

## 11.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS ON COMMERCIAL, RECREATIONAL, AND ABORIGINAL FISHERIES

Commercial, recreational, and Aboriginal (CRA) fisheries are important to the livelihoods of the individuals employed by these sectors, the local and regional economy, traditions, and cultural heritage of the region. These fisheries have been included as a VC due to the regulatory requirements of the *Fisheries Act* and the potential for Project components to interact with CRA fisheries during construction and operation that could potentially affect CRA fisheries activities being carried out. This VC addresses potential environmental effects of the Project on CRA fisheries, including Aboriginal communal commercial and food, social, and ceremonial (FSC) fisheries.

Project activities and components could affect targeted CRA fishery species; therefore, this VC is closely related to the assessment of the marine environment VC (Section 7.0), including potential biological effects on marine CRA fishery species. Due to the nature of existing and historical Aboriginal fishing activities within the region, the CRA Fisheries VC is also related to the socioeconomic environment VC (Section 9.0), and the current use of land and resources for traditional purposes by Aboriginal persons VC (Section 12.0).

### 11.1 REGULATORY AND POLICY SETTING

CRA fisheries in the Bay of Fundy are guided under the federal *Fisheries Act* and associated regulations, and administered by Fisheries and Oceans Canada (DFO). Provisions under the *Fisheries Act* protect fish and fish habitat, including fisheries resources, and apply specific regulations governing CRA fisheries. CRA fisheries are defined by the *Fisheries Act* as follows:

- Commercial fisheries refer to the harvesting of fish under the authority of a license for the purpose of sale, trade, or barter.
- Recreational fisheries refer to the harvesting of fish under the authority of a license for personal use of the fish or for sport.
- Aboriginal fisheries refer to the harvesting of fish by an Aboriginal organization or any of its members for the purpose of using the fish as food, for social or ceremonial purposes or for purposes set out in an agreement entered into between DFO and the Aboriginal organization.

Section 35 of the *Fisheries Act* restricts work, undertakings or activities that result in “serious harm” to fish that are part of a CRA fishery, or to fish that support such a fishery. Serious harm is defined under section 2(2) of the *Fisheries Act* as “the death of fish or the permanent alteration to, or destruction of, fish habitat.”

CRA fishing activities in the Bay of Fundy fall within the jurisdiction of four specific regulations under the *Fisheries Act*:

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

- The *Maritime Provinces Fishery Regulations* govern fishing activity in inland and adjacent tidal waters of the provinces of New Brunswick, PEI, and Nova Scotia.
- The *Atlantic Fishery Regulations* provide for the management and allocation of fishery resources off the Atlantic coast of Canada.
- *Aboriginal Communal Fishing License Regulations* provide for the management and allocation of Aboriginal fishery resources within Canada.
- *Fishery (General) Regulations* provide for the management of fishing activity within Canada that fall outside of the regulations described above including recreational fishing activities under the jurisdiction of DFO and that are beyond the scope of provincial fishery regulations.

Fishery resources are protected from uncontrolled fishing activity through various measures such as area closures, permits and licenses, fishing quotas, fishing seasons, and gear and vessel restrictions as detailed under the regulations listed above and by Fisheries Management Decisions applied by DFO in accordance with the roles and responsibilities outlined in the *Fisheries Act* (DFO 2013a).

Other broad mechanisms for the protection of marine resources are provided in the federal *Oceans Act*, which governs the establishment and alteration of fishing zones and Marine Protected Areas within Canadian waters.

DFO manages Aboriginal fishing in accordance with the Aboriginal Fisheries Strategy, which was established in response to the Supreme Court of Canada's 1990 Sparrow decision and recognizes Aboriginal rights to fish for food, social, and ceremonial (FSC) purposes (DFO 2012a). DFO issues communal licenses under the *Aboriginal Communal Fishing Licenses Regulations*, pursuant to the *Fisheries Act*, to provide for the harvest of fish for FSC purposes.

Provincial administration of aquaculture falls under the jurisdiction of regulations in New Brunswick. The New Brunswick Department of Agriculture, Aquaculture and Fisheries and the New Brunswick Department of Energy and Resource Development implement the *Fisheries and Aquaculture Development Act* and the *Fish and Wildlife Act*. Fishing in inland waters is regulated under the New Brunswick *Fish and Wildlife Act*, though this Act is not relevant to this Project being carried out in marine waters.

The Supreme Court of Canada's 1999 Marshall decision further recognizes that Mi'kmaq and Wolastoqey (Maliseet) peoples in the Maritimes (i.e., Nova Scotia, New Brunswick, Prince Edward Island, and the Gaspé region of Québec) have Aboriginal and treaty rights to hunt, fish, and gather in pursuit of a moderate livelihood (INAC 2013). Following the Marshall decision, DFO implemented the Marshall Response Initiative from 2000 to 2007 to provide increased Aboriginal access to the commercial fishery through the issuance of communal commercial licenses, which are issued by DFO to the individual First Nations but are administered by the Chief and Council. The Atlantic Integrated Commercial Fisheries Initiative was subsequently created in 2007 to sustain the public investment made to the Aboriginal commercial fishery through the Marshall Response Initiative and provide the 34 Mi'kmaq and Wolastoqey (Maliseet) First Nations affected by the Marshall decision with capacity-building support for the successful

management of Aboriginal communal commercial fisheries and effective Aboriginal participation in fisheries co-management (DFO 2010, DFO 2014).

## **11.2 POTENTIAL ENVIRONMENTAL EFFECTS, PATHWAYS, AND MEASURABLE PARAMETERS**

Project activities and components could potentially interact with CRA fisheries to result in adverse environmental effects on fishing activities. In consideration of these potential interactions, the assessment of Project-related environmental effects on CRA fisheries is focused on the following potential environmental effect:

- change in fishing activities.

The environmental effect pathways and measurable parameters for the assessment of the environmental effect presented above are provided in Table 11.1.

**Table 11.1 Potential Environmental Effects, Environmental Effects Pathways, and Measurable Parameters for Commercial, Recreational, and Aboriginal Fisheries**

<b>Potential Environmental Effect</b>	<b>Environmental Effect Pathway</b>	<b>Measurable Parameter(s) and Units of Measurement</b>
Change in fishing activities	<ul style="list-style-type: none"> <li>• Loss of access to or availability of fishing grounds</li> <li>• Change in abundance, distribution, or catchability of species of importance for CRA fisheries</li> <li>• Increased risk of gear loss or damage</li> </ul>	<ul style="list-style-type: none"> <li>• Change in access to or availability of area used for CRA fisheries (ha)</li> <li>• Change in catch rates (catch per unit effort or catch per unit time) or landings (kg)</li> <li>• Area of fish habitat permanently affected (m<sup>2</sup>)</li> <li>• Mortality of species of importance for CRA fisheries (qualitative likelihood of mortality, or direct measurement of number of individuals lost)</li> <li>• Gear loss or damage (qualitative likelihood of gear loss or damage, or direct measurement of number of incidents reported)</li> <li>• Increased steaming time (h)</li> </ul>

## **11.3 BOUNDARIES**

### **11.3.1 Spatial Boundaries**

The Project development area (PDA) for the Project is defined in Section 2.1. Of particular relevance to the CRA fisheries VC is the portion of the PDA in the marine environment below higher high water large tide (HHWLT), which is referred to in the context of this VC as the “marine PDA” and includes:

- two 10 m wide corridors extending across Head Harbour Passage, from HHWLT on the eastern coast of Deer Island (Chocolate Cove) to HHWLT on the western coast of Campobello Island (Wilson's Beach); one corridor each for the proposed and existing submarine cables.
- two 10 m wide corridors extending across Grand Manan Channel, from HHWLT on the eastern coast of Campobello Island (Little Whale Cove) to HHWLT on the northern coast of Grand Manan Island (Long Eddy Point); one corridor each for the proposed and existing submarine cables.

The marine PDA for both the existing and proposed submarine cables is 10 m wide along its entire length to be consistent in the assessment process for all Project-related construction and decommissioning activities; however, the actual footprint of disturbance for removal of the existing cables and placement of the proposed cables will be narrower in certain areas of the marine PDA:

- The actual footprint of disturbance for the potential removal of the existing cables will be 4 m wide in the portions of the marine PDA that are located in Head Harbour Passage and the Grand Manan Channel and are at water depths of more than 3 m below lower low water large tide (LLWLT) (i.e., the portions of the marine PDA beyond the intertidal zone).
- The actual footprint of disturbance for placement of the proposed submarine cables will be 2 m wide in the portions of the marine PDA that are located in the Passage and are at water depths of more than 3 m below LLWLT (i.e., the portions of the marine PDA beyond the area in which horizontal directional drilling (HDD) or open-cut trenching will be used at the landfall sites).

Consideration of a wider corridor for the marine PDA within which a narrower area of disturbance will result provides flexibility to the Project in the specific routing of the submarine cables in response to specific routing studies, detailed design, and constructability challenges along the route. This approach also provides some level of conservatism to the assessment.

Non-Project vessels will be temporarily excluded from a Project exclusion zone (PEZ) for navigational safety purposes as Project activities progress along the PDA. In consideration of requirements in the 2017 annual edition of Notices to Mariners issued by the Canadian Coast Guard (DFO 2017), the PEZ will occupy a radius of one nautical mile (NM), or approximately 1.85 km, around Project vessels actively engaged in laying or repairing the submarine cable at any given location within the marine PDA. The PEZ will be lifted at a particular location once the Project vessel moves on to another location, and completely lifted once construction in the marine environment is complete.

The LAA is the maximum area where Project-specific environmental effects can be predicted and measured with a reasonable degree of accuracy and confidence. In consideration of the PEZ, the LAA for the CRA Fisheries VC includes the marine PDA and extends 1 NM on either side of the marine PDA.

Figure 11.1 illustrates the PDA and LAA for the CRA fisheries VC.

### **11.3.2 Temporal Boundaries**

The temporal boundaries for the assessment of the potential environmental effects on CRA fisheries include:

- construction – scheduled to begin in the spring of 2018 and last for approximately 16 months; and
- operation – scheduled to begin in late 2019 and continue for the life of the new submarine cables, currently anticipated to be at least 40 years.

Decommissioning and abandonment pertains to both the existing submarine cables and the proposed new submarine cables. Decommissioning or abandonment of the existing submarine cables will occur at some time following the successful completion of the proposed installation of the new submarine cables, as per current regulations and requirements. Decommissioning or abandonment of the proposed new submarine cables will occur following the end of their useful service life, and will be carried out in accordance with regulations in place at that time.

