

# Existing regional environmental characteristics and mapping data for the Northern Coast of Nova Scotia

DFO Gulf region response to Request for Advice from the Committee for the Regional Assessment of Offshore Wind Development in Nova Scotia

October 2023

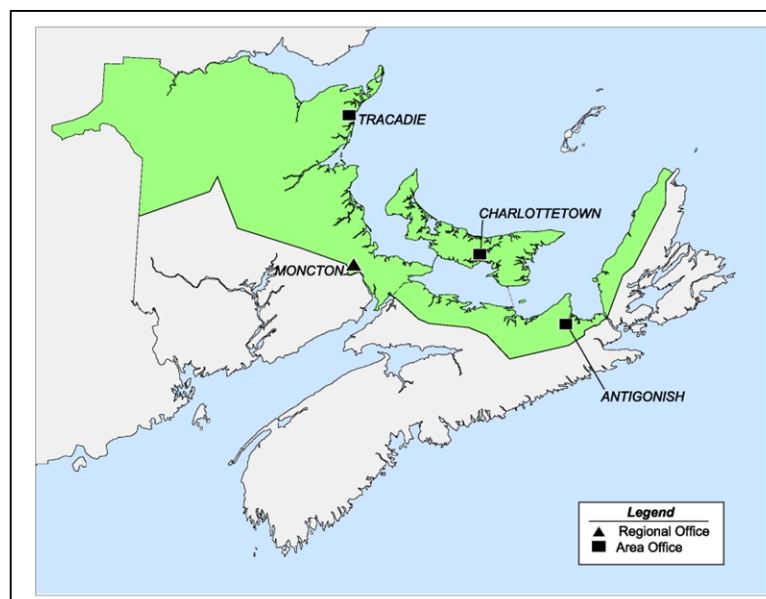
Prepared by the DFO Gulf Region Marine Planning and Conservation (MPC) Directorate

## Purpose of Document

This document provides the response from the Fisheries and Oceans Canada (DFO) **Gulf Region** on existing regional environmental characteristics and mapping data, as per the Request for Advice from the Committee for the Regional Assessment of Offshore Wind Development in Nova Scotia received on August 8, 2023. The information is provided in tabular or bullet form as requested, including supporting spatial information for ease of reference (i.e., .pdf file with layer navigation pane functions, and a geodatabase sent separately). This response summarizes information from several sources, including published literature as well as input from several subject matter experts in DFO Science.

The information received from DFO Gulf Science Branch is included throughout the document under the applicable subheadings. However, the original, verbatim personal communications from Science Branch SMEs in response to the Request for Advice are also provided as an attachment (Annex H), for your reference. While the key information is the same, the original communications provide some additional context around the responses.

Finally, chlorophyll-a information is not included in this letter, as subject matter experts were solicited by DFO MSP Science, Maritimes Region for information regarding the entire RA study area (including the Gulf region).



**Map of DFO Gulf Region**

## 1. Fish and Fish Habitat

### 1.1 Ecological productivity hotspots and Identified areas and/or times of year that are important for one or more fish species

The important areas provided in Table 1 (Appendix A) represent both ecological productivity hotspots and identified areas for fish and fish habitat in the RA study area (Savenkoff *et al.* 2007, Rondeau *et al.* 2016). These areas are considered unique for the EGSL bioregion, where an impact would have higher consequences on the ecosystem of the bioregion compared to other areas in the RA study area.

In general, the northern coast of Nova Scotia is known to have two locations that encircle unique important areas and productivity hotspots for many fish species:

- Cape Breton Trough up to St. Paul Island and “the edge” of the Laurentian Channel, and including the coastal zone of the Northern tip of Cape Breton,
- Northumberland Strait up to East of and including St. Georges Bay.

These important areas are used by most pelagic, semi-pelagic and demersal fish species in the southern Gulf of St. Lawrence, providing critical and/or unique migration corridors, summer feeding areas, spawning areas and/or wintering habitat to many depleted species and fish stocks (e.g. herring, mackerel, eel, cod, white hake, tuna; Figure 1). Several demersal and pelagic fish stocks are at very low abundance levels so caution is warranted when assessing anthropogenic activities that might be disruptive to them (personal communication, Amélie Rondeau, DFO Science, Gulf region).

