ARBITRATION UNDER ANNEX VII OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

MAURITIUS

v.

UNITED KINGDOM

PRELIMINARY OBJECTIONS TO JURISDICTION

SUBMITTED BY

THE UNITED KINGDOM

VOLUME II

ANNEXES

21 December 2012

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British Overseas Territories Law

Ian Hendry _{and} Susan Dickson

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British Antarctic Territory Order 1989 enables courts established by Ordinance to sit within the Territory or in the United Kingdom or 'any other colony' with the concurrence of the Governor of such colony. By virtue of the Falkland Islands Courts (Overseas Jurisdiction) Order 1989,⁴³ the Supreme Court and Magistrate's Court of the Falkland Islands respectively have jurisdiction to hear and determine any civil or criminal proceedings in respect of matters arising under the law of the British Antarctic Territory which are within the jurisdiction of the Supreme Court or the Magistrate's Court of the Territory. Local magistrates are appointed from among the British Antarctic Survey personnel serving at the scientific stations in the Territory.

There is a Court of Appeal for the Territory, established by Order in Council, which may sit outside the Territory.⁴⁴ Final appeal lies to the Judicial Committee of the Privy Council.⁴⁵

Law

The statute law in force in the British Antarctic Territory mainly comprises Ordinances enacted by the Commissioner and instruments made under them. These local laws are supplemented by certain Acts of the United Kingdom Parliament and Orders in Council that have been extended to the Territory. The incorporation of English statutes, common law and rules of equity is provided for in detail in sections 5 and 6 of the Administration of Justice Ordinance 1990.⁴⁶

Economy

The main source of income is the sale of postage stamps and local tax paid by overwintering scientists. Tourism is a growing industry, mostly ship-based. The currency is the pound sterling.

BRITISH INDIAN OCEAN TERRITORY

The British Indian Ocean Territory is a group of islands lying about 1,770 kilometres east of Mahe in Seychelles. It comprises the following islands, known collectively as the Chagos Archipelago: Diego Garcia; Egmont or Six Islands; Peros Banhos; Salomon Islands; Three Brothers Islands; Nelson or Legour Island; Eagle Islands; and Danger Islands.⁴⁷ While the Territory covers about 54,400 square kilometres of sea, the total land area is 60 square kilometres, the largest island, Diego

⁴³ SI 1989/2399, as amended by SI 2009/1737.

⁴⁴ British Antarctic Territory Court of Appeal Order 1965 (SI 1965/590, as amended by SI 1989/2399).

⁴⁵ British Antarctic Territory Court of Appeal (Appeal to Privy Council) Order 1965 (SI 1965/592, as amended by SI 2009/224).

⁴⁶ Laws of the British Antarctic Territory, Ordinance No 5 of 1990.

⁴⁷ British Indian Ocean Territory (Constitution) Order 2004 (see n 58 below) s 2(2) and sch.

Garcia, being 44 square kilometres. The Territory was constituted and is set aside for the defence purposes of the United Kingdom and the United States of America,⁴⁸ and has no permanent population. The temporary inhabitants are the armed forces at the United States defence facility on Diego Garcia, civilian employees of contractors to the United States military, and a small Royal Navy contingent. All of these reside on Diego Garcia, the other islands (sometimes called 'the outer islands') being uninhabited. Mauritius has asserted a sovereignty claim to the Territory since 1980. While the United Kingdom rejects this claim, successive British Governments have given undertakings to the Government of Mauritius that the Territory will be ceded to Mauritius when it is no longer required for defence purposes.⁴⁹

History

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The islands of the Chagos Archipelago were charted by Vasco da Gama in the early sixteenth century, and Portuguese seafarers named the archipelago and some of the atolls. The islands were administered by France from Mauritius during the late eighteenth century. France ceded the islands to the United Kingdom, along with Mauritius and Seychelles, by the Treaty of Paris, 1814.⁵⁰ They were administered as a dependency of the colony of Mauritius until 1965 when, with the agreement of the Mauritius Council of Ministers, they were detached to form the major part of a new colony called the British Indian Ocean Territory. The United Kingdom Government paid the Government of Mauritius £3 million in consideration of the detachment of the islands. Three other island groups,⁵¹ previously part of the colony of Seychelles, made up the Territory as originally constituted,⁵² but these were returned to Seychelles when that country became independent in 1976.⁵³

The new colony was established for the defence purposes of the United Kingdom and the United States, as provided for in an Exchange of Notes between their two Governments of 30 December 1966.⁵⁴ This agreement is expressed to last for 50 years, followed by a further period of 20 years unless, not more than two years before the end of the 50 year period, notice of termination has been given by either Government, in which case it shall terminate two years after the date of such notice.⁵⁵ Further Exchanges of Notes were concluded between the United Kingdom and United States Governments on 24 October 1972 and 25 February 1976 relating to the United States naval facility on Diego Garcia.⁵⁶

⁴⁸ British Indian Ocean Territory (Constitution) Order 2004 s 9(1).

⁴⁹ UK White Paper 'Partnership for Progress and Prosperity, Britain and the Overseas Territories' (Cm 4264) p 51.

⁵⁰ State Papers vol 1 pt 1 p 151.

⁵¹ The Farquar Islands, the Aldabra Group and the Island of Desroches.

⁵² British Indian Ocean Territory Order 1965 (SI 1965/1920), amended by SI 1968/111. These Orders recited powers granted by the Colonial Boundaries Act 1895 (1895 c 34) as well as prerogative powers.

⁵³ British Indian Ocean Territory Order 1976 (SI 1976/893) s 14. This Order also recited the Colonial Boundaries Act 1895 and prerogative powers.

⁵⁴ UKTS No 15 (1967); Cmnd 3231.

⁵⁵ See paragraph (11).

⁵⁶ UKTS No 126 (1972); Cmnd 5160 and UKTS No 19 (1976); Cmnd 6413. The 1976 agreement replaced the 1972 agreement.

The Chagos islands had been exploited for copra from the late eighteenth century. After emancipation in the nineteenth century the former slaves on the islands became contract employees working the copra plantations, and some chose to remain on the islands, having children who also stayed there. Following the 1966 Exchange of Notes, in 1967 the Crown purchased the freehold title to all land in the islands that was not already Crown land. The copra plantations were run down as they had become commercially unviable. The plantation workers were progressively relocated, mostly to Mauritius and Seychelles, and the last of them left the Territory in 1973. The United Kingdom Government paid the Government of Mauritius £650,000 in 1973, and a further £4 million in 1982 into a Trust Fund, to assist in the resettlement of the workers in Mauritius. Attempts by the former inhabitants, originally called 'Ilois' but now more commonly called 'Chagossians', to win the right to return to the islands or to obtain further compensation in the English courts have been ultimately unsuccessful.⁵⁷

Status

The British Indian Ocean Territory is a British overseas territory, the islands comprising which were acquired by cession. The government of the Territory is provided for by Royal prerogative powers.

Constitution

The current Constitution of the Territory is set out in the British Indian Ocean Territory (Constitution) Order 2004.⁵⁸ This establishes the office of Commissioner, who is appointed by the Queen. In practice the office of Commissioner is held by a senior official in the Foreign and Commonwealth Office. The Commissioner exercises executive powers, may constitute offices for the Territory and make appointments to such offices. In practice the Commissioner is assisted by an Administrator, resident in London, and by the Commissioner's Representative, who is the officer in charge of the Royal Navy contingent on Diego Garcia.

The Commissioner may make laws for the peace, order and good government of the Territory. Exceptionally, section 10(2) of the Order declares, without prejudice to the generality of the provision granting legislative power and 'for the avoidance of doubt', that

the Commissioner may make any such provision as he considers expedient for or in connection with the administration of the Territory, and no such provision shall be deemed to be invalid

⁵⁷ See R (Bancoult) v Secretary of State for Foreign and Commonwealth Affairs [2001] QB 1067; Chagos Islanders v Attorney General [2003] EWHC 2222 (QB); [2003] All ER (D) 166; R (Bancoult) vSecretary of State for Foreign and Commonwealth Affairs (No 2) [2008] UKHL 61, [2009] 1 AC 453 (HL). The history is recounted most comprehensively and authoritatively, on the basis of extensive documentary and oral evidence, in the judgment of Ouseley J in Chagos Islanders v Attorney General (above).

⁵⁸ This is a prerogative Order, and therefore not a statutory instrument. It was published in the (2004) 36(1) British Indian Ocean Territory Official Gazette. For convenience it is reproduced at pp 305–10 below.

except to the extent that it is inconsistent with the status of the Territory as a British overseas territory or with this Order or with any other Order of Her Majesty in Council extending to the Territory or otherwise as provided by the Colonial Laws Validity Act 1865.

Any law made by the Commissioner may be disallowed by Her Majesty through a Secretary of State. Power to legislate for the Territory by Order in Council is reserved in unusual detail, and power is also expressly reserved to Her Majesty to amend or revoke the 2004 Order.⁵⁹

The 2004 Order also expressly provides in section 9:

- (1) Whereas the Territory was constituted and is set aside to be available for the defence purposes of the Government of the United Kingdom and the Government of the United States of America, no person has the right of abode in the Territory.
- (2) Accordingly, no person is entitled to enter or be present in the Territory except as authorised by or under this Order or any other law for the time being in force in the Territory.⁶⁰

Courts

The Territory has a Supreme Court and a Magistrates' Court established by Ordinance.⁶¹ The Supreme Court consists of a Chief Justice, and the British Indian Ocean Territory (Constitution) Order 2004 makes provision for the Court to sit in the United Kingdom 'as the Chief Justice may direct'.⁶² There is a legally qualified, but non-resident, Senior Magistrate, and the officer in charge of the Royal Navy component on Diego Garcia is in practice appointed as a local magistrate.

The Territory has a Court of Appeal, established by Order in Council.⁶³ Final appeal lies to the Judicial Committee of the Privy Council.⁶⁴

Law

The statute law in force in the British Indian Ocean Territory comprises Ordinances made by the Commissioner and instruments made under them, and certain Acts of the United Kingdom Parliament and Orders in Council that have been extended to

⁵⁹ See s 15. The detail of these provisions, and the exceptional provision in s 10(2), were occasioned by the judgment in *R* (*Bancoult*) v Secretary of State for Foreign and Commonwealth Affairs [2001] QB 1067, which had held that the power to legislate for 'peace, order and good government' was not unlimited, a finding later overruled by the House of Lords in *R* (*Bancoult*) v Secretary of State for Foreign and Commonwealth Affairs (No 2) [2008] UKHL 61, [2009] 1 AC 453 (HL).

 60 The validity of this section was challenged, and upheld by the majority in the House of Lords, in R (Bancoult) v Secretary of State for Foreign and Commonwealth Affairs (No 2) [2008] UKHL 61, [2009] 1 AC 453 (HL).

⁶¹ Courts Ordinance 1983, Parts II and III (Laws of the British Indian Ocean Territory, Ordinance No 3 of 1983).

⁶² See s 13(4) and (5)-(8).

⁶³ British Indian Ocean Territory (Court of Appeal) Order 1976 (published in SI 1976, II, p 3815).

⁶⁴ British Indian Ocean Territory (Appeals to Privy Council) Order 1983 (SI 1983/1888, as amended by SI 2009/224).

the Territory. The incorporation of English statutes, common law and rules of equity is provided for in detail by sections 3 to 5 of the Courts Ordinance 1983.⁶⁵

Economy

There are no commercial, industrial or agricultural activities in the Territory, the population being solely military personnel and people employed to support the defence facility. The currency in use is the US dollar.

BRITISH INDIAN OCEAN TERRITORY (CONSTITUTION) ORDER 2004

At the Court at Buckingham Palace

THE 10th DAY OF JUNE 2004

PRESENT,

THE QUEEN'S MOST EXCELLENT MAJESTY

IN COUNCIL

Her Majesty, by virtue and in exercise of all the powers in Her Majesty vested, is pleased, by and with the advice of Her Privy Council, to order, and it is hereby ordered, as follows:—

Citation and Commencement

1. This Order may be cited as the British Indian Ocean Territory (Constitution) Order 2004 and shall come into force forthwith.

Interpretation

2.-(1) The Interpretation Act 1978 shall apply, with the necessary modifications, for the purpose of interpreting this Order, and otherwise in relation thereto, as it applies for the purpose of interpreting, and otherwise in relation to, Acts of Parliament.

(2) In this Order, unless the contrary intention appears—

'the Commissioner' means the Commissioner for the Territory and includes any person for the time being lawfully performing the functions of the office of Commissioner;

⁶⁵ Laws of the British Indian Ocean Territory, Ordinance No 3 of 1983. These provisions need to be read with section 3(2) of the British Indian Ocean Territory (Constitution) Order 2004.

'the Gazette' means the Official Gazette of the Territory; 'the Territory' means the British Indian Ocean Territory specified in the Schedule.

Revocation

3.— (1) The British Indian Ocean Territory Orders 1976 to 1994 ('the existing Orders') are revoked.

(2) Without prejudice to the generality of sections 15, 16 and 17 of the Interpretation Act 1978 (as applied by section 2(1) of this Order)—

- (a) the revocation of the existing Orders does not affect the continuing operation of any law made, or having effect as if made, under the existing Orders and having effect as part of the law of the Territory immediately before the commencement of this Order; but any such law shall thereafter, without prejudice to its amendment or repeal by any authority competent in that behalf, have effect as if made under this Order and be construed with such modifications, adaptations, qualifications and exceptions as may be necessary to bring it into conformity with this Order;
- (b) the revocation of the existing Orders does not affect the continuing validity of any appointment made, or having effect as if made, or other thing done, or having effect as if done, under the existing Orders and having effect immediately before the commencement of this Order; but any such appointment made or thing done shall, without prejudice to its revocation or variation by any authority competent in that behalf, continue to have effect thereafter as if made or done under this Order.

Establishment of Office of Commissioner

4.—(1) There shall be a Commissioner for the Territory who shall be appointed by Her Majesty by instructions given through a Secretary of State and who shall hold office during Her Majesty's pleasure.

(2) During any period when the office of Commissioner is vacant or the holder thereof is for any reason unable to perform the functions of his office those functions shall, during Her Majesty's pleasure, be assumed and performed by such person as Her Majesty may designate in that behalf by instructions given through a Secretary of State.

Powers and Duties of Commissioner

5. The Commissioner shall have such powers and duties as are conferred or imposed on him by or under this Order or any other law and such other functions as Her Majesty may from time to time be pleased to assign to him and, subject to the provisions of this Order and of any other law, shall do and execute all things that belong to his office according to such instructions, if any, as Her Majesty may from time to time see fit to give him.

Official Stamp

6. There shall be an Official Stamp for the Territory which the Commissioner shall keep and use for stamping all such documents as may be required by any law to be stamped therewith.

Constitution of Offices

7. The Commissioner, in Her Majesty's name and on Her Majesty's behalf, may constitute such offices for the Territory as may lawfully be constituted by Her Majesty and, subject to the provisions of any law for the time being in force in the Territory and to such instructions as may from time to time be given to him by Her Majesty through a Secretary of State, the Commissioner may likewise—

- (a) make appointments, to be held during Her Majesty's pleasure, to any office so constituted; and
- (b) terminate any such appointment, or dismiss any person so appointed or take such other disciplinary action in relation to him as the Commissioner may think fit.

Concurrent Appointments

- 8. Whenever the substantive holder of any office constituted by or under this Order is on leave of absence pending relinquishment of his office—
 - (a) another person may be appointed substantively to that office; and
 - (b) that person shall, for the purposes of any functions attaching to that office, be deemed to be the sole holder of that office.

No Right of Abode in the Territory

9.—(1) Whereas the Territory was constituted and is set aside to be available for the defence purposes of the Government of the United Kingdom and the Government of the United States of America, no person has the right of abode in the Territory.

 \cdot (2) Accordingly, no person is entitled to enter or be present in the Territory except as authorised by or under this Order or any other law for the time being in force in the Territory.

Commissioner's Powers to Make Laws

10. -(1) Subject to the provisions of this Order, the Commissioner may make laws for the peace, order and good government of the Territory.

(2) It is hereby declared, without prejudice to the generality of subsection (1) but for the avoidance of doubt, that, in the exercise of his powers under subsection (1), the Commissioner may make any such provision as he considers expedient for or in connection with the administration of the Territory, and no such provision shall be deemed to be invalid except to the extent that it is inconsistent with the status of the Territory as a British overseas territory or with this Order or with any other Order of Her Majesty in Council extending to the Territory or otherwise as provided by the Colonial Laws Validity Act 1865.

(3) All laws made by the Commissioner in exercise of the powers conferred by subsection (1) shall be published in the *Gazette* in such manner as the Commissioner may direct.

(4) Every law made by the Commissioner under subsection (1) shall come into force on the date on which it is published in accordance with subsection (3) unless it is provided, either in that law or in some other such law, that it shall come into operation on some other date, in which case it shall come into force on that other date.

Disallowance of Laws

11.—(1) Any law made by the Commissioner in exercise of the powers conferred on him by this Order may be disallowed by Her Majesty through a Secretary of State.

(2) Whenever any law has been disallowed by Her Majesty, the Commissioner shall cause notice of the disallowance to be published in the *Gazette* in such manner as he may direct, and the law shall be annulled with effect from the date of that publication.

(3) Section 16(1) of the Interpretation Act 1978 shall apply to the annulment of a law under this section as it applies to the repeal of an Act of Parliament, save that a law repealed or amended by or in pursuance of the annulled law shall have effect as from the date of the annulment as if the annulled law had not been made.

Commissioner's Powers of Pardon, etc

12. The Commissioner may, in Her Majesty's name and on Her Majesty's behalf-

- (a) grant to any person concerned in or convicted of any offence against the law of the Territory a pardon, free or subject to lawful conditions; or
- (b) grant to any person a respite, either indefinite or for a specified period, of the execution of any sentence passed on that person for any such offence; or
- (c) substitute a less severe form of punishment for any punishment imposed by any such sentence; or
- (d) remit the whole or any part of any such sentence or of any penalty or forfeiture otherwise due to Her Majesty on account of any such offence.

Courts and Judicial Proceedings

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13.—(1) Without prejudice to the generality of section 3(2), all courts established for the Territory by or under a law made under the existing Orders and in existence immediately before the commencement of this Order shall continue in existence thereafter as if established by or under a law made under this Order.

(2) All proceedings that, immediately before the commencement of this Order, are pending before any such court may be continued and concluded before that court thereafter.

(3) Without prejudice to the generality of section 3(2), the provisions of any law in force in the Territory as from the commencement of this Order that relate to the enforcement of decisions of courts established for the Territory or to appeals from such decisions shall apply to such decisions given before the commencement of this Order in the same way as they apply to such decisions given thereafter.

(4) The Supreme Court may, as the Chief Justice may direct, sit in the United Kingdom and there exercise all or any of its powers or jurisdiction in any civil or criminal proceedings.

(5) Subject to subsection (6), the Chief Justice may make a direction under subsection (4) where it appears to him, having regard to all the circumstances of the case, that to do so would be in the interests of the proper and efficient administration of justice and would not impose an unfair burden on any party to the proceedings.

(6) A direction under subsection (4) may be made at any stage of the proceedings or when it is sought to institute the proceedings and may be made on the application of any party to the proceedings or of any person who seeks to be or whom it is sought to make such a party or of the Chief Justice's own motion.

(7) Subject to any law made under section 10 (and without prejudice to the operation of section 3(2)), the Chief Justice may make rules of court for the purpose of regulating the practice and procedure of the Supreme Court with respect to the exercise of the Court's powers and jurisdiction in the United Kingdom.

(8) Without prejudice to the operation of section 3(2), a sub-registry may be established in the United Kingdom for the filing, sealing and issue of such documents relating to proceedings in the Supreme Court (whether or not they are proceedings in which the Court exercises its powers and jurisdiction in the United Kingdom) as may be prescribed by rules of court made by the Chief Justice.

(9) Anything done in the United Kingdom by virtue of subsections (4) to (8) shall have, and have only, the same validity and effect as if done in the Territory.

(10) In this section, 'the Supreme Court' means the Supreme Court of the Territory as established by or under a law made, or having effect as if made, under section 10 and 'the Chief Justice' means the Judge (or, if there is more than one, the presiding Judge) of that Court.

Disposal of Land

14. Subject to any law for the time being in force in the Territory and to any instructions given to the Commissioner by Her Majesty through a Secretary of State, the Commissioner, in Her Majesty's name and on Her Majesty's behalf, may make and execute grants and dispositions of any land or other immovable property within the Territory that may lawfully be granted or disposed of by Her Majesty.

Powers Reserved to Her Majesty

15.—(1) There is hereby reserved to Her Majesty full power to make laws for the peace, order and good government of the Territory, and it is hereby declared, without prejudice to the generality of that expression but for the avoidance of doubt, that—

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- (a) any law made by Her Majesty in the exercise of that power may make any such provision as Her Majesty considers expedient for or in connection with the administration of the Territory; and
- (b) no such provision shall be deemed to be invalid except to the extent that it is inconsistent with the status of the Territory as a British overseas territory or otherwise as provided by the Colonial Laws Validity Act 1865.

(2) Without prejudice to the generality of the power to make laws reserved to Her Majesty by subsection (1), any such law may make such provision as Her Majesty considers expedient for the purposes for which the Territory was constituted and is set aside, and accordingly and in particular, to give effect to section 9(1) and to secure compliance with section 9(2), including provision for the prohibition and punishment of unauthorised entry into, or unauthorised presence in, the Territory, for the prevention of such unauthorised entry and the removal from the Territory of persons whose presence in the Territory is unauthorised, and for empowering public officers to effect such prevention or, as the case may be, such removal (including by the use of such force as is reasonable in the circumstances).

(3) In this section—

- (a) 'public officer' means a person holding or acting in an office under the Government of the Territory; and
- (b) for the avoidance of doubt, references in this section to the prevention of unauthorised entry into the Territory include references to the prevention of entry into the territorial sea of the Territory with a view to effecting such unauthorised entry and references to the removal from the Territory of persons whose presence there is unauthorised include references to the removal from the territorial sea of the Territory of persons who either have effected an unauthorised entry into the Territory or have entered the territorial sea with a view to effecting such an unauthorised entry.

(4) There is hereby reserved to Her Majesty full power to amend or revoke this Order.

THE SCHEDULE

Section 2(2)

Diego Garcia

Egmont or Six Islands

Peros Banhos

Salomon Islands

Three Brothers Islands Nelson or Legour Island Eagle Islands Danger Islands

EXPLANATORY NOTE

(This note is not part of the Order)

This Order makes new provision for the Constitution and administration of the British Indian Ocean Territory.

CAYMAN ISLANDS

The Cayman Islands consist of three islands, Grand Cayman, Cayman Brac and Little Cayman, and are situated in the Caribbean Sea. The largest island, Grand Cayman, with the capital George Town, lies approximately 320 kilometres northwest of Jamaica and 240 kilometres south of Cuba. Together the three islands cover an area of around 260 square kilometres. The population is 57,000 (2008 estimate). The name 'Cayman' (originally 'Caymanas') comes from the Carib word for the marine crocodiles once found on the islands' shores. The islands were originally called Las Tortugas after the 'tortoises', in fact turtles, spotted by the first sailors which appeared to them like little rocks in the water. At one stage soon after their discovery, the islands also appear to have been called 'Lagortas' but this was replaced by Caymanas by 1530.⁶⁶

History

Christopher Columbus discovered the Cayman Islands in 1503 during his fourth and last voyage when he was searching for a route to India,⁶⁷ and he was probably heading for Hispaniola. They appear to have remained unsettled for many years, but an Anglo-French treaty of 1686 which granted permission to French fishermen to catch turtles in Cayman waters shows that the islands were already considered to be under British occupation at that time. It appears that significant settlement began in the eighteenth century with the first record of a grant of Crown land being recorded in 1734. Cayman Brac and Little Cayman were not permanently populated until 1833. The islands have almost from the outset had a close connection with Jamaica. At first they were administered by Justices of the Peace appointed by the Governor of Jamaica and then in 1832 the government was expanded to include elected members, known as 'Vestrymen'. The Cayman Islands Act 186368 gave the Governor, legislature and courts of Jamaica extensive powers in relation to the Cayman Islands, and in effect gave the Governor the same powers in relation to the Cayman Islands as if they had been part of Jamaica. Unlike the Turks and Caicos Islands, they were never annexed to, and made part of, Jamaica, but were instead a dependency of it. But the legislature of Jamaica had the power to make laws for the peace, order and good government of the islands. Under the 1863 Act the Justices of the Peace and Vestrymen were permitted to continue to legislate but the Governor of Jamaica had to assent to any such legislation. Locally, from 1957 to 1962, the Islands were governed by a Commissioner,⁶⁹ who was selected by the Secretary of State and appointed by and acted under the authority of the Governor of Jamaica. The Commissioner, as President, together with the Justices of the Peace and the Vestrymen.⁷⁰ formed the legislature of the islands. It was as a dependency

⁶⁶ See Cayman Islands Government website at www.gocayman.ky/history.html.

⁶⁷ Hansard, HC Deb 21 January 1958 vol 580 cc 907-24, 907.

⁶⁸ 1863 c 31.

⁶⁹ The first Commissioner was Frederick Sanguinetti, an official of the Jamaican Government.

⁷⁰ The Vestrymen numbered 27 in 1957.

of Jamaica that the Islands became part of the Federation of the West Indies in 1957. The Cayman Islands and Turks and Caicos Islands Act 1958⁷¹ repealed the 1863 Act, and separated the Cayman Islands from Jamaica. However, the powers under the 1958 Act were exercised in 1959 to provide for the Cayman Islands to continue to be governed from Jamaica, and the Cayman Islands remained within the Federation of the West Indies under the umbrella of Jamaica until the West Indies Act 1962⁷² was used to dissolve the Federation in that year. When Jamaica obtained independence from the United Kingdom in 1962, the Jamaica Independence Act 1962⁷³ made clear that 'Jamaica' did not include the Cayman Islands, and since 1962 the Cayman Islands have been administered as a separate territory.

Status

The Cayman Islands are a British overseas territory, acquired by settlement. But they are not a British settlement for the purposes of the British Settlements Acts 1887 and 1945,⁷⁴ having been brought under the jurisdiction of the legislature of Jamaica by the Cayman Islands Act 1863.⁷⁵ The current power to provide for the government of the Cayman Islands by Order in Council is conferred by the West Indies Act 1962.⁷⁶ The official language of the Cayman Islands, provided for in the Constitution, is English.⁷⁷

Constitution

The Cayman Islands Constitution is contained in Schedule 2 to the Cayman Islands Constitution Order 2009.⁷⁸ With the exception of Part I, dealing with Fundamental Rights, Freedoms and Responsibilities, which has a later entry into force date, the Constitution came into force on 6 November 2009.⁷⁹ It was the result of several years of negotiations between representatives of the Cayman Islands, including from the Government and Opposition, the Human Rights Committee,⁸⁰ the churches and civil society, and representatives of the British Government. For the first time, the Cayman Islands Constitution contains a Bill of Rights, Freedoms and Responsibilities for the people of the islands, enforceable in the Grand Court.

⁷¹ 1958 c 13.

⁷⁴ 1887 c 54 and 1945 c 7.

⁷⁵ 1863 c 31.

⁷⁶ 1962 c 19.

⁷⁷ See Cayman Islands Constitution (SI 2009/1379) s 123.

⁷⁸ SI 2009/1379.

⁷⁹ In accordance with section 4(2) of the Constitution Order, the Bill of Rights, Freedoms and Responsibilities contained in Part I of the Constitution will come into force three years after the Constitution comes into force (ie on 6 November 2012), with the exception of section 6(2) and (3) thereof concerning certain rights of prisoners, which will come into force one year after that (ie on 6 November 2013).

⁸⁰ Under the 2009 Constitution, the Human Rights Committee was replaced by the Human Rights Commission: see s 116(5).

⁷² 1962 c 19.

⁷³ 1962 c 40.

The Queen is represented in the islands by the Governor who is assisted by a Deputy Governor. The Deputy Governor must be a Caymanian.⁸¹ There is a Cabinet and a Legislative Assembly and political parties.

The executive authority of the islands is vested in Her Majesty the Queen. This authority is exercised on behalf of Her Majesty by the Government of the Cayman Islands which consists of the Governor and the Cabinet, and may be exercised directly by them or through public officers. The Governor presides at Cabinet meetings, which entitles him or her to participate fully in them. The Governor has special responsibility for the conduct of the business of government with respect to defence, external relations, internal security (including the police), the appointment, dismissal and discipline of public officers and, subject to financial constraints, application of their terms and conditions of employment and the organisation of the public service. In the field of external relations the Governor may not conclude any international agreement that would affect internal policy or require to be implemented by local legislation without first obtaining the agreement of the Cabinet unless he or she is instructed to do otherwise by a Secretary of State. The Governor must also, acting after consultation with the Premier, assign or delegate to the Premier or another Minister responsibility for defined aspects of external affairs.⁸² The Governor's responsibility for internal security and the police is without prejudice to the role of the National Security Council established by the Constitution. Other matters not specifically reserved to the Governor are devolved to Ministers, subject to the occasions specified (in the Constitution or other laws) on which the Governor is not required to act on the advice of Ministers, including when so instructed through a Secretary of State and when such advice would adversely affect the Governor's special responsibilities.

The Cabinet consists of the Premier and six other Ministers,⁸³ one of whom is the Deputy Premier, together with the Deputy Governor and the Attorney General, both of whom are ex officio members. A local law may increase the number of Ministers so long as that number never exceeds two-fifths of the total number of elected members of the Legislative Assembly. The Cabinet has responsibility for the formulation and implementation of policy as it relates to every aspect of government except matters for which the Governor has special responsibility under the Constitution. The Cabinet is collectively responsible to the Legislative Assembly for its policies and their implementation.

The Governor appoints as Premier the elected member of the Legislative Assembly recommended by a majority of the elected members who are members of the party which gains the majority of the seats of elected members of the Assembly. Where no party gains such a majority, or there is no recommendation, the Speaker organises a ballot among the elected members and the Governor appoints as Premier the person who obtains a majority of the votes of those members. A person may not

⁸¹ The term 'Caymanian' has the meaning ascribed to it in the laws of the Cayman Islands for the time being in force: see Constitution s 124(1). In general, Caymanians are those most closely connected with the Islands, often, but not exclusively, by birth.

⁸² See further ch 13 above.

 $^{^{83}}$ Until the Legislative Assembly is next dissolved after the commencement of the Constitution, the maximum number of other Ministers is four: see Constitution Order s 4(3)(a).

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be appointed as Premier for more than two consecutive parliamentary terms unless at least one parliamentary term has expired since he or she last held office. The maximum parliamentary term is four years. Other Ministers, including the Deputy Premier, are appointed by the Governor acting on the advice of the Premier. There is a Leader of the Opposition appointed by the Governor. The Governor appoints as Leader of the Opposition the person recommended by a majority of the elected members of the Assembly who are members of any opposition political party whose numerical strength is greater than any other opposition political party. If it appears to the Governor that there is no such party but there is an elected members of the Assembly in opposition to the Government, the Governor will appoint that person. If there is no such person, the Governor will appoint the person who in his or her opinion would be acceptable to the greatest number of members of the Assembly in opposition to the Government.

The Legislature consists of Her Majesty and the Legislative Assembly. The Legislative Assembly consists of the Speaker, 18 elected members⁸⁴ and two ex officio members, the Deputy Governor and the Attorney General. The ex officio members are not entitled to vote, and the Speaker only has a casting vote. The elected members of the Assembly are elected in accordance with local legislation on elections. The Speaker is elected by the elected members of the Assembly from among the elected members or persons who are qualified to be elected as members, other than Ministers. The Deputy Speaker is elected by the elected members of the Assembly from among the elected members of the Assembly Speaker is elected by the elected members of the Assembly from among the elected members of the Assembly from an of the Assembly from among the elected members of the Assembly from among the elected members of the Assembly from among the elected members of the Assembly fro

The Legislature has power, subject to the Constitution, to make laws for the peace, order and good government of the Cayman Islands. To become law Bills passed by the Legislative Assembly require the assent of Her Majesty or the Governor on Her behalf. Subject to any instructions, the Governor may assent or refuse assent to a Bill, or reserve it for the signification of Her Majesty's pleasure, but is required to reserve certain Bills unless he or she has been authorised by a Secretary of State to assent to them. Laws to which the Governor has assented may be disallowed by Her Majesty through a Secretary of State, but the Legislative Assembly must be given time to reconsider a law, with an explanation of the difficulties perceived by the Secretary of State, before disallowance. The Governor has a reserved legislative power with respect to, or in the interests of, matters for which he or she has special responsibility. Power is reserved to Her Majesty to legislate by Order in Council for the peace, order and good government of the Cayman Islands.

The constitution also contains provisions relating to the public service, and establishes a Judicial and Legal Services Commission and 'institutions supporting democracy', namely a Human Rights Commission, a Commission for Standards in Public Life, a Constitutional Commission, a Complaints Commissioner and a Register of Interests.

⁸⁴ Until the Legislative Assembly is next dissolved after commencement, the number of elected members is 15: see Constitution Order s 4(3)(c). Thereafter a local law may, subject to specified conditions, increase the number of elected members: see Cayman Constitution s 60(2), read with Constitution Order s 4(3)(d).

Courts

The Constitution establishes a Grand Court and a Court of Appeal for the Cayman Islands. The Grand Court, which is the superior court of first instance, consists of a Chief Justice and such number of other judges (if any) as may be prescribed by a local law. The Court of Appeal consists of a President and not less than two Justices of Appeal, and usually sits for three sessions of three weeks each year.

The Constitution also provides for courts subordinate to the Grand Court to be established by local law and gives the Grand Court jurisdiction to supervise the proceedings of such courts. A Summary Court, presided over by a magistrate, has been established by local law.⁸⁵ The Summary Court also sits as the Coroner's Court with a magistrate sitting as the coroner with a jury.

Final appeal lies to the Judicial Committee of the Privy Council. Appeals to the Privy Council are provided for in a separate Order in Council,⁸⁶ apart from the final right of appeal in fundamental rights cases brought under the Constitution.87

Law

Most law in force in the Cayman Islands is constituted by legislation, called Laws, enacted by the local Legislature of the Cayman Islands, and subordinate legislation made under such Laws. The local legislation is supplemented by certain Acts of the United Kingdom Parliament and Orders in Council (including the Constitution) that have been extended to the Islands. United Kingdom legislation which has not been extended to the Islands may be incorporated by local law and English common law forms part of the law of the Cayman Islands.⁸⁸ Certain Jamaican laws may still be in force by virtue of the Cayman Islands Act 1863 and successive provisions preserving the force of existing laws.89

Economy

The economy is based on tourism, banking and international finance with several hundred banks having a presence there. The main income source of the islanders therefore comes from the service industry. Although the Cayman Islands have one of the highest standards of living in the world, almost all of its food and consumer goods have to be imported. The Cayman Islands use Cayman Islands dollars, tied to the US dollar at US\$1.00=CI\$0.80, but US dollars are also widely used on the islands.

⁸⁵ Summary Jurisdiction Law (Laws of the Cayman Islands, Law 10 of 1975 (2006 Revision)).

⁸⁶ Cayman Islands (Appeals to Privy Council) Order 1984 (SI 1984/1151, as amended by SI 2009/224 and 2009/3206).

⁸⁷ See s 26(3).
⁸⁸ See eg Penal Code (Laws of the Cayman Islands, Law 12 of 1975 (2007 Revision)) s 2(a).

Regional Integration

The Cayman Islands are an associate member of the Caribbean Community (CARICOM) and are a member or associate member of a number of other Caribbean regional organisations.

FALKLAND ISLANDS

The Falkland Islands are an archipelago consisting of around 750 islands situated in the South Atlantic approximately 650 kilometres from the south-eastern tip of South America and 770 kilometres north-east of Cape Horn. They have a total land area of approximately 12,000 square kilometres. The two main islands are East Falkland, where the capital, Stanley, is situated, and West Falkland. All land outside of Stanley is referred to as 'Camp', which derives from the Spanish for countryside (*campo*). The local population is 2,478 (2006 census). There is also a substantial garrison of British armed forces and civilian support staff.

History

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The first recorded sighting of the Falkland Islands was in 1592 by the English explorer John Davis, captain of the ship Desire, and the first recorded English landing was made in 1690 by Captain John Strong, who named the channel dividing the two main islands 'Falkland Sound' after Viscount Falkland who was at that time the Treasurer of the Royal Navy. In 1764 a French settlement was established at Port Louis on East Falkland by Louis Antoine de Bougainville and formal possession was taken of the Islands on behalf of the French King, Louis XV. In 1765 Captain John Byron led an expedition on behalf of the British Admiralty which landed at Port Egmont on West Falkland; he took possession of it and of 'all the neighbouring Islands' in the name of the British Crown. In 1766 Captain John McBride led a second expedition, established a settlement at Port Egmont and discovered the French settlement at Port Louis on East Falkland. He warned the French to leave but they refused. Around this time the Spanish became involved and bought the French settlement, renaming it Puerto de la Soledad. It was put under the jurisdiction of the Captain-General of Buenos Aires, which was then a Spanish colony. In June 1770 the Spanish expelled the British from Port Egmont, but it was restored to Britain in 1771 following bilateral negotiations between Britain and Spain. However, in 1774 the British settlers left the Islands as an economy measure, leaving only a plaque recording Britain's continuing sovereignty over them. A Spanish garrison withdrew from Puerto de la Soledad in 1811, leaving the Islands without inhabitants or any form of administration. The Government of Buenos Aires declared its independence from Spain in 1816. In 1820 an American national, Jewett, landed at Puerto de la Soledad and claimed possession in the name of the Government of Buenos Aires; he returned to Buenos Aires after a few days and his visit was not followed up with any settlement. The Islands remained without effective government. In 1823 the Buenos Aires Government appointed a Governor to the Islands but he never visited them. In 1826 Louis Vernet, who had apparently been a handicrafts to passing ships. There is development assistance from the United Kingdom. The currency is the New Zealand dollar.

ST HELENA, ASCENSION AND TRISTAN DA CUNHA

St Helena, Ascension and Tristan da Cunha is the name of the British overseas territory that until 2009 was known as 'St Helena and Dependencies'.¹⁴³ It consists of the South Atlantic islands of St Helena, Ascension and, in the Tristan da Cunha Group, Tristan da Cunha, Gough Island, Nightingale Island and Inaccessible Island.

St Helena has an area of 122 square kilometres, and lies 1,930 kilometres from the west coast of Africa and 2,900 kilometres from South America. The population is 4,084 (2008 census). The capital is Jamestown. It is accessible only by sea, by the Royal Mail Ship St Helena, but the construction of an airport has been under discussion for some years.

Ascension covers an area of 90 square kilometres, and lies 1,125 kilometres north-west of St Helena. The population is about 880, around 90 per cent of them from St Helena, though there are no permanent residents. The temporary inhabitants consist of British and American Air Force personnel, government officials, contract employees of the organisations established on the island, and their families. The administrative centre is Georgetown. Ascension is accessible by air, the United States Government having built Wideawake Airfield on the island during the Second World War.

Tristan da Cunha has an area of 98 square kilometres, and lies 2,173 kilometres south of St Helena and 2,400 kilometres west of Cape Town. The population is 246 (2009). The only settlement is Edinburgh of the Seven Seas. The neighbouring islands of Nightingale and Inaccessible are uninhabited, while a team of South African meteorologists live on Gough Island. The Tristan da Cunha Group is accessible only by sea, and is the most remote inhabited archipelago in the world.

History

St Helena was discovered by the Portuguese navigator Juan de Nova on 21 May 1502. The Portuguese used it as a port of call but kept its existence secret until a British captain, Thomas Cavendish, found it in 1588. It was then visited frequently by English and Dutch ships, and the Dutch formally claimed the island in 1633 but did not occupy it. In 1659 the East India Company took possession of the island and fortified it, authorised by a Charter granted by the Lord Protector, Richard Cromwell. The Dutch captured the island in 1673 but it was recaptured by the English four months later. In the same year a Royal Charter granted by Charles II confirmed the rights of the East India Company, and the Company held the island

¹⁴³ The name change was effected by the St Helena, Ascension and Tristan da Cunha Constitution Order 2009 (SI 2009/1751) s 4(a). This Order established a new constitution for the territory. See also SI 2009/2744, which amends the British Nationality Act 1981 sch 6 to list the territory with its new name.

until it was vested in the Crown by the Government of India Act 1833.¹⁴⁴ Napoleon Bonaparte was exiled on St Helena from 1815 until his death there in 1821.

Ascension was discovered by the Portuguese in 1501 and named by Alphonse d'Albuquerque who found it on Ascension Day 1503. It was uninhabited until a British garrison was stationed there to deny it to the French in 1815, when Napoleon was sent to St Helena. The island remained under Admiralty supervision until it was made a dependency of St Helena by Letters Patent in 1922.¹⁴⁵ This status continued until a new constitution came into force on 1 September 2009.¹⁴⁶

Tristan da Cunha was discovered and named in 1506 by the Portuguese navigator Tristao da Cunha. It was formally claimed by a British garrison stationed there in 1816. After the garrison was withdrawn in 1817 three men, one with his wife and children, chose to remain and founded the colony. The settlers ran the island themselves for over 100 years as an egalitarian community with local de facto leaders, first William Glass and then Peter Green. An Island Council was established in the 1930s and an Administrator was appointed in 1948. All of the islands in the archipelago were made dependencies of St Helena by Letters Patent in 1938.¹⁴⁷ This status continued until a new constitution came into force on 1 September 2009.¹⁴⁸

Status

St Helena, Ascension and Tristan da Cunha now constitute a single British overseas territory under that name, with none of the other islands being dependencies of St Helena.¹⁴⁹ All of the islands were originally colonies acquired by settlement. Ascension and Tristan da Cunha are British settlements for the purposes of the British Settlements Acts 1887 and 1945,¹⁵⁰ and power to provide for their government by Order in Council is conferred by those Acts. St Helena is not a British settlement for the purposes of those Acts, power to provide for its government by Order in Council being conferred by the Saint Helena Act 1833.¹⁵¹

Constitution

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The current Constitution is set out in the Schedule to the St Helena, Ascension and Tristan da Cunha Constitution Order 2009.¹⁵² It was negotiated between representatives of the British Government and the St Helena Legislative Council and the

¹⁴⁵ SRO & SI Rev XX, 552. Superseded by St Helena Order in Council 1956 (SI 1956/414).

- ¹⁴⁶ See n 143 above.
- ¹⁴⁷ SRO & SI Rev XX, 554. Superseded by St Helena Order in Council 1956 (above).
- ¹⁴⁸ See n 143 above.

¹⁵² SI 2009/1751.

¹⁴⁴ 1833 c 85 s 112. Now called the Saint Helena Act 1833: see Statute Law Revision Act 1948 (1948 c 62).

¹⁴⁹ The 2009 Constitution states: 'mindful of the fact that, while separate territories, St Helena, Ascension and Tristan da Cunha form a single territorial grouping under the Crown'; preamble, para (j). The islands are listed as a single British overseas territory in the British Nationality Act 1981, sch 6.

¹⁵⁰ 1887 c 54 and 1945 c 7. ¹⁵¹ 1833 c 85.

Ascension and Tristan da Cunha Island Councils. The three parts of the territory share the same Governor, Attorney General, Supreme Court and Court of Appeal. The Governor is appointed by the Queen, and exercises executive authority in each island on Her behalf. But otherwise the Constitution makes separate provision for the government of each part: Chapter 1 deals with St Helena, Chapter 2 Ascension, and Chapter 3 Tristan da Cunha. Each chapter starts with a common set of 'partnership values', including the rule of law, good government and sound financial management, on which the partnership of each island with the United Kingdom, and the relationship between each of the islands, is to 'continue to be based'. Each chapter then sets out, in similar but not identical terms, a catalogue of fundamental rights and freedoms of the individual, which are enforceable by the superior courts of the territory. Thereafter the three chapters diverge in providing for the government of each part of the territory.

In St Helena, the Governor chairs and is advised by an Executive Council, consisting of five members elected by the Elected Members of the Legislative Council from among their number, and the Chief Secretary, the Financial Secretary and the Attorney General as non-voting ex officio members. Subject to stated exceptions (including Ascension and Tristan da Cunha matters) the Governor must consult and act in accordance with the Council's advice in exercising his or her functions under the Constitution or any other law. The Governor has special responsibility for defence, external affairs, internal security (including the police), defined public service matters, the administration of justice, finance and shipping. The Governor may act against the advice of the Council in cases involving these matters, and when he or she judges that the advice would involve an inconsistency with any of the 'partnership values'. There are no Ministers, and no political parties. Instead there are 'Council Committees' (committees of the Legislative Council), to assist with executive government. Each Committee is chaired by an Elected Member of the Legislative Council, and may consist of Members and non-Members of that Council. The Governor, with the advice of the Executive Council, decides the number of Council Committees and their functions.

The Legislature for St Helena consists of Her Majesty and the Legislative Council. The Legislative Council comprises a Speaker and a Deputy Speaker, twelve Elected Members, and the Chief Secretary, the Financial Secretary and the Attorney General as non-voting ex officio Members. The Legislature has power, subject to the Constitution, to make laws for the peace, order and good government of St Helena. (It therefore has no power to legislate for Ascension or Tristan da Cunha.) To become law Bills passed by the Legislative Council require the assent of Her Majesty or the Governor on Her behalf. The Governor, acting in his or her discretion, must either assent to a Bill or reserve it for the signification of Her Majesty's pleasure, but the Governor must reserve certain Bills unless he or she has been authorised by a Secretary of State to assent to them. Any law to which the Governor has assented may be disallowed by Her Majesty through a Secretary of State. The Governor has no reserved legislative power.

Chapter 1 of the Constitution also makes provision for a Public Accounts Committee, public finance including independent audit, the St Helena public service, and a Complaints Commissioner. In Ascension, the Governor (resident in St Helena) exercises executive power with the assistance of a resident Administrator and an elected Island Council. The Island Council is composed and has such functions in relation to the government of Ascension as may be prescribed by law.¹⁵³ While Ascension shares with St Helena an Attorney General, who is resident on St Helena, the Attorney General is assisted by a Crown Counsel resident on Ascension. Subject to the Constitution the Governor, acting after consultation with the Island Council, may make laws for the peace, order and good government of Ascension. In doing so the Governor is not obliged to act in accordance with the Council's advice, but in any case where the Governor does not do so any Council member has the right to submit his or her views on the matter to a Secretary of State. Any law enacted by the Governor may be disallowed by Her Majesty through a Secretary of State. Chapter 2 also makes provision for the Ascension public service and for public finance including independent audit.

In Tristan da Cunha the Governor (resident in St Helena) exercises executive power with the assistance of a resident Administrator and an elected Island Council. The Island Council is composed and has such functions in relation to the government of Tristan da Cunha as may be prescribed by law.¹⁵⁴ Subject to the Constitution the Governor, acting after consultation with the Island Council, may make laws for the peace, order and good government of Tristan da Cunha. In doing so the Governor is not obliged to act in accordance with the Council's advice, but in any case where the Governor does not do so any Council member has the right to submit his or her views on the matter to a Secretary of State. Any law enacted by the Governor may be disallowed by Her Majesty through a Secretary of State. Chapter 3 also makes provision for the Tristan da Cunha public service and for independent audit of the public accounts.

Power is reserved to Her Majesty to legislate by Order in Council for the peace, order and good government of St Helena, Ascension and Tristan da Cunha.

Courts

The Constitution establishes a Supreme Court of St Helena, consisting of a Chief Justice and such number (if any) of other judges as may be prescribed by law, and a Court of Appeal of St Helena, composed of a President and two or more Justices of Appeal. It provides that these courts are also the Supreme Court and Court of Appeal for Ascension and Tristan da Cunha. Provision is made for these courts to sit within or outside the islands. None of the judges of these courts is resident in the territory, and they visit as necessary. Final appeal lies to the Judicial Committee of the Privy Council.¹⁵⁵

There are separate magistrates' courts for each of the islands, in practice staffed by local lay magistrates. The (legally qualified) Senior Magistrate in the Falkland Islands is also appointed as a magistrate for Ascension. The Constitution establishes

¹⁵³ See Island Government (Ascension) Ordinance 2008 (Laws of Ascension, Ordinance No 7 of 2008).

¹⁵⁴ See Island Council Ordinance 1985 (Laws of Tristan da Cunha, Ordinance No 1 of 1985).

¹⁵⁵ St Helena Court of Appeal (Appeal to Privy Council) Order 1964 (SI 1964/1846, as amended by SI 1990/991, 2009/224 and 2009/3204). See also Constitution ss 24(10), 140(10) and 206(10), conferring a right of appeal in fundamental rights cases.

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separate Judicial Service Commissions for St Helena and Ascension to give binding advice to the Governor on the appointment and removal of magistrates.

Law

Apart from certain Acts of the United Kingdom Parliament and Orders in Council that extend to the territory (or to any part of it), the statute law in force consists of separate laws, called Ordinances, enacted for each of St Helena, Ascension and Tristan da Cunha. The incorporation into the law of St Helena of English statutes, common law and rules of equity is provided for in detail by sections 2 to 5 of the English Law (Application) Ordinance 2005.¹⁵⁶ In turn, the incorporation of St Helena law into the law of Ascension and the law of Tristan da Cunha (including English law incorporated by the St Helena Ordinance of 2005) is provided for by the Application of St Helena Law (Ascension) Ordinance 1987.¹⁵⁸

Economy

In St Helena, the economy is supported by fisheries, agriculture, construction, tourism, and remittances from the many St Helenians working abroad, but about 60 per cent of the employment on the island is in the public service and the United Kingdom provides substantial budgetary aid and development assistance. The currency is the St Helena pound, which has parity with the pound sterling.

Ascension is principally used by the United States Air Force as a missile tracking station, as an intermediate stop for Royal Air Force flights to the Falkland Islands, and by Cable and Wireless, the BBC, the Composite Signals Organisation and the European Space Agency. Most of the temporary inhabitants are employees of these 'User' organisations and their families. There is limited tourism. There is no aid from the United Kingdom. The currency is the St Helena pound.

The economy of Tristan da Cunha relies chiefly on income from crayfishing, the sale of postage stamps and coins, and limited tourism. The island is largely self-sufficient, and there is modest development assistance from the United Kingdom. The currency is the pound sterling.

SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS

The territory of South Georgia and the South Sandwich Islands consists of 'all islands and territories whatsoever between the 20th degree of west longitude and the 50th degree of west longitude which are situated between the 50th parallel of

¹⁵⁶ Laws of St Helena, Ordinance No 10 of 2005.

¹⁵⁷ Laws of Ascension, Ordinance No 4 of 1987.

¹⁵⁸ Laws of Tristan da Cunha, Ordinance No 3 of 1987.



Meeting of States Parties

Distr.: General 20 June 2008

Original: English

Eighteenth Meeting New York, 13-20 June 2008

> Decision regarding the workload of the Commission on the Limits of the Continental Shelf and the ability of States, particularly developing States, to fulfil the requirements of article 4 of annex II to the United Nations Convention on the Law of the Sea, as well as the decision contained in SPLOS/72, paragraph (a)

The Meeting of States Parties,

Recalling the responsibility of all States parties to fulfil in good faith the obligations assumed by them under the United Nations Convention on the Law of the Sea,

Recalling also that the rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or any express proclamation,

Noting the importance of the delineation of the outer limits of the continental shelf beyond 200 nautical miles and that it is in the broader interest of the international community that States with a continental shelf beyond 200 nautical miles submit information on the outer limits of the continental shelf beyond 200 nautical miles to the Commission on the Limits of the Continental Shelf for examination in accordance with article 76 of the Convention,

Recalling the importance of the work of the Commission for coastal States and the international community as a whole,

Mindful of the increasing workload of the Commission owing to an increasing number of submissions and the need to ensure that the Commission can perform its functions under the Convention effectively and maintain its high level of quality and expertise,

Recalling the decision of the eleventh Meeting of States Parties regarding the date of commencement of the 10-year period for making submissions to the Commission set out in article 4 of annex II to the United Nations Convention on the Law of the Sea,¹

¹ SPLOS/72.



Recalling also the decision of the seventeenth Meeting of States Parties to continue to address as a matter of priority issues related to the workload of the Commission, and to take up at the eighteenth Meeting the general issue of the ability of States, particularly developing States, to fulfil the requirements of article 4 of annex II to the Convention, as well as the decision contained in SPLOS/72, paragraph (a),

Recognizing that some coastal States, in particular developing countries, including small island developing States, continue to face particular challenges in submitting information to the Commission in accordance with article 76 of the Convention and article 4 of annex II to the Convention, as well as the decision contained in SPLOS/72, paragraph (a), due to a lack of financial and technical resources and relevant capacity and expertise, or other similar constraints,

1. *Decides* that:

(a) It is understood that the time period referred to in article 4 of annex II to the Convention and the decision contained in SPLOS/72, paragraph (a), may be satisfied by submitting to the Secretary-General preliminary information indicative of the outer limits of the continental shelf beyond 200 nautical miles and a description of the status of preparation and intended date of making a submission in accordance with the requirements of article 76 of the Convention and with the Rules of Procedure² and the Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf;³

(b) Pending the receipt of the submission in accordance with the requirements of article 76 of the Convention and with the Rules of Procedure and the Scientific and Technical Guidelines of the Commission, preliminary information submitted in accordance with subparagraph (a) above shall not be considered by the Commission;

(c) Preliminary information submitted by a coastal State in accordance with subparagraph (a) is without prejudice to the submission in accordance with the requirements of article 76 of the Convention and with the Rules of Procedure and the Scientific and Technical Guidelines of the Commission, and the consideration of the submission by the Commission;

(d) The Secretary-General shall inform the Commission and notify member States of the receipt of preliminary information in accordance with subparagraph (a), and make such information publicly available, including on the website of the Commission;

2. *Encourages* coastal States, where appropriate, to take advantage of available data and opportunities for scientific and technical capacity-building, advice and assistance, including from relevant national, regional and other intergovernmental bodies and organizations, as well as the Commission;

3. *Requests* the Commission to compile a list of publicly available scientific and technical data relevant to the preparation of submissions to the Commission, and to publicize the list, including by posting the list on the website of the Commission;

² CLCS/40/Rev.1.

³ CLCS/11 and Corr.1 and Corr.2; CLCS/11/Add.1 and Corr.1.

4. *Welcomes* the availability on the website of the Commission of information relating to scientific and technical capacity-building, advice and assistance available to coastal States in the preparation of submissions to the Commission;

5. *Calls upon* States parties to contribute voluntarily to the Trust Funds, with a view to facilitating the participation of the members of the Commission from developing States in the meetings of the Commission, as well as to facilitating the preparation of submissions to the Commission on the Limits of the Continental Shelf for developing States, in particular the least developed countries and small island developing States, and compliance with article 76 of the United Nations Convention on the Law of the Sea;

6. *Decides* to take up the issues related to the workload of the Commission at the next Meeting of States Parties under the item "Commission on the Limits of the Continental Shelf: Workload of the Commission".

IN THE NAME of Her Majesty ELIZABETH the Second, by the Grace of God. of the United Kingdom of Great Britain and Northern Ireland and of Her other Realms and Territories, Queen, Head of the Commonwealth, Defender of the Faith.

Official Stamp

WILLIAM NIGEL WENBAN-SMITH, Commissioner.

By William Nigel Wenban-Smith, Commissioner for the British Indian Ocean Territory.

I, William Nigel Wenban-Smith, Commissioner for the British Indian Ocean Territory, acting in pursuance of instructions given by Her Majesty through a Secretary of State do hereby proclaim and declare that—

1. There is established for the British Indian Ocean Territory a fisheries zone contiguous to the territorial sea of the British Indian Ocean Territory.

2. The said fisheries zone has as its inner boundary the outer limits of the territorial sea of the British Indian Ocean Territory and as its seaward boundary a line drawn so that each point on the line is twelve nautical miles from the nearest point on the low-water line on the coast or other baseline from which the breadth of the territorial sea is measured.

3. Her Majesty will exercise the same exclusive rights in respect of fisheries in the said fisheries zone as She has in respect of fisheries in the territorial sea of the British Indian Ocean Territory, subject to such provisions as may hereafter be made by law for the control and regulation of fishing within the said zone.

4. In this Proclamation "the British Indian Ocean Territory" means the islands of the British Indian Ocean Territory set out in the Schedule to this Proclamation.

5. Proclamation No. 1 of 1969 is hereby revoked.

GOD SAVE THE QUEEN

Given at the Foreign and Commonwealth Office, London this 15 day of North 1984.

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SCHEDULE

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The Islands of the British Indian Ocean Territory

The Chagos Archipelago consisting of:

Diego Garcia Egmont or Six Islands Peros Banhos Salomon Islands

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The Brothers Islands Nelson or Legour Island Eagle Islands Danger Island

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THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.11 of 1984.

An Ordinance to make fresh provision for the control of fishing and the taking of marine product within the fishery limits of the British Indian Ocean Territory and for matters incidental thereto and connected therewith.

Arrangement of sections.

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THE BRITISH INDIAN OCEAN TERRITORY

Ordinance No.11 of 1984.

An Ordinance to make fresh provision for the control of fishing and the taking of marine product within the fishery limits of the British Indian Ocean Territory and for matters incidental thereto and connected therewith.

Enacted by the Commissioner for the British Indian Ocean Territory.

1984. W. N. Wenban-Smith.

Commissioner.

Short title 1. This Ordinance may be cited as the Fishery Limits Ordinance, 1984, and shall come into operation on such date as the Commissioner may by commencenotice in the Gazette appoint.

Interpret-2. In this Ordinance unless the context otherwise requires— 'British fishing boat' means a fishing boat registered as such under Part IV of the Merchant Shipping Act 1894 or under any similar provisions superseding the same;

> 'fish' means fish of any kind found in the sea and includes crustacea and mollusca;

'fishery limits' means the territorial waters of the Territory and any fisheries zone contiguous thereto established by the Commissioner by Proclamation published in the Gazette;

'fishing boat' means a vessel of whatever size and in whatever way propelled, which is for the time being employed in fishing operations;

'foreign fishing boat' means a fishing boat other than a British fishing boat:

'taking' and 'fishing' and other grammatical variations of those words' with reference to fish and marine product, include collecting, capturing' killing and destroying, or attempting to do any of those things;

'unauthorised fishing gear' means fishing gear the use of which is prohibited under Regulations or under a licence granted under section 5.

Control of fishing in fishery limits.

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3.—(1) Subject to the provisions of this Ordinance, no person on board a fishing boat shall take any fish or marine product within the fishery limits except under and in accordance with the conditions of a licence granted in respect of that fishing boat under section 5, and in the case of a foreign fishing boat unless, in addition, that fishing boat is registered in a country designated under section 4.

(2) If any person contravenes any of the provisions of subsection (1) of

	this section, that person and the person in charge of the boat, and,. if he is on board that boat, the owner, shall each be guilty of an offence and shall be liable to a fine of £5,000 or to imprisonment for two years, and any fish or marine product and any fishing gear found in the boat or taken or used by any person from the boat, and the boat used in such taking, shall be liable to forfeiture
	(3) Where any fish, marine product or- unauthorised fishing gear is found on board a fishing boat within the fishery limits or where any- fish or marine product or unauthorised fishing gear is landed from a fishing boat on any island within the Territory, such fish or marine product shall be deemed to have been taken, or as the case may be, such unauthorised gear shall be deemed to have been used, within the fishery limits by a person on board such fishing boat, until the contrary be proved.
Designation of Foreign Countries.	4. For the purpose of enabling fishing traditionally carried on in any area within the fishery limits by foreign fishing boats to be continued, the Commissioner may by order published in the Gazette, designate any country outside the Territory, and upon such designation any fishing boat registered in such country may take fish and marine product within such areas and subject to such conditions as may be specified in a licence granted under section 5.
Licensing of fishing boats.	5. The Commissioner or an agent authorised by him may grant licences for fishing boats permitting the taking of fish and marine product within the fishery limits. Any such licence may be for such period and in respect of such areas within the fishery limits as the Commissioner may think fit and may contain such conditions as to the descriptions or quantities of fish or marine product which may be taken, the gear which may be used, or as to such other matters, whether similar to the foregoing or not, as the Commissioner may impose, and shall be subject to variation or revocation by the Commissioner in his discretion. Without prejudice to the generality of the foregoing, a licence may be granted for the purposes only of taking of fish or marine product for - commercial research or scientific research.
Exemption for sporting fishing.	6. Nothing in this Ordinance shall prohibit any person lawfully temporarily resident in or visiting the Territory from taking fish or marine product in the course of sport and not for profit in any area in which that activity is not prohibited by the Commissioner's Representative by notice in the Gazette.
Appointment and powers of fisheries inspectors.	7.—(1) The Commissioner may appoint fisheries inspectors for the purposes of this Ordinance. Every Peace Officer shall be ex officio a fisheries inspector.
-	(2) A fisheries inspector and any person whom he may call to his assistance may at any time stop, go on board and search any fishing boat within the fishery limits, and may require the person in charge, the crew, or any of them, to produce any certificate of registry, licence, official logbook, official paper, article of agreement or any other document relative to the fishing boat or to the crew or any member thereof or to any person on board the fishing boat which is in their respective

possession or control or on board the fishing boat, and may require the person in charge to appear and to give an explanation concerning the fishing boat or its activities or any crew or other person on board the fishing boat or any document mentioned in this subsection. -(3) If a fisheries inspector has reason to suspect that any person on board a fishing boat has contravened any of the provisions of this Ordinance he may without warrant or other process seize 4he boat and detain any person found on board, and may take, or require that the person in charge of the boat take, the boat and any persons thereon to any island in the Territory and detain it and them until the alleged contravention is adjudicated upon. (4) A fisheries inspector and any person whom he may call to his assistance may arrest and detain without warrant any person who such inspector has reason to suspect has committed an offence against this Ordinance. (5) Any person who assaults, resists or obstructs any fisheries inspector or any person whom he may call to his assistance in the exercise of any of the powers conferred by this section shall be guilty of an offence and shall be liable to a fine of £10,000 or to imprisonment for two years. (6) A fisheries inspector and any person assisting him and acting under his instructions shall not be liable in any civil or criminal proceedings for anything done in purported exercise of the powers conferred on him by this section, if the court is satisfied that the act was done in good faith and that there were reasonable grounds for doing it. Trial of 8.—(1) Where an offence against any of the provisions of this Ordinance offences. is committed within the contiguous fisheries zone referred to in section 2 then, for the purposes of the jurisdiction of any court in the Territory, that offence shall be deemed to have been committed in the Territory. (2) The jurisdiction conferred by subsection (1) of this section shall be in addition to, and not in derogation of, any jurisdiction or power which is enjoyed by any court in the Territory apart from the provisions of the said subsection. (3) Notwithstanding anything contained in the Criminal Procedure Code, a Magistrates' Court presided over by either a Senior Magistrate or a Magistrate may impose any fines in respect of offences under this Ordinance, up to those specified as maxima. Detention of 9. In default of payment forthwith of any fine imposed under this fishing boat Ordinance, the court may order that the person convicted shall give or on failure to obtain to be given security for payment thereof, and if security to the pay or satisfaction of the court is not given may order the detention of the secure fine. fishing boat concerned with the offence in respect of which the fine was imposed; and such fishing boat may accordingly be detained in the Territory until the fine is paid or until sufficient security for its payment is given to the satisfaction of the court. Regulations. 10. The Commissioner may make regulations to carry out the objects and purposes of this Ordinance, and without prejudice to the generality of the

foregoing, such regulations may make provision as respects-3

(a) the types or sizes of fl or marine product which may or may not be taken;

(b) the types or sizes of fishing gear which may or may not be used;

(c) any person, vessel or thing detained under this Ordinance;

(d) the forfeiture of any fish or marine product taken contravention of section 3;

(e) the forfeiture of any fish or marine product or any fishing gear or fishing boat used in taking any fish or marine product in contravention of section 3;

(f) the fees to be paid on the issue of any licence under this k Ordinance.

11. The Fishery Limits Ordinance, 1971 is repealed.

Repeal of Ordinance No.2 of 1971.

THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.1 of 1993.

Arrangement of sections.				
Section		Page.		
1.	Short title and commencement.	2.		
2.	Amendment of S.4 of Ordinance of 1991.	2.		

THE BRITISH INDIAN OCEAN TERRITORY

ORDINANCE No. 1 of 1993

An ordinance to amend the Fisheries (Conservation and Management) Ordinance 1991.

	Enacted by the Commissioner for the British Indian Ocean Territory.
	1 February 1993 Commissioner
Short title and commencement	1. This Ordinance may be cited as the Fisheries (Conservation and Management) (Amendment) Ordinance 1993 and shall come into force on 1 February 1993.
Amendment of S.4 of Ordinance of 1991.	2. Section 4 of the Fisheries (Conservation and Management)Ordinance 1991 is amended by the addition at the end of subsection (11) thereof of the following proviso:—
	Provided that the foregoing provisions of this subsection shall apply only to fishing in which there is, or there is to be, at any one time no more than two lines in use under the control of any one person.
THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.5 of 1993. An Ordinance to further to amend the Fisheries (Conservation and Management) Ordinance 1991

Arrangement of sections.

	i mangement of sections.	
Section	Short title and commencement	Page.
2.	Amendment of s.4 of principal Ordinance.	2.
3.	Amendment of s.5 of principal Ordinance.	2.
4.	Amendment of s.7 of principal Ordinance	3.
5.	Amendment of s.14 of principal Ordinance	3.
6.	Amendment of s.18 of principal Ordinance	3.
7.	Amendment of s.21 of principal Ordinance	3.

THE BRITISH INDIAN OCEAN TERRITORY ORDINANCE No. 5 of 1993

An Ordinance to further to amend the Fisheries (Conservation and Management) Ordinance 1991

Enacted by the Commissioner for the British Indian Ocean Territory.

T. G. Harris

17 December 1993 Commissioner

Short title and commencement.	1. — (1) This Ordinance may be cited as the Fisheries (Conservation and Management) (Amendment) (No.2) Ordinance 1993 and shall be construed as one with the Fisheries (Conservation and Management) Ordinance 1991 (hereinafter referred to as "the principal Ordinance.")
Amendment of s.4 of principal Ordinance.	(2) This Ordinance shall come into force on 1 January 1994 and shall thereafter be deemed to have come into force together with the principal Ordinance (that is to say, on 1 October 1991.)
	2. Section 4 of the principal Ordinance is amended by the deletion of subsection (6) and the substitution therefor of the following: "(6) Without prejudice to any liability for an offence under
	subsection (1) or under section 7, the master of a fishing boat on which there is found, within the fishing waters, fish that has been caught or taken within those waters otherwise than under the authority of and in accordance with a fishing licence or that has been transhipped to that boat otherwise than under the authority of and in accordance with a transhipment licence shall be guilty of an offence; and in any proceedings for an offence under this subsection (and without prejudice to section 15(4)) the onus of proving—
	(a) that the fish was not caught or taken within the fishing waters; or, alternatively,
	(b) that it was caught or taken under the authority of an accordance with a fishing licence; or, alternatively,
	(c) that it was transhipped to that boat under the authority of in accordance with a transhipment licence shall lie on the accused. PENALTY - £200,000
Amendment of s.5 of principal Ordinance.	3. Section 5 of the principal Ordinance is amended by the insertion subsection (1), immediately after the words "on board the boat", of a se colon followed by the words "and a master who fails without reasons excuse to comply with that requirement or who, in pursuance of requirement, gives a notification which he knows to be false or reckle5 gives a notification which is false shall be guilty of an offence".

Amendment of s.7 of principal Ordinance	4. Section 7 of the principal Ordinance is amended—
	(a) by the insertion in subsection (1), immediately after the word "the transhipment", of the words "of fish";
	(b) by the deletion of the proviso to subsection (2); and
	(c) by the deletion of the word "shipment" in subsection (3) and the substitution therefor of the word "transhipment".
Amendment of s.14 of principal Ordinance	5. Section 14 of the principal Ordinance is amended by the insertion therein, immediately after the words "in pursuance of this Ordinance", the words "or any such regulations".
Amendment of s.18 of principal Ordinance	6. Section 18 of the principal Ordinance is amended—
	(a) by the deletion from subsection (2) of the words "and shall endorsed with a statement setting out the provisions of t1 section" and the substitution therefor of the words "and a copy of the provisions of this section shall be attached thereto"; and
	(b) by the insertion in subsection (4), immediately after the won "by notice in writing", of the words "in the prescribed form",
Amendment of s.21 of principal Ordinance	7. Section 21 of the principal Ordinance is amended—
	(a) by the insertion in subsection (2), immediately after the won "such regulations may provide for", of the words "or m authorise the Director of Fisheries to provide for or determine";
	(b) by the deletion from subsection (2) (i)of the words "in the British Indian Ocean Territory"; and
	(c) by the insertion in subsection (2), immediately after the said paragraph (i), of the following new paragraph as paragraph
	(ii) of and in "(ii) the place or places where persons who are to be designated as such authorised agents may reside or have their place of business;".

THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.2 of 1995. AN ORDINANCE further to amend the Fisheries (Conservation and Management) Ordinance 1991

Arrangement of sections.

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2.	Amendment of S.2 of principal Ordinance	2.

THE BRITISH INDIAN OCEAN TERRITORY

ORDINANCE NO 2 of 1995

AN ORDINANCE further to amend the Fisheries (Conservation and Management) Ordinance 1991

Enacted by the Commissioner for the British Indian Ocean Territory.

5 October 1995

D R MacLennan Commissioner

Short title, commence- ment and construction.	1. (1) This Ordinance may be cited as the Fisheries (Conservation and Management) (Amendment) Ordinance 1995 and shall come into force on 1 st November 1995.
	(2) In this Ordinance "the principal Ordinance" means the Fisheries (Conservation and Management) Ordinance 1991.
Amendment of S.2 of principal Ordinance	2. Section 2 of the principal Ordinance is amended by the insertion in the definition therein of "fishing", immediately after paragraph (c) of that definition, of the words "and, for the avoidance of doubt, includes exploring or prospecting for the presence of fish,"

THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.4 of 1995.

Arrangement	Δf	sections
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Section	
1.	Short title and commencement
2.	Amendment of principal ordinance
3.	S.11 repealed and replaced.

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THE BRITISH INDIAN OCEAN TERRITORY ORDINANCE No. 4 of 1995

An Ordinance to further to amend the Fisheries (Conservation and Management) Ordinance 1991.

Enacted by the Commissioner for the British Indian Ocean Territory.

7 December 1995 D R MacLennan Commissioner

1. (1) This Ordinance may be cited as the Fisheries (Conservation and Management) (Amendment) (No.2) Ordinance 1995 and shall come into force on 1 January 1996.

(2) In this Ordinance "the principal Ordinance" means the Fisheries (Conservation and Management) Ordinance 1991.

2. Section 10 of the principal Ordinance is amended:

Amendment of principal ordinance.

S.11

(a) by the insertion in subsection (1) thereof, immediately after the words "with respect to any fishing boat within the fishing waters", of the words "or with respect to any fishing boat that he believes is fishing or has been fishing within the fishing waters";

(b) by the deletion from subsection (1)(i) thereof of the words "to any place in the British Indian Ocean Territory" and the substitution therefor of the words "to such place within the British Indian Territory as he may appoint"; and

(c) by the repeal of subsection (l)(j) thereof

and its replacement by the following:

"(j) in the case of any person whom he suspects to have committed an offence against this ordinance, or any regulation made thereunder, in connection with the boat, he may, without summons, warrant or other process, take the suspected offender and take, or require the master of the boat to take, the boat, together with the crew thereof, to such place within the British Indian Ocean Territory as he may appoint; and he shall then bring the suspected offender before a competent court and may, subject to section 11 and to any order that the court may make, detain the suspected offender, the master and crew, and the boat in the British Indian Ocean Territory until the suspected offence has been adjudicated upon;".

3. Section 11 of the principal ordinance is repealed and replaced by the

following:

repealed and replaced.

11. (1) Where, in exercise of any of the powers conferred by section 10 or in pursuance of a requirement imposed in the exercise of such a power, a fishing boat is taken to a place within the British Indian Ocean Territory and is then detained, the Director of Fisheries shall, on demand by the master, owner or charterer or by the agent of the owner or charterer, release the boat (together with any equipment, stores and cargo seized with it) if no proceedings in respect of the suspected offence in connection with which that power was exercised have been instituted within 14 days after the arrival of the boat at that Place.

(2) Where anything is seized in the exercise of the powers conferred by paragraph (n), paragraph (n) or paragraph (o) of section 10(1) and the fishing boat concerned (that is to say, the fishing boat from which it was seized, or to which the court is satisfied that it belongs) is not itself taken by a Fisheries Protection Officer or a person authorised by him to a place within the British Indian Ocean Territory in pursuance of section 10(1)(j), then, unless the master of that fishing boat either has, within the specified period, taken his boat to the appointed place within the British Indian Ocean Territory in pursuance of a requirement laid on him under section $10(-^1)(j)$ or, if he is not subject to such a requirement, has, within the specified period, otherwise taken his boat to Diego Garcia or to such other place within the British Indian Ocean as a Fisheries Protection officer, the thing seized may, subject to the following provisions of this section, be ordered by a court to be forfeited to the Crown and shall then be disposed of as the Commissioner may direct.

A court shall not make an order for forfeiture under subsection (2) save on application made by or with the authority of the Principal Legal Adviser. (4) Where anything has been seized as referred to in subsection (2) and, within the specified period, the fishing boat concerned has beer: taken to a place within the British Indian Ocean Territory as specified in that subsection, the Director of Fisheries shall, on demand by the master, owner or charterer of the boat or by the agent of the owner or charterer, release that thing to him if no proceedings in respect of the suspected offence in connection with which the seizure was made has been instituted within 14 days after the arrival of the boat at that place.

(5) In this section " the specified period" means the period of 14 days after the seizure of the thing in question or such longer period as a court may allow in any particular case.".

THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.2 of 1997.

An Ordinance to further to amend the Fisheries (Conservation and Management) Ordinance 1991 and the regulations made thereunder so as to authorise the exercise of certain powers thereby conferred outside the fishing waters of the Territory as an incident of the exercise of the right of hot pursuit in accordance with international law.

Arrangement of sections.

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l.	Short title, commencement and construction	2.
2.	Exercise of the right of hot pursuit.	2.

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THE BRITISH INDIAN OCEAN TERRITORY

ORDINANCE No.2 of 1997

AN ORDINANCE

further to amend the Fisheries (Conservation and Management) Ordinance 1991 and the regulations made thereunder so as to authorise the exercise of certain powers thereby conferred outside the fishing waters of the Territory as an incident of the exercise of the right of hot pursuit in accordance with international law.

ENACTED by the Commissioner for the British Indian Ocean Territory.

24th February 1997

Commissioner

Short title, commencement and construction. 1. (1) This Ordinance may be cited as the Fisheries (Conservation and Management) (Extension of Enforcement Powers) Ordinance 1997 and shall come into force on1st March... 1997.

(2) This Ordinance shall be construed as one with the Fisheries (Conservation and Management) Ordinance 1991 as for the time being amended (which is hereinafter referred to as "the principal Ordinance").

(3) In this Ordinance, "the Regulations" means the Fishing Regulations 1993 as for the time being amended.

Exercise of the right of hot pursuit.

2. Any provision of the principal Ordinance or of the Regulations which confers powers on a Fisheries Protection Officer in relation to a fishing boat that is within the fishing waters, or in relation to any person or thing connected therewith, shall be construed as conferring those powers also in relation to a fishing boat that is outside the fishing waters, or in relation to any person or thing connected therewith, in any circumstances in which, in international law, those powers may properly be exercised as an incident of the exercise of the right of hot pursuit for an offence or suspected offence against any provision of the principal Ordinance or of the Regulations.

THE BRITISH INDIAN OCEAN TERRITORY.

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 2007

Ordinance No. 5 of 2007.

An Ordinance to consolidate, with amendments, existing provisions relating to the regulation, conservation and management of the fishing waters of the British Indian Ocean Territory and to provide for matters connected therewith or incidental thereto.

Arrangement of sections.

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Enacted by the Commissioner for the British Indian Ocean Territory

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Commissioner

THE BRITISH INDIAN OCEAN TERRITORY

Ordinance No. 5 of 2007

An Ordinance to consolidate, with amendments, existing provisions relating to the regulation, conservation and management of the fishing waters of the British Indian Ocean Territory and to provide for matters connected therewith or incidental thereto.

Short title and commencement.

1. This Ordinance may be cited as the Fisheries (Conservation and Management) Ordinance 2007 and shall come into operation on such date as the Commissioner may appoint by notice which shall be published in the *Gazette*.

Interpretation.

2. (1) In this Ordinance, unless the contrary intention appears -

"the Director" means the Director of Fisheries appointed under section 4(1);

"fish" means any marine animal (other than a bird but including shellfish), irrespective of whether it is fresh or cured, and any marine plant; and references to fish include references to any part of a fish;

"a Fisheries Protection Officer" means any person declared by section 4(5) to be such an Officer and includes the Director;

"fishing" means -

(a) the catching or taking of fish;

(b) any activity which can reasonably be expected to result in the catching or taking of fish;

or

(c) any operation at sea in support of or in preparation for any activity mentioned in paragraph (a) or paragraph (b),

and, for the avoidance of doubt, includes exploring or prospecting for the presence of fish and the collecting or taking by any means of sea cucumbers (all species of Holothuria) or molluscs;

"fishing boat" has the meaning assigned to that term in subsection (2);

"a fishing licence" means a licence granted under section 7;

"the fishing waters" means the fishing waters of the Territory, as defined in section 3;

"the Fisheries Conservation and Management Zone" means the zone of that name which was established by the Proclamation made by the Commissioner on 1 October 1991 (Proclamation No.1 of 1991) and whose extent is defined in that Proclamation (as it may be amended from time to time by further such Proclamation);

"the internal waters of the Territory" means the sea-waters on the landward side of the baselines from which the territorial sea of the Territory is measured;

"a licence" means a fishing licence or a transhipment licence;

"the master", in relation to a fishing boat, includes any person for the time being in command or in charge of the boat and any person in charge of fishing operations on board the boat;

"prescribed" means prescribed by or under regulations made under section 21;

"shark" means all species of shark (elasmobranchii taxon)

"shellfish" includes crustaceans and molluscs of any kind, any (or any part of any) brood, ware, half-ware or spat of shellfish, any spawn of shellfish and the shell (or any part of the shell) of any shellfish;

"a transhipment licence" means a licence granted under section 10 and includes a fishing licence operating as a transhipment licence by virtue of section 10(4); and

"transhipment", in relation to fish, means the passing of the fish from one boat to another, whether or not it was first caught or taken by the boat from which it is passed.

(2)(a) In this ordinance, unless the contrary intention appears, the term "fishing boat" means, subject to paragraphs (b) and (c), any vessel of whatever size and in whatever way propelled which is for the time being employed in fishing or in the processing, storage or transport of fish or in any operations (including the transhipment of fish) ancillary to any of the foregoing; and, for the avoidance of doubt but subject as aforesaid, the term includes any vessel, of whatever size and in whatever way propelled, which is for the time being operating as an independent support vessel in support of one or more other vessels that are themselves engaged in fishing.

(b) The term "fishing boat" does not, in this Ordinance, include a vessel (such as, but not limited to, a net tender) whose principal use is in support of, and is integral to, the fishing operations of a larger vessel (being itself a fishing boat) and which, when not being so used, is normally stored on board that larger vessel as part of its fishing gear; but the term does include any vessel, whether or not normally stowed as aforesaid, which is itself employed in the catching or taking of fish.

(c) For the purposes of section 7(11), the term "fishing boat" has the meaning provided in that subsection.

(3) Unless the contrary intention appears, any provision of this ordinance, or of any regulations made under section 21; that confers

powers on a Fisheries Protection Officer or on a person acting under his direction in relation to a fishing boat that is within the fishing waters, or in relation to a person or thing connected therewith, shall be construed as conferring those powers also in relation to a fishing boat that is outside the fishing waters, or in relation to a person or thing connected therewith, in any circumstances in which, in international law, those powers may properly be exercised as a incident of the right of hot pursuit for an offence or suspected offence against any provision of this ordinance or any such regulations.

The fishing waters of the Territory. 3. The fishing waters of the Territory comprise -

(a) the internal waters of the Territory;

(b) the territorial sea of the Territory; and

(c) the Fisheries Conservation and Management Zone.

Director of Fisheries and Fisheries Protection Officers. **4.** (1) There shall be a Director of Fisheries for the Territory who shall be appointed by the Commissioner.

(2) The Director has charge of the administration of this Ordinance and of any regulations made under section 21 and, in particular and without prejudice to the generality of the foregoing, is responsible for -

(a) the conservation of fish stocks;

(b) the assessment of fish stocks and the collection of data (including statistics) and other information relevant thereto;

(c) the development and management of fisheries;

(d) the monitoring, surveillance and control of fishing and of operations ancillary to fishing;

(e) the regulation of the conduct of fishing and of operations ancillary to fishing;

(f) the grant, suspension, revocation and variation of licences under this Ordinance;

(g) the collection of fees for licences; and

(h) the making of such reports to the Commissioner as he may require.

(3) This Ordinance and any regulations made under section 21 shall be enforced by Fisheries Protection Officers who, for the purposes of their functions, have the powers conferred on them by this Ordinance and by or under any regulations made under section 21.

(4) In the exercise of their function Fisheries Protection Officers shall be subject to the direction of the Director:

Provided that in acting as a public prosecutor in relation to any proceeding arising under this Ordinance or under any regulations made under section 21 a Fisheries Protection Officer shall be subject to the direction of the Principal Legal Adviser.

(5) The following persons shall be Fisheries Protection Officers:

(a) every person appointed as such by Commissioner;

(b) every Peace Officer;

(c) every person for the time being appointed to be an Imports and Exports Control Officer for the purposes of the Imports and Exports Control Ordinance 1984;

(d) all commissioned officers of Her Majesty's ships; and

(e) any person for the time being in command or in charge of any aircraft or hovercraft of the Royal Navy, the Army or the Royal Air Force.

5. (1) Any person who within the fishing waters or within the Territory-

(a) uses or permits to be used any explosive, poison or other noxious substance for the purpose of killing, stunning or disabling fish with a view to its being caught or taken or to rendering it more easily caught or taken; or

(b) carries or has in his possession or control any explosive, poison or other noxious substance which is intended for any of the purposes mentioned in paragraph (a); or

(c) uses, permits to be used or has in his possession any wire trace line; or

(d) fails to release live into the fishing waters any shark or other large game fish caught while fishing; or

(e) collects, takes by any means, or has in his possession any sea cucumber (which expression includes all species of Holothuria) or mollusc;

is guilty of an offence; and where a contravention of this subsection is committed on or from a fishing boat, the owner, master and charterer of the boat is each guilty of an offence.

(2) Any explosive, poison or other noxious substance which is found on board any fishing boat in the fishing waters shall be presumed, unless the contrary is proved, to be intended for a purpose mentioned in subsection (1)(a).

(3) Any person who lands, tranships, sells, buys, receives or is

Prohibited fishing and fishing methods. found in possession of fish which has been caught or taken by the use of an explosive, poison or other noxious substance in contravention of subsection (1)(a) and who, at the time when he did so or was so found, knew or had reasonable cause to believe it to have been so caught or taken is guilty of an offence; and where a contravention of this subsection is committed on or from a fishing boat or by any member of the crew of a fishing boat, the master, the owner and the charterer of the boat is each guilty of an offence.

(4) In any proceedings for an offence under subsection (3) a certificate signed by a Fisheries Protection Officer stating the cause or manner of the death of, or of any injury suffered by, any fish shall be accepted as prima facie evidence of that matter, and any certificate purporting to be so signed shall be received in evidence as such unless credible evidence to the contrary is adduced.

(5) A person who is convicted of an offence under this section is liable to imprisonment for 6 months, or a fine of \pounds 50,000 or to both such imprisonment and fine.

6. (1)(a) Any person who uses any prohibited fishing gear for fishing within the fishing waters is guilty of an offence.

(b) Any person who is found in possession other than on a fishing boat of any prohibited fishing gear, whether or not with the intention to use it within the fishing waters, is guilty of an offence.

(2) The master, the owner and the charterer of any fishing boat on which there is found, within the fishing waters, any prohibited fishing gear is each guilty of an offence.

(3) In this section "prohibited fishing gear" means -

(a) any net whose mesh size is smaller than the prescribed minimum size for nets of that type;

(b) any other type of fishing gear which does not conform to the standards prescribed for that type of gear; and

(c) any fishing gear which is prohibited by regulations made under section 21.

(d) any net which, for the purpose of fishing, is set or operated otherwise than by a fishing boat unless it is so set or operated in accordance with a permit issued by the Commissioner's Representative or a Fisheries Protection Officer;

(e) any trap, including (without prejudice to the generality of that term) any pot, barrier or fence;

(f) any gear for grappling or wounding, including (without prejudice to the generality of those terms) any harpoon, spear or arrow;

(g) in relation to fishing otherwise than by a fishing boat, any line unless the use of that line satisfies the conditions specified (in relation to fishing by a fishing boat) in paragraphs (a) to (d) of section 7(10).

Possession of prohibited fishing gear. (h) any diving equipment or underwater swimming equipment unless the person in possession of that equipment has a permit to use it issued by the Commissioner.

(4) A permit issued for the purposes of sub-sections (3)(d) or (h) may be unconditional or may be made subject to such conditions as the Commissioner or the officer issuing it thinks fit.

(5) The Director of Fisheries may impose, or authorise the imposition of, fees for the issue of permits for the purpose of subsection (3)(d) and, without prejudice to the generality of section 43 of the Interpretation and General Provisions Ordinance 1993, different fees may be imposed for different permits or for different categories of permits.

(6) Sub-section (3)(d) does not apply to the use of nets for fishing under arrangements, approved for the purposes of this paragraph, made by the Morale, Welfare and Recreation organisation of the United States Forces ("MWR") and if all of the following conditions are satisfied: -

(a) the nets used are hand-held cast nets;

(b) they are used only for fishing for bait fish; and

(c) they are used only in the waters of Diego Garcia and its environs and are not used in areas of actively growing coral.

(7) Arrangements made by MWR are approved for the purposes of sub-section (6) if they provide, to the satisfaction of the Director of Fisheries, for MWR to collect, and to make available to any Fisheries Protection officer on request and to the Director at such intervals as may from time to time be notified to MWR by or on behalf of the Director, accurate data (in such form as may be so notified to MWR) giving the following information: -

(a) the total catch, in weight, of the major species of fish caught on each occasion when nets are used as specified in sub-section (6);

(b) the number of nets so used on each such occasion; and

(c) the locations in which nets are so used on each such occasion.

(8) Where, in any proceedings for an offence under sub-section (2), it is proved that prohibited fishing gear was found on a fishing boat within the fishing waters, the onus of proof that no person had used or intended to use that gear for fishing within the fishing waters shall lie on the accused person.

(9) (a) A person who is convicted of an offence under subsections l(a) or 2 is liable to a fine of £50,000.

(b) A person who is convicted of an offence under subsections 1(b) is liable to a fine of £5,000. Fishing Licences. 7. - (1) Fishing within the fishing waters is prohibited unless carried out in accordance with a licence (a "fishing licence") granted by the Director under this section.

(2)(i) Where sub-section (1) is contravened by fishing by a fishing boat, the master, the owner and charterer of the boat is each guilty of an offence and is liable, on conviction, to a fine of £500,000.

(ii) Where sub-section (1) is contravened by a person fishing other than by a fishing boat such person shall be liable upon conviction to a fine of \pounds 5,000.

(3) (i) Every fishing licence for fishing by a fishing boat shall be granted in respect of a single fishing boat specified in it and may be granted to the master, the owner or the charterer of the boat.

(ii) Every fishing licence for fishing other than by a fishing boat shall be granted in respect of the person specified in it.

(iii) No fishing licence may permit fishing for marine mammals.

(4) The authority to fish in the fishing waters that is conferred by a fishing licence may be unlimited or may be limited by reference to such matters as the Director thinks fit, including (but not confined to)-

(a) the area within which fishing is authorised;

(b) the period, times or particular voyages during which fishing is authorised;

(c) the descriptions, quantities, sizes and presentation of the fish that may be caught or taken or, conversely, that may not be caught or taken, whether as by-catch or otherwise; and

(d) the method of fishing and the type or construction of the fishing gear to be used.

(5) Within any limitation imposed under subsection (4) and subject to any regulations made under section 21, a fishing licence may be unconditional or may be made subject to such conditions as the Director thinks fit, including (but not confined to) conditions as to -

(a) the landing of any fish caught or taken;

(b) the use to which any fish caught or taken may be put;

(c) the marking of the licensed fishing boat in accordance with accepted international practice, or as directed by a Fisheries Protection Officer, including the display of its assigned international radio call sign: (d) the installation on the licensed fishing boat of any equipment specified in the condition, including equipment for monitoring the position or operation of the boat;

(e) the records of fishing operations to be kept on board the licensed fishing boat;

(f) the records of fish caught to be kept and maintained by a person licensed to fish other than by a fishing boat.

(6) (i) Where a condition to which a fishing licence is subject is contravened in respect of fishing by a fishing boat, the master, the owner and the charterer of the fishing boat in respect of which the licence was granted is each guilty of an offence and is liable, on conviction, to a fine of $\pounds 200,000$.

(ii) Where a condition to which a fishing licence is subject is contravened by a person fishing otherwise than by a fishing boat such person shall be liable upon conviction, to a fine of £5,000.

(7) Fees may be charged for fishing licences in accordance with regulations made under section 21.

(8) The master, the owner or the charterer of a fishing boat in respect of which he intends to apply for a fishing licence and each person applying for a licence to fish other than by a fishing boat shall, before so applying, supply to the Director such information as the Director may require or as may be prescribed by or under regulations made under section 21; and a person who, for the purpose of obtaining a fishing licence or in purported compliance with any such requirement or prescription, supplies information which he knows to be false or misleading in any material particular or recklessly supplies information which is so false or misleading is guilty of an offence and is liable, on conviction, to a fine of £50,000.

(9) The Director may at any time suspend or revoke a fishing licence or vary it in any respect; but no part of any fee that was charged for the licence shall, in any such case, be refunded unless the Director considers that it is appropriate, in all the circumstances of the case, to make such a refund.

(10) Subsection (1) does not apply to fishing, by persons who are lawfully present in the Territory, including but not limited to United States personnel and United Kingdom personnel lawfully present in Diego Garcia, if the following conditions are satisfied: -

(a) the fishing is, or is to be, for a reasonable amount for personal consumption within 3 days by the person fishing, and not for sale, barter or other profit;

(b) the fishing is, or is to be, carried out by an attended line

(whether or not with a rod);

(c) there is, or there is to be, at any one time no more than two such lines in use under the control of any one person, each line having no more than three hooks attached to it (or such other lesser number of hooks as may, for that occasion, have been specified to that person by a Fisheries Protection Officer); and

(d) the fishing is not, or is not to be, carried out in any area of the Territory which is specified, by a notice signed by the Commissioner and published in the Gazette, to be an excepted area for the purposes of this subsection.

(11)(a) The exception to subsection (1) that is provided by subsection (10) does not apply to any fishing carried out by a fishing boat (other than one based in and operating out of Diego Garcia in circumstances where the persons fishing from that boat have paid, or have contracted to pay, for the right to do so or to be on board the boat); and any boat that is being used in such circumstances is deemed to be a fishing boat for the purposes of that subsection.

(b) No fish caught by fishing in accordance with the provisions of subsection 10 may be frozen, and the burden of proving that frozen fish was not caught within the fishing waters of the Territory or was caught from a licensed fishing boat shall lie on the person in possession of such frozen fish.

(12) (a) Subsection (1) does not apply to fishing, by persons who are lawfully present in the Territory, if such fishing is part of a fishing tournament, the limitations and conditions for which have been arranged or approved in writing by the Commissioner's Representative not less than seven days before the tournament.

(b) No such tournament may last more than one day.

(13) The foregoing provisions of this section are without prejudice to -

(a) any prohibition, restriction, condition or requirement imposed by or under a regulation made under section 21; and

(b) any other law for the time being in force in the Territory with respect to the protection and preservation of wildlife or with respect to the conservation of the natural resources of the Territory or with respect to the regulation of activities within the waters of the Territory or with respect to visitors and visiting vessels.

Notification of fish on board fishing boats.

8. - (1) The master of a fishing boat that has fish on board shall -

(a) before the boat enters the fishing waters; and

(b) before the boat leaves an area of the fishing waters in which it is licensed to fish,

notify a Fisheries Protection Officer of the quantities, sizes, descriptions and presentation of the fish on board.

(2) A master who, without reasonable excuse, contravenes subsection (1) or who, in pursuance of that subsection, gives a notification which he knows to be false or misleading is guilty of an offence and is liable, on conviction, to a fine of $\pounds 50,000$.

(3) The giving of a notification under this section is not a defence to a prosecution for an offence under section 17(8).

Stowage of gear.

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9. - (1) At any time when a fishing boat is in any area of the fishing waters and either -

(a) it is not authorised by a fishing licence to fish in that area; or

(b) it is so authorised to fish only for certain descriptions of fish in that area,

its fishing gear, or so much of it as is not required for the fishing which it is authorised to carry out, shall be stowed in such manner as is prescribed or, if no manner is prescribed, in such manner that it is not readily available for use for fishing.

(2) If subsection (1) is contravened, the master of the fishing boat in question is guilty of an offence and is liable, on conviction, to a fine of $\pounds 100,000$.

Transhipment.

10.- (1) The transhipment of fish from a fishing boat within the fishing waters or the transport from the territorial sea of the Territory or the internal waters of the Territory by any fishing boat of fish transhipped from another fishing boat is prohibited unless it is carried out in accordance with a licence (a "transhipment licence") granted by the Director under this section in respect of every fishing boat concerned.

(2) Where subsection (1) is contravened, the master, the owner and the charterer of each boat which took part in the contravention is each guilty of an offence and is liable, on conviction, to a fine of $\pm 500,000$.

(3) Every transhipment licence shall be granted in respect of a single fishing boat specified in it and may be granted to the owner or the charterer of the boat.

(4) If (but only if) it purports to do so, a fishing licence may also operate as a transhipment licence and may accordingly include, in addition to conditions or other provisions relating to fishing by the fishing boat specified in it, such conditions or other provisions relating to the transhipment or transport of fish as are authorised by this section.

(5) The authority to carry out the transhipment or transport of fish that is conferred by a transhipment licence may be unlimited or

may be limited by reference to such matters as the Director thinks fit, including (but not confined to) -

(a) the area within which fish may be transhipped;

(b) the periods or times within which fish may be transhipped or may be transported by a fishing boat authorised by the licence to do so;

(c) the descriptions and quantities of fish that may be transported by a fishing boat authorised by the licence to do so; and

(d) the number of times that fish may be transported by a fishing boat authorised by the licence to do so.

(6) Within any limitation imposed under subsection (5) and subject to any regulations made under section 21, a transhipment licence may be unconditional or may be made subject to such conditions as the Director thinks fit, including (but not confined to) conditions as to the treatment of transhipped fish on board the fishing boat to which it has been passed.

(7) Where a condition to which a transhipment licence is subject is contravened, the master, the owner and the charterer of the fishing boat in respect of which the licence was granted is each guilty of an offence and is liable, on conviction, to a fine of $\pounds100,000$.

(8) Fees may be charged for transhipment licences in accordance with regulations made under section 21.

(9) The Director may require the master, the owner or the charterer of a fishing boat in respect of which a transhipment licence has been granted, or any person who is for the time being designated to the Director, under regulations made under section 21, as the agent of the owner or charterer in respect of that boat, to provide him with such information, relevant to the licence or to the operation of the boat, as he may direct; and any person to whom such a requirement is addressed who fails without reasonable excuse to comply with it is guilty of an offence and is liable, on conviction, to a fine of £20,000.

(10) Any person who, for the purpose of obtaining a transhipment licence or in purported compliance with a requirement under subsection (9), provides information which he knows is false or misleading in any material particular or recklessly supplies information which is so false or misleading is guilty of an offence and is liable, on conviction, to a fine of $\pm 50,000$.

(11) The Director may at any time suspend or revoke a transhipment licence or vary it in any respect; but no part of the fee that was charged for the licence shall, in any such case, be refunded unless the Director considers that it is appropriate, in all the circumstances of the case, to make such a refund.

Exercise of Director's 11. - (1) The powers vested in the Director by this Ordinance or by or under regulations made under section 21 may, subject to any such powers.

regulations and subject to subsection (3), be exercised by him in his absolute discretion to such extent, in such manner and in such cases as he considers necessary or expedient for the regulation of fishing or of the transhipment of fish, for the conservation or management of fisheries or for the economic benefit of the Territory.

(2) Without prejudice to the generality of subsection (1) but subject as provided in that subsection, the Director may, in exercising his powers as aforesaid, make different provision or impose different requirements (including provision or requirements as to fees) for different boats or boats of different descriptions and may impose different limitations on or attach difference conditions to licences granted in respect of different boats or boats of different description, and he may in particular exercise his powers as aforesaid for the purpose of limiting the number of boats, or boats of any particular description, that may engage in fishing, transhipping fish or transporting fish within the fishing waters; and the references in this subsection to the description of a boat include references to the country in which is registered.

(3) In the exercise of his powers and duties under this Ordinance or under any regulations made under section 21, the Director shall be subject to the direction of the Commissioner, who, in giving him any such direction, shall enjoy the same discretion as is vested by this section in the Director:

Provided that in acting as a public prosecutor in relation to any proceedings arising under this Ordinance or under any regulations made under section 21 the Director shall be subject to the direction of the Principal Legal Adviser.

(4) The exercise of the Director's power to grant licences shall be sufficiently signified if signified under the hand of a person authorised by the Director in writing to signify on his behalf.

12.- (1) For the purpose of enforcing the provisions of this Ordinance and of any regulations made under section 21, a Fisheries Protection Officer and any person acting under his direction may exercise the following powers with respect to any person whom he believes to have committed an offence in contravention of any provision of this Ordinance, and with respect to any fishing boat within the fishing waters or with respect to any boat within the fishing waters which be believes to be, or to have been, employed as a fishing boat within those waters: -

(a) he may stop the boat;

(b) he may require such person, or in respect of a boat the master of the fishing boat to cease fishing and take back on board the boat's fishing gear;

(c) he may require such a master to facilitate the boarding of the boat by all appropriate means;

(d) he may go on board the boat and take with him such other persons as he may require to assist him in the exercise of his powers;

General enforcement powers of Fisheries Protection Officers. (e) he may require any person (including the master or any member of the crew of a boat) to produce, and he may examine and take copies of, any document relating to the person, the boat or to any person that is in that person's possession or control, including (without prejudice to the generality of the foregoing) any certificate of registry, licence, official logbook, official paper, article of agreement, passport, or record of fish caught or taken;

(f) he may muster the crew of the boat;

(g) he may require the master of the boat to appear and give an explanation of any matter that he may put to the master concerning the boat or concerning any such person or any such document as is mentioned in paragraph (e);

(h) he may make any search, examination or enquiry which he considers necessary to establish whether there has been an contravention of any provision of this Ordinance or of any regulations made under section 21;

(i) he may take, or require the master to take, the boat (together with the crew and any other person on board) to such place within the Territory as he may appoint for the purpose of enabling any such search, examination or enquiry to be carried out;

(j) where he suspects any person or master or member of the crew of a fishing boat of having committed an offence under this Ordinance or under any regulations made under section 21, he may, without warrant, summons or other process, take the suspected offender and take, or require the master to take, the boat (together with the crew and any other person on board) to such place within the Territory as he may appoint, and he shall then bring the suspected offender before a competent court; and, subject to section 13 and to any order made by the court, he may cause the suspected offender, the master, the crew and any other such person as aforesaid, and also the boat, to be detained in the Territory until the suspected offence has been adjudicated upon;

(k) in the case of a boat which, in the exercise of his powers under this Ordinance or under any regulations made under section 21, he has taken or caused to be taken to any place in the Territory or has caused to be detained in the Territory or has seized, he may take such steps as he considers necessary, while having regard to the safety of the boat, to immobilise it for the purpose of preventing it from departing from that place before the completion of the search, examination or enquiry for which it was taken there or, as the case may be, before it is released from detention or seizure under the provisions of this Ordinance or by order of a court;

(l) in any case where he suspects that an offence under section 6(1), 6(2), 7(2), section 7(6), section 10(2) or section

10(7) has been committed, he may -

(i) seize any fishing gear, equipment or boat which he believes to have been involved in the commission of that offence;

(ii) seize the equipment and fishing and other gear of any such person or boat, and also any instruments, appliances, stores and cargo;

(iii) seize any fish which he believes to have been caught or taken or transhipped or transported in the commission of that offence or any fish products produced from any such fish; and

(iv) seize, or take copies of, any documents which he believes to be relevant to that offence.

(2) In relation to any action which, under paragraph (i) or paragraph (j) of subsection (1), a Fisheries Protection Officer may take, or may require to be taken, in respect of a fishing boat, the references in that paragraph to the boat include references to its fishing or other gear, to its instruments and appliances, to its stores and cargo and to any fish or fish products on board it.

(3) In exercising the powers conferred on him by subsection (1), a Fisheries Protection Officer or any person acting under his direction may use such force as is reasonably necessary.

(4) The powers conferred by this section may be exercised irrespective of whether any person or fishing boat in respect of which, or in respect of whose operations or suspected operations, they fall to be exercised is, at the time when they fall to be exercised, engaged in fishing or in operations ancillary to fishing.

(5) Upon any person, including, but not limited to the master or a member of the crew of a fishing boat, refusing or failing to comply with any order or direction given by a Fisheries Protection Officer in the exercise of his powers under this or any other section of this Ordinance or obstructing such an officer in relation to the exercise of his said powers, and upon such officer reporting such refusal, failure or obstruction to the Director, any licence held by such person, or held by some other person in respect of the fishing boat of which such person is master or a member of the crew shall forthwith be revoked, and the holder of such licence shall not be entitled to any refund of fees paid in respect of such a revoked licence.

Disposal of detained or seized boats, etc. 13.- (1) Where, in exercise of a power conferred by section 12 or by any regulation made under section 21 or in pursuance of a requirement imposed in the exercise of such a power, a boat is seized or is taken to a place within the Territory and there detained, then, if no proceedings for an offence under this ordinance or under such regulations, being an offence alleged to have been committed in connection with that boat, have been instituted within 14 days after the boat is brought to Diego Garcia following the seizure or, as the case may be, within 14 days after the arrival of the boat at that place and if the master, the owner or the charterer or the agent of the owner or the charterer so demands, the boat, together with any person on board it and any thing seized with it or on board it at the time when it was seized or was so taken, shall be released.

(2) Where any thing is seized under section 12(1)(1)(ii), (iii) or (iv) and the boat concerned (that is to say, the boat from which it was seized or to which the court is satisfied that it belongs) is not itself either seized under section 12(1)(l)(i) or taken by a Fisheries Protection Officer or a person acting under his direction to a place within the Territory under section 12(1)(j), then, unless the master of that boat has, within the specified period, taken his boat to the appointed place within the Territory in pursuance of a requirement laid on him under section 12(1)(j) or, if he is not subject to such a requirement, unless he has, within the specified period, otherwise taken it to Diego Garcia or such other place within the Territory as a Fisheries Protection Officer or a person acting as aforesaid may appoint and has there reported its arrival to a Fisheries Protection Officer, the thing seized may, subject to the following provisions of this section, be ordered by a court to be forfeited to the Crown and shall then be disposed of as the Commissioner may direct.

(3) A court may not make an order for forfeiture under subsection (2) save on application made by or with the authority of the Principal Legal Adviser.

(4) Where any thing has been seized in the circumstances referred to in subsection (2) and, within the specified period, the fishing boat concerned has been taken to a place within the Territory as specified in that subsection, then, if no proceedings in respect of the suspected offence in connection with which the seizure was made have been instituted within 14 days after the arrival of the boat at that place and if the master, the owner or the charterer of the boat or the agent of the owner or the charterer so demands, the thing shall be released.

(5) In this section "the specified period" means the period of 14 days after the seizure of the thing in question or such longer period as a court may allow in any particular case.

(6) Notwithstanding any other provision of this Ordinance, where any perishable goods (that is to say, fish or fish products or other goods which are subject to decay unless kept in storage facilities specially designed or adapted for that purpose) have been seized under any provision of this Ordinance and -

> (a) before the elapse of any period after which, under any provision of this Ordinance, those goods must, on demand, be released; or

(b) before any such demand is made; or

(c) before the conclusion of any proceedings pending which those goods are being held,

a court is satisfied that, because of the deteriorating condition of the

goods, it is no longer practicable to keep them, the court may order them to be destroyed or otherwise disposed of; and no compensation therefor shall be payable to the owner of the goods or to any other person claiming an interest in them.

Security for release of seized or detained boat, etc. 14.- (1) Where a fishing boat is seized or detained under this Ordinance or under any regulations made under section 21 in connection with a suspected offence under this Ordinance or under any such regulations and proceedings for that offence are instituted against the master, the owner or the charterer of the boat or the agent of the owner or the charterer, the master, the owner or the charterer may, at any time before the conclusion of those proceedings, apply to the court which is, or will be, seised of the proceedings for the release of the boat on the provision of security in accordance with this section.

(2) If, on an application under subsection (1), the court is satisfied that adequate security has been given to the Crown as specified in subsection (3), it may order the release of the boat.

(3) The security which is to be given to the Crown for the purposes of subsection (2) is security for the aggregate of -

(a) the maximum fine that may be imposed on the defendant for the offence with which he is charged;

(b) a sum representing the value (as estimated by the court) of anything that may in due course be ordered under section 17(3) to be forfeited to the Crown; and

(c) such sum by way of costs and expenses as the court estimates may in due course be ordered by the court to be paid to the Crown under section 17(6),

or for such lesser aggregate sum as the prosecution agrees to and the court approves.

(4) If, on an application under subsection (1), the court is not satisfied as mentioned in subsection (2), it may order the release of the boat on the execution by one or more suitable persons approved by it of a bond, in the prescribed form (or in such form as it may specially approve) and conditioned in accordance with subsection (5), in an amount corresponding to the aggregate of the sums specified in paragraphs (a), (b) and (c) of subsection (3) or in such lesser amount as the prosecution agrees to and the court may fix having regard to any special circumstances of the case; but the order for release shall not have effect until the bond is executed to the satisfaction of the court.

(5) The condition of a bond executed for the purposes of subsection (4) shall be that if -

(a) at the conclusion of the proceedings, the defendant is not convicted of the offence with which he was charged; or

(b) having been convicted of that offence, he pays in full and

within 14 days (or such longer period as the court may, on application by him, allow) the fine imposed on him by the court, the sum specified in subsection (3)(b) (or such lesser sum as the court may allow, having regard to such order for forfeiture as has in fact been made) and the amount of any costs and expenses ordered by the court to be paid to the Crown,

the bond shall then be of no effect, but that it shall otherwise, on the expiry of the said 14 days (or such longer period as aforesaid), be of full effect and enforceable.

(6) Without prejudice to any remedy available for the enforcement of any fine imposed, or any other order made, by the court, the sum for which a bond is executed for the purposes of this section is, when the bond has become enforceable, due to the Crown as a civil debt owed by the person, or owed jointly and severally by the persons, who executed the bond, and is recoverable as such.

(7) In this section references to the release of a boat that has been seized or detained include references to the release of any person on board it and any thing seized with it or on board it at the time when it was seized or detained.

Fisheries Protection Officers' immunity form process.

Obstruction of Fisheries Protection Officers. 15. No civil suit or criminal process shall be brought against any Fisheries Protection officer, or against any person acting under the direction of a Fisheries Protection Officer, in respect of any act performed by him, in good faith and with reasonable cause, in the exercise or purported exercise of his functions under this Ordinance or under any regulations made under section 21.

16. Without prejudice to any other provision in that behalf contained in this Ordinance or in any regulations made under section 21, any person who wilfully obstructs a Fisheries Protection Officer, or any person acting under the direction of a Fisheries Protection Officer, in the exercise of his functions under this ordinance or under such regulation or who, without reasonable cause (the onus of proof of which lies on him), refuses or neglects to comply with any order, direction or requirement lawfully given to him or laid on him by a Fisheries Protection Officer, or by any person acting as aforesaid, or to answer any question reasonably put to him by a Fisheries Protection Officer, or by any person acting aforesaid, or who prevents another person from so complying or so answering is guilty of an offence and is liable, on conviction, to a fine of $\pounds100,000$.

Offences, penalties, evidence and proceedings, etc. 17.- (1) Any person who commits a contravention of any provision of this Ordinance or of any regulations made under section 21 (being a contravention which is not, by any such provision other than this subsection, specifically declared to be an offence) commits an offence under this subsection and is liable, on conviction, to a fine of $\pm 100,000$.

(2) Without prejudice to section 319 of the Penal Code, any person who attempts to commit an offence under this Ordinance or under any regulations made under section 21 commits an offence under this subsection and is liable, on conviction, to the same fine as if he had committed the attempted offence.

(3) Without prejudice to any provision of this Ordinance authorising the imposition of a fine in any such case, where a person is convicted of any offence under this ordinance or under any regulations made under section 21 (being an offence in respect of the use or operation of a fishing boat), the court may, in addition to imposing a fine but subject to subsection (4), order that any fishing or other gear, or instruments or appliances, on board the boat (whether or not used in the commission of the offence), and any fish or fish products on board the boat (whether or not the offence related thereto), shall be forfeited to the Crown; and anything so forfeited shall then be disposed of as the Commissioner may direct.

(4) A court may not make an order for forfeiture under subsection (3) save on application made by or with the authority of the Principal Legal Adviser.

(5) Notwithstanding any provision of law limiting the time within which proceedings may be commenced, proceedings for an offence under this Ordinance or under any regulations made under section 21 may be commenced at any time after the commission of that offence.

(6) Notwithstanding section 194(1) of the Criminal Procedure Code 1986, the Magistrates' Court, on convicting any person of an offence under this Ordinance or under any regulations made under section 21, has jurisdiction to impose on him any fine to which he is liable under this Ordinance or under those regulations for that offence; and notwithstanding section 226(1) of that Code, any court may, in such a case, order that person to pay to the Crown such costs and expenses incurred by the Crown in preparation for or otherwise in connection with the proceedings as it thinks proper (including the expenses incurred, whether before or after the commencement of the proceedings, in the exercise of any of the powers vested in a Fisheries Protection Officer).

(7) Every Fisheries Protection Officer shall be <u>ex officio</u> a public prosecutor in proceedings for offences under this Ordinance or under any regulations made under section 21.

(8) Without prejudice to any liability for an offence under section 7(2) or under section 10, the master of a fishing boat on which there is found fish that has been caught or taken within the fishing waters otherwise than in accordance with a fishing licence or that has been transhipped to the boat within the fishing waters otherwise than in accordance with a transhipment licence is guilty of an offence and is liable, on conviction, to a fine of £200,000; and in any proceedings in any such case, whether for an offence under this subsection or for an offence under section 7(2) or section 10 or under regulations made under section 21, it shall be sufficient for the prosecution to prove that the fish was found on the boat and the onus of proving -

(a) that the fish was not caught or taken within the fishing waters; or, alternatively,

(b) that it was caught or taken in accordance with a fishing

licence; or, alternatively,

(c) that it was transhipped to that boat outside the fishing waters or in accordance with a transhipment licence,

shall then lie on the accused.

(9) A certificate signed by the Director or by any person authorised by him to sign such a certificate -

(a) as to whether or not, at any material time specified in the certificate, a fishing boat so specified was licensed under this Ordinance; or

(b) as to the nature of any such licence; or

(c) as to any limitations imposed on, or conditions attached to, any such licence;

(d) as to who was the person to whom any such licence was granted,

shall, if tendered in evidence in any proceedings under this Ordinance or under any regulations made under section 21, be sufficient evidence of that matter unless the contrary is proved.

(10) Any certificate which purports to be such a certificate as is mentioned in subsection (9) shall, in any such proceeding as aforesaid, be received in evidence as such, without proof of signature or of authorisation to sign, unless credible evidence to the contrary is adduced; and a facsimile copy of such a certificate shall be received in evidence as if it were the original certificate.

18.- (1) Where any person has once been convicted of any offence to which this section applies and is, within the period of five years following the date of that conviction, convicted of the like or any other such offence committed after that date, then, subject to subsection (3), any licence which he then holds is thereupon revoked and he shall, for the period of three years following the date of that subsequent conviction, be disqualified from being granted any further licence.

(2) Where a licence is revoked in accordance with subsection (1), no part of any fee that was charged for the licence shall be refunded unless the Director considers that it is appropriate, in all the circumstances of the case, to make such a refund.

(3) If any person whose licence is revoked in accordance with subsection (1) applies to the Director within 30 days of the conviction by virtue of which it is revoked or within such longer period as the Director may allow, the Director, in his discretion and having regard to all the circumstances of the case, may restore the licence, with effect from such date and with such variations and subject to such conditions as he thinks fit, and may remove, or reduce the duration of, or vary in such other respect as he thinks fit, the disqualification

Revocation of licences of repeated offenders. imposed by that subsection.

(4) The offences to which this section applies are any offences under this Ordinance (or under any Ordinance repealed by this Ordinance) or under any regulations made (or deemed to be made) under section 21.

Fixed penalty notices and procedure 19. (1) Where, on any occasion, a Fisheries Protection Officer finds a person who he has reason to believe is committing or has on that occasion committed an offence under this Ordinance or under any regulations made under section 21, he may give that person a fixed penalty notice in respect of that offence.

(2) In this section "fixed penalty notice" means a notice offering the opportunity of the discharge of any liability to be convicted of the offence to which the notice relates by payment of a fixed penalty in accordance with this section.

(3) A fixed penalty notice must –

(a) give such particulars of the circumstances alleged to constitute the offence to which it relates as are necessary for giving reasonable information about the alleged offence;

(b) be issued from an authorised sequentially numbered official pad of notices in the form prescribed in the schedule; (c) state the amount of the fixed penalty;

(d) state that the fixed penalty may be paid forthwith to the Fisheries Protection Officer,

and a copy of the provisions of this section shall be attached to the notice.

(4) The fixed penalty for an offence is -

(a) £5000 for an offence relating to fishing from a fishing boat and £200 for an offence relating to a person fishing other than from a fishing boat or relating to a person fishing from a fishing boat based in and operating out of Diego Garcia in circumstances where the persons fishing from that boat have paid, or have contracted to pay, for the right to do so or to be on board the boat; or

(b) one-half of the maximum fine to which a person committing the offence would be liable on conviction of that offence by the Magistrates' Court,

whichever is the less.

(5) Where a fixed penalty notice has been given to a person no proceedings may be brought against him for the offence if he has forthwith paid the penalty to the Fisheries Protection Officer.

(6) A Fisheries Protection Officer shall issue to the recipient an official receipt for every payment made to him in respect of a fixed penalty and every Fisheries Protection Officer shall account to the Commissioner for each fixed penalty notice form and receipt form issued to him and for all payments received by him.

(7) For the avoidance of doubt, nothing in this section obliges an officer to issue a fixed penalty notice when he decides that the alleged offender should be prosecuted for the alleged offence.

(8) Where the fixed penalty notice relates to the unlawful possession of prohibited fishing gear, in addition to the payment of the penalty, the recipient shall surrender to the officer the prohibited fishing gear for destruction.

Non-payment of fines, etc: detention and forfeiture of boat.

20.- (1) When any fine is imposed on the master, the owner or the charterer of a fishing boat for an offence under this Ordinance or under any regulations made under section 21, or where any sum is ordered by a court to be paid by him to the Crown by way of costs or expenses incurred in connection with the proceedings for that offence, then, if no security therefor has been given, or bond for the payment thereof has been executed, under section 14, or if the court considers that any such security or bond is inadequate to secure the payment of the sums due from him in consequence of his conviction (including the value of anything ordered to be forfeited to the Crown that is not already being detained under this Ordinance), it may order that, in default of payment forthwith of all such sums, he shall give security (or additional security) therefor to the satisfaction of the court; and, subject to subsection (2), his fishing boat may then be detained (or continue to be detained) in such place within the Territory as the court may order until all such sums are paid (and anything ordered to be forfeited but not already detained has been surrendered to the court) or until security is given as aforesaid.

(2) If any such fine as is referred to in subsection (1) or any such sum by way of costs and expenses as is there referred to remains unpaid for more than 30 days (or such longer period as the court may allow) after it was imposed or was ordered to be paid, the court may, subject to subsection (3), order that the fishing boat concerned shall be forfeited to the Crown; and it shall then be disposed of as the Commissioner may direct.

(3) A court may not make an order for forfeiture under subsection (2) save on application made by or with the authority of the Principal Legal Adviser.

(4) An order for the forfeiture of a fishing boat under this section may extend to such of its fishing and other gear, its instruments and appliances, its stores and cargo and any fish and fish products on board it as the court may direct.

Regulations.

21.- (1) The Commissioner may make such regulations as he considers necessary for the purposes of this Ordinance.

(2) Without prejudice to the generality of subsection (1), regulations made by the Commissioner may provide for or may authorise the Director to provide for or to determine -

(a) anything which is to be, or which may be, prescribed under this Ordinance;

(b) the forms to be used for the purposes of this Ordinance;

(c) all questions relating to the procedures for applying for licences;

(d) all questions relating to the procedures for granting licences;

(e) the conditions subject to which licences are to be, or may be, granted;

(f) the fees to be charged for licences and the method of computing such fees;

(g) the equipment to be carried on board fishing boats;

(h) the reports and notifications to be made, and the records and logs to be kept, in respect of fishing boats or in respect of fishing or otherwise for the purposes of this ordinance or for the purposes of any regulations made under this section (and the procedures relating thereto);

(i) the designation, by applicants for licences or by licensees, of authorised agents, and the authority to be attributed to, and the obligations and liabilities to be assumed by or imposed on, such agents;

(j) the place or places where persons who are to be designated as authorised agents may reside or have their place of business;

(k) the execution, by applicants for licences or by licensees or by other persons, of bonds (or the provision by them of other forms of security) for securing compliance with obligations arising under a licence or otherwise arising under the provisions of this Ordinance or of any regulations made under this section;

(I) the placing on board fishing boats of Fisheries Protection Officers or of observers, and the facilities and conditions to be accorded to them while on board;

(m) the conferment on Fisheries Protection Officers, or persons acting under their direction, of such powers, additional or supplementary to those conferred by this Ordinance, as the Commissioner considers necessary or expedient for the regulation of fishing boats or of fishing or otherwise for the purposes of this Ordinance or for the purposes of any regulations made under this section.

(3) Regulations made under this section may make different provision for (and the Director, in exercising an authority conferred by such regulations to make provision for any matter or to determine any matter, may make different provision for or a different determination in respect of) different parts of the fishing waters or different boats or boats of different descriptions (including descriptions which differ by reference to the countries in which the boats are registered) or different licences or different descriptions of licences.

(4) Regulations made under this section may provide that the contravention of any provision thereof shall constitute an offence, and may prescribe, as the penalty for any such offence, a fine not exceeding $\pm 100,000$.

Saving for laws regulating access to Territory, etc.

Repeal and savings.

22.- For the avoidance of doubt, nothing in this Ordinance shall be construed as in any way derogating from the provisions of the British Indian Ocean Territory (Immigration) Order 2004, the British Indian Ocean Territory Waters (Regulation of Activities) Ordinance 1997, or the Visitors and Visiting Vessels Ordinance 2006.

23.- (1) The Fisheries (Conservation and Management) Ordinance 1998 ("the 1998 Ordinance") is repealed.

(2) Without prejudice to section 21(1) or section 22(2) of the Interpretation and General Provisions Ordinance 1993, the repeal of the 1998 Ordinance does not affect the continuing operation, according to its tenor, of any licence granted or other instrument made under or for the purposes of that ordinance;

and any such instrument shall thereafter be deemed to have been granted or made under the relevant enabling provision of this Ordinance or, as the case may require, for the purposes of this Ordinance, and any reference therein to a particular provision of the 1998 Ordinance shall thereafter be construed as if it were a reference to the corresponding provision of this Ordinance.

(3) Notwithstanding subsection (1) and without prejudice to subsection 21(1) of the Interpretation and General Provisions Ordinance 1993, proceedings may be instituted after the commencement of this Ordinance for an offence alleged to have been committed before that commencement under any provision repealed by subsection (1), and any such proceedings shall be dealt with for all purposes as if this ordinance had not been enacted and the repealed provision remained in force; and any proceedings that were instituted before the commencement of this ordinance by virtue of any provision repealed by subjection (1) may be continued thereafter and may likewise be dealt with for all purposes as if this Ordinance had not been enacted and the repealed provision remained in force.

THE SCHEDULE

Fixed Penalty Notice form



BRITISH INDIAN OCEAN TERRITORY

Section 19 The Fisheries (Conservation and Management) Ordinance 2007

FIXED PENALTY NOTICE

Notice official number

To(Here set out name and details of recipient)

2.

1.

Circumstances constituting offence.

It is alleged that you have committed an offence under sectionof the Fisheries (Conservation and Management) Ordinance 2007/regulation of the Fishing Regulations 2007. The circumstances alleged to constitute that offence are as follows:

(Here set out sufficient particulars of the offence alleged, including date and approximate time, to give the recipient reasonable information about what he is alleged to have done)

3. You have the opportunity to discharge any liability to be convicted of the above offence if you immediately pay the fixed penalty which is specified in paragraph 4 below to the Officer who gave you this notice. If you fail to do so you may be detained and prosecuted for the offence.

4. Fixed penalty (insert £5000/£200 or half the maximum penalty for offence, whichever is the least amount)

(Date of Notice)

)

)

(Signature and name of officer issuing notice)

Section 19 The Fisheries (Conservation and Management) Ordinance 2007.
Fixed penalty notices and procedure 19. (1) Where, on any occasion, a Fisheries Protection Officer finds a person who he has reason to believe is committing or has on that occasion committed an offence under this Ordinance or under any regulations made under section 21, he may give that person a fixed penalty notice in respect of that offence.

(2) In this section "fixed penalty notice" means a notice offering the opportunity of the discharge of any liability to be convicted of the offence to which the notice relates by payment of a fixed penalty in accordance with this section.

(3) A fixed penalty notice must –

(a) give such particulars of the circumstances alleged to constitute the offence to which it relates as are necessary for giving reasonable information about the alleged offence;

(b) be issued from an authorised sequentially numbered official pad of notices in the form prescribed in the schedule; (c) state the amount of the fixed penalty;

(d) state that the fixed penalty may be paid forthwith to the Fisheries Protection Officer,

and a copy of the provisions of this section shall be attached to the notice.

(4) The fixed penalty for an offence is-

(a) £5000 for an offence relating to fishing from a fishing boat, and £200 for an offence relating to a person fishing other than from a fishing boat or relating to a person fishing from a fishing boat based in and operating out of Diego Garcia in circumstances where the persons fishing from that boat have paid, or have contracted to pay, for the right to do so or to be on board the boat; or

(b) one-half of the maximum fine to which a person committing the offence would be liable on conviction of that offence by the Magistrates' Court,

whichever is the less.

(5) Where a fixed penalty notice has been given to a person (in this section referred to as "the recipient") under section 53, no proceedings may be brought against him for the offence if he has forthwith paid the penalty to the Fisheries Protection Officer. (6) A Eicheries Protection Officer shall issue a to the recipient an

(6) A Fisherie's Protection Officer shall issue a to the recipient an official receipt for every payment made to him in respect of a fixed penalty and every Fisheries Protection Officer shall account to the Commissioner for each fixed penalty notice form and receipt form issued to him and for all payments received by him.

(7) For the avoidance of doubt, nothing in this section obliges an officer to issue a fixed penalty notice when he decides that the alleged offender should be prosecuted for the alleged offence.

(8) Where the fixed penalty notice relates to the unlawful possession of prohibited fishing gear, in addition to the payment of the penalty, the recipient shall surrender to the officer the prohibited fishing gear for destruction.

THE BRITISH INDIAN OCEAN TERRITORY. Ordinance No.4 of 1998.

An Ordinance to consolidate, with amendments, existing provisions relating to the regulation, conservation and management of the fishing waters of the British Indian Ocean Territory and to provide for matters connected therewith or incidental thereto.

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THE BRITISH INDIAN OCEAN TERRITORY

Ordinance No. 4 of 1998

An Ordinance to consolidate, with amendments, existing provisions relating to the regulation, conservation and management of the fishing waters of the British Indian Ocean Territory and to provide for matters connected therewith or incidental thereto.

Enacted by the Commissioner for the British Indian Ocean Territory

12 October 1998

C J B White Commissioner

Short title and commencement.

1. This Ordinance may be cited as the Fisheries (Conservation and Management) Ordinance 1998 and shall come into operation on such date as the Commissioner may appoint by notice which shall be published in the Gazette.

Interpretation.

2. - (1) In this Ordinance, unless the contrary intention appears

"the Director" means the Director of Fisheries appointed under section 4(1);

"fish"-means any marine animal (other than a mammal or a bird but including shellfish), irrespective of whether it is fresh or cured, and any marine plant; and references to fish include references to any part of a fish;

"a Fisheries Protection Officer" means any person declared by section 4(5) to be such an Officer and includes the Director;

"fishing" means

(a) the catching or taking of fish;

(b) any activity which can reasonably be expected

to result in the catching or taking of fish;

or

(c) any operation at sea in support of or in preparation for any activity mentioned in paragraph (a) or paragraph (b),

and, for the avoidance of doubt, includes exploring or prospecting for the presence of fish;

"fishing boat" has the meaning assigned to that term in subsection (2);

"a fishing licence" means a licence granted under section 7;

"the fishing waters" means the fishing waters of the Territory, as defined in section 3;

"the Fisheries Conservation and Management Zone" means the zone of that name which was established by the Proclamation made by the Commissioner on 1 October 1991 (Proclamation No.1 of 1991) and whose extent is defined in that Proclamation (as it may be amended from time to time by further such Proclamation);

"the internal waters of the Territory" means the sea-waters on the landward side of the baselines from which the territorial sea of the Territory is measured;

"a licence" means a fishing licence or a transhipment licence;

"the master", in relation to a fishing boat, includes any person for the time being in command or in charge of the boat and any person in charge of fishing operations on board the boat;

"prescribed" means prescribed by or under regulations made under section 21;

"shellfish" includes crustaceans and molluscs of any kind, any (or any part of any) brood, ware, half-ware or spat of shellfish, any spawn of shellfish and the shell (or any part of the shell) of any shellfish;

"a transhipment licence" means a licence granted under section 10 and includes a fishing licence operating as a transhipment licence by virtue of section 10(4); and

"transhipment", in relation to fish, means the passing of the fish from one boat to another, whether or not it was first caught or taken by the boat from which it is passed.

(2) (a) In this ordinance, unless the contrary intention appears, the term "fishing boat" means, subject to paragraphs (b) and (c), any vessel of whatever size and in whatever way

propelled which is for the time being employed in fishing or in the processing, storage or transport of fish or in any operations (including the transhipment of fish) ancillary to any of the foregoing; and, for the avoidance of doubt but subject as aforesaid, the term includes any vessel, of whatever size and in whatever way propelled, which is for the time being operating as an independent support vessel in support of one or more other vessels that are themselves engaged in fishing.

(b) The term "fishing boat" does not, in this Ordinance, include a vessel (such as, but not limited to, a net tender) whose principal use is in support of, and is integral to, the fishing operations of a larger vessel (being itself a fishing boat) and which, when not being so used, is normally stored on board that larger vessel as part of its fishing gear; but the term does include any vessel, whether or not normally stowed as aforesaid, which is itself employed in the catching or taking

(c) For the purposes of section 7(11), the term "fishing boat" has the meaning provided in that subsection.

(3) Unless the contrary intention appears, any provision of this ordinance, or of any regulations made under section 21, that confers powers on a Fisheries Protection Officer or on a person acting under his direction in relation to a fishing boat that is within the fishing waters, or in relation to a person or thing connected therewith, shall be construed as conferring those powers also in relation to a fishing boat that is outside the fishing waters, or in relation to a person or thing connected therewith, in any circumstances in which, in international law, those powers may properly be exercised as a incident of the right of hot pursuit for an offence or suspected offence against any provision of this ordinance or any such regulations.

The fishing waters of the Territory. 3. The fishing waters of the Territory comprise

(a) the internal waters of the Territory;

(b) the territorial sea of the Territory; and

(c) the Fisheries Conservation and Management Zone.

Director of Fisheries and Fisheries Protection Officers. 4. - (1) There shall be a Director of Fisheries for the Territory who shall be appointed by the Commissioner.

(2) The Director has charge of the administration of this Ordinance and of any regulations made under section 21 and, in particular and without prejudice to the generality of the foregoing, is responsible for

(a) the conservation of fish stocks;

(b) the assessment of fish stocks and the collection of data (including statistics) and other information relevant thereto;(c) the development and management of fisheries;

(d) the monitoring, surveillance and control of fishing and of operations ancillary to fishing

(e) the regulation of the conduct of fishing and o of operations ancillary to fishing;

(f) the grant, suspension, revocation and variation of licences under this Ordinance;

(g) the collection of fees for licences; and

(h) the making of such reports to the Commissioner as he may require.

(3) This Ordinance and any regulations made under section 21 shall be enforced by Fisheries Protection Officers who, for the purposes of their functions, have the powers conferred on them by this Ordinance and by c under any regulations made under section 21.

(4) In the exercise of their function Fisheries Protection Officers shall be subject to the direction c the Director:

Provided that in acting as a public prosecutor in relation to any proceeding arising under this Ordinance or under any regulations made under section 21 a Fisheries Protection Officer shall be subject to the direction of the Principal Legal Adviser.

(5) The following persons shall be Fisheries Protection Officers:

(a) every person appointed as such by Commissioner (b) every Peace

Officer;

(c) every person for the time being appointed to f an Imports and Exports Control Officer for the purposes of the Imports and Exports Control Ordinance 1984;

(d) all commissioned officers of Her Majesty's ships; and

(e) any person for the time being in command or in charge of any aircraft or hovercraft of the Royal Navy, the Army or the Royal Air Force.

Prohibited fishing methods. 5. - (1) Any person who

(a) uses or permits to be used any explosive, poison or other noxious substance for the purpose of killing, stunning or disabling fish with a view to its being caught or taken or to rendering it more easily caught or taken; or

(b) carries or has in his possession or control any explosive, poison or other noxious substance which is intended for any of the purposes mentioned in paragraph (a),

is guilty of an offence; and where a contravention of this subsection is committed on or from a fishing boat, the owner, master and charterer of the boat is each guilty of an offence.

(2) Any explosive, poison or other noxious substance which is found on board any fishing boat in the fishing waters shall be presumed, unless the contrary is proved, to be intended for a purpose mentioned in subsection (1)(a).

(3) Any person who lands, tranships, sells, buys, receives or is found in possession of fish which has been caught or taken by the use of an explosive, poison or other noxious substance in contravention of subsection (1) (a) and who, at the time when he did so or was so found, knew or had reasonable cause to believe it to have been so caught or taken is guilty of an offence; and where a contravention of this subsection is committed on or from a fishing boat or by any member of the crew of a fishing boat, the master, the owner and the charterer of the boat is each guilty of an offence.

(4) In any proceedings for an offence under subsection (3) a certificate signed by a Fisheries Protection Officer stating the cause or manner of the death of, or of any injury suffered by, any fish shall be accepted as <u>prima facie</u> evidence of that matter, and any certificate purporting to be so signed shall be received in evidence as such unless credible evidence to the contrary is adduced.

(5) A person who is convicted of an offence under this section is liable to a fine of $\pounds 50,000$.

Possession o prohibited fishing gear.

of 6. - (1) Any person who uses any prohibited fishing gear for fishing within the fishing waters, or who is found in possession of such gear with the intention to use it within the fishing waters, is guilty of an offence.

(2) The master, the owner and the charterer of an fishing boat on which there is found, within the fishing waters, any prohibited fishing gear which any person o board that boat has used or intends to use for fishing within the fishing waters is each guilty of an offence

(3) In this section "prohibited fishing gear" means

(a) any net whose mesh size is smaller than the prescribed minimum size for nets of that type;

(b) any other type of fishing gear which does not conform to the standards prescribed for that type of gear; and

(c) any fishing gear which is prohibited by regulations made under section 21.

(4) Where, in any proceedings for an offence under subsection (2), it is proved that prohibited fishing gear was found on board a fishing boat within the fishing waters, the onus of proof that no person on board that boat had used or intended to use that gear for fishing within the fishing waters shall lie on the accused person.

(5) A person who is convicted of an offence under this section is liable to a fine of £50,000.

Fishing Licences. 7. - (1) Fishing by a fishing boat within the fishing waters is prohibited unless carried out in accordance with a licence (a "fishing licence") granted by the Director under this section.

(2) Where subsection (1) is contravened, the master, the owner and charterer of the boat is each guilty of an offence and is liable, on conviction, to fine of £500,000.

(3) Every fishing licence shall be granted in respect of a single fishing boat specified in it and n be granted to the master, the owner or the charterer c the boat.

(4) The authority to fish in the fishing waters that is conferred by a fishing licence may be unlimited or may be limited by reference to such matters as the Director thinks fit, including (but not confined to)-

(a) the area within which fishing is authorised;

(b) the period, times or particular voyages during which fishing is authorised;

(c) the descriptions, quantities, sizes and presentation of the fish that may be caught or taken or, conversely, that may not be caught or taken, whether as by-catch or otherwise; and

(d) the method of fishing and the type or construction of the fishing gear to be used.

(5) Within any limitation imposed under subsection(4) and subject to any regulations made under section 21, a fishing licence may be unconditional or may be made subject to such conditions as the Director thinks fit, including (but not confined to) conditions as to

(a) the landing of any fish caught or taken;

(b) the use to which any fish caught or taken may be put;

(c) the marking of the licensed fishing boat in accordance with accepted international practice, or as directed by a Fisheries Protection Officer, including the display of its assigned international radio call sign;

(d) the installation on the licensed fishing boat of any equipment specified in the condition, including equipment for monitoring the position or operation of the boat;

(e) the records of fishing operations to be kept on ,board the licensed fishing boat.

(6) Where a condition to which a fishing licence is subject is contravened, the master, the owner and the charterer of the fishing boat in respect of which the licence was granted is each guilty of an offence and is liable, on conviction, to a fine of £200,000.

(7) Fees may be charged for fishing licences in accordance with regulations made under section 21.

(8) The master, the owner or the charterer of a fishing boat in respect of which he intends to apply for a fishing licence shall, before so applying, supply to the Director such information as the Director may require or as may be prescribed by or under regulations made under section 21; and a person who, for the purpose of obtaining a fishing licence or in purported compliance with any such requirement or prescription, supplies information which he knows to be false or misleading in any material particular or recklessly supplies information which is so false or misleading is guilty of an offence and is liable, on conviction, to a fine of £50,000.

(9) The Director may at any time suspend or revoke a fishing licence or vary it in any respect; but no part of any fee that was charged for the licence shall, in any such case, be refunded unless the Director considers that it is appropriate, in all the circumstances of the case, to make such a refund.

(10) Subsection (1) does not apply to fishing, by persons who are lawfully present in the Territory, if the following conditions are satisfied:

(a) the fishing is, or is to be, for sport and not for sale, barter or other profit;

(b) the fishing is, or is to be, carried out by an attended line (whether or not with a rod);

(c) there is, or there is to be, at any one time no more than two such lines in use under the control of any one person, each line having no more than three hooks attached to it (or such other number of hooks as may, for that occasion, have been specified to that person by a Fisheries Protection Officer); and

(d) the fishing is not, or is not to be, carried out in any area of the Territory which is specified, by a notice signed by the Commissioner and published in the <u>Gazette</u>, to be an excepted area for the purposes of this subsection.

(11) The exception to subsection (1) that is provided by subsection (10) does not apply to any fishing carried out by a fishing boat (other than one based in and operating out of Diego Garcia) in circumstances where the persons fishing from that boat have paid, or have contracted to pay, for the right to do so or to be on board the boat; and any boat that is being used in such circumstances is deemed to be a fishing boat for the purposes of this subsection.

(12) The foregoing provisions of this section are without prejudice to

(a) any prohibition, restriction, condition or requirement imposed by or under a regulation made under section 21; and

(b) any other law for the time being in force in the Territory with respect to the protection and preservation of wildlife or with respect to the conservation of the natural resources of the Territory or with respect to the regulation of activities within the waters of the Territory.

Notification of fish on board fishing boats. 8. - (1) The master of a fishing boat that has fish on board shall

(a) before the boat enters the fishing waters; and

(b) before the boat leaves an area of the fishing waters in which it is

licensed to fish,

notify a Fisheries Protection Officer of the quantities, sizes, descriptions and presentation of the fish on board.

(2) A master who, without reasonable excuse, contravenes subsection (1) or who, in pursuance of that subsection, gives a notification which he knows to be false or misleading is guilty of an offence and is liable, on conviction, to a fine of £50,000.

(3) The giving of a notification under this section is not a defence to a prosecution for an offence under section 17(8).

Stowage of gear.

9. - (1) At any time when a fishing boat is in any area of the fishing waters and either

(a) it is not authorised by a fishing licence to fish in that area; or

(b) it is so authorised to fish only for certain descriptions of fish in that area,

its fishing gear, or so much of it as is not required for the fishing which it is authorised to carry out, shall be stowed in such manner as is prescribed or, if no manner is prescribed, in such manner that it is not readily available for use for fishing.

(2) If subsection (1) is contravened, the master of the fishing boat in question is guilty of an offence and is liable, on conviction, to a fine of $\pounds 100,000$.

Transhipment.

10.- (1) The transhipment of fish from a fishing boat within the fishing waters or the transport from the territorial sea of the Territory or the internal waters of the Territory by any fishing boat of fish transhipped from another fishing boat is prohibited unless it is carried out in accordance with a licence (a

"transhipment licence") granted by the Director under this section in respect of every fishing boat concerned.

(2) Where subsection (1) is contravened, the master, the owner and the charterer of each boat which took part in the contravention is each guilty of an offence and is liable, on conviction, to a fine of £500,000.

(3) Every transhipment licence shall be granted in respect of a single fishing boat specified in it and may be granted to the owner or the charterer of the boat.

(4) If (but only if) it purports to do so, a fishing licence may also operate as a transhipment licence and may accordingly include, in addition to conditions or other provisions relating to fishing by the fishing boat specified in it, such conditions or other provisions relating to the transhipment or transport of fish as are authorised by this section.

(5) The authority to carry out the transhipment or transport of fish that

is conferred by a transhipment licence may be unlimited or may be limited by reference to such matters as the Director thinks fit, including (but not confined to)

(a) the area within which fish may be transhipped;

(b) the periods or times within which fish may be transhipped or may be transported by a fishing boat authorised by the licence to do so;

(c) the descriptions and quantities of fish that may be transported by a fishing boat authorised by the licence to do so; and

(d) the number of times that fish may be transported by a fishing boat authorised by the licence to do so.

(6) Within any limitation imposed under subsection (5) and subject to any regulations made under section 21, a transhipment licence may be unconditional or may be made subject to such conditions as the Director thinks fit, including (but not confined to) conditions as to the treatment of transhipped fish on board the fishing boat to which it has been passed.

(7) Where a condition to which a transhipment licence is subject is contravened, the master, the owner and the charterer of the fishing boat in respect of which the licence was granted is each guilty of an offence and is liable, on conviction, to a fine of $\pm 100,000$.

(8) Fees may be charged for transhipment licences in accordance with regulations made under section 21.

(9) The Director may require the master, the owner or the charterer of a fishing boat in respect of which a transhipment licence has been granted, or any person who is for the time being designated to the Director, under regulations made under section 21, as the agent of the owner or charterer in respect of that boat, to provide him with such information, relevant to the licence or to the operation of the boat, as he may direct; and any person to whom such a requirement is addressed who fails without reasonable excuse to comply with it is guilty of an offence and is liable, on conviction, to a fine of £20,000.

(10) Any person who, for the purpose of obtaining a transhipment licence or in purported compliance with a requirement under subsection (9), provides information which he knows is false or misleading in any material particular or recklessly supplies information which is so false or misleading is guilty of an offence and is liable, on conviction, to a fine of £50,000.

(11) The Director may at any time suspend or revoke a transhipment licence or vary it in any respect; but no part of the fee that was charged for the licence shall, in any such case; be refunded unless the Director considers that it is appropriate, in all the circumstances of the case, to make such a refund.

Exercise of Director's powers.

11. - (1) The powers vested in the Director by this Ordinance or by or under regulations made under section 21 may, subject to any such regulations and subject to subsection (3), be exercised by him in his

absolute discretion to such extent, in such manner and in such cases as he considers necessary or expedient for the regulation of fishing or of the transhipment of fish, for the conservation or management of fisheries or for the economic benefit of the Territory.

(2) Without prejudice to the generality of subsection (1) but subject as provided in that subsection, the Director may, in exercising his powers as aforesaid, make different provision or impose different requirements (including provision or requirements as to fees) for different boats or boats of different descriptions and may impose different limitations on or attach difference conditions to licences granted in respect of different boats or boats of different description, and he may in particular exercise his powers as aforesaid for the purpose of limiting the number of boats, or boats of any particular description, that may engage in fishing, transhipping fish or transporting fish within the fishing waters; and the references in this subsection to the description

of a boat include references to the country in which is registered.

(3) In the exercise of his powers and duties under this Ordinance or under any regulations made under section 21, the Director shall be subject to the direction of the Commissioner, who, in giving him any such direction, shall enjoy the same discretion as is vested by this section in the Director:

Provided that in acting as a public prosecutor in relation to any proceedings arising under this Ordinance or under any regulations made under section 21 the Director shall be subject to the direction of the Principal Legal Adviser.

12.- (1) For the purpose of enforcing the provisions of this Ordinance and of any regulations made under section 21, a Fisheries Protection Officer and any person acting under his direction may exercise the following powers with respect to any fishing boat within the fishing waters or with respect to any boat within the fishing waters which be believes to be, or to have been, employed as a fishing boat within those waters:

(a) he may stop the boat;

(b) he may require the master to cease fishing and take back on board the boat's fishing gear;

(c) he may require the master to facilitate the boarding of the boat by all appropriate means;

(d) he may go on board the boat and take with him such other persons as he may require to assist him in the exercise of his powers;

(e) he may require any person on board the boat (including the master or any member of the crew) to produce, and he may examine and take copies of, any document relating to the boat or to any such person that is in that person's possession or control on board the boat, including (without prejudice to the generality of the foregoing) any certificate of registry, licence, official logbook, official paper, article of agreement

General enforcement powers of Fisheries Protection Officers. or record of fish caught or taken;

(f) he may muster the crew of the boat;

(g) he may require the master to appear and give an explanation of any matter that he may put to the master concerning the boat or concerning any such person or any such document as is mentioned in paragraph (e);

(h) he may make any search, examination or enquiry which he considers necessary to establish whether there has been an contravention of any provision of this Ordinance or of any regulations made under section 21;

(i) he may take, or require the master to take, the boat (together with the crew and any other person on board) to such place within the Territory as he may appoint for the purpose of enabling any such search, examination or enquiry to be carried out;

(j) where he suspects any person connected with the boat of having committed an offence under this Ordinance or under any regulations made under section 21, he may, without warrant, summons or other process, take the suspected offender and take, or require the master to take, the boat

(together with the crew and any other person on board) to such place within the Territory as he may appoint, and he shall then bring the suspected offender before a competent court; and, subject to section 13 and to any order made by the court, he may cause the suspected offender, the master, the crew and any other such person as aforesaid, and also the boat, to be detained in the Territory until the suspected offence has been adjudicated upon;

(k) in the case of a boat which, in the exercise of his powers under this Ordinance or under any regulations made under section 21, he has taken or caused to be taken to any place in the Territory or has caused to be detained in the Territory or has seized, he may take such steps as he considers necessary, while having regard to the safety of the boat, to immobilise it for the purpose of preventing it from departing from that place before the completion of the search, examination or enquiry for which it was taken there or, as the case may be, before it is released from detention or seizure under the provisions of this Ordinance or by order of a court;

(1) in any case where he suspects that an offence under section 7(2), section 7(6), section 10(2) or section 10(7) has been committed, he may

(.) seize any boat which he believes to have been involved in the commission of that offence;

(ii) seize the equipment and fishing and other gear of any such boat, and also its instruments and appliances and its stores and cargo;

(iii) seize any fish which he believes to have been caught or taken or transhipped or transported in the commission of that offence or any fish products produced from any such fish; and

(iv) seize, or take copies of, any documents which he believes to be

relevant to that offence.

(2) In relation to any action which, under paragraph (i) or paragraph (j) of subsection (1), a Fisheries Protection Officer may take, or may require to be taken, in respect of a fishing boat, the references in that paragraph to the boat include references to its fishing or other gear, to its instruments and appliances, to its stores and cargo and to any fish or fish products on board it.

(3) In exercising the powers conferred on him by subsection (1), a Fisheries Protection Officer or any person acting under his direction may use such force as is reasonably necessary.

(4) The powers conferred by this section may be exercised irrespective of whether any fishing boat in respect of which, or in respect of whose operations or suspected operations, they fall to be exercised is, at the time when they fall to be exercised, engaged in fishing or in operations ancillary to fishing.

13.- (1) Where, in exercise of a power conferred by section 12 or by any regulation made under section 21 or in pursuance of a requirement imposed in the exercise of such a power, a boat is seized or is taken to a place within the Territory and there detained, then, if no proceedings for an offence under this ordinance or under such regulations, being an offence alleged to have been committed in connection with that boat, have been instituted within 14 days after the boat is brought to Diego Garcia following the seizure or, as the case may be, within 14 days after the arrival of the boat at that place and if the master, the owner or the charterer or the agent of the owner or the charterer so demands, the boat, together with any person on board it and any thins seized with it or on board it at the time when it was seized or was so taken, shall be released.

(2) Where any thing is seized under section 12(1)(ii), (iii) or (iv) and the boat concerned (that is to say, the boat from which it was seized or to which

the court is satisfied that it belongs) is not itself either seized under section 12(1)(1)(i) or taken by a Fisheries Protection Officer or a person acting under his direction to a place within the Territory under section 12(1)(j), then, unless the master of that boat has, within the specified period, taken his boat to the appointed place within the Territory in pursuance of a requirement laid on him under section 12(1) (j) or, if he is not subject to such a requirement, unless he has, within the specified period, otherwise taken it to Diego Garcia or such other place with the Territory as a Fisheries Protection Officer or a person acting as aforesaid may appoint and has there reported its arrival to a Fisheries Protection Officer, the thing seized may, subject to the following provisions of this section, be ordered by a court to be forfeited to the Crown and shall then be disposed of as the Commissioner may direct.

(3) A court may not make an order for forfeiture under subsection (2) save on application made by or with the authority of the Principal Legal Adviser.

(4) Where any thing has been seized in the circumstances referred to

Disposal of detained or seized boats, etc.

	in subsection (2) and, within the specified period, the fishing boat concerned has been taken to a place within the Territory as specified in that subsection, then, if no proceedings in respect of the suspected offence in connection with which the seizure was made have been instituted within 14 days after the arrival of the boat at that place and if the master, the owner or the charterer of the boat or the agent of the owner or the charterer so demands, the thing shall be released.
	(5) In this section "the specified period" means the period of 14 days after the seizure of the thing in question or such longer period as a court may allow in any particular case.
	(6) Notwithstanding any other provision of this Ordinance, where any perishable goods (that is to say, fish or fish products or other goods which are subject to decay unless kept in storage facilities specially designed or adapted for that purpose) have been seized under any provision of this Ordinance and
	(a) before the elapse of any period after which, under any provision of this Ordinance, those goods must, on demand, be released; or
	(b) before any such demands is made; or
	(c) before the conclusion of any proceedings pending which those goods are being held,
	a court is satisfied that, because of the deteriorating condition of the goods, it is no longer practicable to keep them, the court may order them to be destroyed or otherwise disposed of; and no compensation therefor shall be payable to the owner of the goods or to any other person claiming an interest in them.
Security for release of seized or detained boat, etc.	14 (1) Where a fishing boat is seized or detained under this Ordinance or under any regulations made under section 21 in connection with a suspected offence under this Ordinance or under any such regulations and proceedings for that offence are instituted against the master, the owner or the charterer of the boat or the agent of the owner or the charterer, the master, the owner or the charterer may, at any time before the conclusion of those proceedings, apply to the court which is, or will be, seised of the proceedings for the release of the boat on the provision of security in accordance with this section.
	(2) If, on an application under subsection (1), the court is satisfied that adequate security has been given to the Crown as specified in subsection (3), it may order the release of the boat.
	(3) The security which is to be given to the Crown for the purposes of subsection (2) is security for the aggregate of
	(a) the maximum fine that may be imposed on the defendant for the offence with which he is charged;
•	(b) a sum representing the value (as estimated by the court) of anything that may in due course be ordered under section 17(3) to be forfeited to the Crown; and

(c) such sum by way of costs and expenses as the court estimates may in due course be ordered by the court to be paid to the Crown under section 17(6),

or for such lesser aggregate sum as the prosecution agrees to and the court approves.

(4) If, on an application under subsection (1), the court is not satisfied as mentioned in subsection (2), it may order the release of the boat on the execution by one or more suitable persons approved by it of a bond, in the prescribed form (or in such form as it may specially approve) and conditioned in accordance with subsection (5), in an amount corresponding to the aggregate of the sums specified in paragraphs (a), (b) and (c) of subsection (3) or in such lesser amount as the prosecution agrees to and the court may fix having regard to any special circumstances of the case; but the order for release shall not have effect until the bond is executed to the satisfaction of the court.

(5) The condition of a bond executed for the purposes of subsection(4) shall be that if

(a) at the conclusion of the proceedings, the defendant is not convicted of the offence with which he was charged; or

(b) having been convicted of that offence, he pays in full and within 14 days (or such longer period as the court may, on application by him, allow) the fine imposed on him by the court, the sum specified in subsection (3) (b) (or such lesser sum as the court may allow, having regard to such order for forfeiture as has in fact been made) and the amount of any costs and expenses ordered by the court to be paid to the Crown,

the bond shall then be of no effect, but that it shall otherwise, on the expiry of the said 14 days (or such longer period as aforesaid), be of full effect and enforceable.

(6) Without prejudice to any remedy available for the enforcement of any fine imposed, or any other order made, by the court, the sum for which a bond is executed for the purposes of this section is, when the bond has become enforceable, due to the Crown as a civil debt owed by the person, or owed jointly and severally by the persons, who executed the bond, and is recoverable as such.

(7) In this section references to the release of a boat that has been seized or detained include references to the release of any person on board it and any thing seized with it or on board it at the time when it was seized or detained.

Fisheries Protection Officer' immunity form process. 15. No civil suit or criminal process shall be brought against any Fisheries Protection officer, or against any person acting under the direction of a Fisheries Protection Officer, in respect of any act performed by him, in good faith and with reasonable cause, in the exercise or purported exercise of his functions under this Ordinance or under any regulations made under section 21.

Obstruction of Fisheries Protection Officers. 16. Without *prejudice to any other provision in that behalf contained in this Ordinance or in any regulations made under section 21, any person who wilfully obstructs a Fisheries Protection officer, or any person acting under the direction of a Fisheries Protection Officer,

in the exercise of his functions under this ordinance or under such regulation or who, without reasonable cause (the onus of proof of which lies on him), refuses or neglects to comply with any order, direction or requirement lawfully given to him or laid on him by a Fisheries Protection Officer, or by any person acting as aforesaid, or to answer any question reasonably put to him by a Fisheries Protection Officer, or by any person acting aforesaid, or who prevents another person from so complying or so answering is guilty of an offence and is liable, on conviction, to a fine of £100,000.

17.- (1) Any person who commits a contravention of any provision of this Ordinance or of any regulations made under section 21 (being a contravention which is not, by any such provision other than this subsection, specifically declared to be an offence) commits an offence under this subsection and is liable, on conviction, to a fine of £100,000.

(2) Without prejudice to section 319 of the Penal Code, any person who attempts to commit an offence under this Ordinance or under any regulations made under section 21 commits an offence under this subsection and is liable, on conviction, to the same fine as if he had committed the attempted offence.

(3) Without prejudice to any provision of this Ordinance authorising the imposition of a fine in any such case, where a person is convicted of any offence under this ordinance or under any regulations made under section 21 (being an offence in respect of the use or operation of a fishing boat), the court may, in addition to imposing a fine but subject to subsection (4), order that any fishing or other gear, or instruments or appliances, on board the boat (whether or not used in the commission of the offence), and any fish or fish products on board the boat (whether or not the offence related thereto), shall be forfeited to the Crown; and anything so forfeited shall then be disposed of as the Commissioner may direct.

(4) A court may not make an order for forfeiture under subsection (3) save on application made by or with the authority of the Principal Legal Adviser.

(5) Notwithstanding any provision of law limiting the time within which proceedings may be commenced, proceedings for an offence under this Ordinance or under any regulations made under section 21 may be commenced at any time after the commission of that offence.

(6) Notwithstanding section 194(1) of the Criminal Procedure Code 1986, the Magistrates' Court, on convicting any person of an offence under this Ordinance or under any regulations made under section 21,

Offences penalties, evidence and proceedings, etc. jurisdiction to impose on him any fine to which he is liable under this Ordinance or under those regulations for that offence; and notwithstanding section 226(1) of that Code, any court may, in such a case, order that person to pay to the Crown such costs and expenses incurred by the Crown in preparation for or otherwise in connection with the proceedings as it thinks proper

(including the expenses incurred, whether before or after the commencement of the proceedings, in the exercise of any of the powers vested in a Fisheries Protection Officer).

(7) Every Fisheries Protection Officer shall be \underline{ex} officio a public prosecutor in proceedings for offences under this Ordinance or under any regulations made under section 21.

(8) Without prejudice to any liability for an offence under section 7(2) or under section 10, the master of a fishing boat on which there is found fish that has been caught or taken within the fishing waters otherwise than in accordance with a fishing licence or that has been transhipped to the boat within the fishing waters otherwise than in accordance with a transhipment licence is guilty of an offence and is liable, on conviction, to a fine of £200,000; and in any proceedings in any such case, whether for an offence under this subsection or for an offence under section 7(2) or section 10 or under regulations made under section 21, it shall be sufficient for the prosecution to prove that the fish was found on the boat and the onus of proving

(a) that the fish was not caught or taken within the fishing waters; or, alternatively,

(b) that it was caught or taken in accordance with a fishing licence; or, alternatively,

(c) that it was transhipped to that boat outside the fishing waters or in accordance with a transhipment licence,

shall then lie on the accused.

(9) A certificate signed by the Director or by any person authorised by him to sign such a certificate

(a) as to whether or not, at any material time specified in the certificate, a fishing boat so specified was licensed under this Ordinance; or

(b) as to the nature of any such licence; or

(c) as to any limitations imposed on, or conditions attached to, any such licence;

(d) as to who was the person to whom any such licence was granted,

shall, if tendered in evidence in any proceedings under this Ordinance or under any regulations made under section 21, be sufficient evidence of that matter unless the contrary is proved.

(10) Any certificate which purports to be such a certificate as is mentioned in subsection (9) shall, in any such proceeding as aforesaid, be received in evidence as such, without proof of signature or of authorisation to sign, unless credible evidence to the contrary is adduced; and a facsimile copy of such a certificate shall be received in evidence as if it were the original certificate.

Revocation of licences of repeated offenders. 18.- (1) Where any person has once been convicted of any offence to which this section applies and is, within the period of five years following the date of that conviction, convicted of the like or any other such offence committed after that date, then, subject to subsection (3), any licence which he then holds is thereupon revoked and he shall, for the period of three years following the date of that subsequent conviction, be disqualified from being granted any further licence.

(2) Where a licence is revoked in accordance with subsection (1), no part of any fee that was charged for the licence shall be refunded unless the Director considers that it is appropriate, in all the circumstances of the case, to make such a refund.

(3) If any person whose licence is revoked in accordance with subsection (1) applies to the Director within 30 days of the conviction by virtue of which it is revoked or within such longer period as the Director may allow, the Director, in his discretion and having regard to all the circumstances of the case, may restore the licence, with effect from such date and with such variations and subject to such conditions as he thinks fit, and may remove, or reduce the duration of, or vary in such other respect as he thinks fit, the disqualification imposed by that subsection.

(4) The offences to which this section applies are any offences under this Ordinance (or under any Ordinance repealed by this Ordinance) or under any regulations made (or deemed to be made) under section 21.

Administrative penalties for minor offences 19.- (1) Where the Commissioner believes that an offence under this Ordinance (other than an offence under section 7(2)) or under any regulations made under section 21 has been committed by any person in connection with a fishing boat and he considers-

(a) that the offence is a minor offence; and

(b) that, having regard to the previous conduct of that person and the way in which the operations of the boat have previously been conducted, it would be appropriate to impose a penalty under this section instead of instituting proceeding before a court for that offence,

then, unless proceedings for that offence have already been instituted against that person, he may cause a notice in writing, in accordance with subsection (2) and in the prescribed form, to be served on that person. (2) A notice under subsection (1) shall specify(a) the date and nature

of the alleged offence;

(b) a summary of the facts on which the allegation is based (being a sufficiently full and fair summary to inform the recipient of the notice of the allegation against him); and

(c) any other matters (other than previous convictions) which the Commissioner considers relevant to the imposition of a penalty,

and a copy of the provisions of this section shall be attached to the notice.

(3) Any person on whom a notice under subsection

(1) has been served may, within 28 days thereafter, serve a notice in writing and in the prescribed form on the Commissioner, requiring that any proceedings in respect of the alleged offence shall be dealt with by a court; and, when a notice under this subsection has been so served, no further proceedings may be taken under this section but nothing that has previously been done under this section shall prevent the institution of, or in any way affect, any proceedings before a court for the alleged offence.

(4) Any person on whom a notice under subsection(1) has been served who does not require that any proceeding in respect of the alleged offence shall be dealt with by a court may, within 28 days of that notice, serve a notice, in writing and in the prescribed form, on the Commissioner

(a) admitting the offence; and

(b) making such submissions to the Commissioner as he wishes concerning any matters which he asks the Commissioner to take into account in imposing a penalty under this section.

(5) If a person on whom a notice under subsection (1) has been served does not, within 28 days thereafter, serve on the Commissioner either a notice under subsection (3) or a notice under subsection (4), he shall be deemed to have admitted the offence.

(6) Where a person has, under subsection (3), admitted the offence or is deemed, under subsection (4), to have admitted it, the Commissioner may, after taking into account any submissions made under subsection (4), impose a monetary penalty on that person, not greater than one-third of the maximum fine to which he would be liable if convicted of that offence by a court.

(7) The admission, or deemed admission, of an offence, and the imposition of a penalty, under this section shall not be regarded for any purpose as a conviction for an offence.

(8) Where the Commissioner imposes a penalty under this section on a person, he shall cause a notice in writing and in the prescribed form

to be served on that person, giving the particulars of the penalty.

(9) A person on whom a notice has been served under subsection (8) shall, within 28 days thereafter, pay the penalty thereby notified, failing which it may be enforced in like manner as a fine imposed by a court for an offence.