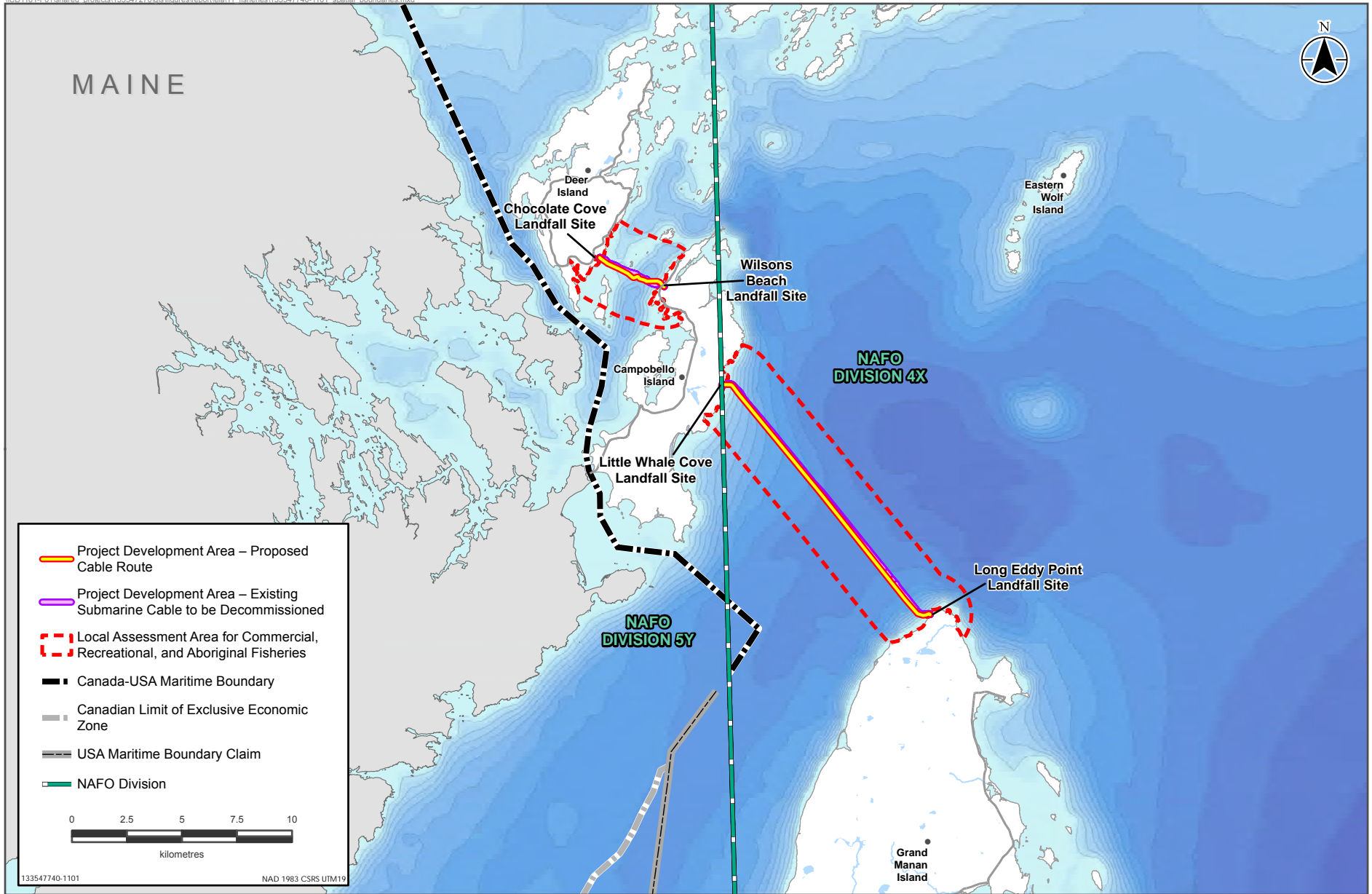
The fishing seasons identified in Section 11.5.2 are sensitive time periods when the risk of Project-related conflicts with CRA fishing activities is highest.

## **11.4 RESIDUAL ENVIRONMENTAL EFFECTS CHARACTERIZATION AND SIGNIFICANCE DEFINITION**

For the purposes of this environmental effects assessment, a significant adverse residual environmental effect on CRA fisheries is defined as a residual Project-related environmental effect that results in one or more of the following outcomes:

- local CRA fishers being displaced or unable to use substantial portions of the areas currently fished for all or most of a fishing season;
- local CRA fishers experiencing a change in the availability of fisheries resources (e.g., fish mortality and/or dispersion of stocks) such that resources cannot continue to be used at current levels within the Bay of Fundy for more than one fishing season; or
- unmitigated damage to fishing gear.

Criteria used to characterize and describe residual environmental effects for the assessment of CRA fisheries are provided in Table 11.2.



Source Data: Data provided by the Governments of New Brunswick and Canada

Spatial Boundaries for Commercial, Recreational, and Aboriginal Fisheries

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.2 Characterization of Residual Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries**

<b>Characterization</b>	<b>Description</b>	<b>Quantitative Measure or Definition of Qualitative Categories</b>
Direction	The long-term trend of the residual environmental effect.	<b>Positive</b> —the residual environmental effect moves measurable parameters in a direction beneficial to CRA fisheries relative to baseline. <b>Adverse</b> —the residual environmental effect moves measurable parameters in a direction detrimental to CRA fisheries relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions.	<b>Negligible</b> —no measurable change in use of fishing areas or availability of CRA fisheries resources, and no damage to fishing gear. <b>Low</b> —Temporary loss of access to fishable areas representing up to one quarter of the PDA, availability of CRA fisheries resources affected for period of a temporary loss of access to fishable areas across the entire PDA, or availability of CRA fisheries resources affected for more than one fishing season, or demonstrated loss of fishing gear that is not mitigated. <b>Moderate</b> —a temporary loss of access to fishable areas representing less than one half of the PDA, or availability of CRA fisheries resources affected for less than one fishing season, or demonstrated loss of fishing gear that is mitigated. <b>High</b> —a temporary loss of access to fishable areas across the entire PDA, or availability of CRA fisheries resources affected for more than one fishing season, or demonstrated loss of fishing gear that is not mitigated.
Geographic Extent	The geographic area in which an environmental effect occurs.	<b>PDA</b> —the residual environmental effect is restricted to the marine PDA (as defined in Section 11.3.1). <b>LAA</b> —the residual environmental effect extends into the LAA for the CRA Fisheries VC (as defined in Section 11.3.1).
Frequency	Identifies when the residual environmental effect occurs and how often during the Project or in a specific phase.	<b>Single event</b> —the residual environmental effect occurs only once. <b>Multiple irregular event</b> —the residual environmental effect occurs at no set schedule. <b>Multiple regular event</b> —the residual environmental effect occurs at regular intervals. <b>Continuous</b> —the residual environmental effect occurs continuously.
Duration	The period of time required until the measurable parameter or the VC returns to its existing condition, or the residual environmental effect can no longer be measured or otherwise perceived.	<b>Short-term</b> —the residual environmental effect is restricted to less than one fishing season. <b>Medium-term</b> —the residual environmental effect extends through approximately one fishing season. <b>Long-term</b> —residual environmental effect extends beyond one fishing season but is not permanent. <b>Permanent</b> —the residual environmental effect is permanent.

**Table 11.2 Characterization of Residual Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries**

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Timing	Considers when the residual environmental effect is expected to occur. Timing considerations should be noted in the evaluation of the residual environmental effect, where applicable or relevant.	<b>Not Applicable (N/A)</b> —seasonal aspects are unlikely to alter the residual environmental effect on CRA fisheries. <b>Applicable</b> —seasonal aspects may alter the residual environmental effect on CRA fisheries.
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the Project activity ceases.	<b>Reversible</b> —the residual environmental effect is likely to be reversed after activity completion or reclamation. <b>Irreversible</b> —the residual environmental effect is unlikely to be reversed.
Ecological and Socioeconomic Context	Existing condition and trends in the area where environmental effects occur.	<b>Undisturbed</b> —CRA fisheries are relatively undisturbed due to limited vessel traffic, development, and other anthropogenic activities in the area. <b>Disturbed</b> —CRA fisheries are often disturbed due to interactions with heavy vessel traffic, development, or other anthropogenic activities in the area.

## 11.5 EXISTING CONDITIONS FOR COMMERCIAL, RECREATIONAL, AND ABORIGINAL FISHERIES

### 11.5.1 Approach and Methods

Information regarding current CRA fishing activities in the Bay of Fundy was obtained through review of existing literature, online public resources, engagement with stakeholders, and formal data requests from the DFO Maritimes Region.

### 11.5.2 Description of Existing Conditions

The CRA fisheries that occur within the Bay of Fundy are described below.

#### 11.5.2.1 Commercial Fisheries

Commercial fishing is an important industry in the Bay of Fundy. This section describes the fishing management zones, number of licenses by catch type, commercial species and their season, landed values of major fisheries, and diadromous fish species that contribute to commercial fisheries in tidal waters near the Fundy Isles.



## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

### Fishery Management Areas

The Project and surrounding Bay of Fundy are located within the boundaries of DFO's Maritimes Region. Management of CRA fisheries resources in the marine and inland waters of DFO's Maritimes Region falls under the jurisdiction of the Regional Fisheries Management Program.

Canada is a member of the Northwest Atlantic Fisheries Organization (NAFO) and is a contracting party to the associated *Convention on Cooperation in the Northwest Atlantic Fisheries* (NAFO Convention), which is intended to promote the long-term conservation and sustainable use of the fishery resources in the Convention Area (NAFO 2017). The NAFO Convention Area spans a large region in the Northwest Atlantic Ocean which encompasses the entire Bay of Fundy and also includes the majority of the Atlantic coast of Canada, the Atlantic coast of the United States to North Carolina, and the western side of Greenland. Article IV of the NAFO Convention divides the Convention Area into several scientific and statistical subareas, divisions and subdivisions (ibid). Smaller areas within the NAFO divisions are known as unit areas; they are not set out in the NAFO Convention but are used by Canadian scientists and fisheries managers to track fisheries and stock status and implement fisheries management measures in geographic units smaller than the NAFO divisions (DFO 2005).

The Grand Manan Channel segment of the marine PDA is located within NAFO Subarea 4, NAFO Division 4X, and NAFO Unit Area 4Xs. NAFO Division 4X includes the New Brunswick and Nova Scotia portions of the Bay of Fundy.

The Head Harbour Passage segment of the marine PDA is located with NAFO Subarea 5, NAFO Division 5Y, and NAFO Unit Area 5Yb. Only a small portion of NAFO Division 5Y is located within Canadian waters; the majority of NAFO Division 5Y is located west of the maritime boundary with in the United States.

Figure 11.1 shows the location of the Project relative to the boundary between NAFO Divisions 4X and 5Y.

### Species and Seasons

Fisheries data obtained from DFO Maritimes Region include fisheries maps that aggregate landed catch weight per 2 x 2-minute (cartesian) grid cell for selected species/species groupings and gear types to identify fishing areas (Butler and Coffen-Smout 2017). Each 2 x 2-minute DFO grid cell is approximately 9.8 km<sup>2</sup> in size. The grid cells associated with inshore lobster landings in and around the LAA consist of 10 x 10-minute grid cells with a total area of 244 km<sup>2</sup>, and are larger than the 2 x 2-minute grid cells associated with other commercial fisheries for other species. The temporal coverage of the data is from 2012 to 2014 for the commercial inshore lobster fishery, and from 2010 to 2014 for all other commercial fisheries.

The data set released from DFO (Butler and Coffen-Smout 2017) was screened to comply with the Government of Canada's privacy policy to protect the identity or activity of individual vessels or companies. DFO conducted privacy assessments on all map layers to identify NAFO unit areas containing data from less than five vessel IDs, license IDs, and fisher IDs; this is the threshold below

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

which data is privacy-screened. The data that are publicly available from DFO omit confidential information (e.g., catch weight and fishing effort locations) for privacy-screened fisheries within these NAFO unit areas. In some cases, consents were sought from license holders to publicly release map products (Butler and Coffen-Smout 2017).

From 2010 to 2014, commercial fisheries for up to 16 species had landings originating within DFO grid cells that overlap spatially with the marine PDA and/or LAA (Table 11.3). Those DFO grid cells have been privacy-screened for commercial fisheries for another 10 species that had landings originating within the NAFO unit areas intersected by the Project during the same period. Some or all of these privacy-screened fisheries may have also been within DFO grid cells that overlap spatially with the marine PDA and/or LAA. It is noted that this information is for landings reported to DFO under Canadian fishing licenses; data from United States based landings are unavailable from DFO, nor thought to be relevant in the context of this Project within Canadian jurisdictional waters.