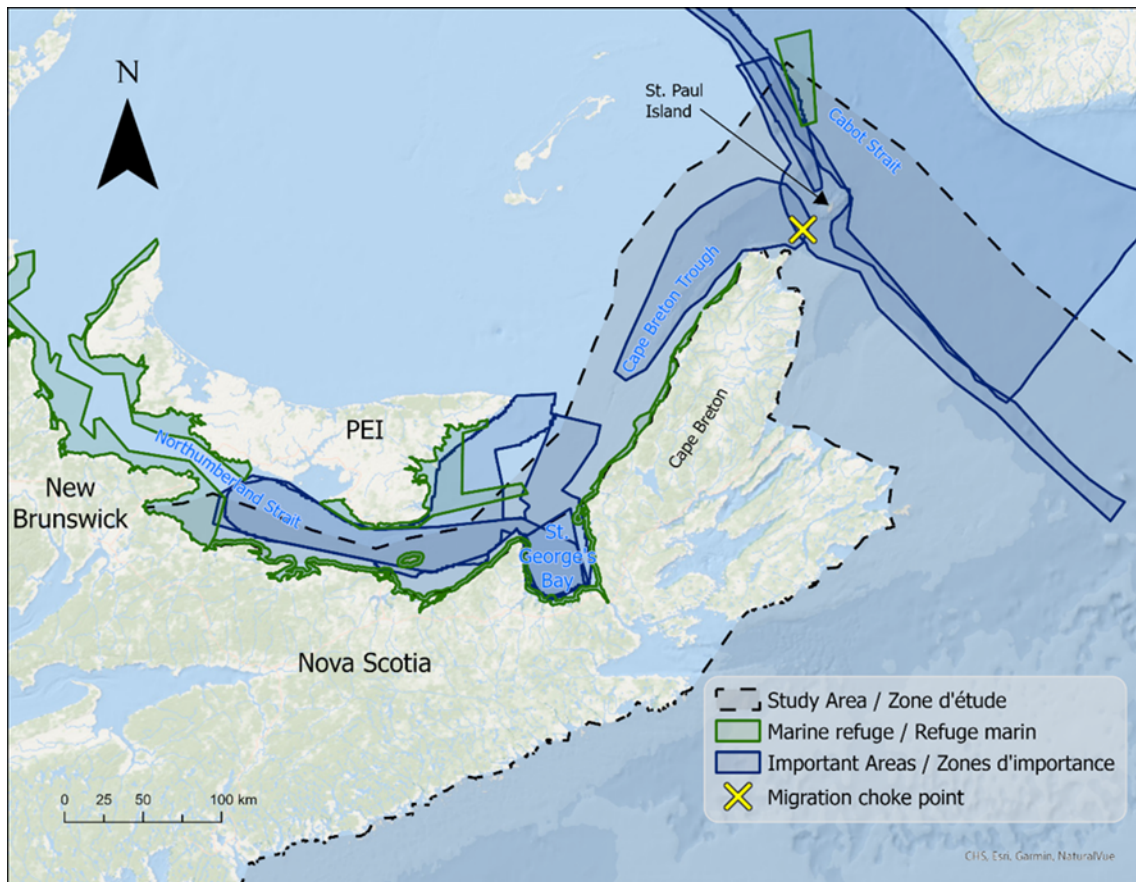
Redfish (*Sebastes marinus* and *S. mentella*) population has displayed a significant increase since the publication of important areas in 2007 but in the context of this request, there is no need to add to these important areas since the RA study area does not overlap the bulk of the species’ distribution/aggregation (i.e. the Laurentian Channel; personal communication, Amélie Rondeau, DFO Science, Gulf region).

For benthic invertebrates, especially crustaceans, species found in the RA study area within the sGSL are widespread and abundant, with no particular spatially defined area critical for their fitness.

Anthropogenic activities could have impacts locally but nothing that would impact a stock, even for the commercially important lobster and snow crab. (personal communication, Amélie Rondeau, DFO Science, Gulf region).

In addition, three marine refuges also delineate important areas for juvenile lobster and cold water corals, as described in Table 2 in Appendix A, and Figure 1 below: The Scallop Buffer Zones and Eastern Gulf of St. Lawrence Coral Conservation Area. These three marine refuges are fisheries closures that are managed by DFO for the achievement of conservation objectives that also counts towards the Marine Conservation Target of conserving 25% of Canada’s Oceans by 2025.

Finally, also see Appendix B for information on important areas and the attachment titled “DFO Gulf Existing Regional Environmental Characteristics” for information on important areas for pelagic and demersal fish in the sGSL. This information is also available in a .ppkx format, also shared as an attachment.



**Figure 1:** Map of the southern Gulf of St. Lawrence with place names identified and outlines of important areas for pelagic and demersal fish species from Table 1 (Appendix A), and Marine Refuges from Table 2 (Appendix A). See pdf file and/or geodatabase for more detailed labelling.

### 1.2 Chlorophyll-a concentrations and the noted trends in timing and location of blooms within the Study Area.

- The [State of the Atlantic Ocean report](#) contains information on Chlorophyll. An updated version of the State of the Atlantic Ocean report (2018-2021) is currently being published and should be available in coming weeks.
- There are also many sources of chlorophyll information available on the Atlantic Zone Monitoring Program website: [Atlantic Zone Monitoring Program \(AZMP\) \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca/atlantic-zone-monitoring-program/). This includes information for 2022 which will not be included in the updated State of the Atlantic Ocean report. For example, [https://publications.gc.ca/collections/collection\\_2023/mpo-dfo/Fs97-18-357-eng.pdf](https://publications.gc.ca/collections/collection_2023/mpo-dfo/Fs97-18-357-eng.pdf).
- Other publication also have information requested on Chlorophyll:
- Modeling publication with some information on timing of blooms and primary production <https://doi.org/10.3389/fmars.2021.732269>
  - o As well as a publication with future projections [https://publications.gc.ca/collections/collection\\_2020/mpo-dfo/Fs97-18-334-eng.pdf](https://publications.gc.ca/collections/collection_2020/mpo-dfo/Fs97-18-334-eng.pdf)

- Please note: after discussions with Maritimes Region MSP Science it was realized that requests for Chlorophyll information was requested for the entire RA area by Maritimes region therefore most of this information will come from that request. Please see DFO Maritimes submission for more information.

### 1.3 Coral and Sponge Overview

In the Gulf of St. Lawrence, sea pens (order Pennatulacea) and Sponges (phylum Porifera) are taxa groups considered sensitive benthic areas (SBAs), and thus taxa that aggregate resulting in structural habitat for fish species (Murillo *et al.* 2016). There are many knowledge gaps related to coral and sponges in the northern coast of Nova Scotia and the Laurentian Channel which limits the ability of indicating coral and sponge aggregation areas.

#### *Corals*

Based on models and some observations, sea-pens are known to occur on the edge of the Laurentian Channel (Kenchington *et al.* 2016). Although the sensitive benthic areas are mostly outside of the RA study area, one coral conservation area does overlap. This fishing closure was put in place to protect part of the sensitive benthic area from bottom-contact fishing gear due to the presence of sea-pens, and also counts towards the Marine Conservation Targets as a Marine Refuge (Table 2 in Appendix A).

#### *Sponges*

Sponges are widespread in the RA study area, from nearshore to deep-water areas depending on the species (Dinn 2020). Most coral and sponge data have been obtained through the Multispecies Survey which is not the most ideal for surveying the distribution of these species. As such, distribution of sponges is likely under reported.

Specifically in Cape Breton Trough, species that are considered Vulnerable Marine Ecosystem (VME) indicator species are known to be present, such as *Polymastidae* sponges, *Mycale lingua*, *Plicatellopsis bowerbanki* (Coomber *et al.* 2021).

