APPENDIX B

Traditional Use Study

Traditional Use Study

Mi'kmaq and Wolastoqiyik Fisheries

Scotian Basin Exploration Drilling Project

Version 2

Submitted to:

Stantec Consulting Ltd

Submitted by:

Membertou Geomatics Solutions (MGS) &

Unama'ki Institute of Natural Resources (UINR)

April 22, 2016

Project Team

Jason Googoo, Project Manager

Dave Moore, Author and Research

Craig Hodder, Author and GIS Technician

Laura Wensink, Editor and GIS Technician

Shelley Denny, Editor

Acknowledgements

We would like to thank the First Nation commercial fishery departments in the participating Mi'kmaq and Wolastoqiyik bands within Nova Scotia and New Brunswick for providing fishery and contact information; to the captains, commercial and food, social and ceremonial harvesters for their time and participation in this project. We would also like to think Tyson Paul for his time and effort to conduct interviews.

Prepared by:

_____

Craig Hodder, Author

Reviewed by:

_____

Jason Googoo, Manager

Table of Contents

Table of Abbreviations

AANDC	Aboriginal Affairs and Northern Development Canada
AFS	Aboriginal Fisheries Strategy
AICFI	Atlantic Integrated Commercial Fisheries Initiative
ATP	Allocation Transfer Program
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ELs	Exploration Licenses
FSC	Food, Social, Ceremonial
LAA	Local Assessment Area
MRI	Marshall Response Initiative
NCNS	Native Council of Nova Scotia
NAFO	Northwest Atlantic Fisheries Organization
PA	Project Area
RAA	Regional Assessment Area
SARA	Species at Risk Act

List of Figures

Executive Summary

The Traditional Use Study will be undertaken to determine the extent of Mi'kmaq Traditional Use Activities within the Project Site and Study Area of the Scotian Basin Exploration Drilling Project with a special focus on the extent of current Mi'kmaq fisheries activities, both commercial and food, social and ceremonial (FSC). The proposed Project Area is located approximately 250 km offshore from Halifax in a geographical offshore area known as the Southwest Scotian Slope and a geological region known as the Scotian Basin. Water depths in the Project Area range from 1000 to 3000 m, this is known as the Project Site. The Regional Assessment Area extends from the international maritime boundary between Canada and the United States to the Laurentian Channel and outward to the Exclusive Econimic Zone, at the 200 nautical mile limit.

The purpose of the TUS will be to determine the Mi'kmaq fisheries and traditional use with respect to the area being considered for development. This information is very important to the Mi'kmaq role within the project, as the information that is gathered and documented will assist the company in determining potential impact of their project on the Mi'kmaq fisheries and traditional use. The information from this study will be incorporated into the development of an effects assessment to assist in the establishment of mitigative measures and determination of the significance of any potential residual effects to fisheries during the construction, operation, and decommissioning of the Project.

Fishers and fishery directors were interviewed regarding commercial communal and the traditional fisheries within the Project and Regional Assessment Area. Mi'kmaq and Wolastoqiyik bands from Nova Scotia and New Brunswick participated in this version of the report including Acadia, Eskasoni, Millbrook, Pictou Landing, Glooscap, Membertou, Potlotek, Paq'tnkek Mi'kmaq Nation, Wagmatcook, We'koqma'q, Fort Folly First Nation, St. Mary's, Woodstock First Nation, and the Native Council of Nova Scotia.

There are no areas currently identified within the Project Area for Food, Social, Ceremonial (FSC) harvest, however, this does not imply the area is not utilized for FSC fisheries, of significance, or that it may not be accessed for future FSC needs. The importance of this area is in the means by which it connects other ecosystems, such as the Bay of Fundy, the Scotian Shelf, the Gulf of St. Lawrence, and the Bras d'Or Lakes, for example, for which culturally significant species such as salmon, eels, mackerel, and striped bass migrate through. Within the Regional Assessment Area, lobster, scallops, and clams, were identified as being fished for food, social, and ceremonial purposes.

Commercial fishery harvesting by Mi'kmaq and Wolastoqiyik occurs within the boundaries of the Regional Assessment Area for 31 species: albacore tuna, bigeye tuna, bluefin tuna, clam, cod, cusk, eel, flounder, gaspereau, green crab, haddock, hagfish, halibut, herring, Jonah crab, lobster, mackerel, mahi-

mahi, marine worm, monkfish, pollock, quahaug, redfish, scallop, sea urchin, shark, shrimp, silver hake, snow crab, swordfish and white hake. Larger fisheries are in tuna, snow crab, haddock, halibut, cod and lobster.

Within the Project Area commercial fishing occurs for 11 of the aforementioned species including tuna species, halibut, swordfish, silver hake, cod, haddock, snow crab, mahi-mahi, cusk, shark and shrimp.

The inner shelf is an important fishing area for groundfish (cod, redfish, ect) (Appendix B), herring (Appendix C), snow crab, shrimp and lobster (Appendix D). The shelf area is important fishing grounds for groundfish, in particular cod and redfish and hagfish (Appendix B). The slope/channel areas are an important fishing area for redfish, cod, flounder and groundfish in general, and also for shrimp (Appendix D).

Some of the concerns and/or recommendations expressed by fishers interviewed were primarily concerns over the effects on habitats and species because of any sort of development in the area, as well as any ecological impacts especially if there is a spill.

The information gathered and processed is highly dependent on the data provided by the informants during the interview process. This study should not be taken as an absolute measure of Mi'kmaq ecological knowledge and use of the land and sea.

1.0 Introduction

1.1 Project Description

BP is proposing to conduct an exploratory drilling program approximately 250 kilometres off the coast of Nova Scotia, consisting of up to seven exploration wells within Exploration Licenses (ELs) 2431, 2432, 2433, and 2434, over a four year period from 2017 to 2022. Specific drilling locations will be determined using seismic data gathered as part of the 3D Wide Azimuth Seismic Survey conducted in summer 2014.

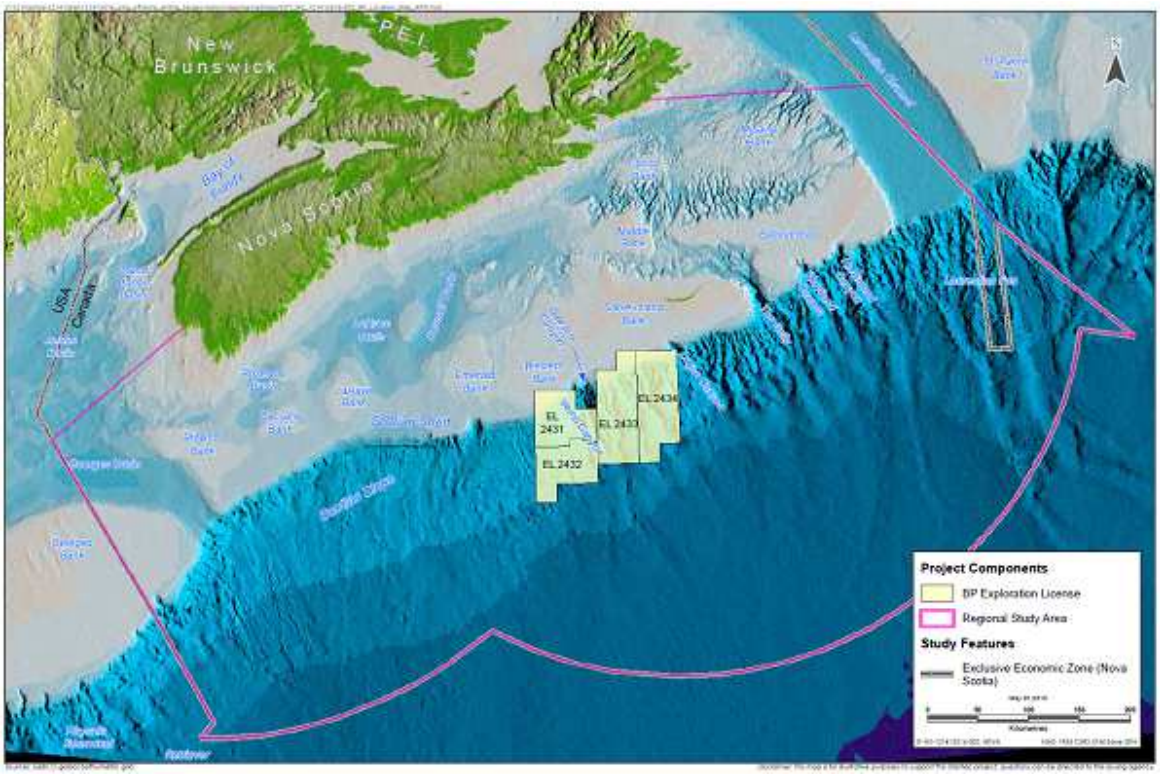

Figure 1: Scotian Basin Drilling Project Site and Regional Study Area as provided by Stantec Consulting Ltd.

The purpose of this study was to define the extent and timing of current Mi'kmaq and Wolastoqiyik (also referred to as Maliseet) fisheries in the study area based on existing data and through interviews with participating band fishery directors and/or managers, fishers and associated fisheries organizations. Communities from across Nova Scotia and New Brunswick were consulted. A contextual review of the project site and surrounding areas was also conducted within this study.

1.2 Project Boundaries

The spatial boundaries delineated for the environmental effects assessment for fish and fish habitat as part of the Scotia Basin Exploration Drilling Project Environmental Impact Statement were adopted for this study. The descriptions of each area were provided by Stantec Consulting Ltd. (2015).

Exploration Drilling Project Area (PA): The Project Area encompasses the immediate area in which Project activities and components may occur and includes the area within which direct physical disturbance to the marine benthic environment may occur. Future well locations have not currently been identified, but will occur within the Project Area. The Project Area includes ELs 2431, 2432, 2433, and 2434.

Local Assessment Area (LAA): The LAA is the maximum area within which environmental effects from routine Project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. It consists of the Project Area and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information including effects thresholds and predictive modelling, professional judgement. The LAA has also been defined to include PSV routes to and from the Project Area.

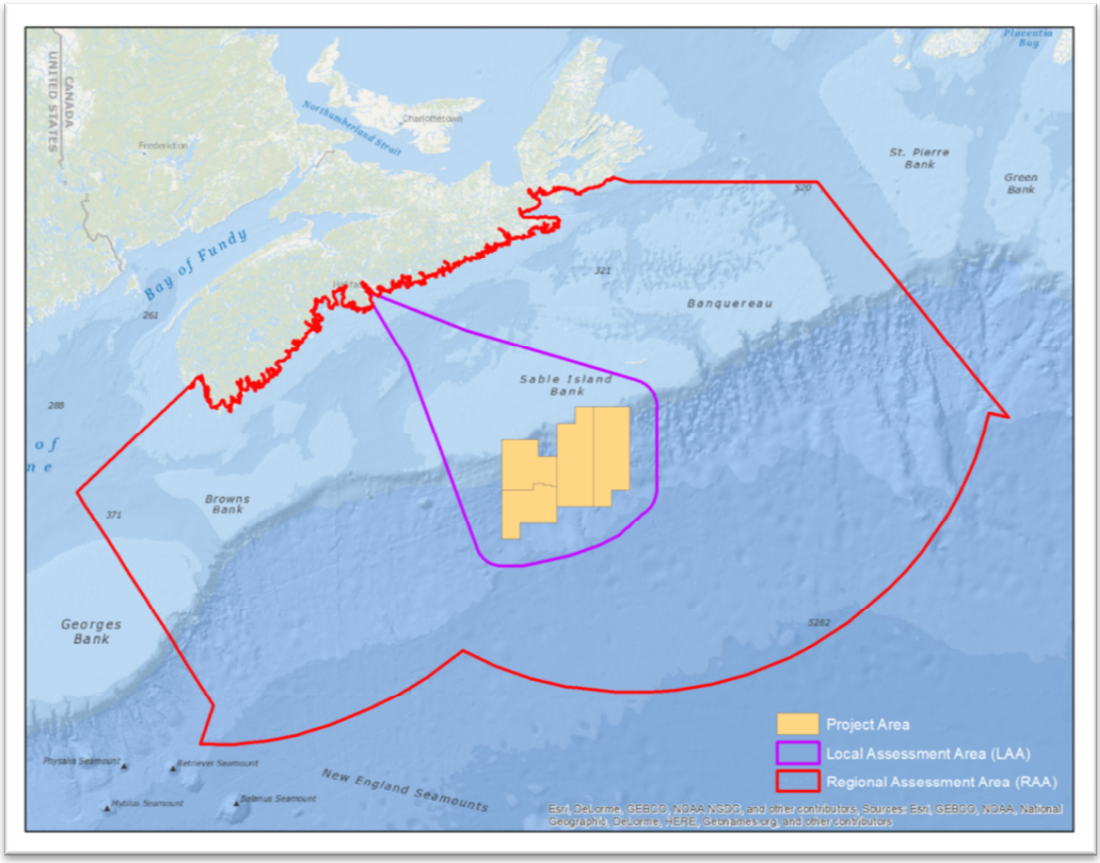

Figure 2: The location of the Project Area, Local Assessment Area, and Regional Assessment Area

Regional Assessment Area (RAA): The RAA is the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other past, present, and future (*i.e.*, certain or reasonably foreseeable) physical activities. The RAA is restricted to the 200 nautical mile limit of Canada's Exclusive Economic Zone, including offshore marine

waters of the Scotian Shelf and Slope within Canadian jurisdiction. The western extent of the RAA encompasses the Georges Bank Oil and Gas Moratorium Area and terminates at the international maritime boundary between Canada and the United States. The eastern extent of the RAA extends into the Laurentian Channel to the NAFO division 4S boundary and approaches the Nova Scotia coastline along the boundary of NAFO Unit Area 4VSb. The RAA extends along the Nova Scotia coastline from North Fourchu, Richmond County to Comeaus Hill, Yarmouth County.

Table 1. Commercial fishery management zones located within the PA, LAA and RAA spatial boundaries.

Management Zones	Zones in PA	Zones in LAA	Zones in RAA
Herring (mackerel and capelin)	HFA 20 (4VWX)	HFA 20 (4VWX)	HFA 20 (4VWX)
Lobster	LFA 41	LFA 33, 41	LFA 31B, 32, 33, 34, 40, 41
NAFO (groundfish, large pelagics)	4W, 4X	4W, 4X	4VS, 4W, 4X, 5Y, 5ZE
Scallop	SFA 25	SFA 25	SFA 25, SFA 26, SFA27, SFA 29
Shrimp	SFA 15, SFA 16	SFA 15, SFA 16	SFA 14, SFA 15, SFA 16
Snow Crab	FA24	FA24	FA23, FA24
Squid	20	20	20

1.3 Aboriginal Worldview

The Mi'kmaq are part of the Algonquin-speaking confederacy known as Wabanaki which includes four other Nations - Wolastoqiyik, Passamaquoddy, Penobscot and Abenaki. Mi'kma'ki, or land of the Mi'kmaq, encompasses the five Atlantic Provinces and northern Maine.

Mi'kma'ki was held in communal ownership. Land, water, and its resources are considered gifts from the Creator. Mi'kmaq are the caretakers and strived to live in harmony within Mi'kma'ki. This belief remains strong in the culture today.

The Mi'kmaq view the world and all that was in it as having spirit. All life is equal and treated with respect. By developing an intimate understanding of the relationships between the living and non-living, each plant, animal, constellation, full moon or red sky told a story to guide the Mi'kmaq so they could survive. These beliefs affect the manner in which the natural world is treated for sustenance and survival. Animals and plants are not taken if they are not needed. All spirits are acknowledged and respected as relations and are offered tobacco, prayer or ceremony (or combination of) when taken. No part of an animal is wasted. All parts that could not be used are returned to the Creator in ceremony.

All life serves purpose and cannot exist in isolation. The Mi'kmaq worldview is interconnected, interdependent and must exist in its entirety. Animals and plants are viewed within the realm of their habitat. The preservation of biodiversity and habitats maintains balance and harmony on Mother Earth.

As with most nations with Algonquin ties, Wolastoqiyik had similar worldviews as the Mi'kmaq with deep connections to the land and waters. (*Wolastoqiyik, 2016*) Algonquin peoples had a shared belief in *Midewiwin* or *Medewin* with Gluskabe a central figure in related spiritual stories (*Penobscot, 2016*).

2.0 Methods

2.1 Literature Review

Several sources were used to complete this report. Particularly,

- DFO Issued licenses for communal commercial, imposed food, social and ceremonial and community negotiated food, social and ceremonial agreements, from community-based interviews with commercial fishing managers;
- Mi'kmaq ecological knowledge
- Archival accounts of Mi'kmaq history and use
- Verification of fishing activities through interviews with fishers[1]

Special attention was given to literature that was specific to, and adjacent to, the area. Specifically, the State of the Scotian Shelf Report (2011), Natural History of Nova Scotia Volume I & II (Region 900 Offshore/Continental Shelf), An Ocean of Diversity The Seabeds of the Canadian Scotian Shelf and Bay of Fundy (WWF 2009), and the Canada – Nova Scotia Offshore Petroleum Board.

2.2 Interviews

Prior to the commencement of the project, several Mi'kmaq and Wolastoqiyik communities in Nova Scotia and New Brunswick, as well as the Native Council of Nova Scotia, were solicited for their participation because of known existing fishing activity. These communities included Acadia First Nation, Glooscap First Nation, Membertou First Nation, Millbrook First Nation, Sipekne'katik (Indian Brook) First Nation, Woodstock First Nation, St. Mary's First Nation, and Fort Folly First Nation. The scope of the communities was then expanded to include Eskasoni First Nation, Potlotek First Nation, Wagmatcook First Nation, Waycobah First Nation, Paq'tnkek Mi'kmaq Nation, Pictou Landing First Nation, Annapolis Valley First Nation and Bear River First Nation.

