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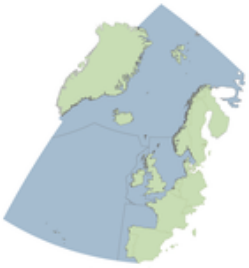
Status Assessment 2023 - Black-legged Kittiwake

The status of Black-legged Kittiwake (*Rissa tridactyla*) breeding populations is still declining in Arctic Waters and the Greater North Sea and is also declining in the Celtic Seas and the Bay of Biscay. Climate change appears to be continuing to affect food supply in the Arctic, Greater North Sea and the Iberian Coast. Food supply in the North Sea is also threatened by sandeel fishing in some areas. A northward contraction in breeding range in Bay of Biscay and Celtic Seas appears consistent with climate change predictions.



OSPAR QSR2023

(/en/ospar-assessments/quality-status-reports/qsr-2023/)

Assessment of status[1]		Non-Breeding Distribution	Non-Breeding Population size	Breeding Distribution	Breeding Population size	Condition i.e. breeding productivity	Breeding Status (overall assessment)[3]	Previous OSPAR status assessment 2010
Region	I	?	?	5 ←→	1↓	1↓	1↓	●
	II	?	1↑[2]	5 ←→	1↓	1↓	1↓	●
	III	?	?	1 ↓	1↓	1↓	1↓	○
	IV	?	?	1 ↓	1↓	?	1↓	○
	V	?	?	NA	NA	NA	?	○

Assessment of Pressures		Climate change impacts ([a]direct: shift in breeding distribution; [b]indirect: reduced food supply)	Over-exploitation of natural resources - fishing depletion of small forage fish stocks (e.g. sandeel and herring)	Threat or impact (conclusion based on the above rows)
Region	I	3 ↓[b]	3 ←→	3 ↓
	II	3 ←→[b]	3 ↓	3 ↓
	III	3↑[a]	5←→	3,5↑
	IV	3[a], 4[b] ←→	?	3,4←→
	V	?	?	?

⊞ Table Legend

⊞ Method of Assessment

Confidence

High

Background Information

Year added to OSPAR List of Threatened and/or Declining Species and Habitats (T&D List): 2008 (OSPAR 2009)

- **Global/regional importance**: 85% of the breeding population of the subspecies *R. t. tridactyla* occurred within the OSPAR Area at the time of listing (2008).
- **Decline**: Using breeding population data up to 2006, the species was evaluated as significantly declined at the time of listing, in particular, in Greenland, Norway and the UK.
- **Sensitivity**: The species was considered sensitive at the time of listing due to its low resilience to adverse effects from human activity, with recovery likely to be slow due to its life history characteristics (long-lived and relatively slow to reproduce).
- **Anthropogenic pressures and biological factors**: The species was considered threatened due to changes in the availability of key prey species, linked to possible climate change factors and over-fishing in parts of its range, e.g. sandeel fisheries in the UK. Predation in some areas, e.g. by Great Skuas *Stercorarius skua* in Shetland, and White-tailed eagles *Haliaeetus albicilla* in Norway, were also cited as threats.

Last status assessment: 2009 (based on data up to 2006) - OSPAR (2009).

Geographical Range and Distribution

Breeding distribution

The breeding distribution of Black-legged kittiwakes is confined to more northerly latitudes on both sides of the Atlantic (**Figure 1**) and is restricted by the availability of sea cliffs where they nest. Modelling predicts that by 2100, the climate in the eastern North Sea and in the Bay of Biscay and Iberian Coast will no longer be suitable for breeding kittiwakes (Russell *et al.* 2015). Indeed, only a few pairs now remain breeding in the entire Bay of Biscay OSPAR Region (Simian *et al*. 2018; Legroux 2019), although climate is probably affecting them indirectly by reducing the abundance of their prey (Martínez-Abraín *et al*. 2019). No constriction in range is yet evident in the North Sea. However, in the Celtic Seas, the southeast corner of their range is constricting northwards: all colonies have disappeared from Brittany in NW France during the last 10 years (Legroux 2019) and many colonies have also gone extinct along the SW coast of the UK (McMurdo-Hamilton 2016).

