# REGIONAL ASSESSMENT OF OFFSHORE OIL AND GAS EXPLORATORY DRILLING EAST OF NEWFOUNDLAND AND LABRADOR

## Draft Report

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**Committee Members:**

**Garth Bangay (Co-Chair)**
**Wes Foote (Co-Chair)**
**Gerald Anderson**
**Maureen Murphy Rustad**
**Keith Storey**

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# EXECUTIVE SUMMARY

On April 15, 2019 the federal Minister of the Environment and Climate Change (ECCC) announced the appointment of a five-member Committee to conduct a Regional Assessment of Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador. The Committee was mandated by a Terms of Reference outlined in an Agreement signed by the federal Ministers of ECCC and Natural Resources Canada and the provincial Ministers of Natural Resources and Intergovernmental and Indigenous Affairs. The directive was to facilitate a more effective and efficient assessment process for exploratory drilling projects in the defined offshore Study Area, while also ensuring that the highest levels of environmental protection continued to be applied and maintained. The Agreement stipulated that this work was to be completed by the Fall of 2019, which was subsequently extended to the end of February 2020 for the Regional Assessment Report and the end of May 2020 for completion of the associated Geographic Information System (GIS) decision-support tool.

This Report details the knowledge gained over the course of ten months of work by the Committee, including its associated analysis and engagement activities, the conclusions reached and the recommendations being made. In many cases these are directed towards creating an improved regulatory regime for future exploratory drilling projects, whereas others are directed to other government departments and agencies to improve the knowledge base and processes needed for future sustainable resource management.

The Regional Assessment Committee was ably supported by a Task Team consisting of impact assessment (IA) and technical experts drawn from both levels of government. The Committee quickly developed a program of work that initially focused on reaching out to everyone with an interest in offshore oil and gas exploration in the Study Area and its potential effects. During the course of the Committee's work, over 100 meetings were held with these interested parties, either individually, by group or collectively in facilitated workshops. In every instance, the Committee made efforts to document, verify and publicly share the results of these engagements. The views of participants ranged from outright skepticism to energetic support. Concerns were often raised that the Committee had insufficient time, the Study Area was too large and complex, and that there were just too many unknowns. Conversely, many saw this process as an opportunity to improve and replace one that was costly, time consuming, duplicative and which added little value in protecting the offshore environment.

Faced with this range of often conflicting interests and views, the Committee began a process of gathering knowledge from both government and non-government sources that could contribute to achieving its objectives. The Committee decided at a very early stage that a GIS component would be the optimal tool to compile, organize and allow the effective and efficient presentation of the geospatial information and associated knowledge being assembled. This was initially a somewhat experimental process, but with the expertise provided by the GIS contractor, quickly became a working tool that successfully integrated both spatial and textual information into a functioning system that could be used to support analysis and future decision-making. The Committee views the further development and maintenance of this system as integral to the successful implementation of the regulation that it understands will be derived from the Regional Assessment Report. It also provides a publicly accessible system that can be widely used in undertaking future analysis and resource planning and risk assessments in the Regional Assessment Study Area. Assessing and evaluating risk was beyond the timing and resources available to the Committee, but remains a fundamental requirement to guide future decision-making around sustainable use of offshore resources. The GIS decision-support tool gives resource managers the means to identify and analyse the multitude of factors at play in the offshore environment that are relevant to future exploratory drilling in this region.

Directly related to the future development and use of this system and the subsequent regulation is the need for the Impact Assessment Agency of Canada (IAAC) to establish a Regional Assessment Oversight Committee. This will ensure that there is a continued, coordinated focus on the objectives outlined above, and continued public scrutiny of the evolving Regional Assessment process, as well as a long-term commitment and investment in updating and keeping the GIS decision support tool and the Regional Assessment outcomes relevant to an evolving offshore environment and industry. This Oversight Committee will need to comprise a broad range of interests, including Indigenous groups, and have the authority to advise the IAAC when and where updates and improvements are necessary. There will also need to be firm commitments from other government agencies to provide ongoing support to the future updates to, and evolution and use of, the Regional Assessment.

The Committee made an early decision to meaningfully engage Indigenous communities by meeting early, often and at locations and times convenient to those who wished to participate. Many of these communities, often located far from offshore drilling projects, felt disengaged from an environmental assessment (EA) process that required the review of extensive, repetitive documents and where, in their view, the balance of power was highly skewed. Some Indigenous people also felt their knowledge and worldviews on the connectivity of all aspects of ocean ecosystems were not well recognized or considered in decision-making. In the future, a more sustained effort to reflect on these views together with western science (through "Two-eyed Seeing") will advance our overall understanding and ultimately the management of these marine resources. Directly involving Indigenous people in reviewing and updating the Regional Assessment through the Oversight Committee, as well as having additional input into Regional Assessment procedures and policies going forward, will help build a relationship that can only improve the management of the offshore environment. We have also heard from Indigenous people that governments still spend too much time working in silos, which is a clear impediment to gaining a comprehensive understanding of the environment and potential effects and in effective management.

One particular area that challenged the Committee was around determining if there are identifiable geographic areas within the Study Area that deserved outright protection from future oil and gas exploratory drilling, or which required additional or enhanced mitigative measures. The Committee found that there are a number of important defined "special areas" in the Study Area, but to date there have been no requirements for any enhanced protective measures within these for proposed exploratory drilling activities, including within identified Marine Refuges that currently prohibit certain types of commercial fishing activities. No supporting scientific basis has been provided through the Regional Assessment process upon which to define specific locations, times or other situations where additional or enhanced mitigation or follow-up requirements should be applied. Consequently, the Committee has not recommended that any portions of the Study Area be excluded from exploratory drilling activities at this time. The Committee has however, recommended that responsible government agencies accelerate the relevant science / policy processes relevant to these areas, which have already been designated as having special ecological values in the near term, to determine if additional environmental protection (including mitigation requirements for exploratory drilling) are prudent within these areas.

While the Agreement did provide the Committee with access to scientific staff and resources through the Technical Advisory Group component, too often in the Committee's view the science expertise of the federal government was not available or accessible to support the work of this Committee. In particular, it was originally envisioned that the government experts would be directly involved in the planning, data analysis and writing of various components of the Regional Assessment. With some notable exceptions, this did not occur. This is an untenable situation and seriously hampered our efforts, and the Committee maintains that federal agencies

simply offering to peer review the report is not a sufficient nor particularly useful role for a cooperative initiative such as this. If there are future Regional Assessments this weakness will need to be addressed as a priority.

The consideration of cumulative effects was also a challenge for the Committee, as these effects are inherently complex and challenging to assess and manage. Compared to a project-specific assessment approach, a Regional Assessment provides a more holistic and proactive approach to considering cumulative effects, but the difficulties of modelling cumulative effects and their ecological outcomes still pose key challenges in this regard. As part of the Regional Assessment process, a number of scenarios were developed in an attempt to forecast possible future exploratory drilling activities in the Study Area. Neither experience to date nor the future drilling scenarios developed here indicate that there has been or will likely be significant spatial and temporal concentrations of offshore activity and associated cumulative effects from exploratory drilling in the Study Area. However, the inevitable uncertainties associated with predicting these outcomes suggest that a planning, rather than a predictive modelling approach, is a more useful one if potential adverse effects are to be avoided or minimized – an approach which needs to begin early in the offshore exploration life cycle. For this reason, the Committee focused its attention on the Canada-Newfoundland and Labrador Offshore Petroleum Board's land tenure process as an optimal point in the offshore oil and gas planning process to consider the spatial and temporal distribution and intensity of future activity, and to seek to address this through appropriate planning through the use of the GIS decision support tool.

The Committee feels that important progress on issues around potential effects on marine and migratory birds has been, and can continue to be, made. To that end, we are proposing a cooperative framework between scientists and the offshore industry to establish the factual evidence necessary to ensure effects on these populations are better understood and minimized. In a related way, we are also calling for a more scientific approach to monitoring the presence of, and effects on, marine mammals during offshore oil and gas activities. It is notable that past project-specific EAs have not significantly advanced either of these issues, but it is hoped that a more regional and cooperative approach can.

On the matter of mitigation measures, the Committee has found that, based on the experience gained from earlier EA reviews, there are a number of typical and fairly standard mitigation measures applied to exploratory drilling projects in the Study Area. Indeed, there has been a high degree of commonality across projects and assessments, as documented in their respective Environmental Impact Statements (EISs) and in the various EA decision statements issued by government. The Committee was encouraged that the Newfoundland and Labrador offshore oil and gas industry works within internationally accepted standards for environmental protection, and the Committee has recommended that the various mitigation and follow-up measures that have been identified in and required under recent EAs become regulatory requirements for all future exploratory drilling projects in the Study Area. However, without the discipline of successive individual EAs keeping these measures up to date, this must become a critical role for the proposed Oversight Committee. Adequate resources to build and maintain that capacity will be mandatory if public confidence in the Regional Assessment process is to be maintained.

Time and again concerns were raised related to the possible catastrophic release of hydrocarbons from offshore oil and gas activity and the certain damage to the ecosystem that would follow. There is no doubt this is always a possible risk, and there are various measures and processes in place to address these incidents and their outcomes. The fact that such spill prevention and response measures in Newfoundland and Labrador's offshore environment are likely to be less than totally effective means a much harder look at risks to marine resources in

the vicinity of offshore exploratory wells needs to become a priority. Thus, the Committee has called for improved science-policy linkages and the conduct of both qualitative and quantitative risk assessments in the future. Only then will we truly understand what critical environmental components are at risk. There is also no doubt that a large oil spill, such as from a blowout, could hinder Canada's ability to meet its obligations under the UN Convention on Biological Diversity. Fortunately, based on the history of offshore exploration drilling, as well as numerous control mechanisms in place to prevent and respond to such incidents, this scenario is considered unlikely to occur as the risks have been reduced to as low as reasonably practicable.

In a time of climate crisis, the issue of greenhouse gas emissions (GHG) associated with offshore oil and gas exploratory drilling is an important one. The Committee has undertaken calculations of potential emissions based on the Government of Newfoundland and Labrador's projection of 100 new exploratory wells being drilled in the Canada-NL Offshore Area over the next 10-12 years. The estimated annual GHG emissions for these 100 wells are predicted to contribute 0.07 – 0.1 percent of the federal 2020 GHG target and 0.09 – 0.12 percent of the federal 2030 target. All emissions are important in determining whether and how our national GHG targets can be reached. However, given the small portion of total emissions generated by this sector, and our inability to analyze other national sources, it is considered unlikely that exploratory drilling itself would hinder Canada's ability to meet its emissions targets. The Committee does recognize however, that exploratory drilling is the "thin edge of the wedge" and successful exploration may lead to oil and gas production with concomitant GHG emissions. The Committee's mandate to examine only exploratory drilling then leaves the broader issue of GHG emissions, and associated climate change considerations from the overall oil and gas sector to other, more appropriate venues.