(10) Where an offence is admitted, or deemed to be admitted, under this section by any person, no proceedings for that offence may be instituted against him before any court.

Non-payment of fines, etc: detention and forfeiture of boat. 20.- (1) When any fine is imposed on the master, the owner or the charterer of a fishing boat for an offence under this Ordinance or under any regulations made under section 21, or where any sum is ordered by a court to be paid by him to the Crown by way of costs or expenses incurred in connection with the proceedings for that offence, then, if no security therefor has been given, or bond for the payment thereof has been executed, under section 14, or if the court considers that any such security or bond is inadequate to secure the payment of the sums due from him in consequence of his conviction (including the value of anything ordered to be forfeited to the Crown that is not already being detained under this Ordinance), it may order that, in default of payment forthwith of all such sums, he shall give security (or additional security) therefor to the satisfaction of the court; and, subject to subsection (2), his fishing boat may then be detained (or continue to be detained) in such place within the Territory as the court may order until all such sums are paid (and

anything ordered to be forfeited but not already detained has been surrendered to the court) or until security is given as aforesaid.

(2) If any such fine as is referred to in subsection (1) or any such sum by way of costs and expenses as is there referred to remains unpaid for more than 30 days (or such longer period as the court may allow) after it was imposed or was ordered to be paid, the court may, subject to subsection (3), order that the fishing boat concerned shall be forfeited to the Crown; and it shall then be disposed of as the Commissioner may direct.

(3) A court may not make an order for forfeiture under subsection (2) save on application made by or with the authority of the Principal Legal Adviser.

(4) An order for the forfeiture of a fishing boat under this section may extend to such of its fishing and other gear, its instruments and appliances, its stores and cargo and any fish and fish products on board it as the court may direct.

Regulations.

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21.- (1) The Commissioner may make such regulations as he considers necessary for the purposes of this Ordinance.

(2) Without prejudice to the generality of subsection (1), regulations made by the Commissioner may provide for or may authorise the Director to provide for or to determine

(a) anything which is to be, or which may be, prescribed under this

Ordinance;

(b)' the forms to be used for the purposes of this Ordinance;

(c) all questions relating to the procedures for applying for licences;

(d) all questions relating to the procedures for granting licences;

(e) the conditions subject to which licences are to be, or may be, granted;

(f) the fees to be charged for licences and the method of computing such fees;

(g) the equipment to be carried on hoard fishing boats;

(h) the reports and notifications to be made, and the records and logs to be kept, in respect of fishing boats or in respect of fishing or otherwise for the purposes of this ordinance or for the purposes of any regulations made under this section (and the procedures relating thereto);

(i) the designation, by applicants for licences or by licensees, of authorised agents, and the authority to be attributed to, and the obligations and liabilities to be assumed by or imposed on, such agents;

(j) the place or places where persons who are to be designated as authorised agents may reside or have their place of business;

(k) the execution, by applicants for licences or by licensees or by other persons, of bonds (or the provision by them of other forms of security) for securing compliance with obligations arising under a licence or otherwise arising under the provisions of this Ordinance or of any regulations made under this section;

(1) the placing on board fishing boats of Fisheries Protection Officers or of observers, and the facilities and conditions to be accorded to them while on board;

(m) the conferment on Fisheries Protection Officers, or persons acting under their direction, of such powers, additional or supplementary to those conferred by this Ordinance, as the Commissioner considers necessary or expedient for the regulation of fishing boats or of fishing or otherwise for the purposes of this ordinance or for the purposes of any regulations made under this section.

(3) Regulations made under this section may make different provision for (and the Director, in exercising an authority conferred by such regulations to make provision for any matter or to determine any matter, ma; make different provision for or a different determination in respect of) different parts of the fishing waters or different boats or boats of different descriptions (including descriptions which differ by reference to the countries in which the boats are registered) or different licences or different descriptions of licences.

(4) Regulations made under this section may provide that the contravention of any provision thereof shall constitute an offence, and may prescribe, as the penalty for any such offence, a fine not exceeding $\pounds 100,000$.

Saving for laws regulating access to Territory, etc. 22.- For the avoidance of doubt, nothing in this Ordinance shall be construed as in any way derogating from the provisions of the Immigration Ordinance 1971 or the British Indian Ocean Territory Waters (Regulation of Activities) Ordinance 1997.

Repeal and savings.

23.- (1) The Fisheries (Conservation and Management) Ordinance 1991 ("the 1991 Ordinance") and the Fisheries (Conservation and Management) (Extension of Enforcement Powers) Ordinance 1997 are repealed.

(2) Without prejudice to section 21(1) or section 22(2) of the Interpretation and General Provisions Ordinance 1993, the repeal of the 1991 Ordinance does not affect

(a) the continuing operation, according to its tenor, of any licence granted or other instrument made under or for the purposes of that ordinance; or, in particular,

(b) the continuing operation of the Fishing Regulations 1993;

and any such instrument (including the said Regulations;" shall thereafter be deemed to have been granted or made under the relevant enabling provision of this Ordinance or, as the case may require, for the purposes of this Ordinance, and any reference therein to a particular provision of the 1991 Ordinance shall thereafter be construed as if it were a reference to the corresponding provision of this Ordinance.

(3) Notwithstanding subsection (1) and without prejudice to subsection 21(1) of the Interpretation and General Provisions Ordinance 1993, proceedings may be instituted after the commencement of this Ordinance for an offence alleged to have been committed before that commencement under any provision repealed by subsection (1), and any such proceedings shall be dealt with for all purposes as if this ordinance had not been enacted and the repealed provision remained in force; and any proceedings that were instituted before the commencement of this ordinance by virtue of any provision repealed by subjection (1) may be continued thereafter and may -Likewise by dealt with for all purposes as if this Ordinance had not been enacted and the repealed provision remained in force.

S.I. No. 3 of 1993

THE BRITISH INDIAN OCEAN TERRITORY

The Fisheries (Conservation and Management) Ordinance 1991

The Fishing Regulations 1993

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IN EXERCISE of the powers conferred on me by section 21 of the Fisheries (Conservation and Management) Ordinance 1991 as amended by the Fisheries (Conservation and Management) (Amendment) (No. 2) Ordinance 1993, I hereby make the following Regulations:

PART 1

INTRODUCTORY

Citation and 1. - (1) These Regulations may be cited as the Fishing Regulations commencement. 1993.

(2) These Regulations shall come into force on 1 January 1994 and shall thereafter be deemed to have come into force immediately after the commencement of the Ordinance, that is to say, on 1 October 1991.

(3) Without prejudice to section 6(5) of the Interpretation and General Provisions Ordinance 1993, no person shall be guilty of an offence under these Regulations or be liable to any penalty thereunder by reason of anything done or omitted before 1 January 1994.

Interpretation.

2. - (1) In these Regulations, unless the contrary intention appears -

"agent", in relation to the owner or charterer of a licensed fishing boat or a licensed transhipment boat, means the person for the time being engaged as his agent in pursuance of regulation 5;

"the Convention of 1969" means the International Convention on Tonnage Measurement of Ships, 1969;

"the Director" means the Director of Fisheries;

"fee", in relation to a fishing licence or a transhipment licence, means the fee therefor that is prescribed by Regulations made under the Ordinance or, if there are no such Regulations prescribing that fee or subject to any such Regulations, the fee therefor that is determined by the Director;

"fishing boat notification application" means an application for a fishing boat notification number made in accordance with regulation 4(2);

"fishing licence application" means an application for a fishing licence made in accordance with regulation 4(1);

"the International Tonnage Rules" means the Regulations for Determining Gross and Net Tonnages of Ships annexed to the Convention of 1969;

"Khz" means kilohertz, that is to say, one thousand cycles per second;

"licence" means a fishing licence or, as the case may require, a transhipment licence;

"licensed fishing boat" means a fishing boat which is specified in a fishing licence;

"licensed transhipment boat" means a fishing boat which is specified in a transhipment licence (whether or not it is also a licensed fishing boat);

"licensee" means a person granted a fishing licence or, as the case may require, a transhipment licence:

"to lodge", in relation to an application to the Director made under these Regulations, means to cause that application to be actually delivered to the Director at the address specified in regulation 4(3) and in a manner approved by him;

"mhz" means megahertz, that is to say, one million cycles per second;

"the Ordinance" means the Fisheries (Conservation and Management) Ordinance 1991;

"patrol vessel" means a vessel for the time being engaged in the surveillance and policing of the fishing waters for the Government of the Territory;

"period of validity", in relation to a licence, means the period specified in the licence as the period during which the activity authorised by the licence may lawfully be carried out;

"surveillance aircraft" means an aircraft for the time being engaged in the surveillance of the fishing waters for the Government of the Territory; and "VHF" means very high frequency, that is to say, a single radio frequency or band lying between 300 mhz and 30 mhz.

(2) Where these Regulations require any form or other document or thing or any procedure or other matter to be as approved by the Director, it shall be deemed to be as so approved if it conforms with what is for the time being specified or otherwise indicated in that behalf in or under the relevant Administration Documentation and Guidance or other similar document (by whatever name called) issued by or on behalf of the Director for the purposes of the administration of the Fisheries Management and Conservation Zone (including any guidance issued under regulation 36.)

(3) Where, under these Regulations, any communication or requirement relating to the operation, navigation or other handling of a fishing boat falls to be made by the Director to the master of the boat or by the master to the Director, it may be made by or to any Fisheries Protection Officer on behalf of the Director.

(4) In these Regulations, or in any licence or in other documents issued in pursuance of these Regulations, "prescribed" means prescribed by or under these Regulations and includes specified or otherwise indicated as referred to in paragraph (2) or otherwise specified or indicated by the Director.

PART II

FISHING LICENCES AND LICENSED FISHING BOATS

Application of this Part.

Applications for fishing licences and fishing boat notification numbers. 3. This Part applies to applications for fishing licences, to the grant, content and incidents of such licences, to operations undertaken under such licences and to the obligations of persons in relation to licensed fishing boats.

4. - (1) Subject to the following provisions of this regulation, every application for a fishing licence shall be made in a form approved by the Director and shall be lodged with the Director, in a manner approved by him, not less than 7 days before the date specified in the application as the date on which the licence is required.

(2) Subject to the following provisions of this regulation, before a fishing licence application is lodged with the Director in respect of any fishing boat, there shall have been lodged with him, not less than 7 days previously and in a manner and form approved by him, an application for a fishing boat notification number specific to that boat; and that number, when notified to the applicant by the Director, shall thereafter be cited in all communications with the Director relating to that boat, including any fishing licence application in respect thereof.

(3) Fishing licence applications and fishing boat notification applications shall be lodged with the Director at the following address:-

"The Director of Fisheries, British Indian Ocean Territory, c/o Marine Resources Assessment Group Limited, 8 Prince's Gardens, LONDON, SW7 INA, ENGLAND."

(4) The Director may, in his discretion, accept a fishing licence application or a fishing boat notification application that has been lodged with him after the time specified therefor in paragraph (1) or, as the case may be, paragraph (2).

(5) Subject to paragraph (6), each fishing boat notification application shall be accompanied by the International Tonnage Certificate (1969), issued pursuant to the Convention of 1969, relating to the fishing boat in respect of which the application is made.

(6) If any fishing boat in respect of which a fishing boat notification application is made is not registered in a country whose Government is a Party to the Convention of 1969, the Director may, in his discretion, accept such evidence as he thinks fit of the dimensions and other relevant features of that boat and, using such method of calculation as he thinks fit, calculate therefrom the gross tonnage of that boat; and the tonnage so calculated shall be deemed to be the gross tonnage for the purposes of determining any fee payable for a licence in respect of that boat.

(7) Notwithstanding that the Director has issued a fishing boat notification number in respect of a fishing boat, he may, then or at any time thereafter, require, as a condition of his granting a fishing licence in respect of that boat, that the fishing licence application -

- (a) be lodged with him by a date specified by him; and
- (b) subject to paragraph (8), be accompanied by the deposit of such sum as he may specify.

(8) The sum that is payable by way of deposit under paragraph (7) shall be paid in such manner as the Director may direct, but the Director may instead accept security for such payment either in the form of irrevocable letters of credit or in any other form satisfactory to him.

(9) The sum that has been paid by way of deposit under paragraph (7) shall be refunded to the applicant (or the security that has been given therefor shall be returned or cancelled, as the case may require) if no licence is granted; but if a licence is granted, that sum (or the sum so secured) shall be applied towards the payment of the fee for the licence.

5. - (1) The owner or the charterer, as the case may be, of a fishing boat shall, before a fishing boat notification application is lodged in respect of that boat, engage a person as his agent in respect of that boat for the purposes of these Regulations and that person shall be so designated to the Director in the application.

(2) The owner or the charterer of a fishing boat who has, in accordance with this regulation, engaged a person, and designated him to

Agents.

the Director, as his agent in respect of that boat may, at any time thereafter, engage, and designate to the Director, another person as his agent in respect of that boat for the purposes of these Regulations and, if the Director approves that designation, that other person shall, for all such purposes, replace the person previously so designated.

(3) A person who is for the time being designated under paragraph (1) or, with the approval of the Director, under paragraph (2) as the agent of the owner or charterer in respect of a fishing boat shall be deemed for the purposes of these Regulations to have the full and irrevocable authority of his principal in connection with any fishing operations of that boat or any related activity (including any proposed such operations or activity), and such authority shall include, without prejudice to the generality of the foregoing, authority (for the purposes aforesaid) to incur financial or other legal liability on behalf of his principal in connection with any such operations or activity and authority (for the purposes aforesaid) to receive service on behalf of his principal of any notice, summons or other document issued in or for the purposes of any legal proceedings arising out of or otherwise connected with any such operations or activity.

(4) The designation of a person as the agent of the owner or charterer of a fishing boat shall not be effective for the purposes of this regulation unless that person resides or has his place of business in a country approved in that behalf by the Director.

(5) The designation of a person under this regulation as the agent of the owner or charterer of a fishing boat shall be made to the Director in such manner and with such details as may be approved by the Director or otherwise be directed by him.

Bond or security.

6. The licensee or the agent of the licensee shall, if so required by the Director before or after the grant of a fishing licence, either-

- (a) execute and maintain a bond, in an amount and form satisfactory to the Director, to guarantee compliance with the Ordinance, with these and any other Regulations made thereunder and with any conditions to which the licence is subject; or
- (b) provide such other financial or other security for that purpose as the Director may approve.

7. - (1) A fishing licence may be granted in respect of only one fishing boat, which shall be specified in it, and shall not be transferable.

(2) Every fishing licence shall bear its own serial number allocated by the Director, and the master of a licensed fishing boat shall, on demand by any Fisheries Protection Officer, inform him of the number of the licence granted in respect of that boat.

(3) The Director may, before granting a fishing licence in respect of a fishing boat –

Fishing licences.

- (a) require that there shall be produced to him the ship's papers of the boat and such drawings and diagrams relating to its construction as he may specify;
- (b) require the master to permit a Fisheries Protection Officer to inspect the boat and to take measurements and photographs of it and of any equipment or apparatus carried on board it.

(4) A fishing licence shall be granted for such fixed period or fixed periods as the Director may decide.

(5) A fishing licence, when granted, shall be issued to the master of the fishing boat specified in it in London or, at the request of the applicant, in such other place as the Director may agree.

(6) Every fishing licence shall contain, or have endorsed on or annexed to it, or refer to, the conditions subject to which it is granted.

(7) Without prejudice to regulations 5(2) and 5(5), if, at any time when a fishing licence is in force, a change takes place in any circumstance or respect which was required, by or under these Regulations, to be notified to the Director in or together with the application for that licence, that change shall, within 30 days of the day on which it took place (or such longer period as the Director may in any particular case allow), be notified to the Director by the owner or charterer of the boat, or by his agent, in a manner and form approved by the Director.

8. Every licensed fishing boat engaged in fishing in the fishing waters shall be equipped with radio equipment capable of providing radio telephony (voice) communications using maritime frequencies in the High Frequency and VHF bands.

9. - (1) Every licensed fishing boat, at all times when it is within the fishing waters, shall carry a copy of the International Code of Signals published by the International Maritime Organisation and an appropriate set of flags and shall at all such times carry persons competent to exchange messages by means thereof with a Fisheries Protection Officer embarked in any vessel or aircraft.

(2) In every communication by radio, flag or light between any licensed fishing boat in the fishing waters and a Fisheries Protection Officer, the signals specified in the International Code of Signals shall be used.

Navigational charts and aids to be carried.

Information on entry into and departure from fishing waters. 10. Every licensed fishing boat, at all times when it is within the fishing waters, shall carry appropriate navigational charts and publications and be fitted with such electronic navigational aids as will enable the master accurately to ascertain its position in the fishing waters.

11. - (1) The master of a licensed fishing boat who intends his boat to enter the fishing waters shall, not more than 48 hours or less than 12 hours before the entry of the boat into the fishing waters, inform the Director of his intention.

Compulsory radio equipment.

International Code of Signals and flags to be carried and Code to be used.

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(2) The master of a licensed fishing boat who intends his boat to leave the fishing waters shall, before the boat leaves the fishing waters and in sufficient time for the carrying out, if the Director so requires, of the procedures provided for by regulation 12, inform the Director of his intention.

(3) The information required by this regulation to be given to the Director shall be so given in such form and manner as is approved by him or as he may from time to time specifically prescribe or direct.

12. - (1) The master of a licensed fishing boat whose boat is about to leave the fishing waters shall, if so required by the Director, bring the boat to such place within the Territory as the Director may designate for the purpose of its being inspected by a Fisheries Protection Officer or other person authorised in that behalf by the Director.

(2) The master of a licensed fishing boat whose boat is about to leave the fishing waters shall, if so required by the Director, deliver to the Director, before leaving the fishing waters, the fishing log referred to in regulation 13(2).

13. - (1) The master of every licensed fishing boat engaged in fishing in the fishing waters shall keep a radio log in a form approved by the Director.

(2) The master of every licensed fishing boat engaged in fishing in the fishing waters shall keep a fishing log in a form approved by the Director.

(3) The radio log and the fishing log shall, on demand by a Fisheries Protection Officer, be produced to him for inspection and copies thereof or copy extracts therefrom shall also, on demand, be given to him, without payment.

14. If the main radio equipment of a licensed fishing boat becomes unusable while the boat is within the fishing waters, the master shall make adequate arrangements for all information which he is required, by or under these Regulations, to furnish to the Director to be relayed to the Director through another vessel.

15. - (1) The International Radio Call Sign of each licensed fishing boat within the fishing waters shall be prominently displayed on that boat in accordance with international standards as set out in the publication of the Food and Agriculture Organisation entitled "The Standard Specifications for the Marking and Identification of Fishing Vessels."

(2) The letters and numbers of the Call Sign shall be painted in black on a white background or in white on a black background and the paintwork where they are painted shall be maintained in good condition so that they are clearly visible at all times.

16. The master of each licensed fishing boat shall ensure that, while it is within the fishing waters, there shall be at least one member of its crew who is able to speak English, and understand spoken English, with reasonable fluency.

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Post-fishing

inspection and

delivery of log.

Log books.

If radio is unusable.

Display of radio call signs.

English-speaking crew-member.

Radio listening watches.

17. The master of each licensed fishing boat shall cause a continuous listening watch to be maintained on VHF marine band Channel 16 and 2182 Khz while the boat is within the fishing waters, but these frequencies shall be used as calling and distress frequencies only and shall not be used for inter-ship communications.

PART III

TRANSHIPMENT LICENCES AND TRANSHIPMENT OF FISH

Application of this Part.

Each fishing boat taking part in transhipment to be licensed.

Applications for transhipment licences.

18. This Part applies to applications for transhipment licences, to the grant, content and incidents of such licences, to operations undertaken under such licences and to the obligation of persons in relation to licensed transhipment boats.

19. - (1) No transhipment of fish shall take place within the fishing waters unless a transhipment licence is in force with respect to each fishing boat taking part in the transhipment, that is to say, the fishing boat from which the fish is passed, the fishing boat which receives the fish and any fishing boat which transports from the territorial sea or internal waters of the Territory any fish previously transhipped.

(2) If (but only if) it purports to do so, a fishing licence may also operate as a transhipment licence and may accordingly include, in addition to conditions or other provisions relating to fishing by the fishing boat specified in it, such conditions or other provisions relating to the transhipment of fish by that boat as are authorised under section 7 of the Ordinance.

20. - (1) An application for a transhipment licence may be made by the owner or charterer of the fishing boat in respect of which the licence is required or by the master of that boat on behalf of the owner or charterer.

(2) An application for a transhipment licence shall be made in a form approved by the Director or as otherwise directed by him and shall be lodged with the Director, not less than 72 hours before the date specified in the application as the date on which the licence is required, in a manner approved by him or as otherwise directed by him:

Provided that, unless and until the Director directs otherwise, the lodging of an application may be effected by causing it to be actually delivered to him, at the address specified in paragraph (3), by post, telex, telegram or facsimile transmission.

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(3) Applications for transhipment licences shall be lodged with the Director at the following address:

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"The Director of Fisheries, British Indian Ocean Territory, c/o Marine Resources Assessment Group Limited, 8, Prince's Gardens, LONDON, SW7 INA, ENGLAND."

(4) The Director may, in his discretion, accept an application for a transhipment licence that has been lodged with him after the time specified therefor in paragraph (2).

(5) Without prejudice to the foregoing provisions of this regulation, where the fishing boat in respect of which a transhipment licence is applied for does not already have a fishing boat notification number, the provisions of regulations 4, 5 and 6 (relating to applications for and the grant of such numbers, to the appointment of agents and to the execution and maintenance of bonds or the provision of other security) have effect in relation to the application for and the grant of the transhipment licence as they have effect in relation to an application for and the grant of a fishing licence.

Transhipment licences.

- 21. (1) A transhipment licence shall be valid only-
 - (a) in respect of the fishing boat specified in the licence;
 - (b) for a fixed period or for fixed periods, as specified in the licence;
 - (c) for a fixed number or a fixed quantity, or for both a fixed number and a fixed quantity, of transhipments of fish, as specified in the licence; and
 - (d) for a fixed place or for fixed places of transhipment, as specified in the licence.

(2) A transhipment licence, when granted, shall be issued to the master of the fishing boat specified in it in London or, at the request of the applicant, in such other place as the Director may agree.

(3) Every transhipment licence shall contain, or have endorsed on or annexed to it, or refer to, the conditions subject to which it is granted.

(4) Every separate transhipment licence (that is to say, a transhipment licence other than a fishing licence which also operates as a transhipment licence by virtue of regulation 19(2)) shall bear its own serial number allocated by the Director, and the master of a licensed transhipment boat shall, on demand by any Fisheries Protection Officer, inform him of the number of the licence (whether a fishing licence or a separate transhipment licence) granted in respect of that boat.

(5) Without prejudice to regulations 5(2) and 5(5), if, at any time when a transhipment licence is in force, a change takes place in any circumstance or respect which was required, by or under these Regulations, to be notified to the Director in or together with the application for that licence, that change shall, within 30 days of the day on which it took place (or such longer period as the Director may in any particular case allow), be notified to the Director by the owner or charterer of the boat, or by his agent, in a manner and form approved by the Director.

22. Where a fee is payable for a transhipment licence, the Director may, as a condition of his granting the licence, require-

- (a) that the fee is first paid in full; or
- (b) that payment thereof is first secured by irrevocable letters of credit or by other means satisfactory to him.

Application of certain regulations in Part II.

Fees.

23. Without prejudice to regulation 24, regulations 8, 9, 10, 13, 14, 15, 16 and 17 apply to all licensed transhipment boats as they apply to licensed fishing boats.

PART IV

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PROVISIONS APPLYING TO ALL FISHING BOATS

Application of this Part.

Compliance with instructions from patrol vessels.

Compliance with instructions from surveillance aircraft. 24. This Part applies to the operations of all fishing boats within the fishing waters and to the obligations of persons in relation to all such boats within those waters.

25. - (1) The master of a fishing boat within the fishing waters shall comply with any instruction, order or requirement given from a patrol vessel by or at the direction of a Fisheries Protection Officer.

(2) The instruction that a fishing boat in the fishing waters should stop for boarding and inspection by a Fisheries Protection Officer will be conveyed by VHF radio marine band on the ship-to-ship calling channel (Channel 16) or by the international code signal "SIERRA QUEBEC 3" or by flashing, by a signal lamp from a patrol vessel, the morse code symbol "LIMA" (that is to say, "You should stop your vessel instantly"); but if contact cannot be made by any of these means, the patrol vessel will direct a series of flashing white lights towards the fishing boat and this shall be interpreted as an instruction to the master of the fishing boat that it must forthwith desist from any previous manoeuvre, course or action and follow that patrol vessel.

26. - (1) The master of a fishing boat within the fishing waters shall comply with any instruction, order or requirement given from any surveillance aircraft by or at the direction of a Fisheries Protection Officer.

(2) A Fisheries Protection Officer on board a surveillance aircraft who wishes to communicate on Channel 16 of VHF radio marine band with a fishing boat in the fishing waters will cause the aircraft to signal the morse code symbol "KILOG" with a yellow light or to signal by switching its navigation and landing lights on and off. (3) If the fishing boat does not make radio contact with the aircraft in response to a signal given in accordance with paragraph (2), the Fisheries Protection Officer will cause the aircraft to waggle its wings from side to side and then to settle on a steady course; and this shall be interpreted as an instruction to the master of the fishing boat that it must forthwith desist from any previous manoeuvre, course or action and immediately proceed in the direction indicated by the aircraft (that is to say, following the course adopted by the aircraft after waggling its wings) and that he must at the same time attempt to make radio contact with a Fisheries Patrol Vessel or the fisheries authorities in the Territory (call sign CHAGOS FISHERIES 5144 mhz).

27 - (1) The master of a licensed fishing boat shall, when requested to do so by the Director, permit one or more official observers (being persons designated as such by the Director in writing) to board the boat and remain on board it, while it is within the fishing waters, for all or any of the following purposes, that is to say:-

- (a) recording scientific data and observations;
- (b) inspecting the boat's radio log and fishing log; and
- (c) taking samples;

and he shall permit any such observer to retain and remove from the boat any records, notes and samples taken by him.

(2) Where an official observer is on board a licensed fishing boat for a period of more than four hours, the master shall provide him with food and accommodation of the same standard as is provided to officers on board the boat.

(3) The master of a licensed fishing boat shall also provide the facilities referred to in paragraph (2) to any Fisheries Protection Officer who is compelled for any reason to remain on board the boat for a period of more than four hours.

(4) The master of a licensed fishing boat shall, at the request of a Fisheries Protection Officer or official observer who is on board the boat in pursuance of this regulation-

- (a) arrange for him to be able send or receive messages by means of radiotelegraph or radiotelephone facilities on board the boat; and
- (b) provide all reasonable assistance within his power to enable him to carry out his duties and functions.

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28. - (1) The master of a fishing boat which receives an instruction, in accordance with regulation 25(2), to stop for boarding and inspection shall cause the boat, so far as is consistent with the safety of navigation, to heave to and take all way off and shall, if instructed to permit a Fisheries Protection Officer to board, take such steps as, in accordance with good seamanship, are requisite or most convenient to facilitate such boarding.

Accommodation and facilities for observers and Fisheries Protection Officers.

Action on receiving instruction to stop for inspection. (2) A fishing boat which has hove to and taken way off in accordance with paragraph (1) shall not, without the permission of a Fisheries Protection Officer, again put on way.

Powers in relation to stopped fishing boats. 29. - (1) On instructing a fishing boat to stop in accordance with regulation 25(2), a Fisheries Protection Officer may also require the master-

- (a) to haul in his nets or discontinue the use of fishing gear;
- (b) to take such steps as the Fisheries Protection Officer may specify to desist from taking or catching fish;
- (c) to stow his fishing gear.

(2) Having boarded a fishing boat which has stopped pursuant to an instruction given in accordance with regulation 25(2). a Fisheries Protection Officer may-

- (a) require the master-
 - to cause radio communication to be maintained with a patrol vessel on such frequency or channel as he may direct;
 - to permit him to speak, by means of the boat's radio equipment, with a patrol vessel or with the Director or any other person;
 - (iii) in the case of a licensed fishing boat or a licensed transhipment boat, to produce any document or thing required to be carried on such a boat;
 - (iv) to produce the boat's navigation log, radio log and fishing log, any charts carried on the boat and any documents relating to its registration and tonnage;
 - (b) inspect and take copies, or require the master to furnish him with copies, of any documents produced to him pursuant to a requirement imposed under subparagraph (a);
 - (c) search and inspect and take photographs of the boat, any fish on board it and any fishing gear, apparatus or equipment on board it;
 - (d) impose any such requirement as, in the circumstances referred to in paragraph (1), might be imposed under that paragraph.

(3) The master of a fishing boat which has stopped pursuant to the instructions of a Fisheries Protection Officer-

 (a) shall comply with any requirement imposed on him by a Fisheries Protection Officer under paragraph (1) or paragraph (2);

- (b) shall furnish every assistance requisite to enable a Fisheries Protection Officer to do anything which he is authorised to do under paragraph (2);
- (c) shall not obstruct or hinder a Fisheries Protection Officer, or cause or permit him to be obstructed or hindered, in the performance of his duties.
- 30. (1) If a Fisheries Protection Officer-
 - (a) has reason to believe that an offence under the Ordinance, or under these or any other Regulations made under the Ordinance, has been committed in relation to a fishing boat; or
 - (b) considers it necessary or expedient so to do for the better carrying out of any search, examination or enquiry in relation to a fishing boat;

he may, whether or not he is then on board the boat, direct the master to bring or take it to such place within the Territory as he appoints.

(2) A direction under paragraph (1) may be modified or withdrawn by a Fisheries Protection Officer.

(3) The master of a fishing boat to whom a direction has been given under paragraph (1) shall comply with it or cause it to be complied with and shall cause the crew of the boat to take all steps necessary for that purpose.

31. - (1) The master of a fishing boat that has been brought or taken to a place within the Territory under regulation 30 shall ensure that the provisions of this regulation are complied with.

(2) On arrival at the appointed place within the Territory and at all times thereafter, the boat shall moor, anchor or make fast in such manner and in such anchorage, berth or other position as a Fisheries Protection Officer from time to time directs.

(3) After mooring, anchoring or making fast in accordance with paragraph (2), the boat may not be unmoored or up-anchor, nor may it slip its moorings or anchor or otherwise move from its mooring, berth or position, without the prior consent of a Fisheries Protection Officer.

(4) Paragraph (3) shall not prevent a fishing boat from being moved, without the prior consent of a Fisheries Protection Officer, within the confines of the port or harbour in which it is for the time being directed to moor, anchor or make fast to the extent that such movement is necessary, in accordance with the dictates of good seamanship, by reason of some emergency of tide, wind or water or other like emergency and to the extent that, in those circumstances, the boat or the safety of its crew would be hazarded by the delay attendant on obtaining such prior consent.

(5) Nothing in this regulation shall be construed as authorising any person on or connected with a fishing boat which is moored, anchored or made fast at any place within the Territory to land in the Territory, or in

Power to direct fishing boat to proceed to place within Territory.

Fishing boat brought to Territory under regulation 30 to remain moored as directed.
any other way to enter the Territory, unless he is in possession of a permit, or his name is endorsed on a permit, issued under the Immigration Ordinance 1971.

Saving for powers conferred by section 10 of Ordinance. 32. The powers conferred on a Fisheries Protection Officer by regulations 29 to 31 are without prejudice to the powers vested in him by section 10 of the Ordinance.

PART V

ADMINISTRATIVE AND GENERAL

Records, etc. to be in English.

Maintenance of records by Director. 33. All records (including logs), reports and notifications required to be made or maintained by or under these Regulations shall be made or maintained in English.

34. - (1) The Director shall make and maintain records of the following matters:-

- (a) all licences granted;
- (b) the date on which each licence was granted;
- (c) the name and address of each licensee;
- (d) the conditions, if any, subject to which each licence was granted;
- (e) the name of the fishing boat in respect of which each licence was granted and its country of registry, port of registry, registration number, fishing boat notification number and International Radio Call Sign;
- (f) the type of licence granted in each case;
- (g) in each case where the licence is a fishing licence-
 - (i) any limitation (in terms of species) on the fish that may be caught or taken;
 - (ii) any limitation (in terms of quantity or size) on the amount of fish, or fish of any species, that may be caught or taken;
 - (iii) if the licence is limited to fishing in a part or parts of the fishing waters, a sufficient description of that part or those parts, which description shall be by reference to

longitudinal and latitudinal co-ordinates except where the licence is limited to fishing in the internal waters of the Territory in which case the description may be by reference to a chart or map;

- (iv) the period or periods of validity of the licence;
- (h) in each case where the licence is a transhipment licence (whether or not it is also a fishing licence)-
 - (i) the period or periods of validity of the licence to tranship;
 - (ii) the number or quantity, or (as the case may be) the number and quantity, of transhipments of fish specified in the licence;
 - (iii) the place or places of transhipment specified in the licence;
 - (iv) whether the transhipment that is licensed is the transhipment of fish caught or taken in the fishing waters or is the transhipment of fish caught or taken elsewhere or is the transhipment of fish wherever caught or taken;
- all notifications and communications of any kind made to the Director by or on behalf of any person pursuant to the Ordinance, these Regulations or the conditions of any licence;
- (j) if any licence has been varied, the details of the variation, the date when it was made and the date when it was to take effect;
- (k) if any licence has been revoked, suspended or surrendered, the date when the revocation, suspension or surrender was made and the date when it was to take effect;
- (1) all fines or other penalties imposed on any person by any court or by way of administrative penalty for an offence under the Ordinance or under these or any other Regulations made thereunder;
- (m) all deposits and fees paid or owing by any applicant for a licence or any licensee pursuant to the Ordinance or to these or any other Regulations made thereunder or, where any such fees have not been paid in full, any security that has been given or any arrangements that have been made for the payment of those fees.

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(2) The records required by paragraph (1) shall be made and maintained in such manner as the Director may determine and may be so made or maintained wholly or partly on a computer.

35. - (1) The Director shall issue to each Fisheries protection Officer an identification document which shall-

Identity documents.

(a) bear the name and a photograph of the person to whom it is issued;

(b) state that that person is a Fisheries Protection Officer, and

(c) state its date of issue and period of validity.

(2) Every Fisheries Protection Officer shall produce his identification document whenever any person reasonably requests him to do so in relation to his performance of any of the functions of a Fisheries Protection Officer.

(3) Paragraphs (1) and (2) do not apply to a person who is a Fisheries Protection Officer by virtue of being any of the following, that is to say, a Peace Officer or an Imports and Exports Control Officer or a commissioned officer of any of Her Majesty's ships or the person in command or charge of any aircraft or hovercraft of the Royal Navy, the Army or the Royal Air Force.

36. - (1) The Director may from time to time issue to masters of fishing boats and other persons such written guidance or advice as he thinks fit relating to the observance, implementation and administration of the Ordinance and of these and other Regulations made thereunder or generally for the purposes of the administration of the Fisheries Management and Conservation Zone.

(2) Non-compliance with any such written guidance or advice shall not in itself constitute an offence (unless made an offence by, or by virtue of, some other provision of these Regulations) but the guidance or advice shall be admissible in evidence in any proceedings before a court and, if it appears to the court to be relevant to any question arising in those proceedings, shall be taken into account in determining that question.

37. -(1) Every patrol vessel for the time being operating as such outside the territorial sea or internal waters of the Territory shall be clearly marked on its sides and front with the words "FISHERIES PATROL" in capital letters in a colour contrasting with the colour of the background on which the words appear.

(2) Every patrol vessel for the time being operating as such within the territorial sea or internal waters of the Territory shall either be marked as specified in paragraph (1) or be clearly marked on its sides and front with the words "HARBOUR PATROL" in capital letters in a colour contrasting with the colour of the background on which the words appear.

(3) This regulation does not apply to Her Majesty's ships.

38. - (1) Any person who contravenes any provision of Parts I to IV or regulation 33 or any of the terms and conditions of a licence commits an offence under these Regulations. PENALTY - £100,000

(2) Any person who, without reasonable cause (the onus of proof whereof shall lie on him), refuses or fails to provide to the Director or any other Fisheries Protection Officer any information which he is required, by

Notes of Guidance.

Patrol vessels to be marked.

Offences and penalties.

or under these Regulations, to provide or who, in purported pursuance of these Regulations, provides to the Director or any other Fisheries Protection Officer any information -

- (a) which he knows to be false in any material particular; or
- (b) which, in any such particular, he does not believe to be true; or
- (c) which he knows to be misleading in any such particular

commits an offence under these Regulations. PENALTY - $\pounds100,000$

(3) Paragraphs (1) and (2) are without prejudice to any other law for the time being in force in the Territory (including the Ordinance) by virtue of which any such conduct as is mentioned in either of those paragraphs constitutes an offence or which prescribes the penalty for such an offence.

Administrative penalties: forms.

39. - (1) The prescribed forms for the purposes of section 18 of the Ordinance (administrative penalties) are those set out as models in the Schedule to these Regulations and include any form which substantially corresponds to a model there set out.

(2) For the purposes of paragraph (1), a form may substantially correspond to a model set out in the Schedule to these Regulations notwithstanding any minor departure therefrom or minor variation thereof unless that departure or variation is shown, by the person upon whom the form is served, to have misled him, or otherwise prejudiced him, in any material respect.

17 December 1993

T. G. Harris (Commissioner) **Regulation 39**

SCHEDULE

FORM A

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONVERSATION AND MANAGEMENT) ORDINANCE 1991

Notice of Alleged Offence (Notice given under section 18(1)) No..... of 19...

IN THE MATTER of section 18 of the Fisheries (Conservation and Management) Ordinance 1991

To:

.....

in that you (specify brief details of alleged offence)

and that it would be appropriate to impose a penalty for that offence under section 18 of the Fisheries (Conservation and Management) Ordinance 1991.

2. The following is a summary of the facts on which this allegation is based:

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· · · · · · · · · · · · · · · · · · ·

(Give a sufficient summary fully and fairly to inform the recipient of the allegation against him)

3. The Commissioner considers the following matters to be relevant to the imposition of a penalty in this case:

4. This notice is served on you pursuant to section 18 of the Fisheries (Conservation and Management) Ordinance 1991. The provisions of that section are set out in the attachment to this notice. Your attention is drawn to the options open to you under subsections (3) and (4) and to the consequences, under subsection (5), of your failing to exercise either option within 28 days of the service on you of this notice.

:

Dated this19....

(Name and designation of signatory of notice)

*

(Attachment: A legible copy of the full provisions of section 18 of the Ordinance must be attached to Form A when it is served on the alleged offender. The copy may be in any convenient form. including a photocopy of an extract from a copy of the Ordinance.)

FORM B

THE BRITISH INDIAN OCEAÑ TERRITORY

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 1991

Notice Requiring Proceedings to be Dealt with by Court (Notice given under section 18(3))

To: The Commissioner

TAKE NOTICE that I require that any proceedings in respect of the alleged offence referred to in your Notice No. . . . , served on me under section 18(1) of the Fisheries (Conservation and Management) Ordinance 1991, shall be dealt with by the Court.

Dated this19....

(Signature of person giving this notice)

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FORM C

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 1991

Notice Admitting Offence (Notice given under section 18(4))

To: The Commissioner

1. I refer to the Notice No. served on me under section 18(1) of the Fisheries (Conservation and Management) Ordinance 1991. In accordance with section 18(4), I admit the offence specified in that Notice.

2. I wish you to take the following matters into account in imposing a penalty:

.....

Dated this19....

(Signature of person giving this notice)

FORM D

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 1991

Imposition of Administration Penalty (Notice given under section 18(8)) No..... of 19...

IN THE MATTER of section 18 of the Fisheries (Conservation and Management) Ordinance 1991

To:

23

2. This penalty must be paid, within 28 days after this Notice is served on you, to the Director of Fisheries either through the Commissioner's Representative in the British Indian Ocean Territory or at the following address:

:

"The Director of Fisheries, British Indian Ocean Territory, c/o Marine Resources Assessment Group Limited, 8, Prince's Gardens, LONDON, SW7 1NA, ENGLAND."

Dated this19....

(Name and designation of signatory of notice)

*

S.I. No. 4 of 2007

THE BRITISH INDIAN OCEAN TERRITORY

(Came into force 01.01.08) Amended 08.12.2008

Ord. 3 of 2008 (effected)

The Fisheries (Conservation and Management) Ordinance 2007

The Fishing Regulations 2007

IN EXERCISE of the powers conferred on me by section 21 of the Fisheries (Conservation and Management) Ordinance 2007:

PART 1 INTRODUCTORY

Citation and commencement.

 (1) These Regulations may be cited as the Fishing Regulations 2007.
(2) These Regulations shall come into force on 01 January 2008 and replace all Regulations made or deemed to have been made under the Fisheries (Conservation and Management) Ordinance 1998

Interpretation.

2. (1) In these Regulations, unless the contrary intention appears -

"agent", in relation to the owner or charterer of a licensed fishing boat or a licensed transhipment boat, means the person for the time being engaged as his agent in pursuance of regulation 5;

"the Convention of 1969" means the International Convention on Tonnage Measurement of Ships, 1969;

"the Director" means the Director of Fisheries;

"fee", in relation to a fishing licence or a transhipment licence, means the fee therefor that is prescribed by Regulations made under the Ordinance or, if there are no such Regulations prescribing that fee or subject to any such Regulations, the fee therefor that is determined by the Director;

"fishing boat notification application" means an application for a fishing boat notification number made in accordance with regulation 4(2);

"fishing licence application" means an application for a fishing licence made in accordance with regulation 4(1);

"the International Tonnage Rules" means the Regulations for Determining Gross and Net Tonnages of Ships annexed to the Convention of 1969;

"Khz" means kilohertz, that is to say, one thousand cycles per second;

"licence" means a fishing licence or, as the case may require, a transhipment licence;

- "licensed fishing boat" means a fishing boat which is specified in a fishing licence;
- "licensed transhipment boat" means a fishing boat which is specified in a transhipment licence (whether or not it is also a licensed fishing boat);
- "licensee" means a person granted a fishing licence or, as the case may require, a transhipment licence;
- "to lodge", in relation to an application to the Director made under these Regulations, means to cause that application to be actually delivered to the Director at the address specified in regulation 4(3) and in a manner approved by him;
- "mhz" means megahertz, that is to say, one million cycles per second;
- "the Ordinance" means the Fisheries (Conservation and Management) Ordinance 2007;
- "patrol vessel" means a vessel for the time being engaged in the surveillance and policing of the fishing waters for the Government of the Territory;
- "period of validity", in relation to a licence, means the period specified in the licence as the period during which the activity authorised by the licence may lawfully be carried out;

"shark" means all species of shark (elasmobranchii taxon)

"surveillance aircraft" means an aircraft for the time being engaged in the surveillance of the fishing waters for the Government of the Territory; and

"VHF" means very high frequency, that is to say, a single radio frequency or band lying between 300 mhz and 30 mhz.

(2) Where these Regulations require any form or other document or thing or any procedure or other matter to be as approved by the Director, it shall be deemed to be as so approved if it conforms with what is for the time being specified or otherwise indicated in that behalf in or under the relevant Administration Documentation and Guidance or other similar document (by whatever name called) issued by or on behalf of the Director for the purposes of the administration of the Fisheries Management and Conservation Zone (including any guidance issued under regulation 36.)

(3) Where, under these Regulations, any communication or requirement relating to the operation, navigation or other handling of a fishing boat falls to be made by the Director to the master of the boat or by the master to the Director, it may be made by or to any Fisheries Protection Officer on behalf of the Director.

(4) In these Regulations, or in any licence or in other documents issued in pursuance of these Regulations, "prescribed" means prescribed by or under these Regulations and includes specified or otherwise indicated as referred to in paragraph (2) or otherwise specified or indicated by the Director.

PART II

FISHING LICENCES AND LICENSED FISHING BOATS

Application of this Part.

3. This Part applies to applications for fishing licences, to the grant, content and incidents of such licences, to operations undertaken under such licences and to the obligations of persons in relation to licensed fishing boats.

4. (1) Subject to the following provisions of this regulation, every application for a fishing licence shall be made in a form approved by the Director and shall be lodged with the Director, in a manner approved by him, not less than 7 days before the date specified in the application as the date on which the licence is required.

(2) Subject to the following provisions of this regulation, before a fishing licence application is lodged with the Director in respect of any fishing boat, there shall have been lodged with him, not less than 7 days previously and in a manner and form approved by him, an application for a fishing boat notification number specific to that boat; and that number, when notified to the applicant by the Director, shall thereafter be cited in all communications with the Director relating to that boat, including any fishing licence application in respect thereof.

(3) Fishing licence applications and fishing boat notification applications shall be lodged with the Director at the following address:

"The Director of Fisheries, British Indian Ocean Territory, c/o MRAG Limited, 18 Queen Street, LONDON, W1J 5PN, ENGLAND."

(4) The Director may, in his discretion, accept a fishing licence application or a fishing boat notification application that has been lodged with him after the time specified therefor in paragraph (1) or, as the case may be, paragraph (2).

(5) Subject to paragraph (6), each fishing boat notification application shall be accompanied by the International Tonnage Certificate (1969), issued pursuant to the Convention of 1969, relating to the fishing boat in

Applications for fishing licences and fishing boat notification numbers. respect of which the application is made.

(6) If any fishing boat in respect of which a fishing boat notification application is made is not registered in a country whose Government is a Party to the Convention of 1969, the Director may, in his discretion, accept such evidence as he thinks fit of the dimensions and other relevant features of that boat and, using such method of calculation as he thinks fit, calculate therefrom the gross tonnage of that boat; and the tonnage so calculated shall be deemed to be the gross tonnage for the purposes of determining any fee payable for a licence in respect of that boat.

(7) Notwithstanding that the Director has issued a fishing boat notification number in respect of a fishing boat, he may, then or at any time thereafter, require, as a condition of his granting a fishing licence in respect of that boat, that the fishing licence application -

- (a) be lodged with him by a date specified by him; and
- (b) subject to paragraph (8), be accompanied by the deposit of such sum as he may specify.

(8) The sum that is payable by way of deposit under paragraph (7) shall be paid in such manner as the Director may direct, but the Director may instead accept security for such payment either in the form of irrevocable letters of credit or in any other form satisfactory to him.

(9) The sum that has been paid by way of deposit under paragraph (7)(less a processing fee of One Hundred pounds) shall be refunded to the applicant (or the security that has been given therefor shall be returned or cancelled, as the case may require) if no licence is granted; but if a licence is granted, that sum (or the sum so secured) shall be applied towards the payment of the fee for the licence.

5. (1) The owner or the charterer, as the case may be, of a fishing boat shall, before a fishing boat notification application is lodged in respect of that boat, engage a person as his agent in respect of that boat for the purposes of these Regulations and that person shall be so designated to the Director in the application.

(2) The owner or the charterer of a fishing boat who has, in accordance with this regulation, engaged a person, and designated him to the Director, as his agent in respect of that boat may, at any time thereafter, engage, and designate to the Director, another person as his agent in respect of that boat for the purposes of these Regulations and, if the Director approves that designation, that other person shall, for all such purposes, replace the person previously so designated.

Agents.

(3) A person who is for the time being designated under paragraph (1) or, with the approval of the Director, under paragraph (2) as the agent of the owner or charterer in respect of a fishing boat shall be deemed for the purposes of these Regulations to have the full and irrevocable authority of his principal in connection with any fishing operations of that boat or any related activity (including any proposed such operations or activity), and such authority shall include, without prejudice to the generality of the foregoing, authority (for the purposes aforesaid) to incur financial or other legal liability on behalf of his principal in connection with any such operations or activity and authority (for the purposes aforesaid) to receive service on behalf of his principal of any notice, summons or other document issued in or for the purposes of any legal proceedings arising out of or otherwise connected with any such operations or activity.

(4) The designation of a person as the agent of the owner or charterer of a fishing boat shall not be effective for the purposes of this regulation unless that person resides or has his place of business in a country approved in that behalf by the Director.

(5) The designation of a person under this regulation as the agent of the owner or charterer of a fishing boat shall be made to the Director in such manner and with such details as may be approved by the Director or otherwise be directed by him.

6. The licensee or the agent of the licensee shall, if so required by the Director before or after the grant of a fishing licence, either -

(a) execute and maintain a bond, in an amount and form satisfactory to the Director, to guarantee compliance with the Ordinance, with these and any other Regulations made thereunder and with any conditions to which the licence is subject; or

(b) provide such other financial or other security for that purpose as the Director may approve.

7. (1) A fishing licence may be granted in respect of only one named person for fishing other than by a fishing boat, or one fishing boat for fishing by a fishing boat, which name or boat shall be specified in it, and shall not be transferable.

(2) Every fishing licence shall bear its own serial number allocated by the Director, and the holder of a licence for fishing other than by a fishing boat and the master of a licensed fishing boat shall, on demand by any Fisheries Protection Officer, inform him of the number of the licence granted.

Fishing licences and conditions on licences.

Bond or security.

(3) The Director may, before granting a fishing licence in respect of a fishing boat –

(a) require that there shall be produced to him the ship's papers of the boat and such drawings and diagrams relating to its construction as he may specify;

(b) require the master to permit a Fisheries Protection Officer to inspect the boat and to take measurements and photographs of it and of any equipment or apparatus carried on board it.

(4) A fishing licence shall be granted for such fixed period or fixed periods as the Director may decide.

(5) A fishing licence, when granted, shall be issued to the named person or to the master of the fishing boat specified in it in London or, at the request of the applicant, in such other place as the Director may agree.

(6) Every fishing licence shall contain, or have endorsed on or annexed to it, or refer to, the conditions subject to which it is granted.

(7) Without prejudice to regulations 5(2) and 5(5), if, at any time when a fishing licence is in force, a change takes place in any circumstance or respect which was required, by or under these Regulations, to be notified to the Director in or together with the application for that licence, that change shall, within 30 days of the day on which it took place (or such longer period as the Director may in any particular case allow), be notified to the Director by the named person or by the owner or charterer of the boat, or by his agent, in a manner and form approved by the Director.

(8) Every fishing licence shall be granted subject to the following conditions-

- (1) No person shall on board a fishing boat or elsewhere in the Territory remove fins from sharks;
- (2) No person shall keep in the Territory or on board a fishing boat or tranship or land therefrom shark fins removed contrary to condition (1);
- (3) The master of a licensed fishing boat shall upon inspection under regulation 12 declare the quantities of shark fins and shark products on board the boat;
- (4) The named person in a fishing licence for fishing other than by fishing boat, and the master of a fishing boat shall record all catches of shark in the log book kept by him under regulation 13(2).

Compulsory radio equipment.

International Code of Signals and flags to be carried and Code to be used. 8. Every licensed fishing boat engaged in fishing in the fishing waters shall be equipped with radio equipment capable of providing radio telephony (voice) communications using maritime frequencies in the High Frequency and VHF bands.

9. (1) Every licensed fishing boat, at all times when it is within the fishing waters, shall carry a copy of the International Code of Signals published by the International Maritime Organisation and an appropriate set of flags and shall at all such times carry persons competent to exchange messages by means thereof with a Fisheries Protection Officer embarked in any vessel or aircraft.

(2) In every communication by radio, flag or light between any licensed fishing boat in the fishing waters and a Fisheries Protection Officer, the signals specified in the International Code of Signals shall be used.

Navigational charts and aids to be carried.

Notification of entry into and departure from fishing waters, and related matters. 10. Every licensed fishing boat, at all times when it is within the fishing waters, shall carry appropriate navigational charts and publications and be fitted with such electronic navigational aids as will enable the master accurately to ascertain its position in the fishing waters.

11. (1) The master of a licensed fishing boat who intends his boat to enter the fishing waters shall, not more than 48 hours or less than 12 hours before the entry of the boat into the fishing waters, notify the Director of that intention, of the time when his boat will enter the fishing waters and of the purpose for which it will so enter.

(2) The master of a licensed fishing boat who intends his boat to leave the fishing waters shall, before the boat leaves the fishing waters and in sufficient time for the carrying out, if the Director so requires, of the procedures provided for by regulation 12, notify the Director of that intention; and he shall likewise notify the Director of the time when his boat does leave the fishing waters.

(3) A licensed fishing boat in respect of which the intention notified to the Director in accordance with paragraph (1) is that it is to fish within the fishing waters shall be deemed, for the purpose of the computation of any fees for its licence, to have been engaged in fishing throughout the period beginning with the time notified to the Director as the time when it will enter the fishing waters and ending with the time notified to the Director as the time when it leaves the fishing waters; but any fishing within the fishing waters by that boat outside that period, or by any licensed fishing boat whose master has not notified an intention as aforesaid, shall not be authorised by its licence and is accordingly unlawful.

(4) Notifications required by this regulation to be given to the Director shall be given in such form and manner, and shall be accompanied or supplemented by such further information, as he may, either generally or specifically, prescribe or direct or approve

(5) A prescription made or a direction given by the Director in pursuance of paragraph (4) may provide, and an approval given by him may be so expressed as to have the effect, that notifications and other information required by this regulation to be given to the Director shall be treated as not having been validly so given unless and until their receipt is acknowledged by him and unless his acknowledgement is evidenced in such manner as he may, either generally or specifically, prescribe or direct or approve.

(6) In this regulation "non-fishing day", in relation to a licensed fishing boat, means a day when that boat is engaged in fishing in the fishing waters but does not set gear; and "fishing day" means any such day when the boat does set gear.

(7) Where, whether under the license for a licensed fishing boat or by agreement between the Director and the master, owner or charterer of the boat, the daily fee payable for the boat's licence is to be computed at different rates for fishing days and non-fishing days respectively, the boat may not set gear on any day until the master has notified the Director that he intends it to do so.

(8) The master of every licensed fishing boat that is engaged in fishing in the fishing waters shall, at the conclusion of its fishing operations on each day, notify the Director whether that day has been a fishing day or a non-fishing day.

(9) For the purposes of the computation of the daily fee for a licence as referred to in paragraph (2), any day during the time when a licensed fishing boat is engaged in fishing while within the fishing waters that has not been validly notified as a non-fishing day in accordance with paragraph (3) shall be deemed to be a fishing day.

(10) The provisions of regulation 11(4) apply in relation to notifications required to be given under this regulation as they apply in relation to notifications required to be given under regulation 11, and regulation 11(5) shall have effect accordingly.

Post-fishing inspection and delivery of log. 12. (1) The master of a licensed fishing boat whose boat is about to leave the fishing waters shall, if so required by the Director, bring the boat to such place within the Territory as the Director may designate for the purpose of its being inspected by a Fisheries Protection Officer or other person authorised in that behalf by the Director.

(2) The master of a licensed fishing boat whose boat is about to leave the fishing waters shall, if so required by the Director, deliver to the Director, before leaving the fishing waters, the fishing log referred to in regulation 13(2).

Log books.

13. (1) The master of every licensed fishing boat in the fishing waters shall keep a radio log in a form approved by the Director.

(2) The named person in a fishing licence for fishing other than by fishing boat, and the master of every licensed fishing boat engaged in fishing in the fishing waters shall keep a fishing log in a form approved by the Director.

(3) The radio log and the fishing log shall, on demand by a Fisheries Protection Officer, be produced to him for inspection and copies thereof or copy extracts therefrom shall also, on demand, be given to him, without payment.

14. If the main radio equipment of a licensed fishing boat becomes

unusable while the boat is within the fishing waters, the master shall make adequate arrangements for all information which he is required, by or under these Regulations, to furnish to the Director to be relayed to the

Director through another vessel.

If radio is unusable.

Display of radio call signs.

Englishspeaking crew-

member.

watches.

15. (1) The International Radio Call Sign of each licensed fishing boat within the fishing waters shall be prominently displayed on that boat in accordance with international standards as set out in the publication of the Food and Agriculture Organisation entitled "The Standard Specifications for the Marking and Identification of Fishing Vessels."

(2) The letters and numbers of the Call Sign shall be painted in black on a white background or in white on a black background and the paintwork where they are painted shall be maintained in good condition so that they are clearly visible at all times.

16. The master of each licensed fishing boat shall ensure that, while it is within the fishing waters, there shall be at least one member of its crew who is able to speak English, and understand spoken English, with reasonable fluency.

17. The master of each licensed fishing boat shall cause a continuous Radio listening listening watch to be maintained on VHF marine band Channel 16 and 2182 Khz while the boat is within the fishing waters, but these frequencies shall be used as calling and distress frequencies only and shall not be used for inter-ship communications.

PART III

TRANSHIPMENT LICENCES AND TRANSHIPMENT OF FISH

Application of this part.

18. This Part applies to applications for transhipment licences, to the grant, content and incidents of such licences, to operations undertaken under such licences and to the obligation of persons in relation to licensed transhipment boats.

Each fishing boat taking part in transhipment to be licensed. **19.** (1) No transhipment of fish shall take place within the fishing waters unless a transhipment licence is in force with respect to each fishing boat taking part in the transhipment, that is to say, the fishing boat from which the fish is passed, the fishing boat which receives the fish and any fishing boat which transports from the territorial sea or internal waters of the Territory any fish previously transhipped.

(2) If (but only if) it purports to do so, a fishing licence may also operate as a transhipment licence and may accordingly include, in addition to conditions or other provisions relating to fishing by the fishing boat specified in it, such conditions or other provisions relating to the transhipment of fish by that boat as are authorised under section 7 of the Ordinance.

Applications for transhipment licences.

20. (1) An application for a transhipment licence may be made by the owner or charterer of the fishing boat in respect of which the licence is required or by the master of that boat on behalf of the owner or charterer.

(2) An application for a transhipment licence shall be made in a form approved by the Director or as otherwise directed by him and shall be lodged with the Director, not less than 72 hours before the date specified in the application as the date on which the licence is required, in a manner approved by him or as otherwise directed by him:

Provided that, unless and until the Director directs otherwise, the lodging of an application may be effected by causing it to be actually delivered to him, at the address specified in paragraph (3), by post, telex, telegram or facsimile transmission. (3) Applications for transhipment licences shall be lodged with the Director at the following address:

"The Director of Fisheries, British Indian Ocean Territory, c/o MRAG Limited, 18 Queen Street, LONDON, W1J 5PN, ENGLAND."

(4) The Director may, in his discretion, accept an application for a transhipment licence that has been lodged with him after the time specified therefor in paragraph (2).

(5) Without prejudice to the foregoing provisions of this regulation, where the fishing boat in respect of which a transhipment licence is applied for does not already have a fishing boat notification number, the provisions of regulations 4, 5 and 6 (relating to applications for and the grant of such numbers, to the appointment of agents and to the execution and maintenance of bonds or the provision of other security) have effect in relation to the application for and the grant of the transhipment licence as they have effect in relation to an application for and the grant of a fishing licence.

Transhipment licences.

21. (1) A transhipment licence shall be valid only -

- (a) in respect of the fishing boat specified in the licence;
- (b) for a fixed period or for fixed periods, as specified in the licence;
- (c) for a fixed number or a fixed quantity, or for both a fixed number and a fixed quantity, of transhipments of fish, as specified in the licence; and
- (d) for a fixed place or for fixed places of transhipment, as specified in the licence.

(2) A transhipment licence, when granted, shall be issued to the master of the fishing boat specified in it in London or, at the request of the applicant, in such other place as the Director may agree.

(3) Every transhipment licence shall contain, or have endorsed on or annexed to it, or refer to, the conditions subject to which it is granted.

(4) Every separate transhipment licence (that is to say, a transhipment licence other than a fishing licence which also operates as a transhipment licence by virtue of regulation 19(2)) shall bear its own serial number allocated by the Director, and the master of a licensed transhipment boat shall, on demand by any Fisheries Protection Officer,

inform him of the number of the licence (whether a fishing licence or a separate transhipment licence) granted in respect of that boat.

(5) Without prejudice to regulations 5(2) and 5(5), if, at any time when a transhipment licence is in force, a change takes place in any circumstance or respect which was required, by or under these Regulations, to be notified to the Director in or together with the application for that licence, that change shall, within 30 days of the day on which it took place (or such longer period as the Director may in any particular case allow), be notified to the Director by the owner or charterer of the boat, or by his agent, in a manner and form approved by the Director.

Fees.

22. Where a fee is payable for a transhipment licence, the Director may, as a condition of his granting the licence, require -

- (a) that the fee is first paid in full; or
- (b) that payment thereof is first secured by irrevocable letters of credit or by other means satisfactory to him.

Application of certain regulations in Part II. **23.** Without prejudice to regulation 24, regulations 8, 9, 10, 13, 14, 15, 16 and 17 apply to all licensed transhipment boats as they apply to licensed fishing boats.

PART IV

PROVISIONS APPLYING TO ALL FISHING BOATS

Application of this Part.

24. This Part applies to the operations of all fishing boats within the fishing waters and to the obligations of persons in relation to all such boats within those waters.

25. (1) The master of a fishing boat within the fishing waters shall comply with any instruction, order or requirement given from a patrol vessel by or at the direction of a Fisheries Protection Officer.

(2) The instruction that a fishing boat in the fishing waters should stop for boarding and inspection by a Fisheries Protection Officer will be conveyed by VHF radio marine band on the ship-to-ship calling channel (Channel 16) or by the international code signal "SIERRA QUEBEC 3" or by flashing, by a signal lamp from a patrol vessel, the morse code symbol "LIMA" (that is to say, "You should stop your vessel instantly"); but if contact cannot be made by any of these means, the patrol vessel will direct a series of flashing white lights towards the fishing boat and this shall be interpreted as an instruction to the master of the fishing boat that it must forthwith desist from any previous manoeuvre, course or action and follow that patrol vessel.

Compliance with instructions from patrol vessels. Compliance with instructions from surveillance aircraft. 26. (1) The master of a fishing boat within the fishing waters shall comply with any instruction, order or requirement given from any surveillance aircraft by or at the direction of a Fisheries Protection Officer.

(2) A Fisheries Protection Officer on board a surveillance aircraft who wishes to communicate on Channel 16 of VHF radio marine band with a fishing boat in the fishing waters will cause the aircraft to signal the Morse code symbol "KILOG" with a yellow light or to signal by switching its navigation and landing lights on and off.

(3) If the fishing boat does not make radio contact with the aircraft in response to a signal given in accordance with paragraph (2), the Fisheries Protection Officer will cause the aircraft to waggle its wings from side to side and then to settle on a steady course; and this shall be interpreted as an instruction to the master of the fishing boat that it must forthwith desist from any previous manoeuvre, course or action and immediately proceed in the direction indicated by the aircraft (that is to say, following the course adopted by the aircraft after waggling its wings) and that he must at the same time attempt to make radio contact with a Fisheries Patrol Vessel or the fisheries authorities in the Territory (call sign CHAGOS FISHERIES 5144 mhz).

Accommodation and facilities for observers and Fisheries Protection Officers. 27. (1) The master of a licensed fishing boat shall, when requested to do so by the Director, permit one or more official observers (being persons designated as such by the Director in writing) to board the boat and remain on board it, while it is within the fishing waters, for all or any of the following purposes, that is to say: -

(a) recording scientific data and observations;

(b) inspecting the boat's radio log and fishing log; and

(c) taking samples;

and he shall permit any such observer to retain and remove from the boat any records, notes and samples taken by him.

(2) Where an official observer is on board a licensed fishing boat for a period of more than four hours, the master shall provide him with food and accommodation of the same standard as is provided to officers on board the boat.

(3) The master of a licensed fishing boat shall also provide the facilities referred to in paragraph (2) to any Fisheries Protection Officer who is compelled for any reason to remain on board the boat for a period of more than four hours.

(4) The master of a licensed fishing boat shall, at the request of a Fisheries Protection Officer or official observer who is on board the boat in pursuance of this regulation -

- (a) arrange for him to be able (to) send or receive messages by means of radiotelegraph or radiotelephone facilities on board the boat; and
- (b) provide all reasonable assistance within his power to enable him to carry out his duties and functions.

28. (1) The master of a fishing boat which receives an instruction, in accordance with regulation 25(2), to stop for boarding and inspection shall cause the boat, so far as is consistent with the safety of navigation, to heave to and take all way off and shall, if instructed to permit a Fisheries Protection Officer to board, take such steps as, in accordance with good seamanship, are requisite or most convenient to facilitate such boarding.

(2) A fishing boat which has hove to and taken way off in accordance with paragraph (1) shall not, without the permission of a Fisheries Protection Officer, again put on way.

Powers in relation to stopped fishing boats.

Action on receiving

stop for

inspection.

instruction to

29. (1) On instructing a fishing boat to stop in accordance with regulation 25(2), a Fisheries Protection Officer may also require the master -

- (a) to haul in his nets or discontinue the use of fishing gear;
- (b) to take such steps as the Fisheries Protection Officer may specify to desist from taking or catching fish;

(c) to stow his fishing gear.

(2) Having boarded a fishing boat which has stopped pursuant to an instruction given in accordance with regulation 25(2), a Fisheries Protection Officer may -

(a) require the master -

(i) to cause radio communication to be maintained with a patrol vessel on such frequency or channel as he may direct;

(ii) to permit him to speak, by means of the boat's radio equipment, with a patrol vessel or with the Director or any other person;

(iii) in the case of a licensed fishing boat or a licensed transhipment boat, to produce any document or thing required to be carried on such a boat;

(iv) to produce the boat's navigation log, radio log and fishing log, any charts carried on the boat and any documents relating to its registration and tonnage; (b) inspect and take copies, or require the master to furnish him with copies, of any documents produced to him pursuant to a requirement imposed under subparagraph (a);

(c) search and inspect and take photographs of the boat, any fish on board it and any fishing gear, apparatus or equipment on board it;

(d) impose any such requirement as, in the circumstances referred to in paragraph (1), might be imposed under that paragraph.

(3) The master of a fishing boat which has stopped pursuant to the instructions of a Fisheries Protection Officer -

(a) shall comply with any requirement imposed on him by a Fisheries Protection Officer under paragraph (1) or paragraph (2);(b) shall furnish every assistance requisite to enable a Fisheries Protection Officer to do anything which he is authorised to do under paragraph (2);

(c) shall not obstruct or hinder a Fisheries Protection Officer, or cause or permit him to be obstructed or hindered, in the performance of his duties.

Power to direct fishing boat to proceed to place within Territory

Power to direct 30. (1) If a Fisheries Protection Officer -

(a) has reason to believe that an offence under the Ordinance, or under these or any other Regulations made under the Ordinance, has been committed in relation to a fishing boat; or

(b) considers it necessary or expedient so to do for the better carrying out of any search, examination or enquiry in relation to a fishing boat;

he may, whether or not he is then on board the boat, direct the master to bring or take it to such place within the Territory as he appoints.

(2) A direction under paragraph (1) may be modified or withdrawn by a Fisheries Protection Officer.

(3) The master of a fishing boat to whom a direction has been given under paragraph (1) shall comply with it or cause it to be complied with and shall cause the crew of the boat to take all steps necessary for that purpose.

Fishing boat brought to Territory under regulation 30 to remain moored as directed. **31.** (1) The master of a fishing boat that has been brought or taken to a place within the Territory under regulation 30 shall ensure that the provisions of this regulation are complied with.

(2) On arrival at the appointed place within the Territory and at all times thereafter, the boat shall moor, anchor or make fast in such manner and in such anchorage, berth or other position as a Fisheries Protection Officer from time to time directs.

(3) After mooring, anchoring or making fast in accordance with paragraph (2), the boat may not be unmoored or up-anchor, nor may it slip its moorings or anchor or otherwise move from its mooring, berth or position, without the prior consent of a Fisheries Protection Officer.

(4) Paragraph (3) shall not prevent a fishing boat from being moved, without the prior consent of a Fisheries Protection Officer, within the confines of the port or harbour in which it is for the time being directed to moor, anchor or make fast to the extent that such movement is necessary, in accordance with the dictates of good seamanship, by reason of some emergency of tide, wind or water or other like emergency and to the extent that, in those circumstances, the boat or the safety of its crew would be hazarded by the delay attendant on obtaining such prior consent.

(5) Nothing in this regulation shall be construed as authorising any person on or connected with a fishing boat which is moored, anchored or made fast at any place within the Territory to land in the Territory, or in any other way to enter the Territory, unless he is in possession of a permit, or his name is endorsed on a permit, issued under the British Indian Ocean (Immigration) Order 2004.

32. The powers conferred on a Fisheries Protection Officer by regulations 29 to 31 are without prejudice to the powers vested in him by the conferred by the Ordinance.

PART V

ADMINISTRATIVE AND GENERAL

Records etc. to be in English.

33. All records (including logs), reports and notifications required to be made or maintained by or under these Regulations shall be made or maintained in English.

Maintenance of 34. (1) The Director shall make and maintain records of the following records by matters:-Director

- (a) all licences granted;
- (b) the date on which each licence was granted;
- (c) the name and address of each licensee;
- (d) the conditions, if any, subject to which each licence was granted;
- (e) the name of the fishing boat in respect of which each licence was granted and its country of registry, port of registry, registration number, fishing boat notification number and International Radio Call Sign;

Saving for powers

Ordinance.

- (f) the type of licence granted in each case;
- (g) in each case where the licence is a fishing licence -
 - (i) any limitation (in terms of species) on the fish that may be caught or taken;
 - (ii) any limitation (in terms of quantity or size) on the amount of fish, or fish of any species, that may be caught or taken;
 - (iii) if the licence is limited to fishing in a part or parts of the fishing waters, a sufficient description of that part or those parts, which description shall be by reference to longitudinal and latitudinal co-ordinates except where the licence is limited to fishing in the internal waters of the Territory in which case the description may be by reference to a chart or map;
 - (iv) the period or periods of validity of the licence;
- (h) in each case where the licence is a transhipment licence (whether or not it is also a fishing licence) -
 - (i) the period or periods of validity of the licence to tranship;
 - (ii) the number or quantity, or (as the case may be) the number and quantity, of transhipments of fish specified in the licence;
 - (iii) the place or places of transhipment specified in the licence;
 - (iv) whether the transhipment that is licensed is the transhipment of fish caught or taken in the fishing waters or is the transhipment of fish caught or taken elsewhere or is the transhipment of fish wherever caught or taken;

(i) all notifications and communications of any kind made to the Director by or on behalf of any person pursuant to the Ordinance, these Regulations or the conditions of any licence;

(j) if any licence has been varied, the details of the variation, the date when it was made and the date when it was to take effect;

(k) if any licence has been revoked, suspended or surrendered, the date when the revocation, suspension or surrender was made and the date when it was to take effect;

(l) all fines or other penalties imposed on any person by any court or by way of administrative penalty for an offence under the Ordinance or under these or any other Regulations made thereunder,

(m) all deposits and fees paid or owing by any applicant for a licence or any licensee pursuant to the Ordinance or to these or any other Regulations made thereunder or, where any such fees have not been paid in full, any security that has been given or any arrangements that have been made for the payment of those fees.

(2) The records required by paragraph (1) shall be made and maintained in such manner as the Director may determine and may be so made or maintained wholly or partly on a computer.

Identity documents.

Notes of

Guidance.

35. (1) The Director shall issue to each Fisheries protection Officer an identification document which shall -

(a) bear the name and a photograph of the person to whom it is issued;

(b) state that that person is a Fisheries Protection Officer; and

(c) state its date of issue and period of validity.

(2) Every Fisheries Protection Officer shall produce his identification document whenever any person reasonably requests him to do so in relation to his performance of any of the functions of a Fisheries Protection Officer.

(3) Paragraphs (1) and (2) do not apply to a person who is a Fisheries Protection Officer by virtue of being any of the following, that is to say, a Police officer or an Imports and Exports Control Officer or a commissioned officer of any of Her Majesty's ships or the person in command or charge of any aircraft or hovercraft of the Royal Navy, the Army or the Royal Air Force.

36. (1) The Director may from time to time issue to masters of fishing boats and other persons such written guidance or advice as he thinks fit relating to the observance, implementation and administration of the Ordinance and of these and other Regulations made thereunder or generally for the purposes of the administration of the Fisheries Management and Conservation Zone.

(2) Non-compliance with any such written guidance or advice shall not in itself constitute an offence (unless made an offence by, or by virtue of, some other provision of these Regulations) but the guidance or advice shall be admissible in evidence in any proceedings before a court and, if it appears to the court to be relevant to any question arising in those proceedings, shall be taken into account in determining that question.

Patrol vessels to be marked.

37. (1) Every patrol vessel for the time being operating as such outside the territorial sea or internal waters of the Territory shall be clearly marked on its sides and front with the words "FISHERIES PATROL" or the words "BIOT PATROL VESSEL" in capital letters in a colour contrasting with the colour of the background on which the words appear.

(2) Every patrol vessel for the time being operating as such within the territorial sea or internal waters of the Territory shall either be marked as specified in paragraph (1) or be clearly marked on its sides and front with the words "HARBOUR PATROL" in capital letters in a colour contrasting with the colour of the background on which the words appear. (3) This regulation does not apply to Her Majesty's ships.

Offence and penalties.

38. (1) Any person who contravenes any provision of Parts I to IV or regulation 33 or any of the terms and conditions of a licence commits an offence under these Regulations. PENALTY - £100,000

(2) Any person who, without reasonable cause (the onus of proof whereof shall lie on him), refuses or fails to provide to the Director or any other Fisheries Protection Officer any information which he is required, by or under these Regulations, to provide or who, in purported pursuance of these Regulations, provides to the Director or any other Fisheries Protection Officer any information -

(a) which he knows to be false in any material particular, or

(b) which, in any such particular, he does not believe to be true; or

(c) which he knows to be misleading in any such particular commits an offence under these Regulations.

PENALTY - £100,000

(3) Paragraphs (1) and (2) are without prejudice to any other law for the time being in force in the Territory (including the Ordinance) by virtue of which any such conduct as is mentioned in either of those paragraphs constitutes an offence or which prescribes the penalty for such an offence.

Administrative penalties: forms.

39. (1) The prescribed forms for the purposes of section 18 of the Ordinance (administrative penalties) are those set out as models in the Schedule to these Regulations and include any form which substantially corresponds to a model there set out.

(2) For the purposes of paragraph (1), a form may substantially correspond to a model set out in the Schedule to these Regulations notwithstanding any minor departure therefrom or minor variation thereof unless that departure or variation is shown, by the person upon whom the form is served, to have misled him, or otherwise prejudiced him, in any material respect.

21 December 2007

(signed) Leigh Turner

(Commissioner)

SCHEDULE

Regulation 39

FORM A

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONVERSATION AND MANAGEMENT) ORDINANCE 2007

No.....of 20...

Notice of Alleged Offence (Notice given under section 18(1))

IN THE MATTER of section 18 of the Fisheries (Conservation and Management) Ordinance 2007

To:

.....

1. TAKE NOTICE that the Commissioner has reasonable cause to believe that on

you committed an offence under (specify section or regulation).....

.....

in that you (specify brief details of alleged offence.)

.....

menalty for that offence under section 18 of the Fisheries (Conservation and Management) Ordinance 2007.

2. The following is a summary of the facts on which this allegation is based:

.....

.....

(Give a sufficient summary fully and fairly to inform the recipient of the allegation against him)

3. The Commissioner considers the following matters to be relevant to the imposition of a penalty in this case:

4. This notice is served on you pursuant to section 18 of the Fisheries (Conservation and Management) Ordinance 2007. The provisions of that section are set out in the attachment to this notice. Your attention is drawn to the options open to you under subsections (3) and (4) and to the consequences, under subsection (5), of your failing to exercise either option within 28 days of the service on you of this notice.

Dated this day of 20....

(Name and designation of signatory of notice)

(Attachment: A legible copy of the full provisions of section 18 of the Ordinance must be attached to Form A when it is served on the alleged offender. The copy may be in any convenient form, including a photocopy of an extract from a copy of the Ordinance.)

FORM B

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 2007

Notice Requiring Proceedings to be Dealt with by Court (Notice given under section 18(3))

To: The Commissioner

TAKE NOTICE that I require that any proceedings in respect of the alleged offence referred to in your Notice No.served on me under section 18(1) of the Fisheries (Conservation and Management) Ordinance 2007, shall be dealt with by the Court.

Dated this day of 20....

(Signature of person giving this notice)

FORM C

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 2007

Notice Admitting Offence (Notice given under section 18(4))

To: The Commissioner

I refer to the Notice No.served on me under section 18(1) of the
Fisheries (Conservation and Management) Ordinance 2007. In accordance with section 18(4), I admit the offence specified in that Notice.

2. I wish you to take the following matters into account in imposing a penalty:

Dated this20....

.....(Signature of person giving this notice)

FORM D

THE BRITISH INDIAN OCEAN TERRITORY

THE FISHERIES (CONSERVATION AND MANAGEMENT) ORDINANCE 2007

Imposition of Administration Penalty (Notice given under section 18(8)) of 20..

No.

IN THE MATTER of section 18 of the Fisheries (Conservation and Management) Ordinance 2007

То:

.....

.....

....

....

.....

.....
2. This penalty must be paid, within 28 days after this Notice is served on you, to the Director of Fisheries either through the Commissioner's Representative in the British Indian Ocean Territory or at the following address:

"The Director of Fisheries, British Indian Ocean Territory, c/o MRAG Limited, 18 Queen Street, LONDON, W1J 5PN, ENGLAND."

••••••

(Name and designation of signatory of notice)

RAMSAR INFORMATION SHEET

FOR WETLANDS OF INTERNATIONAL IMPORTANCE

Site reference number

1	Compilation date	February 2001						
2	Country	British Indian Ocean Territory						
3	Name of wetland	Diego Garcia						
4	Site centre location:	Latitude: 07 19 00 S Longitude: 72 28 00 E						
5	Altitude (m)	Min: 0.0 Max: Mean 2.0m						
6	Area (ha)	35424.05 ha						

7 Overview

Diego Garcia is the southernmost atoll of the Laccadive-Maldives-Chagos atoll chain. The archipelago possesses an exceptionally low level of pollution and provides a standard for measuring the impact of human pressures on other reef systems. The World Heritage quality of the territory is recognised in the BIOT Conservation Policy Statement (October 1997) which specifies that BIOT will be treated in accordance with the requirements of the Convention subject only to defence requirements.

8 Wetland type

Marine and Coastal Wetlands

Code	Name	% Area
В	Marine beds (eg. sea grass beds)	0.5
С	Coral reefs	99
Р	Freshwater lakes: seasonal / intermittent	0.5

9 10	Ramsar Criteria Map of the site		1, 3, 4, 5, 6, 7, 8
11	Compiler		Joint Nature Conservation Committee
	*		Monkstone House
			City Road
			Peterborough
			Cambridgeshire PE1 1JY
			UK
	Telephone/Fax	:	+44(0) 1733 562626 / +44(0) 1733 555948

12 Justification of criteria

Ramsar Criterion 1.

The site is a particularly good example of a relatively unpolluted coral reef system in a near natural state which provides a valuable link in the marine ecology of the Indian Ocean.

Ramsar Criterion 3 and 4.

The site is of special value for maintaining the genetic and ecological diversity of the region, especially its marine life. The site provides a habitat for marine flora and fauna at a critical stage of their biological cycle including the endemic coral *Ctenella chagius* and the threatened Hawksbill and Green Turtles, *Eretymochelys imbricata* and *Chelonia mydas*. The site is also important for breeding seabirds.

Ramsar Criterion 5.

The site regularly supports 20,000 or more waterbirds including Greater frigate *Fregata minor*, Redfooted Boobies *Sula sula*, Greater crested-tern *Thalasseus bergii*, Black-naped tern *Sterna sumatrana*, White (fairy) tern *Gygis alba*, Brown (common) noddy *Anous stolidus*, Lesser noddy *Anous tenuirostris*. There are 28,410 individuals estimated to occur on Diego Garcia (Sheppard C.R.C and Seaward M.R.D. eds 1999). Ramsar criterion 6

The site supports a breeding colony of approximately 9,000 Red-footed Boobies *Sula sula* and 320 Greater frigate *Fregata minor*.

Ramsar Criterion 7 and 8.

The site supports a large number of fish species including some endemics and is also a valuable nursery for fish stocks.

13 General location

Diego Garcia (outside the specific area) Nearest Town/City: Diego Garcia. The Chagos Archipelago is located in the central Indian Ocean. Administrative Region: British Indian Ocean Territory

14 Physical Features

Soil & Geology	biogenic reef, sand			
	coastal, island, lagoon, subtidal rock			
Geomorphology and Landscape	(including rocky reefs), subtidal sediments			
	(including sandbank/mudbank)			
Nutrient status	oligotrophic			
pH	alkaline			
Salinity	saline / euhaline			
Soil	mainly mineral, mainly organic			
Water permanence	usually seasonal / intermittent			
	Diego Garcia has a tropical maritime			
	climate. The average temperature is 27C,			
Summary of main climatic features	average maximum 30C, average minimum			
	25C. Mean relative humidity 80%. Mean			
	annual rainfall is 102.5 inches.			

15 Hydrological values

No special values known

16 Ecological features

Diego Garcia is a mid-ocean coral reef and the southernmost atoll of the Chagos Archipelago which contains about 220 zooanthellate species of 58 genera and is rich in marine life.

17 Noteworthy flora

Species at levels of national importance

Sea grass beds

These are not widespread, and the only known area of seagrasses of significant size lies on the eastern side of the lagoon at Diego Garcia. A number of fish species have been recorded in these seagrasses which have not yet been seen anywhere else in the Archipelago.

18 Noteworthy faunaSpecies occurring at levels of international importance.Invertebrates

Coconut crab *Birgus latro*.

Species occurring at levels of national importance. Birds Lesser noddy tern *Anous tenuirostris*, Black-naped tern *Sterna sumatrana* and White (fairy) tern *Gygis alba*. Fish At least two species of endemic fish. Invertebrates There is one, possibly two species of endemic coral: *Ctenella chagius*.

20 Land tenure/ownership

Ownership category	On-Site	Off-Site
National/Crown estate	+	+

21 Current land use

Activity	On-Site	Off-Site	Scale
Nature conservation	+	+	Large-Scale
Research	+	+	Large-Scale
Fishing: recreational/sport	+	+	Large-Scale
Harbour/port	+	+	Large-Scale
Military activities	+	+	Large-Scale

22 Adverse factors affecting the ecological character of the site

Activity	On-Site	Off-Site	Scale
Introduction/invasion			
of exotic animal	+	+	Large-Scale
species			

23 Conservation measures taken

Conservation measure	On-site	Off-site
NNR	+	
Longstanding legislation already in place – please refer to Annex	+	+

24 Conservation measures proposed but not yet implemented see below

Site vulnerability and management statement

There is a fully comprehensive Natural Resources Management Plan for Diego Garcia (NRMPDG). It was issued in 1997 and is currently being revised. Nature and Strict Nature Reserves have also been established and these are shown on the map attached. Diego Garcia has feral cats and rats but the three islands at the entrance of the lagoon are free of both. There is a cat eradication programme being undertaken and a rat eradication programme is planned. The enforcement of conservation measures is the responsibility of the Commissioner's Representative. He is assisted by the BIOTPolice and fisheries officers.

25 Current scientific research/survey/monitoring and facilities

Scientific expeditions and visits were conducted in 1967, 1973, 1975 1978/9, 1996, 1999 and 2001. Surveys of recreational fishing are regularly conducted. The BIOT Conservation Consultant has visited annually for about a month from 1993 onwards and reports to the Commissioner.

26 Current conservation education

The Friends of Chagos is a registered charity whose objectives are to promote conservation, scientific and historical research and to advance education concerning the Chagos Archipelago. The Friends have produced 4 booklets on The Sea Shores of Chagos, the Reef Fishes of Chagos, the Plants of Chagos and the Birds of Chagos. They have also produced CDs with several hundred photographs about the nature of the Chagos Archipelago past and present. There is turtle recording and awareness activity and recording of red footed boobies. The NRMPDG contains measures to protect wildlife and

efforts are made with local television and a locally produced news sheet to make the community interested in nature and aware of the need to protect the environment.

27 Current recreation and tourism Nil.

28 Functional jurisdiction British Indian Ocean Territory Administration Foreign and Commonwealth Office London SW1A 2AH

29 Management authorityCommissioner's RepresentativeNP 1002 BFPO 485Diego GarciaBritish Indian Ocean Territory

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Chagos Conservation Management Plan

for

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Top: Salomon atoll, Bottom: the Chagos Anemonefish

Chagos Conservation Management Plan

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We recognise that not all those named here will agree with all the contents, or on the necessity of particular elements. We have not steered what we saw to be an unsatisfactory course of greatest compromise but, while heeding advice, have outlined a course which we believe this large region needs in order to be conserved over the years ahead.



Charts available for the Chagos Archipelago

Diego Garcia: Admiralty Charts and Publications, chart No. 920. 1:25,000 Transverse Mercator, UK 1996.
Salomon Islands, Admiralty Charts and Publications, chart No. 4. 1:38,180 Gnomonic Projection, UK 1994,
Egmont Islands, Admiralty Charts and Publications, chart No. 4. 1:72,600 Transverse Mercator, UK 1994;
Peros Banhos, Admiralty Charts and Publications, chart No. 4. 1:72,600 Mercator, UK 1994;
Great Chagos Bank, Hydrographic Office, UK, chart No 3, 1:360,000, Mercator Projection, 1976.

Great Chagos Bank , Defense Mapping Agency, USA, chart No. 61610, 1:360,000, Mercator Projection, Washington DC, 1976.



The British Indian Ocean Territory Exclusive Economic Zone. The EEZ area is approximately: 160,000 square nautical miles, or 209,000 square miles, or 544,000 square km.

This is also approximately the outer boundary of the Environment (Preservation and Protection) Zone.

1 Summary

This Chagos Conservation Management Plan (CCMP) takes a fresh look at the conservation of the biodiversity and natural resources of the British Indian Ocean Territory (BIOT). Various legal and management interventions already exist, but the government has recognised the need for a more comprehensive approach to ensure the long-term protection and sustainable use of this region. This document does not aim to replace existing management but rather seeks to complement it, and add to it in matters relating to good environmental governance of the region. The archipelago is arguably the most important island and coral reef wilderness area in the Indian Ocean, and with its vast reefs (Figure 1.1) and about 50 small islands (Figure 1.2), it is a place of unrivalled conservation interest.

To date Chagos has suffered relatively little in terms of direct human impacts. Its location makes it a place of critical value regionally, providing a connection or stepping stone between east and west. It is an unusual site in the increasingly pressured Indian Ocean, whose surrounding shores are over-exploited and degraded.

Implementation of this CCMP will go some way to implementing the UK Government's conservation objectives, including the targets for 2012 of the World Summit on Sustainable Development. It takes into account:

- ? The existing legal framework, existing protected areas and current management practices,
- ? The particular conditions of the area, namely its remoteness and difficulty of access, the small size of most islands, and the vast and widely dispersed reefs,

? The inappropriateness of many aspects of con-



Figure 1.1 British Indian Ocean Territory and part of England and Wales, to same scale, illustrating the size of BIOT. Green shows shallow, submerged reefs. Islanded atolls, and major or referenced submerged atolls and banks are named, the latter in smaller print. ventional management plans, given the absence of a local population which needs managing and the lack of simple facilities in most of it from which to carry it out, and

? The need for up-to-date management methods despite the above, to ensure its long term conservation.

This document brings together activities of all sectors which impact on natural resources, over the whole archipelago, in an integrated approach. Chapters following this provide review and explanation for the plan. The CCMP is also set against the background of, firstly, the massive mortality of most reefs in the Indian Ocean in 1998 and the increasing probability that this kind of warming event will recur and, secondly, of islands which have low elevations and increasing vulnerability to climate change. This CCMP provides a set of actions that would achieve the conservation of the archipelago as a whole.

The CCMP is simple. It **must** be so due to access problems, but it **can** be simple due to the lack of complex human / interactions over most of the area. Its generally excellent condition can be attributed to this



lack of human pressures. Where there are people (visitors to northern atolls as well as the special case of Diego Garcia), separate sections address important issues there. The CCMP suggested here can largely bypass many of the classic sectorial issues, and does so by use of three key actions. Specifics are important, but if these three actions are implemented, many of the details will automatically be accounted for.

- 1. Extensive, fully protected areas. Much is made of the simplicity of this measure which is gaining wide success around the world. BIOT already has extensive protection on land, but its marine waters are largely unprotected. The area needed to be covered is one third. This proportion may seem large, but is based on recent scientific argument. Protection under this scheme need not mean exclusion from all access, in the case of reefs at least, but does mean exclusion of all extractive activity, construction or other interference, including anchoring on coral-rich areas. The 30% proportion has been shown to allow: recovery of damaged areas; supply of juveniles to areas which are exploited; increased and restored catches in adjacent exploited areas; and maintenance of enough protected habitat to allow a 'natural' ecosystem to persist, particularly in the face of changing climate and increasing exploitation elsewhere. In the case of special islands, it does mean general exclusion (as at present).
- Scientific advisory group and a programme of regular monitoring and rapid managerial response. It is imperative to build up the base-

Figure 1.2 Areas of all Chagos islands (excluding seasonal bars or those dry only at low water. In order of size, those larger than 100 hectares are, from left to right:

Diego Garcia (2,720 ha), Eagle (Great Chagos Bank) 245 ha, Ile Pierre (Peros Banhos) 150 ha, Eastern Egmont ~150 ha, Ile de Coin (Peros Banhos) 128 ha, Ile Boddam (Salomon) 108 ha. Figure 1.3 Ile Yéyé, northeast Peros Banhos, and an un-named islet.

This photo captures many issues of the northern reefs and atolls. The seaward reef flat (left side) is narrow and, following the mortality of 1998 caused by warming, currently has very reduced coral growth. Yéyé is only 60 ha yet is one of the larger islands. It used to be farmed for coconuts. The smaller islet shows signs of erosion, broaches of its rim, and 'inland' flooding. Island elevations are very low, yet sea level is risina. Island rims are generally the highest points of the islands, whose interiors tend to be near or even below water levels. In lagoons (right side) coral survival was much better, so lagoons may help restock damaged areas. The remoteness of the area is evident.



line knowledge of BIOT, but also to actively commence monitoring changes over time. It is only through such work that we will be able to determine change, which may result from fisheries impacts, anchor damage, introduced species or climate change. Key aspects include coral reef biota and condition, including fishstocks, and assessment of coastline erosion. Coupled to monitoring, rapid managerial and legal response must follow. For example, boundaries of protected areas may need adjusting if and when rich sites are discovered an example would be the discovery by fishermen of a spawning aggregation of grouper, which could be extinguished in very short time if not immediately protected. Another example would be discovery of reef locations where coral survival was high - such areas need protection if they are to serve as potential sites for future recovery. On islands, increasing erosion is likely to become important; here, monitoring is the only way to estimate severity and timing of problems. To attain these, a scientific advisory group is recommended. This would follow 'Guidelines 2000' and 'The Code of Practice for Scientific Advisory Committees' issued by the Office of Science and Technology.

3. A practical mechanism for information gathering. The present fisheries protection vessel already supports regular patrols to the northern atolls for BIOT administrative tasks, and has supported several scientific projects over the years. While its role remains primarily fisheries protection and sovereignty issues, continued use of this vessel for necessary information gathering will be required on occasion. No greater size or cost of vessel would be needed, and nor would there be any conflict with present use.

These three points appear throughout this document. One problem is that, despite several scientific visits, many huge areas remain unobserved, and the approach taken here reflects this limitation. Management must be flexible.

Diego Garcia.

A perfectly sound management regime already exists for Diego Garcia in terms of its 'human environment'. Nothing is added to this. What is added concerns long term conservation of the atoll, focusing on shoreline erosion, the potential problem of the excavated western reef flat, and sources and use of material for future land fill.

Resettlement and Chagossian access

Consequences of possible resettlement was subject to a separate study. Settlement would require environmental and pollution management, for each atoll, of the sort which currently exists for Diego Garcia in its NRMP. The present document addresses the archipelago as a whole, in its present condition with respect to population and visitors. This is an overall conservation plan and presents mechanisms to make it work.

Whether or not resettlement occurs, Chagossians have access to all islands except Diego Garcia. However, Chagossians are subject to conservation controls on islands in the way that applies to other visitors.

Future climate changes

Changing climate means that the past is no longer a good guide to the future; coral death, rising fishing pressure, rising sea level, coastal erosion and the rest, are already having profound effects on all Indian Ocean reefs. If these measures are implemented, Chagos stands the best possible chance of escaping the worst effects, perhaps for decades.

In conclusion:

This CCMP is deliberately simple due to logistical constraints, and it *can* be simple due to its unusual nature. Much of the detail normally found in CMPs of inhabited areas can be side-stepped here, and its simplicity will allow it to work well in these conditions.

Time is not on the side of the Chagos ecosystem. If these measures are to work in this rapidly changing part of the world, they should be implemented rapidly. The purpose of the scientific committee would be to suggest timely actions for issues which arise.

The archipelago is also exceptionally beautiful. Such considerations regrettably are omitted from many scientific documents, though scenic and aesthetic considerations do form key components, and even the main basis, of many protected area designations worldwide. This archipelago merits protection for this alone, in the view of many. Indeed, its government correctly alludes to this aspect in several documents such as its annual conservation reports and statements.



Figure 1.4 Seaward reef slopes of northern Chagos atolls. Both illustrate approximately the same site. Left: A thriving reef in 1996. Right: the site in 2001, three years after the near-total mortality of corals and soft corals down to about 10-20 m depth, resulting from the warming of 1998. In the right photo, the dead corals have eroded, so that the sea bed is covered with bare rock and by mobile dead coral rubble.

2 The Management Plan

An inability to effectively police and manage most of BIOT except Diego Garcia has long been cited as the reason for the lack of active conservation management. However, several important Strict Nature Reserves have been declared, and improved management is possible with some relatively modest changes

Long term objectives

The following long term objectives should be pursued to the greatest extent compatible with current and future constraints relating to the use and occupation of the Chagos islands, including Diego Garcia, and with the resources available.

Aims are:

To maintain or restore BIOT as an intact, functioning coral reef / atoll system dominated by native species, and to maintain the resilience of the Chagos ecosystem.

To ensure that all human uses of the natural resources of BIOT are sustainable and set within the context of an ecosystem and precautionary approach.

To conserve or restore to carrying capacity the populations of globally threatened or regionally and locally significant populations of native species.

To eradicate, control at non-damaging levels and prevent further establishment of populations of non-native species which could threaten biodiversity.

Three cornerstones underpin this Management Plan. Following these three, Paragraph 4 details key aspects which should be undertaken as soon as possible.

1. To conserve within BIOT a representative and viable sample of all terrestrial and marine habitats (The 30% Protected Area scheme).

1.1 Designate a representative sample, comprising c.30% by area, of all terrestrial and marine habitats within the archipelago. Within these areas, no extractive activity of any kind should be permitted, including fishing to the extent feasible. The need for this proportion of protected area is now well documented. Figure 2.1 shows boundaries for recommended Protected Areas, with explanations.

1.2 The ability is needed to expand boundaries or add sites according to new information. This will be swift and simple given the scientific management advisory group described below.

1.3 Include in the protected area system areas with newly discovered rare or endangered species, or important, newly discovered populations.

2. Establishment of a scientific advisory group

This essentially formalises a practice which already takes place and which follows *Scientific Advice and Policy Making* guidelines from the Office of Science and Technology (www.ost.gov.uk/policy/advice/index. htm). Participants on this group should include tropical island and reef scientists, fisheries scientists and others as needed. Formalisation will allow members



Figure 2.1. Blue boxes indicate recommended Protected Areas for Chagos Archipelago (other than Diego Garcia which is separately commented upon) based on present knowledge. Red lines enclose existing Strict Nature Reserves. This has three groupings.

<u>The Northern Grouping</u> of four boxes cannot simply be enclosed into one, because of use and presumed continued use of the atolls. Some of its components (Blenheim, Colvocoresses, Victory, northern GCB adjacent to Nelson Island) appear lightly fished at present (see figure 3.5). Colvocoresses is exceptionally rich (A. Watson, personal communication).

<u>The western GCB</u>. Reefs of this section of the Great Chagos Bank is the only section of this huge atoll which has been well studied, and are known to be extremely biodiverse. This box includes extensive bird islands. It is, however, well fished at present. The box is drawn south to include Egmont atoll, which appears not to be heavily fished.

<u>Centurion Bank.</u> This small area is included for three reasons. It is not a heavy focus of fishing. It is diametrically opposite the Northern Grouping (ref the explanation earlier that geographically widespread sites are highly desirable), and it is apparently (in 2000) possibly the richest site of all (A. Watson, personal communication).

to bring matters to the attention of BIOT, at an early stage. This body should:

2.1 Establish by end 2004, monitoring protocols and a planned programme for priority features.

2.2 Encourage, enable and ask the BIOT Government to commission visits by scientists to undertake monitoring and survey, or to ask the BIOT Government to lend support to relevant scientific research proposals. Assist where possible applications from scientists for funding from conventional bodies for research in the area.

2.3 Include a conservation adviser and ensure annual visits by him/her to BIOT.

2.4 Disseminate the results of research and monitoring widely to decisions makers, the scientific community and wider general public.

2.5 Determine the future conservation and nature protection needs of BIOT with the BIOT Administration.

3. Support for information gathering

Any conservation management or scientific work to support it requires information gathering, and this requires some inter-island transportation. There is at present a Fisheries Protection Vessel which previously has supported a few scientific visits in addition to its primary roles. While this appears to be the most cost effective means of securing essential information and scientific data, there should not and need not be a conflict with its current essential fisheries role.

4. Details of specific needs

(Reference to later sections provides background to most items.)

1. Monitoring and research

1.1 There is a need for a regular programme of monitoring of islands (seabirds, turtles), and reefs (corals, reef fish), both within and outside designated areas. These can be viewed as 'sentinel' species.

1.2 A monitoring programme of reefs should be undertaken as directed by the scientific advisory group.

1.3 More substantial programmes (e.g. as in 1996 with 18 people) should be mounted when needed, in response to identified needs, not expected to be more frequent than every 5-8 years.

1.4 The scientific advisory group would be expected to form links with other UK research groups. E.g., the Natural Environment Research Council whose ships occasionally visit other parts of the Indian Ocean.

2. Protected areas (Background in Section 3)

2.1 The initial boundaries of protected areas shown on Figure 2.1 should be declared.

2.2 Recognising that much of the region has never been surveyed, boundary changes or additions would be recommended by the Scientific Advisory Group following results obtained from monitoring visits or by the conservation adviser on annual visits.

3. Plant conservation (Background in Section 4)

3.1 Vegetation cutting other than that authorised should be prohibited. Several species should be 'named' as is the case with fauna, specifically the high shoreline bush *Scaevola*, and all hardwood with the exception of *Casuarina*.

3.2 Exceptions required for conservation projects (e.g.

removal for access in a rat eradication project) should require specific authority of the BIOT Administration or local authority.

4 Species introductions (Background in Section 4)

The requirement to not introduce species is adequately clear in the Notice to Visitors, as are penalties for violations. The practice may fall short.

4.1 Ballast water discharge is a major source of introduced species in many parts of the world. This should be specifically prohibited in all BIOT waters.

4.2 The importance of preventing species introductions into Diego Garcia needs to be continually emphasised. Effective quarantine remains essential. This has been highlighted in several annual reports of the conservation advisor (113).

5 Eradication of introduced species to aid natural restoration of turtles, birds and vegetation (Background in Section 4)

The BIOT government is committed to continuing efforts of control and eradication of some important alien species.

5.1 Eagle Island has been selected as being a priority for rat eradication. This island is remote from other rat infested islands, minimising risk of reintroduction. Its size would mean that success would approximately double the rat-free habitat in the archipelago, with probably extremely beneficial consequences to birds, which are largely absent at present, and to turtles. Investigation and exploration of the feasibility of this has started, and should continue.

5.2 Monitoring of rats from any islands targeted for eradication should be annual (by visits by the conser-

vation adviser) who also will monitor any bird recovery. If possible, additional 6 monthly checks should be made on an opportunis tic basis.

6 Fisheries (Background in Section 5)

The intent is to ensure that commercial & recreational fisheries in BIOT are harvested sustainably, reflect international obligations & collaboration, and incorporate an ecosystem and precautionary approach.

Fisheries management provides a good example of successful management in BIOT. BIOT waters are one of the very few large areas of the Indian Ocean with demonstrable and beneficial husbandry.

Responses to changes have been implemented, and this flexibility remains essential. Notable have been the responses to the 1998 mass coral mortality when the number of fishing licences was reduced, measures concerning sharks, and measures concerning spawning aggregations were introduced.

6.1 The BIOT government should remain actively engaged in the Indian Ocean Tuna Commission, recommending precautionary measures, to ensure the sustainable management of migratory species. BIOT should argue for a ban on steel trace within the IOTC area. This would greatly reduce shark by-catch in the long-line fishery.

6.2 The observer system is effective and studies on incidental mortality carried out since 2001 should be continued. Turtle and seabird by-catch should continue to be monitored. Findings should be made widely available.

6.3 A shark plan is required under the IPOA for the Conservation and Management of Sharks, which should consider a total ban on shark fishing. Even unilaterally declared, this would have a major impact on shark by-catch in the tuna fishery.

6.4 The drift netting prohibition should continue.

6.5 Purse seining around cetaceans should be prohibited.

6.7 The definition of "lagoon" as held in the current license agreement should be clearly stated to include atoll channels up to 500 m offshore, to avoid likely sites for spawning aggregations.

6.8 Fishing of spawning aggregations should be expressly prohibited within the license agreements. When location of aggregations become known, they should be quickly incorporated into the protected area network, giving permanent legal protection.

7 Recreational fishing in Diego Garcia (Background in Sections 5, 7)

7.1 All areas included in the Ramsar designation should exclude fishing.

7.3 The log-sheet system should be applied to all fis hers. Completion of logs for the recording scheme, should be encouraged.

8. Visitors to northern atolls (Background in Section 6)

8.1 The present 'anchor at will' system should be changed to one of anchoring in clearly defined areas or depths.

8.2 The feasibility of moorings should be examined, with a view to adopting a mooring system as soon as possible. Moorings would result in greatly reduced damage.

8.3 Current levels of charging are very low. Once (or

if) moorings are in place, BIOT Administration will look at the fee structure and the desirability of setting a maximum stay duration of 1 month.

8.4 Notice boards should contain the text found in the new handout to visitors. The latter is clear.

9 Enforcement

9.1 Enforcement is possible, in exactly the same way as is currently applied to illegal fishing vessels. The new handout explains clearly that expulsion is possible, which could be chosen as a simpler alternative to confiscation and fines by the local officers according to local judgement.

9.2 As noted by the conservation consultant four years ago: "Never has it been so important to establish a permanent BIOT Patrol vessel... It is for consideration that when the FPV is not engaged on fisheries duties, the ship could be employed on Chagos research" (114). The value of the FPV in this respect in the past has been clear.

9.3 The effectiveness of policing is related to considerable degree to the extent to which a policing party is aboard the fisheries patrol vessel. The new BIOT guidelines to visitors make clear the penalties of infringing the conservation rules, and only such a presence could impose them.

10. Diego Garcia (Background in Section 7)

10.1 A Conservation Consultant should continue annual visits which focus on Diego Garcia. These visits should, where possible, coincide with visits by other scientists. The consultant should be a key member of the scientific advisory group.

10.2 Monitoring of the natural environment is the responsibility of the UK government, but support should be sought from the US government—the main users. 10.3 Provision should be made for the inclusion of UK government appointed scientists on all monitoring activities to ensure consistency with other ongoing work, and adequate data transfer.

10.4 A 15 year material requirement study is needed, or if done, made available to BIOT Administration.

10.5 There should be a prohibition of lagoon extraction unless essential to existing channel maintenance.

10.6 A study should commence to examine 'restoration' of the western, trenched seaward reef. It has not and will not recover as some hoped, so traditional concrete strengthening and new 'electrolysis' methods should be examined. The Natural Resources Management Plan's request for 'artificial reef' work is most sensibly directed here.

10.7 Surveys are needed of progressive shoreline erosion to better than 10 cm accuracy.

10.8 Investigations should be made regarding active replacing of shoreline *Scaevola* and / or *Tournefortia* in all areas where previously it was removed, with a view to replacing the concrete debris used to repair the gaps.

10.9 All environmental reports and studies should be made available to BIOT Government.

10.10 The NRMP recommends several series of 'baseline surveys' followed by annual or near annual follow-up studies. These can all be consolidated into one series. This would best be planned and coordinated by the scientific advisory group in conjunction with the USA. These should be carried out.

10.11 The NRMP recommended annual monitoring. The need for this has increased, due to recent mæsive changes to the condition of the reefs. Changes should be measured using standard methods for both the coral reefs and the seagrass beds. These would be designed by the scientific advisory group.



Figure 2.2 Left: Middle Brother, western rim of the Great Chagos Bank. This island is part of a tiny atoll-shaped 'ring reef' with a remarkable lagoon of 10 metres deep, and with one channel cut through the reef flat. It is the only structure of its kind in Chagos, and resembles some 'faros' found in Maldivian atolls. This reef sits in a larger ring of reefs, the latter in turn being part of the wes tern rim of the largest ring of coral of all, the Great Chagos Bank - the atoll with the largest area in the world. Aerial photo from 1970s, taken by 'Eyes of the Fleet'.

Right: Middle Brother, the shore seen from the little lagoon. All the dots on the shore are terns.

3 Protected Areas

Protected areas were recognised by the UN Economic and Social Council in 1959 as providing a means of conserving nature and natural resources, and providing benefit. Substantial work since then has confirmed that, in many cases, it provides the only or best means of doing so. Many have been designated, but in many, a lack of subsequent monitoring means their effectiveness and benefits remain unknown.

Today, estimates of what proportion should be protected to ensure preservation of many marine ecosystems, has risen to 30%. In the recent *Troubled waters: a Call to Action* (176), over 1,600 scientists called for the protection of 20% of marine areas, to be set aside for reserves. A recent review (177) cites 26 separate scientific studies on optimum reserve areas and conclude that 20-40% should be set aside for no-take. The mean figure of 30% should be the target for Chagos. It cannot be prescribed completely at present because over half of the archipelago has never been surveyed in even a rudimentary way, though this CCMP proposes a substantial start to this process through its monitoring recommendations. This proportion has, moreover, already been achieved in Diego Garcia lagoon and islands.

It is now recognised that no-take zones are critical for fisheries management (this has been endorsed by the British Mauritian Fisheries Commission, Section 5), as well as for general reef conservation. Examples of benefits from such protection include the increased availability of these species to fisheries operating outside the protected areas. Such benefits may become more urgently required as vessels increasingly use the



Figure 3.1 Existing protected areas. In Chagos. Red boundaries are all Strict Nature Reserves. For Diego Garcia (blue box) see Figures 3.2 and 3.3 for detail. From North to South:

Peros Banhos Atoll Strict Nature Reserve

(All islands to the east of a line drawn between the easternmost point of land on Moresby bland and the easternmost point of land on Fouquet Island).

Nelson Island Strict Nature Reserve The Three Brothers and Resurgent Islands Strict Nature Reserve Cow Island Strict Nature Reserve Danger Island Strict Nature Reserve

These categories are probably equivalent to the IUCN category la "Strict Nature Reserve: protected area managed mainly for science... Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring". Indian Ocean, as other oceans become depleted. The existence of effective protected areas also allows for the accurate monitoring of recovery of areas. Finally, marine protected areas also provide an important security measure against potential future climate change. During periods of high mortality of corals and other species, there is considerable geographic variation in the extent of the impacts; if areas of higher survival are discovered by monitoring and are then protected (e.g. from anchoring), they will serve an important role in future recovery.

Existing protected areas

Figures 3.1 - 3.3 show existing protected areas, created under various instruments. Areas in other atolls are called 'Strict Nature Reserves' into which entry is

prohibited and activities are clearly proscribed by BIOT (129, 130, 148). Note however that any commercial fishing within parts of some could substantially downgrade their effectiveness. Captions to Figures 3.1 -3.3 also show the IUCN (international) equivalent in terms of protection afforded.

Environment Zone

In addition, an Environment (Preservation and Protection) Zone was declared in 2003 (shown in page v). This has as its outer boundary the 200 mile limit of the Fisheries EEZ and has an inner limit which borders the outer limit of the Territorial Seas.

Size and representation of existing system

The total areas currently under some protection are



Figure 3.2 Protected areas in Diego Garcia. Diego Garcia Restricted Area includes:

Nature Reserve Area

Lagoon area: from Rambler Bay to Main Passage

These are probably equivalent to IUCN Category V.

Special Conservation Areas: Barton Point, East Island, Middle Island, West Island

These are probably equivalent to IUCN Category 1a.

Diego Garcia Ramsar Site (see nextfigure)

IUCN category la "Strict Nature Reserve: protected area managed mainly for science... Area of land and/ or sea possessing some outstanding or representative ecosystems, geological or physiological features and/ or species, available primarily for scientific research and/or environmental monitoring". Category V is "Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation") and probably equates to the Nature Reserve Area. Marine areas within the lagoon are probably equivalent to IUCN category V.



Figure 3.3 Diego Garcia Ramsar site. (Map supplied by Joint Nature Conservation Committee.)

c.19 sq km of land, and c.377 sq km of shallow reef.These represent about 35% of the total land area, and 3 % of reefs to 60m depth (21).

For the islands this is suitable, especially since the ratfree islands are included with their seabird populations and, in some cases, native hardwood stands.

For the reefs, much too little is protected: fishing of some kinds is allowed in several of these zones, and additionally, too little is known about huge swathes (eastern Great Chagos Bank) to know how representative the present small protected zones actually are. Currently, marine protection is confined to lagoon areas in Diego Garcia and to the Strict Nature Reserve areas of the northern atolls. Although these would appear extensive, commercial fishing within some renders protection of the marine component of these sites effectively meaningless. No protection is provided to reef or shallow benthic areas away from these **e**serves. Thus while about 3% of the shallow waters of the Chagos Archipelago appear to fall within protected areas, the area of real protection is less. Most of the outer protected areas (Strict Nature Reserves) are defined by their islands, with access prohibited within 200 metres of the islands, as stated in the handout given to yachts. This distance would not exclude walking on several of the reef flats surrounding these islands (e.g. Middle Brother).

At present, commercial vessels may fish in lagoon channels, though not in the lagoon. Channels are a part of lagoons in ecological terms, and generally are some of their richest parts, and are used by several commercially important species as spawning grounds. At present fishing in these areas appears to be slight with the exception of a recent targeting of a spawning area.

Several atolls have to date been excluded because they have no permanent islands or are more deeply submerged, yet these atolls have similar marine biological characteristics to islanded atolls.

The 30% Protected Areas system

Of great importance in any protected areas system is the need to include a representative selection of all habitats. Much of Chagos remains unknown, so boundaries are proposed based on existing inform ation. It thus has a more modest scope in terms of area than is desirable. The intent is mainly conservation, but is also designed to accommodate fisheries, which have continued here for decades, with as little disruption as possible. It is believed that reef fishery capture is currently below sustainable yields (38), and it is also possible to determine areas which are relatively little fished (38, 40) but which past surveys have shown to contain rich reefs. Rich but little fished sites are prime candidates for protection.

Figure 3.5 shows existing commercial fishing locations (38). It also shows several locations, known to support rich reefs, where fishing is apparently not high: Blenheim, Colvocoresses and Victory Banks in the North, much of the northern Great Chagos Bank near Nelson (though further south into the lagoon is heavily targeted), and Egmont atoll.





Figure 3.4 Table corals and staghorn corals were almost entirely killed in 1998. A few large survivors of these kinds were discovered in 2001 in Peros Banhos near the jetty of Ile de Coin. This is a site where anchoring currently takes place. Rapid management would be needed to protect this site from anchor damage.

Other vital considerations for determining the boundaries shown in Section 2 are:

- ? Protected sites must be geographically widespread, incorporating representative areas of all habitats as they become known, and will include isolated banks. Future monitoring would add to or modify boundaries.
- ? The size of areas should bear in mind requirements of management. Fewer, larger and contiguous areas are preferable to many small ones, though some fragmentation may be needed where existing use can be accommodated without detriment.
- ? Particularly vulnerable communities, or locations, should be singled out. Notably, this would include areas where spawning aggregations of commercially important fish were observed, or where corals were found to have survived mortality from warming. Rapid response to extend or designate new boundaries should be permitted to capture such essential core areas as they are discovered.

Figure 3.5 Chagos Archipelago, indicating statistical fishing sectors and average dory catch rate information per mother-vessel relative to the anchoring position of the mother-vessel, recorded in log-books during 1997. (Figure and caption from reference 38 by Mees et al).

The protected area boundaries shown in Figure 2.1 reflects these factors. These areas should have complete biological protection. Passage need not be affected. As at present, there should be no access to the included islands which are Strict Nature Reserves. With regard to Diego Garcia, current protection provided to marine areas is largely restricted to lagoon waters. The restricted area coverage on this island should be extended to cover 30% of the reef flats and outer reef slopes. To accommodate present use, most suitable for this would be the seaward side of the eastern side of that atoll. With regard to terrestrial protection in Diego Garcia, there may be a need to give the Restricted Area a stronger legal instrument than the current Public Notices.

Management and enforcement

The declaration of protected areas must be accompanied by the means to manage and to enforce legislation. This is addressed in other Sections (especially 6 and 9).

International protected areas

The above is independent of any international designations. Declaration of protected areas under international legislation confers prestige and recognition of the international importance of a site. In 1999 the UK government extended its commitments under the Ramsar Convention to include BIOT. So far, a large site has been declared in Diego Garcia. Two main areas marked in Figure 3.6 (the northern grouping of reefs and banks, and the western Great Chagos Bank area), would be preferred follow-up areas (based on current knowledge of their biodiversity).

4 Species: protection and eradication

Chagos is host to as many as 60 species which are included in the IUCN Red List. Some 19 of these are defined as threatened, while many others are insufficiently known for a clear threat category to be assigned. Most species protection is achieved by proper protection of habitat, as outlined in Section 3 though special cases may require specific regulations. The Convention on International Trade in Endangered Species (CITES) governs trade of several species, local regulations prohibit access to most bird breeding sites, and other local ordinance prohibits collection of or interference with several other species groups. This section notes those which need special attention, whether or not they already are listed in CITES conservation appendices or BIOT regulations. The question of introduced invasive species is included here. Fish and fish spawning assemblages are covered in Section 5.

Of particular note is the fact that this region is especially rich, partly because of very limited exploitation to date by humans. It is a key 'stepping stone' for marine species in the Indian Ocean, and one of few and a diminishing number of areas which can continue to serve as nurseries, or sources, for other increasingly pressurised parts of the Indian Ocean. Its importance comes partly from the fact that it still does have rich and biodiverse habitats of kinds which are decreasingly common in the Ocean as a whole.

Existing measures

Current provisions to protect wildlife in Chagos forbid the killing or harming of any animal, with the exception of fish and marine products specified under fisheries legislation, pests or vermin. It is illegal to destroy or damage any nest or eggs belonging to turtles and birds. It is not permitted to be in possession of any coral, alive or dead, or of any seashell which is alive or which was taken alive. Prohibitions regarding the Coconut crab receive special mention. Trade restrictions prevent the export of almost all animal materials with the exception of seashells not taken alive. International regulations under CITES are strictly enforced. Turtles,



Figure 4.1 The tiny hardwood forest of *Pisonia* in the Three Brothers is a rare remnant of this vegetation in the Indian Ocean.

giant clams and most hard corals are listed under CITES appendices also. These are all sufficient.

There is little specific legislation preventing damage to plant-life. Prohibitions on forestry and on lighting unauthorised fires provide some protection to plants. Clearer wording is needed with respect to plants. Most hardwoods are extremely limited and their extraction is likely to be non-sustainable.

Introduced species

One of the biggest problems facing life on remote islands is that of introduced species. About 45 plant species are thought to be native to these islands (112, 113), amongst a list which now stands close to 280. Over 100 plants have arrived in the last 40 years. Many pose a threat to native species, and to the island ecology.

Introduced animals can be an even greater problem. Rats are present on 36 islands, including all the largest. Rats regularly feed on birds eggs and chicks and can severely reduce the populations of breeding seabirds. However, around the world successful rat eradication has now become commonplace, and there is no reason to suppose that it would not succeed if tried on Chagos islands



Figure 4.2 Coconut crab *Birgus latro*. Endangered in much of the world, Chagos islands are home to significant populations. They are under threat from illegal poaching by visitors.

<u>Rat eradication</u>. For this reason rat eradication is proposed for Eagle Island. The island is large enough to be significant, is the only island on the Great Chagos Bank which has rats, and there is evidence that eradication here could significantly improve habitat for birds, turtles and, eventually, some native vegetation. Examination of the feasibility of this has commenced.

<u>Marine introductions</u> are a global problem. Although there is currently no evidence for marine introductions, this relates simply to the lack of knowledge here. Ma-



Figure 4.3 Many of the smaller islands have enormous densities of seabirds. This is Nelson Island, Great Chagos Bank, where about 22,000 nests were counted in its 80 hectares in 1996 (111). The archipelago has possibly the most important seabird diversity in Indian Ocean islands. Part of Nelson is well elevated compared with most islands (about 3-4 m above sea level in parts), but is very narrow (only about 200 m wide at one point). With the other islands of the Great Chagos Bank, mostly smaller than this, this atoll is the most important for birds in the archipelago. Figure 4.4 Birds, birds eggs and fledglings, especially of groundnesting birds, are vulnerable to rats. Eagle Island is the preferred island to eradicate rats because of its size (it is the second largest island in the group), its position (it is in the Great Chagos Bank many of whose islands have prohibited access already) and is least likely to become re-infested (due to its location and distance from other infested islands).



rine introductions regularly occur in other areas; on any one day an estimated 3000 different species are transported alive around the world in ballast waters of ocean-going vessels. In some cases, their release has had devastating social and economic impacts and farreaching consequences for marine ecosystems.

Ballast water discharge is a potential problem within the BIOT EEZ. This may be covered under existing provisions of the Environment Protection (Overseas Territories) (147) which aims "to replace the Dumping at Sea Act 1974 (c. 20) with fresh provision for controlling the deposit of substances and articles in the sea...". <u>Pollution</u> is a threat to many groups of species in many coral reef areas, especially enclosed lagoons. Emptying of effluents from vessels in lagoon areas, including sewage and paint scrapings, may come under this provision, though clarity to vessels would possibly help. Sewage in particular should not be discharged into lagoon areas of enclosed lagoon of Diego Garcia due to its exceptionally enclosed nature.

<u>By-catch reduction</u>. Efforts to reduce by-catch, especially of threatened species must be strongly encouraged, and targeting of spawning aggregations should be prohibited; these and other measures are addressed under Fisheries (Section 5).

5 Fisheries

The Chagos Archipelago supports offshore tuna fisheries and a commercial near-shore fishery on the northern reefs. These are covered here. A recreational fishery off Diego Garcia is covered in Section 7. Each operates under different management regimes.

Tuna

These oceanic fishes range widely. Details of the main species are available on request. Many are migratory, and large schools may contain several species. Globally, most tuna stocks are intensively fished, fully-fished or already over-fished. Indian Ocean stocks are being increasingly targeted: catches are "half those of the Atlantic or the Eastern Pacific Oceans, but they have increased rapidly and now account for more than a quarter of world tuna landings. The value of the annual catch of 1.2 million tonnes in the Indian Ocean is also very high (estimated to be between US\$2 billion and US\$3 billion), as there is a large proportion of valuable fish caught by longlines" (28). Different fishing methods target different species and size classes. Purse-seining, which targets schools containing immature or young fish, has much greater impact on recruitment to the adult population. Long-lining targets larger individuals. Levels of by-catch also vary considerably.

Since the BIOT Fisheries Conservation Management Zone was declared in 1991, monitoring and licensing of the tuna fishery has been managed by MRAG Ltd for BIOT. Since 1993, scientific observers have been placed on some vessels to provide independent information on fishing methods, by-catch, verification of catch statistics, and to undertake sampling. These observations are added to the ship-book records and supplied to the government.

BIOT is the only State in the Indian Ocean region to routinely deploy observers on commercial longline and



Fig 5.1: Fishing effort and catch per day for the longline fishery. Diamonds (bottom line) are days fishing. Squares (top line) are catch per day.

purse seine vessels targeting tuna. Their information on this fishery and its by-catch is thus of regional importance (J. Pearce, pers. comm., 28/8/02).

Longline fishery

Dominated by vessels operating out of Taiwan RoC (though some under flags of convenience), since 1997/8 about 20% of licences are now taken by Japanese vessels. Longlines may extend over 120 km in length, with 3000 hooks. Lines are set at different depths depending on target species (to below 300m for bigeye tuna). Setting and recovery takes a day, and fish are frozen on board. This fishery targets larger, higher value individuals of yellowfin and bigeye tuna, but there is a broad by-catch.

Over the past eight seasons, this fishery yielded broadly equal quantities of yellowfin and bigeye tuna (Figure 5.1). In 2000/01, 9% (by weight) was made up of billfish (marlin and swordfish), which have a high commercial value and are kept. Sharks make up a further 7%. These may be kept, but the 2000/01 observers noted that only mako sharks (0.23% of the total catch by weight) were kept, the remainder being 'finned', and the bodies discarded.

The 2001/02 observer programme lasted only 4 days on one vessel. Tuna made up 55% of the catch by weight, with billfish a further 15% and sharks 9%. Lancetfish made up a further 15% by weight (Figure 5.3). This common by-catch had not been counted previously. Lancetfishes are soft tissued, unpalatable, and usually are jerked off the lines before being landed, in which case they are not recorded (unless by an observer). This group has probably suffered a high and usually unreported mortality. Other by-catch is low but varied.

Purse seine fishery

This is dominated by Spanish and French vessels, with others from Seychelles and Mauritius, some under flags of convenience. Many follow the yellowfin tuna migration patterns, which means that, from December to mid-February, a large proportion of the western Indian Ocean purse seine fleet may enter BIOT waters.

Purse seiners locate dense schools of tuna, sometimes using fish attracting devices (FADs). The latter



Figure 5.2 Summary of the fishing effort and catch per day for the purse seine fishery. Diamonds (bottom line) are days fishing. Squares (top line) are catch per day.

may be natural objects floating in the water, or rafts, with GPS locating units and fish detection sonar, deployed by the vessel. Nets of over 1.5 km long and 250m deep are set around the school, and the bottom is then drawn in.

Access to this fishery, its licences and fees, are negotiated annually between MRAG Ltd and the fishing companies (two Spanish, and one French) which control the fleet.

BIOT waters are one of few places in the Indian Ocean where free-swimming schools of large yellow-fin tuna can be regularly caught by purse seines. For this reason, FADs are not widely deployed, and vessels are prepared to invest more time in trying to locate these schools (J. Pearce, pers. comm., 28/8/02).

Catch composition has varied significantly over eight years. In 1997/8 the valuable yellowfin were scarce, while the following year they formed 55-75% of the catch. In 2000/01 the catch was mainly (60-75%) skipjack. By-catch is generally <1% from the free schools according to the observer programme in 2000/01.

Sets have sometimes been cast around whales, which may only be reported if observers are present, though there is a code for this on logsheets. The risk of whales damaging valuable nets, however, means that fishers generally avoid capturing the whale. Dolphins associate with tuna, but there are few records of purse seiners targeting such schools here.

Commercial nearshore fisheries

Demersal fisheries have long existed on all Chagos' banks except Diego Garcia. These focus mainly on reef slopes of 30-70 m depth and catch mainly emperors, groupers and snappers. Year 2000 figures show that Lethrinids form 48% of the catch, Serranids 35%, Lutjanids 16% and others 1%.

Coral reef fisheries are complex, and are still poorly understood. Their productivity ranges from about 0.4 to 44 tonnes per km² per year. These estimates are mostly based on shallow water studies in more nutrient rich areas, with multi-species targets. In BIOT's waters, which are nutrient poor, the fishery is in deeper waters and more focussed on few species, hence productivity might lie towards the lower end of this range.

Target species are all predators, so form a small part of the total biomass. Many aggregate for spawning, commonly at dawn or dusk, or at night, and individuals may travel some distance to join such aggregations. In other parts of the world, uncontrolled fishing of spawning aggregations has led to some dramatic declines or local extinction of the fish.

Several of these target species begin their sexually mature life as a female, but become male after a number of years. From a fisheries perspective, heavy fishing of larger individuals can significantly impact sex ratios and reduce the reproductive potential of a population. These targeted species live to 17 or 25 years or longer. There is now evidence, at least among groupers, of dominance by particular age-classes with different reproductive ability. This has important fisheries implications: if a stock is heavily dependent on recruitment which is only occasionally successful, dramatic stock-declines could result.

Existing fishery

The current fishery in the northern atolls is a licensed, Mauritian, mother-ship dory operation. Mother-ships are capable of blast-freezing up to 10 tonnes of fish per day, deploying up to 20 dories, each with three fishermen, whose hand-lines each have 35 baited hooks. In 1998 one vessel used four dories equipped with 2-3 electric reels which targeted snapper and sharks. To date, licences have only been granted to

Table 5.1: Summary of fishing effort

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Licences used	3	5	4	4	3	4	6	2	2	2
Days in zone	120	183	105	159	117	159	163	61	65	104
Fishing effort (man-days)	5,602	7,893	3,910	6,710	4,569	5,798	5,607	1,532	2,174	4,314
Total catch (tonnes)	299	305	200	305	217	320	295	82	127	309
Catch rate (kg/ man day)	53.4	38.6	51.2	45.5	47.5	55.2	52.6	53.5	58.4	71.6

Mauritian applicants, and only in 1997 were all six licences taken up.

This fishery is allowed in The Strict Nature Reserves (Section 1), along their seaward reefs and reef channels, though not in lagoons of Peros Banhos, Salomon, and Egmont (but lagoons of Blenheim and Great



Figure 5.3 The lancetfish *Alepisaurus ferox*. These are caught in large numbers, but usually are not landed, so generally do not count in the by -catch figures. (Photo Andy Watson.)

Chagos Bank may be fished). However, one-off restrictions can be placed on individual licenses.

From a stock conservation perspective, the number of licences or total fishing effort are less important than the total catch (Table 5.1). As methods or equipment, change, catch per unit effort can increase considerably, and effects can be masked (such as when targeting spawning aggregations). The current management regime based on effort controls is appropriate, and there should be an automatic review of the level of effort if recorded catches reach certain levels.

An observer programme has been run for several years. Typically observers have covered up to 50% of vessel fishing days, though in 1999 and 2000 observers were present on 96% and 65% of days respectively. Observers provide good independent verification, and additionally measure numerous statistics, as well as by-catch details which are not otherwise **e**-corded.

The total catch appears well within sustainable limits, with two concerns:

Sharks are widely hunted world-wide, where numbers have collapsed. Even in Chagos an unlicensed fishery was reported in 1996 when it was estimated that numbers of sharks had fallen by 85% (1). In 1998,
over 5,400 sharks were caught (as by-catch) by one licensed vessel, and their fins sold for \$6-12 / kg. This was halted next year by banning steel trace on fishing lines, an example of rapid and relevant management intervention. Sharks are a very vulnerable group, yet essential in the ecosystem. There is evidence that numbers in Chagos have increased slightly since 1996, attributable at least in part to the presence of the effective Fisheries Protection Vessel (100).

Spawning aggregations have been fished. In 2000, massive catches of grouper were linked to a spawning aggregation in Peros Banhos, between Ye-Ye and Manoel islands. Catches have been repeated there in 2001 and 2002, with markedly fewer caught in 2002 (C. Mees pers comm., 28/8/02). The danger in targeting these is that they may contain a large proportion of the breeding stock from an area of tens of square kilometres. In some parts of the world entire regional stocks have been fished out in two or three years, and the lower numbers caught in 2002 may have been the result of this. In BIOT, the most recent BSFC SSCM stated:

"The UK delegation indicated that due to the relatively low level of fishing effort significant changes to the management strategy in BIOT were not required. However, the recommendation to the Commission for protection of spawning aggregations was discussed and closed area management was considered by the delegations to be the most appropriate management action (via extension of the Strict Nature Reserve around Peros Banhos to encompass fisheries). " The simple closed area system proposed in this CCMP should adequately encompass this. Enforcement, as always, is a key issue, whatever closed area management system is applied.

Note on turtle and bird by-catch

Leatherback turtles are widely reported as victims to longline fishing in other areas. There is a record of one

individual being caught in 2001/02, and they are generally thought to be rarely caught here, although their capture would only be recorded by observers. It is impossible to ascertain whether this is due to their general rarity in these waters, or of the fact that longlines do not represent a significant threat.

Longline fishing is also reported to impact seabirds, but this impact is largely or entirely thought to relate to larger species such as albatross, where these fisheries are operating in the Southern Ocean.

In general it would appear that by-catch is much lower with the purse seines fishery than with the longlines, although there are slightly higher levels of by-catch associated with FADs. From the observer programme in 2000/01, tuna made up over 99% of the catches from the free schools (the majority of sets), and some 90% of the FAD catches. The remainder of the catch from the FADs is mostly comprised of kawakawa, bullet tuna, and rainbow runner, with sharks making less than 1%. Data from the observer records in 2001/02 season show even lower rates of by-catch (less than 0.5%).

In 2001/02, two sets watched by the observers were carried out around whales (the species was not ecorded, and it not clear if these were individuals or small groups). A similar observation was reported in 1998/9. As these are only reported when observers are present, and it is possible that the presence of observers may actually discourage this activity, it should be assumed that such setting has occurred on other occasions. The very high risk that a whale could damage the nets (often worth up US\$0.5 million) means that it is in the fishers interest to place the set after the whales have made off, or to ensure the whale can easily escape before the nets are fully closed.

Note on UN Agreement

The United Nations Agreement for the Implementation of the Provisions of UNCLOS (United Nations Convention ? on the Law of the Sea) relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks entered into force as from 11 December ? 2001, and the Overseas Territories, including BIOT were ? specifically included in this agreement. This particular agreement aims at the "long-term conservation and sustainable use" of these marine living resources. The agreement is centred upon three conservation principles: ? the precautionary approach, protection of biodiversity in the marine environment, and sustainable use of fisheries ? resources. Participating states are called to

- ? Protect biodiversity in the marine environment.
- ? Take into account the interest of artisanal and subsistence fishers.
- ? Adopt measures to ensure the long term sustainabil-

ity of the fish stocks and promote their optimum utilization.

- Ensure that the measures taken are based on the best scientific evidence available.
- Take account of environmental and economic factors, such as the special requirements of developing States.
- Apply the precautionary approach.

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- Adopt an ecosystems approach, whereby dependent or associated species are taken into account.
- Take measures to prevent or eliminate over-fishing and excess fishing capacity.
- Give a high priority to the collection and sharing of data, and
- Implement and enforce conservation and management measures through effective monitoring, surveillance, and exchange of information.

6 Visitors

The number of yachts spending several months in Chagos, especially Salomon lagoon, has risen to several score each year. This has led to two problems. First is the discrepancy between the illegality of this with the fact that it is permitted to the point of charging modest fees. Regulation and conservation here has had a rather low priority in the past. Secondly, these yachts and occupants can cause damage.

The lagoon

In no other part of the world where there is concern about conservation or management are yachts permitted to drop anchors on coral reefs. The extensive damage known to occur from this is well known (Figure 6.2). This matters in proportion to both the quality of the reefs and numbers of anchors. As far back as 1996, the BIOT conservation advisor recommended that the number of yachts in Salomon be restricted to 10 or less, for stays of 1 month or less, requiring permission in advance. This could have been achieved without further legislation (114). In 1997, the issue was raised again, with the comment that the situation "makes our claim that 'the islands will be treated with no less strict regard for natural heritage conditions, than places actually nominated as World Heritage Sites' rather hollow... and... a position hard to defend." (114). Since then, yacht numbers have increased further. Each yacht anchoring probably damages over 100 square metres of seabed.

There is a clear difference between anchoring and mooring, and BIOT legislation refers to 'mooring' repeatedly, where it actually means 'anchoring'. No mooring occurs, and yachts drop their own anchors in various parts of the two northern lagoons, according to



Figure 6.1 Salomon lagoon in the 1980s showing nine anchored yachts. Many more than this now anchor here. By swinging around its anchor, each yacht's chain can destroy over 100 square metres of coral.

Salomon lagoon is unusual in that almost its entire bed is a rich coral garden, and there are few natural sand patches.



Fig 6.2 Top: Damage to branching corals typical of anchoring in lagoon habitats. Sheltered lagoons support vast stands of fragile branching corals. Follow ing 1998, the lagoons contain almost the only surviving, mature branching corals of these types.

Bottom: Anchor chains, not the anchors themselves, cause the most damage, in circles around the anchor with a radius of many metres.

convenience and shelter. Anchor damage is severe near Ile Boddam in Salomon atoll. Mostly, damage comes from mobile anchor-chain leaders, though one huge 400 yr. old coral around which is tied several ropes, for example, has died since 1999, from abrasion.

Two methods can constrain yacht numbers and damage to the lagoon. The first allows anchoring only within an area which is buoyed and defined by compass fixes from land. This would be satisfactory if the area had been a sandy bottom, but in Salomon this preferred area is, or was and remains potentially, a coral-rich sea bed. To date the southern part of the lagoon has been described as a 'sacrificial area', but this area is clearly expanding to accommodate the greater numbers. Second, the preferred method in most valued areas, is use of moorings. With this method, usually no anchoring is allowed anywhere.

BIOT Administration will consider supporting legislation regarding moorings. Meanwhile, unless or until moorings are installed, it is recommended that an anchoring area be declared, fixed by bearings to islands, outside of which no anchoring is allowed. This area would be fixed, and would be located roughly where yachts are visible in Figure 6.1. Regarding the size and capacity of the anchorage, the number recommended repeatedly by the conservation consultant (ten yachts) could be provisionally and reasonably set, as should his suggested residence time (up to one month). Once moorings are in place, BIOT Administration will look at the fee structure and the setting of a maximum duration of stay. In Peros Banhos lagoon, unlike Salomon, there are many sand patches below 15 m depth, above which in any case shelving is generally too steep to anchor. Thus anchoring here (Figure 6.2, lower photo) generally has taken place on the shallower slopes, which are more coral rich. Here, more flexibility could be allowed regarding location, providing depth was greater than 15 m, otherwise a similarly defined 'sacrificial area' should be defined.

Islands

While most visitors may respect the wildlife, enough do not. Coconut crab collection and spearfishing are known to occur, for example. Very recently, leaflets for visitors have been updated. These make abundantly clear all important issues about staying on islands, removal of vegetation or wildlife, growing crops, and other basic conservation activities. Complete exclusion from particularly sensitive areas remains a key point of this conservation policy, and will help ensure that, for example, rats are not introduced to more islands, and that bird disturbance is minimal.

Enforcement

No further laws or regulations seem to be needed to apply the above. The present 'Guidance to Visitors' is perfectly clear: "Breaking the law could lead to your expulsion, to your being fined or imprisoned and to your vessel being seized", "Failure to pay mooring fees on demand by a VVCO is an offence for which you may be prosecuted and/or expelled from the Territory", and: landing on some islands is already "strictly prohibited... Any person doing so is liable to prosecution and/or expulsion from the Territory." Furthermore, "property left unattended on the islands, is liable to confiscation without compensation." Regarding species, capture or interference with many is prohibited (Section 2) and in several cases is a "criminal offence". While it is accepted that far from all violators will be caught, the knowledge that some could be, and subjected to the above, would be a strong deterrent. It has proved to be so in many other sparsely inhabited and poorly guarded marine protected areas.

Notices

Notices on key points on islands should be revised. They are not 'yacht-friendly' and could be improved to convey better several key environmental messages. They state only 'do not' messages and should briefly explain 'why'. A 'carrot and stick' approach would work better. Text from the new guide to visitors is perfectly clear for this purpose and could be used. The purpose of restrictions should be clear, as this helps improve compliance.

7 Diego Garcia

Half the land area of Chagos is contained in the main island of Diego Garcia (Figure 1.2 in Summary). In the case of this atoll, it is important to note that there is no expectation that occupants are even slightly sustainable in an environmental way. For example, in the 1980s 40,000 lbs of fresh produce was flown in weekly, and more was imported by sea each month. Diego Garcia is sustained entirely from another hem isphere, which emphasises its 'special case' compared to other atolls of Chagos. To many, its 'environment' has meant primarily the 'human environment', or living conditions.

The Natural Resources Management Plan Diego Garcia (118) is the main document for environmental management in that atoll. Together with procedural and technical data in the *Final Governing Standards Diego Garcia* (170) it has ensured that Diego Garcia now has one of the best managed communities living on coral atolls in the world. This did not come automatically: in 1993 the conservation consultant to BIOT found a paper which said "Being located overseas, the US EPA (Environmental Protection Agency) regulations do not apply on Diego Garcia" (114). It was emphasised that EPA standards did apply, even if EPA was not the regulator. The Final Governing Standards now apply those standards.

The standards largely deal with the 'built environment': the immediate, human environment of emissions, pollution, drinking water quality and the like, and rarely cover the 'greater environment'. Of the latter, it was said in 1996: "During all this time there has been no

Figure 7.1 Probably the first aerial photomosaic of Diego Garcia (1965). This will be important in monitoring change. Photo kindly supplied by Kirby Crawford.

known significant contribution from the USA who of course have caused significant ecosystem disturbance in developing Diego Garcia. The UK has even undertaken some NRMP items which should have been funded by the USA. ... The USA is not pulling its weight" (114). The military base itself touches many sensitivities in the region, so that : "Conservation is about the only field of endeavor in which we can earn credit for being in the Indian Ocean where other countries do not want us." (114). This has not noticeably changed in the last six years.

The NRMP went some way in suggesting how to put this right. It includes examples of where environmental best practice conflicts with operations, and



considers several future needs. It lists US regulations which locally supplement those of BIOT / UK. It does, however, have sections which need updating or which now seem wrong, and a revision is underway.

Its generalised objectives were to:

- ? Provide a multiple use management program for fish, wildlife and plants,
- ? Identify wetlands and sensitive or protected species and reduce conflicts between these and the operational requirements of the base,
- ? Improve land management practices, in which are included water and soil pollution and alien species introductions, and
- ? Enhance recreational elements.

Issues relating directly to personnel are well covered, but broader issues (e.g. the first item listed above) are less so. It lacks adequate guidance on some aspects, as its authors recognised by listing several "...principal opportunities for improvement of natural resources management and use...".

Its details are not repeated here. Instead this section focuses on development or change which are less well covered. The intent is to look forward. The NRMP is dated 1997 (*Final Governing Standards* is December 2001). The following focuses on significant issues needing to be addressed, on changes needed partly as a result of greater knowledge, on issues resulting from continued use, and on wider environmental æpects. It does not mean to diminish the NRMP's areas of considerable achievement.

Marine issues

Marine issues in Diego Garcia mostly have not been adequately addressed despite being highlighted in the NRMP:

? Use of excavated reef flat material seaward of the runway vs. need for landfill (this was viewed as an

unresolved and ongoing conflict of requirements),

- ? Shoreline erosion issues,
- ? Monitoring of coral and sand dredging from the lagoon,
- ? Recreational fish catch and its monitoring programme has been started, but requires continual attention,
- ? The need to carry out marine surveys of lagoon and seaward reefs and compile species inventories,
- ? Establishment of permanent moorings,
- ? Protection of turtles, especially nesting areas.

Terrestrial issues

Terrestrial issues generally are easier to manage and have a more obvious, visible and direct bearing on the population, so are much better addressed, some in ongoing programmes. The NRMP highlighted:

- ? Fresh water and water lens conservation ,
- ? Alien weed and animal control,
- ? Species protection,
- ? Wetland habitat protection and maintenance,
- ? Awareness and education enhancement,
- ? Inter-agency co-ordination,
- ? Waste disposal issues,
- ? Greater use of native trees,
- ? Implement environmental awareness programmes including brochures, nature trails etc.,
- ? Bird habitat near runways vs. bird strike on aircraft (now resolved by controlling egrets, the main species involved),
- ? Historical preservation and scenic locations.

Priorities and past work

Unusually and constructively, the NRMP noted responsibility for implementing various plans, and prioritised tasks. Diego Garcia is classed, apparently, as a small facility in US military terms and was entered for the small installation environmental award, whose docu-



Figure 7.2 Sections of the seaward reef flat along the western side of the runway. Left: The rectangles are excavations of reef rock to about 1 m deep, made for the purpose of obtaining landfill. The reef crest is located where the waves are breaking. The much smaller perpendicular striations to seaward of the white water are the natural spur and groove system. Photo taken in 1966 by Prof. A. Eisenhauer. Right: Closer view of the northernmost extent, shortly after excavation. These perpendicular trenches extend right into the beach.

mentation (168) also provides useful information. UK / BIOT and US environmental regulations were noted, and it observed that sometimes priorities were partly selected for reasons of legal compliance. But some sections are rather 'light'. Those on Fish and Wildlife, for example, contain little more than a summary of regulations, with many photos and lists of species, to no apparent end. Tabular information on e.g. artificial reefs, recreational fisheries intentions and others are mentioned but not amplified. Missing also is a useful review, even a bibliography, of presumably numerous environmental impact assessments and studies done over the past 25 years prior to major works. Some subsequently found on lagoon water and sediment patterns (31, 42, 43, 120) have value beyond their original and immediate purpose. Many others may exist, or may now be lost.

Dredging, landfill and reefs

Construction material is in short supply, as in many atolls. Lagoon sand and rock are commonly excavated for this purpose. In Diego Garcia, unusually, trenches were dug over four miles of seaward reef flat adjacent to the runway, obtaining material "for pouring over 150,000 cubic yards of concrete..." (118) (Figure 7.2). It was hoped that the reef would grow back: "The excavated basins... were designed so that, in theory, they would recapture sediments and erosion would be minimised. It is also possible that such dredged basins may recover biologically and would become more diverse than they had been previously."

This never could have been the case, which should have been known. Such excavations are of relict material, not actively growing coral. It is now confirmed that reef flats in Chagos are 2,800 - 4,300 years old (24). And the mobile sediments that the designers hoped to trap act as liquid sandpaper, which kills rather than encourages new coral growth.

There was no new reef growth seen in a very brief look in the late 1990s, and few corals had settled in the trenches. Trenches had accumulated a film of sand.

This may turn out to be especially unfortunate. Sea level is rising and storms may increase (Section 8), and seaward reef flats are a primary defence to shoreline erosion. It was suggested in 1996 (82) that a study be made of this excavation, its recovery or increased erosion; the NRMP said: "This suggestion is in concert with the dredging policy which is strongly endorsed – that no new dredging be authorised without having careful investigations conducted by coastal engineers and marine ecologists". There has been no proper examination of erosion or growth here.

The NRMP then recommended that, if it was confirmed that excavation of the primary sea defence was ill-advised, "excavation in on-land areas and importation may be necessary" instead. "On-land areas" certainly should be ruled out. Given the low-lying nature of the atoll, it may not be sensible to take material from anywhere on the atoll or its lagoon. Diego Garcia does have exceptionally high (for Chagos) dune systems in certain small locations. But some of these dunes line the shore along the trenched reef flat. This may be very fortunate - the dunes may be all the more required because of this.

Consideration should be given to strengthening the trenched seaward reef. Two processes should be assessed. First is filling the trenches with concrete blocks secured to prevent movement. This is an obvious measure to investigate, but should include blocks which stand proud of existing surfaces to further break wave energy (something which will eventually be needed). But concrete is colonised poorly compared

with limestone. Thus a second method gaining momentum, or at least publicity, is the 'electric reef' whereby electrodes (large sheets of wire mesh serve well) are fixed on the reef and applied with about 5 volts. Little scientific information exists for this as yet, though its proponents claim vastly increased deposition of 'natural' limestone given very modest electrolysis. Increased growth of live coral on the precipitated limestone is also reported.

<u>The lagoon.</u> Extraction from Diego Garcia lagoon is also inadvisable, for different reasons. Parts of the lagoon include the only known reefs in this atoll where coral cover remains significant. Diego Garcia was especially badly hit by the 1998 warming (100); coral mortality on seaward reefs was extreme to 40 m deep, and was similar in the eastern lagoon's Strict Nature Reserve. But in 2001, lagoon reefs in the Northwest still supported 50% live coral. These and any other patches require the greatest protection.

Shoreline erosion in the northwest

It has been repeatedly noted (114) that shoreline erosion is evident and will deteriorate with continued coastal development and vegetation clearing. It was



Figure 7.3. Use of concrete for shore protection in northwest Diego Garcia, needed in place of removed vegetation. Taken from (172).

Note the narrow width of the reef flat to seaward of the concrete.

Note also that this island has rims which have higher elevations than much of the interior (see Section 8).

stressed in 1995 and subsequently, that a 5 m width of the shoreline bush *Scaevola* needs to be maintained to prevent erosion. As a consequence of its loss, erosion control in the inhabited area has so far involved the unsightly replacement of the shrub by "over 500 tons of construction and demolition debris, and planting *Scaevola* ..." (168). With rising frequency of storms and sea level, and if coral recovery continues to be impaired (Section 8), much more shoreline protection than this may become needed over the next few years. It is understood that a survey using light aircraft was conducted in 2002, though details are unavailable.

Active replanting of *Scaevola* and / or *Tournefortia* should take place where previously it was replaced by the concrete debris. A method of adequately measuring shoreline erosion is needed, either Differential GPS in selected locations on both the inhabited (west) and uninhabited (east) arms of the atoll, or continuation of aerial mapping techniques commenced in 2002. Either way, a 10 cm accuracy or better will be needed for best forewarning of problems.

Survey of lagoon and seaward reefs

The NRMP notes in its 10 year plan under Reef Dredging: 'Conduct baseline survey' in year 3, followed by 'Annual monitoring' in years 4-8. This does not appear to have been done. The NRMP also discusses designing and installing artificial reefs, in year 3, with maintenance of them in two further years. It is not known what these artificial reefs would be for, or where they would be.

These 'Baseline surveys' (meaning better knowledge of the locations of all marine habitats and of biological inventories) have now become essential. A brief study of corals in the lagoon 23 years ago (74) showed it to be healthy then, and little different from conditions in the northern atolls. Since that date, the small boat harbour and other lagoon construction may have changed conditions, and the 1998 warming also severely damaged coral in Diego Garcia (100). Several parts of the lagoon were also dredged to obtain landfill.

Diego Garcia is the least known of the islanded atolls as regards reef life. All large studies from the 1970s excluded it, though its terrestrial aspects are amongst the best known (109). There have been investigations on current flows (31, 42, 43, 120), and brief observations more recently (88, 100). Reefs in the eastern lagoon's Strict Nature Reserve were almost totally killed, but 50% or more are alive in the North-western lagoon, and anecdotal reports further suggest good coral in some deeper areas where ships anchor.

Determination of what coral exists, and where, is necessary for making any conservation progress at all. It is especially needed if any further extraction of materials or dredging takes place.

The NRMP recommends another survey: its estimated budget for 10 years includes sums to "Conduct bas eline survey" in year 2, "If required, establish additional monitoring stations on reef" in year 3, followed by "Continue monitoring / maintain stations" from years 4-10. There were good reasons for these recommendations, which are even more valid today, but if any of this was done, it is not known what the results were. It also notes that in year 1 (1997) there would be the activity "Conduct baseline survey (UK action)". This may refer to the 1996 programme, though the latter excluded Diego Garcia. The NRMP also suggests an annual census from years 2-10. These activities should be consolidated into one series of work, in the near future. This should be allied to similar work proposed for the northern atolls.

Recreational fishing

The NRMP notes allocation of \$13,000 for conducting a catch monitoring programme and then a licensing and permit programme in the first two financial years, but then shows nothing for the following 8 years. In its 'Milestones' tables, however, it refers to annual catch monitoring, and to a licensing programme including 'training as necessary for staff and customers' for a full 10 years.

The fisheries ordinance 1998 (148) allows sport fishing in Diego Garcia, and limited fishing for non-profit purposes across BIOT (except in protected areas). This fishery comprises:

- ? a shore-based fishery, primarily in reef flat and lagoon areas. This includes sharks, jacks, snapper, grouper, mullet, rudderfish, parrotfish, damselfish, bonefish and mojarras;
- ? a demersal near-shore fishery on outer reef slopes. Catches are mainly top predators: groupers, snappers and emperors;
- ? a demersal and semi-pelagic fishery operating mostly from fishing barges and vessels at anchor, mostly in the lagoon. Top predators are again the primary target; and
- ? a pelagic fishery from sport-fishing boats, target-

ing oceanic species, notably tuna and marlin.

Top predators are targeted, so sustainable limits will be broadly similar to those of the northern atoll reef fishery (Section 5, though little is known about the smaller yacht-based fishery there, Section 6). Since 1998, MRAG Ltd has been responsible for monitoring this fishery and has established a system of log-sheets to be filled by individual fishers. Log-sheet returns are now good from some of the boat-based fisheries, but remain poor for shore-based fishers. The only other information available comes from a creel survey undertaken in 1999 by a BIOT observer.

Information on catches is thus most accurate for the pelagic fishery and the demersal/semi-pelagic fishery from one boat-type (Mako). Using this data, combined with either extrapolation or direction assumption of nochange from the 1999 creel survey, overall fish-yields have been estimated (Table 7.1).

MRAG Ltd have also calculated yields per unit area for the reefs (Table 7.1). They considered these figures were "well within the sustainable limits for both reef and lagoon habitats". While they are certainly not high, they indicate the highest levels of fishing pressure in the Archipelago. While within sustainable limits set by some authors for some waters, they are higher

Table 7.1: Combined catch by ecosystem for the recreational fisheries in Diego Garcia, in tonnes.

	1988	1999	yield/km² 1999	2000	yield/km² 2000
Lagoon	36.35	63	0.47	42	0.31
Reef flats		12	2.02	12	2.02
Drop-off		18	1.24	18	1.24
Reef flats plus drop-off	21.59				
Pelagic	45.8	46		48	
TOTAL	103.74	139		120	

than sustainable limits set in others. Also, because Chagos lies in nutrient poor waters and many of these fisheries are restricted to a subset of predatory species, it seems likely that sustainable limits here will be lower than for reefs in continental waters.

Total catches in some of these fisheries could be reduced through encouraging the practise of tagging in game fishing. This is already in place for sharks and billfish, and the scheme has reduced landings of these successfully. Following initial resistance this is now accepted. In 2000 sharks represented 13% of the <u>landed</u> catch from pelagic fisheries, but this had reduced to 3% in 2001; landed billfish catches **e**-duced from 2.4% to 0.2% over the same period, suggesting the scheme is having a positive effect. Annual or monthly maximum targets for particular species could be established, with tagging alone permit-

ted after set totals are reached. It may be possible to further encourage tagging through the introduction of reduced licence fees.

At present, the only control on fishing on the outer reefs is in the Strict Conservation Area where it is at the discretion of the Commissioner's Representative. There is no land-based fishing in the Strict Conservation Area. Permanent no-take zones covering 30% of the reef flat and drop-off (Sections 3, 9) would greatly protect stocks; fis hing is currently not widely undertaken over large areas already so such measures could be easily implemented.

8 Climate change: timing and consequences

Climate change will have serious consequences to small tropical islands and reefs (166). The most recent data and climate models suggest that four main issues will become important (92, 107): temperature rise leading to reef mortality, sea level rise, greater extremes of storm activity, and changes in rainfall.

Temperature change

The most important effect of temperature rise, as understood at present, lies in the fact that corals in Chagos, on which the entire reef system is based, are killed when it rises above about 29.8 °C for a few weeks. This occurred in Chagos in 1998, when sea surface temperatures (SST) of almost 30 °C caused heavy mortality to corals to at least 30 m depth in the south, including Diego Garcia, and to 15 m depth in northern atolls (88, 100). It was not temperature alone which caused that mortality (increased light and UV penetration are important) but temperature is the most easily measured variable. The rising trend between 1871 and 2100 is shown in Figure 8.1.

Presently, SST is rising at over 0.25 °C per decade. The rise began in the 1960-70s and previously noted reductions of shallow coral in the 1996 research visit (85) might be explained by this rising temperature. The rate of SST warming is also accelerating.

These data allow statistical treatments which estimate the frequency of a repeat occurrence of the lethal 1998 temperature. This model projects that temperatures reached in 1998 will occur annually beginning som etime between 2025 and 2030. However, repeat occurrences of much less than annually will lead to a permanent crisis in reef condition. It is possible, and it is hoped, that corals and other reef life may adapt, acclimate or evolve to resist this, and this is an active area of research. It seems unlikely that they can: they did not adapt to resist 1998 despite the gradual start of warming 30 years earlier, for example.



Figure 8.1 Blended temperature series from historical (HadISST 1871-1999) and forecast (HadCM3 (1950-2099) data. Red line is a best fit average annual temperature.

Overlapping dates were used to adjust forecast data to intercept historical data. Statistical methods using normalisation and residuals corrected annual oscillation of forecast data. HadISST data have extensive verification (101) though the method of combining them is work still in progress.



Figure 8.2 Sea level rise in Diego Garcia (167). Red line is the linear best fit. The equation indicates an average 5.44 mm rise per vear since 1985.

Inset: Monthly pattern of sea level rise; most takes place in October / November (red). June / July (orange) is also a time of rise (actually less variable annually than October / November). Pale blue is a region of statistical uncertainty.

Consequences are likely to be widespread conversion of thriving and accreting reefs to dead coral platforms and rubble, the latter derived from coral colonies as continuing storms and naturally occurring eroding organisms break them down (89, 100). Reef growth rate is likely to fall behind reef erosion rate, and may already have done so in some places. Also, most of the shallow, thick stands of staghorn coral which provided an initial breakwater in many areas, were eliminated in 1998, so these shallow seaward areas (mainly on southwest and northwest facing reefs in Chagos) almost certainly now provide much less resistance to waves, whose energy is thus dissipated nearer shore. The caveat, as noted, is that corals may adapt rapidly to these rising temperatures.

Sea level rise

Average sea level (SL) is predicted to rise by 0.2 - 0.5 cm per year globally (166). In Diego Garcia it has been a little greater than this (Figure 8.2), averaging 0.54 cm annually since 1986 (167), which is similar to values from the nearby Maldives (102). Sea level rise is accelerating, however (165, 166). Greatest rises appear to occur during the Southeast Trades and during its switch to North-westerly winds in October and November (inset, Figure 8.2).

Reef flats are positioned at the mean low tide level, so as sea level rises, the flats will become less effective in attenuating waves, whose energy will increasingly become dissipated on island shores.

Reef flats here probably will not grow upwards to match sea level as the latter rises. For many islands, height above high tide level is minimal (Figure 8.3). For unknown reasons, there are more submerged or 'drowned' atolls in this group than there are islanded atolls (90) despite the past 11,000 years of apparently healthy coral growth. We should not assume that reef growth will be any faster in the future if their corals are



Figure 8.3: Ile Gabrielle and Ile Monpatre in Peros Banhos, at high tide on a calm day. Theses islands are separated from each other along their length (i.e. along the atoll circumference). Clearance above high tide is small.

killed by repeated warming events. This is likely to lead to erosion of island shores.

Maximum elevation of the islands in the northern atolls, Egmont, and Great Chagos Bank is only 1-2 metres in most cases, and less in several small islands. Some substantially higher dunes exist in Diego Garcia. These maximum elevations are restricted mainly to relatively narrow rims around island perimeters; most islands have a central depression which dips near to sea level or even below it. Nine examples of island profiles were shown in (94, 95), with two new examples (Figure 8.4) in Salomon and Peros Banhos (56). Diego Garcia also has generally similar concave profiles (34, 118). Thus island erosion is not likely to be a gradual attrition of island edge as would be the case on typical convex islands. In Chagos, erosion of the rim, which effectively serves as a dam for central parts, would likely lead to broaching, followed by flooding of disproportionately large areas. Early examples of the likely effects may be seen in Figure 8.5.

Timing and rates of erosion of island rims is impossible to estimate at present, especially along sections facing storms. The monitoring of rates of erosion may be one of the most the most crucial elements of all.

Storm activity

Modelling of storm events has recently shown that storms and overtopping by waves of these islands will increase the risk of flooding (57). With their concave profiles, increased overtopping onto Chagos islands would flow centrally, sinking into water tables. The study concluded that with respect to future inhabitation: "... overtopping and the subsequent flooding is potentially a very serious problem..." (57). It also showed, in several graphs, the volumes of overtopping





Figure 8.4 Profiles of two previously settled islands of the northern atolls (from 56).

Top: Ile de Coin (Peros Banhos atoll), and

Bottom: Ile Boddam (Salomon atoll).

These profiles have a general similarity to 9 examples from Egmont and Great Chagos Bank shown in (93, 94).

Note also the island area liable to salt water flooding from wave overtopping (dotted blue lines). Rims of these islands are 1-2 m above mean high tide as profiled here. As these islands are similar to other better surveyed islands, some parts of these rims will be higher, some lower. It is the lowest (seaward) parts which are likely to be the critical or weakest points. Certain meteorological conditions can increase high tide substantially.



Figure 8.5 Depressions in two Chagos islands, filled with water.

Top: Ile Anglais, Salomon, this may be fresh water following heavy rain, and indicates a depression to, or possibly below, present sea level.

Bottom: Diego Garcia islet with a broached rim and seawater ponds.

water under different scenarios, including during 1:50 and 1:1000 year storm events. These authors suggest that much of the islands can be considered at risk, and that much of any development would need to be confined along their rims.

Rainfall and water tables

These atolls are extremely wet, with 2,500 to 4,000 mm rainfall each year. Rainfall is currently impossible to model accurately, but models suggest little gross change, possibly with greater variability (166). The maintenance of water tables, and the length of time they may be sustained, might depend much more on sea water encroachment if erosion of island rims takes place. The turnover time of fresh water in water lenses of Ile Boddam and Ile de Coin in the northern

atolls is about one year (57), so island vegetation may readily survive some periods of drought, based on fresh water input alone, though smaller islands will have a smaller buffering capacity. The southernmost Diego Garcia may well become drier than the other atolls, but its lens is much larger.

Changes of annual rainfall by, say, 2020 or 2040 are likely to be small, though annual fluctuations may increase.

The main climatic controls

In general, rising sea surface temperatures which kill the reef life, sea levels and storm overtopping will probably be the main climate controls on Chagos. The temperature rise will lead to progressively deteriorating reef condition and island erosion. The results may first be seen by a continued decline in reef quality and by erosion of shorelines. These are all active areas of research at present in several parts of the world, as well as in Chagos itself.

Relevance to BIOT

It could be argued that the issues addressed here are global, and lie outside the ability of BIOT government (indeed any single government) to manage in ways other than by, for example, 'plugging holes'. This is partly correct, but two important issues arise.

First is not to underestimate change that can be made or manipulated in future. 'Plugging holes' provides immediate (even if temporary) solutions. Buying time is extremely important in the present context.

Second is the need to espond quickly, to minimise problems and provide protection where it lies within the managing regime's ability to do so.

Monitoring and protected area designation

Expansion of the system of protected areas has been proposed (Section 3). This is not an exercise of drawing static lines on a map; it must be flexible and responsive to new observations, which would only be possible given a continuance of bi-annual (at least) monitoring and observation in several fields. This exactly parallels, and should co-ordinate with, suggestions made for Diego Garcia in the NRMP (Section 7).