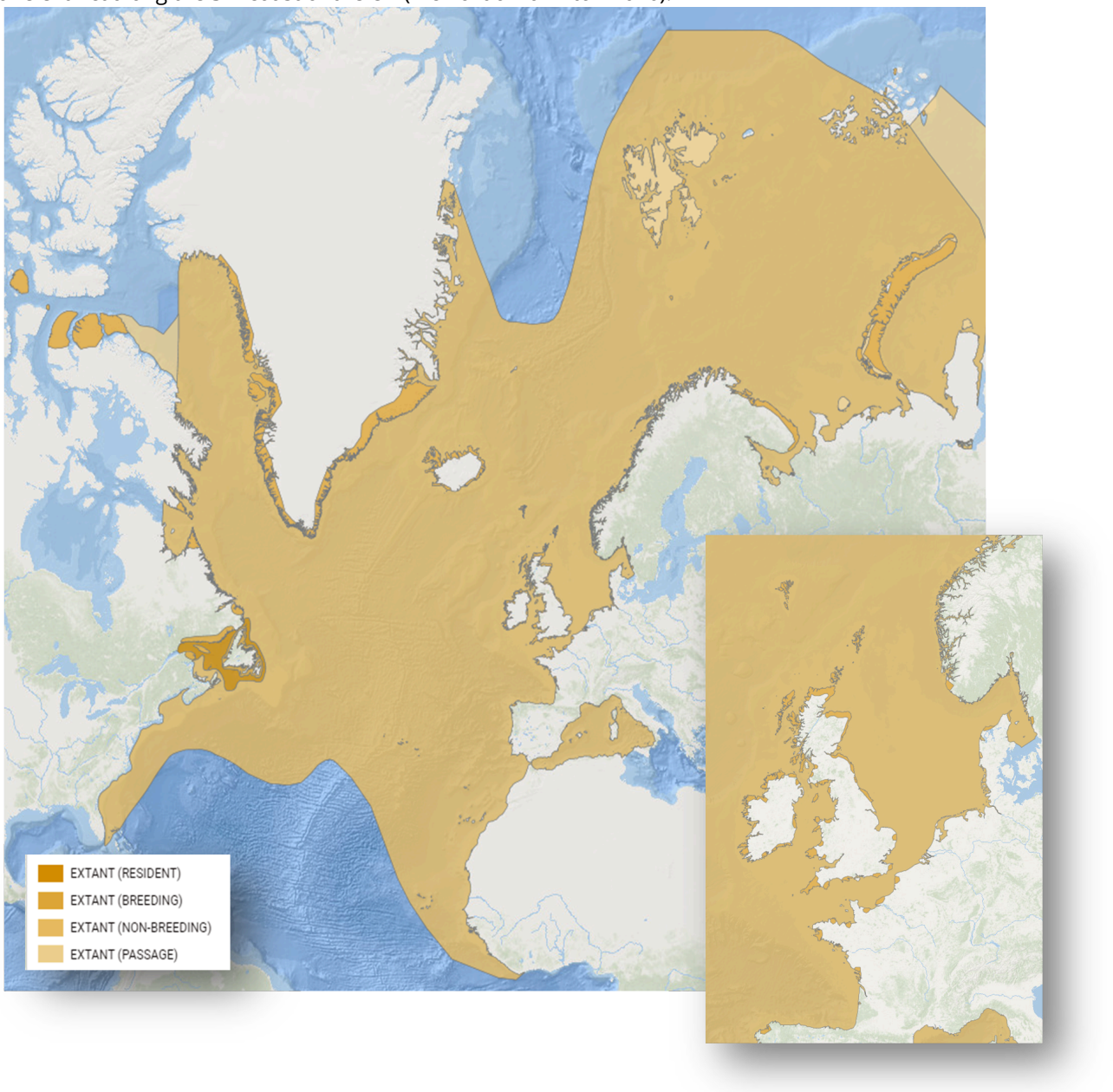


Figure 1: Breeding and non-breeding distribution of Black-legged kittiwake - sub-species R. t. tridactyla (Source: IUCN Red List at https://www.iucnredlist.org/species/22694497/155617539).

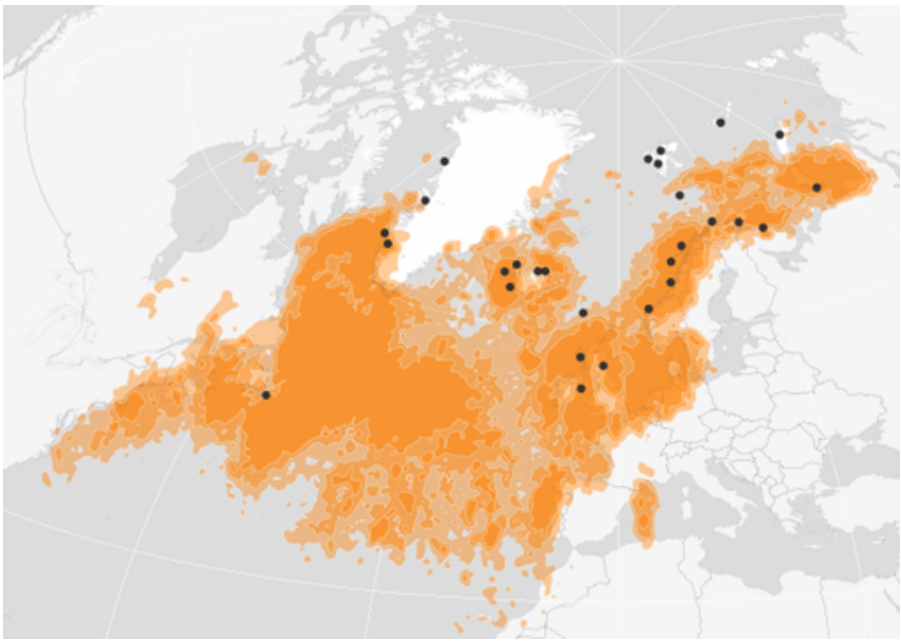


Figure 2: Distribution of Black-legged kittiwakes ouside the breeding season (i.e. excludes May-July) during 2007 to 2021. Distribution of 1 285 individual kittiwakes fitted with geolocators at 28 colonies (black dots). Source: //seapop.no/en/seatrack/ (accessed on 12/09/22).

Non-breeding distribution

Individual kittiwakes cover thousands of kilometres outside the breeding season (**Figue 2**). Birds breeding in the North Sea and Celtic Seas leave colonies and head north to waters around Greenland and will then spend the winter in the Western Atlantic off Newfoundland and mainland Canada (Frederiksen *et al.* 2012). Some will also head south to the Azores and off mainland Portugal or as far south as 30deg N. Birds breeding at more northerly colonies tend to remain furter north in the winter and some stay north of the Arctic circle. As the SEATRACK dataset on individual bird movements expands into the future, it may be possible to detect changes indistribution of kittiwakes at sea outside the breeding season across their entire range in the North Atlantic.

Method of assessment: 1 Data driven - Bay of Biscay, Celtic Seas; 5 Expert judgement - other regions