This version of the report only included the following communities: Acadia, Eskasoni, Millbrook, Pictou Landing, Glooscap, Membertou, Potlotek, Paq'tnkek Mi'kmaq Nation, Wagmatcook, We'koqma'q, Fort Folly First Nation, St. Mary's, Woodstock First Nation, and the Native Council of Nova Scotia.

[1] Fishers refer to those individuals who are communal commercial and/or traditional fishers.

Once the band agreed to participate (either agreement by fishery departments within each band or via meetings/presentations to Chief and Councils), interviews with community fishery departments were arranged. In most communities, the same individual coordinates both the commercial communal and the traditional fisheries. From these initial interviews, a list of commercial communal licenses and information regarding the traditional fishery were obtained, with fishing areas specified, and other related fishing information. Potential contacts for further interviews were obtained from the community to verify and narrow areas of Mi'kmaq and Wolastoqiyik fishing activities within defined fishing areas. This referral-type methodology improves quality of, and confidence in, information provided in the study.

Commercial communal fishing licenses acquired by participating bands were provided by the bands and NCNS. A list of species traditionally fished, as part of the AFS agreement, community harvest guidelines, or imposed licenses, were provided. Fishers were selected based on the recommendation of the band fishery manager. Recommendations were based on the diversity of species fished and experience in the assessment area.

Fishers were then provided with a map highlighting project specific information, as well as details providing the informants location references, such as lobster fishing areas, crab fishing areas, NAFO (Northwest Atlantic Fisheries Organization) fishing zones, and bathymetry data. The fishers were then asked a series of questions related to their fishing activities as well as any other information they may have pertaining to fish in the area (i.e., spawning or nursery areas, migratory routes, etc.). Finally, the fishers were provided an opportunity to relate any special concerns or comments they may have in relation to either the Project/Project Site or fish species in the area. Initial interviews for this project took place through October 2015 to December 2015. Further interviews were undertaken with additional communities through February and March 2016.

2.3 Limitations

Gathering of information regarding commercial and traditional fishing, including Traditional Ecological Knowledge is highly dependent on the information that is provided to the team. Because not all traditional activity users are interviewed, there is always the possibility that some traditional use activities and areas may not have been identified by this study. The following communities were not available to participate in this version of the study: Annapolis Valley First Nation and Bear River First Nation. Sipekne'katik First Nation has declined participation with the report.

The views and concerns expressed in this report do not represent those of the entire Mi'kmaq or Wolastoqiyik nations. Be aware that participation by MGS and UINR in the project and the assessment of the area should not be construed as ***CONSULTATION*** or ***APPROVAL*** of the proposed project. Any new areas being proposed by the Crown(s) to have expanded legal protection would require separate consultation under the Mi'kmaq-Nova Scotia-Canada Consultation process.

Information obtained from DFO issued licenses for food, social and ceremonial purposes, through negotiated agreements such as Aboriginal Fishery Strategy, community harvest agreements, or imposed licenses for FSC, should not be considered an exhaustive list of species fished and may not define fishing activities for all aquatic species harvested for food, social and ceremonial needs.

3.0 Historical Review of Assessment Area

3.1 The People of the Land

Northeastern North America is home to many First Nations including the Mi'kmaq and Wolastoqiyik, Passamaquoddy, Penobscot and Abenaki.

3.1.1 Mi'kma'ki

The traditional lands of the Mi'kmaq was comprised of 7 Districts collectively known as Mi'kma'ki. The sources reviewed provided very general District Boundaries that have just enough detail to give an approximation of boundaries along the coast but not much detail for the interior limits (Paul, 2006, UINR, 2016 and Trigger 1978). Mi'kma'ki encompasses the five Atlantic Provinces and northern Maine (Fig 3).

Using the general boundaries provided by the sources, MGS interpreted the source maps and recreated detailed District boundaries of the 7 districts of Mi'kma'ki using significant watersheds as the defining features on the ground. The district boundaries may be adjusted after review by the Mi'kmaq and Wolastoqiyik communities. Until then, the 7 Districts of Mi'kma'ki are as follows:

Kespek (Last Land)	All the land and waters draining into the Gulf of St. Lawrence including the Miramichi River watershed and north to include the Gaspe' Peninsula and shore of the St Lawrence River.
Siknikt (Drainage Area)	All the lands and waters draining into the Gulf of St. Lawrence and Northumberland Strait from Escuminac Point, N. B. to and including the Wallace River watershed. All the lands and waters draining into the Minas Basin and Bay of Fundy from Five Islands, East River Watershed to Deep Cove on the east side of St. John Harbour.
Epekwitk (Lying in the Water) and aqq Piktuk (The Explosive Place)	This District combines the entire Island of Prince Edward Island with all the lands and waters draining into the Northumberland Strait and St. Georges Bay from the Mainland. The District

	includes the East River of Pictou watershed to and including the Tracadie River and Little Tracadie River watersheds.
Sipekni'katik (Wild Potato Area)	This District includes all lands and waters draining into the Northumberland Strait from Macfarlane Point, Wallace Harbour to and including the Middle River of Pictou watershed. Sipekni'katik also includes all the lands and waters draining into Cobequid Bay, Minas Basin and Bay of Fundy from Five Islands Carrs Brook and Economy River watersheds to and including North River and Salmon River, Avon River, Cornwallis River watersheds to MacNeily Brook near Margaretsville. In addition, Sipekni'katik includes all lands draining into St. Margarets Bay and Mahone Bay including the Ingram River watershed to and including eastern shore of the LaHave River.
Kespukwik (Last Flow, Land Ends)	This District includes all the lands and waters draining into the Bay of Fundy from approximately Margaretsville, the Gulf of Maine coast and the Atlantic to the western shore of the LaHave River. The LaHave River Watershed may have divided by east and west districts with the eastern watershed a portion of Sipekni'katik and the western watershed is a portion of Kespukwik. Champlain's early map of the LaHave River show two separate Mi'kmaq communities on either side of the River located near Upper Kingsburg and at Green Bay near Petite Riviere (LaHave Islands Marine Museum, 2016). This may indicate a community of each district sharing the LaHave River.
Aqq Ktaqmkuk (Land Across the Water) and Unama'kik (Land of Fog)	This District combines all of Cape Breton Island with the Southern Coast of Newfoundland.
Eskikewa'kik (Skin Dressers)	Eskikewa'kik includes all lands and waters draining into the Atlantic from St. Margarets Bay including Big Indian Lake, Chebucto (Halifax), Eastern Shore, Strait of Canso to Cape Blue

on St. Georges Bay. The District includes the entire Musquodoboit River watershed, a portion of the Shubenacadie River to and including the Stewiacke River watershed draining into Cobequid Bay. In addition, Eskikewa'kik includes the West St. Marys River watershed, East St. Marys River watershed, Country Harbour River watershed as well as the Salmon River and Milford Haven River watersheds draining into Chedabuctou Bay.

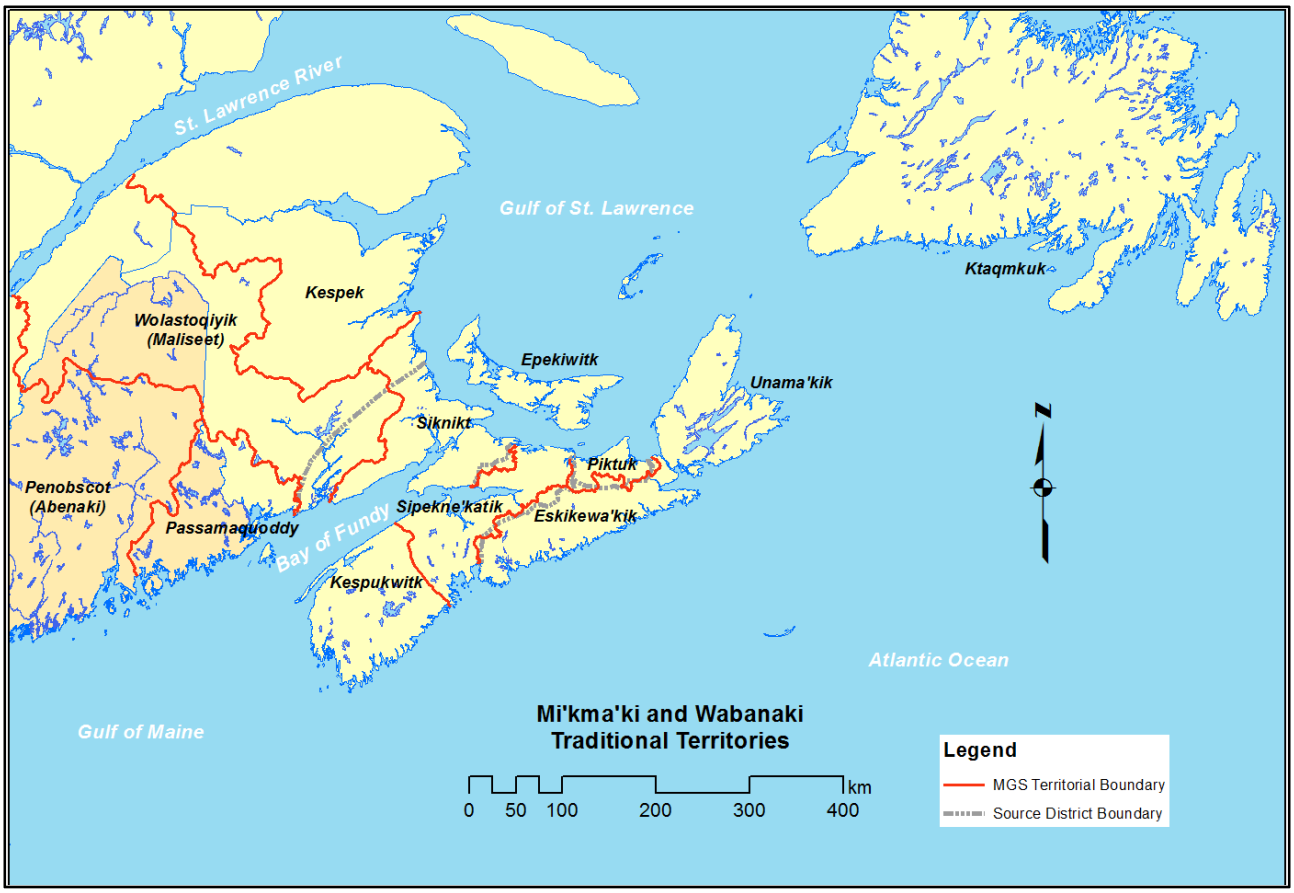

Figure 3: Mi'kma'ki and Wabanaki Traditional Territories (Paul, 2006, UINR, 2016 and Trigger 1978)

3.1.2 The Wolastoqiyik (Maliseet)

Among the sources reviewed the terms Wolastoqiyik and Maliseet are used interchangeably. The Wolastoqiyik have always had a bond with all the lands and waters draining the River Wolastoq (St. John River) watershed (Fig 3). (*Wolastoqiyik, 2016*) The Wolastoqiyik are the people of the Wolastoq

(Beautiful River). (Gagnon, 2016) The Wolastoq is known today as the St. John River and the Wolastoqiyik are also known today as the Maliseet. (*Wolastoqiyik, 2016*)

The early French referred to the Wolastoqiyik and the Passamaquoddy as *Etchemin,* and *Maliseet* was derived from the Mi'kmaq language referring to the differences in the Wolastoqiyik and Mi'kmaq languages. That difference is maintained today with Wolastoqiyik and the Passamaquoddy sharing a similar but distinct language from other Algonquin speaking peoples such as the Mi'kmaq. Wolastoqiyik and Maliseet are used interchangeably among the sources reviewed.

The sources show the entire St. John River watershed as the Wolastoqiyik Traditional Territory which covered an area of 400km from the Bay of Fundy northeast to the St. Lawrence River and approximately 300km at its widest in the upper St. John River. The vastness and richness of the watershed and the territory connection to the St. Lawrence River allowed for the Wolastoqiyik to develop and maintain a self-sufficient and separate Nation. (*Wolastoqiyik, 2016*) Wolastoqiyik Traditional Territory bordered the Mi'kmaq Traditional Territory to the east which was all the Mi'kmaq lands and waters draining into the Gulf of St. Lawrence, portion of the St. Lawrence River shore and a portion of the lands and waters draining into the Bay of Fundy. Wolastoqiyik Traditional Territory is bordered to the west by the Passamaquoddy Traditional Territory along the Bay of Fundy and Gulf of Maine coast and the Penobscot Traditional Territory

3.1.3 The Passamaquoddy

The Passamaquoddy Traditional Territory included all the lands and waters of the St. Croix River watershed, Machias River watershed and the Magaguadavic River watershed, draining into the Bay of Fundy and Gulf of Maine (Bassett, 2014). The territory is bordered on the northeast by the Wolastoqiyik Traditional Territory of all the lands and waters draining the St. John River Watershed. Passamaquoddy Traditional Territory is bordered on the west by the Penobscot Traditional Territory of the Penobscot River watershed and Union River watershed.

The Passamaquoddy name is traditionally pronounced *Peskotomuhkati* and is derived from *Peskotom,* translated as Pollock. The People of the Pollack, the Passamaquoddy share a distinct language with the Wolastoqiyik (Maliseet) that is distinct from other Algonquin linguistic linked languages of the region. Passamaquoddy communities were traditionally along the coast and were mainly a seafaring nation of fisherman and harvesters of fish and wildlife migrating to and from the coast within the rivers and valleys (Bassett, 2014).

Today there are 3 distinct and self-governing Passamaquoddy communities with 2 located in Maine at Pleasant Point and Indian Township and claim another community located at St. Andrews, New Brunswick (Bassett, 2014).

3.1.4 The Penobscot

The Penobscot name is derived from *Penawapskew* meaning "rocky part" or "descending ledges" referring to a portion of the Penobscot River. Sources refer to the Penobscot as Eastern Abenaki which is a dialect distinction and language of the Penobscot Nation (*Penobscot, 2016*).

The Penobscot traditionally moved seasonally between harvesting along the coast and hunting inland for large animals (*Penobscot, 2016*). The Penobscot Traditional Territory includes the watersheds of the Union River and the Penobscot River. Penobscot Traditional Territory borders the Passamaquoddy Traditional Territory to the east and Wolastoqiyik (Maliseet) Traditional Territory to the north and northeast. Penobscot Traditional Territory borders the Kennebec River watershed to the west and the Traditional Territory of the Kennebec who were a neighboring Eastern Abenaki Nation.

Today the Penobscot mainly reside on the Indian Island Reservation on the Penobscot River (*Penobscot, 2016*).

3.1.5 The Wabanaki Confederacy

The sources reviewed refer to Abenaki, Eastern Abenaki and Western Abenaki which are references to a group or groups of Algonquin peoples located within northeastern North America *(Abenaki, 2016).* The Eastern Abenaki included the Kennebec and Penobscot. Some sources also include the Passamaquoddy, Wolastoqiyik (Maliseet) and Mi'kmaq as Eastern Abenaki *(Abenaki, 2016).*

Wabanaki is derived from Abenaki "waban" (light) which referrers to the light of dawn and "aki" (land). The Wabanaki Confederacy was formed in the early to mid 1600's as an alliance and formalization of the sacred bond among the Algonquin Brotherhood (Prins, 2016). The Wabanaki Confederacy was formed in response to Iroquois aggression and New England settlers and included the Penobscot (Eastern Abenaki), Passamaquoddy, Wolastoqiyik (Maliseet) nations and later the Mi'kmaq Nation (*Penobscot, 2016*).

The Wabanaki Confederacy in its original form and intent lasted about 200 years until the mid 1800's when it faded but was not forgotten among the member nations (Prins, 2016). The Wabanaki Confederacy resurfaces today when a situation requires a unified voice of some of the original member nations as well as expanded list of member nations.

3.2 Early Peoples

Based on material evidence first found in New Mexico and more recently in Oregon, (Stastna, 2012) the earliest time known when people occupied North America is approximately 13,500 years ago. (Mann 2013) During that time, the ice sheet covering the entire province of Nova Scotia had receded to the approximate coastline of today along the Eastern Shore and approximately 20km offshore along the South Shore (Stea, 1992). During this time the earlier proposed land bridge or island chain between the present New England Coast and Nova Scotia had already been flooded some 1,500 years earlier by rising

sea levels (Davis et al, Vol. 1, 1996:60-61). The relative sea level on the outer Scotia Shelf at that time was approximately -80m lower than today's sea level (Davis et al, Vol. 1, 1996:60-61).

To put in perspective and ignoring the erosion loss and movement of sediment materials during submergence, at a -80m sea level, a portion of the Western Bank may have been exposed as an island of approximately 70m elevation. A large portion of the Sable Island Bank may have been exposed as an island of roughly 50m in elevation with a an additional 76m elevation for Sable Island (Stantec, Depth Data, 2014).

An archaeology source very briefly mentions the possibility of the landforms on the Grand Banks and the Scotia Shelf supporting vegetation, animals and people. Most underwater archaeology finds in Atlantic Canada are found in the -20 to -50m bottom depth range and are mostly stone tools dated 5000 to 7000 years ago and particularly ground slate "ulu" tools. The semi-circular blade is similar to the Inuit Ulu knives used for slaughtering sea mammals and may have been lost on offshore ice flows during a seasonal hunt and slaughter on the ice. (Keenlyside)

The Natural History of Nova Scotia lists 5 Archaeological time periods for the Province of Nova Scotia that are prior to and including European contact with the Mi'kmaq:

11,000-10,000 Years Before Present, Paleo-Indians
The earliest evidence of early peoples east of the State of Maine is found at Debert, Nova Scotia with evidence of an encampment on the site dated to be in use roughly 11,000 to 10,500 years before present (Canadian 2014). Local ice sheets remained centered at locations of Bras d'Or Lakes/Highlands of Cape Breton, Canso, Baie Verte and South Mountain adjacent the Annapolis Valley. There was a large ice sheet centered on the Eastern Mainland of province with ice flows into St. Georges Bay, Minas Basin and along the Eastern Shore (Stea 1992). The time of the Debert Site occupation is within the same period of the glacial re-advances of the Younger Dryas Period of 11,000 and 10,000 before present. Increasingly harsh conditions are thought to have caused the early peoples to abandon the region (Davis *et al*, Vol. 1, 310-311, 1996).

