Habitat Characterization of Tiverton, Digby County, Nova Scotia Project No. 308017

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1.0 INTRODUCTION

This habitat characterization is to support the decision steps for the authorization of a proposed harbour development project (breakwater, floating dock construction and dredging) at Tiverton, Digby County, Nova Scotia. This report will describe the proposed project, the fisheries resources and habitat present at and around the project site.

The proposed harbour development project will be broken into three phases with the major components outlined below.

The proposed harbour development will be a phased construction over five years. Project components are listed below:

- Construction of new breakwater;
- Installation of 7 floating wharves, access ramp and parking area; and
- Dredging of basin, installation of pipe piles and construction of marginal wharf (service area).

The first phase of the proposed project is the construction of an armourstone breakwater. The breakwater will extend 149 m east and then 69 m southward. The length of the proposed breakwater is approximately 220 meters. The breakwater will be 5 meters wide at the crest and approximately 50 meters wide at the base, depending on water depth.

The breakwater will be constructed of clean rock obtained from an approved quarry, and will consist of a 0.2 – 100 kg corestone surrounded by 2 layers of 200 - 800 kg filterstone, 1.5 meters thick. The north side (seaside and crest) will be protected with 2 layers of 8-10 tonne armourstone and a single layer of 6-8 tonne armourstone will protect the south side. Approximately 40,000 tonnes of armourstone, 25,000 tonnes of filter stone and 93,000 tonnes of core stone will cover an area of approximately 9,500 square meters on the harbour bottom. An additional infill of rock will extend along the shoreline for a length of approximately 120 m. This infill will be constructed of rockfill and two layers of 500-1000 kg filterstone. Minor dredging may be conducted before breakwater construction is complete to allow for adequate berthing depth of future floating docks along the first leg of the breakwater. If dredging in the vicinity of the future floating docks is conducted after breakwater construction is complete, rock will have to be temporarily removed from the breakwater structure to allow for the dredge equipment to properly remove material. This minor dredging in the vicinity of the future floating docks (along the first leg of the breakwater) may consist of blasting of bedrock bottom. Class A material removed from blasting activities may be used in the construction of the breakwater itself. Class B material dredged from the vicinity of the future floating docks (along the first leg of the breakwater) may be used to begin construction of a small parking area (for which construction is not scheduled until the second project phase).

The second phase of the proposed project is the installation of seven floating docks to allow for maximum berthing capacity of 20 vessels. The floating docks complete with access ramp will be anchored to the breakwater with concrete anchors. A parking area will also be constructed where the breakwater meets the shoreline. The parking area will provide parking space for up to 70 vehicles.

The final phases of the project involves dredging of the new basin, installing steel pipe piles and the construction of a marginal wharf. An excavator will be used in the proposed land-based dredging to attain a depth 2 meters below present Chart Datum. The anticipated dredge volume is approximately 13,000 cubic meters. The proposed area to be dredged is within the new berthing area. Dredging of the new basin may consist of blasting of bedrock bottom to attain desired dredge depth. The dredge material (50% Class A rock, 50% Class B overburden) will be disposed on land to form the proposed parking area. Any remaining dredge material that cannot be utilized in the construction of the parking area will be disposed on land at a Provincially approved site. A total of ten steel pipe piles will be driven to anchor the remaining floating wharves (berthing capacity of 15 vessels). A marginal wharf will be constructed to serve as a service area for loading and unloading. The marginal wharf will be constructed of rockfill and two layers of 500 – 1000 kg filterstone at a 1:25 to 1.0 slope. The marginal wharf construction will measure approximately 90 m long by 4 m wide. The marginal wharf will be finished with a concrete deck.

In this report, the proposed breakwater area and the area to be dredged will be referred to as the project footprint.

In describing the habitat and context of the productive capacity of the project footprint, the surrounding habitat that provides a similar habitat (or a species stock that may contribute to the species in the footprint) will be described in context of the spatial boundary of Tiverton. In this report, this area (i.e., Petit Passage) will be referred to as the adjacent habitat. This description of the adjacent habitat also provides context as to what is not in the project footprint.

The summary will provide a rationale for the classification of the footprint habitat in context of the adjacent habitat. The summary will also make a prediction as to the evolution of the habitat in the project footprint after the disruption caused by the project.

2.0 CHARACTERISTICS OF PETIT PASSAGE AREA

2.1 BIOLOGICAL CHARACTERISTICS

According to the Atlas of Breeding Birds of the Maritime Provinces (1992) there are between fifty-eight (58) and seventy (70) different bird species in the area.

Marine waters of Petit Passage and farther out into the Bay of Fundy support populations of herring *(Clupea harengus)*, cod *(Gadus morhua)*, flounder *(Pleuronectes americanus)*, mackerel *(Scomber scombrus)*, haddock *(Melanogrammus aeglefinus)*, silver hake *(Merluccius bilinearis)*, rock crab *(Cancer irroratus)* and lobster *(Homarus americanus)*.