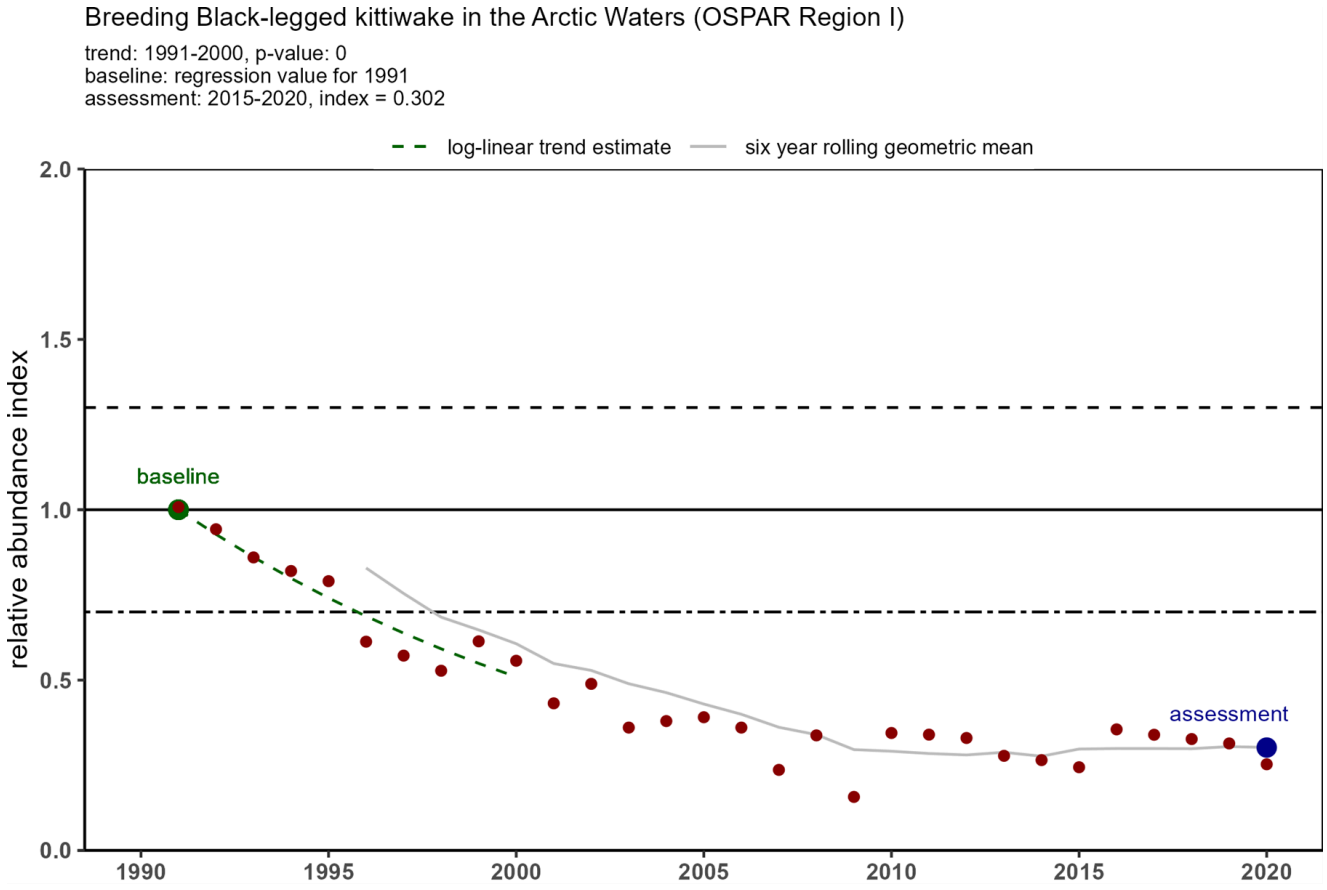
Population/Abundance

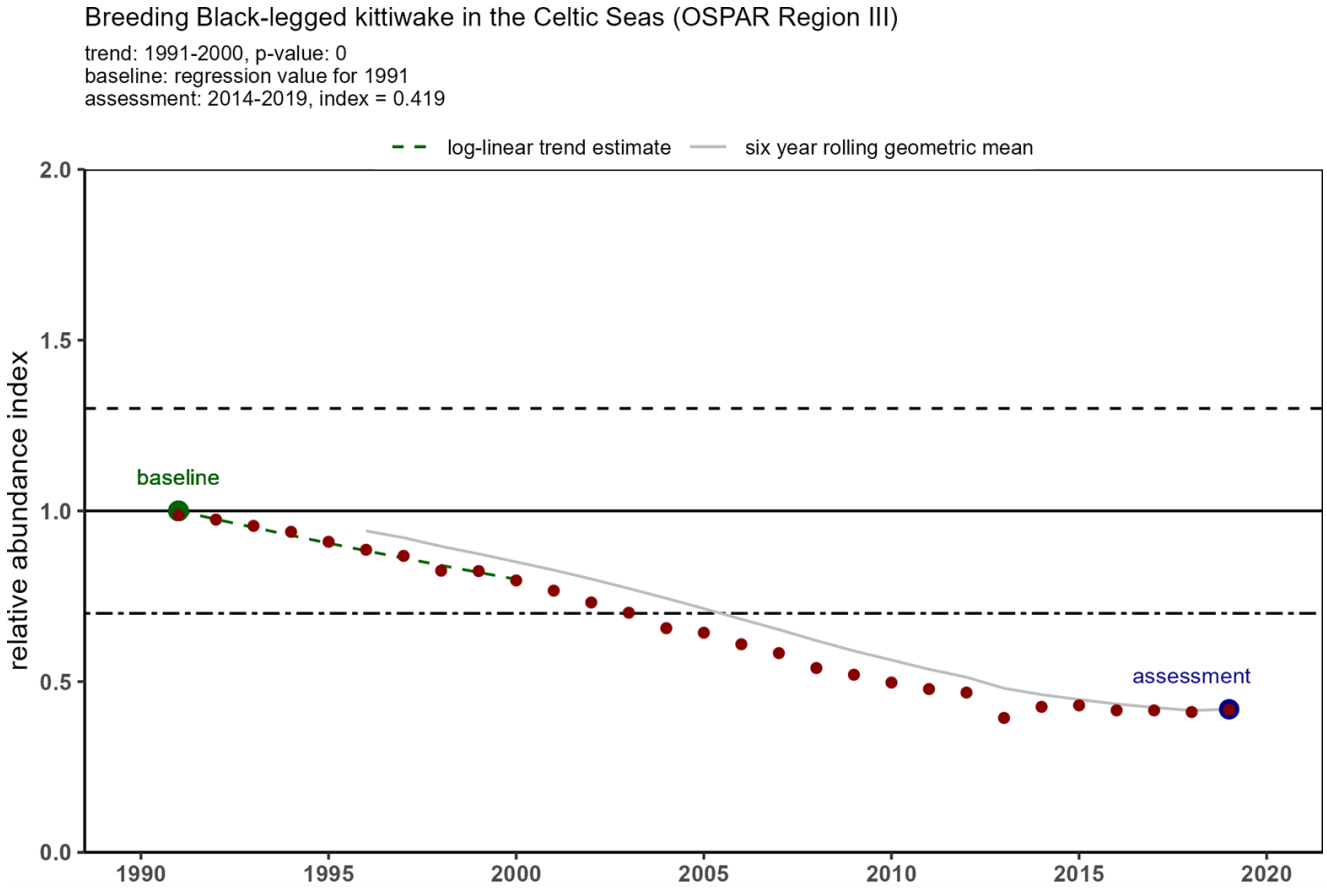
Trends in OSPAR's common indicator of marine bird abundance (**Figure 3**) show that there have been substantial declines in breeding numbers of kittiwakes since the baseline in 1991 in all four regions where they breed. In 1991, there were around 1,8 million pairs of kittiwakes in the monitored areas, but by 2015-2020 there were only 600 000 pairs (**Table 1**). The decline in Arctic waters was the most substantial in terms of numbers of birds and overall decline - 70%. The declining status of kittiwakes breeding in the Celtic Seas and Bay of Biscay was not identified when kittiwakes were added to the T&D List in 2008, or in the subsequent background document (OSPAR, 2009).