The only glass sponge observed to date is *Asconema foliatum* although the identification was not confirmed because no photos or samples were taken. *Vazella* spp. have not been observed in the southern Gulf of St. Lawrence.

#### *Other potential structural habitats*

Although not a coral or sponge, it should be noted that unique dense aggregations of anemones have been found on rocky and nearly vertical cliffs of Cape Breton Trough, about 2 km from the tip of the Cape Breton Peninsula (Joseph *et al.* in prep., Faille *et al.* 2019). In several locations, anemones covered more than 75% of the seafloor.

#### *Sources of sponge distribution information*

There is a [field guide](#) with some distribution information that can be used to better understand which sponges were collected in the area. However, note that this is only based on some collections in 2018 (and the ROPOS 2017 collections) and is therefore **not** a complete resource of species distributions.

- Reference: Dinn, C. 2020. Sponges of the Gulf of St. Lawrence: Field and Laboratory Guide. Can. Manuscr. Rep. Fish. Aquat. Sci. 3198: vi + 118

Sponges are collected each year in trawl surveys, but identifications are difficult in the field, even with a guide. So records of species distributions from trawl surveys are not always accurate to the species level.

Portions of the Cape Breton Trough (CBT) area were surveyed with ROPOS (an underwater Remotely Operated Vehicle, ROV) in 2017 (report in preparation).

- Polymastidae sponges were probably the most common sponges counted in the ROV transects in the CBT. All members of the genus *Polymastia* are considered to be Vulnerable Marine Ecosystem (VME) representative taxa which includes groups of animals that form ecosystems that are easily disturbed, slow to recover, or may never recover from damage such as trawling (ICES 2020). *Mycale (Mycale) lingua* is also a VME representative taxon that was seen in the CBT area. Prior to being re-combined into a separate genus in 2020, *Plicatellopsis bowerbanki* was considered to be within the genus *Phakellia* (Dinn et al. 2020), and *Phakellia* spp. is also considered a VME representative taxon
- A list of species seen and also collected nearby from the Cape Breton Trough (CBT) ROPOS report (in preparation) can be found in Table 3 in Appendix A.

In the Southern Gulf of St. Lawrence (sGSL), the only glass sponge observed to date is *Asconema foliatum*. *A. foliatum* is also listed by ICES as a deep-sea sponge aggregation Vulnerable Marine Ecosystem (VME) indicator species. *Vazella pourtalesi* the species found on the Nova Scotia shelf has not yet been observed in the Gulf.

During the Southern Gulf Survey of 2013 a glass sponge was coded as *Asconema foliatum*, however, there is no way to confirm the identification as there were no photos or samples collected (location indicated in Figure 2 below).



**Figure 2:** Possible locations of glass sponge from the 2013 Southern Gulf Survey.

*Caveats:*

- For past survey records, there is no way to confirm species identifications as there were no photos or samples collected.

- *Asconema* was not available to code in the survey before 2011, therefore if observed would have been coded as “Sponge Unidentified” (species code 8600) prior to 2011.
- Much of the area is not trawlable (complex, non-flat benthic habitat) so there is limited information available. Limited trawl coverage of higher relief areas (boulder-rich and bedrock outcrop areas) could lead to biased records of sponges which often anchor on hard surfaces.
- Not much coverage by other survey methods, such as underwater ROVs.
- Due to current survey methods it is difficult to determine true species distributions.

#### *Sources of coral distribution information*

- Sea pens and small soft corals are most common in the Gulf of St. Lawrence. Distribution information can be found in Kenchington et al. (2010).
- Although not directly related to corals and sponges, there is also dense anemone fields in the CBT area, mentioned in Faille et al. (2017)
- The CBT ROPOS report (in preparation) will have more info on this.

#### *Gaps in data collection*

- Most coral and sponge data have been obtained through annual multispecies surveys which are not the most ideal for surveying corals and sponges.
- Sponge absence is not exactly possible to confirm. There is a catchability problem tied to a trawlable-area bias problem. The trawls are also generally limited to soft bottom habitats. Trawls used in regional surveys also have rock hopper gear which often precludes organisms attached to hard substrates. Soft bodied sponges also tend to disintegrate in trawls. As such, the absence of sponges in a trawl should not be considered a true absence.
- Sponge presence is fine to report on. However, data presented as weight caught or kg/tow should be taken with a grain of salt due to the catchability problem with the trawls. To obtain accurate sponge catch weight numbers you need to use more destructive methods (beam trawls for example) which collect more of the benthos.
- It should be noted that species IDs for the gulf may not be up to date in the Multispecies Survey database. Identification of some species are still being conducted.

#### *Spatial information*

- Can be found in the listed important references below:

Dinn, C. 2020. Sponges of the Gulf of St. Lawrence: Field and Laboratory Guide. Can. Manusc. Rep. Fish. Aquat. Sci. 3198: vi + 118 p.

Dinn C., LEYS, S.P., ROUSSEL, M., and MÉTHÉ, D. 2020. Geographic range extensions of stalked, flabelliform sponges (Porifera) from eastern Canada with a new combination of a species of *Plicatellopsis* in the North Atlantic. *Zootaxa* 4755(2): 301–321. doi:10.11646/zootaxa.4755.2.6.

Faille, G., Méthé, D., Thériault, M., Thorne, M., Roy, V., Chiasson, M., Benjamin, R., and Rangeley, R. 2019. Cruise Report for the 2017 Fisheries and Oceans Canada and Oceana Canada Mission using the ROPOS in the Gulf of St. Lawrence. Can. Manusc. Rep. Fish. Aquat. Sci. 3171: v + 22 p.

ICES. 2020. ICES / NAFO JOINT WORKING GROUP ON DEEP-WATER ECOLOGY (WGDEC). 2(62): 188.  
doi:<https://doi.org/10.17895/ices.pub.7503>.