It also often seems that any review process such as the Regional Assessment inevitably unearths the issue of consultation and communication. Recurring concerns about lack of notification, lack of awareness, timing, inability to understand, and perceived secretiveness abounded as the Committee met with the broad spectrum of people and groups associated with the offshore. We heard these concerns, and as a result made some straightforward and actionable recommendations about how improvements can be made. In an increasingly digital world, the response "we posted it on our web page" is not a surrogate for adequate communications and engagement. Many communities of interest are not operating at the same level of digital awareness and too often things are missed or not enough layers peeled to get the answers to concerns. The Committee believes that more can and should be done regarding effective communication.

The Committee will of course ultimately be judged on the extent to which it heard concerns and acted on what we were told in the form of our findings and recommendations. Many have made the effort to fully and thoughtfully participate in the Regional Assessment and to help the Committee achieve its goals, and for that we are truly grateful. Time was short and there is no doubt the Committee could have used more. Still, we believe the Regional Assessment Report and the accompanying GIS decision support system represents an important step forward in ensuring that Newfoundland and Labrador's offshore resources are managed sustainably into the future.

## ACKNOWLEDGEMENTS

The Regional Assessment Committee could not have completed this Report without the assistance and guidance of many individuals and groups. We are very grateful to Indigenous groups and stakeholders for participating in the engagement process and the Technical Advisory Group sessions that spanned from Newfoundland and Labrador to Québec from May to December. Your willingness to accommodate the Committee and our tight timeline is greatly appreciated.

The collaborative manner in which information was shared and exchanged at these sessions provided the Committee with meaningful insight on your perspectives on the Regional Assessment. The Committee thanks you for that and for the feedback you took the time and effort to offer in the interim.

It is important to us that you know we listened intently and applied the learnings throughout the Report in an effort to achieve the ultimate goal of improving the efficiency and effectiveness of environmental assessment while providing the highest level of protection for the marine environment.

The Committee gives special mention to the Indigenous communities and organizations involved in the Regional Assessment: the Innu Nation (Labrador Innu); Nunatsiavut Government (Labrador Inuit); NunatuKavut Community Council; Miawpukek First Nation; Qalipu First Nation; Kwilmu'kw Maw-klusuaqn Negotiation Office representing Acadia First Nation, Annapolis Valley First Nation, Bear River First Nation, Eskasoni First Nation, Glooscap First Nation, Membertou First Nation, Paqtnkek Mi'kmaw Nation, Pictou Landing First Nation, Potlotek First Nation, Wagmatcook First Nation, and We'koqma'q First Nation; Mi'gmawe'l Tplu'taqnn Inc representing Fort Folly First Nation, Eel Ground First Nation, Pabineau First Nation, Esgenoôpetitj First Nation, Buctouche First Nation, Indian Island First Nation, Eel River Bar First Nation, and Metepnagiag Mi'kmaq First Nation; Wolastoqey Nation of New Brunswick representing Kingsclear First Nation, Madawaska Maliseet First Nation, Oromocto First Nation, Saint Mary's First Nation, Tobique First Nation and Woodstock First Nation; Mi'kmaq Confederacy of PEI representing Abegweit First Nation and Lennox Island First Nation; Mi'gmawei Mawiomi Secretariat representing Micmacs of Gesgapegiag, La Nation Micmac de Gespeg, and Listuguj Mi'gmaq Government; Conseil des Innu de Ekuanitshit; Première Nation des Innus de Nutashkuan; Unama'ki Institute of Natural Resources; Mi'kmaq Conservation Group; and Atlantic Policy Congress.

We acknowledge the written format does not capture the spirit of the spoken messages shared with us. The Committee is grateful for the time you spent with us and the knowledge imparted. It was an invaluable experience to witness and learn about Indigenous values, beliefs and the effects of the power imbalance. You broadened our horizons with the lessons of *two-eyed seeing* and "it is not what you know but how you know it".

Special thanks to Dr. Steve Bonnell, Manager of Strategic and Regional Assessments with the Impact Assessment Agency of Canada, and the other members of the Task Team. The Committee commends your effort, diligence and the countless hours worked to facilitate our ability to complete the Report to this standard. We also thank ICI Innovations for their support in the development of the associated GIS decision-support tool.

This Regional Assessment Report is the first such assessment to be completed under federal impact assessment legislation in Canada. The Committee has endeavoured to meet expectations and challenges encountered during this process and deliver an evergreen product that will benefit all users.

# 1 INTRODUCTION

This Regional Assessment of offshore oil and gas exploratory drilling east of Newfoundland and Labrador represents the first such assessment to be undertaken under federal impact assessment (IA) legislation in Canada. It seeks to improve the efficiency and effectiveness of the federal IA process as it applies to offshore oil and gas exploratory drilling and associated activities, by both facilitating a more predictable and timely regulatory process for future drilling activities while also ensuring the protection of the environment. This approach represents a planned departure from the traditional and duplicative project-specific IA reviews that have characterized recent drilling proposals, and instead seeks to undertake a comprehensive, regional-scale analysis that helps inform the establishment of specific environmental protection requirements for future exploratory drilling in this region.

In planning and completing this Regional Assessment, the Committee has undertaken to design and implement an open, transparent and fully participative process, and complete a robust and comprehensive assessment of the effects of exploratory drilling and associated activities in the Study Area. The Committee's resulting recommendations are aimed at identifying and implementing environmental protection measures for future drilling proposals, drawing from the findings of recent project assessments but also highlighting any key outstanding issues of concern (both project-specific and cumulative) and recommending additional mitigation and follow-up measures for future activities as required. In completing its work, the Committee has also made a number of recommendations around further studies and analysis to fill important data gaps.

Fundamental to the Committee's work has also been investigating ways of presenting and using information in a more effective and efficient manner, particularly through the development of an associated geographic information system (GIS) decision-support tool. This represents the first time that this information has been compiled and made publicly available through an interactive system such as this, which has been designed to be accessible and beneficial for all interested parties. It is also envisioned as an "evergreen" product that must be regularly updated as new information and knowledge becomes available, which will require the on-going involvement of all relevant parties, under the guidance of an oversight committee comprised of Indigenous and stakeholder interests.

The sections that follow provide an introduction to the Regional Assessment Report, outlining the purpose and rationale, regulatory context, governance structure and scope of the assessment, as well as its planned use in future decision-making regarding offshore exploratory drilling and associated activities in this region. It also describes the overall organization and focus of the report, and of the associated technical supporting documents (modules) and GIS decision-support tool that have also been developed as part of this process.

## 1.1 Purpose and Rationale

This Regional Assessment was initiated and undertaken pursuant to an April 2019 Agreement between the Ministers responsible for the Impact Assessment Agency of Canada (IAAC), Natural Resources Canada, the Newfoundland and Labrador Department of Natural Resources and for Intergovernmental and Indigenous Affairs for Newfoundland and Labrador (the Agreement). The Agreement sets out the terms of reference for the Committee and other procedural matters related to the completion of the Regional Assessment, as well as defining its scope and various matters that it must consider and address. The Regional Assessment applies to,

and is focused on, offshore exploratory drilling and associated activities in a large marine Study Area off Eastern Newfoundland (Figure 1.1).

As directed in the Agreement, the Committee immediately undertook to engage with Indigenous groups and any others that had knowledge relevant to the Regional Assessment or whose interests and uses might be affected by exploratory drilling in the Study Area. Throughout the Regional Assessment process, the Committee engaged with 41 Indigenous groups in the region and numerous stakeholder groups to identify and understand concerns, seek feedback and collaborate on parts of the process.

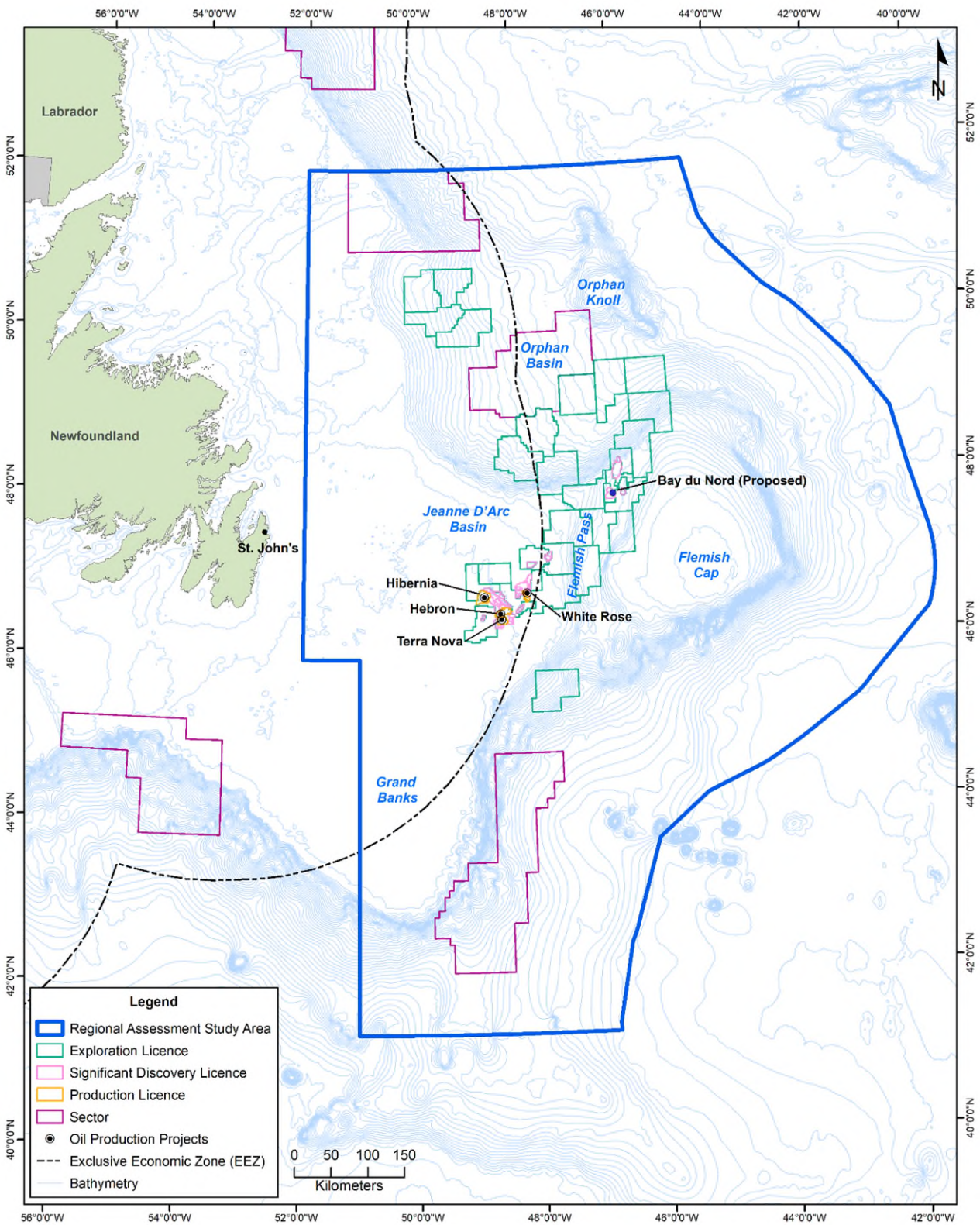
The Committee understands that the primary rationale and key drivers for this Regional Assessment have stemmed from the findings of recent project-specific environmental assessments (EAs) for proposed exploratory drilling projects in the Study Area. Through recent project-specific EA experience, it has become somewhat - although certainly not completely nor uniformly - acknowledged that many of the potential effects of routine exploratory drilling activities in this area are relatively well understood and may be managed through rather generic mitigation measures that are often based in regulation or other guidelines and are thus relatively standard industry practices. These are now rather consistent and predictable outcomes of project-specific EA reviews, which have resulted in a high degree of repetition and duplication in previous project-specific assessments and associated regulatory decisions. As a result, the parties agreed to address these issues through a comprehensive, proactive, regional-scale assessment, while at the same time seeking to ensure that the natural and human environments are protected. A key stated objective of this Regional Assessment by governments has therefore been that it:

> *Will help to improve the effectiveness and efficiency of the assessment process for future exploratory drilling and associated activities in this region, while also ensuring the highest standards of environmental protection continue to be applied and maintained.*

While improved efficiency and the reduction of unnecessary regulatory burden and process fatigue amongst EA participants is one objective, in its many engagement activities (Chapter 2) the Committee has heard loud and clear that the Regional Assessment must continue to provide the highest level of environmental protection for future exploratory drilling activities in this offshore region. Some participating Indigenous and stakeholder groups have, for example, stated very clearly that they do not support the Regional Assessment replacing the need for further project-specific assessments. Some have cautioned that while some issues and effects may indeed be managed through standard and generic measures, practice to date has indicated that there are required improvements and additions to the standard suite of mitigation and follow-up requirements. Moreover, the sheer size and diversity of the Study Area suggests that there is not necessarily always a "one size fits all" approach to environmental protection for all future exploratory drilling activities in this region, with the resulting need to therefore consider any situation-specific issues and requirements as applicable. Others have also raised procedural issues and have expressed concern that without requiring some type and level of project-specific review for future exploratory drilling projects, there will be no mechanism for the public to be aware of and consulted on future projects.

As discussed in further detail in the later chapters of this report, a key focus of much of the Committee's work in this Regional Assessment has been on making suggestions on how key issues around environmental protection, data availability and quality, and future public participation should be addressed through applicable regulatory and planning processes.

**Figure 1.1 Regional Assessment Study Area**



## 1.2 Regulatory Context and Governance

As noted above, this Regional Assessment has been undertaken pursuant to an Agreement between the Governments of Canada and Newfoundland and Labrador, which was originally prepared and released for public comment in September 2018. A Final Agreement was subsequently developed, with consideration of the input received during that comment period, and the Final Agreement and appointment of the Committee were subsequently announced on April 15, 2019.

Although it was initiated, and initially conducted, under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) (Section 75), the Regional Assessment was planned and carried out with a view to its completion, submission and eventual use under the relevant provisions of the new federal *Impact Assessment Act* (Sections 92-103), which eventually came into force on August 28, 2019. This intent, and the relevant provisions and requirements of the *Impact Assessment Act* itself, were referenced and included in the Agreement, including with regard to the definition of the various factors to be considered in the Regional Assessment (see Agreement, Appendix A).

The five member independent Committee was appointed by the federal Minister of the Environment and Climate Change, in consultation with the other Ministers that were signatories to the Agreement. It consists of two co-chairs and three other members, who collectively represent a variety of backgrounds and areas of expertise. The Committee's mandate includes responsibility for planning and completing the Regional Assessment and its delivery to the Ministers, in accordance with the requirements and provisions of the legislation and the Final Agreement referenced above. This included directing the various information gathering, analytical and engagement activities that were undertaken in its preparation and ultimate decisions on structure and content of this Regional Assessment Report including its findings and recommendations. In completing its work, the Committee has been supported by:

1) A *Task Team*, comprised of provincial and federal government employees representing each of the four parties to the Agreement, and co-chaired by the IAAC and the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB). This group directly supported the planning and completion of the Regional Assessment based on direction from the Committee; and

2) A *Technical Advisory Group* (TAG) comprised of representatives of relevant government departments and agencies, Indigenous groups, industry and stakeholder organizations, and others that have interests, information and expertise related to the Regional Assessment.

Further information on the involvement and specific activities of each of these groups in the completion of the Regional Assessment is provided in Chapter 2.

## 1.3 Scope of the Assessment

### 1.3.1 Exploration Drilling and Associated Activities

Exploratory wells are drilled to confirm the presence of oil and gas resources at particular locations, often within areas of interest that have been identified from previous geophysical surveys and other investigations. Drilling programs are carried out by an operator in order to fulfill its obligations under one or more Exploration Licences

(ELs) issued by the C-NLOPB, and with the ultimate objective of finding commercially significant petroleum resources. Exploratory drilling is a necessary step in the exploration for and eventual development of offshore petroleum, as it is only through the drilling of one or more wells that the presence and specific characteristics of such resources can be confirmed. Exploratory drilling and associated activities can also result in a number of direct and indirect socioeconomic benefits, including the creation of employment, training and business opportunities over the planning and operational phases of such programs, as well as the advancement of technology and other knowledge generation. Should an exploratory drilling program be successful in identifying important and commercially viable petroleum resources it may result in additional economic activity related to further exploration, and possibly, development and production activities pending the receipt of required approvals and authorizations from the relevant regulatory authorities (including those related to environmental protection). An important potential outcome of an exploratory drilling program may therefore be future development and growth in the province's offshore oil and gas sector and overall economy. As described later in Chapters 5 and 7, there have been a total of 162 exploration and delineation wells drilled in the Study Area to date, leading to four existing and one proposed oil production projects in this region.

Offshore exploratory drilling programs in the Study Area typically include various components and activities, including the drilling of one or more wells using either a semi-submersible drill rig, drill ship or jack-up rig. Pending receipt of all required regulatory approvals, the selected drill rig is mobilized to the planned drilling location. Prior to the start of drilling, a seabed investigation is conducted using a remotely operated vehicle (ROV), sonar (multi-beam or side scan) or other relevant equipment, which is deployed from the drill rig or a support vessel for a visual inspection of the seabed prior to initiating drilling activities. Once the drill rig is mobilized and in place and all of the above described preparatory activities have been completed, an offshore exploration well is then progressively drilled in sections over a period of up to several months (see Module 2 for further details). Exploratory drilling itself comprises the key focus of the Regional Assessment, and the Agreement refers specifically to "offshore oil and gas exploratory drilling east of Newfoundland and Labrador". It is the planned drilling of exploratory wells (including drilling-related activities, such as pre-drilling wellsite seabed surveys) themselves that comprise the "designated projects" that have triggered federal EA review requirements to date.

Although not referenced directly in the Agreement, the Committee also recognizes that there are also various types of ancillary activities typically associated with offshore exploratory drilling in the Study Area, which are also relevant to the scope of the Regional Assessment. Depending on the results of an exploration well, an operator may then drill delineation wells into different parts of the identified hydrocarbon accumulation to confirm its size and the characteristics of the hydrocarbons found. Vertical seismic profiling (VSP) surveys may be conducted following completion of drilling to obtain accurate time-to-depth ties to correlate seismic data to well depth. If there is an indication of significant hydrocarbons being found during a drilling program, a well flow test may be conducted to sample and identify formation fluids and to measure flow rates. Once drilling and any associated well testing is completed, offshore wells that do not result in hydrocarbon discoveries are then abandoned permanently. In some circumstances, a well may be suspended for future re-entry. Supply vessels and helicopters are used to transport personnel, equipment and materials to and from an active drill rig, with supply and support activities typically taking place at one or more existing, established onshore facilities in Eastern Newfoundland (see Module 2 for further details). For completeness, the Regional Assessment has therefore included and addressed each of the above listed associated activities, where they are proposed as part of (and are thus directly linked to) planned offshore exploratory drilling programs.

Alternative means of carrying out exploratory drilling activities that have been considered in recent EAs include various options related to: drilling fluid selection (water based and synthetic bases muds), rig types (semi-submersible, drillship, jack-up), drilling waste management (offshore discharge after treatment, onshore disposal, offshore re-injection), offshore lighting (amounts and types), timing of flaring, and chemical selection. Such alternatives are considered in this assessment as relevant, with required and standard equipment and methods being the "base case" for the analysis, and with other options being identified as required and in the event that the Committee had specific recommendations around these. It is also recognized that the technologies used in the offshore oil and gas industry are constantly evolving through experience and innovation. This includes an increased emphasis on the development and implementation of new technologies, such as digitalization and other design, operational and monitoring equipment and techniques drawing on local and international experience and expertise.

An on-shore supply base provides re-fueling, temporary storage, staging and loading of materials and supplies in support of offshore exploration drilling activities. One or more existing facilities in Eastern Newfoundland are typically utilized for these purposes, for exploratory drilling programs in this region, with aircraft support usually based at St. John's International Airport. These shore-based facilities are owned and operated by independent third party service providers that service multiple operators and their activities, and are developed and operate in accordance with relevant regulatory requirements and approvals. Exploratory drilling projects typically do not require or result in any upgrades or the development and use of new infrastructure at these established shore base facilities, and so the infrastructure and overall (multi-party) activities associated with the operation of these existing shore-based facilities are therefore not typically included within the scope of exploration drilling project EAs. They are likewise therefore not considered within the scope of the Regional Assessment.

In addition, offshore seismic surveys are carried out in the Study Area to get an overall understanding of regional geology and hydrocarbon potential, and to help identify particular locations that may warrant further investigation through eventual exploration drilling activities. These seismic surveys are, however, not directly linked to exploratory drilling programs, and typically have different proponents (and often multiple end users), EAs and other regulatory requirements, potential effects and required mitigations as compared to offshore drilling. Offshore seismic surveys are therefore also not directly included within the scope of the Regional Assessment per se, in that this assessment is not intended to have direct consequences for the future regulatory requirements for such activities. Offshore seismic surveys are however considered as part of the cumulative effects assessment (Chapter 5).

Finally, although future exploratory drilling in the Study Area may lead to further petroleum discoveries, and thus to possible future oil and gas development activities in the region, the potential for and specific characteristics of any such development would depend on the type and quantity of any hydrocarbons found, the location, area, depth and other characteristics of these reserves, and other factors. These and numerous other technical and economic considerations will determine the likelihood, feasibility and specific characteristics, of any future exploration or development projects and their associated infrastructure and activities. Experience with offshore oil and gas discoveries and associated development planning, design, regulatory approval and implementation processes and timelines for this region also suggests that these can take well over a decade to advance to production following a significant discovery. Therefore, any potential future development activities are not and cannot be defined, described or assessed in any degree of detail at this early stage, and so these are not included within the scope of the Regional Assessment. The Committee understands that any future proposals for new petroleum production activities in the Study Area would continue

to undergo detailed, project specific regulatory review and approval requirements under applicable legislation and processes.