Table 1: Predicted number of breeding pairs and relative breeding abundance (a proportion of the baseline in 1991) of kittiwakes in each OSPAR Region compared to the period 2001-06, used in the last assessment in 2009 (Source: OSPAR 2023a; ~A. Chabrolle pers. Comm.).

	Baseline 1991[2]	**2001-2006**		**2014-2019 (2015-20[#] 2019-20[~])**	
OSPAR Region	No. Pairs	No. pairs	Relative abundance	No. pairs	Relative abundance
Arctic (Norwegian part only)	1 233 810	419 495	0,34	370 143[#]	0,30[#]

	Baseline 1991[2]	2001-2006		2014-2019 (2015-20[#] 2019-20[~])	
Greater North Sea	505 694	277 051	0,55	183,304	0,36
Celtic Seas (UK & France)	87 079	59 458	0,68	36 524	0,42
Bay of Biscay & Iberian Coast	263	108	0,41	22~	0,08~


Breeding Black-legged kittiwake in the Arctic Waters (OSPAR Region I)
trend: 1991-2000, p-value: 0
baseline: regression value for 1991
assessment: 2015-2020, index = 0.302
log-linear trend estimate
six year rolling geometric mean
relative abundance index
baseline
assessment
2.0
1.5
1.0
0.5
0.0
1990
1995
2000
2005
2010
2015
2020


Breeding Black-legged kittiwake in the Celtic Seas (OSPAR Region III)
trend: 1991-2000, p-value: 0
baseline: regression value for 1991
assessment: 2014-2019, index = 0.419
log-linear trend estimate
six year rolling geometric mean
relative abundance index
baseline
assessment
2.0
1.5
1.0
0.5
0.0
1990
1995
2000
2005
2010
2015
2020

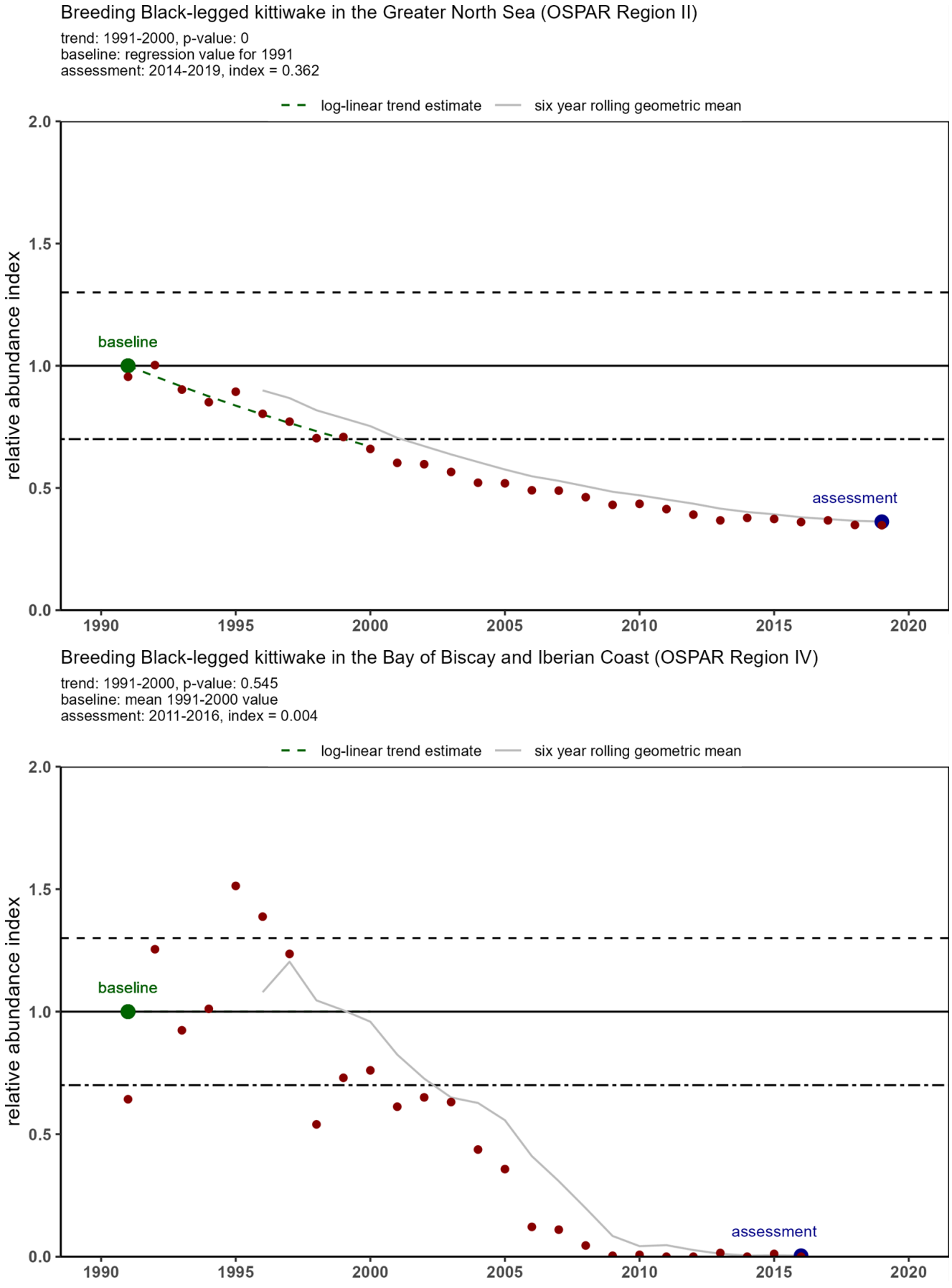


Figure 3: Trends in relative breeding abundance of black-legged kittiwake in each of OSPAR Regions I, II, III and IV, from 1991 onwards to 2020 (depending on Region). Datapoints represent yearly relative abundance values and the grey line represent the six-year rolling relative abundance geometric mean. The black line indicates the baseline which is calculated from the first ten years of data[1]. The black dotted line indicates the lower threshold value of 0,7 (for species that lay >1 egg). The assessment value (in blue) is the geometric mean of the last six years (e.g. 2015-2020). Kittiwake abundance was assessed as 'good' or 'poor' depending on whether the assessment value was higher or lower than the threshold value of 0,7. (Source: OSPAR 2023a).