**Table 11.3 Fisheries with Landings and Potential Landings Within DFO Grid Cells Overlapping the Marine Project Development Area and Local Assessment Area (2010–2014) – Canadian Landings Only**

Landings Originating in DFO Grid Cells Overlapping the PDA	Landings Originating in DFO Grid Cells Overlapping the LAA	Privacy-Screened Fisheries in DFO Grid Cells Overlapping the PDA and/or LAA
Atlantic halibut	Atlantic halibut	Dogfish
Cod	Cod	Greenland halibut
Crab (other than snow crab)	Crab (other than snow crab)	Hagfish
Flatfish	Flatfish	Mackerel
Groundfish (bottom longline, bottom trawl)	Groundfish (bottom longline, bottom trawl, gillnet)	Red hake
Haddock	Haddock	Scallop
Herring	Herring	Sea Urchin
Lobster	Lobster	Skate
Pollock	Monkfish	Snow crab
Redfish	Pollock	Swordfish
Scallop	Redfish	Tuna
Sculpin	Scallop	
White hake	Sculpin	
	Shrimp	
	White hake	
	Wolffish	

Commercial fishing seasons vary by species and management areas, and are subject to changes such as closures for conservation (i.e., quota, percent bycatch, size limits), important ecological areas (e.g., known spawning areas), safety, and contamination concerns. Season length may also vary for a species based on the gear types used.

Table 11.4 lists the commercial fishing seasons for various groundfish, pelagic, shellfish/invertebrate, and marine mammal species that have potential to be fished in NAFO Divisions 4X and 5Y and other relevant

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

fishery management areas within the Bay of Fundy (i.e., fishery management areas that overlap spatially with the marine PDA and/or LAA). This is not necessarily an exhaustive list of all species with potential to be fished commercially in and around the marine PDA and LAA.

**Table 11.4 Commercial Fishing Seasons Near the Marine Project Development Area and Local Assessment Area – Canadian Regulated Fisheries Only**

Grouping	Common Name	Scientific Name	Relevant Fishery Management Area(s) <sup>1</sup>	Commercial Season <sup>2</sup>
Groundfish	American plaice <sup>3</sup>	<i>Hippoglossoides platessoides</i>	NAFO Division 4X	Bycatch only
	Argentine	<i>Argentina silus</i>	NAFO Division 4X	April 1 to March 31 <sup>5</sup>
	Atlantic cod	<i>Gadus morhua</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	Atlantic halibut	<i>Hippoglossus hippoglossus</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	Cusk	<i>Brosme brosme</i>	NAFO Division 4X	Bycatch only <sup>3</sup>
	Haddock	<i>Melanogrammus aeglefinus</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	Monkfish	<i>Lophius americanus</i>	NAFO Division 4X	Bycatch only <sup>3</sup>
	Pollock	<i>Pollachius virens</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	Redfish	<i>Sebastes fasciatus and S. mentella</i>	NAFO Division 4X	April 1 to March 31 <sup>3</sup>
	Sculpin <sup>4</sup>	<i>Myoxocephalus spp.</i>	NAFO Divisions 4X and 5Y	Bycatch only <sup>3</sup>
	Silver hake	<i>Merluccius bilinearis</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	Spiny dogfish	<i>Squalidae</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	White hake	<i>Urophycis tenuis</i>	NAFO Divisions 4X and 5Y	April 1 to March 31 <sup>3</sup>
	Winter flounder	<i>Pseudopleuronectes americanus</i>	NAFO Division 4X	April 1 to March 31 <sup>3</sup>
	Witch flounder <sup>5</sup>	<i>Glyptocephalus cynoglossus</i>	NAFO Division 4X	Bycatch only <sup>3</sup>
	Wolffish	<i>Anarhichas spp.</i>	NAFO Divisions 4X and 5Y	Bycatch only <sup>3</sup>
Yellowtail flounder <sup>5</sup>	<i>Limanda ferruginea</i>	NAFO Division 4X	Bycatch only <sup>3</sup>	
Pelagic Fish	Atlantic herring	<i>Clupea harengus</i>	Herring Fishing Area 20	April 30 to December 31
	Blue shark	<i>Prionace glauca</i>	NAFO Divisions 4X and 5Y	Bycatch only <sup>6</sup>
	Bluefin tuna	<i>Thunnus thynnus</i>	NAFO Divisions 4X and 5Y	January 1 to December 31 <sup>7</sup>

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.4 Commercial Fishing Seasons Near the Marine Project Development Area and Local Assessment Area – Canadian Regulated Fisheries Only**

Grouping	Common Name	Scientific Name	Relevant Fishery Management Area(s) <sup>1</sup>	Commercial Season <sup>2</sup>
	Capelin	<i>Mallotus villosus</i>	Capelin Fishing Area 21	Unknown
	Mackerel	<i>Scomber scombrus</i>	Mackerel Fishing Area 21	April to November <sup>8</sup>
	Porbeagle shark	<i>Lamna nasus</i>	NAFO Divisions 4X and 5Y	Bycatch only <sup>6</sup>
	Shortfin Mako shark	<i>Isurus oxyrinchus</i>	NAFO Divisions 4X and 5Y	Bycatch only <sup>9</sup>
	Atlantic salmon	<i>Salmo salar</i>	Salmon Fishing Area 23	Unknown
	Swordfish	<i>Xiphias gladius</i>	NAFO Divisions 4X and 5Y	Bycatch only
Shellfish/ Invertebrates	Bar clam	<i>Spisula solidissima</i>	Clam Harvest Area 7	January 1 to December 31
	Lobster	<i>Homarus americanus</i>	Lobster Fishing Areas (LFAs) 36 and 37	March 31 to June 29, and second Tuesday in November to January 14 <sup>10</sup>
			LFA 38	Second Tuesday in November to June 29 <sup>10</sup>
	Scallop	<i>Placopecten magellanicus</i>	Scallop Fishing Area 28B	Full Bay fleet – October 1 to September 30 <sup>11</sup>
				Mid Bay fleet – January 1 to September 30 <sup>11</sup>
	Sea urchin	<i>Strongylocentrotus spp.</i>	Sea Urchin Fishing Area (SUFA) 36	October 1 to May 15 <sup>12</sup>
			SUFA 37	October 1 to May 15 <sup>12</sup>
			SUFA 38	November 1 to April 15 <sup>12</sup>
	Shrimp	<i>Pandalus borealis</i>	Shrimp Fishing Area 16	April 1 to March 31
	Snow crab	<i>Chionoecetes opilio</i>	NAFO Division 4X	November 1 to March 31 <sup>13</sup>
Soft-shell clam	<i>Mya arenaria</i>	Clam Harvest Area 7	January 1 to December 31	
Squid	<i>Loligo spp.</i>	Squid Fishing Area 21	Unknown	
Marine Mammals	Grey seal	<i>Halichoerus grypus</i>	Sealing Area 32	March 1 to December 31

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

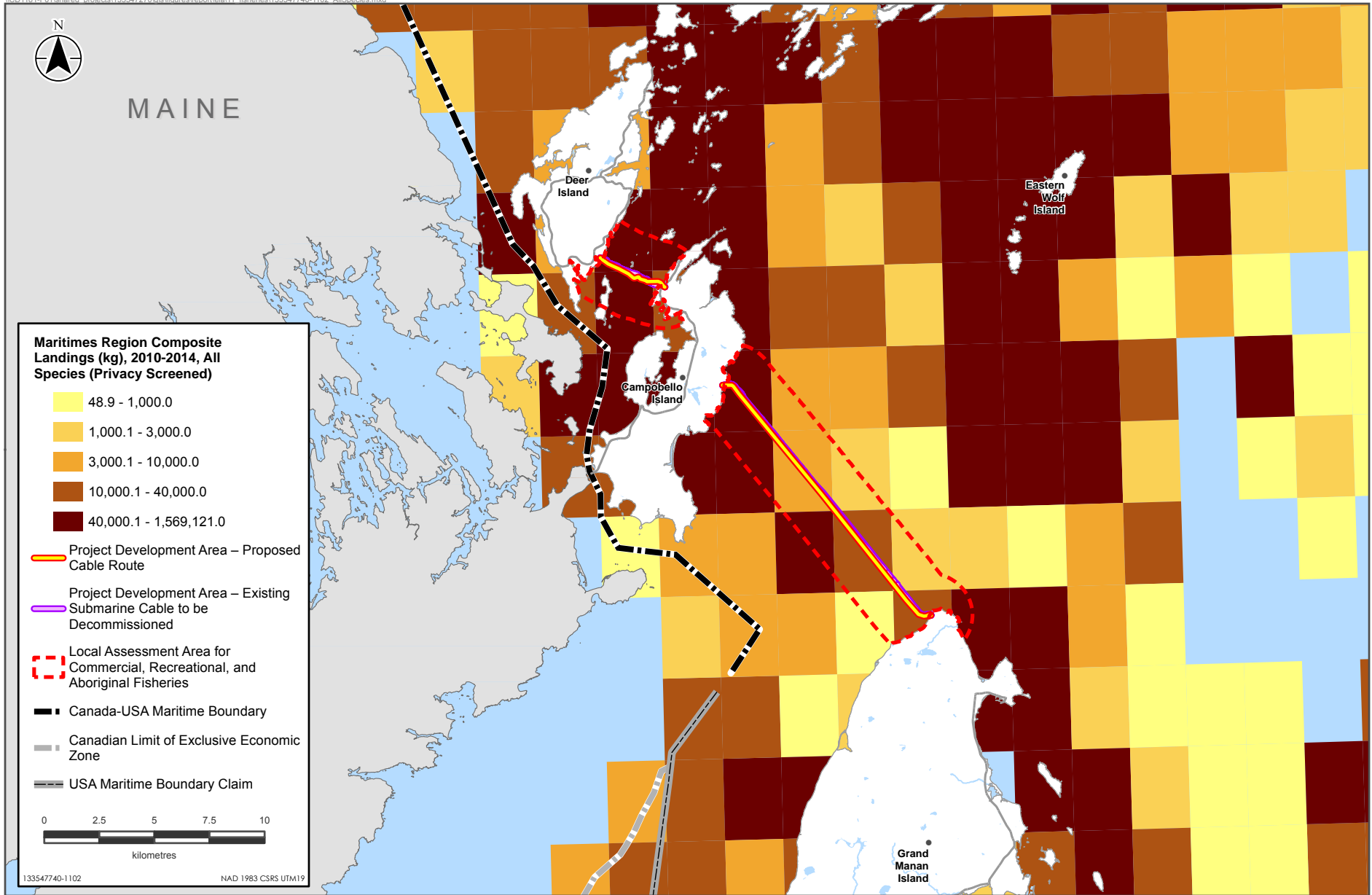
Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.4 Commercial Fishing Seasons Near the Marine Project Development Area and Local Assessment Area – Canadian Regulated Fisheries Only**

Grouping	Common Name	Scientific Name	Relevant Fishery Management Area(s) <sup>1</sup>	Commercial Season <sup>2</sup>
<p>Notes:</p> <p><sup>1</sup> Fishery Management Areas that overlap spatially with the marine PDA and LAA. Commercial fishing activities carried out under these licenses have potential to occur within the marine PDA and/or LAA.</p> <p><sup>2</sup> Commercial seasons are subject to change and subject to any variation orders or closures specified in license conditions.</p> <p><sup>3</sup> DFO 2015a</p> <p><sup>4</sup> There is a directed fishery for longhorn sculpin (<i>Myoxocephalus octodecemspinosus</i>) in St. Mary's Bay in southwest Nova Scotia. All other sculpin landings in and around the Bay of Fundy are groundfish longline and trawl bycatches (Butler and Coffen-Smout 2017).</p> <p><sup>5</sup> Allowable bycatch for this species is based on percentage of total allowable catch for winter flounder.</p> <p><sup>6</sup> DFO 2016b</p> <p><sup>7</sup> DFO 2012b</p> <p><sup>8</sup> DFO 2009a</p> <p><sup>9</sup> DFO 2009b</p> <p><sup>10</sup> DFO 2013b</p> <p><sup>11</sup> Nasmith et al. 2016</p> <p><sup>12</sup> DFO 2000</p> <p><sup>13</sup> DFO 2013a</p>				