### 1.3.2 Spatial and Temporal Boundaries

The Agreement defines the Study Area for the assessment, which covers a marine region of nearly 735,000 $km^2$ offshore Eastern Newfoundland (Figure 1.1). The Study Area generally aligns with that of the C-NLOPB's Eastern Newfoundland Strategic Environmental Assessment (SEA) (Amec 2014), while extending its eastern boundary to Canada's 2013 submission to the United Nations Convention on the Law of the Sea (UNCLOS). It also generally aligns with the subareas identified under the C-NLOPB's scheduled land tenure system (see Module 1). The Regional Assessment Study Area is thus administratively and activity focused, as opposed to being environmentally defined, and future exploratory drilling activities that occur within these spatial boundaries are considered to be within the scope of this Regional Assessment. The information and analysis presented in this assessment do, however, consider relevant and potentially affected environmental components that overlap with but extend beyond the Study Area boundaries, and any that are entirely outside the Study Area but still have the potential to be affected by future exploratory drilling activity inside it (e.g., where the zone of influence of a disturbance or effect may go beyond the Study Area, such as for underwater noise, oil spills, etc.). It also includes consideration of the movement patterns and ranges of migratory species, relevant oceanographic processes, and the location and extent of marine activities such as fisheries, and others.

The overall size of the Study Area has proven to be one of the largest challenges in the completion of this Regional Assessment, given the extent and the diverse and dynamic nature of this very large offshore environment, and associated considerations of data availability, quality and compatibility across different environmental components and in different parts of the Study Area. For this reason, the descriptions of the existing environment (Chapter 3 and Modules 5 to 7) and the analysis of potential effects are framed at the sub-region level where possible and applicable. The Committee has also provided recommendations on how any key data gaps may be filled.

In terms of its temporal scope, the Regional Assessment focusses on and applies to future exploratory drilling and associated activities within the Study Area, and as such the results of the assessment and its use do not have a defined "expiration date". The Committee has recognized, however, that the current Regional Assessment Report is based on information and analysis available at the time of writing, and the information and findings presented herein will therefore require periodic updating as new information becomes available. The Committee has provided specific recommendations for the use and regular updating of the Regional Assessment in the future (Chapters 3, 4 and 8).

### 1.3.3 Factors Considered in the Regional Assessment

In addition to setting out the terms of reference for the Committee and other procedural elements for completing the Regional Assessment, the Agreement also identifies the specific factors to be considered in it. These are listed in some detail in Appendix A of the Agreement, and cover the various activities, biophysical and socioeconomic components and potential effects that have been included in recent project-specific EAs for exploratory drilling programs offshore Newfoundland and Labrador under CEAA 2012. These include the usual consideration of potential effects on marine biota and fisheries (both activity-specific and cumulative), as well as Indigenous interests and knowledge and potential impacts on the rights of Indigenous peoples of Canada.

It is noteworthy, however, that the Agreement also includes specific reference to issues and factors that have not traditionally been considered in such assessments, including: potential changes to health, social or economic conditions and the positive and negative consequences of such changes; the extent to which offshore exploratory drilling contributes to sustainability, as well as hinders or contributes to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change; the intersection of sex and gender with other identity factors; and any other matter relevant to the Regional Assessment.

All of the factors to be considered that are specified in the Agreement have been included and addressed in this Regional Assessment Report. A Table of Concordance indicating where and how these have been addressed is included at the end of this chapter.

### 1.4 Use of the Regional Assessment

The Committee understands that once it submits its Final Report to Ministers, the IAAC will make it available to the public, and will consult with stakeholders and Indigenous groups on its findings and how they might be used in future decisions. Eventually, the federal Minister of Environment and Climate Change will make decisions on the approval of its contents and recommendations (or particular portions of these) and on how the results of the Regional Assessment will be used to help inform and influence future project decisions for exploratory drilling offshore Eastern Newfoundland.

It is also understood that the federal Minister may make a regulation that would exempt future offshore exploratory drilling projects from federal impact assessment requirements if they are proposed in the area where the Regional Assessment was carried out and they meet the conditions for exemption established by the Minister in such a regulation. The development of that regulation would be informed by the findings of the Regional Assessment, and would set out the conditions which a future exploratory drilling project offshore Eastern Newfoundland would need to meet in order to be exempt from federal impact assessment requirements.

In keeping with its understanding of how the Regional Assessment is intended to be used the Committee has attempted to structure its Report and its associated recommendations in a way that helps facilitate their eventual review and consideration by the Minister, and particularly, their ability to inform the eventual content of any such regulation. This includes providing clear information and recommendations on the following:

- An identification of the specific exploratory drilling activities to which it applies (Section 1.3.1);
- A list of mitigation and follow-up requirements that the Committee feels should apply to all future exploratory drilling projects in the Study Area; and
- The identification and proposal of any additional requirements that the Committee feels should apply to exploratory drilling activities in particular situations.

The Committee has also provided advice and recommendations related to other applicable issues, including the identification of key data gaps and proposed measures to address these in the future, as well as suggestions on how other issues around environmental protection and future public participation should be addressed through applicable regulatory and planning processes.

Therefore, while in many cases the Committee's recommendations are directed specifically to the federal Minister of the Environment and Climate Change for consideration in developing the aforementioned regulation, in other cases recommendations are directed to other federal or provincial government departments and agencies or other parties (such as recommendations for addressing data gaps through future study) that will not likely form part of such a regulation.

Finally, in addition to the planned regulatory use of the Regional Assessment, the Committee has also approached its design and development with a view to optimizing the potential interest in and use of this product by Indigenous groups and stakeholders for their own needs and activities. This objective has been driven largely by the Committee's engagement activities (Chapter 2), where it has been clear that other parties also see great potential to use the information and analysis contained herein for their own interests, including as a tool for more effectively accessing and analysing environmental information. This is especially so for the on-line GIS decision-support tool that has been developed through the Regional Assessment process, as described further below.

A recurring question that has been raised throughout this process is around how the Regional Assessment compares to, or differs from, the SEAs undertaken by the C-NLOPB, including the Eastern Newfoundland SEA completed in 2014 (Amec 2014). The Committee notes that the C-NLOPB completes SEAs for defined parts of the Canada-Newfoundland and Labrador Offshore Area, the results of which are considered by the Board in determining whether further exploration rights (licences) should be offered in whole or in part within the SEA Study Area in question. The SEA for the Eastern Newfoundland Offshore Area was completed in 2014, and there are currently no known updates to that SEA in progress or planned. Regional Assessments, on the other hand, examine the known and potential effects of existing and future activities in a region. The results of a Regional Assessment conducted in accordance with the relevant provisions of the *Impact Assessment Act* are considered by the IAAC in determining whether an impact assessment is required for a designated project or class of designated projects, and if so, its results are considered in scoping and conducting project-specific assessments. This Regional Assessment engages specifically in an analysis of the potential effects of exploratory drilling projects in the Study Area, and makes recommendations about mitigation and follow-up requirements for these. In short, whereas the C-NLOPB's SEAs are intended to inform and influence *licencing* decisions, the Regional Assessment is intended to inform and influence *project* decisions.

### 1.5 Overview of the Committee's Approach, Focus and Objectives

Throughout the course of planning and completing this Regional Assessment, the Committee has been guided by a number of key principles and approaches, with a view to ensuring a transparent and fully participative process leading to a robust and comprehensive assessment.

From an engagement perspective, the Committee has, as described in further detail in Chapter 2, endeavoured to design and implement a fully inclusive and meaningful program of engagement with all interested and potentially affected parties, including Indigenous groups, stakeholder organizations and the general public.

In terms of information and analysis, the Committee has undertaken to bring together existing and available data on the environmental setting of the Study Area, along with existing knowledge on the known and potential effects of offshore exploratory drilling. In order to manage this vast array of knowledge, the Committee has worked to develop a sophisticated GIS decision-support tool applicable to the entire Study Area. This system will

make the task of considering multiple sources of geographically based information manageable in support of decision-making. It also has the added value of making previously either unavailable or very difficult to find information accessible to everyone. This alone will help to build a more inclusive and transparent decision-making process.

In developing this system, the Committee has maintained a clear focus on information and analysis that are directly relevant to the nature, scale and objectives of the Regional Assessment, in order to optimize efficiency and brevity and to avoid incorporating data and conducting analysis that have no clear link to its focus and planned outcomes. It is also recognized that doing so would pose challenges for the planned future updates of the Regional Assessment and the information and findings contained herein. Wherever possible, the Regional Assessment has also incorporated and made use of the results of previous scientific processes that have identified important and potentially sensitive areas and times within the Study Area as the basis for its analysis and conclusions regarding effects and mitigation.

As shown in Figure 1.1 and illustrated in the sections that follow, the Regional Assessment Study Area is large and inherently complex in nature, with characteristics and processes that are continuously changing over time as a result of various natural and anthropogenic influences. These components are linked to one another, resulting in a complex system of interactions and inter-relationships that have implications for the characteristics and health of this ecosystem and for the nature, magnitude and consequences of human-induced disturbances in this marine setting. There are therefore inevitable gaps in information and understanding, which is a reality that the Regional Assessment cannot hope to fully address. While, for example, the development of a detailed and comprehensive ecological model for the Eastern Newfoundland offshore would likely be a valuable exercise overall, doing so is clearly outside the ability and scope of this Regional Assessment. The Committee has instead sought to obtain and make the best use possible of available and relevant information, and in the course of doing so has identified some areas where there is a relatively high degree of existing knowledge, as well as others where there is a profound lack of data.

The Committee's approach to completing the Regional Assessment has therefore included:

- Identifying and describing what we do know, with a focus on the compilation and use of existing information as opposed to the generation of new data or modelling;
- Evaluating this knowledge against how much we reasonably need to know in order to reach general conclusions about effects and their management for future exploratory drilling activities;
- Identifying and proposing solutions to address any important, relevant gaps in this knowledge base; and
- Using the information and understanding that we do have to reach conclusions and make recommendations that are relevant to the nature, scale and objectives of the Regional Assessment.

The Committee's focus has therefore been on *planning* rather than *prediction*, and on seeking to proactively manage issues through the identification and recommendation of mitigation and follow-up requirements for future projects, as well as suggested improvements in associated regulatory processes where required. This has involved taking a precautionary approach where key areas of risk and uncertainty exist, and in advocating adaptive management approaches for future projects through, for example, proposed regular updates of the

information and analysis contained in the Regional Assessment and of the associated mitigation and follow—up requirements that apply to future exploratory drilling projects in the Study Area as required.