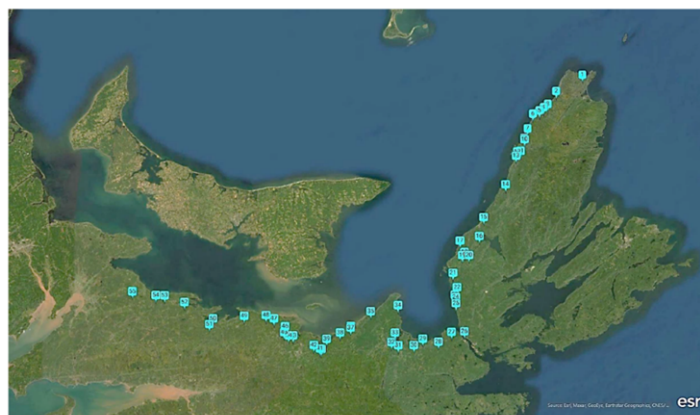
Kenchington, E., Lirette, C., Cogswell, A., Archambault, D., Archambault, P., Benoit, H., Bernier, D., Brodie, B., Fuller, S., Gilkinson, K., Lévesque, M., Power, D., Siferd, T., Treble, M., and Wareham, V. 2010. Delineating Coral and Sponge Concentrations in the Biogeographic Regions of the East Coast of Canada Using Spatial Analyses. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/041. vi + 202 pp.

#### 1.4 Summary of fish species (including shellfish)

See Table 4 in Appendix A. The table is not an exhaustive list of all fish species found in the RA study area, and does not include buried invertebrates nor coral and sponges. However, it does list all commercial species, species listed as Species at Risk or with a COSEWIC status, as well as all species related to the important areas of Table 1.

#### 1.5 Atlantic salmon

- There are 55 rivers thought to have Atlantic salmon in the Nova Scotia rivers draining into the Gulf of St. Lawrence (Figure 3).
- The Margaree River is known as an important Atlantic Salmon river, salmon is broadly distributed in most rivers adjacent to the RA study area (Science Advisory Report 2022/027).
  - The Margaree River has had a stock assessment conducted annually since 1987, and it has remained above the Limit Reference Point (LRP) in each year of the series.
- Stock status is not available for other rivers of Salmon Fishing Area 18 although active recreational fisheries occur in all rivers of Salmon Fishing Area 18.
- Catch per unit effort in salmon rivers in Gulf Nova Scotia remain below long-term averages, including Margaree River.
- Evidence to suggest that the Cabot Strait may be an important migratory corridor for salmon smolts from Gulf NS and PEI rivers.
- Repeat spawner adult salmon have been detected using the Cabot Strait to enter the Gulf of St. Lawrence and return to their respective rivers.
- Unclear how Offshore Wind development may affect salmon migration or the specific routes they use for migration.



**Figure 3:** Potential Atlantic salmon rivers in Gulf Nova Scotia (SFA 18), figure modified from Daigle 2023.

#### *Important areas*

The important areas related to Atlantic Salmon migration in the RA study area is the Northumberland Strait and St. Georges Bay for both species to allow access to freshwater endpoints, (Table 1, Rondeau et al. 2016). However, specific migration corridors in the marine environment are not known (Rondeau et al. 2016).

Evidence suggests that the Cabot Strait may be an important migratory corridor for salmon smolts from Gulf Nova Scotia and Prince Edward Island rivers. Repeat spawner adult salmon have been detected using the Cabot Strait to enter the Gulf of St. Lawrence and return to their respective rivers.

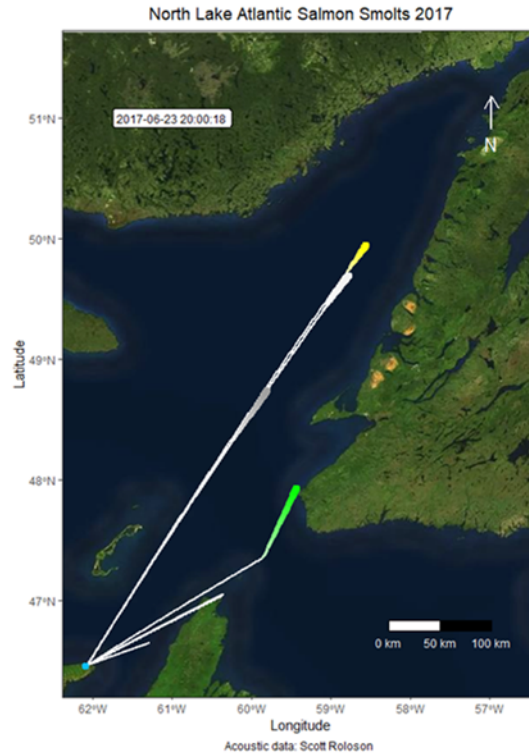
#### *Overview of Atlantic Salmon in Salmon Fishing Area 18*

Within the Gulf of St. Lawrence area identified by the IAAC wind project evaluation, there are an estimated 55 Atlantic salmon rivers (Figure 1; Daigle 2023). The Gulf Nova Scotia (GNS) rivers are collectively referred to as Salmon Fishing Area (SFA) 18. Within SFA 18 population status is only available for the Margaree River (Cape Breton) which has a population estimate above the Limit Reference Point (LRP), and it has been for every year since 1987 (DFO, 2023). Catch per unit effort from the recreational Atlantic salmon fishery in other rivers in SFA 18 remain below long term average, including the Margaree River. Daigle 2023 cites habitat shifting and alteration, extreme temperatures and droughts as principal threats, all of which are related to climate change.