Where these field surveys discover surviving areas of

corals, for example, or spawning aggregation of certain fishes, adaptation or expansion of the protected area boundaries needs to be made quickly. In this way much more habitat can be preserved, and elimination of the species avoided. In some cases, lagoon corals showed good survivorship and their strict protection may be critical. Another example, noted in 2001, was that deeper parts of reefs in the two northern atolls survived the ravages of 1998 much better than did their shallow areas, and much better than areas of any depths seen in the southern atolls (including Diego Garcia). The prime need is to include those surviving, deeper seaward reef slopes in the north into protected areas, to afford maximum protection. These will be the nursery grounds needed for the future.

Such actions will ease future problems and prolong survival considerably. For them to work, monitoring remains key.

Changes to our response to climate effects are perfectly possible and, given human ingenuity, nothing should be written off now. It has been unusual for a management plan to adopt very much flexibility, and where they have, they may stand accused of being 'fire-fighting plans' rather than management plans. 'Fire-fighting', however, is proving to be a valuable element in our response to global changes. Knowledge of where and how to fire-fight is needed, and this comes from regular monitoring and from ability to manage.

9 Legal provisions

This summarises BIOT law which is concerned with, or touches on, conservation. It is arranged by topic. Annex 1 (on disk) contains more detail, and a summary by Instrument of the legally binding provisions.

International agreements and BIOT

<u>The Convention on Biological Diversity</u>, was signed by the UK government in 1992. This is a key Convention, but has not yet been extended to BIOT.

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (162) was extended to BIOT in January 1999 when the UK announced at the Conference of the Parties to Ramsar its intention to designate most of the archipelago as a Ramsar site. Diego Garcia's lagoon, Restricted Area and the atoll's territorial waters were designated in 2001. The government has indicated that it cannot give a timescale for other areas at present.

International Convention for the Regulation of Whaling. The Indian Ocean Sanctuary was established by the IWC in 1979, covering the entire Indian Ocean, including BIOT waters. Commercial whaling is prohibited irrespective of any decisions of the IWC which may call for the resumption of whaling.

The UN Convention on the Law of the Sea (UNCLOS) of 1982, entered into force in 1994 (169). It provides the legal basis for establishment of territorial seas (to 12 nautical miles), contiguous zones (to 24 nm) and EEZs (to 200 nm). States must make a claim to extend its territorial sea from 3 to 12 nm; BIOT has not claimed this, but has claimed the 200 nm EEZ. Foreign fishing vessels have right of passage, but not to fish while doing so. States may determine catches

and must ensure that stocks are not endangered. States must preserve and protect the marine environment and promote scientific research.

The UN Agreement for the Implementation of the Provisions of the UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks entered into force from 11 December 2001. BIOT was specifically included. States must protect biodiversity as well as accommodate artisanal and subsistence fishers, based on best information and economic requirements, taking an ecosystem approach. Effective monitoring, surveillance, and exchange of information is required through regional arrangements, and other States within a region may board and inspect vessels should the flag State fail to act on a notified likely violation.

<u>The Indian Ocean Tuna Commission</u> (153), established within the FAO, aims to promote cooperation among its Members and ensure sustainable tuna fis heries. Resolutions to date deal with observers, statistical reporting, and mechanisms to promote compliance by non-Contracting Party vessels.

The <u>Convention on International Trade in Endangered</u> <u>Species of Wild Fauna and Flora (CITES)</u> restricts trade in species listed in three Appendices (157). Appendix I covers endangered species, II species that may become endangered unless trade is regulated; III covers species that any party wishes to regulate, so requires international cooperation to control trade. A permit is required for trade in species listed in Appendix I or II (see Annex).

<u>The Convention on the Conservation of Migratory Spe-</u> <u>cies of Wild Animals (Bonn Convention)</u> (159) also lists species in two Appendices: I for species requiring strict protection, and II for those which would benefit from international collaboration. States are encouraged to co-operate in and support research on migratory species; to provide immediate protection for species in Appendix I, and to conclude Agreements for species in Appendix II. For BIOT the most significant group is marine turtles, thus a Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia was signed by the UK in March 2002. A Conservation and Management Plan linked to this contains 24 programmes and 105 specific activities aimed at reducing threats, conservation, exchanging data, increasing public awareness, promoting regional cooperation, and seeking resources for implementation. Regarding birds, Chagos lies at the extreme end of a migration pathway from central and northern Asia to India and the Indian Ocean Islands. Thus current discussions regarding creation of a Central Asian - Indian Flyway Agreement are relevant, and the BIOT government is considering partaking in such an agreement.

BIOT Legislation

Protected areas

Present legislation designates Strict Nature Reserves, Special Reserves and Restricted Areas under national legislation, and Ramsar Sites under international legislation (Table 2.1). The <u>Protection and Preservation of</u> <u>Wild Life Ordinance 1970</u>, empowers the Commissioner to designate Strict Nature Reserves and Special Reserves.

<u>Strict Nature Reserves</u> are defined by The Protection and Preservation of Wild Life Ordinance 1970 and by the Strict Nature Reserve Regulations 1998. The latter gives effect to the former. No person may:

"a – enter, traverse, camp in or reside...;

- b fly...at an altitude lower than is...specified...;
- c engage in...any form of hunting or fishing; any un-

dertaking connected with forestry; agriculture; any excavations, levelling of the ground or construction; any work involving the alteration of the configuration of the soil or the character of the vegetation; any act...which pollutes any source of water...or sea area within the reserve; or any act...likely to harm or disturb the fauna or flora...

d – knowingly introduce...any non-indigenous wild life" The 1998 Regulations expand the term "island" to include "the internal waters of that island and to the territorial sea appurtenant to that island and to any reef or bank situated therein". However Gazette Notice No 13 of 1998 (see page 11) grants exemptions to activities licensed under the fisheries legislation, effectively removing any protection this "territorial sea" definition may have provided.

<u>Special Reserves</u> are defined under The Protection and Preservation of Wild Life Ordinance 1970 as "areas in which any particular species of wild life requires protection and in which all other interests and activities shall, whenever possible, be subordinate to that end." No areas have been designated to date.

<u>Restricted areas</u> are defined under the <u>Diego Garcia</u>

Table 2.1List of presently protected areas.See alsomaps in section 3.

Diego Garcia Restricted Area

(includes Diego Garcia Nature Reserve Area and the following Special Conservation Areas: Barton Point, East Island, Middle Island, West Island, and the lagoon areas from Rambler Bay to the Main Passage)

Diego Garcia Ramsar Site

The Three Brothers and Resurgent Islands Strict Nature Reserve

Danger Island Strict Nature Reserve

Cow Island Strict Nature Reserve

Nelson Island Strict Nature Reserve

Peros Banhos Atoll Strict Nature Reserve

(All islands to the east of a line drawn between the easternmost point of land on Moresby Island and the easternmost point of land on Fouquet Island). Conservation (Restricted Area) Ordinance 1994. They may not be entered without a permit. Clearer definitions and restrictions were first provided in a Public Notice of 1997 which established the Restricted Area of Diego Garcia, defined as "all of the main island outside the Specific Area, the four Islets at the mouth of the lagoon and the areas within the lagoon as shown" (on an attached map). This Notice further defines a Nature Reserve Area and a Strict Conservation Area. All access requires permits, but these are to be routinely given for "a - sightseeing, b - swimming Lagoon Side during daylight hours, c - wading Oceanside, d - Collection of DEAD shells and DEAD coral" in the Nature Reserve Area. A broader set of activities may be undertaken in the Nature Reserve Area with additional written permission: "a - overnight stays, b swimming or Surfing Oceanside, c - fishing, d - camping away from the Rest and Recreation site, e - Arrival and Departure by boat". Access is more strictly controlled in the Strict Conservation Area, and is only to be given for a limited set of activities including sailing in lagoon areas (but not anchoring or mooring), and for observation of wildlife by bona fide naturalists/ environmental observers. The Public Notice establis hing this area is regularly re-released to ensure its continued profile.

Fisheries

Commercial fisheries are restricted in some parts of the archipelago via the licensing system. Tuna vessels may not operate within 12 nm of land, and nearshore commercial vessels are not permitted to fish in the lagoons of the islanded atolls.

Commercial fisheries require licensing. Legislation covers access to the fishery, and gear, and there is provision for restrictions by season, location (restricted areas) and fishing gears.

The Fisheries (Conservation and Management) Ordi-

nance 1998 (148) repealed and revised much previous legislation. It defines fishing waters as "the internal waters of the Territory; the territorial sea of the Territory; and the Fisheries Conservation and Management Zone". Effectively this is all areas to the EEZ. It states the Director of Fisheries, appointed by the Commissioner "has charge of the administration of this Ordinance and of any regulation made under section 21 and...is responsible for : a –conservation of fish stocks, b –assessment of fish stocks..., c – development and management of fisheries; d – monitoring, surveillance and control of fishing... h – making of such reports to the Commissioner as he may require".

Enforcement is the duty of Fisheries Protection Officers who will include persons appointed by the Commissioner, every Peace Officer, every Import and Export Control Officer and senior military personnel (S4)

Specific provisions prohibit: "any explosive, poison or other noxious substance for the purpose of killing, stunning or disabling fish" or of having such substances. (S5) and use, or possession with intent to use, "prohibited fishing gear", including "a - any net whose mesh size is smaller than the prescribed minimum...; b - any other type of fishing gear which does not conform to the standards prescribed for that type of gear; and c - any fishing gear which is prohibited by regulations made under section 21." (S6). "Fishing by a fishing boat within the fishing water is prohibited unless carried out in accordance with a licence" (S7-1). Licences may place restrictions on "the area within which fishing is authorised;...the period;" the catch in terms of "description, quantities, sizes or presentation"; and on "the method of fishing".

These provisions do not apply "to persons who are lawfully present in the Territory if...the fishing is for sport and not for sale, barter or other profit; the fishing is...carried out by an attended line...; there is...no more than two such lines in use under the control of any one person, each line having no more than three hooks attached to it...; and the fishing is not...carried out in any area of the Territory which is specified...to be an excepted area...". These exceptions do not apply "to any fishing carried out by a fishing boat (other than one based in and operating around Diego Garcia) in circumstances where the persons fishing from that boat have paid...for the right to do so or to be on board the boat..." (S7 – 10,11)

Several rules exist regarding notification of fishing, reporting of catches, stowage of non-permitted fishing gear, transhipment of fish to other vessels (which must also be licensed), powers of enforcement and seizure of vessels and goods.

Section 21 enables the Commissioner to "make such regulations as he considers necessary for the purposes of this Ordinance", including "the conditions subject to which licences are to be...granted; the fees to be charged for licences...; the equipment to be carried on board fishing boats;..." and various measures covering reporting, observing and licensing.

Fishing Regulations 1993 provide details on the reporting of catches and for the appointment of an "observer" to join vessels and take details of catches.

The Fishing (Prohibited Gear) Regulations 2000 prohibits: "a – any net which, for the purpose of fishing, is set or operated otherwise than by a fishing boat...; b – any trap, including...any pot, barrier or fence; c – any gear for grappling or wounding, including...any harpoon, spear or arrow;..." Permits may be issued for using nets in other circumstances, and a general provision permits use of hand-held cast nets for the purpose of bait fishing in Diego Garcia. These may only be used away from areas of actively growing coral and their use must be approved by the Moral, Welfare and Recreation organisation of the US Forces.

Current restrictions under the licensing regime

The licensing regime of the above may be used to limit and control this fishery. A number of regulations have been developed by MRAG Ltd, within the context of Licensing Briefings with the BIOT government which have taken place most years.

The main provisions regarding tuna and near-shore commercial fisheries licenses are that fishing gear be deployed to target only the stated target species (either "tunas, tuna like species and those species that are generally caught incidental thereto" or "inshore water species and those species that are generally caught incidental thereto"); and that fishing gear is deployed in a manner that avoids or minimises by-catch.

For tuna, fishing vessels may not operate within 12 nm from the nearest land.

Current policy and regulation of the commercial nearshore fishery, based on the licensing regime, include some controls developed in consultation with the bilateral British Mauritian Fisheries Commission (BMFC):

- ? Up to six 80-day licenses may be issued each season;
- ? Fishing is restricted to 1 April to 31 October;
- ? Fishing is only permitted with hooks and lines, though hand-held cast-nets may be used for catching fish bait;
- ? The use of steel wire on fishing lines is prohibited;
- ? Fishing is prohibited within any lagoons (Diego Garcia, Egmont, Salomon, and Peros Banhos);
- ? Officers or crew may not land on any island without a permit (excepting the case of bona-fide Chagossians who may land).

There is no clear definition of the boundary of the "lagoon", which could lead to quite extensive fishing in lagoon channels.

Commercial fishing is allowed in Strict Nature Reserve areas. This is based on an agreement from the BMFC stating that changes to the fishery regime should be undertaken after consultation with the fishing communities (not the BMFC). This was not done when the Strict Nature Reserves were established so it was decided not to apply this legislation to this fishery (C. Mees, pers. comm., 28/9/02). This informal minuted agreement may conflict with the Strict Nature Reserves regulations.

Gazette Notice No 13 of 1998 states: "On Oct 17 1998 the Commissioner granted written permission under section 5 of Protection and Preservation of Wildlife Ordinance 1970 for any person, notwithstanding any other provisions of that Ordinance, or any provisions of the Strict Nature Reserve Regulations 1998, to do any act which he is authorised to do by, or by virtue of, a license granted, or having effect as if granted, under the Fisheries (Conservation and Management) Ordinance 1991." In effect, this counters the intent of the Strict Nature Reserve legislation and to date the **i**censing procedure has ignored the Strict Nature Reserve restrictions.

Voluntary fishing agreements and BIOT

There have been several UN Resolutions and "soft law" agreements. One is a drift-nets moratorium on all "large-scale pelagic driftnet fishing" at the end of 1992.

The FAO Code of Conduct for Responsible Fisheries is voluntary, but often cited. It sets out "principles and international standards of behaviour for responsible [fishing] practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity". To this end a number of International Plans of Action (IPOAs) have been made.

The IPOA for the Conservation and Management of

<u>Sharks</u> is one such: "States should adopt a national plan of action for conservation and management of shark stocks (*Shark-plan*) if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries". This Sharkplan should ensure, *inter alia* that "shark catches...are sustainable", it should "assess threats to shark populations; identify...vulnerable or threatened shark stocks; ...minimize unutilized incidental catches of sharks; contribute to the protection of biodiversity and ecosystem structure and function; minimize waste and discards from shark catches...(for example, requiring the retention of sharks from which fins are removed);..."

There is also an IPOA for <u>Reducing Incidental Catch of</u> <u>Seabirds in Longline Fisheries</u>, which states that countries should investigate this problem and, if necessary, establish a National Plan of Action to address it.

Non-fisheries species and BIOT

Further provisions provide protection for species not subject to conventional harvest, and injunctions against species introductions.

<u>The Protection and Preservation of Wild Life Ordi-</u> <u>nance 1970</u> (131) empowers the Commissioner to enact legislation to protect wildlife [including coral], prohibit the purchase, sale or export of wild life, and prohibit the introduction of wildlife.

<u>The Wild Life Protection Regulations of 1984</u> (135) makes it an offence to:

? "intentionally to kill, injure or attempt to kill or injure, or to take or be in possession of, any animal" with the exception of "any fish or marine product lawfully taken in accordance with the [Fisheries Ordinance 1991 or subsequent laws replacing this] ...or vermin or other pest or insect in the interests of public health"

"to take or be in possession of any live seashell,

?

live coral...or any...which has been taken alive"

? "intentionally to destroy, damage or take any bird's nest while the nest is in use or being built, or any bird's egg or turtle's egg"

<u>The Wild Life Protection (Amendment) Regulations</u> <u>2000</u> extends this list to include possession of "a dead animal or any part of an animal or of a dead animal".

The Green Turtles Protection Regulations 1968 apply although turtles are also covered under the above, and state that "No person shall harpoon, kill, destroy or take possession of any turtle [means the green turtle or *tortue de mer*] for any reason whatsoever."

Trade of species in BIOT

The Prohibited Imports and Exports Order, 1984 (136) prohibits the exportation of: "wild animals, whether alive or dead; Live seashells or seashells which have been taken alive; Live coral or coral which has been taken alive; Wild birds' nests; Birds' eggs; Turtles' eggs; Flora, coral or seashells specified under the Wild Life Protection Regulations, 1984". Restrictions on coral were further altered by the Prohibited Imports and Exports Control (Amendment) Order 1999 to read "Coral, whether alive or dead".

The Trade in Endangered Species (Control) Ordinance 2001 (151) provides for the application of CITES, appointing the Administrator as the "Management Authority", and requiring that advice be taken from a scientific "…person or authority as the Commissioner may from time to time appoint".

Species introductions in BIOT

The introduction of species does not appear to be expressly prohibited other than in Strict Nature Reserves.

Marine pollution in BIOT

The prevention of oil pollution, and the finance to support clean-up, are covered under several laws.

<u>The Oil Pollution (Compulsory Insurance) Regulations,</u> <u>1976,</u> (133) which refers back to the Merchant Shipping (Oil Pollution) Act 1971 and requires certification of insurance against liability for oil pollution.

<u>The Prevention of Oil Pollution Ordinance 1994</u>, (142) makes it an offence to cause an oil spill, and it is also a duty to report any discharge.

The Merchant Shipping (Oil Pollution) (British Indian Ocean Territory) Order 1997 (144) extends sections of the Merchant Shipping Act 1995 to BIOT. It assigns liability for oil spills, and the costs of their control and clean-up. A certificate of insurance is required for "any ship carrying in bulk a cargo of more than 2000 tons of oil". This Order also ensures compliance with the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992, and establishes conditions under which that Fund may be used.

The Merchant Shipping (Liability and Compensation for Oil Pollution Damage) (Transitional Provisions) (Overseas Territories) Order 1997 (145) extends those sections of the Merchant Shipping Act 1995 to all Overseas Territories, giving effect to the rules governing liability and compensation linked to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992

Other marine pollution is covered under <u>The Environ-</u> <u>ment Protection (Overseas Territories)</u> Order 1988, extended to BIOT by <u>The Environment Protection</u> <u>(Overseas Territories) (Amendment) Order 1999</u>. "This Order extends...the provisions of Parts II and IV of the Food and Environment Protection Act 1985" which aims "to replace the Dumping at Sea Act 1974 (c. 20) with fresh provision for controlling the deposit of substances and articles in the sea...[and] under the seabed, and for connected purposes".

A licence is required for:

- ? depositing substances or articles within the territorial waters or fisheries zone;
- ? scuttling vessels in these waters;
- ? loading of vessels in territorial waters with substances or articles for depositing in the sea.

A licence is required for incineration at sea on any British vessel, or on any vessel within territorial waters. The Governor has responsibility for granting licences and charging fees, but will make provision for the protection of the marine environment and human health. Although not clearly specified, this legislation might cover the emptying of ballast water. It may also be used to address land-based sources of pollution, notably sewage outfalls and the release of hot water or brine e.g. from desalination plants.

Atmospheric pollution in BIOT

Penal Code: Ordinance No. 5 of 1981 (134) includes, among its offences, pollution of the atmosphere "making it noxious to the health".

<u>The Ozone Layer Protection Ordinance 1994</u> (140) brings the Montreal Protocol into effect controlling "the manufacture, importation and exportation of certain substances and products", namely man-made, ozonedepleting substances.

Landscape protection in BIOT

Penal Code: Ordinance No. 5 of 1981 lists activities including pollution of "any river, stream, spring or reservoir"; the lighting of "a fire in any forest, plantation or

field...without having previously obtained written permission"; the carrying of "fire or a lighted naked torch or candle...in any street, road, way, lane, track, footpath, square or open space...or in any forest, plantation or field, except...with the permission of the Commissioner's Representative"; and disposal of "any litter or refuse...on the foreshore or in any public place"

Restrictions on access in BIOT

Although not necessarily conceived for conservation purposes, restrictions on access may benefit the natural environment. Aside from restrictions on fishing vessels, a number of regulations restrict access or activities in BIOT waters, particularly to the Strict Conservation Areas. As noted, the Immigration Ordinance of 2000 permits Chagossians to land on any island except Diego Garcia.

The Outer Islands (Services for Visiting Vessels) Ordinance 1993 (139) covers all vessels apart from government or UK or US military vessels, and any others certified exempt by the Commissioner's Representative. Under this "no vessel shall moor at any place in the outer islands without the consent of the Commissioner's Representative", but "consent...shall be deemed to have been given in any case where the master of the vessel has, in response to a demand made by a Visiting Vessels Control Officer, paid in full the mooring-charge payable in respect of that mooring."

Note that the term 'moor' is used, but 'anchoring' is meant, as moorings are not provided.

British Indian Ocean Territory Waters (Regulation of Activities) Ordinance 1997 (143) regulates activities, which include "any form of exploration or survey of, or research into, any aspect of the waters of the Territory or the seabed or subsoil beneath those waters or the living or non-living resources of those waters or of that seabed or subsoil, whether....for reward or in pursuit

of scientific knowledge, or for pleasure...". Any such activities require the consent of the Commissioner or of an authorised officer.

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- 130. The Protection and Preservation of Wild Life Ordinance 1968. (Ordinance No. 2 of 1968)
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- The Merchant Shipping (Oil Pollution) (Overseas Territories) Order, 1975 (Statutory Instrument No 4 of 1976)
- The Oil Pollution (Compulsory Insurance) Regulations, 1976 (Refers back to the Merchant Shipping (Oil Pollution) Act 1971)
- 134. Penal Code: Ordinance No. 5 of 1981
- 135. The Wild Life Protection Regulations 1984 (S.I. No 6 of 1984)
- The Prohibited Imports and Exports Order, 1984 (S.I. No 7 of 1984)
- Imports and Exports Control Ordinance, 1984 (Ordinance No 13 of 1984)
- 138. Fishing Regulations, 1993 (S.I. No 3 of 1991)
- 139. Outer Islands (Services for Visiting Vessels) (Ordinance No 4 of 1993)
- 140. Ozone Layer Protection Ordinance 1994 (Ordinance No 3 of 1994)
- 141. Diego Garcia Conservation (Restricted Area) (Ordinance No 6 of 1994)
- 142. Prevention of Oil Pollution Ordinance 1994 (Ordinance No 7 of 1994)
- 143. British Indian Ocean Territory Waters (Regulation of Activities) (Ordinance No 3 of 1997)
- 144. The Merchant Shipping (Oil Pollution) (British Indian Ocean Territory) Order 1997 (Extends sections of the Merchant Shipping Act 1995 to BIOT)
- 145. The Merchant Shipping (Liability and Compensation for Oil Pollution Damage) (Transitional Provisions) (Overseas Territories) Order 1997
- 146. Public Notice 1997. Updated in Annex A to Public Notice 14/02 dated 9 August 2002
- 147. The Environment Protection (Overseas Territories) Order 1988. [As originally legislated this did not cover BIOT, but was extended to BIOT by The Environment Protection (Overseas Territories) (Amendment) Order 1999].
- 148. The Fisheries (Conservation and Management) (Ordinance No 4 of 1998)
- 149. Strict Nature Reserve Regulations 1998 (S.I. No 4 of 1998)
- 150. The Fishing (Prohibited Gear) Regulations 2000 S.I. No 3 of 2000)
- 151. The Trade in Endangered Species (Control) (Ordinance No 3 of 2001)
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR)

Web sites

- 153. Agreement for the Establishment of the Indian Ocean Tuna Commission <u>http://www.seychelles.net/iotc/</u>
- 154. Convention concerning the Protection of the World Cultural and Natural Heritage <u>http://whc.unesco.org/toc/</u> toc index.htm
- 155. Convention for the Protection of the Ozone Layer <u>http://</u> www.unep.ch/ozone/treaties.shtml
- 156. Convention on Biological Diversity http://www.biodiv.org/
- 157. Convention on International Trade in Endangered Species of Wild Fauna and Flora <u>http://www.cites.org/</u>
- 158. Convention on Long Range Transboundary Air Pollution

http://www.unece.org/env/lrtap/

- 159. Convention on the Conservation of Migratory Species of Wild Animals <u>http://www.unep-wcmc.org/cms/index.htm</u>
- 160. Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal <u>http://www. unep.ch/basel/</u>
- 161. Convention on Transboundary Effects of Industrial Accidents <u>http://www.unece.org/env/teia/intro.htm</u>
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR). Http://www, ramsar.org
- 163. Framework Convention on Climate Change <u>http://unfccc.</u> int/
- 164. International Coral Reef Initiative (ICRI) <u>http://www. icriforum.org/secretariat/pdf/icri-framework.pdf</u>
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The Overseas Territories

Security, Success and Sustainability



Foreign & Commonwealth Office



www.fco.gov.uk



Foreign & Commonwealth Office

The Overseas Territories

Security, Success and Sustainability

Presented to Parliament by the Secretary of State for Foreign and Commonwealth Affairs by Command of Her Majesty

June 2012

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The Overseas Territories

Foreword by the Prime Minister

The United Kingdom's 14 Overseas Territories are an integral part of Britain's life and history. Today they include one of the world's richest communities (Bermuda) and the most remote community (Tristan da Cunha). They include thousands of small islands, vast areas of ocean, but also, in Antarctica, land six times the size of the United Kingdom.

Most of the people of the Territories are British and where they choose to remain British we will respect and welcome that choice. The relationship entails a balance of benefits and responsibilities which everyone must respect.

This Government is ambitious for our Territories as we are ambitious for the United Kingdom. We want to see our communities flourish in partnership, with strong and sustainable local economies. We see an important opportunity to set world standards in our stewardship of the extraordinary natural environments we have inherited.

> This Government is ambitious for our Territories as we are ambitious for the United Kingdom. <</p>

This White Paper sets out our commitment to work with the Territories to address the challenges we face together. This is a commitment from across the UK Government.

The White Paper also celebrates the diversity, successes and opportunities in the Territories.

2012 is the Centenary of Scott's heroic journey to the South Pole. It is the 30th Anniversary of the Falklands conflict when so many gave their lives to protect the islanders' right to choose their own future.



It is also Her Majesty The Queen's Diamond Jubilee. The Territories are a valued part of the Realm and recently joined in this celebration.

It is an ideal time to publish this White Paper and I hope it will raise awareness in the United Kingdom of these British communities, lands and seas around the world.

Vil Cam

David Cameron Prime Minister
Foreword by the Secretary of State for Foreign and Commonwealth Affairs

No historian can fail to be intrigued by the stories which tell how the United Kingdom's 14 Overseas Territories have been entwined in our national history and how they come to remain linked to Britain in the 21st Century. Each Territory is different. Each history is different. But today most of the people in the Territories are British and our continuing connections bring benefits to the UK and to the Territories.

The Coalition Government has a vision for the Territories: of flourishing communities, proudly retaining aspects of their British identity and creating new opportunities for young and future generations; of natural environments protected and managed to the highest international standards.

We and Territory Governments share significant challenges: building more diverse and resilient economies; cutting public sector deficits; regulating finance businesses effectively; and protecting biodiversity and natural resources. In many respects the Territories are more vulnerable than the UK. We have a broad responsibility to support them and to ensure their security and good governance.

The strategy set out in this White Paper is designed to meet these challenges and deliver the vision. It is a strategy of re-engagement. It builds on the 1999 White Paper (Partnership for Progress and Prosperity).

It is also a strategy of re-evaluation. We have not in the past devoted enough attention to the vast and pristine environments in the lands and seas of our Territories. We are stewards of these assets for future generations.



The scale of these challenges is beyond the means of one or two departments of Government. So I am bringing the whole of the UK Government, central and local, into this work. British public servants have much to offer, but also much to learn from working with the Territories. And it doesn't stop with Government. The strategy aims to support coalitions and partnerships across and between the private sector, professional bodies and civil society in the UK and in the Territories. I particularly welcome the growing partnerships between the Territories and local authorities and with the NGO community on environmental and other issues.

The White Paper is broad ranging, but does not pretend to be comprehensive. It focuses on the security of the Territories, their economic development and their natural environment. It looks at how we can foster high standards of governance and build strong communities. It promotes the development of wider partnerships for the Territories.

The Government has taken care to consult widely in preparing this White Paper. Our dialogue with Territory Governments and the international public consultation we ran from September 2011 to January 2012 have helped us to identify priorities.

We have set these priorities out clearly in the Paper. This is an ambitious and broad agenda. The test of the commitment of all concerned will be delivery against this agenda. We plan to upgrade engagement between UK Ministers and Territory Governments into a Joint Ministerial Council tasked with monitoring and driving forward work to realise our vision.

We will report regularly on progress and welcome scrutiny from the public and parliaments.

William Hague Foreign Secretary

>> We and Territory Governments share significant challenges: building more diverse and resilient economies; cutting public sector deficits; regulating finance businesses effectively; and protecting biodiversity and natural resources <<

Executive Summary

Valued Partnerships within the Realm

- > The UK's Overseas Territories are highly diverse and each has its own relationship with the UK. The constitutional relationships continue to evolve. But the underlying constitutional structure between the UK and the Territories, which form an undivided realm, is common to all. The choice to remain a British Overseas Territory engages responsibilities and benefits for the Territories and for the UK.
- > The Government, in consultation with the Territories and other stakeholders, has developed a strategy of re-engagement to help meet the challenges and the opportunities of the 21st century: strengthening links between the Territories and the UK; strengthening governance; and enhancing support to the Territories.
- > As part of this strategy, all UK Government Departments are committed to engaging with and supporting the Territories.

Defence, Security and Safety

- > The UK is committed to defend the Territories and protect their peoples from external threats, ensuring their right of self-determination.
- > The UK helps the Territories protect themselves from international terrorism, organised crime and natural disasters.
- > The Territories provide the UK and our allies with strategically located bases which support a wide range of security operations.

Successful and Resilient Economies

- > The economic success of many Territories is a tribute to the endurance and ingenuity of their people. The UK is determined to support successful economic development, including through strengthened economic planning, management of public finances and the promotion of free trade.
- > The UK remains committed to providing assistance to Territories in need and to supporting developments which will reduce aid dependency.
- > The UK will encourage British businesses to pursue trade and investment opportunities in the Territories.

Cherishing the Environment

- > The Territories are internationally recognised for their exceptionally rich and varied natural environments. They contain an estimated 90% of the biodiversity found within the UK and the Territories combined.
- > The UK and Territory Governments are committed to working together to preserve the Territories' rich environmental heritage and to addressing the challenges of climate change. Together we have launched a programme to promote environmental mainstreaming in the formation of Territory Government policies.
- > The UK aims to be a world leader in the environmental management of its uninhabited Territories which cover many millions of square kilometres. We are developing a strategic approach to large-scale marine management including through the establishment of the world's largest Marine Protected Areas.
- > The UK welcomes the participation of civic society and the scientific community in this work.

Making Government Work Better

- > The Government has responsibilities towards the people of the Territories and of the UK to ensure the good governance of the Territories. The Government acknowledges the sensitivity of this area of work but believes that those living in the Territories have a right to expect the same high standards of governance as in the UK, including in the areas of human rights, rule of law and integrity in public life.
- > The Government expects high quality public financial management and financial services regulation as important contributors to building resilient economies and providing for the wellbeing of Territory communities.
- > The UK is determined to tackle corruption in all its forms.
- > The UK is committed to working closely with the Territories on these issues. To this end the UK is launching a long-term programme of support for the public services in the Territories.

Vibrant and Flourishing Communities

- > Each Territory has a unique community and it is for the Territory to shape the future of its own community. But most Territories face challenges as a result of their small scale or isolation.
- > UK Government Departments are supporting the Territories in a wide range of community issues such as education, health, labour, culture and sport.

Links with the Wider World

- > The UK is committed to supporting Territories which aim to strengthen their societies and economies by forming links with international and regional organisations or other countries. In some cases they can pursue these links themselves; in some cases the UK will represent the Territories.
- > The Territories' links with the EU, Commonwealth and United Nations will continue to be important. The UK is committed to strengthening these links. The UK also welcomes initiatives to develop links with regional organisations and other countries. Individual countries, such as Canada and New Zealand, already play an important role in some Territories.

The Way Forward

> The White Paper sets out priorities for action at the end of each chapter. Taking forward this work will require a partnership between the UK Government and Territory Governments. The UK Government will work to strengthen political engagement between Ministers in the UK and the Territories, particularly through the proposed Joint Ministerial Council. Together we will address this agenda and report on progress, inviting public and parliamentary scrutiny.

Map of the Overseas Territories



Introduction: Small Communities, Big Societies

The Coalition Government came into office in 2010 determined to re-invigorate the United Kingdom's relationship with its 14 Overseas Territories. Our vision for the Territories is for them to be vibrant and flourishing communities, proudly retaining aspects of their British identity and generating wider opportunities for their people; and for the uninhabited Territories to be world leaders in environmental conservation and management. This White Paper sets out how we are working with the Territories to further this vision.

The UK Government's relationship with its Territories is a modern one based on partnership, shared values and the right of the people of each Territory to choose to remain British. Where the people of a Territory choose to remain British, we will maintain and deepen our special relationship. The UK and the Territories recognise that our relationship brings mutual benefits and responsibilities. It is time to strengthen our engagement to reflect the enduring nature of this relationship.

A picture of diversity

The UK is proud of its special links with the 14 Overseas Territories – Anguilla; Bermuda; British Antarctic Territory; British Indian Ocean Territory; Cayman Islands; Sovereign Base Areas of Akrotiri and Dhekelia in Cyprus; Falkland Islands; Gibraltar; Montserrat; Pitcairn, Henderson, Ducie and Oeno Islands (commonly known as the Pitcairn Islands); St Helena, Ascension and Tristan da Cunha; South Georgia & the South Sandwich Islands; Turks and Caicos Islands; and Virgin Islands (commonly known as the British Virgin Islands).

Our shared history

In the three decades after the Second World War most British colonies and dominions became new independent states and members of the Commonwealth. A number of small territories retained links of various kinds to the UK, including some territories directly dependent on the UK for budgetary aid, linked to the UK because of the wishes of the inhabitants or, in some cases, maintained as military bases or for their longer term strategic value. In 1997 Hong Kong passed to China. The 1999 White Paper Partnership for Progress and Prosperity set out a new relationship between the UK and its Overseas Territories based on the principles of self-determination, mutual responsibilities, and autonomy, and a pledge of UK help when needed. British citizenship was extended to most of the people of the Territories. The Coalition Government's strategy endorses and builds on this work.

Our relationship is rooted in four centuries of shared history. Bermuda, off the eastern coast of North America, became one of the first British territories in the Americas when it was settled by the survivors from a shipwreck in 1609. Bermuda's first capital, St George's, was founded in 1612. Bermuda is now the most populous Territory with a population of 66,000 and enjoys one of the highest per capita incomes in the world.

The five Caribbean territories – Anguilla, British Virgin Islands, Cayman Islands, Montserrat and Turks and Caicos Islands – became British territories during the 17th and 18th centuries when sugar plantations were established on many islands.

There are two populated Territories in the South Atlantic – the Territory of St Helena, Ascension and Tristan da Cunha; and the Falkland Islands. Both have for centuries played a role in our national history. Tristan da Cunha is the most remote permanently inhabited island in the world and is economically self-sufficient. St Helena is preparing to re-launch its economy with the construction of an international airport. Ascension is host to a range of UK/US military and communication assets. It has no permanent population, but depends largely on St Helena for its workforce. The Falkland Islands have been continuously inhabited and administered under British sovereignty since 1833. It has a thriving economy based on fishing, agriculture and tourism. More recently offshore oil exploration has begun to support diversification.

Gibraltar is the only Overseas Territory in the EU. It was ceded to Britain under the *Treaty of Utrecht* in 1713. Its economy is based largely on tourism, financial services, online gaming and shipping.

The Sovereign Base Areas in Cyprus are not formally part of the EU. They cover around 256 square kilometres and offer the UK a military base in a region of strategic importance. Much of this land is privately owned by around 10,000 Cypriot nationals.

Pitcairn in the South Pacific has the smallest population – around 50 permanent inhabitants, although there is a significant diaspora, mainly in New Zealand and Australia.

The British Antarctic Territory, British Indian Ocean Territory and South Georgia & the South Sandwich Islands have no permanent population. These are extensive Territories many times the size of the UK including some of the world's best preserved environments and the world's largest Marine Protected Areas. The British Antarctic Territory is also highly prized as a global laboratory. Scientists from the British Antarctic Survey discovered the ozone hole here in 1985. This triggered international concerns about the effects of atmospheric pollution.



HMS Iron Duke off the coast of Montserrat Credit: Crown Copyright (Ministry of Defence)

The International Context

There is much to celebrate in the survival and success of these communities and the preservation of the natural environment through the vicissitudes of history. The 21st Century has brought and will continue to bring significant challenges: from economic and financial crises to climate change and extreme weather events. Our Territories can be more vulnerable to these pressures than the UK itself. Our strategy of re-engagement is designed to help us all meet the challenges and seize the opportunities of the 21st Century.

UK Benefits and Responsibilities

The relationship between the UK and the Overseas Territories is founded on mutual benefits and responsibilities.

The Territories offer the UK:

- > A global presence: the global spread of our Territories gives us access and insights in diverse regions of the world;
- > A set of strategic assets: some of the Territories host military bases or cover regions of significant current operational and long term strategic value;
- > Economic and financial opportunities: there are multiple economic opportunities for a broad spectrum of UK companies as well as financial sector specialists. The international financial centres in the Territories can play a positive and complementary role to the UK-based financial services industry with particular strengths in providing services to fast growing economies in Asia and the Americas;
- > Natural and environmental resources: these are of global significance, including fisheries, minerals and hydrocarbons, and biodiversity far exceeding that in the UK's home territory and waters. The diverse natural environments of the Territories provide UK and international scientists and specialists with unique opportunities for research, including into the evolution of the earth's climate and plant and animal life;

 > Talent and diversity: the people of the Territories bring talents to the UK, as students at our universities and workers in our businesses.
British nationals from the Overseas Territories also serve in the UK Armed Forces.

The UK Government's fundamental responsibility and objective is to ensure the security and good governance of the Territories and their peoples. This responsibility flows from international law including the Charter of the United Nations. It also flows from our shared history and political commitment to the wellbeing of all British nationals. This requires us, among other things, to promote the political, economic, social and educational advancement of the people of the Territories, to ensure their just treatment and their protection against abuses, and to develop self-government and free political institutions in the Territories. The reasonable assistance needs of the Territories are a first call on the UK's international development budget. A consequence of these responsibilities is that the UK Government carries significant contingent liabilities in respect of the Territories. The Government has a duty to manage these liabilities effectively and therefore maintains certain residual powers to ensure it is able to discharge this duty.



Grytviken Church, South Georgia Credit: Oscar Castillo

In the case of the uninhabited Territories the UK Government has a responsibility to ensure that they are administered, and that their environmental and natural resources are protected and managed, to the highest standards.

Overseas Territory Benefits and Responsibilities

The Territories benefit from the relationship with the UK through:

- > Defence and Security: the UK is committed to defend the Territories and contributes to their protection from crime and support in the event of natural disaster;
- Economic Assistance: the UK provides substantial budgetary assistance to Territories in need;
- Technical Support: the UK Government provides a broad range of technical assistance and support;
- International Support: the UK is responsible for the external relations of the Territories and uses its diplomatic resources and influence to promote their interests;
- > Reputational Benefits: the reputations of Territory Governments and businesses are strengthened by their association with the UK.

Being an Overseas Territory entails responsibilities. We expect Territory Governments to meet the same high standards as the UK Government in maintaining the rule of law, respect for human rights and integrity in public life, delivering efficient public services, and building strong and successful communities. Territories in receipt of budgetary support are expected to do everything they can to reduce over time their reliance on subsidies from the UK taxpayer.

Our Constitutional Relationship

The UK, the Overseas Territories and the Crown Dependencies form one undivided Realm, which is distinct from the other States of which Her Majesty The Queen is monarch. Each Territory has its own Constitution and its own Government and has its own local laws. As a matter of constitutional law the UK Parliament has unlimited power to legislate for the Territories. Territory Constitutions set out the powers and responsibilities of the institutions of government, which for most Territories include a Governor or Commissioner, an elected legislature and Ministers. Governors or Commissioners are appointed by Her Majesty The Queen on the advice of Her Ministers in the UK, and in general have responsibility for external affairs, defence, internal security (including the police) and the appointment, discipline and removal of public officers. Elected governments have a wide range of responsibilities.

We have reviewed the constitutional status of the Territories. Each Territory has its own unique constitution. The previous government launched in 1999 a process of modernising the constitutions of the inhabited Territories. We are continuing this work with a view to equipping each Territory with a modern constitution. We expect these constitutions to continue to evolve and to require adjustment in the light of circumstances. But we believe that the fundamental structure of our constitutional relationships is the right one: powers are devolved to the elected governments of the Territories to the maximum extent possible consistent with the UK retaining those powers necessary to discharge its sovereign responsibilities. We believe that at this point in the history of our relationships with the Territories, when a decade of constitutional revision is coming to a close, the time is not right to embark on a further round of constitutional change. Rather our strategy is to ensure the constitutional arrangements work effectively to promote the best interests of the Territories and of the UK. The Government

recognises that it is important to continue to reflect on the constitutional relationship. We will ensure that a dialogue on these issues is sustained with all those Territories which wish to engage.

The Government maintains the UK's long-standing position on independence for the Territories. Any decision to sever the constitutional link between the UK and a Territory should be on the basis of the clear and constitutionally expressed wish of the people of the Territory. Where independence is an option and it is the clear and constitutionally expressed wish of the people to pursue independence, the UK Government will meet its obligations to help the Territory to achieve it.

The Territories are involved in significant royal events. Their elected leaders attended the Royal Wedding in 2011. The Territories were also fully involved in the Diamond Jubilee in 2012. Many of the elected leaders or their representatives attended the celebrations in the UK during the main Diamond Jubilee weekend. The Territories also marked the occasion by holding special events and lighting beacons, including in the world's most remote community of Tristan da Cunha. We want to celebrate the Territories and ensure that they are appropriately recognised in the UK. The flags of the Territories will be flown at the Trooping the Colour ceremony and other ceremonial occasions, to bring representation of the Territories in line with Commonwealth Nations.

What are the Crown Dependencies?

The Crown Dependencies are the Bailiwick of Jersey, the Bailiwick of Guernsey and the Isle of Man. The Bailiwick of Guernsey includes the separate jurisdictions of Alderney and Sark and the islands of Herm, Jethou and Lihou. The island of Brecqhou is part of Sark.

Jersey, Guernsey and Isle of Man are not part of the UK but are internally self-governing dependencies of the Crown. This means they have their own directly elected legislative assemblies, administrative, fiscal and legal systems and their own courts of law. The Crown Dependencies are not represented in the UK Parliament. The Crown Dependencies have never been colonies of the UK. Neither are they members of the EU.

www.justice.gov.uk



Phone box, Gibraltar Credit: iStockphoto

Our Strategy towards the Overseas Territories

In June 2010 the Foreign Secretary ordered a review of all policies towards the Overseas Territories. The UK Government quickly reasserted, through the Strategic Defence and Security Review later that year, that the defence of the Territories and their people was one of our most important defence responsibilities. The Department for International Development announced funding for an airport in St Helena. We committed ourselves to the objective of restoring the principles of good governance and sound public financial management to the Turks and Caicos Islands.

Henry Bellingham, Minister for the Overseas Territories, held a number of discussions with leaders of the Territories, including at the November 2010 Overseas Territories Consultative Council. Following this, the Prime Minister confirmed, through the National Security Council, the general principles of the Government's new strategy towards the Overseas Territories, which the Foreign Secretary announced to Parliament on 14 September 2011 HMG's strategy for the Overseas Territories www.publications. parliament.uk

The strategy recognises the political, social, economic and geographical diversity of the Territories and the need to develop policies that are tailored to support the needs and specific circumstances of each Territory. The strategy is designed to provide a framework in which these policies can be developed and implemented consistently and effectively.

The strategy focuses on three practical policy goals:

(i) to strengthen the engagement and interaction between the UK and the Territories;

- (ii) to work with Territories to strengthen good governance arrangements, public financial management and economic planning where this is necessary; and
- (iii) to improve the quality and range of support available to the Territories.

Stronger Engagement between the UK and the Territories

We want to see greater engagement between the UK and the Territories. We want to foster links between individuals, companies and Non-Governmental Organisations with their counterparts in the Territories. We want to strengthen interaction between the Territories and UK Government Departments and local government. Each UK Department has now assumed responsibility for supporting the Territories, as needed, in its own areas of competence and expertise. Departments have published papers setting out how they can provide support for and work with the Territories. Links to these papers are provided throughout this White Paper.

We also want to build stronger political links. Since 1999 the elected leaders of the Territories and UK Ministers have met in an annual consultative council. We will strengthen this into a Joint Ministerial Council and give it a clear mandate to lead work to review and implement the strategy and the commitments in this White Paper. The UK Government will provide a small secretariat to support the work of the Council including reporting to it on progress and developing action plans for implementation of specific proposals. We will also report progress regularly to the UK Parliament. We would welcome greater engagement between the UK Parliament and the elected bodies of the Territories. We propose that the Council consider options for taking this forward.

Strengthening Good Governance, Public Financial Management and Economic Planning

The UK and the Territories will continue their partnership to meet the high standards set out in this White Paper. The UK will provide support to the Territories, where necessary, to develop good governance, robust public financial management and sound economic planning. In particular we will support greater exchange of expertise between public servants in the Territories and the UK. We will do this by supporting Territory officials with opportunities to train and work with colleagues in the UK, and UK experts to work in the Territories. We particularly want to encourage long-term partnerships between the Territories and public bodies in the UK.

Improving the Quality and Range of Support to the Territories

"In this White Paper the Coalition Government has set out a compelling vision of flourishing and vibrant Overseas Territories, freer from financial dependence on Whitehall, proudly retaining aspects of their British identity and generating wider opportunities for their people. For our part, the Government remains committed to meeting the reasonable assistance needs of Territories where financial self-sufficiency is not possible, as a first call on the aid budget. We are prepared to invest British taxpayers' money – as we are doing, for example, with the St. Helena airport project where we can see the real prospect of selfsufficiency being achieved in due course and the reduction or elimination of dependency on UK Aid. For their part, we expect Territories to help develop their financial management capacity so that they can meet their budgetary obligations. My department is playing an active role in making this vision a reality."

> Rt Hon Andrew Mitchell, Secretary of State, Department for International Development

DFID is delivering a step-change in the quality of the support they are providing to those Territories in receipt of UK budgetary aid. In Montserrat the UK has provided £350 million of assistance since the volcanic crisis of 1995-7 which destroyed the island's capital and shattered the economy.

UK assistance is targeted on developing the north of the island, supporting the Government of Montserrat to ensure the provision of public services and the development of an enabling environment for economic growth. DFID and the Government of Montserrat signed a Memorandum of Understanding on 1 May 2012 which sets out Government of Montserrat commitments to reforms that will improve business and tourism.

The UK will provide up to £246.6 million to build an airport in St Helena to help end the Territory's isolation and open up economic and social opportunities for the people of the island.

For those Territories that need support, DFID will continue to provide assistance with the aim of helping those Territories achieve sustainable, inclusive growth and financial independence from the UK. DFID works in partnership with those Territories that need support to provide assistance with the aim of helping them achieve sustainable, inclusive growth and reducing their financial dependence on the UK wherever this is possible.

DFID provides budget aid to some Territories to fund essential public services that cannot be funded from local resources and provides technical assistance to support improvements in the quality of public services, good governance and opportunities to pursue economic growth and financial independence.

More information about the work of DFID with the Overseas Territories can be found at www.dfid.gov.uk The UK Government recognises that external organisations are often best placed to provide assistance and support. Our focus is therefore on strengthening the engagement of the Territories with international organisations such as the EU, the Commonwealth, the UN and regional organisations. There is significant potential for these organisations to provide more support to the Territories. The EU has a substantial assistance programme that is little understood and appreciated in the Territories. We want to improve access to this support and the impact it makes. The Commonwealth has a range of programmes to support small states, dealing with many of the issues facing the Territories.

Public Consultation

We undertook a public consultation on the Overseas Territories strategy at the end of 2011, through a web-based platform. We posed six general questions, based on the three policy goals of the strategy, to help focus the responses. An independent organisation analysed the responses and produced a report which we published in March 2012. This report can be found at http://www.fco.gov.uk

The White Paper

This White Paper highlights the scale, spread and importance of our Territories in an age of diminishing resources, climate change and pressure on the environment. The following chapters, which show how the UK and Territory Governments work in mature partnership, set out priority issues and areas for action.



Overseas Territories Consultative Council, November 2011 Credit: Tony Bates

The Overseas Territories

1: Defence, Security and Safety of the Territories and their People

Overview

The UK sees its responsibility for the defence, security and safety of the Overseas Territories as a core task of Government. We work with Territory Governments to counter external threats, international terrorism and organised crime and to ensure the safety and security of air and sea links. This work engages a number of UK Departments including the Ministry of Defence, the Department for International Development, the Department for Transport and the Home Office and its agencies.

Defence

"Our resolve to defend our Overseas Territories remains undiminished. Providing security for the Nation and its Overseas Territories, safe-guarding its citizens and their way of life remains the first duty of Government and Defence."

> Gerald Howarth MP Minister for International Security Strategy Ministry of Defence



Crew of RFA Wave Ruler helping to clear flood debris, Tortola, British Virgin Islands Credit: Government of British Virgin Islands

The protection of the Overseas Territories and their people is one of the UK Government's most important responsibilities. It is included as a National Security Task in the Government's 2010 National Security Strategy, and reaffirmed in the conclusions of the Strategic Defence and Security Review later that year. We will continue to maintain an independent ability to defend the Territories – including their territorial waters and airspace – from any external security threats they may face.

We will continue to ensure that our sovereignty over the Territories is defended against all challenges so that, for those who live in the Territories as British citizens, their right of selfdetermination is protected. In the South Atlantic British forces will maintain a defensive military posture to defend the Falklands and other British islands. There will be no weakening of the Government's resolve.

We will also ensure that the Territories are able to trade, to exploit their natural resources and to develop their economies free from undue external interference. The role of Britain's Armed Forces in the Territories varies enormously. For example, the Royal Navy Ice Patrol Ship HMS Protector operates around the British Antarctic Territory every summer, delivering UK obligations under the Antarctic Treaty System and supporting the British Antarctic Survey (BAS)'s ground-breaking scientific endeavours. In the Indian Ocean, our small detachment of military personnel secures the British Indian Ocean Territory, while helping to protect its pristine environment, working with our fishery protection officers to deter poachers and others who damage this unique part of the world. And in the Caribbean our Royal Navy presence ensures we are on hand to provide immediate humanitarian relief from natural disasters or assist in the interdiction of illicit narcotics.



16 September 2009 – Typhoon aircraft arrive at Mount Pleasant Airfield in the Falkland Islands, in preparation for taking over from the Tornado F3, which had been at the airfield for 17 years Credit: Cpl David Parnham

Conversely, the Territories contribute to the security interests of the UK and our close allies. A number of the Territories provide invaluable training environments for all three Services. UK Armed Forces based in the Sovereign Base Areas in Cyprus have provided extensive support for UK operations in Afghanistan, Irag and most recently in Libya. Gibraltar is one of the UK's Permanent Joint Operating Bases and is used for forward mounting of operations in the Mediterranean, North Africa (most recently in Libya) and the Gulf. There are permanently stationed forces in the shape of the Royal Navy's Gibraltar Squadron and the Royal Gibraltar Regiment. The Royal Navy is tasked with maritime force protection operations and with upholding the sovereignty of British Gibraltar Territorial Waters. The British Indian Ocean Territory (BIOT) hosts a US base at Diego Garcia which facilitates Allied operations across the Middle East and South Asia. Wideawake Airfield on Ascension played a crucial part in the Falkland Islands conflict in 1982 and continues to offer vital support as part of the airbridge to the Islands. Our Overseas Territories give Britain a global strategic reach in support of our international objectives.

Royal Gibraltar Regiment

The Royal Gibraltar Regiment, which has regular and reserve elements, is the resident UK Armed Forces infantry battalion based in Gibraltar. The Regiment is funded by the MOD, recruited locally and is trained in the UK. As well as providing security and protection it contributes to wider defence objectives through exercise and training deployments in the UK, Morocco and West Africa, where the Regiment trains soldiers to prepare them for deployment to Darfur with UNAMID. The Regiment also provides soldiers for operational deployments where they are attached to other British Army units. Members of the Regiment have served in Northern Ireland, Sierra Leone, Iraq, and Afghanistan.

"We will have to work harder, and in different ways, to advance and protect British interests as the world around us evolves. British Overseas Territories play an essential role in furthering those interests."

> Gerald Howarth MP Minister for International Security Strategy Ministry of Defence

More information about the work of the MOD with the Overseas Territories can be found at www.mod.uk

Bermuda, the Falkland Islands and Montserrat have their own defence forces.

The Bermuda Regiment

The Bermuda Regiment is a battalion-sized reserve unit with two key roles: supporting the Bermuda Police Service and undertaking post-disaster relief work at home and in the Caribbean region. Their profile has risen after deployments to assist in the Cayman Islands (Hurricane Ivan in September 2004), Grenada (2005) and the Turks and Caicos Islands (Hurricane Ike in September 2008), and more recently in Bermuda itself for Hurricane Igor (September 2010). The Regiment enjoys a long association with the Royal Anglian Regiment. Although the Government of Bermuda is financially responsible for the Regiment, it falls under the ultimate command of the Governor, who is its Commander-in-Chief. The UK retains ultimate responsibility for the security of the island. The Falkland Islands has a local defence force (Falkland Islands Defence Force) made up principally of volunteers, whose role is to contribute to wider defence efforts on the Islands alongside UK forces. It also fulfills the role of a mountain rescue agency for the Islands.

In Montserrat there is a Royal Montserrat Defence Force (RMDF) which consists of approximately 20 volunteers and currently performs mainly ceremonial duties. The RMDF has a historical association with the Irish Guards.



Her Royal Highness The Duchess of Gloucester presents the Bermuda Regiment with new colours, 13 November 2010 Credit: Crown Copyright (Ministry of Defence)

Tackling Serious Crime

The UK Government and Overseas Territory Governments work in partnership to tackle threats arising from international terrorism and serious and organised crime. The results of the public consultation suggest that crime is one of the main concerns of the people of the Territories. The UK and Territory Governments will work together and with international partners to reduce and prevent crime and ensure people feel safe in their homes and communities. The main threat to the Caribbean Territories and Bermuda is from organised crime, drugs, firearms and in some cases people trafficking and associated money laundering. The Territories lie on recognised drug trafficking routes from South America to the UK, continental Europe and the US. The traffickers use ever-changing techniques to conceal their goods and constantly shift patterns of shipment. Violent gangs, primarily engaged in street-level drug trafficking, operating in some Territories, have been responsible for the significant increase in firearm-related murders and assaults in these Territories. Some Territories have introduced drug and violent crime control strategies.

Territories in the South Atlantic generally have low levels of crime, but smaller law enforcement capability presents special challenges when unexpected incidents occur.

The UK Government believes that police and local communities need to work together to step up the fight against criminal behaviour. It is important that the police and other law enforcement agencies work together across the criminal justice system. There also needs to be an improved system to secure borders and reduce illegal immigration. These arrangements must command public confidence and serve the Territories' security and economic interests.

The UK Government welcomes the moves in some Territories to set up National Security Councils or equivalents to co-ordinate the work of Governors, Governments and the relevant agencies with regard to these challenges. We are committed to supporting their work.

The FCO co-ordinates and encourages policy and operational engagement between law enforcement authorities in the Territories and in the UK, including the Ministry of Defence, Home Office, Serious Organised Crime Agency (SOCA, which from 2013 will become the National Crime Agency), UK Border Agency and the Police.

The FCO employs Law Enforcement Advisers for the Overseas Territories to provide advice and help Territories engage with counterparts in the UK and elsewhere.

SOCA provides advice and specialist support to the Caribbean Overseas Territories to tackle organised crime in the region, and works with local and international law enforcement partners to reduce the harm to the citizens of the Territories from drug trafficking and other organised crime.

The Home Office will continue to authorise the deployment of UK police officers to Territories where required. It will also continue to provide legislative advice to Territories; and help them update their criminal justice legislation.

"The Home Office is committed to assisting the Overseas Territories to overcome a range of challenges in the field of home affairs. SOCA and UK police forces continue to provide specialist support to local law enforcement and assistance in criminal investigations. This work is helping the Territories to tackle organised criminals operating along the cocaine route from South America. We have a shared interest in tackling this threat, not only to reduce the impact of gang related crime on the citizens of the Territories, but to protect local communities in the UK by restricting the supply of drugs in accordance with the ambition of Local to Global, the Government's organised crime strategy published in 2011."

> James Brokenshire, Minister for Crime and Security, Home Office

More information about the Home Office's work with the Overseas Territories can be found at www.homeoffice.gov.uk The UK provides significant operational support. This includes UK police deployments; technical support for intelligence gathering; and secondments of UK experts into the Territories' authorities.

Seizure of Drugs from the Vessel "LOUISE"

In April 2011 the Royal Virgin Islands Police Force (RVIPF) assisted in a joint operation with the Serious Organised Crime Agency (SOCA) and other Caribbean jurisdictions concerning a suspicious vessel, the "LOUISE". This yacht was considered to be transporting illegal drugs when travelling to Europe on a container ship. The RVIPF were able to establish that the vessel was in the British Virgin Islands and was awaiting transportation to the United Kingdom via the United States Virgin Islands. As a result of further enquiries completed by the RVIPF in conjunction with SOCA, it was considered highly likely that the boat concealed illegal drugs.

The joint operation continued into late May 2011 when the boat reached Southampton and, as a direct result of the information supplied by SOCA and the RVIPF, a decision was taken to search the boat. Following a systematic six-day search, the UK Border Agency team at Southampton docks recovered 1.2 tonnes of cocaine worth approximately £300 million on the open market.

The UK supports and encourages international law enforcement co-operation with the Territories. This is especially important in the Caribbean region where the US and EU have significant programmes and co-ordination is important to ensure that crime is reduced and not just displaced from one island to another.

The UK Border Agency (www.ukba.homeoffice. gov.uk) assists the Territories by handling and processing visa applications through visa application centres around the world. UK Entry Clearance officers make decisions and issue visas on behalf of some Territories and refer applications to others. UKBA will continue to provide this service. UKBA also provides practical support to the Territories including assistance with visa policy and training in forgery detection. In most Territories visa legislation and regimes are closely aligned to the UK. Territories keep UKBA informed of planned changes to their visa regimes or legislation.

Natural and Man-Made Disasters

The UK's small and isolated Territories are vulnerable to natural disasters. The main threats to the Territories are hurricanes, volcanoes, earthquakes and tsunamis. There is also a risk of man-made disasters in particular air and sea accidents and environmental disasters such as oil spills. The emergency services in a small Territory can be overwhelmed by a major incident. The UK Government recognises its responsibility to support a Territory facing a disaster.



Sign indicating the nearest hurricane shelter, Grand Cayman, Cayman Islands Credit: Tony Bates

In most Territories the Governor is responsible for co-ordinating the immediate disaster response. The FCO co-ordinates the UK and international response to a disaster, working closely with the Department for International Development (DFID) and the Ministry of Defence. Royal Navy patrols in the Caribbean and South Atlantic are likely to be in the frontline in providing emergency support. In the MOD's Atlantic Patrol Task (North) (APT(N)), a Royal Fleet Auxiliary ship maintains a maritime presence in the Caribbean region all year, which can be enhanced with a naval party (including boarding party and embarked naval helicopter). This is normally supplemented by a Royal Navy frigate or destroyer during the hurricane season between May and November. DFID has the capacity and expertise to provide longer term disaster relief and co-ordinate international relief effort and supplies.

"I am very proud of the essential role the Armed Forces play in disaster relief, but particularly in the Overseas Territories where hurricanes and other natural disasters have the potential to cause widespread devastation."

> Nick Harvey, Minister for the Armed Forces, Ministry of Defence



The Bermuda Regiment clears damage caused by Hurricane Igor Credit: Bermuda Regiment

The UK and Overseas Territory Governments work together to reduce the risk of disasters and to build disaster management capacity. Territory Governments are responsible for ensuring the necessary public bodies are set up, tasked and adequately resourced to plan, prepare and respond effectively to potential disaster scenarios.

Roles and responsibilities need to be set out in local legislation and regulations. There need to be robust and effective national and departmental plans for dealing with disasters. These plans must support risk reduction and disaster preparation. The FCO organises an annual pre-hurricane season seminar for the Caribbean Territories and Bermuda. The UK will continue to provide advice to Governors and Territory Governments through periodic reviews of disaster management capabilities and plans, ad hoc advice, targeted training and live and table-top exercises. The FCO requires all Governors to undergo specialist training in Disaster Management before taking office.

The UK encourages co-operation between the Overseas Territories including the sharing of lessons learned and best practice. The Caribbean Territories and Bermuda agreed in early 2012 to provide assistance to each other including through the temporary secondment of law enforcement officials during times of crisis or in exceptional circumstances. We also support and encourage those Territories with their own defence forces to build on their capabilities and take a more regional role in disaster preparedness and response. The UK supports the Territories to engage with regional and international disaster response agencies, for example the Caribbean Disaster Emergency Management Agency (CDEMA), the UN and the Red Cross. The Overseas Territories Directorate in FCO has a team of four officials (the Assist team) which can deploy to a Territory to assist the Governor and the Territory Government in preparing for and responding to particular disasters in the Caribbean region and Bermuda.



Clearing up after Hurricane Earl, Tortola, British Virgin Islands, August 2010 Credit: Boyd McCleary

Aviation Safety and Security

"A safe and prosperous aviation industry is vital to growth and economic development. This is why we remain committed to assisting our Overseas Territories to establish and maintain safety regulatory regimes which conform with international standards and ensure the safety of passengers and all involved in their aviation industries."

> Theresa Villiers MP, Minister of State, Department for Transport

The Territories need to apply international air safety standards in order to maintain the international air links that are vital to their people and economies. The UK Department for Transport provides essential support. In 2003 the Department responded to a critical report by the International Civil Aviation Organisation (ICAO) by setting up Air Safety Support International (ASSI - http://www.airsafety.aero), a subsidiary of the UK Civil Aviation Authority, to support the development of air safety regulation and provide safety assurance (except in Gibraltar and the British Antarctic Territory which have separate arrangements). ASSI has developed aviation legislation that is tailored to the needs of small administrations. ASSI provides support and training to Territories to build the capacity of Territory regulators. Where Territories have not yet set up fully-functioning regulators, ASSI provides direct regulation services such as airport licensing and certifying aircraft airworthiness.

The UK Government will continue to help the Territories meet international safety standards but believes that they should take over responsibility for safety regulation; pay for direct regulation services provided by ASSI; and contribute to the costs of other services. The Department for Transport has agreed Memoranda of Understanding on funding safety regulation with each of the relevant Territories, in which they have agreed to contribute in proportion to the wealth of the Territory and the benefit they gain from civil aviation. The Department remains committed to providing the major share of funding for ASSI for the rest of the spending period.



RAF Sea King search and rescue helicopter near Mount Kent, Falkland Islands Credit: MOD

ASSI will be responsible for the certification of the new international airport being built on St Helena. It will be working with DFID and its consultants to ensure that the airport meets international standards.

Gibraltar has been excluded from the ASSI system as it is covered by EU legislation. The UK Department for Transport helped the Government of Gibraltar establish its own aviation safety regulatory regime in 2009 and continues to provide some support.

Aviation Security

International terrorism is a threat to aviation in the Territories as it is in small independent states. The UK provides assistance to improve aviation security. In the Caribbean the Department for Transport employs a regional aviation and maritime security advisor to provide oversight and advice. The adviser has introduced improved assessments of terrorist and organised crime threats and risks, involving a wide range of government agencies.

Maritime Safety and Security

"We recognise and remain immensely proud of the growth of the British Shipping Registers operated by the Overseas Territories which has ensured that the combined British fleet at more than 50.1 million Gross Tonnage stands seventh in the world's shipping fleets. Along with the Maritime and Coastguard Agency, we will continue to work collaboratively with colleagues within the Territories to ensure that all ships flying the Red Ensign are maintained to the highest possible standards, and that the Territories meet their obligations as flag, port and coastal states under the International Maritime Conventions."

Mike Penning MP, Parliamentary Under Secretary of State, Department for Transport

All of the Overseas Territories have to comply with international security standards for ships and ports developed by the International Maritime Organisation (IMO).

Any vessel registered in the UK, a Crown Dependency or an Overseas Territory is a "British ship" and is entitled to fly the British Merchant Shipping flag, the 'Red Ensign', or a version of it.

Bermuda, British Virgin Islands, Cayman Islands and Gibraltar currently run large international shipping registers. Anguilla, Falkland Islands, St Helena and the Turks & Caicos Islands operate mainly domestic shipping registers. All are required to meet standards equivalent to those of the UK Register. This requirement is set out in individual Memoranda of Understanding (MoUs) between the UK and the Territory.

The UK Maritime and Coastguards Agency (MCA) monitors the Territories to ensure they comply with UK, international and – where appropriate

– EU standards. The UK represents their interests in international fora such as the International Maritime Organisation (IMO) and the International Labour Organisation (ILO). The MCA continues to work with the Territories to ensure the highest level of international maritime safety. It provides practical assistance to Territory Registers through a four yearly cycle of advisory and assessment visits; and organises regular conferences and technical meetings. More information about the work of the Department for Transport with the Overseas Territories can be found at www.dft.gov.uk

The Department for Transport continues to work with the UK's Territories to ensure appropriate standards of security are maintained at their port facilities. The Department's Miami-based Regional Aviation and Maritime Security Adviser undertakes regular security visits to the Caribbean Territories and Bermuda. The Department maintains a security dialogue with the shipping administrations of the Territories through annual security meetings of the Red Ensign Group.

Priorities for Action

- > maintain commitment to defend the Territories and their peoples.
- > address security threats such as organised crime and illegal migration, including through strengthened border security and the development of National Security Councils to improve co-ordination in the Territories.
- > reduce risks and strengthen preparation for potential natural and man-made disasters, including through regional co-operation arrangements.
- > maintain international standards of aviation and maritime safety and security in the Territories.



Law Enforcement Officers from the Overseas Territories practising boat handling skills at the Overseas Territories Regional Maritime Training Centre, Tortola, British Virgin Islands Credit: Mike Riley

2: Successful and Resilient Economies

Overview

The Overseas Territories have made considerable strides over the last decade in their economic development. Although many Territories have limited natural resources and few have manufacturing industries they have recognised the need to diversify their economies. The UK Government will continue to work with the Territories to help them develop their economies.

The Territories are acutely vulnerable to shifts in the global economy, regulatory regimes and commodity prices. Prudent fiscal management and effective fiscal planning are fundamental to the delivery of continued economic success and increased resilience to external economic shocks.

Some Territories are in receipt of budgetary aid to assist them in their Government's business, infrastructure, development and growth prospects. Where the conditions are right, DFID will consider further investments that would stimulate growth and reduce financial dependency. The decision to proceed with an airport for St Helena (see below) is an excellent example of this.

Structure of Economies

The economies of the Territories vary significantly in size, but they share a number of features in common: they are open economies; economic activity is often concentrated predominantly in a small number of sectors; the public sector is a major employer; and they are reliant on imports. These factors leave Territory economies particularly exposed to factors outside their control. For example, an economic downturn in the United States economy will tend to result in a reduction of tourist arrivals in the Caribbean Overseas Territories with a consequent reduction in government revenues.

Despite such challenges, there are many economic success stories. Bermuda, the British Virgin Islands and the Cayman Islands have developed important niche positions in international financial markets. The UK Government strongly believes that Territories which meet financial sector international standards should be free to continue to compete in international markets without discrimination.

The role these three Territories play in international financial markets, and the commitment of their Governments and regulatory authorities to meeting international standards, has also been recognised by the international community. Bermuda, British Virgin Islands and the Cayman Islands are, for example, members of the Financial Stability Board's regional group for the Americas. And Bermuda, as Vice Chair, hosted the second meeting of the Global Forum on Transparency and Exchange of Information for Tax Purposes in 2011.

The UK Government will continue to support Territories with financial centres that demonstrate commitment to maintaining high regulatory standards to gain increased recognition through participation in international and regional fora.

Tourism is a major part of the economy of most Territories. It is important to develop this industry but also to consider carefully the environmental impact of proposed development so that the coasts, seas and wildlife that attract tourists are not damaged.

Air Services

"We will continue to promote the interests of our Overseas Territories in negotiating international air service agreements, to support their growth and economic development."

> Theresa Villiers MP, Minister of State, Department for Transport

The Department for Transport seeks to promote the interests of the Territories when negotiating air service agreements with other countries, which are an important element to supporting the economic development of the Territories. For example, the Department for Transport obtained additional rights for Cayman Airways and Air Turks and Caicos to conduct services to Cuba when a new bilateral air services agreement was negotiated in 2011.

The Department will continue to provide ongoing support to the Territories with regard to air services. In particular, the Department stands ready to help Bermuda and the Caribbean Territories with the liberalisation of air service agreements with the US and other states wishing to develop their air services. The Department will also be providing assistance to the Government of St Helena in the development of air services to the new airport.



Cayman National Bank, Cayman Islands Credit: Ministry of Finance

Successful Economic Development

Over the last 40 years, the British Virgin Islands has evolved from an agriculture/subsistence economy where people left the islands to find work, to one based on tourism (sailing and luxury hotels) and then one based also on the provision of financial services to the international business community. They are now the leading centre for international business companies, with much business coming from Asia/Pacific in addition to strong business links with the United States.

From the mid-1960s the Cayman Islands started on the path of development from a predominantly maritime economy to the world's fifth largest financial services centre. The development of financial services legislation helped to solidify Cayman's position as a leading financial services centre. It is now the world's leading centre for hedge funds and also a significant wholesale banking centre, with high volumes of overnight banking business from the United States.

Financial services have also featured significantly in Bermuda's economic development. Bermuda is the third largest reinsurance centre in the world and the second largest captive insurance centre, with firms based in the jurisdiction writing significant volumes of business in the United Kingdom and the United States. Bermuda has one of the highest per capita incomes in the world.

As part of the EU, Gibraltar is subject to EU standards and offers a gateway to the European single market of close to 500 million people. Gibraltar provides an extensive selection of financial services that meet the requirements of both local and international investors. Numerous international trading entities and financial services companies have bases in Gibraltar. The Government of Gibraltar is engaged in maximising the potential for expansion of Gibraltar's financial services sector, which contributes approximately 22 per cent to the GDP of the Territory.

The Falkland Islands are economically self-sufficient in all areas except defence. A system of licensing has enabled the development of the fishing industry and helped the economy move on from reliance on wool.

In common with the Caribbean Territories, tourism also makes an important contribution to the economy as the Falklands Islands promote their pristine environment.

The Tristan da Cunha economy is heavily reliant on the islands' lobster fishery. Tristan lobster is a top-end product mainly exported to the United States and Far East. The Territory works with its commercial partner to ensure that the fishery is well run and highly sustainable. In July 2011 the fishery was awarded Marine Stewardship Council certification. Aside from the lobster fishery, small scale tourism and sales of stamps and coins provide income for Tristan.

The UK Government Supports St Helena

On 3 November 2011 the St Helena Government entered into a contract with Basil Read Ltd to build an airport on St. Helena. The costs will be met by DFID.

The airport is the largest single investment ever made in a Territory and is the clearest possible example of the UK Government's commitment to the island.

In the short term the project will create new jobs in construction and associated supporting industries. But the real benefits are long term and will come through development of St Helena's tourism industry, bringing visitors to the island and boosting the economy.

An airport is the best chance in generations of stimulating sustainable growth on the island. It offers the best prospect for St. Helena to reduce and eventually graduate from its dependence on UK aid. The airport is scheduled to open towards the end of 2015.

We will work closely with the Governor and the St Helena Government to ensure that St Helena gains maximum benefit from this investment, while remaining mindful of the scale of social and economic transformation that the airport will bring.

Building on Success

Overseas Territory Governments continue to explore the options for developing economic resilience. Doing this in the context of a robust economic plan ensures that the feasibility and impact of development options are fully assessed and understood. The exploitation of technology, geology and the richness of the environment all provide opportunities for development, as do improved trading links.



Hamilton, Bermuda business district Credit: Government of Bermuda

Economic Planning

Having a robust "business plan" for the economy is an important tool for building on success and is an approach the UK Government encourages all Territories to adopt. Such economic planning is a means to assess the feasibility of development options and to identify the expertise and infrastructure required to deliver them successfully, as well as considering how to make best use of those resources that are available. In short, the plan combines the vision for the economy with an objective assessment of deliverability.

Sharing Experience of Diversification

Territory Governments have between them a wealth of experience in delivering successful economic diversification, which the UK Government encourages the Territories to share with each other. The Falkland Islands, for example, has experience of establishing a system of fishing licences from which Territories with under-exploited fisheries can learn.

Science, Energy and the Environment

Montserrat has become a centre of excellence in volcanology and is exploring the development of geothermal energy to reduce the island's dependence on imported fossil fuel (see box). The successful development of geothermal energy would be a catalyst for wider economic development.

The Government of Montserrat is keen to confirm and develop the potential geothermal resource on Montserrat. While geothermal surface exploration has taken place, no drilling has been carried out, so despite encouraging indications, this potential has yet to be proven. Current electricity demand on the island is met by diesel generation. The Government of Montserrat is keen to displace this source with clean and affordable energy for domestic consumption, and to assist with the economic development of the island as a place to visit and do business. DFID is continuing to work with and support the Government of Montserrat to explore the potential to develop the resource, including financing the exploration phase. The result of this will be known in 2013.



Wind Turbines, Ascension Credit: Stocktrek Images

The Bermuda Institute of Ocean Sciences is the leading authority on the Sargasso Sea. Scientific research in this area has the potential to broaden the base of Bermuda's economy. Research into the development of alternative energy based on Algal Biodiesel also has the potential of developing a fuel source that emits less carbon and chemical contaminants than traditional diesel fuel.

The Falkland Islands have established a South Atlantic Environmental Research Institute (SAERI). The Institute has a vision of providing a centre for scientific activity and related commercial opportunities, taking advantage of its existing economic strengths, its geographical location and its place at the centre of a system of British Territories in the South Atlantic. The UK will work with the South Atlantic Territories to support the development of SAERI. The Natural Environment Research Council is supporting the development of SAERI in kind by providing expert advice on international scientific collaboration.

"On a recent trip to the British Antarctic Territory, I visited research facilities that place the UK at the forefront of environmental science. The Department for Business, Innovation and Skills fully supports our Overseas Territories and is committed to working with them to promote prosperity and growth."

> David Willetts, Minister of State for Universities and Science, Department for Business, Innovation and Skills

Trade Policy

The ability to trade freely is vital for the Overseas Territories. The majority of trade is in services. Whilst the volume of trade in visible goods is currently low, it nevertheless makes an important contribution to Territory economies.

The UK Government is a strong supporter of free trade. We will ensure that the Territories are aware of developments in the World Trade Organisation and other international trade fora which could affect them. Should a Territory want to participate in WTO meetings, the Department for Business, Innovation and Skills (BIS) will offer advice and assistance. BIS will work with Territories as the European Commission prepares their proposals on trade preferences and Rules of Origin. The UK Government will also work with the Territories to ensure that the impact on them of Free Trade Arrangements made between the EU and other countries is taken into account.

The Trade Policy Unit in BIS will continue to offer support and advice on specific issues relating to trade matters to Territories wherever possible, including offering assistance to individual citizens regarding cases of free movement rights.

More information about the work of BIS with the Overseas Territories can be found at www.bis.gov.uk

Trade Promotion and Inward Investment

The Government believes that there are opportunities for British business in the Overseas Territories, for example in the hydrocarbons, fisheries, sustainable energy and tourism sectors. In some cases they might be deterred from pursuing these opportunities through uncertainty over the legal and political context or because they simply lack the necessary information. The Government wants to encourage British business to explore these opportunities.



Gibraltar International Airport Credit: Gibraltar Tourist Board

Investment Promotion

The UK has extended to the Territories a number of Investment Promotion and Protection Agreements when the Territories have provided a case for doing so and the other country agreed. These set out the standards of treatment on which investors of both parties can rely when investing in the Territory of the other, and enable investors to resolve disputes through arbitration.

The EU has taken over responsibility for this work. Negotiations are underway on how this will work in practice. Once this has been resolved the UK will work with the Territories to determine how best to accommodate their interests.

Economic Partnership Agreements

A number of Economic Partnership Agreements (EPAs) have been negotiated between the European Union and the Africa, Caribbean and Pacific (ACP) countries. They are intended to protect ACP countries' access to EU markets, promote trade integration and accelerate development and poverty reduction in the ACP regions. Economic Partnership Agreements are World Trade Organisation compatible and development friendly. Not all Territories are in regions with an Economic Partnership Agreement. There is an option for Territories to join Economic Partnership Agreements should they so wish, but to do so will require authority (an entrustment) from the UK Government.

The Territories currently benefit from preferential trade arrangements under the EU's Overseas Association Decision. The UK Government will support any future arrangements which leave Territories no worse off than preferences offered by the Economic Partnership Agreements. We will discuss with Territory Governments the provisions of Economic Partnership Agreements, should they want to explore whether membership of them would be beneficial. The Territories will continue to face economic challenges, but the Territory governments and peoples have shown themselves adept at responding to past challenges to build vibrant economies. The UK Government is committed to supporting the right of the Territories to trade freely, whether in goods or services, and will continue to work with the most vulnerable Territories to help them along the path to self-sustainability.

Priorities for Action

- > build economic resilience, including through prudent fiscal management and economic diversification.
- > help Territories in receipt of budgetary aid achieve sustainable and inclusive growth and financial independence from the UK.
- > strengthen economic planning capacity.
- > increase trade and investment between the UK and the Territories.
- > protect trade rights and preferences.

3: Cherishing the Environment

Overview

The UK Government wishes to ensure that the rich environmental assets of the Overseas Territories, for which they are internationally recognised, are cherished. The Territories are home to many species and environments found nowhere else in the world – including an estimated 90% of the biodiversity found within the UK and the Territories combined. Each of the Territories depends on these assets in some way such as for fisheries or from tourism.

"The United Kingdom's Overseas Territories play host to some of our most precious environmental assets, many of which would be irreplaceable if lost. We recognise that environmental challenges are increasingly threatening the future security and safety of our Territories and in particular the people and the biodiversity that they support. We are committed to working in partnership - across government, with the Territories themselves, and with non-government organisations – using funding mechanisms such as the Darwin Initiative, to ensure that these highly valuable natural resources are protected for the future."

Richard Benyon Minister for the Natural Environment and Fisheries, Department for Environment, Food and Rural Affairs

The unique environmental wealth of the Territories brings responsibilities for its sustainable management. Territory Governments, civil society groups, the private sector and the UK Government each has a role to play. The key long-term threat faced by the Territories is climate change. The impacts of this are already being felt, in particular in the British Antarctic Territory which is warming faster than almost anywhere else on the planet. The Intergovernmental Panel on Climate Change has identified the Territories as amongst the "most vulnerable" and "virtually certain to experience the most severe impacts" of climate change. This will mean sea level rise; changes in weather patterns, including higher intensity of extreme weather events; coral bleaching; ocean acidification; and sea temperature changes. Other immediate threats include land use change; waste management; invasive species; and threats to habitats from unsustainable development.

Case Study: The British Indian Ocean Territory (BIOT)

BIOT is situated in the middle of the Indian Ocean and is made up of over 50 islands (the Chagos Archipelago) in 640,000 square kilometres of ocean. The Great Chagos Bank is the world's largest atoll. The islands, reef systems, biodiversity and waters of BIOT are among the richest on the planet, containing about half of all the reefs of this ocean which remain in good condition. Established on 1 April 2010, the Marine Protected Area – where commercial fishing is prohibited – is the largest such marine reserve in the world.



Plant Beach, BIOT: Some of the world's cleanest waters Credit: Crown Copyright (FCO)

Taking Stock of Progress

Territory Governments are responsible for the protection and conservation of their natural environments. They are supported by UK Government Departments, who have been working together, in conjunction with Territory Governments, Non-Governmental Organisations, the private sector and other stakeholders. Much progress has been made. Supported activities include:

- > the joint FCO-DFID Overseas Territories Environment Programme (OTEP) which, since its inception, has disbursed £8m through more than 140 projects across the Territories, in areas such as climate change, renewable energy, recycling, conservation and species protection;
- > development of the Overseas Territories Biodiversity Strategy, an initiative led by the Department for Environment, Food and Rural Affairs (DEFRA), under which DEFRA, DFID, FCO and the Joint Nature Conservation Committee (JNCC) work together towards conservation and sustainable use of biodiversity in the Territories;
- > the DEFRA-led Darwin Initiative, within which £5.2m has been spent to date on Territory projects, including through a special Challenge Fund created to help the Territories work up more successful bids; and the Flagship Species Fund, part-funded by DEFRA, which has a focus on supporting projects in the Territories;
- > funding a fisheries patrol around Ascension, St Helena and Tristan da Cunha, and providing model legislation for Territories to enable them to take appropriate action against illegal, unregulated and unreported fishing;
- > assisting St Helena with institutional reform of its government environmental function, including the creation of a new Directorate of Environmental Management;
- > establishing a Millennium Seed Bank Partnership through The Royal Botanic Gardens, Kew to

ensure the future safety of rare, endemic plant species from the Territories;

- > supporting, through the provision of direct grants, enhanced environmental work in the British Indian Ocean Territory, British Antarctic Territory and South Georgia & the South Sandwich Islands, for example to support non-native species eradication, fisheries patrols and heritage conservation; and
- > ensuring the needs and concerns of the Territories are represented at international meetings, and providing advice and support in meeting the demands of international agreements. Much of this work is led by DEFRA who assist the Territories in meeting the requirements of:
 - > the Convention on International Trade in Endangered Species;
 - > the Convention on Biological Diversity; and

> the Convention on Migratory Species. This work has included supporting an officer in the Falkland Islands responsible for implementing the Agreement on the Conservation of Albatrosses and Petrels, part of the Convention on Migratory Species. In addition, the Department for Energy and Climate Change (DECC) has shared with the Overseas Territories information on the development of UK negotiating positions under the UN Framework Convention on Climate Change.

Case Study: Assistance to the Caribbean Overseas Territories on Climate Change

For four years, DFID funded the Caribbean Overseas Territories' participation in a regional project entitled "Enhancing Capacity for Adaptation to Climate Change in the Caribbean Overseas Territories". This helped these Territories adapt to climate change and variability within the context of sustainable development. During the project each Territory developed public education and outreach programmes, established National Climate Change Committees, completed climate change vulnerability and capacity assessments and developed a climate change policy document. This has helped underpin action by the Territories to plan and implement measures to mitigate climate impacts.

Case Study: UK Overseas Territories Online Herbarium

The Overseas Territories Environment Programme has supported The Royal Botanic Gardens, Kew through a 2-year project to create an online herbarium cataloguing the native and introduced plant species of each Territory.

The project is contributing to the Global Strategy for Plant Conservation and will better enable Territory Governments to understand the wealth of their natural environments and ensure they are adequately protected. In particular, this 'one-stop shop' for plant information should help enable effective protection and management of native plants, including through the implementation of multilateral environmental agreements such as the Convention on Biological Diversity, and create a better understanding of their importance.

To date, over 17,000 specimens and 10,000 taxa have been collated into the database held at Kew and freely available through the website: http://herbaria.plants. ox.ac.uk/bol/UKOT
Case Study: St Helena – Saving a Unique Species from Extinction

St Helena hosts a large number of species that are unique to the island. These include 43 different types of plant and 45 different types of spider alone, as well as the single remaining land bird – the wirebird. Over the years there have been a number of threats to the survival of these species and populations of many have declined. The unique Bastard Gumwood tree, for example, carries International Union for the Conservation of Nature 'Red List' status and was thought to be extinct in the wild. However, in 2007 a single wild tree growing on a remote cliff on St Helena was discovered. With support from the Overseas Territories Environment Programme genetic material from this specimen is being used to develop a selfsustaining population. Now, a network of National Conservation Areas is being proposed on the island which would help to restore and conserve St Helena's unique natural heritage for the future.

This work has facilitated greater knowledge and understanding of environmental problems and helped Territories put in place measures to protect some key species and habitats. We now want to build on this towards a more strategic, co-ordinated approach to place environmental consideration at the heart of decision-making within each of the Territories.

Shaping the Foundations of a More Sustainable Future

To facilitate this, the UK Government has funded two stakeholder-led pilot projects, in the British Virgin Islands and the Falkland Islands. The aim of these projects has been to raise awareness of the value of the environment in economic growth and development, and human wellbeing, and to identify ways to integrate or 'mainstream' that awareness into Territory policies, regulatory frameworks and decision-making. By taking account of the goods and services delivered by the environment, such as flood protection, prevention of coastal erosion, and mitigation of climate change impacts, Territory Governments can take more balanced decisions and help to provide a stronger foundation for sustainable economic growth and development. This in turn can help to ensure a healthy, productive and biodiverse natural environment, whose contribution to the economy is recognised and sustainably managed.

Case Study: Greening the Economy – Towards Sustainable Development for the British Virgin Islands (BVI)

The BVI Government, FCO, and Joint Nature Conservation Committee (JNCC) supported a two-day workshop in BVI in February 2012 as part of a wider project piloting a new approach to environmental management within the Overseas Territories.

The workshop aimed to identify a range of priority actions that need to be taken forward to help secure a sustainable future for the islands. In his remarks to the workshop, Dr The Hon Kedrick Pickering, Deputy Premier and Minister for Natural Resources and Labour made clear the importance of the issue of environmental management for the BVI: *"Unless and until the environment becomes everyone's business, and is thought about, and seriously considered in every decision we make, we can forget about an environment that will be in any condition to maintain our economy, secure our development or continue to provide the lifestyle that we now enjoy."*

Among issues identified by the workshop was the need for effective management of waste and water – which will be critical to the success of the tourism industry which is a major contributor to the BVI economy.

We intend to offer similar projects to other Territories where appropriate and, through these and other activities, develop a shared agenda for sustainable environmental management with each of the Territories based on the following principles:

> the natural environment, and the goods and services it provides, whether through individual species, habitats or whole ecosystems, is appropriately valued;

- > economic activity, including tourism and fisheries, is managed in a way that is consistent with the long-term sustainable use of the natural environment, avoiding over-exploitation and ensuring a renewable contribution to economic growth;
- > unique, highly vulnerable or sensitive natural environments are identified, protected and conserved by appropriate means including through the use of management plans, underpinned by scientific research;
- > the role of the natural environment in underpinning long-term economic prosperity is understood and integrated within Overseas Territory policies and decision-making.

We will encourage Territory Governments to support the delivery of this shared agenda. We intend to continue to make available UK Government funding streams over the course of the current Spending Review period, as well as continue to offer technical advice and expertise, on environment, climate and renewable energy issues. We will continue to work together across Government to deliver co-ordinated support on natural environment issues, each Department leading in their respective areas of responsibility.



Cacti in Anguilla Credit: iStockphoto

For example, DEFRA will continue to provide support for endangered species and habitats,

such as through the Darwin Initiative and implementation of the UK Overseas Territories Biodiversity Strategy. DEFRA will also lead on biodiversity and climate change adaptation issues. Together with its Agencies (Royal Botanic Gardens, Kew, JNCC, the Food and Environment Research Agency and the Centre for Environment, Fisheries and Aquaculture Sciences) it will continue to provide technical and policy advice and ensure that key research in the Territories is delivered. More information about the Department's work with the Overseas Territories can be found at: www.defra.gov.uk

DFID will continue to engage with Territories on wider climate, environment and natural resource issues. The Department for Energy and Climate Change will look to increase their support to the Territories in areas of climate change collaboration (including working with Territories to inform UK negotiating positions within international climate change, and other, discussions). They will also provide support on energy-related issues including renewable energy technologies. More information about the Department's work with the Overseas Territories can be found at www.decc.gov.uk

In the EU, we will continue to engage with the Commission and the Territories on the renewal of the Overseas Association Decision, to try to ensure that Overseas Territory environment policy and funding needs are taken into account. We will also seek to secure funding from other sources to assist the Territories in conserving their biodiversity and ecosystem services. Internationally, we will continue to represent Territory interests in the context of multilateral environmental agreements such as the International Commission for the Conservation of Atlantic Tunas, the Convention on Biological Diversity, and the UN Framework Convention on Climate Change.

The Uninhabited Overseas Territories: British Antarctic Territory, South Georgia & the South Sandwich Islands and British Indian Ocean Territory

In the uninhabited Territories the principles of environmental protection and sustainable ecosystem management are already enshrined in our activities. We will continue to support and oversee the effective stewardship of these almost-pristine natural environments.

The British Antarctic Territory is the largest of the UK's Overseas Territories, covering over 1,700,000 square kilometres, but it has no indigenous population. The Government of the British Antarctic Territory, in consultation with stakeholders, has developed an ambitious rolling five year strategy which sets out objectives and funding priorities. Environmental protection is an integral part of this strategy and is amongst its highest priorities: the Antarctic Peninsula is one of the fastest warming, and therefore most rapidly changing places on the planet. The historic leadership and scientific endeavour shown by the UK in early Antarctic exploration, including the meteorological data, rocks, fossils and marine samples collected by Captain Robert Falcon Scott's polar party, laid the early foundations of our scientific understanding of Antarctica. It has underpinned much of the environmental research subsequently conducted, including the study of climate change.

Case Study: Climate Change in the British Antarctic Territory.

Recent climate change has driven significant changes in Antarctica. This has been most apparent in the Antarctic Peninsula, part of the British Antarctic Territory, where in the last 50 years: average temperatures have risen by nearly three degrees Celsius; 25,000 km² of ice has been lost from floating ice sheets; and 87% of glaciers have retreated. These changes are already affecting wildlife. Adélie penguins, a species well adapted to sea ice conditions, are being replaced by open water species such as gentoo penguins. Melting snow and ice cover has resulted in increased colonisation by plants. And reduced sea ice cover may be contributing to a decline in Antarctic krill, a fundamental staple of the Southern Ocean food chain. The FCO is working with the British Antarctic Survey, and through the Antarctic Treaty System, to better understand these changes so that we can better plan for the impacts they may have.



British Antarctic Survey Plane Credit: Henry Burgess

We are helping to further the UK's historic legacy in Antarctica by:

- > developing a better understanding of the environment and implementing the best Antarctic environmental practices in our activities;
- enhancing UK expertise on tourism management and minimising human impacts;
- identifying rare flora and fauna and/or special areas across the British Antarctic Territory and developing protection and conservation measures;

- > proactively managing key Protected Areas in the British Antarctic Territory; and
- > identifying future environmental challenges, including climate change, and developing mitigation measures.



British Antarctic Territory Credit: Paul Stansfield

South Georgia & the South Sandwich Islands also has a prominent history in polar exploration, and acted as an important staging post for the expeditions of Sir Ernest Shackleton, who died and was buried on South Georgia in 1922. But it is of international importance in its own right for its rich environmental heritage. South Georgia & the South Sandwich Islands sustains major populations of seabirds and marine mammals including globally threatened species, like the iconic wandering albatross. It is also home to one of the longest and most detailed scientific datasets in the Southern Ocean, with over 30 years of population data on seabirds and marine mammals at Bird Island.

The sustainable management and environmental stewardship of South Georgia & the South Sandwich Islands is therefore the key priority. The waters around South Georgia & the South Sandwich Islands are some of the best managed in the world, and the fishery is carefully controlled to minimise adverse impacts. The latest stage of the Government of South Georgia & the South Sandwich Islands' long-term management strategy was the recent designation of a sustainable-use marine protected area (MPA) within its maritime zone.

Case Study: South Georgia & the South Sandwich Islands Marine Protected Area (MPA).

In February 2012 the Government of South Georgia & the South Sandwich Islands declared a sustainable-use MPA covering over 1,000,000 km² of the Territory's maritime zone, including 20,000 km² of no-fishing zones. It establishes the waters around South Georgia & the South Sandwich Islands as one of the largest areas of sustainably managed ocean in the world.

The declaration of the MPA builds on existing management measures which go above and beyond those required by the Convention for the Conservation of Antarctic Marine Living Resources. As a result, the Marine Stewardship Council (MSC) has certified the island's toothfish fishery, which is rated as the third highest scoring MSC-certified fishery in the world.

The declaration of this MPA contributes to the World Summit on Sustainable Development's global commitment to establish representative networks of MPAs by 2012. The MPA will be monitored through scientific programmes and enforced through a dedicated patrol vessel.

We will continue to support the Government of South Georgia & the South Sandwich Islands' environmental stewardship of the Territory, including through tough environmental and biodiversity protection measures, effective fishery and tourism management and, where feasible, the eradication of non-native species to restore the natural habitat of South Georgia.

We will continue to represent the interests of both the British Antarctic Territory and South Georgia & the South Sandwich Islands in the Antarctic Treaty System, where we uphold the principles of ecosystem management and work with the British Antarctic Survey and other stakeholders to ensure decisions are based on robust scientific evidence. Tourism, to both the British Antarctic Territory and South Georgia & the South Sandwich Islands, will continue to be carefully managed. The British Antarctic Territory receives the overwhelming majority of all Antarctic tourists. A key focus is to ensure visits are both safe and environmentally friendly, for example through the development of guidelines, educational materials and field guides, many of which have subsequently been adopted by the Antarctic Treaty System.

Within the British Indian Ocean Territory we are committed to similarly high standards of environmental protection. The Administration of the British Indian Ocean Territory has developed a legislative framework which underpins the protection of sites and species of particular importance, and has also designated special reserves. These include an area of Diego Garcia which has been designated as a Wetland of International Importance under the Ramsar Convention on Wetlands.



King Penguin, South Georgia Credit: Oscar Castillo

This work, together with the establishment of the no-take marine protected area in 2010, has contributed to the very high levels of nature conservation achieved in the Territory and highlights the UK's intention to ensure the on-going protection of this unique environment. We will work with the newly established, multidisciplinary Science Advisory Group and other relevant stakeholders to take forward this work and deliver effective management measures.



Masked Booby, British Indian Ocean Territory Credit: Peter Carr

Priorities for Action

- > manage terrestrial and marine natural resources sustainably and address challenges of climate change, including by putting environmental considerations at the heart of all decision-making.
- > oversee exemplary environmental management of the uninhabited Territories.
- > ensure compliance with the requirements of relevant multilateral environmental agreements.
- > strengthen co-operation with the Non-Governmental and scientific communities.

4: Making Government Work Better

Overview

The UK Government has a responsibility for the overall good government of the Territories and takes a close interest in how Territory Governments discharge the functions devolved to them. Those Territories which choose to remain British should abide by the same basic standards of good government as in the UK.

The Territories have proud traditions of democracy and respect for human rights. Territory Governments have used their devolved responsibilities to make significant improvements to the quality of life of their people, outperforming comparable independent states. But small Territories face particular challenges. It is difficult to maintain all the skills needed to regulate modern economies and meet public expectations for specialist services. It is sometimes difficult to procure good value services. Public concerns about capacity, transparency and corruption need to be addressed.

The UK Government has a vision of making government work better. We believe in sound public finances, building economic resilience and effective regulation. We want to increase efficiency and effectiveness, ensure public funds are spent wisely, and foster a fairer, more open and mobile society. We believe in giving power to people and communities across the UK and the Territories to drive reform. This means strengthening accountability including by making the performance of public bodies and services more transparent. We will work with the people, communities and governments of the Territories to realise this vision.

Democracy

The populated Territories have vibrant democratic traditions. Each Territory has its own legal system with its own local laws. In most Territories the legislature consists predominantly of members elected by the Territory's voters (except for the Senate in Bermuda, the members of which are all appointed). Most of the Territories have a ministerial system of government, loosely reflecting the Westminster model, with the elected member who commands support of a majority in the legislature becoming the Premier or Chief Minister. Political parties operate freely and are required to operate transparently and with appropriate controls on party finance. Territory Constitutions and laws define who can vote in elections. In some Territories recent economic success has attracted significant numbers of people and their families. In some cases these people are not able to vote. The UK Government believes that people who have made their permanent home in the Territories should be able to vote, but recognises the desire of island communities to maintain their cohesion and hence the need for a reasonable qualifying process.



Bermuda Parliament, Hamilton Credit: Hemera

Election Observers

The UK Government encourages observers to monitor UK elections as an important way to promote internationally accepted standards. We encourage other confident and open democracies, including the Territories, to welcome observers. In this spirit, the UK Government supported the observer mission to monitor the elections in the British Virgin Islands in November 2011 which was organised by the Caribbean Community (CARICOM) and the Commonwealth Parliamentary Association (CPA). This mission concluded that the will of the people of the British Virgin Islands had been fairly and freely expressed in an open democratic process, and commended the Territory for transparent, orderly and peaceful elections. The mission also made a number of helpful recommendations. The British Virgin Islands can be proud of the high standards it has set.



Members of the Legislative Assembly, Falkland Islands Credit: Falkland Islands Government

The Territories have a free and open press that serves to inform the public and foster debate on issues of policy. In recent years there has been an explosion of colourful internet debate and political blogs. The Territories have a wide range of official organisations that work to ensure openness and transparency and to hold public bodies to account, including auditors and complaints commissions. There are many civil society organisations that play an active role in checking that public bodies are working properly. This important work helps strengthen the people's trust in government and encourages greater public participation in decision making. The UK Government is supporting the development of these organisations.

Complaints Commission in the British Virgin Islands

The Complaints Commission provides an avenue to the public for redress of grievances arising from the administrative action of any government agency including any department, unit, statutory body, public board or committee. Since it was set up in 2009 the Commission has helped people who have had bad experiences and has made six special reports into specific issues.



Dr Elton Georges, BVI Complaints Commissioner Credit: Government Information Services; British Virgin Islands

It is important that everyone in the UK and the Territories in public life acts in accordance with the highest standards. This includes Governors, Ministers, public officials and advisers, members of national assemblies, members and officers of boards and other bodies discharging publicly funded functions.

The Seven Principles of Public Life

The UK Committee on Standards in Public Life has set out these principles for the benefit of all who serve the public in any way. They have been adopted by many public bodies in the UK and the Territories.

SELFLESSNESS

Holders of public office should act solely in terms of the public interest. They should not do so in order to gain financial or other material benefits for themselves, their family, or their friends.

INTEGRITY

Holders of public office should not place themselves under any financial or other obligation to outside individuals or organisations that might seek to influence them in the performance of their official duties.

OBJECTIVITY

In carrying out public business, including making public appointments, awarding contracts, or recommending individuals for rewards and benefits, holders of public office should make choices on merit.

ACCOUNTABILITY

Holders of public office are accountable for their decisions and actions to the public and must submit themselves to whatever scrutiny is appropriate to their office.

OPENNESS

Holders of public office should be as open as possible about all the decisions and actions that they take. They should give reasons for their decisions and restrict information only when the wider public interest clearly demands.

HONESTY

Holders of public office have a duty to declare any private interests relating to their public duties and to take steps to resolve any conflicts arising in a way that protects the public interest.

LEADERSHIP

Holders of public office should promote and support these principles by leadership and example.

Human Rights

The UK and the Territories share a common agenda to promote respect for human rights and tackle discrimination. The UK Government expects the Territories to abide by the same basic standards of human rights as the UK. Over the last decade, as new Territory Constitutions have been agreed, these have included new or strengthened human rights chapters that reflect these standards, in particular the European Convention on Human Rights (ECHR) and the United Nations International Covenant on Civil and Political Rights (ICCPR). Significant progress has also been made on extending core UN human rights conventions to the Territories. The UK Government's longstanding practice in this area is to encourage the Territories to agree to the extension of UN human rights conventions that the UK has ratified, but to extend these to the Territories only when they are ready to apply them. We want to work with all the populated Territories with a view to extending outstanding UN human rights conventions to them by the end of 2013. We will support those Territories that face resource and capacity constraints.

UN Human Rights Conventions

The following core Conventions have been extended to almost all Territories:

- the International Covenant on Civil and Political Rights;
- the International Covenant on Economic, Social and Cultural Rights;
- the Convention on Elimination of all forms of Racial Discrimination;
- the Convention Against Torture and Other Cruel, Inhuman and Degrading Treatment or Punishment; and
- the Convention on the Rights of the Child.

The Government of Anguilla is preparing for the extension of the UN covenants on civil and political rights and economic, social and cultural rights. The Government of Gibraltar is similarly considering the extension of the Convention on the Rights of the Child.

The Convention on the Elimination of all forms of Discrimination against Women has been extended to the British Virgin Islands, Falkland Islands and the Turks and Caicos Islands. Bermuda and the Cayman Islands are preparing for extension by the end of 2012. We are working with the remaining Territories to prepare for extension.



Foreign Office Minister Henry Bellingham meeting Ascension Island Councillor Kitty George in London, 22 November 2011 Credit: Crown Copyright (FCO)

In the Territories in which fundamental rights have been incorporated directly into the Constitution, local courts can enforce those rights directly. Six territories had enforceable fundamental rights chapters before the introduction in the UK of similar arrangements through the Human Rights Act 1998. The Constitution of Bermuda, which is the oldest amongst the Territories' constitutions, has contained a fundamental rights chapter since 1968.

The UK Government is responsible in international law for ensuring that the Territories comply with international human rights conventions that have been extended to them. Territory Governments have a duty to ensure local law complies with the relevant conventions and court judgements and is non-discriminatory. We expect Territories to take action, including legislating where necessary, in any areas of disparity to reach full compliance.

Territory Governments, with support from the UK, are doing a great deal of work to look after vulnerable members of society and to tackle discrimination. A major responsibility is the safeguarding of children. This is taken very seriously and all Territories need to ensure that proper measures are put in place to protect children and to help prevent child abuse. The UK is ready to support further work, including to improve reporting to the various UN human rights treaty bodies; strengthen specialised training and organisations; and tackle all forms of discrimination.

Building Human Rights Capacity in the British Overseas Territories

The UK has supported a Commonwealth Foundation project which has provided training workshops, specialist assistance and advice to help Territory Governments improve the implementation of human rights and worked with civil society to raise awareness of human rights issues. Among other things the project supported a poster and booklet campaign in the Falkland Islands; training for civil servants, police and social workers in the British Virgin Islands; a workshop in Pitcairn; proposals for a Human Rights Commission in St Helena; and the development of national action plans.

Safeguarding Children in the Overseas Territories (SCOT)

The UK has also supported a project to strengthen the protection of children, young people and their families by supporting policy making, professional practice, inter-agency collaboration and regional collaboration. St Helena and Ascension introduced legislative changes to support families and protect children from abuse. Anguilla and St Helena have established systems to encourage effective inter-agency cooperation in child protection cases. The project has also overseen extensive training activities including behaviour management training for teachers in Anguilla and for front line community workers in Montserrat.



SCOT workshop in Turks and Caicos Islands Credit: Viv Neary, SCOT Programme

The Rule of Law

The UK and the Territories share a long legal tradition and a belief that an independent and effective judicial system is a cornerstone of democratic society. The Territory judiciaries are separate and independent of the locally elected governments in order to ensure the rule of law is enforced impartially and consistently no matter who is in power. It is vital that the judiciary behave in an appropriate professional manner and maintain the highest standards of integrity and independence. One of the key challenges is attracting applicants of a suitably high standard to fill judicial vacancies.

The Ministry of Justice is working with the Territories to advise on sourcing the highest calibre of candidates and maintains close links with the Territory Governors to provide additional assistance where required. The Ministry of Justice is also exploring with the Territories the provision of additional training and support to both current and future members of the judiciary.

The Judicial Committee of the Privy Council (JCPC)

All of the Overseas Territories have the Judicial Committee of the Privy Council as their final court of appeal in both civil and criminal matters. This appellate jurisdiction in relation to the British Territories is ancient. Despite its heavy caseload, the Judicial Committee endeavours to ensure that appeals lodged with it are processed expeditiously, particularly where the case is time sensitive. The Territories need an effective criminal justice system that delivers justice without delay, protects the civil liberties of all people, and works for the victims of crime and witnesses and also for the accused and convicted. Effective systems are needed, for example, to encourage dispute settlement, provide legal aid where this is needed, and to protect vulnerable witnesses. Sentencing policy should punish those who break the law and help reduce reoffending. It is important to have systems to help offenders get off drugs, get support with mental health problems and reintegrate them back into their communities.

The UK Government will continue to help the Territories find effective ways to deal with young offenders including though promoting the use of diversion from prosecution in appropriate cases and the use of rehabilitation. Diversion away from the criminal justice system, with support and guidance applied correctly, can help prevent the risk of young offenders becoming repeat offenders. We will work with the Territories to demonstrate that diversion and rehabilitation can help turn the lives of many young offenders around and in turn, delivers longer term savings in criminal justice systems and societies.

Restorative Justice

Whilst small island communities can create challenges, they also present significant opportunities. One of the fundamental principles of good justice is that it must be seen to be done, and in small communities, visibility is more easily achieved.

Restorative justice aims to go further than simply meting out punishment, by helping to repair some of the harm done to victims and communities. It also offers the opportunity for offenders to give something back to the communities they have wronged and can help form a basis from which to begin rehabilitation.

The Ministry of Justice will continue to provide best practice and support from the UK to help the Territories develop and use restorative justice to the benefit of their communities. We will also assist in building networks to facilitate the sharing of expertise and experience.

The Territories are increasingly looking at alternatives to custody and more community and rehabilitation based sentences for offenders. For small islands with relatively small prison populations, custody is an expensive, and sometimes impractical way to deal with offenders. Non-custodial sentences can offer an alternative and can have dramatic effects on reducing reoffending rates when compared to prison for certain types of offenders.

The UK Government supports the aim of increasing the range of sentences available to the courts. Building effective probation services to support offenders in the community is a key aspect to this work. Several Territories now have probation services in place and some good results are being achieved. The Ministry of Justice supports this work and officials from the Parole Board have recently travelled to some Territories to help to train justice professionals including probation staff.

Many Territory Governments are looking for cost effective ways to rehabilitate offenders in the prison system and reduce recidivism rates as a key to tackling crime in their communities. We will continue to work with the Territory Governments to support this move to a more rehabilitative prison system that is better equipped to deal with specialist requirements. Key to achieving this is building capacity through pooling and sharing of expertise.

Prisons

The majority of Territories have only a single prison. Total numbers of prisoners are small and facilities often limited, but in some Territories the overall incarceration rate is amongst the highest in the world. This leads to crowded prisons with an average of 30% over capacity across the Territory prison system.

The small size of the prisons also means that it can be difficult, if not impossible to separate offenders with specific needs, such as minors, women or high risk offenders. Facilities to promote rehabilitation and treat offenders who require specialist treatment, such as those convicted of sexual offences, are often not available.

It is important that the Territories have adequate systems to protect witnesses giving evidence where they may be at risk of reprisal. This can be particularly important in the Territories where there is only one prison and offenders may be giving evidence against others and then find themselves imprisoned together. Effective systems are needed to separate witnesses and the accused in the long term, whether through relocating witnesses or ensuring prisoners can be kept separately or protected from reprisals.

Protecting vulnerable witnesses

The protection of vulnerable witnesses in small island communities can be challenging. The Territories need systems to ensure that witnesses are not intimidated, are protected from harm or reprisal and that there are alternatives available for evidence to be proved to Courts in the appropriate circumstances. This is particularly relevant in cases where children are required to give evidence, such as in cases of abuse where it is good practice to enable a child to give video recorded evidence and evidence by live link to avoid having to go into the Courtroom. It is important for the Territories to ensure the fast and effective resolution of disputes in the civil and family justice systems. The Territories must ensure that all citizens have equal access to the Courts and are treated equally before the law. This means that justice must be accessible, efficient and not prohibitively expensive. Whether through the effective use of legal aid, the use of mediation or alternative dispute resolution, equal access to justice and the fast and effective resolution of disputes should be the right of every citizen of the Territories.

Promoting mediation in civil and family cases also enables positive outcomes across the justice system. Through promoting alternatives to the courts, the Territories can significantly reduce costs for litigants as well as the costs to the public sector. Alternative dispute resolution is often also considerably faster. It encourages negotiated compromise resolution. It is also often a more amicable and positive way to resolve issues, particularly in family cases. In small islands communities, the amicable resolution of disputes carries even more importance. The Ministry of Justice will continue to support the Territories through the promotion of best practice and sharing of ideas.

The UK is committed to maintaining support for the justice systems in the Territories. The FCO funds regional advisers in the Caribbean and South Atlantic who provide advice and training. The Ministry of Justice provides substantial support on judicial issues and is working with the Territories to identify where expert advice can be best targeted to achieve results. The range of support currently provided includes predeployment training for Governors; training for probation and prison staff; and sourcing and recruiting experts to support justice projects. More information about the work of the Ministry of Justice with the Overseas Territories can be found at www.justice.gov.uk

Public Service

The Territories have professional public services built on the principle that public servants and other persons appointed to positions of public authority are selected and promoted on merit and through open competition. Efforts are made to attract candidates from all sections of society so that the public service refl ects the population it serves. It is difficult for small public services to build up all the specialist skills demanded of modern government. The UK Government encourages Territories to work together; to carry out some functions through joint bodies; to exchange personnel; and to open up more recruitment to skilled staff from other Territories, the Crown Dependencies and the UK (jobs in the UK are already open to British citizens from the Territories).

The public services in the Territories and the UK have much to learn from sharing experience with each other. The UK Government wants to see more engagement between public bodies in the UK and the Territories. We are setting up a programme to support public servants from the Territories to get training and work experience in the UK and for specialists from the UK to work in the Territories.



Students from the Turks and Caicos Islands visit 10 Downing Street Credit: Crown Copyright (FCO)

Policy Making

Public services have a vital role in providing objective and impartial policy advice to Ministers and managing the policy making process including organising public consultation and assessing the potential impact of particular policy options. The UK Government is supporting the development of policy making capacity in some Territories.

Public Services

UK and Territory Governments share a determination to deliver a better deal for taxpayers, directing resources into priority frontline services such as schools and hospitals and reducing waste and administration. Good public procurement is an important priority. This is sometimes challenging for Territory Governments, particularly where there are few suppliers and little competition. The UK Government is ready to share expertise and good practice to help the Territories get the most out of tight budgets.

Better Regulation

Much regulation in the UK and Gibraltar stems from EU law. The UK will ensure that Gibraltar is involved in the development of European directives at the earliest stage. We will support implementation in a way that does not disadvantage businesses relative to their EU competitors.

The Territories outside the EU face the challenge of developing their own regulation including for specialised business areas. Territory Governments work to provide regulation that promotes fair competition and protects the public without unnecessarily burdening businesses. There is an important agenda to remove or simplify regulations that unnecessarily impede growth, for example by restricting entry to certain businesses or professions.



Executive Council, Anguilla Credit: Governor's office; Anguilla

Good Regulation Principles

PROPORTIONALITY

Regulators should intervene only when necessary. Remedies should be appropriate to the risk posed, and costs identified and minimised.

ACCOUNTABILITY

Regulators should be able to justify decisions and be subject to public scrutiny.

CONSISTENCY

Government rules and standards must be joined up and implemented fairly.

TRANSPARENCY

Regulators should be open, and keep regulations simple and user-friendly.

TARGETING

Regulation should be focused on the problem and minimise side effects.

Regulation of International Financial Services

"Overseas Territories have developed as important financial centres in the global financial network. I welcome the significant progress Territories have made in complying with international standards on tax transparency and dealing with the threat of terrorism financing and money laundering. HM Treasury will continue to represent the interests of those Territories which meet these standards in international fora and will strongly support their right to compete freely in international markets."

> Lord Sassoon, Commercial Secretary to the Treasury, HM Treasury

The UK and Territory Governments have a shared agenda on the application of high international standards for financial regulation. The financial services industry is one of the main contributors to the economies of Bermuda, the British Virgin Islands, the Cayman Islands and Gibraltar and to a lesser extent Anguilla and the Turks and Caicos Islands. Adhering to international standards is therefore important to the long term development of these Territories.

The Territories need regulation that promotes fair competition and growth, ensures the stability of their financial systems and prevents abuse. It is important that the responsibilities of the state, business, civil society and individuals are properly balanced so that the international community can have the confidence to do business in the Territories. Territories' supervisory and enforcement regimes must be adequately resourced, well targeted and risk-based. The FCO employs a Regional Financial Services Adviser based in Bridgetown who provides advice and training on financial regulation.

The UK Government will strongly support those Territories that meet international standards. HM Treasury will work in the international arena to ensure that there is no discrimination against well-regulated offshore financial centres and that the same international standards are applicable to all jurisdictions.

All Territories have an obligation to ensure that they are not an avenue for corrupt practices and have systems in place to implement EU and UN sanctions against individuals and businesses where these sanctions have been extended to the Territories. HM Treasury will engage with and provide support for the Territories in the following key areas: financial regulation; tax and customs; anti-money laundering; counter terrorist financing regimes; and support for economic and financial risk management. HM Treasury will continue to work with the FCO to endeavour to inform Territories in advance of key international meetings and to take into account any concerns that are brought to their attention. More information about the Treasury's work with the Overseas Territories can be found at: www.hm-treasury.gov.uk

High Standards of Financial Regulation

In November 2011, with support from the UK, Bermuda, the Cayman Islands and the British Virgin Islands were invited to participate in the Financial Stability Board's new Regional Consultative Group for the Americas.

All the Caribbean Territories and Bermuda are active members of the Caribbean Financial Action Task Force which oversees anti-money laundering and counterterrorist financing standards in the Region.

The BVI Financial Services Commission, the Bermuda Monetary Authority and the Cayman Islands Monetary Authority are members of the International Organisation of Securities Commissions, the International Organisation of Insurance Supervisors and the Group of International Financial Centre Supervisors.

The Gibraltar Financial Services Commission (FSC) is a member of the International Organisation of Securities Commissions (IOSCO), the International Association of Insurance Supervisors (IAIS), Offshore Group of Insurance Supervisors (OGIS) and the Group of International Financial Centre Supervisors. The Gibraltar FSC's application to become an "Appendix A" signatory to IOSCO's Multilateral Memorandum of Understanding concerning Consultation and Co-operation and the Exchange of Information is - at time of publication – under consideration by IOSCO. The FSC intends to submit an application to become a signatory to the IAIS Multilateral Memorandum of Understanding on Co-operation and Information Exchange.

Sound Public Finances

Territory Governments are responsible for decisions on taxation and public spending and thus for maintaining sound public finances. Sound finances are necessary to encourage private sector investment, spur economic growth and build diverse economies that are resilient to external shocks. The UK Government expects Territory Governments to manage public finances sustainably and takes a close interest in this because it is an important part of good governance.

The UK Government recognises the challenging global economic climate and is working closely with Territories to provide technical assistance on the sustainability and good governance of public finances, as well as wider economic policy where requested. There is no one size fits all policy prescription for the delivery of sound and stable public finances, but there are a number of internationally recognised standards, which when applied by Territory Governments contribute to increased economic resilience. These standards include:

- > timely and accurate measurement of economic variables to give a clear picture of the performance of a Territory economy;
- > effective measures to plan and control expenditure, including medium-term planning and budgeting;
- > systems to ensure transparency and accountability, including on procurement procedures;
- > a sound revenue base and an efficient system of revenue collection;
- limits on government and public sector borrowing;
- > a policy of building reserves in good economic times.

The UK Government will support Territory Governments strengthen their public finances by adopting measures in line with these standards and will be proactive in working with Territory Governments to increase resilience and head off potential problems.

The UK Government and some Territory Governments have agreed Borrowing Guidelines, which provide a disciplined framework for managing public finances and a valuable commitment to sustainability. We are working to update these agreements to reflect the changing economic landscape and the particular circumstances of each Territory.

The Cayman Islands and the Framework for Fiscal Responsibility

In November 2011 the Cayman Islands agreed a Framework for Fiscal Responsibility with the UK Government. The framework demonstrates a commitment to strengthen the management of public finances, improve medium term planning, put value for money first, limit borrowing and deliver improved accountability.



The Premier of the Cayman Islands, Hon. McKeeva Bush and the Minister for the Overseas Territories, Henry Bellingham, signing the Framework for Fiscal Responsibility, London, November 2011 Credit: Tony Bates

The British Virgin Islands and the Protocols for Effective Financial Management

In April 2012 the BVI Government signed Protocols for Effective Financial Management with the UK Government. At the same time the BVI Government undertook to strengthen its public financial management legislation and return the public finances to a sustainable footing in the medium term. The UK welcomes the commitment this represents to accountable, transparent and prudent financial management.



The Premier of the British Virgin Islands, Dr Hon Orlando Smith, the Minister for the Overseas Territories, Henry Bellingham and the Governor of the British Virgin Islands, Mr Boyd McCleary, signing the Protocols for Effective Financial Management, Tortola, April 2012 Credit: BVI Government Information Services

Transparency

Territory Governments work hard to demonstrate that public resources are being used effectively and efficiently, but our public consultation highlighted some concerns about transparency which need to be addressed. Territory Governments are working to strengthen, as necessary, systems to ensure public money is spent correctly, including publishing audited accounts for all public sector activities and strengthening independent supreme audit institutions and Public Accounts Committees. The UK will continue to support the Territories to comply with good international audit practice and with international financial control standards. The FCO, Commonwealth Secretariat and the Commonwealth Parliamentary Association UK are working in partnership to support members of public accounts committees and staff of audit bodies in the Territories.

Tax Systems and Revenue Base

Most Territories rely on two or three main business sectors and on a narrow tax base made up of specific transaction and consumption taxes (in most Territories there is no income tax or sales tax). This approach can work well during periods of economic growth as governments earn revenue from customs duty on imports and stamp duty on property transactions. However, revenue can fall significantly during an economic downturn.

A number of Territory Governments have work underway to broaden their revenue base by, for example, introducing a value added tax. There is no one approach that is right for all Territories, but it is important for economic resilience to ensure that the revenue can be collected; that the distortionary impact of revenue measures on the economy is limited; and that the revenue base is sufficiently broad to reduce the size of swings in revenue to government during the economic cycle.

The UK Government respects the right of Territory Governments to compete on tax. The fiscal autonomy of the Territories means that relations between Territories and the UK in tax matters are in many ways similar to those between any other competitive tax systems.

The UK Government and Territory Governments have common interests in complying with international standards of tax co-operation. This is an important part of the good governance of the Territories and their international reputation rests considerably on their compliance with such standards. HM Treasury and HM Revenue and Customs welcome the significant progress the Territories have made in recent years.

Meeting International Standards of Tax Co-operation

All Territories with a financial services industry have met the internationally agreed minimum standard of 12 Tax Information Exchange Agreements. Some Territories have gone considerably further than this and are continuing to negotiate and conclude additional Agreements.

Seven Territories are members of the Global Forum on Transparency and Exchange of Information for Tax Purposes and represent themselves in its discussions.

The Peer Reviews undertaken by the Global Forum show considerable progress made by the Territories with all those reviewed having successfully moved to Phase II of the process.

Borrowing

It is important for Territory Governments to keep borrowing under control. The need to exercise discipline on borrowing is particularly important to ensure the economic resilience of the Territories because of the structure of their economies and the limited macroeconomic tools available to Territory Governments. (Territory Governments do not, for example, set their own interest rate policy and, even where currency depreciation is technically feasible, it would be of little or no value given the nature of the Territories' economies).

Financial Reserves

Building financial reserves during good economic times is a particularly important contributor to economic resilience. A healthy level of reserves helps Territory Governments maintain public services and capital expenditure throughout the economic cycle and creates room for countercycle fiscal policies.

Tackling Corruption

The UK is committed to taking strong action to combat corruption and expects the Territories to do so too.

Bribery must have no place in British business, at home or abroad. The UK Bribery Act 2010 provides a robust legal framework to combat bribery in the UK and internationally. It applies to British citizens including in the Territories. The UK is also committed to implementing international standards, such as the UN Convention Against Corruption and the OECD Anti-Bribery Convention. The UK expects the Territories to adhere to relevant standards and to put the necessary legislation in place so that these Conventions can be extended to them.

In July 2009 a Commission of Inquiry led by Sir Robin Auld identified a high probability of systemic corruption in government and the legislature and among public officers in the Turks and Caicos Islands. This led to the suspension of Ministerial government and the Legislative Assembly and a programme of systemic reform. In June 2012 the UK Government announced that significant progress had been made on eight milestones set for a return to democratic government and on putting in place robust financial controls and that elections would be set for November 2012. We expect the Turks and Caicos Islands government to continue to implement and consolidate these reforms. We are determined that the evidence of corruption and maladministration revealed in the Turks and Caicos Islands is never repeated, there or in any other Territory. The UK Government will take firm and resolute action wherever there is evidence of corruption or maladministration in a Territory.

Priorities for Action

- > monitor and report progress on good governance, public financial management and economic planning.
- > continue to develop democratic institutions that serve and take account of the interests of all the people in the Territories.
- > take necessary action to safeguard fundamental rights and freedoms and tackle discrimination.
- > ensure effective justice systems.
- > strengthen public service, including through increased secondments between the UK and the Territories.
- > manage public finances sustainably.
- > strengthen assurance that public spending delivers overall value for money.
- > take action wherever there is evidence of corruption or maladministration, and work to bring in anti-bribery legislation and to sign up to the relevant international Conventions.

5: Vibrant and Flourishing Communities

Overview

The UK Government cherishes and celebrates the rich diversity of community life in the Territories and works with Territory Governments to build vibrant and flourishing communities. Community cohesion is particularly important in small and remote island communities.

Each Territory has a vision for its own development, its own priorities and makes its own choices about the role of government in building communities through decisions on the education of children and the care of older people, the sick and disadvantaged.

This chapter focuses on engagement between the UK and the Territories in the areas of education, health, work and pensions, local government and culture, media and sport. The UK Government provides substantial support for education and health services in those Territories supported by the UK international development programme – currently Pitcairn, St Helena and Montserrat. The UK Government also provides technical advice and support to the Territories individually and on a cross-cutting basis. UK Departments and their agencies and professional bodies provide technical advice in their areas of expertise, helping Territories improve services and meet international standards.

Education

The UK Government and the Overseas Territories share a vision of building well-educated societies in which opportunity is more equal for children and young people no matter what their background or family circumstances. This means raising standards of educational achievement and closing the achievement gap between rich and poor. Respondents to the UK Government's public consultation on the Overseas Territories strategy in 2011 identified education as one of the main areas where the UK could provide further assistance to the Territories. All the populated Territories have systems that provide free public education at primary and secondary levels. Education is a priority for the UK development programmes managed by the Department for International Development (DFID) in Pitcairn, St Helena and Montserrat.

Education in Pitcairn

In Pitcairn, the 10 children of school age are taught in Pulao School. The school follows the New Zealand curriculum and the teacher is also recruited from New Zealand. The school delivers both primary and secondary education. Two students are currently being funded to complete their senior secondary education in New Zealand.

DFID is supporting improvement in the quality of teaching and learning including through teacher training and the development of partnerships between the Territories and the UK. St Helena has a partnership with Shropshire which involves school linking and professional development for teachers, while Montserrat had a partnership with the Isle of Wight. Distance education plays an important role in providing access to learning opportunities in isolated communities. DFID funds have enabled broadband internet access for schools and adult education in St Helena in order to assist in building the skills necessary for development.

Rebuilding the Education System in Montserrat

The destruction and depopulation caused by the eruption of the Soufriere Hills volcano in 1995, and the resulting move to the north of the remaining population, severely affected the education sector in Montserrat. Since the eruption DFID has helped Montserrat re-establish its education system. The island now has two government primary schools and two private fee paying schools (both run by churches), one secondary school, a community college, and an extra mural campus of the University of the West Indies, offering direct and distance learning courses. In total, Montserrat caters for about 480 primary school students and about 350 secondary school students. Sixth form work, nurses training and trades classes are held at the community college.

The UK Department for Education is responsible for primary and secondary education in England. The Department for Education provides support to the Territories in specialist areas.

"Education underpins the foundation of any society and is an important issue for the Territories. My Department has a lot of experience and expertise that it is happy to share with the Territories. We understand the importance of the Overseas Territories to Britain and equally understand the role education can play in bringing about economic wealth and social prosperity and maintaining political stability in the Territories."

Sarah Teather MP, Minister of State for Children and Families, Department for Education The Department for Education helps support improvement in education systems and children with special needs.

The Department's Central Information Officers Group, which initiates and maintains the departmental ICT infrastructure, including contract management and electronic documentation and records, is providing advice to the Government of Bermuda.

The Department is working with the Director of Education on St Helena on the potential use of synthetic phonics in teaching St Helena children reading.

The UK is a world leader in provision for Special Education Needs. The Department is supporting the British Virgin Islands with the development of improved services for children with special needs, focusing in particular on helping children with autism.

More information about the Department for Education's work with the Overseas Territories can be found at https://www.education.gov.uk/publications

Several populated Territories have established colleges that provide tertiary education, which is a local responsibility in all Territories. Bermuda provides a good example. Although it has the Bermuda College (equivalent of day-school US junior college), it has no university so the Government of Bermuda encourages those wishing to attend universities in the UK, the US and Canada and in many cases grants scholarships to them. Bermuda is now seeing the long term benefits of these policies with the 2010 Census there revealing that 29% of the population had received a university education.



Children's tennis group, Anguilla Tennis Academy Credit: Government of Anguilla

The Department for Business, Innovation and Skills is responsible for tertiary education in England. Students from the Territories are encouraged to study in the UK and only pay the same fees as UK students at English Universities rather than the higher rate for overseas students. Territory students are entitled to full student support on the same basis as UK students if they have lived in the UK for the three years prior to the course. In 2010/11 there were 1,295 students from the Territories studying in the UK at under-graduate level and a further 305 at postgraduate level.



Montserratian Chevening scholar Michael Skerrit visits the Foreign Office, London Credit: Tony Bates

The FCO runs the Chevening scholarship programme to provide outstanding graduates and young professionals from across the world with the opportunity to study at UK universities. Since 1984 some 93 scholarships have been awarded to students from the Territories. In 2010/2011 two scholarships were awarded to students from Anguilla and Montserrat. There are many examples of successful scholars returning to the Territories to excel in their chosen careers in government, private business, or civil organisations.

Health

The Territories have their own health care systems that are separate from the UK National Health Service (NHS). There is a wide range of healthcare systems in the Territories reflecting their diverse situations and traditions. There are examples of health care funded through tax revenue, social insurance and private insurance. Most Territories have a mix of public and private health care providers. Health care services in the smallest and most remote Territories are very limited and seriously ill patients sometimes have to make long and difficult journeys overseas for treatment. Even in the most populous Territories some specialist services are provided by visiting specialists or by sending patients to specialist units overseas.

Territory communities are continuing to develop their healthcare systems. These need to remain true to their values but develop so they are fit for the future and ensure the available resources deliver the best possible outcomes.

Reform of Healthcare in the Turks and Caicos Islands

The opening of the Blue Hills Primary Healthcare Clinic on 10 February 2012 was evidence of a shift in healthcare investment from hospitals to primary healthcare facilities that provide residents with preventative, holistic and patient-centred care. Initial services included Antenatal, Child Health and Family Practice Clinics and various healthy lifestyle and health promotion programmes. In welcoming this development, Permanent Secretary in the Ministry of Health Judith Campbell said:

"The Ministry plans to place increased focus on this area moving forward. We believe community clinics should be a first stop for persons seeking health care. This way we can focus on prevention and early treatment and reduce future expenditure on secondary health care. The community clinics will allow the major hospitals on Grand Turk and Providenciales to better fulfil their purpose of providing secondary health care."



Governor Ric Todd tries the Primary Healthcare facilities at Blue Hills Clinic for himself. His blood pressure is being taken by Nurse Douglas.

The UK Department of Health provides assistance to the Territories as part of its objectives to improve global health and to ensure the UK's international health obligations are met. The Department represents the Territories at regional and international meetings, including those of the World Health Organisation, and works with DFID and other partners to help the Overseas Territories to:

- > manage their health sectors sustainably;
- > influence and maximise the impact of regional health organisations and initiatives;
- > be better prepared for, and able to manage, emergencies; and
- > fulfil international responsibilities to which the UK has committed, such as International Health Regulations.

"Access to good quality healthcare is a key element in sustaining a vibrant and flourishing community. In 2010 the Department of Health produced a report outlining support to the Overseas Territories, which stimulated thinking about how we could best work together to address health challenges and improve healthcare provision. We remain committed to maximising the effectiveness of support provided by the Department, as well by other government departments and regional bodies."

> Anne Milton Parliamentary Under-Secretary of State for Public Health, Department of Health

The UK Government assists the Territories by providing a number of referrals, per year, for NHS treatment. Typically, this is high level elective treatment that is not available in the Territories. In addition, the UK has bilateral agreements with some Territories that allow for the provision of free emergency treatment to be given to temporary visitors from the UK to those Territories and vice versa.

Support for Mental Health Services

The Department of Health is working with Health Action Partnerships International (HAPI) to help the Territories provide proper support for people with mental health problems. Some Territories have limited capacity to provide appropriate treatment. A project is being developed with the Royal College of Psychiatrists for a partnership to provide longer term peer support, exchange and training for the different professionals. The UK and Territory Governments work together to implement the internationally agreed standards (the International Health Regulations) for detection, assessment and response to public health threats that have the potential to cross borders and threaten people worldwide. These Regulations provide the framework for reducing risks from diseases with potentially serious epidemic potential such as Influenza, Polio, Cholera and Yellow Fever. The Department of Health is working with DFID and the Health Protection Agency (HPA) to assist the Territories to reach the necessary standard of compliance. More information about the Department of Health's work with the Overseas Territories can be found at www.dh.gov.uk

Pandemic Flu

Pandemic influenza presents potential challenges for the Territories, just as it does for the rest of the world. Some of the Overseas Territories confirmed cases of H1N1 in the 2009 pandemic. The Department of Health made available both antiviral medicines and pandemic vaccines to the Territories during the pandemic at cost price, and there are arrangements in place to ensure supplies are available in any future such emergency.

DFID's budgetary aid and development assistance to St Helena, Montserrat and Pitcairn includes support to the health and social welfare sectors aimed at introducing and facilitating reforms and improving the quality of service provision. Pitcairn, St Helena and Tristan da Cunha receive financial aid to help them recruit essential staff resources in the health sector.

DFID has supported the Territories on a crosscutting basis to develop their capacity to deal with specific public health challenges. A recent DFID project helped the Territories develop the capacity to deal with sexual and reproductive health issues and HIV, focusing on building the necessary skills in the Territories and linking them with regional and international resources.

Work and Pensions

Territory Governments face many and varied challenges in helping people find work that enables them to support themselves and their families and in ensuring that the most vulnerable in society are protected. Territory Governments are responsible for creating welfare systems that tackle poverty and incentivise work. Some of the Territories face challenges of an ageing society and providing for people in retirement. All Territories are working to provide opportunity, choice and independence to enable disabled people to take an equal role in society. Employment issues were identified as priorities by a fair number of respondents from the Territories to the public consultation in 2011.

Employment Challenges in Tristan da Cunha and Pitcairn

In most countries Governments spend time, money and effort trying to provide employment for their people. But in the South Atlantic Territories the reverse is true. The islands have near full employment and in the smaller, more remote islands, many people, of necessity, have multiple roles. An example is the Tristan da Cunha Chief Islander who has to juggle his responsibilities within the Island Council with jobs operating heavy machinery in the Public Works Department and acting as Fisheries Observer for the Fisheries Department.

The size of the population on these islands means that there are not enough people to do all the essential tasks and so it is essential that the community works together to ensure that things are done. In Tristan (population less than 300), the lobster fishery is vital and civil servants take leave of their day jobs on good fishing days to ensure a good catch for the island. On Pitcairn (population less than 60) most people have a number of Government jobs which they have to balance with the need to trade with passing ships; and by internet sales; and to make products for sale. The UK Department for Work and Pensions supports the Territories on a number of policy issues. The Department supports the Territories adopt international standards, including advising Territories on the legislation they need to comply with International Labour Organisation (ILO) Conventions.

"We recognise the difficulties that small territories face in dealing with issues such as employment and health and safety. We will continue to provide advice and support where needed."

> Chris Grayling Minister for Employment Department for Work and Pensions

The Department is responsible for paying UK state pensions to eligible citizens in the Overseas Territories. Improvements to the payment system have recently been announced so that these will be made into a bank account in the local currency wherever possible.

The International Pension Centre (a part of DWP) is able to provide support and help for those people who are planning or already have their pension paid to them overseas (their contact details can be found under "Britons living abroad" at: www.Direct.gov.uk).

The UK Government pays an annual increase to some overseas pensioners depending on where they permanently reside. Territory Governments have asked that the UK Government consider extending such pension arrangements to all the Overseas Territories.

More information about the Department for Work and Pensions' work with the Overseas Territories can be found at www.dwp.gov.uk

Offshore Oil Exploration Safety

The Health and Safety Executive is providing support to the Falkland Islands Government to develop health and safety legislation for its offshore oil and gas activities. The support includes: policy advice; offshore safety case assessment; investigations; and inspections of the installations involved. The support is paid for by the Falkland Islands Government.



Falklands Islands oil exploration Credit: Falklands Islands Government

Local Community and Government issues

"For our Overseas Territories, we at the Department for Communities and Local Government can offer a vital and valuable resource of knowledge and skills, which cover important, wide-ranging issues. Whether advising on improving fire safety, ensuring the delivery of good quality homes that neighbourhoods need or implementing an effective planning system, this Department has a long history of providing support and expertise to the Overseas Territories and I am determined to see this important link continue for years to come."

> Grant Shapps, Housing and Local Government Minister, Department of Communities and Local Government

On 16 March 2011 the bulk carrier MS Oliva ran aground on Nightingale Island, Tristan da Cunha. Although no lives were lost, the vessel quickly broke up, releasing heavy fuel oil and its soya bean cargo. Nightingale is the home of internationally protected bird species, nearby Inaccessible Island is a World Heritage Site and both form part of the lobster fishing grounds on which the Territory depends. Faced with potential economic and ecological disaster the islanders showed exceptional resilience and cohesion as they worked together with professional teams in dealing with the aftermath. Tristan islanders were involved in rescuing and sheltering the ship's crew and threw themselves into salvage efforts, the environmental clean-up operation and attempts to rehabilitate nearly 4000 oiled penguins rescued from the scene.



Wreck of MS Oliva, Nightingale Island, Tristan da Cunha Credit: Tristan da Cunha News



Cleaning oil off penguins after the spillage from the MS Oliva, Tristan da Cunha Credit: Tristan da Cunha News

Territory Governments need to respond to people's housing aspirations and the desire of communities to shape the places in which they live. Territory Governments are responsible for running effective planning systems that balance different interests, are transparent and support sustainable and eco-friendly economic growth and development.

The Department for Communities and Local Government provides advice and guidance to Territory Governments in areas where it has expertise – in particular planning, housing, and fire safety and rescue services. More information about the Department's work with the Overseas Territories can be found at www.communities.gov.uk

The Local Government Association supports, promotes and improves local government in the UK and is building partnerships with Territories to help them harness knowledge and expertise of UK local government. The Local Government Association has organised leadership and human resources management training for the Falkland Islands Government and advised the Turks and Caicos Islands Government on setting up an Integrity Commission to help restore public confidence in those in public service. The work of the Local Government Association is especially valuable because many of the practical challenges facing Territory Governments are issues which in the UK are dealt with by local government. The Local Government Association also helps build long term partnerships between Territories and local government in the UK. More information about the Local Government Association's work with the Overseas Territories can be found at www.communities.gov.uk/ localgovernmentassociation/

British Virgin Islands and Hertfordshire Build a Partnership

At the Overseas Territories Consultative Council in November 2011 the Premier of the British Virgin Islands and the Deputy Leader of Hertfordshire County Council signed a Memorandum of Understanding to foster engagement and share best practice, skills and business contacts between the public service and private sectors in Hertfordshire and the British Virgin Islands.

In January 2012, the BVI Education Minister met Hertfordshire County Council education officials to discuss the development of policies and training to enhance the education system in the Territory, particularly in the areas of special needs education, technical and vocational education and training, strategic education planning, school governance and educational leadership.



Premier of the British Virgin Islands, Dr Hon Orlando Smith and the Deputy Leader of Hertfordshire County Council signing a Memorandum of Understanding on mutual co-operation, London, November 2011 Credit: Tony Bates

Culture, Media and Sport

Her Majesty The Queen's Diamond Jubilee and the London Olympics make 2012 a unique year in which to celebrate the links between the UK and the Territories. The elected leaders of the Territories have been invited to attend the celebrations in the UK over the Diamond Jubilee weekend. Many Territories will be lighting Beacons that weekend to mark the Jubilee. Citizens of the Overseas Territories will also be eligible for the Diamond Jubilee medal in line with the agreed eligibility criteria. The UK Government recognises the diverse cultures of the Territories that span the globe and the special nature of their links with the UK. Every Territory is proud of its local culture and passionate about its sporting achievements. Territory Governments work to enable everyone to enjoy these and to create the conditions which encourage the growth of creative, communications, cultural, tourism and leisure businesses.



Masked dancers performing on St Patrick's Day, Montserrat, 2011 Credit: Tony Bates

The Department for Culture, Media and Sport (DCMS) supports the Territories by sponsoring museums that provide access to material from the Territories; representing their interests internationally; and providing advice on issues relating to electronic communications, gambling, and sport. "I firmly believe that it is vital for our Overseas Territories to be vibrant and flourishing communities, proudly retaining aspects of their British identity and generating wider opportunities for their people. My Department currently works in a number of ways to support the people of our Overseas Territories, including in the fields of communications, culture, and sport, and we will work to build on those links in the future."

> John Penrose Minister for Tourism and Heritage Department for Culture, Media and Sport

More information about the Department's work with the Overseas Territories can be found at www.culture.gov.uk

Museums

The Department for Culture, Media and Sport sponsors a range of national museums, which provide free access to a wealth of inspiring objects representing heritage from Britain and from around the world. Many of our museums hold material from the Overseas Territories.

The Overseas Territories in British Museums

The **National Maritime Museum** holds charts, manuscripts, photographs, paintings, coins and maps from a large number of the Territories. They include whaling station furniture from South Georgia & the South Sandwich Islands, material relating to the Bounty mutiny and Pitcairn Island and material from the time when Napoleon was on St Helena.

The **Natural History Museum** holds collections from nearly all the Overseas Territories, including corals and molluscs from British Indian Ocean Territory, Neanderthal fossils from Forbes' Quarry and Devil's Tower in Gibraltar and significant entomological collections from Anguilla and the Cayman Islands. Its library holds very significant collections of drawings, paintings, engravings and manuscripts from or relating to the Territories.

The **Imperial War Museum** has exhibitions and learning programmes about the Falklands War. Their film collection includes scenes from Anguilla after the British landing in March 1969, footage of HMS Southampton in Montserrat after the volcanic eruption in August 1995 and aerial views of the British Antarctic Territory. Their sound archive includes material from Montserrat and the Sovereign Base Areas on Cyprus. They have books, photographs and other material from Bermuda, the Cayman Islands, the Falkland Islands, Gibraltar, British Indian Ocean Territory and the British Virgin Islands. The **British Library** has remarkable images – engravings, maps, stamps and views – relating to the Overseas Territories which can be seen in their Online Gallery. It has printed books, manuscripts, newspapers and maps from a range of different Territories. Its sound recordings include wildlife recordings from eight Territories, unique recordings of traditional music from Pitcairn Island and interviews from an oral history project in 2006 with islanders from Tristan da Cunha. The British Library holds 168 volumes of records relating to St Helena between 1676 and 1836, when the island was administered by the East India Company. It also holds philatelic material for all of the Territories except Anguilla and the Sovereign Base Areas on Cyprus.

National Gallery of the Cayman Islands

Established in 1996, the National Gallery of the Cayman Islands is a vibrant arts organisation that promotes and encourages the appreciation and practice of the visual arts in the Cayman Islands through exhibitions, artist residencies, education/outreach programmes and research projects. Their programmes aim to capture every age group in the community from the youngest pre-schoolers to senior citizens.

After a series of temporary sites the National Gallery moved into its permanent home in January 2012. This new centre, the capital cost of which was funded almost entirely by the private sector, permits the National Gallery to consolidate its programmes under one roof for the very first time.

This centre is a state-of-the-art civic resource, providing a home for schoolchildren, teachers, researchers, artists, archivists, seniors and students of all ages and space for artists to exhibit the very best of Cayman's cultural production.



Opening of the Cayman Islands National Art Gallery Credit: David Wolfe Photography

World Heritage

The Department for Culture, Media and Sport is responsible for the UK's compliance with the UNESCO World Heritage Convention, which the UK ratified in 1984. The UK currently has 25 World Heritage Sites: an additional three are in Overseas Territories: the Town of St George and related fortifications in Bermuda; Gough and Inaccessible Islands (Tristan da Cunha); and Henderson Island (Pitcairn).

Every six years, the signatories to the Convention are invited to submit a report to UNESCO covering the state of conservation of the World Heritage properties located on its territories. The Department submits these on behalf of world heritage sites in the Overseas Territories and represents them at meetings of the World Heritage Committee.

The Department is also responsible for nominating sites for world heritage status. Governments put forward new sites from a Tentative List of Future Nominations. Each Tentative List is expected to last for approximately ten years. Following a public consultation and review process, the Department announced the new UK Tentative List in March 2011. There were eleven sites on the list, three of them in Overseas Territories:

- > Gorham's Cave Complex, Gibraltar This complex is of international importance because of the long sequence of occupation and the evidence for the end of Neanderthal humans, and the arrival of modern humans.
- > The Island of St. Helena This site has a high number of endemic species and genera and a range of habitats, from cloud forest to desert, representing a biome of great age which exists nowhere else on earth.
- > Turks and Caicos Islands The islands have a high number of endemic species and others of international importance, partially dependent on the conditions created by the oldest established salt-pan development in the Caribbean.

The Expert Panel that reviewed the List also suggested that the Fountain Cavern in Anguilla could be considered for the UK Tentative List in the future as part of a possible transnational nomination.



Giant tortoise on St Helena Credit: Chrystele Todd

The UK National Lottery

The UK National Lottery is the most cost efficient in Europe and has so far raised £27 billion for Good Causes. Some 28% of Lottery revenue is distributed to Good Causes through a number of distributing bodies which support sport, the arts, heritage and communities. The Lottery cannot currently be played in the Territories. However, distributing bodies, which make their funding decisions independently of Government, can make grants to support good causes in the Territories to organisations based in the UK and working in the Territories, where applications meet the relevant criteria and the distributors have the legal vires to do so.

Sport

DCMS provide support to the Territories to combat drug use in sport. In line with commitments under the UNESCO Anti-Doping Convention the UK has set up an organisation to provide education and testing and is taking measures to restrict the availability of banned substances and withhold funding from non-compliant sports and athletes. Territory Governments are responsible for setting up and implementing their own programmes. UK Anti-Doping, an arm's length body of DCMS, is responsible for the implementation and management of UK antidoping policy and works to support the Territories to comply with these requirements. The UK successfully applied on behalf of the Cayman Islands for US\$4,000 from the UNESCO Fund for the Elimination of Doping in Sport to fund an anti-doping awareness workshop.

The Overseas Territories and the Olympics

In 1996 the International Olympic Committee (IOC) amended its Olympic Charter to define 'country' to mean 'an independent state recognised by the international community', as the basis for determining applications for National Olympic Committees (NOC). Bermuda, the Cayman Islands and the British Virgin Islands had all been recognised by the IOC before this date and are therefore the only three Territories that have their own Olympic teams. All three will be sending teams to the London 2012 Olympics.

Any individual from Territories not recognised by the IOC, who holds a valid British passport, is eligible to compete for the Great Britain Olympic Team (Team GB) provided that: a) they are affiliated to the relevant British National Governing Body of sport (NGB) which is a member of the BOA; and in turn is affiliated to the appropriate International Federation of that sport; and b) they meet the Olympic qualifying standards for their chosen sport.

Shara Proctor of Anguilla, a 23-year-old long jumper, made her debut at the European Team Championships in June 2011 representing Great Britain, where she took third place with a jump of 6.6m. In March 2012 she broke the British indoor record with a long jump of 6.89 metres.

Priorities for Action

- > continue to provide development assistance to Territories in need.
- > improve education systems and encourage and enable students to study in the UK.
- > build sustainable healthcare systems and prepare for health emergencies in line with international obligations.
- > encourage employment and ensure the most vulnerable members of society are protected.
- > build partnerships between the Territories and UK local government.
- > celebrate and cherish the cultural heritage of the Territories and support participation in international sporting events.

The Overseas Territories
6: Productive Links with the Wider World

Overview

Realising our vision for the Overseas Territories in an increasingly interconnected world requires active engagement with other states and international organisations. The UK Government is responsible for the external relations of the Territories but we encourage Territory Governments to play an active role in building productive links with the wider world. A number of responses to the public consultation suggested that the UK and Territory Governments could do more to work together to harness international support for the Territories.

The Territories have a special relationship with the EU because of the UK's membership. Many of the Territories have privileged access to the EU market which creates opportunities for trade, investment and the development of beneficial business links. The EU provides substantial financial and practical support to some Territories through a range of assistance programmes.

The Territories are part of the Commonwealth through their connection to the UK. The UK Government wants to strengthen the links between the Commonwealth and the Territories. The Commonwealth family includes many small island nations and provides a wealth of opportunities to exchange experience and build practical co-operation on issues of common interest. The UK Government encourages the Territories to engage directly with regional groups as appropriate, including the Caribbean Community (CARICOM), and the Pacific Community.

Where the UK Government is leading internationally on issues of concern to the Territories we will make every effort to ensure the Territories are consulted and their interests defended. Where it is appropriate we will continue to include representatives of Territory Governments as part of UK delegations.

We will similarly encourage as appropriate the Territories to engage directly with other international bodies including the UN. We will continue to support the Territories to represent their own interests in the financial services and tax arena, including in the Global Forum and the Caribbean Financial Action Task Force and in other international fora.

The UK Government expects the Territories to use attendance at international fora productively, use international assistance effectively and live up to their international commitments.

European Union



When the UK joined the European Union in 1973 special arrangements were made for the UK's non-European Overseas Territories in line with those already in place for French and Dutch Territories. This special relationship with those Territories is aimed at promoting their economic and social development and helping them establish closer economic relations with the EU as a whole. As a result of this association those Territories have been able to benefit from preferential trade arrangements and direct financial assistance.

The Overseas Association Decision (OAD)

Part 4 of the Treaty on the Functioning of the EU and an EU Decision govern the relationship between the Territories and the EU. The current Decision is due to expire at the end of 2013. We will work with the Commission and the Overseas Territories to build on the benefits of the current Decision further to improve the quality and standard of living in the Territories. The new Decision should ensure that adequate funding and trade provisions remain and include an acknowledgement of the unique environment found in the Territories. Gibraltar and the Sovereign Base Areas are excluded from this arrangement because they are located within Europe, and their relationship with the EU is dealt with separately. Bermuda is not included in the current Decision by choice, but is considering whether they want to be included in revised arrangements.

Under the OAD, Territories benefit from quota free and duty free access to European markets as well as preferential Rules of Origin. We want EU policy to foster greater trade and economic co-operation both amongst the Territories subject to the OAD, and with neighbouring countries. Although EU law does not in general apply in the non-European Territories it can sometimes impact on their economies. We will give those Territories as much notification as possible of proposed EU legislation which might have an effect on them. Public servants at the UK Representation in Brussels and across Whitehall look out for policies that might impact on them.



Falklands trawler John Cheek unloading frozen fish at Stanley, Falkland Islands Credit: Falklands Islands Government

Gibraltar and the European Union

Although Gibraltar does not form part of the UK it is within the European Union as part of the UK's membership by virtue of Article 355(3) of the Treaty on the Functioning of the European Union.

Under the terms of UK membership of the EU, certain parts of the Treaty do not apply to Gibraltar. As a result, Gibraltar has exemptions from four main areas of EU policy: the Common Customs Territory and Common Commercial Policy (thus although EU rules on free movement of services apply to Gibraltar, rules on the free movement of goods do not); the Common Agricultural Policy; the Common Fisheries Policy; and the requirement to levy VAT. Gibraltarians are British Nationals for EU purposes and have rights of free movement within the EU.

While the UK Government is ultimately responsible under the Treaty for the implementation of EU law in Gibraltar, EU measures are implemented within the Territory by means of local legislation enacted by the Gibraltar Parliament or by subsidiary legislation.

Following a ruling by the European Court of Human Rights in 1999, the franchise for European Parliament elections was extended to Gibraltar by means of the European Parliament Representation Act 2003 and accompanying regulations. These measures provided for the creation of a new electoral region combining Gibraltar with the existing South West England constituency. The Gibraltar electorate voted for the first time in European Parliament elections in 2004. This did not change the constitutional relationship between the UK and Gibraltar.

EU helps the Falkland Islands' Fishing Industry

Preferential access to the EU market via Rules of Origin (RoO) laws, with derogations where required, has allowed the main export industry of fisheries to expand considerably over recent years in the Falkland Islands. This approximately US\$150m annual industry faces a remote and challenging environment with few economies of scale and considerable logistical difficulties. Without preferential access to the European market this industry would not be economically viable within the Falkland Islands.

The EU is a significant donor to the Territories. In the period 2008 – 2013 approximately €60 million is being allocated to programmes for the Territories from the European Development Fund (EDF). The richer Territories do not receive direct funding but benefit from regional programmes, such as support for small and medium sized enterprises in the Caribbean. Some of the Territories have struggled to access EU funding in a timely way. We want the Commission to continue to provide funding for the Territories that need assistance and to simplify procedures, reduce bureaucracy and speed up decision making, to enable the Territories to have easier access to these funds.

Participation in other EU programmes also increases the visibility of the Overseas Territories in Europe. Territories are eligible under the current Overseas Association Decision for funding from EU education and research programmes such as Leonardo da Vinci and Erasmus. We want these funding programmes to remain open to the Territories and for them to be eligible for other EU funding streams.

EU Money Helps Improve Access to St Helena, Ascension and Tristan da Cunha

Jamestown, the capital of St Helena, lies in a narrow valley and its wharf was subject to frequent rock-falls from unstable cliffs. EU funding has enabled cliffs to be stabilised and the wharf widened. The wharf, which provides the only access to the island, is now a safer place and can stay open in rough weather. EU funding also enabled the construction of a new passenger terminal building which provides a much more comfortable arrival for visitors wishing to sample the fascinating history and beautiful landscape of the island.



View of Jamestown, St Helena, from the sea Credit: Mark Lavaud

The harbour on Tristan da Cunha was in imminent danger of collapse. EU funding enabled emergency repair upgrading, thus keeping the world's most isolated inhabited island open for business. The EU has also funded vital improvements to the sea port and Wideawake airfield on Ascension.

The London based representatives from the British Territories play an important role in promoting Territory interests in Europe. We welcome and support this work. We also welcome a recent Territory initiative to support the establishment of a bureau to promote the interests of all the European Overseas Territories in Brussels and provide a central focal point for researching funding opportunities.

Commonwealth



The modern Commonwealth brings together all continents, almost two billion people, and all the world's major faiths. Its membership is based on common history, culture and values and includes many of the fastest growing economies in the world. It fosters business, civil society and parliamentary links.

The Territories are part of the Commonwealth through their connection to the UK. The Commonwealth family includes many small island nations and provides a wealth of opportunities to exchange experience and build practical co-operation on issues of common interest, such as governance, climate change and economic diversification. There are already a number of areas where the Commonwealth is working with the Territories.

The Territories have their own branches of the Commonwealth Parliamentary Association (CPA) and participate in the CPA's annual conference, as well as in the programmes and seminars they run. An important strand of CPA work is to support links between smaller states and the Territories. The Territories also have their own Commonwealth Games Associations, which means that they can send teams to the Commonwealth Games and participate, as observers, in the Commonwealth Sports' Ministers meetings that take place in the margins of the Games. Representatives of the Territories' civil society and business communities are invited to participate in the Commonwealth Youth, Business and People's Forums, which take place biennially ahead of the Commonwealth Heads of Government Meeting (CHOGM).

We will ensure that the Territories are consulted on future CHOGM agendas, and that they have the opportunity to feed in their comments, and we will continue to inform them of CHOGM outcomes. In addition, they are invited to attend other meetings such as the Commonwealth Finance Ministers' meeting as part of the UK delegation. We will continue to liaise with the Territories in advance of relevant Ministerial meetings so that their interests can best be represented.

The Territories are invited to join the Commonwealth of Learning, which works to improve access to open and distance learning opportunities for people in the Commonwealth's developing countries. Montserrat has recently joined the Virtual University of Small States of the Commonwealth.

The Territories already participate in the Malta-Commonwealth Third Country Training Programme which aims to strengthen skills and capacity in small states in areas where Malta has expertise, for example in banking and finance, and coastal management. As a result of our discussions with the Commonwealth Secretariat, the Territories will be able to use the Commonwealth Small States Office in Geneva, and have been invited to participate in the Commonwealth's 2012 Small States Conference. We will also work with the Commonwealth Secretariat to ensure that the Territories benefit from programmes specifically aimed at the Small States, for example on climate change risk management and the financial regulatory network initiative.

The UK wants to strengthen links between the Commonwealth and the Territories. We are exploring the possibility of creating observer or associate member status of the Commonwealth from which the Territories might benefit. Some Commonwealth bodies, such as the Commonwealth Foundation and Commonwealth Local Government Forum already offer associate member status. The Anguilla National Trust has received grants from the Foundation.

Pitcairn Islander Receives a Commonwealth Foundation Award

In 2011 Meralda Warren, a 7th generation descendent of the Bounty mutineers, became the first Pitcairn Islander to receive a Commonwealth Foundation Award for her work in rediscovering the traditional Pacific island art of making decorative bark cloths called tapa. This art had originally been brought to Pitcairn by Polynesian women taken on board the Bounty in 1789, but had died out.

Travel to and from this remote and isolated community is expensive and opportunities limited. The award allowed Meralda to accept an invitation to be the keynote speaker at the first Maori and Pacific Textile Symposium at the Te Papa Museum in Wellington. The award also provided Meralda with the opportunity to promote Pitcairn arts and crafts through workshops and an exhibition of her work.

Meralda is now passing on her skills and knowledge to others on Pitcairn. In particular to the children, some of whom have already produced some excellent examples of tapa cloth, beautifully painted with Pitcairn scenes. On receiving the award, Meralda said; "I am very honoured to be the first Pitcairn Islander to achieve recognition and support. It is my hope that this recognition will open doorways for future generations of Pitcairners so they too can make their dream a reality and aim for a positive future."



Meralda Warren, Commonwealth Foundation Award winner Credit: Meralda Warren

The United Nations



The Territories already interact with different parts of the United Nations, either in their own right or through the UK.

Territory representatives have joined UK delegations to special UN meetings and UN conferences, including the UN Conference on Women and the World Summit on the Information Society as well as UN meetings related to the situation of Small Island Developing States. The UK will continue to look for further opportunities for the Territories to attend relevant UN meetings.

Some Territories have particular relationships with some of the UN Specialised Agencies. The UK's membership of the Universal Postal Union (UPU) includes all the Territories that have their own postal systems. The Caribbean Territories are separate members of the World Meteorological Organisation (WMO) as they run their own meteorological network. They are able to cast their own vote and send their own representatives to WMO meetings in Geneva. The British Virgin Islands and the Cavman Islands are associate members of UNESCO. The Caribbean Territories and Bermuda participate in and contribute to the work of the World Health Organisation's regional body, the Pan-American Health Organisation (PAHO).

UN Decolonisation Committee

The UK believes that the UN's Decolonisation Committee (the C24) no longer has a relevant role to play in respect of our Territories. The British Territories on the Committee's list have a large measure of internal self-government and have all chosen to retain their link to the UK. In the UK's view, all our Territories should have been delisted a long time ago. Nevertheless, given that some Members of the UN wish to retain the Committee, some democratically elected Territory representatives wish to present their own positions directly to the Committee, and to the Fourth Committee of the General Assembly, at annual meetings of these Committees. The UK Government will continue to support this and these Territories' right to determine their own futures.

Regional Organisations in the Caribbean

The Caribbean Territories and Bermuda are full or associate members of a number of regional organisations including the Caribbean Community (CARICOM). We encourage these links. At our initiative the Territories were invited to the UK Caribbean Forum in January 2012 where they were able to discuss common concerns such as tackling organised crime and climate change with the independent Caribbean states. We believe that there is scope to increase co-operation with the Territories of France, the Netherlands and the US.

As already mentioned in Chapter 1 some of the Caribbean Territories are full members of the Caribbean Disaster Emergency Management Agency (CDEMA), a subsidiary of CARICOM, which supports its members in all aspects of disaster preparedness and response. The UK Government supports CDEMA's work.

How can Territories join International Organisations?

If an Overseas Territory Government wishes to enter into negotiations with an international or regional organisation, or to conclude a treaty with it, it requires the authority of the UK Government. Such authority can be given in the form of a specific or general entrustment (i.e. a letter to the Territory Government confirming that it can enter into negotiations and/or conclude a treaty). Before issuing an entrustment or agreeing to the conclusion of a treaty, the UK Government will consider whether the Territory is able to meet the obligations that membership of the treaty imposes. In recent years general entrustments have been given to the Cayman Islands, the British Virgin Islands and Montserrat as part of their constitutional reviews. Bermuda's 1968 General Entrustment was updated in 2009. These general entrustments give these Territories greater freedom to engage with regional organisations and governments across a range of issues.

Co-operation in the Southern Oceans

The populated Territories in the South Atlantic are too isolated geographically to benefit from regional organisations. The Falkland Islands, St Helena, Ascension and Tristan da Cunha have recognised that they can benefit from shared experience and have therefore organised themselves into the South Atlantic Co-operation Forum. This organises quarterly political meetings and expert level engagement on issues such as fisheries and tourism. The UK Government welcomes and supports this. The South Atlantic Territories form a regional system offering new strategic and economic opportunities for the future, including in respect of South Georgia & the South Sandwich Islands and the British Antarctic Territory where these opportunities are consistent with our international obligations within the Antarctic Treaty System.

The EU is funding collaboration between the Secretariat of the Pacific Community and Pitcairn to combat drought. Pitcairn Islanders are experiencing longer, more severe periods of drought. The effects can be devastating on many fronts, from crop production to drinking water consumption or for fire fighting purposes. The project is monitoring the weather on Pitcairn, and using this information to bolster the island's water catchment, storage, treatment and distribution systems.

Tristan da Cunha Develops Links with the Isle of Man

The most remote inhabited island in the world and the island which is home to the world's oldest parliament have been developing useful links. The Tristan da Cunha Chief Islander, Ian Lavarello, visited the Isle of Man in November 2011 as part of a study tour looking at the system of governance on the island. The Chief Islander gave a presentation about Tristan to the Tynwald and was able to investigate how the Isle of Man manages its fishing, agriculture and tourism industries along with sales of stamps and commemorative coins – all activities directly relevant to the Tristan economy. Building on these beginnings the two islands are now looking at possible options for further co-operation which might include nurse training and tourism development.

Priorities for Action

- > develop the Territories' special relationship with the EU, particularly in trade, educational and cultural links.
- > ensure EU support is continued, processes are simplified and assistance is used effectively, including through successful negotiation of the successor to the Overseas Association Decision.
- > strengthen engagement with the Commonwealth, particularly programmes for small states.
- > encourage co-operation with regional partners in the Caribbean.
- > develop with the South Atlantic Territories a long-term strategy which takes full advantage of the regional system stretching from Ascension to the Antarctic.