The Committee has therefore approached its work with a view to addressing the fundamental objectives of the Regional Assessment, as described above – namely, in seeking to improve the effectiveness and efficiency of the assessment process for future exploratory drilling activities in this region while also ensuring environmental protection. In terms of the former, this includes providing a sound and comprehensive assessment of potential effects and required mitigation, which is informed by, but also builds on, the outcomes of recent project EAs while at the same time negating the need for lengthy and duplicative project-specific assessments. Key to the Committee's approach has also been to explore and implement ways of presenting environmental information and analysis in a more effective and efficient manner, particularly through the associated GIS decision-support tool. Through its associated findings and recommendations, the Committee has also sought to ensure, and indeed advance, environmental protection by identifying and proposing additional measures for future exploratory drilling projects and in recommending further study to fill important data gaps.

### 1.6 Report Organization and User Guide

This Report contains a description of the Regional Assessment process and the various activities of the Committee throughout its development, as well as presenting the overall findings, conclusions and recommendations of the Committee. It is structured as follows:

*Chapter 1* (this Introduction): Outlines the Regional Assessment's purpose and rationale, regulatory context, governance structure, scope, and its planned use in future decision-making. It also describes the overall organization of the report.

*Chapter 2* (Approach, Methods and Activities): Describes the work undertaken by the Committee over the course of the Regional Assessment, including all associated Indigenous and stakeholder engagement activities and their findings, as well as the manner in which these have informed and shaped the assessment and its outcomes.

*Chapter 3* (Environmental Setting): Provides a high-level overview of the existing biophysical and socioeconomic environments of the Study Area, which is intended to provide background and context to the assessment by identifying and describing the key components and activities that are most likely to be affected by offshore exploratory drilling in the Study Area, and the identification of any key data gaps and opportunities to address these. As noted above, the focus of this section is on providing information that is considered to be directly relevant to the nature, focus and objectives of the Regional Assessment.

*Chapter 4* (Potential Effects and Their Management): Describes the various issues and potential effects of offshore exploratory drilling that the Committee has identified. It also includes the identification and evaluation of standard mitigation and follow-up requirements, highlighting any identified issues, gaps and requirements and providing the Committee's recommendations around how these should be addressed for future projects.

*Chapter 5* (Cumulative Effects): Provides an analysis and discussion of potential cumulative effects that may result from current and future offshore oil and gas exploratory drilling activities in the region in combination with each other and with other projects and activities, and associated planning considerations.

*Chapter 6* (Integrating Indigenous Knowledge): Describes the approach to, and outcomes of, the Indigenous Knowledge discussions held between the Committee and participating Indigenous groups, and the associated incorporation and consideration of this knowledge in the Regional Assessment and its outcomes.

*Chapter 7* (Sustainability, Climate Change and Other Considerations): Provides a discussion of: the extent to which offshore exploratory drilling in the Study Area contributes to sustainability; the implications of the effects of exploratory drilling projects for the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change; and considers the intersection of sex and gender with other identity factors, including whether and how exploratory drilling in the Study Area might affect different groups of people in different ways and to varying degrees.

*Chapter 8* (Summary and Conclusions): Provides a summary of the key findings and recommendations of the Regional Assessment Committee, which are organized according to the particular party to which they are directed (i.e., to the federal Minister of the Environment and Climate Change for consideration in developing the aforementioned regulation, or to other government departments and agencies or other parties).

The Committee's Report is supplemented by a series of supporting technical documents and mapping which provide additional information and analysis in support of the Regional Assessment and its findings. All of this content is located in the GIS decision-support tool that is being developed as part of this process, and takes the form of a series of "modules" that present further details on:

a) The regulatory and planning context for offshore exploratory drilling in the Study Area (Module 1).

b) A generic description of typical offshore exploratory drilling and associated activities, including planned (and alternative) components and activities (Module 2) and possible accidental events (Module 3).

c) Summary descriptions of the existing physical (Module 4), biological (Module 5) and socioeconomic (Module 6) settings of the Study Area.

   The associated GIS decision-support tool is a key element of this section, where the brief text descriptions provided for each component are linked directly to pre-set regional-scale mapping within the system, which in turn then allows for multiple features (layers) to be activated as desired, along with the ability to query select information for specific locations or time periods where the relevant datasets allow for this.

d) An overview of the potential effects of offshore exploratory drilling and associated activities on each of the following Valued Components (VCs) (which are further defined and explained in Chapter 4):

1) Marine Fish and Fish Habitat (including Species at Risk) (Module 7);
2) Marine and Migratory Birds (including Species at Risk) (Module 8);
3) Marine Mammals and Sea Turtles (including Species at Risk) (Module 9);
4) Special Areas (Module 10);
5) Indigenous Communities and Activities (Module 11);
6) Fisheries and Other Ocean Users (Module 12);
7) Health, Social and Economic Conditions (Module 13); and
8) Atmospheric Emissions (Module 14).

This includes summarizing the existing and available literature on the effects of drilling activities, which has in turn influenced and informed the findings and conclusions of the Regional Assessment.

e) A description of the various predictive scenarios of possible, future exploration drilling activity in the Study Area used as part of the cumulative effects assessment (Module 15).

While the GIS decision-support tool is a key aspect of the Regional Assessment developed and submitted by the Committee, it is a work in progress, and it is fully anticipated that its content, scope and functionality will continue to evolve over time. Although considerable progress has been made on developing this tool, its primary focus and utility at this point is centred on the compilation and presentation of regional-scale environmental information in a more effective and efficient manner. The Committee has made a series of recommendations concerning the future use and maintenance of this system, at which time it may be possible to build in additional information and analytical capabilities, including around drilling technologies and operational factors, and potential emissions and effects from drilling activities (e.g., detailed oil spill trajectory modelling results from particular locations, etc.). The Committee has also made recommendations about the future application of risk analysis and management approaches, which the GIS decision-support tool can potentially help facilitate.

## 1.7 References

Amec (Amec Environment and Infrastructure) (2014). Eastern Newfoundland Strategic Environmental Assessment – Final Report. 670 pp. Available at: https://www.cnlopb.ca/sea/eastern

**APPENDIX 1.A**

**Tables of Concordance: Factors to Be Considered and Other Requirements of the Regional Assessment Agreement**

| Factor to be Considered (As specified in Regional Assessment Agreement, Appendix A) | Regional Assessment Report Section(s) | Module(s) |
|---|---|---|
| 1. The Regional Assessment of offshore oil and gas exploratory drilling east of Newfoundland and Labrador will be conducted so that it satisfies the requirements of CEAA 2012, and will include a consideration of the following factors: | | |
| (a) the changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes that are likely to be caused by offshore exploratory drilling, including | 4.0, 5.0. 7.0 | 7-14 |
| i. the effects of malfunctions or accidents that may occur in connection with exploratory drilling, | 4.3 | 3, 7-14 |
| ii. any cumulative effects that are likely to result from offshore exploratory drilling in combination with other physical activities that have been or will be carried out, and | 5.0 | 15 |
| iii. the result of any interaction between those effects; | 4.0, 5.0, 7.0 | 7-15 |
| (b) mitigation measures that are technically and economically feasible and that would mitigate any adverse effects of offshore exploratory drilling; | 4.5, 8.0 | 2-3, 7-14 |
| (c) the impact that exploratory drilling may have on any Indigenous group and any adverse impact that offshore exploratory drilling may have on the rights of the Indigenous peoples of Canada recognized and affirmed by section 35 of the Constitution Act, 1982; | 4.2.3, 6.0 | 6, 11 |
| (d) the purpose of and need for offshore exploratory drilling; | 1.3.1, 7.0 | 1-2 |
| (e) alternative means of carrying out offshore exploratory drilling that are technically and economically feasible, including through the use of best available technologies, and the effects of those means; | 1.3.1, 4.0 | 2-3 |
| (f) Indigenous knowledge provided with respect to offshore exploratory drilling; | 2.2.4, 6.0 | |
| (g) the extent to which offshore exploratory drilling contributes to sustainability; | 7.1 | |
| (h) the extent to which the effects of offshore exploration drilling hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change; | 7.2 | |
| (i) any change to offshore exploratory drilling that may be caused by the environment; | 4.4 | 2-3 |
| (j) the requirements of the follow-up program in respect of offshore exploratory drilling; | 4.5 | |
| (k) community knowledge provided with respect to offshore exploratory drilling; | 2.2.5, 3.5, 8.0 | |
| (l) comments received from the public; | 2.0 + Registry | |
| (m) comments from a jurisdiction that are received in the course of consultations; | 2.0 + Registry | |
| (n) any assessment of the effects of offshore exploratory drilling that is conducted by or on behalf of an Indigenous governing body and that is provided with respect to offshore exploratory drilling; | 6.0 | |
| (o) any study or plan that is conducted or prepared by a jurisdiction – or an Indigenous governing body not referred to above - that is in respect of a region related to offshore exploratory drilling and that has been provided | 1.4 | 5-7 |

| Factor to be Considered (As specified in Regional Assessment Agreement, Appendix A) | Regional Assessment Report Section(s) | Module(s) |
|---|---|---|
| with respect to offshore exploratory drilling such as strategic environmental assessments conducted by the C-NLOPB; | | |
| (p) the intersection of sex and gender with other identity factors; and | 7.3 | |
| (q) any other matter relevant to the Regional Assessment. | Report | Modules |

| Factor to be Considered (As specified in Regional Assessment Agreement, Appendix C) | Regional Assessment Report Section(s) | Module(s) |
|---|---|---|
| 2.2 The Committee should include in its Report the following: | | |
| • All information described in the Factors to be considered in the Regional Assessment (Appendix A). | See above | See above |
| • A description of the existing regulatory regime for oil and gas exploratory drilling and for the Regional Assessment; | 1.3 | 1 |
| • A description of the works and activities to which the Regional Assessment would apply; | 1.3 | 2 |
| • A description of the existing biophysical and socio-economic environment; | 3.0 | 5-7 |
| • A summary of the findings of follow-up and environmental effects monitoring programs that have been conducted in connection with offshore exploration and production drilling; | 4.0 | 7-14 |
| • A description of the public and Indigenous engagement activities undertaken during the Regional Assessment, including a summary of any comments received; and | 2.0 | |
| • How the Committee, in determining the effects that are likely to be caused by offshore exploratory drilling, took into account and used any Indigenous knowledge provided with respect to offshore exploratory drilling. In doing so, the Committee must obtain permission to disclose any Indigenous knowledge. | 6.0 | |

# 2 APPROACH, METHODS AND ACTIVITIES

The following sections describe the work undertaken by the Committee, including all associated Indigenous and stakeholder engagement activities and their findings, as well as the manner in which these have informed and shaped the assessment and its outcomes.