#### *Atlantic Salmon Migration in Study Area*

There is a knowledge gap in understanding the importance of the Cabot Strait to migrating salmon. An acoustic receiver line was first established across the entire width of Cabot Strait in 2012, enabling the detection of fish tagged with acoustic transmitters. Chaput et al. 2019 conducted a study tagging smolts in northern New Brunswick Rivers (Miramichi and Restigouche rivers; n = 2,862), and they detected 2 tagged smolts that used the Cabot Strait corridor. Based on two acoustic tracking projects conducted in northeast Prince Edward Island (PEI) and the Margaree River (Cape Breton, NS), smolt migration through the Cabot Strait may be more common for smolts derived from nearby rivers (Figure 4: Scott Roloson, Unpublished Data). From the PEI study, 7/106 post-smolt were detected on the Cabot Strait array, several were subsequently detected on the Strait of Belle Isle array, meaning they did not pass through the Cabot Strait, but used it as a migratory corridor in their northward migration to the Strait of Belle Isle. The relatively high detection rate, compared to other rivers of the Gulf (Chaput et al., 2019), suggests there may be region specific migratory corridors. With the proximity of SFA 18 rivers to the Cabot Strait it is plausible that salmon migrating from there may also be using the Cabot Strait as a migratory corridor. Unfortunately, there are no other data sources, to our knowledge, of tagged smolt since the Cabot Strait receiver array was deployed in 2012. With regards to adult salmon returning to the Gulf, limitations of acoustic tag size and battery life dictate that there is a dearth of information on return migration of first time spawning salmon. However, repeat spawner salmon migrating from the Labrador Sea have been detected using the Cabot Strait to enter the Gulf of St. Lawrence on the return to their home rivers (J. Daniels, ASF, pers. comm). These data suggest that the Cabot Strait could be an important migratory corridor for salmon returning to all rivers throughout the Gulf of St. Lawrence.





**Figure 4:** Atlantic salmon detection data illustrating detections of acoustic tagged smolts from North Lake Creek, PEI. Exact locations of fish estimated based upon timing of detections at entry into Gulf, Cabot Strait and Strait of Belle Isle.

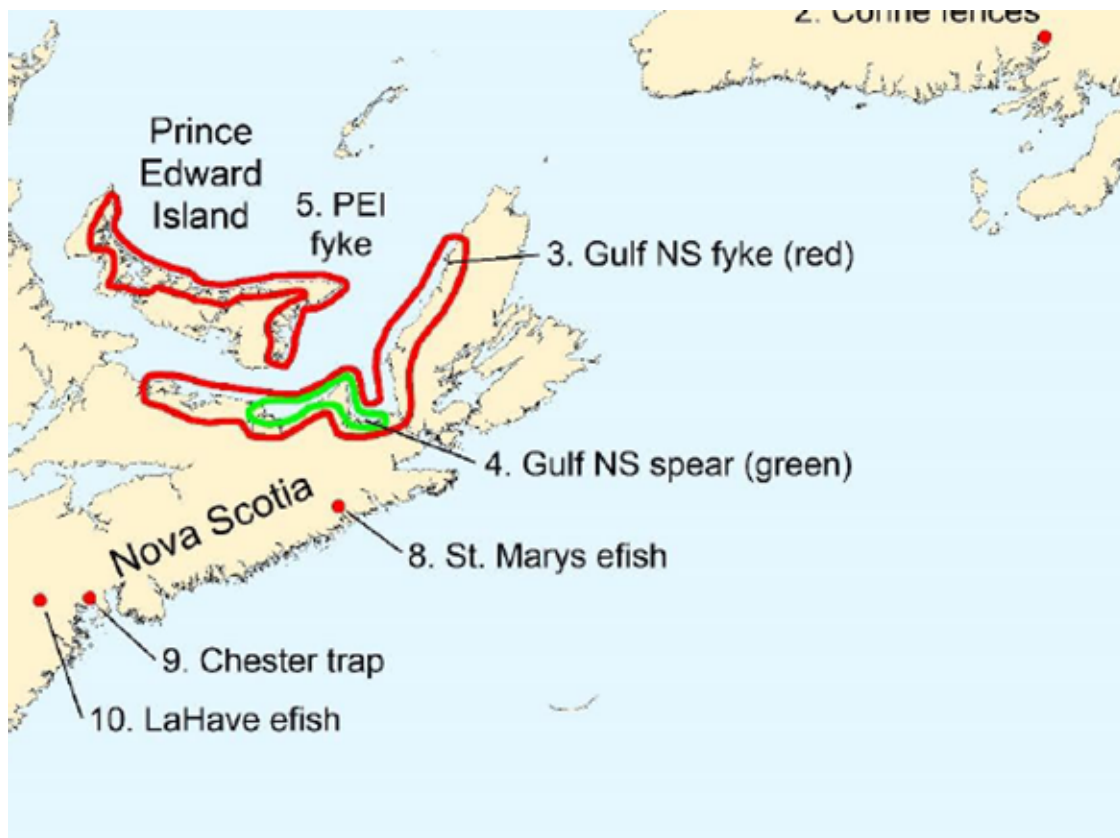
### 1.6 American eel presence and migration through the study area

- The important areas related to American eel migration in the RA study area are the Northumberland Strait and St. Georges Bay (to allow access to freshwater endpoints) as well as the Cape Breton Choke Point for migration (Table 1, Rondeau *et al.* 2016). However, specific migration corridors in the marine environment are not known (Rondeau *et al.* 2016).
- American eels are known to use the Study Area in multiple critical life cycle phases, but there is a lack of information on the spatiotemporal dynamics of occupancy of the area.
- Mature American eel (referred to as silver eels) actively migrate through the Study Area on the southward migration to the spawning area in the Sargasso Sea.
- Juvenile eel larva (referred to as leptocephali) are transported into the Study Area by ocean currents. When they return to coastal waters they metamorphose into glass eels, where they are the target of a valuable commercial fishery.
- Some of the juvenile eels migrating into the Study Area end up occupying habitats within the region, but others use the area as a migratory corridor to areas within the Gulf of St. Lawrence, Newfoundland and Labrador, and potentially farther north.

#### Gaps

- Active sites for data collection are listed in Figure 5 (from Cairns 2020), but there are large knowledge gaps on the temporal and spatial dynamics of American eel migration through the Study Area.

- While exact migratory corridors aren't known, it is prudent to assume that the majority of American eels migrating between Sargasso Sea and Canadian waters travel through the Study Area, making this area critical to Canadian eel populations.



**Figure 5:** Possible data sources for assessment of American eel abundance in Study Area, modified from Cairns 2020.

### 1.7 Climate Change Trends

“Climate change driven rise in air temperature is leading to warmer sea-surface waters, less sea ice cover, and weaker cold intermediate layers.” (Bernier *et al.* 2018).