Conclusion

We have set out in this Paper the Coalition Government's overall approach to the UK's Overseas Territories. The Government is determined to live up to its responsibilities towards all the Territories. We have demonstrated our commitment through our actions over the past two years. All UK Government Departments have undertaken to engage with and support the Territories in their areas of expertise and competence. This Paper and the links to the Departments' own Papers set out the extensive work in hand. We have launched the construction of an international airport on St Helena. We have taken new initiatives to improve our stewardship of the rich environmental assets in the unpopulated territories. We are defending robustly Territories which face external threats.

We have made good progress, but much remains to be done. We will work with Territory Governments to implement priorities identified in this Paper in ways that are appropriate for each Territory. The agenda identified in this Paper will evolve as new challenges and opportunities emerge. We expect the relationships to continue to evolve. We hope this Paper will encourage wider interest in and support for the Territories, bringing in new ideas and enthusiasm. The Government is both ambitious and optimistic for the future of our Territories. We believe the UK is important to the future of the Territories and that the Territories are an important part of the future of the UK.



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Anguilla

General

Anguilla is the most northerly of the Leeward Islands in the Eastern Caribbean. It is a flat island with an area of some 91 sq km but limited natural resources. It has, however, one of the most important largely unbroken coral reefs in the Eastern Caribbean. Its coastal and marine biodiversity (including fish, seabirds and marine turtles) is the island's most important natural asset.

Government

Colonised by British and Irish settlers in 1650, Anguilla has had an eventful shared history with its neighbour St Kitts and Nevis and was administered at times as a single colony and an associated state with St Kitts and Nevis. The Anguillians, believing their interests were being ignored and wishing to retain their direct links with Britain, sought separation at various times in the 1950s and 60s. This disguiet culminated in what is known as "the Anguilla revolution" of 1967. Anguilla came under direct UK administration in the 1970s, and eventually became a separate British Dependent Territory in 1980. Government is executed through a Governor appointed by the Crown, an Executive Council which has the general control and direction of government, and a House of Assembly. The Governor has reserved powers in respect of legislation, and is responsible for external affairs, offshore finance, defence and internal security (including the police force) and aspects of the public service. The Executive Council consists of the Chief Minister, not more than three other Ministers and the Attorney General and Deputy Governor. The House of Assembly has 12 members. Elections are held every five years and last took place in February 2010.



Economy

Anguilla has built a reputation as a beautiful, safe, exclusive and high-end tourism destination. Tourism is the mainstay of the economy, although construction and financial services have also played roles in Anguilla's development.



Sandy Ground Bay, Anguilla Credit: Tony Bates

The international financial services industry has steadily grown over the last decade and Anguilla is now a major location for captive insurance vehicles – in 2010 it was ranked fifth in the world with 252 captives domiciled in the jurisdiction. The Financial Services Commission, the island's regulatory body, was established as an independent, self-funded statutory authority in 2004 and oversees all Anguilla's international financial services activities. Anguilla was assessed by the OECD Peer Review Group in 2011 and was successful in proceeding to Phase II of the assessment programme. Anguilla's anti-money laundering and counter-terrorist financing systems were assessed in 2010 by the Caribbean Financial Action Task Force for compliance against the recognised international standard. The Task Force ranked Anguilla among the best in the region.

Anguilla graduated from UK bilateral development assistance in 2003 and then experienced economic growth averaging 14% per annum between 2003 and 2007. The global downturn starting in 2008 hit Anguilla's economy and public finances hard. Recently the UK has provided technical assistance from a regional risk management allocation to help Anguilla effectively manage its public finances and improve the effectiveness and efficiency of delivering public services. Anguilla has one of the most important largely unbroken reefs in the Eastern Caribbean. Its coastal and maritime biodiversity is the island's most important natural feature. <</p>

> Currency	Eastern Caribbean Dollar
> Population	16,318 (estimated 2010)
> Capital	The Valley
> Government Website	http://www.gov.ai/



Bermuda

General

Bermuda, a group of over 130 islands and islets, lies 1,046 km east of the coast of North Carolina. The total land area is 54 sq km. The warming effect of the Gulf Stream makes Bermuda the most northerly group of coral islands in the world. Small surviving areas of natural habitat support 14 endemic plants and the Bermuda Cahow, the only endemic bird in Bermuda.

Approximately 65 per cent of the population are of African descent and the remainder of European extraction (including expatriates). Portuguese settlers from the Azores have been coming to Bermuda for about 150 years.



St Peter's Church in St George's, Bermuda is the oldest Anglican church in the world outside the United Kingdom. Credit: Tony Bates

Government

Bermuda is Britain's oldest territory and its Parliament, which first met in 1620, is the oldest legislature in the Commonwealth outside the British Isles. It is a largely self-governing territory with a high degree of control over its own affairs. The Governor retains responsibility for external affairs, defence, including the armed forces, internal security and the police. Bermuda has two legislative chambers, the House of Assembly and the Senate. The last General Election was held in December 2007.



Economy

Offshore finance (especially reinsurance) and tourism are the main pillars of the economy. There are more than 15,300 Bermuda-based international companies, 2650 local companies, 430 overseas partnerships and 940 other nonresident companies, many with a global business empire. They include subsidiaries of 75% of the Fortune 100 and their European equivalents. In insurance and reinsurance, Bermuda has an industry capital base exceeding US\$35 billion and gross premiums of US\$24 billion. It ranks with Lloyds of London and New York as a global leader. Tourism accounts for 15 per cent of Bermuda's overseas earnings. There are few natural resources and little manufacturing activity. ≫ Bermuda is Britain's oldest territory and its Parliament, which first met in 1620, is the oldest legislature in the Commonwealth outside the British Isles ≪

> Currency	Bermuda Dollar (parity with US\$)
> Population	64,722 (June 2011 estimate)
> Capital	Hamilton
> Government Website	http://www.gov.bm



British Antarctic Territory (BAT)

General

The British Antarctic Territory (BAT) comprises that sector of the Antarctic south of latitude 60°S and bounded by longitudes 20°W and 80°W. It is the UK's largest Overseas Territory covering around 1,700,000 sq km, but it has no permanent population. The UK has the longest established claim to territory in the Antarctic with letters patent having been issued in 1908. Territorial sovereignty in Antarctica is however held in abeyance by the Antarctic Treaty 1959, which provides an internationally agreed regime for the governance of the continent. For just over 50 years now, the Antarctic Treaty has preserved Antarctica for peace and science and is arguably one of the world's most successful international agreements.

The Government of the Territory, in consultation with a range of stakeholders, has developed an ambitious rolling five year strategy, which sets out objectives and funding priorities. The objectives include ensuring security and upholding British sovereignty; raising awareness of British interests in Antarctica; protecting the environment; and delivering effective administrative and financial governance. These objectives are underpinned by the overarching FCO objective to ensure that the UK plays an active and influential role in upholding the Antarctic Treaty System. This strategy, covering 2009-2013, is reviewed annually and is available through www.britishantarcticterritory.fco.gov.uk.

The Government of the Territory takes pride in ensuring that the historic leadership shown by the UK in early Antarctic exploration and scientific endeavour is matched today by rigorous and effective governance and international engagement across the whole range of Antarctic issues.

The UK's presence in the Territory is primarily provided by the British Antarctic Survey (BAS). BAS has three research stations within the



Territory; two year-round, Rothera and Halley, plus a further summer-only station, Signy. The work of the stations is supported by two Royal Research Ships, the Ernest Shackleton and James Clark Ross and a fleet of five aircraft. The UK is also represented each year in Antarctica by the Royal Navy. The current Ice Patrol Vessel, HMS Protector, made her maiden Antarctic voyage during the austral summer 2011/12. As well as supporting the work of the FCO and BAS, the Royal Navy ships carry out extensive hydrographic surveying work and perform important inspections, environment and logistics work. An additional presence is provided by a summer-only team from the UK Antarctic Heritage Trust which runs the historic base at Port Lockroy, the most visited site in Antarctica.

Government

In 1989 responsibility for administering the Territory was assumed by a Commissioner appointed by the Foreign Secretary. Previously it was a British Dependent Territory administered by the Falklands Islands (1962 – 1989) and a Dependency of the Falkland Islands (1908 – 1962). The Commissioner appoints such officers as the Chief Justice and Senior Magistrate, as required. He has powers to make laws, subject to certain conditions, and the BAT has a suite of its own laws, together with both judicial and postal administrations. Legislation enacted by the Territory is in line with, and implements, international regulations under the Antarctic Treaty System (i.e. the Antarctic Treaty and its Environmental Protocol, and the Convention on

the Conservation of Antarctic Marine Living Resources), as well as other relevant international instruments.

Antarctic Treaty Parties have recently agreed a new Annex to the Treaty's Protocol on Environmental Protection, which requires Antarctic operators to take all necessary remedial steps in the event of an environmental emergency. The UK is keen to be among the first to ratify the Annex, and is preparing a new Antarctic Bill that will be introduced as soon as Parliamentary time allows, both in recognition of the environmental importance of the Territory and as part of our continuing leading role in the Antarctic Treaty System.

Economy

The Territory is self-financing; generating revenue primarily from the sale of stamps and coins and income tax from overwintering British Antarctic Survey scientists and others. The majority of British Antarctic Territory revenue is reinvested in projects which support the BAT strategy – focusing on protecting the environment, conserving British heritage and education and outreach.

Environment

Environmental protection is an integral part of the Territory's strategy and amongst its highest priorities: the Antarctic Peninsula is one of the fastest warming, and therefore most rapidly changing, places on the planet.



Iceberg formations, Ronge Island, British Antarctic Territory Credit: Paul Stansfield

We are working to develop a better understanding of the Territory's environment and to develop and implement the best Antarctic environmental practices. In addition, we are enhancing our expertise on tourism management and minimising human impact, along with identifying and developing protection and conservation measures for flora and fauna across the Territory. We are also proactively managing key Protected Areas in the Territory, identifying future environmental challenges (including climate change), and developing mitigation measures.

the Antarctic Peninsula is one of the fastest warming, and therefore most rapidly changing, places on the planet <</p>

> Number of visitors	26,000 (2010/11)
> Indigenous human population	0
> Number of penguins	20 million pairs (estimate)
> Administration centre	London (largest British science base in the Territory is Rothera Research Station)
> Government Website	http://britishantarcticterritory.fco.gov.uk/en/



British Indian Ocean Territory (BIOT)

General

BIOT is close to the very centre of the Indian Ocean, mid-way between Tanzania and Indonesia. Its nearest neighbours are the Maldives and Sri Lanka. The Territory covers 640,000 sq km of ocean (more than twice the size of the UK) but the land area is only 60 sq km. The largest and most southerly of some 55 islands, Diego Garcia, accounts for more than half the land area. The other islands are very small, none larger than Hyde Park.

The islands were uninhabited until the late 18th century. The French established coconut plantations using slave labour in 1793. After emancipation, many slaves became contract employees and remained on the islands. They were then referred to as llois but are now usually known as Chagossians.

The islands of the Chagos Archipelago have been British territory since 1814 when they were ceded to Britain with Mauritius (which then included the Seychelles). For administrative convenience, and following the French practice, they were administered as a dependency of Mauritius until 1965 when, with the full agreement of the Mauritian Council of Ministers, they were detached to form part of the newly established colony of the British Indian Ocean Territory. At the same time Britain paid £3 million to Mauritius in consideration of the detachment of the islands. Three other island groups, formerly part of the Seychelles, made up the rest of the Territory, but these were returned to the Seychelles when it gained independence in 1976. The Government of Mauritius claims sovereignty of the Territory. The UK does not recognise this claim but successive governments have given undertakings to the Government of Mauritius to cede the Territory to Mauritius when it is no longer required for defence purposes.



In 1966 the UK agreed with the US to make the BIOT available for the defence purposes of the two countries. The Crown purchased the freehold title to the land in the islands in 1967. The copra plantations were run down as their commercial future was already unviable, and the last of the contract workers and their children left the Territory in 1972/73. Successive British Governments have expressed regrets about the way resettlement was carried out. Britain made £650,000 available to the Government of Mauritius in 1973 and a further ex-gratia sum of £4 million in 1982 to the Ilois Trust Fund in order to assist the resettlement of the contract workers in Mauritius. The British Overseas Territories Act 2002 granted British citizenship to Overseas Territories citizens, including a large number of Chagossians. This gave them a right of abode in the UK. Some Chagossians have brought a case against the UK at the European Court of Human Rights for the right to return to BIOT and for further compensation.

The BIOT has no permanent population, only UK and US military personnel and the civilian employees of contractors to the military, who are mostly Filipino. The number of people on Diego Garcia varies significantly, depending on military needs. In early 2012 it was around 2,500. There are no inhabitants on the other islands. Access to the BIOT is restricted and a permit is required. There are no commercial flights to the BIOT and permits are only issued to yachts in safe passage. The British Indian Ocean Territory is not a tourist destination.

Government

The BIOT is governed by a Commissioner, Deputy Commissioner and Administrator based in the FCO in London. The Commissioner's representative in Diego Garcia is a Royal Navy commander who combines this role with his military duties as Commander British Forces.

The constitution of the BIOT is set out in the British Indian Ocean Territory Order 1976. The 1976 Order gives the Commissioner full power to make laws for the Territory. Two Orders in Council in 2004 provided that there is no right of abode and imposed immigration controls.

In the Territory, the Commissioner's representative holds the office of Magistrate and is responsible for handling routine cases and also, through his subordinate officers, for the enforcement of both the criminal law and laws regulating matters such as customs, immigration and conservation.

A series of exchanges of notes between the UK and the US regulates matters arising from the use of the Territory for defence purposes. The current agreement runs until 2016 and allows for a roll-over for a further twenty years.

Economy

There is no economy in the normal sense; and no industrial production or commercial agricultural activities. Since the declaration of the Marine Protected Area (MPA), no commercial fishing licences are sold.

The British military presence is funded by the Ministry of Defence.

The Commissioner proclaimed the BIOT Marine Protected Area (MPA) on 1 April 2010 to ensure the on-going protection of this unique environment of global significance. The BIOT MPA is currently the world's largest full no-take MPA. A Science Advisory Group was set up in 2011 to make recommendations on a science strategy for the Territory.

>> the Commissioner proclaimed the BIOT Marine Protected Area (MPA) on 1 April 2010 to ensure the on-going protection of this unique environment of global significance. The BIOT MPA is currently the world's largest. <<



Manta Ray, British Indian Ocean Territory Credit: Anne Sheppard



Cayman Islands

General

Discovered by Christopher Columbus in 1503 the three Cayman Islands (Grand Cayman, Cayman Brac and Little Cayman) are situated some 260 km north-west of Jamaica in the Caribbean Sea. The islands have an area of about 260 sq km. 'Cayman' comes from a Carib word for the marine crocodiles, once found on their shores. The vast majority of the population live on the largest of the three islands, Grand Cayman. English is the principal language.

Government

The present Constitution came into force on 6 November 2009 and provides for a Ministerial system of Government. The Governor retains responsibility for aspects of the public service, defence, external affairs and internal security including the police.

The Legislative Assembly comprises the Speaker, fifteen elected members and two ex-officio members (the Deputy Governor and the Attorney General). Elections are held every four years, most recently in May 2009. The Constitution also provides for a Cabinet consisting of the Premier, four other Ministers (rising to six when the number of Members of the Legislative Assembly increases from fifteen to eighteen) and the two ex-officio members of the Legislative Assembly. The Governor presides at meetings of Cabinet. Cabinet has responsibility for the formulation of policy, except in the areas reserved to the Governor.



Economy

International offshore finance and tourism are the major economic activities. In 2010, there were circa 300,000 stay-over visitors and some 1.5 million cruise ship visitors. At the end of that year there were 371 bank and trust companies, 739 captive insurance companies, 9,003 licensed or registered mutual funds and 91,206 registered companies in the Cayman Islands.

The principal sources of government revenue are import duties, company, bank and trust licence fees, work permit fees and stamp duties. There is no national insurance, no income or payroll tax, no company or corporation tax, no inheritance tax, no capital gains or gift taxes and no VAT. Although imports outstrip exports by about 100:1, the visible trade gap is more than offset by invisible earnings from the financial services and tourism sectors.

The Cayman Islands have done much over the years to protect their flora and fauna. The Islands have 25 endemic species of plants and reptiles, and over 200 species of birds. A botanical park and bird sanctuary on Grand Cayman provide safe environments for endangered species of birds and lizards. The National Trust is engaged in long-term projects to preserve the unique wildlife and flora indigenous to Cayman Brac.

>> The Islands have 25 endemic species of plants and reptiles, and over 200 species of birds. A botanical park and bird sanctuary on Grand Cayman provide safe environments for endangered species of birds and lizards <<



Seven Mile Beach, Cayman Islands Credit: Cayman Islands Department of Tourism

> Currency	Cayman Islands Dollar (fixed at 1 CI $=$ US 1.25)
> Population	55,456 (2010)
> Capital	George Town (on Grand Cayman)
> Government Website	www.gov.ky



Falkland Islands

General

The Falkland Islands are an archipelago of around 700 islands in the South Atlantic, the largest being East Falkland and West Falkland. They are situated about 770km (480 miles) north-east of Cape Horn and 480km (300 miles) from the nearest point on the South American mainland. The Islands have a total land area of 12,173 sq km (4,700 sq miles) – about the size of Northern Ireland – and a permanent population of 2,995 (2006 census). The capital is Stanley, which is the only town on the Islands, though it qualifies as a city by virtue of its cathedral. Elsewhere in Camp (the local term derived from Spanish for countryside (campo)), there are a number of smaller settlements.

The majority of the population of the Falkland Islands are British by birth or descent and many can trace their family origins in the Islands back to the early nineteenth century. There are Anglican, Roman Catholic and non-conformist churches on the Falklands.

There are over 250 species of plant in the Falkland Islands, of which 164 are recorded as native – including the Islands' national flower, the Pale Maiden. The Islands are also noted for their abundant range of wildlife, particularly the Rockhopper, Magellanic, Gentoo, King and Marconi penguins.



Government

Navigators of several countries have been credited with first sighting the Falklands but the earliest sighting that has been conclusively authenticated was by the Dutch sailor Sebald van Weert in 1600. The first known landing was made in 1690 by a British naval captain, John Strong. He named the Islands after Viscount Falkland, First Lord of the Admiralty at the time. A British expedition reached West Falkland in 1765, and anchored in a harbour which it named Port Egmont. It took formal possession of it and of 'all the neighbouring islands' for King George III. The following year, another British expedition established a settlement of about 100 people at Port Egmont. This settlement was withdrawn on economic grounds in 1774, but British sovereignty was never relinquished or abandoned. There was no indigenous or settled population of the Islands before 1833, when British administration of the Islands was resumed and this has continued until the present day. The Falklands were invaded and illegally occupied by Argentine military forces on 2 April 1982. A British task force was dispatched immediately and, following a conflict in which over 900 British and Argentine lives were lost, the Argentine forces surrendered on 14 June 1982.

Argentina continues to assert a claim to sovereignty over the Falkland Islands. The United Kingdom has no doubt about its sovereignty over the Islands. The principle of self-determination, enshrined in the UN Charter, underlies our position. There can be no negotiation on the sovereignty of the Islands unless and until the Islanders so wish. The Islanders regularly make it clear that they wish to remain British. On 12 June 2012, The Falkland Islands Government announced its intention to hold a referendum on the political status of the Falkland Islands.

The present Constitution dates from January 2009. The Constitution recognises the Islanders' right to self-determination. Executive authority is vested in HM The Queen and exercised by a Governor on her behalf, with the advice of the Executive Council and Legislative Assembly, and in accordance with the Constitution. The Governor presides over an Executive Council composed of five members: three elected and two ex-officio (the Chief Executive, Financial Secretary). In addition, the Attorney General and the Commander of the British Forces in the Falkland Islands attend by invitation. The Legislative Assembly has eight members elected by universal adult suffrage as well as the two ex-officio members of the Executive Council. It is chaired by a speaker.

Elected Members have a substantial measure of responsibility for the conduct of their Territory's affairs. The Governor is obliged to consult the Executive Council in the exercise of his functions (except in specified circumstances, for example on defence and security issues, where he must consult and follow the advice of the Commander of the British Forces in the Islands) and on foreign affairs issues. Although he has the constitutional power to act against the advice of the Executive Council, he would be required, without delay, to report such a matter to the UK Government with the reasons for his action.



Falkland Islands Credit: Overseas Territories Directorate

Economy

Since 1982 the economy of the Islands has grown rapidly. Initially this was as a result of UK development aid, but by 1998 the Islands were self-sufficient in all areas except defence. The Falkland Islands Government's stated aim is to ensure a diverse and sustainable economy for the future. The latest Islands Plan (2010 – 2015) is available at their website: http://www.falklands.gov.fk/. It outlines their vision for improved financial management, quality of life and communications while ensuring a sustainable economy.

The role of tourism in the Islands' economy is also increasing. Tourist numbers continue to grow, with many attracted by the diverse wildlife. Besides the tourists who fly in to stay on the Islands, the number of cruise ship passengers making day trips to Stanley and the surrounding countryside has grown significantly.

Agriculture was the chief industry for most of the last century and remains an important part of the Islands' economy and culture. Though its contribution to GDP in recent years has been lower than the fisheries sector, it remains one of the largest sectors for employment outside of the public sector. The Government has recently encouraged the modernisation of this sector, for example setting up a modern abattoir designed to meet EU standards and strongly supporting organic farming. Offshore oil exploration is underway in the Northern and Southern Basins of the Islands. >> The Falkland Islands Government's stated aim is to ensure a diverse and sustainable economy for the future <<

> Currency:	Falkland Islands Pound (parity with Pound Sterling)
> Population:	2995 (2006 Census)
> Capital:	Stanley
> Government Website:	http://www.falklands.gov.fk/



General

Gibraltar is a rocky peninsula rising from the south coast of Iberia. It has a total area of 5.8 sq km and is just under five km long from north to south. It has a land border with Spain.

The population (2010 figures) is 29,441, of whom 24,127 are Gibraltarians. Most Gibraltarians claim British, Genoese or Maltese ancestry. English is the official language, but Spanish is widely spoken. About four-fifths of the population are Roman Catholic, along with significant Protestant, Jewish, Hindu and Muslim communities.

Government

Sovereignty of Gibraltar was ceded to the UK by Spain under the Treaty of Utrecht of 1713. Spain has, nonetheless, repeatedly sought to regain sovereignty. However Spanish pressure, including the closure of the border from 1969 until the early 1980s, has largely served to strengthen Gibraltarians' sense of identity. The UK Government has reaffirmed that it will never enter into arrangements under which the people of Gibraltar would pass under the sovereignty of another State against their wishes, and that furthermore, the UK will not enter into a process of sovereignty negotiations with which Gibraltar is not content.



Gibraltar's current constitution dates from 2006. Following negotiations between the UK and Gibraltar, it was approved in a referendum on 30 November 2006 by over 60% of those who voted, and came into force on 2 January 2007. It modernised the UK-Gibraltar relationship, giving Gibraltar control over its internal affairs. The Governor remains responsible for external affairs, defence, internal security and ensuring good government, including responsibility for some public appointments, while the Government of Gibraltar has responsibility for all areas not specifically assigned to the Governor, including economic and environmental management and provision of education, healthcare and other social and public services.

Gibraltar's legislature, the Parliament, consists of 17 elected Members plus a Speaker. Elections take place every four years. The Territory consists of a single constituency and each elector may vote for up to ten candidates. The most recent elections were held on 8 December 2011.

Gibraltar is within the European Union by virtue of Article 355(3) of the Treaty on the Functioning of the European Union. However, under the UK's Act of Accession, Gibraltar is excluded from four areas of EU policy: the Common Customs Territory and Common Commercial Policy (and thus EU rules on the free movement of goods do not apply); the Common Agricultural Policy; the Common Fisheries Policy; and the requirement to levy VAT. Gibraltarians have rights of free movement within the EU. While the UK Government is ultimately responsible under the Treaty for the implementation of EU Law in Gibraltar, EU measures are in practice implemented within Gibraltar by means of legislation enacted by Gibraltar's Parliament.

Economy

Since the late 1970s Gibraltar has diversified its economy, developed niche sectors which require little land but offer high added value, and adapted to reflect changing circumstances, including the re-opening of the border with Spain. Gibraltar has a thriving economy dominated by four main sectors. The financial services sector accounts for about 22% of GDP (2010 figures); it is regulated by the Gibraltar Financial Services Commission and conforms to EU standards. Retail/tourism makes up 25% of GDP – the Cruise Ship Terminal, which opened in 1997, received 303,371 visitor arrivals in 2010. Shipping accounts for 20% of GDP. The online gaming sector has also become a pillar of the economy in Gibraltar, accounting for a similar percentage (and around 2000 jobs). The former Royal Naval Dockyard is now privately owned and operated.



Rock of Gibraltar Credit iStockphoto

→ Gibraltar is a rocky peninsula rising from the south coast of Iberia <</p>

> Currency:	Gibraltar Pound (Pound Sterling notes & coins issued by the Government of Gibraltar)
> Population:	29,441 (2010)
> Capital:	Gibraltar
> Government Website:	http://www.gibraltar.gov.gi/

Montserrat

General

Montserrat is one of the Leeward Islands in the Eastern Caribbean, lying 43 km south-west of Antigua and 64 km north-west of Guadeloupe. The island is 17 km long and 11 km wide, occupying an area of 102 sq km, entirely volcanic and very mountainous. Named after a monastery in Spain by Columbus during his second great voyage in 1493, the island became a British Colony in 1632. The first settlers were largely Irish. Montserrat was captured twice by the French for short periods but was finally restored to Britain in 1783.

English is the official language. Christianity is the principal religion and the main denominations are Anglican, Roman Catholic and Methodist.

The Soufriere Hills Volcano has been active since 1995, with a fluctuating level of activity. The capital, Plymouth and several other villages were destroyed in 1997. An area around the volcano, approximately two-thirds of the island, has been designated a Special Vulnerable Area and three areas around the coastline have been designated as Maritime Exclusion Zones. The volcano is closely monitored by the Montserrat Volcano Observatory. A Hazard Level System was introduced in August 2008 and information on the current hazard level can be found on the Observatory website (www.mvo.ms). There has been no significant activity at the volcano since February 2010, representing the longest pause since the first volcanic eruptions in 1995.



Sunset at Woodlands Beach, Montserrat Credit: Tony Bates



Government

Government is executed through a Governor appointed by the Crown, a Cabinet which has the general control and direction of government, and a Legislative Assembly. The Governor retains responsibility for external affairs, defence, internal security including the police, aspects of the public service and regulation of offshore finance. The Cabinet is chaired by the Governor and consists of the Premier and three other Ministers, as well as the Cabinet Secretary, Financial Secretary, Attorney General and Deputy Governor. The Legislative Assembly consists of nine elected members and the same ex-officio members as Cabinet. The Deputy Governor may attend but has no voting rights in the Legislative Assembly.

A new constitution for Montserrat came into force on 27 September 2011. The new constitution gives more power to the government of Montserrat in the field of international relations and strengthens and expands the fundamental rights and freedoms of those living in Montserrat, reflecting the European Convention on Human Rights and the International Covenant on Civil and Political Rights. The Constitution establishes a number of new Commissions to deal with complaints, integrity, mercy and elections. It establishes a National Advisory Council, and retains the existing Public Service Commission. These are all designed to enhance democracy and good government, and to give greater powers to local politicians and senior civil servants.

Elections are held every five years and last took place in September 2009.

Economy

Montserrat's economy is dominated by the rebuilding of the island's infrastructure since the start of volcanic activity. A new capital is under development in the north of the island and work continues to re-house the population and government. Tourism and agriculture continue to show solid growth and contribute most to the economy outside the public sector and construction. Prospects for future growth are good, given the significant public investment in Little Bay town and port as well as ferry and air connections.

Montserrat aims to grow its declining and ageing population (4,922 in 2011 compared with 11,314 in 1991) back to pre-crisis levels. Currently around 25% of the population are immigrants, largely from other Caribbean countries. Approximately 10% of the population is in receipt of some form of social assistance scheme, all of which operate strict eligibility regimes. The UK has provided financial support to Montserrat since the start of volcanic activity in 1995. This was initially in the form of humanitarian assistance and is now focussed on rebuilding public infrastructure and the provision of basic public services. Both the Government of Montserrat and the UK are working to develop the economy so Montserrat becomes self sufficient in the medium term.

>> Prospects for future growth are good, given the significant public investment in Little Bay town and port as well as ferry and air connections <<

> Currency	Eastern Caribbean Dollar
> Population	4922 (2011)
> Capital	Little Bay (planned)
> Government Website	http://www.gov.ms/



Pitcairn, Henderson, Ducie and Oeno

General

The Pitcairn Islands comprise Pitcairn Island itself and three uninhabited islands, Henderson, Ducie and Oeno. Pitcairn is approximately three km long and 1.5 km wide. It was first settled in 1790 by some of the HMS Bounty mutineers and their Tahitian companions. Pitcairn was left uninhabited between 1856 and 1859 when the entire population was resettled on Norfolk Island. The present community are descendants from two parties who, not wishing to remain on Norfolk, returned to Pitcairn in 1859 and 1864 respectively.

The population totals only 54, all living in the only settlement, Adamstown. The official languages of Pitcairn are English and Pitkern, the latter becoming an official language by declaration of the Island Council in 1997. This is a mixture of English and Tahitian with the former predominating.

Henderson Island is the best example in the Pacific of a large raised coral atoll and is an important breeding ground for seabirds. Henderson has been designated as a UNESCO World Heritage Site. The UK and Pitcairn Governments have been working with the Royal Society for the Protection of Birds (RSPB) to safeguard Henderson's biodiversity through a project to remove non-indigenous rats.

>> Pitcairn was first settled in 1790 by some of the HMS Bounty mutineers and their Tahitian companions <<



Government

Pitcairn is a British settlement under the British Settlements Act of 1887, although the Islanders usually date their recognition as a British Territory to a constitution of 1838 devised with the help of a visiting Royal Navy officer. The office of the Governor was established in 1970, after Fiji (whose Governor had been responsible for Pitcairn since 1952) became independent from the UK. The British High Commissioner to New Zealand is appointed concurrently as Governor (Non-Resident) of Pitcairn.

In September 2009, a consultation period began on a new Constitution better to meet the needs of Pitcairn in the 21st century. The new Constitution came into force in March 2010. For the first time the new Constitution included a fundamental rights chapter. It also established the role of the Island Council in the Constitution and obliges the Governor to consult with the Island Council before making laws (and, in cases where the Governor acts contrary to advice of the Island Council, entitles any member of the Council to submit his or her views on the matter to a UK Secretary of State). The new Constitution affirms the independent role of the Pitcairn courts and judicial officers and guarantees the independence of the public service. Pitcairn Islanders manage their internal affairs through the Pitcairn Island Council, for which elections are held every two years.

Economy

The economy of Pitcairn is largely based on subsistence fishing, horticulture, and the sale of handicrafts. Pitcairn's primary source of income was traditionally the sale of postage stamps, but a downturn in the market led to financial reserves being exhausted and Pitcairn now receives budgetary aid from the UK. The Pitcairn Government is trying to boost revenue through small business development, the sale of .pn domain names, honey production and by increasing tourism.

The population of the Territory is self-employed or works for local government. There is no formal taxation. The dwindling and ageing population of the Island has become an increasing concern. The UK is assisting the Pitcairn Government in developing plans to tackle population decrease and develop the Island's economy and society.



Longboat shed, Pitcairn Island Credit: Ian Cramman

The UK has provided bilateral aid to Pitcairn since 2002/03. In 2010/11 this aid amounted to £2,447,000.

Over the last decade the UK Government has provided extensive development assistance for a range of projects designed to help provide an environment which encourages economic and social development and meet the reasonable assistance needs of the community. These have included a health centre, rebuilding the school, upgrading telecommunications and a sealed road from the jetty to the main settlement. A regular shipping service was established in December 2009 and this provides a necessary life-line in terms of freight and passenger services.

Work is also progressing on projects to provide sustainable wind energy and an alternate harbour to make the landing of supplies, tourists (particularly from cruise ships) and islanders easier and safer.

> Currency:	New Zealand Dollar
> Population:	54 (February 2012)
> Administrative centre:	Adamstown
> Government Website:	http://www.government.pn/

St. Helena, Ascension and Tristan da Cunha

St Helena, Ascension and Tristan da Cunha are three island territories which together form a single territorial grouping under the Crown.

St Helena

General

St Helena is a small island of volcanic origin in the South Atlantic with an area of 122 sq km. It is 1,930 km from the west coast of Africa and 2,900 km from South America. The nearest land is Ascension, 1,125 km away.

St Helena was discovered by the Portuguese navigator, Juan da Nova, on St Helena Day (21 May) 1502. Its existence was kept secret until the English seafarer Thomas Cavendish found it in 1588. In 1658, a Charter from Richard Cromwell, Lord Protector, authorised the British East India Company to colonise and fortify the Island, which it did the following year. Napoleon was exiled on St Helena from 1815 until his death there in 1821. It became a Crown Colony in 1834.

St Helena is currently accessible by sea only. In November 2011 a contract was signed between the St Helena Government and the construction company Basil Read to construct an airport. An airport could transform St Helena from an island in decline into a prosperous and thriving community. The UK Government will finance the airport and St Helena will do all it can to develop and eventually graduate from budgetary aid.



Government

A new Constitution was introduced in 2009, containing a comprehensive suite of fundamental human rights, including provisions to guarantee a fair trial. The St Helena Constitution Order provides for a Legislative Council consisting of the Speaker, twelve elected members and three ex-officio members (the Chief Secretary, the Financial Secretary and the Attorney General). The last general election took place on 4 November 2009. The Governor enacts laws acting in his or her discretion. The Executive Council consists of five elected members of the Legislative Council and the ex-officio members. The Governor has responsibility for the conduct of government business relating to defence, external affairs, internal security including the police, shipping, finance, administration of justice, and aspects of the public service.

Economy

St Helena's Gross Domestic Product (GDP) stood at £15.5 million in 2009/10. The economy has expanded sluggishly, averaging growth of 0.7% per annum over the past 10 years (in real terms). The main driver of growth has been financial support from the UK Government, with the public sector employing 44% of the working population.

In order to make the most of the airport development, the St Helena Government has embarked on a programme of far reaching reforms to open its economy up for tourism and to encourage greater levels of inward investment. These reforms are designed to make the island a more attractive place to live, invest, work and to visit. A ten-year Economic Development Plan is also being written that will outline what activities will be undertaken in the coming years to attract investors, develop tourism sites and critically to enable the people of the Territory to participate fully in the local private sector. The total aid package from the Department for International Development averaged £23.5m a year over the three years from 2009/10 to 2011/12. DFID provides development support to St Helena to meet the reasonable assistance needs of citizens cost-effectively and to promote greater self-sufficiency. DFID's direct budgetary aid currently provides over half of the St Helena Government's recurrent budget but this proportion will decrease as the island's economy grows and revenues increase. Budgetary aid helps fund the delivery of basic public services such as health care, education and social security. DFID aid also maintains maritime access by subsidising the operation of the Royal Mail Ship St Helena. The final component of DFID's aid supports specific interventions, such as the provision of technical expertise, a project to modernise and increase efficiency in the public sector, and support to a number of infrastructure development projects.

Key facts

> Currency:	Pound Sterling and St Helena Pound (at parity)
> Population:	4000 (2009/10)
> Capital:	Jamestown
> Government Website:	http://www.sainthelena.gov.sh/



Jamestown harbour, St Helena seen from Jacob's Ladder Credit: Chrystele Todd

>> Its existence was kept secret until the English seafarer Thomas Cavendish found it in 1588 <<

Ascension

General

Ascension is in the South Atlantic, some 1,125 km north-west of St Helena and around 3,200km east of Brazil. It covers an area of 90 sq km and is of volcanic origin. The last eruption was about 600 years ago.

Ascension was discovered in 1501 by the Portuguese and "found" again on Ascension Day 1503 by Alphonse d'Abuquerque, who named the island. In 1815, when Napoleon was a prisoner on St Helena, a small British naval garrison was stationed on Ascension. The island remained under Admiralty supervision until 1922 when it was made a Dependency of St Helena.

During the Second World War the US Government built 'Wideawake' airstrip on the island. In 1957 a US Air Force presence was re-established and the airstrip and ancillary facilities enlarged. It is now a missile tracking station and an airfield used by UK and US Air Forces. In 1982 it became the crucial stop for Royal Air Force flights to and from the Falklands. Ascension continues to provide a re-fuelling stop-over point for RAF flights to the Falklands and a small UK military presence to support these flights.

Ascension is also used by Cable and Wireless, the BBC and the Composite Signals Organisation as well as the Royal Air Force. These 'user' organisations financed all non-military activities on the island until 2001/2. A plebiscite was held on Ascension in 2002. 95% of those who voted chose the option of forming an Island Council. The first elections took place in November 2002. There is no indigenous population and no right of abode.



Ascension from the sea Credit: Colin Wells

Ascension has globally important populations of seabirds and turtles. In addition Ascension is home to many endemic species – 22 plant, 26 invertebrate and seven fish types. The Ascension Island Government funds a Conservation Department to protect the Island's biodiversity with major partners such as the University of Exeter, Kew Gardens and the RSPB using funding from the UK and Ascension Governments, and the Darwin Fund. The central Green Mountain area is now a National Park.

Government

Executive authority for the Territory is exercised by the Governor resident on St Helena, either directly or through the resident Administrator of Ascension. There is an Island Council. The Governor receives advice from the Island Council and consults it when making laws. The composition and functions of the Island Council are prescribed by law. The current Island Council consists of five elected members plus three ex-officio members, the Administrator, the Attorney General and the Director of Financial Services. Ex-officio members have no vote.

>>> Ascension has globally important populations of seabirds and turtles <<

> Currency:	Pound Sterling and St Helena Pound (at parity)
> Population:	873 [December 2011]
> Capital:	Georgetown
> Government Website:	http://www.ascension-island.gov.ac/



Tristan da Cunha

General

Tristan da Cunha is a small, isolated island of volcanic origin in the South Atlantic. It is almost circular in shape and has an area of 98 sq km. Gough Island, Inaccessible and Nightingale islands make up the Tristan da Cunha Group. A team of South African meteorologists live on Gough. Inaccessible and Nightingale are uninhabited. The nearest neighbours to the group are St Helena, 2,100 km to the north. Cape Town is 2,400 km to the east.

Tristan da Cunha was discovered in 1506 by the Portuguese navigator Tristao da Cunha who did not land but named the island after himself. It was garrisoned and possessed by the British in 1816.

There are no air services. Transport to and from the island is provided by nine return sailings a year from Cape Town by fishery concession vessels and a further annual visit by the South African research vessel, SA Agulhas. Due to heavy seas the harbour is accessible for only 60 to 70 days a year. Improvements to the harbour are vital to Tristan da Cunha's future.

The islands have very distinctive endemic flora and fauna and are important breeding grounds for many seabirds. Gough and Inaccessible Islands have UNESCO World Heritage Site designation. The volcano is still active and last erupted in October 1961. The population was evacuated to the UK, but returned in 1963.

Government

Executive authority for the Territory is exercised by the Governor resident on St Helena, either directly or through the resident Administrator of Tristan. There is an Island Council. The Governor receives advice from the Island Council and consults the Island Council when making laws. The composition and functions of the Island Council are prescribed by law. The Island Council consists of the Administrator, who is President, eight elected members, at least one of whom must be a woman and three members appointed by the Administrator. The Chief Islander is appointed by the President and is the councillor who declares himself or herself willing to act as Chief Islander and who receives the most votes for that post.

Economy

Tristan da Cunha is largely self-sufficient. The economy relies predominantly on the income from the island's highly sustainable lobster fishery. Fluctuating market demand and prices for Tristan lobster has a direct effect on Territory revenue and government reserves have been substantially depleted in recent years.

Other sources of current income – a small scale tourist industry based on three or four tourist ships per annum and the sale of stamps and coins – are limited and further potential economic developments, such as the sale of mineral water, will require considerable capital investment.

Despite the economic challenges, the Tristan Government is committed to trying to balance its budget through efficiencies and effective management of the finances.
Annual bilateral assistance to Tristan da Cunha is modest and consists of support for the provision of medical care and assistance with education, public works and government reform. In addition the UK has funded several repairs to Tristan's harbour, and is working with the Tristan Government in developing a longer term plan for the harbour.



Chief islander surveys Nightingale Island Credit: Sean Burns

Key facts

> Currency:	Pound Sterling
> Population:	261 (February 2012)
> Capital:	Edinburgh of the Seven Seas
> Government Website:	http://www.tristandc.com/government.php

>>> The economy relies predominantly on the income from the island's highly sustainable lobster fishery <<



South Georgia & the South Sandwich Islands (SGSSI)

General

South Georgia is situated 1290 km south east of the Falkland Islands and occupies an area of 3,755 sq km. It is a mountainous sub-Antarctic island, more than half of which is permanently ice covered, with Mount Paget rising to 2,934m. The South Sandwich Islands lie 760 km south east of South Georgia and comprise a chain of eleven small volcanic islands stretching over 240 km. The climate is wholly Antarctic and the islands may be surrounded by pack ice during the winter months. The SGSSI maritime zone occupies in excess of 1,000,000 sq km of the Southern Ocean, equivalent to over four times the terrestrial area of the United Kingdom.

Captain Cook claimed South Georgia for the UK in 1775, the year in which he also discovered the South Sandwich Islands. SGSSI has a rich heritage. Its unique natural environment is internationally recognised and featured in the BBC's *Frozen Planet* series in 2011. South Georgia has a prominent history as the gateway to Antarctica for polar explorers, including Sir Ernest Shackleton. It was also a centre for land-based whaling during the early 20th Century, which provides much of the cultural heritage of the island.



King Edward Point, South Georgia Credit: Dr Martin Collins



The Territory is internationally recognised for its biological importance, and sustains major populations of seabirds and mammals, including globally threatened species. The South Sandwich Islands represent a maritime ecosystem scarcely modified by human activities, their only inhabitants being millions of breeding penguins and other seabirds. The principles of environmental protection and sustainable ecosystem management are enshrined within the Government of SGSSI's legislation and policies including measures to protect against invasive and non-native species that threaten the natural environment. A programme to eradicate rats - which pose one of the greatest threats - from South Georgia is currently underway.

>> The Territory...sustains major populations of seabirds and mammals, including globally threatened species <<

Government

SGSSI has been under continuous British administration since 1908 apart from a short period of Argentine occupation in 1982. SGSSI has been a separate UK Overseas Territory since 1985, before which it was a Dependency of the Falkland Islands. There is no indigenous population, although South Georgia is home to two scientific bases maintained by the British Antarctic Survey, as well as SGSSI Government representatives based at the Administrative Centre, King Edward Point.

SGSSI has its own constitution and is administered by a Commissioner, who is currently the person who holds the office of Governor of the Falkland Islands, based in Stanley. The Commissioner is supported by officials of the Government of SGSSI. The Government of SGSSI is responsible for making its own laws which cover the principal activities of the Territory. This legislation is in line with, and implements, regulations under the Antarctic Treaty System (including the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)) and other international agreements. The UK retains overall responsibility for good governance, defence and foreign policy. In consultation with stakeholders the Government of SGSSI and the UK have developed complementary rolling five year strategies which underpin our respective activities.

Economy

SGSSI is self-financing and generates income primarily through fisheries and tourism. Fishing is the lifeblood of the economy and generates over 75% of the Territory's revenue. The toothfish fishery exceeds the standards laid down by CCAMLR and is the third highest scoring Marine Stewardship Council certified fishery in the world. Its management is underpinned by scientific research, much of it conducted on South Georgia. The Government of SGSSI also issues a range of stamps and coins annually which generated over £150,000 in revenue in 2010. Tourism contributes over 15% of revenues and over 7000 visitors arrive in South Georgia every year, many of them en route to the Antarctic Peninsula.

Key Facts

> Currency:	Pound Sterling
> Indigenous Human Population:	0
> Macaroni Penguin Population:	1 million breeding pairs (estimate)
> Administrative Centre:	King Edward Point
> Government website:	www.sgisland.gs

Sovereign Base Areas of Akrotiri and Dhekelia on Cyprus (SBAs)

General

The SBAs are those areas of Cyprus that remained under British sovereignty when the 1960 Treaty of Establishment created an independent Republic of Cyprus (RoC). The SBAs cover around 256 square kilometres. Most of this land (some 60%) is privately owned by Cypriot nationals. The British population of the SBAs is around 7,500 and includes Service personnel, UK-based civilians and their families. In addition there is a population of around 10,000 Cypriots. The Cypriots living in the areas are recognised residents of the SBA but are European Union (EU) and RoC citizens.

There are two locations: the Western Sovereign Base Area (or WSBA), which consists of Episkopi and Akrotiri stations, and the Eastern Sovereign Base Area (or ESBA), which consists of Dhekelia station and Ayios Nikolaos. As such, the SBAs have never been part of the RoC, they are not on temporary loan, nor have they been ceded to the UK. The SBAs are run as military bases, not colonial territories. It is because of this military focus that the SBAs are administered by the Ministry of Defence, and not the Foreign and Commonwealth Office, which administers other overseas territories.

There are in most areas no entry or exit controls between the SBAs and the rest of Cyprus, and the boundary itself is marked only by inconspicuous pillars. Although there is free access to the majority of SBA Territory, access to the military bases is restricted.

Government

Under the 1960 Treaty of Establishment, the bases remain sovereign British territory under the Crown unless the Government of the United Kingdom, in view of changes in its military requirements, decide to divest itself of the sovereignty or effective control over the SBAs or any part thereof. The military requirement for the bases still exists and there are no plans to withdraw from the SBAs.



Aerial view of Sovereign Base Areas Credit: Crown Copyright (Ministry of Defence)

Civil government of the SBAs is the responsibility of the Administrator, and is carried out by the SBA Administration on his behalf. The philosophy for the administration of the SBAs was stated by the UK Government in 1960 through an appendix to the Treaty of Establishment known as Appendix O. Appendix O declared that the UK's key policy objectives in administering the Areas were:

- > The effective use of the SBAs as military bases;
- > Full co-operation with the Republic of Cyprus;
- > Protection of the interests of those resident or working in the SBAs;

Legislation in the SBAs is made by the Administrator but, in general, mirrors the RoC's laws, in line with the UK's declaration that the laws applicable to the Cypriot population of the SBAs would be, as far as possible, the same as in the Republic. When Cyprus joined the EU in May 2004, the SBAs did not become part of the EU but Protocol 3 to the 2003 Accession Treaty, acknowledging the open boundaries, applied specific provisions of the EU Treaties to the SBAs mainly in the areas of Agriculture & Fisheries, Social Security, and Customs and Fiscal. The ESBA and corridor road that links Dhekelia to Ayios Nikolaos is a de facto EU external border, bringing immigration and customs responsibilities for the SBA administration.

Economy

The UK Government declaration accompanying the Treaty of Establishment currently restricts the establishment of civilian commercial or industrial enterprises within the SBAs, unless they are connected with military requirements but British Forces Cyprus and the Sovereign Base Areas Administration do provide some direct local employment opportunities.

The Cyprus Review 2011

In May 2011, in order to implement the SDSR conclusions, the Defence Secretary announced that a review of the British SBAs in Cyprus would be undertaken. On announcing its completion in December 2011, the Defence Secretary confirmed Her Majesty's Government's enduring commitment to the SBAs in Cyprus. The key considerations in affirming this commitment were:

- The SBAs, situated in a region of geo-political importance, remain high priority for the UK's long-term national security interests.
- The SBAs provide an adaptable and capable Forward Mounting Base, the utility of which has been amply demonstrated: for example in aircraft basing during the Libya campaign and as a logistic hub for operations in Afghanistan.
- In addition, the SBAs are expected to make a significant contribution to the logistic drawdown from Afghanistan, as well as to wider humanitarian and conflict prevention activities in the region. They also continue to provide excellent training opportunities for the Armed Forces.

This announcement offered a timely opportunity to put the necessary financial support for the SBAs – and access to wider Government expertise – in place. The MOD will continue to work closely with Other Government Departments to ensure there are sustainable plans to support the SBAs, including by means of ensuring that the SBAs are treated equitably with other Overseas Territories.

Turks and Caicos Islands

General

The Turks and Caicos Islands (TCI) form the south-eastern extremity of the Bahamas chain and lie north of Haiti and south-east of Miami. The Territory comprises some 40 islands and cays. Six islands are permanently inhabited: Grand Turk – the capital; Salt Cay; South Caicos; Middle Caicos; North Caicos; and Providenciales.

TCI Islanders account for about one third of the total population: there are many immigrants from other Caribbean Islands and North America as well as significant numbers of illegal migrants. English is the main language. The main religion is Christianity.

Juan Ponce De Leon discovered the islands in 1512. Locals claim that the islands were the first landfall of Christopher Columbus in 1492. For several centuries the islands changed hands between the French, Spanish and British. They remained virtually uninhabited until 1678 when they were settled by a group of Bermudians who started to extract salt and timber. The islands became part of the Bahamas in 1799. In 1848 the islanders were granted separate colonial status with an elected Legislative Board and an administrative President. From 1872 until 1962 the islands were part of Jamaica. In 1959 an Administrator for TCI was appointed. From 1965 until 1973 the Governor of the Bahamas was also the Governor of TCI. Since 1973 the islands have had a Governor in their own right

Government

In 2009 a Commission of Inquiry concluded that there was a high probability of systemic corruption among Ministers, members of the legislature and public officials in the former TCI Government. As a result of these findings, parts of the Constitution providing for Ministerial Government and the House of Assembly as well as the automatic right to trial by jury were suspended. Powers and functions previously exercised by Ministers are – at the time of



publication – exercised by the Governor acting in his discretion. A Special Investigation and Prosecution Team (SIPT) consisting of former police officers, lawyers and senior counsel from the UK was appointed to investigate matters identified in the 2009 Commission of Inquiry report. A prominent international law firm was appointed to carry out civil recovery work.

An FCO/DFID joint Written Ministerial Statement in December 2010 set out eight milestones that would have to be met before elections could take place:

- > implementation of a new Turks and Caicos Islands Constitution Order, in support of recommendations of the Commission of Inquiry, which underpins good governance and sound public financial management;
- > introduction of a number of new Ordinances, including those making provision for: (i) the electoral process and regulation of political parties; (ii) integrity and accountability in public life; (iii) public financial management;
- > establishment of robust and transparent public financial management processes to provide a stable economic environment and a strengthening of the Turks and Caicos Islands Government's capacity to manage its public finances;
- > implementation of budget measures to put the Turks and Caicos Islands Government on track to achieve a fiscal surplus in the financial year ending March 2013;
- implementation of a transparent and fair process for acquisition of Belongership;

- > significant progress with the civil and criminal processes recommended by the Commission of Inquiry, and implementation of measures to enable these to continue unimpeded;
- > implementation of a new Crown Land policy;
- > substantial progress in the reform of the Public Service.

On 12 June 2012 the UK Government announced that it judged there had been significant and sufficient progress on the eight milestones and on putting in place robust financial controls and set 9 November as the date for elections.

Economy

In the last thirty years TCI has developed from being dependent on budgetary aid and technical assistance from the UK (until 2003) to a territory with a booming economy based primarily on tourism, with a small financial services sector. The Territory has become a popular up market holiday destination. By 2007 TCI had a per capita income of US\$23,768. Growth hit a peak of 15% per annum.

However in 2008 TCI's economy was hit by the global financial crisis and by Hurricane Ike which caused widespread damage. The economy suffered further in 2009 when the gross mismanagement of public finances, corrupt practices and unsustainable levels of debt servicing were revealed following the suspension of parts of the Constitution. In 2011, in response to the unfolding financial plight of the Turks and Caicos Islands Government, DFID put in place a five year guarantee with commercial lenders, to provide the TCI Government with access to a maximum capital amount of US\$260 million over the guarantee period. A Chief Financial Officer was appointed to meet the urgent task of addressing the TCI Government's structural deficit. Once the Territory is in fiscal surplus it will be able to start to pay off its debt and should, after the five year period is over, if not before, be able to secure new and reduced bank lending without the need for a UK Government guarantee.



Holiday Resort, Turks and Caicos Islands Credit: iStockphoto

Key facts

> Currency:	US\$
> Population:	36,600 (2008 est)
> Capital:	Cockburn Town, Grand Turk
> Government Website:	http://www.gov.tc

In 2011 the tourism sector began to recover, and in 2012 arrivals were around 10% up from the previous year. The extension of the runway at Providenciales Airport and further development on Grand Turk as a destination for cruise ships should ensure that TCI's tourism market remains buoyant. Foreign investors, mainly from North America and the UK, play a significant role in the Islands' economic life particularly in the development of tourism resorts and real estate.

Since the suspension of parts of the constitution in 2009, the UK has funded a wide range of technical assistance in the key areas highlighted in the Commission of Inquiry report, including public financial management, Crown Land, Public Sector Reform, legislative drafting, Immigration and Customs. Canada has provided and funded the Commissioner and Deputy Commissioner of Police for two years. >> The Territory has become a popular up market holiday destination <<



Virgin Islands (commonly known as the British Virgin Islands)

General

The Virgin Islands comprises over 60 islands, islets and cays situated in the north-eastern arc of the Caribbean archipelago covering a geographical area of 152 sq km. The Territory is located about 97 km east of Puerto Rico. The main islands of Tortola, Virgin Gorda, Anegada and Jost Van Dyke are home to most of the Territory's 29,000 people. The capital, Road Town, is located on the main island of Tortola.

The population is predominantly of African descent. The remainder are of European, American and Asian extraction. Approximately half the population are immigrants from other Caribbean islands. The majority of the population is Christian. English is the main language and Spanish is the second most widely used language.



Government

Discovered by Christopher Columbus in 1493, the islands came into British possession in 1666 when planters took control from the original Dutch settlers, and have been a British colony since 1672. The Constitution provides for a Cabinet comprising the Premier, four other Ministers and one ex-officio member, the Attorney General. Cabinet is responsible for the formulation and implementation of policy, though the Governor has responsibility for external affairs, defence, internal security, aspects of the public service and the administration of the courts. The House of Assembly comprises 13 elected members, nine representing individual districts and four elected by a territory-wide vote. The Attorney General, an appointed official, is also an ex-officio member of the House of Assembly. Elections are held at least every four years and the last election took place in November 2011.



Roadtown Credit: Tony Bates

Economy

The main pillars of the economy are financial services and tourism. The financial services sector has grown rapidly in the last decades and now generates about 60% of total government revenue. The Territory specialises in international business companies and has a dominant share of around 45% of the global market for this product. By the end of 2011 there were in excess of 450,000 registrations. Tourism accounts for 30% of GDP.

The Territory is known for its numerous white sand beaches as well as being one of the world's greatest sailing destinations. Agriculture and manufacturing each account for less than 5% of GDP. >> The Territory specialises in international business companies and has a dominant share of around 45% of the global market for this product. <<

Key facts

Currency:	US Dollar
Population:	29,537 (2010 estimate)
Capital:	Road Town (Tortola)
Government Website:	http://www.bvi.org.uk/

Front cover photographs

Left: Hamilton, Bermuda Credit: Alfred Wekelo

Right: Neko Harbour, British Antarctic Territory Credit: iStockphoto



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Marine conservation in the British Indian Ocean Territory: science issues and opportunities

Workshop held 5-6 August 2009 at the National Oceanography Centre, Southampton supported by the NERC Strategic Ocean Funding Initiative and the Oceans 2025 programme



Figure 1. The British Indian Ocean Territory (Chagos Archipelago) is centrally-located in the Indian Ocean Ocean; larger islands circled. This position increases its conservation value as a 'stepping stone' for reefassociated marine life, providing a re-seeding source and refuge for other Indian Ocean localities.

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Report available online at <u>www.oceans2025.org/SOFI Workshops.php</u>

Marine conservation in the British Indian Ocean Territory: science issues and opportunities

Report of workshop held 5-6 August 2009, Southampton, UK

1. Executive summary

- There is sufficient scientific information to make a very convincing case for designating all the potential Exclusive Economic Zone of the British Indian Ocean Territory (BIOT, Chagos Archipelago) as a Marine Protected Area (MPA), to include strengthened conservation of its land area.
- The justification for MPA designation is primarily based on the size, location, biodiversity, near-pristine nature and health of the Chagos coral reefs, likely to make a significant contribution to the wider biological productivity of the Indian Ocean. The potential BIOT MPA would also include a wide diversity of unstudied deepwater habitats.
- iii) There is very high value in having a minimally perturbed scientific reference site, both for Earth system science studies and for regional conservation management.
- iv) Whilst recognising that there is already relatively strong *de facto* environmental protection, MPA designation would greatly increase the coherence and overall value of existing BIOT conservation policies, providing a very cost-effective demonstration of UK government's commitment to environmental stewardship and halting biodiversity loss.
- v) MPA designation for the BIOT area would safeguard around half the high quality coral reefs in the Indian Ocean whilst substantially increasing the total global coverage of MPAs. If all the BIOT area were a no-take MPA it would be the world's largest site with that status, more than doubling the global coverage with full protection. If multi-use internal zoning were applied, a BIOT MPA could still be the world's second largest single site.
- vi) Phasing-out of the current commercial tuna fisheries would be expected. Nevertheless, this issue would benefit from additional research attention to avoid unintended consequences.
- vii) Climate change, ocean acidification and sea-level rise jeopardise the long-term sustainability of the proposed MPA. They also increase its value, since coral reef areas elsewhere (that are mostly reduced in diversity and productivity) are likely to be more vulnerable to such impacts.
- viii) To safeguard and improve the current condition of the coral reefs, human activities need to continue to be very carefully regulated. Novel approaches to wider sharing of the benefits and beauty of the MPA would need to be developed, primarily through 'virtual tourism'.
- ix) Many important scientific knowledge gaps and opportunities have been identified, with implications both for BIOT MPA management and for advancing our wider understanding of ecosystem functioning, connectivity, and the sustained delivery of environmental goods and services.
- Further consideration of the practicalities of MPA designation would require increased attention to *inter alia* site boundary issues, possible zoning, and socio-economic considerations, with wider engagement and consultations expected to involve other UK government departments; neighbouring nations (e.g. Mauritius, Seychelles and Maldives); NGOs with interests; and other stakeholder groups (including Chagossian representatives).

2. Background

The 55 islands of the British Indian Ocean Territory (Chagos Archipelago; Figs 1 & 3) have a combined land area of less than 60 sq km - around 15% of the size of the Isle of Wight. However, they are surrounded by several thousand sq km of coral reefs¹, and the potential BIOT Exclusive Economic Zone for management of marine resources is at least 544,000 sq km - more than twice the total UK land area. This marine space includes mid-ocean ridges, trenches and abyssal plains, as well as coral reefs, atolls and banks. Whilst the UK government is already committed to strong environmental protection²⁻⁵ of the Territory and its surrounding marine resources "as if it were a World Heritage site"², the case for formal, additional safeguards with international recognition has been made⁶ by the Chagos Conservation Trust and the Chagos Environment Network, as discussed at a meeting at the Royal Society on 9 March 2009.

To assess the scientific justification for such action, the UK Foreign and Commonwealth Office (FCO) sought independent advice from the National Oceanography Centre, Southampton (NOCS) on environmental considerations relevant to the possible designation of a BIOT Marine Protected Area (MPA, see below). In response, NOCS, in partnership with university coconvenors, obtained NERC SOFI support for a workshop held on 5-6 August in order to i) widen the informal evidence base for such scientific advice, through involvement of relevant experts in the UK research community and elsewhere, and ii) identify knowledge gaps and associated marine science opportunities⁷.

Workshop participants were made aware of the unique historical and legal complexities relating to the Territory. It was recognised that many issues relating to MPA establishment and governance for this area could not be covered by a two-day meeting, arranged at relatively short notice and focused on environmental questions in the context of existing conditions. A comprehensive socio-economic assessment would anyway be beyond NERC interests and competence, requiring wider stakeholder engagement and attention to human dimension issues (including ethical, jurisdictional and defence considerations) at both national and international levels. The workshop noted that a formal FCO consultation [now in progress] will be carried out on the potential BIOT MPA, and the UK and Mauritian governments have had preliminary discussions on this issue⁸.

Annex 1 of this report provides the workshop programme; Annex 2, the participants list; Annex 3, references and notes; and Annex 4, acronyms.

3. MPA definition and global context

The workshop adopted the International Union for Conservation of Nature (IUCN) definition of a Protected Area, whether terrestrial or marine, as "A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values"⁹. This definition is also used by the Convention on Biological Diversity (CBD).

Protected Area designation regulates, but does not necessarily exclude, human use. As detailed in Table 1 (below), six categories are recognised by IUCN, depending on the naturalness of what is being conserved, and the objectives and strictness of protection. Most existing large MPAs are zoned, to allow for multiple uses; e.g. 0.3% of the area of the Great Barrier Reef Marine Park is IUCN category I, fully protected; 33% category II; 4% category IV; and 62% category VI. MPA zoning can also be vertical, with different levels of protection for the water column and seafloor. For all categories, protection needs to be a deliberate goal, involving a long-term commitment and addressing both generic and site-specific conservation objectives, rather than as an incidental outcome of other management policies (e.g. defence), that may change according to external circumstances.

The global total MPA coverage (of all categories) has recently been estimated¹⁰ as 2.35 million sq km, 0.65% of the world ocean. This value compares with the internationally-agreed CBD target of 10% (by 2012), and a 30% target by the World Commission on Protected Areas. Only 0.08% of the world's ocean was estimated to be fully protected, i.e. 'no-take'.

Although there have since been additional substantive MPA designations in the Pacific by the US (Marianas Trench, Pacific Remote Islands, and Rose Atoll Marine National Monuments) and Australia (Coral Sea Conservation Zone; interim status), representative Indian Ocean ecosystems remain poorly protected or unprotected^{11,} with many already badly damaged. As a result, the US-based Pew Environment Group has identified the Chagos Archipelago to be "top of the global list" as the marine area most worthy of MPA status, with full protection considered to be both highly desirable and achievable.

For the purposes of the workshop, the potential MPA was considered to include land-based ecosystems and the lower atmosphere, as well as reef systems, the

deep sea-floor and the open ocean water column. All discussions were held without prejudice to the outcome of proceedings at the European Court of Human Rights, i.e. whilst noting the UK government position on Chagossian issues, the workshop made no assumptions with regard to the possibility of future resettlement of any of the currently uninhabited BIOT islands.

Table 1.	IUCN categories for	protected	areas in	MPA	context9
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Category		Main characteristics
I	Strict nature reserve/ wilderness area	Strictly protected, and as undisturbed as possible to preserve natural condition. Very limited visitor access. No commercial extraction of either living or non-living resources (no-take).
II	National Park	Natural or near-natural areas; managed for ecosystem protection, with provision for visitor use. Resource extraction not generally considered compatible with this designation.
III	Natural monument or feature	Aimed at specific natural feature (e.g. sea mount) or cultural site (flooded historical/ archaeological area); visits and recreation may be encouraged .
IV	Habitat/species management area	Aimed at particular habitats or target species (e.g. whale sanctuary); may require active management intervention or time-limited protection (e.g. during spawning/breeding season).
V	Protected landscape/ seascape	Balanced interaction of nature and culture; human intervention is expected. Considered suitable designation for inhabited coastal areas of high aesthetic value .
VI	Protected area with sustainable use of natural resources	Explicit promotion of sustainable use of natural resources (including regulated fishing) to provide the means of achieving nature conservation



Figure 2. Coral reefs cover less than 1% of the Earth's surface, yet are home to around 25% of marine fish species.

4. Scientific (and societal) importance of the BIOT area

Through national legislation (Marine and Coastal Access Act), European directives (e.g. EU Marine Strategy Framework Directive, EU Habitats Directive, Natura 2000), international agreements (e.g. CBD, Ramsar Convention on Wetlands, UN Convention on Law of the Sea, and 2002 World Summit on Sustainable Development), and recent speeches¹², the UK government is committed to protecting marine biodiversity for direct and indirect human benefits. The wider scientific and societal rationale for MPAs is detailed elsewhere¹³⁻¹⁶, although not without critics¹⁷. Discussions at the workshop focused on the environmental features of the BIOT area¹⁸ that are either unique or particularly valuable in an MPA context – as follows, and in Tables 2 and 3 below.

Large size. Many conservation-related benefits of Protected Areas increase non-linearly with size, since smaller areas are much less effective in maintaining viable habitats or populations of threatened species (particularly in the face of global warming, causing major spatial shifts in weather patterns and climatic regimes). Furthermore, the scale of a possible BIOT MPA would be global news, clearly delivering on UK political objectives for environmental protection and sustainability. Thus if all the potential EEZ is included, the BIOT MPA would be the world's second largest to date, only exceeded by Australia's Coral Sea Conservation Zone – and if all the MPA were a no-take zone, it would more than double the total world marine area with fully protected status.

Habitat diversity. Whilst most conservation attention has to date focussed on shelf and coastal sea habitats (temperate and tropical), the BIOT area also includes an exceptional diversity of deepwater habitat types. Thus a very wide range of geomorphological and tectonic features are indicated from survey transects and satellite altimetry (sea surface height used as a proxy for bathymetry; Figs 3 & 4), with such features including plate separation, fracture zones, sea-floor spreading, sea-mounts and mid-ocean ridges (Central Indian Ridge and Chagos-Laccadive Ridge, the former likely to support chemosynthetic vent communities); deep trenches, to ~6000m (Chagos Trench); and abyssal plains (mid-Indian Ocean Basin). Although the deepwater habitats of the BIOT area have not been mapped or investigated in any detail, work elsewhere has shown that: i) deepwater biodiversity is closely linked to physical diversity; ii) there may be marked temporal and spatial variability in community composition and abundances; and iii) species richness can be very high (particularly at the microbial scale; e.g. molecular analyses of deep sea sediment yielding >1000 species of a single class, Actinobacteria, per sample, with >90% being novel taxa)¹⁹.

Near-pristine conditions. Human impacts on the BIOT area are minimal, and less than any other tropical island groups in the Indian, Pacific or Atlantic Oceans. Fishing is limited and relatively well-regulated (see Section 5 below), and there are currently no significant economic activities on the islands other than those associated with the US military base on Diego Garcia. Direct anthropogenic impacts elsewhere in BIOT relate to the introduction of nonnative terrestrial species (coconut palms and rats, not on all islands); illegal harvesting of sea cucumbers²⁰ and reef sharks, with occasional temporary encampments; mooring damage by visiting yachts; and some strandline marine litter, originating outside the BIOT area. Sea-water quality is exceptionally high (even in the Diego Garcia lagoon), with pollutant levels mostly below detection limits.

The combination of these factors results in the BIOT area supporting around half the total area of 'good quality' coral reefs in the Indian Ocean, on the basis that 17% of that total is estimated to have been effectively lost, 22% is in a critical condition, 32% is threatened by a range of human activities, and only 29% (with BIOT providing 14%) remaining at low threat level²¹. The health of marine ecosystems in the BIOT area gives them crucial importance as the 'control' for research and management activities elsewhere, where human impacts are very much greater.

High resilience of BIOT coral reefs. Since the late 1970s, coral reefs worldwide have increasingly suffered mass mortalities from temperature-induced bleaching, due to the breakdown of the symbiotic relationship between corals (animals) and algae (plants), the former relying on the latter for photosynthetically-derived energy. Whilst BIOT surface waters have warmed by ~1°C since the late 19th century, and many Chagos reefs were badly affected by bleaching in 1998, they have recovered more, and faster, than any other known coral reef system²². This resilience has been ascribed to the lack of suspended sediment, pollution and other human impacts, providing beneficial consequences both for ecosystem integrity and water clarity. Thus grazing reef-fish prevent overgrowth by macro-algae; lagoonal corals are more abundant than in reef systems subject to anthropogenic pressures; and high light penetration allows Chagos corals to grow to depths of >60m where they are less prone to thermal stress (cf lower limits of 20-40m elsewhere in the Indian Ocean). Chagos corals may also benefit from locally-favourable hydrodynamic conditions (intermittent inflows of cooler water, due to vertical movements of the thermocline), and/or genetic factors (prevalence of heat- and light-resistant dinoflagellate clades²³). Whatever the basis for this

resilience – currently subject to research attention, and meriting additional effort – it is of global conservation significance, in the context of recent dire prognoses for the future survival of coral reefs²⁴⁻²⁶.

Role as regional stepping stone and re-seeding source. A key role for MPAs is their natural export of 'surplus' production and reproductive output, providing other areas with biomass and propagules (juveniles, larvae, seeds and spores) of species important either for commercial exploitation, conservation purposes or more general ecosystem functioning. This replenishment is hard to quantify, yet can be critical to the viability of heavily-harvested populations, particularly if they arealso subject to regionally or temporarily variable breeding success. The BIOT area is exceptionally wellplaced to serve this role (Fig 1), and preliminary studies of connectivity, based on species similarity coefficients and genetic markers²⁷, indicate potentially significant export (and hence scope for population replenishment) to the western Indian Ocean, consistent with ocean current data.

In particular, such connectivity studies show that corals and turtles are linked east-west, not north-south, with fish genetics results also indicating high regional dispersion²⁸. Other groups currently being investigated (by US, German, Canadian and Taiwanese researchers) include terns and boobies, coconut crabs, and reef invertebrates. High-resolution biophysical modelling (combining life cycle features, dispersal behaviour and ocean hydrodynamics) could also advance our understanding of crucial connectivity issues; for example, as developed for zooplankton in the North Atlantic²⁹.





Figure 3. Bathymetry around the British Indian Ocean Territory, mostly indirectly determined from satellite-derived sea height data. Larger islands and atolls named. The boundary of the current Fisheries Conservation Management Zone (minimum potential EEZ) is shown, based on 200 nm limits.

Figure 4. Bathymetry around the British Indian Ocean Territory, as above; 3D view from south-east. <u>Table 2</u>. Specific issues raised by the FCO to assist in assessing the conservation value of the BIOT area. Priority assessment: **XXXX**, very high global/regional importance; **XXX**, high global/regional importance; **XX**, moderate regional importance; **X**, low importance.

FCO question	Priority	Summary response
Are there areas kept inviolate from human interference so that future comparisons may be possible with localities that have been affected by human activities?	XXXX	Nowhere on Earth is inviolate from human impacts, but the BIOT area is amongst the least affected (with many pollutants lower than in polar regions). Land access is highly controlled and limited to military personnel and support workers, the BIOT Administration, and authorised scientists. Most of Diego Garcia is a designated Ramsar site ³⁰ ; the Chagos Bank is a proposed Ramsar site; and five reef/island areas are managed as Strict Nature Reserves (all or part of Peros Banhos Atoll, Nelsons Island, Three Brothers and Resurgent Islands, Cow Island and Danger Island). Non-native terrestrial species are problematic on some islands; a recent attempt at eradicating rats from Eagle Island was unsuccessful. All the BIOT area is a Fisheries Conservation Management Zone, with commercial catches regulated by licence and limited to 'surplus production'. However, some illegal fishing (for sea cucumbers, sharks and reef fish) does occur, and the BIOT area is affected by over- fishing elsewhere (e.g. ~90% depletion of sharks throughout the Indian Ocean since 1970s).
Are there represent- ative examples of major marine ecosystems or processes? What is the level of heterogeneity?	хххх	There is a very wide range of (tropical) marine habitats and ecosystems. Shallow water and land areas are all reef-based, including one of the world's largest – if not <i>the</i> largest – atoll (Chagos Bank). Reef heterogeneity is high, depending on wave-exposure, shelter and water depth, with different coral assemblages. Some island ecosystems have been greatly affected by historical use. Deep seafloor ecosystems are expected to be highly diverse, based on large-scale geomorphological variety, but have not been surveyed or studied in detail. Water column (planktonic) ecosystems are inherently less heterogeneous.
Are there areas with important or unusual assemblages of species, including major colonies of breeding native birds or mammals? Is there type locality or is the region the only known habitat of any species?	XXXX	The BIOT area is host to ~440 red-listed ³¹ species with 76 having elevated risk of extinction (including the world's largest arthropod, the coconut crab); 10 Important Bird Areas recognised by Birdlife International ³² , at least 784 species of fish, 280 land plants, 220 corals, 105 macroalgae, 96 insects and 90 birds (24 breeding); and undisturbed and recovering populations of Hawksbill and Green Turtle. Bird breeding populations are amongst the densest in the Indian Ocean (e.g. 22,000 nests on Nelsons Island, that has a total area of only 80 ha). Vegetation includes remnants of Indian Ocean island hardwoods. Marine endemics and type localities include the Chagos Brain Coral <i>Ctenella chagius</i> and the Chagos Clownfish <i>Amphiprion chagosensis</i> However, there are relatively few other endemics, supporting the case for high connectivity between BIOT and other areas.
Are there areas of particular interest to ongoing or planned scientific research?	ххх	All areas are of scientific interest. Over 200 publications to date from research visits limited in number, duration and platform capabilities. Current work includes reef resilience and palaeo-climate studies (on 300 yr old corals). There is scope for globally-significant advances in knowledge of i) ocean acidification, using BIOT as a 'clean' reference site for observations on atmospheric composition and ocean carbon chemistry; ii) climate change, by developing and testing climate prediction models; iii) spatial scaling of population connectivity, from field-based and theoretical approaches; and iv) deep sea biology, geochemistry and geology. [Also see Section 7]
Are there examples of outstanding geological or geomorphological features?	XXX	Unique or near-unique reef features include: i) Chagos Bank is the world's largest atoll; ii) archipelago has a very high number of drowned and awash atolls yet with good coral growth; iii) Diego Garcia is possibly the most completely enclosed atoll with a sea connection; iv) the calcareous algal ridges are the most developed of the Indian Ocean (these stop atolls from eroding); only long-swell Pacific atolls show the development seen in Chagos; v) there are lagoonal spur and groove systems (only site where this is reported; vi) most lagoon floors are carpeted with corals instead of sand and mud; vii) light penetration to >60 m in deep lagoons and seaward slopes, linked to exceptionally deep peak coral diversity (20m); viii) earlier Holocene still-stand cuts and caves clearly visible at 30m depth; ix) location is seismically active, resulting in examples of recent uplifted limestone (raised reef islands) and some down-jolted, now submerged reefs. As noted above, deepwater geology and geomorphology in the BIOT area are also potentially of great interest, but have yet to be subject to detailed scientific study.
Are there areas of outstanding aesthetic and wilderness value?	ххх	Nearly all of it. Most small islands and lagoons are extremely picturesque and idyllic, with several smaller islands in near-pristine condition. The 'bird islands' are exceptionally rich. Reef quality and health ares at a level that has not been seen at most other global locations for > 50 years, with water clarity for seaward reefs near its theoretical maximum.

Table 2. continued.

FCO question	Priority	Summary response
Are there any sites or monuments of recognised historic value?	XX ³³	Known historic sites include the restored old settlement on eastern Diego Garcia. Settlements on other atolls have mostly disintegrated, especially those on Egmont and Eagle which were abandoned in 1950s. There are graveyards on Diego Garcia, Peros Banhos and Salomon, with some recent restoration. Some pre-settlement wrecks deduced from collections of artefacts, such as Ming pottery, copper and brass naval items from various times over last 400 years. An Australian expedition in November 2009 looked for even older remains or evidence of settlement from very early ocean-faring societies.
What is the general state of Indian Ocean fisheries and reef fish? Is the status of blue water and reef fish in Chagos different?	хххх	Indian Ocean reef fisheries are mostly grossly over-exploited, with low catch per unit effort. Catch per unit effort of reef fish in the mostly unexploited BIOT area is ~20 times higher than in East Africa and elsewhere (although that does not mean 20-fold higher harvests could be sustained). Licensed blue water fisheries in BIOT focus on migratory tuna (in BIOT waters for only 10-20% of their lives), with some bycatch. [Also see Section 5]

The analyses given in Tables 2 and 3 indicate that nonuse values of BIOT natural resources are generally higher than use values. Preliminary monetary values were included in Gravestock's presentation at the workshop. Global studies done on the economic benefits of coral reefs estimate their value to range between \$100,000 - \$600,000 per sq km per year. That range compares with current BIOT protection costs of ~\$5 per sq km per year. There was not, however, the opportunity at the workshop for detailed discussions of economic issues.



Figure 5. Fauna that would benefit from the proposed BIOT marine protection area include a) the endemic Chagos brain coral Ctenella chagius; b) shallow-water holothurians (sea cucumbers), such as Thelenota ananas; c) the land-breeding hawksbill turtle Eretmochelys imbricata, and d) a wide range of nesting seabirds, including the red footed booby Sula sula, shown here in juvenile plumage.

<u>Table 3.</u> Preliminary assessment of relative economic values (use and non-use) for the environmental goods and services^{34,35} provided by the BIOT area, excluding mineral resources [from presentation prepared for the workshop by P Gravestock and shown by C Sheppard]. Darker shading = higher value.

Environmental goods and services	USE VALUES		NON-USE VALUES		
	Direct use	Indirect use	Option value	Bequest value	Existence value
Tourism					
Fisheries					
Shoreline protection					
Research					
Scientific baseline					
Aesthetic land/seascapes					
Support for Indian Ocean fisheries					
Cornerstone of Indian Ocean reef recovery					
Model for Indian Ocean reef restoration					
Spiritual and cultural values					
Iconic					
Pristine					
Biodiverse(ity)					
Unique					

5. Fishery issues

The expectation for MPAs is that they are partly, if not fully, no-take zones for fishing, either immediately or phased-in, on the basis that the protected area thereby assists in achieving stock recovery and/or maximising longterm yields over a larger area. No-take zones should also eliminate any non-targeted bycatch, that might threaten endangered species.

As already noted, fisheries in the BIOT area are both protected and exploited to some degree. MRAG Ltd is currently contracted to the BIOT Administration for the provision of relevant services and advice, primarily relating to fishery management within the 200 nm BIOT Fisheries Conservation Management Zone (FCMZ) declared in 1991 and revised in 1998³.

Indian Ocean tuna fisheries are regulated by the Indian Ocean Tuna Commission (IOTC), of which UK-BIOT is a member. Yellowfin, bigeye and skipjack are the main species commercially targeted in the BIOT FCMZ, through both longline and purse seine fisheries (Fig 6; Table 4)³⁶. The latter generally has higher catches, although both are very variable due to tuna's migratory behaviour (with maximum abundance in BIOT waters in December and January). Longline bycatches of sharks have been recorded by weight since 2005, averaging ~50 tonnes per year. Bird bycatch is not considered a significant problem.

There are two other BIOT fisheries: i) low-level recreational fishing activity in Diego Garcia and from visiting yachts; and ii) Mauritian inshore fishing, through historical rights regulated through free licences, with the number of licences based on assessments of surplus allowable catch. Licence uptake and inshore catches have been very low in recent years, with no Mauritanian-flagged vessels fishing since 2006.

MRAG representatives at the workshop questioned whether full closure of all BIOT fisheries would achieve the desired conservation outcomes, providing a paper³⁷ that argued that:

• Inshore and offshore fishing areas need to be considered separately. Whilst a full no-take MPA would undoubtedly benefit resident reef fish, its benefits were less certain for highly migratory species such as tuna.

• The most likely outcome of tuna fishery closure would be a displacement of the fishing fleets to the edge of the BIOT area; total fishing effort (and tuna

<u>Table 4</u>. Summary of commercial tuna fisheries in BIOT Fisheries Conservation Management Zone. Data based on fishing vessels' logbooks, as provided in 2008 UK national report to the IOTC Scientific Committee³⁶.

	LONGLINE		PURSE SEINE		
	2007/08	Range 2003/04 – 2007/08	2007/08	Range 2003/04 – 2007/08	
Total catch (tonnes per yr)	1366	590 - 1366	23418	95 - 23418	
Catch per unit effort (tonnes	0.91	0.52 - 1.10	18.1	3.5 - 36.2	

catches) might therefore remain much the same, the only difference being that the BIOT Administration would no longer receive licence income.

• True conservation benefit for tuna may best be achieved by maintaining an IOTC catch quota allocation as a coastal state and subsequently managing that quota to meet conservation aims, as a sunset option. This could help reduce the total Indian Ocean tuna catch in contrast to merely closing the FCMZ and displacing fishing elsewhere.

• If all the BIOT area were a no-take zone, that action might reduce the conservation influence of UK-BIOT within the IOTC.

• Furthermore, illegal fishing in the BIOT area might increase, since licensed fishing vessels currently assist in the policing (and exclusion from the FCMZ) of unlicensed ones. Such an increase would have cost implications for management and surveillance, no longer covered by licence fees.

• The above factors make it preferable to fully or partly continue the commercial fishery, by internally zoning the BIOT MPA, or by limiting its size to less than the current FCMZ.

Whilst acknowledging the complexities of the above issues, other workshop participants were not all fully persuaded by these arguments. Coupled modelling of fishing fleet behaviour and tuna population dynamics under different zoning scenarios was suggested as an approach that might assist in quantifying key interactions, together with an analysis of the effects of the current 'closure' of Somali waters (due to risk of piracy). An interim measure for the BIOT area could include a more comprehensive research and observer programme for the licensed tuna fisheries, to increase the database on tuna spawning, juvenile catches and bycatches, and sensitivity of individual and population movements to climate change³⁸ and other environmental variables. If the tuna fishery in the BIOT area were to continue, on the basis of MPA-zoning, then such research activities could, in MRAG's view, contribute to longterm population coservation whilst also identifying any areas of aggregation of protected, endangered or threatened species that might benefit from targeted time-area closures.

Ultimately the decision on the extent of the open ocean no-take zone within a potential BIOT MPA will be a political one. There is undoubted attractiveness in the simplicity – and greater presentational impact – of a large, no-take MPA. For either a scaled-down version or an internally zoned one, more subtle justifications would be needed, with the risk that such options might appear to be no different from business-as-usual.

The workshop also considered the issue of Mauritian fishing rights to be a political one, that could only be resolved by negotiation and international agreement. Full protection of the BIOT area as a no-take MPA would also need to apply to recreational fishing by visiting yachtsmen and on Diego Garcia.



Figure 6. Purse seine catch of yellowfin tuna.



Figure 7. BPV Pacific Marlin *escorting an illegal fishing vessel into Diego Garcia.*

6. Threats, risks and uncertainties

The workshop discussion groups identified a number of events, activities and possible developments that, depending on their location, timescale, severity and combination, might either strengthen the case for MPA establishment or jeopardise its future success. These issues could be grouped under three general headings – environmental changes, human activities, and science-policy interactions – as below. This list does not claim to be comprehensive; for additional details on several of these topics, see the Chagos Conservation Management Plan (2003)⁵.

Environmental changes

Direct climate change impacts. In addition to a likely increase of ~2°C in sea surface temperatures over the next 20-30 years (with serious implications for the frequency of coral bleaching^{24,25}), significant changes in storm activity, rainfall, and ocean circulation are now near-inevitable³⁹. All these aspects of climate change will impact the integrity and ecosystem functioning of coral reef ecosystems not just in the Indian Ocean but globally, increasing the societal and scientific value of near-pristine reefs that have shown greatest resilience to date, and that are therefore most likely to survive in future.

<u>Ocean acidification</u>. Closely linked to climate change, increases in dissolved CO_2 cause decreases in pH and aragonite saturation – with potentially serious implications for coral calcification⁴⁰. Thus ~50% reduction in coral growth rates are predicted⁴¹ if atmospheric CO_2 levels reach 450 ppm (optimistically considered the 'safe' target in international climate negotiations; levels are currently ~385 ppm). Ocean acidification may already be affecting the rate of postbleaching recovery, and is highly likely to hasten the demise of coral reefs subject to other stressors. Sea level rise. Closely linked to climate change (but also affected by local vertical land/seafloor movements), relative sea level at Diego Garcia increased by 4.4 mm per year over the period 1988-2001⁴², nearly twice the global average for absolute sea level change. If future increases are not fully matched by the upward growth of reef flats - considered unlikely on the basis of historical evidence - the consequence will be increased shoreline wave energy, erosion of island rims and much greater flooding risk (Fig 9), particularly during extreme weather events. Since the maximum elevation of most northern BIOT islands is only 1-2 m, these are at risk of becoming submerged or 'drowned' atolls within a century on the basis of business-as-usual climate change scenarios.

Introduced species. Current (land-based) problems for invasive non-native animals and plants are relatively well known, and the need for control measures recognised. No marine introductions were found when surveyed by IUCN in 2006, but continued care, e.g. re ballast water discharge in Diego Garcia lagoon, is necessary.

Human activities

<u>Illegal fishing</u>. Illegal near-shore and reef fishing (e.g. for holothurians – sea cucumbers²⁰; Fig 5b) is a concern, and any increases could require a step-wise increase in protection and enforcement effort, in the form of an additional fishery protection vessel (Fig 7; that could also be available for research and monitoring activities). Underlying factors include the increase in the small-vessel fishing fleets of Sri Lanka and other nearby nations, in part due to post-tsunami aid; the rapid growth of populations all around the Indian Ocean; and the declining condition of coral reefs elsewhere, with severe over-exploitation of their fisheries.

Figure 8. Whilst all tropical corals are threatened by global warming and ocean acidification, those in Chagos reefs may be more resilient due to fewer other stresses.



Visitors. Anchor-damage from yachts was identified as a significant visitor impact in the 2003 Management Plan⁵, and remedial action has since been taken. The workshop considered that the development of commercial tourism would risk ecological damage and disturbance, and was pragmatically unlikely because of current defence activities; the very limited land available for infrastructure (~16 sq km, excluding Diego Garcia); and constraints on freshwater supply and waste disposal. Nevertheless, it would be important goal for a BIOT MPA to provide virtual visits online (e.g. using Google Earth, and via the websites of conservation bodies⁴³). Such access should involve underwater and land-based webcams and opportunities for 'citizen science' engagement in research and educational projects.

<u>Research activities</u>. Scientists are also occasional visitors (around 50 over the past 25 years, not connected with defence issues). Whilst considerable care has been taken to ensure that researchers do not themselves cause environmental damage, high standards need to be maintained for any future expansion of scientific activities – that could be expected following MPA designation.

Sound pollution. Underwater seismic surveys and defence-related underwater acoustic operations are potentially damaging to marine mammals such as whales and dolphins, and were identified as a concern at a recent Indian Ocean Cetacean Symposium⁴⁴. Any such activities would need to be carefully regulated to minimise or exclude impacts within a BIOT MPA.

<u>Oil pollution, marine litter.</u> No marine oil-spill incidents to date. Most UK legal measures to minimise the incidence of oil pollution and assign liability for cleanup costs already apply to BIOT. Marine litter (flotsam, mostly plastic debris originating outside the BIOT area) is a shoreline problem on northern islands; its periodic removal is underway to maintain beach quality for nesting turtles.

Seabed mineral extraction. Although not currently of economic importance, deep sea mineral exploitation may occur in future as land-based ore reserves become depleted and metal prices rise. The Central Indian Ocean abyssal plain (Figs 1,3 & 4; to the east of the BIOT area) is rich in ferromanganese nodules⁴⁵, and deposits of polymetalic sulphides and cobalt-rich ferromanganese crusts may occur at the actively-spreading Indian Ridge system⁴⁶ (Figs 1, 3 & 4; to the west of the BIOT area). An ISA licence for polymetallic nodule exploration⁴⁷ was issued to India in 2002 for an area of 150,000 sq km outside national jurisdiction to the south-east of the Chagos Archipelago. The environmental impacts of commercial-scale seabed mineral extraction have yet to be determined.

<u>Bioprospecting</u>. The high genetic diversity of coral reef ecosystems makes them attractive targets for biotechnological and pharmacological applications⁴⁸. However, bulk harvesting is generally not required; instead small samples are used for initial screening, with subsequent laboratory-based molecular characterisation and production scale-up of any novel bioactives. The high cost of drug safety testing, together with patenting problems for natural products, has limited commercial development to date.

Science-policy interactions

Political uncertainties. The head of the FCO delegation at the workshop stated the UK government position with regard to Chagossian re-settlement, US military use of Diego Garcia, and Mauritian sovereignty claims for the Chagos Archipelago: on all of these issues, no changes to existing arrangements were envisaged in the near future. Whilst some workshop attendees considered that more detailed planning for an MPA should not preclude re-settlement, and/or the possible return of all or some of the islands to Mauritian jurisdiction, these scenarios were not discussed in detail. The FCO emphasised that any proposal for the establishment of a BIOT MPA was without prejudice to the outcome of proceedings at the European Court of Human Rights.

<u>Financial commitment</u>. MPA designation, establishment and maintenance are not cost-free activities: a longterm financial commitment is needed for their success⁴⁹. Protection costs for the BIOT area are currently modest (estimated by Gravestock to be ~\$5 per sq km per year), at the low end of a global analysis⁵⁰ of MPA costs that had a median of \$775 per sq km per year. Whilst larger areas can be expected to have lower costs when expressed on a per area basis, other site-specific factors would continue to keep costs low for a BIOT MPA; in particular, the very low visitor numbers (reducing infrastructure and maintenance costs), and the negligible opportunity costs (income that might otherwise be available from alternative uses).

<u>Stakeholder support.</u> As already noted, wide stakeholder support would be needed for the success of a BIOT MPA, where stakeholders are defined as all groups involved in achieving project objectives – not just in terms of permission or financial support, but also those who are directly or indirectly affected, and with the ability to influence public opinion.

7. Science needs and opportunities

A recent online review⁵¹ identified a very wide range of environmental science topics (mostly coral-reef related) considered to be of high importance for the Chagos Archipelago, grouped under 16 headings: Stepping stone in the Indian Ocean; ocean warming effects; coral mortality from warming; coral recovery and trajectories; fore- and hindcasting of coral population trajectories; lagoon responses; fish responses to climate change; acclimation by zooanthellae clades; water, exchange, clarity and sand budgets; reef geomorphology from remote sensing; estimates of fish diversity from remote sensing; pollution and water quality; invasive and introduced species; bird life; exploitation and poaching; and geochemistry and climate teleconnections.

The workshop had neither the time nor the expertise to consider all of these in detail. Nevertheless, it did re-group some key knowledge gaps and environmental science opportunities, in the context of both wider understanding (hypothesis-testing research opportunities, that might be of interest to NERC, the Royal Society or NSF) and MPA management (more operationally focussed requirements, for support by BIOT Administration/FCO, DfID, Defra or NGOs), as summarised in Table 5 below.

NERC support could either be through individual, responsive-mode research grant proposals; consortium bids, assessed on scientific merit and involving a multiinstitute research team; or a large-scale Research Programme, addressing NERC strategic priorities and initiated through theme leaders' Theme Action Plans. The workshop noted that responsive-mode grant bids were highly competitive, and that it was difficult to achieve the critical mass needed for interdisciplinary work. Whilst Research Programme development and approval were likely to be a lengthy and uncertain processes, multi-sector linkages (involving marine, terrestrial, geological and atmospheric research communities) could enhance the likelihood of success. Co-support arrangements could also be potentially advantageous, e.g. research proposal development via the multi-agency Living with Environmental Change (LWEC) programme⁵².





Figure 9 (above). Coastal erosion is likely to increase as a consequence of future sea level rise, currently occurring more rapidly in the central Indian Ocean than elsewhere.

Figure 10 (left). Studies of coral cover include measurement of densities of juvenile and young colonies, to quantify recovery from warming-induced mortality events.

	Knowledge gap	Context of wider understanding	Context of MPA management
1. Survey- based research and mapping	Deep sea geophysics in BIOT area	Geomorphological evolution of West Indian Ocean basin; plate tectonics and other seafloor processes	Basic mapping and knowledge of habitat diversity; requirement for EEZ recognition under UNCLOS, and MPA boundary definition
	Deep sea biodiversity in BIOT area	Development of biodiversity rules re ubiquity/endemism, trophic structuring, and upper ocean - lower ocean connectivities; potential for novel discoveries	Inventories of species' presence and abundances within the MPA; reference for future changes
	Shallow sea (50-200m) habitats and biodiversity in BIOT area [below standard SCUBA diving range]	Key ecosystem component linking islands/reefs with open ocean; maximum planktonic production likely to be at base of thermocline	Inventories of species' presence and abundances within the MPA; importance for fish feeding and spawning; reference for future changes
	Detailed mapping of island vegetation and soil structure	Comparison of natural and human- influenced tropical island eco- systems; improved calibration/ validation of satellite-based data	Baseline information for monitoring and stability/ erosion assessments
2. Monitoring environmental change	Atmospheric and marine biogeochemistry observations	Role as 'clean' control site, including dynamics of air-sea exchange processes; testing and development of global models of climate change and Earth system biogeochemistry (including ocean acidification)	Basic parameters for detecting site pollution and anthropogenic impacts
	Measurements of key coral reef parameters (for corals, reef fish invertebrates, turtles and birds) as indicators of ecosystem health	Distinguishing responses to local, regional and global environmental change; quantifying factors determining ecosystem resilience; reference data for studies elsewhere	Information on MPA status and management effectiveness (protection, restoration or remedial action)
	Open ocean plankton studies and abundance estimates for top predators (blue water fish and sea mammals)	Regional studies of ocean productivity, linkage to ocean circulation changes; development of ecosystem approach to marine resource management	Information on MPA status and management effectiveness
	Physical oceanography measurements over range of spatial scales, including sea-level changes	Improved models of reef and lagoon currents and circulations within wider context; impacts of extreme events and future climate change	Identification of coastal erosion risks
3. Large-scale or generic science	Palaeo-climate studies using coral cores (century- scale)	Understanding responses of reef system to past changes	Quantifying natural variability and referencing future changes
questions	Biological connectivity of BIOT area to wider region (via genetics, tagging and modelling, and including open-ocean fisheries)	Theoretical basis for ecosystem scaling and delivery of goods and services; optimising design and effectiveness of protected areas; management of migratory fish populations	Quantifying benefits of MPA for food security in wider Indian Ocean; engagement with Indian Ocean Tuna Commission and wider conservation activities
	Factors determining recovery from coral bleaching and wider ecosystem resilience	Improved understanding of species interactions, non-linear ecosystem changes, emergent properties of intact systems and functional redundancy	Information on MPA status and management effectiveness; 'best practice' approaches for application elsewhere

Table 5. Summary of some environmental science needs and opportunities for the BIOT area.

Annex 1. Workshop programme

Wednesday 5 August

10.45 Welcome, scene setting and current progress

- Context of meeting, broad outline (Lindsay Parson)
- UK government perspective of Chagos/BIOT MPA (Joanne Yeadon)⁵³
- Chagos protection as of now (Charles Sheppard)
- Chagos shallow water ecosystems and issues (John Turner)
- Chagos mid- and deepwater ecosystems and issues (David Billett) •
- 12.00 Discussion

12.30 Lunch

13.30 Short presentations/contributions with discussion, including:

- Fisheries management in the Chagos FCMZ (Chris Mees)
- Marine conservation: the Pew perspective (Jay Nelson)
- The economic value of the British Indian Ocean Territory (Pippa Gravestock; presentation given by Charles Sheppard)
- Marine conservation: the IUCN perspective (Dan Laffoley)
- Issues relating to MPA development and design (Francesca Marubini)
- Marine conservation in SE Asia (Heather Koldewey)
- MPA development in Southern Ocean (Susie Grant)
- Shallow marine benthic biodiversity: tropical-temperate comparisons (Andrew Mackie)
- 16.30 Scientific review; key issues
- 17.30 Close

Thursday 6 August

09.00 Short presentations/contributions with discussion, continued

- Deepwater bathymetry and habitat mapping (Colin Jacobs)
- 09.15 Working Groups on science justification for BIOT MPA : benefits, threats and research issues
- 12.00 Reports from Working Groups (Rapporteurs: David Billett, Phil Williamson)
- 12.30 Lunch

- 13.30 Concluding discussions
- 15.30 Close of meeting.

Note (54) below gives details of additional written inputs.

Annex 2. Workshop participants

David Billett	National Oceanography Centre, Southampton
Alan Evans	National Oceanography Centre, Southampton
Susie Grant	British Antarctic Survey
Simon Harding	Institute of Zoology
Peter Hunter	National Oceanography Centre, Southampton
Colin Jacobs	National Oceanography Centre, Southampton
Douglas Kerr	Foreign and Commonwealth Office
Heather Koldewey	Zoological Society of London/Institute of Zoology
Dan Laffoley	International Union for Conservation of Nature / Natural England
Andrew Mackie	National Museum of Wales
Francesca Marubini	Joint Nature Conservation Committee
Chris Mees	MRAG Ltd
Jay Nelson	Pew Environment Group: Global Ocean Legacy project
lain Orr	Independent observer
Scott Parnell	Foreign and Commonwealth Office
Lindsay Parson	National Oceanography Centre, Southampton
John Pearce	MRAG Ltd
Katharine Shepherd	Foreign and Commonwealth Office
Charles Sheppard	University of Warwick / Chagos Conservation Trust
John Turner	University of Bangor
Keith Wiggs	BIOT Administration
Phil Williamson	University of East Anglia / NERC
Ian Wright	National Oceanography Centre, Southampton
Joanne Yeadon	Foreign and Commonwealth Office

Annex 3. References and notes

1. 3,400 sq km is a minimum estimate for the BIOT coral reef area. The total may be as much as 20,000 sq km if all water to 60m depth supports coral communities. BIOT land areas are from www.fco.gov.uk/en/about-the-fco/country-profiles/asia-oceania/british indian ocean territory

2. BIOT Administration/FCO (1997) The British Indian Ocean Territory Conservation Policy 1997.

3. BIOT Administration/FCO (1998) *The Fisheries* (Conservation and Management) Ordinance 1998.

4. Huckle AE (2004) Proclamation No 1 of 17 September 2003 establishing the Environment (Protection and Preservation) Zone for the British Indian Ocean Territory. *Law of the Sea Bulletin* 54, 99.

5. Sheppard CRC & M Spalding (2003) *Chagos Conservation Management Plan.* Online at

www.zianet.com/tedmorris/dg/chagos conservation manag ement_plan2003.pdf. Includes references to other BIOTrelevant legal provisions.

6. Chagos Conservation Trust (2009) *The Chagos Archipelago: its nature and the future.*

7. Relevant research relates directly to priority challenges in two NERC themes (Biodiversity, and Sustainable Use of Natural Resources) and indirectly to all other five NERC themes and the inter-agency Living with Environmental Change (LWEC). NERC Strategy at

www.nerc.ac.uk/about/strategy.

8. Meeting of delegations of the Mauritian and British Governments, Port Louis, Mauritius, 21 July 2009. The Mauritian side welcomed, in principle, the establishment of a marine protected area. Joint Communiqué published by FCO as Annex to BIOT MPA consultation document, at www.fcogov.uk/resources/en/pdf/21153320/mpaconsultation-101109

9. Dudley N (ed) (2008) *Guidelines for Applying Protected Area Management Categories*, IUCN, Gland; x + 86pp. Online at <u>http://data.iucn.org/dbtw-wpd/edocs/PAPS-016.pdf</u>

10 Wood LJ, L Fish, J Laughren & D Pauly (2008) Assessing progress towards global marine protection targets: shortfalls in information and action. *Oryx* 42, 340-51.

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 Speech by Huw Irranca-Davies, Defra Minister, at UK Overseas Territories Conservation Forum conference "Making the Right Connections: A conference on conservation in UK OTs, Crown Dependencies and other small island communities", Grand Cayman, 4 June 2009. At

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13. National Research Council (US). Committee on the Evaluation, Design, and Monitoring Marine Reserves and Protected Areas in the United States. (2001) *Marine Protected Areas: Tools for Sustaining Ocean Ecosystems*. National Academies Press, 272 pp .

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53. Apart from this initial short presentation, stating the current UK government position, FCO participants had an observer role at the meeting.

54. Comments and other written submissions were provided both before and after the workshop by Pippa Gravestock (Univ of York), Sidney Holt (ex FAO), Peter Sand (ex-UNEP lawyer, University of Munich), David Vine (American University) and David Snoxell (Coordinator of Chagos All Party Parliamentary Group), also on behalf of the Chagos Refugee Group (Olivier Bancoult) and the Mauritius Marine Conservation Society (Philippe la Hausse de Lalouvière and Jacqueline Sauzier). Most of these inputs were either circulated to all workshop participants or made available at the meeting.

Annex 4. Acronyms and abbreviations

BIOT, British Indian Ocean Territory; CBD, Convention on Biological Diversity; CCT, Chagos Conservation Trust; DECC, Department of Energy and Climate Change; Defra, Department for Environment, Food and Rural Affairs; DfID, Department for International Development; EEZ, Exclusive Economic Zone; ESRC, Economic and Social Research Council; EU, European Union; FCMZ, Fisheries Conservation Management Zone; FAO, Food and Agriculture Organization; FCO, Foreign and Commonwealth Office; GEBCO, General Bathymetric Chart of the Oceans; IOTC, Indian Ocean Tuna Commission; ISA, International Seabed Authority; IUCN, International Union for Conservation of Nature; LWEC, Living with Environmental Change; MPA, Marine Protected Area; NERC, Natural Environment Research Council; NGO, non-governmental organisation; NOAA, National Oceanic and Atmospheric Administration; NOCS, National Oceanography Centre, Southampton; NSF, National Science Foundation; SOFI, Strategic Ocean Funding Initiative; UNCLOS, United Nations Convention on the Law of the Sea; UNEP, United Nations Environment Programme.



Figure 11. a) The maximum species diversity for corals in the Chagos Archipelago is around 20m depth, with light penetration to >60m in deep lagoons and seaward slopes. b) Very little is known about the deep water fauna of the BIOT area; shown here are seafloor crabs from the north-western Indian Ocean, feeding on dead jellyfish Crambionella orsini . c) Sea mammals visiting the Chagos reefs include spinner dolphins Stenella longirostris.





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Editorial

This is a very exciting time for the Chagos Conservation Trust! Professor Charles Sheppard, Dr John Turner and Dr Heather Koldeway have been given a Darwin Award by DEFRA to carry out research in Chagos over the next two and a half years. This will mean three expeditions – in February 2013, November 2013 and February 2014. The purpose of the work is to further inform the management of the Chagos marine reserve in particular and also to develop the baseline of information from as unspoilt a location in the Indian Ocean as possible to help with management in other marine reserves.

Being awarded this grant shows recognition of the important role that Chagos plays as a scientific baseline, and it is likely to become even more important for this purpose in the future as more scientists need to study a comparatively unspoilt reef ecosystem. This became very apparent during the expedition there during February 2012, because a lot of the research was using the fact that Chagos is unspoilt and so can be used to compare data from there with other locations globally.

Another big part of grant aided work is the Island Restoration Project, a description of which is given in this issue of *Chagos News* by Pete Carr. This is a tremendous project which will hopefully restore some islands to their pre-plantation days condition, with native hardwoods and hugely abundant seabird colonies.

Three more grants have been awarded recently too. One is from the FCO and concerns outreach to Chagossians and their descendants living in the UK. Much more on that in this issue by Xavier Hamon of ZSL. Secondly, another Darwin grant will progress research of turtles in Diego Garcia, awarded to Science Advisory Group member Professor Graeme Hays, and he will be working there with

Dr Jeanne Mortimer who has worked in Chagos several times before, thanks to funding from the FCO. And thirdly an expedition to research pelagic and deeper regions will depart this November, led by Professor Jessica Meeuwig from the University of Western Australia. This work commenced in February's expedition, and has subsequently successfully trialled the new pelagic method off Australia. These results promise to be striking.

All in all, the science is advancing well. And on Tuesday 27 November there will be a conference on Chagos at the ZSL. This follows the very successful one in November last year at the Linnean Society, though at that one the room capacity was 100 people and so quite a few had to be turned away; this time the meeting room is larger.

We also have a new website which will be frequently updated with new information pertaining to Chagos. Did you follow the blog from the 2012 expedition? It had a wide readership and was syndicated to prestigious organisations like Scientific American. We hope that a daily blog will become a feature of future expeditions, as a way of drawing the CCT membership into the expedition.

CCT is also now employing two consultants to help out with all the extra work that is being done and needs to be done. Charley Cranmer is a fund raising specialist, and hopes to raise grants for particular important projects that CCT want to undertake in Chagos. Kate Longhurst is our communications and outreach consultant, and she will be undertaking many projects to help people understand the importance of the Chagos marine reserve. She is also helping with the production of *Chagos News* starting with this issue.

> Anne Sheppard Editor

The 2012 BIOT Expedition

In February 2012 a team of scientists visited the Chagos for the first scientific expedition since the declaration of the Marine Protected Area in April 2010. Expedition Leader, Professor Charles Sheppard, introduces a series of reports on the work the team carried out.

The expedition in early 2012 pulled off some remarkable research, made some major discoveries (not all of them good unfortunately), conducted quite a lot more of what has now become routine monitoring work, and started one or two new lines of research as well. The next several pages amplify a lot of this, though of course, as is the case with all science, much still needs to be analyzed and worked up. Some of this has been briefly written up in an expedition report for BIOT on our return and this is available at www.chagos-trust.org/resources. The following is more my impressions several months on and focuses on my own observations at the time, leaving others to describe parts later.

My own work starts with monitoring the reefs and their

condition in broad terms, as has been the case almost every time I have visited the northern islands. To do this we count numbers of coral and soft coral colonies, numbers of interactions between colonies, and total coral cover at 5 m depth intervals down to our maximum depth of 25 m deep. The abundance of fish in several sites often made viewing the seabed complicated! We coral cover on the reefs, and I have seen a remarkable recovery (in terms of the amount of coral covering the reef at least) subsequent to the major devastation caused by the 1998 sea water in greater and better detail their own warming. Below is a graph, an earlier weather had hampered their version of which has been shown at



Coral cover to 25 m depth at 5 m depth intervals, at various dates up to the present 2012 is shown by the pale blue line (vertical lines are standard errors).



presentations before, but here with the 2012 data added to it the light blue line is 2012. Coral cover now exceeds that which existed in Chagos in 1996, in other words before the major warming wipe-out. But there is an interesting twist to this data. You can see on the line for 2012 the dip which occurs around 10 or 15 m deep in the live suspect this is because of quite severe storm damage done earlier this year. The officers and crew of the Marlin told us how, in fact, we were very lucky because severe bad operations for weeks up to our arrival and had dissipated just in time for us, allowing us to do all the diving that we wanted. I suspect that these storms were the reason for the many broken table corals that we saw in these depths. Storms have long been known to be a major structuring force shaping the ecology of coral reefs, which build up islands (and indeed destroy islands on occasion) and most work in this respect has been done in the Caribbean. Yet in Chagos we can see the results of storms in this 2012 trace and I would guess that we have now reached some sort of equilibrium which is at least quasistable. We have to qualify all such statements of course with the



observation that another major warming event could wreak havoc as it has done at least once before.

Water temperature is the key to this, more particularly increasing ocean temperature. Again in 2012 we recovered and replaced most of the underwater temperature recorders that have been located on several reefs throughout the archipelago, both in the lagoon and on seaward slopes of the atolls. The southernmost sites where we do this are on the seaward side of Diego Garcia, while the northernmost sites are in northwest of Peros Banhos atoll, with others deployed at several sites in between. These little instruments are fixed underwater on stakes, and are programmed to record the temperature at intervals of two hours. With the batteries they have in them, they can keep going for over two years. We have lost a couple in the past, and one or two have failed, although even the failures have yielded perhaps a year

of data before the instrument ceased to function for some reason. Key to their successful operation and recovery lies in how we secure them, surrounded by a piece of fact, which

prevents grazing fish from chewing on them, for each is only a few inches across. It is always greatly satisfying firstly to find one and retrieve it, and secondly, when back on deck and attaching it to a laptop to download the data, seeing its faint red LED light winking at you which tells you that it is still working! To date we have had more or less continuous recordings from several sites since about 2006, and 10 more were deployed this time which should keep going until 2014. This is a huge amount of data which has already yielded some unexpected surprises including possible reasons why corals in Chagos have been able to resist high water temperature incursions in the way that they have.

Connected with this we have a paleoclimate programme. Corals have growth rings in the same way that trees do, and various isotope ratios in each annual layer can tell us a great deal about climatic conditions, including temperature

> was being laid down by the living coral. This time we took cores from corals located beside several of the temperature loggers which will help to better an interesting procedure because the source of the

drills at high speed is compressed air, and one core may require the air from three or more for diving cylinders, as the operator becomes almost invisible behind clouds of bubbles as the discharged air spins the drill bit.

One programme we began, or rather re-began, was counts of juvenile plastic drain pipe in corals. Juveniles are of course the next generation of adults. We had looked at this in 2001 and again in 2006 but now I think we must have a regular programme to monitor this because the preliminary results we got, in Diego Garcia's seaward slopes only, show that the number of juvenile corals that exist is substantial. In fact Chagos is still one



Coral coring with compressed air drill, powered by air from spare diving tanks

of the richest sites ever measured in this respect. The graph on the next page shows the number of juvenile corals >15mm across which changes with depth, taken on the seaward slopes where the military facility is located. All things being equal, we can assume that the next generation and rainfall, when that layer of corals is on track to maintaining the high abundance that we see in this archipelago.

We had a few interesting discoveries as well. We had discovered vast seagrass beds just south of Danger calibrate the data. Coring is Island a couple of years ago but had not dived on them, merely looked at them while hanging over the side of power for rotating the small a boat. This time we did dive on




The graph of juvenile coral number showing rise in abundance until 10-15 m depth, then a decline. The top (red) curve shows numbers per square metre substrate adjusted for non-available substrate (such as live adult corals).

them. Massive expanses of rich seagrass is not something we had until then associated with Chagos, and so now we wonder how much of the submerged Great Chagos Bank, and indeed other banks, is covered with this entirely different and richly productive ecosystem. Exploring those parts of Chagos that have never been visited (which is in fact over 90% of it) is something on the list of things to do.

work for a day to map its extent. So far it does not cover a very big area but, who knows what these coral predators will do and how they will expand? Many times in other parts of the world, plagues of crown of thorns starfish will simply disappear. Many times too they may remain with a constant but very patchy and episodic high presence. All we could do here was to record it and map its extent and see what happens on a

Part of the seagrass bed just south of Danger Island on the Great Chagos Bank



Another discovery we made was not so welcome, and that was a plague outbreak of crown of thorns starfish off Eagle Island, also on the Great Chagos Bank. These feed voraciously on the living corals and can kill a reef, at least temporarily. We diverted

future visit. We did take the opportunity of collecting tissue from about 20 of them for a genetic analysis programme in Germany where others are examining the distribution of various forms of this animal. Collections were in fact another of our roles: for genetic analyses of various kinds for institutions in several different countries.

I also had the pleasure of visiting the mangrove stand discovered two years ago but not visited since, in the north of Peros Banhos atoll. This again is an entirely different sort of habitat, but one with much urgent potential for restoration work because the coconuts will, if not controlled, relentlessly take over this habitat completely in due course as has happened on Eagle Island.

Chagos remains a magnificent place, and later articles will expand on this. It is the largest expanse of reefs which remain in very good condition in the world. There is a new management plan now which will help to guide and direct the work that is needed in the future, for the BIOT Administration to maintain the good condition that the marine habitats are in, and to guide the kinds of science programmes that we consider are needed for the better

strips the live tissues, leaving the white skeleton Sheppard Charles 6

Crown of Thorns starfish feeding on Acropora coral - it

understanding of the place. This Plan has just been placed on the FCO website, with a link to it on the CCT website.

Because of several successful grant applications, we now have several

funded expeditions ahead of us. For the first time ever, we have work mapped out for us stretching at least two years into the future; meaning a lot of tasks can be planned and done which will help us understand how the archipelago works both underwater and on land, with a view to helping BIOT Administration in the management of the area in the best possible way.

No expedition works without substantial input from a large number of people. The officers and crew of the Pacific Marlin were marvellously supportive, as always. The expedition doctor, Bob Long, was not given any medical crises to deal with, and worked tirelessly on deck and with the diving work. Pascaline Cote is a young woman with Chagossian ancestry who came along too, and with her tireless, enthusiastic and skilled support, she worked with several groups and contributed greatly to the expedition. It has given us great pleasure to learn that she has now

successfully enrolled in a degree course in biology, so I very much hope that she will be visiting Chagos again in a professional capacity. And Pete Raines came along again too after arranging almost all the logistics before the expedition as well as during, and after



The mangroves in the north of Peros Banhos. The palm trees are gradually shrinking the area available for mangroves, and the area needs conservation attention to encourage young mangroves to thrive.

it too. This is the unglamorous but essential component of any expedition, and again many, many thanks are due to Pete not least of which for the fact that he did much more than his fair share of many chores such as filling aqualungs which we, most ungratefully, then proceeded to empty again before each day was out.

Publication and publicising results are all an essential part of science.

Many will remember the day at the Linnean society last November where we had a conference on the science of Chagos to that point. This was successful and in fact we had to turn away people who wanted to come and see it because the Linnean rooms could hold only 100 people. This November we are repeating this with another meeting, held this time in the larger lecture theatre at ZSL in London. We hope to see many of you there.

Human Impacts on Hidden Coral Reef Biodiversity

Catherine Head, University of Oxford and Zoological Society of London

After 21 days of hard work, great diving, and amazing new experiences on the Chagos 2012 Expedition, I headed back home with 5000 cryptofaunal samples from 55 dead coral heads from across the archipelago.

But to back-track a bit - my PhD research involves investigating the patterns of diversity and community structure of the reef cryptofauna, that is the small, often hidden, crabs, shrimp, gobies, and molluscs (to

name but a few!) and how these contribute to reef functionality and resilience. The effects of human impacts on reef diversity are understood, to some degree, on elements of the reef community, particularly on the reef building corals themselves and on communities of fish, but there is little understanding of how such impacts affect the diversity of reef cryptofauna and the consequences of this on reef resilience.

To investigate this I assess cryptofauna species richness and abundance on dead coral heads across locations in the Indo-Pacific that represent a gradient of human impacted reefs. In order to assess reef health in Chagos, we carried out benthic photo transects at each site to measure benthic cover, which will be used alongside Dr Nick Graham's fish





health. Our team's dives consisted of chiselling off two or three dead coral heads and bagging them for processing back on the boat and collecting the reef health data as described above, while occasionally popping our heads up from the coral heads to watch sharks and mantas passing by.

Once back from the dive, we spend the next few hours processing the coral heads. This involves a technique of freshwater flushing then sieving out the cryptofauna which inhabit these coral heads, and taking various measurements of the coral heads to account for habitat size and shape variations. All cryptofauna collected were recorded and preserved in ethanol for transport back to Oxford where I am now about one third of the way through identifying these species taxonomically. To date I have found many new species records for Chagos and have made some interesting findings, so look out for the publications! Soon I will start DNA

barcoding on a subsample (the Caridea shrimp and snapping shrimp) of the cryptofauna, to build a phylogeny that will allow me to investigate the ecological and evolutionary processes shaping community structure.

The Chagos archipelago is probably the closest to a true baseline for a healthy reef ecosystem that we have, and when you're there this becomes apparent from the huge shoals of fish, the size of the fish, the expanse of Acropora tables, and the regular sightings of top predators. That's not to say that Chagos reefs haven't been impacted by bleaching and other global impacts, which are arguably now impossible for any corner of the globe to escape, but the point is these reefs do not have to cope with local human impacts on a daily basis and are therefore able to bounce back from bleaching as was evident from the way these reefs recovered following the 1998 El Nino event. Chagos is therefore highly appropriate as the healthy reef site for my project that looks at biodiversity across a gradient of reef health. Over the next couple of years I will be collecting data from comparatively degraded locations across the Indo-Pacific, such as sites in Madagascar and the Philippines and this data will be compared to the

> Chagos cryptofauna diversity. In the meantime while I'm back in the lab analysing the data I'll allow my mind to wander just a little bit and relive the wonderful Chagos adventures and the archipelago's beautiful marine life!

Chagos 2012: A First Timer's Perspective

David Tickler, Bertorelli Foundation

I was delighted to be able to join the 2012 Chagos Expedition as diving officer, and as a keen diver and underwater photographer, the opportunity to be part of the research effort in the new marine reserve was almost too good to be true. However, it was with a certain amount of trepidation that I prepared for the trip – after all the Chagos is a long way from the nearest dive store, so there would be no popping out for spares if there was a kit failure. Fortunately for me, I had experienced help in the form of Charles Sheppard, Pete Raines and the other team members, and, after getting abundant advice by email, landed in Singapore excited to be getting underway, and with enough spares and

tools to build a couple of new regulators if need be.

From the outset it was obvious that it was going to be a fascinating place to work. As we flew in



over Diego Garcia's East Plantation area (a site we would dive a few days later) we were treated to an aerial panorama of the bommie-strewn lagoon – a foretaste of what we would be exploring in the coming weeks. Like excited school children autograph hunting, the Chagos newbies coyly asked for the official BIOT crest stamp at immigration and then admired this new addition to





Illegally fished sharks awaiting disposal

our passports. The uniqueness of this health of the coral, and overall visit was not lost on any of us.

The trip started on a sobering note, with our first morning involving a visit to the waste processing facility where the latest catch of illegally fished sharks was awaiting disposal. That the first sharks I saw in Chagos were piled in a rotting heap was a salutary reminder that its remoteness does not afford the reserve complete protection and the patrol effort there has an enormous task on its hands.

The first couple of days were devoted to setting up the Pacific Marlin, our generous hosts for the expedition, as a research vessel for the coming weeks of exploration and data gathering. Pete Raines led the transformation with military exactness and we soon had three inflatable boats set up on deck, a working pair of dive compressors on the forepeak, and dive gear, toolkits, and scientific equipment installed in the Marlin's deck hangar and ready to use.

From our first dives in Diego Garcia, the underwater life was stunning. Blown away by the abundance and busyness of the reefs on our doorstep in DG, I was frequently told "If you think this is good, wait until we get up amongst the outer atolls". But it is worthwhile making the point birdwatching' that Diego Garcia – the 'developed' atoll with its naval base and airstrip boasts reefs that would put most other marine parks in the shade. The those of us strict measures in place mean that the immediate marine environment appears almost entirely unaffected by the presence of the base.

That said, once we left the lagoon and began our slow circuit of the Great Chagos Bank and its outlying atolls, the scenery just got better and better and the sheer unspoiled-ness of the place was evident above and below the waterline.

As obvious as the physical beauty of the place was the enormous passion for its conservation that is shared by those involved in both the scientific and protection efforts. This came across both in the effort that was being put in, and also the willingness of all the team to get the non-

scientists involved and to share their experience and knowledge. Pete Carr's 'extreme missions will not soon be forgotten by who survived them.



Research volunteer Pascaline processing samples



This was my first involvement with marine biology at the coalface and it turns out that the key ingredient to ensure the success of an expedition of this kind is bucket loads of elbow grease. All the team were putting in long days (and nights) collecting and processing samples and data, and it was not long before both the expedition doctor and I, as well as the research volunteer Pascaline, were fully involved in the collection effort: when you only have three weeks in somewhere as unique and difficult to get to as Chagos every minute in the water counts. For someone for whom diving is normally centred around teaching or tourism, I found scientific diving to

be an interesting change of focus. It is very different diving when you spend 40 minutes staring at small squares of reef through a camera viewfinder and quadrat, so engrossed in getting it right that you have to be tapped on the shoulder because there's a manta flying over you. You have both the reward of getting useful work done, and the thrill of it being interrupted by the most marvellous distractions: like the day we were laying transect tapes in the lagoon inside Eagle Island when a sailfish swam by, or when, after a long day helping the Marlin crew haul BRUV (Baited Remote Underwater Video) units off the bottom, I dropped over the side with mask, fins and camera and blue water snorkelled with a dozen silvertip sharks. Every day had its signature moment.



I have been so fortunate to have had the opportunity to have been part of the effort in the Chagos Marine Reserve, and to have worked with a team who were both great fun to be stuck on a boat with, and incredibly

generous in sharing their time and knowledge. With their involvement and hard work the reserve can only be a success.

All images in this article by David Tickler © Bertorelli Foundation

Terrestrial Aspects

Peter Carr, University of Warwick

As the expedition ornithologist and only dedicated terrestrial researcher on the expedition my prime role was

to repeat the censuses of the internationally important seabird colonies that were conducted in 1996 (Symens, 1999), 2006 (McGowan, Broderick & Godley, 2008) and 2010 (Carr, in prep.). Secondary roles were to assess whether the present system of designation of IUCN classified Important

Bird Areas (IBAs) (based upon specific islands) is the most conservation-efficient method and to The Breeding Seabirds: The counts further develop plans for enhancing the ecological value of some of the

islands via restoration/rehabilitation involving managing invasive species. On all islands in the Chagos, rehabilitation would involve rat eradication and some form of habitat 2006 and 2010 have now been

the breeding phenology of seabirds in the Chagos. Fortunately the counts from scientific research expeditions in February/March 1996,



management, usually reducing the presence of coconut *Cocos nucifera*. from February 2012 have contributed to the understanding of supplemented by counts throughout the year between October 2008 and December 2010. These through year counts have proven invaluable from a conservation perspective. A clear picture is now emerging that the seabirds of the Chagos do not all breed annually and,

to complicate their IBA status, do not use the same islands for breeding every breeding cycle.

The year round seabird counts have

revealed that the Red-footed Booby breeds continuously throughout the year with spikes in breeding triggered by as yet unknown reasons. Data also suggests the trigger is later on the southern atoll of Diego Garcia than in the northern atolls, with breeding spikes generally being about two months behind in the south.

The results from the 2012 expedition show this species is still expanding its breeding range in the Chagos, with a new small colony of 23 pairs being discovered on Petite Ile Mapou and at least two pairs breeding on native hardwoods at another new site on the eastern headland of the formerly inhabited Ile Diamant, both islands in the western half of Peros Banhos atoll which is not part of the strict nature reserve. A single pair was also recorded nesting on the Ile Lubine group of islands in the Egmont Islands atoll, another new island to be nested upon. Since the first comprehensive breeding seabird survey in 1996 (Symens, 1999) this species has colonised, (or more likely re-colonised) four islands in the Salomon Islands atoll, both island groups of the Egmont Islands atoll and now the northern islands of western Peros Banhos.

The Sooty Tern *Sterna fuscata* has been proven to breed in the Chagos at a less than annual cycle (Carr, in prep.). Fortunately, it was breeding in February 2012 with 155,500 breeding pairs found on four islands and a count of 48,000 pairs on Ile Longue in eastern Peros Banhos being the highest count ever for an individual island. What is now

© Pete Carr



 possibly the cause of periodic desertions of islands classified as Important Bird Areas in the Chagos

becoming clear is that some islands are deserted as breeding sites periodically. This phenomena has been recorded elsewhere (Feare, 1976) and it may be, as Feare postulates happens on Bird Island in the Seychelles, that parasitic ticks are vagaries of accurately counting a the cause, infestations being noted in colonial arboreal-nesting seabird). July 2009 on Ile Longue, an island not used for breeding in 2010. Another example of desertions and "island cluster" breeding is that in 2012, 32,000 breeding pairs were present on Middle Brother (one of the Three Brothers); but in July 2009 there were an estimated 10,000 pairs on each of the Three Brothers. Similar "island hopping breeding" has been noted from clusters of islands in

eastern Peros Banhos for this species.

The Lesser Noddy Anous tenuirostris has also proved a challenging species to unravel its breeding phenology. This species has three epicentres of breeding in the Chagos based upon Nelson's Island, the

Three Brothers and eastern Peros Banhos. In February 1996, the breeding at all three epicentres coincided, and resulted in a count of 43,275 breeding pairs (Symens, 1999). In 2006, the breeding epicentres were presumably asynchronous and resulted in a count of 2,682 breeding pairs and a cautious assumption that this species had catastrophically declined in the Chagos (McGowan, Broderick & Godley, 2008). Through-year counts between 2008 and 2010 have shown this species also breeds on a less than annual cycle and the three

epicentres of breeding are not necessarily synchronised and, most important, that breeding numbers have remained relatively constant (taking in to consideration the

The Important Bird Areas: The conclusion drawn from analysing the breeding seabird data has been that classifying individual islands as IBAs based upon annual "spot-counts" does not necessarily do ecological justice to the island (Carr, 2011). The proposal now on the table is that clusters of islands (and possibly the surrounding and intervening seas)



Part of the Sooty Tern colony on Petite Coquillage. The colony on the Coquillages alternates between being on both or one or the other and numbers around 40-50,000 pairs



should be classified as IBAs, e.g. the Eastern Peros Banhos island group (that includes all islands from Ile du Passe round to Vache Marine), taking a monoculture of unmanaged in to consideration the shifting nature of the most populous breeder, Sooty Tern (Carr, in prep.).

Ecological restoration: In amongst the proposed cluster of islands' IBAs are islands of low ornithological importance. These are usually islands that were given over to the

coconut Cocos nucifera plantation regime and are now infested by Black hectares, with meticulous planning, Rats *Rattus rattus* and dominated by coconuts, both of which are strong deterrents to most terrestrial nesting ecological restoration venture. It is seabirds. The long-term aspiration for these degraded islands is some form of ecological rehabilitation in order to improve their biomass and biodiversity, particularly for breeding attempt at rat eradication of Ile seabirds and nesting sea turtles. The precedent has been set for attempts

at ecological restoration in the Chagos with the 2006 rat eradication effort on the second largest land mass in the archipelago, that of Eagle Island (243.5 hectares). Sadly, this far-sighted and bold venture was unsuccessful (Daltry, Hillman & Meier, 2007).

Sights have now been set on removing rats from tiny Ile Vache Marine in eastern Peros Banhos. Set amongst six IBAs, it is hoped that a successful rat eradication project on this island will provide a further safe haven for breeding species. At eight financial backing and, most important, political will, this island is very feasible for a successful hoped that preparations for this venture can be incorporated in to the proposed 2013 scientific research expedition in order to allow an Vache Marine in either late 2013 or 2014.

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Quantifying fish behaviour, size at sex change and abundances in Chagos

Dr Nicholas Graham, ARC Centre of **Excellence for Coral Reef Studies,** James Cook University

The 2012 Chagos expedition was my third time to the archipelago, having participated in both the 2006 and 2010 expeditions. Whereas my earlier research in Chagos focused on expedition doctor, I quantified the

reef fish diversity and biomass, in 2012 I also quantified some behavioural and life history characteristics and the fish fauna.

Flight initiation distance of reef fishes

With the help of Bob Long, our

flight initiation distance (FID) of both parrotfishes and surgeonfishes at multiple sites around the archipelago. The flight initiation distance (FID) is the distance at which a predator (a human in this case) can approach an animal before it flees. The technique has been used in behavioural studies of animals

Bob Long approaching a fish, with a marker at hand ready to drop when the fish flees



around the world, including birds, squirrels, antelope and fish. For fish, FID has been shown to vary predictably in response to fishing pressure and when comparing marine protected areas to fished areas. Specifically, fish can be approached much more closely when fishing pressure is light or they are within a protected area. Such behavioural changes have been shown to relate to how vulnerable fish are to being caught by fishers.

FID was quantified for parrotfishes and surgeonfishes at 12 sites around the northern atolls of Chagos. The data were collected at sites where reef fish biomass data were collected in 2010, which will allow the effects of predation risk to also be assessed when analyzing the data. The data

will be compared to other locations in the Indo-Pacific (e.g. Philippines, Papua New Guinea and Vanuatu) where FID data have been collected

in a range of fished and protected areas by my research group. It will be particularly interesting to see how this behavior varies in a large remote marine reserve such as Chagos, compared to the small reserves that are typical elsewhere for coral reefs. Initial results suggest the FID of fish in Chagos was between 40 and 65% less than recorded elsewhere

using this technique, reflected how tame, or naïve, the fish are to humans as predators.

A large school of initial phase greenthroat parrotfish (Scarus prasiognathos) feeding on the algae that grows on dead corals



Size at sex change in parrotfishes

Some families of fish, such as parrotfishes, have a life history of sequential sex change. In parrotfishes the "initial phase" fish are females, with typically more drab coloration, whereas the "terminal phase" fish are males, and usually have much more vibrant coloration. Many species live in harems with a single male to a number of females. The size at which this sex change occurs can vary according to fishing pressure, and the influence of natural predators in the system. Size at sex change is an important variable as it has implications for the number of larval fish that can be produced, and the functions these important fish play on the reef.

The size at sex change of 17 species of parrotfishes was estimated across 16 sites in Chagos in 2012. Reef fish biomass, including predators, is also available for each of these sites. Again, similar data are available for a range of other locations across the



Indo-Pacific which will allow the effects of fishing and local populations of predators to be assessed with regards to size at sex change in parrotfishes.

Biomass of reef fishes

I quantified reef fish biomass at 18 sites on seaward reefs of Salamons atoll, Peros Banhos atoll and the Great Chagos Bank in 2010, and found it to be exceptionally high. In 2012, the biomass of reef fishes was quantified at six sites around Diego Garcia using identical methods as those used in the northern atolls and

A grey reef shark (Carcharhinus amblyrhynchos), the most common species of shark observed by divers in the waters of Chagos



© Nick Graham

one additional site in the northern atolls. At each of the sites surveyed, four transect tapes were laid out at approximately 8m depth. Each transect was 50m long, and the fish species and an estimate of their body size were counted along a 5m wide belt of each transect. This body length estimate can be used to calculate the weight of each fish observed using well documented "length-weight" conversions.

Monitoring of shark populations

Documenting the number of sharks seen per scientific dive has been an ongoing activity in Chagos since the 1975 expedition. By 1996 population numbers had declined by ~90%, from around 4 sharks seen every dive to about 1 shark seen every second dive. The populations had not recovered by 2006. The data from 2012 suggest that around 1 shark was seen per dive, which may warrant cautious optimism that populations are showing a weak recovery. However, it will be important to continue monitoring the populations into the future to be sure about any recovery.

A Trainee Scientist's Perspective

Pascaline Cotte

Being given the rare opportunity of taking part on a Chagos Expedition is we were all getting a bit fussy something I never thought would ever happen to me. I say this because I was unaware that any Chagos expeditions were happening. and very rich, rich in fishes and rich Growing up in the Chagossian community and being quite young, I was not conscious of the Chagossian environment, as I believe that it is an ignored topic within the community, until the recent declaration of the MPA.

I enjoyed the expedition from two perspectives, being a Chagossian and being a trainee scientist. Being of Chagossian descendant, it is a blessing to be back on the islands of my ancestors. Coming down in the plane and having an overall look at the great Chagos Bank I could begin to see why the Chagossians do not want to let go of their homeland. The shimmering turquoise water, the soft white beach and the lush green trees were just breathtaking. To finally see the famous landmarks such as the Barton Point plantation, the Catalina Wreck and setting foot on my grandfather's home island was very emotional for me.

As a marine biologist, being on such an expedition was already a big privilege: as a trainee scientist with not a lot of experience I cannot

express how happy and grateful I was for the opportunity for taking part in it. I have only dived in Tobago before (editor's note - see Chagos News 37 www.chagostrust.org/resources) and the experiences were

amazing but Chagos was purely exceptional. For example, the visibility was so clear that at the end, whenever it was not crystal clear.

The whole reef was just beautiful in corals. The only dive site I was saddened to look at was the one at Eagle Island. This particular dive site was covered with Acropora corals but most of them were dead already and it looked like there was an outbreak of Crown of Thorns a couple of weeks before. I was saddened because I wish that I could've done something to help somehow, but I suppose that it's just nature occurring.

The great Chagos bank is definitely the place to fall in love with the ocean whether ashore or underwater and it has definitely made me want even more to be a marine biologist than before. I have learnt more than I imagined I would, from doing underwater transects to tying an eye splice rope knot. I have to be honest, it was not a walk in the park and there were difficulties, but at the end all turned out well. If I was given the chance to go back, I would definitely take it; just like I would encourage anyone to get involved in expeditions and conservation alike.

© Anne Sheppard

Surrounded by birds: Pascaline is amazed at the rich bird life on Middle Brother island



Resetting Baselines

Dr Heather Koldeweythe scientists, seen the daGlobal Conservation Programmesknew Chagos was special,Section Head, Zoological Societyhence my commitment anof Londonsupport for it becoming a

Chagos taught me that I didn't know what the ocean should look like.

Through my job at the Zoological Society of London (ZSL), I'm one of those very privileged people to have had the opportunity to travel the world, and have worked from Mozambique to the Philippines in community-based marine conservation efforts.

In the Philippines, the areas I work are what can only be described as 'trashed' – blasted craters giving evidence of recent dynamite fishing, few tiny schooling fish, and if you're lucky, the flick of a tail as a small grouper scoots into a rocky crevice. Here, marine protected areas (MPAs) are about securing some hope for the future for poor and hungry communities with ever-decreasing options. And MPAs do work, protecting and restoring a diversity of coral reefs, but also recovering fish populations. Fishers there are fully engaged with MPA management, as they know the importance of such areas of ocean protection to secure their future, as well as that of the ocean, something I only wish was a more widely held view within UK fishing communities.

I knew Chagos was different. I'd seen the talks, read the articles, talked to



the scientists, seen the data. I knew Chagos was special, hence my commitment and support for it becoming a notake MPA and involvement in the CEN and CCT executive committee. But seeing it for real was quite another experience that a graph, a chart, or even an image could simply not prepare me for.

I was lucky enough to be one of the leaders for the C2012 Chagos expedition having been able to secure the core funding for the expedition through Project Ocean -ZSL's novel partnership with Selfridges' department store. Project Ocean transformed the London store for six weeks to promote sustainable seafood choices and the importance of MPAs – including an event on Chagos – and raised funds that supported the participation of half the scientists and support staff of the expedition.

Working closely with the legendary experience of Professor Charles Sheppard and extraordinary expedition skills of Pete Raines, we were fortunate to pull together a world class team of scientists prioritising the immediate research needs that would best inform a Chagos MPA management plan. For the first time, an integral member of the team was a trainee scientist who also represented the Chagossian community, a hugely positive step and one of the many successes of the expedition.

But back to my knowledge gap. Once in the water, I was unprepared for the sheer abundance of fish, the size and age of fish, and particularly the behaviour of those fish. For many



years, I was curator of ZSL London Zoo's aquarium so I know what a gnarly old fish looks like and you just don't see them in the wild. Chagos was full of them. I have never had so many different kinds of fish swim towards me out of sheer curiosity including lots of huge grouper that hung in the water column, something I hadn't seen before. To quote from Finding Nemo – "fish are friends not food" in Chagos. I could not believe the vast areas of stunning plate corals, any one of which would be a significant attraction in any dive site in the world. I experienced the sheer joy of seeing sharks on every dive decimated in most of our oceans and even in trouble in Chagos. Most of all, I could not quite come to terms with what we have done almost everywhere else. Our oceans are in a desperate state and pressure from people is only increasing. Worringly, even those of us who are involved in ocean conservation are shifting our reference points, starting to consider mediocre, depleted reefs to be comparatively good. We have lost a sense of what our oceans should look like and could look like. Chagos was certainly the most beautiful place on Earth I have ever been to and being part of the expedition has further increased my resolve that this is a vital wilderness area of enormous significance that must be protected. And the graphs and charts say that too.

Pulling back the blue curtain in the Chagos



Professor Jessica Meeuwig and Dr Tom Bech Letessier Centre for Marine Futures – Oceans Institute, University of Western Australia

This was the question that researchers from the University of Western Australia's Centre for Marine Futures, Oceans Institute sought to answer when they joined the February 2012 Expedition. The reef fish and shark populations of the support a rich and abundant fish and Chagos Archipelago are thought to be in excellent condition and indeed, SCUBA-based research on the shallow reefs confirms this. As such. the Chagos Archipelago represents an important example of very healthy reef fish and relatively healthy shark communities that contributes to our global understanding of the impacts of human activities on reef ecosystems.

The fish and sharks associated with atoll reef and lagoon habitats below 15 m had yet to be surveyed. We deployed baited remote underwater video systems (BRUVS) (Figure 1) to

document what species are present, how many there are, and the sizes of each individual. The team deployed the BRUVS at over 200 locations throughout the archipelago, including a newly discovered Who lives below 15 m in the Chagos? seamount, rising to approximately 60m from the ocean's surface.

> While the over 200 hours of video imagery are still being analysed, initial impressions confirm that the deeper waters, like the shallows, shark fauna. Large groupers, myriad sharks, dense schools of fusiliers and snappers populate the deeper reefs and lagoons (Figure 2). We were also able to sample the seamount, the first time that any of these have been importance of the Chagos Marine observed in the archipelago. Surrounded by depths plunging to more than 500m, the seamount attracts roaming species such as silvertip sharks.

This survey is the first at these depths, effectively pulling back the blue curtain so that we can see what the fish and shark assemblages look like below

depths where we can dive safely. The survey will help establish an ecological baseline in the Chagos that will help track changes through time following establishment of the world's largest no-take marine protected area and in the face of climate change. As a critical reference area for the Indian Ocean, the status of these deeper water fishes and sharks provide an important baseline when compared to areas remaining open to fishing.

Next step - completing the quantitative analysis of the video imagery so that we can provide a first baseline for these deeper habitats, demonstrating the Reserve as a global reference area.



Chagossian Community Environment Project



The ZSL Chagossian Outreach Team

CCT has teamed up with ZSL in a new initiative to work with Chagossian communities to raise awareness of environmental issues and provide opportunities in the field of conservation. Here, members of the project team introduce the work which they have been doing.

Crawley, East Croydon, Manchester, Mauritius ... Seychelles. The Chagossian community is represented around the world in many places. The majority of the Chagos Islands have been uninhabited for over 40 years now, and the rich wildlife of this environment both underwater and on the ground has been left untouched, essentially unspoiled. But what about Chagossians' knowledge and perception of the ocean, the reef and the plants and animals of the islands? They share a common heritage, passion for their homeland and a strong sense of community and after all this time, what of their traditional know-how and use of this environment has been passed on to current generations and what do they envisage for the future?

Times have changed and the rich

Indian Ocean fish stocks have been over-exploited: shark poaching has become big business, the impacts global warming brings to the rest of the world have not ignored Chagos, and the archipelago now faces new environmental threats and challenges. What can the Chagossian community do so far from their homeland?

The vision of the new Chagossian **Community Environment Project is** firstly to raise awareness of these issues throughout the entire Chagossian community, first in the UK (2012), and hopefully in Seychelles and Mauritius in the years to come. Secondly, to train Chagossians in practical conservation, science and communication in line with the Zoological Society of London's (ZSL) commitment to global capacity building. ZSL and its partners CCT, Kew, Royal Society for the Protection of Birds (RSPB) and Coral Cay Conservation (CCC) hope to inspire and train future conservationists and environmentalists who could take part in upcoming expeditions, conservation projects and sustainable activities on Chagos' Islands and in their current countries of residence, whatever the future of their status.

Xavier Hamon, Chagos Environment Outreach Officer, says: "This is a fantastic opportunity for environmental and conservation organisations to pro-actively work with Chagossians towards a better understanding of the fragile natural environment of Chagos and ways in which the Chagossian community can get directly involved in its preservation, for now and generations to come. Chagossians are best placed to

talk about their home land and we want to support and train individuals so that they can take part in future expeditions and conservation projects in the UK and abroad".

Xavier Hamon, Chagos Environment Outreach Officer



Originally from France, Xavier has worked in community engagement at the Bat Conservation Trust over the last two years and specialised before that in agriculture and environment research and education.

Rudy Pothin, originally from Seychelles – where he worked at the Conservation unit for the Museum of Natural History - and who is of Chagossian descent, joining the project this year, says: *"This is an amazing opportunity for me to work on this project, realising I can make* such a difference for both the conservation of Chagos and the Chagossians. That is where my family comes from and although I was not born there, it's "home". Coming from the Seychelles and knowing how amazingly beautiful, precious, fragile and rich the marine life is, helps to motivate me to do more for the conservation of the Chagos ecosystems. Everyone should work together for the conservation of what is the crown jewel of marine biodiversity on earth".



Rebecca Short is also working on the project. Rebecca has a background in marine biology and conservation and is providing input into the science content of the project as well as a general co-ordination role: "For a marine scientist the Chagos archipelago and its wildlife are like a dream to study. Anyone with a passion for the Indian Ocean and Chagos' role within it could not help but want to share the existing and new discoveries being made out there, especially with those most deeply connected to it. Central to the expert' opportunity for those with a message our team wants to promote through this project is the notion that terrestrial conservation. A Q&A Chagos doesn't have to change: we don't have to lose what makes it so unique and appealing to both the scientific community and for

Chagossians. We can and should make every effort to preserve this environment, for both human and natural heritage, whatever happens."



The project is being managed by CCT member, Dr Heather Koldewey, who was part of the Chagos expedition team earlier this year and Sarah Thomas, ZSL's Head of Discovery and Learning.

The project is structured in multiple phases designed to allow everyone to get involved, from families just wishing to learn a bit more about their heritage to young people considering a career in conservation and indeed conservation of Chagos. A range of events and training are planned to this end:

Chagos Environment Family Days:

On Saturday 7th July, London Zoo hosted the Chagossian community of the South East of England at a flagship Chagos Environment Family Day. Family fun, arts & crafts and traditional activities were complemented by presentations from ZSL staff and a 'meet the deeper interest in marine and session got people thinking and talking about what the Chagos Archipelago and surrounding marine life means to them and why it needs

preserving. On the 21st July we took the family day on the road and visited the Chagossian community based in Manchester for a Chagos **Environment Family Day at** Manchester Museum.

Towards Future Conservationists: Through the Chagos Environment Family Days and additional advertising, we are recruiting the enthusiastic, the promising and the passionate for a ten week training course. Over the course of the two fun days 47 people expressed an interest in joining up. Held over weekends the course will offer some of the fundamental knowledge and practical conservation skills necessary to kick-start a career in conservation, environmental management and other naturebased opportunities. With this project potentially feeding into existing schemes such as the ZSL EDGE fellowship programme, potential scholarships with project partners like Coral Cay Conservation, and increasing investment in initiatives like this, the team's aim is that those committed to their training could significantly further careers in their chosen path. In addition, it is hoped that Chagos





expeditions in the coming years, akin planning and decision making to that in February 2012, will not only include Chagossians in their research teams but allow these new scientists/environmental professionals to participate in the

required for development of conservation in Chagos itself.

All resources created during this project are being translated into

French and made available through our website. We are also working on producing a film to showcase the opportunity this project could offer to other Chagossian communities around the world.

If you want to follow the progress of this project please visit: www.zsl.org/chagoscommunity. We will be posting details about upcoming events and resources (with French translation).

Please do get in touch with us if you want to know more about the project or if you feel you could add your contribution: Xavier.Hamon@zsl.org; Rudy.Pothin@zsl.org; Rebecca.Short@zsl.org or Kate.Longhurst@chagos-trust.org or call +44(0)7440 187756

TheSeaMonster

Anne Sheppard

TheSeaMonster is a fascinating blog with some of the most amazing photographs of the marine environment. It has guest blogs by marine scientists from around the world, and featured one by Charles Sheppard, the leader of the Chagos Expeditions, after the last expedition this year. You can read it at http://theseamonster.net/2012/03/charles-on-chagos and http://theseamonster.net/2012/03/charles-on-chagos-2





One of the writers for TheSeaMonster, marine biologist, writer and broadcaster Helen Scales attended the Chagos Regagné meeting at the Royal Geographical Society last year. Her report on that meeting can be read at http://theseamonster.net/2011/05/why-chagos-matters

The blog has many clever cartoons and interesting articles. One which caught my attention was about some little crabs and shrimp which live in corals and help them stay clean and healthy, see http://theseamonster.net/2012/06/corals-and-their-housekeeping-mutualists

It is also accessible through Facebook, where people can leave a comment about an article http://www.facebook.com/photo.php?fbid=37102265962612 2&set=a.2966450397207.71935.157201757674881&type=1&theater

Diego Garcia's 'Lawn Sharks'



Professor Charles Sheppard

One advantage of being a 'reviewer' for the Nobel prize-winning Intergovernmental Panel on Climate Change is that this draws your attention to numerous publications that may have escaped you, quite aside from the fact that you get to see drafts of reviews written by leading experts. Looking at IPCC work just drafted, I see that estimates of sea level rise have now been greatly increased over past estimates, as a consequence of the last 3-4 years of measurements and research. Today, estimates of sea level rise for this century range between 50 cm and 2 metres. Already in some parts of Asia it is rising by 1 cm per year. For sea level, like several other factors related to climate change, estimates are being revised to levels at or even above what we call 'worst case' scenarios of just a few years ago. Of course, global averages are just that: averages, and different parts of the world are responding differently and

© Charles Sheppard

by coral 'breakwaters' and if those die (for example from warming as happened in 1998) then much of the reef's breakwater effect is reduced at least for a few years until they can grow again. Secondly, the middle of islands are generally at a lower elevation than their rims: almost all have raised rims that keep the sea at But really it isn't amusing. This area, bay.

Now, the effect of sea level rise on coral islands is not like many people imagine – it is not a sort of small scale, slow motion tsunami. It is not even average sea level rise that matters anyway, but rather the high tides, especially high spring tides. What happens is that high tides may erode away the soft rock of these rims, so we see no change for year upon year until, one day, the next high tide broaches the rim, and the sea floods in, covering part of the land.

This point has now been reached in several parts of these islands. At several sites in Diego Garcia, this

sometimes unpredictably

With coral islands, we can add two other points. Firstly, they are protected

happened in March 2012; within a few minutes of each broach, water cascaded in like small rivers, here flooding the roadside grass to more than knee deep. It was fascinating to see coral reef fishes swimming over the grass and around the poles carrying electrical power to the south of the island. This group of four small lemon sharks joined in, swimming over the unfamiliar grass on their eternal quest for food, including inspecting my own wetsuit boots. This is not sea grass, but land grass. 'Croquet spoilers', someone called them, or 'Lawn Sharks' (you have to say that one aloud to get it).

like several others, flooded repeatedly on several consecutive high tides, then neap tides came and no flooding would have happened, for a month at least. But it leaves salt behind which percolates down to fresh water tables, and even salt resistant shoreline grass can't take this kind of treatment for too long so that the longer term consequences may be more permanent. Here, on an expensive military facility, fortification against water incursions can be done, though it is costing millions. It is a different matter for the many coastal settlements in the rest of the tropical ocean. For more details and photos, see www.chagostrust.org/resources/documents

Ships and Anchors in Diego Garcia

LCdr Jason W Schwarzkopf MP SRON TWO, Chief Staff Officer, **Diego Garcia**

Lieutenant Commander Jason W Shwarzkopf examines the past damage done to reefs around Diego Garcia by the military base, and explains what steps have been

carried out to prevent this in the future.

Diego Garcia is a strategically located island in the middle of the Indian Ocean and home to one of America's two remaining Maritime Prepositioning Squadrons. Far away, lush, and idyllic, the southernmost



island of the Chagos Archipelago is representative of the stereotypical island paradise that has inspired writers, adventurers, and travelers for centuries. Fresh sea-breezes, untouched by any continent for three thousand miles in all directions prevent the coral sand beaches and coconut tree forests from broiling in the equatorial sun. According to Prof. Charles Sheppard, British Indian on these creatures fracture their **Ocean Territories (BIOT)** environmental advisor and foremost expert on Chagos ecology, the waters calcified remains of previous polyps. of the whole archipelago including Diego Garcia remain the most



pristine environment in the world despite the sizable British and U.S. military footprint on Diego Garcia. This tropical jewel is constantly in some danger of suffering erosion for several reasons, some being climatic changes but also because portions of its reef were ground to dust in years past by years of anchoring (Figure 1). The damage inflicted upon the reef was grave, but was not irreparable provided action was taken.

The reef at Diego Garcia was slowly built by corals as the original volcano subsided over millions of years. Six thousand years ago, complicated changes in sea level meant that the present islands broached the surface of the Indian Ocean and life erupted in a green riot all over the island. Unlike the Philippines, Japan, or the Hawaiian Islands, the Chagos Archipelago, terminating in Diego

Garcia, is generated and sustained by miniscule coral polyps, whose limestone skeletons entwine and ossify over the staggering intervals of geological time. In terms of lifespan, their importance to the ecosystem, and sheer mass, these coral polyps are analogous to the magnificent sequoias of the Pacific Northwest. Anchors and anchor chain dropped connections with each other and with the 'roots' of the island- the The anchors can weigh three tons and each trails an average of four hundred feet of steel links back to the hawse on the ships above. Each link in the chain weighs a hundred pounds, and the motion of the cable as the ship pivots at anchor carves through the reef with all the delicacy of a chainsaw (Figure 2). In this fashion a ship at anchor in the lagoon replenishing the sands at the can reduce an acre or more of reef to required rate. Diego Garcia is rubble in a day or less. Once areas of concave when viewed from above. the formerly thriving reef have been reduced to dead rock, it is very difficult to regenerate, as the boulder-like remains of the dead reef will be immersed, rather than face a form an inhospitable substrate for the next generation of polyps to settle upon. At any point in the past, ships anchored on living reef inexorably ground the coral underneath their anchors to dust, killing sections of the reef and preventing previously damaged areas Back in 2008, Dr. Sheppard led a from regenerating.

Any destruction of the reef is of concern to everyone, not just environmentalists or conservationists. In addition to providing a refuge of incredible biodiversity, the corals when alive also generate the sand which keeps much of the atoll of Diego Garcia above water. Through the natural abrasion of wave action and feeding habits of certain animals, the sand -



small pieces of aragonite - are washed up on the beaches of the lagoon in a gradual process that over short time periods become the thousands of tons of sand required to build and sustain the island. Without this constant construction, the island would swiftly (in a matter of a few decades, not centuries) vanish beneath the powerful breakers of the Indian Ocean. The island and its military facilities will be uninhabitable if further damage to the ailing reef prevents it from When the shallow lip that rings the shoreline is eroded away, large portions of the centre of the island gradual, linear process of erosion. The erection of seawalls and breakwaters can then only delay the inevitable and even then at great cost; the solution has to come from the reef itself.

survey team of UK and US scientists and divers to conduct the largestscale underwater inspection of the reefs in the lagoon of Diego Garcia in the history of the island (Figure 3).



The survey revealed the extent of damage done to sand-producing corals in the lagoon, as well as assessing the quantities of sand being produced and eroded on an annual basis. The most salient point the survey made was that the anchoring practices of the previous four decades had indeed impacted the delicate equilibrium attained over the previous 6,000 years, as had conservation and preservation of our the large-scale coral die-off in the Indian Ocean in 1998. These factors so impacted sand production that by 2008 the northern beaches near Eclipse Point (nearest the lagoon entrance) saw a 3-meter erosion of the beach in a single year and some of this may have been attributable to lagoon sand loss (Figure 4).

Although it will take decades for any reefs damaged from any cause to completely recover their dazzling variety of species, if these reefs are given respite from the pounding of anchors and chain they do recover and have recovered quickly enough to maintain equilibrium of sand without the loss of additional real estate on the island (Figures 5 & 6). This year, island leadership—both British and U.S., re-evaluated the steps that have already been taken to minimize the amount of damage the ships in the lagoon inflict upon the reef. However, much more needs to be done to ensure the

health of the reef and the physical integrity of the island.

The U.S. Navy maintains its proactive stance towards environmental stewardship of waterways from small inlet harbors to vast oceans around the world. As stewards of the environment and in accordance with U.S. Naval Regulations, the oceanic environment is of paramount importance. The British Indian Ocean Territory Diego Garcia is no exception. Several initiatives are in progress to balance the strategic needs with maintaining the island's environment. While proposals, such as mooring buoys being re-installed in the lagoon, or the refurbishment of the pier on the southern end of the lagoon, are being considered, such options must remain viable to balance the Navy's need for a strategic forward presence and its deep commitment to environmental stewardship. The short term implementation costs could amount to potential long-term cost-savings for the U.S. Navy installation in Diego Garcia by foregoing the need for re-locating prepositioning ships. Additionally, the cost of installing the buoys is minimal compared to the expenses that have been incurred attempting to reclaim land that has already eroded, currently estimated at

between \$20-\$40 million USD.

Less costly options include leaving the ships adrift at sea, anchoring the vessels in nearby banks (following survey to find suitable places), and moving the anchorages to lessdamaging locations within the lagoon. After re-evaluating requirements for ships' anchorage locations versus the most fertile portions of the reef, Maritime Prepositioning Ships Squadron Two (in agreement with the British Representative and in concurrence with Prof. Sheppard's finding) a few years ago opted to reposition ships within Diego Garcia lagoon to negate the impact to sand-producing corals in the lagoon, and this is continuing. In addition to saving the reef and rebuilding the island naturally, these policies save millions being spent on beach reclamation in the short term and prevent the loss of an invaluable asset in the long term. The U.S. Navy continues to take proactive measures to mitigate damage to the coral atoll. Our focus on current mission readiness is first and foremost. Yet, we're committed to the future readiness of our joint forces, and as a gift to future generations, to preserve the reef on Diego Garcia.

Note: This article is not a commentary on US or DoD policy toward environmental agreements or intentions in the BIOT.



Update from the 12th International Coral Reef Symposium (ICRS)

Dr Sam Purkis, CCT-US

Like the Olympics, every four years the International Society for Reef Studies (ISRS) sanctions a major international scientific conference which provides the latest knowledge and leading edge technologies about coral reefs worldwide. In July 2012, the world's most renowned natural scientists, resource managers, conservationists, economists, educators and graduate students met in Cairns, Australia, to progress coral reef science, management and conservation. I was in attendance amongst 2,500 other delegates who had travelled to Cairns from some 80 countries to communicate their science and hear the latest advances from the international experts in coral reef studies.

A major theme of the ICRS was the study of the ecological, biological, and physical factors that determine coral reef resilience. Resilience is more than being able to recover from a major disturbance, surviving bleaching, or resisting bleaching. For a community to be resilient, it must also be able to continue to thrive, reproduce, and compete for space and resources. For example, coral communities that have experienced bleaching but not mortality may be weakened and less able to thrive, grow, and reproduce in the competitive reef environment. Chagos and the BIOT MPA was



prominently featured in the work of many British scientists, Dr. Nick Graham (Senior Research Fellow, ARC Centre of Excellence for Coral Reef Studies), Alasdair Harris (Founder and Research Director, Blue Ventures), and Prof. John Turner (Senior Lecturer, Bangor University), among them. Particularly exciting was the report that Nick Graham provided on the high biomass of reef fish within the BIOT MPA, as compared to sites elsewhere in the Indian Ocean.

Arising out of the ICRS was a **Consensus Statement on Climate** Change and Coral Reefs which, at the time of writing, has been signed by more than 3,000 people. The Consensus Statement was drafted by a working group of eminent scientists, brought together under the auspices of The Center for Ocean Solutions, to address the topic of climate change impacts on coral reefs. There still remains time to sign the statement and I encourage you to do so online at: www.icrs2012.com/Consensus State ment.htm

Bob Richmond, the current President of the International Society for Reef Studies, announced during the closing ceremony of ICRS 2012 that the 13th ICRS will take place in Hawaii in 2016. With the momentum that we have, Chagos and its fabulous reefs can be anticipated to again take center stage in Hawaii in four years time.

A link to the ICRS' news releases is www.icrs2012mediaportal.com



© Anne Sheppard

CCT AGM

Our Annual General Meeting will be held on Tuesday 27th November 2012 at: The Zoological Society of London, Regents Park, London NW1 4RY.

The meeting will be held in conjunction with a day long conference concerning the Chagos Archipelago. Full details will soon be available on our website.

In accordance with the Constitution, Members present at the Annual General Meeting will elect a Chairman, a Treasurer, the Secretary and members of the Executive Committee.

One third of the members of the Executive Committee must stand down each year, and this year the following are standing down:

- Pete Carr
- Rachel Jones
- Richard Martin
- Pete Raines
- John Turner

Nominations for office must be received by the Secretary at least seven days before the meeting.

Simon Hughes, CCT Secretary



Welcome to new members of the CCT team

Simon Hughes, CCT Secretary

In July, the Chagos Conservation Trust was delighted to welcome **Charley Cranmer and Kate Longhurst** to our team. Charley and Kate are joining us thanks to a generous grant from Pew Charitable Trusts which has enabled us, for the first time, to engage dedicated professional services to further our charitable goals.

Charley Cranmer - Fundraiser

An experienced fundraiser, Charley has worked in the charity sector for several years, raising money for a variety of causes including overseas development, cancer patients, animals and the environment. A committed environmentalist since she was 16 years old, when she took part in her first campaign to save an ancient woodland, she is eager to bring her skills and experience to

bear on behalf of CCT and Chagos.

Kate Longhurst - Communications and Outreach

Having worked in communications and outreach for both the Linnean Society of London and Coral Cay Conservation, Kate has tackled a range of challenges from website management to community engagement. She earned her Masters degree in conservation from University College London and is dedicated to the protection of the natural environment.

CCT Chairman, Alan Huckle, warmly welcomed the new additions to the team saying, "We are extremely pleased to be working with Charley and Kate at this time. We are looking forward to developing and expanding the work of CCT and they will play a key role in enabling us to do this."



Paul Caboche 1918-2012

Paul Caboche became known to readers of Chagos News in 2005 (CN 26) when we printed his memoir of life in the Chagos during the 1930s. That contact led to close and fruitful collaboration with CCT right up to a few weeks before his death in July. In 2006, recognizing his contribution to the study of the archipelago's history the Trust chose him as an honorary life member.

Paul's father managed the Salomon plantation from 1933 until his death there in 1952. Paul's connection with SOE to provide radio communication the Chagos began a year later when he hitched a ride aboard a sailing ship Saint Gérant. A few months later he found himself touring the archipelago aboard the Diégo. As war loomed he visited Chagos again as radio operator of the Zambezia,

shortly afterwards finding himself posted to Diego Garcia as the Royal Navy's radio operator. His interest in days and encouraged by his father who got him to install a receiver and transmitter in Salomon in 1936. From could spare from radio was used to those beginnings, Paul became a lifelong 'ham' with a call sign familiar to operators the world over.

Withdrawn from Diego Garcia in 1942 when the RAF set up its own radio station, Paul was recruited by with the Free French parties and in Vichy controlled Reunion; he also underwent training as a saboteur, to be deployed in the event of enemy invasion of Mauritius. After the war, he worked as an engineer in a number of Mauritian sugar estates,

with at least two patents to his credit.

radio had been acquired in his school In retirement, spent in his villa on the shores of Baie du Tombeau, (rich in historical associations), the time he study Mauritian and, especially, Chagos history; and he amassed an extensive archive of documents and a wide network of interlocutors. His capacious and extremely accurate memory enabled him to provide penetrating comments on every aspect of the history of the Chagos in the 20th century.

> Widowed in the 1990s, Paul continued to enjoy the support and company of his four sons. The CCT joins them and many others in mourning his loss.

The Chagos Marine Reserve: Building on Success

The British Indian Ocean Territory (Chagos) is the world's largest effective marine reserve, and its marine fauna reflects this in its startling abundance. A public and scientific meeting on the archipelago is planned for Tuesday November 27th at the Zoological Society of London. This will both provide an update on the science of the archipelago as it rapidly develops, and will also have presentations on the ongoing Chagossian outreach and training programme, as well as on future scientific plans. The research expedition to the archipelago in 2012 has obtained some strikingly successful results and images of the sort that can only come from places such as this in today's over-exploited oceans. At this meeting you can see island and marine life with an abundance that is today very uncommon, along with the scientific meaning of it.