An inventory and study of archaeological site occurrences on the Atlantic Outer Continental Shelf off the U. S. A. east coast including Georges Bank and Gulf of Maine, set the archaeological sensitivity based on the Last Glacier Maximum (LGM) (TRC, 2012).

No Sensitivity: Areas that would have been subaqueous (submerged under water) at LGM and have no potential for terrestrial sites and set at -60m and deeper for the Gulf of Maine Study Area (TRC 2012).

Low Sensitivity: Areas that were subaerial (exposed to the atmosphere) between LGM and *Paleoindain Period* (12,500-10,000 years before present for this study) (TRC, 2012).

High Sensitivity: Areas that were subaerial beginning with the *Paleoindian Period* (12,500-10,years before present for this study) to the present and set at -60m and shallower (TRC, 2012).

The settlement models referenced in the study support *Paleoindian Period* peoples utilizing the subaerial exposed areas on the outer continental shelf depending on connections with the mainland coastline being available or possessing ability to navigate on open water (TRC, 2012).

10,000-5,000 Years Before Present, The Great Hiatus
The rising sea levels and submerging coastlines are thought to be responsible for the lack of physical evidence of early peoples for this time period. Any evidence of coastal settlements of that period would be lost to coastal erosion and submergence (Davis et al, Vol. 1, 310-311, 1996).

5,000-3,500 Years Before Present, The Archaic Period
A period characterised by physical evidence of stone tools some of which are found offshore and possibly lost during deep water fishing. There was an influence or peoples present in the southern part of the province dated at a time between 3,500 and 2,500 years before present known as the Susquehanna Tradition. The Susquehanna Tradition originated in area of the mid-Atlantic states of today and is identified by some unique artifacts (Davis et al, Vol. 1, 310-311, 1996).

2,500-500 Years Before Present, The Ceramic Period
Evidence of pottery is introduced to the archaeological record during this period as are burial mounds. Ceramic period sites are scattered throughout the province and a 10m diameter burial mound was discovered at Whites Lake, HRM dated at 2,300 years before present (Davis et al, Vol. 1, 310-311, 1996).

500-100 Years Before Present, The Contact Period
The first European contact with the Mi'kmaq was most likely with Portuguese fishermen roughly 500 years ago (Davis et al, Vol. 1, 310-311, 1996).

The Contact Period is followed by the Acadian Period of 1605-1755 and the overlapping British Period of 1749-1867, followed by the Twentieth Century period with each period having significant impact on Mi'kmaq history (Davis et al, Vol. 1, 310-311, 1996).

As the sea level continues to rise, earlier coastlines are were eroded, drown and materials were carried away building beaches and spits which in turn were eventually flooded and eroded in a process that continues today. One source author often cited in discussion of the archaeological history of the Maritime Region proposes that as early as the Paleo-Indian Period, early peoples would have exploited the coastal and marine food resources available at any given time throughout the last 11,000 years, much as the Mi'kmaq did at the time of European contact and continuing through to present day (Murphy, After Tuck, 1998) (Tuck 1984).

3.3 Current Mi'kmaq and Wolastoqiyik Bands

According to Aboriginal Affairs and Northern Development Canada (AANDC, 2016), there are currently thirteen (13) Mi'kmaq Bands in Nova Scotia with some having multiple lands and communities at various locations throughout the Province. The Nova Scotia Bands include (Fig 4):

Acadia
Annapolis Valley
Bear River
Eskasoni
Glooscap First Nation
Membertou
Millbrook
Paq'tnkek Mi'kmaw Nation
Pictou Landing
Potlokek First Nation
Sipekne'katik
Wagmatcook
Waycobah First Nation

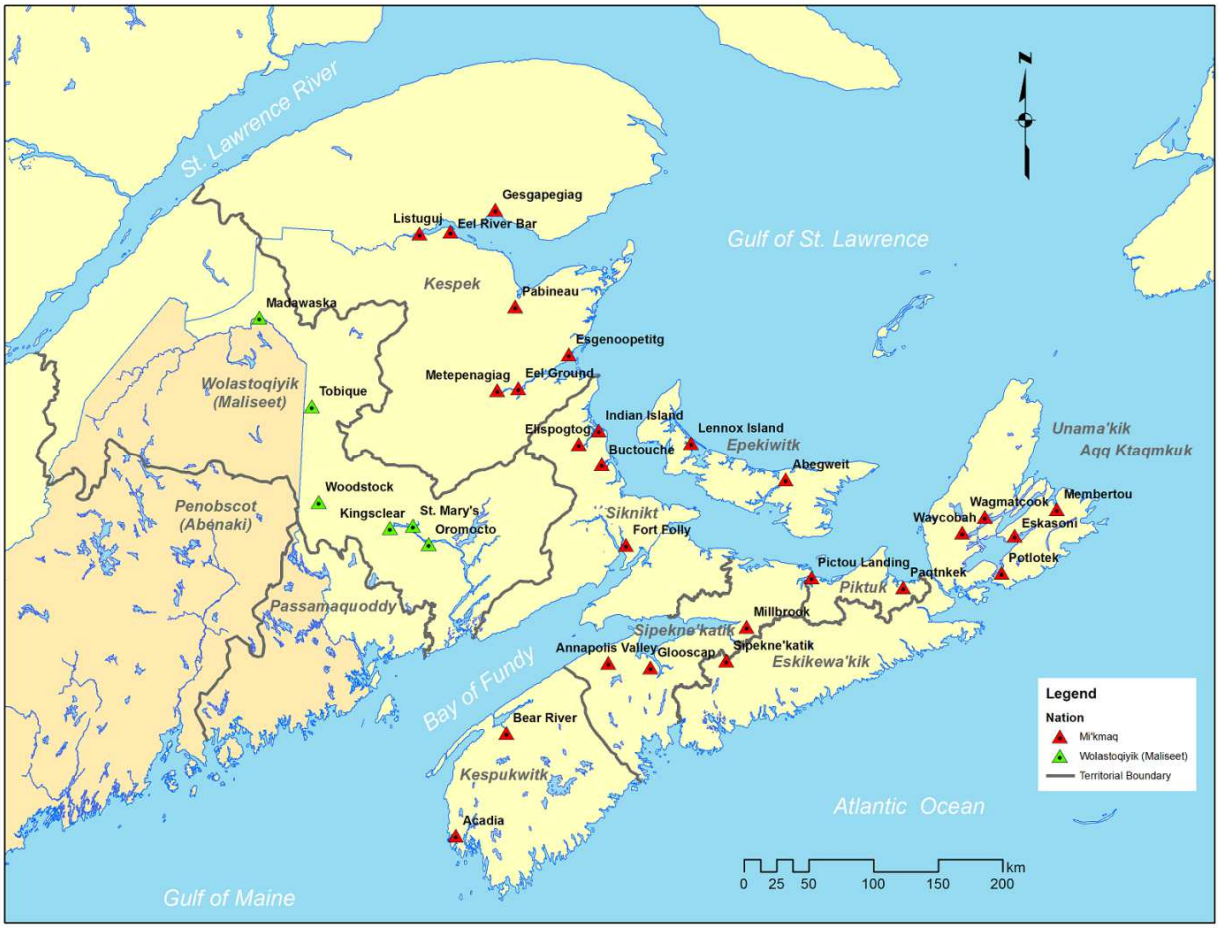

Figure 4: Mi'kmaq and Wolastoqiyik (Maliseet) Band Map

According to Aboriginal Affairs and Northern Development Canada (AANDC, 2016), There are a total of fifteen (15) Mi'kmaq and Wolastoqiyik bands in New Brunswick including:

Buctouche	*Eel Ground*	*Eel River Bar First Nation*
Elsipogtog First Nation	*Esgenoôpetitj First Nation*	*Fort Folly*
Indian Island	*Kingsclear*	*Madawaska Maliseet First Nation*
Metepenagiag Mi'kmaq Nation	*Oromocto*	*Pabineau*
Saint Mary's	*Tobique*	*Woodstock*

Additional Bands in Quebec, Prince Edward Island, Newfoundland and the Northeastern United States that are part of the larger Mi'kmaw Nation and Wabanaki Confederacy but were not included in this report.

3.4 Geological Context of Assessment Area

The Regional Assessment Area (RAA) includes most of Nova Scotia's Atlantic Coast from Comeau's Hill, Yarmouth Co. to Forchu, Richmond Co. and seaward to Canada's 200 mile (320 km) Limit. The western limit of the RAA begins at Comeau's Hill and a line extending southwesterly approximately 172km to the territorial limits of the Canada and the United States. The easterly limits of the RAA are roughly 880 km northeast of the western limits and beginning at Forchu and extending a line east approximately 218km to a point in the center of the Laurentian Channel and southeast, approximating the channel center for a distance of about 330km to the 200 mile limit (Fig 5).

To provide a geographic reference for the descriptions of the natural conditions of the Study Area, a baseline was established between two points that roughly parallels the Nova Scotia Coastline (Fig 5). The southern point of the Baseline is located at Lockeport, Nova Scotia with a distance of 0.0km and the northern point of the Baseline located at Canso, Nova Scotia with a distance of 375km along the Baseline. Distances will be measured along the Baseline beginning at Lockeport with NE Distances being measured northeast of Lockeport and SW Distances being measured southwest along the Baseline from Lockeport. Distances offshore will be measured southeast and perpendicular to the Baseline.

Referencing the Baseline, the western limits of the RAA is approximately SW 230km, southwest of Lockeport and the eastern limits of the RAA are approximately NE 645km, northeast of Lockeport. The group of Leased Parcels are centered approximately NE 250km along the Baseline and 250km directly offshore of the Baseline and Sheet Harbour. The south westerly extreme limits of the leased parcels is NE 160km along the Baseline and directly offshore of Halifax Harbour. The north easterly extreme limit of the leased parcels is NE 350km along the baseline paralleling the coast and offshore of Canso. The minimum distance offshore for the limits of the Leased Parcels is approximately 185km and the maximum distance offshore being approximately 310km.

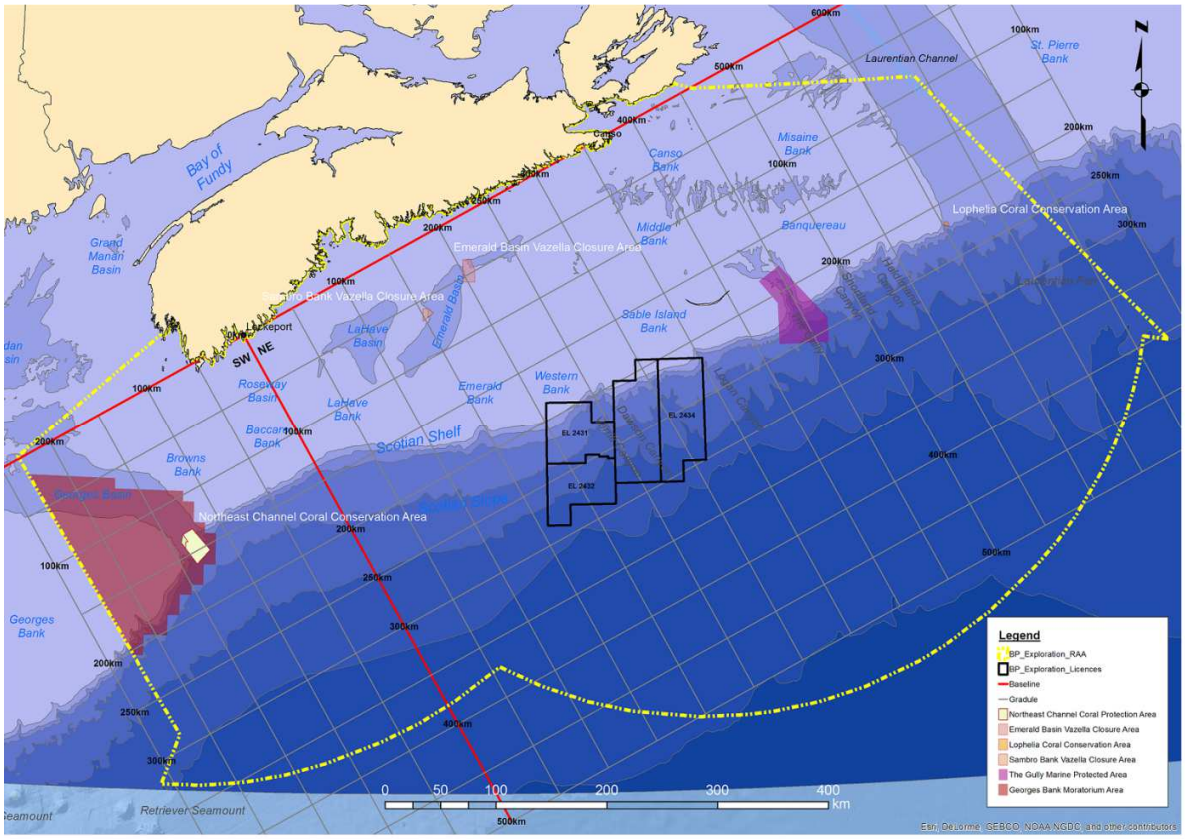

Figure 5: Context Map and Base Line and Coral Conservation Areas (highlighted in purple)

In addition to the horizontal geographic location, the vertical location of the Leased Parcels within the water column is an important contextual reference. The Leased Parcels limits projected onto the sea bottom has a portion of the parcels on the edge of the Western Bank and Sable Bank of the Scotia Shelf with depths in the -10m to -183m range. The majority of the leased parcel areas are draped diagonally over the Scotia Slope with the extreme vertical depths at the parcel limits on the seabed in the -3340m to -3720m depth range. The Leased Parcels are orientated to a north grid and irrespective to the northeast-southwest orientation of the coastline and Continental Shelf Break. This provides for a variety of bottom landscapes at the corners of each Parcel Limit bounds.

The -200m contour also referred to as the Continental Shelf Break .The Continental Shelf Break is the offshore edge of the Continental Shelf that parallels and approximates the northeast-southwest orientation of the Nova Scotia Atlantic Coastline. Southeast of the Continental Shelf Break -200m contour, the ocean bottom drops dramatically along the Scotia Slope to depths of -4000m over a distance of approximately 125km through the Leased Parcels. Depths of -5000m are encountered an additional 225km seaward. (Encana-Stantec 2014)

The Leased Parcels are a group of four parcels arranged in three columns with Parcel EL2431 over Parcel EL2432 in the west column and Parcel EL2433 occupying the middle column and Parcel EL2434 being the east column. All three columns are of approximate equal with of roughly 61km and column height of roughly 111km and arranged in a stepped formation upward in a northeast direction.

The northwest corner of EL2431 projects down upon the edge of the Western Bank with depths of -10m near the corner located approximately 14km northwest of the Continental Shelf Break. The southeast corner of EL2431 projects down to the Scotia Slope and a depth of approximately -2800m. The northeast corner of EL 2432 has the Scotia Slope beneath at a depth of approximately -1800m and the deepest depths of -3600m near the southeast parcel corner(s). Both EL2433 and EL2434 project down upon the edge of the Sable Bank with depths in the -80m to -110m range along the northwest corners of the parcels. The Continental Shelf Break also runs through the northwest corners EL2433 and EL2434 and of all the parcels to a maximum of 14km northwest of the Shelf Break. The southeast corners of EL2433 and EL2434 project down upon the Scotia Slope at depths in the range of -3400m to -3700m. (Encana-Stantec 2014)

There are at least four major canyon incised features along the Scotia Slope that are grouped roughly within the center of the group of Leased Parcels. The most westward incised feature is unnamed in the sources available and forms a 5th incision at the shelf break that runs into the Verrill Canyon and is approximately NE 235km along the baseline. The Verrill Canyon top is located approximately NE 250km along and 250km offshore of the Baseline. Dawson Canyon is approximately NE 275km along the baseline with another unnamed incised feature NE 290km and Bonnechamps Channel is located approximately NE 310km along the Baseline. The top of Logan Channel is near the northeast corner of EL 2434. (Campbell et al 2008)

The Shelf Edge and Canyons provide good habitat for corals as corals are fixed in location and favorable habitat conditions include a good current flow to deliver nutrients as well as scour the bottom to expose hard surfaces which to anchor. Deep channels between the banks also provide good habitat as the Basins and Channels would be less impacted by seasonal temperature changes and storms (Breeze, 1997). Sponges require similar habitat conditions as coral and particularly a rocky bottom which to anchor. Areas designated by the Department of Fisheries and Oceans (DFO) for sponge and coral conservation include (Fig 5) (Fisheries and Oceans, 2015):

Gully Marine Protected Area
Vazella Closure
Sambro Bank Vazella Closure
Lophelia Coral Conservation Area (The Emerald Basin Stone Fence)

3.4.1 The Water Column

In addition to the ocean surface and the ocean bottom coverage by the Lease Parcels boundary limits, the entire water column in-between the two surfaces are included in this study. The two major divisions

concerning the water column are the Pelagic Zone which encompasses the entire water column while the Benthic Zone encompasses the entire ocean bottom from the low tide mark. The Horizontal divisions include Neritic zone that includes all areas associated with the Continental Shelf and the Oceanic Zone which includes all areas beyond the Continental Shelf. The Vertical zones of the water column includes from the water surface to -200m below the surface as the Epipelagic Zone where sunlight penetrates the water column to support photosynthesis and the Epipelagic Zone supports approximately 90% of marine life. Below the -200m depth down to the -1000m depth is the Mesopelagic Zone which is also referred to as the Midwater or Twilight Zone where sunlight penetration in the water column is too faint to support photosynthesis. The Bathypelagic Zone or Midnight Zone occupies the -1000m to -4000m depth range within the water column where there is no sunlight penetration and extremely cold habitat that supports roughly 1% of known marine life. From below -4000m to -6000m is the Abyssopelagic Zone where approximately 75% of the earth's ocean bottom is within this zone. The Hadalpelagic Zone of below -6000 to -10,000m is a zone of deep canyons and trenches where pressures of approximately 8 tons per square inch provides habitat for only a very few known species of invertebrates and fish (NOC 2014).