“Recent warming trends observed across the Atlantic zone have been linked to species range expansions, shifts in distributions, and increases in abundance of warmer water species, including coastal invertebrates like American lobster and demersal fish like silver hake and Atlantic halibut. The abundance of cold water invertebrate species, such as northern shrimp and snow crab, which increased during the 1990s, has decreased in some areas in recent years.” (Bernier *et al.* 2018).

Species ranges are expected to continue to change with warming water temperatures and increased storm events, and cold-water species as well as coastal species are expected to be relatively more affected (Bernier *et al.* 2018).

The State of the Ocean Report (2018-2021) is in preparation and will provide additional updated information on regional climate trends (Bernier *et al.* in press).

## 1.8 Identified gaps related to data collection

Specific migration corridors for diadromous species (e.g. Atlantic salmon, American eel, Striped bass) once they exit estuaries are not well known due to limited targeted studies (Rondeau *et al.* 2016).

Small bodied species, coral and sponges, as well as buried invertebrates are not represented by the important areas of Table 1 (Appendix A) because the monitoring method used (i.e., benthic multispecies trawl) do not target these organisms, or do so inefficiently, and other regional studies for these species are lacking (Rondeau *et al.* 2016; personal communication, Curtis Dinn, DFO).

Some of the important areas' boundaries are not constrained to physical features (e.g. land and seafloor) and as such do include subjectivity from subject matter experts (Savenkoff *et al.* 2017). Therefore, the boundaries should be considered approximate at a small spatial scale.

## 1.9 Mapping/data requirements

- Please refer to Annex A for information on requested data

## 2. Marine Mammals and Sea Turtles

### 2.1 Summary of marine mammals and sea turtle species

- See Table 5 in Appendix A. The table is not an exhaustive list of all marine mammal species potentially found in the RA study area but represents Species at risk, COSEWIC listed species, and species related to important areas of Table 1.
- Furthermore, the attachment titled "DFO Gulf Existing Regional Environmental Characteristics" displays information on important areas for marine mammals in the sGSL. This information is also available in a .ppkx format, also shared as an attachment.

### 2.2 Key areas or times for marine mammals (e.g. feeding, breeding, nursing, migration etc.)

- The entire RA study area of the northern coast of Nova Scotia overlaps important areas for multiple marine mammal species, providing important habitats in the summer and winter time for different functions (Table 4; Lesage *et al.* 2007; Figure 6).
- In general, whales and seals are present during ice-free period in the RA study area mostly for migration and feeding. North Atlantic Right Whales in particular are only present in late spring through fall. In winter, seal species are present on the ice for breeding and nursing, while some whales such as Blue Whales are present in the ice-free areas found in deeper waters.
- The leatherback sea turtle also occurs in the entire RA study area of the northern coast of Nova Scotia based on the Fisheries and Oceans Canada Species at Risk Distribution (Range).
- Also see Appendix B for information on important areas.



### 3. Commercial, Recreational and Indigenous Fisheries

#### 3.1 Primary species harvested and the value of key fisheries in the Study Area;

- General overview of Commercial fishing within the region, including: Primary species harvested and the value of key fisheries in the Study Area; <https://www.dfo-mpo.gc.ca/stats/commercial/sea-maritimes-eng.htm> (landed weights and values selected for the province of Nova Scotia (Gulf and Maritimes Regions combined).
- For more specific data requests with specified parameters, for Gulf Region’s data please send them to us directly: [Monica.MacLellan@dfo-mpo.gc.ca](mailto:Monica.MacLellan@dfo-mpo.gc.ca) and/or [Patricia.MacLeod@dfo-mpo.gc.ca](mailto:Patricia.MacLeod@dfo-mpo.gc.ca)
- Also see Annex F for information on commercial fisheries landings and associated maps
- Finally, please refer to the attached geodatabase titled “DFO Gulf Region Commercial Landings Data” for geospatial information that is relevant to this section.

#### 3.2 Mobile and fixed gear types used within the region and distribution of fisheries;

- See Annex F for distribution of fisheries.
- See Annex G for information on gear types used in the region.

#### 3.3 Identified key areas and times of the year for certain fisheries (e.g., lobster, crab, shrimp, etc.);

- See Annex G for information times of year for certain fisheries.

#### 3.4 Areas currently closed to fishing activity including the reasons for and expected duration of;

- See Annex G for information on fisheries closures.

#### 3.5 General trends in fishing throughout the year (e.g., summer fishing distribution vs winter);

- See Annex G for information on key times for fisheries.

#### 3.6 Any recent or predicted future effects on fishing activities attributed to climate change

- From Bernier *et al.* (2018): “Recent warming trends observed across the Atlantic zone have been linked to species range expansions, shifts in distributions, and increases in abundance of warmer water species, including coastal invertebrates like American lobster and demersal fish like silver hake and Atlantic halibut. The abundance of cold water invertebrate species, such as northern shrimp and snow crab, which increased during the 1990s, has decreased in some areas in recent years.”
- A great summary document for this topic is available in the [“State of The Atlantic Ocean” report](#).
  - o Note: A more recent version of this document is soon to be published: Bernier, R.Y., Jamieson, R.E., Kelly, N.E., Lafleur, C., and Moore, A.M. (eds.) 2023. State of the Atlantic Ocean Synthesis Report. Can. Tech. Rep. Fish. Aquat. Sci. 3544: v + 219 p. (in publication).
- There are also many information resources available on the Atlantic Zone Monitoring Program website: [Atlantic Zone Monitoring Program \(AZMP\) \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca/atlantic-zone-monitoring-program/). This includes information for 2022 which will not be included in the updated State of the Atlantic Ocean report.

3.7 Summary of commercial – communal licences for Indigenous groups and organizations within the Study Area, including the species under these licences. This should include groups within NS, NB, PEI, NL, and Quebec, if applicable.