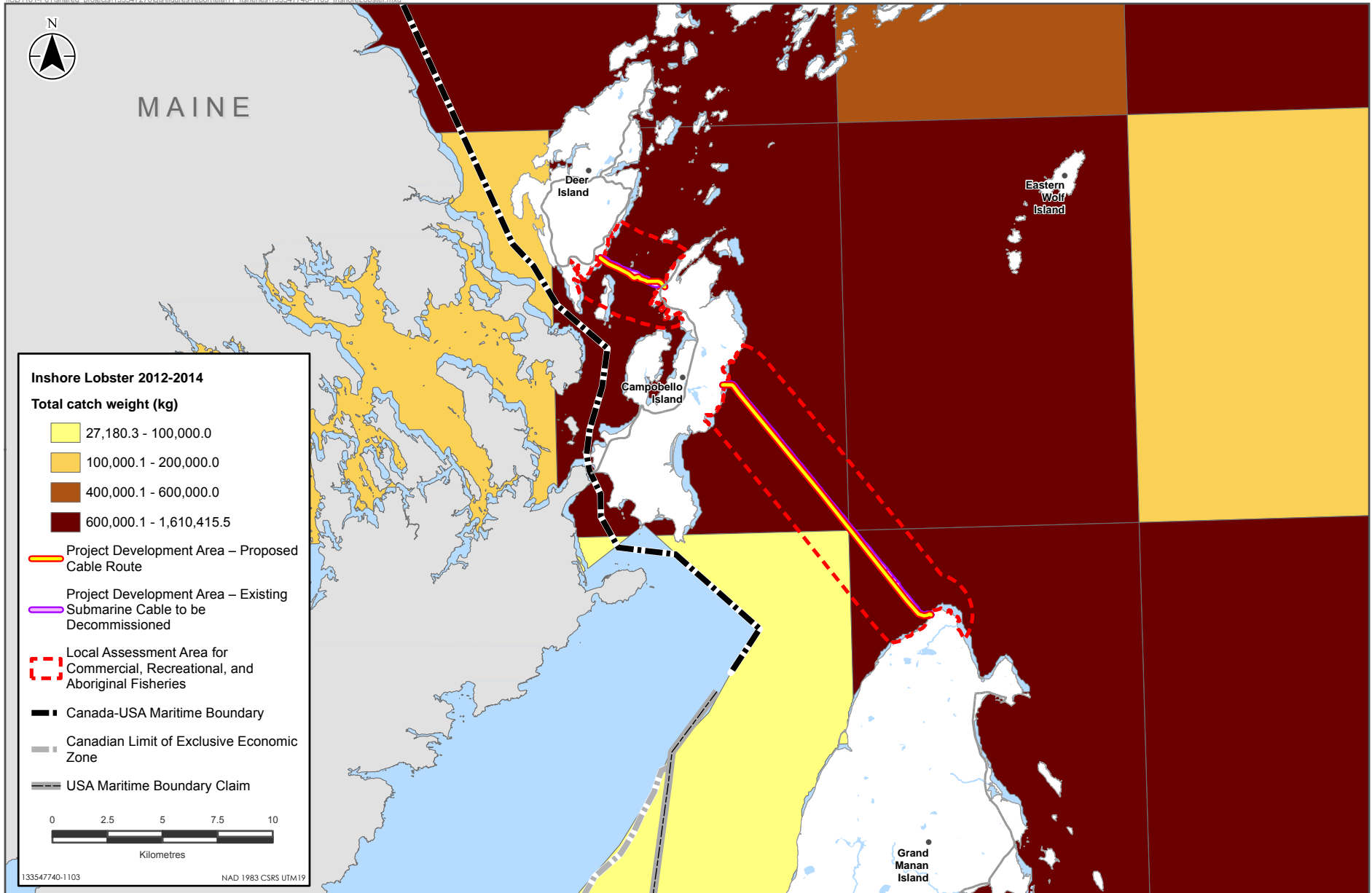
By value, the top three commercial fisheries in the New Brunswick portion of the Maritimes Region are lobster, scallop, and herring (DFO 2017a) (Table 11.5). Other commercial fisheries in the Bay of Fundy include groundfish, large pelagics, and shellfish. Figure 11.2 shows the 2010 to 2014 catch weight landings for all commercial fisheries, other than lobster. The catch weight landings for the inshore lobster commercial fishery are shown separately on Figure 11.3, due to the different DFO grid cell size and temporal coverage of the DFO data available for this fishery.

Lobsters are harvested using baited lobster traps placed on the seabed. The marine PDA overlaps spatially with three inshore lobster fishing areas in the Bay of Fundy (i.e., LFAs 36, 37, and 38). The seasons for the inshore lobster fishery vary by fishing area (Table 11.3). It was noted by fishers during a consultation meeting with the Fundy North Fishermen's Association held on September 13, 2017 in St. George, New Brunswick (Section 4.3), that the commercial fishing season for lobster in LFA 36 is currently under review and has potential to be extended later into July. It was also noted during that meeting that the peak times for harvesting lobster are generally at the beginning and end of the commercial lobster fishing season. The total 2012–2014 lobster catch weights for the most heavily fished DFO grid cells that are intersected by the marine PDA in LFAs 36, 37, and 38 range from approximately 1.15 million kg in the southernmost portion of the Grand Manan Channel to approximately 1.61 million kg in the northernmost portion of the Grand Manan Channel and the entire Head Harbour Passage. For comparison, the total 2012–2014 inshore lobster catch weights in other DFO grid cells within these LFAs range from approximately 11,100 kg to approximately 2.26 million kg. One of the grid cells that is intersected by the marine PDA in the Grand Manan Channel is the most heavily fished DFO grid cell for inshore lobster within LFA 37; the total 2012–2014 inshore lobster catch weight within that cell is



Source Data: Data provided by the Government of New Brunswick, and Fisheries and Oceans Canada, Oceans and Coastal Management Division, Maritimes Region.

Catch Weight Landings for All Commercial Fisheries Other Than Inshore Lobster (2010–2014)



Source Data: Data provided by the Government of New Brunswick, and Fisheries and Oceans Canada, Oceans and Coastal Management Division, Maritimes Region.

Catch Weight Landings for Inshore Lobster (2012–2014)

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

### Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

approximately 1.41 million kg. Lobster fishing also takes place off southwestern Nova Scotia (DFO 2015d); however, this offshore fishery is not near the proposed Project route and is not discussed further.

Scallops are harvested by dragging a metal frame with a mesh bag (“Digby Dredge”) along the bottom of the ocean. The Bay of Fundy is fished by three distinct “Full Bay”, “Mid Bay” and “Upper Bay” scallop fishing fleets. Full Bay scallop license holders can fish for scallops anywhere in the Bay of Fundy. Mid Bay license holders can only fish for scallops on the northern side of the Mid Bay line (i.e., primarily the New Brunswick side of the Bay of Fundy) and consist primarily of New Brunswick-based vessels. Upper Bay license holders fish in the easternmost portions of the Bay of Fundy. Scallop fishing area (SFA) 28 encompasses the entire Bay of Fundy, but is subdivided into SFAs 28A, 28B, 28C, and 28D. The marine PDA is located entirely within SFA 28B, which is on the northern side of the Mid Bay line and is therefore fished by the Full Bay and Mid Bay scallop fishing fleets. The Full Bay fleet season runs from October 1 to September 30, and the Mid Bay fleet season runs from January 1 to September 30. Approximately 3 km of the northernmost portion of the Head Harbour Passage segment of the marine PDA (i.e., extending southeast off Deer Island) and approximately 3 km of the northernmost portion of the Grand Manan Channel segment of the marine PDA (i.e., extending southeast off Campobello Island) are located within some of the most heavily fished areas for scallop within SFA 28B, by weight. The total 2010–2014 scallop catch weights for the most heavily fished DFO grid cell intersected by the marine PDA in the Grand Manan Channel are approximately 75,000 kg. The total 2010 to 2014 scallop catch weights for the most heavily fished DFO grid cells intersected by the marine PDA in the Head Harbour Passage range from approximately 161,000 kg to approximately 167,000 kg, and the LAA in the Head Harbour Passage crosses a DFO grid cell where the total 2010 to 2014 scallop catch weight is approximately 260,000 kg. For comparison, the total 2010 to 2014 scallop catch weights in other DFO grid cells within SFA 28B range from 0.2 kg to approximately 537,000 kg.

Herring fisheries in the Bay of Fundy target migrant juveniles and adults. Migrant juveniles are captured primarily through the weir and shutoff fisheries in the nearshore waters at the mouth of the Bay of Fundy. Most adult herring that are fished in the Bay of Fundy are captured by purse seine. The Bay of Fundy encompasses herring fishing areas (HFAs) 20, 21, and 22. The marine PDA and LAA are located entirely within HFA 20. The fishing season for herring varies depending on the gear type and type of vessel (Table 11.4 above). There are several herring weirs located within the LAA, but none are known to be crossed by the marine PDA. It was noted during the September 2017 consultation meeting with the Fundy North Fishermen’s Association (Section 4.3) that a new herring weir will be built near Chocolate Cove in 2018, and that the herring weirs are only fished at night. The purse seine herring fishery has not been historically active along most of the marine PDA; the only portion of the marine PDA that crosses through known purse seine herring landing areas is approximately 3 km of the northernmost portion of the Grand Manan Channel segment of the marine PDA (i.e., extending southeast off Campobello Island). The total 2010–2014 purse seine herring catch weight in this area is approximately 399,000 kg. For comparison, the total 2010–2014 purse seine herring catch weights in other DFO grid cells within HFA 20 range from 0.001 kg to approximately 13.23 million kg. A known spawning area for herring is located off the northern tip of Grand Manan Island and is intersected by the marine PDA.



## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

### Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

Groundfish are captured by a variety of methods, including fixed and mobile gear consisting of seines, bottom trawls, gill nets, longlines, and handlines. The season operates from April 1 to March 31, with a number of groundfish species only being captured as bycatch with no quota allocated (Table 11.4). There are gill net groundfish landing areas near Grand Manan Island and some landings of redfish and sculpin in the surrounding area. Landings for longline or bottom trawl groundfish, cod, haddock, pollock, monkfish, and white hake are relatively low or dispersed near the marine PDA. The Project area is not a frequent landing area for wolffish. Distribution information for individual species was not available for skate, dogfish, and red hake due to privacy screening. Privacy-screened data which were removed from the data set included NAFO unit areas with less than 5 vessels, licenses or fisher identifications per DFO grid cell; therefore, privacy-screened areas are assumed to have low landings.

Bluefin tuna, swordfish and other large pelagic species (e.g., yellowfin, bigeye tuna) are typically captured off the Scotian Shelf closer to Nova Scotia. There are no longer any targeted commercial fisheries for swordfish near the Project; however, swordfish are occasionally landed as bycatch from other commercial fisheries. Shark are no longer commercially targeted in the Bay of Fundy and are typically caught as bycatch with other fisheries. There have been landings of shark between Campobello Island and Grand Manan Island.

There are small intermittent landing areas for harvesting shrimp and crab off the southwestern side of Grand Manan Island. Information is not available for sea urchin or snow crab due to the privacy screening associated with the data set, as described above.

#### Licenses and Landed Values

In recent years (2013 to 2015), commercial fisheries in the New Brunswick Maritime Region have been valued between 90 to 160 million dollars per year (Table 11.5).