Method of assessment: 1 Data driven; Source: OSPAR (2023a)

Condition

The condition of breeding populations of kittiwakes has been assessed using the common indicator of marine bird breeding productivity from the QSR2023 (OSPAR 2023b). The new approach predicts how observed levels of breeding productivity (number of chicks successfully fledging each year) may impact the long-term population growth rate of a species. It was not assessed in Region IV where very few, if any kittiwakes have bred since 2010. In the other Regions, kittiwake breeding productivity has fluctuated from year to year, but there was a clear decline during late 1990s and early 2000s to a low around 2010 (**Figure 4**). Subsequently, between 2010 and 2020, productivity has been increasing in all Regions. However, the levels of productivity are still below what would be required to sustain growth and recovery in these depleted populations (Figure 5). The poor growth rate in Region I, which has persisted since 1990, reflects the species' status there as Critically Endangered (under IUCN Red List Criteria). The recovery of productivity in Regions II and III is still insufficent to sustain population growth and the species would be considered to be Endangered (under IUCN Criteria) in both Regions (**Figure 5**). Productivity would need to rise above 0,99 chicks per pair in Region I, 1,15 in Region II and 1,02 in Region III for population growth to be achieved, given the prevailing levels of age-specific survival in each population (**Figure 4**).

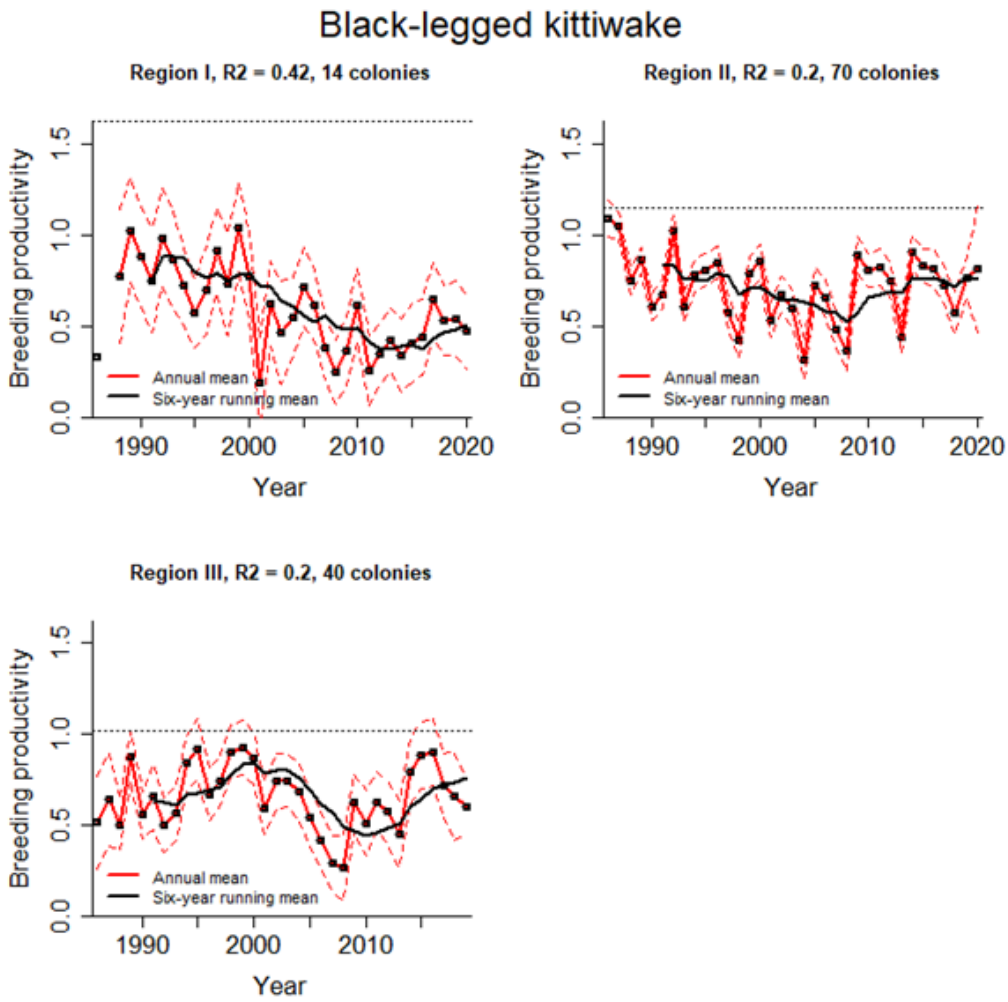
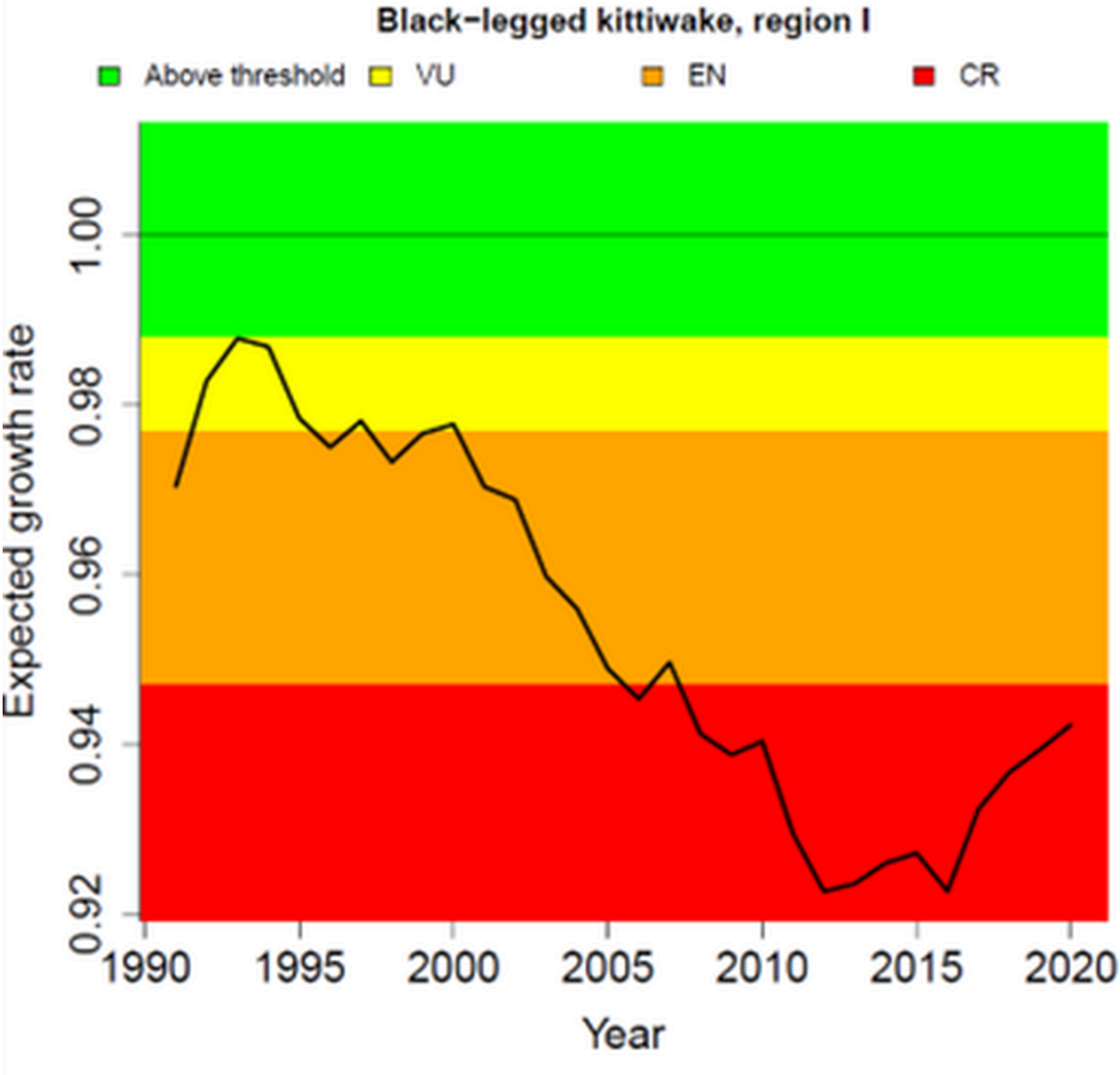
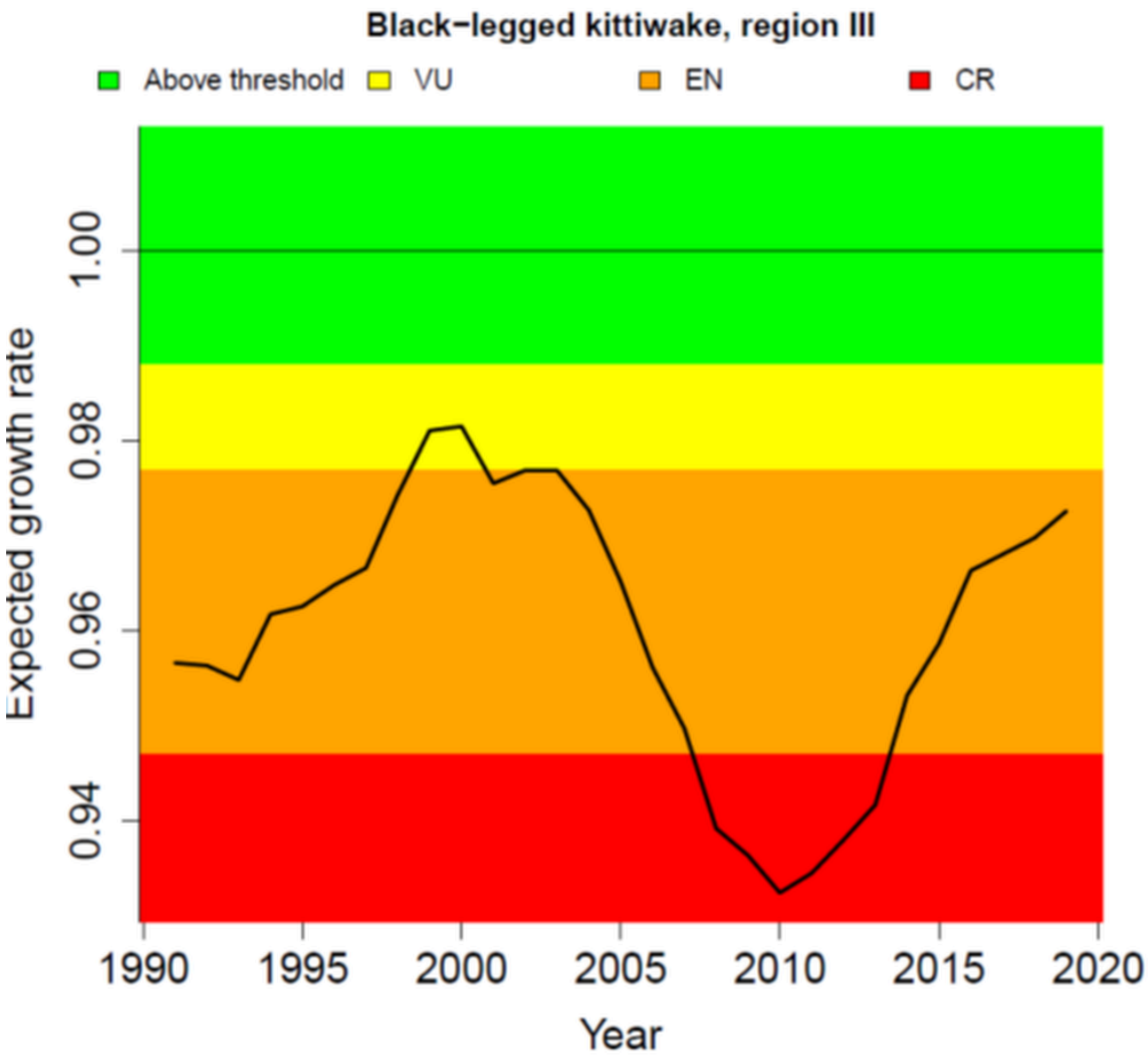


Figure 4 - Trends in annual breeding productivity (mean number of chicks fledged per pair) of black-legged kittiwake in each of OSPAR Regions I, II and III, from 1986 to 2019 or 2020 (depending on region). Dashed red lines indicate upper and lower 95% confidence limits around the annual mean productivity estimates (data points connected by red line). The black line represent the six-year rolling mean productivity. Horizontal dotted lines show the breeding productivity required to maintain a stable population, given the prevailing levels of age-specific survival: 1,62 in Region I, 1,15 in Region II and 1,02 in Region III. (Source: OSPAR 2023b).