## 2.1 Committee Meetings and Information Exchange

Since being appointed in the spring of 2019, the five-member Regional Assessment Committee has met frequently. Meetings involved attendance by Committee members and the Task Team co-chairs, with other Task Team members also participating periodically. Representatives from other government departments and agencies and other organizations also attended at times to provide technical briefings to the Committee on specific matters. Details on the Committee's meetings (including dates and summary of the main topics discussed) can be found on the Canadian Impact Assessment Registry for the Regional Assessment (the Registry), which was developed and updated bi-weekly throughout the Regional Assessment process, see: https://iaac-aeic.gc.ca/050/evaluations/proj/80156. Outside of its scheduled in-person meetings, the Committee has also engaged in discussions by telephone as well as on-going information exchange through email and other means.

## 2.2 Engagement Activities

In keeping with the requirements and spirit of the Regional Assessment Agreement (the Agreement) and of the Committee's terms of reference, the Regional Assessment was planned and conducted to involve considerable governmental, Indigenous, and public and stakeholder engagement throughout all stages of the process. A number of engagement initiatives were undertaken, using a variety of mechanisms to share and receive information and perspectives about the Regional Assessment, including its methods, format and content, as well as the key issues that it should address.

An engagement log was created and maintained to track all activities, including the method of engagement (i.e., meeting, telephone, email, or Registry comment tool), names of participating organizations and representatives, meeting notes, action items and status, key issues and concerns raised, and any written submissions received from Indigenous and stakeholder groups. This log was updated throughout the engagement process.

### 2.2.1 Participant Funding

The Impact Assessment Agency of Canada (IAAC) has allocated funding to Indigenous groups and non-profit groups through grants and contribution agreements. The IAAC allocated over $436,000 in grants and contribution agreements to 12 Indigenous groups and eight non-profit organizations in February 2018, December 2018 and October 2019 to provide participants with support to participate in face-to-face meetings with the Committee, attend Technical Advisory Group (TAG) meetings, review materials and to comment on the draft Regional Assessment Report.

### 2.2.2 Notifications and Advertisements

A generic email address (*iaac.nloffshorestudy-etudeextracotieretnl.aeic@canada.ca*) was established for the Regional Assessment to allow Indigenous and stakeholder groups and members of the public to connect with

the Committee and Task Team, to ask questions, voice concerns and make submissions. This email account was also used to issue invitations to Indigenous and stakeholder groups to participate in the various engagement activities and to distribute other information throughout the process.

The Registry was also used to share information on the Regional Assessment, including summaries of Committee meetings and meetings with Indigenous and stakeholder groups, notices regarding funding availability, and invitations to participate in the TAG process. Both solicited (e.g., responses to Committee questions circulated during Indigenous and stakeholder meetings) and unsolicited (e.g., letters and emails to the Committee raising issues or providing suggestions for information sources) submissions from Indigenous and stakeholder groups were also posted to the Registry. In June 2019, a Public Notice was posted to the Registry encouraging all individuals and organizations interested in the Regional Assessment to contact the Committee to provide input and participate in the process, including participating in associated workshops and meetings, and in reviewing and providing comments on relevant documents. It also noted that future participation opportunities would include a public review period on the draft Regional Assessment Report, and included the generic email address and mailing address for the Committee. In August 2019, the Registry was updated to include an online commenting feature that allowed anyone to submit comments on the Regional Assessment and make submissions to the Committee through that on-line tool, as well as to review other comments made by other individuals and organizations.

An extensive advertising campaign was also undertaken throughout July 2019 in local print, radio and online media to invite the public to participate in the Regional Assessment and to provide contact information for the Committee. This included running advertisements in seven newspapers and on five radio stations throughout Newfoundland and Labrador, as well as on-line advertising at these and other media. The IAAC's Twitter channel was also used to encourage participation in the Regional Assessment throughout the process, including providing links to the Registry page and advertising specific notices and events (e.g., the general public notifications, invitation to the TAG sessions, etc.).

### 2.2.3 Federal and Provincial Government Departments and Agencies

In addition to those that have been directly involved in the Regional Assessment through the Task Team, the Committee has recognized that various other federal and provincial government departments and agencies have regulatory responsibilities, information and advice, or other interests related to the environmental setting of the Study Area, or to managing the potential effects of future exploratory drilling activities within this region, pursuant to their associated legislation and mandates. Government departments and agencies that have participated in the Regional Assessment, through the TAG process or otherwise, have included:

*Federal Government*

- Fisheries and Oceans Canada (DFO)
- Environment and Climate Change Canada (including Canadian Wildlife Service)
- Natural Resources Canada
- Parks Canada / Canadian Heritage
- Crown-Indigenous Relations and Northern Affairs Canada
- Health Canada
- National Defence
- Transport Canada

*Provincial Government*

- Natural Resources
- Fisheries and Land Resources
- Intergovernmental and Indigenous Affairs Secretariat
- Tourism, Culture, Industry and Innovation

In completing the Regional Assessment, the Committee and its supporting Task Team have continuously engaged with government departments and agencies to identify and obtain environmental information and to seek technical input on potential effects and mitigation approaches for future drilling activities.

### 2.2.4 Indigenous Engagement and Knowledge

The Agreement describes the Committee's mandate and requirement to engage with Indigenous groups and any others that have knowledge relevant to the Regional Assessment or whose interests and uses may be affected by exploratory drilling. Furthermore, it describes the Crown's role to consult with Indigenous peoples throughout the Regional Assessment process, as required and in particular on the Committee's Draft Report. Crown consultation is intended to be conducted in a manner consistent with the honour of the Crown and at an appropriate level, taking into account potential impacts on potential or established Aboriginal and Treaty rights arising from future decisions pertaining to exploratory drilling projects in the Study Area.

The Regional Assessment Committee notes that any such legal duty to consult with Indigenous groups as a result of eventual government decisions and actions regarding exploration drilling activities in the Study Area (including any that may be informed by this Regional Assessment) continues to rest with the Crown. As outlined in Section 4.17 of the Agreement, the Committee is responsible for engaging with Indigenous groups that have knowledge and interests relevant to the Regional Assessment and who have identified concerns around the potential effects of offshore exploratory drilling in the Study Area. Some of the key, underlying principles with which the Committee planned and conducted its Indigenous engagement activities included:

- Meaningful participation in the Regional Assessment process;
- Transparency and respect; and the
- Inclusion and appropriate use of Indigenous Knowledge (IK)

Prior to finalizing the Agreement and the appointment of the Committee, Indigenous groups were consulted by government on the Draft Agreement and other matters related to the early planning and implementation of the Regional Assessment. In early May 2019, all 41 Indigenous groups involved in the Regional Assessment were provided with a draft document describing the Crown's proposed consultation approach for the Regional Assessment, and were invited to provide input into that approach. In October 2019, the Indigenous groups were asked to again review and consider the Crown consultation approach, based on the engagement conducted for the Regional Assessment process to date, and to provide any input that they wished to. IAAC representatives, serving as Crown consultation coordinators for the Regional Assessment, also participated in all Indigenous engagement activities undertaken by the Committee as described below.

The Committee developed and implemented the following phased approach in engaging with Indigenous groups during the Regional Assessment:

- *Phase 1: Initial Engagement / Introduction to the Regional Assessment:* The Committee held a series of introductory in-person meetings / information sessions with Indigenous groups to introduce the Regional Assessment and build an understanding of issues to inform the scope of the assessment.

- *Phase 2: TAG Sessions and IK Workshops:* Indigenous groups were invited to participate in all TAG sessions held in September 2019, along with a series of workshops held from September to November 2019 with the sole purpose of directly engaging with Indigenous peoples on the complex issue of how to include IK directly in the work and recommendations of the Committee.

- *Phase 3: Review of Regional Assessment Findings and Draft Recommendations*: In late 2019 the Committee conducted a series of meetings to discuss its draft recommendations. A key focus of these sessions was on confirming that relevant questions and issues raised during the Indigenous engagement process were addressed in the Regional Assessment outcomes.

It should be noted that while there were three phases of "formal" Indigenous engagement planned and completed as part of the Regional Assessment, this was also an on-going process where individual Indigenous groups had the opportunity to request a meeting or provide written or verbal input to the Committee at any time.

#### 2.2.4.1 Phase 1 Indigenous Engagement: Introductory Discussions on the Regional Assessment

Following the finalization and announcement of the Agreement in April 2019, Phase 1 of the Committee's Indigenous engagement program was initiated. An initial letter was sent on May 15, 2019 inviting each Indigenous group to meet with the Committee in June 2019 at a series of proposed locations and times, or inviting groups to identify another preferable date and location for such a meeting. Follow-up calls were made in early June 2019 with those groups that had not responded. Details on the Committee's meetings with Indigenous groups (including dates, participants and a summary of the main topics discussed) can be found on the Registry, which was developed and updated bi-weekly throughout the Regional Assessment process (see https://iaac-aeic.gc.ca/050/evaluations/proj/80156).

Representatives from 33 of the 41 Indigenous groups met with Committee members during this initial phase of the Indigenous engagement program. Draft meeting notes were circulated to meeting participants for review and comment, and once the notes were finalized they were sent to all 41 Indigenous groups and posted to the Registry. Identified questions and concerns were considered and addressed in planning and completing the Regional Assessment Report.

#### 2.2.4.2 Phase 2 Indigenous Engagement: Technical Advisory Group Sessions and Indigenous Knowledge Workshops

**Technical Advisory Group (TAG) Sessions (September 2019)**

As part of the Phase 2 Indigenous engagement program, invitations were sent to all 41 Indigenous groups on August 7, 2019 to attend the September 2019 TAG sessions in St. John's, NL (which are described further below). From August 26 to September 4, 2019, Committee members attempted to call representatives of all 41 Indigenous groups to provide an update on the Regional Assessment, to inquire whether there were any

questions or issues that they wanted to raise, and to remind them of the upcoming TAG sessions and encourage them to participate in these and the IK TAG sessions planned for later in September and early October (see next section). In terms of Indigenous participation, the TAG sessions in St. John's, NL were attended by a total of 16 people representing 31 Indigenous groups, with several individuals participating in multiple TAG sessions either in person or by video-conference.

As part of the Phase 2 engagement program for the Regional Assessment, IK TAG sessions were held in five locations and attended by representatives from 33 of the 41 Indigenous groups (Table 2.1). The Committee's main goal for these sessions was to discuss with representatives from the various Indigenous groups how best to share and consider IK in the Regional Assessment Report. As for all engagement activities undertaken by the Committee, draft meeting notes were circulated to participants for review and comment, and once finalized they were sent to all 41 Indigenous groups and posted to the Registry.