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.5 Value of New Brunswick Maritime Region Commercial Landings (thousands of dollars) from 2013 to 2015**

Species	2013	2014	2015
<b>Groundfish</b>			
Atlantic Cod	0	0	x
Haddock	x	0	x
Redfish spp.	0	0	0
Halibut (Atlantic)	295	x	343
Flatfishes	x	x	1
Greenland turbot	0	0	0
Pollock	x	0	0
Hake	0	0	0
Cusk	0	0	0
Catfish	0	0	0
Skate	0	0	0
Dogfish	0	0	0
Other	x	0	x
<b>Total</b>	<b>297</b>	<b>295</b>	<b>344</b>
<b>Pelagic and Other Finfish</b>			
Herring	7,718	7,472	6,274
Mackerel	0	0	x
Swordfish	0	0	0
Tuna	0	0	0
Gaspereau (Alewife)	42	128	x
Eel	70	56	x
Salmon (Atlantic)	0	0	0
Smelt	0	0	0
Silversides	0	0	0
Shark	0	0	0
Capelin	0	0	0
Other	6,703	1,193	932
<b>Total</b>	<b>14,533</b>	<b>8,849</b>	<b>9,907</b>
<b>Shellfish</b>			
Clams / quahaug	x	x	1,272
Oyster <sup>1</sup>	0	0	0
Scallop <sup>2</sup>	6,477	8,355	10,031
Squid	0	0	0
Mussel	0	0	0

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.5 Value of New Brunswick Maritime Region Commercial Landings (thousands of dollars) from 2013 to 2015**

<b>Species</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Lobster	63,200	104,961	131,063
Shrimp	0	0	0
Crab, queen	0	0	0
Crab, other	99	175	x
Whelks	0	0	0
Cockles	0	0	0
Sea cucumber	x	x	x
Sea urchin	3,569	3,654	3,547
Other	16	0	0
<b>Total</b>	<b>74,696</b>	<b>119,004</b>	<b>146,646</b>
<b>Subtotal</b>	<b>89,526</b>	<b>128,148</b>	<b>156,897</b>
<b>Others</b>			
Marine plants	638	596	571
Lumpfish roe	0	0	0
Miscellaneous <sup>3</sup>	0	0	0
<b>Total</b>	<b>638</b>	<b>596</b>	<b>571</b>
<b>GRAND TOTAL<sup>4</sup></b>	<b>90,164</b>	<b>128,744</b>	<b>157,469</b>
<b>Note:</b>			
x Suppressed to meet confidentiality requirements.			
<sup>1</sup> Oyster: Atlantic includes wild and farmed data.			
<sup>2</sup> Scallop includes meat with roe.			
<sup>3</sup> Miscellaneous includes seal value.			
<sup>4</sup> Totals may not add up due to rounding.			
Source: Modified from DFO 2017a.			

In 2015, 1,749 fishing licenses were issued for commercial fishing in the Maritimes Region in New Brunswick. The majority were for clam, lobster, scallop, and herring (Table 11.6) (DFO 2017b).

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.6 Number of Commercial Fishing Licenses Issued for New Brunswick in the Maritimes Region in 2015**

<b>Species</b>	<b>Number of Licenses (Including Active and Inactive)</b>
Groundfish	165
Atlantic herring	282
Atlantic mackerel	39
Swordfish	10
Bluefin tuna	2
Atlantic salmon	2
Capelin	0
Clam	331
Scallop	206
Squid	1
American lobster	320
Shrimp	8
Crab	10
Other	373
<b>Total</b>	<b>1,749</b>

Source: DFO 2017b.

### Tidal Water Fisheries

Within the tidal waters of the Bay of Fundy there are a number of migratory diadromous fish species including gaspereau (*Alosa pseudoharengus* and *Alosa aestivalis*), American eel (*Anguilla rostrata*), American shad (*Alosa sapidissima*), and rainbow smelt (*Osmerus mordax*), which may contribute to commercial fisheries within the tidal portion of rivers flowing into the Bay of Fundy.

#### 11.5.2.2 Recreational Fisheries

Recreational fisheries exist in the Bay of Fundy for groundfish (cod, flounder haddock, dogfish, pollock, and striped or Atlantic wolffish), from February to December by handline or angling (DFO 2016a). Fisheries exist for mackerel and shark (porbeagle, blue shark, shortfin mako), year-round with handline and angling, and for bluefin tuna year-round by charter or as a tournament participant (DFO 2015b). Recreational fisheries also exist for marine worms (DFO 2016a) and shellfish (which includes bar clams, bay quahaug, razor clams, soft shell clams, scallops, and oysters) (DFO 2015c). Fishing seasons and dates vary based on the area, and are subject to changes such as closure for conservation, safety, contamination, seasonal, or other reasons.

Some species of diadromous fish that have potential to migrate through the PDA are fished recreationally in the tidal waters of New Brunswick. They may include American eel, gaspereau, rainbow smelt, American shad, sturgeon, and striped bass (NBDNR 2016).

## **ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

Detailed catch and license information is not available for recreational fisheries near the LAA, since DFO does not have licensing or reporting requirements for most species caught recreationally in tidal waters and the provincial governments issue licenses for recreational fishing in inland waters only.

### **11.5.2.3 Aboriginal Fisheries**

Community members of the Mi'kmaq and Wolastoqey (Maliseet) First Nations participate in fisheries for FSC purposes under the constitutional protection of Aboriginal and treaty rights. Access to these fisheries is through FSC licenses issued by the Government of Canada, community-negotiated agreements under the Aboriginal Fisheries Strategy, or by community assertion of Aboriginal and treaty rights to harvest species for which conservation is not a concern (MGS and UINR 2016).

The participation of First Nations in commercial fisheries includes co-management through the Atlantic Integrated Commercial Fisheries Initiative and the harvesting of fish for commercial purposes under communal commercial licenses issued by the Government of Canada. The license-holder for a communal commercial license is typically the First Nation band. Aboriginal communal commercial fishers are subject to the same regulatory requirements as non-Aboriginal commercial fishers (MGS and UINR 2016).

The information presented below represents publicly available information and may not include all applicable Aboriginal FSC licenses and/or communal commercial licenses.

Table 11.7 lists eleven Aboriginal communities and organizations from New Brunswick and Nova Scotia that are known to have recently held FSC fishing licenses for areas near the marine PDA. For the purposes of the assessment, it is assumed that these licenses will remain in effect throughout the Project. The FSC fishing activities carried out under these licenses therefore have potential to occur within the marine PDA and/or LAA.

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.7 2015–2016 Food, Social, and Ceremonial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

<b>Aboriginal Community/ Organization</b>	<b>Species</b>	<b>Location</b>
Acadia First Nation – Nova Scotia (Mi'kmaq)	Catfish	NAFO Division 4X
	Cod	
	Haddock	
	Halibut	
	Pollock	
	Striped bass	All inland and tidal waters
	Eel	No restrictions
	Smelt	
	Shad	
Annapolis Valley First Nation – Nova Scotia (Mi'kmaq)	Eel	Bay of Fundy
	Flounder	
	Halibut	
	Pollock	
	Smelt	No restrictions
Bear River First Nation – Nova Scotia (Mi'kmaq)	Eel	No restrictions
	Shad	
	Smelt	
	Groundfish	NAFO Division 4X
Glooscap First Nation – Nova Scotia (Mi'kmaq)	Eel	No restrictions
	Shad	
	Smelt	
	Mackerel	Bay of Fundy
	Mussel	
	Soft-shell clam	
	Cod	NAFO Division 4X – Bay of Fundy
	Flounder	
	Haddock	
	Halibut	
	Pollock	
	Kingsclear First Nation – New Brunswick (Wolastoqey)	Lobster
Lobster Fishing Area 37		
Millbrook First Nation – Nova Scotia (Mi'kmaq)	Trout	Tidal waters of the Bay of Fundy

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.7 2015–2016 Food, Social, and Ceremonial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

Aboriginal Community/ Organization	Species	Location
Native Council of Nova Scotia – Nova Scotia (Mi'kmaq)	American plaice	Various locations, as specified in license
	Capelin	
	Chain pickerel	
	Clam	
	Cod	
	Crab (green, Jonah, and rock)	
	Cusk	
	Eel	
	Flounder (winter, summer, yellowtail)	
	Gaspereau	
	Haddock	
	Halibut (Atlantic and Greenland)	
	Herring	
	Mackerel	
	Marine worms	
	Monkfish	
	Mussel	
	Oyster	
	Perch (yellow and white)	
	Pollock	
	Red hake (red, silver, and white)	
	Redfish	
	Scallop	
Shrimp		
Smallmouth black bass		
Smelt		
Squid		
Striped bass		
Trout		
Striped bass	Meat Cove on Cape Breton Island to and including Bay of Fundy (DFO Scotia-Fundy Region)	
Oromocto First Nation – New Brunswick (Wolastoqey)	Lobster	Lobster Fishing Area 36

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.7 2015–2016 Food, Social, and Ceremonial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

Aboriginal Community/ Organization	Species	Location
Sipekne'katik – Nova Scotia (Mi'kmaq)	Eel	No restrictions
	Shad	
	Smelt	
	Groundfish	NAFO Division 4X
St. Mary's First Nation – New Brunswick (Wolastoqey)	Groundfish	Bay of Fundy
	Lobster	Lobster Fishing Area 36
	Soft-shell clams	Tidal waters of Charlotte, Saint John and Albert counties in the Province of New Brunswick where there is no closure in effect
Woodstock First Nation – New Brunswick (Wolastoqey)	Lobster	Lobster Fishing Area 36
Source: Data compiled from Stantec 2016b.		

Table 11.8 lists 28 Aboriginal communities and organizations from New Brunswick, Nova Scotia, and Prince Edward Island that are known to have recently held communal commercial fishing licenses that allowed them to fish in the relevant fishery management areas identified in Table 11.3. For the purposes of the assessment, it is assumed that these licenses will remain in effect throughout the Project. The communal commercial fishing activities carried out under these licenses therefore have potential to occur within the marine PDA and/or LAA.

The majority of the approximately 189 communal commercial fishing licenses summarized in Table 11.8 are for groundfish (54 licenses – i.e., 27 in NAFO Division 4X and 27 in NAFO Division 5Y), lobster (31 licenses – i.e., 15 in LFA 36 and 16 in LFA 38), sea urchin (30 licenses – i.e., 22 in SUFA 36 and 8 in SUFA 38), and scallop (26 licenses in SFA 28B). A number of other species are fished under communal commercial licenses held by several of the Aboriginal communities/organizations identified in Table 11.8, as well as the Apaqtukewag Fisheries Co-operative in Nova Scotia and the Bear River First Nation in Nova Scotia; however, the relevant fishery management areas are not specified for all such licenses in the information provided by DFO (Stantec 2016). There is therefore potential for the following additional Aboriginal communal commercial fisheries to occur within the marine PDA and/or LAA: American eel, herring, mackerel, quahaug, Jonah and green crab, squid, shrimp, gaspereau, American shad, and smelt (Stantec 2016). It is likely that Table 11.8 under-represents the actual number of communal commercial licenses issued to various Aboriginal communities/organizations within the relevant fishery management areas.