Leased Parcels EL 2431, EL 2433 and EL 2434 cover a sea bottom in the water surface to -200m below the surface of the Epipelagic Zone where sunlight penetrates. EL 2431 also has bottom depths in the Bathypelagic Zone or Midnight Zone where there is no sunlight penetration as does EL 2433 and EL2434 with deeper bottom depths in the -3500m to -3700m range. EL 3432 has bottom depths of -1700m to -3600m and entirely within the Bathypelagic Zone or Midnight Zone.

3.4.2 Continental Shelf

The Regional Assessment Area (RAA) includes the entire bottom features of the Continental Shelf within the RAA bounds including the Canada-US boundary through Georges Bank, northeast to the center of the Laurentian Channel.

The Continental Shelf extends offshore between 125 and 230 km and to a depth of -200m. Regionally, the Continental Shelf is comprised of major areas of the Northumberland Strait, southeastern Gulf of St. Lawrence, Sydney Bight, Scotia Shelf, Georges Bank, Gulf of Maine and the Bay of Fundy. The shelf can have deep basins as much as -280m in depth as well as banks that rise as much as 26m above sea level as is the Sable Island Bank. Beyond the -200m contour the bottom of the Continental Shelf steeply slopes to depths in the -2000m range and gradually slopes to maximum depths in the -5000m range (Davis et al 1996:228-230).

The regional landscape of the sea bottom of the Continental Shelf is that of a submerged coastal plain that shows the influences of terrestrial erosion, continental ice sheets and more recent ocean influences (Davis et al 1996:228).

The Natural History of Nova Scotia divides the offshore and Continental Shelf into four districts. District 910 is the Inner Shelf and is the district closest to the land and is adjacent the shoreline. The Inner Shelf is characteristically the gradual sloping bottom that extends to the -110m contour (Fig 6) (Davis et al 1996:228).

The Middle Shelf is District 920 in the Natural History of Nova Scotia and is characterized by fishing banks and deep basins throughout the middle zone of the Continental Shelf that includes the Scotia Shelf and the Gulf of Maine (Davis et al 1996:228).

District 930 is the Outer Shelf and is characterised by large offshore banks, water cut channels and geologic saddles on the outer edge of the Continental Shelf (Davis et al 1996:228).

The deep water area beyond the Continental Shelf Break (-200m Contour) and Continental Slope extends the Scotia Slope, District 940 with the southeast district bounds at Canada's 200 Nautical Mile Limit (370.4km) (Davis et al 1996:228).

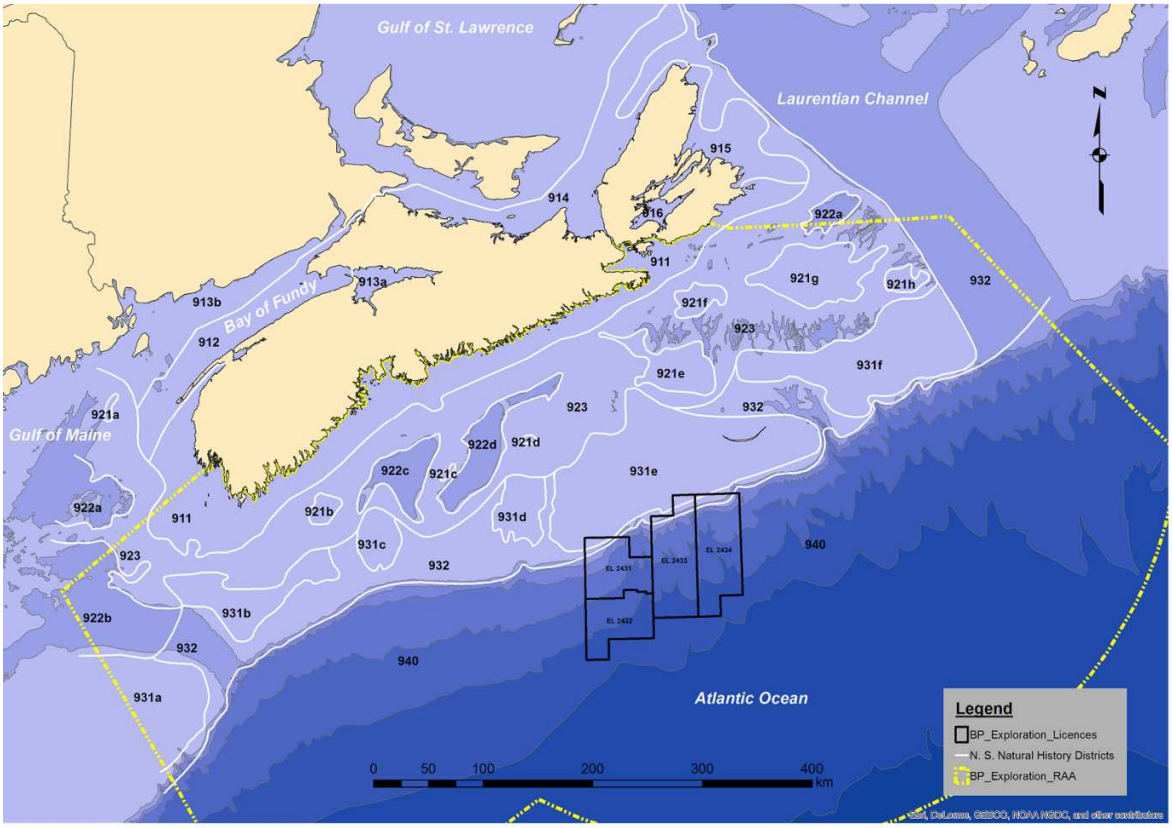

Figure 6: Natural History of Nova Scotia, Offshore Districts Map (Davis et al, Vol. 2, 1996:227)

3.4.3 Geology

The inshore regions of the Continental Shelf are usually extensions of the adjacent terrestrial bedrock formations. Although mapping of the geologic formations comprising the Continental Shelf are not as detailed as onshore bedrock mapping, it is thought that the offshore geology is as varied offshore as onshore. There are four major bedrock units comprising the Continental Shelf: the Triassic rocks (251 to 199.6 million years) of the Acadian Basin of the Bay of Fundy and Gulf of Maine, terrestrial bedrock extending 25km offshore along the Atlantic Coast of Nova Scotia, the Jurassic (199.6 to 145.5 million years), Cretaceous (145.5 to 65.5 million years) and Tertiary rocks 65.5 to 3.6 million years) of the Middle and Outer Scotia Shelf including Georges Bank and the outer Gulf of Maine, the fourth major bedrock unit is the Carboniferous rocks (359.2 to 299.0 million years) of the Sydney Basin (Davis et al 1996:228).

3.4.4 The Inner Shelf

Adjacent the coastline is a zone of seaweed growth that extends offshore over suitable rocky habitat to the -30m contour (Davis et al 1996:232).

The Natural History of Nova Scotia describes the Inner Shelf District 910 of the Offshore/Continental Shelf as an extension of the Nova Scotia landmass extending seaward in a gradual slope offshore to a depth ranging from -100m to -120m. Along the Atlantic Coast (District 911), the bottom gradually slopes seaward extending approximately 25 km offshore to a depth of -110m (Davis et al 1996:232-233).

The topography of the Inner Shelf bottom is generally shaped by the ancient bedrock surface with some areas of exposed bedrock but is mostly covered by reworked glacial tills of sand, gravel and boulders. Rising sea levels have removed most of the glacial deposits covering bedrock leaving a bottom with extensive areas of bedrock exposure and reworked sediments of mostly coarse sand and gravel (Davis et al 1996:232-236).

Features found on the Inner Shelf bottom include sand waves, gravel waves, folded bedrock, submerged drumlins and glacial moraines. Ancient eroded features in the bedrock such as former river drainage cuts have since been in-filled with later sediments. Inner Shelf sediment composition varies locally based on the material composition eroded and the degree of exposure the local tills and bedrock have to wave action and currents (Davis et al 1996:232-236).

3.4.5 The Middle Shelf

The Middle Shelf District (District 920) is the submerged Atlantic Coastal Plain that has a topography that was shaped by ero sional and tectonic processes during an earlier history of being above sea level. The Middle Shelf District extends from the near shore -110m contour to the near shore edges of the major offshore banks and is further broken down into sub-districts of Middle Shelf Banks (921), Middle Shelf Basins (922) and Valley and Plains (923) (Davis et al 1996:251).

The Middle Shelf Banks within the RAA include the Roseway Bank (921b) centered approximately 50km directly offshore of Lockeport and has depths of -100m. The Sambro Bank (921c) is located between the Lahave Basin (922c) and the Emerald Basin (922d) with depths of -108m. The bank is centered approximately NE 125km along the Baseline and 75km offshore of the Baseline and Terence Bay. The MacKenzie Spot (921d) is a small bank located NE 225km along the Baseline and 75km offshore of Musquodoboit Harbour with depths of -105m. The Middle Bank is a large bank with depths of -94m and centered approximately NE 350km along the Baseline northeast of Lockeport and roughly 75 km offshore of Tor Bay. Approximately NE 425km along the baseline and about 45 km offshore of the Baseline and L'Ardoise is the center of the Canso Bank (921f) with depths of -89m. The Misaine Bank (921g) is centered NE 525km along the Baseline and approximately 90 km offshore of the Baseline and Scaterie Island and has depths of -95m. The last and most easterly Middle Shelf within the RAA is the Artimon Bank (921h) centered NE 590km along the Baseline and approximately 80km offshore of the baseline with depths of -105m (Davis et al, Vol.2, 1996:251).

Moving offshore from the -110 contour, the Valley and Plains District (923) is encountered in a depth zone between -100m and -200m and located between the Middle Shelf Banks and Middle Shelf Basins containing glacial features of moraines and glacial till of sand mixed with clay and silt (Davis et al 1996:251-255).

Both the Roseway Bank and the Sambro Bank are steep sided and flat topped Mesas (table land with steep sides) and predominantly covered in gravel with sand proportions increasing in shallow depths (Davis et al, Vol.1, 1996:71).

The Middle Shelf Basins are extensive depressions similar to lowlands and have been smothered with sediments and smoothed by currents. The grey clay sediments of the basins was formed during glacial retreat and settled in the basins. Beneath the clay are layers of silt from glacial melt water called Emerald Silt. Glacial moraines are features found within the basins that were deposited in marine conditions from the bottom of floating ice sheets. There is a rough chain of End Moraines on the middle shelf that parallels the coastline. Beginning approximately 220 km southwest of Cape Sable (SW269 km along Baseline, 0 km offshore) and just east of the center of the Gulf of Maine, an area of End Moraine follows the northern edge of Georges Basin and Browns Bank. Continuing through the coastal side of the Roseway Basin the chain of End Moraines is interrupted by the Roseway Bank before continuing through the coastal side of the LaHave Basin and northern edge of the Emerald Basin to continue paralleling the Eastern Shore and Cape Breton. Some End Moraines are found within the LaHave Basin and the chain of End Moraines has many large gaps in the Chain parallel to the Eastern Shore and off the coast of Cape Breton. The Middle Shelf Basins have outlets to the edge of the Continental Shelf through saddles within the Valley and Plains District (923) of -100m and -200m depth range (Davis et al, Vol.2, 1996:253).

Middle Shelf Basins within the RAA include the LaHave Basin (922c) has depths of -205m centered approximately NE 100km northeast of Lockeport along the Baseline and 50km offshore of the Baseline

and the LaHave River. The elongated Emerald Basin (922d) has depths of -207m and is centered NE 175km along the Baseline and 75km offshore of Cole Harbour. St Anns Basin is located and deepest depths of -200m and is centered NE 550km along the Baseline and 40km seaward of the Baseline and east of Forchu. (Davis et al, Vol.2, 1996:253).

3.4.6 The Outer Shelf

The Outer Shelf District (930) is a 50km to 75km wide zone from the seaward extents of the Middle Shelf to the edge of the Continental Shelf. The Natural History of Nova Scotia further breaks the Outer Shelf District down into the Outer Shelf Banks (931) and the Bank Edges, Saddles, and Channels (932). There are no Basins within the Outer Shelf District (Davis et al, Vol.2, 1996:256).

The Outer Shelf Banks are large flat top Cuesta features of bedrock formed on a former coastal plain while above sea level in an earlier time period. The raised features have a gently sloping side with an opposite side of steeply sloped face or scarp face. Over time the bedrock was covered in glacial till of sand and gravel that have since been levelled by rising sea levels since the last ice sheets and reworked into extensive sand fields. The Outer Shelf Banks have depths in the -30m to -80m range and the topography of the banks is of moderate relief with tops ranging between 100m to 150m above the lower Saddles and Channels being comparable to North Mountain of Nova Scotia being approximately 200m above the Annapolis Valley and Bay of Fundy (Davis et al, Vol.2, 1996:256-261).

The Outer Shelf Banks within the RAA include the East Georges Bank (931a) centered SW 200km southwest of Lockeport along the Baseline and approximately 140km offshore with depths near center of -70m. The Browns/Baccaro Bank (931b) is an elongated bank with the Browns portion centered SW 100km southwest of Lockeport and 100km offshore. The Baccaro portion of the bank is roughly centered NE 0km at Lockeport and 100km offshore of Liverpool with depths of -86m. The LaHave Bank (931c) is roughly centered NE 50km northeast of Lockeport and 100km offshore of the Baseline and Liverpool with depths of -82m. The Emerald Bank (931d) with depths of -87m is centered approximately NE 175km along the Baseline and 150km offshore of Halifax. The shallows of the Emerald Bank are mostly covered in gravels and areas below -110m have more sand cover with a small proportion of clay. The Natural History of Nova Scotia does not distinguish the Western Bank from the Sable Island Bank where most sources distinguish the Western Bank as the western portion of a large Outer Shelf Bank referenced as the Sable Island Bank, District (931e). The Sable Island Bank (931e) is a large and elongated bank that hugs the Continental Shelf Break along it's southeast edge. The Sable Island Bank has shall depths of -10m NE 200km along the Baseline and 175km offshore. The Sable Island Bank has depths of -2m surrounding Sable Island located NE 375km along the Baseline and 175km offshore. Banquereau Bank (931f) is the most easterly and last of the Outer Shelf Banks within the RAA. Banquereau Bank is centered approximately NE 525km along the Baseline and 175km offshore of Scaterie Island with shallow depths of -1m. (Encana-Stantec, 2014)

The Outer Shelf Banks and bounded by Bank edges, Saddles and Channels (932) the Natural History of Nova Scotia describes as deeper areas between the banks where saddles are more shallow than channels. Channels include the Northeast Channel centered SW 140 southwest of Lockeport and the Laurentian Channel centered NE 660km along the Baseline.

3.4.7 The Scotian Slope

The Natural History of Nova Scotia District 940, Scotia Slope is the ocean beyond the -200m contour to Canada's 200 mile limit as a boundary for the district. Depths within the Scotia Slope District are in the -200m to -5000m (Davis et al 1996:263).

At the edge of the Continental Shelf in the area adjacent the Study Lease Area, the sea bottom plunges to depths of approximately -4000m over 125km horizontal distance seaward through the Leased Parcels. Depths of -5000m are encountered an additional 225km seaward. (Encana-Stantec 2014)

The steepness of the sea bottom is not constant as the steep upper portions of the slope change to a more gradual slope at deeper depths. The Natural History of Nova Scotia does not distinguish between Continental Slope and Continental Rise where the Slope is the steepest portion of the seabed where sediments slump over the Shelf Break and add to the thick accumulation of sediments that slump down the steep slope between -200m and -2000m. (Davis et al 1996:263-264) The Rise is where the majority of sediments flowing over the Continental Shelf Break and down the Continental Slope settle and accumulate at deeper depths forming a gradual rise between the steep Continental Slope and Abyssal Plain (Middleton, 2014).

3.4.8 Exploration Geology

In addition to the Natural History of Nova Scotia classifications, offshore exploration has produced further breakdown detailed breakdown into district classifications for the Continental Shelf , Continental Slope and Abyssal Plain off the coast of Nova Scotia based on the geological history of the region. The offshore of Nova Scotia is divided in to Margins or Regions with the Western Scotia Margin is a zone approximately from Georges Bank to Western Bank. The Central Scotia Margin from Western Bank to The Gully, Marine Protected Area.

The large canyon incision "The Gully" or "Sable Gully" is a Marine Protected Area (MPA) under the Oceans Act where no petroleum activities are permitted and future activities adjacent the MPA will be considered as a Valued Ecosystem Component and subject to Environmental Effects Monitoring (CNSOPB). The Eastern Region is the area east of The Gully, Marine protected Area and detailed history and geology information of the Eastern Region is not included in this review.

Approximately 200 million years ago at the end of the Triassic Period and the beginning of the Jurassic Period, the super continent of Pangea began to break up and the north eastern coast of North America and the north western coast of African were detached when a rift developed along the broad valley that

separated the approximate areas of Nova Scotia and Morocco. The once joined regions of North West Africa and North Eastern North America were closer to the equator during this time and both moved north as the rift valley grew wider (OERA, PL.2-10, 2014). The area landscape 200 million years ago was most likely heavily vegetated and wet.