**Table 2.1 Indigenous Knowledge Technical Advisory Group Meetings**

| Date | Location | Indigenous Groups | # Participants* |
|---|---|---|---|
| September 24, 2019 | Crowne Plaza Hotel, Moncton NB | Kwilmu'kw Maw-klusuaqn Negotiation Office<br>Mi'gmawei Mawiomi Secretariat<br>Mi'gmawe'l Tplu'taqnn Incorporated<br>Wolastoqey Nation NB | 10 |
| September 26, 2019 | Hotel Pur, Québec, QC | Première Nation des Innus de Nutashkuan | 3 |
| October 2, 2019 | College of the North Atlantic, Happy Valley Goose Bay, NL | NunatuKavut Community Council | 2 |
| October 11, 2019 | Mount Peyton Inn, Grand Falls-Windsor, NL | Miawpukek First Nation<br>Qalipu First Nation | 5 |
| November 5, 2019 | Atsanik Lodge, Nain, NL | Nunatsiavut Government | 3 |
| * External participants only (i.e., does not include Committee and Task Team members). | | | |

At those IK sessions, the following key points with respect to IK were raised:

- Two-eyed Seeing is a way of viewing the world in combination with a western scientific worldview;
- A request that IK be integrated throughout the Regional Assessment Report;
- The importance of Atlantic salmon, not only in traditional activities but as part of the identity of many groups. Lack of information exists with respect to presence in Study Area;
- The Study Area is considered an important area for species that migrate to traditional territories;
- The magnitude of activity in the Regional Assessment Study Area is large and increasing which points to importance of cumulative effects assessments;
- Inclusion of a timing element to the Regional Assessment Report whereby information like traditional knowledge and current uses are updated regularly;
- IK is complicated and difficult to incorporate into reports in a meaningful way. It is important to continue to engage with Indigenous people and communities; and
- It is important that IK not be collected and shelved but rather be used to make decisions.

Based on input from Indigenous groups at the five IK sessions, the Committee organized a workshop with Indigenous groups to collaborate on a section of the Regional Assessment Report. The workshop was held on November 13, 2019 in Millbrook, Nova Scotia. Fourteen participants representing 29 Indigenous groups attended the day-long session. Following a presentation on Two-eyed Seeing, areas of tension and concern resulting from the Regional Assessment process for Indigenous groups were raised. These areas of tension and concern were grouped into the following seven topics and the participants developed recommendations which follow the principles of Two-eyed Seeing:

- Cumulative effects;
- Power imbalances;
- Valuing economy over environment;
- Lacking ability to adapt within processes;
- Lacking protection of areas of significance;
- Knowledge gaps and how they are addressed through collaboration; and
- Lacking meaningful interaction between Indigenous groups and Industry.

Further information on these sessions and their outcomes is provided in Chapter 6 of this report.

The Committee held a follow-up meeting with Indigenous groups on December 2, 2019 in Millbrook, Nova Scotia. The purpose of the meeting was to discuss preliminary recommendations with Indigenous groups and provide an update on the geographic information system (GIS) decision-support tool.

#### 2.2.4.3 Phase 3 Indigenous Engagement: Review of Regional Assessment Committee Findings and Proposed Recommendations

During the November 13, 2019 workshop described above, a follow-up meeting was planned for December 2, 2019 with Indigenous groups in Millbrook Nova Scotia, the main objective of which was to discuss and seek feedback on the preliminary Regional Assessment recommendations. On November 14, 2019, invitations to attend the follow-up meeting were sent to all 41 Indigenous groups, with reminders sent on November 22, 2019.

Eight participants representing 30 Indigenous groups attended the day-long meeting on December 2, 2019. The Committee introduced the draft recommendations at the beginning of the day. The group then reviewed and discussed the draft recommendations, with particular reference to the seven key areas of concern described in the workshop of November 13, 2019 (see previous section). The last part of the day consisted of a demonstration of, and question and answer session on, the GIS decision-support tool.

Immediately following the meeting, the draft recommendations were updated based on the suggestions and concerns brought forward by the Indigenous groups. These updated recommendations were sent to all 41 Indigenous groups and stakeholders on December 4, 2019, and were used as the basis for stakeholder meetings held on December 5 and 6, 2019 (Section 2.2.5.3). Summary notes from the meeting were circulated to participants for comment, after which they were finalized and posted to the Registry.

### 2.2.5 Public and Stakeholder Engagement

The Regional Assessment has also included an extensive program of public and stakeholder engagement, through which the Committee has likewise used a variety of mechanisms to provide opportunities for interested organizations and individuals to receive and review information, and to provide their views. This has included providing input on the key information that the Regional Assessment should contain, as well as on the potential effects of offshore exploratory drilling activities and possible means to address these in the future.

In planning and implementing its engagement program, the Committee has been mindful of, and informed by, the experiences and lessons from other similar initiatives in the past. While the necessity and benefits of reaching and including all interested parties are recognized, experience has shown that some of the more traditional engagement methods used for EAs and Strategic Environmental Assessments (SEAs) in the offshore oil and gas sector have not always been particularly effective at soliciting public involvement. The Committee therefore made an early decision to steer away from the traditional "public open house" formats, which tend to be quite resource intensive and logistically complex to organize, advertise and carry out, as well as somewhat restrictive in that they require individuals to participate in a particular and defined time, place and format. Moreover, recent experience (such as for the recent Eastern Newfoundland SEA, see Amec 2014) has shown very low public participation rates in these types of sessions for the offshore oil and gas industry in Newfoundland and Labrador.

The Committee's public and stakeholder engagement approach therefore involved a variety of techniques, including an extensive advertising campaign, along with the posting of similar requests for participation on the Registry. These were designed to allow any and all interested persons and groups to become aware of the Regional Assessment and to contact the Committee and arrange a meeting or teleconference discussion, to participate in any of the meetings held by the Committee, or to provide written input at any time. Details on the Committee's meetings with stakeholder groups (including dates, participants and a summary of the main topics discussed) can be found on the Registry, which was developed and updated bi-weekly throughout the Regional Assessment process (see https://iaac-aeic.gc.ca/050/evaluations/proj/80156).

#### 2.2.5.1 Phase 1 Stakeholder Engagement: Introductory Discussions on the Regional Assessment

Parallel to the open and on-going calls for public participation and input referenced above, the Committee also identified and contacted key stakeholder groups directly and conducted a series of meetings and other discussions with these organizations. The groups initially identified and contacted by the Committee were those that were known to have an interest in offshore oil and gas activities off Eastern Newfoundland and who have participated in recent EA reviews for exploratory drilling projects in the region, with additional groups being identified and included as the stakeholder engagement program progressed.

In early May 2019, an email was sent to all identified stakeholders to provide an introduction to the Regional Assessment, to welcome their participation in the Regional Assessment, and to invite them to an introductory meeting with the Committee. They were also encouraged to circulate the invitation within their organization and professional networks.

Five initial meetings were held between May 22, 2019 and May 28, 2019 in St. John's, NL and Halifax, NS, with teleconferencing available for those who could not attend in-person. A "backgrounder" containing introductory

information and key questions for discussion was sent to all participants in advance to seek early input on the Regional Assessment. Each meeting had at least one dedicated note taker who was a Task Team member directly involved in the Regional Assessment and familiar with its subject matter. Notes from these meetings were distributed in draft form to all participants for review and comment, after which they were finalized, distributed to all identified groups, and posted to the Registry. A high-level summary of these meetings was also posted to the Registry and updated regularly. Follow-up to these meetings occurred throughout June and July 2019, including contacting attendees to address identified issues and action items, and inviting all attendees to participate in the TAG process (see Section 2.2.5.2 below).

In late August and early September of 2019, Committee members again reached out to all stakeholder groups via phone to provide an update on the Regional Assessment, inquire whether they had any additional questions or concerns, and to remind them of the upcoming (September 2019) TAG meetings. Follow-up emails were sent where phone call attempts were unsuccessful.

#### 2.2.5.2 Phase 2 Stakeholder Engagement: Technical Advisory Group

As specified in the Agreement and described earlier in Chapter 1, the Committee has also been supported by a TAG, comprised of representatives of applicable government departments and agencies, Indigenous groups, industry and stakeholder organizations, and others that have interests, information and expertise related to the Regional Assessment.

The TAG has proven to be a very useful and informative component of the Regional Assessment process. TAG activities primarily originated from, and focussed on, particular issues for which the Committee identified a need for further information and input from external organizations. From the onset, the TAG was not envisioned nor implemented as a fixed membership committee, but rather it had a rather fluid composition in which the involvement of particular groups and individuals varied according to specific issues being discussed and considered at any particular time. There were also no strictly defined forums or set methods for the activities of the TAG, and as such this involved some meetings to discuss and review particular items, as well as the exchange of information and comments by email or other electronic means as required. Its primary activities and contributions have been being focussed on the:

1) Identification, provision and analysis of environmental data and other information for use in the Regional Assessment;

2) Provision of technical expertise and analysis in relation to potential effects and associated mitigation and follow-up requirements; and

3) Provision of input into individual draft components of the Regional Assessment as they were being prepared.

Those in receipt of funds through the IAAC's Participant Funding Program were able to use those funds to support their participation in the TAG process.

Initially, and even prior to the formal appointment of the Committee, the Task Team engaged with other federal and provincial departments and agencies in preparation for the Regional Assessment. This primarily involved

discussions to identify and obtain existing and available sources of environmental information and datasets for use in the Regional Assessment.

Upon the appointment of the Committee and immediately following its initial Indigenous and stakeholder engagement sessions in May and June 2019, all identified and participating groups were sent an overview of the TAG process and a request for their participation in it. This correspondence also asked each group to identify a single point of contact to coordinate its future TAG participation, as well as to indicate, based on its particular areas of expertise and interest, the specific subject areas that its participation would likely focus on. These TAG invitations were also posted to the Registry for the Regional Assessment, in order to allow all individuals and organizations to be informed about the TAG process and to participate in it should they wish to. Throughout the spring and summer of 2019 there were on-going discussions with organizations both within and outside government to identify and access key information sources and through which these groups had the opportunity to provide other technical input to the Regional Assessment.

**TAG Sessions - September 2019**

In late summer 2019, the Committee identified a number of specific topics for which it wanted to convene organized "TAG sessions" with interested organizations to discuss and seek input on various issues (Table 2.2). The sessions were geared towards seeking specific input related to key issues, and that could inform the Committee's findings and recommendations for the Regional Assessment. In early August 2019, invitations to these sessions were sent to all identified organizations (regardless of whether or not they had responded to the original request for TAG participation distributed in May and June 2019), and posted on the Registry. Reminder emails were sent out in late August, and the IAAC Twitter channel also promoted the TAG sessions. In addition, Committee phone calls to all identified stakeholder and Indigenous groups in August 2019 also included a reminder to participate in these sessions.

**Table 2.2 Overview of the September 2019 TAG Sessions**

| TAG Topic | Date and Time (NDT) | # Groups* | # Participants* |
|---|---|---|---|
| Commercial Fisheries | Monday, September 9 (9:30 a.m.-12:30 p.m.) | 19 | 26 |
| Marine Birds | Tuesday, September 10 (9:30 a.m.-12:30 p.m.) | 15 | 21 |
| GIS Decision-Support Tool | Wednesday, September 11 (9:30 a.m.-12:30 p.m.) | 27 | 32 |
| Oil Spills | Thursday, September 12 (9:30 a.m.-12:30 p.m.) | 28 | 31 |
| Cumulative Effects | Friday, September 13 (9:30 a.m.-12:30 p.m.) | 28 | 36 |
| Marine Fish and Fish Habitat | Monday, September 16 (9:30 a.m.-12:30 p.m.) | 21 | 25 |
| Climate Change | Tuesday, September 17 (9:30 a.m.-12:30 p.m.) | 23 | 30 |
| * External participants only (i.e., does not include Committee and Task Team members). | | | |

In early September 2019, information on the TAG meeting venue, and video- and tele-conferencing options was sent to all confirmed participants. A "backgrounder" containing an introduction to the topic and specific items and questions for discussion was also prepared for each TAG session and sent to all confirmed participants generally a week before each meeting.