**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.8 2015–2016 Communal Commercial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

<b>Aboriginal Community/ Organization</b>	<b>Species</b>	<b>License Area (Relevant Fishery Management Area)</b>	<b>Number of Licenses</b>
Abegweit First Nation – Prince Edward Island (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Acadia First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Scallop	Scallop Fishing Area 28B	2
	Snow crab	NAFO Division 4X	2
	Swordfish	NAFO Division 4X	1
Annapolis Valley First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Scallop	Scallop Fishing Area 28B	2
Bouctouche First Nation – New Brunswick (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Chapel Island Band Council – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
Eel River Bar First Nation – New Brunswick (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Elsipogtog First Nation – New Brunswick (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Esgenoôpetitj First Nation – New Brunswick (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Eskasoni First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
Fort Folly First Nation – New Brunswick (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Scallop	Scallop Fishing Area 28B	1
	Swordfish	NAFO Division 4X	1
Glooscap First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	2
	Groundfish (not specified)	NAFO Division 5Y	2
	Swordfish	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Indian Island First Nation – New Brunswick (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.8 2015–2016 Communal Commercial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

<b>Aboriginal Community/ Organization</b>	<b>Species</b>	<b>License Area (Relevant Fishery Management Area)</b>	<b>Number of Licenses</b>
Kingsclear First Nation – New Brunswick (Wolastoqey)	Groundfish (not specified)	NAFO Division 4X	2
	Groundfish (not specified)	NAFO Division 5Y	2
	Lobster	Lobster Fishing Area 36	2
	Lobster	Lobster Fishing Area 38	2
	Rock crab	Lobster Fishing Area 36	1
	Scallop	Scallop Fishing Area 28B	2
	Sea Urchin	Sea Urchin Fishing Area 36	8
	Sea Urchin	Sea Urchin Fishing Area 38	3
Lennox Island First Nation – Prince Edward Island (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Membertou Band Council – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Scallop	Scallop Fishing Area 28B	1
Millbrook First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Swordfish	NAFO Division 4X	1
Mime 'J Seafoods Ltd. – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	6
	Groundfish (not specified)	NAFO Division 5Y	6
	Snow crab	NAFO Division 4X	1
	Swordfish	NAFO Division 4X	4
Native Council of Prince Edward Island – Prince Edward Island (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
New Brunswick Aboriginal Peoples Council – New Brunswick (Mi'kmaq and Wolastoqey)	Clams, Unspecified	Clam Harvest Area 7	1
	Lobster	Lobster Fishing Area 36	1
	Lobster	Lobster Fishing Area 38	1
	Scallop	Scallop Fishing Area 28B	1
	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Oromocto First Nation – New Brunswick (Wolastoqey)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Lobster	Lobster Fishing Area 36	4
	Scallop	Scallop Fishing Area 28B	3
	Sea Urchin	Sea Urchin Fishing Area 36	4
Pabineau First Nation – New Brunswick (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.8 2015–2016 Communal Commercial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

<b>Aboriginal Community/ Organization</b>	<b>Species</b>	<b>License Area (Relevant Fishery Management Area)</b>	<b>Number of Licenses</b>
Pictou Landing First Nation – Nova Scotia (Mi'kmaq)	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Shubenacadie Band – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Scallop	Scallop Fishing Area 28B	1
	Swordfish	NAFO Division 4X	1
St. Mary's First Nation – New Brunswick (Wolastoqey)	Lobster	Lobster Fishing Area 36	7
	Scallop	Scallop Fishing Area 28B	1
	Sea Urchin	Sea Urchin Fishing Area 36	9
	Shrimp	Shrimp Fishing Area 16	1
	Swordfish	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Tobique First Nation – New Brunswick (Wolastoqey)	Groundfish (not specified)	NAFO Division 4X	4
	Groundfish (not specified)	NAFO Division 5Y	4
	Jonah crab	Lobster Fishing Area 38	1
	Lobster	Lobster Fishing Area 38	10
	Scallop	Scallop Fishing Area 28B	10
	Sea Urchin	Sea Urchin Fishing Area 38	3
	Tuna <sup>1</sup>	NAFO Division 4X	1
	Tuna <sup>1</sup>	NAFO Subarea 5	1
Wagmatcook First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Swordfish	NAFO Division 4X	1
Waycobah First Nation – Nova Scotia (Mi'kmaq)	Groundfish (not specified)	NAFO Division 4X	1
	Groundfish (not specified)	NAFO Division 5Y	1
	Swordfish	NAFO Division 4X	1
Woodstock First Nation – New Brunswick (Wolastoqey)	Groundfish (not specified)	NAFO Division 4X	2
	Groundfish (not specified)	NAFO Division 5Y	2
	Lobster	Lobster Fishing Area 36	1
	Lobster	Lobster Fishing Area 38	3
	Scallop	Scallop Fishing Area 28B	2
	Sea Urchin	Sea Urchin Fishing Area 36	1
	Sea Urchin	Sea Urchin Fishing Area 38	2
	Swordfish	NAFO Division 4X	1

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.8 2015–2016 Communal Commercial Fishing Licenses That Have Potential to Overlap Spatially with the Marine Project Development Area and Local Assessment Area**

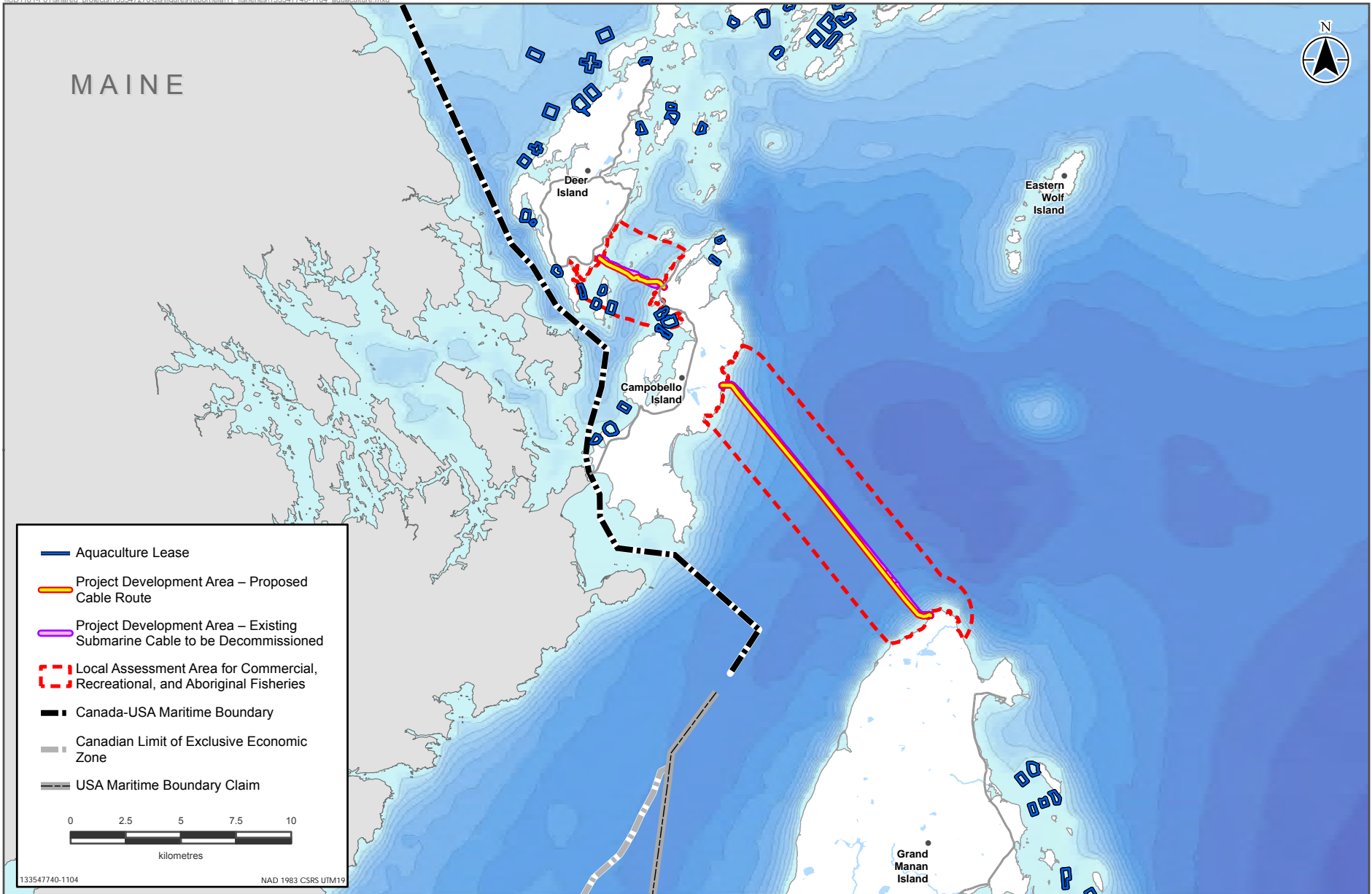
Aboriginal Community/ Organization	Species	License Area (Relevant Fishery Management Area)	Number of Licenses
<b>Approximate Total<sup>2</sup></b>			<b>189</b>
<p>Notes:</p> <p><sup>1</sup> The available data regarding Aboriginal communal commercial tuna licenses in fishery management areas that overlap spatially with the PDA and LAA does not specify the number of tuna licenses held by each Aboriginal community/organization. It has been assumed for the purposes of this table that each applicable Aboriginal community/organization was issued one communal commercial tuna license per license area.</p> <p><sup>2</sup> Approximate total was calculated based on the assumption that each applicable Aboriginal community/organization was issued only one tuna license per license area. The actual total number of communal commercial licenses issued for fishery management areas that overlap spatially with the marine PDA and LAA may be higher than presented in this table.</p> <p>Source: Data compiled from Stantec 2016b.</p>			

### 11.5.2.4 Aquaculture

Aquaculture production in the Bay of Fundy is primarily for Atlantic salmon. Seven aquaculture leases overlap with the southern edge of the LAA, but no aquaculture leases are crossed by the marine PDA; the nearest is located approximately 0.93 km south of the PDA (Figure 11.4).

## 11.6 PROJECT INTERACTIONS WITH COMMERCIAL, RECREATIONAL, AND ABORIGINAL FISHERIES

Table 11.9 identifies the physical activities that may interact with CRA fisheries and result in a change in fishing activities. These interactions are discussed in detail in Section 11.7, in the context of effects pathways, standard and Project-specific mitigation/enhancement, and residual environmental effects. A justification for no environmental effect for some Project physical activities is provided following the table.



Source Data: Data provided by the Government of New Brunswick, and Fisheries and Oceans Canada, Oceans and Coastal Management Division, Maritimes Region.

Aquaculture Leases

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.9 Project-Environment Interactions with Commercial, Recreational, and Aboriginal Fisheries**

Physical Activities	Potential Environmental Effect
	Change in Fishing Activities
<b>Construction</b>	
Landfall construction	✓
Modification to cable riser stations	–
Cable installation in Head Harbour Passage and Grand Manan Channel	✓
Clean-up and revegetation	–
Inspection and energizing the Project	–
Emissions and wastes	✓
Land-based transportation	–
Marine transportation	✓
Employment and expenditure	✓
<b>Operation</b>	
Vegetation management	–
Access road maintenance	–
Energy transmission	–
Infrastructure inspection, maintenance, and repair	✓
Emissions and wastes	✓
Land-based transportation	–
Marine transportation	✓
Employment and expenditure	✓
<b>Decommissioning</b>	
Decommissioning of existing cables	✓
Reclamation	–
Emissions and wastes	✓
Land-based transportation	–
Marine transportation	✓
Employment and expenditure	✓
<b>Notes:</b> ✓ = Potential interaction – = No interaction	

Land-based Project activities that are conducted above the HHWLT mark (i.e., modification to cable riser stations, clean-up and revegetation, and land-based transportation during the construction phase of the Project; vegetation management, access road maintenance, and land-based transportation during the operation phase of the Project; and reclamation and land-based transportation during the

decommissioning phase of the Project) are considered unlikely to interact with CRA fisheries due to their lack of spatial overlap with the marine environment. The implementation of standard mitigation measures, such as erosion and sediment control, during land-based Project activities (refer to Section 6.7) will further reduce the likelihood of potential interactions with the marine environment and associated CRA fisheries.

Inspection and energizing the Project during construction is not expected to interact with the marine environment or associated CRA fisheries, other than through the potential use of marine vessels to support inspection of the submarine cables (which is assessed in the context of marine transportation) and the potential underwater emission of electromagnetic fields (EMF) following energizing of the submarine cables (which is assessed in the context of Project emissions and wastes).

Energy transmission through the cables during Project operation is not expected to interact with the marine environment or associated CRA fisheries, other than through the potential emission of EMF (which is assessed in the context of Project emissions and wastes).