Black−legged kittiwake, region I
Above threshold
VU
EN
CR
Expected growth rate
1.00
0.98
0.96
0.94
0.92
1990
1995
2000
2005
2010
2015
2020
Year


Black−legged kittiwake, region III
Above threshold
VU
EN
CR
Expected growth rate
1.00
0.98
0.96
0.94
1990
1995
2000
2005
2010
2015
2020
Year

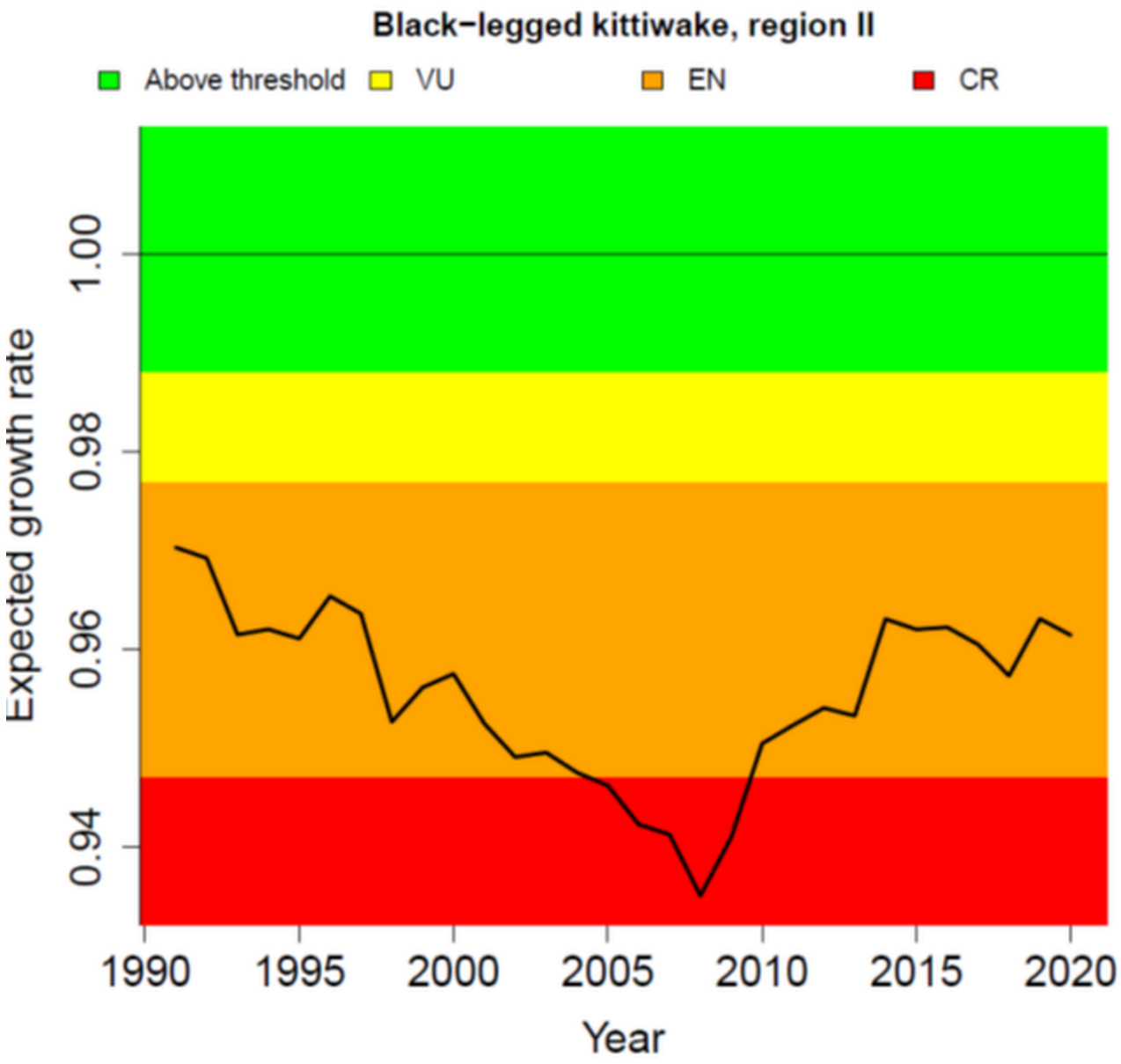


Figure 5: Expected annual population growth rate of Black-legged kittiwake in OSPAR Regions I, II and III, 1991-2020 (black line). The colour-coded background shows the OSPAR QSR2023 threshold values; values in the green zone indicate the threshold is achieved, whereas values in the other zones are below and indicate the threshold is not achieved. For illustration, the figure also shows a breakdown for the corresponding IUCN red list categories of Vulnerable (VU), Endangered (EN) and Critically Endangered (CR). Source: OSPAR (2023b).

Method of assessment: 1 Data Driven – Source: OSPAR (2023b)

Threats and Impacts

Threats to the kittiwakes' food supply of sandeels from climate change appear to be continuing in the Arctic and Greater North Sea (Cook *et al.* 2014; Mitchell *et al.* 2020). Threats from sandeel fishing in the North Sea appear to be decreasing due to a combination local closures and reduction in sandeel stocks and fishing effort (Mitchell *et al*. 2018). However, there is no evidence from the Celtic Seas to suggest climate change is driving reductions in food supply in the same way (Cook *et al*. 2014, Lauria *et al*. 2012). The southern edge of the breeding range in the Celtic Seas is constricting northwards, which is consistent with climate change predictions of Russell *et al.* (2015).

In Arctic Waters, some large kittwiake colonies in the Norwegian Sea have gone extinct since the last assessment due to a combination of poor food supply and increasing predation on chicks from White-tailed eagles (*Haliaeetus albicilla*) (Anker-Nilssen *et al.* in review). Post-larval herring from the Norwegian spring-spawning (NNS) stock that collapsed in the late 1960s, has proven to be a key driver of kittiwake breeding success in this part of Region I (Cury *et al.* 2011). The current low availbility of sandeels is more likely to be driven by competition for food with other larger fish and predation by larger fish than by climate change-induced temperature changes (Frederiksen *et al.* 2013, but see Hátún *et al.,* 2017).
In the Bay of Biscay and Iberian Coast, a collapse in food supply (sardines) in 1991 caused the decline in Spain (Martínez-Abraín, 2019). The declines eslewhere in the Region may be part of northward shift in range, consistent with climate change predictions of Russell *et al.* (2015).

An emerging threat to kittiwakes may come from the expansion of offshore renewable energy generation in some areas, particularly in the North Sea.