The rift valley was periodically flooded by an adjacent ancient sea and that was the beginnings of the Atlantic Ocean of today. The rift valley was poorly drained and the trapped seawater would eventually evaporate. The cycle of flooding and evaporation continued over time leaving thick deposits of salt in the shallow basins of the valley. As the rift widened by forming new crust in opposite directions of the rift, the inland basins were eventually permanently flooded with seawater which started a 200 million year sediment deposition process (CNSOPB, Geoscience, 2014).

The Jurassic landscape including salt deposits are buried in sediments up to 24 km thick that hide the broken upper crust. These break-lines form the divisions between the four structural provinces (CNSOPB, Geoscience, 2014). The Lahave Platform (LP) approximates the same district as the Middle Shelf and Outer Shelf combined. Extending from the coast line to the Continental Shelf Break, a line approximating the Continental Shelf Break is referred to as the Hinge Zone. The Hinge Zone is the division between the LaHave Platform and the Slope Detachment Province (SD) for the Western Scotia Margin and represents broken and detached blocks of 200 to 65 million year old Jurassic and Cretaceous strata heavily influenced by underlying salt tectonics. The SD Province blocks dips steeply seaward as underlying salt deposits are extruded through breaks in the younger and heavier overlying strata (CNSOPB, Fig. 15b, 2014).

The zone where these salt extrusions occur marks the division between the Slope Detachment Province (SD) and the Allochthonous Salt (Diapir) and Minibasin (ASM) Province. The salt extrusions (Allochthonous Salt) deform overlying strata as the salt is forced through weaknesses and in some conditions forming large areas of Salt Canopies over the overlying strata such as the Shelburne Canopy. It is the deformations in overlying strata caused by the salt extrusions that are of greatest interest to oil exploration as the deformations form traps in the strata that may contain oil or gas. The Shelburne Canopy is an Allochthonous Salt deposit approximately 80 km long and adjacent and paralleling the Nova Scotia Coastline from Georges Bank to Browns Bank. While the Salt Layers are several kilometres below the present ocean bottom, the (ASM) Province is horizontally located between the -1500m and -3000m contour line in the area directly south of the LaHave Bank and between the -2000m and 4000m contours lines directly south of the Emerald Bank and Western Bank and within the RAA. The Central Scotia Margin has the large Allochthonous Salt deposit of the Southwest Sable Canopy several km below the ocean bottom located south of the Sable Island Bank and roughly underlies the southern portions of Parcels EL2433 and EL 2434 (CNSOPB, Fig.15b, 2014).

Beyond the Allochthonous Salt (Diapir) and Minibasin (ASM) Province is the outer East Coast Magnetic Anomaly (ECMA). Offshore exploration has identified magnetic linear anomalies interpreted as volcanic

margins. The (ECMA) Province's landward division with the (ASM) Province is where the Autochthonous (undisturbed) salt deposits end while the seaward limit is where the seismic reflections below the sea bottom shows oceanic crust abruptly changing from rugged to smooth which is used as a reference to mark the transition from Continental Crust to Oceanic Crust (CNSOPB 2014).

The Slope Detachment Province (SD), the Allochthonous Salt (Diapir) and Minibasin (ASM) Province and the East Coast Magnetic Anomaly (ECMA) combined share the same district as the Natural History of Nova Scotia District 940, Scotia Slope but the seaward limit of the of District 940 is the 200 Mile Limit political bounds, the East Coast Magnetic Anomaly (ECMA) is horizontally located roughly along the -4000m contour line (CNSOPB, Fig. 15b, 2014).

All the Leased Parcels have most of the area within the parcel limits underlain by the Sable Sub-Basin. Parcel EL 2431 has the Hinge Zone with the LaHave Platform passing through the northwest corner of the parcel. Parcel EL 2434 is underlain with Transitional Oceanic Crust through the far southeast corners of the Parcel. Parcels EL 2431and EL24 are on the edge of the Central Scotia Margin division with the Western Scotia Margin and shares much of the Western Scotia Margin geology as previously described. Parcels 2433 and EL2434 are more within the interior of the Central Scotia Margin and the major difference being the Central Scotia Margin is underlain with the Sable Sub-Basin and the large Southwest Sable Salt Canopy and the Western Scotia Margin is underlain with the Shelburne Sub-Basin and mostly Salt Diapirs with the exception of the Shelburne Salt Canopy to the west. (CNSOPB, Fig.5, 2014)

3.4.9 Ice Sheets

Deep ocean sediment core samples show that were at least 16 Glaciations during the Quaternary Period (2,588,000 years ago to the Present) with each lasting approximately 100,000 years each.

The extent of the glaciation offshore on the Scotia Shelf is uncertain as each glacier event erases the evidence of previous events as does time and environment. Although North America experienced Glaciation or Ice Ages as early as 800,000-900,000 years ago, only the Illinoian (began 200,000 years ago) and Wisconsin glaciations have been identified within terrestrial Nova Scotia. The landforms and deposits present on the landscape today are evidence of the last Wisconsin Glaciation which began approximately 75,000 years ago and the Wisconsin ice within Nova Scotia had disappeared between 12,000 to 10,000 years ago (Davis et al, Vol. 1, 1996:57-63).In the last 75,000 years there were 4 distinct phases of glaciation over the terrestrial province that ended approximately 10,000 years ago (Davis et al, Vol. 1, 1996:57-63).

The seaward extent of the Glacial Ice flow on the Scotia Shelf is inconclusive at this time. The first three phases would seem to have more impact on the landscape of the Scotia Shelf than the last phase as there were only remnants of ice sheets remaining during the last Phase that were mostly confined to the inland highlands of the province (Davis et al, Vol. 1, 1996:59).

There exists a major moraine system ranging 40 km to 80km offshore paralleling the Nova Scotia coastline and referred to as the Scotia Shelf Moraine System. It was thought that the Scotia Shelf Moraine System represented the extent of the ice flows but flows from the last Phase but the Scotian Ice Divide may have been more extensive than earlier thought. Although the extent of the Glaciation on the Scotia Shelf is undetermined, the extent of the Glacial Tills extends beyond the Scotia Shelf Moraine System. Adjacent the Study Area, the known seaward limits of Glacial Tills are the top edges of Georges Bank and the northwestern portion of Browns Bank including the seaward side of Roseway Basin. The seaward limits of the Glacial Tills on the Scotia Shelf continue along the coastal side of the LaHave Bank and rounding the eastern side of the LaHave Bank to the Continental Shelf Break edge and following the edge eastward to the western edge of the Emerald Bank. The Glacial Till seaward limits continue along the western edge of the Emerald Bank and rounding the northwestern or coastal side of the Emerald Bank, Western Bank and the entire coastal side of the Sable Island Bank to the large Canyon known as the Gully. (Davis et al, Vol. 1, 1996:71).

3.4.10 Sea Level Changes

When discussing the history of the land, sea and early peoples within the Maritime Region, the rise and fall of the sea level must be discussed as it relates to the subsidence and rebound of the earth's crust during and after glaciation.

The Natural History of Nova Scotia collects and summarises the work that has been done to publication date and provides a good background to the subject of changing sea levels.

As the last of the Wisconsin ice receded and the weight of the ice on the landscape diminished the elevation of the land increased as the landscape slowly rebounded. The last of the large regionally centered ice sheets was centered in the Gulf of St. Lawrence and this would have been the ice sheet's thickest and heaviest portion and gradually thinning toward the margins on the Scotia Shelf. The amount of rebound in the landscape is directly related to the thickness and weight of the previous ice cover. The Gulf of St. Lawrence has the most rebound as the ice center and the least rebound is along the ice margins such as along the Scotia Shelf (Davis *et al,* Vol. 1, 1996:60).

As the land rebounded the sea level rose as water was released from the melting ice sheets. When the isostatic rebound of the landscape occurred and outpaced the rising sea levels, the terrestrial surface of the landforms in the region increased such as the coastlines of Nova Scotia, Cape Breton Island, Prince Edward Island of today are proposed at one time to be one large single terrestrial landform. Based on evidence of plants and animals found on the bottom of the Gulf of Maine, an unglaciated landform of a strip or series of islands connected the New England coastline of today with Nova Scotia that eventually flooded some 15,000 years ago. Since the Landscape rebound was uneven across the region some areas maintained the basic coastline of today when the rate of landscape rebound and sea level rise were matched and some areas such as most of the Atlantic Coastline were flooded as sea level rise superseded the minimal isostatic rebound (Davis *et al*, Vol. 1, 1996:60-61).

During the Quaternary period (2,880,000 years ago to Present) the relative sea level cycled through 120m of changing sea levels. Another figure proposed is 80-90m range of sea level changes. In a period of 120,000-100,000 years ago the sea level was 4-6m above today's level and left elevated wave cut and coastal features. Approximately 15,000 years ago the last ice sheets were receding on the Scotia Shelf and the sea level was estimated to be -80m of the sea level today. Sea level rose to -40m of today's sea level approximately 10,000 years ago and rose at a rate of 1.1m/Century prior to 7,000 years ago. Other theories suggest that relative sea level rise occurred in 3 stages with a very rapid rise in sea level between 12,000 and 11,000 years ago then slowed between 11,000 and 8,000 years ago and again a rapid rise between 8,000 and 5,000 years ago. Approximately 2,500 years ago is a marker for relative sea level rise rates as prior to 2,500 years ago the sea level rise was as high as 1m per Century and sea level rise after 2,500 years ago the relative sea level rise rate slowed to 20cm per Century. However relative sea level rise near the Continental Shelf Break has not changed in 4,500 years. Rates of relative sea level rise along Nova Scotia coastlines range between 25 and 30cm per Century as determined in the mid 1990's (Davis *et al*, Vol. 1, 1996:60-61).

Many of the sources related to sea level rise within the Maritime region refer to the work of D. R. Grant in the late 1960's and early 1970's where Grant explored the reasons why the Maritimes are experiencing faster rates of submergence compared to other regions along the Atlantic Coast of North America and seemed to be out of step with rates of sea level rise as determined along stable coasts. South of the Pleistocene (2.58 Million to 11,700 years ago) ice limits located near New York City of today, the sea level rise is determined to be 100-130m during the last 15,000 to 20,000 years and continues to rise today. North of the Pleistocene ice limit, the early emergence of the landscape due to the earth's crust rebound was followed by submergence due to the earth's crust subsiding over the last several thousand years. The Newfoundland – Labrador Coast to the north are currently emerging due to the Earth's crust rebounding. (Grant, 1970)

Within the Maritime Region, evidence of sea-level rise are found in forests of tree stumps submerged 10.7m below current high tide level and covered in salt marsh near Fort Lawrence, Nova Scotia. Submerged European cultural artifacts and refuse are found 30-50cm below marsh surfaces along the Bay of Fundy and Atlantic Coast. A 300 year old corduroy road laid across the marsh near Fort Lawrence was 1m below the high tide salt-marsh mud. Grant's most curious evidence of sea level rise was found during the reconstruction of Fortress Louisbourg at the time of his publication. Mooring rings mounted on an excavated sea wall at the fortress were 37cm below the current highest tide and were probably originally mounted 50cm above the high tide of the period 270 years ago or approximately 250 years prior to publication. After further investigation by Fortress staff, it was concluded that the sea level rise at Louisbourg was 1m in the period since original fortress construction in the early 1700's to the 1970's. (Grant, 1970)

Grant set out to explore the factors contributing to the varying rates of sea level rise along the coast of North America and within the Maritime Region. Grant looked at tidal amplification and water-load subsidence as factors in the Maritime submergence of coastlines and although contributing factors, neither could fully account for the variations in sea-level rise within the region and along the Atlantic Coast. At the time of publication, Grant also explored theories of changes in atmospheric pressures acting on land and water as well as geologic composition and formations as contributing factors but the sea-level rise rates were still insufficient to explain the rate of submergence in the Maritime Region. Grant mentions the work of others who proposed that the displacement of molten sub-crust material under Ice loads created elevated peripheral bulges of 80-185m and approximately 65km from the ice limits. When the ice load gradually disappeared, the peripheral bulges subsided as the sub-crust material filled the void of the rebounding earth's crust under the former ice sheet center. Grant concluded that the displacement of sub-crust material and subsequent subsidence of the peripheral bulge accounted for most of the rate of submergence and most of the sea-level rise variations within the Maritime Region. (Grant, 1970)

Other work on the subject of sea level rise was reviewed concerning the existence of terrestrial landforms on the Scotia Shelf beginning with 13,000 before present which proceeded the earliest known evidence of early peoples in the Maritime region by approximately 2000-2500 years. None of the sources reviewed specific to sea level rise, attempted to answer if early peoples were aware or exploited resources on the early landforms of the Scotia Shelf. A review of these sources can only describe what was occurring on the landscape at the time of the appearance of early peoples within the Maritime Region.

One source reviewed provided a map of approximate coastlines for the periods of 13,000, 11,000, 10,000, 9,000 and 6,000 before present, of the Atlantic Coast and Gulf of St. Lawrence from Cape Cod to Newfoundland and the Strait of Bell Ile. The map demonstrates the regional variations in sea level rise with some coastlines such as the western shore of the Gulf of Maine and particularly Georges Bank area showing an expanding coastline between 13,000 and 11,000 before present before contracting in 10,000 before present. During the same period, the coastline of areas of present day Sable Island Bank, Western Bank, Middle Bank and Banquereau Bank were at a maximum expanse at 13,000 before present (the limit of the report data). At this time, the exposed Sable Island Bank and Western Bank formed a landform of approximately 250 km long NE to SW x 100km wide NW to SE. The exposed Middle Bank was roughly 50km x 50km and Banquereau Bank landform was approximately 200km long NE to SW and 50km wide NW to SE. Georges Bank appears yet to fully emerge at this time and was an island landform of approximately 125km NE to SW x 100km wide NW to SE. (Shaw, 2005)

The coastlines of these Scotia Shelf landforms gradually contracts over time through 11,000 and 10,000 before present which corresponds with the period of evidence of the arrival of early peoples found at Debert, Nova Scotia. At 11,000 before present, Georges Bank emerged to maximum exposure and was a

landform of 250 km NE to SW x 150km wide NW to SE and connected to the Mainland. While the Middle Bank and Banquereau Bank coastline contracted slightly, the combined Western Bank and Sable Island Bank landform contracted to approximately 200km long NE to SW and 75km wide NW to SE. Browns Bank was an island of roughly 25km x25km located mid distance between the Georges Bank coastline and the coastline of what would become mainland Nova Scotia. (Shaw, 2005)

At 10,000 before present, Georges Bank was again an island landform of approximately 150km long NE to SW x 100km wide NW to SE and Browns Bank was a small island. The Scotia Shelf landforms of Western Bank and Sable Island Bank had gradually contracted to where it was mostly Sable Bank at that time with a landform of approximately 175km long NE to SW x 75km wide NW to SE. The Middle Bank landform contracted slightly at this time and while the Banquereau Bank landform maintained its overall size, what remained exposed was beginning to form a group of islands rather than a single landform. (Shaw, 2005)

The Banquereau Bank landform was a group of Islands at 9,000 before present and the Middle Bank contracted only slightly. Browns Bank was completely submerged and Georges Bank had contracted to approximately 125km long NE to SW x 75km wide NW to SE. The Sable Island Bank Landform had contracted to a size of approximately 175km long NE to SW x 50km wide NW to SE. (Shaw, 2005)

The most dramatic changes occur in the map depicting shorelines at 6,000 before present where the Scotia Shelf landforms and Georges Bank completely submerged with the exception of an island on the Sable Island Bank which approximates present-day Sable Island. The present-day coastlines of the Gulf of Maine, Atlantic Coast and the Gulf of St Lawrence approximated the present-day coastlines at this time. (Shaw, 2005)

Of the Leased Parcels, the northwest corner of EL2431 projects down upon the edge of the Western Bank with depths of -10m near the corner and may have been a portion of these early Scotia Shelf landforms. Both EL2433 and EL2434 project down upon the edge of the Sable Bank with depths in the -80m to -110m range along the northwest corners of the parcels. These two parcel corners may have been along the shoreline of the early landform from14,000 to 9,000 before present.

3.5 Ecological Significance of Assessment Area

The area adjacent to the project area is a region known for enhanced primary productivity (phytoplankton). Phytoplankton are the base of the marine food-web and the primary food source for the animal component of the plankton (zooplankton).The band stretching along the outer edge of the Scotian Shelf where shelf and slope waters meet and nutrients come to the surface is of particular importance for plankton productivity. These areas, where major currents and local circulation patterns interacts, create gyres or partial gyres that collect plankton and other organisms like jellyfish which attract predators like sea turtles, whales to the area (Coin Atlantic 2014) and provide food for most organisms that live in, or depend on, the ocean at some point in their development (NS Museum 1996).

The area is dominated by migratory species such as whales (Bottlenose, Humpback, and Northern Right Whale), sharks (porbeagle and Greenland sharks), squid, sea turtles, and large pelagic fishes (tuna and swordfish). Seabirds use the area as a stopover for feeding and resting (NS Museum 1996). This highly productive area supports life for local marine species and migrating species of the Atlantic Ocean.

4.0 Mi'kmaq and Wolastoqiyik Aboriginal and Treaty Rights and Mi'kmaq Fisheries

Existing Aboriginal and Treaty rights are recognized as constitutionally protected rights under the federal Constitution Act, 1982 (GOC, 2016). As affirmed by various recent Supreme Court decisions, these treaties guarantee Aboriginal rights to hunt and fish throughout the region and to maintain a moderate livelihood. These rights are protected by section 35(1) of the Constitution Act, 1982 (GOC, 2016).