> More information will soon be available at: www.chagos-trust.org For enquiries please contact: kate.longhurst@chagos-trust.org







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STATEMENT BY JUDGE ALBERT HOFFMANN, OBSERVER OF THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA.

Asian-African Legal Consultative Organization FORTY-SIXTH SESSION CAPE TOWN, REPUBLIC OF SOUTH AFRICA 2 - 6 JULY 2007

I am highly honored to address the Asian African Legal Consultative Organization at its 46th Session as a representative of the International Tribunal for the Law of the Sea.

On behalf of the President of the Tribunal, Dr. Rüdiger Wolfrum, I would like to thank AALCO for inviting the Tribunal to your session this year as an observer. Judge Hugo Caminos represented the Tribunal at the 45th Session of AALCO in New Delhi in April last year.

As you know, I am from South Africa, so I also wish to welcome all the African and Asian delegates and observers to my country. I hope that you will have a wonderful visit. I invite you all to enjoy the warmth of South African hospitality.

Contribution of AALCO to UNCLOS III

First, I would like to recall the significant contribution of AALCO to the negotiations at the Third United Nations Conference for the Law of the Sea. The meetings of the AALCO from 1970 to 1982, though conducted outside of UNCLOS III, were acknowledged to have had an important influence on the outcome of UNCLOS III and on the 1982 United Nations Convention for the Law of the Sea.¹

The Tribunal follows with great interest the issues important to the member States of AALCO. We note that issues concerning the law of the sea continue to occupy a place of significance in your work programme.

"A Constitution for the oceans"

The 1982 United Nations Convention on the Law of the Sea regulates all aspects of the ocean space, its uses and its resources and includes, among others, such matters as fisheries, archipelagic States, maritime delimitation, regime of islands, protection and preservation of the marine environment, marine

¹ T Koh and S Jayakumar, "The Negotiating Process of the Third United Nations Conference on the Law of the Sea", in M. H. Nordquist (ed), *United Nations Convention on the Law of the Sea 1982, A Commentary,* vol. 1, (Center for Oceans Law and Policy, University of Virginia, 1985), p. 59.

scientific research. The comprehensive scope of the Convention makes it truly a "constitution for the oceans."²

Today, the Convention has 154 States parties plus the European Community. Forty (40) States Members of the AALCO have ratified or have acceded to the Convention. The goal of the Convention is universal participation. Every year, in a resolution, the General Assembly calls on all States that have not done so, to consider becoming parties to the Convention.³

Dispute settlement options and written declarations under article 287

As you know, the Tribunal is established by the United Nations Convention on the Law of the Sea as one of the options available to the parties to the Convention under article 287 for the compulsory settlement of disputes concerning the interpretation or application of the Convention. The other options being the International Court of Justice in the Hague, arbitration under Annex VII or special arbitral tribunal under Annex VIII.

There is no hierarchy between the various options. It is up to the parties to choose which dispute settlement procedure they prefer. In article 287, paragraph 1 of the Convention, States and entities, when signing, ratifying or acceding to the Convention, or at any time thereafter, may make declarations specifying the forums for the settlement of disputes which they accept.

In practice, only 36 States, out of 154 States Parties, have made declarations under article 287. Twenty-four States have chosen the Tribunal as first choice. Twenty-three States have chosen the ICJ as first, second or third choice. Fifteen States have made declarations in favour of arbitration as first, second or third choice. Since, in the absence of declarations, States are deemed to have chosen arbitration, this shows clearly that in most cases arbitration will be the only means of settling disputes, except where the parties decide otherwise. I would like to take this opportunity to reiterate that written declarations in favour of the Tribunal under article 287 may be made at the time of ratification, accession or at any time thereafter.

On the matter of written declarations, allow me to guote paragraph 27 of the General Assembly Resolution 61/222 of 16 March 2007, where the General Assembly,

Encourages States parties to the Convention that have not yet done so to consider making a written declaration choosing from the means set out in article 287 of the Convention for the settlement of disputes concerning the interpretation

² The phrase "A Constitution for the Oceans" is attributed to Ambassador Tommy Koh in the statements made on 6 and 11 December 1982 at the final session of UNCLOS III, in M. H. Nordquist (ed), United Nations Convention on the Law of the Sea 1982, A Commentary, vol. 1, (Center for Oceans Law and Policy, University of Virginia, 1985), p. 11.

See paragraph 3, A/RES/61/222 of 16 March 2007.

or application of the Convention and the Agreement, bearing in mind the comprehensive character of the dispute settlement mechanism provided for in Part XV of the Convention. (end of quote)

Let me emphasize that declarations under article 287 are not the only way to bring a case before the Tribunal. It is always possible for the parties to a dispute to submit a case to the Tribunal on the basis of an agreement. Two cases have already been submitted to the Tribunal on the basis on an agreement. (Saint Vincent and the Grenadines/Guinea and Chile/European Community).

Jurisdiction of the Tribunal

Let me now refer you briefly to the jurisdiction of the Tribunal. As you know, the core competence of the Tribunal is to deal with disputes arising out of the Convention. In other words, whenever a dispute relates to a provision of the Convention (with its 320 articles) or whenever it is alleged that a State has not complied with a provision of the Convention, the Tribunal is competent.

For example, issues relating to the delimitation of maritime areas, the detention or arrest of a vessel, damages resulting from oil pollution, overexploitation of fishery resources, are disputes that may be brought to the Tribunal for resolution.

With respect to disputes relating to the Convention, the Tribunal is open to States Parties to the Convention. This means the 154 States which have ratified or acceded to the Convention, plus the European Community.

Under the Convention, it is also possible for non-States Parties, such as the Authority, a state enterprise or a natural or juridical person, to appear before the Seabed Dsiputes Chamber of the Tribunal with respect to disputes relating to the exploration and exploitation of the deep seabed area.

The Tribunal may also acquire jurisdiction over disputes arising out of other agreements. Article 21 of the Statute provides that the jurisdiction of the Tribunal comprises all matters provided for in any other agreement which confers jurisdiction on the Tribunal. A number of agreements have been concluded which contain provisions stipulating that disputes arising out of the interpretation or application of these agreements could be submitted to the Tribunal. As an illustration, two of such agreements are the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. The most recent convention that has adopted the dispute settlement procedure of the Convention is the Nairobi International Convention on the Removal of Wrecks, 2007.⁴ A list of the agreements and the relevant provisions contained therein are published in the Tribunal's Yearbook and made available on the website of the Tribunal.⁵ The list does not claim to be exhaustive and is based on information brought to the attention of the Registry of the Tribunal.

Advisory proceedings

I wish to add that the Tribunal is not only competent to deal with contentious proceedings, i.e., cases involving disputes between two States. It may also give an advisory opinion on legal questions. Indeed, the Convention provides that the International Seabed Authority may address requests for advisory opinions to the Seabed Disputes Chamber, a chamber consisting of 11 members of the Tribunal.

Requests for advisory opinions may also be submitted to the Tribunal pursuant to article 138 of the Rules of the Tribunal, which states that the Tribunal "may give an advisory opinion on a legal question if an international agreement related to the purposes of the Convention specifically provides for the submission to the Tribunal of a request for such an opinion".

Jurisprudence of the Tribunal

In its 10-year existence, the Tribunal has delivered decisions in 13 cases on several issues on the law of the sea, including the prompt release of vessels and their crews, protection and preservation of the marine environment, fisheries, the commissioning of a nuclear facility and the movement of radioactive materials, reclamation activities, freedom of navigation, nationality of claims, use of force in law enforcement activities, hot pursuit and the question of the genuine link between a vessel and its flag State. On the occasion of the Tribunal's tenthyear anniversary, Judge Rosalyn Higgins, the President of the International Court of Justice, stated that (and I quote) "within a decade, the Tribunal has pronounced interesting law, built a reputation for its efficient and speedy management of cases and shown innovative use of information technology" (end of quote). The General Assembly has also recognized (and I quote), "the continued and significant contribution of the Tribunal to the settlement of disputes by peaceful means in accordance with Part XV of the Convention, and underlines

⁴ Adopted 18 May, 2007.

⁵ The other agreements in the list include the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas; the Agreement for the Conservation of Fishery Resources in the High Seas of the South-East Pacific; the Convention on the Protection of the Underwater Cultural Heritage; the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean; the Convention on the Conservation and Management of Fishery Resources in the South-East Atlantic Ocean.

the important role and authority of the Tribunal concerning the interpretation or application of the Convention and the Agreement." (end of quote)⁶

Chambers of the Tribunal

Unless otherwise provided, cases are dealt with by the Tribunal, consisting of 21 judges. Parties to a case may also request that the case be heard by a chamber composed of three or more of the elected judges. They may choose a standing chamber: *Chamber for Marine Environment Disputes; Chamber for Fisheries Disputes; Chamber of Summary Procedure; and Chamber for Maritime Delimitation Disputes.*

They may also request the constitution of an *ad hoc* chamber, in which case the composition of the chamber will be determined by the Tribunal with the approval of the parties. Here, I would like to quote what President Wolfrum has said of the many advantages of *ad hoc* chambers in his Statement before the 61st Session of the General Assembly on 8 March 2006.

The system of *ad hoc* special chambers, which was used for the first time by Chile and the European Community, is a flexible mechanism that combines the advantages of a permanent court with those of an arbitral body. The parties have control over the chamber's composition, as they may choose any of the 21 judges who are to sit in the chamber and may also appoint judges *ad hoc* if the chamber does not include a member of the nationality of the parties. Under the Statute, a judgment given by any of the chambers is considered as rendered by the Tribunal. A further advantage is that the parties have at their disposal the Rules of the Tribunal, which allow the case to be processed swiftly. The parties have a certain degree of flexibility in that they may propose modifications or additions to the Rules. Interested delegations will find detailed information on the Tribunal's proceedings and its special chambers in the *Guide to proceedings before the Tribunal*. (end of quote)

Work of the Tribunal

The Tribunal, at its Twenty-Second and Twenty-third Sessions, dealt with a number of legal matters that have a bearing on its judicial work. One of the issues considered by the Tribunal concerned the competence of the Tribunal on disputes on maritime delimitation. Article 288 of the Convention confers jurisdiction on the Tribunal, as well as the ICJ or an arbitral tribunal, to deal with any dispute concerning the interpretation or application of the Convention.

⁶ Paragraph 24, A/RES/61/222.

Therefore, disputes relating to maritime boundaries are considered disputes concerning the interpretation or application of the Convention.

The Tribunal has noted that its jurisdiction over jurisdiction over maritime delimitation disputes also include those which involve issues of land or islands. In his Statement before the 61st Session of the General Assembly, President Wolfrum stated that (and I quote)

This approach is in line with the principle of effectiveness and enables the adjudicative body in question to truly fulfill its function. Maritime boundaries cannot be determined in isolation without reference to territory. Moreover, several provisions of the Convention deal with issues of sovereignty and the inter-relation between land and sea. Accordingly, issues of sovereignty or other rights over continental or insular land territory, which are closely linked or ancillary to maritime delimitation, concern the interpretation or application of the Convention and therefore fall within its scope. (end of quote)

Costs

The expenses relating to the functioning of the Tribunal are covered by the contributions of the States Parties. Therefore, submitting a case to the Tribunal would not require the payment of court or any administrative fees. The parties to the case have only to bear the expenses relating to counsel and advocates, together with the accommodation expenses during their stay in Hamburg for the hearing.

A trust fund was set up in 2000 in order to assist developing States, which are parties to a case before the Tribunal with respect to expenses. The fund is maintained by the secretariat of the Convention, the United Nationes Division on Ocean Affairs and the Law of the Sea (DOALOS). In 2005, the Fund awarded US \$20,000 to Guinea-Bissau to defray its expenses related in the Juno Trader Case (St. Vincent and the Grenadines v. Guinea-Bissau).⁷ As of 31 December 2006, the balance of the fund was US \$85,869.⁸

Workshops

I would like to inform the members States of AALCO of the regional workshops on the role of the Tribunal on the settlement of disputes under the Convention. So far, the Tribunal has organized four workshops. The first workshop took place in Dakar, Senegal from 31 October to 2 November 2006. It was attended by representatives of different ministries of 13 Western African

⁷ Paragraph 55, A/60/63 of 4 March 2005.

⁸ Paragraph 358, A/62/66 of 12 March 2007

States. The second was in Kingston, Jamaica from 16 to 18 April 2007. It was attended by representatives of 19 Latin American and Caribbean States.

A joint workshop was also organized by the Gabonese authorities and the Intergovernmental Oceanographic Commission of UNESCO in conjunction with the Meeting of the Advisory Board of Experts on the Law of the Sea (ABELOS) in Libreville on 26 and 27 March 2007. It was attended by representatives of 17 States that participated in the meeting of ABELOS.

The fourth workshop was held in Singapore from 29 to 31 May 2007. The Singapore Workshop was attended by representatives of 17 States from the Northeast, Southeast and South Asia.

In his statement at the opening of the Singapore Workshop, Deputy Prime Minister S Jayakumar encouraged States to turn to the Tribunal in settling disputes related to the law of the sea. Singapore, as you know, was the respondent State in a provisional measures case concerning land reclamation in the Straits of Johore brought by Malaysia to the Tribunal. Singapore and Malaysia subsequently resolved the dispute. Singapore has acknowledged the role played by third-party institutions, including the Tribunal, in resolving the dispute with Malaysia.

Training programme on dispute settlement

I also wish to inform you that the Tribunal recently entered into an agreement with the Nippon Foundation of Japan, to organize a training programme on dispute settlement under the Convention. The programme has been developed to offer young government officials and researchers working in the field of the law of the sea or dispute settlement in-depth knowledge of the dispute-settlement mechanisms available to States under Part XV of UNCLOS.

Five participants have been selected to join the 2007-2008 programme which will last for 8 months from July 2007 to March 2008. Lectures, case studies, and training will enable participants to acquire a deeper understanding of the dispute-settlement mechanisms under the Convention. Study visits will be made to organizations dealing with law of the sea matters. Lectures will be given on law of the sea issues (fisheries, environment, climate change, delimitation, and the international seabed area).

I would like to encourage, in particular, AALCO's Center for Research and Training to take note of this training programme and of the deadlines for application. This year's application process has been completed.

In conclusion, I wish to reiterate my gratitude to AALCO for its invitation to the Tribunal to participate as an observer and for granting me the opportunity to address the organization on matters concerning the Tribunal. On behalf of the Tribunal, I would like to wish AALCO success in its deliberations at this session. Thank you very much.

INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA



Statement by

H.E. JUDGE RÜDIGER WOLFRUM,

President of the International Tribunal for the Law of the Sea

to the Informal Meeting of Legal Advisers of Ministries of Foreign Affairs

New York

23 October 2006

Statement by

H. E. Judge Rüdiger Wolfrum, President of the International Tribunal for the Law of the Sea,

to the Informal Meeting of Legal Advisers of Ministries of Foreign Affairs

New York, 23 October 2006

Mr. Chairman Excellencies, Ladies and Gentlemen,

It is a great honour for me to address this meeting of distinguished Legal Advisers for the second time as President of the International Tribunal for the Law of the Sea. I am sincerely grateful for your kind invitation and I very much appreciate the possibility to exchange views on issues of mutual interest.

I feel that it would be useful to take this opportunity to discuss with you two recurring questions of great importance; namely, the competence of the Tribunal in maritime delimitation cases and the Tribunal's advisory function.

The competence of the Tribunal in maritime delimitation cases

A fundamental innovation of the United Nations Convention on the Law of the Sea of 1982 was the establishment of a comprehensive system for the settlement of disputes consisting of both voluntary and compulsory procedures. This system, which constitutes an integral part of the Convention - namely Part XV - applies to the vast majority of the provisions of the Convention, including those concerning sea boundary delimitation.

The procedures for the settlement of disputes are set out in Part XV of the Convention. According to Part XV, parties to a dispute concerning the Convention who fail to resolve their dispute through voluntary procedures are obliged to resort to compulsory procedures entailing binding decisions provided for in section 2 of Part

XV. It is noteworthy that, under the Convention, States Parties have accepted compulsory procedures by the mere fact of adhering to the Convention.

As you know, following complicated negotiations, consensus on a dispute settlement system was reached at the Third United Nations Conference on the Law of the Sea through the so-called "Montreux Compromise", which is reflected in article 287. This provision gives States Parties the possibility to choose, by means of a written declaration, one or more means for the settlement of disputes concerning the Convention, namely, the International Tribunal for the Law of the Sea, the International Court of Justice or arbitration. The adjudicating bodies referred to in article 287 have equal standing under the Convention. The jurisdiction of an adjudicating body becomes compulsory when the parties to a dispute have accepted it by virtue of a declaration. Of the present 149 States Parties, so far only 38 have filed declarations, of which 22 have chosen the Tribunal as their preferred means, or one of the means, for the settlement of maritime disputes. In the absence of a declaration, parties are deemed to have accepted arbitration, and this has proven to be the general rule, while selecting the Tribunal or the ICJ remains the exception. I wonder whether this development was anticipated when the Convention was adopted or whether arbitration was meant to be the exception rather than the rule, which it is *de facto* at the moment. It is therefore to be hoped that an increasing number of States will make declarations with regard to the choice of procedure, as is repeatedly recommended by the General Assembly.

In accordance with article 288 of the Convention, the Tribunal, the ICJ or an arbitral tribunal has jurisdiction over any dispute concerning the interpretation or application of the Convention. In this regard, disputes relating to maritime boundaries are – as a general rule – to be considered disputes concerning the interpretation or application of the Convention. Allow me to explain this point.

First of all, there is a specific reference to Part XV procedures in the provisions governing the delimitation of the exclusive economic zone and the continental shelf. In effect, articles 74 and 83 explicitly provide that, failing agreement on delimitation within a reasonable period of time, the States concerned shall resort to Part XV procedures.

Secondly, even without an explicit reference of this nature, there can be no doubt that disputes concerning the interpretation or application of other provisions, that is, those regarding the territorial sea, internal waters, baselines and closing lines, archipelagic baselines, the breadth of maritime zones and islands, are disputes concerning the Convention (see articles 3 to 15, 47, 48, 50, 57, 76 and 121).

Thirdly, if a State wishes to exclude certain maritime delimitation disputes from compulsory procedures it has to make a declaration opting out of such means, in accordance with article 298, paragraph 1(a) of the Convention. This declaration can be made in relation to disputes concerning the delimitation of the territorial sea (article 15), the exclusive economic zone (article 74) and the continental shelf (article 83) as well as those involving historic bays or titles. A small number of States have made use of this possibility. Some of these States have excluded delimitation disputes from all of the compulsory procedures while others have made a declaration excluding such disputes from one procedure only.

The fact that a State has excluded maritime delimitation disputes from compulsory procedures by virtue of article 298, paragraph 1(a) of the Convention does not mean that the dispute is entirely exempted from settlement under the Convention. The State concerned will be bound to refer the dispute to compulsory conciliation if the following conditions are met:

- the dispute must be one that has arisen subsequent to the entry into force of the Convention;
- conciliation will be mandatory only where no agreement between the parties is reached within a reasonable period of time;
- any dispute that necessarily involves the concurrent consideration of any unsettled dispute concerning sovereignty or other rights over continental or insular land territory is excluded from the submission to conciliation;
- also excluded from conciliation is any dispute finally settled by an arrangement between the parties.

Certainly, these conditions are peculiar to the compulsory conciliation procedure; they do not apply to adjudication by the Tribunal, the ICJ or arbitration. This is of particular relevance to the condition regarding "mixed" delimitation cases; namely cases in which a maritime dispute involves the concurrent consideration of any dispute concerning sovereignty or other rights over continental or insular land territory. I will come back to this point in a moment. In addition, it should be noted that, if mandatory conciliation has proven unsuccessful, the dispute may revert to the compulsory system, unless agreed otherwise by the parties.

The general rule that, under the Convention, all maritime delimitation disputes are subject to compulsory binding settlement – unless a declaration to opt out is made – applies to the Tribunal, the ICJ and arbitration. The adjudicating bodies referred to in article 287 are equal in terms of their jurisdiction over sea boundary disputes under Part XV of the Convention. The ICJ may, however, decide maritime delimitation cases beyond Part XV of the Convention on the basis of its jurisdiction as provided for in the Statute of the Court.

A fundamental principle of international adjudication is the consent of the parties. Accordingly, States are free to choose the procedures for resolving their disputes. In line with this principle, the Convention authorizes the parties to a dispute on issues of maritime delimitation, at any time, to agree jointly to submit the dispute to the Tribunal, or any other court or tribunal, by the notification of a special agreement. Through a special agreement, the parties can also overcome any limitations or exceptions to compulsory jurisdiction. Further, the parties to a dispute can always bring the dispute to the Tribunal even when they have chosen other compulsory means under article 287 of the Convention.

With regard to jurisdiction based on a special agreement, the area to be delimited will normally be determined in the special agreement between the parties and nothing prevents them from submitting to the Tribunal any maritime delimitation case involving issues regarding land boundaries or cases involving disputed sovereignty over islands.

As to compulsory jurisdiction – and by this I mean jurisdiction of the Tribunal or

any other court or tribunal on the basis of article 287 of the Convention - this covers disputes regarding the delimitation of the various maritime zones. In this respect, it may be noted that the competence of the Tribunal, or any other court or tribunal, to deal with the main claim that maritime delimitation be effected according to articles 15, 74 or 83 includes the associated question of delimitation over land or islands. I have indirectly alluded to this point already. This approach is in line with the principle of effectiveness and enables the adjudicative body in question to truly fulfil its function.

It is apparent that maritime boundaries cannot be determined in isolation without reference to territory. Moreover, sea boundaries are associated with issues of sovereignty, such as the determination of entitlements over maritime areas, the treatment of islands, the identification of the relevant basepoints - whether they are located at sea, in river mouths or on terra firma – or the fixing of baselines including archipelagic baselines. Such issues of sovereignty and the inter-relation between land and sea are addressed in several provisions of the Convention, for instance, those concerning internal waters, the territorial sea, baselines, archipelagic States and the continental shelf. The presence of islands is a frequent factor in maritime delimitation and the regime of islands is provided in article 121 of the Convention.

Issues of sovereignty or other rights over continental or insular land territory, which are closely linked or ancillary to maritime delimitation, concern the interpretation or application of the Convention and therefore fall within its scope. This may be evidenced by a reading *a contrario* of article 298, paragraph 1(a), namely, in the absence of a declaration under article 298, paragraph 1(a), a maritime delimitation dispute including the necessarily concurrent consideration of any unsettled dispute concerning sovereignty or other rights over continental or insular land territory is subject to the compulsory jurisdiction of the Tribunal, or any other court or tribunal.

In this connection, I would like to draw your attention to the fact that – apart from contentious proceedings - the parties to a maritime delimitation dispute may also take advantage of the Tribunal's advisory functions. Accordingly, they may request the Tribunal to determine the principles according to which the dispute can

be settled through direct negotiation. This brings me to the second part of my presentation, namely: the advisory function of the Tribunal.

The advisory function of the Tribunal

I will deal briefly with this topic.

The advisory function of the Tribunal is twofold. On the one hand, the Seabed Dispute Chamber has jurisdiction to give an advisory opinion with regard to matters pertaining to Part XI of the Convention. On the other hand, the Tribunal may give advisory opinions on the basis of other international agreements. I will explain this in more detail.

Under article 138 of its Rules, the Tribunal may be requested to give an advisory opinion on a legal question if an international agreement related to the purposes of the Convention specifically provides for the submission of a request for such an opinion. The Tribunal's advisory function is based on article 21 of the Statute, which states that the jurisdiction of the Tribunal comprises "all disputes and all applications submitted to it" and "all matters specifically provided for in any other agreement which confers jurisdiction on the Tribunal." Accordingly, future international agreements, for instance, between States or between States and international organizations, could provide for recourse to the Tribunal's advisory procedures. A request for an advisory opinion before the Tribunal is transmitted to the Tribunal by the body or entity so designated in accordance with the international agreement in guestion. For instance, States could consider submitting an advisory opinion directly to the Tribunal or through an international "body" such as the Meeting of States Parties to the Convention. The rules applicable to advisory proceedings before the Tribunal are set out in the Tribunal's Rules. Interested delegations will find detailed information on the Tribunal's proceedings, including its advisory function, in the Guide to proceedings before the Tribunal, copies of which are available here.

The advisory function of the Tribunal is a significant innovation in the international judicial system and may offer an interesting alternative to contentious proceedings, in particular, in view of its non-binding nature. Through an advisory

opinion, the requesting body may obtain legal guidance from the Tribunal on a specific question but the requesting body is not bound to accept the conclusions of the Tribunal. This could be advantageous for those seeking an indication as to how a particular dispute may be solved through direct negotiations. As mentioned earlier, the parties to a delimitation dispute could ask the Tribunal to determine the principles and rules of international law applicable to the dispute and undertake thereafter to establish the boundary on that basis. Although advisory procedures have not been used yet, they can certainly assist conflicting parties in reaching a settlement and even prevent them from engaging in a dispute.

Mr. Chairman Excellencies, Ladies and Gentlemen,

I conclude by expressing my appreciation to you for the opportunity given me to address this meeting. I thank you for your kind attention.




IOTC-2012-CoC09-08b[E]

A note on IUU Fishing in BIOT waters by fishing vessels flagged in Sri Lanka submitted to the 9th IOTC Compliance Committee Meeting

Prepared by the United Kingdom

1. Introduction

In 2011 UK(BIOT) presented eleven Sri Lankan vessels for IUU listing and outlined a history of persistent IUU fishing by Sri Lankan vessels over many years. Paragraph 72 of the Report of the 15th Session of the Commission, 2011, records the Commission's decision:

'72. The Commission **agreed** on the severity of the cases under consideration. Notwithstanding the lack of consensus, the Commission agreed to not list the 11 vessels flagged in Sri Lanka in the IOTC IUU Vessels List. In addition, the Commission requested Sri Lanka to report every month, through the IOTC Secretariat, information on the whereabouts of each vessel; as well as communicating final decision from the Sri Lankan Court and fate of each fishing vessel, where applicable. The Commission further agreed that, in the case that any of such vessels is involved in IUU activities in the future, it shall be automatically listed in the IOTC IUU Vessels List.'

Additionally, in the margin of the 2011 Commission meeting the Sri Lankan authorities approached the UK(BIOT) authorities and requested that a bilateral exchange of information occurs prior to presenting vessels to the IOTC Compliance Committee for potential IUU listing. Such a system was implemented during 2011 (see IOTC Circular 2011-46).

UK(BIOT) welcomes the closer collaboration with the Sri Lankan authorities and also notes that they have implemented IUU awareness campaigns amongst fishermen in Sri Lanka, but wishes to highlight that this has failed to address the issue (see Table 1); that Sri Lanka has not complied with the decision of the Commission in 2011 on monthly reporting; and, that although Sri Lanka has in excess of 3000 vessels on the IOTC list of authorised vessels, it has failed to comply with its international obligations and those required under IOTC. These details are brought to the attention of the Compliance Committee for consideration.

2. Failure to address IUU fishing

Since the 2011 Commission meeting eleven Sri Lankan vessels have been arrested for illegally fishing in BIOT waters one of which has not yet been reported formally to IOTC (see Table 1). The Sri Lankan Authorities have taken subsequent action with respect to eight vessels as indicated in the cited IOTC Circulars and as a result UK(BIOT) have not recommended that these vessels are included on the IUU list. The UK (BIOT) nevertheless retains concerns about the ability of the Sri Lankan Competent Authorities to meet international obligations (See Section 4). The UK has requested that two of these vessels be placed on the IOTC IUU Vessels List (Circular 2012/04).

IOTC-2012-CoC09-08b[E]

No.	Vessel Name	Sri Lanka/IOTC Identification Number	Infringement	Date of Arrest	Outcome	Submitted to Sri Lanka	Response and action by Sri Lankan Authorities	Source of verification	Submitte d to IOTC	Recomme ndation	IOTC Circular
1	Vissopa matha	IMULA0346KLT	Fishing without a licence Possession of wire trace	27/12/2010	Fine paid: vessel released	17/06/2011	12/07/2011: Cancellation of vessel registration Cancellation of operation licence	Letter to UK informing of deregistration and cancellation of licence and copy of fax dated 24/06/2011 instructing district office to execute actions	20/07/20 11	No further action	2011-54; 2012-31
2	Rushan Putha 7	IMULA0086KLT	Fishing without a licence Possession of wire trace	14/02/2011	Fine paid: vessel released	20/05/2011	31/05/2011: Cancellation of vessel registration Cancellation of operation licence	Letter to UK informing of deregistration and cancellation of licence	20/06/20 11	No further action	2011-46
3	Anjali Duwa	IMULA0245CH W	Fishing without a licence Possession of wire trace	23/02/2011	Fine paid: vessel released	20/05/2011	31/05/2011: Cancellation of vessel registration Cancellation of operation licence	Letter to UK informing of deregistration and cancellation of licence	20/06/20 11	No further action	2011-46
4	Pradeepa 2	IMULA0058KLT IOTC011097	Fishing without a licence Possession of wire trace	23/08/2011	Fine paid: vessel released:	09/09/2011	10/10/2011: Cancellation of vessel registration Cancellation of operation licence	Fax to district fisheries office instructing investigation to identify vessel	10/10/20 11	No further action	2011-70; 2012-31
5	Speedbird 3	Unknown	Fishing without a licence Possession of wire trace	14/10/2011	Fine paid: vessel released:	23/11/2011	10/10/2011 Vessel unknown to SL authorities Investigation to identify vessel	Fax to district fisheries office instructing investigation to identify vessel	06/01/20 12	Inclusion on IOTC IUU list	2012-04; 2012-31
C C	Muthaku	11-1	Fishing without a licence	47/40/2004	Fine paid:	22/44/2044	06/12/2012: Vessel unknown	Email communication to UK informing of	06/01/20	Inclusion	2012-04;

Table 1: Details of Sri Lankan Vessels arrested in BIOT waters and presented to IOTC under Resolution 11/03 since the March 2011Commission meeting.

No.	Vessel Name	Sri Lanka/IOTC Identification Number	Infringement	Date of Arrest	Outcome	Submitted to Sri Lanka	Response and action by Sri Lankan Authorities	Source of verification	Submitte d to IOTC	Recomme ndation	IOTC Circular
							operation licence	licence			
8	Kasun Putha 1	IMULA0215TLE	Fishing without a licence Possession of wire trace	10/11/2011	Non payment: vessel not released	23/12/2011	04/01/2012: Cancellation of vessel registration Cancellation of operation licence*	Email communication to UK informing deregistration of vessel and cancellation of licence	06/01/20 12	No further action	2012 -04; 2012-31
9	Little Moon- shine	IMULA0507KLT	Fishing without a licence Possession of wire trace	13/12/2011	Fine paid: vessel released:	24/01/2011	26/01/2012 Cancellation of vessel registration Cancellation of operation licence	Fax to District fisheries office instructing action	27/01/20 12	No further action	2012-12
10	Helga Siril	IMULA0356KLT IOTC012094	Fishing without a licence Possession of wire trace	04/01/2012	Fine paid: vessel released:	24/01/2011	26/01/2012: Cancellation of vessel registration Cancellation of operation licence	Fax to District fisheries office instructing action	27/01/20 12	No further action	2012-12
11	Sunju Putha 4	IMUL- A0014KLT/ IOTC01103	Fishing without a licence Possession of wire trace	11/02/2012	Pending	N/A	N/A	N/A	N/A	N/A	N/A

*As the vessel Kasun Putha 1 has not been released from BIOT as noted in Circular 2012-04, the UK is unclear as to the source of the Sri Lankan authorities' verification for this action

With respect to the vessels Speed Bird 3 and Muthukumari placed on the provisional IUU list, we note in the recent Circular 2012-31 (13 March 2012) that to date the Sri Lankan authorities remain unable to trace these vessels. The crew, master and owner of both vessels were Sri Lankan, vessel markings on the Muthukumari were Sri Lankan and those on the Speed Bird 3 indicated the port of Beruwala in Sri Lanka. Additionally details obtained by the Court in Diego Garcia indicated the ownership and registration of the vessel Speed bird 3 (See Annex 1). These additional details were provided to Sri Lanka on 16 March 2012. In addition to the failure to control licensed vessels, the case of these two vessels raises the question of the capacity of the Sri Lankan authorities to maintain control over all vessels originating in Sri Lanka.

3. Monthly reporting by Sri Lanka to IOTC

Sri Lanka has failed to report monthly to IOTC. UK(BIOT) has also requested that each new case of IUU be added to the monthly report and this has not consistently been done. Sri Lanka produced monthly reports in May, June, July and September 2011 and a summary report on 13 March 2012 only. <u>UK(BIOT) highlight this non compliance for the consideration of the Compliance Committee.</u>

Furthermore, evidence of actions taken by the Sri Lankan authorities provided in the monthly reports and bilateral exchanges of information has been inconsistent. Therefore, UK would like to propose that the Sri Lankan authorities provide standardised evidence for completing the actions required by Resolution 11/03, paragraph 10b. In this respect we note that under the Sri Lankan Fisheries Act of 1996, there exists a means for the provision of standardised verification under Part 11, Section 1, whereby the Director or a Licensing Officer acting under his authority decides to cancel a licence, "he shall communicate such decision and the reasons therefore [*sic.*] to the applicant or licensee as the case may be, by registered post". The UK (BIOT) propose for the consideration of the Compliance Committee that this should be adopted as the minimum standard body of evidence that should be provided by the Sri Lankan Authorities to UK (BIOT) and to the IOTC.

In addition, in those cases in which vessels are guilty of IUU activity the Sri Lankan Authorities should circulate a request to the Commission that the vessel in question is removed from the IOTC authorised vessel list (but see Section 4). This would ensure that authorised fishing vessels (AFVs) on the IOTC record have no history of IUU fishing as required in Resolution 07/02.

Many of the Sri Lankan vessels guilty of IUU fishing have been sold to new owners and whilst we note that presently new owners can only 'obtain an operational licence for the vessel to operate in the EEZ of Sri Lanka' (letter from the Sri Lankan authorities, 31.5.11, Circular IOTC 2011-46), should that situation change Resolution 07/02 para 5d indicates the evidence required by the Commission in that case:

d) ensure that their AFVs on the IOTC Record have no history of IUU fishing activities or that, if those vessels have such history, the new owners have provided sufficient evidence demonstrating that the previous owners and operators have no legal, beneficial or financial interest in, or control over those vessels, or that having taken into account all relevant facts, their AFVs are not engaged in or associated with IUU fishing;

4. Compliance with IOTC and international obligations

Sri Lanka is a party to the UN Fish Stocks Agreement (UNFSA, ratified 24 October 1996) which imposes a number of duties on flag States including a requirement for licensing, for ensuring relevant documentation is carried on board, and for vessel marking (see Annex 2).

Sri Lanka is a Member of IOTC and therefore Resolutions passed by IOTC are binding upon it.

We argue that Sri Lanka at the present time does not comply with its obligations under the UNFSA nor does it comply with a number of IOTC Resolutions, *inter alia*:

- The current Sri Lankan Fisheries and Aquatic Resources act of 1996 does not make provision for the licensing of high seas fishing [see letter from the Sri Lankan Authorities to UK(BIOT) dated 10.10.11 in IOTC Circular 2011-70].
- Sri Lanka has placed in excess of 3000 vessels on the IOTC register of authorised vessels (i.e. authorised to fish on the high seas within the IOTC area of competence) and therefore is not compliant with UNFSA (article 18 (3)(b)(ii) [Annex 1, c)].
- In respect of vessels on the IOTC list of authorised vessels IOTC Resolution 07/02 defines the responsibilities of the flag CPCs of vessels on the record (authorised list) and requires the flag State, *inter alia*, to (Paragraph 5):
 - authorise their AFVs to operate in the IOTC Area only if they are able to fulfil in respect of these vessels the requirements and responsibilities under the IOTC Agreement and its conservation and management measures;
 - take necessary measures to ensure that their AFVs comply with all the relevant IOTC conservation and management measures;
 - take necessary measures to ensure that their AFVs on the IOTC Record keep on board valid certificates of vessel registration and valid authorisation to fish and/or tranship;
 - \circ ~ ensure that their AFVs on the IOTC Record have no history of IUU fishing activities.

Sri Lanka does not meet these responsibilities as evidenced in the information contained in IOTC Circulars 2011-46; 201154; 2011-70; 2012-04 and 2012-12, *inter alia*:

- Sri Lanka does not <u>enforce</u> requirements for vessel marking nor for documentation to be carried on board, including logbooks. IOTC Resolution 01/02 paragraph 2 and Resolution 07/02 paragraph 5c (documentation required to be carried on board) and Resolution 01/02 paragraph 3 (vessel markings) apply (see also IOTC Circular 2011-70).
- As highlighted in Section 2, Sri Lanka lacks capacity to effectively exert flag State control and needs to address this urgently.

The fact that since the Compliance Committee meeting in 2011 a further 11 Sri Lankan vessels have been guilty of IUU in BIOT waters demonstrates Sri Lanka's lack of capacity to control and manage its fishing fleet. Action has been taken retrospectively against IUU vessel owners but there is an urgent need to build capacity to take preventative measures and implement flag state control.

In a statement (IOTC-2011-S15-07[E]), the Sri Lankan authorities have indicated that they are:

- seeking legal advice to impose restrictions on fishers involved in IUU fishing;
- in the process of amending their Fisheries Act to incorporate international obligations and conventions ratified by their government; and,
- establishing VMS as a legal requirement for vessels operating on the high seas.

However, UK(BIOT) has not yet been notified that these changes have been implemented. In the absence of appropriate legislation authorising its flag vessels to fish outside its EEZ, in the absence of a VMS system on board vessels wishing to fish outside its EEZ, and in the absence of capacity to enforce IOTC conservation and management measures we question whether Sri Lanka should list any of its vessels on the IOTC list of authorised vessels. This raises a number of issues for the consideration of the IOTC compliance Committee:

- When listing vessels on the IOTC Record of vessels authorised to operate in the IOTC area, what evidence does the Secretariat require to ensure that the vessels comply with the requirements of Resolution 07/02, and what is the means of verification?
- If no evidence of compliance is required, should it be?; and if so this should be addressed through an amendment to Resolution 07/02
- Specifically in the case of the Sri Lankan vessels, until such a time as a VMS system is introduced, a new fisheries act is in place and the competent authorities can demonstrate they have the capacity to enforce IOTC conservation and management measures, all Sri Lankan vessels should be removed from the IOTC Record.

Annex 1: Email to BIOT authorities indicating registration and ownership of Speed Bird 3

From: Sent: Tuesday, October 18, 2011 12:26 PM To: LS(CIS) UK BRN BIOT Subject: Re: Sri Lanka Multiday Fishing Boat "SPEED BIRD 03" Dear Sir, Many thanks for your assistance for this matter and according to the registration book of the boat in 2009 it has been registered under 44-CBY-03 (BE 861)of ,Beruwala,SriLanka as a owner of the boat named "SPEED BIRD 03". In 2010 the ownership of the said boat change to Mr Maligawe Singgakkarage Richman wijayananda of c/o ,Massala,Beruwala,Sri Lanka. Fax no and email Pl sent all the information to this email and address to named Mr M S Richman Wijayananda of said address. Further more I wish to contact the skipper of the boat and grant him to contact this number of the owner . (I am write this email on behalf of Mr Wijayawadena ,owner of the said fishing vessel.)

Best Regards

Annex 2: Extract of duties as regards high seas fishing under the UN fish stocks agreement.

Sri Lanka is under a duty as regards high seas fishing to 'take such measures as may be necessary to ensure that vessels flying its flag comply with subregional and regional conservation and management measures and that such vessels do not engage in any activity which undermines the effectiveness of such measures' (article 18(1)).

Moreover Sri Lanka is *inter alia* required:

a) to control Sri Lanka flagged vessels that fish on the high seas through fishing licences, authorisations or permits (hereafter 'high seas fishing licences') (article 18 (3)(a));

b) to adopt regulations that provide for the inclusion of conditions in high seas fishing licences such that Sri Lanka can fulfil its subregional, regional or global obligations (article 18 (3)(b)(i));

c) to adopt regulations to prohibit fishing on the high seas by Sri Lanka flagged vessels that are not subject to a high seas fishing licence or which fish otherwise than in accordance with conditions contained in such a licence (article 18 (3)(b)(ii));

d) to require Sri Lanka flagged vessels to carry the high seas fishing licence on board at all times and to produce it on demand for inspection by a duly authorized person (article 18 (3)(b)(iii));

e) to ensure that Sri Lanka flagged vessels do not conduct unauthorized fishing within areas under the national jurisdiction of other States (article 18 (3)(b)(iv));

f) to establish a national record of fishing vessels authorized to fish on the high seas and to provide access to directly interested States subject to any applicable confidentiality provisions (article 18 (3)(c); and

g) to require Sri Lanka flagged fishing vessels to be marked 'in accordance with uniform and internationally recognizable vessel and gear marking systems, such as the Food and Agriculture Organization of the United Nations Standard Specifications for the Marking and Identification of Fishing Vessels' (article 18 (3)(d);

In addition Sri Lanka may only authorize high seas fishing by Sri Lanka flagged vessels 'where it is able to exercise effectively its responsibilities in respect of such vessels' under (the LOSC) and (the Fish Stocks Agreement)' (article 18(2).





Report of the Fourteenth Session of the IOTC Scientific Committee

Mahé, Seychelles, 12–17 December 2011

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ACRONYMS

ACAP	Agreement on the Conservation of Albatrosses and Petrels
B _{MSY}	Biomass at MSY
CBD	Convention on Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CMM	Conservation and Management Measure (of the IOTC; Resolutions and Recommendations)
CPCs	Contracting parties and cooperating non-contracting parties
CPUE	Catch per unit of effort
EBSA	Ecologically or Biologically Significant marine Areas
EU	European Union
EEZ	Exclusive Economic Zone
ERA	Ecological Risk Assessment
F	Fishing mortality: F_{2000} is the fishing mortality estimated in the year 2009
FAD	Fish-aggregating device
FAO	Food and Agriculture Organization of the United Nations
France	Fishing mortality at MSY
	Inter-American Tropical Tuna Commission
	International Commission for the Conservation of AtlanticTunas
IOTC	Indian Ocean Tuna Commission
1010	Indian Ocean Swordfish Stock Structure
IUCN	International Union for Concernation of Nature
IUCN	Longling
	Longine
	Multifum CI
MFCL	Multian-CL Marine Destanted Area
MPA	Martine Protected Area
MPF	Meeting Participation Fund
MSE	Management Strategy Evaluation
MSY	Maximum sustainable yield
NGO	Non-governmental organization
NPOA	National plan of action
OFCF	Overseas Fishery Cooperation Foundation of Japan
01	Oversears Territory
PS	Purse-seine
ROP	Regional Observer Programme
ROS	Regional Observer Scheme
tRFMO	tuna Regional Fishery Management Organization
RTTP-IO	Regional Tuna Tagging Project of the Indian Ocean
SC	Scientific Committee of the IOTC
SSB	Spawning stock biomass
SSB_{MSY}	Spawning stock biomass at MSY
SWIOFC	South West Indian Ocean Fisheries Commission
SWIOFP	South West Indian Ocean Fisheries Project
UNCLOS	United Nations Convention on the Law of the Sea
VME	Vulnerable marine ecosystems
VMS	Vessel Monitoring System
WP	Working Party of the IOTC
WPB	Working Party on Billfish of the IOTC
WPEB	Working Party on Ecosystems and Bycatch of the IOTC
WPM	Working Party on Methods of the IOTC
WPNT	Working Party on Neritic Tunas of the IOTC
WPDCS	Working Party on Data Collection and Statistics of the IOTC
WPTmT	Working Party on Temperate Tunas of the IOTC
WPTT	Working Party on Tropical Tunas of the IOTC

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Appendix XXXVIII Consolidated set of Recommendations of the Fourteenth Session of the Scientific Committee (12–17 December, 2011) to the Commission

EXECUTIVE SU	UMMARY
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The Fourteenth Session of the Indian Ocean Tuna Commission's (IOTC) Scientific Committee (SC) was held on Mahé, Seychelles, from 12 to 17 December 2011. A total of 50 individuals attended the Session, comprised of 39 delegates from 14 Member countries and 0 delegates from Cooperating Non-Contracting Parties, as well as 11 observers and invited experts.

Noting that <u>Table 1</u> in this report provides an overview of the stock status and management advice for each species under the IOTC mandate as well as species directly impacted by fisheries for tuna and tuna-like species, the SC **AGREED** to an Executive Summary for each species or species group as detailed below.

Tuna – Highly migratory species

- Albacore (*Thunnus alalunga*) <u>Appendix X</u>
- Bigeye tuna (*Thunnus obesus*) <u>Appendix XI</u>
- Skipjack tuna (Katsuwonus pelamis) Appendix XII
- Yellowfin tuna (*Thunnus albacares*) <u>Appendix XIII</u>

Tuna and mackerel – Neritic species

- Longtail tuna (*Thunnus tonggol*) <u>Appendix XIV</u>
- Narrow-barred Spanish mackerel (*Scomberomorus commerson*) <u>Appendix XV</u>
- Bullet tuna (*Auxis rochei*) <u>Appendix XVI</u>
- Frigate tuna (*Auxis thazard*) <u>Appendix XVII</u>
- Kawakawa (Euthynnus affinis) <u>Appendix XVIII</u>
- Indo-Pacific king mackerel (Scomberomorus guttatus) <u>Appendix XIX</u>

Billfish

- Swordfish (*Xiphias gladius*) <u>Appendix XX</u>
- Black marlin (*Makaira indica*) <u>Appendix XXI</u>
- Indo-Pacific blue marlin (*Makaira mazara*) <u>Appendix XXII</u>
- Striped marlin (*Tetrapturus audax*) <u>Appendix XXIII</u>
- Indo-Pacific sailfish (Istiophorus platypterus) <u>Appendix XXIV</u>

Marine turtles

• Marine turtles – <u>Appendix XXV</u>

Seabirds

• Seabirds – <u>Appendix XXVI</u>

Sharks

- Blue sharks (*Prionace glauca*) <u>Appendix XXVII</u>
- Oceanic whitetip sharks (*Carcharhinus longimanus*) <u>Appendix XXVIII</u>
- Scalloped hammerhead sharks (Sphyrna lewini) Appendix XXIX
- Shortfin mako sharks (Isurus oxyrinchus) Appendix XXX
- Silky sharks (*Carcharhinus falciformis*) <u>Appendix XXXI</u>
- Bigeye thresher sharks (Alopias superciliosus) Appendix XXXII
- Pelagic thresher sharks (*Alopias pelagicus*) <u>Appendix XXXIII</u>

The following are a subset of the complete recommendations from the SC14 to the Commission, which are provided at <u>Appendix XXXVIII</u>.

Report of the Third Session of the Working Party on Temperate Tunas

(para. 32) Noting the request by the Commission at its 15th Session for a new assessment of albacore to be undertaken in 2011 (para. 37 of the S15 report), the SC **RECOMMENDED** that the Commission note that although a new assessment was undertaken in 2011, there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series, and about the total catches over the past decade and that the WPTmT has limited confidence in the assessment undertaken. Thus, there is an urgent need to carry out a revised stock assessment for the albacore resource in the Indian Ocean in 2012, and the Commission should consider allocating funds for this purpose, noting that individual CPCs are finding it difficult to justify expending the necessary resources to undertake stock assessments.

Sharks – Wire leaders/traces

(para. 68) On the basis of information presented to the SC in 2011 and in previous years, the SC **RECOGNISED** that the use of wire leaders/traces in longline fisheries may imply targeting of sharks. The SC therefore **RECOMMENDED** to the Commission that if it wishes to reduce catch rates of sharks by longliners it should prohibit the use of wire leaders/traces.

Sharks – Resolution 05/05 concerning the conservation of sharks caught in association with fisheries managed by IOTC

Fin to body weight ratio

(para. 69) The SC **ADVISED** the Commission to consider, that the best way to encourage full utilisation of sharks, to ensure accurate catch statistics, and to facilitate the collection of biological information, is to revise the IOTC Resolution 05/05 *concerning the conservation of sharks caught in association with fisheries managed by IOTC* such that all sharks must be landed with fins attached (naturally or by other means) to their respective carcass. However, the SC **NOTED** that such an action would have practical implementation and safety issues for some fleets and may degrade the quality of the product in some cases. The SC **RECOMMENDED** all CPCs to obtain and maintain the best possible data for IOTC fisheries impacting upon sharks, including improved species identification.

Seabirds

(para. 83) The SC **RECOMMENDED** that the Commission consider revising Resolution 10/06 *On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries*, noting the technical specifications and other considerations outlined and agreed to by the SC in paragraphs 73 to 82 of the report of the SC14.

Report of the First Session of the Working Party on Neritic Tunas

(para. 97) The SC **AGREED** that there was an urgent need to carry out stock assessments for neritic tunas in the Indian Ocean, however at present the data held at the IOTC Secretariat would be insufficient to undertake this task. As such, the SC **RECOMMENDED** that the Commission consider allocating appropriate funds to further increase the capacity of coastal states to collect, report and analyse catch data on neritic tuna and tuna-like species in the Indian Ocean.

Increased workload and staffing at the IOTC Secretariat

(para. 114) The SC **RECOMMENDED** that an additional Fishery Officer (P3 or P4) be hired, or consultants contracted, to handle a range of issues related to bycatch, including those from the Commission relating to ecosystems and bycatch issues (see <u>para. 113</u>).

Implementation of the Precautionary approach and Management strategy Evaluation

(para. 146) Noting that the development of an MSE process will require management objectives to be specified, the SC **RECOMMENDED** that the Commission provide clear guidance in this regard, noting that the adoption of the Precautionary Approach, as defined in the Fish Stocks Agreement, may be the first step.

(para. 149) The SC **RECOMMENDED** that interim target and limit reference points be adopted and a list of possible provisional values for the major species is listed in <u>Table 5</u>. These values should be replaced as soon as the MSE process is completed. Provisional target reference points would be based on the MSY level of the indicators, and on different multipliers for the limit reference points.

(para. 157) The SC **ENDORSED** the roadmap presented for the implementation of MSE in the Indian Ocean in IOTC–2011–SC14–36 and **RECOMMENDED** the Commission agree to initiate a consultative process among managers, stakeholders and scientists to begin discussions about the implementation of MSE in IOTC.

Data Provision Needs – by gear

(para. 170) The SC **RECOMMENDED** that IOTC Recommendation 11/06 be modified to include the elements as provided in <u>Appendix XXXV</u>, noting that the lists of species to be recorded, as detailed in section 2.3 of Annex II, and makes collection of these data mandatory.

Outlook on Time-Area Closures

(para. 173) Noting that the request contained in Resolution 10/01 does not specify the expected objective to be achieved with the current or alternative time area closures, and that the SC and WPTT were not clear about the intended objectives of the time-area closure taking into account recent reduction of effort as well as recent likely recovery of the yellowfin tuna population, the SC **RECOMMENDED** that the Commission specify clear objectives as to what are the management objectives to be achieved with this and/or alternative measures. This will, in turn, guide and facilitate the analysis of the SC, via the WPTT in 2012 and future years.

Evaluation of the IOTC time-area closure

(para. 178) The SC **RECOMMENDED** that the Commission note that the current closure is likely to be ineffective, as fishing effort will be redirected to other fishing grounds in the Indian Ocean. The positive impacts of the moratorium within the closed area would likely be offset by effort reallocation. For example, the WPTmT noted that longline fishing effort has been redistributed to traditional albacore fishing grounds in recent years, thereby further increasing fishing pressure on this stock.

(para. 179) Noting that the objective of Resolution 10/01 is to decrease the overall pressure on the main targeted stocks in the Indian Ocean, in particular yellowfin tuna and bigeye tuna, and also to evaluate the impact of the current time/area closure and any alternative scenarios on tropical tuna population, the SC **RECOMMENDED** that the Commission specify the level of reduction or the long term management objectives to be achieved with the current or alternative time area closures, as these are not contained within the Resolution 10/01.

Alternative Management Measures; Impacts of the Purse-Seine Fishery; Juvenile Tuna Catches (para 186) The SC RECOMMENDED that the Commission note that:

(para. 186) The SC **RECOMMENDED** that the Commission note that:

- most of the evidence provided to date has indicated that the resource in the southwest Indian Ocean has been overfished in the past decade and biomass remains below the level that would produce MSY (B_{MSY}), however recent declines in catch and effort have brought fishing mortality rates to levels below F_{MSY}. There is a risk of reversing the rebuilding trend if there is any increase in catch in this region. Thus, catches in the southwest Indian Ocean should be maintained at levels at or below those observed in 2009 (6,600 t), until there is clear evidence of recovery and biomass exceeds B_{MSY}.
- the southwest region should continue to be analysed as a special resource, as it appears to be highly depleted compared to the Indian Ocean as a whole. However the difference in depletion does not appear to be as extreme as analyses in previous years have suggested. A review of the spatial assumptions should be conducted following the final results of the Indian Ocean Swordfish Stock Structure (IOSSS) project and the analysis of tagging experiments undertaken by SWIOFP.
- that there is no current need to apply additional management measures to the southwest Indian Ocean, although the resource in the area should be carefully monitored.
- that the Working Party on Methods will be progressing Management Strategy Evaluation over the coming year that will aid in addressing the Commission's request, which was considered as the appropriate mechanism for this work.

(para. 190) The SC **NOTED** however, that the fishery statistics available for many fleets, in particular for coastal fisheries, are not accurate enough for a comprehensive analysis as has been repeatedly noted in previous WPTT and SC reports. In particular, the SC **RECOMMENDED** that all CPCs catching yellowfin tuna should undertake scientific sampling of their yellowfin tuna catches to better identify the proportion of bigeye tuna catches. Therefore, the SC **RECOMMENDED** the countries engaged in those fisheries to take immediate actions to reverse the situation of fishery statistics reporting to the IOTC Secretariat.

(para. 192) The SC **ADVISED** the Commission that the Western and Central Pacific Fisheries Commission has implemented since 2009 a FAD closure for the conservation of yellowfin tuna and bigeye tuna juveniles which has been very effective. The SC **RECOMMENDED** further investigation of the feasibility and impacts of such a measure, as well as other measures, in the context of Indian Ocean fisheries and stocks.

Requests from the Commission

(para. 222) Noting that each year the Commission makes a number of requests to the SC without clearly identifying the task to be undertaken, its priority against other tasks previously or simultaneously assigned to the SC and without assigning a budget to fund the request made, the SC **RECOMMENDED** that these matters be addressed by the Commission at its next session.

Election of a Chairperson and Vice-Chairperson for the Next Biennium

(para. 232) The SC **RECOMMENDED** that the Commission note the new Chair, Dr. Tom Nishida (Japan) and Vice-Chair, Mr. Jan Robinson (Seychelles), of the SC for the next biennium, as well as the Chairs and Vice-Chairs of each of the Working Parties as provided in <u>Appendix VII.</u>





IOTC-2011-SC14-R[E]

Table 1. Status summar	ry for species of tuna and	tuna-like species under the IOTC	<u>mandat</u>	e, as we	ell as oth	er species impacted by IOTC fisheries.				
Stock		Indicators	Prev ¹	2010	2011	Advice to Commission				
Major stocks: These are the ma received, in general, the highest	Aajor stocks: These are the main stocks being exploitation by industrial and artisanal fisheries throughout the Indian Ocean, both on the high seas and in the EEZ of coastal countries. These stocks are those that have eceived, in general, the highest fishing pressure in the region.									
Albacore Thunnus alalunga	Catch 2010: Average catch 2006–2010: MSY: F _{2010/} F _{MSY} : B _{2010/} B _{MSY} : B ₂₀₁₀ /B ₁₉₈₀ :	43,711 t 41,074 t 29,900 t (21,500–33,100 t) 1.61* (1.19–2.22) 0.89* (0.65–1.12) 0.39 (n.a.)	2007			The available evidence indicates considerable risk to the stock status at current effort levels. The two primary sources of data that drive the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority. Current catches likely exceed MSY. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. < <u>Click here for full stock status summary</u> >				
Bigeye tuna Thunnus obesus	Catch: Average catch last 5 years: MSY: F _{curr} /F _{MSY} : ² SB _{curr} /SB _{MSY} : ² SB _{curr} /SB ₀ : ²	$\begin{array}{ccc} SS3^3 & ASPM^4 \\ 102,000 t & 71,500 t \\ 104,700 t & 104,700 t \\ 114,000 (95,000- & 102,900 t (86,600- \\ 183,000) & 119,300) \\ 0.79 (0.50-1.22) & 0.67 (0.48-0.86) \\ 1.20 (0.88-1.68) & 1.00 (0.77-1.24) \\ 0.34 (0.26-0.40) & 0.39 \end{array}$	2008			At this time, annual catches of bigeye tuna should not exceed 102,000 t. If the recent declines in effort continue, and catch remains substantially below the estimated MSY, then immediate management measures are not required. However, continued monitoring and improvement in data collection, reporting and analysis is required to reduce the uncertainty in assessments. < <u>Click here for full stock status summary</u> >				
Skipjack tuna Katsuwonus pelamis	Catch 2010: Average catch 2006–2010: MSY: C ₂₀₀₉ /MSY: ⁵ SB ₂₀₀₉ /SB _{MSY} : SB ₂₀₀₉ /SB ₀ :	428,719 t 489,385 t 564,000 t (395,000–843,000 t) 0.81 (0.54–1.16) 2.56 (1.09–5.83) 0.53 (0.29–0.70)				At this time, annual catches of skipjack tuna should not exceed 512,305 t. If the recent declines in effort continue, and catch remains substantially below the estimated MSY, then immediate management measures are not required. However, recent trends in some fisheries, such as Maldivian pole-and-line, as well as the decrease of catches of large skipjack tuna, suggest that the situation of the stock should be closely monitored. < <u>Click here for full stock status summary</u> >				
Yellowfin tuna Thunnus albacares	$\begin{array}{c} Catch \ 2010: \\ Average \ catch \ 2006-2010: \\ MSY: \\ F_{2009/}F_{MSY}: \\ SB_{2009/}SB_{MSY}: \\ SB_{2009/}SB_0: \end{array}$	299,074 t 326,556 t 357 (290–435) 0.84 (0.63–1.10) 1.61 (1.47–1.78) 0.35 (0.31–0.38)	2008			At this time, annual catches of yellowfin tuna should not exceed 300,000 t, in order to ensure that stock biomass levels could sustain catches at the MSY level in the long term. Recent recruitment is estimated to be considerably lower than the whole time series average. If recruitment continues to be lower than average, catches below MSY would be needed to maintain stock levels. < <u>Click here for full stock status summary</u> >				
Swordfish (whole IO) <i>Xiphias gladius</i>	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	18,956 t 23,799 t 29,900 t–34,200 t 0.50–0.63 1.07–1.59 0.30–0.53	2007			At this time, annual catches of swordfish should not exceed 30,000 t. If the recent declines in effort continue, and catch remains substantially below the estimated MSY, then management measures are not required which would pre-empt current resolutions and planned management strategy evaluation. However, continued monitoring and improvement in data collection, reporting and analysis is required to reduce the uncertainty in assessments. < <u>Click here for full stock status summary</u> >				
Swordfish (southwest IO) <i>Xiphias gladius</i>	Catch 2009: Average catch 2006-2010: MSY:	6,513 t 7,112 t 7,100 t–9,400 t				At this time, annual catches in the southwest Indian Ocean should be maintained at levels at or below those observed in 2009 (6,678), until there is clear evidence of recovery and biomass exceeds B_{MSY} . < <u>Click here for full stock status</u>				

Stock		Indicators	Prev ¹	2010	2011	Advice to Commission
	F ₂₀₀₉ /F _{MSY} : SB ₂₀₀₉ /SB _{MSY} : SB ₂₀₀₉ /SB ₀ :	0.64–1.19 0.73–1.44 0.16–0.58				<u>summary</u> >
Billfish (other than swordfish) artisanal fisheries (e.g. sailfish ir	: This category includes speci the northern Arabian Sea and	es that are not usually targeted by most fl l the Persian Gulf) or as targets in recreati	eets, but a onal fishe	are caught pries (e.g. 1	as bycatcl marlins)	h of the main industrial fisheries. They are important for localised small-scale and
Black marlin Makaira indica	Catch 2010: Average catch 2006–2010: MSY:	5,018 t 4,689 t Unknown				
Indo-Pacific blue marlin Makaira mazara	Catch 2010: 11,261 t Average catch 2006–2010: 9,508 t MSY: Unknown Catch 2010: 1,921 t Average catch 2006–2010: 2,542 t MSY: Unknown					No quantitative stock assessment are currently available for these species in the Indian Ocean. The Maximum Sustainable Yield estimates for the whole Indian Ocean is unknown and annual catches urgently need to be reviewed. Improvement in data collection and reporting is required to assess these stocks
Striped marlin Tetrapturus audax						However, aspects of species biology, productivity and fisheries combined with a lack of fisheries data on which to base quantitative assessments is a cause for concern. < <u>Click here for full stock status summary</u> >
Indo-Pacific Sailfish Istiophorus platypterus	Catch 2010: Average catch 2006–2010: MSY:	25,498 t 22,151 t Unknown				
Neritic tunas: These are importation reported as aggregates of various	ant species for small-scale and s species, making it difficult to	l artisanal fisheries, almost always caught o obtain appropriate data for stock assessn	within the nent analy	e EEZs of /ses.	IO coasta	l states. They are caught only occasionally by industrial fisheries. Catches are often
Bullet tuna Auxis rochei	Catch 2010: Average catch 2006–2010: MSY:	4,188 t 2,884 t Unknown				
Frigate tuna Auxis thazard	Catch 2010: Average catch 2006–2010: MSY:	71,023 t 64,245 t Unknown				No quantitative stock assessment is currently available for these species in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary
Narrow-barred Spanish mackerel Scomberomorus commerson	Catch 2010: Average catch 2006–2010: MSY:	124,107 t 116,444 t Unknown				stock indicators can be used. However, aspects of the biology, productivity and fisheries for these species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern. The continued increase of annual actives for most of these species in recent users has further increased.
Kawakawa Euthynnus affinis	Catch 2010: Average catch 2006–2010: MSY:	128,871 t 122,895 t Unknown				the pressure on the Indian Ocean stocks as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. The apparent fidelity of these species to particular areas/regions is a matter for
Longtail tuna Thunnus tonggol	Catch 2010: Average catch 2006–2010: MSY:	141,937 t 115,973 t Unknown				concern as overfishing in these areas can lead to localised depletion. < <u>Click here</u> for full stock status summary>
Indo-Pacific king mackerel Scomberomorus guttatus	Catch 2010: Average catch 2006–2010: MSY:	37,257 t 37,980 t Unknown				

Stock	Indicators	Prev ¹	2010	2011	Advice to Commission			
Sharks: Although they are not part of the 16 species directly under the IOTC mandate, sharks are frequently caught in association with other species as bycatch, and for some fleets are often as much a target as tuna. As such, IOTC Members and Cooperating non-Contracting Parties are required to report information at the same level of detail as for the 16 IOTC species. The following are the main species caught in tuna fisheries, but the list is not exhaustive.								
Blue shark Prionace glauca	Unknown Unknown							
Silky shark Carcharhinus falciformis	Unknown Unknown							
Oceanic whitetip shark Carcharhinus longimanus	Unknown Unknown				There is a paucity of information available for these species and this situation is not expected to improve in the short to medium term. There is no quantitative			
Scalloped hammerhead shark Sphyrna lewini	Unknown Unknown				stock assessment and limited basic fishery indicators currently available. Therefore the stock status is highly uncertain. The available evidence indicates considerable risk to the stock status at current effort levels. The primary source of			
Shortfin mako Isurus oxyrinchus	Unknown Unknown				data that drive the assessment (total catches) is highly uncertain and should be investigated further as a priority. <click for="" full="" here="" status="" stock="" summary=""></click>			
Bigeye thresher shark Alopias superciliosus	Unknown Unknown							
Pelagic thresher shark Alopias pelagicus	Unknown Unknown							

¹ This indicates the last year taken into account for assessments carried out before 2010

²Current period ($_{curr}$) = 2009 for SS3 and 2010 for ASPM.

³Central point estimate is adopted from the 2010 SS3 model, percentiles are drawn from a cumulative frequency distribution of MPD values with models weighted as in Table 12 of 2010 WPTT report (IOTC-2010-WPTT12-R); the range represents the 5th and 95th percentiles.

⁴Median point estimate is adopted from the 2011 ASPM model using steepness value of 0.5 which is the most conservative scenario (values of 0.6, 0.7 and 0.8, which are more optimistic, are considered to be as plausible as these values but are not presented for simplification); the range represents the 90 percentile Confidence Interval.

⁵Due to numerical problems in the F_{MSY} calculations for this population, the proxy reference point C/MSY is reported instead of F/FMSY, which should be interpreted with caution for the following reasons: it may incorrectly suggest F>F_{MSY} when there is a large biomass (early development of the fishery or large recruitment event); it may incorrectly suggest that F<F_{MSY} when the stock is highly depleted; due to a flat yield curve, C could be near MSY even if F << F_{MSY}.

*(Note: at this time the WPTmT had limited confidence in the assessment results (refer to paragraphs 71–77 in the report of the WPTmT03 (IOTC-2011-WPTmT03-R) for further clarification).

Colour key	Stock overfished(SB _{vear} /SB _{MSY} < 1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		
Not assessed/Uncertain		





1. OPENING OF THE MEETING

- 1. The Fourteenth Session of the Indian Ocean Tuna Commission's (IOTC) Scientific Committee (SC) was held on Mahé, Seychelles, from 12 to 17 December 2011. A total of 50 individuals attended the Session, comprised of 39 delegates from 14 Member countries and 0 delegates from Cooperating Non-Contracting Parties, as well as 11 observers and invited experts. The list of participants is provided at <u>Appendix I</u>.
- 2. The meeting was opened on 12 December, 2011 by the Chair Dr. Francis Marsac (European Union), who subsequently welcomed participants to the Seychelles. The Chair informed participants that his term as Chair and that of the Vice-Chair had expired at the 2010 SC meeting, however, under exceptional circumstances, both positions had been extended for 2011. However, a new Chair and a new Vice-Chair will need to be elected at the end of the current meeting.

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

3. The SC **ADOPTED** the Agenda provided at <u>Appendix II</u>. The documents presented to the SC are listed in <u>Appendix III</u>.

3. ADMISSION OF OBSERVERS

- 4. The SC **NOTED** that at the Third Session of the Commission, Members decided that its subsidiary bodies would be open to the participation of observers from Member parties of the Food and Agriculture Organisation (FAO), from international organisations and from non-governmental organisations, which had attended previous meetings or were admitted to attend Commission Sessions (Rule XIII.9 of the Rules of Procedure).
- 5. The SC **ADMITTED** the following observers to the Fourteenth Session of the SC: Birdlife International, South West Indian Ocean Fisheries Project, World Wildlife Fund (World Wide Fund for Nature), Food and Agriculture Organisation of the United Nations, Russian Federation, the International Seafood Sustainability Foundation and the Marine Stewardship Council.
- 6. The SC also **ADMITTED** the invited experts from Taiwan, China, under Rule X of the Rules of Procedure, which states that the Commission may invite experts, in their individual capacity, to enhance and broaden the expertise of the Scientific Committee and of its Working Parties.

4. ACTIVITIES OF THE COMMISSION

- 7. The SC **NOTED** paper IOTC-2011-SC14-03 which outlined the decisions and requests made by the Commission at its Fifteenth Session, held from 18-22 March 2011, specifically relating to the work of the SC, including the six Conservation and Management Measures (five Resolutions and one Recommendation) adopted during the Session. The SC **AGREED** to develop advice in response to each of the requests made by the Commission during the current session.
- 8. The SC **NOTED** paper IOTC–2011–SC14–04 which outlined a number of Commission decisions, in the form of previous Resolutions that require a response from the Scientific Committee in 2011, and **AGREED** to develop advice to the Commission in response to each request during the current session.

5. ACTIVITIES OF THE IOTC SECRETARIAT IN 2011

9. The SC **NOTED** paper IOTC–2011–SC14–05 which provided an overview of the work undertaken by the IOTC Secretariat in 2011, including the following key activities: 1) First Working Party on Neritic Tunas; 2) First Capacity Building Workshop aimed at bridging the gap between IOTC science and management; 3) First stock assessment for skipjack tuna; and 4) the continued increase in participation at IOTC scientific meetings by developing coastal states, including via the submission of working papers.

- 10. The SC **NOTED** with thanks, the outstanding contributions of the staff of the IOTC Secretariat to the science process in 2011, in particular through the contributions of the stock assessment expert, the facilitation of invited experts and in support of the working party and SC meetings.
- 11. The SC **RECOMMENDED** that while the recruitment process for a new stock assessment expert at the IOTC Secretariat is being finalised, the Secretariat hire an individual/s to fill the staffing gap. This was considered to be particularly important given the upcoming tagging symposium in late 2012.

6. NATIONAL REPORTS FROM CPCs

- 12. The SC **NOTED** the 25 National Reports presented by CPCs (Contracting parties and cooperating noncontracting parties) for the meeting, the abstracts of which are provided at <u>Appendix IV</u>. The following matters were raised in regard to the content of specific reports:
 - Australia: Nil comments.
 - Belize: Not presented orally.
 - China: Not presented orally.
 - **Comoros**: Nil comments.
 - **Eritrea**: The SC **EXPRESSED** its disappointment that Eritrea did not provide a National Report and urged Eritrea to fulfil its reporting obligations to the IOTC.
 - European Union (EU): The SC NOTED that species composition sampling of the EU purse seine fleets is being adapted to better reflect the changes in fishing strategies. The EU indicated that the sampling scheme has not undergone major structural changes. The SC was informed that the EU observer program resumed in 2011 with a coverage rate of 11%, in collaboration with TAAF (Terres Australes et Antarctiques Françaises). Finally, the SC recognised that improvements be made in this regard. In response to a question regarding the catch composition of EU,Portugal longline vessels, which includes almost 50% blue sharks, the EU confirmed that these vessels are using wire leaders to catch more sharks in some areas and periods.
 - **France (territories)**: Not presented orally.
 - **Guinea**: The SC **EXPRESSED** its disappointment that Guinea did not provide a National Report and urged Guinea to fulfil its reporting obligations to the IOTC.
 - India: The SC NOTED the slightly improved situation by India in regard to the mandatory data reporting requirements, as well as the consultations underway with various stakeholders to further improve data collection and reporting. However, it was noted that there remains substantial improvements to be made and higher quality data needs to be provided by India in 2012.
 - Indonesia: The SC NOTED that the current level of observer coverage is less than 1% for Indonesian vessels and is based on port samplers in the port of Benoa. Currently, the program consists of five port samplers, however it was indicated that Indonesia plans to double the level of covered in 2012, compared to 2010. Indonesia acknowledged that it has had problems implementing the sampling scheme designed by the IOTC-OFCF, CSIRO (Commonwealth Scientific and Industrial Research Organisation) and ACIAR (Australian Centre for International Agricultural Research) to comply with the IOTC mandatory requirements for data provision. Key actions under the Indonesian NPOA-sharks have begun to be implemented in East Lombok, since this location is considered one of the main places where sharks are landed.
 - Iran, Islamic Republic of: Not presented orally.
 - Japan: The SC NOTED the comment from Japan that its longline fleet operating in the Indian Ocean does use wire leaders although not to target sharks. Japan acknowledged the conflicting estimates of average weight derived from operational catch and size frequency datasets for its longline fisheries, and the concerning effect that the problems identified may have on the assessments of tuna and billfish species. Japan indicated that in order to clarify these issues, it will endeavour to identify deficiencies in the size sampling program and to report progress at the next SC meeting.
 - **Kenya**: The SC **NOTED** that additional information on the composition of recreational fisheries catches from Kenya are available, although the size composition is not yet available for all IOTC species, namely billfishes, as many are released alive and are not measured.

- Korea, Republic of: The SC NOTED the improved seabird identification reports, from 2009 to 2010, was most likely due to improved observer training as well as improved identification skills by the vessel captains.
- Madagascar: Not presented orally.
- Malaysia: Not presented orally.
- Maldives, Republic of: The SC NOTED the substantial declines in the catches of skipjack tuna by the Maldives in recent years (>50% decline from 2006 to 2010), and acknowledged that this trend was of great concern given that the Maldives, even in recent years accounts for approximately 20% of the skipjack tuna catch in the Indian Ocean. There might be multiple causes for such a decline (environmental changes, high fuel price, lower tuna biomass etc.) but there are not well understood and further investigation is needed.
- **Mauritius**: The SC **NOTED** the sharp increase in albacore catches reported from 2008 (2,024 t) to 2009 (4,293 t) due to a shift of effort by longline vessels from the northern Indian Ocean to the southern Indian Ocean.
- **Oman, Sultanate of:** The SC **EXPRESSED** its disappointment that Oman did not provide a National Report and urged Oman to fulfil its reporting obligations to the IOTC.
- **Pakistan**: The SC **EXPRESSED** its disappointment that Pakistan did not provide a National Report and urged Pakistan to fulfil its reporting obligations to the IOTC.
- **Philippines**: The SC **EXPRESSED** its disappointment that the Philippines did not provide a National Report and urged the Philippines to fulfil its reporting obligations to the IOTC.
- Seychelles, Republic of: The SC NOTED that the Seychelles report did not follow the new reporting format and requested that Seychelles follow the new template in 2012.
- Sierra Leone: The SC EXPRESSED its disappointment that Sierra Leone did not provide a National Report and urged Sierra Leone to fulfil its reporting obligations to the IOTC.
- Sri Lanka: The SC NOTED that none of the >3,000 Sri Lankan fishing vessels authorised and capable of fishing on the high seas have any form of VMS, and logbooks are only being used by a very small proportion of vessels. As a result, almost none of the total catch taken by Sri Lankan vessels can be accurately assigned to either the EEZ of Sri Lanka or the high seas, or at any other spatial scale. The lack of spatial data has a negative impact on stock assessments for IOTC species. The SC NOTED that Sri Lanka agreed to provide an explanation of the large increase in shark catches reported from 2009 to 2010, and reporting catches by species rather than as an aggregated shark catch, in 2012. The SC NOTED that improvements have been made regarding data collection, monitoring and reporting, and encouraged Sri Lanka to continue to improve these systems as quickly as possible.
- **Sudan**: The SC **EXPRESSED** its disappointment that Sudan did not provide a National Report and urged Sudan to fulfil its reporting obligations to the IOTC.
- Tanzania, United Republic of: Not presented orally.
- Thailand: Nil comments.
- United Kingdom (BIOT): The SC NOTED that the potential impacts of Marine Protected Areas (MPAs) in the Indian Ocean will be discussed under Agenda item 16 later in the meeting. A Science Advisory Group will develop a research plan associated with the no-take area, to include engagement with existing research projects within the region. The SC recalled the exceptional location of the BIOT to study movements of tuna between the east and west Indian Ocean using tagging techniques.
 - i. The SC **NOTED** the following statement made by the Republic of Mauritius: "The Government of the Republic of Mauritius does not recognize the so-called "British Indian Ocean Territory" ("BIOT") which the United Kingdom purported to create by illegally excising the Chagos Archipelago from the territory of Mauritius prior to its independence. This excision was carried out in violation of United Nations General Assembly Resolutions 1514 (XV) of 14 December 1960, 2066 (XX) of 16 December 1965, 2232 (XXI) of 20 December 1966 and 2357 (XXII) of 19 December 1967.

The Government of the Republic of Mauritius reiterates that the Chagos Archipelago, including Diego Garcia, forms an integral part of the territory of Mauritius under both Mauritian law and international law.

The Government of the Republic of Mauritius does not also recognize the existence of the 'marine protected area' which the United Kingdom has purported to establish around the Chagos Archipelago. On 20 December 2010, Mauritius initiated proceedings against the

United Kingdom under Article 287 and Annex VII to the United Nations Convention on the Law of the Sea to challenge the legality of the 'marine protected area."

- ii. The SC **NOTED** the following statement made by the United Kingdom: "The UK has no doubt about its sovereignty over the British Indian Ocean Territory which was ceded to Britain in 1814 and has been a British dependency ever since. As the UK Government has reiterated on many occasions, we have undertaken to cede the Territory to Mauritius when it is no longer needed for defence purposes."
- Vanuatu: Not presented orally.
- Mozambique: Not presented orally.
- Senegal: Not presented orally.
- South Africa, Republic of: Not presented orally.

Recommendation/s

13. Noting that the Commission, at its 15th Session, expressed concern regarding the limited submission of National Reports to the SC, and stressed the importance of proving the reports by all CPCs, the SC **RECOMMENDED** that the Commission note that in 2011, 25 reports were provided by CPCs, up from 15 in 2010 and 14 in 2009 (<u>Table 2</u>). The SC stressed the importance of the submission of National Reports by all CPCs and urged those CPCs who did not met their reporting obligations in this regard (7), to provide a National Report to the SC in 2012.

СРС	2010	2011
Australia		
Belize		
China		
Comoros		
Eritrea		
European Union		
France (territories)		
Guinea		
India		
Indonesia		
Iran, Islamic Republic of		
Japan		
Kenya		
Korea, Republic of		
Madagascar		
Malaysia		
Maldives, Republic of		
Mauritius		
Oman, Sultanate of		
Pakistan		
Philippines		
Seychelles, Republic of		
Sierra Leone		
Sri Lanka		
Sudan		
Tanzania, United Republic of		
Thailand		
United Kingdom (BIOT)		
Vanuatu		
Mozambique*	n.a.	
Senegal*		
South Africa, Republic of*		

Table 2. CPC submission of National Reports to the Scientific Committee in 2010 and 2011.

*Cooperating non-contracting party in 2011. Green = submitted. Red = not submitted. Green hash = submitted as part of EU report, although needs to be separate. n.a. = not applicable.

Discussions on improving/modifying the National Reporting Template

14. The SC AGREED that the National Reporting template should be maintained in its current format for 2012 and be reviewed annually for potential improvements.

Status of development and implementation of Nation Plans of Action for seabirds and sharks

- 15. The SC **NOTED** paper IOTC–2011–SC14–33 which provided the SC with the opportunity to update and comment on the current status of development and implementation of National Plans of Action for seabirds and sharks by each CPC.
- 16. The SC **NOTED** that the original purpose of the FAO National Plans of Action for Seabirds (NPOA-Seabirds) in 1998 was to address concerns about longline fishing. However, recent information has shown significant concerns about seabird bycatch in several other capture fisheries, especially gillnet fishing. The 2009 FAO Best Practice Technical Guidelines, developed to assist in the preparation of NPOA-Seabirds, explicitly includes advice on longline, trawl and gillnet fisheries.
- 17. The SC **NOTED** that species such as cormorants and migratory shearwaters (which are common in coastal waters of many IOTC coastal states), are known to be especially vulnerable to bycatch in gillnet fisheries. CPCs operating gillnet fisheries were strongly **ENCOURAGED** to go through an NPOA-Seabirds assessment exercise. BirdLife International offered assistance to CPCs wishing to assess the impacts of gillnet fishing in their national fisheries.
- 18. The SC **NOTED** the current status of development and implementation of Nation Plans of Action for sharks and **RECOMMENDED** that all CPCs without an NPOA-Sharks expedite the development and implementation of their NPOA-Sharks, and to report progress to the WPEB in 2012, recalling that NPOA-Sharks are a framework that should facilitate estimation of shark catches, and development and implementation of appropriate management measures, which should also enhance the collection of bycatch data and compliance with IOTC Resolutions.
- 19. The SC **NOTED** the updated status of development and implementation of National Plans of Action for sharks and seabirds, by each CPC as provided at <u>Appendix V</u>.

7. **REPORT OF THE 2011 IOTC WORKING PARTY MEETINGS**

7.1 Report of the Ninth Session of the Working Party on Billfish

- 20. The SC **NOTED** the report of the Ninth Session of the Working Party on Billfish (IOTC-2011-WPB09-R), including the consolidated list of recommendations provided as an appendix to the report. The SC expressed its satisfaction on improved attendance and participation by national scientists working on billfish fisheries (27 participants in 2011 compared to 12 in 2010), particularly from the main fleets targeting swordfish (EU,Spain, EU,Portugal and Indonesia).
- 21. The SC **NOTED** that a range of quantitative modelling methods were applied to the swordfish assessment in 2011, ranging from the highly aggregated ASPIC surplus production model to the age, sex- and spatially-structured SS3 analysis (Models used: SS3, ASPIC, BMAP, ASIA; see report of the WPB09 for descriptions).
- 22. The SC **NOTED** that the stock structure of the Indian Ocean swordfish resource is under investigation, but currently uncertain. The southwest region was identified as a management unit of particular concern, because it seems to be more depleted than other regions in the Indian Ocean, and may have limited mixing with other regions. However the magnitude of depletion does not appear to be as extreme as analyses in previous years have suggested. The limited movements and subsequent viscosity of the swordfish resource in a localized area is not an exceptional situation as it has been observed in most swordfish fisheries globally, leading to sharp CPUE declines and apparent localized depletion.
- 23. Noting the Commission's request to provide clear advice outlining alternative management approaches which would provide effective protection of a possible southwest Indian Ocean swordfish stock (IOTC-2011-S15-R, para. 46), the SC AGREED that a separate Executive Summary for swordfish in the southwest Indian Ocean be provided to the Commission, noting the work currently in progress to determine the level of connectivity between swordfish in the southwest with the wider Indian Ocean.
- 24. The SC **NOTED** that SWIOFP is currently undertaking a research project on swordfish using pop-up archival tags that may shed additional light on the degree of connectivity between swordfish in the

southwest and the broader Indian Ocean. The SWIOFP representative agreed to present a progress report at the next WPB meeting. The SC also **NOTED** that EU,France, in cooperation with Australia, Seychelles, South Africa, Sri Lanka and Thailand, is conducting the Indian Ocean Swordfish Stock Structure (IOSSS) which aims at understanding the stock structure of swordfish in the Indian Ocean using genetic markers. Progress updates were provided at the WPB sessions in 2010 and 2011.

25. The SC **ACKNOWLEDGED** the outstanding contributions of the outgoing Chair of the Working Party on Billfish, Mr. Jan Robinson, and thanked him for his leadership over the past four years.

7.2 Report of the Third Session of the Working Party on Temperate Tunas

- 26. The SC **NOTED** the report of the Third Session of the Working Party on Temperate Tunas (IOTC-2011-WPTmT03-R), including the consolidated list of recommendations provided as an appendix to the report.
- 27. The SC **NOTED** that the assessment of the albacore stock was conducted with a single model in 2011(ASPIC, a surplus production model). While most of the catches of albacore have traditionally come from the western Indian Ocean (on average 64% from 1970–2002), since 2003 a larger proportion of the catch has come from the eastern Indian Ocean (on average 63%). The catches of albacore in recent years have come almost exclusively from vessels flagged in Indonesia and Taiwan, China, although the catches of albacore reported for the fresh tuna longline fishery of Indonesia have increased considerably since 2003 to around 17,000 t, which represents approximately 40% of the total catches of albacore in the Indian Ocean.
- 28. The SC **NOTED** that the catches of albacore estimated for the fresh tuna longline fishery of Indonesia in recent years are thought to be uncertain, as they cannot be verified using data collected through port sampling, and that to date, the IOTC Secretariat has not received catch-and-effort data for this fishery. The SC was also informed that misidentification between yellowfin tuna and albacore might occur in the Indonesian catches which may contribute to the rise of declared albacore catches in recent years. However, the catch levels estimated by the IOTC Secretariat also account for other sources such as the export declarations from Bali and canning factories receiving the products abroad. Finally, the SC urged Indonesia to undertake a thorough examination of the sampling procedure at landing sites as soon as possible. Indonesian authorities by providing a list of vessels directly exporting albacore to the canning factories abroad.
- 29. The SC **NOTED** the difficulties faced by Indonesian scientists and managers in terms of commercial catches being transhipped at sea , as well as catches directly exported abroad contributing to IUU fishing. The SC **HIGHLIGHTED** the need for logbooks to be utilised on all commercial fishing vessels, noting that this is already a mandatory requirement for IOTC CPCs. Indonesia encouraged collaboration among CPCs to exchange necessary information related to vessels landing their catch to their countries.
- 30. The SC **NOTED** that the impacts of piracy in the western Indian Ocean has resulted in the displacement of a substantial portion of longline fishing effort into the traditional albacore fishing areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on albacore will decline in the near future.
- 31. Noting that at present very little is known about the population structure and migratory range of albacore in the Indian Ocean, other than the possible connectivity with the southern Atlantic, the SC **AGREED** that the determination of albacore stock structure, migratory range and movement rates in the Indian Ocean should be considered as high priority research projects for 2012, and for these to be included in the IOTC scientific workplan to be discussed under Agenda item 19.
- 32. Noting the request by the Commission at its 15th Session for a new assessment of albacore to be undertaken in 2011 (para. 37 of the S15 report), the SC **RECOMMENDED** that the Commission note that although a new assessment was undertaken in 2011, there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series, and about the total catches over the past decade and that the WPTmT has limited confidence in the assessment undertaken. Thus, there is an urgent need to carry out a revised stock assessment for the albacore resource in the Indian Ocean in 2012, and the Commission should consider allocating funds for this purpose, noting that individual CPCs are finding it difficult to justify expending the necessary resources to undertake stock assessments.

7.3 Report of the Thirteenth Session of the Working Party on Tropical Tunas

33. The SC **NOTED** the report of the Thirteenth Session of the Working Party on Tropical Tunas (IOTC-2011–WPTT13–R), including the consolidated list of recommendations provided as an appendix to the report. The SC expressed its satisfaction on improved attendance and participation by national scientists working on tropical tuna fisheries (49 participants in 2011 compared to 39 in 2010).

Skipjack tuna

- 34. The SC **ACKNOWLEDGED** the excellent work undertaken by the IOTC Secretariat's stock assessment expert and other collaborators in undertaking the first fully quantitative assessment of skipjack tuna in the Indian Ocean.
- 35. The SC **NOTED** that the skipjack tuna stock was assessed using a single model in 2011 (SS3, a statistical integrated model). The model estimates a steep biomass decline between 1980 and 1990 followed by a steep biomass increase. At this stage, there are no CPUE series during this period to inform the model. The catch increased in this period due to the onset of industrial purse seine fishing and motorisation of the Maldivian pole and line fishing vessels and thus, trends in recruitment are required to explain the biomass patterns. The biomass/recruitment trends were supported only by the length frequency data, and it is not likely that these data are sufficiently informative to estimate this trend. Furthermore, the trend is not evident in the nominal CPUE series from either the pole and line or purse seine fisheries.
- 36. The SC **NOTED** that the CPUE series from the EU fleet targeting free schools of skipjack tuna could be extended back to 1983. It was noted, however, that this nominal series would not take into account changes in fishing/gear efficiency and so could still be unsuitable as an index of abundance for the earlier years. These restrictions also apply to the post–1991 series. However, it should be taken into account that the free school catch of purse seiners is relatively small in comparison to Fish-Aggregating Device (FAD)-associated fishing (less than 10%) and the fishery is seasonal, located mainly in the Mozambique Channel in March, April and May.
- 37. The SC recognised that skipjack tuna assessments are generally difficult to conduct in most fisheries, mainly because the purse seine CPUE does not represent biomass levels accurately. In the particular case of the Indian Ocean, there are additional reasons related to coastal states' fisheries. Those fisheries which contribute greatly to the skipjack tuna catches (~55%) are sampled with a large degree of uncertainty and are characterized by a lack of, or poor reporting in a number of CPCs (notably Comoros, Indonesia, I.R. Iran, Madagascar, Pakistan, Sri Lanka). The lack of quality data usually leads to assessments being limited to rough fisheries indicators instead of formal and quantitative approaches.
- 38. The SC **AGREED** that further investigation of the existing data irregularities, and expansion of the logbook programme to improve Maldivian CPUE analyses for skipjack tuna in the Indian Ocean be carried out in 2012. The SC also **AGREED** that further analyses of standardization of purse seine CPUE should be carried out in 2012.

Yellowfin tuna

- 39. The SC **NOTED** that the yellowfin tuna stock was assessed using a single model in 2011 (MULTIFAN-CL (MFCL), a statistical integrated model). While the biomass trends were very similar between the 2010 and 2011 assessments, the estimates of stock productivity and thus, the status, differed. There were several reasons for this: there was poor convergence in the 2010 assessment, thus the fits were suboptimal and alternative solutions were near optimal. Refitting the 2010 assessment is now more optimistic. Also, fitting the 2010 model to 2011 data was more optimistic. Thus, revisiting of key parameters and the inclusion of the latest year of data in the 2011 assessment appeared to be important. These issues are difficult to explore in the MFCL framework.
- 40. The SC **NOTED** that the WPTT reviewed several alternative model structures and parameter formulations for the model that were presented in the assessment. These included: the new longline model structure for Region 5; alternative Japanese CPUE indices; a single region model where all 5 Regions were collapsed into one; a Region 2 model estimated separately from other Regions; the 5 values of steepness and alternative tag mixing periods (1–4 quarters). Additionally, an attempt was made to estimate age-specific mortality (M). In regards to the latter, this parameter was not well estimated and the WPTT adopted the low M profile as the most appropriate way to proceed.

- 41. The SC **NOTED** the large uncertainty in the assessment when considering the model outputs (biomass and recruitment trends, movements across areas). The surprisingly low level of natural mortality estimated from tag-recovery data has large impacts on the dynamics of the stock. Similarly, the longevity considered in the analysis (7 yrs) might be too low and should be set at a higher value. Finally, the model does not appear to reflect well enough the fishing mortality expected from the record catches of yellowfin tuna taken between 2003 and 2006, suggesting that some processes might not be well captured by the current model.
- 42. The SC **NOTED** that some of the key biological parameters used in stock assessment (natural mortality, growth, movements) need further work from the IOTC tag-recovery dataset and **AGREED** that results be presented at the Tagging Symposium which will be held in Mauritius in October or November 2012.
- 43. The SC **NOTED** that Yield-per-recruit analyses are absent among the various methods used to assess the yellowfin tuna stock, whereas they are useful when there are several fleet components exploiting different age groups, and when gear regulations affecting age/size at first capture may be an important management tool. Therefore, the SC **AGREED** that the WPTT should be presented with such analytical approaches as part of the next assessment process.
- 44. The SC **NOTED** the problems identified in the catch data from some fisheries, and especially on the length frequencies in the catches of various fleets, a very important source of information for stock assessments. Length frequency data is almost unavailable for some fleets, while in other cases sample sizes are too low to reliably document changes in abundance and selectivity by age.

Bigeye tuna

- 45. The SC **NOTED** the bigeye tuna stock was assessed using a single model in 2011 (ASPM). With respect to the modelling approach used in 2011, the steepness value (h=0.5) was selected on the basis of the likelihood and was near the lower boundary of what would be considered plausible for bigeye tuna. Selection of steepness on the basis of the likelihood was not considered reliable because i) steepness is difficult to estimate in general, and ii) substantial autocorrelation in the recruitment deviates was ignored in the likelihood term.
- 46. The SC **NOTED** that uncertainty in natural mortality was not considered, and **AGREED** that it was essential to include uncertainty in the steepness parameter as a minimum requirement for the provision of management advice.
- 47. The SC **NOTED** that the general population trends and MSY parameters estimated by the ASPM model appeared to be plausibly consistent with the general perception of the fishery and the data. However, these results are considered to be uncertain because of i) uncertainty in the catch rate standardization, and ii) uncertainty in recent catches due to the expansion of artisanal fleets offshore in areas where bigeye tuna is recognised to be abundant.
- 48. The SC **NOTED** that the management advice for bigeye tuna was based on the 2010 SS3 stock assessment and various steepness scenarios of the current 2011 ASPM stock assessment results.
- 49. The SC **NOTED** that the recent drop in catches of bigeye tuna could be related to the expansion of piracy in the western tropical Indian Ocean, which has led to a marked drop in the levels of longline effort in the core fishing area of the species. The purse seine effort also declined substantially (30% in number of EU purse seiners) and this, combined with the drop of longline effort, had a positive effect on status of the stock. In addition, it was considered that during the period of record catches of yellowfin tuna (2003–2006), fishing effort on bigeye tuna was also reduced to a level which allowed rebuilding of the stock over several years.
- 50. The SC **SUGGESTED** that at future WPTT meetings, the WPTT consider developing a figure that shows the likely status of the stock under different fishing scenarios, i.e. with and without particular fleets and gears, providing that sufficient data is available, noting that size sampling for some fleets is considered unreliable. The WPTT should also consider developing yield per recruit plots.

Other relevant papers

51. The SC **NOTED** paper IOTC–2011–SC14–46 which provided a comparison between yellowfin tuna stocks and 2011 stock assessment results for the Indian and Eastern Pacific oceans. Although many similarities exist in the biological characteristics of both stocks and the geographical size of the fisheries, the assessment produced by models of the same nature gives very diverging results. Some

explanation might be related to environmental signals which differ from one ocean to another but some other reasons may also exist.

- 52. The SC **NOTED** the suggestion by the author that an ad hoc working party between IOTC and IATTC stock assessment experts be held, in order to clarify issues presented above, and **AGREED** that at present, an ad-hoc working group would not be desirable, but rather, for scientists to work collaboratively via other means (electronically) and for this matter to be revisited at the next SC meeting in 2012, following the Tagging Symposium tentatively scheduled for November 2012.
- 53. The SC **NOTED** paper IOTC–2011–SC14–INF07 which outlined some of the outcomes of the FAD symposium held in Tahiti, from 28 November to 2 December, 2011.

7.4 Report of the Seventh Session of the Working Party on Ecosystems and Bycatch

54. The SC **NOTED** the report of the Seventh Session of the Working Party on Ecosystems and Bycatch (IOTC-2011-WPEB07-R), including the consolidated list of recommendations provided as an appendix to the report. The SC expressed its satisfaction on improved attendance and participation by national scientists working on ecosystem and bycatch topics (49 participants in 2011 compared to 37 in 2010).

Definitions of scientific terms

- 55. The SC **CONSIDERED** the need to develop and agree to a set of definitions for the most commonly used scientific terms in IOTC Conservation and Management Measures (CMM) and **REQUESTED** the IOTC Secretariat to develop definitions in this regard, and for these to be posted to the IOTC website for reference by those drafting CMM proposals for the consideration of the Commission. The SC indicated that it may wish to modify these incrementally in the future.
- 56. The SC **AGREED** that the IOTC currently utilises the following definition for bycatch: All species, other than the 16 species listed in Annex B of the IOTC Agreement, caught or interacted with by fisheries for tuna and tuna-like species in the IOTC area of competence.

Status of catch statistics

- 57. The SC **RECOMMENDED** that the Commission note the status of catch statistics for the main species of sharks, by major fisheries (gears), for the period 1950–2010, as provided in <u>Appendix VI:Tables a-</u><u>c</u>. Although some CPCs have reported more detailed data on sharks in recent years, including time-area catches and effort, and length frequency data for the main commercial shark species, the SC expressed strong **CONCERN** that the information on retained catches and discards of sharks contained in the IOTC database remains very incomplete.
- 58. The SC **NOTED** that despite the adoption of IOTC Resolutions 05/05 and 08/01, recently superseded by Resolution 10/02, the levels of reporting of data on sharks and other bycatch species remains very poor and prevents useful analyses of that data.
- 59. Noting that despite the mandatory reporting requirements detailed in Resolutions 05/05, 08/04, 09/06, 10/02, 10/03, and 10/06, bycatch data remain largely unreported by CPCs and the SC **RECOMMENDED** that the Compliance Committee and the Commission address this non-compliance by taking steps to develop mechanisms which would ensure that CPCs fulfil their bycatch reporting obligations.
- 60. The SC **RECOMMENDED** that the current IOTC Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area, Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area and Resolution 10/02 mandatory statistical requirements for IOTC members and cooperating non-contracting parties be amended in order to include a clear list of shark and marine turtle species or group of species, that should be recorded and reported to the IOTC Secretariat as per the IOTC requirements for target species.
- 61. Noting that there is extensive literature available on pelagic shark fisheries and interactions with fisheries targeting tuna and tuna-like species, in countries having fisheries for sharks, and in the databases of governmental or non-governmental organizations, the SC AGREED on the need for a major data mining exercise in order to compile data from as many sources as possible and attempt to rebuild historical catch series of the most commonly caught shark species. In this regard, the WPEB **RECOMMENDED** that the Scientific Committee considers presenting a proposal to the Commission for this activity, including a budget.

On Resolution 98/02 Data confidentiality policy and procedures

- 62. Noting that CPCs have begun to submit observer trip reports and observer data to the IOTC Secretariat, and that confidentially rules contained apply to these data (Cf. Resolution 11/04, para. 12), the SC **RECOMMENDED** that Resolution 98/02 be amended in order to clearly incorporate observer data in the data confidentiality policy of the IOTC.
- 63. The SC NOTED the following statement from Japan: "Japan showed its view that the SC is a subsidiary body to propose scientific recommendations for action to the Commission and proposing recommendation for amendment of existing resolutions of IOTC is beyond its authority".
- 64. The SC **RECOGNIZED** that it is a subsidiary body of the Commission, and that its primary role is to provide scientific advice of relevance to the Commission. With the exception of Japan, the SC **RECOGNIZED** that, where appropriate, its advice may include the provision of recommendations for amendment of existing Resolutions.

Species identification cards – Sharks, seabirds and marine turtles

- 65. The SC **NOTED** that the IOTC Secretariat has finalised the IOTC identification cards for sharks, seabirds and marine turtles and **COMMENDED** the Secretariat for its work.
- 66. The SC **RECOMMENDED** that the Commission agree to allocate additional funds from the IOTC accumulated funds, or other sources, be allocated to print and distribute the identification cards for sharks, seabirds and marine turtles to developing coastal states.

Sharks – ERA

67. Noting the general lack of catch data on sharks, the SC strongly **RECOMMENDED** that an (Ecological Risk Assessment) ERA is conducted for sharks caught in fisheries targeting tuna and tunalike species in the Indian Ocean before the next session of the WPEB. In order to do so, the SC **RECOMMENDED** that the Commission allocate specific funds for such an analysis. Should a Fishery Officer be recruited at the IOTC Secretariat, he/she may be in a position to coordinate this task.

Sharks – Wire leaders/traces

68. On the basis of information presented to the SC in 2011 and in previous years, the SC **RECOGNISED** that the use of wire leaders/traces in longline fisheries may imply targeting of sharks. The SC therefore **RECOMMENDED** to the Commission that if it wishes to reduce catch rates of sharks by longliners it should prohibit the use of wire leaders/traces.

Sharks – Resolution 05/05 concerning the conservation of sharks caught in association with fisheries managed by IOTC

Fin to body weight ratio

69. The SC **ADVISED** the Commission to consider, that the best way to encourage full utilisation of sharks, to ensure accurate catch statistics, and to facilitate the collection of biological information, is to revise the IOTC Resolution 05/05 *concerning the conservation of sharks caught in association with fisheries managed by IOTC* such that all sharks must be landed with fins attached (naturally or by other means) to their respective carcass. However, the SC **NOTED** that such an action would have practical implementation and safety issues for some fleets and may degrade the quality of the product in some cases. The SC **RECOMMENDED** all CPCs to obtain and maintain the best possible data for IOTC fisheries impacting upon sharks, including improved species identification.

Sharks – Resolution 10/02 Mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC'S):

70. Noting that the collection and reporting of data on sharks as per the IOTC Resolution 10/02 *mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPCs)* is very poor at the moment, the SC **RECOMMENDED** that Resolution 10/02 is reinforced by including specific requirements in the provision of nominal catch data for a list of most commonly caught shark species (<u>Table 3</u>). The SC **NOTED** that nominal catch data can be derived from logbook data, observer data or port sampling scheme. Furthermore, the Resolution should be strengthened by amending the provision of catch-and-effort and size data to be applicable to sharks species as well as other bycatch, noting that these data can be derived from logbook or observer data.

Table 3. List of the most commonly caught elasmobranch specie						
	Common name	Species	Code			
	Manta and devil rays	Mobulidae	MAN			
	Whale shark	Rhincodon typus	RHN			
	Thresher sharks	Alopias spp.	THR			
	Mako sharks	Isurus spp.	MAK			
	Silky shark	Carcharhinus falciformis	FAL			
	Oceanic whitetip shark	Carcharhinus longimanus	OCS			
	Blue shark	Prionace glauca	BSH			
	Hammerhead shark	Sphyrnidae	SPY			
	Other Sharks and rays	_	SKH			

Sharks – On Resolution 10/12 on the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence

71. Noting that Resolution 10/12 on the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence prohibits the retention of any part or whole carcass of thresher sharks and that the collection of biological samples on dead individuals would increase the scientific knowledge of these species, the SC **RECOMMENDED** that Resolution 10/12 be amended in order to allow observers to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from thresher sharks that are dead at haulback.

Seabirds

- 72. The SC AGREED that the current area of application for seabird bycatch mitigation measures contained in Resolution 10/06, i.e. south of 25°C, was supported by the available evidence and should not be revised at this point.
- 73. The SC **NOTED** that three measures weighting of branchlines, night setting of longlines and use of bird scaring lines (tori lines) are proven and recommended measures for use in pelagic longline gear, and that other measures, including the three which are currently included in Resolution 10/06 blue-dyed squid bait, offal discharge control and use of a line shooting device are not considered to be effective mitigation measures following ACAPs (Agreement on the Conservation of Albatrosses and Petrels) review of available mitigation measures for the following reasons:
 - <u>Blue dyed squid bait</u> has been insufficiently researched and cannot be recommended.
 - <u>Line shooting device</u>. There is no experimental evidence that line shooters reduce seabird bycatch in pelagic longline fisheries; therefore, they should not be considered a seabird bycatch mitigation option, although they will continue to be used on many vessels because they are considered to improve fishing efficiency and they avoid bycatch of epipelagic species
 - <u>Offal discharge control</u>. Appropriate management of offal is encouraged as good operating practice but is not considered a primary mitigation measure in pelagic fisheries as there are much smaller quantities of fish waste derived from fishing operations, in direct contrast to the situation in demersal fisheries. The inclusion of offal management as a mitigation measure in Resolution 10/06 most likely has been taken from use of this measure in CCAMLR and other demersal longline fisheries, where it is much more important.

74. The SC AGREED that:

- A combination of weighted branchlines, bird scaring lines and night setting are best practice mitigation in reducing bycatch of seabirds to the lowest possible level in pelagic longline fisheries. These measures should be applied in high risk areas, i.e. South of 25°S, within the IOTC area of competence.
- Currently, no single mitigation measure can reliably prevent the incidental mortality of seabirds in most pelagic longline fisheries. The most effective approach is to use the measures described in combination. Other factors such as safety, practicality and the characteristics of the fishery should also be recognised when framing conservation measures.
- The current recommended minimum standards for branchline weighting configurations are:
 - i. Greater than a total of 45 g weight attached within 1 m of the hook; or
 - ii. Greater than a total of 60 g weight attached within 3.5 m of the hook; or
 - iii. Greater than a total of 98 g weight attached within 4m of the hook.
- Positioning weight farther than 4 m from the hook is not recommended.

- 75. The SC **NOTED** that for bird scaring lines (BSL), ACAP best practice advice recognises that vessel size is an important determinant in their practical use, with respect to the aerial extent that can be achieved, and the ability to deploy single or twin BSLs. For vessels that exceed 35 m in length, an aerial extent of 100 m and use of two BSLs is recommended; for smaller vessels an aerial extent of 75 m and use of a single BSL is recommended.
- 76. Taking into account the information presented at the WPEB (WPEB working papers IOTC-2011-WPEB07-43, IOTC-2011-WPEB07-44 and IOTC-2011-WPEB07-54) and to the SC, the SC **AGREED** that a combination of weighted branchlines, bird scaring lines and night setting is best practice mitigation in reducing bycatch of seabirds to the lowest possible level in pelagic longline fisheries.
- 77. The SC further **NOTED**, in agreement with the WPEB, that if this proposal was accepted, together with the proposal to remove blue-dyed squid bait, line shooters and offal discharge control from the existing measure, the 'two column' approach used in Resolution 10/06 would be abandoned in favour of an approach that specifies the three measures to be applied in areas of seabird interaction risk (Table 4), of which two shall be implemented by the vessels operating south of 25°S.

Mitigation measure	Description
Night setting with minimum deck lighting	No setting between nautical dawn and before nautical dusk. Deck lighting to be kept to a minimum
Bird scaring lines (Tori lines)	Bird scaring lines shall be deployed before longline setting starts and for the entire setting operation to deter birds from approaching the branch line
Line weighting	Line weights to be deployed on the branch line prior to setting

Table 4. Seabird bycatch mitigation measures.

78. The SC AGREED that at this stage, line weighting should be seen as an adaptive management response to the seabird bycatch problem. Continued refinement of line weighting configurations (mass, number and position of weights and materials) through controlled research and application in fisheries, is highly desirable to find configurations that are most safe, practical and effective. The regimes recommended above should be implemented in working fisheries, monitored through observer programmes, and reviewed and modified if found to be inadequate in reducing bycatch to acceptable levels.

Recommendations

79. The SC **RECOMMENDED** that the specifications for the design and deployment of bird scaring lines be amended in order to take into account different specifications depending on the size of the longline fishing vessel, as follows:

Bird-scaring line design

1. The bird-scaring line shall be a minimum aerial extent of 100 m in length for vessels that exceed 35 m in length and of 75 m in length for vessel less or equal to 35 m in length. If the bird-scaring line is less than 150 m in length, it will include an object towed at the seaward end to create tension to maximise aerial coverage. The section above water shall be a strong fine line of a conspicuous colour such as red or orange.

Deployment of bird scaring lines

- 1. The bird scaring line shall be deployed before longlines enter into the water.
- 2. The vessels exceeding 35 m in length should deploy two lines with an aerial extent of 100 m minimum. The vessels that are less or equal to 35 m in length could deploy a single line with an aerial extent of 75 m minimum. To achieve this coverage the line shall be suspended from a point a minimum of 5 metres above the water at the stern on the windward side of the point where the branch line enters the water.
- 80. The SC further **NOTED** the benefits for the IOTC to harmonize its Conservation and Management Measure for seabirds with that from ICCAT (Supplementary recommendation by ICCAT on reducing incidental bycatch of seabirds in ICCAT longline fisheries, PA4-813A/2011), as there are a number of longline fishing vessels operating in both the Atlantic and Indian Ocean south of 25°S.
- 81. The SC **RECOMMENDED** that Resolution 10/06 be strengthened in order to make the reporting of seabird interactions mandatory for vessels fishing for species under the IOTC mandate.

- 82. The SC **RECOMMENDED** that any amendment to Resolution 10/06 should allow sufficient time for orderly implementation, to allow training and redevelopment of gears and operations.
- 83. The SC **RECOMMENDED** that the Commission consider revising Resolution 10/06 *On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries*, noting the technical specifications and other considerations outlined and agreed to by the SC in paragraphs 73 to 82 of the report of the SC14.
- 84. The SC AGREED that seabird identification can be very difficult, even for trained scientific observers, and **RECOMMENDED** that observers take photographs of seabirds caught by fishing vessels and submit them to seabird experts, or to the IOTC Secretariat, for confirmation of identification.
- 85. As a matter of consistency and to increase the reporting of seabird interactions, the SC **RECOMMENDED** that the recording of interactions with seabirds (as a group) be included in the minimum requirements for logbooks or through observer programmes for all fleets.
- 86. The SC further **RECOMMENDED** the Commission consider that more research is conducted on the identification of hot spots of interactions of seabirds with fishing vessels.

Marine turtles

- 87. The SC **NOTED** that the lack of data from CPCs on interactions and mortalities of marine turtles in the Indian Ocean is a significant concern, resulting in an inability of the WPEB to estimate levels of marine turtle bycatch.
- 88. Noting the general lack of data on incidental catch of marine turtles, the SC **RECOMMENDED** that an ERA be conducted for marine turtles caught in fisheries targeting tuna and tuna-like species in the Indian Ocean before the session of the WPEB where marine turtles will be a priority. In order to do so, the SC **RECOMMENDED** that the Commission allocate specific funds for such an analysis.
- 89. Noting that reporting of interactions with marine turtles is already mandatory through Resolution 09/06 which states "*CPCs shall collect (including through logbooks and observer programs) and provide to the Scientific Committee all data on their vessels' interactions with marine turtles in fisheries targeting the species covered by the IOTC Agreement*" (Res.09/06, para.2), and in order to increase the reporting of interactions, the SC **RECOMMENDED** that the recording of marine turtles caught as bycatch is included in the minimum requirements of logbooks or through observer programmes for all fleets fishing in the IOTC area.
- 90. The SC **NOTED** that there is an urgent need to quantify the effects of fisheries for tuna and tuna-like species in the Indian Ocean on non-target species, and it is clear that little progress on obtaining and reporting data on interactions with marine turtles has been made. This data is imperative to allow the IOTC to respond and manage the adverse effects on marine turtles, and other bycatch species.
- 91. The SC **RECOMMENDED** that current IOTC Resolution 09/06 *on Marine Turtles* be strengthened to ensure that CPCs report annually on the level of incidental catches of marine turtles by species.
- 92. Noting that paragraph 4 of Resolution 09/06 *on Marine Turtles* currently refers to "hard shelled turtles", which could be read to exclude leatherback turtles, and noting the Scientific Committee's previous recommendation to the Commission that the resolution should apply to leatherback turtles, the SC **RECOMMENDED** that the Commission revise Resolution 09/06 *on marine turtles* so that the term "hard-shelled" be deleted and replaced by "marine" to ensure application to all marine turtle species.

Redundant/obsolete Conservation and Management Measures (Resolutions and Recommendations)

- 93. The SC **RECOMMENDED** that the Commission revoke the following Conservation and Management Measures, noting that they have either been superseded by a new Resolution adopted by the Commission, but were not specifically revoked (Recommendation 05/09 and 05/08), or the CMM was to carry out a specific scientific task which is now complete (Resolution 00/02):
 - Recommendation 05/09 On incidental mortality of seabirds
 - Recommendation 05/08 On sea turtles and Resolution 09/06 On marine turtles
 - Resolution 00/02 On a survey of predation of longline caught fish.

Other relevant papers

94. The SC **NOTED** paper IOTC–2011–SC15–45 which provided a review of IOTC discussions and recommendation for shark conservation in the Indian Ocean. In particular, the SC **NOTED** Australia's

intention to present a proposal at the 16^{th} Session of the Commission that would amend both Resolution 05/05 and Resolution 10/12. The proposal will seek to strengthen conservation and management arrangements for sharks caught in association with fisheries managed by the IOTC, in line with the discussion and recommendations of the WPEB and SC.

7.5 Report of the First Session of the Working Party on Neritic Tunas

- 95. The SC **NOTED** the report of the First Session of the Working Party on Neritic Tunas (IOTC-2011-WPNT01-R), including the consolidated list of recommendations provided as an appendix to the report. The meeting was attended by 28 participants, including 9 recipients of the Meeting Participation Fund. The SC **AGREED** that the outcomes of the meeting will form the basis of a productive and dynamic group of national scientists focused on neritic tuna and tuna-like stocks which are known to be critically important to many of the Indian Ocean coastal states. The SC expressed its satisfaction that the first meeting of this working party had finally been held after several failed attempts, and thanked all of those responsible for the organisation and successful delivery of the meeting outcomes.
- 96. The SC **NOTED** that at present very little is known about the population structure and migratory range of most neritic tunas in the Indian Ocean, and **AGREED** that research needs to be undertaken along two separate lines; i) genetic research to determine the connectivity of neritic tunas throughout their distributions, and ii) tagging research to better understand the movement dynamics, possible spawning locations, and post-release mortality of neritic tunas from various fisheries in the Indian Ocean.
- 97. The SC AGREED that there was an urgent need to carry out stock assessments for neritic tunas in the Indian Ocean, however at present the data held at the IOTC Secretariat would be insufficient to undertake this task. As such, the SC RECOMMENDED that the Commission consider allocating appropriate funds to further increase the capacity of coastal states to collect, report and analyse catch data on neritic tuna and tuna-like species in the Indian Ocean.

7.6 Report of the Eighth Session of the Working Party on Data Collection and Statistics

98. The SC **NOTED** the report of the Eighth Session of the Working Party on Data Collection and Statistics (IOTC-2011-WPDCS08-R), including the consolidated list of recommendations provided as an appendix to the report.

IOTC Observer Trip Report Template

- 99. Noting that in 2010, the SC requested that the WPDCS discuss collection and reporting by observers of the data items below:
 - Information on the type and numbers of branch lines and wire leaders used (longline)
 - Information on the number and type of electronic equipment used on board
 - Area resolution (1 degree square at present)
 - Information on the state of the sea and weather conditions
 - Information on depredation
 - Information on lost fishing gear
 - Information on the number of hooks used by type and size.

and noting the difficulties that some observers may have in collecting and reporting of the data items that are requested in the observer trip report template (seven items listed above), and further noting that collecting this information may compromise access to other basic data on board longline vessels, the SC **RECOMMENDED** that the Commission allow for some flexibility in the collection and reporting of these data, until such a time where the CPCs concerned are in a position to collect and provide this information.

- 100. Noting that the use of monofilament leaders may allow sharks to escape by biting through the line (removing the hook), in contrast to wire leaders which are not prone to 'bite-off', the SC **RECOMMENDED** that, where possible for fleets that have not already prohibited the use of wire leaders, the number of 'bite-off' per leader type is added to the longline hauling information recorded by the observer (currently in the IOTC observer form FORM 4-LL Fishing Event Longline).
- 101. Noting that the current observer trip reporting template includes summaries of catch and bycatch by 1° square as required in Resolution 11/04, and that there is no summary of the effort exerted during the trip at the same scale, the SC **RECOMMENDED** that a new table is added to the observer trip reporting template that would ensure effort during the trip is recorded, as follows:

Year	Month	Square (1°x1°)	Effort deployed
			Longline: number of hooks deployed
			Purse seine on free-schools: number of fishing sets
			Purse seine on associated schools: number of fishing sets,
			and number of new FADs deployed
			Gillnet: number of panels deployed
			Pole-and-line: number of fishing days
			Handline: number of fishing days
			Troll-line: number of fishing days

- 102. The SC **RECOMMENDED** that the observer trip report is submitted in an electronic format, where possible, noting that the forms/tables in the observer trip report template are for illustrative purposes and that the complete information required could be reported in a different format.
- 103. Noting that at present, the observer reporting template includes obligatory reporting of information concerning waste management on board the fishing vessel (International Convention for the Prevention of Pollution from Ships MARPOL), the SC **RECOMMENDED** that the reporting of this information be made optional, as most fishing vessels are already bound by this international regulation.
- 104. Noting that the reporting of transhipment events have to be reported through the IOTC Transhipment Programme, and that the IOTC Transhipment Programme applies only where transhipments involve a fishing vessel with LOA 24 m or greater and carrier vessels, pointing out that transhipments between fishing vessels, in particular, fresh-tuna longliners, are very common, the SC AGREED that in order to avoid duplication, observers under the IOTC Regional Observer Scheme can refrain from reporting Transhipments when those events are recorded by observers under the IOTC Transhipment Programme, **RECOMMENDING** that this is incorporated into the observer report.
- 105. The SC AGREED that from a technical point of view the existing standards for the collection and reporting of data by observers are appropriate, and ENDORSED the data requirements of the observer trip report template with the amendments recommended in paragraphs 99 to 104.

Review of IOTC Minimum Requirements for Operational Catch and Effort Data (Logbook Templates)

106. The SC **NOTED** the agreement reached by the WPDCS on revised logbook templates, which is discussed in detail under section 15 below.

Activities under the IOTC-OFCF Project

107. Acknowledging the value of projects such as the IOTC-OFCF in the region, the SC **NOTED** with thanks the support offered by the IOTC-OFCF project since 2002, and strongly **RECOMMENDED** that the activities carried out under the IOTC-OFCF project, including the IOTC-OFCF project itself, continue after the project ends in March 2013.

Common topics among IOTC Working Party's

Meeting participation fund

- 108. The SC **NOTED** that the increased attendance by national scientists from developing CPCs to IOTC Working Parties in 2011 was partly due to the IOTC Meeting Participation Fund (MPF), adopted by the Commission in 2010 (Resolution 10/05 *on the establishment of a Meeting Participation Fund for developing IOTC Members and non-Contracting Cooperating Parties*), and **RECOMMENDED** that the Commission maintain this fund into the future.
- 109. The SC **RECOMMENDED** that the Commission consider the problems encountered by potential MPF recipients in 2011. Specifically, there were a number of officially funded recipients who could not attend the various IOTC meetings at the last moment due to internal/domestic administrative processes (including but not limited to South Africa, I.R. Iran). In some cases this resulted in loss of the Commission's MPF funds due to late cancellations.

Dedicated workshop on CPUE standardisation

110. Noting the combined recommendations from the WPB, WPTmT and WPTT to hold a dedicated workshop on CPUE standardization in 2012, the SC **RECOMMENDED** that a dedicated, informal workshop on CPUE standardization, including issues of interest for other IOTC species, should be carried out before the next round of stock assessments in 2013, and that where possible it should include a range of invited experts, including those working on CPUE standardisation in other

ocean/RFMOs, in conjunction with scientists from Japan, Republic of Korea and Taiwan, China, and supported by the IOTC Secretariat. The SC **NOTED** the CPUE workshop organised by ISSF and scheduled to be held late March 2012 in Hawai'i, USA, and urged national scientists working on purse seine CPUE standardisations to attend where possible.

Definition of overfishing

111. The SC NOTED the recommendations from the WPB, WPTmT and WPTT to:

- **NOTE** the current definition of overfishing used by the IOTC, where fishing mortality is in excess of F_{MSY} ($F_{curr}/F_{MSY} > 1$) is considered overfishing;
- **NOTE** that fishing mortality in excess of F_{MSY} is not always defined as overfishing (within tRFMOs) if the stock is well above the B_{MSY} level, although no specific threshold has been defined;
- **CONSIDER** the current definition of overfishing ($F_{curr}/F_{MSY} > 1$), and determine that if in situations where the biomass of a given stock is well above B_{MSY} , but $F_{curr}/F_{MSY} > 1$, under what circumstances should a stock be classified as subject to overfishing;
- 112. The SC **AGREED** that the current definition of overfishing ($F_{curr}/F_{MSY} > 1$) should be maintained, irrespective of the level of biomass of a particular stock. Any future modification to the definitions, including the possible introduction of alternative reference points and harvest controls rules, should be addressed through the IOTC Management Strategy Evaluation process, as agreed by the Commission in 2011.

Increased workload and staffing at the IOTC Secretariat

- 113. The SC, **NOTED:**
 - the recommendation of the first Bycatch Joint Technical Working Group (BJTWG) meeting and the KOBE II and III meetings, that an additional staff member be hired at each tuna RFMO to deal with bycatch issues;
 - the increasing workload of the IOTC Secretariat regarding bycatch issues, including through the direct requests of the Commission;
 - that the workload of the WPEB has increased exponentially in recent years and yet there appears to be limited resources being given to issues of bycatch, despite the range of IOTC Conservation and Management Measures and other international agreements addressing bycatch in fisheries for tuna and tuna-like species;
- 114. The SC **RECOMMENDED** that an additional Fishery Officer (P3 or P4) be hired, or consultants contracted, to handle a range of issues related to bycatch, including those from the Commission relating to ecosystems and bycatch issues (see <u>para. 113</u>).
- 115. Noting the need to provide advice to the Commission concerning the status of the most commonly caught species of sharks in the Indian Ocean, the SC AGREED on the need to explore the shark data presently available at the IOTC Secretariat, and to determine if that data can be used to derive total estimates of shark catches for each species.

Chairs and Vice-Chairs of the Working Parties

116. The SC **NOTED** and welcomed the re-elected and new Chairs and Vice-Chairs for each of the IOTC Working Parties, as listed in <u>Appendix VII</u>.

Recommendations from the Working Parties on data collection and reporting deficiencies

117. Noting the wide range of recommendations from the IOTC Working Parties in 2011, which included requests to address the deficiencies in data collection, monitoring and reporting by CPCs, as well as recommendations to improve research, the SC ENDORSED the consolidated list of recommendations of the WP's on these matters as those of the SC (provided at <u>Appendix VIII</u>). The SC requested that the IOTC Secretariat communicate these recommendations to relevant parties so that they may address these matters in 2012 and provide progress updates to the IOTC Working Parties at their next meetings.

Recommendations from the Working Parties to the IOTC Secretariat, Chairs and NGOs

118. The SC **ADOPTED** the recommendations from the WPs to the IOTC Secretariat, Chairs and other groups (<u>Appendix IX</u>).

8. UPDATE ON THE KOBE PROCESS

- 119. The SC **NOTED** paper IOTC-2011-SC14-06 which provided a report on the first meeting of the bycatch joint technical working group (BJTWG). The BJTWG developed recommendations on data collection and harmonization, sharks, collaboration and research, and a provisional list of research priorities was proposed covering bycatch mitigation measures, their impacts in a multi-taxa context, depredation, life history parameters, electronic monitoring systems and the development of Ecological Risk Assessments. The SC **NOTED** that the current activities undertaken by the WPEB cover most of the priority topics, and thus, **ENCOURAGED** that WPEB scientists get involved in the BJTWG workplan.
- 120. The SC **NOTED** paper IOTC-2011-SC14-07 which provided the recommendations arising from the KOBE III meeting. The SC expressed its disappointment at the very limited scope of the three scientific recommendations arising from the meeting, in comparison to the list of research priorities agreed by the Chairs of the tRFMO's scientific committees and presented at the meeting. The SC **NOTED** that the Kobe process continues, but allow some time for implementation of agreed recommendations before convening another joint meeting.

9. EXAMINATION OF THE EFFECT OF PIRACY ON FLEET OPERATIONS AND SUBSEQUENT CATCH AND EFFORT TRENDS

- 121. The SC NOTED that the Commission, at its 15th Session recognized that piracy activities in the western Indian Ocean, have had substantial negative consequences on the activities of some fleets, as well as the level of observer coverage in these areas. The Commission requests that the Scientific Committee assess the effect of piracy on fleet operations and subsequent catch and effort trends (para. 40 of the S15 report).
- 122. The SC **NOTED** that many papers presented at the WPTT meeting in 2011 demonstrated clear impacts of piracy on fishing operations in the western Indian Ocean (Somali Basin). In particular, the impacts appear to have been greatest on the longline fleets with effort having declined to negligible levels in recent years by most fleets. Of the vessels from Taiwan, China, 10 have moved to the Atlantic Ocean. These originally targeted bigeye tuna, however according to information from observers, some of the remaining vessels have now moved south to target albacore. Japan reported a reduction of ~90 vessels since 2006, with 85 remaining in 2010 (preliminary numbers), which corresponds to a decrease of total catch of about 75–80%. Rep. of Korea reported that one longline vessel was hijacked in 2006 and this had resulted in a large reduction (50%) of the number of Korean active vessels, from 26 in 2006 to 13 in 2010, while the remaining vessels moved to the Southern Indian Ocean.
- 123. The SC **NOTED** the number of purse seiners has decreased from 51 in 2006 to 35 in 2010 (30% reduction). There was also a large increase in the proportion of sets made on drifting FADs by the EU fleet (from 53 to 77%) and a parallel decline of sets made on free schools. For security reasons, the number of supply vessels has also decreased in comparison with previous years. Fishing effort of the EU purse seine fleet initially shifted east by at least 100 miles compared to the historic distribution of effort in the Somali basin, but the fleets progressively returned in the traditional area whilst military forces were set on board the vessels. However this situation halted the EU observer programme in 2008, but which resumed on EU,France and France(OT) vessels in 2011. Overall, the piracy situation did not significantly decrease the catch and the catch rates of the EU purse seine fleet.
- 124. The SC **NOTED** that piracy was also reported to be playing a role in the behaviour of some small-scale fishing vessels for which the number have declined in the region.
- 125. The SC **NOTED** that for skipjack tuna, the large declines of catches observed in the Maldives are unlikely to be linked to the impacts of piracy, but rather by other factors which require further investigation to be elucidated.
- 126. The SC **NOTED** that a workshop will be held in the Seychelles in early 2012 that will explore the impacts of piracy on fisheries at national, regional and international levels. The workshop is being convened by the governments of Seychelles and Norway and the South West Indian Ocean Fisheries Project, with support from the European Bureau for Conservation and Development. The SC **AGREED** that it is preferable for consolidated information from the various working parties to be presented at the workshop, focusing on current knowledge of pirate impacts on fisheries managed by the IOTC.
127. In response to the request of the Commission (para. 40 of the S15 report), the SC **RECOMMENDED** that given the lack of quantitative analysis of the effects of piracy on fleet operations and subsequent catch and effort trends, and the potential impacts of piracy on fisheries in other areas of the Indian Ocean through the relocation of longliners to other fishing grounds, specific analysis should be carried out and presented at the next WPTT meeting by the CPCs most affected by these activities, including Japan, Republic of Korea and Taiwan, China.

10. STATUS OF TUNA AND TUNA-LIKE RESOURCES IN THE INDIAN OCEAN

128. Noting that <u>Table 1</u> in this report provides an overview of the stock status and management advice for each species under the IOTC mandate as well as species directly impacted by fisheries for tuna and tuna-like species, the SC **AGREED** to an Executive Summary for each species or species group as detailed below.

10.1 Tuna – Highly migratory species

- 129. The SC **RECOMMENDED** that the Commission note the management advice developed for each tropical and temperate tuna species as provided in the Executive Summary for each species.
 - Albacore (*Thunnus alalunga*) <u>Appendix X</u>
 - Bigeye tuna (Thunnus obesus) Appendix XI
 - Skipjack tuna (Katsuwonus pelamis) Appendix XII
 - Yellowfin tuna (*Thunnus albacares*) <u>Appendix XIII</u>
- 130. The SC AGREED that the Chairs of the IOTC Working Parties should ensure that where possible, all KOBE plots should be presented in a standardized format for the consideration of the SC.
- 131. The SC **NOTED** paper IOTC–2011–SC14–12 which provided an overview of the biology, stock status and management of southern bluefin tuna (*Thunnus maccoyii*), and thanked CCSBT for providing it.

10.2 Tuna and mackerel – Neritic species

- 132. The SC **RECOMMENDED** that the Commission note the management advice developed for each neritic tuna species as provided in the Executive Summary for each species:
 - Longtail tuna (*Thunnus tonggol*) <u>Appendix XIV</u>
 - Narrow-barred Spanish mackerel (Scomberomorus commerson) Appendix XV
 - Bullet tuna (Auxis rochei) <u>Appendix XVI</u>
 - Frigate tuna (Auxis thazard) <u>Appendix XVII</u>
 - o Kawakawa (Euthynnus affinis) Appendix XVIII
 - Indo-Pacific king mackerel (*Scomberomorus guttatus*) <u>Appendix XIX</u>

10.3 Billfish

- 133. The SC **RECOMMENDED** that the Commission note the management advice developed for each billfish species as provided in the Executive Summary for each species:
 - Swordfish (*Xiphias gladius*) <u>Appendix XX</u>
 - Black marlin (Makaira indica) Appendix XXI
 - Indo-Pacific blue marlin (*Makaira mazara*) <u>Appendix XXII</u>
 - Striped marlin (*Tetrapturus audax*) <u>Appendix XXIII</u>
 - Indo-Pacific sailfish (*Istiophorus platypterus*) <u>Appendix XXIV</u>

11. STATUS OF MARINE TURTLES, SEABIRDS AND SHARKS IN THE INDIAN OCEAN

11.1 Marine turtles

- 134. The SC **RECOMMENDED** that the Commission note the management advice developed for marine turtles, as provided in the Executive Summary encompassing all six species found in the Indian Ocean:
 - Marine turtles <u>Appendix XXV</u>

11.2 Seabirds

- 135. The SC **RECOMMENDED** that the Commission note the management advice developed for seabirds, as provided in the Executive Summary encompassing all species commonly interacting with IOTC fisheries for tuna and tuna-like species:
 - Seabirds <u>Appendix XXVI</u>

11.3 Sharks

- 136. The SC **RECOMMENDED** that the Commission note the management advice developed for a subset of shark species commonly caught in IOTC fisheries for tuna and tuna-like species:
 - Blue sharks (*Prionace glauca*) <u>Appendix XXVII</u>
 - Oceanic whitetip sharks (*Carcharhinus longimanus*) <u>Appendix XXVIII</u>
 - Scalloped hammerhead sharks (Sphyrna lewini) <u>Appendix XXIX</u>
 - Shortfin mako sharks (*Isurus oxyrinchus*) <u>Appendix XXX</u>
 - Silky sharks (*Carcharhinus falciformis*) <u>Appendix XXXI</u>
 - Bigeye thresher sharks (*Alopias superciliosus*) <u>Appendix XXXII</u>
 - Pelagic thresher sharks (Alopias pelagicus) <u>Appendix XXXIII</u>

12. IMPLEMENTATION OF THE REGIONAL OBSERVER SCHEME

- 137. The SC **NOTED** paper IOTC-2011-SC14-34 which provided an update on the national implementation of the regional observer scheme by CPCs, noting that the IOTC Regional Observer Scheme (ROS) started on July 1st, 2010 (Resolution 10/04 superseded by Resolution 11/04).
- 138. The SC **NOTED** the update on the implementation of the Regional Observer Scheme set out in Resolution 11/06 *on a Regional Observer Scheme* and **EXPRESSED** its concerns regarding the low level of implementation and reporting to the IOTC Secretariat of both the observer trip reports and the list of accredited observers since the start of the ROS in July 2010 (8 CPCs provided a list of accredited observers and 11 reports were submitted from 4 CPCs).
- 139. The SC **RECOMMENDED** that all IOTC CPCs urgently implement the requirements of Resolution 11/04 on a Regional Observer Scheme, which states that: "The observer shall, within 30 days of completion of each trip, provide a report to the CPCs of the vessel. The CPCs shall send within 150 days at the latest each report, as far as continuous flow of report from observer placed on the longline fleet is ensured, which is recommended to be provided with 1°x1° format to the Executive Secretary, who shall make the report available to the Scientific Committee upon request. In a case where the vessel is fishing in the EEZ of a coastal state, the report shall equally be submitted to that Coastal State." (para. 11), **NOTING** that the timely submission of observer trip reports to the Secretariat is necessary to ensure that the Scientific Committee is able to carry out the tasks assigned to it by the Commission, including the analysis of accurate and high resolution data, in particular for bycatch, which would allow the scientists to better assess the impacts of fisheries for tuna and tuna-like species on bycatch species.
- 140. The SC **NOTED** that the implementation of the ROS is not a simple task and CPCs should continue to work towards full implementation of the scheme as prescribed in Resolution 11/04. Solving the difficulties experienced in the training of observers and deployment, would benefit from collaborative arrangements among CPCs.
- 141. The SC **NOTED** the work being undertaken by the SWIOFP to accredit observers in the region (40 observers trained so far) and the development of a database for observer data. SWIOFP indicated that it has also been proving field sampling equipment for CPCs in the region to carry out the necessary observer tasks onboard vessels.
- 142. The SC **NOTED** the indication by some CPCs present at the SC14 meeting (Rep. of Korea, Thailand, Mauritius), that they do have the necessary information available but due to domestic administrative difficulties, the information has not yet been provided to the IOTC Secretariat. The SC **NOTED** the commitment by these CPCs to provide the information early in 2012.
- 143. The SC AGREED that such a low level of implementation and reporting is detrimental to its work, in particular regarding the estimation of incidental catches of non-targeted species, as requested by the Commission and **RECOMMENDED** the Commission to consider how to address the lack of implementation of observer programmes by CPCs for their fleets and reporting to the IOTC Secretariat as per the provision of Resolution 11/04 *on a Regional Observer Scheme*, noting the update provided in <u>Appendix XXXIV</u>.
- 144. The SC **RECOGNISED** the difficulties that some CPCs have in developing and implementing a national observer programme, in particular due to the piracy activities in the western Indian Ocean, the lack of trained observers and the lack of resources and expertise in observer training and management of such programmes.

13. IMPLEMENTATION OF THE PRECAUTIONARY APPROACH AND MANAGEMENT STRATEGY EVALUATION

- 145. The SC **NOTED** that the Commission, at its 15th Session endorsed the development of a Management Strategy Evaluation (MSE) in the framework of IOTC and **requests** that this process be continued in 2011 (para. 43 of the S15 report).
- 146. Noting that the development of an MSE process will require management objectives to be specified, the SC **RECOMMENDED** that the Commission provide clear guidance in this regard, noting that the adoption of the Precautionary Approach, as defined in the Fish Stocks Agreement, may be the first step.
- 147. The SC **NOTED** paper IOTC–2011–SC14–35 which provided a proposal for the implementation of the precautionary approach by the IOTC, responding to the recommendations from the Performance Review Panel, and in line with recommended best practices from international legal instruments and eco-certification guidelines.
- 148. The SC **NOTED** that the proposed implementation includes the formulation of interim or provisional target and reference points for the major tuna stocks. These provisional reference points will be replaced by updated reference points and harvest control rules, that will be recommended based on their performance in the management strategy evaluation process.
- 149. The SC **RECOMMENDED** that interim target and limit reference points be adopted and a list of possible provisional values for the major species is listed in <u>Table 5</u>. These values should be replaced as soon as the MSE process is completed. Provisional target reference points would be based on the MSY level of the indicators, and on different multipliers for the limit reference points.

 Table 5. Interim target and limit reference points.

Stock	Target Reference Point	Limit Reference Point
Albacore	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$
Bigeye tuna	$B_{MSY}; F_{MSY}$	0.5*B _{MSY} ; 1.3*F _{MSY}
Skipjack tuna	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.5*F_{MSY}$
Yellowfin tuna	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$
Swordfish	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$

- 150. The SC **NOTED** that the proposal further includes provisions for the SC to be mandated to conduct a full management strategy evaluation and report on its results by the year 2014. The SC considered a workplan to advance this process through the Working Party on Methods, focusing its efforts exclusively on the development of MSE simulations, and taking advantage of existing national initiatives to develop the analytical tools needed.
- 151. The SC, with reservations from India, **ENDORSED** the initiative to implement the precautionary approach as described.
- 152. The SC **NOTED** paper IOTC–2011–SC14–36 which provided a proposal for a Management Strategy Evaluation process for the IOTC.
- 153. The SC **NOTED** that the adoption of management plans requires careful and detailed work that attempts, to the best capacity of the IOTC scientific community, to acknowledge all sources of error and variability, explore possible measures robust to those uncertainties, and present this in a clear and direct manner to managers and stakeholders.
- 154. The SC **NOTED** that the use of Management Strategy Evaluation (MSE), also termed Management Procedure approach, was first proposed as a way of developing management plans for IOTC stocks in 2002.
- 155. The SC **NOTED** that:
 - the impact on management of a MSE procedure is likely to depend on several factors. The political will to better manage the fisheries, and even the support of fishery stakeholders for doing so, is a necessary although not sufficient condition for achieving success. The first element in which stakeholder and manager input is required relates to the objectives for the fishery, both in terms of stock status and economic or yield expectations.
 - deciding on precise objectives for management is an essential component for the development of HCRs. Discussion on this issue could be best carried out in some multi-lateral meeting,

where scientists, managers, industry and other stakeholders, can be introduced into the precise ways in which IOTC finally decides to conduct the development of management plans, feedback can be obtained on the issues of interest to various parties, and agreement could be attempted on the exact objectives that the plans should attempt to provide for.

- given the likely diversity of the audience, an extra effort needs to be made to make the presentation of model and results as clear and attractive as possible. The issue of communication of scientific results, always difficult, is likely to be of major impact for the acceptance of modelling exercise on great complexity. The development of user friendly software tools, for example TUMAS (Tuna Management Simulator), which has been developed for MSE in the WCPFC is strongly encouraged so as to broaden participation in the MSE process.
- some kind of external review process is probably appropriate, both in terms of internal quality assurance, and for external accreditation of results and methods.
- Fisheries management objectives evaluated by MSE are often stock specific but there is also a need to consider food security, economics, multispecies interactions and environmental impacts. These objectives may not be well prioritized in an international context as they are not technical issues but political issues, so scientific exploration of potential objectives should be carried out with open minds as to the objectives of the Commission.
- 156. The SC **RECALLED** the necessity that all CPCs be fully participative in this process, but that capacity building activities would be necessary especially on the quantitative aspect of the approach. Opportunities for funding such capacity building activities should be sought and ISSF announced they could contribute to this kind of financial support.
- 157. The SC **ENDORSED** the roadmap presented for the implementation of MSE in the Indian Ocean in IOTC-2011-SC14-36 and **RECOMMENDED** the Commission agree to initiate a consultative process among managers, stakeholders and scientists to begin discussions about the implementation of MSE in IOTC.
- 158. The SC **AGREED** that Dr. Iago Mosqueira (European Union) and Dr. Toshihide Kitakado (Japan) would act in the roles of co-ordinators for the MSE process until the Working Party on Methods can consider candidates for Chair and Vice-Chair at its meeting in 2012.

14. EVALUATION OF DATA COLLECTION AND REPORTING SYSTEMS

- 159. The SC **NOTED** paper IOTC–2011–SC14–38 which provided an evaluation of data collection and reporting systems for artisanal fisheries in the Indian Ocean.
- 160. The SC **NOTED** the actions undertaken by the IOTC Secretariat to address the request from the Commission on the ability of coastal countries in the IOTC region to report catch data for their artisanal fisheries in close-to-real time, in particular catch data for of yellowfin tuna and bigeye tuna. Two timeframes for the reporting of close-to-real-time catches are defined, depending on the type of fishery. For industrial fisheries, close-to-real-time reporting of catches occurs when catches are reported within 30 days of the day of capture. For artisanal fisheries, close-to-real-time reporting of capture. Artisanal fisheries are defined as those undertaken by vessels (or any other types of fishing crafts) with LOA less than 24m and operated full time within the EEZ of their flag states.
- 161. The SC **NOTED** that the report identifies deficiencies in data collection and reporting in the majority of the countries assessed noting that the reporting of catches as per the timeframes specified will not be possible in eleven out of the eighteen countries evaluated. Those countries will require significant amounts of time and resources to streamline their statistical systems if data by the proposed timeframe is to be reported in the future. Overall an estimated 35% of the combined catches of yellowfin tuna and bigeye tuna will not be reported in time unless the countries address the issues identified as a matter of priority. In the event of catches not being reported, the catches will need to be estimated. The use of such an approach will require the adoption of more conservative measures, to account for the uncertainty of the estimates, and mitigate the risk of exceeding any future catch limits set by the Commission.
- 162. The SC ACKNOWLEDGED the excellent work undertaken by the consultant in collaboration with the IOTC Secretariat in undertaking this thorough, difficult and highly valuable work.

- 163. Noting that in the case of purse seine fleets the catches recorded in the logbooks are corrected for species composition after a delay of approximately three months, the SC **NOTED** that CPCs having purse seine vessels could provide preliminary estimates in a shorter timeframe based on the best information available. However, the SC acknowledged that the catches estimated close-to-real time may slightly differ from the final catches estimated for these fleets, requesting that the CPCs concerned conduct research to assess the difference between both estimates and report back to the SC in 2012.
- 164. The SC **NOTED** the comments from various participants who indicated that their reporting abilities are highly variable, from near real time to many months. It was agreed that data collection and reporting systems need to be continuously updated and improved.

15. DATA PROVISION NEEDS – BY GEAR

- 165. The SC NOTED that the Commission, at its 15th Session requested that the Scientific Committee in its 2011 Session, to evaluate the data provision needs for longline, purse seine, gillnet and pole-and-line gear types, notably regarding information relating to the vessel characteristics and the definition of the pole-and-line 'fishing event'. The evaluation is requested in order to ensure that consistent and uniform information is collected to assist the IOTC to fulfil its mandate. The Scientific Committee should make appropriate recommendations to the 2012 Commission meeting (para. 45 of the S15 report).
- 166. Noting the Commission's request to evaluate the data provision needs for longline, purse seine, gillnet and pole and line gear types, notably regarding information relating to the vessel characteristics and the definition of the pole and line 'fishing event', which was requested in order to ensure that consistent and uniform information is collected to assist the IOTC to fulfil its mandate, the SC **CONSIDERED** the recommendations issued by the WPDCS and WPEB in 2011, including a revised draft of minimum data requirements for trip and operational data, and bycatch species to be recorded, by gear, respectively. In addition, the SC considered a proposal from the WPDCS to incorporate requirements for two more gear types (trolling and handline) into the text of a revised proposal for a Resolution.
- 167. The SC **NOTED** the extended list of shark species (including rays) proposed by the WPEB for each gear, provided at <u>Table 6</u> below for information, agreeing on the need to collect catch data for all the species proposed by the WPEB. However, the SC acknowledged the difficulties that some CPCs may have to add more shark species into their existing logbooks, as identification of some species may be difficult by the crew. In this regard, the SC **NOTED** that the IOTC Secretariat has put together identification cards for shark species, which will be available early in 2012 and will be forwarded to interested parties.

Table 6. Proposed list of shark species to be recorded in logbooks for all gears.

For longline:	For gillnet:
Blue Shark (Prionace glauca)	Blue Shark (Prionace glauca)
Mako Sharks (Isurus spp.)	Mako Sharks (Isurus spp.)
Porbeagle Shark (Lamna nasus)	Other requiem sharks (Carcharhinus spp.)
Other requiem sharks (Carcharhinus spp.)	Oceanic Whitetip Shark (Carcharhinus longimanus)
Oceanic Whitetip Shark (Carcharhinus	Hammerhead Sharks (Sphyrnidae)
longimanus)	Thresher Sharks (Alopias spp.)
Hammerhead Sharks (Sphyrnidae)	Tiger shark (Galeocerdo cuvier)
Thresher Sharks (Alopias spp.)	Mantas and devils rays (Mobulidae)
Other sharks	Other sharks
	Other rays
For purse seine:	

Oceanic Whitetip Shark (*Carcharhinus longimanus*) Silky sharks (*Carcharhinus falciformis*) Mantas and devils rays (Mobulidae) Other sharks Other rays

168. Noting the concerns expressed by some CPCs, the SC AGREED that the logbook recording requirements for shark species are not extended at this time. The SC further AGREED that recording

of shark species other than those in recommendation 11/06, as proposed by the WPEB, be made optional, but to be collected through observer programmes.

- 169. The SC **RECOMMENDED** that the minimum recording requirements for handline and trolling provided in <u>Appendix XXXV</u> be incorporated into the revised proposal for minimum recording requirements as detailed in <u>para. 170</u>.
- 170. The SC **RECOMMENDED** that IOTC Recommendation 11/06 be modified to include the elements as provided in <u>Appendix XXXV</u>, noting that the lists of species to be recorded, as detailed in section 2.3 of Annex II, and makes collection of these data mandatory.
- 171. The SC **RECOGNISED** that not all CPCs attended the SC meeting and that some of these CPCs, especially coastal states, may have difficulties implementing new minimum data requirements immediately. The SC therefore **RECOMMENDED** that the Commission adopt a flexible approach to any further resolutions on minimum data requirements, e.g. through staged implementation over a period of two years.

16. OUTLOOK ON TIME-AREA CLOSURES

- 172. The SC **NOTED** that the Commission, at its 15th Session reiterated the request that the Scientific Committee should evaluate the time-area closure established in Resolution 10/01 for the conservation and management of tropical tunas stocks in the IOTC area of competence, in terms of its impacts on the stocks of tuna and tuna-like species (para. 47 of the S15 report).
- 173. Noting that the request contained in Resolution 10/01 does not specify the expected objective to be achieved with the current or alternative time area closures, and that the SC and WPTT were not clear about the intended objectives of the time-area closure taking into account recent reduction of effort as well as recent likely recovery of the yellowfin tuna population, the SC **RECOMMENDED** that the Commission specify clear objectives as to what are the management objectives to be achieved with this and/or alternative measures. This will, in turn, guide and facilitate the analysis of the SC, via the WPTT in 2012 and future years.
- 174. Noting the lack of research examining time-area closures in the Indian Ocean by the WPTT in 2011, as well as the slow progress made in addressing the Commission request, the SC **RECOMMENDED** that the SC Chair begins a consultative process with the Commission in order to obtain clear guidance from the Commission about the management objectives intended with the current or any alternative closure. This will allow the SC to address the Commission request more thoroughly.
- 175. Seychelles presented information to the SC on the planned activities in the Indian Ocean by the Convention on Biological Diversity (CBD) with respect to Ecologically or Biologically Significant marine Areas (EBSAs), noting that this CBD process links to the FAO recommendations for incorporating vulnerable marine ecosystems (VMEs) in fisheries management. The SC recognised the importance of active contribution by IOTC and its member scientists to this process.

Evaluation of the IOTC time-area closure

- 176. The SC **NOTED** paper IOTC-2011-SC14-39 which provided an evaluation of the IOTC time-area closure by estimating what the maximum potential loss of catches would be under different scenarios of time-area closure, as estimated from the catch statistics of the IOTC. The estimation was based on the historical IOTC database as no information was available for the specific closed periods of 2011 (February for longline, November for purse seine) when the measure took effect. The longline effort had already been entirely redistributed to other areas and the purse seine data for November were not yet available when the paper was prepared, nor at the date of the SC.
- 177. The SC **NOTED** that the results obtained from the study are similar to the analysis carried out for the SC in 2010, which emphasized that catch reduction expected from the current time-area closure were negligible.
- 178. The SC **RECOMMENDED** that the Commission note that the current closure is likely to be ineffective, as fishing effort will be redirected to other fishing grounds in the Indian Ocean. The positive impacts of the moratorium within the closed area would likely be offset by effort reallocation. For example, the WPTmT noted that longline fishing effort has been redistributed to traditional albacore fishing grounds in recent years, thereby further increasing fishing pressure on this stock.

179. Noting that the objective of Resolution 10/01 is to decrease the overall pressure on the main targeted stocks in the Indian Ocean, in particular yellowfin tuna and bigeye tuna, and also to evaluate the impact of the current time/area closure and any alternative scenarios on tropical tuna population, the SC **RECOMMENDED** that the Commission specify the level of reduction or the long term management objectives to be achieved with the current or alternative time area closures, as these are not contained within the Resolution 10/01.

MPA effects on yellowfin tuna

- 180. The SC **NOTED** paper IOTC–2011–SC14–40 which provided a preliminary investigation into the effects of the network of Indian Ocean MPAs on yellowfin tuna, *Thunnus albacares*, with particular emphasis on the IOTC closed area.
- 181. The SC **NOTED** the results of the study which indicated that the current IOTC closure network with only two, one month closures (one month for purse seine and one month for longline), is likely to have little impact on stock status, whether effort is eliminated or redistributed
- 182. The SC **NOTED** that if there were to be a year-round closure of the IOTC area, in addition to the BIOT and Maldivian closures, and under the assumption that fishing effort was removed entirely, would result in the most beneficial conservation outcomes. However, if effort was reallocated under these scenarios, there would be little benefits to the stocks and possibly more fishing pressure in other areas of the distribution range of the stocks. Thus, taking into consideration the precautionary approach, the issues of potential effort reallocation will need to be considered.
- 183. The SC AGREED that the current network of closures is unlikely to be sufficient to protect yellowfin tuna stocks without additional management measures (e.g. a quota allocation system).

17. ALTERNATIVE MANAGEMENT MEASURES; IMPACTS OF THE PURSE-SEINE FISHERY; JUVENILE TUNA CATCHES

- 184. The SC **NOTED** that the Commission, at its 15th Session requested that the Scientific Committee provide clear advice outlining alternative management approaches which would provide effective protection of a possible southwest Indian Ocean swordfish stock (para. 46 of the S15 report).
- 185. The SC **NOTED** that advice provided by the WPB that the stock structure of the Indian Ocean swordfish resource is under investigation, but currently uncertain. The southwest region was identified as a management unit of particular concern, because it seems to be more depleted than other regions in the Indian Ocean, and may have limited mixing with other regions.
- 186. The SC **RECOMMENDED** that the Commission note that:
 - most of the evidence provided to date has indicated that the resource in the southwest Indian Ocean has been overfished in the past decade and biomass remains below the level that would produce MSY (B_{MSY}), however recent declines in catch and effort have brought fishing mortality rates to levels below F_{MSY}. There is a risk of reversing the rebuilding trend if there is any increase in catch in this region. Thus, catches in the southwest Indian Ocean should be maintained at levels at or below those observed in 2009 (6,600 t), until there is clear evidence of recovery and biomass exceeds B_{MSY}.
 - the southwest region should continue to be analysed as a special resource, as it appears to be highly depleted compared to the Indian Ocean as a whole. However the difference in depletion does not appear to be as extreme as analyses in previous years have suggested. A review of the spatial assumptions should be conducted following the final results of the Indian Ocean Swordfish Stock Structure (IOSSS) project and the analysis of tagging experiments undertaken by SWIOFP.
 - that there is no current need to apply additional management measures to the southwest Indian Ocean, although the resource in the area should be carefully monitored.
 - that the Working Party on Methods will be progressing Management Strategy Evaluation over the coming year that will aid in addressing the Commission's request, which was considered as the appropriate mechanism for this work.
- 187. The SC **NOTED** that the Commission, at its 15th Session requested that the Scientific Committee provide advice to the Commission that adds to the information currently available or already requested of the Scientific Committee regarding the take of juvenile yellowfin tuna, bigeye tuna and other species, and on alternative management measures, including an assessment of the impact of current purse seine

activities, including the size/fishing capacity (and gear types i.e. mesh size etc.) of vessels, and the potential implications that may arise for tuna and tuna-like species. Such advice should include options for capping purse seine effort and use in conjunction with drifting FADs in the Indian Ocean (para. 105 of the S15 report).

188. The SC **NOTED** that the most direct measure of impact of fishing fleets on juveniles could be obtained by looking at the catches of juvenile yellowfin tuna and bigeye tuna by gear, as presented in <u>Table 7</u> below. It should be noted that the estimates of catches of juvenile fish are doubtful for some gears, for which catch-at-length information is severely limited or almost non-existent. The SC AGREED that the WPTT should provide the SC with multi-gear yield-per-recruit estimates for all stocks assessed in 2012, as this is another useful indicator of the impact of each gear on potential yields.

Yellowfin tuna Gear type*	Total catch (mt)	% Juveniles of catch within gear	% Juveniles total juvenile catch
BB	18438	85	13.97
GN	84305	40	30.06
HD	32728	25	7.29
LL	94610	2	1.69
TL	21297	37	7.02
FS	92957	3	2.49
LS	69128	60	36.98
OT	1516	37	0.50
TOTAL	414979	27	100
Bigeye tuna	Total catch	% Juveniles of catch	% Juveniles total
Gear type	(mt)	within gear	juvenile catch
BB	1070	70	3.44
GN	445	15	0.31
HD	27	1	0.00
LL	99535	1	4.57
TL	1079	41	2.03
FS	6425	13	3.83
LS	21990	84	84.80
OT	241	92	1.02
TOTAL	130813	17	100

Table 7. Catches of juvenile yellowfin tuna and bigeye tuna by gear.

(*) BB : baitboat / GN : Gillnet / HD : Handline / LL : Longline / TL : Troll / FS : Purse seine free schools / LS : Purse seine FAD schools / OT : Others

- 189. The SC **NOTED** that the existing statistics on catches of juvenile fish by species obtained by the various purse seine fleets fishing on FADs, in both numbers and weight, provide a measure of their impact on the stocks, and the corresponding effort statistics (number of boats, GRT and fishing days), give an indication of the capacity of this fleet, which engages, although not exclusively, on the FAD fishery.
- 190. The SC **NOTED** however, that the fishery statistics available for many fleets, in particular for coastal fisheries, are not accurate enough for a comprehensive analysis as has been repeatedly noted in previous WPTT and SC reports. In particular, the SC **RECOMMENDED** that all CPCs catching yellowfin tuna should undertake scientific sampling of their yellowfin tuna catches to better identify the proportion of bigeye tuna catches. Therefore, the SC **RECOMMENDED** the countries engaged in those fisheries to take immediate actions to reverse the situation of fishery statistics reporting to the IOTC Secretariat.
- 191. The SC **NOTED** that a complete analysis of the likely impact of the juveniles caught by any fishery in the Indian Ocean and of any management plan should be carried out within the context of the work on Management Strategy Evaluation that the SC has agreed to carry out in the future. This could, if necessary, also quantify the impact of such measures not only on the stocks, but also on the fleets, including likely economic impact on activities dependent on the fleets affected.
- 192. The SC **ADVISED** the Commission that the Western and Central Pacific Fisheries Commission has implemented since 2009 a FAD closure for the conservation of yellowfin tuna and bigeye tuna juveniles which has been very effective. The SC **RECOMMENDED** further investigation of the

feasibility and impacts of such a measure, as well as other measures, in the context of Indian Ocean fisheries and stocks.

193. The SC AGREED that the SC Chair present the response to the Commission on this request, at the Technical Committee on Allocation Criteria, to be held in the Maldives from 4–6 March, 2012.

18. PROGRESS IN IMPLEMENTATION OF THE RECOMMENDATIONS OF THE PERFORMANCE REVIEW PANEL

- 194. The SC **NOTED** paper IOTC-2011-SC14-37 which provided an update on progress regarding resolution 09/01 on the performance review follow-up. The SC **NOTED** that the Commission, at its 15th Session agreed that the Secretariat and Chair of each of the three Committee's should further develop the status table by including a work plan with proposed timelines and priorities. The Secretariat was tasked with ensuring the revised table is provided to the respective Committee's in advance of their next Sessions, in accordance with the rules of procedure (para. 125 of the S15 report).
- 195. The SC **RECOMMENDED** that the Commission note the updates on progress regarding Resolution 09/01 on the performance review follow–up, as provided at <u>Appendix XXXVI</u>.

19. SCHEDULE AND PRIORITIES OF WORKING PARTY AND SCIENTIFIC COMMITTEE MEETINGS FOR 2012 AND TENTATIVELY FOR 2013

- 196. The SC **NOTED** paper IOTC–2011–SC14–42 which outlined the proposed schedule and list of priorities for IOTC Working Party and Scientific Committee meetings in 2012 and tentatively for 2013.
- 197. The SC **RECOMMENDED** that the Commission endorse the schedule of Working Party and Scientific Committee meetings for 2012, and tentatively for 2013 (<u>Table 8</u>).

Mosting		2012	2013 (tentative)		
Meeting	Date	Location	Date	Location	
Working Party on Temperate Tunas	3–5 July (3d)	TBD (China?)	Early Aug (3d)	TBD (ICCAT SAA)	
Working Party on Billfish	11–15 SeptCape town, South(5d)Africa – TBD		10-14 Sept (5d)	Bali, Indonesia	
Working Party on Ecosystems and Bycatch	17–19 Sept (3d)	Cape town, South Africa – TBD	16-18 Sept (5d)	Bali, Indonesia	
Working Party on Methods	22-23 Oct (2d)	Port Louis, Mauritius	18-19 Oct (2d)	TBD	
Working Party on Tropical Tunas	24-29 Oct (6d)	Port Louis, Mauritius	21-26 Oct (6d)	TBD	
Working Party on Neritic Tunas	Pending (3d)	Penang, Malaysia	Pending (3d)	TBD	
Working Party on Data Collection and Statistics	nil	nil	5–6 Dec	TBD	
Scientific Committee	10–15 Dec	Victoria, Seychelles	9–14 Dec (6d)	TBD	

Table 8. Schedule of Working Party and Scientific Committee meetings for 2012, and tentatively for 2013.

- 198. The SC **NOTED** the proposed workplans and priorities of each of the Working Parties and **AGREED** to the following:
- 199. The SC AGREED that the SC Chair should develop a draft workplan for the IOTC Scientific Process prior to the SC each year, taking into account the research priorities identified by the Commission and the Working Parties, for the consideration and potential endorsement of the SC.
- 200. The SC **NOTED** a draft paper developed by Australia presenting various options for improving the efficiency and accountability of the SC and Working Parties. The SC **AGREED** that delegations will consider the issues raised and will discuss with their respective Commissioners.

Working Party on Billfish (WPB) – Research Recommendations and Priorities

- 201. The SC **RECOMMENDED** that marlins and sailfish undergo CPUE analysis in 2012, with striped marlin taking priority over other species.
- 202. The SC **RECOMMENDED** that as a matter of priority, striped marlin be the subject of CPUE analysis in 2011, and that CPUE series be compared among fleets where possible.

- 203. The SC AGREED that there was no urgent need to carry out stock assessments for the swordfish resources in the Indian Ocean in 2012, and **RECOMMENDED** that efforts over the coming year be focused on the other billfish species, in particular on striped marlin.
- 204. The SC RECOMMENDED the following core areas as priorities for research over the coming year;
 - Swordfish stock structure and migratory range using genetics
 - Swordfish stock structure and movement rates using tagging techniques
 - Billfish species growth rates
 - Size data analyses
 - Stock status indicators exploration of indicators from available data
 - CPUE standardization swordfish, marlins and sailfish
 - Stock assessment Istiophorids
 - Depredation focus on the southwest

Working Party on Temperate Tunas (WPTmT) – Research Recommendations and Priorities

CPUE standardisation

205. The SC **AGREED** that there was an urgent need to investigate the CPUE issues as outlined in paragraph 61 and for this to be a high priority research activity for the albacore resource in the Indian Ocean in 2012.

Stock assessment

206. The SC AGREED that there was an urgent need to carry out revised stock assessments for the albacore resource in the Indian Ocean in 2012, and **RECOMMENDED** that the Commission consider approving funds for this purpose.

Stock structure

207. Noting that at present very little is known about the population structure and migratory range of albacore in the Indian Ocean, other than the possible connectivity with the southern Atlantic, the SC **RECOMMENDED** that a research project addressing the albacore stock structure, migratory range and movement rates in the Indian Ocean be considered at its 2012 annual meeting as this project is assigned a high priority.

Additional core topics for research

- 208. The SC **RECOMMENDED** that the following core topic areas as priorities for research over the coming year:
 - Size data analyses
 - Growth rates and ageing studies
 - Stock status indicators exploration of indicators from available data
 - Collaborate with SPC-OFP to examine their current simulation approach to determine priority research areas.

Working Party on Tropical Tunas (WPTT) – Research Recommendations and Priorities

CPUE standardisation

- 209. Noting the importance of the various CPUE indices for stock assessment of the tuna tropical species, the SC AGREED that there was an urgent need to investigate the CPUE issues as outlined in sections 8–10, for bigeye tuna, skipjack tuna and yellowfin tuna, and for these to be a high priority research activity for the tropical tuna resources in the Indian Ocean in 2012.
- 210. The SC **NOTED** that there are various levels of needs for each fleet. For example, while for pole-andline and purse seine fleets, the data and methodological approach are considered key issues to be resolved before any attempt of CPUE standardization; longline CPUE standardization constraints (differences between fleets, spatial structure, materials, etc.) can be resolved and reviewed in a dedicated workshop with the presence of other tRFMO CPUE experts.
- 211. The SC **RECOMMENDED** that if possible, the IOTC Secretariat and Maldivian scientists continue the joint effort to standardize the Maldivian pole-and-line CPUE in preparation for assessment in 2012.