Rainbow smelt *(Osmerus mordax)* migrate to the rivers in April, and similarily, American shad *(Alosa sapidissima)* and Alewife or Gaspereau *(Alosa pseudoharengus)* are believed to migrate very near the coastline from mid May through June before migrating into rivers to spawn. Alewife or Gaspereau emigrate from the rivers by autumn to move offshore.

The results of the Underwater Benthic Habitat Survey indicated that flora within the proposed breakwater construction footprint include: kelp (*Laminaria digitata and Laminaria saccharina*), sea colander (*Agarum cribrosum*), sea lettuce (*Ulva lactuca*), filamentous brown and red macrophytes, patches of rockweed (*Fucus spp.*) and knotted wrack (Ascophyllum nodosum). It should be noted that over 10% if the transect areas that were surveyed contained no macrofloral species. The invertebrates encountered within the proposed breakwater footprint include: mussels (*Mytilus edulis*) and green urchins (*Strongylocentrotus droebachiensis*), sea stars (*Asterias spp.),* finger sponge (*Haliclona oculata*), Hermit Crab (*Pagurus spp.*), frilled anemone (*Metridium senile*), barnacles (*Balanus spp.*), and empty scallop shells. It should be noted that over 67% of the transect areas that were surveyed contained no macrofaunal species.

The Atlantic Canada Conservation Data Centre (ACCDC) was requested to provide biological data from a GIS scan of the specified study area. The GIS scan identified no special areas in the vicinity of the study area. Within a 5 kilometer buffer around the study area there were records of 9 rare vascular flora including Coast Pepper-*Bush (Clethra alnifolia),* Mountain Avens *(Geum peckl),* Skunk Cabbage *(Symplocarpus foetidus*), Capitate Spikerush (*Eleocharis olivacea*), Golden Crest (*Lophiola aurea*), Hooded Ladies'-Tresses (*Spiranthes romanzoffiana*), Small Bur-Reed (*Sparganium natans*), Cutleaf Grape-Fern (*Botrychium dissectum*), and Curly-Grass Fern (*Schizaea pusilla*), and no records of rare nonvascular flora. There is minimal potential for the proposed project to impact on these terrestrial species due to the limited spatial limits of the on-land portion of the proposed project site. Within a 5 kilometer buffer around the study area there were records of 2 vertebrate fauna including Wood Thrush (Hylocichla mustelina) and Rusty Blackbird (Euphagus carolinus).

2.2 Resource Harvesting

Commercial fisheries at Tiverton include:

- lobster which is trapped from the last Monday in November to the end of May;
- Groundfish are fished year round (3 vessels);
- herring are fished with the season opening in September (1 vessel);
- Sea Urchins are harvested during the winter months (2 vessels); and
- Rock crab are fished over the summer months (1 vessel).

There are no aquaculture sites at or near the facility. According to the DFO Shellfish Classification Mapping of the general study area, there is one area within Petit Passage that is listed as closed for shellfish harvesting. It is important to note that shellfish area classifications are based on bacteriological contamination of the water column only and may be superceded by DFO Prohibition Orders relative to red tides or elevated bacterial densities in shellfish.

3.0 CHARACTERISTICS OF TIVERTON

On March 21, 2003 a sediment sampling and Underwater Benthic Habitat Survey (UBHS) program was conducted on the project footprint by AMEC Earth and Environmental Limited (AMEC).

3.1 Physical Characteristics

Visual observations of the substrate type from the video surveillance indicated that the dominant substrate type within the proposed project footprint was a combination of sand and rock, with some bedrock outcrops and larger boulders. The substrate size ranges from 6" to 8" for rocks and 3' to 6' for boulders.

A total of four (4) marine sediment samples were collected by AMEC Earth & Environmental Limited (AMEC) on March 21, 2003. All samples were analyzed by Seatech Limited (Halifax, N.S.) for metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides and grain size. The marine sediment samples collected were compared to the CCME Soil Quality Guidelines, NSDOEL Schedule A Guidelines for Land Based Disposal of Marine Sediments and the Atlantic PIRI Tier A Tables for petroleum hydrocarbons. All samples had metal concentrations below the criteria for meeting CCME Interim Soil Quality Guidelines and NSDOEL Schedule A Guidelines for Land Based Disposal of Marine Sediments, with the exception of Boron and Selenium. The sample results of >11 mg/kg for Boron is higher than the CCME Soil Quality Guideline recommended value for 2 mg/kg for Agricultural areas. In addition the sample results of <3 mg/kg for Selenium is higher than the NSDOEL Schedule A recommended values of 0.6mg/kg and 2 mg/kg for Agricultural and Residential/Parkland areas, respectively, and the CCME Soil Quality Guideline recommended values of 1 mg/kg for both Agricultural and Residential/Parkland areas. Reanalysis of the Selenium was conducted at the proper detection limits, and all samples were found to be below the detection limit of 0.3 mg/kg (below all NSDOEL Schedule A and CCME Soil Quality Guidelines for all categories of land disposal). All samples had PAH concentrations below the criteria for meeting CCME Interim Soil Quality Guidelines and NSDOEL Schedule A Guidelines for Land Based Disposal of Marine Sediments. All samples had PCB concentrations below the criteria for meeting CCME Interim Soil Quality Guidelines and NSDOEL Schedule A Guidelines for Land Based Disposal of Marine Sediments. All samples had pesticide concentrations below the criteria for meeting CCME Interim Soil Quality Guidelines and NSDOEL Schedule A Guidelines for Land Based Disposal of Marine Sediments. All samples had petroleum hydrocarbon concentrations below the criteria for meeting Atlantic PIRI Tier 1 Criteria, CCME Interim Soil Quality Guidelines and NSDOEL Schedule A Guidelines for Land Based Disposal of Marine Sediments.