The Mi'kmaq of Atlantic Canada have affirmed and recognized validity of Mi'kmaq treaties with constitutional protection (R. v. Simon 1985), the Aboriginal right to fish for food (R. v. Denny, Paul and Sylliboy 1990), the collective Aboriginal right to fish, priority of Aboriginal fish for food over commercial and recreational user needs, and meaningful participation in co-management (R. v. Sparrow, 1990), and the right to fish for a moderate livelihood (R. v. Marshall, 1999). Currently, the Mi'kmaq participates in the commercial fisheries under the same legal framework as non-Aboriginal fishers. First Nation harvesters have been active in the commercial fishery since the mid1990's and have greater visibility since 2000 as the result of the Marshall Decision and subsequent Marshall Response Initiative (MRI) and the current Atlantic Integrated Commercial Fisheries Initiative (AICFI).

Following the termination of the MRI in 2007 the AICFI was created in order to develop ccommercial fisheries enterprise governance, build capacity in commercial fishing operations and assist with fisheries co-management (DFO 2012).

4.1 Mi'kmaq Access to Food, Social and Ceremonial Fisheries

The Mi'kmaq participates in the fisheries under the constitutional protection of Aboriginal and Treaty rights for food, social and ceremonial purposes. Access to a diversity of fish and invertebrate species for food, social and ceremonial purposes[2] is through community negotiated agreements known as Aboriginal Fisheries Strategy (AFS) agreements, imposed licenses by the Government of Canada, or by community assertion of Aboriginal and Treaty rights for species in which conservation is not a concern.

[2] Fisheries in which the intent is nourishment, or for traditional means, such as in ceremonies or social events. The Supreme Court found that where an Aboriginal group has a right to fish for food, social and ceremonial purposes, it takes priority, after conservation, over other uses of the resource.

AFS agreements could contain the following (DFO 2014a):

- provisions with respect to amounts that may be fished for food, social and ceremonial purposes;
- terms and conditions that will be included in the communal fishing licence (e.g. species, amount that may be fished, area, gear, times, reporting requirements);
- arrangements for co-operative management by the Aboriginal group and DFO of fishing by the group for food, social and ceremonial purposes;
- co-operative management projects for the improvement of the management of fisheries in general, such as stock assessment, fish enhancement and habitat management; and
- provisions related to communal licences under the Allocation Transfer Program (ATP) for obtaining access to commercial fisheries and/or other economic development opportunities.

AFS agreements provide communities or organizations such as the Native Council of Nova Scotia (NCNS), with funding to carry out objectives specified in the agreements. Imposed licenses for food, social and ceremonial fisheries do not have associated funding.

4.2 Mi'kmaq Access to Commercial Fisheries

Presently, the Mi'kmaq have access to the commercial fisheries through community negotiated AFS agreements and more recently through the Marshall Response Initiative and AICFI.

The ATP is an integral component of the AFS. This program facilitates the voluntary retirement of commercial licences and the issuance of licences to eligible Aboriginal groups in a manner that does not add to the existing fishing effort, thereby providing Aboriginal groups with much-needed employment and income. Since 1994-95, when the ATP was first launched, approximately 900 commercial licences have been issued to Aboriginal groups (DFO 2014a).

Through the MRI, the government of Canada reached agreements with 32 of the 34 eligible First Nations. This initiative, which ended March 31, 2007, provided significant support for increased commercial fisheries access (including vessels and gear, and commercial fisheries infrastructure) and internal governance development, and has become a significant driver for economic development in those communities.

As a result of the MRI and AICFI, the Mi'kmaq and Wolastoqiyik First Nations are prominent in eastern Canadian fisheries. With approximately 1,300 communal commercial fishing licences and constituting 520 fishing enterprises, potential economic returns exceeds $45 million annually and more than 1,000 community members earn an income from fishing. An estimated 2,000 First Nations community members received training and mentoring that covers a broad range of practical fishing skills from boat safety to mechanics and ecotourism (DFO 2014b).

Commercial fisheries access, whether by ATP or MRI, is governed through license mechanism known as commercial communal licenses. In most cases, the owner of the license is the band. Incorporated bodies

such as the Native Council of Nova Scotia[3] have been issued licenses. Each band, or incorporated body, designates a commercial fishing department within the community that manages the daily activities of fishing fleets. Revenues are reinvested in the community. Revenues from commercial access comprise a significant portion of community revenues and create the majority of shorter-term employment opportunities for the community in the fishing sector. Other fisheries employment opportunities created are administrative and field support.

4.3 Moderate Livelihood Fishery

The Mi'kmaq plans to participate in the fisheries under the constitutional umbrella of Aboriginal and Treaty rights for a moderate livelihood. At the time of writing this report, the Mi'kmaq have not implemented a moderate livelihood fishery in Nova Scotia.

5.0 Results

The participating bands/organizations included in this version of the report include the Acadia, Eskasoni, Millbrook, Pictou Landing, Glooscap, Membertou, Potlotek, Paq'tnkek Mi'kmaq Nation, Wagmatcook, We'koqma'q, Fort Folly First Nation, St. Mary's, Woodstock First Nation, and the Native Council of Nova Scotia.. *The Mi'kmaq of Nova Scotia represent the first 10 bands listed, Native Council of Nova Scotia is discussed separately, and the Mi'kmaq and Wolastoqiyik of New Brunswick include Fort Folly First Nation, St. Mary's, and Woodstock First Nation.*

5.1 Historic Food, Social, Ceremonial fishing activity in the Assessment Area

Mi'kmaq had an intimate knowledge of the ecology of their territory and fit their lives to seasonal cycles of the vegetation, animals and fish. Highly mobile Bands consisting of several related families would assemble at favorite camp sites. In the fall and winter small groups of 10-15 people would disperse for winter hunting (Prins 1996).

The traditional seasonal diet of the Mi'kmaq consisted mainly of seafood gathered from the waters near warm season coastal camps until the Mi'kmaq moved inland to hunt and fish during the cold months of the year (Table 3). In the past, the Mi'kmaq harvested from the coast in all seasons, targeting a variety of fish, invertebrates and mammals from the sea (Table 3).

[3] Native Council of Nova Scotia (NCNS) is the self-governing authority for the large community of non-status and status Mi'kmaq/Aboriginal peoples residing off-reserve in Nova Scotia throughout traditional Mi'kmaq territory. Their goal is to operate and administer a strong and effective Aboriginal Peoples Representative Organization that serves, advocates and represents the off-reserve community. Native Council of Nova Scotia did not receive access to commercial fishing from the Marshall Response Initiative. Through the Netukulimkewe'l Commission, the natural life management institution authority for NCNS, increases in access to commercial fishing licenses were granted through enhanced Allocation Transfer Program (ATP) over a three year period. NCNS has and Aboriginal Fisheries Arrangement under Department of Fisheries and Oceans' Aboriginal Fisheries Strategy.

Table 3. Historic seasonal food sources, camp locations, and camp size. Taken from Mi'kmaq Annual Sustenance, Cape Breton Magazine 1972.

Month	**Seasonal Locations**	**Seasonal Groupings**	**Food Resource**
Jan.	Sea Coast	Bands	Smelt, Tomcod, Seals & Walrus Beaver, Moose, Bear, Caribou
Feb. (Period of Winter Famine Begins)	Inland	Bands & Family Units	Smelt, Tomcod (ending) Seals & Walrus, Beaver, Moose, Bear, Caribou
Mar. (Period of Winter Famine)	Inland	Bands & Family Units	Smelt, Seals & Walrus (ending) Scallops, Crab, Urchins, Winter Flounder, Beaver, Moose, Bear, Caribou
April (Period of Winter Famine ends)	Sea Coast	Villages	Smelt, Winter Flounder, Scallops, Crab, Urchins, Sturgeon, Brook Trout, Alewife, Herring, Spring Bird Migrations, Beaver, Moose, Bear, Caribou
May	Sea Coast	Villages	Smelt, Scallops, Crab, Urchins, Sturgeon, Salmon, Brook Trout Alewife, Codfish, Capelin, Shad, Mackerel, Skates, Herring, Spring Bird Migrations, Beaver, Moose, Bear, Caribou
Jun.	Sea Coast	Villages	Scallops, Crab, Urchins, Sturgeon, Salmon, Brook Trout Alewife, Codfish, Capelin, Shad, Mackerel, Skates Lobsters, Spring Bird Migrations, Beaver, Moose, Bear, Caribou
Jul.	Sea Coast	Villages	Scallops, Crab, Urchins, Codfish, Capelin, Shad, Mackerel, Skates Lobsters, Spring Bird Migrations, Beaver, Moose, Bear, Caribou, Strawberries, Raspberries
Aug.	Sea Coast	Villages	Scallops, Crab, Urchins, Codfish, Skates Lobsters, Beaver, Moose, Bear, Caribou, Strawberries, Raspberries, Blueberries, Ground Nuts
Sept.	Sea Coast	Villages	Scallops, Crab, Urchins, Codfish, Skates, Salmon, Herring, Eels, Fall Bird Migrations, Beaver, Moose, Bear, Raspberries, Blueberries, Ground Nuts, Cranberries
Oct.	Small Rivers	Villages	Scallops, Crab, Urchins, Smelt Codfish, Skates, Salmon, Herring, Eels, Brook Trout, Fall Bird Migrations, Beaver, Moose, Bear, Blueberries, Ground Nuts, Cranberries
Nov.	Inland	Bands	Smelt, Tomcod, Turtles, Seals, Beaver, Moose, Bear, Ground Nuts, Cranberries
Dec.	Rivers	Bands	Smelt, Tomcod, Turtles, Seals, Beaver, Moose, Bear, Ground Nuts,

5.2 Summary of Mi'kmaq Communal Commercial Fisheries

5.2.1 Mi'kmaq of Nova Scotia

According to the Department of Fisheries and Oceans, all thirteen Bands in Nova Scotia currently have commercial communal fishing licences within the RAA (DFO, 2015). Eight bands participated including Acadia, Eskasoni, Millbrook, Pictou Landing, Glooscap, Membertou, Potlotek and Paq'tnkek Mi'kmaq Nation. This data found that all licensed species, except seals, are currently fished within the RAA. These communities commercially fish 6 species in the project area, 15 species in the LAA and 25 species in the RAA (Table 5).

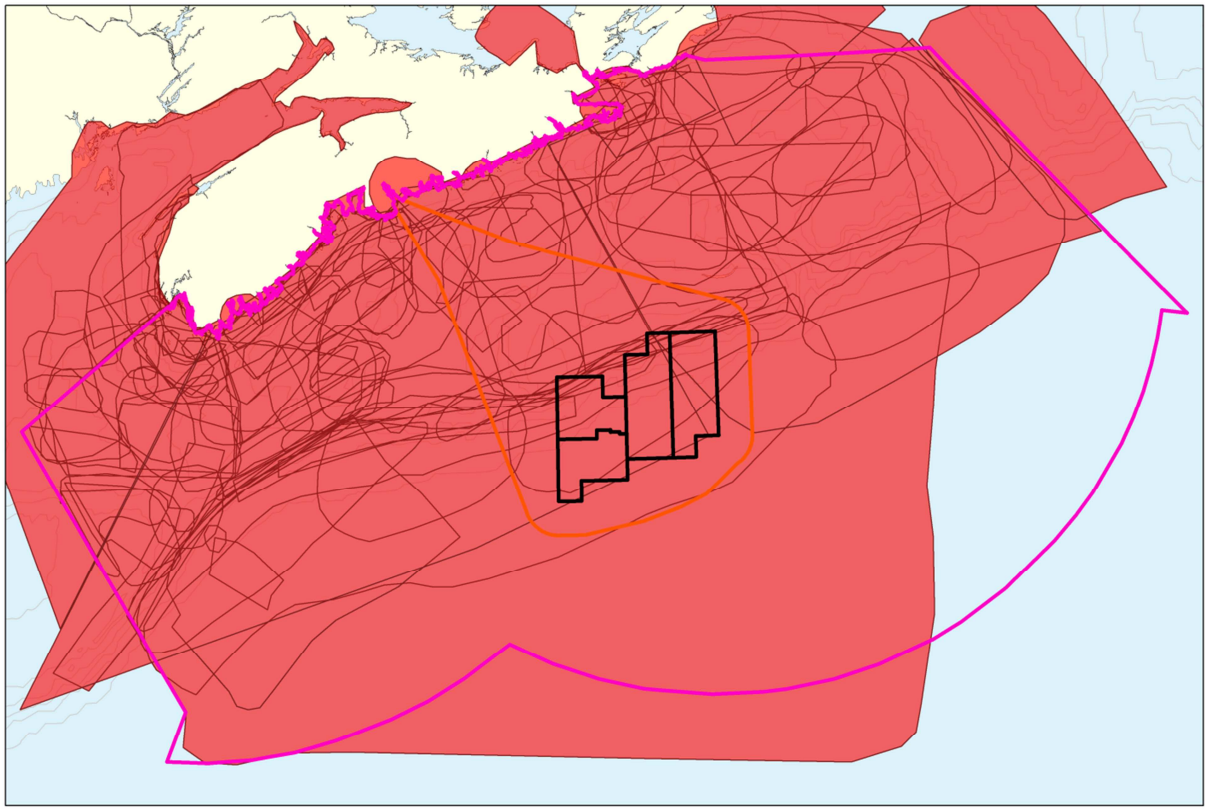

Fig 6: Summary of Fishing Areas of the Mi'kmaq of Nova Scotia for both Commercial Communal and Food, Social and Ceremonial purposes in the regional assessment area (RAA, purple), each red shaded polygon represents one fishers fishing area

Table 4. Commercial communal fisheries access for the Mi'kmaq and timing of fishing activity (directed and as by-catch, and as exploratory or experimental) occurring within the project boundaries of project area (PA), local assessment area (LAA) and regional assessment area (RAA). Symbols refer to those species as listed under COSEWIC (•) and SARA (▪).

Species	Fishing Activity	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
•▪Atlantic cod	Mar to Dec	Yes	Yes	Yes
•▪American Eel	Year Round	No	No	Yes
•▪Bluefin Tuna	Aug to Nov	Yes	Yes	Yes
Atlantic Herring	Jul to Sept	No	No	Yes
Atlantic Mackerel	May to Aug	No	No	Yes
Clams	Apr to Dec	No	No	Yes
•Cusk (By-catch)	Mar to Dec	Yes	Yes	Yes
Flounder	Mar to Dec	No	No	Yes
Gaspereau (Alewife or Blueback herring)	May to Jun	No	No	Yes
Green Crab	Year Round	No	No	No
Haddock	Mar to Dec	Yes	Yes	Yes
Hagfish	Year Round	No	No	Yes
Halibut (By-catch)	Jan to Dec	Yes	Yes	Yes
Harp Seal	INACTIVE	No	No	No
Jonah Crab	Jun to Oct	No	Yes	Yes
Lobster	Year round	No	Yes	Yes
Mahi-Mahi	May-Nov	Yes	Yes	Yes
Marine Worms	Apr to Dec	No	No	No
Monkfish (By-catch)	Mar to Dec	No	No	No
Northern Shrimp	Feb to Jun; Sept to Dec; Apr to Jan	Yes	Yes	Yes
Pollock	Mar to Dec	No	Yes	Yes
Quahaug	Year Round	No	No	No
•Redfish	Mar to Dec	No	Yes	Yes
Rock Crab	Aug to Nov	No	No	No
Scallop	Year Round	No	No	Yes
Sea Urchin	Nov to Jan	No	No	Yes
Shark	May-Nov	Yes	Yes	Yes
Silver hake (By-catch)	Mar to Dec	Yes	Yes	Yes
Snow Crab	Nov to Mar	Yes	Yes	Yes
Swordfish	Sept to Nov	Yes	Yes	Yes
Whelk	Aug to Apr	No	No	No
White hake (By-catch)	Mar to Dec	No	No	Yes

5.2.2 Native Council of Nova Scotia

The Native Council of Nova Scotia has commercial communal access to 7 species in the project area, 9 species in the LAA and 19 species in the RAA (Table 5). A fishery for large pelagic species (tunas and swordfish) as well as halibut occurs in the project area and local assessment area. A larger collection of species are commercially fished within the RAA. These include ground fish (cod, haddock, silver hake and pollock), by-catch species (cusk, halibut, and monkfish), invertebrates (lobster, Jonah crab, marine worms, and snow crab), and anadromous fish species (gaspereau) (Table 5).

Table 5. Commercial communal fisheries access (directed and as by-catch, and as exploratory or experimental) for the Native Council of Nova Scotia occurring within the project boundaries of project area (PA), local assessment area (LAA) and regional assessment area (RAA). Symbols refer to those species as listed under COSEWIC (•) and SARA (▪).