212. The SC **RECOMMENDED** that standardization of purse seine CPUE be made where possible using the operational data on the fishery, and that participants working on CPUE for the main fleets, attend the CPUE standardization workshop being organized by ISSF in Honolulu, Hawaii in 2012.

Stock assessment

213. Noting the difficulty of carrying out stock assessments for three tropical tuna species in a single year, the SC RECOMMENDED to a revised assessment schedule on a two- or three-year cycle for the three tropical tuna species as outlined in <u>Table 9</u>. Following the uncertainty remaining in the yellowfin tuna assessment the SC AGREED that priories for stock assessments in 2012 would be yellowfin tuna (Multifan-CL and SS3, Yield per recruit and possibly others) with an update of fishery indicators for the other two species.

Species/Assessment year	2012	2013	2014	2015	2016	2017
Yellowfin tuna	Full	Update	Update	Full	Update	Update
Skipjack tuna	Update	Full	Update	Update	Full	Update
Bigeye tuna	Update	Update	Full	Update	Update	Full

Table 9. New schedule proposed for tropical tuna species stock assessment.

Note: the schedule may be change depending on the situation of the stock from various sources such as fishery indicators, Commission requests, etc.

Additional topics for research

- 214. The SC **RECOMMENDED** the following core topic areas as priorities for research over the coming year in order of priority:
 - An update of the Brownie-Peterson method for the 3 tropical tuna species (possible issue for the 2012 IO Tuna Tagging Symposium).
 - An updated yellowfin tuna growth curve (work in progress to be presented to 2012 Tuna Tagging Symposium).
 - Multi-gear yield per recruit.

Working Party on Ecosystems and Bycatch (WPEB) – Research Recommendations and Priorities

- 215. The SC AGREED that sharks should be the priority for the next meeting of the WPEB in 2012, and seabirds, marine turtle, marine mammals and other bycatch should be reassessed as priorities at the next session of the SC. Thus, the SC RECOMMENDED the following core topic areas as priorities for research over the coming year.
 - Ecological Risk Assessment
 - i. All sharks
 - **CPUE** analyses
 - i. Oceanic whitetip shark
 - ii. Other sharks
 - Stock status analyses
 - i. Oceanic whitetip shark
 - ii. Other sharks
 - Capacity building
 - i. Scientific assistance to CPCs and specific fleets considered to have the highest risk to bycatch species (e.g. gillnet fleets and longline fleets).

Working Party on Neritic Tunas (WPNT) – Research Recommendations and Priorities

Stock structure

216. Noting that at present very little is known about the population structure and migratory range of most neritic tunas in the Indian Ocean, the SC **RECOMMENDED** a research plan that includes two separate research lines; i) genetic research to determine the connectivity of neritic tunas throughout their distributions, and ii) tagging research to better understand the movement dynamics, possible spawning locations, and post-release mortality of neritic tunas from various fisheries in the Indian Ocean. These should be considered high priority research projects for 2012 and 2013.

Biological information

217. The SC **RECOMMENDED** that quantitative biological studies are required to determine maturity-atage and fecundity-at-age relationships, and age and growth for all neritic tunas throughout their range.

CPUE standardisation

- 218. The SC AGREED that there was an urgent need to develop standardised CPUE series for each neritic tuna species for the Indian Ocean as a whole or by sub-region as appropriate, once stock structure and management units have been determined.
- 219. The SC **RECOMMENDED** that where feasible, support should be provided by the IOTC Secretariat and other CPCs, to aid in the development of standardised CPUE series for each neritic tuna species.
- 220. The SC **ENCOURAGED** CPCs catching neritic tunas to participate in the CPUE standardisation workshop that will be organized by the IOTC Secretariat in 2013.

Stock assessment

221. The SC AGREED that there was an urgent need to carry out stock assessments for neritic tunas in the Indian Ocean, however at present the data held at the IOTC Secretariat would be insufficient to undertake this task. As such, the SC RECOMMENDED that the Commission consider allocating appropriate funds to further increase the capacity of coastal states to collect, report and analyse catch data on neritic tunas.

Requests from the Commission

222. Noting that each year the Commission makes a number of requests to the SC without clearly identifying the task to be undertaken, its priority against other tasks previously or simultaneously assigned to the SC and without assigning a budget to fund the request made, the SC **RECOMMENDED** that these matters be addressed by the Commission at its next session.

20. OTHER BUSINESS

20.1 Rules for the appointment of an invited expert

223. The SC **NOTED** paper IOTC–2011–SC14–43 which provided a proposed set of rules for the appointment of invited experts to attend IOTC Working Party meetings. The SC **AGREED** to a revised set of "*Rules for the appointment of an Invited Expert*" as provided at <u>Appendix XXVII</u>.

20.2 Guidelines for the appointment of a consultant

224. The SC did not add to the previously agreed positions at SC13 and WPTT13.

20.3 Peer review process for IOTC stock assessments

225. The SC **NOTED** paper IOTC-2011-SC14-44 which provided an overview of how peer review of how other tRFMO's undertake peer review of their stock assessments. The SC **AGREED** that at this time it did not feel that there was a need to undertake a peer review of IOTC stock assessments and deferred this discussion to its next meeting in 2013.

20.4 IOTC Regional Tuna Tagging Programme – Tagging Symposium

- 226. The SC **NOTED** the development on the International Tagging Symposium, funded by the EU $(300,000 \in)$, the IOTC $(50,000 \in)$ and the IRD $(25,000 \in)$, that will be organized in Mauritius in early November 2012 (31 October to 2 November, 2012). Part of the funds will be used to undertake analyses of the large datasets from the Indian Ocean Tuna Tagging Programme (IOTTP), in particular from the Regional Tuna Tagging Programme in the Indian Ocean (RTTP-IO), during which more than 200,000 tropical tunas were tagged and released, and more than 31,000 were recaptured and reported. These studies will include analyses of the growth of the three tropical tuna species (based on the tagging data and otolith readings), updates of the estimation of the reporting and shedding rates, estimation of exploitation rates and natural mortalities and the improved use of tagging data in the Indian Ocean stock assessments for tuna and tuna-like species.
- 227. The SC **RECALLED** that the IOTTP and its main phase, the RTTP-IO, were a great success, tagging large numbers of yellowfin tuna, bigeye tuna and skipjack tuna. However, much of the data collected remains largely under-analysed and that this symposium will be the perfect opportunity i) to undertake

these essentials analyses and ii) to present the results of the IOTTP to all interested stakeholders in the region.

20.5 Translation of SC documents into English and French

- 228. The EU **SUGGESTED** that the limited production and submission of scientific documents to the SC meetings could be due to the translation requirements, i.e. each document should be presented in both French and English. However, it was clarified that translation is ensured by the IOTC Secretariat, if the document is not provided in both languages to the extent possible considering the limited translation resources available at the Secretariat.
- 229. The SC AGREED that documents should continue to be provided in both English and French for SC meetings.

21. ELECTION OF A CHAIRPERSON AND VICE-CHAIRPERSON FOR THE NEXT BIENNIUM

- 230. The SC participants were unanimous in **THANKING** the outgoing Chair Dr. Francis Marsac for his outstanding Chairpersonship over the past six years, including his dedication to the IOTC scientific process. It was noted that he has tirelessly attended most of the working party meetings over the six year period and has contributed greatly to almost the full range of activities undertaken by the IOTC.
- 231. Noting the rules of procedure of the IOTC: Rule X.6: The Scientific Committee shall elect, preferably by consensus, a Chairperson and a Vice-Chairperson from among its members for two years, the SC **CALLED** for nominations for the newly vacated positions of Chair and Vice-Chair for the next biennium. Dr. Tom Nishida (Japan) was nominated and elected as Chair, and Mr. Jan Robinson (Seychelles) was nominated and elected as Vice-Chair of the SC for the next biennium, following a vote by the 13 CPCs present.
- 232. The SC **RECOMMENDED** that the Commission note the new Chair, Dr. Tom Nishida (Japan) and Vice-Chair, Mr. Jan Robinson (Seychelles), of the SC for the next biennium, as well as the Chairs and Vice-Chairs of each of the Working Parties as provided in <u>Appendix VII</u>

22. REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE FOURTEENTH SESSION OF THE SCIENTIFIC COMMITTEE

- 233. The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC14, provided at <u>Appendix XXXVIII</u>.
- 234. The report of the Fourteenth Session of the Scientific Committee (IOTC-2011-SC14-R) was **ADOPTED** on 17 December 2011.

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APPENDIX II

AGENDA FOR THE FOURTEENTH SESSION OF THE SCIENTIFIC COMMITTEE

Date: 12–17 December, 2011

Location: International Conference Centre, Victoria

Mahé, Seychelles

Time: 09:00 – 17:00 daily

Chair: Dr. Francis Marsac

- 1. OPENING OF THE SESSION (Chair)
- 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION (Chair)
- 3. ADMISSION OF OBSERVERS (Chair)
- 4. ACTIVITIES OF THE COMMISSION (Secretariat)
- 5. ACTIVITES OF THE IOTC SECRETARIAT IN 2011 (Secretariat)
- 6. NATIONAL REPORTS FROM CPCs (CPCs)

7. REPORTS OF THE 2011 IOTC WORKING PARTY MEETINGS

- 7.1. IOTC-2011-WPB09-R: Report of the Ninth Session of the Working Party on Billfish
- 7.2. IOTC-2011-WPTmT03-R: Report of the Third Session of the Working Party on Temperate Tunas
- 7.3. IOTC-2011-WPTT13-R: Report of the Thirteenth Session of the Working Party on Tropical Tunas
- 7.4. IOTC-2011-WPEB07-R: Report of the Seventh Session of the Working Party on Ecosystems and Bycatch
- 7.5. IOTC-2011-WPNT01-R: Report of the First Session of the Working Party on Neritic Tunas
- 7.6. IOTC-2011-WPDCS08-R: Report of the Eighth Session of the Working Party on Data Collection and Statistics
- 8. UPDATE ON THE KOBE PROCESS (Chair)
- 9. EXAMINATION OF THE EFFECTS OF PIRACY ON FLEET OPERATIONS AND SUBSEQUENT CATCH AND EFFORT TRENDS (Chair)
- 10. STATUS OF TUNA AND TUNA-LIKE RESOURCES IN THE INDIAN OCEAN (Chair)
 - 10.1 Tuna Highly migratory species
 - 10.2 Tuna and mackerel Neritic species
 - 10.3 Billfish

11. STATUS OF MARINE TURTLES, SEABIRDS AND SHARKS IN THE INDIAN OCEAN (Chair)

- 11.1 Marine turtles
- 11.2 Seabirds
- 11.3 Sharks
- 12. IMPLEMENTATION OF THE REGIONAL OBSERVER SCHEME (Secretariat)
- 13. IMPLEMENTATION OF THE PRECAUTIONARY APPROACH AND MANAGEMENT STRATEGY EVALUATION (Chair & Secretariat)
- 14. EVALUATION OF DATA COLLECTION AND REPORTING SYSTEMS (Secretariat)
- 15. DATA PROVISION NEEDS BY GEAR (Chair WPDCS)
- 16. OUTLOOK ON TIME-AREA CLOSURES (Chair)
- 17. ALTERNATIVE MANAGEMENT MEASURES; IMPACTS OF THE PURSE SEINE FISHERY; JUVENILE TUNA CATCHES (Chair)
- 18. PROGRESS IN IMPLEMENTATION OF THE RECOMMENDATIONS OF THE PERFORMANCE REVIEW PANEL (Secretariat)

19. SCHEDULE AND PRIORITIES OF WORKING PARTY AND SCIENTIFIC COMMITTEE MEETINGS FOR 2012 AND TENTATIVELY FOR 2013 (Secretariat)

20. OTHER BUSINESS (Chair)

- 20.1 Rules for the appointment of an invited expert
- 20.2 Guidelines for the appointment of a consultant
- 20.3 Peer review process for IOTC stock assessments
- 20.4 IOTC Regional Tuna Tagging Programme Tagging Symposium
- 20.5 Translation of SC documents into English and French
- 21. ELECTION OF A CHAIRPERSON AND VICE-CHAIRPERSON FOR THE NEXT BIENNIUM (Chair & Secretariat)
- 22. REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE FOURTEENTH SESSION OF THE SCIENTIFIC COMMITTEE (Chair)

APPENDIX III LIST OF DOCUMENTS

Document	Title	Availability
IOTC-2011-SC14-01a	Draft agenda of the Fourteenth Session of the Scientific Committee	✓ (19 August)
IOTC-2011-SC14-01b	Draft annotated agenda of the Fourteenth Session of the Scientific Committee	✓ (12 November)
IOTC-2011-SC14-02	Draft list of documents	✓ (12 November)
IOTC-2011-SC14-03	Outcomes of the Fifteenth Session of the Commission	✓ (11 August)
IOTC-2011-SC14-04	Previous decisions of the Commission	✓ (7 November)
IOTC-2011-SC14-05	Report of the secretariat – Activities in support of the IOTC science process in 2011	✓ (24 November)
IOTC-2011-SC14-06	Report of the First Meeting of the Bycatch Joint Technical Working Group	✓ (22 August)
IOTC-2011-SC14-07	Recommendations arising from the KOBE III meeting	✓ (12 August)
IOTC-2011-SC14-08	Status of the albacore resource	✓ (8 November)
IOTC-2011-SC14-09	Status of the bigeye tuna resource	✓ (23 November)
IOTC-2011-SC14-10	Status of the skipjack tuna resource	✓ (22 November)
IOTC-2011-SC14-11	Status of the yellowfin tuna resource	✓ (23 November)
IOTC-2011-SC14-12	Status and management of southern bluefin tuna (from CCSBT)	✓ (21 November)
IOTC-2011-SC14-13	Status of the bullet tuna resource	✓ (23 November)
IOTC-2011-SC14-14	Status of the frigate tuna resource	✓ (23 November)
IOTC-2011-SC14-15	Status of the longtail tuna resource	✓ (23 November)
IOTC-2011-SC14-16	Status of the Indo-Pacific king mackerel resource	✓ (23 November)
IOTC-2011-SC14-17	Status of the kawakawa resource	✓ (23 November)
IOTC-2011-SC14-18	Status of the narrow-barred Spanish mackerel resource	✓ (23 November)
IOTC-2011-SC14-19	Status of the swordfish resource	✓ (17 November)
IOTC-2011-SC14-20	Status of the black marlin resource	✓ (17 November)
IOTC-2011-SC14-21	Status of the Indo-Pacific blue marlin resource	✓ (17 November)
IOTC-2011-SC14-22	Status of the striped marlin resource	✓ (17 November)
IOTC-2011-SC14-23	Status of the Indo-Pacific sailfish resource	✓ (17 November)
IOTC-2011-SC14-24	Status of marine turtles	✓ (24 November)
IOTC-2011-SC14-25	Status of seabirds	✓ (25 November)
IOTC-2011-SC14-26	Status of blue sharks	✓ (25 November)
IOTC-2011-SC14-27	Status of silky sharks	✓ (25 November)
IOTC-2011-SC14-28	Status of oceanic whitetip sharks	✓ (25 November)
IOTC-2011-SC14-29	Status of scalloped hammerhead sharks	\checkmark (25 November)
IOTC 2011 SC14 20	Status of shortfin make shorks	(25 November)
IOTC 2011-SC14-30	Status of shortini make sharks	 (25 November)
1010-2011-5014-51	Status of bigeye thresher sharks	▼ (25 November)
101C-2011-SC14-32	Status of pelagic thresher sharks	✓ (25 November)
IOTC-2011-SC14-33	Status of development and implementation of National Plans Of Action for seabirds and sharks (Secretariat)	✓ (7 November)
IOTC-2011-SC14-34 Rev_3	National Implementation of the regional observer scheme by CPCs (Secretariat)	✓ (23 November)
IOTC-2011-SC14-35	On the implementation of the precautionary approach (Secretariat)	✓ (25 November)
IOTC-2011-SC14-36	Development of a Management Strategy Evaluation process for the IOTC (SC Chair, in the absence of a Chair WPM)	✓ (30 November)
IOTC-2011-SC14-37 Rev_3	Update on progress regarding Resolution 09/01 – on the performance review follow–up (Secretariat and Chair)	✓ (12 August)
IOTC-2011-SC14-38	Evaluating the ability of IOTC CPCs and other fishing parties in the Indian Ocean to produce close-to-real time estimates of catches of yellowfin tuna and bigeye tuna (Secretariat)	✓ (28 November)

Document	Title	Availability
IOTC-2011-SC14-39 Add_1 & Add_2	Evaluation of current and alternative time/area closures by catch reductions scenarios (H. Murua, M. Herrera, A. Fonteneau and F. Marsac)	✓ (2 December)
IOTC-2011-SC14-40	A preliminary investigation into the effects of Indian Ocean MPAs on yellowfin tuna, <i>Thunnus albacares</i> , with particular emphasis on the IOTC closed area (S. Martin, C. Mees, C. Edwards, and L. Nelson)	✓ (25 November)
IOTC-2011-SC14-41	A preliminary investigation into the potential effects of limiting size at first capture of yellowfin tuna, <i>Thunnus</i> <i>albacares</i> , in the Indian Ocean (S. Martin, C. Edwards and C. Mees)	WITHDRAWN
IOTC-2011-SC14-42	Proposed schedule and priorities of Working Party and Scientific Committee meetings for 2012 and 2013 (Secretariat)	✓ (25 November)
IOTC-2011-SC14-43	Rules for the appointment of an invited expert (Chair SC and Secretariat)	✓ (25 November)
IOTC-2011-SC14-44	Peer review of IOTC stock assessments (Secretariat)	✓ (25 November)
IOTC-2011-SC14-45	Review of IOTC discussions and recommendations for shark conservation in the Indian Ocean (Australia)	✓ (17 November)
IOTC-2011-SC14-46	A comparison between stocks and between 2011 stock assessment results of yellowfin in the Indian and Eastern Pacific oceans (European Union)	✓ (19 November)
Working Party Reports		
IOTC-2011-WPB09-R	Report of the Ninth Session of the Working Party on Billfish	✓ (2 August)
IOTC-2011-WPTmT03-R	Report of the Third Session of the Working Party on Temperate Tunas	✓ (29 September)
IOTC-2011-WPTT13-R	Report of the Thirteenth Session of the Working Party on Tropical Tunas	✓ (9 November)
IOTC-2011-WPEB07-R	Report of the Seventh Session of the Working Party on Ecosystems and Bycatch	✓ (7 November)
IOTC-2011-WPNT01-R	Report of the First Session of the Working Party on Neritic Tunas	✓ (18 November)
IOTC-2011-WPDCS08-R	Report of the Eighth Session of the Working Party on Data Collection and Statistics	✓ (10December)
National Reports – Members		
IOTC-2011-SC14-NR01	Australia	✓ (10 November)
IOTC-2011-SC14-NR02	Belize	✓ (26 October)
IOTC-2011-SC14-NR03 Rev_1	China	✓ (25 November) ✓ (16 December)
IOTC-2011-SC14-NR04 Rev_1	Comoros	✓ (25 November) ✓ (4 December)
IOTC-2011-SC14-NR05	Eritrea	Not provided
IOTC-2011-SC14-NR06	European Union	✓ (2 December)
IOTC-2011-SC14-NR07	France	✓ (9 December)
IOTC-2011-SC14-NR08	Guinea	Not provided
IOTC-2011-SC14-NR09	India	✓ (25 November)
IOTC-2011-SC14-NR10 Rev_2	Indonesia	✓ (10, 12 & 17 December)
IOTC-2011-SC14-NR11	Iran, Islamic Republic of	✓ (26 November)
IOTC-2011-SC14-NR12 Rev_1	Japan	 ✓ (30 November) ✓ (4 December)
IOTC-2011-SC14-NR13	Kenya	✓ (25 November)
IOTC-2011-SC14-NR14	Korea, Republic of	✓ (26 November)
IOTC-2011-SC14-NR15	Madagascar	✓ (26 November)
IOTC-2011-SC14-NR16	Malavsia	✓ (28 November)
IOTC-2011-SC14-NR17	Maldives, Republic of	✓ (9 December)
IOTC-2011-SC14-NR18	Mauritius	\checkmark (3 December)
IOTC-2011-SC14-NR19	Oman. Sultanate of	Not provided
IOTC-2011-SC14-NR20	Pakistan	Not provided

Document	Title	Availability
IOTC-2011-SC14-NR21	Philippines	Not provided
IOTC-2011-SC14-NR22	Seychelles, Republic of	✓ (30 November)
IOTC-2011-SC14-NR23	Sierra Leone	Not provided
IOTC-2011-SC14-NR24	Sri Lanka	✓ (23 November)
IOTC-2011-SC14-NR25	Sudan	Not provided
IOTC-2011-SC14-NR26 Rev_1	Tanzania	✓ (29 November)✓ (3 December)
IOTC-2011-SC14-NR27 Rev_1	Thailand	 ✓ (10 December) ✓ (12 December)
IOTC-2011-SC14-NR28	United Kingdom	✓ (25 November)
IOTC-2011-SC14-NR29	Vanuatu	✓ (8 December)
National Reports – Cooperating nor	n-Contracting Parties	
IOTC-2011-SC14-NR30	Mozambique	✓ (2 December)
IOTC-2011-SC14-NR31	Senegal	✓ (25 November)
IOTC-2011-SC14-NR32	South Africa, Republic of	✓ (29 November)
Information Papers		
IOTC-2011-SC14-INF01	Guidelines for the Presentation of Stock Assessment Models	✓ (3 Aug 2011)
IOTC-2011-SC14-INF02	Kobe Strategy Matrix (Secretariat)	✓ (25 November)
IOTC-2011-SC14-INF03	Protection of leatherback turtles (<i>Dermochelys coriacea</i>) from fishing impacts in the Indian Ocean (Australia)	✓ (17 November)
IOTC-2011-SC14-INF04 Rev_1	Report of the 10 th OFCF tuna statistics and management training course (Japan)	✓ (4 December)✓ (9 December)
IOTC-2011-SC14-INF05	VTC-2011-SC14-INF05 Recording and reporting of catch and effort by fishing vessels in the IOTC area of competence (Australia)	
IOTC-2011-SC14-INF06	Toward improvement of IUCN Red List (Japan)	✓ (4 December)
IOTC-2011-SC14-INF07	Summary of the 2nd symposium on "Tuna Fisheries and FAD" Tahiti, November 28th-December 2nd, 2011 (European Union)	✓ (10 December)
IOTC-2011-SC14-INF08	Effects of wire leader use and species-specific distributions on shark catch rates off the southeastern United States (W.B. Driggers, J.K. Carlson, E. Cortés & G.W Ingram)	✓ (10 December)

APPENDIX IV NATIONAL REPORT ABSTRACTS

Australia

Pelagic longline and purse seine are the two main fishing methods used by Australian vessels to target tuna and billfish in the Indian Ocean Tuna Commission (IOTC) Convention Area. In 2010, four Australian longliners (three from the Western Tuna and Billfish Fishery and one from the Eastern Tuna and Billfish Fishery) operated in the IOTC Convention Area. Together they caught 18.7 t of albacore tuna (*Thunnus alalunga*), 65.3 t of bigeye tuna (*Thunnus obesus*), 21.9 t of yellowfin tuna (*Thunnus albacares*), 349.4 t of swordfish (*Xiphius gladius*) and 0.5 t of striped marlin (*Tetrapturus audax*). These catches represent less than 15 per cent of the peak catches taken by Australian vessels fishing in the IOTC Convention Area in 2001, for these five species combined. The number of active longliners and levels of fishing effort have declined substantially in recent years due to reduced profitability, primarily as a result of lower fish prices and higher operating costs. The catch of southern bluefin tuna (*Thunnus maccoyii*) in the purse seine fishery was 4039 t in 2010. There was no purse seine catch of skipjack tuna (*Katsuwonus pelamis*) in 2010. The peak skipjack catch taken by Australian vessels fishing in the IOTC Convention Area was 1039 t in 2001. In 2010, approximately 5 t of shark was landed by the Australian longline fleet operating in the IOTC Convention Area and approximately 14 000 sharks were discarded/released.

Belize

Long line is the main fishing method used by Belize flagged vessels to target tuna and tuna like species in the Indian Ocean Tuna Commission (IOTC) Convention area. In 2010 our fleet consisted of 7 long line vessels. Together they caught 141.125 m/t of Albacore tuna (*Thunnus alalunga*), 14.362 m/t of yellowfin tuna (*Thunnus albacares*), 31.456 m/t of bigeye tuna (*Thunnus obesus*), 6.689 m/t of swordfish (*Xiphius gladius*), 1.663 m/t of black marlin (*Makaria indica*) and 6.317 of Wahoo (*Acanthocybium solandri*). There has been an 88% reductions in our overall catches from 1257 m/t in 2007 to 201 m/t in 2010. Albacore has always been the main target species for our vessels from 2007 to 2010 followed by bigeye tuna, yellowfin and swordfish. The number of active long liners and levels of fishing effort have declined significantly in recent years due to reduced profitability, principally resulting from reduced fish prices and increased operating cost. The average size of our vessels from 2007 to 2010 have fluctuated over the years from 162 gt in 2007 to 241 gt in 2008, 88 gt in 2009 and 179 gt in 2010. There has also been a reduction in the number of vessels operating in this area from 10 vessels in 2007, 9 in 2008, 6 in 2009 and 7 in 2010.

China

Longline is the only fishing method used by Chinese vessels to catch tuna and tuna-like species in the IOTC waters. The number of longliners operating in the Indian Ocean reduced from 32 in 2009 to 20 in 2010 due to piracy, with the main fishing area shifting to the central and eastern Indian Ocean ($60 \,^{\circ}\text{E} \sim 85 \,^{\circ}\text{E}$, $5 \,^{\circ}\text{N} \sim 20 \,^{\circ}\text{S}$). Chinese fishing fleet caught 1894 MT of main tunas (BET, YFT) in 2010 (39 % lower than the catch of 3114 MT in 2009). The bigeye tuna and yellowfin tuna catches both from deep freezing longliners and ice fresh longliners have been declined dramatically since 2006. There was a remarkable increase in albacore catch for deep freezing longliner since 2009 and for ice fresh longliners since 2008. The logbook and observer programs are going on for the Chinese longline fleets in the Indian Ocean, for which catch and effort data collection of bycatch species are being improved. The observer trip report for 2010 has been submitted to the secretariat.

Comoros

Fishing in Comoros is exclusively artisanal, and operated on 3-9 m motorized or non-motorized wooden or fibreglass non-decked vessels. Comorian fishing exploits mainly pelagic species (*Thunnus albacares, Katsuwonus pelamis, Thunnus alalunga, Istiophorus platypterus, Thunnus obesus, Euthynnus affinis*) and contributes entirely to the population's diet, while providing 55% of total jobs in the agricultural sector, *i.e.* about 8,000 fishermen. According to the latest statistics in 1994, the production was estimated at about 9,822 tonnes. Troll line, drop line and few nets for small pelagic species are the main fishing techniques used. A trip lasts between one to seven days. For technical and financial reasons, since 1995 we haven't been able to continue data collection and processing. Since February 2011, Comoros have implemented a data collection system at unloading sites, thanks to technical and financial support from the IOTC and the OFCF.

Eritrea

National Report not provided.

European Union

Tuna fisheries and research activities of the EU countries through 2010 are outlined in the EU report, doc NR06. Four EU countries operate tuna activities in the Indian Ocean: two countries, Spain and France, have had large fleets of purse seiners and longliners for several decades, and catch significant amounts of tuna annually (average annual catches over the last decade: 150,000 t for Spain and 95,000t for France). Two other EU countries, Portugal and the United Kingdom have also operated tuna fishing activities in the area in recent years, but with longliners exclusively et at a small scale (average annual catches over the last decade: 1,160 t for Portugal and 630 t for the United Kingdom, mainly swordfish). All these fisheries have had good statistical monitoring, most of their catch, fishing effort and size frequency data have been submitted according to IOTC standards, and multi-species sampling has been supported and continuously carried out by scientists. Occasional statistical problems remain for some years and fleets, such as French Reunion longliners in 2009 and 2010, but they should be resolved shortly. Il has been observed in recent years that piracy, which has developed in the western Indian Ocean, has had a significant impact on the EU fleets, by reducing very significantly the number of purse seiners, longliners and supply vessels and their fishing effort, shifting effort and fishing areas since mid-2009 with armed forces on board all purse seiners, and prohibiting the boarding of observers since then. Despite this strong impact on fisheries, it is found that total catches and catches by species made by European purse seine fleets have been very stable for 4 years: a minimum of 192,000 t.in 2009 and 205,000t. in 2010 (despite the departure in 2010 of 7 of the 33 European purse seiners that were active in 2009). Research conducted by European researchers on tuna resources and harvest, on the different components of high-sea pelagic ecosystems and on bycatch, continued to be active and varied. This research is carried out by the different research bodies in EU countries (IEO, AZTI, IFREMER, IRD, CNRS, IPIMAR) in close cooperation with regional laboratories, in particular the SFA in Sevchelles. The majority of research funded by the European Union, through its basic program of biological data collection, or through ad hoc research programmes, such as the MADE programme aiming at reducing tuna fishery discharge. Many scientific papers outlining the results obtained were submitted in 2011 by EU experts to the different IOTC working parties. Finally, note that the EU has just confirmed it will co-fund a symposium to be organized by the IOTC in November 2012, in order to carry out a thorough review of the numerous and very interesting results of the large tuna tagging programme conducted by the IOTC from 2005 to 2007, also financed by the EU. Scientists from the EU play an active part in the preparation of this important symposium, which results should improve significantly the reliability of stock assessments of skipjack, yellowfin and bigeye in the Indian Ocean.

France (territories)

Indian Ocean French territories include Mayotte, overseas community, and the Scattered Islands, which are administratively incorporated into the French Southern and Antarctic Lands (TAAF). The Mayotte Exclusive Economic Zone (EEZ) is a Marine Park (NMP) since January 2010, with a Management Board. The Glorioso EEZ, which is part of the Scattered Islands and adjoins the Mayotte EEZ, will likely become a Marine Park in December 2012. Total catches in the Indian Ocean of purse seiners registered in Mayotte amounted to 18,350 tonnes in 2010, corresponding to a significantly higher level than in 2009 (13,700 t), due to an increased fishing effort. The observer programme implemented in 2005, and then suspended in 2009 for safety reasons given the development of Somali piracy, resumed in 2011, in particular on the biggest purse seiners of the fleet, through collaboration with the TAAF. The artisanal coastal fishing fleet of Mayotte is composed of a great number of canoes and boats mainly engaged in drop line, troll line and net fishing, and of four small longliners (drifting pelagic longline) targeting tuna and swordfish, primarily. Catches by this fleet in the waters of Mayotte have increased in comparison with 2009. The current French tuna research system (IRD & Ifremer essentially) includes observatory-type activities, a study on migratory behaviours of large pelagic fishes, genetic studies for the delineation of stocks, studies on reproductive biology, the implementation of bycatch mitigation measures and a study on tropical ecosystem dynamics. Most of the projects are funded through international, European or national bids. A list of the different projects that continued or started in 2010-2011 can be found in the report.

Guinea

National Report not provided.

India

India's tuna fishing fleet includes coastal multipurpose boats operating a number of traditional gears, oceanic pole and line boats, small longliners and industrial longliners. The total production of tunas and tuna-like fishes, including neritic and oceanic tunas, billfishes and seerfishes during the year 2010 was 127616 tonnes, against a total production of 135262 tonnes during the year 2009. There was a reduction in production by the coastal fishery and increase in the tuna landings by oceanic sector during the year under report. There was considerable reduction in the quantity of tuna exports during the financial year 2010-11 compared to the year 2009-10. Survey conducted by the Fishery Survey of India in the EEZ revealed that sharks constitute 19.49% by number and 28.33% by weight to the total catch in the longline fishery. There are no reported instances of sea bird interaction in any of the Indian tuna fishery. Sea turtles, marine mammals and whale sharks are protected in India under various national legislations. Data on tuna production is collected by different agencies in India including Fishery Survey of India (FSI), Central Marine Fisheries Research Institute (CMFRI) and Marine Products Export Development Authority (MPEDA).

Indonesia

Fisheries management Areas (FMA) 572 (Indian Ocean – west Sumatera) and 573 (South of Java – East Nusa Tenggara), are two fisheries management area among eleven FMAs that located within the IOTC area of competence. Long line contribute a bigger proportion (44 %) of tuna catch com pare to other gears and the number of active long liners registered and operated on the two FMAs is 1118. The national catch of four main tuna species in 2009 is estimated 101,292 while the total catch for all species by all gears type tend to increase to just above 600,000 mt in 2010. Benoa fishing port has demonstrated a long history of both port sampling and scientific observer programs. Although observer data set is currently the most detailed and most reliable data available from the fishery expanding the coverage of scientific observer is substantially required. Indonesia since 10 October 2010 already has a National Plan of Action of the Shark (NPOA-Shark). Template of Indonesia fishing logbook was developed and regulated, however it is required more effort to introduce and implement for both to fishers as well as port officers as required by the commission.

Iran, Islamic Republic of

Tuna and tuna-like species fisheries is one of the most important activities in the Persian Gulf & Oman Sea. In 2010 a total of 5 industrial purse- seiners and 5920 Gillnetters operated in the area. GRT of purse seiners is >1000 t and GRT of Gillnetters ranges from less than 3 t to more than 100 t. Iranian Annual catch Tuna and tuna-like species in 2010 were estimated as follows: Yellowfin tuna: 31485 t; Skipjack tuna: 22285 t; Longtail tuna: 64450 t; Kawakawa: 16336 t; Frigate tuna: 6172 t; Billfish*: 9209 t; Indo-pacific king mackerel: 3170 t; Narrow- barred Spanish mackerel: 10884 t; Total catch: 163991 tons. *contain Sailfish and Marlin. The amount of catch for purse-seiners showed an ascending trend in 2010 comparing to 2009. The amount of catch for different fishing methods of purse seine, Gillnet and trolling was estimated 3377 t, 159320 t and 1294, respectively.

Japan

This Japanese national report describes following 8 issues in recent five years (2007-2011), i.e., (1) tuna fisheries (longline fishery and purse seine fishery) (2) fleet information, (3) catch and effort by species and gear, (4) ecosystem and bycatch, (5) national data collection and processing systems including "logbook data collection and verification", "vessel monitoring system", "scientific observer programme", "port sampling programme" and "unloading/transhipment", (6) national research programs and (7) Implementation of Scientific Committee recommendations & resolutions of the IOTC relevant to the Scientific Committee and (8) literature cited and working documents.

Kenya

Tuna fisheries in Kenya continue to play an important role in the socio-economic development of the country. Artisanal landings of 180 tons of tuna were realised in 2010 while a local longliner landed 137 tons. Recreational big- game fishing for tuna and billfishes landed 60 tons. The artisanal fleet structure remains multi-gear fleet of locally made crafts of varied capacities. Regarding tuna fisheries governance, Kenya is implementing port sampling, improving artisanal fisheries data collection system and playing an active part in implementing the national sea turtle conservation strategy.

Korea, Republic of

Longline is the only type of fishing gear for Korea fishing for tuna species in the Indian Ocean. Korean longline fishery in the Indian Ocean commenced in 1957. 13 longliners were operated in 2010, which were the lowest in number of vessels as it ranged from 31 to 21 during previous 5 years. With this fishing capacity, Korean longloners caught 2,723 mt in 2010, which was 8.6% decreasing of the catch in 2009. In 2010, fishing efforts were 5,079 thousand hooks and distributed higher in the western and eastern areas around 20-40 °S, while the fishing efforts averaged for 2005-2009 were 9,214 thousand hooks and distributed higher in the western areas around 20 °N -20 °S, as well as in the western and eastern areas around 20 °N -20 °S in recent years. As results, the catch of bigeye tuna and yellowfin tuna significantly decreased and albacore became important in catch. In 2010, 2 scientific observers were dispatched for monitoring compliance and scientific data collection and, as results, carried out 7.5 % of observer coverage in terms of the number of hooks.

Madagascar

The year 2010 saw a reconversion attempt of several artisanal prawn trawlers into targeting fish. Those were vessels of less than 12 m LOA. In addition, new handline vessels have started to operate along the eastern coast of Madagascar. Overall, fishing licences were granted to 41 vessels this year, developing a power of 3 398 KW for 1012 GRT. In general, those vessels operate several gears and target several species. Regarding research activities and data collection and processing, Madagascar, through the *Unité Statistique Thonière* in Antsiranana, is planning to implement projects aiming at assessing scrap fishes which are unloaded in Antsiranana and implementing a national database on sport fisheries.

Malaysia

Malaysia is considered as a new country in tuna fisheries in the Indian Ocean. And has experienced a drastic growth in tuna longline fleet from 15 vessels in 2003, the year when it started fishing to 58 in 2010. The highest catch was recorded in 2005 at 2885 tonnes. However, the tuna catch (*Thunnus albacares* and *Thunnus obesus*) from the past two years showed a significant dropped from 2,532 tonnes in 2008 to 1,138 tonnes in 2010. Similar pattern were observed in total effort (number of berthing) which decreased from 79 to 30 during the same period. The highest number of berthing was recorded in 2005 with 110 berthings. The catch of neritic tuna from the Malacca Straits (under IOTC areas of Competence) showed a steady increased in catch from 8,978 tonnes in 2001 to the record highest at 20,147 tonnes in 2010. The fishing areas only confined within the EEZ of Malaysian continental shelf with *Thunnus tonggol, Euthynnus affinis* and *Auxis thazard* formed the only known neritic tuna species found from these areas. Purse seine nets contributed over 90% of the neritic tuna landings from the Malacca Straits followed by trawl nets, gill/drift nets and hook & lines.

Maldives, Republic of

Maldives has a tuna fishery dating back hundreds of years. Fishing is conducted from pole-and-line vessels using livebait. Tuna catches increased to an all time record of 167,000 t in 2006 but have been steadily declining since then. The catch of 2010 was about 60,000 t, more than 50% lower than catches reported in 2006. The pole-and-line method contributes 75-80% of all tuna landings. A handline fishery targeting surface dwelling large yellowfin fishery started in later 1990s. Current catches from landline fishery are estimated to be 10,000 - 12,000 t exported fresh to lucrative markets of EU. Longline fishing is restricted to a licensed foreign fleet of round 25-30 vessels operating in outer EEZ of 75 miles and beyond. Licensing was suspended in 2010. A domestic fleet is now being developed with 4 vessels licensed to fish outside 100 miles range. Maldives used to have an important troll fishery targeting kawakawa and frigate tuna in the coastal areas and atoll basins. The fishery no longer exists and so trolling is now a very minor component of the tuna fishery. The national data collection is based on an enumeration system and requires use of conversion factors to estimate total catch. The conversion factors in use are inadequate both in magnitude and its coverage leading to potential bias in the estimate of total catches. Use of conversion factors however, is now getting less important as catches are also been recorded in weights and being reported through logbook system introduced in January 2010. Reporting from both methods will continue until fishermen have accustomed to reporting through logbooks. Maldives has limited amount of recreational fishing targeting large-bodied reef fish varieties in the so called 'night fishing'. More recently recreational fishing for pelagics is getting popular in the tourism sector. At present there is no formal method of the recording catches. The two main component of the tuna fishery (PL and HL) are extremely selective in their targets and therefore have almost zero bycatch and nothing is discarded. Sharks and other non-target species do occur in the longline fishery and their reporting is mandatory under the new rules on longline fishing.

Mauritius

Though Mauritius is not presently classified as a fishing nation for tuna species, however the tuna fishery forms the basis for the local fish processing industries. Tuna transhipment at Port Louis is another fish related activity. In 2010, a total of 592 calls of fishing vessels was registered and transhipped 43 723 tonnes of fish. The local longliner unloaded 306 tonnes of tuna and related species. Mauritius issued 225 licenses to foreign vessels to operate in its waters during 2010. Licences are issued to foreign longliners (mostly Asian) and purse seiners to operate in the Mauritian waters under a set of conditions which include the compliance of the vessels to international conservation and management measures, listing of the vessel in the Positive or Active lists of IOTC and mandatory VMS reporting. The sport fishery also lands about 330 tonnes of pelagic fishes mostly for the local market. An artisanal tuna fishery has also been developed around fish aggregating devices. Mauritius is implementing all the recommendations of the Scientific Committee. All tuna statistics collected are processed and are transmitted to the IOTC regularly. It has also developed its NPOA-IUU. A Standard Operating Procedure (SOP) is under preparation for the implementation of the NPOA-IUU as well as the IOTC Regulation 10/11on Port State Measures (PSM) to prevent, deter and eliminate IUU fishing. The implementation of an effective PSM would help control the harvest of fish caught in the IOTC Area and thereby would ensure the long-term conservation and sustainable use of these resources and the marine ecosystems.

Oman, Sultanate of

National Report not provided.

Pakistan

National Report not provided.

Philippines

National Report not provided.

Seychelles, Republic of

The Sevchelles national report summarizes activities of the purse seine, longline and semi-industrial fishery for the past 5 years. The total catch for the whole Purse Seine fleet in 2010 is estimated at 279,244 MT, representing increase of 6% over the catches reported for 2009. The mean catch rate stands at 28.243 MT/ fishing day for 2010. CPUE has been on an increasing trend from 15.69 MT /fishing day in 2007. For the Seychelles fleet the total catch for 2010 is estimated at 75,787 MT, representing an increase of 11% and the mean catch rate stand at 29.26 MT/ fishing days. Skipjack remained the dominant species accounting for 55% of the total catch and 58% for the Sevchelles catch. Similar to 2009, the year 2010 saw increasing effort on FADs associated schools whereas effort on free swimming schools dropped. For the longline fishery, a decrease of 39% was recorded in licensed issued and a remarkable increase to 83% in logbook return to SFA. The total catch for the Seychelles fleet in 2010 is estimated at 6,659 MT obtained from a fishing effort of 18 million hooks, representing a 16% drop in catch and 12% drop in fishing effort when compared to 2009. The total catch for the local semi industrial vessel targeting tuna and swordfish stands at 295MT representing a decrease of 10%. The fishing effort increase slightly by 4% from 484,597 hooks to 506,334 hooks. This fishery has been experiencing declining CPUE trends since 2007. The decline has been more significant over the past 2 years. Reported shark catches in the semiindustrial fishery has also decreased significantly since 2008. Seychelles has taken various actions to implement the Scientific Committee recommendations and IOTC Resolutions. Some of the actions include; modification of logbook format to meet mandatory minimum statistic requirement, particularly with regards to data recording of sharks in longline fishery, steps to implement a National Scientific Observer Programme, collaboration with other institutions on research projects focusing on bycatch mitigation, and swordfish (stock structure/ movement).

Sierra Leone

National Report not provided.

Sri Lanka

Sri Lanka is one of the oldest and most important tuna producing island in the Indian Ocean. Longline and the Gillnet are the main fishing gears used for harvesting of tuna and tuna like species. operation of the longlines has become more popular among fishermen, due to the provision of better quality fish than the gillnets. A recent survey indicated that around 20% of the local fishing fleet, used only longline with greater number of hooks per set, as the principal fishing gear, by mechanizing the gear operation, with line-haulers. Two boat types, OFRP and IMUL, which catogorised based on the size/length and the duration of the fishing trip are being operated in Neritic and Oceanic provinces around Sri Lanaka. According to this categorization, six boat types are being operated with the length of 6-7M, OFRPs (one day operating) and 9-10M, 10-12M, 12-15M, 15-18M length IMUL (operating oneday and >1day). Around 3700 boats are actively operated during the period of 2009 - 2010, for large pelagic fishery. About 1% of them are <15M in length.

The catches of tuna fishery resources are mainly, Yellowfin tuna (*Thunnus albacares*), Bigeye tuna (*Thunnus obsesus*), Skipjack tuna (*Katsuwonus pelamis*), Kawakawa (*Enthynnus affinis*), Frigate tuna (*Auxis thazard*) and Bullet tuna (*Auxis rochei*). The estimated total production of large pelagic species in 2010 was 136,626Mt. which is an increment of 28% to the production in 2009. Major portion of the catches of large pelagic varities, in 2010, consisted of tunas; 91,903mt. (66% of the total). Among tunas, skipjack tuna dominated the production, with 55,438Mt., followed by yellow fin tuna with 26,959Mt. Yellowfin tuna production has shown and increase of about 10%. Export of Chilled- yellowfin tuna has become a lucrative venture in recent times. Hence attention is being paid to the production maintanance of the quality of the tuna catch in terms of handling, storage and transport. Shashimi tuna and tuna-loins, etc. Of the yellowfin tuna are exported mainly to Japan and EU markets.

Sudan

National Report not provided.

Tanzania, United Republic of

Presently the national fleet of Tanzania is all artisanal that is involved in multi-species, multi-gear and multicultural fisheries. Most of the fishing takes place within 6nm from shore predominantly on reef areas. However a small number of boats are involved in the fisheries of tuna, bill fish and sharks, using manually handled drift gill nets and long lines. The catch data is collected in terms of weight of fish group and is not based on gear type, vessel size and duration of fishing operations. Statistics from the Fisheries Departments (of Zanzibar and the United Republic of Tanzania) show 1643 tonnes of Tuna species were fished in 2010 and information from Zanzibar alone shows catches of 1334 tonnes and 1418 tonnes of bill fish and sharkand-rays species respectively. There is no available data from the recreational fisheries, and because the artisanal fleet does not operate with any kind of a geographic positioning system there is no data on the distribution of fishing effort and fishing catch. Initial discussions on NPOAs for sharks, seabirds and marine turtles have commenced while terms and conditions related to the protection of these species are contained within the EEZ fishing licenses. Logsheet data started to be collected in 2002 from all licensed EEZ fishing vessels and a Vessel Monitoring System has been monitoring the Tanzania EEZ since 2009. There have been no Observer and Port sampling programmes as well as unloading and transhipment because Tanzanian Ports have no facilities for handling commercial deep sea fishing vessels. Current research programmes are focusing on the potential of establishing a national fleet for small pelagics and tuna and tuna like species in the Exclusive Economic Zone with the aim of reducing the rapidly increasing fishing pressure within the inshore waters.

Thailand

Neritic tuna and king mackerel species in the Andaman Sea Coast, Thailand comprise 6 species (*Thunnus tonggol, Euthynnus affinis, Auxis thazard, Katsuwonus pelamis* and *Sarda orientalis, Scomberomorus* spp.). These species were caught from purse seine, king mackerel gill net and trawl, while purse seine was the main fishing gear. The trend of neritic tuna catches have been decreasing from 45,083 tons in 1997 to 13,093 metric tons in 1999. The production was quite stable around 17,000 tons during 1999 to 2008. These neritic tuna species are more or less have its production trend similarity. Three Thai tuna longliners were operated in the Indian Ocean in 2007 and in 2008-2009 only two Thai tuna longliners kept on fishing there. Fishing grounds were mainly in the western coast of Indian Ocean. The total catches were 1,026.15 tons with 1,429 days of fishing effort. The average catch rate of total catch was the highest at 27.24 number/1,000 hooks in

2007 followed by 16.46 and 14.46 number/ 1,000 hooks in 2008 and 2009. Albacore was the dominant species in 2007 followed by yellowfin tuna and bigeye tuna in 2008 and 2009. While, tuna purse seine fishery operated by four Thai purse seiners, 227-670 fishing operations was conducted in the Indian Ocean during 2007-2010. Fishing ground was mainly in the western Indian Ocean. Tuna purse seine fishery can be operated throughout the year in both the eastern and western parts of the Indian Ocean with the peak from February - May and September - October. Total catch was 28,688.50 tonnes. It was found that skipjack tuna comprised the highest proportion (64.94%) followed by bigeye tuna (18.83%), yellowfin tuna (13.78%) and bonito (2.44%). The average size of skipjack, yellowfin and bigeye tuna were 50.34 ± 9.87 , 63.32 ± 23.09 and 63.24 ± 16.94 cm., respectively.

United Kingdom (BIOT)

On 1 April 2010 the BIOT Commissioner proclaimed a Marine Protected Area (MPA) in the British Indian Ocean Territory [UK (BIOT)]. No fishing licences have been issued since that date and the last foreign fishing licences expired on 31 October 2010. Diego Garcia and its territorial waters are excluded from the MPA and include a recreational fishery. The United Kingdom National Report summarises fishing in its recreational fishery in 2010 and provides details of research activities undertaken. BIOT does not operate a flag registry and has no commercial tuna fleet or fishing port. 28.4t of tuna and tuna like species were landed by recreational fishers on Diego Garcia in 2010. Length frequency data were recorded for a sample of 738 yellowfin tuna from this fishery. The mean length was 74cm. Sharks caught in the recreational fishery are released alive. There was no BIOT observer programme during 2010 on the licensed foreign fishery. IUU fishing remains the greatest threat to the BIOT ecosystem. Research was undertaken into the impact of the network of Indian Ocean MPAs. A Science Advisory Group has been formed to define a science strategy for BIOT and future research priorities, including those relevant to the pelagic ecosystem and IOTC fisheries. Recommendations of the Scientific Committee and those translated into Resolutions of the Commission have been implemented as appropriate by the BIOT Authorities and are reported.

Vanuatu

There was only longline fishery operated by Vanuatu in 2010 in the Indian Ocean. Four longliners targeted oilfishes with bycatch of yellowfin, bigeye and albacore tunas in the southwestern region of the Ocean. Total catch of 2010 was estimated to be 622.2 mt, with 383.0 mt for oilfishes, 93.9 mt for yellowfin tuna, 87.4 mt for bigeye tuna, 53.5 mt for albacore and 4.4 mt for swordfish (data is still preliminary). These data were compiled from the logsheets that submitted by the vessels. All the four vessels have now removed registration from Vanuatu.

Mozambique

Purse seine and long line are the two main fishing techniques used in Mozambique in the tuna fishery. Those activities are undertaken by distant water fishing fleets, which operate in the EEZ as from 12 nautical miles off shore from January to December. Purse seine fishing occurs mainly between the parallels 10° 32' and 20° south. The purse seine fleet is composed of vessels from France, Spain and Seychelles. Long line fishing occurs between 20° and 26° 52' south, with particular intensity below parallel 25° south. For the purse seine fleet, the peak period of fishing activities occurs between March and June. The longline fleet operates from January to December in Mozambique waters and the peak period is from December to February. During the last 5 years, the longline fleet was composed of vessels from Belize, Panama, Cambodia, Honduras, Japan, China, Korea, Spain and Taiwan. The fishery employs only foreign labour. The catches are conserved on board and transferred to cargo reefer ships or unloaded at foreign ports, mainly Seychelles, Madagascar, Mauritius and South Africa. The tuna fleet never calls to a Mozambican port for landing catches in Mozambique but call for pre-fishing briefing and inspection (Japan fleet). Over the last 10 years, the total catch in Mozambique waters ranges from 948 to 17.470 tonnes per year. For the period 2005 / 2010, 264 licenses and 486 licenses were issued respectively to purse seine vessels and longline vessels, giving an average of 125 tuna licenses issued per year. The number of longline vessels operating in Mozambique EEZ has declined substantially since 2007. In 2010, a total of 31 fishing companies were authorized to fish large pelagic species.

Senegal

In 2010, the Senegalese industrial tuna fleet consisted of 6 baitboats targeting mainly yellowfin (*Thunnus albacares*), bigeye (*Thunnus obesus*) and skipjack (*Katsuwonus pelamis*) and 1 longliner targeting swordfish. In addition, some artisanal fisheries (handline, troll line and purse seine) and the sport fishery catch billfishes

(marlins, swordfish and sailfish) and small tunas (kawakawa, king mackerel, frigate etc.). In 2010, total catches from Senegalese baitboats were estimated at 4,606 tonnes (1,168 tonnes of yellowfin, 2,412 tonnes of skipjack, 844 tonnes of bigeye). Catches have decreased in comparison with 2009 (6,720 tonnes). This decrease comes from the decline in fishing effort, from 1,574 fishing days in 2009 to 1,220 in 2010. Longline catches in 2010 are estimated at 312 tonnes (590 tonnes in 2009). Catches mainly consist of swordfish, sharks and marlins. Regarding artisanal fisheries, small tuna and tuna-like catches amounted to 8,719 tonnes. Catches have increased in comparison with 2009 (5,315 tonnes). Regarding the sport fishery, catches were estimated at 288 tonnes in 2010 for a fishing effort of 682 trips. Regular monitoring of tuna vessel fishing activities is still undertaken by the team set up by the CRODT at the port of Dakar. The work undertaken consists in collecting catch and fishing effort statistics. This work is complemented by information from various sources (plants, fitting-out, Department of Marine Fisheries etc.). Multi-species sampling are also undertaken in industrial and artisanal fisheries. Thanks to funds from the Enhanced Program for Billfish Research (EPBR), Istiophorid catch, effort and size sampling is improved at the main artisanal fishing unloading sites.

South Africa, Republic of

South Africa has three commercial fishing sectors which either target or catch tuna and tuna-like species as by-catch in the Indian Ocean. These sectors are swordfish/tuna longline, pole and line/ rod and reel, and shark longline. In addition, there is a boat-based recreational/sport fishery.

APPENDIX V PROGRESS ON THE DEVELOPMENT AND IMPLEMENTATION OF NPOAS FOR SHARKS AND SEABIRDS

СРС	Sharks	Date of Implementation	Seabirds	Date of implementation	Comments	
MEMBERS						
Australia		14-Apr-2004		2006	Sharks: 2 nd NPOA-Sharks due to be released by end of 2011. Seabirds: Threat Abatement Plan (longline fishery only) in review. No Plan for purse seine or other gears.	
Belize					Sharks: No information received by the Secretariat. Seabirds: No information received by the Secretariat.	
China		-		-	Sharks: Development has not begun. Seabirds: Development has not begun.	
-Taiwan,China		May 2006		May 2006	Sharks: No revision currently planned. Seabirds: No revision currently planned.	
Comoros		_		_	Sharks: Development has not begun. Seabirds: Development has not begun.	
Eritrea					Sharks: No information received by the Secretariat. Seabirds: No information received by the Secretariat.	
European Union		5 Feb 2009		-	Sharks: Approved on 05-Feb-2009 and it is currently being implemented. Seabirds: Currently being finalised for adoption in the last quarter of 2011.	
France (territories)					Sharks: Approved on 05-Feb-2009 but not yet implemented. Seabirds: No information received by the Secretariat.	
Guinea					Sharks: No information received by the Secretariat. Seabirds: No information received by the Secretariat.	
India					Sharks: Currently being drafted with the assistance of BOBP-IGO Seabirds: India has determined that seabird interactions are not a problem for their fleets.	
Indonesia		_		-	Sharks: NPOA guidelines developed and released for public comment among stakeholders in 2010 (funded by ACIAR Australia—DGCF). Training to occur in 2011, including data collection for sharks based on forms of statistical data to national standards (by DGCF (supported by ACIAR Australia). Implementation expected late 2011/early 2012. Seabirds: Development has not begun.	
Iran, Islamic Republic of		-		-	Sharks: Have communicated to all fishing cooperatives the IOTC resolutions on sharks. Have in place a ban on the retention of live sharks. Seabirds: I.R. Iran determined that seabird interactions are not a problem for their fleet as they consist of gillnet vessels only.	
Japan		03-Dec-2009		03-Dec-2009	Sharks: NPOA–Shark assessment report submitted to COFI in Jan. 2011 Seabirds: NPOA–Seabird implementation report submitted to COFI in Jan. 2011.	
Kenya					Sharks: Development has not begun. Scheduled for development in 2012. Sharks are	

			considered a target species by Kenya.
			Seabirds: Development has not begun. Scheduled for development in 2012. Kenya has
			a single longliner targeting swordfish and no seabird interactions have been reported to
			date.
V D III A			Sharks: Approved on 18/08/2011 but not yet implemented.
Korea, Republic of	-	-	Seabirds: Early stages of development.
			Sharks: Development has not begun.
Madaaaaaa			Seabirds: Development has not begun.
Madagascar	_	-	Note: A fisheries monitoring system is in place in order to ensure compliance by
			vessels with the IOTC's shark and seabird conservation and management measures.
Malazzia	2006		Sharks: No update received by the Secretariat.
Walaysia	2000		Seabirds: No information received by the Secretariat.
			Sharks: NPOA has been formulated and will be discussed with stakeholders in
			November 2011. Shark fishing was banned on 15 th March 2010 based on scientific
Maldives, Republic of			advice. The Government has spent ~US\$5 million on a gear buyback scheme from
			Maldivian fishers.
			Seabirds: Development has not begun.
			Sharks: Currently being drafted.
Mouniting			Seabirds: Drafting will commence upon completion of NPOA–Sharks. In the meantime
Waurnus			fishing companies have been requested to implement all mitigation measures as
			provided in the IOTC Resolutions.
Omen Sultingto of			Sharks: No information received by the Secretariat.
Oman, Sutmate of			Seabirds: No information received by the Secretariat.
Pakistan			Sharks: No information received by the Secretariat.
1 akistan			Seabirds: No information received by the Secretariat.
Philipping	Sept. 2009	_	Sharks: Under periodic review. Shark catches for 2010 provided to the Secretariat.
T imppines	Bept. 2007		Seabirds: Development has not begun. No seabird interactions recorded.
Sevenelles Republic of	Apr-2007	_	Sharks: NPOA-sharks to be reviewed in 2012.
Seychenes, Republic of	11p1 2007		Seabirds: Development has not begun.
Sierra Leone			Sharks: No information received by the Secretariat.
Sterra Leone			Seabirds: No information received by the Secretariat.
			Sharks: An NPOA-sharks is planned for development in 2012 and an update will be
Sri Lanka			provided at the next SC meeting.
STELuniu			Seabirds: Sri Lanka has determined that seabird interactions are not a problem for their
			fleets.
Sudan			Sharks: No information received by the Secretariat.
			Seabirds: No information received by the Secretariat.
			Sharks: Initial discussions have commenced.
Tanzania, United Republic of	_	_	Seabirds: Initial discussions have commenced.
			Note: Terms and conditions related to protected sharks and seabirds contained within
			tishing licenses.
Thailand	23-Nov-2005	_	Sharks: No revision currently planned.
			Seabirds: Development has not begun.
United Kingdom	_	_	Chagos waters are a MPA closed to fishing except recreational fishing around Diego
gwom			Garcia. Section 7 (10) (e) of the Fisheries (Conservation and Management) Ordinance

				refers to recreational fishing and requires sharks to be released alive.
Vanuatu				Sharks: No information received by the Secretariat. Seabirds: No information received by the Secretariat.
COOPERATING NON-CONTR	ACTING PARTIES			
Mozambique		_	_	Sharks: Development has not begun. Seabirds: Development has not begun.
Senegal		25-Sept-2006	-	Sharks: The Sub-Regional Fisheries Commission supported the development of a NPOA-sharks for Senegal in 2005. Other activities conducted include the organization of consultations with industry, the investigation of shark biology and social -economics of shark fisheries). The NPOA is currently being revised. Consideration is being made to the inclusion of minimum mesh size, minimum shark size, and a ban on shark finning. Seabirds: The need for a NPOA-seabirds has not yet been assessed.
South Africa, Republic of		_	2008	Sharks: Currently being drafted. Seabirds: Not currently under review.

Colour key						
NPOA Completed						
Drafting being finalised						
Drafting commenced						
Not begun						

APPENDIX VI Availability of Catch Data for Sharks by Gear

Availability of catch data for the main shark species expressed as the amount of fleets (%) for which catch data on sharks are available out of the total number of fleets for which data on IOTC species are available, by fishery, species of shark, and year, for the period 1950–2010

a. Longline and gillnet fisheries



Availability of catch data for main shark species expressed as the amount of fleets (%) for which catch data on sharks are available out of the total number of fleets for which data on IOTC species are available, by fishery, species of shark, and year, for the period 1950–2010

b. Purse seine and pole-and-line* fisheries



* Note that catch rates of sharks on pole-and-line fisheries are thought to be nil or negligible

Availability of catch data for main shark species expressed as the amount of fleets (%) for which catch data on sharks are available out of the total number of fleets for which data on IOTC species are available, by fishery, species of shark, and year, for the period 1950–2010





APPENDIX VII LIST OF CHAIRS, VICE-CHAIRS AND THEIR RESPECTIVE TERMS FOR ALL IOTC SCIENCE BODIES

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Group	Chair/Vice-Chair	Chair	CPC/Affiliation	Term commencement date	Term expiration date (End date is until replacement is elected)	Comments
SC	Chair	Dr. Tsutomu Nishida	Japan	17 December 2011	End of SC in 2013	1st term
	Vice-Chair	Mr. Jan Robinson	Seychelles	17 December 2011	End of SC in 2013	1st term
WPB	Chair	Mr. Jerome Bourjea	La Reunion/France	08 July 2011	End of WPB in 2013	1st term
	Vice-Chair	Mr Miguel Santos	EU,Portugal	08 July 2011	End of WPB in 2013	1st term
WPTmT	Chair	Dr. Zang Geun Kim	Korea, Rep. of	22 September 2011	End of WPTmT in 2013	1st term
	Vice-Chair	Dr. Tsutomu Nishida	Japan	22 September 2011	End of WPTmT in 2013	1st term
WPTT	Chair	Dr. Hilario Murua	EU,Spain	25 October 2010	End of WPTT in 2012	1st term
	Vice-Chair	Dr. Shiham Adam	Maldives, Rep. of	23 October 2011	End of WPTT in 2013	1st term
WPEB	Chair	Dr. Charles Anderson	UK/Independent	14 October 2010	End of WPEB in 2013	2nd term
	Vice-Chair	Dr. Evgeny Romanov	La Reunion/France	27 October 2011	End of WPEB in 2013	1st term
WPNT	Chair	Dr. Prathibha Rohit	India	27 November 2011	End of WPNT in 2013	1st term
	Vice-Chair	Mr. Farhad Kaymaram	I.R. Iran	27 November 2011	End of WPNT in 2013	1st term
WPDCS	Chair	Mr. Miguel Herrera	Secretariat	04 December 2010	End of WPDCS 2012	2nd term
	Vice-Chair	Dr. Pierre Chavance	European Union	10 December 2011	End of WPDCS 2013	1st term
WPM	Chair (Coordinator)	Dr. Iago Mosqueira	European Union	18 December 2011	Start of WPM 2012	Interim
	Vice-Chair (Co- Coordinator)	Dr. Toshihide Kitakado	Japan	18 December 2011	Start of WPM 2012	Interim
WPFC	Chair	Not active	Not active	Not active	Not active	Not active
	Vice-Chair	Not active	Not active	Not active	Not active	Not active
APPENDIX VIII

CONSOLIDATED RECOMMENDATIONS TO CPCS ON IMPROVED DATA COLLECTION, MONITORING, REPORTING AND RESEARCH

Working Party on Billfish

Data collection and reporting systems

The SC **RECOMMENDED** that as a matter of priority, India, Iran and Pakistan provide catch-and-effort data and size data for billfish, in particular gillnet fisheries, as soon as possible, noting that this is already a mandatory reporting requirement.

Species identification

The SC **RECOMMENDED** that marlin and sailfish identification material, currently being used by the La Réunion fleets, be provided to the IOTC Secretariat in the coming months to aid in the development of the identification cards.

Sampling coverage

The SC **RECOMMENDED** that Japan increase sampling coverage to attain the minimum recommended by the Commission (1 fish by metric ton of catch by type of gear and species).

Size data

- **NOTING** that the EU,Portugal had recently reported size data for swordfish from its longline fleets; The SC **RECOMMENDED** that the EU,Portugal report size data for marlin and sailfish species for its longline fleets, noting that this is already a mandatory reporting requirement.
- **NOTING** that eleven longliners from the EU,United Kingdom, Kenya, Guinea, and Tanzania have operated in the Indian Ocean in recent years; The SC **RECOMMENDED** that the EU,United Kingdom, Kenya, Guinea, and Tanzania make every possible effort to collect and report size data for billfish species for their longline fleets, noting that this is already a mandatory reporting requirement.
- The SC **RECOMMENDED** that Japan and Taiwan, China analyse the size samples collected from their longline fisheries for swordfish and marlins in order to verify if the length frequencies derived from such samples are representative of their fisheries. In particular Japan to compare length frequency distributions derived from samples collected:
 - by fishermen on commercial vessels
 - by observers on commercial vessels
 - by scientists on research and training vessels.
- The SC **RECOMMENDED** that Taiwan, China collect and provide the IOTC Secretariat with size data for billfish caught by its fresh tuna longliners, noting that this is already a mandatory requirement.
- The SC **RECOMMENDED** that the EU,Spain longline fleet provide the IOTC Secretariat with catch-and-effort and size data of marlins and sailfish by time and area strata, noting that this is already a mandatory reporting requirement.

Sports fisheries

The SC **RECOMMENDED** that the African Billfish Foundation continue its important work, particularly in the areas of collaborative research aimed at obtaining more information on movements of billfishes, via both conventional and archival tagging programs that will allow the collection of information on both horizontal and vertical movements.

Mozambique billfish landings

The SC **RECOMMENDED** that sports fishery and other recreational fishery catches taken from Mozambique waters should be reported to the WPB in 2012.

India longline fishery: Indo-Pacific sailfish

The SC **RECOMMENDED** that Indian scientists continue to carry out new and innovative research on billfish species, and to report findings to each WPB meeting.

Sri Lankan billfish fisheries

- The SC **RECOMMENDED** that as a matter of priority, Sri Lanka increase sampling coverage to attain at least the coverage levels recommended by the Commission, including:
 - catches sampled for at least 5% of the vessel activities for coastal fisheries, including collection of catch, effort and size data for IOTC species and main bycatch species;
 - implementation of logbook systems for offshore fisheries.
 - The information collected through the above activities should allow Sri Lanka to estimate catches by gear and species for billfish and other important IOTC or bycatch species.
- The SC **RECOMMENDED** that billfish catches by Sri Lankan vessels, by gear and location, as per IOTC requirements, be presented at the next WPB meeting.

Portuguese longline fishery

The SC **RECOMMENDED** that EU,Portugal scientists undertake a CPUE analysis for the EU,Portugal longline fleet, and to consider combining the analysis with catch-and-effort data from the EU,Spain longline fleet for the next WPB meeting.

Logbook coverage

- The SC **RECOMMENDED** that Japan and Taiwan, China analyse the size samples collected from their longline fisheries for swordfish and marlins in order to verify if the length frequencies derived from such samples are representative of their fisheries. In particular Japan to compare length frequency distributions derived from samples collected:
 - by fishermen on commercial vessels
 - by observers on commercial vessels
 - by scientists on research and training vessels.

Working Party on Temperate Tunas

Review of the data available for temperate tuna species

The SC NOTED the main albacore data issues that are considered to negatively affect the quality of the statistics available at the IOTC, by type of dataset and fishery, which are provided in Appendix V [Report of the WPTmT03], and **RECOMMENDED** that the CPCs listed in the Appendix, make efforts to remedy the data issues identified and to report back to the WPTmT at its next meeting.

Logbook coverage

The SC **RECOMMENDED** that the main fleets catching albacore (Japan, Taiwan, China and Indonesia) collect biological information on albacore caught in their fisheries, preferably through observer programmes, and provide this information (including the raw data) to the Secretariat in 2012.

Catch-and-effort and Size data

- The SC **RECOMMENDED** that as a matter of priority, India provide catch-and-effort data and size data for temperate tuna, in particular from its commercial longline fleet, as soon as possible, noting that this is already a mandatory reporting requirement.
- The SC **RECOMMENDED** that as a matter of priority, Indonesia and Malaysia provide catch-and-effort data and size data for temperate tuna, in particular for their fresh tuna and/or deep-freezing longline fleets, as soon as possible, noting that this is already a mandatory reporting requirement. Reporting should also include data from their vessels operating from other CPCs.
- The SC **RECOMMENDED** that size data for albacore from the Japanese longline fleet are collected and reported to the IOTC Secretariat in 2012, with a summary to be provided to the WPTmT.
- The SC **RECOMMENDED** that Japan and Taiwan, China analyse the size samples collected from their longline fisheries for albacore in order to verify if the length frequencies derived from such samples are representative of their fisheries. In particular Japan to compare length frequency distributions derived from samples collected:
 - by fishermen on commercial vessels
 - by observers on commercial vessels
 - by scientists on research and training vessels.
- The SC **RECOMMENDED** that as a matter of priority, the Philippines provide size data for temperate tuna, noting that this is already a mandatory reporting requirement.

Observer data from China

- Noting that the current information available on albacore biology from the Indian Ocean is limited, the SC **RECOMMENDED** that China provide further updates on research carried out as part of its national observer program, at the next session of the SC and **ENCOURAGED** other CPCs to provide similar research reports on albacore biology, either from data collected through observer programs or other research programs, at the next WPTmT meeting.
- Noting that there are difficulties faced by some CPCs in collecting gonad samples from albacore albacore is generally frozen whole and not gutted, the SC **RECOMMENDED** that CPCs, in particular Japan, collect gonad samples from albacore to confirm the spawning time and location of the spawning area that are presently hypothesized for albacore, over the coming year and to report findings at the next WPTmT.

Korean catch and effort for albacore

Noting that the nominal catch (NC) data provided at the WPTmT03 meeting was found to conflict with the NC data history provided by the Republic of Korea for all years prior to 1994, and for catch-and-effort data for most of the history of the longline fleet, the SC **RECOMMENDED** that the Rep. of Korea liaise with the Secretariat to provide a fully justified revised catch history which will replace the data currently held by the Secretariat before the end of 2011.

Indonesian longline fishery

Noting that Indonesian catches represent more than 40% of the total albacore catches in the Indian Ocean, determined from the revised catch history developed by the Secretariat, the SC **RECOMMENDED** that Indonesia further strengthen sampling efforts on its coastal and off-shore fisheries in early 2012, where required, and liaise with the Secretariat in order to better determine the catches of albacore by the Indonesian longline fleet.

The SC **RECOMMENDED** that as a matter of priority, India, Indonesia and Japan increase sampling coverage to attain at least the coverage levels recommended by the Commission, including:

• catches sampled or observed for at least 5% of the vessel activities, including collection of catch, effort and size data for IOTC species and main bycatch species;

• implementation of logbook systems for offshore fisheries.

The information collected through the above activities should allow India, Indonesia and Japan to estimate catches by gear and species.

Piracy in the Indian Ocean

The SC **RECOMMENDED** that given the potential impacts of piracy on the albacore fishery through the relocation of longliners into traditional albacore fishing grounds, specific analysis should be carried out and presented at the next WPTmT meeting by CPCs most affected by these activities, including Japan, Republic of Korea and Taiwan, China.

CPUE discussion summary

The SC **RECOMMENDED** that the following matters be taken into account when undertaking CPUE standardisation analysis:

- The SC AGREED that changes in species targeting is the most important issue to address in CPUE standardisations, and that the following points should be taken into consideration:
 - i. While hooks between floats (HBF) provides some indication of setting depth, it is generally considered not to be a sufficient indicator of species targeting. HBF is just one aspect of the setting technique, which can vary by species, area, set-time, and other factors.
 - ii. Highly aggregated (e.g. 5x5 degrees) data can make it difficult to observe the factors driving CPUE in a fishery, in particular the targeting effects. Operational data provides additional information that may allow effort to be classified according to fishing strategy (e.g. using cluster analyses or regression trees to estimate species targeting as a function of spatial areas, bait type, catch species composition, set-time, vessel-identity, skipper, etc.). Operational data also permits vessel effects to be included in analyses.
 - iii. The inclusion of other species as factors in a Generalized Linear Model (GLM) standardization may be misleading, because the abundance of all species changes over time. Including these factors may also fail to resolve problems due to changes in targeting, particularly when modeling aggregated data. However, comparing models with and without the other species factors can be useful to identify whether there is likely to be a targeting problem.
- The SC AGREED that appropriate spatial structure needs to be considered carefully as fish density (and targeting practices) can be highly variable on a fine spatial scale, and it can be misleading to assume that large areas are homogenous when there are large shifts in the spatial distribution of effort. The following points should also be taken into consideration:
 - i. Addition of finer scale (e.g. 5x5 degrees) fixed spatial effects in the model can help to account for heterogeneity within sub-regions.
 - ii. Efforts should be made to identify spatial units that are relatively homogeneous in terms of the population and fishery to the extent possible (e.g. uniform catch size composition and targeting practices).
 - iii. There may be advantages in conducting separate analyses for different sub-regions. The error distribution may differ by sub-region (e.g. proportion of zero sets), and there may be very different interactions among explanatory variables.
 - iv. If the selectivity differs among regions (e.g. due to spatial variability in the age composition of the population, it may not be appropriate to pool sub-regional indices into a regional index (e.g. albacore populations seem to be partitioned with spawners caught predominantly in the equatorial/tropical regions and juveniles caught predominantly in the temperate waters and the two age categories could have somewhat different CPUE trends).
 - v. The possibility of defining a representative 'space-time' window: if this leads to the identification of a fishery with homogeneous targeting practices, it is probably worthwhile. However, it may not be possible to identify an appropriate window, or the window may be so small that it is not representative of the larger population (or has a high variance).
- The SC AGREED that if there are many observations with positive effort and zero catch, it is worth considering models which explicitly model the processes that lead to the zero observations (e.g. negative binomial, zero-inflated or delta models). Adding a small constant to the lognormal model may be okay if there are few zeroes, but may not be appropriate for areas with many zero catches (e.g. north of 10°S). Sensitivity to the choice of constant should be tested.
- The SC NOTED that the appropriate inclusion of environmental variables in CPUE standardization is an ongoing research topic. The SC AGREED that often these variables do not have as much explanatory power as, or may be confounded with, fixed spatial effects. This may indicate that model-derived environmental fields are not accurate enough at this time, or there may need to be careful consideration of the mechanisms of interaction to include the variable in the most informative way.
- The SC AGREED that it is difficult to prescribe analyses in advance, and model building should be undertaken as an iterative process to investigate the processes in the fishery that affect the relationship between CPUE and abundance. Specifically:

- i. Model building should proceed with a stepwise introduction of explanatory terms, in which the net effect of each level of complexity is presented. Parameter estimates should be presented and examined to see if the mechanism makes sense and the contribution has a practical influence.
- ii. Simulations have shown that model selection using Akaike Information Criterion (AIC) tends to recommend over-parameterized models.
- The SC also **ENCOURAGED** data to be used in stock assessments, including CPUE standardisations, be made available not less than three months before each meeting by CPCs and where possible, data summaries no later than two months prior to each meeting, from the IOTC Secretariat; and **RECOMMENDED** that data to be used in stock assessments, including CPUE standardisations be made available not less than 30 days before each meeting by CPCs.

Stock assessment

- Noting that the only stock assessment for albacore was not made available by the authors until the 19th September, 2011 which did not allow the other participants of the meeting to adequately review the methodology, the SC reminded working party participants of the 2010 Scientific Committee **RECOMMENDATION** that stock assessment papers need to be provided to the Secretariat for posting to the IOTC website no later than 15 days before the commencement of the relevant meeting.
- The SC AGREED that there is value in undertaking a number of different modelling approaches to facilitate comparison, and **RECOMMENDED** that spatially structured integrated models, which are capable of more detailed representation of complicated population and fishery dynamics, and integrate several sources of data and biological research that cannot be considered in the simpler production models, be carried out for the next WPTmT.

Working Party on Tropical Tunas

Review of the data available for tropical tuna species

The SC **NOTED** the main tropical tuna data issues that are considered to negatively affect the quality of the statistics available at the IOTC, by type of dataset and fishery, which are provided in Appendix V [Report of the WPTT13], and **RECOMMENDED** that the CPCs listed in Appendix V [Report of the WPTT13] make efforts to remedy the data issues identified and to report back to the WPTT at its next meeting.

Review of the data available for tropical tuna species

- The SC **RECOMMENDED** that as a matter of priority, Pakistan provide catch-and-effort data and size data for tropical tunas, in particular from their gillnet fisheries, noting that this is already a mandatory reporting requirement.
- The SC welcomed the efforts of Sri Lanka to improve data collection and management for its fisheries and **RECOMMENDED** that the IOTC-OFCF project and Sri Lanka continue their cooperation towards improving the collection and reporting of fisheries statistics and to report back to the WPTT at its 2012 Session.
- The SC **RECOMMENDED** that Maldives report catch and effort data as per the IOTC standards for 2010 and that for earlier statistics (2002 to 2009), and that they are reported by atoll, month, gear and species, as it was done in the past.
- The SC urged Madagascar and Yemen to collect and report statistics on their coastal fisheries and **RECOMMENDED** that these countries request assistance from the IOTC Secretariat where required.
- The SC **RECOMMENDED** that Philippines investigate the reasons for the differences between bigeye tuna export data and reported catch data from their longline fishery, and to report findings to the next WPTT meeting.
- The SC **RECOMMENDED** that Iran and Pakistan report size data for tropical tuna species, as per the IOTC requirements, for their gillnet fleets, noting that this is already a mandatory reporting requirement, and that the Secretariat assist Iran and Pakistan to facilitate reporting of this information where required.
- The SC **RECOMMENDED** that India, Malaysia, Oman and Philippines make every possible effort to collect and report size data for tropical tuna species for their longline fleets, noting that this is already a mandatory reporting requirement.
- The SC **RECOMMENDED** that Indonesia report size data for tropical tuna species for its longline vessels as soon as possible as per IOTC standards, noting that this is already a mandatory reporting requirement.
- The SC **RECOMMENDED** that Japan increase sampling coverage to attain at least the minimum required by the IOTC Resolution 10/02 *on mandatory statistical requirements* (1 fish by metric ton of catch by type of gear and species), and for the IOTC Secretariat to assess levels of reporting for Japan upon receiving size data for 2010 and to report back to the WPTT at its next meeting
- The SC **RECOMMENDED** that biological data is gathered and reported to the IOTC Secretariat in order to develop specific length-age, length-weight and processed weight-live keys for the Indian Ocean tropical tuna species, in particular by the main longline fisheries (Taiwan, China, Indonesia, Japan, EU and China).
- Noting the importance of biological information to be considered in the stock assessment models, the SC **RECOMMENDED** that gonad collection and calculation of the gonadosomatic index for yellowfin tuna be carried out prior to the next WPTT meeting.
- The SC **RECOMMENDED** that Japan and Taiwan, China review catch, effort and size frequency datasets in order to assess reasons for discrepancies identified by the IOTC Secretariat and to report results at the next meeting of the WPTT, including a comparison of length frequency data samples collected from commercial and research and training vessels.

The SC **RECOMMENDED** that all CPCs catching small yellowfin tuna should undertake scientific sampling of their yellowfin tuna catches in order to identify potential bigeye tuna catches (in particular for those CPCs identified in previous paragraphs) and to report findings at the next WPTT meeting.

Mozambique catch data

- Noting the difficulties Mozambique has experienced in receiving the logbooks of fishing vessels licensed to fish in its EEZ, the SC **RECOMMENDED** that the CPCs concerned send the logbook data to Mozambique, noting that this is already a mandatory requirement under IOTC Resolution 08/04 *concerning the recording of catch by longline fishing vessels in the IOTC area* and Resolution 10/03 *concerning the recording of catch by fishing vessels in the IOTC area*.
- Noting that to date, Mozambique has not reported data for its coastal fisheries to the IOTC Secretariat the SC **RECOMMENDED** that data are collected and reported as soon as possible.

Comoros artisanal fisheries

The SC welcomed the implementation of a frame survey and of a new sampling programme in the Comoros and strongly **RECOMMENDED** that Comoros maintain this activity after the end of the programme to be able to report annual data as per IOTC requirements.

Malaysian fisheries

Noting that to date, vessels flagged to Malaysia are not using logbooks to record their activities, as required by IOTC Resolution 08/04, which includes minimum requirements for collecting and reporting operational data, the SC

RECOMMENDED that Malaysia implement the requirements under Resolution 08/04 as a matter of priority.

Indian fisheries

Noting that India has a large data set collected on the research longline vessels operated by the Fishery Survey of India during the last 30 years, the SC **RECOMMENDED** that Indian scientists participate in the CPUE standardization workshop in order to assess the value of using this information.

Thailand fisheries

Noting that both the total catches and species composition presented for purse seine vessels flagged to Thailand were substantially different from those reported for other purse seine fleets operating in the Indian Ocean, and that the difference may originate from Thai and EU purse seiners operating in different areas, the SC **RECOMMENED** that the EU and Thailand further investigate the reasons for this difference and to report findings to the next WPTT meeting.

Republic of Korea longline fishery

Noting that the nominal catch (NC) and the catch-and-effort (CE) data provided at the WPTT13 meeting was found to conflict with the historical data for the longline fleet previously provided by the Rep. of Korea to the IOTC Secretariat, and that the differences were due to the ongoing internal data review by the Rep. of Korea, the SC **RECOMMENDED** that the Rep. of Korea liaise with the Secretariat to provide a fully justified revised catch history which will replace the data currently held by the Secretariat before the end of 2011.

I.R. Iran fisheries

The SC **RECOMMENDED** that the I.R. Iran strengthen its port sampling so that bigeye tuna can be properly identified and its catches estimated routinely by field samplers.

Maldives tuna length sampling

Noting that to date no bigeye tuna have been reported as being caught by the Maldives pole-and-line fleet, despite independent verification of substantial numbers of bigeye tuna being caught by these vessels, the SC **RECOMMENDED** that the Maldives rapidly improve species identification in logbooks and in their sampling programme.

Maldives yellowfin tuna fishery

- The SC commended the authors for the efforts devoted to reviewing the time-series of catch and length data for the fisheries in the Maldives and the results presented to the meeting. In this regard, the SC **RECOMMENDED** that the revised dataset be reported to the IOTC Secretariat by the end of 2011, so that the IOTC databases can be updated to include the latest estimates produced by the Maldives.
- Noting that an ad-hoc procedure had been used to separate length frequency samples of yellowfin tuna not recorded by gear, in particular those combining specimens of yellowfin tuna caught by pole-and-line and handline gears during the same trip, the SC **RECOMMENDED** that the Maldives validate the procedure using samples collected for each individual gear, in port or, where not possible, through observers onboard baitboats, and to report progress to the next WPTT meeting.

Maldives skipjack tuna fishery

Noting that the Maldivian skipjack tuna catch is not separated for FAD and free schools, and therefore the proportion of skipjack tuna caught under the FADs anchored around the Maldives is unknown, the SC **RECOMMENDED** that the Maldivian data collection system is improved in order to account for the association of the reported catch, as this could improve the standardization of the pole-and-line CPUE.

Review of new information on the status of skipjack tuna

Noting that catch rates by free and associated school sets for purse seine have showed analogous absolute levels on yearly fluctuations over the time-series, the SC **RECOMMENDED** that EU scientists explore the reasons for this, and to report findings at the next session of the WPTT.

The SC **RECOMMENDED** further investigation of the existing data irregularities, and expansion of the logbook programme to improve CPUE analyses for skipjack tuna in the Indian Ocean, and for information on these matters to be presented to the next meeting of the WPTT.

Review of new information on the status of yellowfin tuna

The SC NOTED that the change in gear appears to have had the effect of increasing the ratio of yellowfin tuna in the Japanese longline catch when compared to bigeye tuna. The SC also NOTED that other factors associated with targeting shifts could be explored in more detail (e.g. NHFCL might not always be the best indicator of hook depth or targeting). Understanding the interactions among NHFCL, fine-scale oceanographic condition, and gear shape under the water might bring further improvement of the CPUE standardization and, thus, the SC RECOMMENDED to further examine those issues in the future.

Review of new information on the status of bigeye tuna

The SC **RECOMMENDED** that the following matters be taken into account when undertaking CPUE standardisation analysis for bigeye tuna as well as yellowfin tuna in 2012:

- The SC AGREED that changes in species targeting is the most important issue to address in CPUE standardisations, and that the following points should be taken into consideration:
 - i. While hooks between floats (HBF) provides some indication of setting depth, it is generally considered not to be a sufficient indicator of species targeting. HBF is just one aspect of the setting technique, which can vary by species, area, set-time, and other factors.
 - ii. Highly aggregated (e.g. 5x5 degrees) data can make it difficult to observe the factors driving CPUE in a fishery, in particular the targeting effects. Operational data provides additional information that may allow effort to be classified according to fishing strategy (e.g. using cluster analyses or regression trees to estimate species targeting as a function of spatial areas, bait type, catch species composition, set-time, vessel-identity, skipper, etc.). Operational data also permits vessel effects to be included in analyses.
 - iii. The inclusion of other species as factors in a Generalized Linear Model (GLM) standardization may be misleading, because the abundance of all species changes over time. Including these factors may also fail to resolve problems due to changes in targeting, particularly when modeling aggregated data. However, comparing models with and without the other species factors can be useful to identify whether there is likely to be a targeting problem.
- The SC AGREED that appropriate spatial structure needs to be considered carefully as fish density (and targeting practices) can be highly variable on a fine spatial scale, and it can be misleading to assume that large areas are homogenous when there are large shifts in the spatial distribution of effort. The following points should also be taken into consideration:
 - vi. Addition of finer scale (e.g. 1x1 degrees or latitude/longitude) fixed spatial effects in the model can help to account for heterogeneity within sub-regions.
 - vii. Efforts should be made to identify spatial units that are relatively homogeneous in terms of the population and fishery to the extent possible (e.g. uniform catch size composition and targeting practices).
 - viii. There may be advantages in conducting separate analyses for different sub-regions. The error distribution may differ by sub-region (e.g. proportion of zero sets), and there may be very different interactions among explanatory variables.
 - ix. If the selectivity differs among regions (e.g. due to spatial variability in the age composition of the population), it may not be appropriate to pool sub-regional indices into a regional index.
 - x. The possibility of defining a representative 'space-time' window: if this leads to the identification of a fishery with homogeneous targeting practices, it is probably worthwhile. However, it may not be possible to identify an appropriate window, or the window may be so small that it is not representative of the larger population (or has a high variance).
- The SC NOTED that the appropriate inclusion of environmental variables in CPUE standardization is an ongoing research topic. The SC AGREED that often these variables do not have as much explanatory power as, or may be confounded with, fixed spatial effects. This may indicate that model-derived environmental fields are not accurate enough at this time, or there may need to be careful consideration of the mechanisms of interaction to include the variable in the most informative way.

Analysis of Tagging Data

The SC **NOTED** that the sex of most large tagged yellowfin tuna and bigeye tuna recovered in Seychelles on the European purse seine fleet have been identified since July 2009. This program offers a unique potential to evaluate if adult yellowfin tuna and bigeye tuna male and female show a differential growth. The results already obtained tend to confirm the existence of such sex differential growth. Worldwide, this is the first time that tagged yellowfin tuna and bigeye tuna have been sexed by scientists. The SC **RECOMMENDED** that this

sampling programme should be maintained as long as these tunas are recovered, in order to ideally sex 100% of the future recoveries.

- The SC **RECOMMENDED** that more analyses on the tagging data should be undertaken in 2011 and 2012, and should include the estimation of mixing rates and tag induced mortality (in particular for the small-scale projects). These analyses should be done in advance of the next Session of the WPTT in order to be included in future analyses and stock assessments.
- The SC **RECOMMENDED** that analysis of the tagging data carried out in preparation for the Tagging Symposium and presented at the next WPTT meeting.

Effect of Piracy on Tropical Tuna Catches

The SC **RECOMMENDED** that given the potential impacts of piracy on fisheries in other areas of the Indian Ocean through the relocation of longliners to other fishing grounds, specific analysis should be carried out and presented at the next WPTT meeting by CPCs most affected by these activities, including Japan, Republic of Korea and Taiwan, China.

Methods

The SC also **ENCOURAGED** data to be used in stock assessments, including CPUE standardisations, be made available not less than three months before each meeting by CPCs and where possible, data summaries no later than two months prior to each meeting, from the IOTC Secretariat; and **RECOMMENDED** that data to be used in stock assessments, including CPUE standardisations by CPCs be made available not less than 30 days before each meeting.

Working Party on Ecosystems and Bycatch

Data available

- Noting that the information on retained catches and discards of sharks contained in the IOTC database remains very incomplete for most fleets, and that catch-and-effort as well as size data are essential to assess the status of shark stocks, the SC **RECOMMENDED** all CPCs to collect and report catches of sharks (including historical data), landings and biological data on sharks so that more detailed analysis can be undertaken for the next WPEB meeting.
- The SC **RECOMMENDED** that data on marine mammal interactions with IOTC fisheries are collected and reported by CPCs to the IOTC Secretariat.
- The SC **NOTED** the main bycatch data issues that are considered to negatively affect the quality of the statistics available at the IOTC Secretariat, by type of dataset and fishery, which are provided in Appendix VI [Report of the WPEB07], and **RECOMMENDED** that the CPCs listed in Appendix VI, make efforts to remedy the data issues identified and to report back to the WPEB at its next meeting.
- The SC **RECOMMENDED** that the actions outlined in Appendix VII [Report of the WPEB07] should be undertaken by each CPC to improve the standing of the data on sharks, seabirds, marine turtles and marine mammals currently available at the IOTC Secretariat. In general, these recommendations are made over and above the existing obligations and technical specifications relating to the reporting of data.
- The SC **RECOMMENDED** that, in addition to the implementation of the Regional Observer Scheme, the collection of scientific data by all other means available including auto-sampling (collection of data by trained crew) and electronic monitoring (sensors and video cameras) be encouraged and developed, and for CPCs to report on progress at the next WPEB meeting.
- The SC further **NOTED** that this could be estimated through the deployment of video monitoring system on the upper deck, however, the SC **RECOMMENDED** that intensive sampling with two observers are conducted, whenever possible, in order to better evaluate this potential bias and to report progress and findings to the next WPEB meeting.
- The SC **RECOMMENDED** that further research into the effectiveness of circle hooks adopt a multi-species approach, so as to avoid, as far as possible, promoting a mitigation measure for one bycatch taxon that might exacerbate bycatch problems for other taxa.
- The SC **RECOMMENDED** that IOTC CPCs eventually translate, print and disseminate the IOTC identifications cards for marine turtles, seabirds and sharks as a priority to their observers accredited for the Regional Observer Scheme and field samplers (Resolution 11/04), and to a larger extent to their fishing fleets targeting tuna, tuna-like and shark species. This would allow accurate observer, sampling and logbook data on marine turtles, seabirds and sharks to be recorded and reported as per IOTC requirements.
- The SC **RECOMMENDED** that scientists from all CPCs having fleets using driftnets in the Indian Ocean shall provide at the next session of the WPEB a report summarizing the known information on bycatch in driftnet fisheries, including sharks and marine mammals, with estimates of their likely order of magnitude where more detailed data are not available.
- The SC **RECOMMENDED** that CPCs explore means to undertake research cruises using driftnet vessels in the Indian Ocean aimed at documenting and quantifying the nature and extent of bycatch in these fisheries and for results to be presented at the next Session of the WPEB.
- Noting the lack of data on bycatch of these fleets, the SC **REMINDED** coastal countries with gillnet fisheries of their responsibilities to monitor catches and bycatch of these fisheries and **RECOMMENDED** them to improve

sampling of landings, to develop and implement their observer schemes, to seek support from the IOTC to develop such activities if necessary and report on progress at the next Session of the WPEB.

Sharks and rays

The SC NOTED the absence of information on shark catches from artisanal fisheries in Mozambique and **RECOMMENDED** that information on bycatch from artisanal fisheries is provided at the next Session of the WPEB.

Noting the absence of data on fishing effort, numbers and species of sharks caught, the SC **RECOMMENDED** that the data collection system in Madagascar is strengthened in order to provide catch and effort reports that are consistent with IOTC standards and **ENCOURAGED** Madagascar to work with the IRD of La Réunion to develop a specific logbook for their new longline fleet.

The SC **RECOMMENDED** that all available data and/or indicators on oceanic whitetip shark abundance and population trends are compiled in order to assess current stock status and the level of decline for discussion at the next WPEB and SC.

The SC **RECOMMENDED** further research on silky sharks, including the possible construction of a data series of silky shark abundance from purse seine associated school fisheries.

- The WPEB **NOTED** that it is important to collect data from all major gears catching silky sharks, including but not restricted to purse seines, longlines and gillnets and the SC **RECOMMENDED** that indicators of the relative abundance of silky sharks are developing to better quantify changes in abundance.
- The SC NOTED that a protocol of 'best practices' for shark handling and release onboard purse seiners will be developed by the MADE project and ISSF to minimize the risk of injury of vessel crew and will increase shark survival opportunities and **RECOMMENDED** that these guidelines are presented at the next session of the WPEB.
- The SC **RECOMMENDED** that more research is conducted on other mitigation methods to be used prior to the sharks being brought onboard, as well as on post-release mortality of sharks.
- The SC **RECOMMENDED** that the recommendations from the KOBE bycatch technical working group are considered to encourage research and development of best practice with regard to setting nets on whale sharks to determine the impacts of the practice. It was noted that these practices are generally recorded in logbooks for the purse seine fleet and the whale sharks are also extracted from the net by fishers, however, it was agreed it would be useful to have information on the extent of the practice and to develop best practice methods through direct collaboration with WCPFC.

Noting the summary of available information on the oceanic whitetip shark (Appendix XI) [Report of the WPEB07] indicating a decline in abundance over the last past two decades, the SC **RECOMMENDED** an urgent need for a more quantitative approach to the assessment of this species.

The SC **RECOMMENDED** research and development of mitigation measures to minimize bycatch of the oceanic whitetip shark and its unharmed release for all types of fishing gears and that CPCs with data on oceanic whitetip sharks (i.e. total annual catches, CPUE time series and size data) to make these available to the next meeting in 2012 when the SC **AGREED** to revisit the status of oceanic whitetip sharks and management options be proposed if appropriate.

Noting that the data holdings of the IOTC Secretariat for sharks are limited and would not facilitate stock assessments, the SC **RECOMMENDED** that historic datasets held by CPCs be provided to the IOTC Secretariat as a matter of urgency, in disaggregated forms.

Seabirds

- The SC **RECOMMENDED** that targeted observer effort be deployed in specific fisheries where high seabird bycatch is known or suspected.
- The meeting **NOTED** that the development of the mitigation measures outlined in the papers presented [at the WPEB07] was the result of excellent collaboration between fishers, seabird experts and mitigation technologists with specialist expertise. Many IOTC members will lack capacity to collect such data, but it is imperative that this be done if further progress is to be made. The SC **RECOMMENDED** that CPCs look to establish collaborative relationships with other CPCs, NGOs and IGOs with the relevant skill set to provide the necessary training and build capacity.

Marine turtles

The SC further **RECOMMENDED** that data on incidental catches of marine turtles should be better recorded in the artisanal and coastal fisheries of the Indian Ocean.

The SC **NOTED** that no new information regarding the development and implementation of any national management plans for the reduction of marine turtle bycatch in tuna fisheries was presented and **RECOMMENDED** that CPCs develop such a plan and that the scientists participating in the WPEB report on progress at the next session of the WPEB.

The SC **RECOMMENDED** that all fleets, including longline, purse seine and gillnet fleets, shall report on interactions between marine turtles and fisheries for tuna and tuna-like species, at the next session of the WPEB.

The SC **RECOMMENDED** that the development and adoption of improved FAD designs to reduce the incidence of entanglement of marine turtles and sharks, including the use of biodegradable materials, be undertaken by the main fleets using FADs, noting that the use of these FADs could become mandatory in the future.

Other bycatch and byproduct species

Noting the potential negative impacts of fish aggregation devices (FADs) on bycatch in fisheries for tuna and tuna-like species in the Indian Ocean, the SC **RECOMMENDED** that CPCs utilizing anchored FADs undertake research aimed as assessing the effect of anchored FADs on bycatch, and for the results to be reported to the next session of the WPEB.

Depredation

- Noting that there is currently no mandatory requirement to report incidences of depredation, the SC **RECOMMENDED** that data collection capacity be strengthened, with regard to depredation, in longlines and other major fisheries (i.e. drift gillnets and purse seines). In addition, the use of other data collection methods, such as questionnaires and interviews (which are an important, inexpensive and rapid method for highlighting problems), should be encouraged.
- Noting that depredation has been reported to be high in some areas of the Indian Ocean (e.g. 19% in the Seychelles longline fishery: IOTC-2011-WPB09-R), which is much higher than in other regions of the Indian Ocean and would lead to bias in the CPUE series, the SC **RECOMMENDED** that the main longline fleets in the Indian Ocean (Taiwan, China, Japan, Indonesia, EU,Spain, EU,Portugal) carry out research and monitoring programs aimed at determining the level of depredation in a range of areas and under different fishing conditions, and for the results to be presented at the next session of the WPEB.

The SC **RECOMMENDED** that research be carried out by EU scientists to analyse the incidental encirclement of whales, through logbooks and observer data from EU flagged vessels, specifically when setting on whales prior to the mid-1990s and in association with whales after the mid-1990s. These results should be presented to the next session of the WPEB.

Depredation

The SC **NOTED** the development of handling guidelines for cetacean by the WCPFC and **RECOMMENDED** that these be presented and discussed at the session of the WPEB.

Noting that the IOTC Secretariat has received limited information to date on marine mammal interactions with driftnet fisheries in the Indian Ocean, the SC **RECOMMENDED** that all CPCs using drift gillnets to report all interactions between marine mammals and drift gillnet fisheries in the Indian Ocean.

Noting that there is no mandatory requirement to record and report incidental catches of marine mammals, the SC **RECOMMENDED** all CPCs to collect and report marine mammal incidental catches through their observer programmes and **ENCOURAGED** that these interactions are recorded in the logbook of fleets catching species under the IOTC Agreement and reported to the IOTC Secretariat.

Ecosystem approaches

Noting with concern the high levels of shark byproduct and bycatch reported in many National Reports to the Scientific Committee, and considering that future management decisions would benefit from collated bycatch data in an attempt to quantify cumulative bycatch impacts, the SC **RECOMMENDED** that research be undertaken as a high priority to assess the cumulative impacts of IOTC fishing operations on bycatch species, with a particular emphasis on shark species, noting that the data required to do this is already present in the National Reports of CPCs.

Working Party on Neritic Tunas

Review of data available for neritic tuna species

- The SC NOTED the main neritic tuna data issues that are considered to negatively affect the quality of the statistics available at the IOTC, by type of dataset and fishery, which are provided in Appendix V [Report of the WPNT01], and **RECOMMENDED** that the CPCs listed in the Appendix, make efforts to remedy the data issues identified and to report back to the WPNT at its next meeting.
- Noting that the nominal catch (NC) data provided at the WPNT01 meeting was found to conflict with the NC data history provided by Malaysia to the IOTC Secretariat, the SC **RECOMMENDED** that Malaysia liaise with the IOTC Secretariat in order to verify and provide a revised catch history which will replace the data currently held by the IOTC Secretariat before the next WPNT meeting in 2012.
- Noting that substantial data sets, i.e. catch and length frequencies, have been collected in India and that several studies analysing these data sets have already been undertaken, the SC **RECOMMENDED** that this data be reported to the IOTC Secretariat as per the requirements adopted by all IOTC Members through Resolution 10/02 *mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties*.
- Noting that the paper presented by Indian scientists did not contain information on narrow-barred Spanish mackerel (*Scomberomorus* commerson) and Indo-Pacific king mackerel (*S. guttatus*) which are covered under the mandate of the WPNT, the SC **RECOMMENDED** that fishery information on these mackerel species caught in Indian fisheries be presented at the next meeting of the WPNT.
- The SC AGREED that there appears to be large datasets available on neritic tuna species caught by fleets of the coastal countries, in particular from India, Indonesia, Malaysia and Thailand, however most of this information has not been provided to the IOTC Secretariat. As such, the SC **RECOMMENDED** that these countries, as well as other CPCs, provide these data sets for neritic tunas, noting that this is already a mandatory requirement as per the IOTC Resolution 10/02 adopted by the IOTC Members, as this would allow a better assessment of the status of these stocks.

Review of information on the status of longtail tuna

Noting that some countries have collected large data sets over long time periods, the SC **RECOMMENDED** that this data, as well as data from other countries, be submitted to the IOTC Secretariat as per the requirements adopted by its members in Resolution 10/02. This would allow the WPNT to develop stock status indicators or a more comprehensive stock assessment of longtail tuna in the future.

Review of information on the status of narrow-barred Spanish mackerel

Noting that some countries have collected large data sets over long time periods, the SC **RECOMMENDED** that this data, as well as data from other CPCs, be submitted to the IOTC Secretariat as per the requirements adopted by its members in Resolution 10/02. This would allow the WPNT to develop stock status indicators or a more comprehensive stock assessment for narrow-barred Spanish mackerel in the future.

Review of information on the status of other neritic tuna species

Noting that some countries have collected large data sets over long time periods, the SC **RECOMMENDED** that this data, as well as data for other CPCs, be submitted to the IOTC Secretariat as per the requirements adopted by its members in Resolution 10/02. This would allow the WPNT to develop stock status indicators or a more comprehensive stock assessments of other neritic tuna species in the future.

Working Party on Data Collection and Statistics

Discrepancy in the size frequency data available from Japan and Taiwan, China for major IOTC species (yellowfin tuna, bigeye tuna, albacore, swordfish)

Noting the information presented by the IOTC Secretariat on the conflicting estimates of average weight derived from operational catch and size frequency datasets for the longline fisheries of Japan and Taiwan, China over their time series, and the concerning effect that the problems identified may have on the assessments of tuna and billfish species, the SC **RECOMMENDED** that Japan and Taiwan, China work with the IOTC Secretariat in order to clarify these issues, and report on their findings at the next meeting of the WPDCS and any other relevant working party meetings (e.g. WPB, WPTmT and the WPTT).

Update on national Statistics Systems

- Noting that while the data collection systems in the Maldives are considered to be appropriately designed, the system continues to rely on summary reports from Island/Atoll Offices until such time the logbook reporting is fully established. Given that quality of the reports from Island/Atoll Offices are deteriorating, the SC **RECOMMENDED** that the Maldives considers implementing a sampling program in order to validate these reports, including the recent logbook data.
- The SC **RECOMMENDED** that the Maldives estimate the quantity of bigeye tuna being caught by its fisheries, in particular those operating around anchored FADs.

Recommendations to Improve the Quality of the Statistics at the IOTC

- The SC recalled its **RECOMMENDATION** that as resources become available, the IOTC Secretariat commence the process to develop a scoring system to assess the quality of data being reported to the Secretariat, noting that the allocation of scores to all data items in the IOTC databases will require a substantial investment of resources by Secretariat. The process shall be implemented gradually, with yellowfin tuna, bigeye tuna and swordfish data as priorities.
- The SC **RECOMMENDED** that countries having sampling schemes or planning to implement such schemes, assess the precision of estimates of catches from those schemes considering different levels of coverage and report the results to the WPDCS.
- Noting that paragraph 9 of Resolution 10/04 contains provisions for the reporting of numbers of fishing vessels monitored and the coverage achieved by gear type, by year to both, the Executive Secretary and the Scientific Committee, the SC **RECOMMENDED** that this information is also provided along with the statistics reported to the IOTC (IOTC Resolution 10/02).
- The SC recalled its **RECOMMENDATION** for scientists from the EU and Thailand to explore the use of size data collected on EU vessels for the same areas and periods to adjust the species composition from logbooks reported by Thai purse seiners, and to report progress to the next WPDCS meeting.
- The SC recalled its **RECOMMENDATION** that Indonesia reported size frequency data for its longline fleet for 2009 and 2010.

APPENDIX IX

CONSOLIDATED RECOMMENDATIONS TO THE IOTC SECRETARIAT, CHAIRS AND NGO'S

Working Party on Billfish

Data inconsistencies for the Japanese and Taiwan, China swordfish catches

The SC **RECOMMENDED** that the IOTC Secretariat finalize the study aimed at assessing the consistency of average weights derived from the available catch and effort data, as derived from logbooks, and size data provided by Japan, Taiwan, China, Seychelles and EU, Spain and to report final results at the next WPB meeting.

Data collection and reporting systems

- The SC **RECOMMENDED** that the IOTC Secretariat travel to India and Pakistan in order to assess the status of data collection and reporting systems in those countries, and to report back to the WPB at its 2012 session.
- The SC **RECOMMENDED** that the IOTC Secretariat further assist India and Pakistan in the strengthening of data collection and reporting systems, where required, so as to facilitate reporting of statistics for billfish species as per IOTC standards.

Species identification

The SC **RECOMMENDED** that the IOTC Secretariat, in collaboration with relevant experts, develop species identification cards for marlins and sailfish by the next meeting of the WPB.

Length-age keys and other information

- The SC **RECOMMENDED** that as a matter of priority, the IOTC Secretariat formally request, and provide assistance where necessary, CPCs that have important fisheries for billfish (EU, Taiwan, China, Japan, Indonesia and Sri Lanka) to collect and provide the basic data that would be used to establish length-age keys and non-standard measurements to standard measurements keys for billfish species, and sex ratio data, by sex and area.
- The SC **RECOMMENDED** that the IOTC Secretariat develop a priority list of measurements to be collected for the purposes of developing length-age keys and other measurement keys, and to communicate this to CPCs before the end of the year.

Sampling coverage

The SC **RECOMMENDED** that the IOTC Secretariat assess levels of reporting for Japan upon receiving size data for 2010 and report back to the next meeting of the WPB.

Logbook coverage

- The SC **RECOMMENDED** that the IOTC Secretariat request countries include levels of precision in their reports of catch-and-effort for billfish species.
- The SC **RECOMMENDED** that the IOTC Secretariat follow-up on the results of the study with Japan and Taiwan, China and to report to the next WPB meeting.
- The SC **RECOMMENDED** that the IOTC Secretariat liaise with the EU,Spain in order to assess the status of catchand-effort data for marlins and sailfish.

Other data matters

- The SC **RECOMMENDED** that the IOTC Secretariat liaise with the Republic of Korea to inform them about the new nominal catches estimated for its longline fishery.
- **NOTING** that Japanese scientists are assisting the Republic of Korea in the review of catch-and-effort data series for longline vessels under the flag of Korea; The SC **RECOMMENDED** that the IOTC Secretariat follow-up with Japan and the Republic of Korea in order to obtain a new catch-and-effort data series from the Republic of Korea as soon as possible.

Sports fisheries

- The SC **RECOMMENDED** that the IOTC Secretariat develop a project aimed at enhancing data recovery from sports and other recreational fisheries in the region, in collaboration with Kenya and other interested parties, and to report progress at the next WPB meeting.
- The SC **RECOMMENDED** that as a matter of priority, the Chair of the WPB, in collaboration with the IOTC Secretariat, participating billfish foundations and other interested parties, facilitate the acquisition of catch-and-effort and size data from sport fisheries, by developing and disseminating reporting forms to Sport Fishing Centres in the region and to report back to the WPB at its meeting in 2012.
- The SC **RECOMMENDED** that the IOTC Secretariat provide contact details for purse seine and longline fleets obtained during the Regional Tuna Tagging Project-Indian Ocean (RTTP-IO), to participating billfish foundations so that they may improve their own outreach and awareness campaigns.
- The SC **RECOMMENDED** that the African Billfish Foundation (ABF) work with the IOTC Secretariat to facilitate engagement between the ABF and IOTC scientists on issues from data analysis to the collection and dissemination of biological information on billfish species.

India longline fishery: Indo-Pacific sailfish

The SC **RECOMMENDED** that as a matter of priority, the IOTC Secretariat liaise with India, Oman, Indonesia, Philippines and Malaysia in order to improve the quality of the data reported from their longline fleets, by species, and to report back to the WPB at its next meeting.

Indonesian longline fishery

The SC **RECOMMENDED** that the IOTC Secretariat send a mission to Indonesia to assist in the reporting of catchand-effort data and to report progress to the WPB at its next meeting.

Sri Lankan billfish fisheries

The SC **RECOMMENDED** that the IOTC-OFCF Project assist Sri Lanka to strengthen sampling efforts on its coastal and off-shore fisheries in late 2011, where required.

Working Party on Tropical Tunas

Review of the data available for tropical tuna species

- Noting that an IOTC mission to Pakistan was scheduled but had to be postponed due to the situation in the country, the SC **RECOMMENDED** that the IOTC Secretariat travel to Pakistan once the situation improves, in order to assess the status of data collection and reporting systems in this country and to report back to the WPTT at its 2012 session.
- The SC **NOTED** the plans from the IOTC-OFCF Project to hold a Catch Estimation Workshop in Indonesia in March 2012, in order to assess data collection and reporting systems for Indonesia's coastal and longline fisheries. The WPTT thanked the IOTC-OFCF Project for this initiative and **RECOMMENDED** that the outcomes of the Workshop be reported to the next Session of the WPTT.
- The SC **RECOMMENDED** that as a matter of priority, the IOTC Secretariat liaise with India, Oman, Indonesia, Philippines and Malaysia to implement the minimum requirements of IOTC Resolution 08/04 *concerning the recording of catch by longline vessels in the IOTC area*, in order to improve the quality of the data reported from their longline fleets, by species, and to report back to the WPTT at its next meeting.
- The SC **RECOMMENDED** that the IOTC Secretariat continue working with the Iranian authorities towards improving reporting from their purse seine fleet, and to report progress to the WPTT at its next meeting.
- Noting the difficulties that the IOTC Secretariat has experienced in completing the review of datasets for tropical tunas, including the implementation of a scoring system and further use of those scores to derive alternative series of catches for tropical tuna species, the SC **RECOMMENDED** that the Secretariat makes every possible effort to finalize this work before the next meeting of the WPTT in 2012.
- Noting the preliminary results of a study conducted by the IOTC Secretariat comparing average weights, as derived from the length frequency, and time area catches in number and weight available for the longline fleets of Japan and Taiwan, China, the SC **RECOMMENDED** that the IOTC Secretariat complete this study and present results to the next meeting of the WPDCS.

Review of new information on the status of yellowfin tuna

- The SC thanked Dr. Adam Langley (consultant) for his contributions and expertise on integrated stock assessment models, and **RECOMMENDED** that his engagement be renewed for the coming year.
- The SC **RECOMMENDED** that the IOTC stock assessment scientist and consultant work in collaboration with Japanese scientists and other interested participants to produce an SS3 assessment for yellowfin tuna in 2012 for presentation to the WPTT.

Working Party on Ecosystems and Bycatch

KOBE process

- The SC **RECOMMENDED** that the Secretariat maintain its involvement in the KOBE process and to lead and/or facilitate the IOTCs involvement with the Bycatch Joint Technical Working Group.
- Noting paragraph 14 of Resolution 11/04 on a Regional Observer Scheme which states that "The funds available from the IOTC balance of funds may be used to support the implementation of this programme in developing States, notably the training of observers and field samplers", and that the IOTC Secretariat has hired a consultant to carry out an evaluation of the data collection and reporting capabilities of a number of developing coastal state CPCs, the SC **RECOMMENDED** that the IOTC Secretariat facilitate the training of observers and field samplers Scheme Manual and Observer Trip Report Template.
- The SC **RECOMMENDED** that all CPCs comply with the requirements of Resolution 09/06 on Marine Turtles which states that "CPCs with longline vessels that fish for species covered by the IOTC Agreement shall: Ensure that the operators of all longline vessels carry line cutters and de-hookers in order to facilitate the appropriate handling and prompt release of marine turtles caught or entangled, and that they do so in accordance with IOTC Guidelines to be developed. CPCs shall also ensure that operators of such vessels are required to carry and use, where appropriate, dip-nets, in accordance with guidelines to be adopted by the IOTC.", and that the IOTC Secretariat develop guidelines for handling and de-hooking marine turtles caught on longliners, and for these to be distributed to all CPCs before the next WPEB meeting.
- The SC **RECOMMENDED** that the IOTC Secretariat develop an identification guide for hooks used in IOTC fisheries, and to distribute the guide to all CPCs once completed.
- The SC **RECOMMENDED** that the IOTC Secretariat print and disseminate the IOTC identifications cards for marine turtles, seabirds and sharks using the remaining funds allocated to the task and to distribute these to developing coastal states as a priority, for use by observers accredited for the Regional Observer Scheme and field samplers (Resolution 11/04), and to a larger extent to their fishing fleets targeting tuna, tuna-like and shark species. This

would allow accurate observer, sampling and logbook data on marine turtles, seabirds and sharks to be recorded and reported as per IOTC requirements.

- The SC **REITERATED** that CPCs should fulfill their FAO obligation to assess the need for an NPOA-Sharks and develop plans if appropriate. The SC **RECOMMENDED** that to assist in this, the IOTC Secretariat should revise annually the table summarising progress towards the development of NPOA-Sharks by CPCs for the consideration as each WPEB and the Scientific Committee meeting.
- The SC **RECOMMENDED** a databank of geo-referenced photographs of sharks (and other species groups) caught in the Indian Ocean be established at the IOTC Secretariat with contributions by scientists and observers from the region. The SC **NOTED** that this would be a useful tool for verification of species identifications.

Marine turtles

The SC **RECOMMENDED** that the comprehensive 'Assessment of the conservation status of the leatherback turtle in the Indian Ocean and South-East Asia', prepared by IOSEA in 2006, be reviewed, especially with regard to its recommended follow-up.

Working Party on Data Collection and Statistics

The SC **RECOMMENDED** that the IOTC Secretariat makes an evaluation of the costs associated with data management of the observer data (e.g. development and maintenance of a database, data entry etc.).

IOTC Data Summary and Field Manual

Noting that the IOTC Secretariat has not resumed the publication of the IOTC Data Summary due to a lack of resources, the SC **RECOMMENDED** that the IOTC Secretariat design a new Data Summary and present an example at the next meeting of the WPDCS and for publication on the new IOTC website once completed.

APPENDIX X Executive Summary: Albacore Tuna





Status of the Indian Ocean Albacore Tuna Resource (*Thunnus alalunga*)

TABLE 1. Status of albacore (*Thunnus alalunga*) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination 2010 ²	
	Catch 2010: Average catch 2006–2010: MSV (1 model):	43,711 t 41,074 t 29,900 t (21,500–33,100 t)	
Indian Ocean	F_{2010}/F_{MSY} (1 model): B_{2010}/B_{MSY} (1 model):	1.61 (1.19–2.22)* 0.89 (0.65–1.12)*	
Derry de view for a the Indian	B_{2010}/B_{1980} (1 model):	0.39 (n.a.)	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence

²The stock status refers to the most recent years' data used for the assessment.

*(Note: at this time the WPTmT had limited confidence in the assessment results (refer to paragraphs 71–77 in the report of the WPTmT03 (IOTC-2011-WPTmT03-R) for further clarification).

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for albacore in the Indian Ocean noting that there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series, and about the total catches over the past decade.

Stock status. Trends in the Taiwan, China CPUE series suggest that the longline vulnerable biomass has declined to about 39% of the level observed in 1980. There were 20 years of moderate fishing before 1980, and the catch has more than doubled since 1980. Catches have increased substantially since the previous albacore assessment when there was considered to be a risk that $SB < SB_{MSY}$, so the risk will have increased further. It is considered likely that recent catches have been above MSY, recent fishing mortality exceeds F_{MSY} ($F_{2010}/F_{MSY} > 1$). There is a moderate risk that total biomass is below B_{MSY} ($B_{2010}/B_{MSY} \approx 1$) (Table 1, Fig. 1).

Outlook. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. The impacts of piracy in the western Indian Ocean has resulted in the displacement of a substantial portion of longline fishing effort into the traditional albacore fishing areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on albacore will decline in the near future.

The SC **RECOMMENDED** the following:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- The two primary sources of data that drive the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Current catches (average ~41,000 t over the last five years, ~44,000 t in 2010) likely exceed MSY (29,900 t, range: 21,500–33,100 t). Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- A Kobe 2 Strategy matrix was calculated to quantify the risk of different future catch scenarios. However, a number of inconsistencies between the model and data were noted for future investigation (matrix not presented here as a result).



Fig. 1. ASPIC Aggregated Indian Ocean assessment Kobe plot (95% Confidence surfaces shown around 2010 estimate). Fixed B/K=0.9. Blue circles indicate the trajectory of the point estimates for the TB ratio and F ratio for each year 1980–2010 (Note: at this time the WPTmT had limited confidence in the assessment results (refer to paragraphs 71–77 in the report of the WPTmTO3 (IOTC–2011–WPTmT03–R) for further clarification).

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Temperate Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Albacore (*Thunnus alalunga*) in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/07 concerning a record of licensed foreign vessels fishing for tunas and swordfish in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Overall, the biology of albacore stock in the Indian Ocean is not well known and there is relatively little new information on albacore stocks. Albacore (*Thunnus alalunga*) life history characteristics, including a relatively late maturity, long life and sexual dimorphism, make the species vulnerable to over exploitation. Table 2 outlines some of the key life history traits of albacore specific to the Indian Ocean.

Catch trends

Albacore are currently caught almost exclusively using drifting longlines (98%), and between 20° S and 40° S, with remaining catches recorded using purse seines and other gears (Fig. 2). Between 1983 and 1992, a large portion of albacore catches were taken by the Taiwan, China fleet using drifting gillnets (Fig. 2; Table 3) which targeted juvenile albacore in the southern Indian Ocean (30° S to 40° S). In 1992 the United Nations worldwide ban on the use of drifting gillnets effectively closed this gillnet fishery.

Catches of albacore were relatively stable until the mid-1980s, except for high catches recorded in 1973 and 1974 (Fig. 2). The catches increased markedly during the mid-1980's due to the use of drifting gillnets by Taiwan, China, with total catches in excess of 30,000 t. Following the removal of the drifting gillnet fleet, catches dropped to less than 20,000 t by 1993. However, catches more than doubled over the period from 1993 (less than 20,000 t) to 2001

(44,000 t). Record catches of albacore were reported in 2007, at around 45,000 t, and again in 2008, at 48,000 t. Catches for 2009 are estimated to be approximately 40,000 t, while preliminary catches for 2010 amount to 43,711 t (Table 3).

Parameter	Description
Range and stock structure	A temperate tuna living mainly in the mid oceanic gyres of the Pacific, Indian and Atlantic oceans. In the Pacific and Atlantic oceans there is a clear separation of southern and northern stocks associated with the oceanic gyres that are typical of these areas. In the Indian Ocean, there is probably only one southern stock, distributed from 5° N to 40° S, because there is no northern gyre.
	Albacore is a highly migratory species and individuals swim large distances during their lifetime. It can do this because it is capable of thermoregulation, has a high metabolic rate, and advanced cardiovascular and blood/gas exchange systems. Pre-adults (2-5 year old albacore) appear to be more migratory than adults. In the Pacific Ocean, the migration, distribution availability, and vulnerability of albacore are strongly influenced by oceanographic conditions, especially oceanic fronts. It has been observed on all albacore stocks that juveniles concentrate in cold temperate areas (for instance in a range of sea-surface temperatures between 15 and 18°C), and this has been confirmed in the Indian Ocean where albacore tuna are more abundant north of the subtropical convergence (an area where these juvenile were heavily fished by driftnet fisheries during the late 1980's). It appears that juvenile albacore show a continuous geographical distribution in the Atlantic and Indian oceans in the north edge of the subtropical convergence. Albacore may move across the jurisdictional boundary between ICCAT and IOTC.
	the surface currents of the south tropical gyre between their tropical spawning and southern feeding zones. In the Atlantic Ocean, large numbers of juvenile albacore are caught by the South African pole-and-line fishery (catching about 10,000 t yearly) and it has been hypothesized that these juveniles may be taken from a mixture of fish born in the Atlantic (north east of Brazil) and from the Indian Ocean. For the purposes of stock assessments, one pan-ocean stock has been assumed.
Longevity	8 years (reported to 10 years in the Pacific)
Maturity (50%)	Age: females 5–6 years; males n.a. Size: females n.a.; males n.a.
Spawning season	Little is known about the reproductive biology of albacore in the Indian Ocean but it appears, based on biological studies and on fishery data, that the main spawning grounds are located east of Madagascar between 15° and 25°S during the 4th and 1st quarters of each year. Like other tunas, adult albacore spawn in warm waters (SST>25°C).
Size (length and weight)	n.a.

TABLE 2. Biology of Indian Ocean albacore (*Thunnus alalunga*)

n.a. = not available. SOURCES: Froese & Pauly (2009); Xu & Tian (2011)

Catches of albacore in recent years have come almost exclusively from vessels flagged in Indonesia and Taiwan, China, although the catches of albacore reported for the fresh tuna longline fishery of Indonesia have increased considerably since 2003 to around 17,000 t (Fig. 3), which represents approximately 40% of the total catches of albacore in the Indian Ocean.

Longliners from Japan and Taiwan, China have been operating in the Indian Ocean since the early 1950s (Fig. 3). While the Japanese albacore catch ranged from 8,000 t to 18,000 t in the period 1959 to 1969, in 1972 catches rapidly decreased to around 1,000 t, due to a change in the target species, mainly to southern bluefin tuna and bigeye tuna. Albacore became a bycatch species for the Japanese fleet with catches between 200 t and 2,500 t. In recent years the Japanese albacore catch has been around 2,000 to 6,000 t.

In contrast to the Japanese longliners, catches by Taiwan, China longliners increased steadily from the 1950's to average around 10,000 t by the mid-1970s. Between 1998 and 2002 catches ranged between 21,500 t to 26,900 t, equating to just over 60% of the total Indian Ocean albacore catch. Between 2003 and 2010 the albacore catches by Taiwan, China longliners have been between 10,000 and 18,000 t, with catches appearing to be on the increase in recent years. There has been a shift in the proportion of catches of albacore by deep-freezing and fresh-tuna longliners in recent years, with increasing catches of fresh-tuna (68% of the total catches for 2008–2010) as opposed to deep-freezing longliners (Fig. 2; Table 3).

While most of the catches of albacore have traditionally come from the western Indian Ocean, in recent years a larger proportion of the catch has come from the southern and eastern Indian Ocean (Fig. 4; Table 4). The relative increase in catches in the eastern Indian Ocean since the early 2000's is mostly due to increased activity of fresh-tuna longliners from Taiwan, China and Indonesia (Indonesia not represented in Fig. 4 as spatial catch-and-effort data is not available or highly uncertain for these fleets). In the western Indian Ocean, the catches of albacore mostly result from the activities of deep-freezing longliners and purse seiners.

Fleets of oceanic gillnet vessels from Iran and Pakistan and gillnet and longline vessels from Sri Lanka have extended their area of operation in recent years, to operate on the high seas closer to the equator. The lack of catch-and-effort data from these fleets makes it impossible to assess whether they are operating in areas where catches of juvenile albacore are likely to occur.



gears nei (Other); Purse seine (PS); Freezing-longline (LL); Fresh-tuna longline (FLL); Swordfish-longline (ELL).



Fig. 3. Annual catches of albacore by fleet recorded in the IOTC Database (1961–2010) (Data as of August 2011).



Fig. 4a–b. Time-area catches (total combined in tonnes) of albacore estimated for 2009 (left) and 2010 (right) by type of gear: Longline (LL, green), Driftnet (DFRT, red), Purse seine (PS, purple), Other fleets (OTHER, blue). Time-area catches are not available for all fleets; catches for those were assigned by 5x5 square and month using information from other fleets. Catches of fresh-tuna longliners are not represented (Data as of August 2011).

TABLE 3. Best scientific estimates of the catches of albacore (*Thunnus alalunga*) by gear and main fleets [or type of fishery] by decade (1950–2000) and year (2001–2010), in tonnes. Data as of October 2011. Catches by decade represent the average annual catch, noting that some gears were not used for all years (refer to Fig. 2).

	By decade (average)				By year (last ten years)											
Fishery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
DN				5,823	3,735											
LL	3,715	17,231	16,900	15,212	21,876	20,283	38,664	29,998	17,818	16,283	16,149	14,123	11,468	11,704	12,874	14,498
FLL			80	314	1,329	15,493	3,728	3,920	6,910	15,242	15,524	14,455	31,759	33,969	26,619	28,752
FS				195	1,578	855	1,030	755	1,493	230	149	1,388	705	1,391	366	166
LS				8	105	65	251	17	3	2	15	160	21	33	26	42
OT	5	9	24	67	61	148	172	139	131	150	143	108	107	91	293	254
Total	3,721	17,240	17,005	21,620	28,684	36,844	43,845	34,829	26,355	31,906	31,979	30,234	44,059	47,189	40,178	43,711

Fisheries: Driftnet (DN; Taiwan, China); Freezing-longline (LL); Fresh-tuna longline (FLL); Purse seine free-school (FS); Purse seine associated school (LS); Other gears nei (OT). Note: LL includes the ELL catches shown in Fig. 2.

TABLE 4. Best scientific estimates of the catches of albacore (*Thunnus alalunga*) by fishing area for the period 1950–2009 (in metric tons). Data as of October 2011.

	By decade (average)					By year (last ten years)										
Area	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ν	3,369	8,275	7,659	5,486	8,525	21,597	20,526	13,867	14,049	19,538	19,809	18,625	34,248	30,189	29,827	23,257
S	351	8,965	9,346	16,134	20,158	15,247	23,319	20,962	12,306	12,368	12,170	11,609	9,811	17,000	10,351	20,454
Total	3,721	17,240	17,005	21,620	28,684	36,844	43,845	34,829	26,355	31,906	31,979	30,234	44,059	47,189	40,178	43,711
	Among N-vil61092 (N), C-vil61092 (C)															

Areas: North of 10°S (N); South of 10°S (S)

Uncertainty of catches

Retained catches are fairly well known (Fig. 5); however catches are uncertain for:

- Longliners of Indonesia, India and Malaysia operating in Southern waters: To date, Indonesian, Indian and Malaysian longline vessels operating in Southern waters have not reported catches of albacore, noting that the Secretariat has estimated these catches at around 3000 t annually.
- Fleets using gillnets on the high seas, in particular Iran, Pakistan and Sri Lanka: Catches are likely to be less than 1000 t.
- Non-reporting industrial longliners (NEI): Refers to catches from longliners operating under flags of nonreporting countries. Historically high catches, however thought to be between 1000 and 2000 t in recent years.



Catches below the zero-line (**Type B**) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (**Type A**) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

- The catch series for albacore in recent years has changed substantially, especially since 2003. This change was due to a review of the data series for Indonesian longliners (Fig. 6).
- Levels of discards are believed to be low although they are unknown for industrial fisheries other than European (EU) purse seiners.

- Catch-and-effort series are available from various industrial fisheries. Nevertheless, catch-and-effort are not available from some fisheries or they are considered to be of poor quality, especially during the last decade, for the following reasons:
 - o uncertain data from significant fleets of longliners, including India, Indonesia and Philippines.
 - non-reporting by industrial purse seiners and longliners (NEI).



Fig. 6. Catches of fresh-tuna longline vessels based in Indonesia (domestic and foreign) estimated in 2011 (1973–2010) versus catches estimated in 2008 (1973–2006). The revised Indonesian nominal catch series data was estimated by the IOTC Secretariat.

Effort trends

0

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 7, and total effort from purse seine vessles flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 8.



Fig. 7. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan,China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

FTLL (red) : fresh-tuna longliners (China, Taiwan, China and other fleets)

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)



Fig. 8. Number of hours of fishing(Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

Standardised catch-per-unit-effort (CPUE) trends

The CPUE series available for assessment purposes are shown in Fig. 9, although only the Taiwan, China series was used in the stock assessment model for 2011 for the reasons discussed in IOTC–2011–WPTmT03–R.



Fish size or age trends (e.g. by length, weight, sex and/or maturity)

The size frequency data for the Taiwanese deep-freezing longline fishery for the period 1980–2009 is available. In general, the amount of catch for which size data for the species are available before 1980 is still very low. The data for the Japanese longline fleets is available; however, the number of specimens measured per stratum has been decreasing in recent years. Few data are available for the other fleets.

- Trends in average weight can be assessed for several industrial fisheries although they are incomplete or of poor quality for most fisheries before 1980, between 1986 and 1991, and in recent years, for the fleets referred to above (Fig. 10).
- Catch-at-Size(Age) tables are available but the estimates are highly uncertain for some periods and fisheries including:
 - all industrial longline fleets before the mid-60s, from the early-1970s up to the early-1980s and most fleets in recent years, in particular fresh-tuna longliners.
 - $\circ~$ the paucity of catch by area data available for some industrial fleets (Taiwan, China, NEI, India and Indonesia).



STOCK ASSESSMENT

A single quantitative modelling method, a highly aggregated "A Stock Production Model Including Covariate" (ASPIC) surplus production model, was applied to the albacore assessment in 2011.

The following is worth noting with respect to the modelling approach used:

- The Taiwan, China CPUE standardisation should be used over the Japanese CPUE series because the Japanese CPUE demonstrates strong targeting shifts away from albacore (1960s) and toward albacore in recent years (as a consequence of piracy in the western Indian Ocean), that was not accounted for in the standardization analysis.
- The Fox model had problems converging to a sensible solution when catch data prior to 1980 were included, when the Japanese CPUE were given substantial weight, and/or when the initial biomass was constrained to be less than or equal to the carrying capacity. The Working paper IOTC-2011-WPTmT03-19: *A note on the ASPIC Fox model and Indian Ocean albacore assessment*, examined this issue and found that the long catch time series tends to result in MSY estimates that approach 0. This causes a numerical failure. However, it appears that a range of MSY values may be reasonably consistent with the data.

The Fox model should be given a realistic biological constraint of B(1980) < carrying capacity (B(1980)/K=0.9), otherwise the model estimates B(1980) >> K. There was some incompatibility among the CPUE series, catch data and the Fox model. The structural rigidity of the Fox model limits the number of ways in which the error processes can be examined, and it was felt that this limited the scope of the analysis. Attempts to resolve the limitations are encouraged, as is the use of alternative models.

The general population trends and MSY parameters estimated by the Fox model appeared to be plausibly consistent with the general perception of the fishery and the data. However, these results are considered to be highly uncertain because of i) uncertainty in the catch rate standardization, ii) uncertainty in recent catches, and iii) limited ability to explore alternative interpretations of the data due to software constraints. The WPTmT had limited confidence in the assessment results.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	43,700 t
Mean catch from 2006–2010	41,100 t
MSY (80% CI)	29,900 t (21,500–33,100)
Data period used in assessment	1980–2010
F ₂₀₁₀ /F _{MSY} (80% CI)	1.61 (1.19–2.22)
B ₂₀₁₀ /B _{MSY} (80% CI)	0.89 (0.65–1.12)
SB_{2010}/SB_{MSY}	_
B ₂₀₁₀ /B ₁₉₈₀ (80% CI)	0.39 (n.a.)
SB_{2010}/SB_{1980}	_
$B_{2010}/B_{1980, F=0}$	_
SB ₂₀₁₀ /SB _{1980, F=0}	-

TABLE 5. Albacore (*Thunnus alalunga*) stock status summary.

LITERATURE CITED

Froese R, & Pauly DE 2009. *FishBase*, version 02/2009, FishBase Consortium, <www.fishbase.org>. Xu L & Tian SQ 2011. A study of fisheries biology for albacore based on Chinese observer data, IOTC–2011– WPTmT03-11.

APPENDIX XI Executive Summary: Bigeye Tuna





Status of the Indian Ocean bigeye tuna resource (Thunnus obesus)

TABLE 1. Status of bigeye tuna (*Thunnus obesus*) in the Indian Ocean.

Area ¹	Indica	2011 stock status determination 2009 ²		
		SS3 ³	ASPM ⁴	
	Catch:	102,000 t	71,500 t	
	Average catch last 5 years:	104,700 t	104,700 t	
Indian Ossan	MSY:	114,000 (95,000-	102,900 t (86,600–	
Indian Ocean		183,000 t)	119,300 t)	
	F _{curr} /F _{MSY} :	0.79 (0.50–1.22)	0.67 (0.48–0.86)	
	$SB_{curr/}SB_{MSY}$:	1.20 (0.88–1.68)	1.00 (0.77–1.24)	
	SB _{curr} /SB ₀ :	0.34 (0.26-0.40)	0.39	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Central point estimate is adopted from the 2010 SS3 model, percentiles are drawn from a cumulative frequency

distribution of MPD values with models weighted as in Table 12 of 2010 WPTT report (IOTC-2010-WPTT12-R); the range represents the 5th and 95th percentiles.

⁴Median point estimate is adopted from the 2011 ASPM model using steepness value of 0.5 which is the most conservative scenario (values of 0.6, 0.7 and 0.8, which are more optimistic, are considered to be as plausible as these values but are not presented for simplification); the range represents the 90 percentile Confidence Interval.

Current period $(_{curr}) = 2009$ for SS3 and 2010 for ASPM.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} < 1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing(F _{year} /F _{MSY} >1)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

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Stock status. Both assessments suggest that the stock is above a biomass level that would produce MSY in the long term and that current fishing mortality is below the MSY-based reference level (i.e. $SB_{current}/SB_{MSY} > 1$ and $F_{current}/F_{MSY} < 1$) (Table 1 and Fig. 1). Current spawning stock biomass was estimated to be 34–40 % (Table 1) of the unfished levels. The central tendencies of the stock status results from the WPTT 2011 when using different values of steepness were similar to the central tendencies presented in 2010.

Outlook. The recent declines in longline effort, particularly from the Japanese, Taiwan, China and Republic of Korea longline fleets, as well as purse seiner effort have lowered the pressure on the Indian Ocean bigeye tuna stock, indicating that current fishing mortality would not reduce the population to an overfished state.

Catches in 2010 (71,489 t) were lower than MSY values and catches in 2009 (102,664 t) were at the lower range of MSY estimates. The mean catch over the 2008–2010 period was 93,761 t which is lower than estimated MSY.

The Kobe strategy matrix (Combined SS3 and ASPM) illustrates the levels of risk associated with varying catch levels over time and could be used to inform management actions (Table 2). Based on the ASPM projections this year (2011) with steepness 0.5 value for illustration, there is relatively a low risk of exceeding MSY-based reference points by 2020 both when considering current catches of 71,489 t (maximum of 15% risk of $B < B_{MSY}$) or 2009 catches of 102,664 t (<40% risk that $B_{2020} < B_{MSY}$ and $F_{2020} > F_{MSY}$). Moreover, the SS3 projections from last year (2010) show that there is a low risk of exceeding MSY-based reference points by 2019 if catches are maintained at the lower range of MSY levels or at the catch level of 102,664 t from 2009 (< 30% risk that $B_{2019} < B_{MSY}$ and < 25% risk that $F_{2019} > FMSY$) (Table 1).

The SC **RECOMMENDED** the following:

- The Maximum Sustainable Yield estimate for the Indian Ocean ranges between 102,900 and 114,000 t (range expressed as the median value for 2010 SS3 and steepness value of 0.5 for 2011 ASPM for illustrative purposes (see Table 1 for further description)). Annual catches of bigeye tuna should not exceed the lower range of this estimate which corresponds to the 2009 catches and last year management advice.
- If the recent declines in effort continue, and catch remains substantially below the estimated MSY of 102,900–114,000 t, then immediate management measures are not required. However, continued monitoring and improvement in data collection, reporting and analysis is required to reduce the uncertainty in assessments.



Fig. 1. SS3 Aggregated Indian Ocean assessment Kobe plot. Black circles represent the time series of annual median values from the weighted stock status grid (white circle is 2009). Blue squares indicate the MPD estimates for 2009 corresponding to each individual grid C model, with colour density proportional to the weighting (each model is also indicated by a small black point, as the squares from highly down weighted models are not otherwise visible).

TABLE 2. Bigeye tuna: Combined 2010 SS3 and 2011 ASPM Aggregated Indian Ocean assessment Kobe II Strategy Matrix. Probability (percentage) of violating the MSY-based reference points for five constant catch projections (2009 and 2010 catch levels, \pm 20% and \pm 40%) projected for 3 and 10 years. K2SM adopted from the 2011 ASPM model using steepness value of 0.5 (values of 0.6, 0.7 and 0.8 are considered to be as plausible as these values but are not presented for simplification).

Reference point and projection timeframe	Alternative catch projections (relative to 2009) and probability (%) of violating reference point							
	2010 SS3							
	60% (61,200 t)	80% (81,600 t)	100% (102,000 t)	120% (122,400 t)	140% (142,800 t)			
$SB_{\rm 2012}{<}SB_{\rm MSY}$	19	24	28	40	50			
$F_{2012} > F_{MSY}$	<1	<6	22	50	68			
$SB_{\rm 2019} < SB_{\rm MSY}$	19	24	30	55	73			
$F_{2019} > F_{MSY}$	<1	<6	24	58	73			

Reference point and projection timeframe	Alternative catch projections (relative to 2010) and probability (%) of violating reference point							
			2011 ASPM ¹					
	60% (42,900t)	80% (57,200t)	100% (71,500t)	120% (85,800t)	140% (100,100t)			
$SB_{\rm 2013} < SB_{\rm MSY}$	4	8	15	24	35			
$F_{2013} > F_{\rm MSY}$	<1	<1	1	8	33			
$SB_{\rm 2020} < SB_{\rm MSY}$	<1	<1	1	11	41			
$F_{2020} > F_{MSY}$	<1	<1	<1	5	38			

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Tropical Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Bigeye tuna (*Thunnus obesus*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/01 for the conservation and management of tropical tunas stocks in the IOTC area of competence.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/07 concerning a record of licensed foreign vessels fishing for tunas and swordfish in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 10/13 On the implementation of a ban on discards of skipjack tuna, yellowfin tuna, bigeye tuna, and non targeted species caught by purse seiners.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Bigeye tuna (*Thunnus obesus*) inhabit the tropical and subtropical waters of the Pacific, Atlantic and Indian Oceans in waters down to around 300 m. Table 3 outlines some of the key life history traits of bigeye tuna relevant for management.

¹ Projections were undertaken with a steepness value at 0.5 which is the most conservative scenario. (values of 0.6, 0.7 and 0.8, which are more optimistic, are considered to be as plausible as these values but are not presented for simplification).

Parameter	Description
Range and stock structure	Inhabits the tropical and subtropical waters of the Pacific, Atlantic and Indian Oceans in waters down to around 300 m. Juveniles frequently school at the surface underneath floating objects with yellowfin and skipjack tunas. Association with floating objects appears less common as bigeye grow older. The tag recoveries from the RTTP-IO provide evidence of rapid and large scale movements of juvenile bigeye tuna in the Indian Ocean, thus supporting the current assumption of a single stock for the Indian Ocean. The average minimum distance between juvenile tag-release-recapture positions is estimated at 657 nautical miles. The range of the stock (as indicated by the distribution of catches) includes tropical areas, where reproduction occurs, and temperate waters which are believed to be feeding grounds.
Longevity	15 years
Maturity (50%)	Age: females and males 3 years. Size: females and males 100 cm.
Spawning season	Spawning season from December to January and also in June in the eastern Indian Ocean.
Size (length and weight)	Maximum length: 200 cm FL; Maximum weight: 210 kg. Newly recruited fish are primarily caught by the purse seine fishery on floating objects. The sizes exploited in the Indian Ocean range from 30 cm to 180 cm fork length. Smaller fish (juveniles) form mixed schools with skipjack tuna and juvenile yellowfin tuna and are mainly limited to surface tropical waters, while larger fish are found in sub-surface waters.

TABLE 3. Biology of Indian Ocean bigeye tuna (*Thunnus obesus*).

SOURCES: Nootmorn (2004); Froese & Pauly (2009)

Catch trends

Bigeye tuna are mainly caught by industrial purse seine and longline fisheries and appears only occasionally in the catches of other fisheries (Fig. 2). However, in recent years the amounts of bigeye tuna caught by gillnet fisheries are likely to be considerably higher than what is reported, due to the major changes experienced in some of these fleets, notably changes in boat size, fishing techniques and fishing grounds.

Total annual bigeye tuna catches have increased steadily since the start of the fishery, reaching the 100,000 t level in 1993 and peaking at 150,000 t in 1999 (Fig. 2). Total annual catches averaged 130,849 t over the period 2001–2005 and 104,635 t over the period 2006–2010 (Table 4). In 2010, preliminary catches of bigeye tuna have been estimated to be at around 71,489 t, representing a large decrease in catches with respect to those estimated for 2009 and previous years (Figs. 2, 3).

The recent drop in catches of bigeye tuna could be related to the expansion of piracy in the western tropical Indian Ocean, which has led to a marked drop in the levels of longline effort in the core fishing area of the species (Figs. 4a, b).

Bigeye tuna has been caught by industrial longline fleets since the early 1950's, but before the mid-1970's they only represented an incidental component of the total catch. With the introduction of fishing practices that improved the access to the bigeye tuna resource and the emergence of a sashimi market in the mid-1970's, bigeye tuna became an important target species for the main industrial longline fleets (Figs. 2, 3). The catches estimated for 2010 are at around 46,000 t, representing less than half the longline catches of bigeye tuna recorded before the onset of piracy in the Indian Ocean.

The total catch of bigeye tuna by purse seiners in the Indian Ocean reached 40,700 t in 1999, but the average annual catch for the period 2006–2010 was 26,000 t (25,000 t for 2001–2005) (Fig. 2). Purse seiners mainly take small juvenile bigeye tuna (averaging around 5–6 kg) whereas longliners catch much larger and heavier fish; and therefore while purse seiners take much lower tonnages of bigeye tuna compared to longliners, they take larger numbers of individual fish.

Although the activities of purse seiners have been affected by piracy in the Indian Ocean, the effects have not been as marked as with longliners. The main reason for this is the presence of security personnel onboard purse seine vessels since the mid-2009, which has made it possible for purse seiners to operate in the northwest Indian Ocean without a reduction in fishing effort (Fig. 4). However, in the IOTC area an approximate 30% reduction of the number of purse seiner has been observed since 2006.





Fig. 4a–b. Time-area catches (total combined in tonnes) of bigeye tuna estimated for 2009 and 2010 by type of gear: Longline (LL), Purse seine free-schools (FS), Purse seine associated-schools (LS), and other fleets (OT), including pole-and-line, drifting gillnets, and various coastal fisheries (Data as of September 2011).

TABLE 4. Best scientific estimates of the catches of bigeye tuna (Thunnus obesus) by gear and main fleets [or t	type
of fishery] by decade (1950-2000) and year (2001-2010), in tonnes. Data as of October 2011. Catches by dec	cade
represent the average annual catch, noting that some gears were not used for all years (refer to Fig. 2).	

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Fishery	By decade (average)				By year (last ten years)											
	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
LL-TW	6,008	18,684	23,647	28,226	19,759	14,699	14,693	14,091	11,217	13,288	15,299	17,261	19,630	14,336	9,812	4,490
LL-JP	481	3,288	6,820	17,716	68,347	80,201	80,472	95,807	93,398	100,341	79,064	73,632	77,695	60,417	59,917	41,875
FS	0	0	0	2,067	4,808	6,042	4,260	4,099	7,172	3,658	8,501	6,406	5,670	9,648	5,317	3,827
LS	0	0	0	4,234	18,224	20,147	19,457	24,944	15,662	18,749	17,568	18,249	18,066	19,831	24,773	18,438
ОТ	154	279	575	1,544	2,298	2,577	2,564	2,504	2,573	2,549	2,315	2,616	2,667	2,897	2,846	2,859
Total	6,642	22,252	31,043	53,787	113,437	123,666	121,447	141,445	130,023	138,584	122,748	118,164	123,728	107,129	102,664	71,489

Fisheries: Longline Taiwan, China and assimilated fleets (LL-TW); Longline Japan and assimilated fleets (LL-JP); Purse seine free-school (FS); Purse seine associated school (LS); Other gears nei (OT).

Uncertainty of catches

Retained catches are thought to be well known for the major fleets (Fig. 5); but are uncertain for the fleets listed below, noting that catches for these fleets are considered to represent a small proportion of total catches:

• Non-reporting industrial purse seiners and longliners (NEI) and for other industrial fisheries (longliners of India and Philippines).

- Some artisanal fisheries including the pole-and-line fishery in the Maldives.
- The gillnet fisheries of Iran and Pakistan.
- The gillnet/longline fishery in Sri Lanka.
- The artisanal fisheries in Indonesia, Comoros and Madagascar.



Catches below the zero-line (Type B) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

- The catch series for bigeye tuna has not been significantly revised since the WPTT12 in 2010.
- Levels of discards are believed to be low although they are unknown for most industrial fisheries, excluding industrial purse seiners flagged in EU countries for the period 2003–2007.
- Catch-and-effort series are generally available from the major industrial fisheries. However, these data are not available from some fisheries or they are considered to be of poor quality, especially throughout the 1990s and in recent years, for the following reasons:
 - non-reporting by industrial purse seiners and longliners (NEI).
 - no data are available for the fresh-tuna longline fishery of Indonesia, over the entire time series, and very little data available for the fresh-tuna longline fishery of Taiwan, China.
 - uncertain data from significant fleets of industrial purse seiners from Iran and longliners from India, Indonesia, Malaysia, Oman, Philippines, and Taiwan, China (fresh tuna up to 2006).
 - no data available for the highseas gillnet fisheries of Iran and Pakistan and the gillnet/longline fishery of Sri Lanka, especially in recent years.

Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 6, and total effort from purse seine vessles flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 7. The total number of fishing trips by vessels flagged to the Maldives by 5 degree square grid, type of boat and gear, for the years 2009 and 2010 are provided in Fig. 8.

IOTC-2011-SC14-R[E]



Fig. 6. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan, China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

FTLL (red) : fresh-tuna longliners (China, Taiwan, China and other fleets)

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)



Fig. 7. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)



Fig. 8. Number of fishing trips by vessels flagged to the Maldives by 5 degree square grid, type of boat and gear, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

BBN (blue): Baitboat non-mechanized; BBM (Green): Baitboat mechanized; BB (Red): Baitboat unspecified; UN (Purple): Unclassified gears Note that the above maps were derived using the available catch-and-effort data in the IOTC database, which is limited to the number of baitboat calls (trips) by atoll by month for Maldivian baitboats for the period concerned. Note that some trips may be fully devoted to handlining, trolling, or other activities (data by gear type are not available since 2002). No data are available for the pole-and-line fisheries of India (Lakshadweep) and Indonesia.

Standardised catch-per-unit-effort (CPUE) trends

Of the CPUE series available for assessment purposes, listed below, only the Japanese series from the tropical areas of the Indian Ocean was used in the stock assessment model for 2011 (shown in Fig. 10).

- Taiwan, China data (1980–2010): Series from document IOTC–2011–WPTT13–39 (Fig. 9).
- Japan data (1960–2010): Series 2 from document IOTC–2011–WPTT13–52. Whole Indian Ocean (Figs. 9 and 10).
- Rep. of Korean data (1977–2009): Series from document IOTC–2011–WPTT13–38 (Fig. 9).
- Japan data (1960–2010): Series1 from document IOTC–2011–WPTT13–52. Tropical area of Indian Ocean (Fig. 10).



The large increase in both the nominal and standardized bigeye tuna CPUEs for longline fleets in the Indian Ocean (as well as in the Atlantic) (Figs. 9 and 10). The increase in CPUEs may be due (1) to a large increase in the adult stock biomass, or (2) more probably to the introduction of deep longline in 1977. The fishery data does not allow to estimate a fully realistic trend of adult BET biomass during the seventies.

Fish size or age trends (e.g. by length, weight, sex and/or maturity)

Trends in average weight (Fig. 11) can be assessed for several industrial fisheries although they are incomplete or of poor quality for most fisheries before the mid-1980s and for some fleets in recent years (e.g. Japan longline) (see paper IOTC-2011-WPTT13-08).



Fig. 11. Changes in average weight (kg) of bigeye tuna from 1950 to 2010 – all fisheries combined (Data as of September 2011).

- Catch-at-Size and Age tables are available but the estimates are highly uncertain for some periods and fisheries including:
 - the paucity of size data available from industrial longliners before the mid-60s, from the early-1970s up to the mid-1980s and in recent years (Japan).
 - the paucity of catch by area data available for some industrial fleets (NEI, India, Indonesia, Iran, Sri Lanka).

Tagging data

The WPTT **NOTED** that a total of 35,971 bigeye tuna were tagged during the Indian Ocean Tuna Tagging Programme (IOTTP) which represented a 17.8% of the total number of fish tagged. Most of the bigeye tuna tagged (96.1%) were tagged during the main EU-funded Regional Tuna Tagging Project-Indian Ocean (RTTP-IO) and were primarily released off the coast of Tanzania (Fig. 12) between May 2005 and September 2007. The remaining were tagged during small-scale projects around the Maldives, India and the southwest and eastern Indian Ocean by institutions with the support of IOTC. To date 5,563 (15.7%) of tagged fish have been recovered and reported to the IOTC Secretariat.



STOCK ASSESSMENT

A single quantitative modelling method (ASPM) was applied to the bigeye tuna assessment in 2011, using data from 1950–2010. The following is worth noting with respect to the modelling approach used:

- The steepness value (h=0.5) was selected on the basis of the likelihood and was near the lower boundary of what would be considered plausible for bigeye tuna. Selection of steepness on the basis of the likelihood was not considered reliable because i) steepness is difficult to estimate in general, and ii) substantial autocorrelation in the recruitment deviates was ignored in the likelihood term.
- Cohort-slicing to estimate ages from lengths introduces substantial errors, for long-living species such as bigeye tuna, except for the youngest ages.
- Uncertainty in natural mortality was not considered.

It is essential to include uncertainty in the steepness parameter as a minimum requirement for the provision of management advice. The general population trends and MSY parameters estimated by the ASPM model appeared to be plausibly consistent with the general perception of the fishery and the data. However, these results are considered to be uncertain because of i) uncertainty in the catch rate standardization, and ii) uncertainty in recent catches.

Management advice for bigeye tuna was based on the 2010 SS3 stock assessment and various steepness scenarios of the current 2011 ASPM stock assessment results (Tables 1, 5). For last year's SS3 assessment, the data did not seem to be sufficiently informative to justify the selection of any individual model and the results were combined on the basis of a model weighting scheme that was proposed to, and agreed by, the WPTT in 2010.

Key assessment results for the 2010 SS3 and 2011 ASPM stock assessments are shown in Tables 1, 2 and 5; Fig. 1.

Table 5. Key management quantities from the 2010 SS3 and 2011 ASPM assessments for bigeye tuna in the IndianOcean.

Management Quantity	2010 SS3	2011 ASPM	
2009 (SS3) and 2010 (ASPM) catch estimate	102,000 t	71,500 t	
Mean catch from 2006–2010	104,700 t	104,700 t	
MSY	114,000 t (95,000–183,000)	102,900 t (86,600–119,300) ⁽²⁾	
Data period used in assessment	1952-2009	1950–2010	
$F_{curr}/F_{MSY}{}^{(3)}$	0.79 ⁽¹⁾ Range ⁽¹⁾ : 0.50 – 1.22	0.67 (0.48–0.86) ⁽²⁾	
B_{curr}/B_{MSY} ⁽³⁾	_	_	
$SB_{curr}/SB_{MSY}^{(3)}$	$\frac{1.20^{(1)}}{\text{Range}^{(1)}: 0.88 - 1.68}$	1.00 (0.77–1.24) ⁽²⁾	
$\mathbf{B}_{\mathrm{curr}}/\mathbf{B}_{0}^{(3)}$	_	0.43 (n.a.)	
$SB_{curr}/SB_0^{(3)}$	$0.34^{(1)}$ Range ⁽¹⁾ : 0.26 - 0.40	0.39 ⁽²⁾	
$\mathbf{B}_{\text{curr}}/\mathbf{B}_{0, \text{ F}=0}^{(3)}$	_	_	
$SB_{aver}/SB_{0} = 0^{(3)}$	_	_	

¹ Central point estimate is adopted from the 2010 SS3 model, percentiles are drawn from a cumulative frequency distribution of MPD values with models weighted as in Table 12 of 2010 WPTT report (IOTC–2010–WPTT12–R); the range represents the 5th and 95th percentiles.

 2 Median point estimate is adopted from the 2011 ASPM model using steepness value of 0.5 (values of 0.6, 0.7 and 0.8 are considered to be as pausible as these values but are not presented for simplification); the range represents the 90 percentile Confidence Interval.

³ Current period ($_{curr}$) = 2009 for SS3 and 2010 for ASPM.

LITERATURE CITED

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APPENDIX XII Executive Summary: Skipjack Tuna





Status of the Indian Ocean skipjack tuna Resource (Katsuwonus pelamis)

TABLE 1. Status of skipjack tuna (Katsuwonus pelamis) in the Indian Ocean.

Area ¹	Indicators – 2	2011 stock status determination 2009 ²	
	Catch 2010:	428,719 t	
	Average catch 2006–2010:	489,385 t	
Indian Ocean	MSY (1 model):	564,000 t (395,000–843,000 t)	
Indian Ocean	$C_{2009}/MSY (1 \text{ model})^3$:	0.81 (0.54–1.16)	
	$SB_{2009/}SB_{MSY}$ (1 model):	2.56 (1.09–5.83)	
	SB_{2009}/SB_0 (1 model):	0.53 (0.29–0.70)	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Due to numerical problems in the F_{MSY} calculations for this population, the proxy reference point C/MSY is reported instead of F/FMSY, which should be interpreted with caution for the following reasons: it may incorrectly suggest F>F_{MSY} when there is a large biomass (early development of the fishery or large recruitment event); it may incorrectly suggest that F<F_{MSY} when the stock is highly depleted; due to a flat yield curve, C could be near MSY even if F << F_{MSY}.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing(C _{year} /MSY>1)		
Stock not subject to overfishing ($C_{year}/MSY \le 1$)		

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Stock status. The weighted results suggest that the stock is not overfished ($B>B_{MSY}$) and that overfishing is not occurring (C<MSY, used as a proxy for F<F_{MSY}) (Table 1 and Fig. 1). Spawning stock biomass was estimated to have declined by approximately 47 % in 2009 from unfished levels (Table 1).

Outlook. The recent declines in catches are thought to be caused by a recent decrease in purse seine effort as well as due to a decline in CPUE of large skipjack tuna in the surface fisheries. However, the WPTT does not fully understand the recent declines of pole and line catch and CPUE, which may be due to the combined effects of the fisheries and environmental factors affecting recruitment or catchability. Catches in 2009 (455,999 t) and 2010 (428,719 t) as well as the average level of catches of 2006–2010 (489,385 t) were lower than median value of MSY.

The Kobe strategy matrix illustrates the levels of risk associated with varying catch levels over time and could be used to inform management actions. Based on the SS3 assessment, there is a low risk of exceeding MSY-based reference points by 2020 if catches are maintained at the current levels (< 20 % risk that B2019 < BMSY and 30 % risk that C2019>MSY as proxy of F > FMSY) and even if catches are maintained below the 2006–2010 average (489,385 t).

The SC **RECOMMENDED** the following:

- The median estimates of the Maximum Sustainable Yield for the skipjack tuna Indian Ocean stock is 564,000 t (Table 1) and considering the average catch level from 2005–2009 was 512,305 t, catches of skipjack tuna should not exceed the average of 2005–2009.
- If the recent declines in effort continue, and catch remains substantially below the estimated MSY, then urgent management measures are not required. However, recent trends in some fisheries, such as Maldivian pole-and-line, suggest that the situation of the stock should be closely monitored.
- The Kobe strategy matrix (Table 2) illustrates the levels of risk associated with varying catch levels over time and could be used to inform management actions.



Fig. 1. SS3 Aggregated Indian Ocean assessment Kobe plot. Black circles indicate the trajectory of the weighted median of point estimates for the SB ratio and C/MSY ratio for each year 1950–2009. Probability distribution contours are provided only as a rough visual guide of the uncertainty (e.g. the multiple modes are an artifact of the coarse grid of assumption options). Due to numerical problems in the F_{MSY} calculations for this population, the proxy reference point C/MSY is reported instead of F/F_{MSY}, which should be interpreted with caution for the reasons given under Table 1 above.

TABLE 2. SS3 Aggregated Indian Ocean assessment Kobe II Strategy Matrix. Weighted probability (percentage) of violating the MSY-based reference points for five constant catch projections (2009 catch level, \pm 20% and \pm 40%) projected for 3 and 10 years.

Reference point and projection timeframe	Alternative catch projections (relative to 2009) and weighted probability (%) scenarios that violate reference point					
	60% (274,000 t)	80% (365,000 t)	100% (456,000 t)	120% (547,000 t)	140% (638,000 t)	
$SB_{2013} < SB_{MSY}$	<1	5	5	10	18	
$C_{2013} > MSY$ (proxy for F_{2009}/F_{MSY})	<1	<1	31	45	72	
$SB_{2020} < SB_{MSY}$	<1	5	19	31	56	
$C_{2020} > MSY$ (proxy for F_{2009}/F_{MSY})	<1	<1	31	45	72	

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Tropical Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Skipjack tuna (*Katsuwonus pelamis*) in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/07 concerning a record of licensed foreign vessels fishing for tunas and swordfish in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 10/13 On the implementation of a ban on discards of skipjack tuna, yellowfin tuna, bigeye tuna, and non targeted species caught by purse seiners.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Skipjack tuna (*Katsuwonus pelamis*) life history characteristics, including a low size and age at maturity, short life and high productivity/fecundity, make it resilient and not easily prone to overfishing. Table 3 outlines some of the key life history traits of skipjack tuna.

TABLE 3.	Biology of Indiar	Ocean skipiack tuna	(Katsuwonus	pelamis).
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Parameter	Description
Range and stock structure	Cosmopolitan species found in the tropical and subtropical waters of the Indian, Pacific and Atlantic Oceans. It generally forms large schools, often in association with other tunas of similar size such as juveniles of yellowfin tuna and bigeye tuna. The tag recoveries from the RTTP-IO provide evidence of rapid, large scale movements of skipjack tuna in the Indian Ocean, thus supporting the current assumption of a single stock for the Indian Ocean. Skipjack recoveries indicate that the species is highly mobile, and covers large distances. The average distance between skipjack tagging and recovery positions is estimated at 640 nautical miles. Skipjack tuna in the Indian Ocean are considered a single stock for assessment purposes.
Longevity	7 years
Maturity (50%)	Age: females and males <2 years. Size: females and males 41–43 cm. Unlike in <i>Thunnus</i> species, sex ratio does not appear to vary with size. Most of skipjack tuna taken by fisheries in the Indian Ocean have already reproduced.
Spawning season	High fecundity. Spawns opportunistically throughout the year in the whole inter-equatorial Indian Ocean (north of 20°S, with surface temperature greater than 24°C) when conditions are favourable.
Size (length and weight)	Maximum length: 110 cm FL; Maximum weight: 35.5 kg. The average weight of skipjack tuna caught in the Indian Ocean is around 3.0 kg for purse seine, 2.8 kg for the Maldivian baitboats and 4–5 kg for the gillnet. For all fisheries combined, it fluctuates between 3.0–3.5 kg; this is larger than in the Atlantic, but smaller than in the Pacific. It was noted that the mean weight for purse seine catch exhibited a strong decrease since 2006 (3.1 kg) until 2009 (2.4 kg), for both free (3.8 kg to 2.4 kg) and log schools (3.0 kg to 2.4 kg).

SOURCES: Collette & Nauen (1983); Froese & Pauly (2009); Grande et al. (2010). NOAA (http://www.nmfs.noaa.gov/fishwatch/species/atl_skipjack.htm, 14/12/2011).

Catch trends

Catches of skipjack tuna increased slowly from the 1950s, reaching around 50,000 t during the mid-1970s, mainly due to the activities of pole-and-lines and gillnets (Fig. 2 and 3). The catches increased rapidly with the arrival of purse seiners in the early 1980s, and skipjack tuna became one of the most important tuna species in the Indian Ocean.