The consistency of all marine sediment samples analysed is less than 1% gravel, 99% sand and less than 1% clay and silt.

3.2 Biological Characteristics

Characterizations of the substrate along two main transect lines and two transect tie-lines at the proposed harbour development (breakwater, floating dock construction and dredging) project footprint in Tiverton were made using a combination of visual field observations and underwater video survey techniques.

The results of the Underwater Benthic Habitat Survey indicated that flora within the proposed breakwater construction footprint include: kelp (*Laminaria digitata and Laminaria saccharina*), sea colander (*Agarum cribrosum*), sea lettuce (*Ulva lactuca*), filamentous brown and red macrophytes, patches of rockweed (*Fucus spp.*) and knotted wrack (Ascophyllum nodosum). It should be noted that over 10% if the transect areas that were surveyed contained no macrofloral species. The invertebrates encountered within the proposed breakwater footprint include: mussels (*Mytilus edulis*) and green urchins (*Strongylocentrotus droebachiensis*), sea stars (*Asterias spp.),* finger sponge (*Haliclona oculata*), Hermit Crab (*Pagurus spp.*), frilled anemone (*Metridium senile*), barnacles (*Balanus spp.*), and empty scallop shells. It should be noted that over 67% of the transect areas that were surveyed contained no macrofaunal species.

There had not been any reports of pelagic or groundfish found transiting through or on the project footprint.

3.3 Resource Harvesting

Lobster is stored in lobster cars from the end of November up to the end of June at the existing Tiverton SCH facility. Both individual fishermen and fishermen's groups (such as co-ops and unions) store lobsters in this manner. There are no fish processing plants located at the harbour and no water intakes or water sources that could be affected by the project.

There is no lobster harvesting conducted in the project footprint. There is no shellfish harvesting within the project footprint due to shellfish closure to the majority of Petit Passage.

4.0 TIVERTON HABITAT SUMMARY

The habitat on the project footprint is typical of the shore area of Tiverton (i.e., dominant substrate type of sand and rock, with some bedrock outcrops and larger boulders).

There are no reports of pelagic or groundfish found transiting through or on the project footprint, nor is there any shellfish species on the project footprint that are being harvested. Considering, that the proposed footprint is presently being disturbed by both, the indirect effects of the adjacent wharf structures (i.e., alteration of water currents, sediment deposition and climate) and other human activity. The proposed footprint is not a contributing habitat to the lobster or any other fishery.

While there is a typical shore habitat on the footprint, it does not appear to support any important life cycle process (i.e., lobster spawning areas) that does not appear elsewhere in the adjacent habitat.

The substrate itself is expected to remain the same after the dredging program, as only the top layer of sediments are being removed. Marine plants are predicted to re-colonize the hard surfaces after the dredging program and any shellfish that are

removed by the dredging program are expected to be replaced by immigration or larval settlement from adjacent habitat.

4.1 DFO - Habitat Management Habitat Definitions

DFO according to the Department's Habitat Conservation and Protection Guidelines, Developed from the Policy for the Management of Fish Habitat (1998).

According to the above-mentioned document, critical, important and marginal habitat types are defined as follows:

Critical habitat – requires a high level of protection because of the importance in sustaining subsistence, commercial, or recreational fisheries, and the rareness, high productive capacity, sensitivity of the certain life stages of fish species supported, etc.

Important habitat – requires a moderate level of protection because of areas utilized by fish for feeding, growth, and migration, which while important to the fish stock are not considered critical. Important habitat types typically contain a large amount of similar habitat type readily available to the stock. Habitat previously disrupted by human activity could also be defined as important habitat.

Marginal habitat – requires a minimal level of protection because of low production capacity, marginal contribution to fish production, but does possess reasonable potential for enhancement or restoration.

4.2 Habitat Classification

As summarized in section 4.0 the project footprint is:

- Habitat that is used by shellfish for feeding and the resident shellfish do provide a larval limited contribution to the stock recruitment.
- The adjacent habitat of Tiverton provides a large area (in context of the project footprint) of similar area that is available to shellfish stocks.
- The area has been previously disturbed and degraded (i.e., adjacent wharf facilities) by human activity.
- The footprint area is expected to be resilient to the dredging disturbance as the substrate will be removed but will expose further substrate that marine plants and shellfish can re-colonize.
- Compensation is an option for the disruption of this habitat.

Therefore the habitat is classified Important Habitat as per the criteria described in Section 4.1.