Species	Fishing Activity	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
Albacore Tuna	Jun to Nov	Yes	Yes	Yes
•▪Atlantic cod	Jan 1 to Oct 30	No	No	Yes
Atlantic Herring	Year Round	No	Yes	Yes
•▪Bluefin Tuna	Jun to Nov	Yes	Yes	Yes
Bigeye Tuna	Jun to Nov	Yes	Yes	Yes
•Cusk (By-catch)	Jan 1 to Oct 30	No	No	Yes
Gaspereau	Apr-Jun 15	No	Yes	Yes
Haddock	Jan 1 to Oct 30	No	No	Yes
Halibut (By-catch)	Jan 1 to Oct 30	Yes	Yes	Yes
Jonah Crab	N/A	No	No	Yes
Lobster	Nov to May, May to Jun	No	No	Yes
Mahi-Mahi (By-catch)	May-Nov	Yes	Yes	Yes
Marine Worms	Year Round	No	No	Yes
Monkfish (By-catch)	Jan 1 to Oct 30	No	No	Yes
Pollock	Jan 1 to Oct 30	No	No	Yes
Silver Hake	Jan 1 to Oct 30	No	No	Yes
Snow Crab	Apr to Mar	No	No	Yes
Swordfish	Jun 1 to Oct 30	Yes	Yes	Yes
Yellowfin Tuna	Jun to Nov	Yes	Yes	Yes

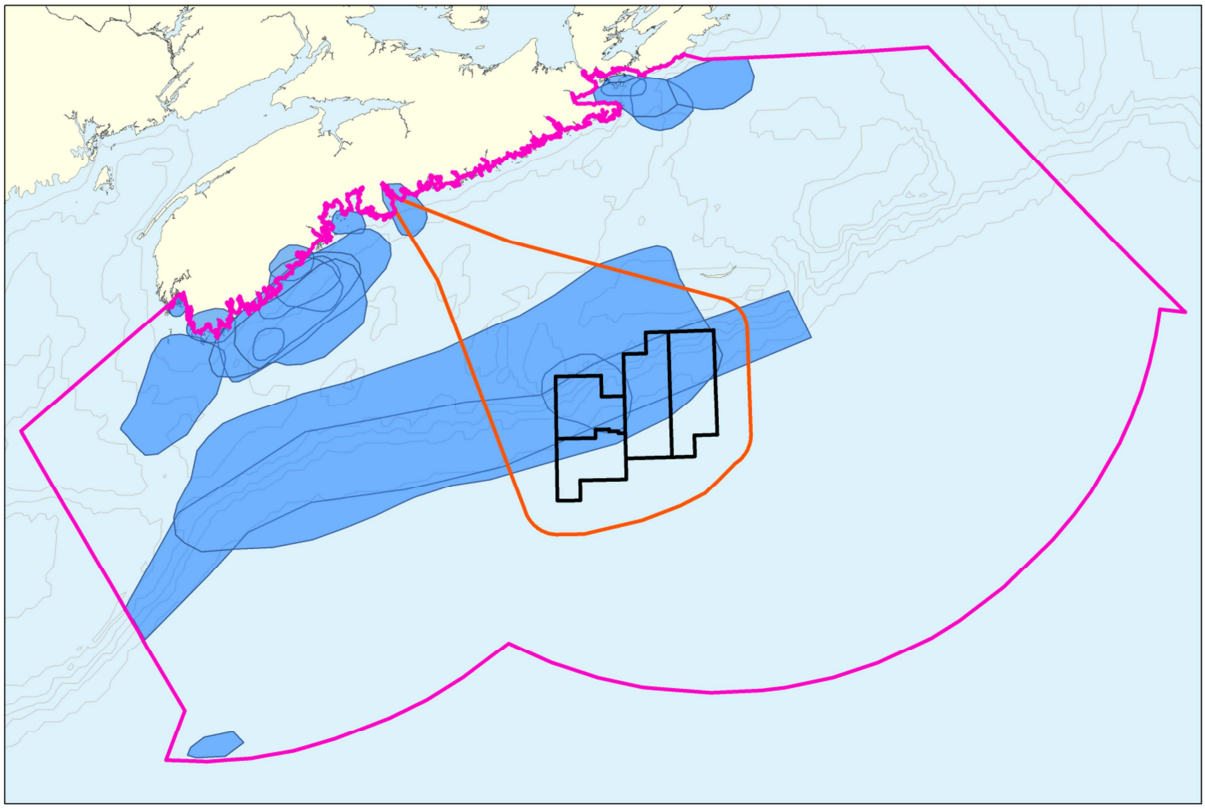

Figure 7: Summary of Fishing Areas of the Native Council of Nova Scotia for both Commercial Communal and Food, Social and Ceremonial purposes in the regional assessment area (RAA, purple), each red shaded polygon represents fishers fishing area

5.2.3 Mi'kmaq and Wolastoqiyik of New Brunswick

Three New Brunswick bands, Fort Folly, St. Mary's, and Woodstock participated in this study. According to the DFO, these three bands currently have commercial communal fishing licences within the RAA (DFO, 2015). Currently, 1 species was reported fished in the project area, 9 species within the LAA and 16 species within the RAA (Table 6).

Table 6. Species fished by one Wolastoqiyik band and one Mi'kmaq band within New Brunswick (directed and as by-catch, and as exploratory or experimental) occurring within the project boundaries of project area (PA), local assessment area (LAA) and regional assessment area (RAA). Symbols refer to those species as listed under COSEWIC (•) and SARA (▪).

Species	Fishing Activity	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
•▪Atlantic cod	Jan 1 to Oct 30	No	Yes	Yes
•▪American Eel	Year Round	No	No	No
Atlantic Herring	Jul to Sept	No	No	No
•▪Bluefin Tuna	Jun to Sept	No	Yes	Yes
Bigeye Tuna	Jun to Nov	No	Yes	Yes
Haddock	Jan 1 to Oct 30	No	Yes	Yes
Jonah Crab	N/A	No	Yes	Yes
Lobster	Nov to May, May to Jun	No	No	Yes
Pollock	Jan 1 to Oct 30	No	Yes	Yes
•Redfish	Year round	No	No	Yes
Scallop	Year round	No	No	Yes
Sea Urchin	Year round	No	No	Yes
Shark	May-Nov	No	Yes	Yes
Shrimp	Year round	No	No	Yes
Silver Hake	Jan 1 to Oct 30	Yes	Yes	Yes
Snow Crab	Apr to Mar	No	No	Yes
Swordfish	Jun 1 to Oct 30	Yes	Yes	Yes
Yellowfin Tuna	Jun to Nov	No	Yes	Yes

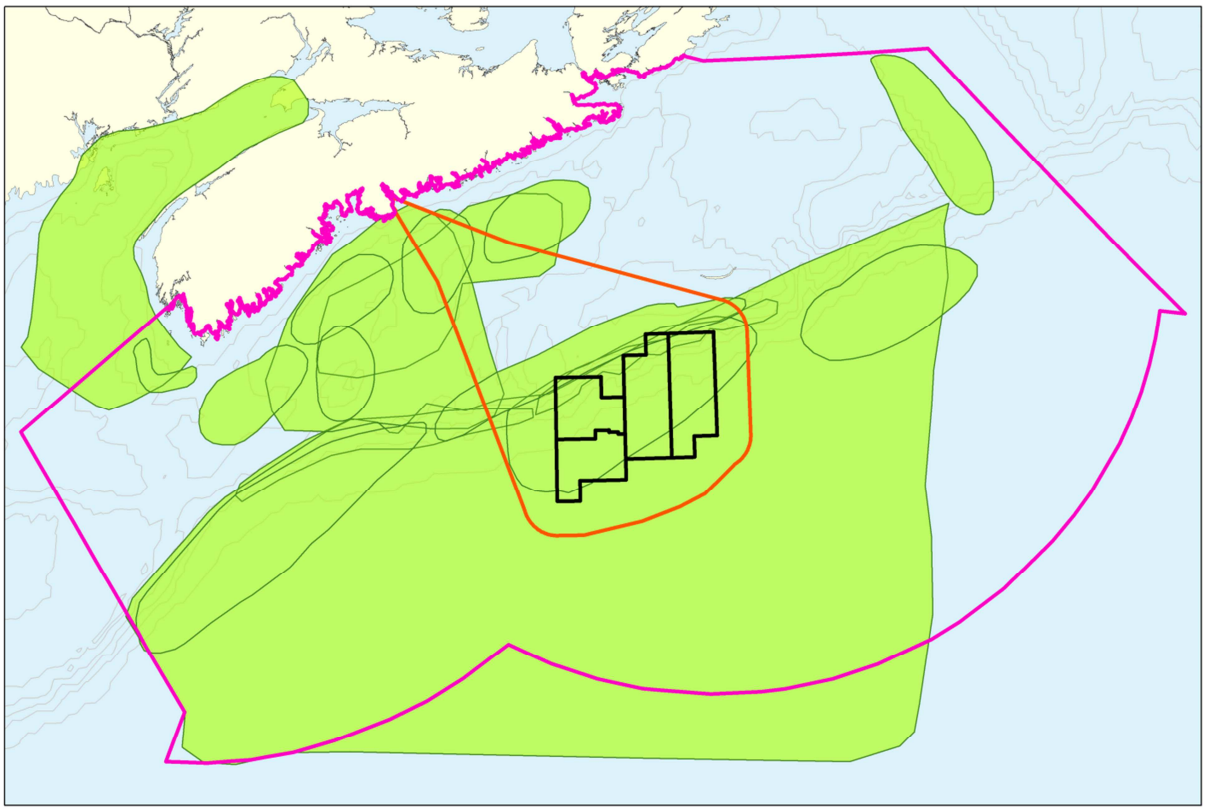

Figure 8: Summary of Fishing Areas of the Mi'kmaq and Wolastoqiyik of New Brunswick for Commercial Communal and Food, Social and Ceremonial purposes in the regional assessment area (RAA, purple), each red shaded polygon represents one fishers fishing area

5.3 Summary of Mi'kmaq Food, Social and Ceremonial Fisheries

5.3.1 Mi'kmaq of Nova Scotia

Thirty-four (34) fish species (Table 7), and ten (10) invertebrate groups (Table 8) were identified as species harvested for food, social and ceremonial purposes by Mi'kmaq throughout Nova Scotia (Fig 6). Where possible, the Mi'kmaq name is also provided. Marine macrophytes are not included. **The following list should not be considered an exhaustive summary. Due to time constraints with the project, some species may not have been identified.** Species fished in other management areas such as the Gulf region or other fishery zones that did not fall within the RAA were not included. The Mi'kmaq of Nova Scotia currently reported harvesting 5 fish species and 3 invertebrate species within the RAA and one invertebrate species in the LAA (Tables 7 & 8). No FSC fishing was reported in the Project Area.

Table 7. Fish species and season of harvest by the Mi'kmaq of Nova Scotia for food, social and ceremonial purposes. Symbols refer to those species as listed assessed by COSEWIC (•) and under consideration for listing by SARA (▪).

Species	Season	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
•▪ American Eel (Katew)	Year round	No	No	Yes
•▪ Striped Bass *(Ji'ka'w)*	Year round	No	No	No
•▪ Atlantic Cod (Peju)	Year round	No	No	No
•American Plaice (Anakwe'j)	Year round	No	No	No
•▪Atlantic salmon (Plamu)	Year round	No	No	Yes
Atlantic Herring (Alanj)	Year round	No	No	No
Atlantic Mackerel (Amlamekw)	Year round	No	No	Yes
•Blue Shark	Year round	No	No	No
Brook Trout (Atoqwa'su)	Year round	No	No	No
Brown Trout (Atoqwa'su)	Year round	No	No	Yes
Bull Brownhead (catfish)	Oct to May	No	No	No
Capelin *(Akukmekw)*	Year round	No	No	No
Chain Pickerel	Oct to May	No	No	No
Flounder (Anakwe'j)	Year round	No	No	Yes
Gaspereau (Alewife) (Kaspalaw)	May to June	No	No	Yes
Haddock (Putomaqanej)	Year round	No	No	No
Halibut (Anakwe'j)	Year round	No	No	No
Lake Trout (Atoqwa'su)	Year round	No	No	No
Lake Whitefish	Oct to May	No	No	No
Landlocked Salmon	Year round	No	No	No
Periwinkle (Jik'jij)	Year round	No	No	No
Pollock (Pestm)	Year round	No	No	No
Rainbow Smelt *(Kaqpesaw)*	Year round	No	No	No
Rainbow Trout (Atoqwa'su)	Year round	No	No	No
Redfish	Year round	No	No	No
Shad *(Msamu)*	Year round	No	No	No
Silver Hake (Ne'kapitalow)	Year round	No	No	No
Small Mouth Bass	Year round	No	No	No
Squid	Year round	No	No	No
Tomcod	Year round	No	No	No
Tuna	Year round	No	No	Yes
White Perch	Oct to May	No	No	No
White Sucker	Oct to May	No	No	No
Yellow Perch	Oct to May	No	No	No

Table 8. Invertebrate and mammalian species and season of harvest by the Mi'kmaq of Nova Scotia

Species	Season	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
American Lobster (Jakej)	June to Dec. 3	No	Yes	Yes
American Oysters (Mn'tmu'k)	Year round	No	No	No
Bay Quahaug (Pukanamowe's)	Year round	No	No	No
Blue Mussels (N'kata'laq)	Year round	No	No	No
Clams: Bar, surf, softshell clam (E's)	Year round	No	No	Yes
Crabs (except Snow Crab)	Year round	No	No	No
Periwinkle	Year round	No	No	No
Scallops (Saqskale's)	Year round	No	No	Yes
Squid	Year round	No	No	No
Seal	Year round	No	No	No

5.3.2 Native Council of Nova Scotia

Thirty-one (31) fish species (Table 9) and twelve (12) invertebrate species (Table 10) were identified as species that NCNS has harvested for food, social and ceremonial purposes throughout Nova Scotia (Fig 7). Where possible, the Mi'kmaq name is also provided. Marine macrophytes are not included. **The following list should not be considered an exhaustive summary and may include other species in the aquatic environments.** Species information in tables 9 & 10 were summarized through documentation provided during the study. The Native Council of Nova Scotia currently reported harvesting 5 fish species in the LAA and 16 fish species within the RAA (Table 9), as well as six (6) invertebrate species in the RAA (Tables 10). There was no FSC fishing in the Project Area.

Table 9. Fish species and season of harvest by the Native Council of Nova Scotia. Symbols refer to those species as listed assessed by COSEWIC (•) and under consideration by SARA (▪).

Species	Season	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
• ▪**American Eel (Katew)**	Year round	No	No	No
•**American Plaice (Anakwe'j)**	Year round	No	No	No
•▪ **Atlantic Cod (Peju)**	Year round	No	No	Yes
Atlantic Herring (Alanj)	Year round	No	Yes	Yes
Atlantic Halibut (Putomaqanej)	Year round	No	No	Yes
Atlantic Mackerel (Amlamekw)	Year round	No	Yes	Yes
•▪**Atlantic salmon (Plamu)**	Jan.1 to Nov. 15	No	No	Yes
•**Cusk**	Year round	No	No	No
Brook Trout (Atoqwa'su)	Year round	No	No	No
Brown Trout (Atoqwa'su)	Year round	No	No	No
Capelin *(Akukmekw)*	Year round	No	No	No
Chain Pickerel (Wisnak)	Year round	No	No	No
Flounder (Anakwe'j)	Year round	No	No	Yes
Gaspereau (Alewife) (Kaspalaw)	Year round	No	No	Yes
Greenland Halibut (Putomaqanej)	Year round	No	Yes	Yes
Haddock (Putomaqanej)	Year round	No	No	Yes
Lake Whitefish	Year round	No	No	No
Landlocked Salmon	Jan. 1 to Oct. 31	No	No	No
Monkfish	Year round	No	No	Yes
Pollock (Pestm)	Year round	No	No	Yes
Rainbow Smelt *(Kaqpesaw)*	Year round	No	No	No
Rainbow Trout (Atoqwa'su)	Year round	No	No	No
Red Hake (Ne'kapitalow)	Year round	No	No	Yes
Redfish	Year round	No	Yes	Yes
Shad *(Msamu)*	Year round	No	No	Yes
Silver Hake (Ne'kapitalow)	Year round	No	Yes	Yes
Small Mouth Bass (Maqtewe'kji'ka'w)	Jan. 1 to Oct. 31	No	No	No
• ▪**Striped Bass *(Ji'ka'w)***	Year round	No	No	No
White Hake (Ne'kapitalow)	Year round	No	No	Yes
White Perch	Year round	No	No	No
Yellow Perch	Year round	No	No	No

Table 10. Invertebrate species and season of harvest by the Native Council of Nova Scotia.

Species	Season	Occurrence in PA	Occurrence in LAA	Occurrence in RAA
Clams: Bar, softshell clam (E's)	Year round	No	No	No
American Lobster (Jakej)	Year round	No	No	Yes
Blue Mussels (Nkata'laq)	Year round	No	No	No
American Oysters (Mn'tmu'k)	Year round	No	No	No
Northern Quahaug (Pukanamowe's)	Year round	No	No	No
Scallops (Saqskale's)	Year round	No	No	Yes
Rock Crab (Mnjinikej)	Year round	No	No	No
Jonah Crab (Mnjinikej)	Year round	No	No	Yes
Green Crab	Year round	No	No	Yes
Shrimp	Year round	No	No	Yes
Squid (Sete'su)	Year round	No	No	No
Marine Worms	Year round	No	No	Yes

5.3.3 Mi'kmaq and Wolastoqiyik of New Brunswick

Only one species (lobster) was identified as a species harvested as food, social or ceremonial needs by both of the New Brunswick bands. This fishing area does not coincide with the proposed project area; occurring in the Bay of Fundy.

5.4 Summary of Interviews Completed

Between October to December 2015 and from February to March 2016, interviews were completed with thirty four (34) Nova Scotia Mi'kmaq, New Brunswick Mi'kmaq and Wolastoqiyik, and NCNS fishers and fishery directors who agreed to provide information for the project.

This summary of the data gathered and analyzed will be classified into the environmental effects assessment areas: Project Area, Local Assessment Area, and Regional Assessment Area.

5.4.1 Project Area

Among the Mi'kmaq of Nova Scotia fishermen, they identified fishing areas that fell within the Project Area. These fisheries include halibut (4 areas), snow crab (3 areas), swordfish (3 areas), hake (2 areas), cod (2 areas), haddock (2 areas), shrimp (2 areas), tuna (2 areas), cusk (1 area), mahi-mahi (1 area), and shark (1 area).

The bands of New Brunswick provided information that identified silver hake (2 areas), mahi-mahi (1 area), swordfish (1 area), and tuna (1area) were caught within the project area.

Fishing areas described by NCNS fishermen within the project assessment area include tuna (4 areas, big eye, Bluefin, and Yellowtail), swordfish (3 areas), and halibut (1 area).

There was no FSC fishing information for the Project Area gathered during the interviews; all fishing areas identified by the Mi'kmaq of Nova Scotia, NCNS, and the bands of New Brunswick, were utilized for commercial fisheries.