The increase in purse seine caught skipjack tuna post 1984 (Figs. 2 and 3) was due to the development of a fishery in association with Fish Aggregating Devices (FADs). Since the 1990's, 85% of the skipjack tuna caught by purse seine vessels was taken in association with FADs. Following the peak catches taken in 2002 (240,000 t) and 2006 (247,000 t), catches dropped markedly, probably as a consequence of exceptional purse seine catch rates on free schools of yellowfin tuna. In 2007 purse seine catches dropped by around 100,000 t (145,000 t), with similar catches recorded in 2008 and have remained low (150,000–160,000 t).

The constant increase in catches and catch rates of purse seiners until 2006 are believed to be associated with increases in fishing power and in the number of FADs used in the fishery. The sharp decline in purse seine catches shown since 2007 (resulting partially from an approximate 30% decline of effort) coincided with a similar decline in the catches of Maldivian pole-and-line vessels (Fig. 3). The Maldivian fishery effectively increased its fishing effort with the mechanisation of its pole-and-line fishery from 1974, including an increase in boat size and power and the use of anchored FADs (AFADs) since 1981. The decrease in catches of both fisheries may also be the result of a sharp decrease in the mean skipjack tuna weight during this period, from 3 kg in 2006 to 2.3 kg in 2010. It should be noted that during the period 2006–2010, the gillnet fishery was catching over 100,000 tons of large skipjack tuna (~4.3 kg).

Several fisheries using gillnets have reported large catches of skipjack tuna in the Indian Ocean (Fig. 3), including the gillnet/longline fishery of Sri Lanka, driftnet fisheries of Iran and Pakistan, and gillnet fisheries of India and Indonesia. In recent years gillnet catches have represented as much as 20–30% of the total catches of skipjack tuna in the Indian Ocean. Although it is known that vessels from Iran and Sri Lanka have been using gillnets on the high seas in recent years, reaching as far as the Mozambique Channel, the activities of these fleets are poorly understood, as no time-area catch-and-effort series have been made available for those fleets to date.

The majority of the catches of skipjack tuna originate from the western Indian Ocean (Fig. 4). Since 2007 the catches of skipjack tuna in the western Indian Ocean have dropped considerably, especially in areas off Somalia, Kenya, Tanzania and around the Maldives. Although the drop in catches could be partially explained by a drop in catch rates and fishing effort by the purse seine fishery, due to the effects of piracy in the western Indian Ocean region, drops in the catches of other fisheries, in particular for the Maldives, are not fully understood.

The absolute price of skipjack tuna in the world tuna market, as well as its relative value compared to yellowfin tuna prices, has been greatly increased during recent years: 80% increase of average landing values between the 2000–2006 (758 USD/t) and 2007–2011 (1355 USD/t) periods. It was considered that the high value had contributed to an increase in the fishing pressure and targeting on skipjack tuna during recent years.



Fig. 2. Annual catches of skipjack tuna by gear recorded in the IOTC Database (1961–2010) (Data as of September 2011).



Fig. 3. Annual catches of skipjack tuna by fleet recorded in the IOTC Database (1961–2010) (Data as of September 2011).



Fig. 4a–b. Time-area catches (total combined in tonnes) of skipjack tuna estimated for 2009 and 2010 by type of gear: Purse seine free-schools (FS), Purse seine associated-schools (LS), pole-and-line (BB), and other fleets (OT), including longline, drifting gillnets, and various coastal fisheries (Data as of September 2011).
TABLE 4. Best scientific estimates of the catches of skipjack tuna (*Katsuwonus pelamis*) by gear and main fleets [or type of fishery] by decade (1950–2000) and year (2001–2010), in tonnes. Data as of October 2011. Catches by decade represent the average annual catch, noting that some gears were not used for all years (refer to Fig. 2).

F :-b	By decade (average)					By year (last ten years)										
r isner y	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
BB	9,292	13,176	22,305	40,579	82,592	118,783	104,130	132,426	126,131	120,718	146,133	155,841	115,599	106,388	84,532	69,032
FS			41	15,551	30,651	25,922	28,919	22,801	30,992	18,565	43,123	34,954	24,198	16,277	10,458	8,826
LS			125	33,570	124,096	164,300	159,646	215,781	180,556	137,882	168,012	211,940	120,925	128,596	148,717	141,797
OT	7,054	17,546	31,665	55,763	109,775	191,540	163,586	155,170	178,094	206,559	186,447	222,339	216,498	208,254	212,292	209,064
Total	16,346	30,721	54,136	145,464	347,115	500,545	456,281	526,179	515,774	483,724	543,715	625,074	477,220	459,515	455,999	428,719
	Fickewing Dale and Line (DD). Durge coine free school (FS): Durge scine associated school (LS): Other score pai (OT)															

Fisheries: Pole-and-Line (BB); Purse seine free-school (FS); Purse seine associated school (LS); Other gears nei (OT).

TABLE 5. Best scientific estimates of the catches of skipjack tuna (*Katsuwonus pelamis*) in the Western and Eastern Indian Ocean areas for the period 1950–2010 (in metric tons). Data as of October 2011.

	By decade (average)						By year (last ten years)									
Area	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
W	10,846	17,569	28,595	96,868	249,919	322,664	326,695	407,328	387,233	349,945	451,617	516,652	342,066	307,021	299,140	258,257
Е	5,499	13,153	25,541	48,596	97,196	139,308	129,586	118,851	128,541	133,780	92,098	108,422	135,155	152,494	156,859	170,462

Uncertainty of catches

Retained catches are generally well known for the industrial fisheries but are less certain for many artisanal fisheries (Fig. 5), notably because:

- Catches are not being reported by species.
- There is uncertainty about the catches from some important fleets including the Sri Lankan coastal fisheries, and the coastal fisheries of Comoros and Madagascar.
- Approximately 10–12 % of the reported catches from some coastal fisheries are uncertain.
- the catch series for skipjack tuna has not been substantially revised since the WPTT12 in 2010.
- levels of discards are believed to be low although they are unknown for most industrial fisheries, excluding industrial purse seiners flagged in EU countries for the period 2003–2007.



Fig. 5. Uncertainty of annual catch estimates for skipjack tuna (Data as of September 2011).

Catches below the zero-line (**Type B**) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (**Type A**) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

- catch-and-effort series are available from various industrial and artisanal fisheries. However, these data are not available from some important fisheries or they are considered to be of poor quality, for the following reasons:
 - o no data are available for the gillnet fishery of Pakistan.
 - o although Iran has provided catch and effort data, it is not reported as per the IOTC standards.
 - the poor quality effort data for the significant gillnet/longline fishery of Sri Lanka.
 - no data are available from important coastal fisheries using hand and/or troll lines, in particular Indonesia, Madagascar and Comoros.

Effort trends

Total effort from purse seine vessles flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 6. The total number of fishing trips by vessels flagged to the Maldives by 5 degree square grid, type of boat and gear, for the years 2009 and 2010 are provided in Fig. 7.



Fig. 6. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)



Fig. 7. Number of fishing trips by vessels flagged to the Maldives by 5 degree square grid, type of boat and gear, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

BBN (blue): Baitboat non-mechanized; BBM (Green): Baitboat mechanized; BB (Red): Baitboat unspecified; UN (Purple): Unclassified gears Note that the above maps were derived using the available catch-and-effort data in the IOTC database, which is limited to the number of baitboat calls (trips) by atoll by month for Maldivian baitboats for the period concerned. Note that some trips may be fully devoted to handlining, trolling, or other activities (data by gear type are not available since 2002). No data are available for the pole-and-line fisheries of India (Lakshadweep) and Indonesia.

Standardised catch-per-unit-effort (CPUE) trends

The CPUE series available for assessment purposes are shown in Fig. 8 and 9, although only the 'Pole-and-line series (Fig.8)–was used in the stock assessment model for 2011.

- Maldives data (2004–2010): Series1 from document IOTC–2011–WPTT13–29 and 31.
- EU purse seine free and log school data (1991–2010) (Fig.9): Series from document IOTC–2011–WPTT13–27. These series were not used in the assessment because they were not standardized and likely subject to problems as noted in paragraphs 133 and 141 of the WPTT13 report (IOTC–2011–WPTT13–R).



Fish size or age trends (e.g. by length, weight, sex and/or maturity)

Trends in average weight (Fig. 10) cannot be accurately assessed before the mid-1980s and are incomplete for most artisanal fisheries post-1980, namely hand lines, troll lines and many gillnet fisheries (Indonesia) (see paper IOTC-2011–WPTT13–08). While the average weight seems to be stable for all fisheries combined, baitboat and purse seiner are showing a decreasing trends during the last 5 years.

Catch-at-Size and Age tables are available but the estimates are uncertain for some years and fisheries due to:

- \circ the lack of size data before the mid-1980s.
- the paucity of size data available for some artisanal fisheries, notably most hand lines and troll lines (Madagascar, Comoros) and many gillnet fisheries (Indonesia, Sri Lanka).



Skipjack tuna – tagging data

A total of 100,620 skipjack tuna were tagged during the Indian Ocean Tuna Tagging Programme (IOTTP) which represented 49.8% of the total number of fish tagged. Most of the skipjack tuna tagged (77.8%) were tagged during the main Regional Tuna Tagging Project-Indian Ocean (RTTP-IO) and were primarily released off the coasts of the Seychelles and Tanzania and in the Mozambique Channel (Fig. 11) between May 2005 and September 2007. The remaining were tagged during small-scale projects around the Maldives, India and the southwest and eastern Indian Ocean by institutions with the support of IOTC. To date 15,270 (15.2%) of the tagged fish have been recovered and reported to the IOTC Secretariat.



STOCK ASSESSMENT

A single quantitative modelling method, a "Stock Synthesis III" (SS3), was applied to the skipjack tuna assessment in 2011, using data from 1950–2009. The model was age-structured, iterated on a quarterly time-step, spatially aggregated, with four fishing fleets and Beverton-Holt recruitment dynamics. Model parameters (virgin recruitment, selectivity by fleet, recruitment deviations, and M in some cases) were estimated by fitting predictions and observations of Maldivian pole-and-line CPUE (2004–2010), length frequency data for all fleets, and tag recoveries (for the purse seine fleets, and in some cases, the Maldivian pole-and-line fleet). The uncertainties and interactions among a range of assumptions was examined (including a range of fixed values for parameters that are known to be difficult to estimate). The stock status estimates represented a synthesis from 180 models (balanced factorial design of 5 assumptions, including i) 3 M options (estimated internally, fixed at point estimates from the preliminary Brownie analysis (IOTC–2011–WPTT13–30), or fixed at ICCAT values), ii) 5 stock recruit steepness options (h = 0.55-0.95), iii) 2 tagging program release/recovery options (RTTP or combined RTTP and small-scale), iv) 2 growth curve options and v) 3 tag recovery overdispersion options.

The following is worth noting with respect to the modelling approach used:

- The models estimate a steep biomass decline between 1980 and 1990 followed by a steep biomass increase. At this stage, there are no CPUE series during this period to inform the model. The catch increased in this period due to the onset of purse seine fishing and industrialization of the Maldivian pole and line fishery and thus, trends in recruitment are required to explain the biomass patterns. The biomass/recruitment trends were supported only by the length frequency data, and it is not likely that these data are sufficiently informative to estimate this trend. Furthermore, the trend is not evident in the nominal CPUE series from either the pole and line or purse seine fisheries.
- Due to numerical problems in the F_{MSY} calculations for this population, the proxy reference point C/MSY is reported instead of F/F_{MSY} , which should be interpreted with caution for the following reasons:
 - it may incorrectly suggest F>F_{MSY} when there is a large biomass (early development of the fishery or large recruitment event)
 - it may incorrectly suggest that $F < F_{MSY}$ when the stock is highly depleted
 - due to a flat yield curve, C could be near MSY even if $F \ll F_{MSY}$.
- Although CPUE from the EU, France fleet targeting free school was only reliable for yellowfin tuna and bigeye tuna after 1991, due to species misidentification, for skipjack tuna this series could be extended back to 1983, as misidentification would not have occurred between this species and the others. It was noted, however, that this nominal series would not take into account changes in fishing/gear efficiency and so could still be unsuitable as an index of abundance for the earlier years. These restrictions also apply to the post–1991 series. However, it should be taken into account that the free school catch of purse seiners is relatively small in comparison to FAD-associated fishing (less than 10%) and the fishery is seasonal, located mainly in the Mozambique Channel during the first quarter of the year.
- Most of the natural mortality assumptions included in the assessment were lower than those assumed in other oceans. The values estimated within the model only using the WPTT tagging data were unrealistically low for ages 0–1. The values estimated within the model appeared plausible when the small-scale tagging data was included with the RTTP data. The values adopted from the independent Brownie analysis using only RTTP data showed a similar pattern of M(age) to the SS3 RTTP+small-scale estimates, but were substantially lower. It was noted that there were some differences in the way that the SS3 model and Brownie analysis estimated M, but it was not obvious why either of the approaches would be biased.

TABLE 6. Key management quantities from the SS3 assessment, for the aggregate Indian Ocean. Estimates represent 50th (5th–95th) percentiles from the weighted distribution of MPD results. Due to numerical problems in the F_{MSY} calculations for this population, the proxy reference point C/MSY is reported instead of F/F_{MSY}, which should be interpreted with caution for the reasons given in Table 1.

Management Quantity	Aggregate Indian Ocean
2009 catch estimate	456,000 t
Mean catch from 2005–2009	512,000 t
MSY (90% CI)	564,000 t (395,000–843,000)
Data period used in assessment	1950–2009
C ₂₀₀₉ / _{MSY} (90% CI) (proxy for F ₂₀₀₉ /F _{MSY})	0.81 (0.54–1.16)
B_{2009}/B_{MSY}	-
SB ₂₀₀₉ /SB _{MSY} (90% CI)	2.56 (1.09-5.83)
B_{2009}/B_0	_
SB ₂₀₀₉ /SB ₀ (90% CI)	0.53 (0.29–0.70)
$B_{2009}/B_{1950, F=0}$	-
SB ₂₀₀₉ /SB _{1950, F=0}	0.53 (0.29–0.70)

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APPENDIX XIII Executive Summary: Yellowfin Tuna





Status of the Indian Ocean yellowfin tuna resource (Thunnus albacares)

TABLE 1.Status of yellowfin tuna (Thunnusalbacares) in the Indian Ocean.

Area ¹		Indicators – 2011 as	ssessment		2011 stock status determination 2009 ²	
		Catch 2010:	299,074 t			
	Average catch 2	2006–2010 (1000 t):	326,556 t			
Indian Occor)				
Indian Ocean		F ₂₀₀₉ /F _{MSY} :	0)			
		SB _{2009/} SB _{MSY} :	1.61 (1.47–1.7	'8)		
		SB_{2009}/SB_0 :	0.35 (0.31-0.3	(8)		
¹ Boundaries for the	Indian Ocean stock a	ssessment are defined a	s the IOTC area o	f competence.		
² The stock status re	fers to the most recent	t years' data used for the	e assessment.			
Colour ke	у	Stock overfished(SB	$_{\text{year}}/\text{SB}_{\text{MSY}} < 1$)	Stock not over	fished $(SB_{year}/SB_{MSY} \ge 1)$	1
Stock subject to overfishing	$rg(F_{year}/F_{MSY} > 1)$					

Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. The stock assessment model used in 2011 suggests that the stock is currently not overfished $(B_{2009}>B_{MSY})$ and overfishing is not occurring $(F_{2009}<F_{MSY})$ (Table 1 and Fig. 1). Spawning stock biomass in 2009 was estimated to be 35% (31–38%) (from Table 1) of the unfished levels. However, estimates of total and spawning stock biomass show a marked decrease over the last decade, accelerated in recent years by the high catches of 2003–2006. It was noted that the current assessment does not explain the high catches of yellowfin tuna from 2003 to 2006, as it does not show peaks in fishing mortality or biomass for this period. Recent reductions in effort and, hence, catches has halted the decline.

The main mechanism that appears to be behind the very high catches in the 2003–2006 period is an increase in catchability by surface and longline fleets due to a high level of concentration across a reduced area and depth range. This was likely linked to the oceanographic conditions at the time generating high concentrations of suitable prey items that yellowfin tuna exploited. A possible increase in recruitment in previous years, and thus in abundance, cannot be completely ruled out, but no signal of it is apparent in either data or model results. This means that those catches probably resulted in considerable stock depletion.

Outlook. The decrease in longline and purse seiner effort in recent years has substantially lowered the pressure on the Indian Ocean stock as a whole, indicating that current fishing mortality has not exceeded the MSY-related levels in recent years. If the security situation in the western Indian Ocean were to improve, a rapid reversal in fleet activity in this region may lead to an increase in effort which the stock might not be able to sustain, as catches would then be likely to exceed MSY levels. Catches in 2010 (299,074 t) are within the lower range of MSY values The current assessment indicates that catches of about the 2010 level are sustainable, at least in the short term. However, the stock is unlikely to support higher yields based on the estimated levels of recruitment from over the last 15 years.

In 2011, the WPTT undertook projections of yellowfin tuna stock status under a range of management scenarios for the first time, following the recommendation of both the Kobe process and the Commission, to harmonise technical advice to managers across RFMOs by producing Kobe II management strategy matrices. The purpose of the table is to quantify the future outcomes from a range of management options (Table 2). The table describes the presently estimated probability of the population being outside biological reference points at some point in the future, where "outside" was assigned the default definitions of $F>F_{MSY}$ or $B<B_{MSY}$. The timeframes represent 3 and 10 year projections (from the last data in the model), which corresponds to predictions for 2013 and 2020. The management options represent three different levels of constant catch projection: catches 20% less than 2010, equal to 2010 and 20% greater than 2010.

The projections were carried out using 12 different scenarios based on similar scenarios used in the assessment for the combination of those different MFCL runs: LL selectivity flat top vs. dome shape; steepness values of 0.7, 0.8 and 0.9; and computing the recruitment as an average of the whole time series vs. 15 recent years (12 scenarios). The probabilities in the matrices were computed as the percentage of the 12 scenarios being $B>B_{MSY}$ and $F<F_{MSY}$ in each year. In that sense, there are not producing the uncertainty related to any specific scenario but the uncertainty associated to different scenarios.

The SC **RECOMMENDED** the following:

- The Maximum Sustainable Yield estimate for the whole Indian Ocean is 357,000 t with a range between 290,000–435,000 t (Table 1), and annual catches of yellowfin tuna should not exceed the lower range of MSY (300,000 t) in order to ensure that stock biomass levels could sustain catches at the MSY level in the long term.
- Recent recruitment is estimated to be considerably lower than the whole time series average. If recruitment continues to be lower than average, catches below MSY would be needed to maintain stock levels.



Fig. 1. MULTIFAN-CL Indian Ocean yellowfin tuna stock assessment Kobe plot. Blue circles indicate the trajectory of the point estimates for the B ratio and F ratio for each year 1972–2009. The equal weighted mean trajectory of the scenarios investigated in the assessment. The range is given by the different scenarios investigated..

TABLE 2. MULTIFAN-CL Indian Ocean yellowfin tuna stock assessment Kobe II Strategy Matrix. Percentage probability of violating the MSY-based reference points for five constant catch projections (2010 catch level, \pm 20% and \pm 40%) projected for 3 and 10 years. In the projection, however, 12 scenarios were investigated: the six scenarios investigated above as well as the same scenarios but with a lower mean recruitment assumed for the projected period.

Reference point and projection timeframe	nce and Alternative catch projections (relative to 2010) and tion (%) of violating reference point ame									
	60% (165,600 t)	80% (220,800 t)	100% (276,000 t)	120% (331,200 t)	140% (386,400 t)					
$B_{2013} < B_{MSY}$	<1	<1	<1	<1	<1					
$F_{2013} \!\!> \! F_{MSY}$	<1	<1	58.3	83.3	100					
$B_{2020} < B_{MSY}$	<1	<1	8.3	41.7	91.7					
$F_{2020}\!>F_{MSY}$	<1	41.7	83.3	100	100					

There was considerable discussion on the ability of the WPTT to carry out projections with Multifan-FCL for yellowfin tuna. For example, it was not clear how the projection redistributed the recruitment among the different regions, as the recent recruitment distribution, assumed in the projections, was different from the historical one. The WPTT agreed that the true uncertainty remains unknown and that the current characterization is not complete. However, the WPTT feels that the projections may provide a relative ranking of different scenarios outcomes. The WPTT recognised that, at this time, the Kobe 2 matrices do not represent the full range of uncertainty from the assessments. Therefore, the inclusion of these matrices at this time is primarily intended to familiarise the Commission with the format and method of presenting management advice.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Tropical Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Yellowfin tuna (*Thunnus albacares*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/01 for the Conservation and Management of tropical tunas stocks in the IOTC area of competence.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/07 concerning a record of licensed foreign vessels fishing for tunas and swordfish in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 10/13 On the implementation of a ban on discards of skipjack tuna, yellowfin tuna, bigeye tuna, and non targeted species caught by purse seiners.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Yellowfin tuna (*Thunnusalbacares*) is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three major oceans, where it forms large schools. Table 3 outlines some of the key life history traits of yellowfin tuna relevant for management.

Parameter	Description
Range and stock structure	A cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three major oceans, where it forms large schools. Feeding behaviour has been extensively studied and it is largely opportunistic, with a variety of prey species being consumed, including large concentrations of crustaceans that have occurred recently in the tropical areas and small mesopelagic fishes which are abundant in the Arabian Sea. It has also been observed that large individuals can feed on very small prey, thus increasing the availability of food for this species. Archival tagging of yellowfin tuna has shown that this species can dive very deep (over 1000 m) probably to feed on mesopelagic prey. Longline catch data indicates that yellowfin tuna are distributed throughout the entire tropical Indian Ocean. The tag recoveries of the RTTP-IO provide evidence of large movements of yellowfin tuna, thus supporting the assumption of a single stock for the Indian Ocean. The average distance travelled by yellowfin between being tagging and recovered is 710 nautical miles, and showing increasing distances as a function of time at sea.
Longevity	9 years
Maturity (50%)	Age: females and males 3–5 years. Size: females and males 100 cm.
Spawning season	Spawning occurs mainly from December to March in the equatorial area (0-10°S), with the main spawning grounds west of 75°E. Secondary spawning grounds exist off Sri Lanka and the Mozambique Channel and in the eastern Indian Ocean off Australia.

TABLE 3. Biology of Indian Ocean yellowfin tuna (*Thunnus albacares*).

Size (length	Maximum length: 240 cm FL; Maximum weight: 200 kg.
and weight)	Newly recruited fish are primarily caught by the purse seine fishery on floating objects. Males are predominant in
	the catches of larger fish at sizes than 140 cm (this is also the case in other oceans). The sizes exploited in the
	Indian Ocean range from 30 cm to 180 cm fork length. Smaller fish (juveniles) form mixed schools with skipjack
	tuna and juvenile bigeye tuna and are mainly limited to surface tropical waters, while larger fish are found in
	surface and sub-surface waters. Intermediate age yellowfin tuna are seldom taken in the industrial fisheries, but are
	abundant in some artisanal fisheries, mainly in the Arabian Sea.

SOURCES: Froese & Pauly (2009)

Catch trends

Contrary to the situation in other oceans, the artisanal fishery (*i.e.* vessels less than 24m fishing inside their EEZ) component of yellowfin tuna catches in the Indian Ocean is substantial, taking approximately 20-25% of the total catch landed. Catches of yellowfin tuna remained more or less stable between the mid-1950s and the early-1980s, ranging between 30,000 and 70,000 t, owing to the activities of longliners and, to a lesser extent, gillnetters (Fig. 2).

Catches of yellowfin tuna increased rapidly with the arrival of the purse seine fleets in the early 1980s (Figs. 2 and 3), along with increased activity by longline vessels, with more than 400,000 t landed in 1993. Purse seiners typically take fish ranging from 40–140 cm fork length and smaller fish are more common in the catches taken north of the equator.

The purse seine fishery is characterized by the use of two different fishing modes: a fishery on drifting objects (FADs), which catches large numbers of small yellowfin in association with skipjack tuna and juvenile bigeye tuna, and a fishery on free swimming schools, which catches larger yellowfin tuna on multi-specific or mono-specific sets. Between 1995 and 2003, the FAD component of the purse seine fishery represented 48–66% of the sets undertaken (60–80% of the positive sets) and took 36–63% of the yellowfin tuna catch by weight (59–76% of the total catch). The proportion of yellowfin tuna caught (in weight) on free-schools during 2003–2006 (64%) was much higher than in previous (49% for 1999–2002) or following years (55% for 2007–2009).

The longline fishery primarily catches large fish, from 80–160 cm fork length, although smaller fish in the size range 60–100 cm have been taken and reported by longliners from Taiwan, China since 1989 in the Arabian Sea. The longline fishery targets several tuna species in different parts of the Indian Ocean, with yellowfin tuna and bigeye tuna being the main target species in tropical waters. The longline fishery can be subdivided into a deep-freezing longline component (large scale deep-freezing longliners operating on the high seas from Japan, Rep. of Korea and Taiwan, China) and a fresh-tuna longline component (small to medium scale fresh tuna longliners from Indonesia and Taiwan, China). As was the case with purse seine fisheries, since 2005 longline catches have decreased substantially with current catches estimated to be at around 41,000 t, representing a more than three-fold decrease over the catches in 2005 (Fig. 2).

Total yellowfin tuna catches dropped markedly from the peak catches taken in 2006, with the lowest catches recorded since the early 1990's reported in 2009, at around 275,955 t. Preliminary catch levels in 2010 are estimated to be around 299,074 t (Tables 4, 5).

The recent drop in catches of yellowfin tuna could be related, at least in part, to the expansion of piracy in the western tropical Indian Ocean, which has led to a marked drop in the levels of longline effort in the core fishing area of the species (Figs. 4a, b) as well as to the decline in the number of purse seiners in the Indian Ocean (~30% reduction).

Catches by other gears, i.e. pole-and-line, gillnet, troll, hand line and other minor gears, have increased steadily since the 1980s (Fig. 2). In recent years the total artisanal yellowfin tuna catch has been between 140,000–160,000 t, with the catch by gillnets (the dominant artisanal gear) at around 80,000 t.

Most yellowfin tuna are caught in the Indian Ocean, north of 12°S, and in the north of the Mozambique Channel (Figs. 4a, b). In recent years the catches of yellowfin tuna in the western Indian Ocean have dropped considerably, especially in areas off Somalia, Kenya and Tanzania and in particular between 2008 and 2010. The drop in catches is the consequence of a generalised drop in fishing effort due to the effect of piracy in the western Indian Ocean region.





Fig. 4a–b. Time-area catches (total combined in tonnes) of yellowfin tuna estimated for 2009 and 2010 by type of gear: Longline (LL), Purse seine free-schools (FS), Purse seine associated-schools (LS), pole-and-line (BB), and other fleets (OT), including drifting gillnets, and various coastal fisheries (Data as of September 2011).

TABLE 4. Best scientific estimates of the catches of yellowfin tuna (*Thunnus albacares*) by gear and main fleets [or type of fishery] by decade (1950–2000) and year (2001–2010), in tonnes. Data as of October 2011. Catches by decade represent the average annual catch, noting that some gears were not used for all years (refer to Fig. 2).

Fishowy		By decade (average)					By year (last ten years)									
r isner y	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
FS	0	0	18	32,590	64,942	89,761	78,969	77,059	137,492	168,799	124,024	85,021	53,529	74,990	36,263	31,951
LS	0	0	17	18,090	56,304	61,909	50,997	61,933	86,585	59,597	69,873	74,454	43,843	41,453	51,565	72,199
LL	21,990	41,256	29,512	33,889	66,689	57,668	43,932	53,132	55,741	86,415	116,847	69,831	54,414	29,128	21,242	17,130
LF	0	0	615	4,286	47,570	32,827	39,323	34,429	31,292	31,125	33,991	30,475	28,752	30,424	23,157	24,089
BB	1,754	1,452	4,380	6,621	11,765	17,162	14,233	19,393	19,451	16,177	16,607	18,644	18,133	18,351	18,463	12,755
GI	2,604	7,569	12,861	15,261	50,192	76,053	60,748	62,982	83,283	99,254	76,660	86,286	66,693	80,086	82,695	101,418
HD	679	1,175	2,615	6,990	20,002	31,762	29,790	34,093	31,105	40,820	38,993	31,789	30,274	28,895	23,952	20,472
TR	832	1,514	3,502	7,193	16,825	19,479	19,453	18,288	17,270	25,798	19,136	19,160	19,061	19,770	17,682	18,177
OT	118	130	497	1,275	1,344	1,107	543	463	1,396	1,734	1,123	1,436	1,290	1,567	936	883
Total	27,978	53,096	54,017	126,193	335,634	387,728	337,988	361,772	463,615	529,719	497,254	417,096	315,989	324,664	275,955	299,074

Fisheries: Purse seine free-school (FS); Purse seine associated school (LS); Deep-freezing longline (LL); Fresh-tuna longline (LF); Pole-and-Line (BB); Gillnet (GI); Hand line (HD); Trolling (TR); Other gears nei (OT).

TABLE 5. Best scientific estimates of the catches of yellowfin tuna (*Thunnus albacares*) in the Western and Eastern Indian Ocean areas for the period 1950–2010 (in metric tons). Data as of October 2011.

A #00*	By decade (average)					By year (last ten years)										
Alta	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
R1	2,164	5,430	9,376	18,462	73,169	83,578	65,544	73,160	82,854	119,183	129,226	92,860	74,179	72,600	62,861	65,123
R2	11,899	23,101	20,921	72,400	143,122	183,679	156,045	164,369	265,456	278,103	248,113	204,035	126,450	135,499	100,973	111,041
R3	919	7,857	4,483	9,646	28,681	33,100	32,009	34,377	31,004	36,490	33,887	33,480	35,123	30,867	28,990	27,545
R4	918	1,799	1,370	1,075	3,314	2,122	3,376	3,328	2,387	3,802	2,904	1,363	540	507	427	498
R5	12,079	14,909	17,869	24,611	87,347	85,250	81,014	86,538	81,914	92,141	83,124	85,358	79,697	85,191	82,704	94,867
Total	27,978	53,096	54,017	126,193	335,634	387,728	337,988	361,772	463,615	529,719	497,254	417,096	315,989	324,664	275,955	299,074

*See Fig. 9 for a description of the areas

Uncertainty of catches

Retained catches are generally well known for the major fleets (Fig. 5); but are less certain for:

- Many coastal fisheries, notably those from Indonesia, Sri Lanka, Yemen, Madagascar and Comoros.
- The gillnet fishery of Pakistan.
- Non-reporting industrial purse seiners and longliners (NEI), and commercial longliners from India.



Catches below the zero-line (Type B) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

- the catch series for yellowfin tuna has not been significantly revised since the WPTT12 in 2010, although there has been some revision to the time series of catch from the fisheries of India leading to changes in catches by gear.
- levels of discards are believed to be low although they are unknown for most industrial fisheries, excluding industrial purse seiners flagged in EU countries for the period 2003–2007.
- catch-and-effort series are available from the major industrial and artisanal fisheries. However, these data are not available for some important artisanal fisheries or they are considered to be of poor quality for the following reasons:
 - no data are available for the fresh-tuna longline fishery of Indonesia, over the entire time series, and very little data available for the fresh-tuna longline fishery of Taiwan, China.
 - o no data are available for the gillnet fisheries of Pakistan.
 - o although Iran has provided catch and effort data, it is not reported as per the IOTC standards.
 - the poor quality effort data for the significant gillnet/longline fishery of Sri Lanka.
 - no data are available from important coastal fisheries using hand and/or troll lines, in particular Yemen, Indonesia, Madagascar and Comoros.

Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 6, and total effort from purse seine vessles flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 7. The total number of fishing trips by vessels flagged to the Maldives by 5 degree square grid, type of boat and gear, for the years 2009 and 2010 are provided in Fig. 8.

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Fig. 6.Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan, China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

FTLL (red) : fresh-tuna longliners (China, Taiwan, China and other fleets)

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)



Fig. 7. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)



Fig. 8.Number of fishing tripsby vessels flagged to the Maldives by 5 degree square grid, type of boat and gear, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

BBN (blue): Baitboat non-mechanized; BBM (Green): Baitboat mechanized; BB (Red): Baitboat unspecified; UN (Purple): Unclassified gears Note that the above maps were derived using the available catch-and-effort data in the IOTC database, which is limited to the number of baitboat calls (trips) by atoll by month for Maldivian baitboats for the period concerned. Note that some trips may be fully devoted to handlining, trolling, or other activities (data by gear type are not available since 2002). No data are available for the pole-and-line fisheries of India (Lakshadweep) and Indonesia.

Standardised catch-per-unit-effort (CPUE) trends

For the longline fisheries (LL fisheries in regions 1–5; Fig. 9), CPUE indices were derived using generalized linear models (GLM) from the Japanese longline fleet (LL regions 2–5) and for the Taiwanese longline fleet (LL region 1) to be used in the stock assessment. Standardised longline CPUE indices for the Taiwanese fleet were available for 1979–2008. The GLM analysis used to standardise the Japanese longline CPUE indices was refined for the 2011 assessment to include a spatial (latitude*longitude) variable. The resulting CPUE indices were generally comparable to the indices derived from the previous model and were adopted as the principal CPUE indices for the 2011 assessment (Fig. 10). There is considerable uncertainty associated with the Japanese CPUE indices for region 2 in the most recent year (2010) and no CPUE indices are available for region 1 for 2009–10.



Fig. 9. Spatial stratification of the Indian Ocean for the MFCL assessment model.



Fig. 10. Annualised GLM standardised catch-per-unit-effort (CPUE) for the principal longline fisheries (longline region 1: Taiwan, China and longline regions 2–5: Japan) and the whole Indian Ocean (IO), scaled by the respective region scalars.

Fish size or age trends (e.g. by length, weight, sex and/or maturity)

• trends in average weight (Fig. 11) can be assessed for several industrial fisheries but they are very incomplete or of poor quality for some fisheries, namely hand lines (Yemen, Comoros, Madagascar), troll lines (Indonesia) and many gillnet fisheries (see paper IOTC-2011-WPTT13-08).



- catch-at-Size and Age tables are available although the estimates are more uncertain in some years and some fisheries due to:
 - size data not being available from important fisheries, notably Yemen, Pakistan, Sri Lanka and Indonesia (lines and gillnets) and Comoros and Madagascar (lines).
 - $\circ~$ the paucity of size data available from industrial longliners from the late-1960s up to the mid-1980s.
 - the paucity of catch by area data available for some industrial fleets (NEI, Iran, India, Indonesia, Malaysia).

Tagging data

A total of 63,310 yellowfin tuna were tagged during the Indian Ocean Tuna Tagging Programme (IOTTP) which represented 31.4% of the total number of fish tagged. Most of the yellowfin tuna tagged (86.4%) were tagged during the main Regional Tuna Tagging Project-Indian Ocean (RTTP-IO) and were primarily released off the coasts of the Seychelles, in the Mozambique Channel, along the coast of Oman and off the coast of Tanzania (Fig. 12) between May 2005 and September 2007. The remaining were tagged during small-scale projects around the Maldives, India and the southwest and eastern Indian Ocean by institutions with the support of IOTC. To date 10,560 (16.7%) tagged fish have been recovered and reported to the IOTC Secretariat.



STOCK ASSESSMENT

A single quantitative modelling method (MULTIFAN-CL) was applied to the yellowfin tuna assessment in 2011, using data from 1972–2010. The following is worth noting with respect to the modelling approach used:

- The main features of the model in the 2010 assessment included a fixed growth curve (with variance) with an inflection, an age-specific natural mortality rate profile (M), the modelling of 24 fisheries including the separation of two purse seine fisheries into three time blocks, using a cubic spline method to estimate longline selectivities in the place of a logistic curve, the down-weighting of length frequency data in the fitting, separation of the analysis into five regions of the Indian Ocean and the specification of four steepness parameters for the stock recruitment relationship (h=0.6, 0.7, 0.8 and 0.9).
- In addition to another year of data, the 2011 assessment included several changes to the previous assessment: the longline CPUE indices were modified (Japanese updated with latest year which included information about latitude and longitude in the standardisation process for Regions 2–5 was supplied and the Taiwan, China index was revised for region 1); major historical catch revisions for fisheries in Region 5, splitting the longline fleet in Region 5 into distant water and fresh tuna logline fleets leaving 25 total fleets in the model; and the range of steepness evaluated was expanded to h=0.55-0.95.

While the biomass trends were very similar between the 2010 and 2011 assessments, the estimates of stock productivity and thus, the status, differed. There were several reasons for this: there was poor convergence in the 2010 assessment, thus the fits were suboptimal and alternative solutions were near optimal. Refitting the 2010 assessment is now more optimistic. Also, fitting the 2010 model to 2011 data was more optimistic. Thus, revisiting of key parameters and the

inclusion of the latest year of data in the 2011 assessment appeared to be important. These issues are difficult to explore in the MFCL framework. The WPTT reviewed several alternative model structures and parameter formulations for the model that were presented in the assessment. These included: the new longline model structure for Region 5; alternative Japanese CPUE indices; a single region model where all 5 Regions were collapsed into one; a Region 2 model estimated separately from other Regions; the 5 values of steepness and alternative tag mixing periods (1–4 quarters). Additionally, an attempt was made to estimate age-specific M's. In regards to the latter, this parameter was not well estimated and the WPTT adopted the low M profile as the most appropriate way to proceed.

The problems identified in the catch data from some fisheries, and especially on the length frequencies in the catches of various fleets, a very important source of information for stock assessments. Length frequency data is almost unavailable for some fleets, while in other cases sample sizes are too low to reliably document changes in abundance and selectivity by age. Moreover, in general, catch data from some coastal fisheries is considered as poor.

The available tagging data has provided the WPTT with relevant information on various biological parameters, such as natural mortality and growth. Further use of these data should better support the analyses conducted by the WPTT.

In the previous assessment purse seine selectivity in the period 2003–2007 was separated into three blocks of time surrounding 2005 to accommodate the unusually large catches in the middle of that time period. This was continued in the current assessment. However, the WPTT questioned whether this was the most appropriate way to do this. An alternative was suggested in which the time blocks of PS fleet were removed and the same selectivity was applied throughout the period. This was explored in new model runs. Results were not demonstrably different.

Longline selectivity will be revisited in 2012 as it was suggested that this selectivity might still be best described by a logistic (flat-topped) model instead of a cubic spline approach, whereby the resulting selectivity was dome-shaped. This option reinvigorated a long standing debate that has yet to be resolved. A run whereby logistic selectivities were imposed was evaluated.

Generally, the runs with alternative parameter and model structures did not suggest large differences in the approach and resulted in qualitatively predictable outcomes. The WPTT felt that the alternative outcomes were an expression of uncertainties in the model, data and assessment. Therefore, the WPTT focused on following basic alternatives for characterizing the uncertainty: logistic versus cubic spline longline selectivity; using the low M profile; alternative steepness of the stock-recruitment relationship of 0.7, 0.8 and 0.9, and estimation of MSY based reference points using the average recruitment for the whole time series. It was determined that with current knowledge outcomes using these alternatives are equally likely and a combined evaluated was generated based upon this.

The final range of model options adopted by the WPTT included the 2 alternative parametrization of longline selectivity (cubic spline and logisitic) and three steepness options (0.7, 0.8 and 0.9). For the cubic spline model option, there is a strong temporal trend in recruitment and recent recruitments (average of the last 15 years) is estimated to be lower (80%) than the long term recruitment level. On that basis, it was agreed to also derived alternative MSY estimates based on the recent levels of recruitment for comparative purposes.Key assessment results for the MFCL stock assessment areshown in Tables 1, 2 and 6; Fig. 1.

It was noted that some of the results of the Multifan-CL model selected were not intuitive and have been discussed extensively by the WPTT and the SC. The SC **NOTED** the following points:

- the movements of yellowfin tuna, between the five regions used in the stock assessment, estimated by the model show insignificant mixing between some regions which may infer three nearly independent different stocks in the Arabian sea (area 1), the South-East Indian Ocean (area 5) and the rest of the Indian Ocean. However, this result seems to be in contradiction with the biological knowledge of the stock and with the recent tagging results suggesting wide and fast movements between all areas.
 - the levels and trends of biomass estimated by the model in each of the 5 areas seem unrealistic:
 - the very high initial biomass in the South-East area (area 5) and its major decline during recent years
 - the biomass in the South-West Indian Ocean (area 3) being larger than that of the Western equatorial Indian Ocean (area 2), which is recognized as the main yellowfin fishing area and consequently, where biomass should be at a much higher level.

Management Quantity	Indian Ocean
2010 catch estimate	299,100 t
Mean catch from 2006–2010	326,600 t
MSY	357,000 t (290,000–435,000)
Data period used in assessment	1972–2010
F_{2009}/F_{MSY}	0.84 (0.63–1.10)
B_{2009}/B_{MSY}	1.46 (1.35–1.59)
SB ₂₀₀₉ /SB _{MSY}	1.61 (1.47–1.78)
B_{2009}/B_0	0.49
SB_{2009}/SB_0	0.35 (0.31-0.38)
$B_{2009}/B_{0, F=0}$	0.58
$SB_{2009}/SB_{0, F=0}$	_

Table 6.Key management quantities from the MFCL assessment, for the agreed scenarios of yellowfin tuna in the Indian Ocean.Values represent an equal weighting mean of the scenarios investigated. The range is described by the range values between those scenarios.

LITERATURE CITED

Froese R, &Pauly DE 2009. FishBase, version 02/2009, FishBaseConsortium, <www.fishbase.org>.

APPENDIX XIV Executive Summary: Longtail Tuna





Status of the Indian Ocean longtail tuna resource (*Thunnus tonggol*)

TABLE 1. Status of longtail tuna (*Thunnus tonggol*) in the Indian Ocean.

Area ¹	Indicators – 20	11 assessment	2011 stock status determination
			2010 ²
	Catch ³ 2010:	141,937 t	
	Average catch ^{3} 2006–2010:	115,973 t	
Indian Ocean	MSY:	unknown	UNCEDTAIN
Indian Occan	F_{2010}/F_{MSY} :	unknown	UNCERTAIN
	$SB_{2010/}SB_{MSY}$:	unknown	
	SB_{2010}/SB_0 :	unknown	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for longtail tuna in the Indian Ocean, noting that there remains considerable uncertainty about stock structure and about the total catches.

Stock status. No quantitative stock assessment is currently available for longtail tuna in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern.

Outlook. The continued increase of annual catches for longtail tuna in recent years has further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. The apparent fidelity of longtail tuna to particular areas/regions is a matter for concern as overfishing in these areas can lead to localised depletion. Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Longtail tuna (*Thunnus tonggol*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Longtail tuna (*Thunnus tonggol*) is an oceanic species that forms schools of varying sizes. It is most abundant over areas of broad continental shelf. Table 2 outlines some key life history parameters relevant for management.

TABLE 2.	Biology of Indiar	Ocean longtail tuna	a (Thunnus tonggol).
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Parameter	Description
Range and stock structure	An oceanic species that forms schools of varying sizes. It is most abundant over areas of broad continental shelf. Feeds on a variety of fish, cephalopods, and crustaceans, particularly stomatopod larvae and prawns. No information is available on the stock structure of longtail tuna in the Indian Ocean.
Longevity	~20 years
Maturity (50%)	Age: n.a.; females n.a. males n.a. Size: females and males ~40 cm FL (Pacific Ocean).
Spawning season	The spawning season varies according to location. Off the west coast of Thailand there are two distinct spawning seasons: January-April and August-September.
Size (length and weight)	Maximum: Females and males 145 cm FL; weight 35.9 kgs. Most common size in Indian Ocean ranges 40–70 cm. Grows rapidly to reach 40–46 cm in FL by age 1.

n.a. = not available. SOURCES: Froese & Pauly (2009); Griffiths et al. (2010a, b); Kaymaran et al. (2011)

Longtail tuna – Catch trends

Longtail tuna is caught mainly using gillnets and, to a lesser extent, purse seine and trolling (Fig. 1). The catch estimates for longtail tuna were derived from small amounts of information and are therefore uncertain. Estimated catches of longtail tuna increased steadily from the mid 1950's, reaching around 20,000 t in the mid-1970's and over 50,000 t by the mid-1980's. Catches reached record levels in 2010, at 141,937 t (preliminary estimate). The average annual catch estimated for the period 2006–2010 is 115,973 t (Table 3).

In recent years, the countries attributed with the highest catches of longtail tuna are the I.R. Iran (34%) and Indonesia (31%) and, to a lesser extent, Oman, Pakistan, Malaysia and India (22%) (Fig. 2). In particular, I.R. Iran has reported large increases in the catch of longtail tuna in 2009 and 2010. This may be the consequence of increased drifting gillnet effort in coastal waters due to the threat of Somali piracy in the western tropical Indian Ocean.



TABLE 3.Best scientific estimates of the catches of longtail tuna by type of fishery for the period 1950–2010 (in metric tonnes). Data as of October 2011.

Fishowy	By decade (average)			By year (last ten years)												
ristiery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purse seine	44	204	980	4,448	8,191	13,912	9,317	15,347	13,367	11,222	9,332	13,105	17,550	14,232	15,197	14,551
Gillnet	2,963	6,761	11,355	29,466	48,717	77,932	70,082	61,269	68,265	59,575	54,711	66,547	72,788	84,711	98,522	115,319
Line	846	1,089	2,379	4,898	7,887	9,278	9,599	10,425	9,053	11,209	12,552	14,527	14,243	9,849	9,530	9,758
Other	290	489	1,054	2,164	2,500	2,428	2,196	1,710	1,603	1,665	1,290	1,338	1,890	2,092	1,807	2,309
Total	4,143	8,544	15,767	40,976	67,294	103,550	91,193	88,751	92,288	83,671	77,884	95,518	106,472	110,883	125,056	141,937

Longtail tuna – Uncertainty of catches

Retained catches are uncertain (Fig. 3), notably for the following fisheries:

- Artisanal fisheries of Indonesia: Indonesia did not report catches of longtail tuna by species or by gear for 1950–2004; catches of longtail tuna, kawakawa and other species were reported aggregated for this period. The IOTC Secretariat used the catches reported since 2005 to break the aggregates for 1950–2004 by gear and species. The Indonesian catches estimated for longtail tuna represent more than 30% of the total catches of this species in the Indian Ocean in recent years.
- Artisanal fisheries of India and Oman: Although these countries report catches of longtail tuna, until recently the catches have not been reported by gear. The IOTC Secretariat used alternative information to assigning the catches reported by species. The catches of longtail tuna that had to be allocated by gear represented 12% of the total catches of this species in recent years.
- Artisanal fisheries of Mozambique, Myanmar, and Somalia: None of these countries have reported catches to the IOTC Secretariat. Catch levels are unknown but are not considered large.
- Other artisanal fisheries: The IOTC Secretariat estimated catches of longtail tuna for the artisanal fisheries of Yemen (no data reported to the IOTC Secretariat) and Malaysia (catches not reported by species). The catches estimated for longtail tuna represent 9% of the total catches of this species in recent years.
- Discard levels are believed to be very low although they are unknown for most fisheries.
- Changes to the catch series: There have been significant changes to the catches of longtail tuna since December 2010, following two reviews of catches for the coastal fisheries of India and, to a lesser extent, Indonesia, involving marked changes in catches by species. The new catches estimated are markedly lower than those previously recorded representing overall 65% and 75% of the catches recorded in the past for India and Indonesia, respectively.



Longtail tuna – Effort trends

Effort trends are unknown for longtail tuna in the Indian Ocean.

Longtail tuna – Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some fisheries but they are considered highly incomplete. In most cases catch-and-effort data are only available for short periods of time. Reasonably long catch and effort series (extending for more than 10 years) are only available for Thailand small purse seines and gillnets (Fig. 4). No catch and effort data are available from sports fisheries, other than for partial data from the sports fisheries of Kenya.



Longtail tuna – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

- The size of longtail tuna taken by the Indian Ocean fisheries typically ranges between 15–120 cm depending on the type of gear used, season and location. The fisheries operating in the Andaman Sea (coastal purse seines and troll lines) tend to catch longtail tuna of small size (15–55cm) while the drifting gillnet fisheries operating in the Arabian Sea catch larger specimens (40–100cm).
- Trends in average weight can only be assessed for I.R. Iran drifting gillnets but the amount of specimens measured has been very low in recent years. The length frequency data available from the mid-eighties to the early nineties was obtained with the support of the IPTP (Indo-Pacific Tuna Programme). Unfortunately, data collection did not continue after the end of the IPTP activities.
- Catch-at-Size(Age) tables are not available for the longtail tuna due to the paucity of size data available from most fleets and the uncertain status of the catches for this species.

• Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for longtail tuna in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. However, a preliminary estimation of stock indicators was attempted on the catch and effort datasets from the Thailand gillnet and purse seine fisheries (described above). However, there is considerable uncertainty about the degree to which this and other indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	114,900 t
Mean catch from 2006–2010	116,000 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	-
B ₂₀₁₀ /B _{MSY} (80% CI)	-
SB_{2010}/SB_{MSY}	-
B ₂₀₁₀ /B ₀ (80% CI)	-
SB_{2010}/SB_{0}	-
$B_{2010}/B_{0, F=0}$	-
SB ₂₀₁₀ /SB _{0, F=0}	_

TABLE 4. Longtail tuna (Thunnus tonggol) stock status summary.

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APPENDIX XV Executive Summary: Narrow-barred Spanish Mackerel



Status of the Indian Ocean narrow-barred Spanish mackerel resource (Scomberomorus commerson)

TABLE 1. Status of narrow-barred Spanish mackerel (Scomberomorus commerson) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination 2010 ²	
Indian Ocean	Catch ³ 2010: Average catch ³ 2006–2010:	124,107 t 116,444 t	
	MSY: F ₂₀₁₀ /F _{MSY} :	unknown unknown	UNCERTAIN
	$SB_{2010/}SB_{MSY}$:	unknown	
	SB_{2010}/SB_0 :	unknown	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for narrow-barred Spanish mackerel in the Indian Ocean noting that there remains considerable uncertainty about stock structure and about the total catches.

Stock status. No quantitative stock assessment is currently available for narrow-barred Spanish mackerel in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern. Although indicators from the Gulf and Oman Sea suggest that overfishing is occurring in this area, the degree of connectivity with other regions remains unknown.

Outlook. The continued increase of annual catches for narrow-barred Spanish mackerel in recent years has further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. The apparent fidelity of narrow-barred Spanish mackerel to particular areas/regions is a matter for concern as overfishing in these areas can lead to localised depletion. Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Narrow-barred Spanish mackerel (*Scomberomorus commerson*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

The narrow-barred Spanish mackerel (*Scomberomorus commerson*) is a pelagic, top level predator found throughout tropical marine waters of the Indo-West Pacific. Table 2 outlines some key life history parameters relevant for management.

Parameter	Description
Range and stock structure	A pelagic, top level predator found throughout tropical marine waters of the Indo-West Pacific. Juveniles inhabit shallow inshore areas whereas adults are found in coastal waters out to the continental shelf. Adults are usually found in small schools but often aggregate at particular locations on reefs and shoals to feed and spawn. Appear to undertake lengthy migrations. Feed primarily on small fishes such as anchovies, clupeids, carangids, also squids and shrimps. Genetic studies carried out on <i>S. commerson</i> from Djibouti, Oman and U.A.E. showed there were small genetic differences among stocks in these three places.
Longevity	~16 years
Maturity (50%)	Age: n.a.; females n.a. males n.a. Size: females ~81 cm FL and males ~52 cm FL.
Spawning season	Females are multiple spawners. Year-round spawning has been observed in east African waters, with peaks during late spring to summer (April-July) and autumn (September-November) coinciding with the two seasonal monsoons which generate high abundances of plankton and small pelagic fish.
Size (length and weight)	Maximum: Females and males 240 cm FL; weight 70 kgs.

TABLE 2. Biology of Indian Ocean narrow-barred Spanish mackerel (Scomberomorus commerson).

n.a. = not available. SOURCES: Grandcourt et al. (2005); Froese & Pauly (2009); Darvishi et al. (2011)

Narrow-barred Spanish mackerel – Catch trends

Narrow-barred Spanish mackerel is targeted throughout the Indian Ocean by artisanal and recreational fishers. The main method of capture is gillnet, but significant numbers of are also caught trolling (Fig. 1).

The catch estimates for narrow-barred Spanish mackerel were derived from very small amounts of information and are therefore highly uncertain. The catches of narrow-barred Spanish mackerel increased from around 50,000 t the mid-1970's to over 100,000 t by the mid-1990's. The highest catches of Spanish mackerel were recorded in 2010, amounting to 124,107 t. In recent years, catches have been increasing, with average annual catches for 2006–2010 estimated to be at around 116,444 t (Table 3). Narrow-barred Spanish mackerel is caught in both Indian Ocean basins, with higher catches recorded in the West.

In recent years, the countries attributed with the highest catches of Spanish mackerel are India (29%) and Indonesia (23%) and, to a lesser extent, Iran, Pakistan, and Madagascar (20%) (Fig. 2).



TABLE 3.Best scientific estimates of the catches of narrow-barred Spanish mackerel by type of fishery for the period 1950–2010 (in metric tonnes). Data as of October 2011.

Fishowy	By decade (average)			By year (last ten years)												
r isner y	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purse seine	0	0	237	1,141	2,571	1,782	1,404	1,928	2,325	1,590	2,116	3,926	1,877	1,951	1,920	2,874
Gillnet	7,164	15,184	26,883	54,952	71,418	78,404	78,408	73,231	76,410	73,571	64,618	74,173	77,371	84,124	84,225	89,352
Line	2,330	3,350	6,529	13,733	14,964	16,823	16,773	15,420	17,023	15,214	16,145	17,137	15,811	17,394	18,099	18,045
Other	1,368	2,012	4,255	6,635	10,616	13,932	13,264	15,354	14,566	12,996	13,537	16,239	15,547	14,793	13,527	13,836
Total	10,862	20,546	37,904	76,462	99,570	110,941	109,849	105,933	110,324	103,370	96,416	111,475	110,605	118,262	117,770	124,107

Narrow-barred Spanish mackerel – uncertainty of catches

Retained catches are uncertain (Fig. 3), notably for the following fisheries:

- Artisanal fisheries of India and Indonesia: India and Indonesia have only recently reported catches of narrow-barred Spanish mackerel by gear, including catches by gear for the years 2005–2008 and 2007–2008, respectively. In both cases, the IOTC Secretariat used the catches reported by gear to break previous catches of this species by gear. The catches of narrow-barred Spanish mackerel estimated for this component represent more than 52% of the total catches of this species in recent years.
- Artisanal fisheries of Madagascar: Madagascar has never reported catches of narrow-barred Spanish mackerel to the IOTC Secretariat. During 2010 the IOTC Secretariat conducted a review aiming to break the catches recorded in the FAO database as narrow-barred Spanish mackerel by species, on the assumption that all catches of nertitic tunas had been combined under this name. The new catches estimated are thought to be very uncertain.
- Artisanal fisheries of Mozambique, Myanmar and Somalia: None of these countries have ever reported catches to the IOTC Secretariat. Catch levels are unknown.
- Other artisanal fisheries: Oman and the United Arab Emirates do not report catches of narrow-barred Spanish mackerel by gear. Although most of the catches are believed to be taken by gillnets, some fish may be also caught by using small surrounding nets, lines or other artisanal gears. Thailand and Malaysia report catches of narrow-barred Spanish mackerel and Indo-Pacific king mackerel aggregated.
- All fisheries: In some cases the catches of seerfish species are mislabelled, the catches of Indo-Pacific king mackerel and, to a lesser extent, other seerfish species, labelled as narrow-barred Spanish mackerel. Similarly, the catches of wahoo in some longline fisheries are thought to be mislabelled as narrow-barred Spanish mackerel. This mislabelling is thought to have little impact in the case of the narrow-barred Spanish mackerel but may be important for other seerfish species.
- Discard levels are believed to be low although they are unknown for most fisheries.
- Changes to the catch series: The catch series of narrow-barred Spanish mackerel has changed since those estimated in 2010, following reviews of catches for the coastal fisheries in Indonesia and India, involving



marked changes in catches by species. Overall, the new catches estimated represent the 98% of those recorded in the past.

Narrow-barred Spanish mackerel – Effort trends

Effort trends are unknown for narrow-barred Spanish mackerel in the Indian Ocean.

Narrow-barred Spanish mackerel – Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some fisheries but they are considered highly incomplete. In most cases catch-and-effort data are only available for short periods. Reasonably long catch-and-effort data series (extending for more than 10 years) are only available for Sri Lanka gillnets (Fig. 4). The catches and effort recorded are, however, thought to be unrealistic due to the dramatic changes in CPUE recorded in 2003 and 2004.



Narrow-barred Spanish mackerel – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

• The size of narrow-barred Spanish mackerel taken by the Indian Ocean fisheries typically ranges between 30–140 cm depending on the type of gear used, season and location. The size of narrow-barred Spanish mackerel taken varies by location with 32–119 cm fish taken in the Eastern Peninsular Malaysia area, 17–39 cm fish taken in the East Malaysia area and 50–90 cm fish taken in the Gulf of Thailand. Similarly, Spanish mackerel caught in the Oman Sea are typically larger than those caught in the Persian Gulf.

- Trends in average weight can only be assessed for Sri Lankan gillnets but the amount of specimens measured has been very low in recent years. The length frequency data available from the mid-eighties to the early nineties was obtained with the support of the IPTP (Indo-Pacific Tuna Programme). Unfortunately, data collection did not continue after the IPTP activities came to an end.
- Catch-at-Size(Age) tables are not available for narrow-barred Spanish mackerel due to the paucity of size data available from most fleets and the uncertain status of the catches for this species.
- Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for narrow-barred Spanish mackerel in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. However, a preliminary estimation of stock indicators was attempted on the catch and effort datasets from the Sri Lankan gillnet fishery (described above). However, there is considerable uncertainty about the degree to which this and other indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

FABLE 4. Narrow-barred Sp	banish mackerel (Scomberomorus	commerson) stock status summary.
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Management Quantity	Aggregate Indian Ocean
2010 catch estimate	124,100 t
Mean catch from 2006–2010	116,400 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	_
B ₂₀₁₀ /B _{MSY} (80% CI)	_
SB_{2010}/SB_{MSY}	-
B ₂₀₁₀ /B ₀ (80% CI)	-
SB_{2010}/SB_0	-
$B_{2010}/B_{0, F=0}$	-
$SB_{2010}\!/SB_{0,F=0}$	_

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APPENDIX XVI Executive Summary: Bullet Tuna



Status of the Indian Ocean Bullet tuna Resource (Auxis rochei)

TABLE 1. Status of bullet tuna (Auxis rochei) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination	
			2010 ²
	Catch ³ 2010:	4,188 t	
	Average catch ^{3} 2006–2010:	2,884 t	
Indian Ocean	MSY:	unknown	UNCEDTAIN
	F_{2010}/F_{MSY} :	unknown	UNCERTAIN
	$SB_{2010/}SB_{MSY}$:	unknown	
	SB_{2010}/SB_0 :	unknown	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for bullet tuna in the Indian Ocean noting that there remains considerable uncertainty about stock structure and about the total catches.

Stock status. No quantitative stock assessment is currently available for bullet tuna in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern.

Outlook. The continued increase of annual catches for bullet tuna is likely to have further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Bullet tuna (*Auxis rochei*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Bullet tuna (*Auxis rochei*) is an oceanic species found in the equatorial areas of the major oceans. It is a highly migratory species with a strong schooling behaviour. Table 2 outlines some key life history parameters relevant for management.

Parameter	Description
Range and stock structure	Little is known on the biology of bullet tuna in the Indian Ocean. An oceanic species found in the equatorial areas of the major oceans. It is a highly migratory species with a strong schooling behaviour. Adults are principally caught in coastal waters and around islands that have oceanic salinities. No information is available on the stock structure in Indian Ocean. Bullet tuna feed on small fishes, particularly anchovies, crustaceans (commonly crab and stomatopod larvae) and squids. Cannibalism is common. Because of their high abundance, bullet tunas are considered to be an important prey for a range of species, especially the commercial tunas.
Longevity	Females n.a; Males n.a.
Maturity (50%)	Age: 2 years; females n.a. males n.a. Size: females and males ~35 cm FL.
Spawning season	It is a multiple spawner with fecundity ranging between 31,000 and 103,000 eggs per spawning (according to the size of the fish). Larval studies indicate that bullet tuna spawn throughout its range.
Size (length and weight)	Maximum: Females and males 50 cm FL; weight n.a.

TABLE 2. Biology of Indian Ocean bullet tuna (Auxis rochei).

n.a. = not available. SOURCES: Froese & Pauly (2009)

Bullet tuna – Catch trends

Bullet tuna is caught mainly using gillnet, handline, and trolling gears across the broader Indian Ocean area (Fig. 1). This species is also an important catch for artisanal purse seiners. The catch estimates for bullet tuna were derived from very small amounts of information and are therefore highly uncertain.

Estimated catches of bullet tuna reached around 1,000 t in the early 1990's, increasing markedly in the following years to reach a peak in 1998, at around 2,800 t. The catches decreased sharply in the following years and remained at values of around 2,000 t until the mid-2000's, to increase again sharply up to the 4,188 t recorded in 2010, the highest catches ever recorded for this species (Table 3). The average annual catch estimated for the period 2006 to 2010 is 2,884 t (Table 3). However, the high catches of bullet tuna recorded since 2006, compared to previous years, are thought to be unrealistic. The difference in catches may come from improved identification of specimens of frigate tuna and bullet tuna in recent years, leading to higher catches of bullet tuna reported to the IOTC. Bullet tuna and frigate tuna are very similar and mislabelling is thought to be overspread. In recent years, the countries attributed with the highest catches of bullet tuna are Sri Lanka and India (Fig. 2).



TABLE 3.Best scientific estimates of the catches of bullet tuna by type of fishery for the period 1950–2010 (in metric tonnes). Data as of October 2011.

Fishery	By decade (average)							By year (last ten years)								
	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purse seine	0	3	10	81	151	194	184	205	204	165	165	204	208	209	194	194
Gillnet	5	8	36	94	680	586	303	1179	463	918	540	1,121	1,447	1,084	1,351	2,866
Line	11	16	71	186	497	525	509	560	537	495	501	626	974	841	804	804
Other	61	103	221	443	533	520	464	367	339	355	270	242	268	335	323	323
Total	78	129	337	803	1,861	1,825	1,460	2,311	1,543	1,933	1,476	2,193	2,897	2,469	2,673	4,188

Bullet tuna – Uncertainty of catches

Retained catches are highly uncertain (Fig. 3), for all fisheries:

- Aggregation: Bullet tunas are usually not reported by species, being aggregated with frigate tunas or, less frequently, other small tuna species.
- Mislabelling: Bullet tunas are usually mislabelled as frigate tuna, their catches reported under the latter species.
- Under reporting: the catches of bullet tuna by industrial purse seiners are rarely, if ever, reported.

It is for the above reasons that the catches of bullet tuna in the IOTC database are thought to represent only a small fraction of the total catches of this species in the Indian Ocean. In particular, catches reported by India in recent years are unreliable and need to be verified.

- Discard levels are moderate for industrial purse seine fisheries. The EU recently reported discard levels of bullet tuna for its purse seine fleet, for 2003–2008, estimated using observer data.
- Changes to the catch series: The catch series of bullet tuna has changed substantially since estimates made in 2010, following reviews of catches for the coastal fisheries in Indonesia and, to a lesser extent India, involving marked changes in catches by species.



Bullet tuna – Effort trends

Effort trends are unknown for bullet tuna in the Indian Ocean.

Bullet tuna – Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some fisheries but they are considered highly incomplete and are usually considered to be of poor quality for the fisheries having reasonably long catch-and-effort data series, as it is the case with the gillnet fisheries of Sri Lanka (Fig. 4).



Bullet tuna – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

- The size of bullet tuna taken by the Indian Ocean fisheries typically ranges between 13–48 cm depending on the type of gear used, season and location.
- Trends in average weight cannot be assessed for most fisheries. Reasonable long series of length frequency data are only available for Sri Lankan gillnets and lines but the amount of specimens measured has been very low in recent years.
- Catch-at-Size(Age) tables are not available for bullet tuna due to the paucity of size data available from most fleets and the uncertain status of the catches for this species.
- Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for bullet tuna in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. However, a preliminary estimation of stock indicators was attempted on the catch and effort datasets from the Sri Lankan gillnet fleet (described above). However, there is considerable uncertainty about the degree to which this and other indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	4,200 t
Mean catch from 2006–2010	2,900 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	_
B ₂₀₁₀ /B _{MSY} (80% CI)	_
SB_{2010}/SB_{MSY}	_
B ₂₀₁₀ /B ₀ (80% CI)	_
SB_{2010}/SB_0	_
$B_{2010}/B_{0, F=0}$	_
$SB_{2010}/SB_{0, F=0}$	-

TABLE 4. Bullet tuna (Auxis rochei) stock status summary.

LITERATURE CITED

Froese R & Pauly DE, 2009.FishBase, version 02/2009, FishBase Consortium, <www.fishbase.org>.

APPENDIX XVII Executive Summary: Frigate Tuna





Status of the Indian Ocean Frigate tuna resource (Auxis thazard)

TABLE 1. Status of frigate tuna (Auxis thazard) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination	
			2010^{2}
	Catch ³ 2010:	71,023 t	
	Average catch ^{3} 2006–2010:	64,245 t	
Indian Ocean	MSY:	unknown	UNCEDTAIN
Indian Ocean	F_{2010}/F_{MSY} :	unknown	UNCERTAIN
	$SB_{2010/}SB_{MSY}$:	unknown	
	SB_{2010}/SB_0 :	unknown	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for frigate tuna in the Indian Ocean noting that there remains considerable uncertainty about stock structure and about the total catches.

Stock status. No quantitative stock assessment is currently available for frigate tuna in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern.

Outlook. The continued increase of annual catches for frigate tuna is likely to have further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Frigate tuna (*Auxis thazard*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and

cooperating non-contracting parties.

- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Frigate tuna (*Auxis thazard*) is a highly migratory species found in both coastal and oceanic waters. It is highly gregarious and often schools with other Scombrids. Table 2 outlines some key life history parameters relevant for management.

Parameter	Description
Range and stock structure	Little is known on the biology of frigate tuna in the Indian Ocean. Highly migratory species found in both coastal and oceanic waters. It is highly gregarious and often schools with other Scombrids. Frigate tuna feeds on small fish, squids and planktonic crustaceans (e.g. decapods and stomatopods). Because of their high abundance, frigate tuna are considered to be an important prey for a range of species, especially the commercial tunas. No information is available on the stock structure of frigate tuna in Indian Ocean.
Longevity	Females n.a; Males n.a.
Maturity (50%)	Age: n.a.; females n.a. males n.a. Size: females and males ~29–35 cm FL.
Spawning season	In the southern Indian Ocean, the spawning season extends from August to April whereas north of the equator it is from January to April. Fecundity ranges between 200,000 and 1.06 million eggs per spawning (depending on size).
Size (length and weight)	Maximum: Females and males 60 cm FL; weight n.a.

TABLE 2. Biology of Indian Ocean frigate tuna (Auxis thazard).

n.a. = not available. SOURCES: Froese & Pauly (2009)

Frigate tuna – Catch trends

Frigate tuna is taken from across the Indian Ocean area using drifting gillnets, pole-and-lines, handlines and trolling (Fig. 1). This species is also an important bycatch for industrial purse seiners and is the target of some ring net fisheries. The catch estimates for frigate tuna were derived from very small amounts of information and are therefore highly uncertain.

Estimated catches have increased steadily since the late 1970's, reaching around 15,000 t in the early 1980's and over 45,000 t by the mid-1990's. Catches increased markedly from 2006 and have been in excess of 65,000 t from 2008 (Fig. 2). The average annual catch estimated for the period 2006 to 2010 is 64,245 t with the highest catches recorded in 2010 of 71,023 t (Table 3).

In recent years, the countries attributed with the highest catches are Indonesia (60%), India (17%), I.R. Iran (8%) and the Maldives (6%).



TABLE 3.Best scientific estimates of the catches of frigate tuna by type of fishery for the period 1950–2010 (in metric tonnes). Data as of October 2011.

Fishery	By decade (average)							By year (last ten years)								
	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purse seine	0	12	895	7,260	16,206	26,427	26,124	24,302	25,149	29,707	27,186	31,173	33,847	41,434	40,262	40,294
Gillnet	265	406	1,268	3,713	9,958	9,978	9,949	11,840	11,816	10,830	10,156	12,051	15,390	17,758	15,864	21,291
Line	372	560	1,015	2,889	5,997	5,653	5,592	5,778	5,197	5,214	4,867	5,257	5,088	5,046	5,169	4,919
Other	1,721	2,477	3,088	3,514	6,319	6,360	6,081	5,808	5,926	5,186	6,074	4,576	5,017	5,715	6,555	4,519
Total	2,358	3,456	6,265	17,376	38,479	48,419	47,746	47,728	48,089	50,938	48,283	53,057	59,342	69,954	67,849	71,023

Frigate tuna – Uncertainty of catches

Retained catches are uncertain (Fig. 3), notably for the following fisheries:

- Artisanal fisheries of Indonesia: Indonesia did not report catches of frigate tuna by species or by gear for 1950–2004; catches of frigate tuna, bullet tuna and other species were reported aggregated for this period. The IOTC Secretariat used the catches reported since 2005 to break the aggregates for 1950–2004 by gear and species. The Indonesian catches estimated for frigate tuna represent around 60% of the total catches of this species in the Indian Ocean in recent years.
- Artisanal fisheries of India: Although India reports catches of frigate tuna they are not always reported by gear. The IOTC Secretariat has allocated the catches of frigate tuna by gear for years in which this information was not available. In recent years, the catches of frigate tuna in India have represented 17% of the total catches of this species in the Indian Ocean.
- Artisanal fisheries of Mozambique, Myanmar and Somalia: None of these countries have reported catches to the IOTC Secretariat, thus catch levels are unknown.
- Other artisanal fisheries: The catches of frigate tuna and bullet tuna are seldom reported by species and, when reported by species, they usually refer to both species (due to mislabelling, with all catches assigned to the frigate tuna).
- Industrial fisheries: The catches of frigate tuna recorded for industrial purse seiners are thought to be a fraction of those retained on board. Due to this species being a bycatch, its catches are seldom recorded in the logbooks, nor can they be monitored in port. The EU recently reported catch levels of frigate tuna for its purse seine fleet, for 2003–2007, estimated using observer data.
- Discard levels are moderate for industrial purse seine fisheries. The EU recently reported discard levels of frigate tuna for its purse seine fleet, for 2003–2007, estimated using observer data.
- Changes to the catch series: The catch series of frigate tuna has changed substantially from those estimated in 2010, following reviews of catches for the coastal fisheries in Indonesia and, to a lesser extent India, involving marked changes in catches by species. Overall, the new catches estimated for Indonesian fisheries are three times higher than those recorded in the past.


Frigate tuna – Effort trends

Effort trends are unknown for frigate tuna in the Indian Ocean.

Frigate tuna – Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Catch-and-effort series are available from some fisheries but they are considered highly incomplete. In most cases catch-and-effort data are only available for short periods. Reasonably long catch-and-effort series (extending for more than 10 years) are only available for Maldives baitboats and troll lines (Fig. 4) and Sri Lanka gillnets. The catches and effort recorded for Sri Lankan gillnets are, however, thought to be inaccurate due to the dramatic changes in CPUE recorded between consecutive years.



Frigate tuna – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

• The size of frigate tuna taken by Indian Ocean fisheries typically ranges between 20–50 cm depending on the type of gear used, season and location. The fisheries operating in the Andaman Sea (coastal purse seines and troll lines) tend to catch frigate tuna of small to medium size (15–40cm) while the gillnet, baitboat and other fisheries operating in the Indian Ocean catch usually larger specimens (25–50cm). Length frequency data for the bullet tuna is only available for some Sri Lanka fisheries and periods. These fisheries catch bullet tuna ranging between 15–35 cm.

- Trends in average weight can only be assessed for Sri Lankan gillnets and Maldivian pole-and-lines but the amount of specimens measured has been very low in recent years. The length frequency data available from the mid-eighties to the early nineties was obtained with the support of the IPTP (Indo-Pacific Tuna Programme). Unfortunately, data collection did not continue in most countries after the end of the IPTP activities.
- Catch-at-Size(Age) tables are not available for the frigate tuna due to the paucity of size data available from most fleets and the uncertain status of the catches for this species.
- Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for frigate tuna in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. However, a preliminary estimation of stock indicators was attempted on the catch and effort datasets from the Maldives baitboat and line fisheries (described above). However, there is considerable uncertainty about the degree to which this and other indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	71,000 t
Mean catch from 2006–2010	64,200 t
MSY (80% CI)	unknown
Data period used in assessment	_
F ₂₀₁₀ /F _{MSY} (80% CI)	-
B ₂₀₁₀ /B _{MSY} (80% CI)	_
SB_{2010}/SB_{MSY}	_
B ₂₀₁₀ /B ₀ (80% CI)	_
SB ₂₀₁₀ /SB ₀	-
$B_{2010} / B_{0, F=0}$	-
SB ₂₀₁₀ /SB _{0, F=0}	_

TABLE 4. Frigate t	una (Auxis thazard)) stock status summary.
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LITERATURE CITED

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APPENDIX XVIII Executive Summary: Kawakawa





Status of the Indian Ocean Kawakawa tuna Resource (*Euthynnus affinis*)

TABLE 1. Status of kawakawa (*Euthynnus affinis*) in the Indian Ocean.

Area ¹	Indicators – 2	2011 stock status determination	
			2010^{2}
Indian Occor	Catch ³ 2010: Average catch ³ 2006–2010: MSY:	128,871 t 122,895 t unknown	
Indian Ocean	$\begin{array}{l} F_{2010}/F_{MSY};\\ SB_{2010}/SB_{MSY};\\ SB_{2010}/SB_{0}; \end{array}$	unknown unknown unknown	UNCERTAIN

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for kawakawa in the Indian Ocean noting that there remains considerable uncertainty about stock structure and about the total catches.

Stock status. No quantitative stock assessment is currently available for kawakawa in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern.

Outlook. The continued increase of annual catches for kawakawa is likely to have further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Kawakawa (*Euthynnus affinis*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Kawakawa (*Euthynnus affinis*) lives in open waters close to the shoreline and prefers waters temperatures ranging from 18° to 29°C. Table 2 outlines some key life history parameters relevant for management.

TABLE 2.	Biology of Indian	Ocean kawakawa	(Euthynnus affinis).
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Parameter	Description
Range and stock structure	Lives in open waters close to the shoreline and prefers waters temperatures ranging from 18° to 29°C. Kawakawa form schools by size with other species sometimes containing over 5,000 individuals. Kawakawa are often found with yellowfin, skipjack and frigate tunas. Kawakawa are typically found in surface waters, however, they may range to depths of over 400 m (they have been reported under a fish-aggregating device employed in 400 m), possibly to feed. Kawakawa larvae are patchy but widely distributed and can generally be found close to land masses. Large changes in apparent abundance are linked to changes in ocean conditions. This species is a highly opportunistic predator feeding on small fishes, especially on clupeoids and atherinids; also squid, crustaceans and zooplankton. No information is available on stock structure of kawakawa in Indian Ocean.
Longevity	n.a.
Maturity (50%)	Age: n.a; females n.a. males n.a. Size: females and males ~45–50 cm FL.
Spawning season	Spawning occurs mostly during summer. A 1.4 kg female (48 cm FL) may spawn approximately 0.21 million eggs per batch (corresponding to about 0.79 million eggs per season).
Size (length and weight)	Maximum: Females and males 100 cm FL; weight 14 kgs. Juveniles grow rapidly reaching lengths between 50–65 cm by 3 years of age.

n.a. = not available. SOURCES: Froese & Pauly (2009); Taghavi et al. (2010).

Kawakawa – Catch trends

Kawakawa is caught mainly by coastal purse seines, gillnets and, to a lesser extent, handlines and trolling (Fig. 1) and may be also an important by-catch of the industrial purse seiners. The catch estimates for kawakawa were derived from very small amounts of information and are therefore highly uncertain.

Annual estimates of catches for kawakawa increased markedly from around 10,000 t in the mid-1970's to reach the 50,000 t mark in the mid-1980's and 130,634 t in 2009, the highest catches ever recorded for this species. Since 2006, catches have been over 100,000 t. The average annual catch estimated for the period 2006 to 2010 is 122,895 t (Table 3). Catches in 2010 were around 128,871 t. The majority of catches of kawakawa are taken in the East Indian Ocean, representing around 60% of the total catches in recent years. In recent years, the countries attributed with the highest catches are Indonesia (35%), India (19%), Iran (13%), and Malaysia (10%) (Fig. 2).



TABLE 3.Best scientific estimates of the catches of kawakawa by type of fishery for the period 1950–2010 (in metric tonnes). Data as of October 2011.

Fishowy			By decad	e (average)						By year (la	ast ten year	s)			
ristiery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purse seine	100	385	1,824	10,526	31,909	47,382	46,054	46,729	49,018	53,443	52,131	60,627	63,373	70,283	72,941	73,248
Gillnet	1,907	3,408	8,130	16,799	26,457	32,409	30,710	34,775	34,578	29,332	30,175	34,358	38,786	43,225	40,678	38,422
Line	1,154	1,628	3,761	8,441	13,115	11,029	10,825	11,334	10,060	11,318	11,507	11,476	12,188	14,301	14,555	13,914
Other	0	60	279	737	1,581	1,424	1,797	1,851	2,006	1,897	2,188	1,546	2,539	2,271	2,461	3,286
Total	3,161	5,481	13,995	36,502	73,062	92,245	89,385	94,690	95,662	95,990	96,001	108,006	116,885	130,078	130,634	128,871

Kawakawa – Uncertainty of catches

Retained catches are uncertain (Fig. 3), notably for the following fisheries:

- Artisanal fisheries of Indonesia: Indonesia did not report catches of kawakawa by species or by gear for 1950–2004; catches of kawakawa, longtail tuna and, to a lesser extent, other species were reported aggregated for this period. The IOTC Secretariat used the catches reported since 2005 to break the aggregates for 1950–2004 by gear and species. The catches of kawakawa estimated for this component represent around 35% of the total catches of this species in recent years.
- Artisanal fisheries of India: Although India reports catches of kawakawa they are not always reported by gear. The IOTC Secretariat has allocated the catches of kawakawa by gear for years in which this information was not available. The catches of kawakawa have represented 19% of the total catches of this species in the Indian Ocean in recent years.
- Artisanal fisheries of Mozambique, Myanmar and Somalia: None of these countries have ever reported catches to the IOTC Secretariat. Catch levels are unknown.
- Other artisanal fisheries: The catches of kawakawa are usually not reported by species, being combined with catches of other small tuna species like skipjack tuna and frigate tuna (coastal purse seiners of Malaysia and Thailand).
- Industrial fisheries: The catches of kawakawa recorded for industrial purse seiners are thought to be a fraction of those retained on board. Due to this species being a bycatch, its catches are seldom recorded in the logbooks, nor are they monitored in port. The EU recently reported catch levels of frigate tuna for its purse seine fleet, for 2003–2007, estimated using observer data.
- Discard levels are moderate for industrial purse seine fisheries. The EU recently reported discard levels of kawakawa for its purse seine fleet, for 2003–2007, estimated using observer data.
- Changes to the catch series: The catch series of kawakawa has changed substantially since those estimated in 2010, following reviews of catches for the coastal fisheries in Indonesia and, to a lesser extent India, involving marked changes in catches by species. Overall, the new catches estimated for Indonesian fisheries represent the 60% of those recorded in the past.



Kawakawa – Effort trends

Effort trends are unknown for kawakawa in the Indian Ocean.

Kawakawa – Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some fisheries but they are considered incomplete. In most cases catch-and-effort data are only available for short periods. Reasonably long catch-and-effort data series (extending for more than 10 years) are only available for Maldives baitboats and troll lines and Sri Lanka gillnets (Fig. 4). The catch-and-effort data recorded for Sri Lankan gillnets are, however, thought to be inaccurate due to the dramatic changes in CPUE recorded between consecutive years.



Kawakawa – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

- Trends in average weight can only be assessed for Sri Lankan gillnets but the amount of specimens measured has been very low in recent years. The length frequency data available from the mid-eighties to the early nineties was obtained with the support of the IPTP (Indo-Pacific Tuna Programme). Unfortunately, data collection did not continue after the end of the IPTP activities.
- The size of kawakawa taken by the Indian Ocean fisheries typically ranges between 20–60 cm depending on the type of gear used, season and location. The coastal purse seine fisheries operating in the Andaman Sea tend to catch kawakawa of small size (15–30 cm) while the gillnet, baitboat and other fisheries operating in the Indian Ocean catch usually larger specimens (25–55 cm).
- Catch-at-Size(Age) tables are not available for kawakawa due to the paucity of size data available from most fleets and the uncertain status of the catches for this species.
- Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for kawakawa in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. However, a preliminary estimation of stock indicators was attempted on the catch and effort datasets from the Maldives baitboat and troll line fisheries (described above). However, there is considerable uncertainty about the degree to which this and other indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	128,900 t
Mean catch from 2006–2010	122,900 t
MSY (80% CI)	unknown
Data period used in assessment	_
F ₂₀₁₀ /F _{MSY} (80% CI)	_
B ₂₀₁₀ /B _{MSY} (80% CI)	_
SB_{2010}/SB_{MSY}	_
B ₂₀₁₀ /B ₀ (80% CI)	_
SB_{2010}/SB_0	_
$B_{2010}/B_{0, F=0}$	_
$SB_{2010}/SB_{0, F=0}$	_

TABLE 4. Kawakawa	(Euthynnus affi	nis) stock status summary
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APPENDIX XIX Executive Summary: Indo-Pacific king mackerel



Status of the Indian Ocean Indo-Pacific king mackerel Resource (Scomberomorus guttatus)

TABLE 1. Status of Indo-Pacific king mackerel (Scomberomorus guttatus) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination	
			2010^2
Indian Ocean	Catch ³ 2010:	37,257 t	
	Average catch ³ 2006–2010:	37,980 t	
	MSY:	unknown	UNCEDTAIN
	F_{2010}/F_{MSY} :	unknown	UNCERTAIN
	$SB_{2010/}SB_{MSY}$:	unknown	
	SB_{2010}/SB_0 :	unknown	

¹Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

³Nominal catches represent those estimated by the IOTC Secretariat. If these data are not reported by CPCs, the IOTC Secretariat estimates total catch from a range of sources including: partial catch and effort data; data in the FAO FishStat database; catches estimated by the IOTC from data collected through port sampling; data published through web pages or other means; data reported by other parties on the activity of vessels; and data collected through sampling at the landing place or at sea by scientific observers.

Colour key	Stock overfished(SB _{vear} /SB _{MSY} <1)	Stock not overfished (SB _{vear} /SB _{MSY} \geq 1)
Stock subject to overfishing($F_{year}/F_{MSY} > 1$)		
Stock not subject to overfishing $(F_{year}/F_{MSY} \le 1)$		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for Indo-Pacific king mackerel in the Indian Ocean noting that there remains considerable uncertainty about stock structure and about the total catches.

Stock status. No quantitative stock assessment is currently available for Indo-Pacific king mackerel in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern.

Outlook. The continued increase of annual catches for Indo-Pacific king mackerel is likely to have further increased the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource. Research emphasis on improving indicators and exploration of stock structure and stock assessment approaches for data poor fisheries are warranted.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Neritic Tunas and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Indo-Pacific king mackerel (*Scomberomorus guttatus*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and

cooperating non-contracting parties.

- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

The Indo-Pacific king mackerel (*Scomberomorus guttatus*) is a migratory species that forms small schools and inhabits coastal waters, sometimes entering estuarine areas. Table 2 outlines some key life history parameters relevant for management.

Parameter	Description
Range and stock structure	A migratory species that forms small schools and inhabits coastal waters, sometimes entering estuarine areas. It is found in waters from the Persian Gulf, India and Sri Lanka, Southeast Asia, as far north as the Sea of Japan. The Indo-Pacific king mackerel feeds mainly on small schooling fishes (e.g. sardines and anchovies), squids and crustaceans. No information is available on the stock structure of Indo-Pacific king mackerel stock structure in Indian Ocean.
Longevity	n.a.
Maturity (50%)	Age: 1–2 years; females n.a. males n.a. Size: females and males ~40–52 cm FL.
Spawning season	Based on the occurrence of ripe females and the size of maturing eggs, spawning probably occurs from April to July in southern India and in May in Thailand waters. Fecundity increases with age in the Indian waters, ranging from around 400,000 eggs at age 2 years to over one million eggs at age 4 years.
Size (length and weight)	Maximum: Females and males 76 cm FL; weight n.a.

TABLE 2. Biology of Indian Ocean Indo-Pacific king mackerel (Scomberomorus guttatus).

n.a. = not available. SOURCES: Froese & Pauly (2009)

Indo-Pacific king mackerel – Catch trends

Indo-Pacific king mackerel is mostly caught by gillnet fisheries in the Indian Ocean but significant numbers are also caught trolling (Fig. 1). The catch estimates for Indo-Pacific King mackerel were derived from very small amounts of information and are therefore highly uncertain.

Estimated catches have increased steadily since the mid 1960's, reaching around 10,000 t in the early 1970's and over 25,000 t since the mid-1990's. Catches increased steadily since then until 1995, the year in which the highest catches for this species were recorded, at around 43,000 t. The catches of Indo-Pacific king mackerel between 1997 and 2005 were more or less stable, estimated at around 30,000 t. Current catches have been higher, close to 40,000 t. The average annual catch estimated for the period 2006 to 2010 is 37,980 t (Table 3).

In recent years, the countries attributed with the highest catches are India (47%) and Indonesia (28%) and, to a lesser extent, Iran and Thailand (15%) (Fig. 2).



TABLE 3.Best scientific estimates of the catches of Indo-Pacific king mackerel by type of fishery for the period 1950–2010 (in metric tonnes). Data as of October 2011.

Fishowy	By decade (average)							By year (last ten years)								
Fishery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purse seine	0	0	48	240	484	276	189	283	349	220	226	293	260	266	265	262
Gillnet	2,310	3,542	7,325	12,731	19,655	19,035	17,343	19,955	19,747	19,055	16,922	21,524	21,543	22,675	203,19	20,996
Line	453	581	1,326	2,014	2,473	1,915	2,467	3,132	3,726	4,532	4,805	5,995	6,570	7,756	7,423	7,441
Other	1,193	1,657	3,641	5,324	7,994	8,236	7,981	8,915	8,772	8,223	8,807	10,554	9,809	9,108	8,280	8,559
Total	3,957	5,780	12,340	20,309	30,606	29,461	27,980	32,285	32,593	32,029	30,761	38,367	38,182	39,805	36,288	37,257

Indo-Pacific king mackerel – Uncertainty of catches

Retained catches are highly uncertain (Fig. 3) for all fisheries due to:

- Aggregation: Indo-Pacific King mackerel is usually not reported by species, being aggregated with narrowbarred Spanish mackerels or, less frequently, other small tuna species.
- Mislabelling: Indo-Pacific King mackerels are usually mislabelled as narrow-barred Spanish mackerel, their catches reported under the latter species.
- Under reporting: the catches of Indo-Pacific King mackerel may be not reported for some fisheries catching them as a bycatch.
- It is for the above reasons that the catches of Indo-Pacific King mackerel in the IOTC database are thought to represent only a small fraction of the total catches of this species in the Indian Ocean.
- Discard levels are believed to be low although they are unknown for most fisheries.
- Changes to the catch series: There have not been significant changes to the estimated catches of Indo-Pacific King mackerel since 2010.



Catches below the zero-line (Type B) refer to fleets that do not report catch data to the IOTC (estimated by the IOTC Secretariat), do not report catch data by gear and/or species (broken by gear and species by the IOTC Secretariat) or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

Indo-Pacific king mackerel – Effort trends

Effort trends are unknown for Indo-Pacific King mackerel in the Indian Ocean.

Indo-Pacific king mackerel - Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some fisheries but they are considered highly incomplete. In most cases catch-and-effort data are only available for short periods of time. This makes it impossible to derive any meaningful CPUE from the existing data.

Indo-Pacific king mackerel – Fish size or age trends (e.g. by length, weight, sex and/or maturity)

- Trends in average weight cannot be assessed for most fisheries. Samples of king mackerel are only available for the coastal purse seiners of Thailand and gillnets of Sri Lanka but they refer to very short periods and the numbers sampled are very small.
- Catch-at-Size(Age) tables are not available for the Indo-Pacific King mackerel due to the paucity of size data available from most fleets and the uncertain status of the catches for this species.
- Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for Indo-Pacific king mackerel in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Neritic Tunas. Further work must be undertaken to derive stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

TABLE 4. Indo-Paci	fic king mackerel (Scomberomor	us guttatus) s	tock status summary.
	M (O (ii)		

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	37,300 t
Mean catch from 2006–2010	38,000 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	-
B ₂₀₁₀ /B _{MSY} (80% CI)	-
SB_{2010}/SB_{MSY}	-
$B_{2010}/B_0 (80\% \text{ CI})$	-
SB_{2010}/SB_0	-
$B_{2010}/B_{0, F=0}$	-
SB ₂₀₁₀ /SB _{0, F=0}	_

LITERATURE CITED

Froese R & Pauly DE, 2009. FishBase, version 02/2009, FishBase Consortium, www.fishbase.org.

APPENDIX XX Executive Summary: Swordfish



Status of the Indian Ocean Swordfish Resource (Xiphias gladius)

TABLE 1. Status of swordfish (*Xiphias gladius*) in the Indian Ocean.

Area ¹		Indicators – 20	Indicators – 2011 assessment						
		Catch 2010:	18,956 t						
	Average	catch 2006-2010:	23,799 t						
Indian Occor	_	MSY (4 models):	29,900 t-34,200) t					
Indian Ocean	F ₂₀₀	$_{9/}F_{MSY}$ (4 models):	0.50-0.63						
	SB ₂₀₀₉ /S	SB _{MSY} (4 models):	1.07-1.59						
	SB_{20}	$_{09}/SB_0$ (4 models):	0.30-0.53						
¹ Boundaries for the India	n Ocean stock as	ssessment are defined	as the IOTC area of	of competence.					
² The stock status refers to	the most recent	t years' data used for	the assessment.						
Colour key		Stock overfished(S	$SB_{vear}/SB_{MSY} < 1$)	Stock not over	rfished (SB _{year} /SB _{MSY} > 1				
Stock subject to overfishing(Fyea	$r/F_{\rm MSY} > 1)$								

Stock not subject to overfishing ($F_{year}/F_{MSY} \le 1$)	
INDIAN OCEAN STOCK – MANAGEMENT ADV	ICE

Stock status. All models suggest that the stock is above, but close to a biomass level that would produce MSY and current catches are below the MSY level. MSY-based reference points were not exceeded for the Indian Ocean population as a whole ($F_{2009}/F_{MSY} < 1$; $SB_{2009}/SB_{MSY} > 1$). Spawning stock biomass in 2009 was estimated to be 30–53% (from Table 1; Fig. 1) of the unfished levels.

Outlook. The decrease in longline catch and effort in recent years has lowered the pressure on the Indian Ocean stock as a whole, indicating that current fishing mortality would not reduce the population to an overfished state. There is a low risk of exceeding MSY-based reference points by 2019 if catches reduce further or are maintained at current levels until 2019 (<11% risk that $B_{2019} < B_{MSY}$, and <9% risk that $F_{2019} > F_{MSY}$) (Table 2).

The SC **RECOMMENDED** that:

- 1) The Maximum Sustainable Yield estimate for the whole Indian Ocean is 29,900–34,200 t (range of best point estimates from Table 2) and annual catches of swordfish should not exceed this estimate.
- 2) if the recent declines in effort continue, and catch remains substantially below the estimated MSY of 30,000– 34,000 t, then management measures are not required which would pre-empt current resolutions and planned management strategy evaluation. However, continued monitoring and improvement in data collection, reporting and analysis is required to reduce the uncertainty in assessments.
- 3) The Kobe strategy matrix illustrates the levels of risk associated with varying catch levels over time and could be used to inform management actions.
- 4) Advice specific to the southwest region is provided below, as requested by the Commission.

0011 4

60% 0-4 0-1	80% 0-8	100% 0–11	120%	140%
0-4 0-1	0-8	0-11	0 10	
0–1	0_2		2-12	4–16
	0-2	0–9	0–16	6–27
0–4	0–8	0-11	0–13	6–26
0-1	0–2	0–9	0–23	7–31
6 6 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	99-09 07-05	© 9-0 92-0 92		
	0-1			

TABLE 2. Aggregated Indian Ocean assessment - Kobe 2 Strategy Matrix, indicating a range of probabilities across four assessment approaches. Probability (percentage) of violating the MSY-based reference points for five constant catch projections (2009 catch level, \pm 20% and \pm 40%) projected for 3 and 10 years.

Fig. 1. ASPIC Aggregated Indian Ocean assessment Kobe plot (95% Confidence surfaces shown around 2009 estimate). Blue circles indicate the historical trajectory.

TABLE 3. Status	of swordfish	(Xiphias	gladius)	in the	southwest	Indian	Ocean
		V	0				

	Area ¹		Indicators – 20	Indicators – 2011 assessment						
			Catch 2010:	6,513 t			1			
		Average	catch 2006-2010:	7,112 t			ľ			
	Southwest Indian Occor		MSY (3 models):	7,100 t–9,400 t			ľ			
	Southwest Indian Ocean	F ₂₀₀	_{9/} F _{MSY} (3 models):	0.64-1.19			1			
		SB _{2009/}	SB _{MSY} (3 models):	0.73-1.44			ľ			
		SB_{20}	$_{09}/SB_0$ (3 models):	0.16-0.58			1			
	¹ Boundaries for southwes	t Indian Ocean	stock assessment are	defined in IOTC-20)11-WPB09-R.	<u> </u>				
	² The stock status refers to	the most recent	t years' data used for	the assessment.						
	Colour key		Stock overfished ($SB_{year}/SB_{MSY} < 1$)	Stock not over	rfished (SB _{vear} /SB _{MSY} \geq	1)			
	Stock subject to overfishing (Fye	$ar/F_{MSY} > 1)$								
St	cock not subject to overfishing (F	$V_{\text{year}}/F_{\text{MSY}} \le 1$								
		-								

SOUTHWEST INDIAN OCEAN - MANAGEMENT ADVICE

Stock status. Most of the evidence provided to the WPB indicated that the resource in the southwest Indian Ocean has been overfished in the past decade and biomass remains below the level that would produce MSY (B_{MSY}). Recent declines in catch and effort have brought fishing mortality rates to levels below F_{MSY} (Table 3).

Outlook. The decrease in catch and effort over the last few years in the southwest region has reduced pressure on this resource. There is a low risk of exceeding MSY-based reference points by 2019 if catches reduce further or are maintained at current levels (<25% risk that $B_{2019} < B_{MSY}$, and <8% risk that $F2019 > F_{MSY}$). There is a risk of reversing the rebuilding trend if there is any increase in catch in this region (Table 4).

The SC **RECOMMENDED** that:

- 1) The Maximum Sustainable Yield estimate for the southwest Indian Ocean is 7,100–9,400 t (range of best point estimates from Table 3).
- Catches in the southwest Indian Ocean should be maintained at levels at or below those observed in 2009 (6,678t), until there is clear evidence of recovery and biomass exceeds B_{MSY}.
- 3) The Kobe strategy matrix illustrates the levels of risk associated with varying catch levels over time and could be used to inform management actions.

TABLE 4. Southwest Indian Ocean assessment - Kobe 2 Strategy Matrix, indicating a range of probabilities across three assessment approaches. Probability (percentage) of violating the MSY-based reference points for five constant catch projections (2009 catch level, \pm 20% and \pm 40%) projected for 3 and 10 years.

Reference point and projection timeframe	Altern and pro	ative catc obability (h projection (%) of viola	ns (relative iting refere	to 2009) nce point
	60%	80%	100%	120%	140%
$B_{2012} < B_{MSY}$	0-15	0-20	0-25	0-30	12-32
$F_{2012} > F_{MSY}$	0-1	0-5	0-8	0-18	13-34
$B_{2019} < B_{MSY}$	0-15	0-20	0-25	0-32	18-34
$F_{2019} > F_{MSY}$	0-1	0-5	0-8	0-18	19-42

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Billfish and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Swordfish in the Indian Ocean are currently subject to a single conservation and management measure adopted by the Commission: Resolution 09-02 *On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.* This resolution applies a freezing of fishing capacity for fleets targeting swordfish in the Indian Ocean to levels applied in 2007. The resolution limits vessels access to those that were active (*effective presence*) or under construction during 2007, and were over 24 metres overall length, or under 24 meters if they fished outside the EEZs. At the same time the measure permits CPCs to vary the number of vessels targeting swordfish, as long as any variation is consistent with the national fleet development plan submitted to the IOTC, and does not increase effective fishing effort. This resolution is effective for 2010 and 2011.

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/07 concerning a record of licensed foreign vessels fishing for tunas and swordfish in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 10/13 On the implementation of a ban on discards of skipjack tuna, yellowfin tuna, bigeye tuna, and non targeted species caught by purse seiners.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Swordfish (*Xiphias gladius*) is a large oceanic apex predator that inhabits all the world's oceans. Throughout the Indian Ocean, swordfish are primarily taken by longline fisheries, and commercial harvest was first recorded by the Japanese in the early 1950's as a bycatch/byproduct of their tuna longline fisheries. Swordfish life history characteristics, including a relatively late maturity, long life and sexual dimorphism, make the species vulnerable to over exploitation. Table 5 outlines some of the key life history traits of swordfish specific to the Indian Ocean.

Parameter	Description
Range and stock structure	Northern coastal state waters to 50°S. Juvenile swordfish are commonly found in tropical and subtropical waters and migrate to higher latitudes as they mature. Large, solitary adult swordfish are most abundant at 15–35°S. Males are more common in tropical and subtropical waters. By contrast with tunas, swordfish is not a gregarious species, although densities increase in areas of oceanic fronts and seamounts. Extensive diel vertical migrations, from surface waters during the night to depths of 1000 m during the day, in association with movements of the deep scattering layer and cephalopods, their preferred prey. For the purposes of stock assessments, one pan-ocean stock has been assumed. However, spatial heterogeneity in stock indicators (catch-per-unit-effort trends) indicates the potential for localised depletion of swordfish in the Indian Ocean.
Longevity	30+ years
Maturity (50%)	Age: females 6–7 years; males 1–3 years Size: females ~170 cm lower-jaw FL; males ~120 cm lower-jaw FL
Spawning season	Highly fecund batch spawner. May spawn as frequently as once every three days over a period of several months in spring. Spawning occurs from October to April in the vicinity of Reunion Island.
Size (length and weight)	Maximum: 455 cm lower-jaw FL; 550+ kg total weight in the Indian Ocean. Sexual dimorphism in size, growth rates and size and age at maturity—females reach larger sizes, grow faster and mature later than males. Most swordfish larger than 200 kg are female. Recruitment into the fishery: varies by fishing method; ~60 cm lower-jaw FL for artisanal fleets and methods. By one year of age, a swordfish may reach 90 cm lower-jaw FL (~15 kg). The average size of swordfish taken in Indian Ocean longline fisheries is between 40 kg and 80 kg (depending on latitude).

TABLE 5. Biology of Indian Ocean swordfish (*Xiphias gladius*).

SOURCES: Froese & Pauly (2009); Poisson & Fauvel (2009)

Catch trends

Swordfish are caught mainly using drifting longlines (95%) and gillnets (5%) (Fig. 2). Between 1950 and 1980, catches of swordfish in the Indian Ocean slowly increased in tandem with the level of coastal state and distant water fishing nation longline effort targeting tunas (Figs. 2 and 3). Swordfish were mainly a bycatch of industrial longline fisheries before the early 1990's with catches slightly increasing from 1950 to 1990 proportionally to the increase in the catches of target species (tropical and temperate tunas).

Since 2004, annual catches have declined steadily (Fig. 2), largely due to the continued decline in the number of active Taiwan, China longliners in the Indian Ocean. Annual catches since 2004 have been dominated by the Taiwan, China and EU fleets (Spain, UK, France and Portugal), with the fishery extending eastward due to the effects of piracy actions (Fig. 4).





Fig. 4a–b. Time-area catches (total combined in tonnes) of swordfish estimated for 2009 and 2010, by year and type of gear. Swordfish longliners (**ELL**), Other longliners (**LL**), Other fleets (**OT**). Time-area catches are not available for non-longline fleets (**OT**, blue); catches for those were fully assigned to the one or more 5x5 squares lying within the EEZs of the countries concerned.

TABLE 6. Best scientific estimates of the catches of swordfish by type of fishery for the period 1950–2009 (in metric tons). Data as of October 2011.

Fishery	By decade (average)							By year (last ten years)									
r isner y	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
ELL				9	1,842	10,439	7,970	8,927	10,727	13,414	15,645	13,629	12,008	8,579	8,423	8,113	
LL	282	1,426	2,135	4,337	21,580	17,475	19,600	20,453	23,032	21,206	14,630	14,350	13,443	11,064	11,825	8,373	
ОТ	40	41	53	317	1,094	2,121	2,381	2,514	2,646	2,531	1,461	2,305	1,600	1,515	1,200	2,470	
Total	322	1,467	2,188	4,664	24,516	30,035	29,950	31,893	36,405	37,152	31,735	30,285	27,051	21,157	21,448	18,956	

Fisheries: Swordfish longline (ELL); Other longline (LL); Other fisheries (OT)

TABLE 7. Best scientific estimates of the catches of swordfish by fishing area for the period 1950–2009 (in metric tons). Data as of October 2011.

	By decade (average)						By year (last ten years)									
Агеа	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
NW	117	551	650	1,469	7,245	9,820	7,969	12,281	15,108	12,276	10,865	10,355	8,719	6,625	4,998	2,204
SW	14	256	405	620	8,599	7,591	8,887	7,359	3,969	6,293	9,680	8,833	7,349	6,188	6,678	6,513
NE	122	405	725	2,017	5,787	6,352	6,379	5,783	8,166	7,775	4,680	6,138	4,973	4,753	6,661	7,393
SE	27	167	271	342	2,518	5,644	6,051	5,737	8,297	9,729	5,753	4,337	5,258	3,507	3,014	2,788
OT	41	88	137	215	368	628	664	734	864	1,079	757	621	752	84	97	58
Total	322	1,467	2,188	4,664	24,516	30,035	29,950	31,893	36,405	37,152	31,735	30,285	27,051	21,157	21,448	18,956

Areas: Northwest Indian Ocean (NW); Southwest Indian Ocean (SW); Northeast Indian Ocean (NE); Southeast Indian Ocean (SE); Southern Indian Ocean (OT)

Uncertainty of time-area catches

Retained catches are fairly well known (Fig. 5); however catches are uncertain for:

- Drifting gillnet fisheries of Iran and Pakistan: To date, Iran has not reported catches of swordfish for its gillnet fishery. Although Pakistan has reported catches of swordfish they are considered to be too low for a driftnet fishery.
- Longline fishery of Indonesia: The catches of swordfish for the fresh tuna longline fishery of Indonesia may have been underestimated in recent years due to insufficient sampling coverage. Although the new catches estimated by the Secretariat are thought to be more accurate, swordfish catches remain uncertain, especially in recent years.
- Longline fishery of India: India has reported very incomplete catches and catch-and-effort data for its longline fishery. Although the new catches estimated by the IOTC Secretariat are thought to be more accurate, catches of swordfish remain uncertain.
- Longline fleets from non-reporting countries (NEI): The IOTC Secretariat had to estimate catches of swordfish for a fleet of longliners targeting tunas or swordfish and operating under flags of various non-reporting countries. The catches estimated since 2006 are, however, low.

- Changes to the catch series: There have not been significant changes to the catch series of swordfish since the WPB in 2010. Changes since the last WPB refer to revisions of historic data series for the artisanal fisheries of Indonesia and India. These changes, however, did not lead to significant changes in the total catch estimates.
- Discards are believed to be low although they are unknown for most industrial fisheries, mainly longliners. Discards of swordfish may also occur in the driftnet fishery of Iran, as this species has no commercial value in this country.



Catches below the zero-line (**Type B**) refer to fleets that do not report catch-and-effort data to the IOTC, do not report catch-and-effort data by gear and/or species or any of the other reasons provided in the document. Catches over the zero-line (**Type A**) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 6, and total effort from purse seine vessels flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 7.



and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan,China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

- FTLL (red): fresh-tuna longliners (China, Taiwan, China and other fleets)
- OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)



Fig. 7. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

Catch-per-unit-effort (CPUE) trends

The following CPUE series were used in the stock assessment models for 2011 (Figs. 8 and 9), while the relative weighting of the different CPUE series would be left to the individual analyst to determine and justify to participants:

- Japan data (1980–2009): Series 3.2 from document IOTC–2011–WPB09–14, which includes fixed latitude and longitude effects, plus environmental effects.
- Taiwan, China data (1995–2009): Model 10 from document IOTC–2011–WPB09–23, which includes fixed latitude and longitude effects, plus environmental effects.
- EU,Spain data (2001–2009): Series 5 from document IOTC–2011–WPB09–23, calculated for the southwest area only (includes sub-region factors and species ratio factors) area and run 1 for the assessment of whole Indian Ocean.
- EU,La Reunion data (1994–2000): Same series as last year (IOTC–2010–WPB–03).



respective means from 1995–2009.



to their respective means (for different overlapping time periods).

Fish size or age trends (e.g. by length, weight, sex and/or maturity)

In general, the amount of catch for which size data for the species are available before 2005 is still very low and the number of specimens measured per stratum has been decreasing in recent years.

- Average fish weight can be assessed for several industrial fisheries although they are incomplete or poor quality for most fisheries before the early-80s and in recent years (low sampling coverage and time-area coverage of longliners from Japan). The average weights of swordfish are variable but show no clear trend (Fig. 10). It is considered encouraging that there are no clear signals of declines in the size-based indices, but these indices should be carefully monitored, as females mature at a relatively large size, therefore, a reduction in the biomass of large animals could potentially have a strong effect on the spawning biomass.
- Catch-at-Size(Age) data are available but the estimates are thought to have been compromised for some years and fisheries due to:
 - $\circ~$ the uncertainty in the catches of swordfish for the drifting gillnet fisheries of Iran and the fresh-tuna longline fishery of Indonesia.
 - the total lack of size data before the early-70s and poor coverage before the early-80s and for most artisanal fisheries (Pakistan, India, Indonesia).
 - the paucity of size data available from industrial longliners since the early-1990s (Japan, Philippines, India and China).
 - \circ the lack of time-area catches for some industrial fleets (Indonesia, India, NEI).
 - o the paucity of biological data available, notably sex-ratio and sex-length-age keys.



STOCK ASSESSMENT

The stock structure of the Indian Ocean swordfish resource is under investigation, but currently uncertain. The southwest region was identified as a management unit of particular concern, because it seems to be more depleted than other regions in the Indian Ocean, and may have limited mixing with other regions.

A range of quantitative modelling methods were applied to the swordfish assessment in 2011, ranging from the highly aggregated ASPIC surplus production model to the age-, sex- and spatially-structured SS3 analysis. The different assessments were presented to the WPB in documents IOTC-2011-WPB09-17, 18, 19 and 20.

There is value in comparing different modelling approaches. The structured models are capable of a more detailed representation of complicated population and fishery dynamics, and integrate several sources of data and biological research that cannot be considered in the simple production models. However, there are a lot of uncertainties in basic swordfish biology (e.g. growth rates, M, stock recruitment relationship), and it is difficult to represent all of these uncertainties. In contrast, the production models often provide robust estimates regardless of uncertainties in basic biological characteristics. However, sometimes the ASPIC model can have difficulty fitting long time series, and production models in general cannot represent some important dynamics (e.g. arising from complicated recruitment variability).

The swordfish stock status was determined by qualitatively integrating the results of the various stock assessments undertaken in 2011 (Tables 1 and 8).

The following should be noted with respect to the various modelling approaches:

- There was more confidence in the abundance indices this year due to the additional CPUE analyses from Japan and Taiwan, China, and the addition of the EU, Spain series. This has led to improved confidence in the overall assessments and the southwest in particular.
- The southwest region should continue to be analysed as a special resource, as it appears to be highly depleted compared to the Indian Ocean as a whole. However the difference in depletion does not appear to be as extreme as analyses in previous years have suggested. A review of the spatial assumptions should be conducted following the final results of the IOSSS project.
- Further analysis is required on the appropriate way to use the size composition data in the integrated models. In particular, consideration of the large discrepancies between size composition data and mean weight data for Japanese and Taiwan, China fleets is needed.
- There is large uncertainty in swordfish growth rate estimates, and this has important implications for the integrated assessments. Most of these differences seem to be attributable to the interpretation of fin spine annulus counts, which have not been directly validated. Further information might be sought from growth increment data from the Atlantic tagging programs.
- It was recognised that the effects of depredation (at least from the southwest), and discarding should be examined in future analyses.
- It was recognised that the deterministic production models were only able to explore a limited number of modelling options. The structural rigidity of these simple models causes numerical problems when fit to long time series for some cases. It was suggested that truncating the catch and CPUE time series would allow more options to be explored. However, some participants of the WPB suggested that it

would be more appropriate to consider the model rather than discarding potentially informative data (e.g. the generation time of swordfish is such that a relatively long time series is required to make inferences about productivity).

TABLE 8. Key management quantities from the Stock Synthesis 3 assessments, for the aggregate and southwest Indian Ocean. Values represent the 50^{th} (5^{th} – 95^{th}) percentiles of the (plausibility-weighted) distribution of maximum posterior density estimates from the full range of the models examined.

Management Quantity	Aggregate Indian Ocean	Southwest Indian Ocean
2009 catch estimate	21,500 t	6,700 t
Mean catch from 2005–2009	26,300 t	77,700 t
MSY	31,000 t (20,000–55,000)	9,400 t (6,500–13,500)
Data period used in assessment	1951-2009	1951-2009
F_{2009}/F_{MSY}	0.50 (0.23-1.08)	0.64 (0.27–1.27)
B_{2009}/B_{MSY}	_	-
SB_{2009}/SB_{MSY}	1.59 (0.94–3.77)	1.44 (0.61–3.71)
B_{2009}/B_0	_	-
SB_{2009}/SB_0	0.35 (0.22-0.42)	0.29 (0.15-0.43)
$B_{2009}/B_{0, F=0}$	_	-
$SB_{2009}/SB_{0, F=0}$	_	-

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APPENDIX XXI EXECUTIVE SUMMARY: BLACK MARLIN





Status of the Indian Ocean Black Marlin Resource (Makaira indica)

TABLE 1. Status of the Indian Ocean Black Marlin (Makaira indica).

Area ¹	Indicators – 20	11 assessment	2011 stock status determination 2010 ²
Indian Ocean	Catch 2010: Average catch 2006–2010: MSY (range): $F_{2009/}F_{MSY}$ (range): $SB_{2009/}SB_{MSY}$ (range):	5,018 t 4,689 t unknown unknown unknown	Uncertain

¹Boundaries for the Indian Ocean = IOTC area of competence.

²The stock status refers to the most recent years' data used for the assessment.

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

Stock status. No quantitative stock assessment is currently available for black marlin in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Outlook. The decrease in longline catch and effort in recent years has lowered the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource.

The Scientific Committee considers the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches of black marlin urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Billfish and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Black marlin (*Makaira indica*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Black marlin (*Makaira indica*) is a large oceanic apex predator that inhabits tropical and subtropical Indo-Pacific oceans. Table 2 outlines some key life history parameters relevant for management. There is limited reliable information on the catches of black marlin and no information on the stock structure or growth and mortality in the Indian Ocean.

TABLE 2. Biology of Indian Ocean black marlin (Makaira Indic

Parameter	Description
Range and stock structure	Little is known on the biology of the black marlin in the Indian Ocean. Thus, the information detailed here pertains to information from other oceans, primarily the Pacific. Black marlin is a highly migratory, large oceanic apex predator that inhabits tropical and subtropical waters of the Indian and Pacific oceans. Individuals have been reported in the Atlantic Ocean but there is no information to indicate the presence of a breeding stock in this area. Black marlin is mainly found in oceanic surface waters above the thermocline and typically near land masses, islands and coral reefs; however, they may range to depths of 1000 m. Thought to associate with schools of small tuna, which is one of its primary food sources (also reported to feed on other fishes, squids, cuttlefishes, octopods, and large decapod crustaceans). No information on stock structure is currently available in the Indian Ocean; thus for the purposes of assessment, one pan-ocean stock is assumed. However, spatial heterogeneity in stock indicators (catch-per-unit-effort trends) for other billfish species indicates that there is potential for localised depletion.
Longevity	Females: 11–12 years; Males: 5–6 years
Maturity (50%)	Age: unknown Size: females around 100 kg; males 50 to 80 kg total weight
Spawning season	No spawning grounds have been identified in the Indian or Pacific oceans, but in Australia spawning individuals apparently prefer water temperatures around 27-28°C. Highly fecund batch spawner. Females may produce up to 40 million eggs.
Size (length and weight)	Maximum: In other oceans can grow to more than 4.6 m FL and weigh 800 kg total weight. Young fish grow very quickly in length then put on weight later in life. In eastern Australian waters black marlin grows from 13 mm long at 13 days old to 180 cm and around 30 kg after 13 months. Sexual dimorphism in size, growth rates and size and age at maturity—females reach larger sizes, grow faster and mature later than males. Females: 326 cm lower-jaw FL, 800 kg total weight; Males: 255 cm lower-jaw FL, 300 kg total weight. Most black marlin larger than 200 kg are female. Recruitment into the fishery: varies by fishing method; ~60 cm lower-jaw FL for artisanal fleets and methods. The average size of black marlin taken in Indian Ocean longline fisheries is not available.

SOURCES: Cry et al. (1990); Froese & Pauly (2009); Nakamura (1985); Speare (2003); Sun et al. (2007)

Catch trends

Black marlin are caught mainly under drifting longlines (44%) and gillnets (49%) with remaining catches recorded under troll and hand lines (Fig. 1). Black marlin are the bycatch of industrial and artisanal fisheries. In recent years, the fleets of Taiwan, China (longline), Sri Lanka (gillnet), Indonesia (gillnets) and India (gillnets) are attributed with the highest catches of black marlin (Fig. 2). The minimum average annual catch estimated for the period 2006 to 2010 is around 4,689 t.

Between the early-1950s and the late-1980s part of the Japanese fleet was licensed to operate within the EEZ of Australia, and reported very high catches of black marlin in that area, in particular in waters off northwest Australia. In recent years, deep-freezing longliners from Japan and Taiwan, China have reported lower catches of black marlin, mostly in waters off the western coast of India and, to a lesser extent, the Mozambique Channel (Fig. 3).





Fig. 3a–b. Time-area catches (in number of fish) of black marlin as reported for the longline fisheries of Japan (JPN) and Taiwan, China (TWN) for 2009 and 2010 by fleet.

TABLE 3. Best scientific estimates of the catches of black marlin by type of fishery for the period 1950–2009 (in metric tonnes). Data as of May 2011.

By decade (average)			By year (last ten years)													
Fishery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Longline	846	1,633	1,288	1,370	1,501	1,646	1,243	1,454	2,291	1,985	2,002	2,110	1,894	2,302	2,359	1,612
Gillnet	47	60	115	473	1,680	2,287	2,549	1,600	1,589	1,596	2,157	2,446	1,955	2,080	2,165	3,121
Line	15	19	25	177	231	127	146	162	183	195	201	250	273	310	285	286
Other	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
Total	908	1,713	1,431	2,021	3,412	4,060	3,938	3,217	4,064	3,776	4,360	4,806	4,121	4,693	4,809	5,018

Uncertainty of time-area catches

Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Difficulties in the identification of marlins also contribute to the uncertainties of the information available to the Secretariat.

Retained catches are uncertain for some fisheries (Fig. 4), due to the fact that:

- catch reports often refer to total catches of all three marlin species combined; catches by species are estimated by the Secretariat for some artisanal (gillnet/longline fishery of Sri Lanka and artisanal fisheries of India, Iran and Pakistan) and industrial (longliners of Indonesia and Philippines) fisheries
- catches of non-reporting industrial longliners (India, NEI) and the gillnet fishery of Indonesia are estimated by the Secretariat using alternative information

- catches are likely to be incomplete for industrial fisheries for which the black marlin is not a target species
- conflicting catch reports: Longline catches from the Republic of Korea are reported as nominal catches, and catch and effort reports are conflicting, with higher catches recorded in the catch and effort table. For this reason, the Secretariat revised the catches of black marlin for the Republic of Korea over the time-series using both datasets. Although the new catches estimated by the Secretariat are thought to be more accurate, catches of black marlin remain uncertain for this fleet.
- a lack of catch data for most sport fisheries.
- discards are unknown for most industrial fisheries, mainly longliners. Discards of black marlin may also occur in the driftnet fishery of I.R. Iran, as this species has no commercial value in this country.



Fig. 4. Uncertainty of time-area catches for black marlin (Data as of October 2011). Catches below the zero-line (Type B) refer to fleets that do not report catch-and-effort data to the IOTC, do not report catchand-effort data by gear and/or species or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 5, and total effort from purse seine vessels flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 6.



Fig. 5. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan, China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

 $\label{eq:FTLL (red): fresh-tuna longliners (China, Taiwan, China and other fleets)$

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)



Fig. 6. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some industrial longline fisheries (primarily the Japanese longline fleet; Figs. 7, 8) although catches are thought to be incomplete (catches of non-target species are not always recorded in logbooks). No catch and effort data are available from sports fisheries, other than for partial data from the sports fisheries of Kenya; or other artisanal (gillnet fisheries of Iran and Pakistan, gillnet/longlines of Sri Lanka, gillnets of Indonesia) or industrial fisheries (NEI longliners and all purse seiners).



Fish size or age trends (e.g. by length, weight, sex and/or maturity)

Average fish weight can only be assessed for the longline fishery of Japan since 1970 and Taiwan, China since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low.

Catch-at-Size(Age) tables have not been built for black marlin due to a lack of information reported by CPCs. Fish size is derived from various length and weight information, however the reliability of the size data is reduced when relatively few fish out of the total catch are measured.

Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for black marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan, China that represent the best available information. Nominal CPUE exhibited dramatic declines since the beginning of the fishery in two major fishing grounds (West Equatorial and north-west Australia) (Figs. 8 and 9) and catches in the initial core areas have also decreased substantially. However, there is considerable uncertainty about the degree to which these indicators represent

abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	5,000 t
Mean catch from 2006–2010	4,700 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	-
B ₂₀₁₀ /B _{MSY} (80% CI)	-
SB ₂₀₁₀ /SB _{MSY}	_
B ₂₀₁₀ /B ₁₉₈₀ (80% CI)	-
SB ₂₀₁₀ /SB ₁₉₈₀	-
B ₂₀₁₀ /B _{1980, F=0}	_
SB ₂₀₁₀ /SB _{1980, F=0}	_

TABLE 4. Black marlin (Makaira indica) stock status summary.

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APPENDIX XXII EXECUTIVE SUMMARY: INDO-PACIFIC BLUE MARLIN





Status of the Indian Ocean Indo-Pacific Blue Marlin Resource (Makaira mazara)

TABLE 1. Status of Indo-Pacific blue marlin (Makaira mazara) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination 2010 ²	
	Catch 2010:	11 261 t	2010
Indian Ocean	Average catch 2006–2010:	9,508 t	
	MSY (range):	unknown	Uncortain
	$F_{2009/}F_{MSY}$ (range):	unknown	Uncertain
	SB _{2009/} SB _{MSY} (range):	unknown	
	SB_{2009}/SB_0 (range):	unknown	

¹Boundaries for the Indian Ocean = IOTC area of competence

²The stock status refers to the most recent years' data used for the assessment.

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

Stock status. No quantitative stock assessment is currently available for Indo-Pacific blue marlin in the Indian Ocean, and due to a lack of reliable fishery data for several gears, only very preliminary stock indicators can be used. The standardised CPUE suggest that there was a decline in the early 1980s, followed by an increase in abundance over the last 20 years. This contrasts with the majority of non-standardised indicators which suggest a decline in abundance since the 1980s. Therefore the stock status is determined as being *uncertain* (Table 1). However, aspects of species biology, productivity and fisheries combined with a lack of fisheries data on which to base a quantitative assessment is a cause for concern.

Outlook. The decrease in longline catch and effort in recent years has lowered the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource.

The SC **RECOMMENDED** the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches of Indo-Pacific blue marlin urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Billfish and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Indo-Pacific blue marlin (*Makaira mazara*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Indo-Pacific blue marlin (*Makaira mazara*) is a large oceanic apex predator that inhabits tropical and subtropical waters of the Indian and Pacific oceans. Table 2 outlines some key life history parameters relevant for management.

TABLE 2. Biology of Indian Ocean Indo-Pacific blue marlir	(Makaira mazara).
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Parameter	Description
Range and stock structure	Little is known on the biology of the Indo-Pacific blue marlin in the Indian Ocean and the istinction between the blue marlin (<i>Makaira nigricans</i>) and Indo-Pacific blue marlin (<i>Makaira indica</i>) is not clear. Thus, the information detailed here pertains to information from other oceans, primarily the Pacific and Atlantic oceans. Indo-Pacific Blue marlin is a highly migratory, large oceanic apex predator that inhabits tropical and subtropical waters of the Indian and Pacific oceans. In the Pacific Ocean one tagged Indo-Pacific blue marlin is reported to have travelled 3000nm in 90 days. Indo-Pacific Blue marlin is a solitary species and prefers the warm offshore surface waters (>24°C); it is scarce in waters less than 100m in depth or close to land. The Indo-Pacific blue marlin's prey includes octopuses, squid and pelagic fishes such as blackfin tuna and frigate mackerel. Feeding takes place during the daytime, and the fish rarely gather in schools, preferring to hunt alone. No information on stock structure is currently available in the Indian Ocean; thus for the purposes of assessment, one pan-ocean stock is assumed. However, spatial heterogeneity in stock indicators (catch–per–unit–effort trends) for other billfish species indicates that there is potential for localised depletion.
Longevity	~28 years; Females n.a; Males n.a.
Maturity (50%)	Age: 2–4 years; females n.a. males n.a. Size: females ~50 cm lower-jaw FL (55 kgs whole weight); males ~80 cm lower-jaw FL (40 kgs total weight).
Spawning season	No spawning grounds have been identified in the Indian ocean. Females may produce up to 10 million eggs. In the Pacific ocean, Indo-Pacific blue marlin are thought to spawn between May and September off the coast of Japan.
Size (length and weight)	Maximum: Females 430 cm FL; 910 kgs whole weight; males 300 cm FL; 200 kgs whole weight. Young fish grow very quickly in length then put on weight later in life. Sexual dimorphism in size, growth rates and size and age at maturity—females reach larger sizes, grow faster and mature later than males.

n.a. = not available. SOURCES: Nakamura (1985); Cry et al. (1990); Shimose et al. (2008); Froese & Pauly (2009)

Catch trends

Indo-Pacific blue marlin are caught mainly under drifting longlines (60%) and gillnets (30%) with remaining catches recorded under troll and hand lines (Fig. 1). Indo-Pacific blue marlins are considered to be a bycatch of industrial and artisanal fisheries. The catches of Indo-Pacific blue marlin are typically higher than those of black marlin and striped marlin combined. In recent years, the fleets of Taiwan, China (longline), Indonesia (longline), Sri Lanka (gillnet) and India (gillnet) are attributed with the highest catches of Indo-Pacific blue marlin (Fig. 2). The distribution of Indo-Pacific blue marlin catches has changed since the 1980's with most of the catch now taken in the western areas of the Indian Ocean.

Catch trends for Indo-Pacific blue marlin are variable; however, this may reflect the level of reporting. The catches of Indo-Pacific blue marlin under drifting longlines were more or less stable until the mid-80's, at around 3,000 t, steadily increasing since then. The largest catches were recorded in 1997 (~14,000 t). Catches under drifting longlines have been recorded under Taiwan, China and Japan fleets and, recently, Indonesia and several NEI fleets (Fig. 2). In recent years, deep-freezing longliners from Japan and Taiwan, China have reported most of the catches of Indo-Pacific blue marlin in waters of the western and central tropical Indian Ocean and, to a lesser extent, the Mozambique Channel and the Arabian Sea (Fig. 3).





Fig. 3a–b. Time-area catches (in number of fish) of Indo-Pacific blue marlin as reported for the longline (LL) fisheries of Japan (JPN) and Taiwan, China (TWN) for 2009 and 2010 by fleet.

TABLE 3. Best scientific estimates of the catches of Indo-Pacific blue marlin by type of fishery for the period 195	0-
2010 (in metric tonnes). Data as of October 2011.	

By decade (average)				By year (last ten years)												
risnery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Longline	2,563	3,512	3,474	4,961	7,119	8,184	5,949	7,441	8,791	8,457	7,400	7,550	6,106	6,163	6,267	6,043
Gillnet	3	4	10	194	2,407	3,524	4,732	2,219	2,124	1,972	3,188	3,842	2,059	1,921	2,276	5,193
Line	11	23	34	313	341	27	27	26	25	24	17	21	25	26	23	25
Other	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,576	3,539	3,518	5,467	9,868	11,735	10,709	9,686	10,940	10,452	10,605	11,413	8,189	8,110	8,566	11,261

Uncertainty of time-area catches

Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Difficulties in the identification of marlins also contribute to the uncertainties of the information available to the Secretariat.

Retained catches are poorly known for most fisheries (Fig. 4) due to:

- catch reports often refer to total catches of all three marlin species combined; catches by species are estimated by the Secretariat for some artisanal (gillnet/longline fishery of Sri Lanka and artisanal fisheries of India, Iran and Pakistan) and industrial (longliners of Indonesia and Philippines) fisheries
- catches of non-reporting industrial longliners (India, NEI) and the gillnet fishery of Indonesia are estimated by the Secretariat using alternative information
- catches are likely to be incomplete for industrial fisheries for which the Indo-Pacific blue marlin is not a target species
- conflicting catch reports: Longline catches from the Republic of Korea are reported as nominal catches, and catch and effort reports are conflicting, with higher catches recorded in the catch and effort table. For this reason, the Secretariat revised the catches of blue marlin for the Republic of Korea over the time-series using both datasets. Although the new catches estimated by the Secretariat are thought to be more accurate, catches of Indo-Pacific blue marlin remain uncertain for this fleet.
- a lack of catch data for most sport fisheries.
- discards are unknown for most industrial fisheries, mainly longliners. Discards of Indo-Pacific blue marlin may also occur in the driftnet fishery of I.R. Iran, as this species has no commercial value in this country.



Fig. 4. Uncertainty of time-area catches for Indo-Pacific blue marlin (Data as of October 2011). Catches below the zero-line (Type B) refer to fleets that do not report catch-and-effort data to the IOTC, do not report catch-and-effort data by gear and/or species or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 5, and total effort from purse seine vessels flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 6.



Fig. 5. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan, China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

FTLL (red) : fresh-tuna longliners (China, Taiwan, China and other fleets)

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)

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Fig. 6. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

Catch-per-unit-effort (CPUE) trends

A CPUE standardisation of Indo-Pacific blue marlin (*Makaira mazara*) caught by the Taiwan, China longline fishery in the Indian Ocean was considered in 2011. The results reveal similar trends of CPUE standardized based on three combinations of fishing areas definitions and data period.

The standardised CPUE for the whole Indian Ocean suggest that there was a decline in the early 1980s, followed by an increase in abundance over the last 20 years (Fig. 7). However, it was also noted that this contrasts with the majority of non-standardised indicators which suggest a decline in abundance since the 1980s (Figs. 8 and 9).







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Fish size or age trends (e.g. by length, weight, sex and/or maturity)

Average fish weight can only be assessed for the longline fishery of Japan since 1970 and Taiwan, China since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low.

Catch-at-Size(Age) tables have not been built for Indo-Pacific blue marlin due to a lack of information reported by CPCs. Fish size is derived from various length and weight information, however the reliability of the size data is reduced when relatively few fish out of the total catch are measured.

Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for Indo-Pacific blue marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan, China that represent the best available information (described above). However, there is considerable uncertainty about the degree to which these indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

TABLE 4. Blue marlin (Makaira mazara) stock status summary.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	11,300 t
Mean catch from 2006–2010	9,500 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	-
B ₂₀₁₀ /B _{MSY} (80% CI)	-
SB_{2010}/SB_{MSY}	-
$B_{2010}/B_{1980} (80\% \text{ CI})$	-
SB_{2010}/SB_{1980}	-
$B_{2010}/B_{1980, F=0}$	-
$SB_{2010}/SB_{1980, F=0}$	-

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APPENDIX XXIII Executive Summary: Striped Marlin





Status of the Indian Ocean Striped Marlin Resource (*Tetrapturus audax*)

TABLE 1. Status of striped marlin (*Tetrapturus audax*) in the Indian Ocean.

Area ¹	Indicators – 20	2011 stock status determination 2010 ²	
	Catch 2010:	1 921 t	2010
	Average catch 2006–2010:	2,542 t	
Indian Ocean	MSY (range):	unknown	Uncortain
	F_{2010}/F_{MSY} (range):	unknown	Uncertain
	SB ₂₀₁₀ /SB _{MSY} (range):	unknown	
	SB_{2010}/SB_0 (range):	unknown	

¹Boundaries for the Indian Ocean = IOTC area of competence

²The stock status refers to the most recent years' data used for the assessment.

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. No quantitative stock assessment is currently available for striped marlin in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Outlook. The decrease in longline catch and effort in recent years has lowered the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource.

The Scientific Committee considers the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches of striped marlin urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Billfish and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Striped marlin (*Tetrapturus audax*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Striped marlin (*Tetrapturus audax*) is a large oceanic apex predator that inhabits tropical and subtropical Indo-Pacific oceans. Table 2 outlines some key life history parameters relevant for management. There is limited reliable information on the catches of this species and no information on the stock structure or growth and mortality in the Indian Ocean.

TABLE 2. Biology of Indian Ocean striped marlin (7)	Tetrapturus audax).
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Parameter	Description
Range and stock structure	A large oceanic apex predator that inhabits sub-tropical waters of the Indian and Pacific oceans, and is rarely found in the Atlantic Ocean. Its distribution is different from other marlins in that it prefers more temperate or cooler waters and tends to be less migratory. In the Indian Ocean seasonal concentrations of striped marlin occur in four main regions: off the east African coast (0°-10°S), the south and western Arabian Sea, the Bay of Bengal, and north- western Australian waters. The stock structure of striped marlin in the Indian Oceans is uncertain.
Longevity	~10 years. Females and males n.a.
Maturity (50%)	Age: 2–3 years. Females and males n.a.
Spawning season	Highly fecund batch spawner. Females may produce up to 20 million eggs. Unlike the other marlins which are serial spawners, striped marlin appear to spawn once per season.
Size (length and weight)	Maximum: 300+ cm FL; 240 kg total weight. Young fish grow very quickly in length then put on weight later in life. Striped marlin is the smallest of the marlin species; but unlike the other marlin species, striped marlin males and females grow to a similar size.

n.a. = not available. SOURCES: Nakamura (1985); Froese & Pauly (2009).

Catch trends

Striped marlin are caught almost exclusively under drifting longlines (98%) with remaining catches recorded under gillnets and troll lines (Fig. 1). Striped marlin are generally considered to be a bycatch of industrial fisheries. Catch trends for striped marlin are variable; however, this may reflect the level of reporting. The catches of striped marlin under drifting longlines have been changing over time, between 2,000 t and 8,000 t (Fig. 1).

Catches under drifting longlines have been recorded under Taiwan, China, Japan, Republic of Korea fleets and, recently, Indonesia and several NEI fleets (Fig. 2). Taiwan, China and Japan have reported large drops in the catches of striped marlin for its longline fleets in recent years. The reason for such decreases in catches is not fully understood. Between the early-50s and the late-80s part of the Japanese fleet was licensed to operate within the EEZ of Australia, reporting relatively high catches of striped marlin in the area, in particular in waters off northwest Australia. High catches of the species were also reported in the Bay of Bengal during this period, by both Taiwan, China and Japanese longliners. The distribution of striped marlin catches has changed since the 1980's with most of the catch now taken in the western areas of the Indian Ocean. In recent years, the fleets of Taiwan, China (longline) and to a lesser extent Indonesia (longline) are attributed with the highest catches of striped marlin.

In recent years, deep-freezing longliners from Japan and Taiwan, China have reported lower catches of striped marlin, mostly in the northwest Indian Ocean (Fig. 3). The minimum average annual catch estimated for the period 2006 to 2010 is around 2,542 t. These changes of fishing area and catches over the years are thought to be related to changes in the type of access agreements to EEZs of coastal countries in the Indian Ocean, rather than changes in the distribution of the species over time. Discards are believed to be low although they are unknown for most industrial fisheries, mainly longliners. Discards of striped marlin may also occur in the driftnet fishery of the I.R of Iran, as this species has no commercial value in this country.





Fig. 3a–b. Time-area catches (in number of fish) of striped marlin as reported for the longline fisheries of Japan (JPN) and Taiwan, China (TWN) for 2009 and 2010 by fleet.

TABLE 3. Best scientific estimates of the catches of striped marlin by type of fishery for the period	1950-2010 (in
metric tonnes). Data as of October 2011.	

Fishery	By decade (average)					By year (last ten years)										
	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Longline	1,024	3,077	3,614	5,042	5,040	3,849	3,069	3,112	3,115	3,730	2,966	3,153	2,582	2,485	2,057	1,773
Gillnet	2	3	6	25	60	83	92	65	66	75	78	89	81	96	96	120
Line	0	0	1	11	35	44	46	38	38	35	36	36	41	41	29	29
Other	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,026	30,80	3,625	5,079	5,135	3,975	3,207	3,216	3,219	3,839	3,079	3,279	2,705	2,622	2,182	1,921

Uncertainty of time-area catches

Retained catches are reasonably well known (Fig. 4) although they remain uncertain for some fleets:

- Catch reports refer to total catches of all three marlin species; catches by species have to be estimated by the IOTC Secretariat for some industrial fisheries (longliners of Indonesia and Philippines).
- Catches of non-reporting industrial longliners (India, NEI) estimated by the IOTC Secretariat using alternative information. As they are not reported by the countries concerned, catches are likely to be incomplete for some industrial fisheries for which the striped marlin is seldom the target species.
• Conflicting catch reports: The catches for longliners flagged to the Republic of Korea, reported as nominal catches and catches and effort, are conflicting with higher catches recorded in the catch and effort table. For this reason, the IOTC Secretariat revised the catches of striped marlin over the time-series using both datasets. Although the new catches estimated by the IOTC Secretariat are thought to be more accurate, catches of striped marlin remain uncertain for this fleet.



Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 5, and total effort from purse seine vessels flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 6.



Fig. 5. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan,China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

FTLL (red) : fresh-tuna longliners (China, Taiwan, China and other fleets)

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)

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Fig. 6. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

Catch-per-unit-effort (CPUE) trends

Standardised CPUE series have not yet been developed. Nominal CPUE series are however available from some industrial longline fisheries (primarily the Japanese longline fleet; Figs. 7 and 8) although catches are thought to be incomplete (catches of non-target species are not always recorded in logbooks). No catch and effort data are available from sports fisheries, other than for partial data from the sports fisheries of Kenya; or other artisanal (gillnet fisheries of I.R. Iran and Pakistan, gillnet/longlines of Sri Lanka, gillnets of Indonesia) or industrial fisheries (NEI longliners and all purse seiners).



Fish size or age trends (e.g. by length, weight, sex and/or maturity)

Average fish weight can only be assessed for the longline fishery of Japan since 1970 and Taiwan, China since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low.

Catch-at-Size(Age) tables have not been built for this species due to a lack of information reported by CPCs. Fish size is derived from various length and weight information, however the reliability of the size data is reduced when relatively few fish out of the total catch are measured.

Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for striped marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan, China that represent the best available information. Nominal CPUE exhibited declines since the beginning of the fishery in two major fishing grounds (West Equatorial and north-west Australia) (Figs. 7 and 8) and catches in the initial core areas have also decreased substantially. However, there is considerable uncertainty about the degree to which these indicators represent

abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

Management Quantity	Aggregate Indian Ocean
2010 catch estimate	1,900
Mean catch from 2006–2010	2,500
MSY (80% CI)	unknown
Data period used in assessment	_
F ₂₀₁₀ /F _{MSY} (80% CI)	_
B ₂₀₁₀ /B _{MSY} (80% CI)	_
SB_{2010}/SB_{MSY}	_
B ₂₀₁₀ /B ₁₉₈₀ (80% CI)	-
SB_{2010}/SB_{1980}	-
$B_{2010}/B_{1980, F=0}$	_
SB ₂₀₁₀ /SB _{1980, F=0}	-

TABLE 4. Striped marlin (*Tetrapturus audax*) stock status summary.

LITERATURE CITED

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Nakamura I, 1985. FAO species catalogue. Billfish of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes, and swordfishes known to date. FAO Fish. Synop. 125(5), 65 p.

APPENDIX XXIV Executive Summary: Indo-Pacific Sailfish





Status of the Indian Ocean Indo-Pacific Sailfish Resource (Istiophorus platypterus)

TABLE 1. Status of Indo-Pacific sailfish (Istiophorus platypterus) in the Indian Ocean.

Area ¹	Indicators – 20	Indicators – 2011 assessment			
			2010^{2}		
Indian Ocean	Catch 2010:	25,498 t			
	Average catch 2006–2010:	22,151 t			
	MSY (range):	unknown	Uncortain		
	F_{2010}/F_{MSY} (range):	unknown	Uncertain		
	SB _{2010/} SB _{MSY} (range):	unknown			
	SB_{2010}/SB_0 (range):	unknown			

¹Boundaries for the Indian Ocean = IOTC area of competence

²The stock status refers to the most recent years' data used for the assessment.

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. No quantitative stock assessment is currently available for Indo-Pacific sailfish in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore stock status remains *uncertain* (Table 1). However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment are a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Outlook. The decrease in longline catch and effort in recent years has lowered the pressure on the Indian Ocean stock as a whole, however there is not sufficient information to evaluate the effect this will have on the resource.

The Scientific Committee considers the following:

- the Maximum Sustainable Yield estimate for the whole Indian Ocean is unknown.
- annual catches of Indo-Pacific sailfish urgently need to be reviewed.
- improvement in data collection and reporting is required to assess the stock.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Billfish and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Indo-Pacific sailfish (*Istiophorus platypterus*) in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission, although none are species specific:

- Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area.
- Resolution 09/02 On the implementation of a limitation of fishing capacity of contracting parties and cooperating non-contracting parties.
- Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC's).
- Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area.
- Resolution 10/08 concerning a record of active vessels fishing for tunas and swordfish in the IOTC area.
- Recommendation 11/06 Concerning the Recording of Catch by Fishing Vessels in the IOTC Area of Competence.

FISHERIES INDICATORS

General

Indo-Pacific sailfish (*Istiophorus platypterus*) is a large oceanic apex predator that inhabits tropical and subtropical Indo-Pacific oceans. Table 2 outlines some key life history parameters relevant for management. There is limited reliable information on the catches of this species and no information on the stock structure or growth and mortality in the Indian Ocean.

Parameter	Description
Range and stock structure	Found throughout the tropical and subtropical regions of the Pacific and the Indian Oceans. It is mainly found in surface waters above the thermocline, close to coasts and islands in depths from 0 to 200 m. Indo–Pacific sailfish is a highly migratory species and renowned for its speed and (by recreational fishers) for its jumping behaviour — one individual has been reported swimming at speeds in excess of 110 km/h over short periods. The stock structure of Indo-Pacific sailfish in the Indian Oceans is uncertain. No information on stock structure is currently available in the Indian Ocean; thus for the purposes of assessment, one pan-ocean stock is assumed. However, spatial heterogeneity in stock indicators (catch–per–unit–effort trends) for other billfish species indicates that there is potential for localised depletion.
Longevity	Females: 11–13 years; Males: 7–8 years
Maturity (50%)	Age: females n.a.; males n.a. Size: females n.a.; males n.a.
Spawning season	Spawning in Indian waters occurs between December to June with a peak in February and June.
Size (length and weight)	Maximum: 350 cm FL and weight 100 kg total weight. The Indo-Pacific sailfish is one of the smallest-sized billfish species, but is relatively fast growing. Individuals may grow to over 3 m and up to 100kg, and live to around 7 years. Young fish grow very quickly in length then put on weight later in life. Sexual dimorphism in size, growth rates and size and age at maturity—females reach larger sizes, grow faster and mature later than males. Females: 300 cm lower-jaw FL, 50+ kg total weight; Males: 200 cm lower-jaw FL, 40+ kg total weight in the Indian Ocean. Recruitment into the fishery: varies by fishing method. The average weight of fish caught in the Kenyan sports fishery is ~25 kgs whole weight.

TABLE 2. Biology of Indian Ocean Indo-Pacific sailfish (Istiophorus platypterus).

n.a. = not available. SOURCES: Nakamura (1985); Speare (2003); Hoolihan (2006); Sun et al. (2007); Froese & Pauly (2009); Ndegwa & Herrera (2011)

Catch trends

Indo-Pacific sailfish is caught mainly under gillnets (78%) with remaining catches recorded under troll and hand lines (15%), longlines (7%) or other gears (Fig. 1). The minimum average annual catch estimated for the period 2006 to 2010 is around 22,151 t. In recent years, the countries attributed with the highest catches of Indo-Pacific sailfish are situated in the Arabian Sea (India, Iran, Pakistan and Sri Lanka). Smaller catches are reported for line fishers in Comoros and Mauritius and by Indonesia longliners. This species is also a popular catch for sport fisheries (e.g. Kenya, Mauritius, Seychelles).

Catches of Indo-Pacific sailfish greatly increased since the mid-1980's in response to the development of a gillnet/longline fishery in Sri Lanka (Fig. 2) and, especially, the extension in the area of operation of Iranian gillnet vessels to areas beyond the EEZ of I.R. Iran. The catches of Iranian gillnets (Fig. 2) increased dramatically, more than six-fold, after the late 1990's, from the values averaging 2,000 t in the late 1980's to a maximum of 12,600 t in 2005.

Catches of Indo-Pacific sailfish under drifting longlines and other gears do not show any specific trends in recent years, with total catches amounting to about 5,000 t. However, it is likely that longline fleets under report catches of this species due to its little commercial value. In recent years, deep-freezing longliners from Japan have reported catches of Indo-Pacific sailfish in the central western Indian Ocean, between Sri Lanka and the Maldives and the Mozambique Channel (Fig. 3).





Fig. 3a–b. Time-area catches (in number of fish) of Indo-Pacific sailfish as reported for the longline fisheries of Japan (JPN) and Taiwan, China (TWN) for 2009 and 2010 by fleet.

TABLE 3.	. Best scientific estimates of the catches of Indo-Pacific sailfish by type of fishery for the period 1950	0–2009
(in metric tor	onnes). Data as of October 2011.	

By decade (average)]	By year (las	st ten years)						
Fishery	1950s	1960s	1970s	1980s	1990s	2000s	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Longline	299	819	450	343	1425	876	785	1,135	2,035	926	1,393	1,399	2,021	1,985	1,176	1,032
Gillnet	164	176	544	2,296	7,621	13,708	10,849	12,197	15,525	24,246	21,453	20,572	14,254	13,285	16,441	21,034
Line	106	155	259	1,260	2,739	3,010	2,947	2,954	2,842	2,947	3,635	3,714	3,474	3,500	3,427	3,429
Other	1	1	50	25	3	2	2	2	2	2	2	2	2	2	2	2
Total	570	1,151	1,302	3,924	11,787	17,596	14,583	16,288	20,404	28,120	26,482	25,687	19,751	18,773	21,047	25,498

Uncertainty of time-area catches

Minimum catch estimates have been derived from very small amounts of information and are therefore highly uncertain. Unlike the other billfish, Indo-Pacific sailfish are probably more reliably identified because of the large and distinctive first dorsal fin that runs most of the length of the body.

Retained catches are poorly known for most fisheries (Fig. 4) due to:

- Catch reports often refer to total catches of all three marlin species combined; catches by species are estimated by the Secretariat for some artisanal (gillnet/longline fishery of Sri Lanka and artisanal fisheries of India, Iran and Pakistan) and industrial (longliners of Indonesia and Philippines) fisheries.
- Catches likely to be incomplete for some artisanal fisheries (gillnets of Pakistan, pole and lines of Maldives) due to under-reporting.
- Catches are likely to be incomplete for industrial fisheries for which the Indo-Pacific sailfish is not a target species.
- A lack of catch data for most sport fisheries.
- Changes to the catch series: There have not been significant changes to the catches of Indo-Pacific sailfish since 2010. The changes recorded in recent years originated in a review (by the Secretariat) of the catches reported by Indonesia, resulting in catches slightly lower than those reported by Indonesia.
- Discards are unknown for most industrial fisheries, mainly longliners (for which they are presumed to be moderate-high).



Fig. 4. Uncertainty of time-area catches for Indo-Pacific sailfish (Data as of October 2011). Catches below the zero-line (Type B) refer to fleets that do not report catch-and-effort data to the IOTC, do not report catch-and-effort data by gear and/or species or any of the other reasons provided in the document. Catches over the zero-line (Type A) refer to fleets for which no major inconsistencies have been found to exist. Light bars represent data for artisanal fleets and dark bars represent data for industrial fleets.

Effort trends

Total effort from longline vessels flagged to Japan, Taiwan, China and EU, Spain by five degree square grid from 2007 to 2010 are provided in Fig. 5, and total effort from purse seine vessles flagged to the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags), and others, by five degree square grid and main fleets, for the years 2007 to 2010 are provided in Fig. 6.



Fig. 5. Number of hooks set (millions) from longline vessels by five degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

LLJP (light green): deep-freezing longliners from Japan

LLTW (dark green): deep-freezing longliners from Taiwan, China

SWLL (turquoise): swordfish longliners (Australia, EU, Mauritius, Seychelles and other fleets)

FTLL (red) : fresh-tuna longliners (China, Taiwan, China and other fleets)

OTLL (blue): Longliners from other fleets (includes Belize, China, Philippines, Seychelles, South Africa, Rep. of Korea and various other fleets)



Fig. 6. Number of hours of fishing (Fhours) from purse seine vessels by 5 degree square grid and main fleets, for the years 2009 (left) and 2010 (right) (Data as of August 2011).

PS-EU (red): Industrial purse seiners monitored by the EU and Seychelles (operating under flags of EU countries, Seychelles and other flags) PS-OTHER (green): Industrial purse seiners from other fleets (includes Japan, Mauritius and purse seiners of Soviet origin) (excludes effort data for purse seiners of Iran and Thailand)

Catch-per-unit-effort (CPUE) trends

Standardised and nominal CPUE series have not yet been developed. No catch and effort data are available from sports fisheries, other than for partial data from the sports fisheries of Kenya; or other artisanal (gillnet fisheries of I.R. Iran and Pakistan, gillnet/longlines of Sri Lanka, gillnets of Indonesia) or industrial fisheries (NEI longliners and all purse seiners).

Fish size or age trends (e.g. by length, weight, sex and/or maturity)

Average fish weight can only be assessed for the longline fishery of Japan since 1970 and Taiwan, China since 1980. The number of specimens measured on Japanese longliners in recent years is, however, very low. Furthermore, the specimens discarded might be not accounted for in industrial fisheries, where they are presumed to be of lower size (possible bias of existing samples).

Catch-at-Size(Age) tables have not been built for this species due to a lack of information reported by CPCs. Fish size is derived from various length and weight information, however the reliability of the size data is reduced when relatively few fish out of the total catch are measured.

Sex ratio data have not been provided to the Secretariat by CPCs.

STOCK ASSESSMENT

No quantitative stock assessment for striped marlin in the Indian Ocean is known to exist and no such assessment has been undertaken by the IOTC Working Party on Billfish. However, a preliminary estimation of stock indicators was attempted on the longline catch and effort datasets from Japan and Taiwan, China that represent the best available information. Nominal CPUE exhibited declines since the beginning of the fishery in two major fishing grounds (West Equatorial and north-west Australia) (Figs. 7 and 8) and catches in the initial core areas have also decreased substantially. However, there is considerable uncertainty about the degree to which these indicators represent abundance as factors such as changes in targeting practices, discarding practices, fishing grounds and management practices are likely to interact in the depicted trends. Further work must be undertaken to derive additional stock indicators for this species, because in the absence of a quantitative stock assessment, such indicators represent the only means to monitor the status of the stock and assess the impacts of fishing.

TABLE 4. Indo-Pacific sailfish (Istiophorus platypterus) stock status summar	ry.
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Management Quantity	Aggregate Indian Ocean
2010 catch estimate	25,500 t
Mean catch from 2006–2010	22,200 t
MSY (80% CI)	unknown
Data period used in assessment	-
F ₂₀₁₀ /F _{MSY} (80% CI)	_
B ₂₀₁₀ /B _{MSY} (80% CI)	_
SB_{2010}/SB_{MSY}	_
B ₂₀₁₀ /B ₁₉₈₀ (80% CI)	-

SB ₂₀₁₀ /SB ₁₉₈₀	_
$B_{2010}/B_{1980, F=0}$	-
$SB_{2010}/SB_{1980, F=0}$	-

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APPENDIX XXV Executive Summary: Marine Turtles



Indian Ocean Tuna Commission Commission des Thons de l'Océan Indien



Status of Indian Ocean Marine Turtles

TABLE 1. IUCN threat status for all marine turtle species reported as caught in fisheries within the IOTC area of competence.

Common name	Scientific name	IUCN threat status ²
Flatback turtle	Natatordepressus	Data deficient
Green turtle	Cheloniamydas	Endangered
Hawksbill turtle	Eretmochelysimbricata	Critically Endangered
Leatherback turtle	Dermochelyscoriacea	Critically Endangered
Loggerhead turtle	Carettacaretta	Endangered
Olive ridley turtle	Lepidochelysolivacea	Vulnerable

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

Stock status. No assessment has been undertaken by the IOTC WPEB for marine turtles due to the lack of data being submitted by CPCs. However, the current International Union for Conservation of Nature (IUCN) threat status for each of the marine turtle species reported as caught in IOTC fisheries to date is provided in Table 1. It is important to note that a number of international global environmental accords (e.g. Convention on Migratory Species (CMS), Convention on Biological Diversity (CBD)), as well as numerous fisheries agreements obligate States to provide protection for these species. While the status of marine turtles is affected by a range of factors such as degradation of nesting beaches and targeted harvesting of eggs and turtles, the level of mortality of marine turtles due to capture by gillnets and to a lesser extent purse seine fishing and longline is not known.

Outlook.Resolution 09/06 on marine turtles includes an evaluation requirement (para. 9) by the Scientific Committee in time for the 2011 meeting of the Commission (para.10). However, given the lack of reporting of marine turtle interactions by CPCs to date, such an evaluation was not able to be undertaken. Unless IOTC CPCs become compliant with the data collection and reporting requirements for marine turtles, the WPEB will continue to be unable to address this issue. Notwithstanding this, it is acknowledged that the impact on marine turtle populations from fishing for tuna and tuna-like species may increase if fishing pressure increases, or if the status of the marine turtle populations worsens due to other factors such as an increase in fishing pressure from other fisheries or anthropological or climatic impacts.

The SC **RECOMMENDED** the following:

- The available evidence indicates considerable risk to the status of marine turtles in the Indian Ocean.
- The primary source of data that drive the ability of the WPEB to determination a status for the Indian Ocean, total interactions by fishing vessels, is highly uncertain and should be addressed as a matter of priority.
- Current reported interactions are a known to be a severe underestimate: 7 interactions reported in 2009.
- Maintaining or increasing effort in the Indian Ocean without appropriate mitigation measures in place, will likely result in further declines in biomass.
- That appropriate mechanisms are developed by the Compliance Commission to ensure CPCs comply with their data collection and reporting requirements for marine turtles.

² The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Marine turtles in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 09/06 *On marine turtles* recognizes the threatened status of the populations of the six marine turtle species found in the Indian Ocean and that some tuna fishing operations carried out in the Indian Ocean can adversely impact marine turtles. This resolution makes mandatory the collection and provision of data on marine turtle interactions and the use of best handling practices to ensure the best chances of survival for any marine turtles returned to the sea after capture.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on marine turtle interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010, and aims to collect scientific observer data on catch and bycatch on, at least, 5% of the fishing operations of vessel over 24m and vessel under 24m fishing outside their EEZ. The requirement under Resolution 11/04 in conjunction with the reporting requirements under Resolution 09/06, means that all CPCs should be reporting marine turtle interactions as part of their annual report to the Scientific Committee.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 09/06 ON MARINE TURTLES

2. CPCs shall collect (including through logbooks and observer programs) and provide to the Scientific Committee all data on their vesselsinteractions with marine turtles in fisheries targeting the species covered by the IOTC Agreement. CPC shall also furnish available information to the Scientific Committee on successful mitigation measures and other impacts on marine turtles in the IOTC Area, such as the deterioration of nesting sites and swallowing of marine debris.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency;

INDICATORS

Biology and ecology

Six species of marine turtles inhabit the Indian Ocean and likely interact with the fisheries for tuna and tuna-like species. The following section outlines some key aspects of their biology, distribution and historical exploitation.

Green turtle

The green turtle (*Cheloniamydas*) is the largest of all the hard-shelled marine turtles and is one of the most widely distributed and commonest of the marine turtle species in the Indian Ocean. The Indian Ocean hosts some of the largest nesting populations of green turtles in the world, particularly on oceanic islands in the southwest Indian Ocean and on islands in South East Asia. Many of these populations are now recovering after intense exploitation in the last century greatly reduced the populations; some populations are still declining.

During the 19th and 20thcenturies intense exploitation of green turtles provided onboard red meat for sustained cruises of sailing vessels before the time of refrigeration, as well as meat and calipee (i.e. yellow glutinous/cartilage part of the turtle found next to the lower shell) for an international market. Several nesting populations in the Indian Ocean were devastated as a result. Table 2 outlines some of the key life history traits of green turtles.

Parameter	Description
Range and stock structure	Globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30°N and 30°S. Green turtles primarily use three types of habitat: oceanic beaches (for nesting), convergence zones in the open ocean, and benthic feeding grounds in coastal areas. Adults migrate from foraging areas to mainland or island nesting beaches and may travel hundreds or thousands of kilometers each way. After emerging from the nest, hatchlings swim offshore, where they are believed to caught up in major oceanic current systems and live for several years, feeding close to the surface on a variety of pelagic plants and animals. Once the juveniles reach a certain age/size range, they leave the pelagic habitat and travel to nearshore foraging grounds.Adult green turtles are unique among marine turtles in that they are herbivorous, feeding on seagrasses and algae.
Longevity	unknown
Maturity (50%)	Exact age is unknown, it is believed that sexual maturity is reached between 25 and 30+ years
Spawning season	Females return to their natal beaches (i.e. the same beaches where they were born) every 2 to 4 years to nest, laying several clutches of about 125 eggs at roughly 14-day intervals several times in a season. However, very few hatchlings survive to reach maturity – perhaps fewer than one in 1,000.
Size (length and weight)	The largest of all the hard-shelled marine turtles, growing up to one meter long and weighing 130-160 kg.

TABLE 2. Biology of the green turtle (*Chelonia mydas*).

SOURCES: FAO (1990); Mortimer (1984)

Hawksbill turtle

The hawksbill turtle (*Eretmochelysimbricata*) is small to medium-sized compared to other marine turtle species and is although generally not found in large concentrations, are widely distributed in the Indian Ocean. The keratinous (horn-like) scutes of the hawksbill are known as "tortoise shell," and they were sought after for manufacture of diverse articles in both the Orient and Europe. In modern times hawksbill turtles are solitary nesters (although some scientists postulate that before their populations were devastated they may have nested on some beaches in concentrations) and thus, determining population trends or estimates on nesting beaches is difficult. Decades long protection programs in some places, particularly at several beaches in the Indian Ocean, have resulted in population recovery. Table 3 outlines some of the key life history traits of hawksbill turtles.

TABLE	3.Biology	of the hav	vksbill turtle	e (<i>Eretmoch</i>	nelvsimbricat	ta).
	••••••			- (/ -

Description
Circumtropical, typically occurring from 30°N to 30°S latitude. Adult hawksbill turtles are capable of migrating long distances between nesting beaches and foraging areas, which are generally shorter to migrations of green and loggerhead turtles. Hawksbill turtles use different habitats at different stages of their life cycle, but are most commonly associated with coral reefs. Post-hatchlings (oceanic stage juveniles) are believed to occupy the pelagic environment. After a few years in the pelagic zone, small juveniles recruit to coastal foraging grounds. This shift in habitat also involves a shift in feeding strategies, from feeding primarily at the surface to feeding below the surface primarily on animals associated with coral reef environments. Their narrow, pointed beaks allow them to prey selectively on soft-bodied animals like sponges and soft corals.
unknown
unknown
Female hawksbill turtles return to their natal beaches every 2-3 years to nest. A female may lay 3-5, or more, nests in a season, which contain an average of 130 eggs. The largest nesting populations of hawksbill turtles in or around the Indian Ocean (which are among the largest in the world) occur in the Seychelles, Indonesia and Australia.
In the Indian Ocean, adults weigh 45 to 70 kg, but can grow to as large as 90 kg.

SOURCES: FAO (1990); Mortimer (1984)

Leatherback turtle

The leatherback turtle (*Dermochelyscoriacea*) is the largest turtle and the most widely distributed living reptile in the world. The leatherback turtle is the only marine turtle that lacks a hard shell: there are no large external keratinous

scutes and the underlying bony shell is composed of a mosaic of hundreds of tiny bones. Table 4 outlines some of the key life history traits of leatherback turtles.

Parameter	Description
Range and stock structure	The leatherback turtle is the most wide ranging marine turtle species, and regularly migrates enormous distances, e.g. between the Indian and south Atlantic Oceans. They are commonly found in pelagic areas, but they also forage in coastal waters in certain areas. The distribution and developmental habitats of juvenile leatherback turtles are poorly understood. While the leatherback turtle is not as common in the Indian Ocean as other species, important nesting populations are found in and around the Indian Ocean, including in Indonesia, South Africa, Sri Lanka and India's Andaman and Nicobar Islands.Adults are capable of tolerating water temperatures well below tropical and subtropical conditions, and special physiological adaptations allow them to maintain body temperature above cool water temperatures. They specialise on soft bodied invertebrates found in the water column, particularly jelly fish and other sorts of "jellies."
Longevity	unknown
Maturity (50%)	Exact age is unknown, it is believed that sexual maturity is reached between 3 and 4 years
Spawning season	Females lay clutches of approximately 100 eggs on sandy, tropical beaches. They nest several times during a nesting season.
Size (length and weight)	Mature males and females can grow to 2 m and weigh almost 900 kg.