## **11.7 ASSESSMENT OF RESIDUAL ENVIRONMENTAL EFFECTS ON COMMERCIAL, RECREATIONAL, AND ABORIGINAL FISHERIES**

### **11.7.1 Analytical Assessment Techniques**

The potential environmental effects were assessed in consideration of recent regional fisheries statistics and information provided by DFO through correspondence and data requests. The information provided was used to determine existing fishing activities and conditions within the LAA and the subsequent potential interactions between commercial fishing activities and the Project.

### **11.7.2 Change in Fishing Activities**

#### **11.7.2.1 Project-Environmental Effects Pathways**

##### **Construction**

The CRA fisheries VC could be adversely affected by a Project-related change in fishing activities through the following pathways associated with Project construction.

Marine-based Project construction activities (i.e., landfall construction, cable installation, and marine transportation) and construction-related marine emissions and wastes (e.g., vessel discharges to the marine environment) have potential to affect the Marine Environment VC through a change in marine populations (Section 7.0). A change in marine populations for species of importance to CRA fisheries could, in turn, reduce the availability of CRA fishery resources (e.g., through effects on their abundance, distribution, and/or catchability), thereby causing a change in catch rates or landings.

Landfall construction, cable installation, and marine transportation during Project construction have potential to disrupt fishing activities through the temporary presence of navigational hazards and interference with access to fishing grounds. Marine-based Project construction activities (including landfall

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

### Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

construction in the intertidal zone) will require the marine PDA to be kept clear of fishing vessels and gear for the duration of these activities at any given point along the marine portions of the PDA. Access to customary CRA fishing grounds along the cable route may therefore be temporarily restricted while Project construction activities are underway.

Establishment of a temporary PEZ around cable installation activities has potential to disrupt fishing activities by restricting access to customary fishing areas. According to the 2017 annual edition of Notices to Mariners issued by the Canadian Coast Guard (DFO 2017c), “[v]essels shall keep at least one nautical mile from vessels engaged in laying or repairing submarine cables. Fishing gear and nets shall be kept at the same distance. Fishing vessels shall be allowed up to twenty-four hours in order to enable them to obey this notice.”

If any fixed fishing gear is left in place in or near the marine PDA, there is a risk of it becoming entangled as a result of potential interaction with Project vessels or equipment, or the cable itself, during cable installation activities.

With respect to employment and expenditure, while a temporary PEZ (discussed above) may adversely affect CRA fisheries during construction activities, the CRA Fisheries VC could be positively affected by a Project-related change in fishing activities during construction. There may be opportunities for local fishers to be hired to be directly involved with cable installation activities and associated marine transportation (e.g., supply and operate support vessels for the project).

### Operation

The CRA fisheries VC could be adversely affected by a Project-related change in fishing activities through the following pathways associated with Project operation.

Marine-based Project operation activities (i.e., marine transportation, and infrastructure inspection, maintenance, and repair) and operational marine emissions and wastes (e.g., emission of EMF and vessel discharges to the marine environment) have potential to affect the marine environment VC through a change in marine populations (Section 7.0). A change in marine populations for species of importance to CRA fisheries could, in turn, reduce the availability of CRA fishery resources (e.g., through effects on their abundance, distribution, and/or catchability), thereby causing a change in catch rates or landings for CRA fisheries.

Infrastructure inspection, maintenance, and repair, and associated marine transportation during Project operation, have potential to disrupt fishing activities through the temporary presence of navigational hazards and interference with access to fishing grounds. Some infrequent submarine cable repair activities will require the marine PDA to be kept clear of fishing vessels and gear for the duration of these activities at any given point along the marine portions of the PDA. Access to customary CRA fishing grounds along the cable route may therefore be temporarily restricted while these activities are underway. The 2017 annual edition of Notices to Mariners (DFO 2017c) states that vessels, fishing gear, and nets must maintain a distance of at least one nautical mile from vessels engaged in repairing submarine cables.



## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

### Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

There is a risk of fixed fishing gear becoming entangled as a result of potential interaction with Project vessels or equipment, or the cable itself, during Project infrastructure inspection, maintenance, and repair activities.

The presence of the cable on the seabed during Project operation may also increase the risk of entanglement or damage for a variety of fishing gear types, including mobile bottom-contact fishing gear. Fishers may therefore avoid segments of the cable that occur in their traditional fishing grounds due to a perceived risk of gear loss or damage or causing a cable fault.

With respect to employment and expenditure, the CRA fisheries VC could be positively affected by a Project-related change in fishing activities during operation. There may be opportunities for local fishers to be hired to be directly involved with inspection, maintenance, and repair activities and associated marine transportation (e.g., providing and operating a support vessel).

### Decommissioning

If the existing submarine cables are abandoned in place during decommissioning of the Project, no further physical interaction with the marine environment is anticipated other than their continual presence. The presence of surface-laid cable following abandonment of the existing cables may positively affect the quality of benthic fish habitat along portions of Grand Manan Channel where burial may not be feasible (if applicable) and along the entire Head Harbour Passage PDA (since burial is not proposed in the Passage). The effect on substrate quality may be neutral in areas where the cable is laid over top of areas already containing a large amount of hard substrate. However, in some cases, the surface-laid cable may introduce new or additional hard multi-dimensional substrate that is valuable for colonization by epibenthic organisms, thereby enhancing habitat quality and causing a beneficial environmental effect. A positive change in marine populations for species of importance to CRA fisheries could, in turn, increase the availability of CRA fishery resources (e.g., through effects on their abundance, distribution, and/or catchability), thereby causing a beneficial change in catch rates or landings.

Conversely, the presence of surface-laid cable following abandonment of the existing cables may increase the risk of entanglement or damage for a variety of fishing gear types, including mobile bottom-contact fishing gear, thereby adversely affecting CRA fisheries. Fishers may continue to avoid segments of the decommissioned cable that occur in their traditional fishing grounds due to a perceived risk of gear loss or damage.

If the existing submarine cables are removed, potential environmental effects pathways for decommissioning the existing cables are generally anticipated to be similar to the environmental effects pathways identified above for the construction phase. Much like marine-based Project construction activities (i.e., landfall construction, cable installation, and marine transportation) and construction-related marine emissions and wastes (e.g., vessel discharges to the marine environment), excavation of the existing submarine cables during decommissioning (if applicable), and associated marine transportation and emissions and wastes, has potential to affect the Marine Environment VC through a change in marine populations (Section 7.0). A change in marine populations for species of importance to CRA fisheries could in turn reduce the availability of CRA fishery resources (e.g., through effects on their abundance, distribution, and/or catchability), thereby causing a change in catch rates or landings. Also

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

like marine-based construction activities, marine transportation associated with removal of the existing submarine cables has potential to disrupt fishing activities through the temporary presence of navigational hazards and interference with access to fishing grounds.

Another potential environmental effect pathway that may be associated with removal of the existing cables during decommissioning, but is not applicable for the construction phase, is the removal of hard multi-dimensional substrate (i.e., surface-laid cable). This could adversely affect habitat quality for CRA fisheries resources in areas where hard substrate is scarce, and has potential to cause injury or mortality to any epibenthic organisms that have colonized the existing cables (if applicable). The potential resultant change in marine populations for species of importance to CRA fisheries could, in turn, reduce the availability of CRA fishery resources (e.g., through effects on their abundance, distribution, and/or catchability), thereby causing a negative change in catch rates or landings.

With respect to employment and expenditure, the CRA fisheries VC could be positively affected by a Project-related change in fishing activities during decommissioning. There may be opportunities for local fishers to be hired to be directly involved with decommissioning of the existing submarine cables and associated marine transportation (e.g., providing and operating support vessels).

### 11.7.2.2 Mitigation

Mitigation measures to reduce the potential environmental effect of a change in fishing activities are described below, with a focus on commercial and Aboriginal fisheries. Potential environmental effects on recreational fishing activities will generally be reduced or avoided because of limited recreational fishing activity predicted to occur within the marine PDA, and because the mitigation measures proposed for commercial and Aboriginal fisheries will also generally be protective of recreational fisheries.

Implementation of the mitigation measures identified for the marine environment VC (Section 7.0) will further mitigate the effects of the Project on the CRA fisheries VC by reducing the potential change in marine populations that could affect populations of marine CRA fishery resources.

#### Construction

- For safety purposes, a temporary PEZ with a 1-NM radius will be established around Project vessels engaged in laying submarine cables. Fishing will be temporarily excluded from this active Project working area and cannot resume until Project vessels/equipment have left the PEZ. This measure will be enforced to protect towed cabling gear and Project vessels, as well as fishing vessels and fishing gear, from collision and entanglement.
- Liaison and communications will continue with local fishing associations and commercial and Aboriginal fishery licensees to keep fishers informed of planned Project activities, the Project schedule, and potential Project-fishing interactions. The associations representing potentially affected fisheries (in particular the Fundy North Fishermens' Association) will be directly contacted and notified of the timing of planned route clearance and cable installation before these Project activities begin. Initial notification of scheduled Project activities will be given at least one month in advance so that the fishing associations have adequate time to contact their membership and confirm that all fixed fishing gear within one nautical mile of the PDA can be retrieved and/or relocated for the brief period (i.e., in the order of one to three days) that Project vessels are operating in an area. Follow-up

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

### Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

reminders will be communicated to the fishing associations as the Project work start-date approaches. Other communications outreach to CRA fishers will include issuance of Notices to Mariners and/or Shipping and communication with individual fish harvesters if necessary for small-scale fisheries.

- To the extent feasible, efforts will be made to schedule marine-based construction activities to avoid overlap with commercial fishing seasons in the LAA by attempting to complete these Project activities within the commercial fishing off-seasons.
- If construction activities must be scheduled during commercial fishing seasons, liaison and communication will continue to manage and reduce conflicts with commercial fishers in the LAA.
- The Canadian Coast Guard will be informed of submarine cable associated work and Notices to Mariners and/or Shipping may be issued to alert vessel traffic of any changes within the region such as exclusion zones around Project vessels to allow for safe navigation of vessel traffic.
- Activities with potential to generate high levels of noise and/or vibration during landfall construction (e.g., HDD operations) will be conducted only during daylight hours to avoid disrupting the nighttime herring fishery.
- Once HDD is complete and capped, the end will be marked to reduce the risk of entanglement with fishing gear.

#### Operation

- The cable will be buried to a depth of approximately 0.6 m below the seafloor on a “best efforts” basis in the Grand Manan Channel and will be protected by double helical armour along the entire marine PDA. These measures will help protect the cable against damage from external sources, such as anchor penetration or interaction with fishing gear.
- In accordance with the 2017 annual edition of Notices to Mariners issued by the Canadian Coast Guard (DFO 2017c), “[v]essels who can prove that they have sacrificed an anchor, a net or other fishing gear, in order to avoid injury to a submarine cable, may receive compensation from the owner of the cable.”
- The Canadian Coast Guard will be informed of submarine cable associated work and a Notices to Mariners and/or Shipping may be issued to alert vessel traffic within the region.
- The final as-built cable route will be included on official navigational charts and in Notices to Mariners.

#### Decommissioning

- The mitigation measures outlined above that address potential Project interactions with anchors and fishing gear during the construction and operation phases of the Project are also applicable with respect to the decommissioning phase of the cable.

### **11.7.2.3 Characterization of Project Residual Environmental Effects**

#### **All Phases**

All phases of the Project have potential to result in a residual adverse change in fishing activities affecting CRA fisheries. The predicted magnitude of the residual environmental effect is moderate in consideration of the intensity of commercial fishing activity along the marine PDA (refer to Figures 11.2 and 11.3). However, given the relatively small size of the marine PDA, the limited predicted environmental effects of the Project on the marine environment, and the low magnitude of the predicted change in marine populations (Section 7.0), construction, operation, and decommissioning of the Project are not anticipated to measurably affect the abundance, distribution, and/or catchability of species that are part of or support CRA fisheries. The residual change in fishing activities is generally expected to be relatively temporary and localized (except for a potential residual positive environmental effect associated with leaving the cable in place, which is predicted to be localized and permanent).