5.4.2 Local Area Assessment

Inside the Local Assessment Area, Mi'kmaq of Nova Scotia fishermen identified eleven (11) tuna, and eight (8) snow crab fishing areas, in the highest frequency. Other species identified by informants were:

- Swordfish (5 areas)
- Haddock (4 areas)
- Halibut (4 areas)
- Cod (3 areas)
- Shark (3 areas)
- Silver Hake (3 areas)
- "Groundfish" (2 areas)
- Jonah Crab (2 areas)
- Lobster (2 areas)
- Pollock (2 areas)
- Shrimp (2 area)
- Cusk (1 area)
- Mahi-mahi (1 area)
- Redfish (1 area)

The species the New Brunswick bands reportedly fished the most in the LAA was swordfish in eight (8) areas), as well as tuna and silver hake in four (4) areas each. Other species fished in the LAA are:

- Shark (3 areas)
- Haddock (2 areas)
- Pollock (2 areas)
- Redfish (2 areas)
- Cod (1 area)
- Jonah Crab (1 area)
- Mahi-mahi (1 area)

Fishermen representing the NCNS reported the majority of fishing activity in the LAA was fishing various species of tuna (Bluefin and Bigeye) in four (4) areas. In addition to tuna, swordfish was fished in two areas, and halibut and gaspereau were reported in one (1) area each.

5.4.3 Regional Assessment Area

Based on the information gathered from the information gathered from informants, the vast majority of fishing activities undertaken by Mi'kmaq fishermen of Nova Scotia were for commercial purposes. Species identified by fishermen were:

- tuna (38 areas)
- snow crab (25 area)
- haddock (21 areas)
- lobster (19 areas)
- halibut (18 areas)
- cod (15 areas)
- pollock (14 areas)
- silver hake (12 areas)
- flounder (9 areas)
- redfish (8 areas)
- cusk (7 areas)
- swordfish (7 areas)
- scallop (6 areas)
- shrimp (6 areas)
- Jonah crab (5 areas)
- mahi mahi (4 areas)
- herring (3 areas)
- shark (3 areas)
- mackerel (2 areas)
- clam (1 area)
- eel (1 area)
- gaspereau (1 area)
- hagfish (1 area)
- sea urchin (1 area)

FSC fishing activities identified by Mi'kmaq fishermen in Nova Scotia consisting of six lobster, three scallop, and one clam fishing areas within the RAA.

Within the RAA, Mi'kmaq and Wolastoqiyik fishermen from New Brunswick only reportedly utilized the area for commercial fisheries. Fish species fished in the area are swordfish reported in seven (7) areas, tuna in five (5) areas, and haddock, mahi-mahi, pollock, redfish, and silver hake, in four (4) areas each.

Other species fished in the RAA are:

- shark (3 areas)
- cod (1 area)
- Jonah Crab (1 area)

Fishermen representing the Native Council of Nova Scotia reported the majority of fishing activity in the RAA was for tuna (7 areas) and snow crab (4 areas). Other species reported to be caught in the RAA are:

- gaspereau (3 areas)
- herring (3 areas)
- lobster (3 areas)
- swordfish (3 areas)
- halibut (2 areas)
- cod (1 area)
- cusk (1 area)
- haddock (1 area)
- silver hake (1 area)
- Jonah crab (1 area)
- marine worm (1 area)
- monkfish (1 area)
- pollock (1 area)

5.5 Significance of Area

Through the analysis of the information gathered for the Study Area, informants were asked to identify other activities or other important information about the area, including spawning areas, nursery areas, etc.

- Migration routes of tuna, swordfish, and haddock along the Scotian Shelf
- Tuna migration route along the coast of Nova Scotia through to Georges Basin
- Eel migration starts in the Sargasso sea and travel up to Canada along the coasts of the continent where they spend the majority of their lives feeding and growing. Mature eels known as silver eels, return to the Sargasso Sea following the deep waters off NS and along the continental shelf to reproduce
- Cod spawning areas in LaHave Bank, Baccaro Bank, Roseway Bank, Browns Bank, Georges Basin, and Georges Bank
- Sightings of whales, porpoises, and swordfish from the southern coast of Nova Scotia through Roseway Basin, Baquereau Bank, Browns Bank, and Georges Bank
- Spawning areas for groundfish spanning from Bay of Fundy, to Browns Bank
- Lobster spawning area located in the areas of Browns Bank to La Have Bank

5.6 Documented Concerns and/or Recommendations for Further Study

- Concern on effect of all species especially since the area is rich in biodiversity
- Concern for area as it is important to species at risk such as the leatherback turtle
- Concern with ecological and economical impacts especially if there is a spill (effects to food web), as well as capping times.
- Migration routes of species within the Project Area, LAA, and RAA could be affected
- All food fisheries in all of Nova Scotia are an inherent Aboriginal right to the Mi'kmaq

6.0 Conclusions and Information Gaps

There are no areas currently identified within the Project Area for FSC harvest, however, this does not imply the area is not utilized for FSC fisheries, of significance, or that it may not be accessed for future FSC needs. The importance of this area is in the means by which it connects other ecosystems, such as the Bay of Fundy, the Scotian Shelf, the Gulf of St. Lawrence, and the Bras d'Or Lakes, for example, for which culturally significant species such as salmon, eels, mackerel, and striped bass migrate through.

Within the Regional Assessment Area, lobster, scallops, and clams, were identified as being fished for food, social, and ceremonial purposes.

Commercial fishery harvesting by Mi'kmaq and Wolastoqiyik occurs within the boundaries of the Regional Assessment Area for 31 species albacore tuna, bigeye tuna, bluefin tuna, clam, cod, cusk, eel,

flounder, gaspereau, green crab, haddock, hagfish, halibut, herring, Jonah crab, lobster, mackerel, mahi-mahi, marine worm, monkfish, pollock, quahaug, redfish, scallop, sea urchin, shark, shrimp, silver hake, snow crab, swordfish and white hake.

The Inner Shelf is an important fishing area for groundfish (cod, and redfish) (Appendix B), herring (Appendix C), snow crab, shrimp, and lobster (Appendix D). The shelf area is important fishing grounds for groundfish, in particular cod and redfish and hagfish (Appendix B). The slope/channel is an important fishing area for redfish, cod, flounder and groundfish in general, and also for shrimp (Appendix D).

Landings, value and employment generated information specific to fishing activities within the Scotian Shelf Project Area is unavailable at the community level. Revenue generated from commercial fishing activities is an important contribution to the overall economy of Mi'kmaq communities. Any limitations to current fishing practices and/or locations of fishing will have a direct impact to employment and revenues generated by Mi'kmaq bands.

The information gathered and processed is highly dependent on the data provided by the informants during the interview process. This study should not be taken as an absolute measure of Mi'kmaq ecological knowledge and use of the land and sea. As the study documents current and past harvesting, questions relating to future plans for fishing for other species in the study area were not posed during the interviews. There may be Mi'kmaq communities with interests in emerging fisheries that are not documented.

7.0 References

Online: *Abenaki*, The New World Encyclopedia http://www.newworldencyclopedia.org/entry/Abenaki

Aboriginal Affairs and Northern Development Canada. First Nation Profiles. 2016. http://fnp-ppn.aandc-aadnc.gc.ca/FNP/Main/Search/RVListGrid.aspx?lang=eng

Bassett, Edward, *Cultural Importance of River Herring to the Passamaquoddy People,* Sipayik Environmental Department, Pleasant Point Reservation, Passamaquoddy Tribe, 2014.

Breeze, Heather, *Distribution of Corals Off Nova Scotia*, Ecology Action Centre, 1997

Online: Campbell, D. C., Piper, D. J. W., Mosher, D. C., Jenner, K. A., *Sun-Illuminated Seafloor Topography, Mohican Channel, Scotian Slope, Offshore Nova Scotia, Map 2124A,* Geological Survey of Canada, 2008, http://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/fulle.web&search1=R=225380

Online: Campbell, D. C., Piper, D. J. W., Mosher, D. C., Jenner, K. A., *Sun-Illuminated Seafloor Topography, Verrill Canyon, Scotian Slope, Offshore Nova Scotia, Map 2125A,* Geological Survey of Canada, 2008, http://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/fulle.web&search1=R=225381

Online: Canadian Museum of History, The Debert Palaeo-Indian National Historic Site, 2014, http://www.historymuseum.ca/cmc/exhibitions/tresors/ethno/etb0370e.shtml

Online: CNSOPB, Canada-Nova Scotia Offshore Petroleum Board, *Call For Bids 2011-2012, NS11-1*, Western Scotia Margin, 2014 , http://www.callforbids.cnsopb.ns.ca/2011/01/regional_geoscience_wsm_intro.html

Online: CNSOPB, Canada-Nova Scotia Offshore Petroleum Board, *Call For Bids 2012, NS12-1*, Central Scotia Margin, 2014, http://www.callforbids.cnsopb.ns.ca/2012/01/ns12-1-parcels/central-scotian-margin-parcels-12-7-11/regional-overview

Online: CNSOPB, Canada-Nova Scotia Offshore Petroleum Board, Geoscience, Geoscience Overview, *Regional Geology*, 2014, http://www.cnsopb.ns.ca/geoscience/geoscience-overview/regional-geology

Online: Coral and Sponge Conservation Measures, Fisheries and Oceans Canada, 2016 http://www.mar.dfo-mpo.gc.ca/Maritimes/Oceans/OCMD/Coral/Conservation-measures

Online: Davis, D. Brown, S., *The Natural History of Nova Scotia, Volumes 1, 2*, Nova Scotia Museum, Department of Education and Culture, Province of Nova Scotia, Nimbus, 1996, http://ojs.library.dal.ca/NSM/search/titles

Online: Deptuck, M., *Impact of a Cosmic Body into the Ocean: Seismic Stratigraphic Evidence for Widespread Margin-Collapse Triggered by the ~51 Ma Montagnais Marine Bolide Impact off Southwestern Nova Scotia*, CNSOPB, 2013, http://www.dal.ca/faculty/science/earth-sciences/news-events/events/2013/11/26/earth_sciences_seminar.html

DFO. 2014a. Aboriginal Fisheries Strategy. [On-line]:http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/afs-srapa-eng.htm. Accessed April 1,2014.

DFO. 2014b. ARCHIVED - First Nation Participation in Commercial Fisheries Following the *Marshall* Decision. [On-line]: http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/marshall/index-eng.htm. Accessed April 1, 2014.

Fisheries and Oceans Canada, *Coral and Sponge Conservation Strategy for Eastern Canada 2015,* 2015

Online: Freie Universitat Berlin, *Plate Tectonics Theory,* 2014, http://www.cms.fu-berlin.de/geo/fb/e-learning/geolearning/en/gondwana/plate_tectonics_theory/index.html?TOC=plate_tectonics_theory/index.html

Online:*,* Gagnon, C. *Native Peoples in the Upper St. John River Valley,* Native Peoples in the Madawaska:The Malisset or Wulustukieg. http://www.upperstjohn.com/history/natives.htm

Online: Government of Canada, Constitution Act, 1867: Rights of the Aboriginal Peoples of Canada. 2016 http://laws-lois.justice.gc.ca/eng/const/page-16.html#h-52

Grant, Douglas R., *Recent submergence of the Maritime Provinces. Canada*, Geological Survey of Canada, Ottawa, 1970

Online: Fisheries and Oceans Canada. Atlantic Integrated Commercial Fisheries Initiative. 2012 http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/aicfi-ipcia/index-eng.htm

Online: *History of the LaHave Islands and Surrounding Area*, LaHave & Surrounding Islands, LaHave Islands Marine Museum. http://www.lahaveislandsmarinemuseum.ca/lahaveislandsandarea.html

Online: Keenlyside, David L., *Glimpses of Atlantic Canada's Past*, Canadian Museum of Civilization, http://www.historymuseum.ca/learn/research/resources/resources-for-scholars/essays/glimpses-into-atlantic-canadas-past/

Mann, Charles C., *The Clovis Point and Discovery of America's First Culture*, Smithsonian Magazine, 2013, http://www.smithsonianmag.com/history/the-clovis-point-and-the-discovery-of-americas-first-culture-3825828/?no-ist

Online: Middleton, G. V., *continental rise,* Encyclopedia Britannica, 2014, http://www.britannica.com/EBchecked/topic/134967/continental-rise

Murphy, Brent M., Researching The Early Holocene of the Maritime Provinces, Thesis, Department of Anthropology, Memorial University of Newfoundland, 1998

Online: NOC, Natural Environment Research Council, *Layers of the water column*, 2014, http://noc.ac.uk/research-at-sea/exploration-at-sea/water-column/layers-water-column

Online: OERA, Offshore Energy Research Association, *Nova Scotia PFA Atlas, Chapter 2, Plate Tectonics*, 2014, http://www.oera.ca/offshore-energy-research/geoscience/play-fairway-analysis/pfa-atlas/

Paul, Daniel M., *We Were Not Savages, A Collision Between European North American Civilizations*, 3rd ed. Fernwood, Halifax, 2006

Online: *Penobscot*, The New World Encyclopedia http://newworldencylopedia.org/entry/Penobscot

Online: Prins, Harold, *Storm Clouds over Wabanakiak, Confederacy Until Drummer's Treaty (1727)*, The Atlantic Policy Congress of First Nations Chiefs. http://genealogyfirst.ca/first-nations/Wabanakiak-Confederacy

Online: Stastna, Kazi, *Clovis people not 1st to arrive in North America*, CBC News, 2012, http://www.cbc.ca/news/technology/clovis-people-not-1st-to-arrive-in-north-america-1.1235030

Stea, R. R., Conley, H., Brown, Y., *Surficial Geology of the Province of Nova Scotia, Map 92-3*, Nova Scotia Department of Natural Resources, 1992

Shaw, John, *Geomorphic Evidence of Postglacial Terrestrial Environments on Atlantic Continental Shelves*, Geological Survey of Canada (Atlantic), Bedford Institute of Oceanography, Dartmouth, 2005

TCR Environmental Corporation*, Inventory and Analysis of Archaeological Site Occurrence on the Atlantic Outer Continental Shelf*, Bureau of Ocean Energy Management, U. S. Department of the Interior, New Orleans, 2012

Tuck, James A., *Maritime Provinces Prehistory*, National Museum of Man, National Museums of Canada, Ottawa, 1984

Trigger, Bruce G., *Northeast*, Vol.15, Smithsonian Institute, Washington, 1978

UINR, CMM, NCNS., *The Mi'kmaw Resource Guide*, 3rd ed., Eastern Woodland Publishing

Online: *Wolastoqiyik, Portrait of a People*, Tourism, Heritage and Culture, Government of New Brunswick, http://www2.gnb.ca/content/gnb/en/departments/thc/heritage/content/archaeology/Wolastoqiyik.html

Appendices

Appendix A

Map of Commercial and FSC Fisheries

BP Scotian Shelf Traditional Use Study

Interview Data:
Commercial and
FSC Fisheries

Legend

- Regional Assessment Area (RAA)
- Local Assessment Area (LAA)
- Exploration Drilling Project Area
- FSC Fisheries
- Commercial Fisheries
- Bathymetry (Meters)

Disclaimer

This map is a graphical representation of Mi'kmaq ecological knowledge gathered throughout the study, and should not be used for navigation purposes. Features presented may not accurately representaactual topographical or proposed features.

This map service displays bathymetric countours, depths are in meters.

N
W E
S

Datum: UTM NAD83 Zone 20
Scale: 1:3,000,000

Version: 2
22 Apr 2016

Membertou
GEOMATICS SOLUTIONS

Appendix B

Map of Demersal Fisheries

BP Scotian Shelf Traditional Use Study

Interview Data:
Demersal Fisheries

Legend

- Demersal Fisheries
- Regional Assessment Area (RAA)
- Local Assessment Area (LAA)
- Exploration Drilling Project Area
- Bathymetry (Meters)

Disclaimer

This map is a graphical representation of Mi'kmaq ecological knowledge gathered throughout the study, and should not be used for navigation purposes. Features presented may not accurately representaactual topographical or proposed features.

This map service displays bathymetric countours, depths are in meters.

N
W E
S

Datum: UTM NAD83 Zone 20
Scale: 1:3,000,000

Version: 2
22 Apr 2016

Membertou
GEOMATICS SOLUTIONS

Appendix C

Map of Pelagic Fisheries

BP Scotian Shelf Traditional Use Study

Interview Data:
Pelagic Fisheries

Legend

- Pelagic Fisheries
- Regional Assessment Area (RAA)
- Local Assessment Area (LAA)
- Exploration Drilling Project Area
- Bathymetry (Meters)

Disclaimer

This map is a graphical representation of Mi'kmaq ecological knowledge gathered throughout the study, and should not be used for navigation purposes. Features presented may not accurately representaactual topographical or proposed features.

This map service displays bathymetric countours, depths are in meters.

N
W E
S

Datum: UTM NAD83 Zone 20
Scale: 1:3,000,000

Version: Draft
22 Apr 2016

Membertou
GEOMATICS SOLUTIONS

Appendix D

Map of Invertebrate Fisheries

British Petroleum Scotian Shelf Traditional Use Study

Interview Data:
Invertebrate Fisheries

Legend

- Invertebrate Species
- Regional Assessment Area (RAA)
- Local Assessment Area (LAA)
- Exploration Drilling Project Area
- Bathymetry (Meters)

Disclaimer

This map is a graphical representation of Mi'kmaq ecological knowledge gathered throughout the study, and should not be used for navigation purposes. Features presented may not accurately representaactual topographical or proposed features.

This map service displays bathymetric countours, depths are in meters.

N
W E
S

Datum: UTM NAD83 Zone 20
Scale: 1:3,000,000

Version: 2
22 Apr 2016

Membertou
GEOMATICS SOLUTIONS