TABLE	4. Biology	of the le	eatherback	turtle ((Dermochel ⁻	vscoriacea)).
110000	T • D 1010 <u>5</u> ,	or the r	cutificiouck	turtie (Dermoener	yscor mccur	/•

SOURCES: FAO (1990); Mortimer (1984)

Loggerhead turtle

The loggerhead turtle (*Carettacaretta*) is globally distributed. The hatchlings and juveniles are pelagic, living in the open ocean, while the adults forage in coastal areas. Table 5 outlines some of the key life history traits of loggerhead turtles.

TABLE 5. Biology of the loggerhead turtle (*Carettacaretta*).

Parameter	Description
Range and stock structure	Circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Studies in the Atlantic and Pacific Oceans show that loggerhead turtles can spend decades living on the high seas, crossing from one side of an ocean basin to another before taking up residence on benthic coastal waters. Their enormous heads and powerful jaws enable them to crush large marine molluscs, on which they specialise.
Longevity	unknown
Maturity (50%)	Exact age is unknown, it is believed that sexual maturity is reached between 12 and 30 years. Age at maturity was estimated at 21.6 years in Tongaland, South Africa, through tagging studies.
Spawning season	Many females nest every 2 to 3 year, once or twice a season, laying clutches of approximately 40 to 190 eggs. Loggerhead turtles nest in relatively few countries in the Indian Ocean and the number of nesting females is generally small, except on Masirah Island (Sultanate of Oman) which supports one of only two loggerhead turtles nesting beaches in the world that have greater than 10,000 females nesting per year.
Size (length and weight)	Mature males and females may grow to over one meter long and weigh around 110 kg or more.

SOURCES: FAO (1990); Mortimer (1984); Hughes (2010)

Olive ridley turtle

The olive ridley turtle (*Lepidochelysolivacea*) is considered the most abundant marine turtle in the world, with an estimated 800,000 nesting females annually. The olive ridley turtle has one of the most extraordinary nesting habits in the natural world. Large groups of turtles gather off shore of nesting beaches. Then, all at once, vast numbers of turtles come ashore and nest in what is known as an "arribada". During these arribadas, hundreds to thousands of females come ashore to lay their eggs. In the northern Indian Ocean, arribada occur on three different beaches along the coast of Orissa, India. Gahirmatha used to be one of the largest arribada nesting sites in the world. However, arribada nesting events have been less frequent there in recent years and the average size of nesting females has been smaller, indicative of a declining population. Declines in solitary nesting of olive ridley turtles have been recorded in Bangladesh, Myanmar, Malaysia, and Pakistan. In particular, the number of nests in Terengganu, Malaysia has declined from

thousands of nests to just a few dozen per year. Solitary nesting also occurs extensively throughout this species' range. Despite the enormous numbers of olive ridley turtles that nest in Orissa, this species is not generally common throughout much of the Indian Ocean. Table 6 outlines some of the key life history traits of olive ridley turtles.

Parameter	Description
Range and stock structure	The olive ridley turtle is globally distributed in the tropical regions of the South Atlantic, Pacific, and Indian Oceans. It is mainly a pelagic species, but it has been known to inhabit coastal areas, including bays and estuaries. Olive ridley turtles often migrate great distances between feeding and breeding grounds. They have an annual migration from pelagic foraging, to coastal breeding and nesting grounds, back to pelagic foraging. They can dive to depths of about 150 m to forage.
Longevity	unknown
Maturity (50%)	Reach sexual maturity in around 15 years, a young age compared to some other marine turtle species.
Spawning season	Many females nest every year, once or twice a season, laying clutches of approximately 100 eggs.
Size (length and weight)	Adults are relatively small, weighing on average around 45 kg.As with other species of marine turtles, their size and morphology varies from region to region.

TABLE 6. Biology of the olive ridley turtle (*Lepidochelysolivacea*).

SOURCES: FAO (1990); Mortimer (1984)

Flatback turtle

The flatback turtle (*Natatordepressus*) gets its name from its relatively flat, smooth shell, unlike other marine turtles which have a high domed shell. Flatback turtles have the smallest migratory range of any marine turtle species and this restricted range means that the flatback turtle is vulnerable to habitat loss, especially breeding sites. Table 7 outlines some of the key life history traits of flatback turtles.

TABLE	7.Biology	of the flatback turt	le (Natatordepressus).
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Parameter	Description
Range and stock structure	Flatback turtle turtles are found in northern coastal areas, from Western Australia's Kimberley region to the Torres Strait extending as far south as the Tropic of Capricorn. Feeding grounds also extend to the Indonesian Archipelago and the Papua New Guinea Coast. Flatback turtles have the smallest migratory range of any marine turtle species, though they do make long reproductive migrations of up to 1300 km. Although flatback turtles do occur in open seas, they are common in inshore waters and bays where they feed on the soft-bottomed seabed. It is carnivorous, feeding mostly on soft-bodied prey such as sea cucumbers, soft corals, jellyfish, molluscs and prawns.
Longevity	unknown
Maturity (50%)	unknown
Spawning season	Many females nest every 1 to 5 years, once or twice a season, laying clutches of between 50 and 60 eggs. The flatback turtle nests exclusively along the northern coast of Australia.
Size (length and weight)	The flatback turtle is a medium-sized marine turtle, growing to up to one meter long and weighing up to 90 kg.

SOURCES: FAO (1990); Mortimer (1984)

Availability of information on the interactions between marine turtles and fisheries for tuna and tuna-like species in the Indian Ocean

The IOTC has implemented data collection measures using onboard observers to better understand the nature and extent of the interactions between fisheries for tuna and tuna-like species in the Indian Ocean and marine turtles. Subsequently, IOTC members have implemented a number of national observer programmes that are providing information on the levels of marine turtle bycatch. Observer data from all fleets and gears remains very low with only Australia and South Africa reporting levels of marine turtle interactions to date (Table 8). However, data from other sources and in other regions indicate that threats to marine turtles are highest from gillnets and longline gear, and to a lesser extent purse-seine gear.

CPC's	2008	2009	2010	Remarks
Australia	4	7	1	
Belize	0	0	0	Nil discards reported; no observers on board
China			0	Non-raised observer data
Taiwan,China				
Comoros				Small-scale
European Union**			7	PS Observer programme discontinued (piracy). 7 interactions reported across period
Eritrea				
France (territories)			0	Nil discards reported; no observers
Guinea				
India				Bycatch levels reported for research vessels
Indonesia			51	51 turtles caught between 2005 and 2010 (non-raised observer data)
Iran, Islamic Republic of				
Japan			14	Non-raised observer data
Kenya				
Korea, Republic of		36		Non-raised observer data
Madagascar				
Malaysia				
Maldives, Republic of				
Mauritius				
Oman, Sultanate of				
Pakistan				
Philippines	0	0	0	Nil discards reported; no observers on board
Seychelles				
Sierra Leone				
Sri Lanka				
Sudan				
Tanzania				
Thailand				
United Kingdon (BIOT)	n.a	n.a.	n.a.	No active fleet
Vanuatu			0	Nil discards reported; no observers on board
Mozambique*	n.a.	n.a.		
Senegal*	n.a.	n.a.	n.a.	No activity since 2007
South Africas*	15	12	24	

TABLE 8. Members and Cooperating non-Contracting Parties reporting of marine turtle interactions for the years 2008–2010 to the IOTC (to be updated before the 14th Session of the SC in December 2011).

Green = CPC reported level of marine turtle interactions; Red = CPC did not report level marine turtle interactions *Cooperating non-Contracting Party

**Observer data was reported for the French purse-seine fleet for 2009 as well as for the La Réunion longline fleet. Moreover, the observer programme on-board the EU Purse-seine fleet has been discontinued because of piracy activities. n.a. = not applicable

Purse seine

European Union observers (covering on average 5% of the operations annually from 2003 to 2007) reported 74 marine turtles caught by EU,France and EU,Spain purse seiners over the period 2003–2007³. The most common species reported was olive ridley, green and hawksbill turtles, and these were mostly caught on log (natural Fish Aggregation Devices – FAD) sets and returned to the sea alive (although there is no systematic information on survivorship after release).Mortality levels of marine turtles due to entanglement in drifting FADs set by the fishery are still unknown and need to be assessed. The EU has indicated that its purse-seine fleet is making progress towards improved FAD designs aimed at reducing the incidence of entanglement of marine turtles, including the use of biodegradable materials. EU,Francehas indicated that it is already deploying FADs that are likely to reduce the entangled of marine turtles in both the Atlantic and Indian Oceans, while EU,Spainhas indicated that it will conduct experiments in the Atlantic Ocean on several FADs designs aimed at reducing the incidence of entanglement of marine turtles, before recommending a final FAD design to replace current FADs.

Longline

Information on most of the major longline fleets in the IOTC is currently not available and it is not known if this fishing activity represents a serious threat to marine turtles, as is the case in most other regions of the world.

The South African longline fleets have reported that marine turtle bycatch mainly comprises leatherback turtles, with lesser amounts of loggerhead, hawksbill and green turtles⁴. Estimated average catch rates of marine turtles ranged from 0.005 to 0.3 marine turtles per 1000 hooks and varied by location, season and year. The highest catch rate reported in one trip was 1.7 marine turtles per 1000 hooks in oceanic waters.

Over the period 1997 to 2000, the Programme PalangreRéunionnais⁵ examined marine turtle bycatch on 5,885 longline sets in the vicinity of Reunion Island (19-25° S, 48-54° E). The fishery caught 47leatherback, 30hawksbill, 16 green and 25 unidentified marine turtles, equating to an average catch rate of less than 0.02 marine turtles per 1000 hooks over the 4 year study period.

The Fishery Survey of India (FSI) carried out survey in the whole Indian EEZ using four longline vessels from 2005 to 2009. During this period around 800,000 hooks were deployed in the Arabian Sea, in the Bay of Bengal and in the waters of Andaman and Nicobar. In total 87 marine turtles (79 olive ridley, 4 green and 2 hawksbill turtles) were caught. Catch rates were of 0.302 marine turtles per 1000 hooks in the Bay of Bengal area, 0.068 marine turtles per 1000 hooks in the Andaman and Nicobar waters. The highest occurrence of incidental catches in the Bay of Bengal area is probably due to the large abundance of olive ridley turtles whose main nesting ground in the Indian Ocean is on the east coast of India, in the Orissa region.

Gillnets

Due to the nature of this gear, the incidental catch of marine turtles is thought to be relatively high compared to that of purse-seine and longline gears, however, quantified data for this gear type are almost non-existent. While the IOTC currently has virtually no information on interactions between marine turtles and gillnets, the IOSEA database indicates that the coastal mesh net fisheries occur in about 90% of IOSEA Signatory States in the Indian Ocean, and the fishery is considered to have moderate to relatively high impact on marine turtles in about half of those IOSEA member States. Given the widespread abundance of mesh net fisheries in the Indian Ocean, there is clearly an urgent need for careful, systematic information to be collected and report on this gear type and its impacts on marine turtles.

Other data sources

The IOTC and the Indian Ocean – South-East Asian Marine Turtle Memorandum of Understanding (IOSEA), an agreement under the Convention on Migratory Species, are actively collecting a range of information on fisheries and marine turtle interactions. The IOSEA database covers information from a wider range of fisheries and gears than those held by the IOTC. The IOSEA Online Reporting Facility⁶ compiles information through IOSEA National Reports on potential marine turtle fisheries interactions, as well as various mitigation measures put in place by its Signatory States and collaborating organisations. For example, members provide information on fishing effort and perceived impacts of fisheries that may interact with marine turtles, including longlines, purse seines, FADs, and gillnets. While the information is incomplete for some countries and is generally descriptive rather than quantitative, it has begun to provide a general overview of potential fisheries interactions as well as their extent. No information is available for China, Taiwan, China, Japan, Republic of Korea (among others) which are not yet signatories to IOSEA. Information is also provided on such mitigation measures as appropriate handling techniques, gear modifications, spatial/temporal closures etc. IOSEA is collecting all of the above information with a view to providing a regional assessment of member States' compliance with the FAO Guidelines on reducing fisheries interactions with marine turtles.

ASSESSMENT

A number of comprehensive assessments of the status of Indian Ocean marine turtles are available, in addition to the IUCN threat status:

- Hawksbill turtle Marine Turtle Specialist Group 2008 IUCN Red List status assessment⁷.
- Loggerhead turtle 2009 status review under the U.S. endangered species act⁸.
- Leatherback turtle Assessment of the conservation status of the leatherback turtle in the Indian Ocean and South-East Asia (IOSEA Marine Turtle MoU, 2006)⁹.

⁴IOTC-2006-WPBy-15

⁵ Poisson F. and Taquet M. (2001) L'espadon: de la recherche à l'exploitation durable. Programme palangre réunionnais, rapport final, 248 p. available in the website www.ifremer.fr/drvreunion

⁶(<u>www.ioseaturtles.org/report.php</u>)

⁷<u>http://www.iucnredlist.org/documents/attach/8005.pdf</u>

⁸http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/loggerheadturtle2009.pdf

⁹http://www.ioseaturtles.org/content.php?page=Leatherback%20Assessment

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APPENDIX XXVI Executive Summary: Seabirds





Status of Seabirds in the Indian Ocean

TABLE	1.	IUCN	threat	status	for	all	seabird	species	reported	as	caught	in	fisheries	within	the	IOTC	area	of
competenc	e.																	

Common name	Scientific name	IUCN threat status ¹⁰
Albatross		
Atlantic Yellow-nosed Albatross	Thalassarche chlororynchos	Endangered
Black-browed albatross	Thalassarche melanophrys	Endangered
Indian yellow-nosed albatross	Thalassarche car teri	Endangered
Shy albatross	Thalassarche cauta	Near Threatened
Sooty albatross	Phoebetria fusca	Endangered
Light-mantled albatross	Phoebetria palpebrata	Near Threatened
Amsterdam albatross	Diomedea amsterdamensis	Critically Endangered
Tristan albatross	Diomedea dabbenena	Critically Endangered
Wandering albatross	Diomedia exulans	Vulnerable
White-capped albatross	Thalassarche steadi	Near Threatened
Petrels		
Cape/Pintado petrel	Daption capense	Least Concern
Great-winged petrel	Pterodroma macroptera	Least Concern
Grey petrel	Procellaria cinerea	Near Threatened
Northern giant-petrel	Macronectes halli	Least Concern
White-chinned petrel	Procellaria aequinoctialis	Vulnerable
Others		
Cape gannet	Morus capensis	Vulnerable
Flesh-footed shearwater	Puffinus carneipes	Least Concern

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

Stock status. No assessment has been undertaken by the IOTC WPEB for seabirds due to the lack of data being submitted by CPCs. However, the current International Union for Conservation of Nature (IUCN) threat status for each of the seabird species reported as caught in IOTC fisheries to date is provided in Table 1. It is important to note that a number of international global environmental accords (e.g. Convention on Migratory Species (CMS), Convention on Biological Diversity (CBD)), as well as numerous fisheries agreements obligate States to provide protection for these species. While the status of seabirds is affected by a range of factors such as degradation of nesting habitats and targeted harvesting of eggs, the level of mortality of seabirds due to fishing gear in the Indian Ocean is poorly known, although where there has been rigorous assessment of impacts in areas south of 25 degrees (e.g. in South Africa), very high seabird bycatch rates have been recorded in the absence of a suite of proven bycatch mitigation measures.

Outlook. Resolution 10/06 On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries includes an evaluation requirement (para. 8) by the Scientific Committee in time for the 2011 meeting of the Commission. However, given the lack of reporting of seabird interactions by CPCs to date, such an evaluation cannot be undertaken at this stage. Unless IOTC CPCs become compliant with the data collection and reporting requirements for seabirds, the WPEB will continue to be unable to address this issue. Notwithstanding this, it is acknowledged that the impact on seabird populations from fishing for tuna and tuna-like species, particularly using longline gear

¹⁰ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

may increase if fishing pressure increases. Any fishing in areas with high abundance of procellariiform seabirds is likely to cause incidental capture and mortality of these seabirds unless measures that have been proven to be effective against Southern Ocean seabird assemblages are employed.

The SC RECOMMENDED consider the following:

- The available evidence indicates considerable risk to the status of seabirds in the Indian Ocean.
- The primary source of data that drive the ability of the WPEB to determination a status for the Indian Ocean, total interactions by fishing vessels, is highly uncertain and should be addressed as a matter of priority.
- Current reported interactions are a known to be a severe underestimate.
- That more research is conducting on the identification of hot spots of interactions between seabirds and fishing vessels.
- Maintaining or increasing effort in the Indian Ocean without refining and implementing appropriate mitigation measures, will likely result in further declines in biomass.
- That appropriate mechanisms are developed by the Compliance Commission to ensure CPCs comply with their data collection and reporting requirements for seabirds.
- Resolution 10/06 on reducing the incidental bycatch of seabirds in longline fisheries includes an evaluation requirement (para. 8) by the Scientific Committee in time for the 2011 meeting of the Commission, noting that this deadline is now overdue.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Seabirds in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

• Resolution 10/06 *On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries* recognizes the threatened status of some of the seabird species found in the Indian Ocean and that longline fishing operations can adversely impact seabirds. The Resolution makes mandatory for vessels fishing south of 25°S, the use of at least two seabird bycatch mitigation measures selected from a table, including at least one measure from Column A (Table shown below) aimed at effectively reducing the mortality of seabirds due to longline operations. In addition, CPCs are required to provide to the Commission all available information on interactions with seabirds. However, it does not include a mandatory requirement for CPCs to record seabird interactions while fishing for tuna and tuna-like species in the IOTC area of competence, but rather to report *"all available information on interactions with seabirds"*.

Column A	Column B
Night setting with minimum deck lighting	Night setting with minimum deck lighting
Bird-scaring lines (Tori Lines)	Bird-scaring lines (Tori Lines)
Weighted branch lines	Weighted branch lines
	Blue-dyed squid bait
	Offal discharge control
	Line shooting device

- Resolution 10/02 Mandatory Statistical Requirements For IOTC Members and Cooperating non-Contracting Parties (CPC's) encourages CPCs to record and report data on seabird interactions. However, if a CPC chooses not to record data on seabird interactions, as permitted under Resolution 10/02, then the requirements of Resolution 10/06 on Reducing the Incidental Bycatch of Seabirds in Longline Fisheries become void, as the wording of Resolution 10/06 only requires reporting of data where it is available.
- Resolution 11/04 *on a Regional Observer Scheme* (commenced on 1 July 2010) requires data on seabird interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) aims to collect scientific observer data on catch and bycatch on, at least, 5% of the fishing operations of vessel over 24m and vessel under 24m fishing outside their EEZ. The requirement under Resolution 11/04 in conjunction with the reporting requirements under Resolution 10/06, means that all CPCs should be reporting seabird interactions as part of their annual report to the Scientific Committee.

RESOLUTION 10/06 ON REDUCING THE INCIDENTAL BYCATCH OF SEABIRDS IN LONGLINE FISHERIES:

7. CPCs shall provide to the Commission, as part of their annual reports, information on how they are implementing this measure and all available information on interactions with seabirds, including bycatch by fishing vessels carrying their flag or authorised to fish by them. This is to include details of species where available to enable the Scientific Committee to annually estimate seabird mortality in all fisheries within the

IOTC area of competence;

RESOLUTION 10/02 MANDATORY STATISTICAL REQUIREMENTS FOR IOTC MEMBERS AND COOPERATING NON-CONTRACTING PARTIES (CPC'S):

3. Catch and effort data:

(...)CPC's are also encouraged to record and provide data on species other than sharks and tunas taken as bycatch.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency.

CONSERVATION AND MANAGEMENT MEASURES IN OTHER REGIONS

Evidence from areas where seabird bycatch was formerly high but has been reduced (e.g. Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and South Africa) has shown that it is important to employ, simultaneously, a suite of mitigation measures. Research conducted in South Africa by Japanese and US researchers (Melvin et al. 2010) showed that bird scaring lines (BSL, also known as tori or streamer lines) displace seabird attacks on baits, but only as far astern as the BSL extends. If baits are sufficiently close to the surface behind the aerial extent of the BSL, the rate of attack by seabirds on baited hooks, and hence risk of bycatch, remains high. This research shows clearly that appropriate sink rates must be used in tandem with BSLs and that unweighted branch lines or those with small weights placed well away from the hook pose the highest risks to seabirds. The research also suggests no negative effect of line-weighting on target catches, but limited sample sizes preclude definitive analysis (Melvin et al. 2010). In addition, experience from CCAMLR and elsewhere has indicated a number of additional factors contribute to successful reduction of seabird bycatch (FAO 2008; Waugh et al. 2008). These include research to optimise the effectiveness of mitigation measures and their ease of implementation, the use of onboard observer programs to collect seabird bycatch data and evaluate the effectiveness of bycatch mitigation measures, training of both fishermen and observers in relation to the problem and its solutions, and ongoing review of the effectiveness of these activities. Mitigation measures recommended by ACAP (Agreement on the Conservation of Albatrosses and Petrels) as effective include weighted branch lines that ensure that baits quickly sink below the reach of diving seabirds, night setting, and appropriate deployment of well designed BSLs.

Reduction of seabird bycatch may even bring benefits to fishing operations, for example by reducing the loss of bait to seabirds. Recent research in Brazil showed a reduction of 60% of the capture of seabirds and higher catch rates (20–30%) of target species when effective mitigation measures were applied (Mancini et al. 2009). However, more detailed economic assessments across a diversity of regions, fishing gears and seasons are required to get a fuller picture of economic benefits.

The International Commission for the Conservation of Atlantic Tunas (ICCAT) established a new conservation measure for seabirds at the November 2011 meeting of the Commission. In keeping with scientific advice given to the ICCAT, which is harmonious with the advice from the WPEB 2011, the new measure requires the use of only three technologies to reduce risk to seabirds, namely bird scaring lines, line weighting and night setting. In areas of high bycatch (or bycatch risk), currently defined in the South Atlantic as of 25°S, longline fishing vessels are required to use two of the three measures.

INDICATORS – FOR SEABIRD SPECIES KNOWN OR LIKELY TO BE VULNERABLE TO MORTALITY FROM FISHING OPERATIONS IN THE IOTC AREA OF COMPETENCE.

Seabirds are species that derive their sustenance primarily from the ocean and which spend the bulk of their time (when not on land at breeding sites) at sea. Seventeen species of seabirds known to interact with longline fisheries for tuna and tuna-like species in the Indian Ocean are listed in Table 1. However, not all reports identify birds to species level and, overall, information on seabird bycatch in the IOTC area remains very limited (Gauffier 2007; IOTC–2011–SC13–R). Due to gaps in tracking and observer data, it is likely that there are other species at risk of bycatch which are not identified in this Executive Summary.

Worldwide, 17 of the 22 species of albatross are listed by the IUCN as globally threatened, with bycatch in fisheries identified as the key threat to the majority of these species (Robertson and Gales 1998). Impacts of longline fisheries on seabird populations have been demonstrated (e.g. Weimerskirch and Jouventin 1987; Weimerskirch et al. 1997; Croxall et al. 1990; Tuck et al. 2001; Nel et al. 2003). In general, other IOTC gear types (including purse seine, bait boats, troll lines, and gillnets) are considered to have low incidental catch of seabirds, however data remain limited. The Convention on Migratory Species (CMS) is finalising a global review of the bycatch levels in gillnet fisheries, and the findings of this report may be relevant to seabird bycatch in gillnet fisheries operating in the IOTC.

Range and stock structure

Eleven seabird families occur within the IOTC area of competence as breeding species. They are typically referred to as penguins (Spheniscidae), albatrosses (Diomedeidae), petrels and allies (Procellariidae), storm-petrels (Hydrobatidae), diving-petrels (Pelecanoididae), tropicbirds (Phaethonidae), gannets and boobies (Sulidae), cormorants (Phalocrocoracidae), frigatebirds (Fregatidae), skuas (Stercorariidae), gulls and terns (Laridae). Of these, the Order Procellariiformes (albatrosses and petrels) are most susceptible to being caught as bycatch in longline fisheries (Wooller et al. 1992, Brothers et al. 1999), and therefore are most susceptible to direct interactions with IOTC fisheries.

The southern Indian Ocean is of global importance in relation to albatross distribution: seven of the 18 species of southern hemisphere albatrosses have breeding colonies on Indian Ocean islands¹¹. In addition, all but one¹² of the 18 southern hemisphere albatrosses forage in the Indian Ocean at some stage in their life cycle. The Indian Ocean is particularly important for Amsterdam albatross (*Diomedea amsterdamensis* – Critically Endangered) and Indian yellow-nosed albatross (*Thalassarche carteri* – Endangered), which are endemic to the southern Indian Ocean, white-capped albatross (*Thalassarche steadi* – endemic to New Zealand), shy albatross (*T. cauta* – endemic to Tasmania, and which forage in the area of overlap between IOTC and WCPFC), wandering albatross (*D. exulans* – 74% global breeding pairs), sooty albatross (*Phoebetria fusca* – 39% global breeding pairs), light-mantled sooty albatross (*P. palpebrata* – 32% global breeding pairs), grey-headed albatross (*T. chrysotoma* – 20% global breeding pairs) and northern and southern giant-petrel (*Macronectes halli and M. giganteus* – 26% and 30% global breeding pairs, respectively).

In the absence of data from observer programs reporting seabird bycatch, risk of bycatch has been identified through analysis of the overlap between albatross and petrel distribution and IOTC longline fishing effort, based on data from the Global Procellariiform Tracking Database (ACAP 2007). A summary map indicating distribution is shown in Figure 1 and the overlap between seabird distribution and IOTC longline fishing effort is shown in Table 2. The 2007 analysis of tracking data indicated that albatrosses breeding on Southern Indian Ocean islands spent 70–100% of their foraging time within areas overlapping with IOTC longline fishing effort. The analysis identified the proximity of the Critically Endangered Amsterdam albatross and Endangered Indian yellow-nosed albatross to high levels of pelagic longline effort. Wandering, shy, grey-headed and sooty albatrosses and white-chinned petrels showed a high overlap with IOTC longline effort. Data on distribution during the non-breeding season was lacking for many species, including black-browed albatrosses and white-capped albatrosses (known from bycatch data to be amongst the species most frequently caught).

In 2009 and 2010, new tracking data were presented to the Working Party on Ecosystems and Bycatch (WPEB) which filled a number of gaps from the 2007 analysis, particularly for sooty albatross, and for distributions of juveniles of wandering, sooty and Amsterdam albatrosses, white-chinned and northern giant petrels (Delord and Weimerskirch 2009; 2010). This analysis indicated substantial overlap with IOTC longline fisheries.

Longevity, maturity, breeding season

Seabirds are long-lived, with natural adult mortality typically very low. Seabirds are characterised as being late to mature and slow to reproduce; some do not start to breed before they are ten years old. Most lay a single egg each year, with some albatross species only breeding every second year. These traits make any increase in human-induced adult mortality potentially damaging for population viability, as even small increases in mortality can result in population decreases.

¹¹ Amsterdam, black-browed, grey-headed, Indian yellow-nosed, light-mantled, sooty and wandering albatrosses

¹² Atlantic yellow-nosed albatross (*Thalassarche chlororhynchos*)



Fig. 1. Distribution of breeding albatrosses, petrels and shearwaters in the Indian Ocean (see Table 2 for a list of species included), and overlap with IOTC longline fishing effort for all gear types and fleets (average annual number of hooks set per 5° grid square from 2002 to 2005).

TABLE 2. Overlag	between the distrib	ution of breeding and	non-breeding albatro	sses, petrels and	shearwaters and
IOTC fishing effort*	(Distributions derived	d from tracking data he	eld in the Global Proc	ellariiform Tracki	ng Database.

Species/Population – Breeding	Global Population (%)	Overlap (%)
Amsterdam albatross (Amsterdam)	100	100
Antipodean (Gibson's) albatross		
Auckland Islands	59	1
Black-browed albatross		1
Iles Kerguelen	1	88
Macquarie Island	<1	1
Heard & McDonald	<1	
Iles Crozet	<1	
Buller's Albatross		2
Solander Islands	15	1
Snares Islands	27	2
Grey-headed albatross		7
Prince Edward Islands	7	70
Iles Crozet	6	
Iles Kerguelen	7	
Indian yellow-nosed albatross		
Ile Amsterdam	70	100
Ile St. Paul	<1	
Iles Crozet	12	
Iles Kerguelen	<1	
Prince Edward Island	17	
Light-mantled albatross	39	
Shy albatross		
Tasmania	100	67
Sooty albatross		
Iles Crozet	17	87
Ile Amsterdam	3	
Ile St. Paul	<1	
Iles Kerguelen	<1	
Prince Edward Island	21	
Wandering albatross		75
Iles Crozet	26	93
Iles Kerguelen	14	96

Prince Edward Islands	3/	95
Northern giant petrel	26)5
Southern giant petrel	20	
White chinned Petrel	9	
Iles Crozet	2	60
lles Korguelen	2	00
Dringo Edward Island	2	
Short tailed shearwater	2	
Australia	2	2
Australia Species/Deputation Non-breading	Clobal Danulation (9/)	$\frac{\mathbf{J}}{\mathbf{O}_{\text{viewlern}}\left(0\right)}$
Species/Population – Non-breeding		Overlap (%)
Amsterdam albatross (Amsterdam)	100	98
Antipodean (Gibson's) albatross	41	9
Antipodes Islands	41	3
Auckland Islands	59	13
Black-browed albatross	1.5	2
South Georgia (GLS data)	16	3
Heard & McDonald Islands	<1	
Iles Crozet	<1	
Iles Kerguelen	1	
Buller's albatross		13
Solander Islands	15	9
Snares Islands	27	15
Grey-headed albatross		
South Georgia (GLS data)	58	16
Iles Crozet	6	
Iles Kerguelen	7	
Prince Edward Island	7	
Indian yellow-nosed albatross		
Light-mantled albatross		
Northern royal albatross		3
Chatham Islands	99	3
Taiaroa Head	1	1
Shy albatross		
Tasmania	100	72
Sooty albatross		
Southern royal albatross		
Wandering albatross		59
White-capped albatross		
Northern giant petrel		
Southern giant petrel		
White-chinned petrel		
Westland petrel		
Short-tailed shearwater		

*Fishing data are based on the average annual number of hooks set per 5° grid square from 2002 to 2005. Overlap is expressed as the percentage of time spent in grid squares with longline effort, and is given for each breeding site as well the species' global population where sufficient data exists. Shaded squares represent species/colonies for which no tracking data were available).

Availability of information on the interactions between seabirds and fisheries for tuna and tuna-like species in the Indian Ocean

Bycatch data from onboard observer programs

Globally it is recognized that onboard observer programs are vital for collecting data on catches of non-target species, particularly those species which are discarded at sea. More specifically, observers need to observe hooks during setting and monitor hooks during the hauling process to adequately assess seabird bycatch and evaluate the effectiveness of mitigation measures in use. Levels of observer coverage significantly in excess of 5% are likely to be needed to accurately monitor seabird bycatch levels in IOTC fisheries.

The IOTC has implemented data collection measures using onboard observers to better understand the nature and extent of the interactions between fisheries for tuna and tuna-like species in the Indian Ocean and seabirds. Subsequently, IOTC members have implemented a number of national observer programmes that are providing information on the levels of seabird interactions. Observer data from all fleets and gears remains very low with only Australia and South Africa reporting levels of seabird interactions to date (Table 3). However, data from other sources and in other regions indicate that threats to seabirds are highest from longline gear.

TABLE 3. Members and Cooperating Non-Contracting Parties reporting of seabird interactions for the years 2008–2010 to the IOTC (to be updated before the 14th Session of the SC in December 2011).

CPC's	2008	2009	2010	Remarks
Australia	0	2	0	
Belize	0	0	0	Nil discards reported; no observers on board
China			0	Non-raised observer data
Taiwan,China				
Comoros	n.a.	n.a.	n.a.	No longline activity
European Union**				
Eritrea				
France (territories)	n.a.	n.a.	n.a.	No longline activity
Guinea				
India				Bycatch levels reported for research vessels
Indonesia			42	42 seabirds caught between 2005 and 2010 (non-raised observer data)
Iran, Islamic Republic of	n.a.	n.a.	n.a.	No longline activity
Japan			11	Non-raised observer data
Kenya				
Korea, Republic of		94	72	Non-raised observer data
Madagascar				
Malaysia				
Maldives, Republic of				No longline activity
Mauritius				
Oman, Sultanate of				
Pakistan	n.a.	n.a.	n.a.	No longline activity
Philippines	0	0	0	Nil discards reported; no observers on board
Seychelles				
Sierra Leone				
Sri Lanka				
Sudan				
Tanzania				
Thailand				
United Kingdom (BIOT)	n.a.	n.a.	n.a.	No longline activity
Vanuatu				
Mozambique*	n.a.	n.a.	n.a.	No longline activity
Senegal*	n.a.	n.a.	n.a.	No longline activity
South Africa*	157	467	162	

Green = CPC reported level of seabird interactions; Red = CPC did not report level of seabird interactions

*Cooperating non-Contracting Party

**Observer data was reported for the French purse-seine fleet for 2009 as well as for the La Réunion longline fleet. Moreover, the observer programme on-board the EU Purse-seine fleet has been discontinued because of piracy activities.

Longline

Observer data from longline fisheries occurring north of 20°S is very sparse (Gauffier 2007). While seabird bycatch rates in tropical areas are generally assumed to be low, a number of threatened seabirds forage in these northern waters. Due to their small population sizes, bycatch at significant levels could be occurring but not, or almost never being observed.

Others gears

The impact of purse-seine fishing on tropical seabird species, including larids (gulls, terns and skimmers) and sulids (gannets and boobies), is generally considered to be low, but data remain sparse and there are anecdotal observations which suggest that these interactions might merit closer investigation. However, no observation of incidental catch of seabird in the purse-seine fishery has been made in the Indian Ocean since the beginning of the fishery 25 years ago. The scale and impacts of gillnet fishing impacts on seabirds in the IOTC convention area is unknown. Outside the convention area, gillnet fishing has been recorded as catching high numbers of diving seabird species, including shearwaters and cormorants (e.g. Berkenbusch and Abraham 2007). The large coastal gillnet fisheries in the northern part of the IOTC clearly merit closer investigation, and should be considered a priority, as should the impact of lost or discarded gillnets (ghost fishing) on seabirds.

Indirect impacts of fisheries

Many tropical seabird species forage in association with tunas, which drive prey to the surface and thereby bring them within reach of the seabirds. The depletion of tuna stocks could therefore have impacts on these dependent species. More widely, the potential 'cascade' effects of reduced shark and tuna abundances on the ecosystem is largely unknown. Although these kinds of impacts are difficult to predict, there are some examples that suggest meso-predator release has occurred in the Convention area (e.g. Romanov and Levesque 2009)

ASSESSMENT

A number of comprehensive assessments of the status of Indian Ocean seabirds are available, in addition to the IUCN threat status:

- Modelling work on Crozet wandering albatrosses and impact of longline fisheries in the IOTC zone (Tuck et al. 2011).
- ACAP Species assessment for: Amsterdam Albatross, Indian Yellow-nosed Albatross, Northern Royal Albatross, Southern Royal Albatross, Shy Albatross, Sooty Albatross, Wandering Albatross, Northern Giant Petrel, Southern Giant Petrel, Grey Petrel, Spectacled Petrel, White-chinned Petrel (<u>http://www.acap.aq/acap-species</u>).

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APPENDIX XXVII Executive Summary: Blue Shark





Status of the Indian Ocean Blue Shark (Prionace glauca)

TABLE 1. IUCN threat status of blue shark	(Prionace	glauca)	in the Indian Ocean
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Common name	Sajantifia nomo	IUCN threat status ¹³					
	Scientific name	Global status	WIO	EIO			
Blue shark	Prionace glauca	Near Threatened	-	-			

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for blue shark in the Indian Ocean noting that there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series from the Japanese longline fleet, and about the total catches over the past decade.

Stock status. The current IUCN threat status of 'Near Threatened' applies to blue sharks globally (Table 1). There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment and limited basic fishery indicators currently available for blue shark in the Indian Ocean therefore the stock status is highly uncertain. Blue sharks are commonly taken by a range of fisheries in the Indian Ocean and in some areas they are fished in their nursery grounds. Because of their life history characteristics – they are relatively long lived (16–20 years), mature relatively late (at 4–6 years), and have relativity few offspring (25–50 pups every year), the blue shark is vulnerable to overfishing. Blue shark assessments in the Atlantic and Pacific oceans seem to indicate that blue shark stocks can sustain relatively high fishing pressure.

Outlook. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into certain areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on blue shark will decline in these areas in the near future, and may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates risk to the stock status at current effort levels.
- The two primary sources of data that drive the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Noting that current reported catches (probably largely underestimated) are estimated at an average ~ 8,924 t over the last five years, ~ 9,416 t in 2010, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

¹³ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Blue shark in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel.
- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks must be recorded.
- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on blue shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Blue shark (*Prionace glauca*) is the most common shark in pelagic oceanic waters throughout the tropical and temperate oceans worldwide (Fig. 1). It has one of the widest ranges of all the shark species and may also be found close inshore. Adult blue sharks have no known predators; however, subadults and juveniles may be preyed upon by shortfin makos, white sharks, and adult blue sharks. Fishing is a major contributor to adult mortality. Table 2 outlines some of the key life history traits of blue shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the blue shark (source: <u>www.iucnredlist.org</u>)

Parameter	Description
Range and stock structure	In the tropical Indian Ocean, the greatest abundance of blue sharks occurs at depths of 80 to 220 m, in temperatures ranging from 12 to 25°C. The distribution and movements of blue shark are strongly influenced by seasonal variations in water temperature, reproductive condition, and availability of prey. Long-distance movements have been observed for blue sharks, including transoceanic route from Australia to South Africa. The blue shark is often found in large single sex schools containing individuals of similar size. Subtropical and temperate waters appears to be nursery grounds south of 20°S, where small blue sharks dominate, but where all range of sizes from 55 to 311 cm FL are recorded. In contrast mature fish (FL > 185cm) dominate in the off-shore equatorial waters. Area of overlap with IOTC management area = high. No information is available on stock structure.
Longevity	Bomb radiocarbon dating of Indian Ocean blue sharks showed that males of 270 cm FL may attain 23 years of age. Preliminary data for Indian Ocean shows that male may reach 25 and females 21 years old. In the Atlantic Ocean, the oldest blue sharks reported were a 16 year old male and a 15 year old female. Longevity is estimated to be around 20 years of age in the Atlantic.
Maturity (50%)	Age: Sexual maturity is attained at about 5 years of age in both sexes. Size: not available for the Indian Ocean. In the Atlantic 182–218 cmTL for males; 173–221 cm TM for females.
Reproduction	 Blue shark is a viviparous species, with a yolk-sac placenta. Once the eggs have been fertilised there is a gestation period of between 9 and 12 months. Litter size is quite variable, ranging from four to 135 pups and may be dependent on the size of the female. The average litter size observed from the Indian Ocean is 38, very similar to the one reported in the Atlantic Ocean, 37. Generation time is about 8-10 years. In Indian Ocean, between latitude 2 °N and 6 °S, pregnant females are present for most of the year. Fecundity: relatively high (25-50) Generation time: 8-10 years Gestation Period: 9-12 months Annual reproductive cycle
Size (length and weight)	Maximum size is around 380 cm FL. New-born pups are around 40 to 51 cm TL. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.159*10 ⁻⁴ * FL ^{2.84554} .

TABLE 2. Biology of Indian Ocean blue shark (*Prionace glauca*).

SOURCES: Gubanov & Gigor'yev (1975); Pratt (1979); Anderson & Ahmed (1993); ICES (1997); Scomal & Natansen (2003); Mejuto et al. (2005); Mejuto & Garcia-Cortes (2006); IOTC 2007; Matsunaga (2007); Rabehagosoa et al. (2009); Romanov & Romanova (2009); Anon (2010), Romano & Campana (2011).

Fisheries

Blue sharks are often targeted by some semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and anecdotally in the purse seine fishery). However, in recent years longliners are occasionally targeting this species, due to an increase in its commercial value worldwide. The blue shark appears to have a similar distribution to swordfish. Typically, the fisheries take blue sharks between 180–240 cm FL or 30 to 52 kg. Males are slightly smaller than the females. In other Oceans, angling clubs are known to organise shark fishing competitions where blue sharks and mako sharks are targeted. Sport fisheries for oceanic sharks are apparently not so common in the Indian Ocean.

There is little information on the fisheries prior to the early 1970's, and some countries continue not to collect shark data while others do collect them but do not report it to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but the statistics are limited by the lack of species-specific data and data from the major fleets.

The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke 2008; Clarke et al. 2006) and the bycatch/release injury rate is unknown but probably high.

Preliminary estimations of at-haulback mortality showed that 24.7% of the blue shark specimens captured in longline fisheries targeting swordfish are captured dead at time of haulback. Specimen size seems to be a significant factor, with larger specimens having a higher survival at-haulback (Coelho et al. 2011a).

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Gears	IS SWO		TUNA	DD/IKUL/HAND	GILL	UNCL	
Frequency	rare	abundant		rare	unknown	unknown	
Fishing Mortality	unknown	13 to 51 %	0 to 31%	unknown	unknown	unknown	
Post release mortality	ost release mortality unknown 19%		unknown	unknown	unknown		
	(2002	2000) D: 0.0	6 (2005)	1 (200 C) D	1 (2000) 1		

TABLE 3. Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

SOURCES: Boggs (1992); Romanov (2002, 2008); Diaz & Serafy (2005); Ariz et al. (2006); Peterson et al. (2008); Romanov et al. (2008); Campana et al. (2009); Poisson et al. (2010)

Catch trends

The catch estimates for blue shark are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories). For CPCs reporting longline data by species (i.e. Australia, Spain, Portugal, United Kingdom and South Africa), 74% of the catch of sharks by longliners, all targeting swordfish, were blue sharks.

TABLE 4. Catch estimates for blue shark in the Indian Ocean for 2009 and 2010.

Catch		2009	2010
Most accort actsh	Blue shark	9,941	9,416 t
Most recent catch	nei-sharks	62,229 t	61,966
Mean catch over the last 5 years (2006–2010)	Blue shark		8,924 t
	nei-sharks		64,838 t

Note that the catches recorded for sharks are thought incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, seven countries reported catches of blue sharks in the IOTC region.

Nominal and standardised CPUE Trends

Statistics not available at the IOTC Secretariat by species.

Point estimates and values of the 95% confidence interval for the standardized Japanese longline CPUE of blue shark data were provided to IOTC.

There are no surveys specifically designed to assess shark catch rates in the Indian Ocean. Trends in localised areas might be possible in the future (for example, from the Kenyan recreational fishery). Historical research data shows overall decline in CPUE while mean weight of blue shark in this time series are relatively stable (Romanov et al. 2008). Trends in the Japanese CPUE series (Fig.1) suggest that the longline vulnerable biomass was more or less stable during 1994-2003 and subsequently decrease to 2010 (Hiraoka and Yokawa 2011). The nominal CPUEs of blue shark catches by the Portuguese longline fleet in the Indian Ocean showed variability between 1999-2010 and a general decreasing trend. However, the standardized series remained relatively stable with no apparently significant trends in the more recent years (2006-2010). This time series of standardized CPUEs is very short (5 years), it is part of an ongoing analysis, and should therefore be regarded as preliminary (Coelho et al. 2011b).



Fig. 1. Standardized Japanese longline CPUE series in the Indian Ocean from 1994 to 2010.

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for blue shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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APPENDIX XXVIII Executive Summary: Oceanic Whitetip Shark





Status of the Indian Ocean Oceanic Whitetip Shark (Carcharhinus longimanus)

TABLE 1. IUCN threat status of oceanic whitetip shark (*Carcharhinus longimanus*) in the Indian Ocean

Common nomo	Scientific nome	IUCN threat status ¹⁴					
Common name	Scientific name	Global status	WIO	EIO			
Oceanic whitetip shark	Carcharhinus longimanus	Vulnerable	_	—			

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for oceanic whitetip sharks in the Indian Ocean, noting that there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series from the Japanese longline fleet, and about the total catches over the past decade.

Stock status. The current IUCN threat status of 'Vulnerable' applies to oceanic whitetip sharks globally (Table 1). There is a paucity of information available on this species in the Indian Ocean and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment and limited basic fishery indicators currently available for oceanic whitetip sharks in the Indian Ocean therefore the stock status is highly uncertain. Oceanic whitetip sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived, mature at 4-5 years, and have relativity few offspring (<20 pups every two years), the oceanic whitetip shark is vulnerable to overfishing. Despite the lack of data, it is apparent from the information that is available that oceanic whitetip shark abundance has declined significantly over recent decades.

Outlook. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into certain areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on oceanic whitetip sharks will decline in these areas in the near future, and may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- The two primary sources of data that drive the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Noting that current catches (probably largely underestimated) are estimated at an average ~265 t over the last five years, ~450 t in 2010, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Oceanic whitetip sharks in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

• Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a

¹⁴ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

ratio of fin-to-body weight for shark fins retained onboard a vessel.

- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks must be recorded.
- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on blue shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Oceanic whitetip shark (*Carcharhinus longimanus*) was one of the most common large sharks in warm oceanic waters. It is typically found in the open ocean but also close to reefs and near oceanic islands (Fig. 1). Table 2 outlines some of the key life history traits of oceanic whitetip shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the oceanic whitetip shark (source: <u>www.iucnredlist.org</u>)

Parameter	Description
Range and stock structure	The population dynamics and stock structure of the oceanic whitetip shark in the Indian Ocean are not known. Area of overlap with IOTC management area = high.
Longevity	Maximum age observed was 11 years for the Central and Western Pacific and, 14 years for males and 17 years for females years for the South-Western Atlantic Ocean.
Maturity (50%)	Both males and females mature at around 6 to 7 years old or about 180–190 cm TL in the western South Atlantic Ocean and 45 years or 170–190 cm TL in the Central and western Pacific Ocean. Range of observed sizes-at-maturity was 160-196cm TL for males and 181-203cm TL for females.
Reproduction	Oceanic whitetip sharks are viviparous. Litter sizes range from 1-15 pups (mean=6.2) in the Pacific Ocean, with larger sharks producing more offspring. Each pup is approximately 60-65 cm at birth. In the south western Indian Ocean, oceanic whitetip sharks appear to mate and give birth in the early summer, with a gestation period which lasts about one year. The reproductive cycle is believed to be biennial. The locations of the nursery grounds are not well known but they are thought to be in oceanic areas. Fecundity: medium (<20 pups) Gestation Period: 12 months Generation time: 11 years Reproductive cycle is biennial
Size (length and weight)	Oceanic whitetip sharks are relatively large sharks and grow to up to 350 cm FL. Females grow larger than males. The maximum weight reported for this species is 167.4 kg. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.386*10-4 * FL2.75586.

TABLE 2. Biology of Indian Ocean oceanic whitetip shark (Carcharhinus longimanus).

SOURCES: Mejuto et al. (2005); Romanov & Romanova (2009); Coelho et al. (2009).

Fisheries

Oceanic whitetip sharks are targeted by some semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and purse seine fishery).

There is little information on the fisheries prior to the early 1970's, and some countries continue not to collect shark data while others do collect it but do not report it to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but the statistics are limited by the lack of species-specific data and data from the major fleets.

The practice of shark finning is considered to be regularly occurring for this species (Clarke 2008; Clarke et al. 2006) and the bycatch/release injury rate is unknown but probably high.

At-haulback mortality of oceanic whitetip sharks in the Atlantic ocean longline fishery targeting swordfish was estimated to be at 30.6% (Coelho et al., 2011).

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Casara	DC	L	L	DD/TDAL/ILAND	СПТ	UNCI						
Gears	F 5	SWO	TUNA	DD/IKUL/HAND	GILL	UNCL						
Frequency	common	common		common	common	unknown						
Fishing Mortality	Study in progress	58%		58%		58%		58%		unknown	unknown	unknown
Post release mortality	Study in progress			unknown	unknown	unknown						

TABLE 3. Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

SOURCES: Romanov (2002, 2008); Ariz et al. (2006); Peterson et al. (2008); Romanov et al. (2008); Poisson et al. (2010)

Catch trends

The catch estimates for oceanic whitetip shark are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories). For CPCs reporting longline data by species (i.e. Australia, Spain, Portugal, United Kingdom and South Africa), 0.6% of the catch of sharks by longliners, all targeting swordfish, were oceanic whitetip sharks, and for CPCs reporting gillnet data by species (i.e. Sri Lanka), 7% of the catches of shark were oceanic whitetip sharks.

Catch		2009	2010
Maat magent astah	Oceanic white tip shark	245 t	450 t
Most recent catch	nei-sharks	62,229 t	61,966 t
Mean catch over the last 5 years (2006-	Oceanic white tip shark		265 t
2010)	nei-sharks		64,838 t

TABL	E 4.	Catch	estimates	for	oceanic	whitetip	shark	in t	the	Indian	Ocean	for	2009	and	201	0.
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Note that the catches recorded for sharks are thought incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, seven countries reported catches of oceanic whitetip sharks in the IOTC region.

Nominal and standardised CPUE Trends

Statistics not available at the IOTC Secretariat. Point estimates and 95% confidence interval for the standardized Japanese longline CPUE of oceanic whitetip shark data were not provided to the IOTC Secretariat.

Historical research data shows overall decline in CPUE and mean weight of oceanic whitetip shark (Romanov et al 2008). The authors of the paper presented at the WPEB07 (Semba and Yokawa 2011) stated that the early CPUE (2000-2002) were not reliable due to the data problems. Trends in the Japanese standardized CPUE series (2004-2009) suggest that the longline vulnerable biomass has clearly decreased (Semba and Yokawa 2011). Anecdotal reports suggest that oceanic white tips have become rare throughout much of the Indian Ocean during the past 20 years. Indian longline research surveys reported zero catches from the Arabia Sea during 2004–09 (John and Varghese 2009).



Fig. 1. Japanese longline CPUE series for oceanic whitetip shark in the Indian Ocean from 2000 to 2009.

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for oceanic whitetip shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.
LITERATURE CITED

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APPENDIX XXIX Executive Summary: Scalloped Hammerhead Shark





Status of the Indian Ocean Scalloped Hammerhead Shark (Sphyrna lewini)

TABLE 1.	IUCN threat status o	scalloped hammerhead shark	(Sphyrna lewini) in the Indian Ocean.
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Common name	Saiantifia nama	IUCN threat status ¹⁵		
Common name	Scientific name	Global status	WIO	EIO
Scalloped hammerhead	Sphyrna lewini	Endangered	Endangered	Least concern

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. The current IUCN threat status of 'Endangered' applies to blue sharks globally and specifically for the western Indian Ocean (Table 1). There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment or basic fishery indicators currently available for scalloped hammerhead shark in the Indian Ocean therefore the stock status is highly uncertain. Scalloped hammerhead sharks are commonly taken by a range of fisheries in the Indian Ocean. They are extremely vulnerable to gillnet fisheries. Furthermore, pups occupy shallow coastal nursery grounds, often heavily exploited by inshore fisheries. Because of their life history characteristics – they are relatively long lived (over 30 years), and have relativity few offspring (<31 pups each year), the scalloped hammerhead shark is vulnerable to overfishing.

Outlook. Maintaining or increasing effort will probably result in further declines in biomass and productivity. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into certain areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on scalloped hammerhead shark will decline in these areas in the near future, and may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- The primary source of data that drive the assessment (total catches) is highly uncertain and should be investigated further as a priority.
- Noting that current reported catches (probably largely underestimated) are estimated at an average ~16 t over the last five years, ~22 t in 2010, maintaining or increasing effort will probably result in further declines in biomass and productivity.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Scalloped hammerhead shark in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel.
- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they

¹⁵ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

fish outside the EEZ of their flag State. As per this resolution, catch of all sharks must be recorded.

- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 11/04 on a Regional Observer Scheme requires data on blue shark interactions to be recorded by
 observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July
 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Scalloped hammerhead shark (*Sphyrna lewini*) is widely distributed and common in warm temperate and tropical waters (Fig. 1). It is also found in estuarine and inshore waters. In some areas, the scalloped hammerhead shark forms large resident populations. In other areas, large schools of small-sized sharks are known to make seasonal migrations polewards. Scalloped hammerhead sharks feeds on pelagic fishes, rays and occasionally other sharks, squids, lobsters, shrimps and crabs. Table 2 outlines some of the key life history traits of scalloped hammerhead shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the scalloped hammerhead shark (source: <u>www.iucnredlist.org</u>)

Parameter	Description
Range and stock structure	The scalloped hammerhead shark is widely distributed and common in warm temperate and tropical waters down to 900 m. It is also found in estuarine and inshore waters. In some areas, the scalloped hammerhead shark forms large resident populations. In other areas, large schools of small-sized sharks are known to migrate seasonally polewards. Area of overlap with IOTC management area = high. There is no information available on stock structure.
Longevity	The maximum age for Atlantic Ocean scalloped hammerheads is estimated to be over 30 years with the largest individuals reaching over 310 cm TL. In the Eastern Indian Ocean, females are reported to reach 350 m TL
Maturity (50%)	Males in the eastern Indian Ocean mature at around 140-165 cm TL. Females mature at about 200 cm TL. In the northern Gulf of Mexico females are believed to mature at about 15 years and males at 9-10 years.
Reproduction	 The scalloped hammerhead shark is viviparous with a yolk sac-placenta. Litters consist of 13-23 pups (mean=16.5). The reproductive cycle is annual and the gestation period is 9-10 months. The nursery areas are in shallow coastal waters. Fecundity: medium (<31 pups) Generation time: 17-21 years Gestation Period: 9-10 months Reproductive cycle is annual
Size (length and weight)	The maximum size for Atlantic Ocean scalloped hammerheads is estimated to be over 310 cm TL. In the Eastern Indian Ocean, females are reported to reach 350 m TL New-born pups are around 45-50 cm TL at birth in the eastern Indian Ocean.

TABLE 2. Biology of Indian Ocean scalloped hammerhead shark (Sphyrna lewini).

SOURCES: Stevens and Lyle (1989); Jorgensen et al (2009)

Fisheries

Scalloped hammerhead sharks are often targeted by some semi-industrial, artisanal and recreational fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and purse seine fishery). There is little information on the fisheries prior to the early 1970's, and some countries continue not to collect shark data while others do collect it but do not report it to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but the statistics are limited by the lack of species-specific data and data from the major fleets.

The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke 2008; Clarke et al. 2006, Holmes et al. 2009) and the bycatch/release injury rate is unknown but probably high.

Coord	DC	LL		DD/TDOL/ILAND	СПТ	UNCI
Gears	rs	SWO	TUNA	DD/IKUL/HAND	GILL	UNCL
Frequency	rare	com	non	absent	common	unknown
Fishing Mortality	unknown	unknown	unknown	unknown	unknown	unknown
Post release mortality	unknown	unknown	unknown	unknown	unknown	unknown

TABLE 3. Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

SOURCES: Romanov (2002, 2008); Dudley & Simpfendorfer (2006); Romanov et al. (2008)

Catch trends

The catch estimates for scalloped hammerhead are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories).

ABLE 4. Catch estimates for scalloped hammerhead shark* in the Indian Ocean for 2009 and 2010.					
Catch		2009	2010		
Most recent octob	Scalloped hammerhead shark	21 t	22 t		
Most recent catch	nei-sharks	62,229 t	61,966 t		
Mean catch over the last 5 years (2006–2010)	Scalloped hammerhead shark		16 t		
	nei-sharks		64.838 t		

* catches likely to be misidentified with the smooth hammerhead shark (S. zygaena) which is an oceanic species.

Note that the catches recorded for sharks are thought incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, seven countries reported catches of scalloped hammerhead sharks in the IOTC region.

Nominal and standardised CPUE Trends

Data not available at the IOTC Secretariat. However, Indian longline research surveys, in which scalloped hammerhead sharks contributed up to 6% of regional catch, demonstrate declining catch rates over the period 1984–2006 (John and Varghese 2009). CPUE in South African protective net shows steady decline from 1978.

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for scalloped hammerhead shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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- Romanov E, Bach P, Romanova N, 2008. Preliminary estimates of bycatches in the western equatorial Indian Ocean in the traditional multifilament longline gears (1961-1989) IOTC Working Party on Ecosystems and Bycatch (WPEB) Bangkok, Thailand. 20-22 October, 2008. 18 p.
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APPENDIX XXX Executive Summary: Shortfin Mako Shark





Status of the Indian Ocean Shortfin Mako Shark (Isurus oxyrinchus)

Common nome	Saiantifia nome	IUCN threat status ¹⁶		
Common name	Scientific name	Global status	WIO	EIO
Shortfin mako shark	Isurus oxyrinchus	Vulnerable	_	_

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for shortfin mako shark in the Indian Ocean, for the consideration of the Scientific Committee, noting that there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series from the Japanese longline fleet, and about the total catches over the past decade.

Stock status. The current IUCN threat status of 'Vulnerable' applies to shortfin mako sharks globally (Table 1). Trends in the Japanese CPUE series suggest that the longline vulnerable biomass has declined from 1994 to 2003, and has been increasing since then. There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment or basic fishery indicators currently available for shortfin mako shark in the Indian Ocean therefore the stock status is highly uncertain. Shortfin mako sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived (over 30 years), females mature at 18–21 years, and have relativity few offspring (<25 pups every two or three years), the shortfin mako shark is vulnerable to overfishing.

Outlook. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into certain areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on shortfin make shark will decline in these areas in the near future, and may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- The two primary sources of data that drive the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Noting that current reported catches are estimated (probably largely underestimated) at an average ~990 t over the last five years, ~738 t in 2010, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Shortfin make shark in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

• Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel.

¹⁶ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks must be recorded.
- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on blue shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Shortfin mako shark (*Isurus oxyrinchus*) is widely distributed in tropical and temperate waters warmer than 16° C (Fig. 1) and is one of the fastest swimming shark species. It is known to leap out of the water when hooked and is often found in the same waters as swordfish. This species is at the top of the food chain, feeding on fast-moving fishes such as swordfish and tunas and occasionally on other sharks. Table 2 outlines some of the key life history traits of shortfin mako shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the shortfin mako shark (source: <u>www.iucnredlist.org</u>)

Parameter	Description
Range and stock structure	Widely distributed in tropical and temperate waters warmer than 16°C. Makos prefer epipelagic and littoral waters from the surface down to depths of 500 meters. Shortfin mako is not known to school. It has a tendency to follow warm water masses polewards in the summer. Tagging results from the North Atlantic Ocean showed that makos migrated over long distances and this suggests that there is a single well-mixed population in this area. Area of overlap with IOTC management area = high. No information is available on stock structure of shortfin mako sharks in the Indian Ocean.
Longevity	Maximum lifespans reported for this species are 32 years for females and 29 years for males in the western North Atlantic.
Maturity (50%)	Sexual maturity is estimated to be reached at 18-19 years or 290-300 m TL for females and 8 years or about 200 m TL for males in the western North Atlantic and 19-21 years or 207-290 m TL for females and 7-9 years or 180-190 m TL for males in the western South Pacific. In the western South Indian Ocean maturity was estimated at about 270 m TL for females and 190-210 m TL for males. The length at maturity of female shortfin make sharks differs between the Northern and Southern hemispheres.
Reproduction	 Female shortfin mako sharks are aplacental viviparous. Developing embryos feed on unfertilized eggs in the uterus during the gestation period, whose length is subject to debate but is believed to last 15-18 months. Litter size ranges from 4 to 25 pups (mean=12.5), with larger sharks producing more offspring. The nursery areas are apparently in deep tropical waters. The length of the reproductive cycle is up to three years. Generation time is estimated to be 14 years. Fecundity: medium (<25 pups) Generation time: 23 years Gestation Period: 15-18 months Reproductive cycle is biennial or triennial
Size (length and weight)	Maximum size of shortfin mako sharks in Northwest Atlantic Ocean is 4 m and 570 kg. In the Indian Ocean a female individual of 248 cm FL and 130 kg TW was aged as 18 years old. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.349*10-4 * FL2.76544. New-born pups are around 70 cm (TL).

TABLE 2. Biology of Indian Ocean shortfin mako shark (*Isurus oxyrinchus*)

SOURCES: Bass et al. (1973); Mejuto et al. (2005); Romanov & Romanova (2009)

Fisheries

Shortfin mako sharks are often targeted by some semi-industrial, artisanal and recreational fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and anecdotally by the purse seine fishery). In other Oceans, due to its energetic displays and edibility, the shortfin mako shark is considered one of the great gamefish of the world. There is little information on the fisheries prior to the early 1970's, and some countries continue not to collect shark data while others do collect it but do not report it to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but the statistics are limited by the lack of species-specific data and data from the major fleets.

The practice of shark finning is considered to be regularly occurring for this species (Clarke et al. 2006; Clarke 2008) and the bycatch/release injury rate is unknown but probably high.

Casar	DC	LL			СПТ	UNCL
Gears	P5	SWO	TUNA	BB/IKUL/HAND	GILL	
Frequency	rare	comm	on	rare-common	unknown	unknown
Fishing Mortality	unknown	13 to 51 %	0 to 31%	unknown	unknown	unknown
Post release mortality	unknown	19%		unknown	unknown	unknown

TABLE 3. Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

SOURCES: Romanov (2002, 2008); Ariz et al. (2006); Dudley & Simpfendorfer (2006); Peterson et al. (2008); Romanov et al. (2008)

Catch trends

The catch estimates for shortfin mako shark are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories). For CPCs reporting longline data by species (i.e.

Australia, Spain, Portugal, United Kingdom and South Africa), 12% of the catch of sharks by longliners, all targeting swordfish, were shortfin make sharks.

Catch		2009	2010
Mast manufactul	Shortfin mako shark	561 t	738 t
Most recent catch	nei-sharks	62,229 t	61,966 t
Mean catch over the last 5 years (2006–2010)	Shortfin mako shark		990 t
	nei-sharks		64,838 t

TABLE 4.	Catch estimates	for shortfin make	shark in the Indian	Ocean for 2009	and 2010
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Note that the catches recorded for sharks are thought incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, seven countries reported catches of blue sharks in the IOTC region.

Nominal and standardised CPUE Trends

Statistics not available at the IOTC Secretariat. Point estimates and 95% confidence interval for the standardized Japanese longline CPUE of shortfin mako shark data were not provided to the IOTC Secretariat.

Historical research data shows overall decline in CPUE and mean weight of mako sharks (Romanov et al. 2008). CPUE in South African protection net is fluctuating without any trend (Holmes et al. 2009). The CPUEs of shortfin mako catches by the Portuguese longline fleet in the Indian Ocean showed some significant variability between 1999-2010, but no noticeable trends. The standardized series for the more recent years (2006-2010) also did not show significant trends. It should be noted that this time series of standardized CPUEs is very short (5 years), part of an ongoing analysis, and should therefore be regarded as preliminary (Coelho et al. 2011b).

The Japanese CPUE series (Fig. 1) suggest that the longline vulnerable biomass largely fluctuated during 1994-2010 (Kimoto et al. 2011) and there are no apparent trends.





Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for shortfin make has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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APPENDIX XXXI Executive Summary: Silky Shark



Status of the Indian Ocean Silky Shark (Carcharhinus falciformis)

TABLE 1. IUCN threat status of silky shark (*Carcharhinus falciformis*) in the Indian Ocean

Common nome	Scientific nome	IUCN threat status ¹⁷				
Common name	Scientific frame	Global status	WIO	EIO		
Silky shark	Carcharhinus falciformis	Near Threatened	Near Threatened	Near Threatened		

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

Stock status. The current IUCN threat status of 'Near Threatened' applies to silky sharks in the western and eastern Indian Ocean and globally (Table 1). There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment or basic fishery indicators currently available for silky shark in the Indian Ocean therefore the stock status is highly uncertain. Silky sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived (over 20 years), mature relatively late (at 6-12 years), and have relativity few offspring (<20 pups every two years), the silky shark is vulnerable to overfishing. Despite the lack of data, it is clear from the information that is available that silky shark abundance has declined significantly over recent decades.

Outlook. Maintaining or increasing effort will probably result in declines in biomass, productivity and CPUE. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into certain areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on silky shark will decline in these areas in the near future, and may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the stock status at current effort levels.
- Total catches are highly uncertain and should be investigated further as a priority.
- Noting that current reported catches (probably largely underestimated) are estimated at an average ~ 670 t over the last five years, ~1, 153 t in 2010, maintaining or increasing effort will probably result in further declines in biomass.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Silky shark in the Indian Ocean are currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel.
- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks must be recorded.

¹⁷ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on blue shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Silky sharks (*Carcharhinus falciformis*) are one of the most abundant large sharks inhabiting warm tropical and subtropical waters throughout the world (Fig. 1). Table 2 outlines some of the key life history traits of silky shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the silky shark (source: <u>www.iucnredlist.org</u>)

TABLE 2. Biology of Indian Ocean Silky sharks (Carcharhinus falciformis).

Parameter	Description
Range and stock structure	Essentially pelagic, the silky shark is distributed from slopes to the open ocean. It also ranges to inshore areas and near the edges of continental shelves and over deepwater reefs. It also demonstrates strong fidelity to seamounts and natural or man-made objects (like FADs) floating at the sea surface. Silky sharks live down to 500 m. Typically, smaller individuals are found in coastal waters. Small silky sharks are also commonly associated with schools of tuna, particularly under floating objects. Large silky sharks associate with free-swimming tuna schools. Silky sharks often form mixed-sex schools containing similar sized individuals. Area of overlap with IOTC management area = high. No information is available on stock structure.
Longevity	20+ years for males; 22+ years for females in the southern Gulf of Mexico and maximum size is over 300 cm long. Generation time was estimated to be between 11 and 16 years in the Gulf of Mexico years.
Maturity (50%)	The age of sexual maturity is variable. In the Atlantic Ocean, off Mexico, silky sharks mature at 10-12+ years. By contrast in the Pacific Ocean, males mature at around 5-6 years and females mature at around 6-7 years. Size: 239 cm TL for males; 216 cm Tl for females.

Reproduction	 The silky shark is a placental viviparous species with a gestation period of around 12 months. Females give birth possibly every two years. The number of pups per litter ranges from 9-14 in the Eastern Indian Ocean, and 2-11 in the Pacific Ocean. Fecundity: medium (<20 pups) Generation time: 11-16 years Gestation period: 12 months Reproductive cycle is biennial
Size (length and weight)	Maximum size is over 300 cm long FL. New-born pups are around 75-80 cm TL or less at birth. Reported as 56–63 cm TL in the Maldives. 78–87 cm TL in South Afrrica. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.160*10-4 * FL2.91497.

SOURCES: Strasburg (1958); Bass et al. (1973); Stevens (1984); Anderson & Ahmed (1993); Mejuto et al (2005); Matsunaga (2007); Romanov & Romanova (2009)

Fisheries

Silky sharks are often targeted by some semi-industrial, artisanal and recreational fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries and purse seine fishery). Sri Lanka has had a large fishery for silky shark for over 40 years.

There is little information on the fisheries prior to the early 1970's, and some countries continue not to collect shark data while others do collect it but do not report it to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but the statistics are limited by the lack of species-specific data and data from the major fleets.

The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke 2008; Clarke et al. 2006) and the bycatch/release injury rate is unknown but probably high.

Caara	DC	LL		DD/TDOL/ILAND	CILI	UNCI	
Gears	rð	SWO	TUNA	DD/IKUL/HAND	GILL	UNCL	
Frequency	common	abundant		common	abundant	abundant	
Fishing Mortality	study in progress	study in progress	study in progress	unknown	unknown	unknown	
Post release mortality	study in progress	unknown	unknown	unknown	unknown	unknown	

TABLE 3. Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

SOURCES: Romanov (2002, 2008); Ariz et al. (2006); Peterson et al. (2008); Romanov et al. (2008)

Catch trends

The catch estimates for silky shark are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories). For CPCs reporting longline data by species (i.e. Australia, Spain, Portugal, United Kingdom and South Africa), 1.5% of the catch of sharks by longliners, all targeting swordfish, were silky sharks, and for CPCs reporting gillnet data by species (i.e. Sri Lanka), 22% of the catches of shark were silky sharks.

TABLE 4. Catch estimates for silky shark in the Indian Ocean for 2009 and 2010.

Catch		2009	2010
Most recent actab	Silky shark	543 t	1,153 t
Most recent catch	nei-sharks	62,229 t	61,966 t
Mean catch over the last 5 years (2006–2010)	Silky shark		670 t
	nei-sharks		64,838 t

Note that the catches recorded for sharks are thought incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also

likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, seven countries reported catches of silky sharks in the IOTC region.

Nominal and standardised CPUE Trends

Data not available at the IOTC Secretariat. However, Maldivian shark fishermen report significant declines in silky shark abundance over past 20 years (Anderson 2009). In addition, Indian longline research surveys, in which silky sharks contributed 7% of catch, demonstrate declining catch rates over the period 1984–2006 (John & Varghese 2009). No long-term data for purse-seine CPUE are available, however there is anecdotal evidences of five-fold decrease of silky shark catches per set between 1980s and 2005s.

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for silky shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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APPENDIX XXXII Executive Summary: Bigeye Thresher Shark





Status of the Indian Ocean Bigeye Thresher Shark (Alopias superciliosus)

TABLE 1. IUCN threat status. of bigeye thresher shark (Alopias superciliosus) in the Indian Ocean

Common name Scientific name		IUCN threat status ¹⁸		
Common name	Scientific name	Global status	WIO	EIO
Bigeye thresher shark	Alopias superciliosus	Vulnerable	—	-

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for bigeye thresher shark in the Indian Ocean, noting that there remains considerable uncertainty in the stock status due to lack of information necessary for assessment or to for the development of other indicators of the stock.

Stock status. The current IUCN threat status of 'Vulnerable' applies to bigeye thresher shark globally (Table 1). There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment and limited basic fishery indicators currently available for bigeye thresher shark in the Indian Ocean therefore the stock status is highly uncertain. Bigeye thresher sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived (+20 years), mature at 9-13 years, and have few offspring (2-4 pups every year), the bigeye thresher shark is vulnerable to overfishing.

Outlook. Current longline fishing effort is directed to other species, however bigeye thresher sharks is a common bycatch these fisheries. Hooking mortality is apparently very high, therefore IOTC regulation 10/12 prohibiting retaining of any part of thresher sharks onboard and promoting life release of thresher shark are apparently ineffective for species conservation. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. However there are few data to estimated CPUE trends, in view of IOTC regulation 10/12 and reluctance of fishing fleet to report information on discards/non-retained catch. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into other areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on bigeye thresher shark will decline in these areas in the near future, which may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the status of the IO stock at current effort levels.
- Two important sources of data that inform the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Noting that current catches (probably largely underestimated) are estimated at an average ~4 t over the last five years, ~5 t in 2010, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.
- The SC agreed that three options should be considered for amendment of Resolution 08/04 concerning the recording of the catch by longline fishing vessels in the IOTC area in order to improve data collection and statistics on sharks that would allow the development of stock status indicators.

¹⁸ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Bigeye thresher shark in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel (although for thresher sharks this has been largely superseded by Resolution 10/12 as it is prohibited to retain any part).
- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks (retained and discarded) must be recorded.
- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 10/12 On the Conservation of Thresher Sharks (Family Alopiidae) caught in Association with Fisheries in the IOTC Area of Competence prohibiting Fishing Vessels flying the flag of IOTC Members and Cooperating non-Contracting Parties (CPCs) from retaining on board, transhipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on bigeye thresher shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.¹⁹

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

1. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 10/12 ON THE CONSERVATION OF THRESHER SHARKS (FAMILY ALOPIIDAE) CAUGHT IN ASSOCIATION WITH FISHERIES IN THE IOTC AREA OF COMPETENCE

- 1. Fishing Vessels flying the flag of an IOTC Member and Cooperating non-Contracting Parties (CPCs) are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.
- 2. CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, thresher sharks when brought along side for taking on board the vessel.
- 3. CPCs shall encourage their fishermen to record incidental catches as well as live releases. These data will be then kept at the IOTC secretariat.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Bigeye thresher shark (*Alopias superciliosus*) is found in pelagic coastal and oceanic waters throughout the tropical and temperate oceans worldwide (Fig. 1). Found in coastal waters over the continental shelves, sometimes close inshore in shallow waters, and on the high seas in the epipelagic zone far from land; also caught near the bottom in deep water on

¹⁹ This is not applicable to Alopiidae in view of Resolution 10/12 On the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC area of competence.

the continental slopes (Compagno 2001). It can be found near the surface, and has even been recorded in the intertidal, but it is commonest below 100m depth, occurs regularly to at least 500 m deep and has been recorded to 723 m deep (Nakano et al. 2003, Compagno 2001). No predation on bigeye thresher sharks has been reported to date; however it may be preyed upon by makos, white sharks, and killer whales. Fishing is the major contributor to adult mortality. This species used its long tail to attack prey (Compagno 2001; Aalbers et al. 2010). Table 2 outlines some of the key life history traits of bigeye thresher shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the bigeye thresher shark (source: FAO).

TABLE 2. Biology of Indian Ocean bigeye thresher shark (Alopias superciliosus).

Parameter	Description
Range and stock structure	In the tropical Indian Ocean, the greatest abundance of bigeye thresher shark occurs at depths of 50 to 300 m, in temperatures ranging from 8 to 25° C. It is considered a highly migratory species, however, no published information on horizontal movements of bigeye thresher shark is known for the Indian Ocean. This species exhibits a prominent diurnal pattern in vertical distribution spending daytime at the depth between 200 and 700 m depth and migrating to the upper layers at night. Bigeye thresher shark is a solitary fish however it is often caught in the same areas and habitats as pelagic thresher sharks <i>Alopias pelagicus</i> . Area of overlap with IOTC management area = high. No information is available on stock structure.
Longevity	No ageing studies is known for the Indian Ocean. In the Pacific Ocean (China, Taiwan Province) the oldest bigeye thresher sharks reported were a 19 year old male and a 20 year old female for fish ~ 370 cm TL. Taking into consideration that maximum length is exceed 400 cm longevity is apparently around 25-30 years. In the Eastern Atlantic Ocean, the maximum ages reported in a recent life history study were 22 years for females and 17 years for males (Fernandez-Carvalho et al., in press).
Maturity (50%)	Age: Sexual maturity is attained at 12-13 years (females), 9-10 years (males). Size: Males mature at 270-300 cm total length (TL) and females at 332-355 cm TL. Size at 50% maturity from the eastern Atlantic Ocean was estimated at 206 cm FL for females (95% CI: 199-213 cm FL), and 160 cm FL for males (95% CI: 156-164 cm FL) (Fernandez-Carvalho et al., 2011).
Reproduction	 Bigeye thresher shark is an aplacental viviparous with oophagy species. Fecundity: very low (2-4) Generation time: around 15 years (due to oophagy) Gestation Period: 12 months Reproductive cycle: unknown Of the thresher sharks, the Bigeye Thresher has the lowest rate of annual increase, estimated at 1.6% under sustainable exploitation (Smith et al. 2008), or 0.002-0.009 (Cortés 2008, Dulvy et al. 2008).
Size (length and weight)	Maximum size is around 461 cm TL. New-born pups are around 64-140 cm TL. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.155*10 ⁻⁴ *FL ^{2.97883}

SOURCES: Compagno (2001); Chen *et al.* (1997); Lui et al. (1998); Nakano et al (2003), Weng, Block (2004); Amorim et al. (2007); Stevens et al. (2010); Romanov (2011) pers. comm.

Fisheries

Bigeye thresher shark are often targeted by some recreational, semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries). Typically, the fisheries take bigeye thresher sharks

between 140-210 cm FL or 40 to 120 kg (Romanov, 2011 pers. comm.). In Australia thresher sharks used to be a target of sport fisherine. Sport fisheries for oceanic sharks are apparently not so common in other Indian Ocean countries.

There is little information on the fisheries prior to the early 1970's. Some countries still fail to collect shark data while others do collect it but fail to report to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many existing catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but their statistics are limited by the lack of species-specific data and data from the major fleets. Thresher sharks were marketed both locally and in European markets until at least up until early 2011 despite the 2010 IOTC regulation. The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke 2008; Clarke et al. 2006). The post-release mortality is unknown but probably high. In longline fisheries bigeye thresher sharks are often hooked by the tail (Compagno, 2001; Romanov, 2011 pers. comm.) and die soon afterward. Therefore they are discarded dead if not retained. In most cases discarded sharks are not recorded in fisheries logbooks. Therefore the current IOTC regulation measures (notably Resolution 10/12) appear to have limited conservation effect while contributing to further loss of fisheries data. Other types of conservation efforts such as protected areas should be considered for this species group by the WPEB, taking into account a detailed analysis of catch distribution and 'hotspots' of abundance derived from research data.

Coord	DC	L	L	DD/TDOL/ILAND	СПТ	UNCL
Gears	rs	SWO	TUNA	DD/IKUL/HAND	GILL	
Frequency	absent	Common		rare	unknown	unknown
Fishing Mortality	no	high	high	unknown	unknown	unknown
Post release mortality	N/A	unknown	unknown	unknown	unknown	unknown

TABLE 3. Estimated frequency of occurrence and bycatch mortality in the Indian Ocean pelagic fisheries.

SOURCES: Boggs (1992); Anderson & Ahmed (1993); Romanov (2002, 2008); Ariz et al., 2006; Peterson et al. (2008); Romanov et al. (2008).

Catch trends

The catch estimates for bigeye thresher shark are highly uncertain, as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories).

TABLE 4.	Catch estimates	for bigeve	thresher sha	rk in the I	Indian Ocean	for 2009 and 2010

Catch		2009	2010
Mart mount antal	bigeye thresher	5 t	5 t
Most recent catch	nei-sharks	62,229 t	61,966
Mean catch over the last 5 years (2006–2010)	bigeye thresher		4 t
	nei-sharks		64,838 t

Note that reported shark catches are incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, seven countries reported catches of bigeye thresher sharks in the IOTC region.

Nominal and standardised CPUE trends

Data not available at the IOTC Secretariat. There are no surveys specifically designed to assess shark catch rates in the Indian Ocean. Historical research data shows overall decline both in CPUE and mean weight of thresher sharks (Romanov, 2011, pers. comm.).

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for bigeye thresher shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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APPENDIX XXXIII Executive Summary: Pelagic Thresher Shark



Status of the Indian Ocean Pelagic Thresher Shark (Alopias pelagicus)

TABLE 1.	IUCN threat status	of pelagic thresher shar	x (Alopias pela	gicus) in the Indian Ocean
			- (A ¹ ··· [*]

Common nome	Saiontifia nome	IUCN threat status ²⁰		
Common name	Scientific name	Global status	WIO	EIO
Pelagic thresher shark	Alopias pelagicus	Vulnerable	_	_

IUCN = International Union for Conservation of Nature; WIO = Western Indian Ocean; EIO = Eastern Indian Ocean SOURCES: IUCN (2007, 2011)

INDIAN OCEAN STOCK - MANAGEMENT ADVICE

The SC **RECOMMENDED** the following management advice for pelagic thresher shark in the Indian Ocean, noting that there remains considerable uncertainty in the stock status due to lack of information necessary for assessment or to for the development of other indicators of the stock.

Stock status. The current IUCN threat status of 'Vulnerable' applies to pelagic thresher shark globally (Table 1). There is a paucity of information available on this species and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment and limited basic fishery indicators currently available for pelagic thresher shark in the Indian Ocean therefore the stock status is highly uncertain. Pelagic thresher sharks are commonly taken by a range of fisheries in the Indian Ocean. Because of their life history characteristics – they are relatively long lived (+ 20 years), mature at 8-9 years, and have few offspring (2 pups every year), the pelagic thresher shark is vulnerable to overfishing.

Outlook. Current longline fishing effort is directed to other species, however pelagic thresher sharks is a common bycatch these fisheries. Hooking mortality is apparently very high, therefore IOTC regulation 10/12 prohibiting retaining of any part of thresher sharks onboard and promoting life release of thresher shark are apparently ineffective for species conservation. Maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE. However there are few data to estimated CPUE trends, in view of IOTC regulation 10/12 and reluctance of fishing fleet to report information on discards/non-retained catch. The impact of piracy in the western Indian Ocean has resulted in the displacement and subsequent concentration of a substantial portion of longline fishing effort into other areas in the southern and eastern Indian Ocean. It is therefore unlikely that catch and effort on pelagic thresher shark will decline in these areas in the near future, which may result in localised depletion.

The Scientific Committee considered the following:

- The available evidence indicates considerable risk to the status of the IO stock at current effort levels.
- Two important sources of data that inform the assessment, total catches and CPUE are highly uncertain and should be investigated further as a priority.
- Noting that current catches (probably largely underestimated) are estimated at 2 t in 2010, maintaining or increasing effort will probably result in further declines in biomass, productivity and CPUE.
- The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.
- The SC agreed three options should be considered for amendment of Resolution 08/04 concerning the recording of the catch by longline fishing vessels in the IOTC area in order to improve data collection and statistics on sharks that would allow the development of stock status indicators.

²⁰ The process of the threat assessment from IUCN is independent from the IOTC and is presented for information purpose only

SUPPORTING INFORMATION

(Information collated from reports of the Working Party on Ecosystems and Bycatch and other sources as cited)

CONSERVATION AND MANAGEMENT MEASURES

Pelagic thresher shark in the Indian Ocean is currently subject to a number of conservation and management measures adopted by the Commission:

- Resolution 05/05 Concerning the conservation of sharks caught in association with fisheries managed by *IOTC* includes minimum reporting requirements for sharks, calls for full utilisation of sharks and includes a ratio of fin-to-body weight for shark fins retained onboard a vessel (although for thresher sharks this has been largely superseded by Resolution 10/12).
- Resolution 08/04 *Concerning the recording of catch by longline fishing vessels in the IOTC area* sets out the minimum logbook requirements for longline fishing vessels over 24 metres length and under 24 metres if they fish outside the EEZ of their flag State. As per this resolution, catch of all sharks (retained and discarded) must be recorded.
- Resolution 10/03 *Concerning the recording of catch by fishing vessels in the IOTC area* sets out minimum logbook requirements for all purse-seine vessels 24 metres length overall or greater and those under 24 metres if they fish outside the EEZs of their flag States. As per this resolution, catch and discard of all shark species should be recorded.
- Resolution 10/12 On the Conservation of Thresher Sharks (Family Alopiidae) caught in Association with Fisheries in the IOTC Area of Competence prohibiting to Fishing Vessels flying the flag of IOTC Member and Cooperating non-Contracting Parties (CPCs) from retaining on board, transhipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.
- Resolution 11/04 *on a Regional Observer Scheme* requires data on pelagic thresher shark interactions to be recorded by observers and reported to the IOTC within 150 days. The Regional Observer Scheme (ROS) started on 1st July 2010.

Extracts from Resolutions 09/06 and 11/04

RESOLUTION 05/05 CONCERNING THE CONSERVATION OF SHARKS CAUGHT IN ASSOCIATION WITH FISHERIES MANAGED BY IOTC

3. CPCs shall take the necessary measures to require that their fishermen fully utilise their entire catches of sharks. Full utilisation is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing.²¹

RESOLUTION 08/04 CONCERNING THE RECORDING OF CATCH BY LONGLINE FISHING VESSELS IN THE IOTC AREA

4. Each flag CPC shall ensure that all long line fishing vessels flying its flag and authorized to fish species managed by IOTC be subject to a data recording system.

RESOLUTION 10/12 ON THE CONSERVATION OF THRESHER SHARKS (FAMILY ALOPIIDAE) CAUGHT IN ASSOCIATION WITH FISHERIES IN THE IOTC AREA OF COMPETENCE

- 2. Fishing Vessels flying the flag of an IOTC Member and Cooperating non-Contracting Parties (CPCs) are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae.
- 5. CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, thresher sharks when brought along side for taking on board the vessel.
- 6. CPCs shall encourage their fishermen to record incidental catches as well as live releases. These data will be then kept at the IOTC secretariat.

RESOLUTION 11/04 ON A REGIONAL OBSERVER SCHEME

10. Observers shall:

b) Observe and estimate catches as far as possible with a view to identifying catch composition and monitoring discards, by-catches and size frequency

FISHERIES INDICATORS

General

Pelagic thresher shark (*Alopias pelagicus*) is a common shark in pelagic coastal and oceanic waters throughout the tropical Indo-Pacific (Fig. 1). This species is commonly confused with common thresher shark (*Alopias vulpinus*), which is mostly temperate species and often recorded under wrong name. Apparently most of tropical records of

²¹ This is not applicable to Alopiidae in view of Resolution 10/12 On the conservation of thresher sharks (Family Alopiidae) caught in association with fisheries in the IOTC area of competence.

common thresher sharks in the Indo-Pacific are misidentified pelagic threshers. Due to identification confusions actual distribution and biology of pelagic and common thresher sharks are poorly known. It is probably highly migratory and is epipelagic from the surface to at least 300 m depth (Compagno 2001, Romanov 2011 pers. comm.). It aggregates around seamounts and continental slopes (Compagno 2001). No predation on pelagic thresher sharks has been reported to date; however being smalles species among thresher sharks it may be preyed upon by bigger species such as tiger shark, makos, white sharks, and killer whales. Fishing is a major contributor to adult mortality. This species used its long tail to attack prey (Compagno 2001; Aalbers et al. 2010). Table 2 outlines some of the key life history traits of pelagic thresher shark in the Indian Ocean.



Fig. 1. The worldwide distribution of the pelagic thresher shark (source: FAO).

TABLE 2. Biology of Indian Ocean pelagic thresher shark (Alopias pelagicus).

Parameter	Description				
Range and stock structure	In the tropical Indian Ocean, the greatest abundance of pelagic thresher shark occurs at depths of 50 to 300 m, in temperatures ranging from 8 to 25°C. It is considered as highly migratory species however no published information on horizontal movements of pelagic thresher shark is known for the Indian Ocean. Apparently pelagic thresher shark is a solitary fish however it is often aggregated around seamounts or over continental slopes. Area of overlap with IOTC management area = high. No information is available on stock structure.				
Longevity	No ageing studies is known for the Indian Ocean, In the Pacific Ocean (China, Taiwan Province) the oldest pelagic hresher sharks reported were a 20 year old male (170 cm SL) and a 28 year old female for fish ~ 188 cm SL.				
Maturity (50%)	Age: Sexual maturity is attained at 8-9 years (females), 7-8 years (males). Size: Males mature at 140-145 cm standard length (SL) and females at 145-150 cm TL.				
Reproduction	 Pelagic thresher shark is an ovoviviparous species, without a placental attachment. Fecundity: very low (2) Generation time: 8-10 years Gestation period: <12 months Reproductive cycle: unknown Its potential annual rate of population increase under sustainable fishing is thought to be very low and has been estimated at or 0.033 (Dulvy et al. 2008) 				
Size (length and weight)	Maximum size is around 365 cm TL. New-born pups are around 158-190 cm TL. Length–weight relationship for both sexes combined in the Indian Ocean is TW=0.001*10 ⁻⁴ *FL ^{2.15243}				

SOURCES: Compagno (2001); Lui et al. (1998); Reardon et al. (2004); Romanov (2011) pers. comm.

Fisheries

Pelagic thresher shark are often targeted by some recreational, semi-industrial and artisanal fisheries and are a bycatch of industrial fisheries (pelagic longline tuna and swordfish fisheries). Typically, the fisheries take pelagic thresher sharks between 120-190 cm FL or 20 to 90 kg (Romanov 2011 pers. comm.). In Australia thresher sharks used to be a

target of sport fishermen. Sport fisheries for oceanic sharks are apparently not so common in other Indian Ocean countries.

There is little information on the fisheries prior to the early 1970's. Some countries still fail to collect shark data while others do collect it but fail to report to IOTC. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many existing catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks usually discarded because of their size or condition) or they reflect dressed weights instead of live weights. FAO also compiles landings data on elasmobranchs, but their statistics are limited by the lack of species-specific data and data from the major fleets. Thresher sharks were marketed both locally and in European markets until at least up until early 2011 despite the 2010 IOTC regulation. The practice of shark finning is considered to be regularly occurring and on the increase for this species (Clarke 2008; Clarke et al. 2006). The bycatch/release mortality rate is unknown but probably high. In longline fisheries pelagic thresher sharks are often hooked by the tail (Compagno, 2001; Romanov, 2011 pers. comm.) and die soon afterward. Therefore they are discarded dead if not retained. In most cases discarded sharks are not recorded in fisheries logbooks. Therefore the current IOTC regulation measures (notably Resolution 10/12) appear to have limited conservation effect while contributing to further loss of fisheries data. Other types of conservation efforts such as protected areas should be considered for this species group by the WPEB, taking into account a detailed analysis of catch distribution and 'hotspots' of abundance derived from research data. Extremely common misidentification of this species with common thresher shark aggravate situation with data collection.

			· · · · · · · · · · · · · · · · · · ·	<u> </u>	1 0	
Cashe	DS	LL		DD/TDOL/HAND	СПТ	UNCI
Gears	r5	SWO	TUNA	DD/IKUL/HAND	GILL	UNCL
Frequency	absent	Common		rare	unknown	unknown
Fishing Mortality	no	high	high	unknown	unknown	unknown
Post release mortality	N/A	unknown	unknown	unknown	unknown	unknown

	TABLE 3. Estimated free	uency	of occu	irrence and b	bycatch	mortality	y in the	Indian	Ocean	pelagic	fisheries
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SOURCES: Boggs (1992); Romanov (2002, 2008); Romanov (2011) pers. comm.

Catch trends

The catch estimates for pelagic thresher shark are highly uncertain as is their utility in terms of minimum catch estimates. Four CPCs have reported detailed data on sharks (i.e. Australia, EU (Spain, Portugal and United Kingdom), South Africa, and Sri-Lanka) while nine CPCs have reported partial data or data aggregated for all species (i.e. Belize, China, Japan, Korea, Malaysia, Oman, Seychelles, Mauritius, UK-territories).

TABLE 4.	Catch estimates	for pelagic	thresher	shark in the	Indian	Ocean for	· 2009	and 2010
IADLL 4.	Catch estimates	101 peragic	unconci	shark in the	mulan	Occan 101	. 2009	anu 2010.

Catch		2009	2010
Mart manual antal	pelagic thresher	2 t	2 t
Most recent catch	nei-sharks	62,229 t	61,966
Mean catch over the last 5 years (2006–2010)	pelagic thresher		No data reported prior to 2009
	nei-sharks		64,838 t

Note that reported shark catches are incomplete. The catches of sharks are usually not reported and when they are they might not represent the total catches of this species but simply those retained on board. It is also likely that the amounts recorded refer to weights of processed specimens, not to live weights. In 2010, none of CPCs reported catches of pelagic thresher sharks in the IOTC region.

Nominal and standardised CPUE Trends

Data not available at the IOTC Secretariat. There are no surveys specifically designed to assess shark catch rates in the Indian Ocean. Historical research data shows overall decline both in CPUE and mean weight of thresher sharks (Romanov, 2011, pers. comm.).

Average weight in the catch by fisheries

Data not available.

Number of squares fished

Catch and effort data not available.

STOCK ASSESSMENT

No quantitative stock assessment for pelagic thresher shark has been undertaken by the IOTC Working Party on Ecosystems and Bycatch.

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APPENDIX XXXIV UPDATE ON THE IMPLEMENTATION OF THE IOTC REGIONAL OBSERVER SCHEME

CPCs	Act	ive Vess High S	sels LO. Seas ves	A≥24m sels ²²	Progress	List of accredited	Observer Trip
	LL	L PS GN BB		observers submitted	Reports submitted		
MEMBERS		L		I			
Australia	4	9			Australia has implemented an observer programme that complies with the IOTC Regional Observer Scheme.	YES: 21	YES: 3
Belize	5				No information received by the Secretariat.	No	No
China	20				China has an observer programme.	No	YES: 1
–Taiwan,China	562				No information received by the Secretariat.	YES: 54	No
Comoros					Comoros does not have vessel more than 24m on which observer should be placed. 2 observers were trained under the IOC Regional Monitoring Project, and 5 by SWIOFP.	YES: 7	N/A
Eritrea					No information received by the Secretariat.	No	No
European Union	47	21			EU has an observer programme on-board its purse-seine fleets, however the programme is limited due to the piracy activity in the western Indian Ocean. EU has or is developing observer programmes on-board its longline fleets, i.e. La Réunion, Spanish and Portuguese fleets.	Partial: EU,France: 7 EU,Portugal: 3	YES: 1
France (OT)		5			No information received by the Secretariat.	YES: 15	No
Guinea	3				No information received by the Secretariat.	No	No
India	53				India has not developed any observer programme so far.	No	No
Indonesia	996				Indonesia has an observer programme based in Benoa, Bali with 5 trained observers. The number of observers should double in 2012.	No	No
Iran, Isl. Rep. of		8	863		No information received by the Secretariat.	No	No
Japan	83	1			Japan has started its observer programme on the 1 st of July 2010, and 14 observers are currently being deployed in the Indian Ocean.	YES: 14	YES: 6
Kenya	1				Kenya is developing an observer programme and 5 observers have been trained under the SWIOFP training.	No	No
Korea, Rep. of	13				Korea has an observer programme since 2002 with 3 observers being deployed in the Indian Ocean giving a14.5% coverage of the fishing operation in 2009.	No	No
Madagascar	3				Madagascar is developing an observer programme. Five and three observers have been trained respectively under the SWIOFP and the IOC projects.	YES: 8	No
Malaysia	41	1			No information received by the Secretariat.	No	No
Maldives, Rep. of				459	Maldives vessels are monitored by field samplers at landing sites. Have in excess of 250 vessels larger than 24m.	No	No
Mauritius	4				Mauritius is developing an observer programme, and, 5 and 3 observers have been trained respectively under the SWIOFP and the IOC projects.	No	No
Oman, Sul. of	48				No information received by the Secretariat.	No	No
Pakistan			10		No information received by the Secretariat.	No	No

²² The number of active vessels is given for 2010.

Philippines	7				No information received by the Secretariat.	No	No
Seychelles, Republic of	35	9			Seychelles is developing an observer programme. Four and three observers have been trained respectively under the SWIOFP and the IOC projects.	YES: 7	No
Sierra Leone					No information received by the Secretariat.	No	No
Sri Lanka			3346		Sri Lanka has not started the implementation of an observer programme.	No	No
Sudan					No information received by the Secretariat.	No	No
Tanzania, United Rep.of	3				No information received by the Secretariat.	No	No
Thailand	2	4			Thailand has not developed an observer programme so far.	No	No
United Kingdom					UK does not have any active vessels in the Indian Ocean.	N/A	N/A
Vanuatu	4				No information received by the Secretariat.	No	No
COOPERATING NON-CONTRACTING PARTIES							
Mozambique					No information received by the Secretariat.	No	No
Senegal	3				No information received by the Secretariat.	No	No
South Africa, Republic of	23				No information received by the Secretariat.	No	No

APPENDIX XXXV

DRAFT PROPOSAL FOR MINIMUM REQUIREMENTS FOR CATCH AND EFFORT DATA

Record once per trip (or month for daily operation), unless gear configuration changes

1.1 REPORT INFORMATION

- 1) Date of the submission of logbook
- 2) Name of reporting person

1.2 VESSEL INFORMATION

- 1) Vessel name and/or registration number
- 2) IOTC number, where available
- 3) Call sign: if call sign is not available, other unique identifying code such as registration or fishing license number should be used
- 4) Vessel size: gross tonnage and/or overall length (meters)

1.3 CRUISE INFORMATION

For multiday fishing operations record the

- 1) Departure date and port
- 2) Arrival date and port

1.4 OTHER REQUIRED INFORMATION

Longline (Gear Configuration):

- 1) Average branch line length (meters): straight length in meters between snap and hook (Figure 1)
- 2) Average float line length (meters): straight length in meters from the float to the snap
- 3) Average length between branch (meters): straight length of main line in meters between successive branch lines
- 4) Main line material classified into four categories:
 - a. Thick rope (Cremona rope)
 - b. Thin rope (PE or other materials)
 - c. Nylon braided
 - d. Nylon monofilament

Purse Seine

Gear configuration:

- 1) Length and height of the purse seine net
- 2) Stretched mesh size
- Search information:
- 1) Days searched
- 2) Spotter plane used (Yes/No)
- 3) Supply vessel (Yes/No)

Gillnet (Gear Configuration):

- 1) Minimum and maximum fishing depth of assembled net (meters): record the maximum and minimum of the depth range fished
- 2) Mesh size of net (millimetres): record the mesh size used during the trip
- 3) Height of assembled net (meters): height on assembled net in meters
- 4) Netting material: e.g. nylon braid, nylon monofilament, etc.
- 5) Total length of net lost and not recovered (meters): record the total length lost during the trip

Pole and line (Gear configuration)

- 1) Number of poles onboard
- 2) Number of fishermen

Record once per set/shot/operation

2.1 OPERATION

For longline:

- 1) Date of set (YYY/MM/DD)
- 2) Position in latitude and longitude: either at noon (GMT) position or position of start of gear, area code of operation (e.g. Seychelles EEZ, High seas, etc.) may be optionally used
- 3) GMT (24 hr) of starting setting the gear
- 4) Sea surface temperature at noon with one decimal point, if available (XX.X°C)
- 5) Number of hooks between floats: if there are different hooks counts between floats in a single set then record the most representative (average) number
- 6) Total number of hooks used in the set
- 7) Number of light-sticks used in the set
- 8) Type of bait used in the set

For purse seine:

- 1) Date of event (YYYY/MM/DD)
- 2) Type of event: fishing set or deployment of a new FAD
- 3) Position in latitude and longitude and time of event, or if no event during the day, at noon (GMT)
- 4) If fishing set: specify if the set was successful, nil, well, type of school (FAD association, specify the type (e.g. object, beacon, whale shark, whale, etc.) and/or free swimming school)
- 5) Sea surface temperature at noon with one decimal point, if available (XX.X°C)

For gillnet:

- 1) Date of set (YYYY/MM/DD): record the date for each set of day at sea (for days without sets)
- 2) Total length of net (meters): length floatline used for each set in meters
- 3) Start fishing time: record the UCT time (24 hr) when starting each set

- 4) Start and end position in latitude and longitude: record start and end latitude and longitude that represent the area that your gear is set between. Record the latitude and longitude at noon for days with no set.
- 5) Depth at which net is set (meters): approximate depth at which the gillnet is set

For Pole and Line:

- 1) Date of activity: record the day. Each day should be recorded separately.
- 2) Position: record the latitude and longitude at noon
- 3) Number of fishing gears used: Record the number of fishing poles used during the day
- 4) Start fishing time (record the UTC time (24 hr) immediately after bait fishing is complete and the vessel heads to the ocean for fishing. For multiple days, the time at which search starts should be recorded) and end fishing time (record the UTC time (24 hr) immediately after fishing is complete from the last school. On multiple days this is the time fishing stopped from the last school.
- 5) Type of school: FAD associated and/or free school

2.2 CATCH

- 1) Catch weight (kg) or number by species per set/shot/fishing event for each of the species and form of processing in section 2.3:
 - a. For longline by number and weight;
 - b. For purse seine by weight;
 - c. For gillnet by weight;
 - d. For pole and line by weight or number

2.3 SPECIES

TABLE 1. List of elasmobranchs species to be recorded in the logbook for longline, purse seine and gillnet fishing vessels.

For longline:

IOTC species	
Southern bluefin tuna (<i>Thunnus maccoyii</i>) Albacore (<i>Thunnus alalunga</i>) Bigeye tuna (<i>Thunnus obesus</i>) Yellowfin tuna (<i>Thunnus albacares</i>) Skipjack tuna (<i>Katsuwonus pelamis</i>) Swordfish (<i>Xiphias gladius</i>) Striped marlin (<i>Tetrapturus audax</i>) Indo-Pacific blue marlin (<i>Makaira mazara</i>) Black marlin (<i>Makaira indica</i>)	Optional species to be recorded Thresher Sharks (Alopias spp.) Tiger shark (Galeocerdo cuvier) Crocodile shark (Pseudocarcharias kamoharai) Great white shark (Carcharodon carcharias) Mantas and devils rays (Mobulidae) Pelagic stingray (Pteroplatytrygon violacea) Other requiem sharks (Carcharhinus spp.) Other sharks
Indo-Pacific sailfish (<i>Istiophorus platypterus</i>) <i>Other species</i> Shortbill spearfish (<i>Tetrapturus angustirostris</i>) Blue Shark (<i>Prionace glauca</i>) Mako Sharks (<i>Isurus</i> spp.) Porbeagle (Lamna nasus) Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>) Hammerhead Sharks (Sphyrnidae) Other bony fish Other sharks	Other rays

For purse seine:

IOTC species Albacore (*Thunnus alalunga*) Bigeye tuna (*Thunnus obesus*) Yellowfin tuna (*Thunnus albacares*) Skipjack tuna (*Katsuwonus pelamis*) Other IOTC species

Optional species to be recorded

Oceanic whitetip shark (*Carcharhinus longimanus*) Silky shark (*Carcharhinus falciformis*) Whale shark (*Rhincodon typus*) Mantas and devils rays (Mobulidae) Other sharks Other rays Other bony fish

For gillnet:

IOTC species Albacore (*Thunnus alalunga*) Bigeye tuna (Thunnus obesus) Yellowfin tuna (*Thunnus albacares*) Skipjack tuna (Katsuwonus pelamis) Longtail tuna (Thunnus tonggol) Frigate and bullet tuna (Auxis spp.) Kawakawa (Euthynnus affinis) Narrow-barred Spanish mackerel (Scomberomorus commerson) Indo-Pacific king mackerel (Scomberomorus guttatus) Swordfish (*Xiphias gladius*) Indo-Pacific sailfish (Istiophorus platypterus) Marlins (Tetrapturus spp.; Makaira spp.) Other IOTC species

Other species

Shortbill spearfish (Tetrapturus angustirostris) Blue Shark (Prionace glauca) Mako Sharks (Isurus spp.) Porbeagle (Lamna nasus) Oceanic Whitetip Shark (*Carcharhinus longimanus*) Hammerhead Sharks (Sphyrnidae) Other bony fish Other sharks **Optional species to be recorded** Thresher Sharks (Alopias spp.) Tiger shark (Galeocerdo cuvier) Crocodile shark (Pseudocarcharias kamoharai) Great white shark (Carcharodon carcharias) Mantas and devils rays (Mobulidae) Pelagic stingray (Pteroplatytrygon violacea) Other requiem sharks (*Carcharhinus spp.*) Other sharks Other rays

For pole-and-line:

IOTC species Albacore (*Thunnus alalunga*) Bigeye tuna (*Thunnus obesus*) Yellowfin tuna (*Thunnus albacares*) Skipjack tuna (*Katsuwonus pelamis*) Frigate and bullet tuna (*Auxis spp.*) Kawakawa (*Euthynnus affinis*) Longtail tuna (Thunnus tonggol) Narrow-barred Spanish mackerel (*Scomberomorus commerson*) Other IOTC species

Optional species to be recorded Other bony fish Sharks Rays

2.4 REMARKS

- 1) Discard of tuna, tuna-like fish and sharks to be recorded by species in weight (kg) or number for all gears should be recorded in the remarks²³
- 2) Any interactions with whale sharks (*Rhincodon typus*), marine mammals, marine turtles and seabirds should be recorded in the remarks
- 3) Other information is also written in the remarks

Note: The species included in the logbooks are regarded as minimum requirement. Optionally other frequently caught shark and/or fish species should be added as required across different areas and fisheries.

HANDLINE

All logbook information shall be recorded by day; where more than one fishing event is recorded for the same day, it is advisable to record each fishing event separately

Record once in one cruise, or month where daily operation 1-1 INFORMATION OF REPORT

- 1) Fishing day (or Date of submission of the logbook, where multiple fishing days).
- 2) Name of reporting person

1-2 VESSEL INFORMATION

- 3) Vessel name and registration number
- 4) IOTC number, where available
- 5) Fishing License number
- 6) Licensed gears and species
- 7) Vessel size: Gross tonnage (in MT) and/or length overall (in m)

1-3 CRUISE INFORMATION

- 1) Departure date and port
- 2) Arrival date and port

HANDLINE

2-1 OPERATION

1) Date of fishing

Record the date of fishing. Each fishing day should be recorded separately.

2) Number of fishermen

Record the number of fishermen on the boat by fishing day (fishing event)

3) Number of Fishing Gear

Record the number of fishing gear used during the day (fishing event). If the exact number is not available a range may be used i) less than 5 lines, ii) 6-10 lines; iii) more than 11 lines.

4) Start Fishing Time

Record the UCT time (24 hr) corresponding to the time the boat heads to ocean for fishing. Where fishing occurs on multiple days the time at which searching starts should be recorded.

5) End Fishing Time

Record the UCT time (24 hr) immediately after fishing is complete. This is the time in which the captain decides to head home. On multiple days this is the time fishing stopped.

²³ Recall the Recommendation 10/13 On the Implementation of a Ban on Discards of Skipjack Tuna, Yellowfin Tuna, Bigeye Tuna and Non Targeted Species Caught by Purse Seiners

6) Type of school (Anchored or drifting FAD, marine mammal, free, other)

Record the type of school, i.e. anchored FAD, drifting FAD, marine mammal associated, other.

7) Position of the catch

Record the latitude and longitude at the start of each fishing event; record the latitude and longitude at noon for non-fishing days, where not in port.

Where information is recorded by day, record the $1^{\circ} \times 1^{\circ}$ area(s) where fishing took place.

8) Bait

Record the type of bait used (e.g. fish, squid), where applicable

2-2 CATCH

Catch in number and weight (kg) by species

1) Catch number and Weight

For each species shown in section 2-3 caught and retained, record the number and estimated live weight (kg), per fishing day (fishing event).

2) Discard number and Weight

For each species shown in section 2-3 caught and not retained record the number and estimated live weight (kg) discarded, per fishing day (fishing event).

2-3 SPECIES

Common name	Scientific name
Yellowfin tuna	Thunnus albacares
Bigeye tuna	Thunnus obesus
Skipjack tuna	Katsuwonus pelamis
Indo-Pacific sailfish	Istiophorus platypterus
Black marlin	Makaira indica
Other billfish	
Longtail tuna	Thunnus tonggol
Kawakawa	Euthynnus affinis
Frigate tuna/Bullet tuna	Auxis spp.
Narrow-barred Spanish mackerel	Scomberomorus commerson
Indo-Pacific king mackerel	Scomberomorus guttatus
Sharks	
Other fishes	

2-4 REMARKS

1) Discard of tuna, tuna-like fish should be recorded in the remarks, to species level where possible.

2) Other relevant information is also written in the remarks.

Note: These species included in the logbook are regarded as minimum requirement. Optionally other species should be added as species may differ depending on the area fished and type of fishery.

TROLLING VESSELS

All logbook information shall be recorded by day; where more than one fishing event is recorded for the same day, it is advisable to record each fishing event separately

Record once in one cruise 1-1 INFORMATION OF REPORT

- 8) Date of the submission of logbook.
- 9) Name of reporting person

1-2 VESSEL INFORMATION

- 10) Vessel name and registration number
- 11) IOTC number, where available
- 12) Fishing License number
- 13) Licensed gears and species
- 14) Vessel size: Gross tonnage (in MT) and/or length overall (in m)

1-3 CRUISE INFORMATION

- 3) Departure date and port
- 4) Arrival date and port

TROLLING VESSELS

2-1 OPERATION

1) Date of fishing

Record the date of fishing. Each fishing day should be recorded separately.

2) Number of fishermen

Record the number of fishermen on the boat by fishing day (fishing event)

3) Number of Fishing Gear

Record the number of lines and hooks used during the day (fishing event). If the exact number is not available a range may be used i) less than 5 lines, ii) 6-10 lines; iii) more than 11 lines.

4) Time Fishing

Record the total number of hours fishing during the day (fishing event).

5) Number and type of school (Anchored or drifting FAD, marine mammal, free, other) fished

Record the number and type of school fished (i.e. anchored FAD, drifting FAD, marine mammal associated or free) fished during the day.

6) Position of the catch

Record the latitude and longitude when fishing starts; record the latitude and longitude at noon for non-fishing days, where not in port.

Where information is recorded by day, record the $1^{\circ} \times 1^{\circ}$ area(s) where fishing took place.

7) Bait

Record the type of bait/lures used, where applicable

2-2 CATCH

Catch in number or weight (kg) by species

1) Number or Weight of fish retained

For each species shown in section 2-3 caught and retained, record the number or estimated live weight (kg), per fishing day (fishing event).

2-3 SPECIES

Common name	Scientific name
Yellowfin tuna	Thunnus albacares
Bigeye tuna	Thunnus obesus
Skipjack tuna	Katsuwonus pelamis
Albacore	Thunnus alalunga
Swordfish	Xiphias gladius
Indo-Pacific blue marlin	Makaira mazara
Black marlin	Makaira indica
Striped marlin	Tetrapturus audax
Indo-Pacific sailfish	Istiophorus platypterus
Other billfish	
Longtail tuna	Thunnus tonggol
Kawakawa	Euthynnus affinis
Frigate tuna/Bullet tuna	Auxis spp.
Narrow-barred Spanish mackerel	Scomberomorus commerson
Indo-Pacific king mackerel	Scomberomorus guttatus
Sharks	
Other fishes	

2-4 REMARKS

1) Discard of tuna, tuna-like fish should be recorded in the remarks, to species level where possible in number or live weight.

2) Other relevant information is also written in the remarks.

Note: These species included in the logbook are regarded as minimum requirement. Optionally other species should be added as species may differ depending on the area fished and type of fishery.

APPENDIX XXXVI Update on Progress Regarding Resolution 09/01 – On the Performance Review Follow-up

(NOTE: NUMBERING AND RECOMMENDATIONS AS PER APPENDIX I OF RESOLUTION 09/01)

ON CONSERVATION AND MANAGEMENT	RESPONSIBILITY	UPDATE/STATUS	WORKPLAN/TIMELINE	Priority
Data collection and sharing				
The Panel identified a poor level of compliance by many IOTC Members. with their obligations, notably those related to the statistical requirements on artisanal fisheries and sharks, and recommends that:				
3. The timing of data reporting be modified to ensure that the most recent data are available to the working parties and the Scientific Committee.	Scientific Committee	Completed : Currently CPCs are required to submit information on their flag vessels by 30 th June every year. The timeline for coastal CPCs who license foreign vessels has been brought forward to 15 th February every year. The timing of the Working Party will be reviewed annually to ensure that assessments can be completed and results reported to the Scientific Committee each year.	Review annually at IOTC WP and SC meetings.	Medium.
5. The scheduling of meetings of the working parties and Scientific Committee be investigated based on the experience of other RFMOs. This should bear in mind the optimal delivery of scientific advice to the Commission.	Scientific Committee	Completed : Given the large number of meetings of other RFMOs, it is becoming increasingly difficult to find a schedule of meetings that would be better than the one currently in practice. However, the Working Parties and the Scientific Committee will annually review the timing of the Working Parties.	Review annually at IOTC WP and SC meetings.	Low.
6. The Commission task the Scientific Committee with exploring alternative means of communicating data to improve timeliness of data provision.	Scientific Committee	 Partially completed: The Secretariat encourages members to utilise electronic means to expedite reporting. A study was commissioned for 2011 to determine the feasibility of reporting near real-time for various fleets. Outcome: Real time reporting not currently possible for most CPCs 	Review annually at IOTC WP and SC meetings. Within the best delays	Medium.

10. There is a need to improve the quality and quantity of the data collected and reported by the Members, including the information necessary for implementing the ecosystem approach. The most immediate emphasis should be placed on catch, effort and size frequency. The Panel also recommends that:	Scientific Committee	Ongoing : See below recommendation 11.		
12. A regional scientific observer programme to enhance data collection (also for non-target species) and ensure a unified approach be established, building on the experience of other RFMOs, Regional standards on data collection, data exchanged and training should be developed.	Scientific Committee	Completed : Resolution 11/04 (superseding Res.09/04 and Res. 10/04) provides CPCs with the necessary framework for putting in place national scientific observer programmes. The Regional Observers Scheme commenced July 1 st 2010, and is based on national implementation. The Secretariat coordinated the preparation of standards for data requirements, training and forms.	Review annually at IOTC WP and SC meetings.	High.
15. The Secretariat's capacity for data dissemination and quality assurance be enhanced, including through the employment of a fisheries statistician.	Standing Committee on Administration and Finance via Scientific Committee Commission	Partially completed : The existing post of Data Analyst was converted to a Fisheries Statistician to join the Data Section of the Secretariat. A new Fisheries Officer (data/stats) has been selected and will join the Secretariat in early 2012.	Staffing needs to be assessed annually at IOTC meetings.	Medium.
16. A statistical working party be established to provide a more efficient way to identify and solve the technical statistical questions.	Scientific Committee	Completed : The Working Party on Data Collection and Statistics resumed its annual meeting in 2009.	Annual meeting.	High.
21. Innovative or alternative means of data collection (e.g. port sampling) should be explored and, as appropriate, implemented.	Scientific Committee	Ongoing : The Secretariat has been implementing sampling programmes since 1999. The IOTC–OFCF Programme has supported sampling programmes and other means of data collection since 2002. The SC recommended the continuation of the IOTC-OFCF project.	Review annually at IOTC WP and SC meetings.	Medium.
Quality and provision of scientific advice				
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23. For species with little data available, the Scientific Committee should be tasked with making use of more qualitative scientific methods that are less data intensive.	Scientific Committee	In progress : The species Working Parties have been using informal analyses of stock status indicators when data are considered insufficient to conduct full assessments for some time. However, a formal system that reviews those qualitative indicators and provides a recommendation on the current status, based on the weight–of–evidence has yet to be developed.	To be considered at the WPM and others. Review annually at IOTC WP and SC meetings.	High.
25. Confidentiality provisions and issues of accessibility to data by the scientists concerned needs to be clearly delineated, and/or amended, so that analysis can be replicated.	Scientific Committee	Ongoing : Input, output and executable files for the assessment of major stocks are archived with the Secretariat to allow replication of analyses. Access to operational data under cooperative arrangements, and those subject to confidentiality rules is still limited. In some cases the Secretariat is bound by the domestic data confidentiality rules of Members and Cooperating non–Contracting Parties. The SC recommended to include observer data under the confidentiality policy of IOTC.	Review annually at IOTC WP and SC meetings.	Medium.
27. To enhance the quality of scientific advice and the technical soundness of the papers being considered by the Scientific Committee and its working parties, and to encourage publication of IOTC scientific papers in relevant journals, future consideration should be given to the establishment of a scientific editorial board within the Scientific Committee	Scientific Committee	Partially completed : Guidelines for the presentation of stock assessment papers were revised and agreed to by the Scientific Committee in 2010. An editorial board should select working party papers to be submitted for publication to a Peer Reviewed journal.	Review annually at IOTC WP and SC meetings. Creation of an Editorial board and prior arrangement with an International Journal by 2013.	Medium.
29. Ongoing peer review by external experts should be incorporated as standard business practice of working parties and the Scientific Committee.	Scientific Committee	Pending : External experts (Invited Experts) are regularly invited to provide additional expertise at Working Party meetings, although this does not constitute a formal process of peer review. The Scientific Committee in 2010, agreed that once stock assessment models were considered robust, that peer review would be advantageous and funds will be requested to undertake peer reviews of stock assessments. The Scientific Committee will review the processes for Invited Experts, Consultants and Peer review at its 14 th Session in 2011.	Review annually at IOTC WP and SC meetings.	Medium.

30. New guidelines for the presentation of more user friendly scientific reports in terms of stock assessments should be developed. In this respect, Kobe plots are considered to be the most desirable method of graphical presentation, especially to non-technical audience.	Scientific Committee	Ongoing : All recent stock assessment results have been presented using the Kobe plot, and the species Working Parties are progressing in presenting the Kobe matrix. The 2010 and 2011Scientific Committee report includes Kobe Matrices for all stock assessments. The format of the Working Party reports and the resultant Executive Summaries has been revised to improve readability and content.	Review annually at IOTC WP and SC meetings.	Medium.
Adoption of conservation and management measures				
35. IOTC should consider developing a framework to take action in the face of uncertainty in scientific advice.	Scientific Committee and Commission	In progress : The Scientific Committee has agreed that the development of a Management Strategy Evaluation process be initiated to provide better advice that would incorporate explicit consideration of uncertainty. The 2012 meeting of the Working Party on Methods will focus on this process.	Intersessional start of the MSE process by correspondence, as of Jan.2012 Progress at 2012 WPM annual meeting.	High.
Capacity management				
42. IOTC should establish a stronger policy on fishing capacity to prevent or eliminate excess fishing capacity.	Working Party on Fishing Capacity Scientific Committee Commission	Ongoing : The Commission has since 2003 adopted a series of Resolutions (03/01, 06/05, 07/05 and 09/02) with the objective of addressing the issue of fishing capacity. However, to date these resolutions have not resulted in a strong control on fishing capacity, and the concern remains that overcapacity might result from this lack of control. The Secretariat is actively involved in developing the global vessels record for vessels fishing for tuna and tuna–like species that would contribute to the assessment of existing fishing capacity.	See Recommendation 33, which has been agreed as the priority path in this regard.	Medium.

APPENDIX XXXVII

Rules of Procedure for the Selection of Invited Experts to Attend IOTC Working Party Meetings

Definition of an Invited expert

The role of an Invited Expert and the guiding principles for their selection are as follows (noting that Invited Experts are **<u>NOT</u>** consultants, as they are **unpaid**, other than for return **economy** airfares and DSA to attend a meeting):

- **Duties**: (i) if possible/willing, to carry out tasks identified by the Working Party (WP) (to be identified separately for each meeting); (ii) as applicable, attend and contribute to discussions at any preparatory sessions (e.g. any pre-assessment workshops, noting that ideally, these may need to be carried out several months in advance of a WP meeting), and at the WP meeting;
- **Capacity**: The invited expert must have recognized experience and skill in the subjects for which they are tasked;
- **Independence:** The invited expert's advice on matters relating to tasks defined by the WP should be based on the principles of independence, impartiality and transparency. Therefore, the invited expert shall be invited in their personal capacity without representing any CPCs and/or stakeholder. Participation of experts based in IOTC developing coastal states shall be encouraged. Invited Experts should not be:
 - directly involved with current IOTC stock assessments or CPUE standardisations.
 - from a CPC where a scientist is presenting a stock assessment or CPUE standardization.

Confidentiality: Invited Experts shall not divulge any information, including data considered confidential by the Commission, as defined in IOTC Resolution 98/02.

Process for Selection

Process and timeline for the selection of an Invited Expert.

STEP	Action Item	Responsibility	Due date	
1	Chair of the Working Party (WP) (Vice-Chair if Chair not	Chair of the WP	No later than 90 days prior	
	available) to distribute an email to the IOTC Science contact list	(or Vice-Chair)	to the commencement of	
	(consisting of the combined WP and SC mailing list/s), calling for		the WP meeting or any	
	Invited Expert nominations. The call for nomination will include		other preparatory sessions	
	a summary of the priority areas for contribution (identified during		as identified by the WP.	
	the previous WP meeting, in combination with requests from the			
	SC and Commission), specific details to be provided by potential			
	candidates (e.g. one page CV), and the selection timeline.			
2	Deadline for nominations: two weeks from the call for	IOTC Science	14 days after the call for	
	nominations. Nominations should be made via return email to the	contact list	nominations by the Chair	
	IOTC Science contact list.		(Step 1 above)	
3	Selection panel, consisting of the Chair and Vice-Chair of the	Selection panel	Within 5 days of the	
	Working Party, in consultation with the Chair of the		deadline for comments on	
	Scientific Committee to determine the most appropriate Invited		candidates from	
	Expert/s for the meeting, taking into consideration budgetary		participants	
	constraints, as advised by the Executive Secretary or his/her			
	delegate. Potential Invited Expert to be contacted by the Chair to			
	confirm availability.			
4	Chair of the Working Party (or Vice-Chair) to advise the IOTC	Chair of WP or	Within 2 days of the	
	Science contact list of the successful Invited Expert/s, and request	alternate &	selection meeting.	
	the Secretariat to commence the travel process. The IOTC	Secretariat		
	Secretariat will also inform the IOTC Commissioner's contact list			
	of the selected Invited Expert/s for each meeting.			
5	Working Party meeting.	Participants	—	

APPENDIX XXXVIII

CONSOLIDATED SET OF RECOMMENDATIONS OF THE FOURTEENTH SESSION OF THE SCIENTIFIC COMMITTEE (12–17 DECEMBER, 2011) TO THE COMMISSION

STATUS OF TUNA AND TUNA-LIKE RESOURCES IN THE INDIAN OCEAN

Tuna – Highly migratory species

- SC14.01 (para. 129) The SC **RECOMMENDED** that the Commission note the management advice developed for each tropical and temperate tuna species as provided in the Executive Summary for each species.
 - Albacore (*Thunnus alalunga*) <u>Appendix X</u>
 - Bigeye tuna (*Thunnus obesus*) <u>Appendix XI</u>
 - o Skipjack tuna (Katsuwonus pelamis) Appendix XII
 - Yellowfin tuna (*Thunnus albacares*) <u>Appendix XIII</u>

Tuna and mackerel – Neritic species

SC14.02 (para. 132) The SC **RECOMMENDED** that the Commission note the management advice developed for each neritic tuna species as provided in the Executive Summary for each species:

- Longtail tuna (*Thunnus tonggol*) <u>Appendix XIV</u>
- Narrow-barred Spanish mackerel (Scomberomorus commerson) Appendix XV
- Bullet tuna (*Auxis rochei*) <u>Appendix XVI</u>
- Frigate tuna (Auxis thazard) Appendix XVII
- Kawakawa (Euthynnus affinis) <u>Appendix XVIII</u>
- Indo-Pacific king mackerel (Scomberomorus guttatus) <u>Appendix XIX</u>

Billfish

SC14.03 (para. 133) The SC **RECOMMENDED** that the Commission note the management advice developed for each billfish species as provided in the Executive Summary for each species:

- Swordfish (Xiphias gladius) <u>Appendix XX</u>
- Black marlin (Makaira indica) <u>Appendix XXI</u>
- Indo-Pacific blue marlin (*Makaira mazara*) <u>Appendix XXII</u>
- Striped marlin (*Tetrapturus audax*) <u>Appendix XXIII</u>
- Indo-Pacific sailfish (Istiophorus platypterus) <u>Appendix XXIV</u>

Status of Marine Turtles, Seabirds and Sharks in the Indian Ocean

Marine turtles

- SC14.04 (para. 134) The SC **RECOMMENDED** that the Commission note the management advice developed for marine turtles, as provided in the Executive Summary encompassing all six species found in the Indian Ocean:
 - Marine turtles <u>Appendix XXV</u>

Seabirds

- SC14.05 (para. 135) The SC **RECOMMENDED** that the Commission note the management advice developed for seabirds, as provided in the Executive Summary encompassing all species commonly interacting with IOTC fisheries for tuna and tuna-like species:
 - Seabirds <u>Appendix XXVI</u>

Sharks

- SC14.06 (para. 136) The SC **RECOMMENDED** that the Commission note the management advice developed for a subset of shark species commonly caught in IOTC fisheries for tuna and tuna-like species:
 - Blue sharks (Prionace glauca) Appendix XXVII
 - Oceanic whitetip sharks (Carcharhinus longimanus) Appendix XXVIII
 - Scalloped hammerhead sharks (Sphyrna lewini) Appendix XXIX
 - Shortfin mako sharks (Isurus oxyrinchus) Appendix XXX
 - Silky sharks (Carcharhinus falciformis) Appendix XXXI
 - Bigeye thresher sharks (*Alopias superciliosus*) <u>Appendix XXXII</u>
 - Pelagic thresher sharks (Alopias pelagicus) Appendix XXXIII

GENERAL RECOMMENDATIONS TO THE COMMISSION

Activities of the IOTC Secretariat in 2011

SC14.07 (para. 11) The SC **RECOMMENDED** that while the recruitment process for a new stock assessment expert at the IOTC Secretariat is being finalised, the Secretariat hire an individual/s to fill the staffing gap. This was considered to be particularly important given the upcoming tagging symposium in late 2012.

National Reports from CPCs

SC14.08 (para. 13) Noting that the Commission, at its 15th Session, expressed concern regarding the limited submission of National Reports to the SC, and stressed the importance of proving the reports by all CPCs, the SC **RECOMMENDED** that the Commission note that in 2011, 25 reports were provided by CPCs, up from 15 in 2010 and 14 in 2009 (<u>Table 2</u>). The SC stressed the importance of the submission of National Reports by all CPCs and urged those CPCs who did not met their reporting obligations in this regard (7), to provide a National Report to the SC in 2012.

Status of development and implementation of Nation Plans of Action for seabirds and sharks

SC14.09 (para. 18) The SC **NOTED** the current status of development and implementation of Nation Plans of Action for sharks and **RECOMMENDED** that all CPCs without an NPOA-Sharks expedite the development and implementation of their NPOA-Sharks, and to report progress to the WPEB in 2012, recalling that NPOA-Sharks are a framework that should facilitate estimation of shark catches, and development and implementation of appropriate management measures, which should also enhance the collection of bycatch data and compliance with IOTC Resolutions.

Report of the Third Session of the Working Party on Temperate Tunas

SC14.10 (para. 32) Noting the request by the Commission at its 15th Session for a new assessment of albacore to be undertaken in 2011 (para. 37 of the S15 report), the SC **RECOMMENDED** that the Commission note that although a new assessment was undertaken in 2011, there remains considerable uncertainty about the relationship between abundance and the standardized CPUE series, and about the total catches over the past decade and that the WPTmT has limited confidence in the assessment undertaken. Thus, there is an urgent need to carry out a revised stock assessment for the albacore resource in the Indian Ocean in 2012, and the Commission should consider allocating funds for this purpose, noting that individual CPCs are finding it difficult to justify expending the necessary resources to undertake stock assessments.

Status of catch statistics

- SC14.11 (para. 57) The SC **RECOMMENDED** that the Commission note the status of catch statistics for the main species of sharks, by major fisheries (gears), for the period 1950–2010, as provided in <u>Appendix VI:Tables a-c</u>. Although some CPCs have reported more detailed data on sharks in recent years, including time-area catches and effort, and length frequency data for the main commercial shark species, the SC expressed strong **CONCERN** that the information on retained catches and discards of sharks contained in the IOTC database remains very incomplete.
- SC14.12 (para. 59) Noting that despite the mandatory reporting requirements detailed in Resolutions 05/05, 08/04, 09/06, 10/02, 10/03, and 10/06, bycatch data remain largely unreported by CPCs and the SC RECOMMENDED that the Compliance Committee and the Commission address this non-compliance by taking steps to develop mechanisms which would ensure that CPCs fulfil their bycatch reporting obligations.
- SC14.13 (para. 60) The SC **RECOMMENDED** that the current IOTC Resolution 08/04 concerning the recording of catch by longline fishing vessels in the IOTC area, Resolution 10/03 concerning the recording of catch by fishing vessels in the IOTC area and Resolution 10/02 mandatory statistical requirements for IOTC members and cooperating non-contracting parties be amended in order to include a clear list of shark and marine turtle species or group of species, that should be recorded and reported to the IOTC Secretariat as per the IOTC requirements for target species.
- SC14.14 (para. 61) Noting that there is extensive literature available on pelagic shark fisheries and interactions with fisheries targeting tuna and tuna-like species, in countries having fisheries for sharks, and in the databases of governmental or non-governmental organizations, the SC AGREED on the need for a major data mining exercise in order to compile data from as many

sources as possible and attempt to rebuild historical catch series of the most commonly caught shark species. In this regard, the WPEB **RECOMMENDED** that the Scientific Committee considers presenting a proposal to the Commission for this activity, including a budget.

On Resolution 98/02 Data confidentiality policy and procedures

SC14.15 (para. 62) Noting that CPCs have begun to submit observer trip reports and observer data to the IOTC Secretariat, and that confidentially rules contained apply to these data (Cf. Resolution 11/04, para. 12), the SC **RECOMMENDED** that Resolution 98/02 be amended in order to clearly incorporate observer data in the data confidentiality policy of the IOTC.

Species identification cards – Sharks, seabirds and marine turtles

SC14.16 (para. 66) The SC **RECOMMENDED** that the Commission agree to allocate additional funds from the IOTC accumulated funds, or other sources, be allocated to print and distribute the identification cards for sharks, seabirds and marine turtles to developing coastal states.

Sharks – ERA

SC14.17 (para. 67) Noting the general lack of catch data on sharks, the SC strongly **RECOMMENDED** that an (Ecological Risk Assessment) ERA is conducted for sharks caught in fisheries targeting tuna and tuna-like species in the Indian Ocean before the next session of the WPEB. In order to do so, the SC **RECOMMENDED** that the Commission allocate specific funds for such an analysis. Should a Fishery Officer be recruited at the IOTC Secretariat, he/she may be in a position to coordinate this task.

Sharks – Wire leaders/traces

SC14.18 (para. 68) On the basis of information presented to the SC in 2011 and in previous years, the SC **RECOGNISED** that the use of wire leaders/traces in longline fisheries may imply targeting of sharks. The SC therefore **RECOMMENDED** to the Commission that if it wishes to reduce catch rates of sharks by longliners it should prohibit the use of wire leaders/traces.

Sharks – Resolution 05/05 concerning the conservation of sharks caught in association with fisheries managed by IOTC

Fin to body weight ratio

SC14.19 (para. 69) The SC **ADVISED** the Commission to consider, that the best way to encourage full utilisation of sharks, to ensure accurate catch statistics, and to facilitate the collection of biological information, is to revise the IOTC Resolution 05/05 *concerning the conservation of sharks caught in association with fisheries managed by IOTC* such that all sharks must be landed with fins attached (naturally or by other means) to their respective carcass. However, the SC **NOTED** that such an action would have practical implementation and safety issues for some fleets and may degrade the quality of the product in some cases. The SC **RECOMMENDED** all CPCs to obtain and maintain the best possible data for IOTC fisheries impacting upon sharks, including improved species identification.

Sharks – Resolution 10/02 Mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPC'S)

SC14.20 (para. 70) Noting that the collection and reporting of data on sharks as per the IOTC Resolution 10/02 mandatory statistical requirements for IOTC Members and Cooperating non-Contracting Parties (CPCs) is very poor at the moment, the SC **RECOMMENDED** that Resolution 10/02 is reinforced by including specific requirements in the provision of nominal catch data for a list of most commonly caught shark species (Table 3). The SC **NOTED** that nominal catch data can be derived from logbook data, observer data or port sampling scheme. Furthermore, the Resolution should be strengthened by amending the provision of catch-and-effort and size data to be applicable to sharks species as well as other bycatch, noting that these data can be derived from logbook or observer data.

Table 3. List of the most com	nmonly caught ela	asmobranch species.
Common name	Species	Code

Common name	Species	Code
Manta and devil rays	Mobulidae	MAN
Whale shark	Rhincodon typus	RHN
Thresher sharks	Alopias spp.	THR
Mako sharks	Isurus spp.	MAK

Silky shark	Carcharhinus falciformis	FAL
Oceanic whitetip shark	Carcharhinus longimanus	OCS
Blue shark	Prionace glauca	BSH
Hammerhead shark	Sphyrnidae	SPY
Other Sharks and rays	_	SKH

Sharks – On Resolution 10/12 on the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence

SC14.21 (para. 71) Noting that Resolution 10/12 on the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence prohibits the retention of any part or whole carcass of thresher sharks and that the collection of biological samples on dead individuals would increase the scientific knowledge of these species, the SC **RECOMMENDED** that Resolution 10/12 be amended in order to allow observers to collect biological samples (vertebrae, tissues, reproductive tracts, stomachs) from thresher sharks that are dead at haulback.

Seabirds

- SC14.22 (para. 79) The SC **RECOMMENDED** that the specifications for the design and deployment of bird scaring lines be amended in order to take into account different specifications depending on the size of the longline fishing vessel, as follows:
 - Bird-scaring line design
 - 1. The bird-scaring line shall be a minimum aerial extent of 100 m in length for vessels that exceed 35 m in length and of 75 m in length for vessel less or equal to 35 m in length. If the bird-scaring line is less than 150 m in length, it will include an object towed at the seaward end to create tension to maximise aerial coverage. The section above water shall be a strong fine line of a conspicuous colour such as red or orange.
 - Deployment of bird scaring lines
 - 1. The bird scaring line shall be deployed before longlines enter into the water.
 - 2. The vessels exceeding 35 m in length should deploy two lines with an aerial extent of 100 m minimum. The vessels that are less or equal to 35 m in length could deploy a single line with an aerial extent of 75 m minimum. To achieve this coverage the line shall be suspended from a point a minimum of 5 metres above the water at the stern on the windward side of the point where the branch line enters the water.
- SC14.23 (para. 81) The SC **RECOMMENDED** that Resolution 10/06 be strengthened in order to make the reporting of seabird interactions mandatory for vessels fishing for species under the IOTC mandate.
- SC14.24 (para. 82) The SC **RECOMMENDED** that any amendment to Resolution 10/06 should allow sufficient time for orderly implementation, to allow training and redevelopment of gears and operations.
- SC14.25 (para. 83) The SC RECOMMENDED that the Commission consider revising Resolution 10/06 On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries, noting the technical specifications and other considerations outlined and agreed to by the SC in paragraphs 73 to 82 of the report of the SC14.
- SC14.26 (para. 84) The SC AGREED that seabird identification can be very difficult, even for trained scientific observers, and **RECOMMENDED** that observers take photographs of seabirds caught by fishing vessels and submit them to seabird experts, or to the IOTC Secretariat, for confirmation of identification.
- SC14.27 (para. 85) As a matter of consistency and to increase the reporting of seabird interactions, the SC **RECOMMENDED** that the recording of interactions with seabirds (as a group) be included in the minimum requirements for logbooks or through observer programmes for all fleets.
- SC14.28 (para. 86) The SC further **RECOMMENDED** the Commission consider that more research is conducted on the identification of hot spots of interactions of seabirds with fishing vessels.

Marine turtles

SC14.29 (para. 88) Noting the general lack of data on incidental catch of marine turtles, the SC **RECOMMENDED** that an ERA be conducted for marine turtles caught in fisheries targeting tuna and tuna-like species in the Indian Ocean before the session of the WPEB where marine

turtles will be a priority. In order to do so, the SC **RECOMMENDED** that the Commission allocate specific funds for such an analysis.

- SC14.30 (para. 89) Noting that reporting of interactions with marine turtles is already mandatory through Resolution 09/06 which states "*CPCs shall collect (including through logbooks and observer programs) and provide to the Scientific Committee all data on their vessels' interactions with marine turtles in fisheries targeting the species covered by the IOTC Agreement"* (Res.09/06, para.2), and in order to increase the reporting of interactions, the SC **RECOMMENDED** that the recording of marine turtles caught as bycatch is included in the minimum requirements of logbooks or through observer programmes for all fleets fishing in the IOTC area.
- SC14.31 (para. 91) The SC **RECOMMENDED** that current IOTC Resolution 09/06 *on Marine Turtles* be strengthened to ensure that CPCs report annually on the level of incidental catches of marine turtles by species.
- SC14.32 (para. 92) Noting that paragraph 4 of Resolution 09/06 *on Marine Turtles* currently refers to "hard shelled turtles", which could be read to exclude leatherback turtles, and noting the Scientific Committee's previous recommendation to the Commission that the resolution should apply to leatherback turtles, the SC **RECOMMENDED** that the Commission revise Resolution 09/06 *on marine turtles* so that the term "hard-shelled" be deleted and replaced by "marine" to ensure application to all marine turtle species.

Redundant/obsolete Conservation and Management Measures (Resolutions and Recommendations)

- SC14.33 (para. 93) The SC **RECOMMENDED** that the Commission revoke the following Conservation and Management Measures, noting that they have either been superseded by a new Resolution adopted by the Commission, but were not specifically revoked (Recommendation 05/09 and 05/08), or the CMM was to carry out a specific scientific task which is now complete (Resolution 00/02):
 - Recommendation 05/09 *On incidental mortality of seabirds*
 - Recommendation 05/08 On sea turtles and Resolution 09/06 On marine turtles
 - Resolution 00/02 On a survey of predation of longline caught fish.

Report of the First Session of the Working Party on Neritic Tunas

SC14.34 (para. 97) The SC AGREED that there was an urgent need to carry out stock assessments for neritic tunas in the Indian Ocean, however at present the data held at the IOTC Secretariat would be insufficient to undertake this task. As such, the SC RECOMMENDED that the Commission consider allocating appropriate funds to further increase the capacity of coastal states to collect, report and analyse catch data on neritic tuna and tuna-like species in the Indian Ocean.

IOTC Observer Trip Report Template

- SC14.35 (para. 99) Noting that in 2010, the SC requested that the WPDCS discuss collection and reporting by observers of the data items below:
 - Information on the type and numbers of branch lines and wire leaders used (longline)
 - Information on the number and type of electronic equipment used on board
 - Area resolution (1 degree square at present)
 - Information on the state of the sea and weather conditions
 - Information on depredation
 - Information on lost fishing gear
 - Information on the number of hooks used by type and size.

and noting the difficulties that some observers may have in collecting and reporting of the data items that are requested in the observer trip report template (seven items listed above), and further noting that collecting this information may compromise access to other basic data on board longline vessels, the SC **RECOMMENDED** that the Commission allow for some flexibility in the collection and reporting of these data, until such a time where the CPCs concerned are in a position to collect and provide this information.

SC14.36 (para. 100) Noting that the use of monofilament leaders may allow sharks to escape by biting through the line (removing the hook), in contrast to wire leaders which are not prone to 'bite-off', the SC **RECOMMENDED** that, where possible for fleets that have not already prohibited the use of wire leaders, the number of 'bite-off' per leader type is added to the longline hauling

information recorded by the observer (currently in the IOTC observer form FORM 4-LL – Fishing Event Longline).

SC14.37 (para. 101) Noting that the current observer trip reporting template includes summaries of catch and bycatch by 1° square as required in Resolution 11/04, and that there is no summary of the effort exerted during the trip at the same scale, the SC **RECOMMENDED** that a new table is added to the observer trip reporting template that would ensure effort during the trip is recorded, as follows:

Year	Month	Square (1°x1°)	Effort deployed	
			Longline: number of hooks deployed	
			Purse seine on free-schools: number of fishing sets	
			Purse seine on associated schools: number of fishing sets, and	
			number of new FADs deployed	
			Gillnet: number of panels deployed	
			Pole-and-line: number of fishing days	
			Handline: number of fishing days	
			Troll-line: number of fishing days	

- SC14.38 (para. 102) The SC **RECOMMENDED** that the observer trip report is submitted in an electronic format, where possible, noting that the forms/tables in the observer trip report template are for illustrative purposes and that the complete information required could be reported in a different format.
- SC14.39 (para. 103) Noting that at present, the observer reporting template includes obligatory reporting of information concerning waste management on board the fishing vessel (International Convention for the Prevention of Pollution from Ships MARPOL), the SC **RECOMMENDED** that the reporting of this information be made optional, as most fishing vessels are already bound by this international regulation.
- SC14.40 (para. 104) Noting that the reporting of transhipment events have to be reported through the IOTC Transhipment Programme, and that the IOTC Transhipment Programme applies only where transhipments involve a fishing vessel with LOA 24 m or greater and carrier vessels, pointing out that transhipments between fishing vessels, in particular, fresh-tuna longliners, are very common, the SC AGREED that in order to avoid duplication, observers under the IOTC Regional Observer Scheme can refrain from reporting Transhipments when those events are recorded by observers under the IOTC Transhipment Programme, **RECOMMENDING** that this is incorporated into the observer report.

Activities under the IOTC-OFCF Project

SC14.41 (para. 107) Acknowledging the value of projects such as the IOTC-OFCF in the region, the SC **NOTED** with thanks the support offered by the IOTC-OFCF project since 2002, and strongly **RECOMMENDED** that the activities carried out under the IOTC-OFCF project, including the IOTC-OFCF project itself, continue after the project ends in March 2013.

Meeting participation fund

- SC14.42 (para. 108) The SC **NOTED** that the increased attendance by national scientists from developing CPCs to IOTC Working Parties in 2011 was partly due to the IOTC Meeting Participation Fund (MPF), adopted by the Commission in 2010 (Resolution 10/05 *on the establishment of a Meeting Participation Fund for developing IOTC Members and non-Contracting Cooperating Parties*), and **RECOMMENDED** that the Commission maintain this fund into the future.
- SC14.43 (para. 109) The SC **RECOMMENDED** that the Commission consider the problems encountered by potential MPF recipients in 2011. Specifically, there were a number of officially funded recipients who could not attend the various IOTC meetings at the last moment due to internal/domestic administrative processes (including but not limited to South Africa, I.R. Iran). In some cases this resulted in loss of the Commission's MPF funds due to late cancellations.

Dedicated workshop on CPUE standardisation

SC14.44 (para. 110) Noting the combined recommendations from the WPB, WPTmT and WPTT to hold a dedicated workshop on CPUE standardization in 2012, the SC **RECOMMENDED** that a dedicated, informal workshop on CPUE standardization, including issues of interest for other IOTC species, should be carried out before the next round of stock assessments in 2013, and that

where possible it should include a range of invited experts, including those working on CPUE standardisation in other ocean/RFMOs, in conjunction with scientists from Japan, Republic of Korea and Taiwan, China, and supported by the IOTC Secretariat. The SC **NOTED** the CPUE workshop organised by ISSF and scheduled to be held late March 2012 in Hawai'i, USA, and urged national scientists working on purse seine CPUE standardisations to attend where possible.

Increased workload and staffing at the IOTC Secretariat

SC14.45 (para. 114) The SC **RECOMMENDED** that an additional Fishery Officer (P3 or P4) be hired, or consultants contracted, to handle a range of issues related to bycatch, including those from the Commission relating to ecosystems and bycatch issues (see <u>para. 113</u>).

Examination of the Effect of Piracy on Fleet Operations and Subsequent Catch and Effort Trends

SC14.46 (para. 127) In response to the request of the Commission (para. 40 of the S15 report), the SC **RECOMMENDED** that given the lack of quantitative analysis of the effects of piracy on fleet operations and subsequent catch and effort trends, and the potential impacts of piracy on fisheries in other areas of the Indian Ocean through the relocation of longliners to other fishing grounds, specific analysis should be carried out and presented at the next WPTT meeting by the CPCs most affected by these activities, including Japan, Republic of Korea and Taiwan, China.

Implementation of the Regional Observer Scheme

- SC14.47 (para. 139) The SC **RECOMMENDED** that all IOTC CPCs urgently implement the requirements of Resolution 11/04 on a Regional Observer Scheme, which states that: "The observer shall, within 30 days of completion of each trip, provide a report to the CPCs of the vessel. The CPCs shall send within 150 days at the latest each report, as far as continuous flow of report from observer placed on the longline fleet is ensured, which is recommended to be provided with 1°x1° format to the Executive Secretary, who shall make the report available to the Scientific Committee upon request. In a case where the vessel is fishing in the EEZ of a coastal state, the report shall equally be submitted to that Coastal State." (para. 11), **NOTING** that the timely submission of observer trip reports to the Secretariat is necessary to ensure that the Scientific Committee is able to carry out the tasks assigned to it by the Commission, including the analysis of accurate and high resolution data, in particular for bycatch, which would allow the scientists to better assess the impacts of fisheries for tuna and tuna-like species on bycatch species.
- SC14.48 (para. 143) The SC AGREED that such a low level of implementation and reporting is detrimental to its work, in particular regarding the estimation of incidental catches of non-targeted species, as requested by the Commission and **RECOMMENDED** the Commission to consider how to address the lack of implementation of observer programmes by CPCs for their fleets and reporting to the IOTC Secretariat as per the provision of Resolution 11/04 *on a Regional Observer Scheme*, noting the update provided in <u>Appendix XXXIV</u>.

Implementation of the Precautionary approach and Management strategy Evaluation

- SC14.49 (para. 146) Noting that the development of an MSE process will require management objectives to be specified, the SC **RECOMMENDED** that the Commission provide clear guidance in this regard, noting that the adoption of the Precautionary Approach, as defined in the Fish Stocks Agreement, may be the first step.
- SC14.50 (para. 149) The SC **RECOMMENDED** that interim target and limit reference points be adopted and a list of possible provisional values for the major species is listed in <u>Table 5</u>. These values should be replaced as soon as the MSE process is completed. Provisional target reference points would be based on the MSY level of the indicators, and on different multipliers for the limit reference points.

Stock	Target Reference Point	Limit Reference Point
Albacore	B · F	$0.4*\mathbf{R} \cdot 1.4*\mathbf{F}$
Bigeve tuna	B _{MSY} , F _{MSY} B _{MSY} : F _{MSY}	$0.4 B_{MSY}$, $1.4 T_{MSY}$ 0.5^*B_{MSY} : 1.3^*F_{MSY}
Skipjack tuna	B_{MSY} ; F_{MSY}	$0.4^{*}B_{MSY}$; $1.5^{*}F_{MSY}$
Yellowfin tuna	B_{MSY} ; F_{MSY}	$0.4*B_{MSY}; 1.4*F_{MSY}$
Swordfish	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$

 Table 5. Interim target and limit reference points.

SC14.51 (para. 157) The SC **ENDORSED** the roadmap presented for the implementation of MSE in the Indian Ocean in IOTC–2011–SC14–36 and **RECOMMENDED** the Commission agree to initiate a consultative process among managers, stakeholders and scientists to begin discussions about the implementation of MSE in IOTC.

Data Provision Needs - by gear

- SC14.52 (para. 169) The SC **RECOMMENDED** that the minimum recording requirements for handline and trolling provided in <u>Appendix XXXV</u> be incorporated into the revised proposal for minimum recording requirements as detailed in <u>para. 170</u>.
- SC14.53 (para. 170) The SC **RECOMMENDED** that IOTC Recommendation 11/06 be modified to include the elements as provided in <u>Appendix XXXV</u>, noting that the lists of species to be recorded, as detailed in section 2.3 of Annex II, and makes collection of these data mandatory.
- SC14.54 (para. 171) The SC **RECOGNISED** that not all CPCs attended the SC meeting and that some of these CPCs, especially coastal states, may have difficulties implementing new minimum data requirements immediately. The SC therefore **RECOMMENDED** that the Commission adopt a flexible approach to any further resolutions on minimum data requirements, e.g. through staged implementation over a period of two years.

Outlook on Time-Area Closures

- SC14.55 (para. 173) Noting that the request contained in Resolution 10/01 does not specify the expected objective to be achieved with the current or alternative time area closures, and that the SC and WPTT were not clear about the intended objectives of the time-area closure taking into account recent reduction of effort as well as recent likely recovery of the yellowfin tuna population, the SC **RECOMMENDED** that the Commission specify clear objectives as to what are the management objectives to be achieved with this and/or alternative measures. This will, in turn, guide and facilitate the analysis of the SC, via the WPTT in 2012 and future years.
- SC14.56 (para. 174) Noting the lack of research examining time-area closures in the Indian Ocean by the WPTT in 2011, as well as the slow progress made in addressing the Commission request, the SC **RECOMMENDED** that the SC Chair begins a consultative process with the Commission in order to obtain clear guidance from the Commission about the management objectives intended with the current or any alternative closure. This will allow the SC to address the Commission request more thoroughly.

Evaluation of the IOTC time-area closure

- SC14.57 (para. 178) The SC **RECOMMENDED** that the Commission note that the current closure is likely to be ineffective, as fishing effort will be redirected to other fishing grounds in the Indian Ocean. The positive impacts of the moratorium within the closed area would likely be offset by effort reallocation. For example, the WPTmT noted that longline fishing effort has been redistributed to traditional albacore fishing grounds in recent years, thereby further increasing fishing pressure on this stock.
- SC14.58 (para. 179) Noting that the objective of Resolution 10/01 is to decrease the overall pressure on the main targeted stocks in the Indian Ocean, in particular yellowfin tuna and bigeye tuna, and also to evaluate the impact of the current time/area closure and any alternative scenarios on tropical tuna population, the SC **RECOMMENDED** that the Commission specify the level of reduction or the long term management objectives to be achieved with the current or alternative time area closures, as these are not contained within the Resolution 10/01.

Alternative Management Measures; Impacts of the Purse-Seine Fishery; Juvenile Tuna Catches

- SC14.59 (para. 186) The SC **RECOMMENDED** that the Commission note that:
 - most of the evidence provided to date has indicated that the resource in the southwest Indian Ocean has been overfished in the past decade and biomass remains below the level that would produce MSY (B_{MSY}), however recent declines in catch and effort have brought fishing mortality rates to levels below F_{MSY} . There is a risk of reversing the rebuilding trend if there is any increase in catch in this region. Thus, catches in the southwest Indian Ocean should be maintained at levels at or below those observed in 2009 (6,600 t), until there is clear evidence of recovery and biomass exceeds B_{MSY} .
 - the southwest region should continue to be analysed as a special resource, as it appears to

be highly depleted compared to the Indian Ocean as a whole. However the difference in depletion does not appear to be as extreme as analyses in previous years have suggested. A review of the spatial assumptions should be conducted following the final results of the Indian Ocean Swordfish Stock Structure (IOSSS) project and the analysis of tagging experiments undertaken by SWIOFP.

- that there is no current need to apply additional management measures to the southwest Indian Ocean, although the resource in the area should be carefully monitored.
- that the Working Party on Methods will be progressing Management Strategy Evaluation over the coming year that will aid in addressing the Commission's request, which was considered as the appropriate mechanism for this work.
- SC14.60 (para. 190) The SC **NOTED** however, that the fishery statistics available for many fleets, in particular for coastal fisheries, are not accurate enough for a comprehensive analysis as has been repeatedly noted in previous WPTT and SC reports. In particular, the SC **RECOMMENDED** that all CPCs catching yellowfin tuna should undertake scientific sampling of their yellowfin tuna catches to better identify the proportion of bigeye tuna catches. Therefore, the SC **RECOMMENDED** the countries engaged in those fisheries to take immediate actions to reverse the situation of fishery statistics reporting to the IOTC Secretariat.
- SC14.61 (para. 192) The SC **ADVISED** the Commission that the Western and Central Pacific Fisheries Commission has implemented since 2009 a FAD closure for the conservation of yellowfin tuna and bigeye tuna juveniles which has been very effective. The SC **RECOMMENDED** further investigation of the feasibility and impacts of such a measure, as well as other measures, in the context of Indian Ocean fisheries and stocks.

Progress in Implementation of the Recommendations of the Performance Review Panel

SC14.62 (para. 195) The SC **RECOMMENDED** that the Commission note the updates on progress regarding Resolution 09/01 – on the performance review follow–up, as provided at <u>Appendix XXXVI</u>.

Schedule and Priorities of Working Party and Scientific Committee Meetings for 2012 and Tentatively for 2013

SC14.63 (para. 197) The SC **RECOMMENDED** that the Commission endorse the schedule of Working Party and Scientific Committee meetings for 2012, and tentatively for 2013 (<u>Table 8</u>).

Table 8. Schedule of Working Party and Scientific Committee meetings for 2012, and tentatively for 2013.

Mooting	2	2012	2013 (tentative)		
Meeting	Date Location		Date	Location	
Working Party on Temperate Tunas	3–5 July (3d)	TBD (China?)	Early Aug (3d)	TBD (ICCAT SAA)	
Working Party on Billfish	11-15 Sept (5d)	11–15 Sept (5d)Cape town, South Africa – TBD		Bali, Indonesia	
Working Party on Ecosystems and Bycatch	17-19 Sept (3d)	Cape town, South Africa – TBD	16–18 Sept (5d)	Bali, Indonesia	
Working Party on Methods	22-23 Oct (2d)	Port Louis, Mauritius	18-19 Oct (2d)	TBD	
Working Party on Tropical Tunas	24-29 Oct (6d)	Port Louis, Mauritius	21-26 Oct (6d)	TBD	
Working Party on Neritic Tunas	Pending (3d)	Penang, Malaysia	Pending (3d)	TBD	
Working Party on Data Collection and Statistics	nil	nil	5–6 Dec	TBD	
Scientific Committee	10-15 Dec (6d)	Victoria, Seychelles	9–14 Dec (6d)	TBD	

Requests from the Commission

SC14.64 (para. 222) Noting that each year the Commission makes a number of requests to the SC without clearly identifying the task to be undertaken, its priority against other tasks previously or simultaneously assigned to the SC and without assigning a budget to fund the request made, the SC **RECOMMENDED** that these matters be addressed by the Commission at its next session.

Election of a Chairperson and Vice-Chairperson for the Next Biennium

SC14.65 (para. 232) The SC RECOMMENDED that the Commission note the new Chair, Dr. Tom

Nishida (Japan) and Vice-Chair, Mr. Jan Robinson (Seychelles), of the SC for the next biennium, as well as the Chairs and Vice-Chairs of each of the Working Parties as provided in <u>Appendix VII.</u>

Review of the Draft, and Adoption of the Report of the Fourteenth Session of the Scientific Committee

SC14.66 (para. 233) The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC14, provided at <u>Appendix XXXVIII</u>.

RESEARCH RECOMMENDATIONS AND PRIORITIES

Working Party on Billfish (WPB) – Research Recommendations and Priorities

- SC14.67 (para. 201) The SC **RECOMMENDED** that marlins and sailfish undergo CPUE analysis in 2012, with striped marlin taking priority over other species.
- SC14.68 (para. 202) The SC **RECOMMENDED** that as a matter of priority, striped marlin be the subject of CPUE analysis in 2011, and that CPUE series be compared among fleets where possible.
- SC14.69 (para. 203) The SC AGREED that there was no urgent need to carry out stock assessments for the swordfish resources in the Indian Ocean in 2012, and **RECOMMENDED** that efforts over the coming year be focused on the other billfish species, in particular on striped marlin.
- SC14.70 (para. 204) The SC **RECOMMENDED** the following core areas as priorities for research over the coming year;
 - Swordfish stock structure and migratory range using genetics
 - Swordfish stock structure and movement rates using tagging techniques
 - Billfish species growth rates
 - Size data analyses
 - Stock status indicators exploration of indicators from available data
 - CPUE standardization swordfish, marlins and sailfish
 - Stock assessment Istiophorids
 - Depredation focus on the southwest

Working Party on Temperate Tunas (WPTmT)

Stock assessment

SC14.71 (para. 206) The SC AGREED that there was an urgent need to carry out revised stock assessments for the albacore resource in the Indian Ocean in 2012, and **RECOMMENDED** that the Commission consider approving funds for this purpose.

Stock structure

SC14.72 (para. 207) Noting that at present very little is known about the population structure and migratory range of albacore in the Indian Ocean, other than the possible connectivity with the southern Atlantic, the SC **RECOMMENDED** that a research project addressing the albacore stock structure, migratory range and movement rates in the Indian Ocean be considered at its 2012 annual meeting as this project is assigned a high priority.

Additional core topics for research

- SC14.73 (para. 208) The SC **RECOMMENDED** that the following core topic areas as priorities for research over the coming year:
 - Size data analyses
 - Growth rates and ageing studies
 - Stock status indicators exploration of indicators from available data
 - Collaborate with SPC-OFP to examine their current simulation approach to determine priority research areas.

Working Party on Tropical Tunas (WPTT)

CPUE standardisation

SC14.74 (para. 211) The SC **RECOMMENDED** that if possible, the IOTC Secretariat and Maldivian scientists continue the joint effort to standardize the Maldivian pole-and-line CPUE in preparation for assessment in 2012.

SC14.75 (para. 212) The SC **RECOMMENDED** that standardization of purse seine CPUE be made where possible using the operational data on the fishery, and that participants working on CPUE for the main fleets, attend the CPUE standardization workshop being organized by ISSF in Honolulu, Hawaii in 2012.

Stock assessment

SC14.76 (para. 213) Noting the difficulty of carrying out stock assessments for three tropical tuna species in a single year, the SC RECOMMENDED to a revised assessment schedule on a two- or three-year cycle for the three tropical tuna species as outlined in Table 9. Following the uncertainty remaining in the yellowfin tuna assessment the SC AGREED that priories for stock assessments in 2012 would be yellowfin tuna (Multifan-CL and SS3, Yield per recruit and possibly others) with an update of fishery indicators for the other two species.

2012	2013	2014	2015	2016	2017
Full	Update	Update	Full	Update	Update
Update	Full	Update	Update	Full	Update
Update	Update	Full	Update	Update	Full
	2012 Full Update Update	20122013FullUpdateUpdateFullUpdateUpdate	201220132014FullUpdateUpdateUpdateFullUpdateUpdateUpdateFull	2012201320142015FullUpdateUpdateFullUpdateFullUpdateUpdateUpdateUpdateFullUpdate	20122013201420152016FullUpdateUpdateFullUpdateUpdateFullUpdateUpdateFullUpdateUpdateFullUpdateUpdate

Table 9. New schedule proposed for tropical tuna species stock assessment.

Note: the schedule may be change depending on the situation of the stock from various sources such as fishery indicators, Commission requests, etc.

Additional topics for research

- SC14.77 (para. 214) The SC **RECOMMENDED** the following core topic areas as priorities for research over the coming year in order of priority: update of the Brownie-Peterson method for the 3 tropical tuna species (possible issue for the 2012 IO Tuna Tagging Symposium).
 - An updated yellowfin tuna growth curve (work in progress to be presented to 2012 Tuna Tagging Symposium).
 - Multi-gear yield per recruit.

Working Party on Ecosystems and Bycatch (WPEB

SC14.78 (para. 215) The SC AGREED that sharks should be the priority for the next meeting of the WPEB in 2012, and seabirds, marine turtle, marine mammals and other bycatch should be reassessed as priorities at the next session of the SC. Thus, the SC RECOMMENDED the following core topic areas as priorities for research over the coming year.

Ecological Risk Assessment

- i. All sharks
- **CPUE** analyses
- i. Oceanic whitetip shark
- ii. Other sharks
- Stock status analyses
 - i. Oceanic whitetip shark
- ii. Other sharks
- Capacity building

i. Scientific assistance to CPCs and specific fleets considered to have the highest risk to bycatch species (e.g. gillnet fleets and longline fleets).

Working Party on Neritic Tunas (WPNT)

Stock structure

SC14.79 (para. 216) Noting that at present very little is known about the population structure and migratory range of most neritic tunas in the Indian Ocean, the SC **RECOMMENDED** a research plan that includes two separate research lines; i) genetic research to determine the connectivity of neritic tunas throughout their distributions, and ii) tagging research to better understand the movement dynamics, possible spawning locations, and post-release mortality of neritic tunas from various fisheries in the Indian Ocean. These should be considered high priority research projects for 2012 and 2013.

Biological information

SC14.80 (para. 217) The SC RECOMMENDED that quantitative biological studies are required to

determine maturity-at-age and fecundity-at-age relationships, and age and growth for all neritic tunas throughout their range.

CPUE standardisation

SC14.81 (para. 219) The SC **RECOMMENDED** that where feasible, support should be provided by the IOTC Secretariat and other CPCs, to aid in the development of standardised CPUE series for each neritic tuna species.

Stock assessment

SC14.82 (para. 221) The SC AGREED that there was an urgent need to carry out stock assessments for neritic tunas in the Indian Ocean, however at present the data held at the IOTC Secretariat would be insufficient to undertake this task. As such, the SC RECOMMENDED that the Commission consider allocating appropriate funds to further increase the capacity of coastal states to collect, report and analyse catch data on neritic tunas.