Measures that address key pressures from human activities or conserve the species/habitat

In 2019, all but one Contracting Party within the breeding range of kittiwake (Ireland) reported on the implementation of national actions under OSPAR Recommendation 2011/5, as amended by OSPAR Recommendation 2020/1 (OSPAR, 2011). Most actions had been implemented by those Contracting Parties who reported, but in some cases it was difficult to assess effectiveness of the measure without more detailed standards (e.g. for monitoring).

Most Contracting Parties have legislation that bans deliberate killing or taking of chicks and eggs. However, regulated hunting of Black-legged kittiwake is permitted by Iceland and by Denmark with respect to Greenland.

OSPAR's most recent MPA assessment (OSPAR 2022) concluded that kittiwake are sufficiently represented in MPAs accross their range (i.e. they are a feature of more than one MPA in each Region where they are declining or threatened). Furthermore, kittiwakes are included as a feature of the North Atlantic Current and Evlanov Sea basin MPA (NACES), which covers 600 000km^2 of ocean in the western part of Region V and was recently nominated collectively (https://www.ospar.org/documents?v=43885 (https://www.ospar.org/documents?v=43885)).

However, protection measures in existing MPAs and measures to determine and address levels of bycatch appear to be under-implemented, according to the 2019 reporting (**Table 2**) and may need further attention.

Table 2: Summary of Contracting Party 2019 reports on implementation of national actions relating to Black-legged kittiwake (Recommendation 2011/5, OSPAR, 2011)

National Action	**Implementation**		
	Full	**Partial**	**None[2]**
National legislation to protect the black-legged kittiwake	BE, DK, FR, DE, NL, NO, SE, UK	IS, DK(GL)[1]	
Relevant conservation measures in key areas	DK, DE, IS, NO, SE, UK	FR, NL, DK(GL)	BE
Marine Protected Areas in OSPAR Network with management plans	FR, SE, UK		BE, DK, DK(GL), **DE**, IS, NL, **NO**
Monitoring and assessment programmes	DK(GL), FR, IS, NO, SE, UK	NL, BE, DE,	DK
Raise awareness of the status of kittiwakes and threats	DK(GL), IS, NO, SE, UK	DE	BE, DK, FR, NL

Seabird bycatch National Plan of Action (NPOA) for longline fisheries	IS, (NO)	UK, NO	BE, DK, **FR**, DE, NL, SE
Support, promote and implement the priority actions identified in the Nordic Action Plan for Seabirds.	NO		BE, DK, FR, DE, NL, IS, SE, UK

[1]DK(GL) = DK Reporting on behalf of Greenland
[2]Grey text = action not applicable; **Bold text** = future plans for implementation

Conclusion (including management considerations)

Results from the QSR 2023 (OSPAR 2023a, b) show that the status of breeding populations of kittiwakes is poor in all four Regions where it breeds, and has declined further since the original assessment in 2008 and 09 (see OSPAR 2008, 2009).

Breeding numbers in all four Regions declined steadily during the 1990s and early 2000s. In Arctic Norway, which held the largest breeding population, numbers have declined by 88% since 1991. Declines of 64% and 58% also occured in the Greater North Sea and Celtic Seas, respectively. The declines occured during periods of poor productivity. In the last decade, productivity in all three Regions where they still breed has improved somewhat, and the declines in breeding numbers have slowed down or stopped since 2010, except in Arctic Waters (Norwegian part), where declines have continued. Despite the improvement, productivity remains at levels that are insufficient to stimulate population recovery.

Low productivity has most probably been caused by reduction in the kittiwakes' food supply of small shoaling fish (e.g. sandeel, sprat, herring). Climate change appears to be the key driver of these changes in their prey-fish populations in the Arctic and Greater North Sea, but it is unclear what drivers are operating in the Celtic Seas. In the Bay of Biscay, few kittiwakes are left breeding, partly due to a collapse in the sardine stock in the south of the region in the 1990s. The declines elsewhere in the Region may be part of a northward contraction in range, which is also evident in the southern part of the Celtic Seas and is consistent with climate change predictions.

Black-legged kittiwakes are therefore still justified for inclusion in the OSPAR List of Threatened and Declining Species.

In view of the impacts of climate change on kittiwake populations, action under OSPAR Recommendation 2011/5, as amended by OSPAR Recommendation 2020/1, could focus on reducing other impacts as much as possible. This will enhance the resilience of kittiwake populations to the impacts of climate change, in parallel with global efforts to reduce carbon emissions. This may include adjusting existing actions such as the regulation of sandeel fishing in the North Sea, work to improve ecosystem-based management of key fisheries, regulation of hunting in the Arctic, management of MPAs and assessing risk from bycatch in fisheries.

Additional action may be required to monitor and address impacts from emerging threats. These threats include the loss of foraging habitat and increased mortality risk (i.e. collision with wind turbines) by offshore renewable energy generation in the North Sea and the spread of avian influenza following recent outbreaks at seabird colonies in the OSPAR Area.

In the future, kittiwakes can be re-assessed when the OSPAR Common Indicators for marine birds are updated, i.e. during future QSR or Intermediate Assessments.

Knowledge Gaps

The assessment for breeding populations of kittiwakes in Arctic Waters lacks data from Greenland, Iceland and the Faroes. The assessment in the Celtic Seas lacks data from Ireland.

This assessment was based on breeding populations of kittiwake. The QSR 2023 included a pilot assessment of their status at sea outside the breeding season (OSPAR 2023c), but this is limited to the southern part of the Greater North Sea.

The assessment of threats would also benefit from a greater understanding of the links between climate change, lower trophic levels and kittiwake population status, predation risks and movements.

Method used

Main source of information:

1. OSPAR data assessment

Assessment is based upon:

a) complete survey or a statistically robust estimate: The ability to assess kittiwake status in the Arctic Waters, Celtic Seas and Greater North Sea was greatly improved in this assessment, compared to the background document (OSPAR 2009), by the inclusion of common indicators from the QSR2023 (OSPAR 2023a, b, c,

d) These were constructed from a systematic collation of seabird data from across the OSPAR maritime area.

⊞ References

[1]In case of a significant trend over the first ten years of the time series (regression p value ≤ 0,05), the abundance in the first year (1991) was predicted from the trend regression and used as the baseline value. If no significant trend existed in the first ten years, the mean abundance of the first ten years (ignoring missing years) was used as the baseline value (OSPAR 2023a).

Sheet reference:

BDC2023/black_legged_kittiwake

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