- See Annex G (second tab) for information on Indigenous Fisheries licenses in Gulf Region.
- **Please note the following:**
  - o FSC licences do not define an Aboriginal right to fish or its scope; however, it is intended to provide a mechanism, for reasons of proper management, control of the fisheries and conservation and protection of fish.
  - o Access is subject to change over time to respond to the evolving needs and interests of Indigenous communities. Given that FSC licences do not define an Aboriginal right to fish or its scope, DFO, Indigenous Affairs, Maritimes Region recommends that the Committee considers consulting with all First Nations and Indigenous Organizations located in Gulf Region to gain insight on priority areas of interest to determine if there are any potential adverse impacts that Offshore Wind Development may have on rights.
  - o **Information about FSC licenses should not be posted publicly. The information provided is for internal use by the Regional Assessment Committee only. Please carefully review the attachment titled “Best Practices FSC Data.”**

### 3.8 Overview of Moderate Livelihood fisheries

Pictou Landing First Nation has reached an interim understanding with the Department to conduct a moderate livelihood lobster fishery in LFA 26A since 2021. In 2023 a harvest document was issued to the community which authorized the use of 1095 lobster traps for the Netukulimk lobster livelihood fishery. This occurs during the open commercial season in LFA 26A. Discussions are ongoing with the community in relation to continued moderate livelihood fishing in LFA 26A.

In 2023 the Department issued a harvest document which authorized the use of up to 750 lobster traps in LFA 26B to Eskasoni First Nation, Potlotek Mi'kmaw Nation, and We'qoqma'q First Nation. This fishing occurred during the open commercial season in LFA 26B. Discussions are ongoing with each community in relation to continued moderate Livelihood fishing in LFA 26B.

Other communities in Nova Scotia have previously indicated interest in conducting a Moderate Livelihood fishery in LFAs 26A and 26B. No formal requests have been made to the department at this time.

## Appendix A – Tables

**Table 1:** List of Important Areas with high uniqueness for fish and fish habitat from Savenkoff *et al.* 2007 and Rondeau *et al.* 2016 that overlap with the OWD RA study area in the Gulf Region (i.e., Northern Coast of Nova Scotia). High aggregation areas are also considered ecological productivity hotspots in the context of this information request. Label corresponds to area labels of spatial data layers in pdf file and geodatabase provided separately.

Label	Name	Description	Productivity hotspot	Species presence
P7	Pelagic Fishes: St. Georges Bay – Northumberland	The only area of feeding for the isolated Butterfish population		Summer
P9	Pelagic Fishes: St. Georges Bay – Northumberland	High feeding concentration of pelagic species such as mackerel as well as spawning for herring	Yes	Spring through fall
P11	Pelagic Fishes: South slope of the Laurentian Channel (Edge)	Area of importance for multiple biological functions for many species		
D7	Demersal fishes: Cabot Strait and Laurentian Channel	Winter refuge for many species	Yes	Winter
D10	Demersal fishes: Cape Breton Trough	Migration corridor for cod and other species, summer grounds for Witch flounder and white hake, high biodiversity area	Yes	Year-round
D11	Demersal fishes: St. Georges Bay	Spawning, nursery and summer feeding grounds of White hake	Yes	May to November
D13	Demersal fishes: South slope of the Laurentian Channel in the Cabot Strait area	Cod overwintering grounds	Yes	November to April
X	Tip of Cape Breton Choke Point	Migratory corridor for many migratory fish species entering the southern Gulf of St. Lawrence, including American eel, Atlantic mackerel and White hake		Spring through fall, predominantly May to November
-	Northumberland Strait	Obligate passage for many diadromous fish species such as Butterfish, Striped bass, American shad and Winter skate		Spring through fall

**Table 2:** Marine refuges that overlap the RA study area in the Gulf Region.

Name	Protection	Description	Prohibition	Species Presence
Scallop Buffer Zones (SFA 22 and 24)	Juvenile American Lobster and its nursery habitat	Juvenile lobsters use complex benthic structures such as cobbles to hide during their vulnerable life cycle stages.	Scallop dragging	Year-round
Eastern Gulf of St. Lawrence Coral Conservation Area	Cold-water corals	This area has the highest concentration of <i>Pennatula grandis</i> sea pens in the Estuary and Gulf of St. Lawrence bioregion, as well as a high concentration of <i>Anthoptilum grandiflorum</i> sea pens.	All fishing that uses bottom-contact gear	Year-round



**Table 3:** List of coral species seen and also collected from the Cape Breton Trough ROPOS report (in prep.)

Body Type	Possible Taxa
Massive	<i>Mycale (Mycale) lingua</i> (Bowerbank, 1866), <i>Tedania (Tedania) c.f. suctoria</i> Schmidt, 1870, <i>Iophon</i> sp. (Bowerbank, 1858)
Vase	<i>Plicatellopsis bowerbanki</i> Vosmaer, 1885), <i>Mycale (Mycale) lorea</i> Dinn, Ott, Marmen, Steeves, Côté, Hayes, Nozères, Everett, Powell & Chu, 2023
Sphere with Projections	<i>Polymastia</i> spp., <i>Sphaerotylus capitatus</i> (Vosmaer, 1885)
Sphere without projections	<i>Tentorium semisuberites</i> (Schmidt, 1870), <i>Tethya</i> spp., <i>Polymastia</i> spp.
Stalked, Erect	<i>Cladocroce spatula</i> (Lundbeck, 1902), <i>Plicatellopsis bowerbanki</i> Vosmaer, 1885)
Encrusting	<i>Aplysilla</i> c.f. <i>sulfurea</i> Schulze, 1878, <i>Hymedesmia (Hymedesmia) cf. paupertas</i> (Bowerbank, 1866)
Other Forms	Unknown “ <i>Protosuberites</i> ”, Suberitida unknown 1

**Table 4:** Summary Table of Fish, marine mammals and sea turtles in the RA study area. Based on Rondeau *et al.* 2016, Coomber *et al.* 2021, the DFO Aquatic Species at Risk Critical Habitat and Distribution Geodatabase, as well as Species at Risk documents, COSEWIC reports and stock assessments. Fish stock status is based on the DFO Sustainable Fisheries Framework.