Although fishing access will be temporarily excluded within the PEZ during construction, and may also be excluded on an as-needed basis during operation (i.e., for potential repairs) and if the existing submarine cables are removed during decommissioning, the amount of time that any given area will be subject to fishing restrictions is expected to be minimal (i.e., in the order of one to three days), after which it would be expected that the cable laying vessel would have moved along the route to deploy other parts of the cables. A temporary PEZ will be in place at some location along the marine cable routes during the entire period of laying the marine cable; however, as the cable laying vessel is mobile and progressively laying cable along the routes, the PEZ will be transient such that a specific location would only be restricted on a temporary basis until the vessel moves along. Depending on its position along the cable route at any given time, the presence of a temporary PEZ may result in a very slight increase in vessel transit times to reach alternative fishing grounds or by having to find alternate routes to reach their destination. However, alternative fishing locations are generally anticipated to be available nearby as the PEZ will be relatively small and will occupy a negligible proportion of the harvestable grounds in the LAA. With good communication (including liaison with local fishing associations and commercial and Aboriginal fishery licensees and issuance of Notices to Mariners and/or Shipping), it is expected that fishers will be able to set their gear in anticipation of cable installation activities to reduce disruption from potentially having to relocate gear. Additional steaming time to go around a 1 NM radius PEZ in order to reach the vessel's destination is expected to be minimal (i.e., for a PEZ having a radius of 1 NM, approximately 9.5 minutes more steaming time for a vessel travelling at 20 knots or 37 km/h).

Fishing can resume in affected areas as soon as it is safe to do so, as no permanent Project-related exclusion zones will be established anywhere along the marine PDA. However, fishers may voluntarily restrict certain activities in the immediate vicinity of the marine PDA due to the presence of the active cables (during operation) or the decommissioned cables (if the existing cables are abandoned in place), in recognition of the intrusive nature of scallop dredging and other mobile bottom-contact fishing activities and the associated risk of gear loss/damage or causing a cable fault. Fishers have requested that the new cable be placed near the existing cable, as they currently know where that area is and do not currently set gear in the that area. Given the relatively small area to be occupied by the marine PDA relative to the remainder of the fishing areas, and the planned inclusion of the final as-built cable route on

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

### Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

official navigational charts, the presence of the new or abandoned cable is not anticipated to substantially affect access to important fishing areas. Opportunities for additional mitigation may be considered as necessary.

Seasonal aspects may alter the residual environmental effect on CRA fisheries during construction and potentially decommissioning (if the existing cables are removed). Scheduling of Project activities will be coordinated through consultation with local fish harvesters and other stakeholders, and best efforts will be made to schedule activities to reduce interference with fisheries and other activities (although given the overlap in the fishing seasons, complete avoidance of construction or decommissioning activity during a commercial fishing season is unlikely to be achievable). Construction will be scheduled to avoid, when feasible, commercial fishing seasons within the LAA. However, in the event of delays or disruptions to the Project schedule, construction may interact with commercial fishing activities.

Although the marine environment (including fish and habitat) has been previously disturbed due to commercial fishing in the area, the ecological and socioeconomic context for the CRA fisheries VC is that CRA fisheries are relatively undisturbed by other projects and activities in the LAA.

All phases of the Project also have potential to result in a residual positive change in fishing activities affecting CRA fisheries. The potential employment of local fishers during construction, inspection and maintenance in the course of cable operation (e.g., if cable retrieval for cable repairs, and subsequent reburial/re-installation, is required), and decommissioning (e.g., if the existing cables are removed) could contribute to: the generation of socioeconomic benefits for fishers and the local community, the incorporation of local fishery-related knowledge into the Project, and mitigation of potential conflicts with fishing vessels and gear.

### Construction

Scheduling of Project activities will be coordinated through consultation with local fish harvesters and other stakeholders and best efforts will be made to schedule activities to reduce interference with fisheries and other activities. Construction will be scheduled to avoid, when feasible, commercial fishing seasons within the LAA, although complete avoidance of these seasons is unlikely given their temporal overlap. However, in the event of delays or disruptions to the Project schedule, construction may interact with commercial fishing activities.

Potential interactions are anticipated to be short in duration and generally limited to the temporary PEZ, which will occupy a radius of one nautical mile around vessels engaged in cable installation activities and will be contained within the LAA. However, other potential interactions are anticipated to be limited to the marine PDA (e.g., risk of gear loss or damage).

The frequency of the potential residual adverse change in fishing activities is anticipated to range from irregular (for increased risk of gear loss or damage) to continuous (for ongoing loss of access to or availability of fishing grounds due to establishment of a PEZ and potential interactions with marine transportation) during the construction period (i.e., short-term in duration). Based on existing conditions and past evidence, this environmental effect is anticipated to be reversible.

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

### Operation

Routine infrastructure inspection, maintenance, and repair activities for the submarine cables will be scheduled, when feasible, during commercial fishing off-seasons. These routine inspections and maintenance are expected to be carried out few times during the life of the cable and most likely associated with an accident or cable malfunction. However, in the event that commercial fishing seasons cannot be completely avoided, interactions with commercial fishing seasons may be unavoidable. It is reasonable to assume that potential inspection and maintenance activities will be short in duration and confined to a small section of the marine PDA at any given time. In some cases, it may be necessary to establish a temporary PEZ around vessels engaged in cable repair. The temporary PEZ would occupy a radius of one nautical mile around vessels engaged in cable installation activities and would therefore be contained within the LAA.

There will be no permanent fishing exclusion zones or fishing gear restrictions within or around the marine PDA or LAA once construction is complete, and fishers will be able to continue to access these fishing grounds during the operation phase, as is currently the case for the existing transmission cables in the Bay of Fundy. Although no permanent Project-related exclusion zones will be established anywhere along the cable routes, fishers using certain bottom-contact mobile fishing gear (e.g., scallop draggers) may voluntarily avoid the marine PDA due to concerns regarding gear entanglement and associated cable or gear damage. The 2017 annual edition of Notices to Mariners (DFO 2017c) recommends that “[m]ariners should exercise every caution to avoid anchoring or trawling in cable areas, even though there may be no specific prohibition against doing so.” Fishers have requested that the new cable be placed near the existing cable, as they currently know where that area is and do not currently set gear in the that area.

The predicted frequency of the residual environmental effect during the operation phase ranges from a single event (for the temporary exclusion of fishers from the PEZ as well as the temporary increased risk of gear loss or damage in the PDA when Project vessels are engaged in repairing submarine cables on an as-needed basis) to continuous (for ongoing presence of the cable in the marine PDA and potential fisher avoidance of segments of the cable that occur in their traditional fishing grounds due to the perceived risk of gear loss or damage or causing a cable fault). The predicted duration of the residual environmental effect ranges from short-term (for potential cable retrieval for cable repairs, and subsequent reburial/re-installation, if required) to long-term (for presence of cable during operation). Based on existing conditions and past evidence, this environmental effect is anticipated to be reversible.

Fishers will be advised to report any suspected snagging/entanglement incidents immediately and leave their gear in place or cut their gear to prevent breakage of the cable. In accordance with the 2017 annual edition of Notices to Mariners (DFO 2017c), “[v]essels who can prove that they have sacrificed an anchor, a net or other fishing gear, in order to avoid injury to a submarine cable, may receive compensation from the owner of the cable.”

### Decommissioning

If the existing submarine cables are abandoned in place during decommissioning of the Project, the predicted nature of the residual change in fishing activities affecting CRA fisheries ranges from positive

## **ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

(for potential improvements in substrate quality associated with unburied segments of submarine cable, which may increase the availability of CRA fishery resources), to neutral (for buried cable that does not improve substrate quality and does not result in fisher avoidance of traditional fishing grounds), to adverse (for buried or unburied cable that results in fisher avoidance of traditional fishing grounds due to perceived risk of gear loss or damage, or of causing a cable fault). The geographic extent of the residual environmental effect would be limited to the marine PDA, the frequency would be continuous (for ongoing presence of the cable in the marine PDA and potential fisher avoidance of segments of the cable that occur in their normal fishing grounds due to the perceived risk of gear loss or damage or causing a cable fault), and the duration would be permanent.

If the existing cables are removed, the residual environmental effect is predicted to be adverse in nature and the geographic extent may extend to the PEZ, but short-term in duration (i.e., during the period that active decommissioning (i.e., cable removal activities) are taking place). Similar to the residual change in fishing activities during the construction phase, the frequency of the potential residual adverse change in fishing activities is anticipated to range from irregular (for increased risk of gear loss or damage) to continuous (for ongoing loss of access to or availability of fishing grounds due to establishment of a PEZ and potential interactions with marine transportation) during the short-term period that active decommissioning (i.e., cable removal activities) are taking place.

Based on existing conditions and past evidence, the residual environmental effect is anticipated to be irreversible if the existing cables are left in place, or reversible if the existing cables are removed.

### **11.8 SUMMARY OF PROJECT RESIDUAL ENVIRONMENTAL EFFECTS**

Table 11.10 summarizes the environmental effects assessment and prediction of residual environmental effects resulting from those interactions between the Project and CRA fisheries rated as having a potential interaction in Table 11.9.

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

**Table 11.10 Summary of Project Residual Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries**

Residual Environmental Effect	Residual Environmental Effects Characterization								
	Project Phase	Direction	Magnitude	Geographic Extent	Frequency	Duration	Timing	Reversibility	Ecological and Socioeconomic Context
Change in fishing activities	C	P-A	M	PDA-LAA	MI-C	ST	A	R	U
Change in fishing activities	O	P-A	M	PDA-LAA	S-C	ST-LT	N/A	R	U
Change in fishing activities	D	P-A	M	PDA-LAA	MI-C	ST-P	N/A-A	R-I	U
<b>KEY</b> See Table 11.2 for detailed definitions  <b>Project Phase</b> C: Construction O: Operation D: Decommissioning  <b>Direction:</b> P: Positive A: Adverse  <b>Magnitude:</b> N: Negligible L: Low M: Moderate H: High			<b>Geographic Extent:</b> PDA: Project Development Area LAA: Local Assessment Area PEZ: Project Exclusion Zone  <b>Duration:</b> ST: Short-term; MT: Medium-term LT: Long-term P: Permanent  N/A: Not applicable			<b>Frequency:</b> S: Single event MI: Multiple Irregular event MR: Multiple Regular event C: Continuous  <b>Timing:</b> A: Applicable N/A: Not applicable  <b>Reversibility:</b> R: Reversible I: Irreversible  <b>Ecological/Socioeconomic Context:</b> U: Undisturbed D: Disturbed			

The rationale for the rankings provided in Table 11.10 above is provided in detail by Project phase in Section 11.7.2.3 above.

## 11.9 DETERMINATION OF SIGNIFICANCE

In consideration of Project planning, design, and mitigation, the residual environmental effects of a change in fishing activities from Project activities or components during all phases of the Project are predicted to be not significant because the Project will not result in local CRA fishers being displaced or unable to use substantial portions of the areas currently fished for all or most of a fishing season, or a change in the availability of fisheries resources (e.g., fish mortality and/or dispersion of stocks) such that resources cannot continue to be used at current levels within the Bay of Fundy for more than one fishing season, or unmitigated damage to fishing gear. This conclusion has been determined with a high level of



**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT: FUNDY ISLES SUBMARINE CABLES  
REPLACEMENT PROJECT, NEW BRUNSWICK**

Assessment of Environmental Effects on Commercial, Recreational, and Aboriginal Fisheries

confidence based on an understanding of the environmental effects of the Project (and submarine cable projects in general), as well as the effectiveness of standard mitigation measures identified in Section 11.7.2.