Categories	Sub-categories	Species Common Name	Species Status
Fish	Benthic invertebrate	American lobster	Fish stock in healthy zone
		Rock crab	
		Queen Snow Crab	Fish stock in healthy zone
		Scallop (i.e. Sea scallop, Iceland Scallop)	

	Shrimp (e.g. Northern shrimp, Sevenspine bay shrimp) Spiny crab Toad crab	Fish stock in healthy zone
Invertebrate	Lesser bobtail squid Shortfin squid Spoonarm octopus	
Demersal fish	American eel American Plaice Atlantic Cod Atlantic halibut Atlantic wolffish Cunner Fourbeard rockling Greenland halibut Greyscale/ Witch flounder Haddock Northern wolffish Silver hake Smooth Skate Spotted wolffish Thorny Skate White Hake Winter flounder Winter Skate Yellowtail Flounder	Threatened by COSEWIC Threatened by COSEWIC, fish stock in critical zone Endangered by COSEWIC, fish stock in critical zone Special Concern by SARA Fish stock in cautious zone Fish stock in cautious zone Threatened under SARA Special Concern by COSEWIC Threatened under SARA Special Concern by COSEWIC Threatened by COSEWIC, fish stock in critical zone Fish stock in critical zone Endangered by COSEWIC Fish stock in critical zone
Pelagic fish	Alewife/Blueback herring American shad Atlantic Bluefin Tuna Atlantic herring Atlantic Mackerel Atlantic Salmon Atlantic saury Butterfish Capelin Striped bass	Endangered by COSEWIC Fish stock in critical (spring spawners) and cautious (fall spawners) zones Fish stock in critical zone Special Concern by COSEWIC, fish stock in critical to healthy zone depending on rivers Special Concern by COSEWIC
Semi-pelagic fish	Acadian Redfish Pollock	Threatened by COSEWIC
Shark	Basking Shark	

		Great White Shark	Endangered under SARA
		Porbeagle Shark	Endangered by COSEWIC
		Shortfin Mako Shark	Threatened by COSEWIC
		Spiny Dogfish Shark	
Marine Mammals	Baleen whale	Blue Whale	Atlantic population is listed endangered under SARA
		Fin Whale	Special Concern under SARA
		North Atlantic Right Whale	Endangered under SARA
	Pinniped	Grey Seal	
		Harbour Seal	
		Harp Seal	
		Hooded Seal	
	Toothed whale	Harbour Porpoise	Special Concern by COSEWIC
		Pilot Whale	
		Striped dolphin	
White whale/Beluga		St. Lawrence Estuary Population is listed Endangered under SARA	
Sea turtle	Sea turtle	Leatherback Sea Turtle	Endangered under SARA

**Table 5:** List of Important Areas for marine mammals from Savenkoff *et al.* 2007 and Lesage *et al.* 2007 that overlap with the OWD RA study area in the Gulf Region (i.e., Northern Coast of Nova Scotia), as well as from preliminary data on North Atlantic Right Whales (personal communication, Deborah Austin, Marine Mammal Science Branch, DFO). Label corresponds to area labels of spatial data layers in pdf file and geodatabase provided separately.

Label	Name	Description	Time of Year
M7	Marine mammals: Southwest Newfoundland, East Cabot Strait and Laurentian Channel	Co-occurrence of several marine mammals for feeding including deep-divers and blue whale in winter (ice-free area)	Year-round
M9	Marine mammals: West of Cape Breton	Feeding function for a diverse megafauna during the ice free period; reproduction function and molting function during winter and early spring for pinnipeds	Year-round
M12	Magdalen Shallows Centre and St. Georges Bay – Northumberland	Reproduction function for three pinniped species	Winter (ice-covered period)
-	Cabot Strait	Important migratory corridor for North Atlantic Right Whales and other marine mammals	Spring through fall

## Appendix B – Important Areas from Savenkoff et al. 2007

- The [research document 2007/0152](#) and its associated spatial data layers have been identified by MPC as information that could be shared with IAAC since it contains location of key sensitive receptors deserving greater than usual risk aversion in our region. Prior to submitting this information to IAAC, the MPC would like to ensure that it is the best available and most up to date.
- The important areas and their significance (i.e., high scores listed in Table 1) in Savenkoff et al. (2007) are considered by Gulf Region Science Branch SMEs as still relevant
- In addition, there are no new important areas that have been identified that should be considered for the portion of the Study Area (SA) within the sGSL.
  - For important areas for NARW East of Cape Breton, please check with the lead science sector in NCR for that species.
- Additional comments about figures in Savenkoff et al. (2007):
  - Fig #8; Important area #11: very limited overlapping with the SA, no concerns
  - Fig #9; Important area #11: very limited overlapping with the SA, no concerns
  - Fig #10; Important areas #8-9: please validate information with leading team for marine mammals in NCR, especially for the portion of the SA East of Cape Breton.
- In summary, DFO Gulf Science SMEs are confident that the information provided in Savenkoff et al. (2007) still maps out an accurate portrait of important areas for most of the species found in the sGSL. Even 16 years later, overall distributions and aggregations of those species remain similar, as well as the fitness consequences previously identified per area. For benthic invertebrates, species found in the SA within the sGSL are abundant and widely distributed, with no particular area critical for their fitness. Anthropogenic activities could have impacts locally but nothing that would impact a stock, even for the commercially important lobster and snow crab. Unfortunately, several demersal and pelagic fish stocks are at very low abundance levels so caution is warranted when assessing anthropogenic activities that might be disruptive to them. Redfish (*Sebastes marinus* and *S. mentella*) population has displayed a significant increase since the 2006 exercise but in the context of this request, there is no need to add anything since the SA does not overlap with the bulk of the species' distribution/aggregation (Laurentian Channel).

**Subject Matter Experts consulted:** Amélie Rondeau, Fabiola Akaishi and Nicolas Rolland

For the full response from Gulf Region Science SMEs, please consult Annex H.

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