The meetings were held at the conference centre at Memorial University's Signal Hill Campus in St. John's, NL. Video- and tele-conferencing was facilitated through the centre's "Blue Jeans" web-conferencing system. An independent facilitator from Memorial University's Harris Centre was retained to create and maintain a participatory yet semi-structured environment, and to guide the multi-party groups to clear and useful outcomes. Each session began with a welcome and introduction from the Committee, and a roundtable of introductions from all participants (in-person, and via video- and tele-conference). The facilitator then reviewed the agenda and the items for discussion as identified in the backgrounder, which were shown on-screen via PowerPoint and shared with those online via a "share-screen" feature. The agenda and presentation slides were also emailed to video- and tele-conference participants one hour before the meeting commenced.

The facilitator then initiated the discussion by welcoming any comments on any aspect of the topic. After approximately an hour of open discussion, the facilitator revisited the questions and discussion items to solicit input on any that had not yet been addressed. Each session concluded with each participant having the opportunity to provide their key message(s) to the Committee. Participant input forms were also distributed to all attendees so that participants could elaborate on the input they provided verbally or provide any additional input on the topic in question. These forms were reviewed by the Task Team for data, information, and concerns for inclusion in the draft Regional Assessment report and the GIS decision-support tool, and were posted to the Registry. Key issues and concerns raised were also discussed with the Committee. Each TAG session had at least two dedicated note takers who were Task Team members directly involved in the Regional Assessment and thus familiar with its subject matter. Notes from these sessions were distributed in draft form to all participants for review and comment, after which they were finalized and posted to the Registry.

**Effects Literature Review Opportunity**

In October and November 2019, the Task Team undertook a review of the existing and available literature on the potential effects of offshore exploratory drilling and associated activities. This review was conducted to ensure that this knowledge was fully considered in the Regional Assessment and to help inform its findings and conclusions.

To ensure that the information used was as comprehensive and balanced as possible, the Committee issued an invitation to TAG participants via email to contribute to that literature review. The Committee welcomed suggestions on available literature or other relevant information sources for inclusion in the literature review. The Committee also offered the opportunity for TAG members to review and provide input on the draft literature review summary tables for the draft modules prepared to date. The input received from TAG members was reviewed by the Task Team for consideration in the draft Regional Assessment report, and was posted to the Registry.

#### 2.2.5.3 Phase 3 Stakeholder Engagement: Review of Regional Assessment Committee Findings and Proposed Recommendations

In October 2019, the Committee decided to convene engagement sessions in late November (subsequently rescheduled to early December 2019) to discuss and seek input on the Committee's draft recommendations for the Regional Assessment, as well as on the GIS decision-support tool (Table 2.3). In early November 2019, invitations to these sessions were sent to all identified groups and organizations, regardless of whether or not they had participated in the engagement process to date. A follow-up email was sent mid-November 2019 with

additional details on the engagement sessions. The invitation and session details were posted to the Registry, and the IAAC Twitter channel also promoted the engagement sessions.

**Table 2.3 Overview of the November/December 2019 Engagement Sessions**

| Engagement Session | Date and Time (Local time) | # Groups* | # Participants* |
|---|---|---|---|
| St. John's Session | Thursday, December 5 (9:00 a.m.- 4:30 p.m.) | 23 | 34 |
| Halifax Session | Friday, December 6 (9:00 a.m.-4:30 p.m.) | 19 | 28 |
| * External participants only (i.e., does not include Committee and Task Team members). | | | |

On December 4, 2019, each confirmed participant for these sessions received an email with the draft recommendations, agenda and current Table of Contents for the draft Regional Assessment Report. The meetings were held at the Delta St. John's Hotel and Conference Centre in St. John's, NL, and at the Hollis Hotel in Halifax, NS.

An independent facilitator was retained to create and maintain a participatory yet structured environment for the sessions, and to guide the participants in producing feedback on the draft recommendations. Each session began with a welcome and introduction from the Committee. The facilitator then spent the morning guiding participants through an exercise focused on reviewing and providing feedback on the draft recommendations, first within smaller groups using an "interview" style activity and then within larger groups to report on key themes and findings. Results from the interview task were recorded anonymously on worksheets, which were later collected by the Task Team. The reporting of each larger group to the entire room consisted of sharing results of the "interview" process both verbally and as notes recorded on flip charts. All participants were given the opportunity to ask questions and clarifications of one another and of the Committee, and the flip chart notes were left up for the rest of the day for all to read at their leisure.

Following a lunch break, the afternoon portion of the session commenced with a demonstration of the GIS decision-support tool, during which time participants could ask questions regarding data, functionality, analytical capabilities, and other related items. After the demonstration, the facilitator again invited participants to provide any additional feedback to the Committee on the draft recommendations and the GIS decision-support tool. This was an individual task, whereby participants could be as detailed or as high-level with their input as they chose to, using "sticky notes" to anonymously share feedback on flip charts throughout the room. Again, these flip chart notes were left up for the remainder of the session for all to read if they chose to. The Committee also invited participants to provide additional feedback on the draft recommendations and GIS decision-support tool via email up to the end of day Sunday, December 8, 2019. This deadline was set as the Committee had a meeting on Monday, December 9, 2019 to begin to revise the draft recommendations in consideration of the feedback received.

Meeting notes from these sessions were developed based on the interview forms and flip chart notes. These notes were distributed in draft form to all participants for review and comment, after which they were finalized and posted to the Registry.

## 2.3 Overview of Key Findings and Outcomes

The above described engagement processes have resulted in the identification and documentation of a variety of information and perspectives related to oil and gas exploratory drilling offshore Eastern Newfoundland, including views on the potential effects of these activities and potential means of addressing these in the future.

Table 2.4 provides a high-level summary of the main questions and recurring issues that were raised during the Regional Assessment Indigenous and stakeholder engagement programs, as well as indicating where and how these are included and addressed in the Regional Assessment Report.

**Table 2.4 Summary of Questions and Issues Raised in the Regional Assessment Engagement Program**

| Summary of Questions / Issues Raised* | Group(s) Raising Issue | | Regional Assessment Report Section(s) | Module(s) |
|---|---|---|---|---|
| | Indigenous | Stakeholder | | |
| **Environmental Setting and Information (Biophysical and Socioeconomic)** | | | | |
| Overall size, diversity and dynamic nature of the marine environment of the Study Area | | ● | 1.3, 3.1 | 5-7 |
| Climatological and oceanographic conditions and their implications for effects | | ● | 3.1, 4.2 – 4.4 | 4, 7-14 |
| Corals and sponges (presence, distributions and sensitivity to disturbance) | | ● | 3.2.1, 4.2.1 | 5 |
| Important and sensitive areas and times for marine fish (feeding / reproduction areas and times) | ● | ● | 3.2.1 | 5 |
| Marine bird numbers / presence, colonies, seasonal presence and migrations, including recent declines for some species | ● | ● | 3.2.2 | 5 |
| Marine mammals and their movements through and use of the Study Area | | ● | 3.3.3 | 5 |
| Species at risk (marine fish, birds, mammals and sea turtles) | | ● | 3.2 | 5 |
| Presence of, and possible effects on, key species such as Atlantic salmon, American eel and others | ● | | 3.2.1 | 5 |
| Reproduction times and activities for marine animals | | ● | 3.2 | 5 |
| Protected and special areas | ● | ● | 3.2.4 | 5 |
| Domestic and international fishing activity (and fisheries surveys) in the Study Area | | ● | 3.3.1, 3.3.2 | 6 |
| The cultural and economic importance of the fishing industry | ● | ● | 3.3.1, 3.3.2 | 6 |
| Important fishing areas and times, and the dynamic nature of the fishery | | ● | 3.3.1, 3.3.2 | 6 |
| The need to consider present but also past and possible future fishing activities (changes in species, locations, times, gear types) | | ● | 3.3.1, 3.3.2, 3.4.2 | 6 |
| Marine vessel traffic to and through the region | ● | ● | 3.3.3 | 6 |
| The complexity of the marine ecosystem and interrelationships between its various components and areas | ● | ● | 3.1 | 4-6 |
| Recent and on-going environmental changes in the marine environment, fish species, distributions and times (regime shifts, climate change) | ● | ● | 3.1, 3.2 | 5 |
| Existing and available information sources on the marine biophysical environment and data gaps | ● | ● | 3.4.1 | 4-5 |
| Information availability, quality, and accessibility | ● | ● | 3.4 | 4-5 |
| Ecosystem and risk based approaches to managing activities in the Study Area sustainably | ● | | 4.6, 8.0 | |
| Incorporation of on-going and future studies into the Regional Assessment once available | ● | ● | 3.5, 8.0 | |

| Summary of Questions / Issues Raised* | Group(s) Raising Issue | | Regional Assessment Report Section(s) | Module(s) |
|---|---|---|---|---|
| | Indigenous | Stakeholder | | |
| Protocols for further gathering and consideration of Indigenous and local knowledge on the marine environment | ● | ● | 3.5, 8.0 | |
| Marine wildlife monitoring protocols and reporting requirements | | ● | 3.5 | |
| Fisheries management and available datasets | | ● | 3.3.1, 3.4.2, 3.5 | 6 |
| **Effects, Mitigation and Follow-up** | | | | |
| *Planning Drilling Activities* | | | | |
| Effects on benthic habitats / invertebrates (especially, smothering from drill cuttings) | | ● | 4.2, 4.6 | 7 |
| Effects of lighting and flaring on marine birds (attraction, mortality, energy expenditure) | | ● | 4.2, 4.6 | 8 |
| Underwater noise and associated behavioural effects on marine biota (especially marine mammals and fish) | ● | ● | 4.2, 4.6 | 9 |
| Vessel strikes (marine mammals) | | ● | 4.2, 4.6 | 9 |
| Effects on special areas and their key ecological characteristics and processes | ● | ● | 4.2, 4.6 | 10 |
| Interference with fishing activity, including direct interference (safety zones) and indirect (reduction in resource availability or quality) | ● | ● | 4.2, 4.6 | 12 |
| Timely communication and cooperation between oil and gas operators, Indigenous groups and fishing industries | ● | ● | 4.5, 4.6 | 12 |
| Compensation for damages to fishing equipment and other effects on commercial, FSC and communal commercial fisheries | ● | ● | 4.5, 4.6 | 12 |
| Potential exclusion areas / times for future exploratory drilling activity in the Study Area | | ● | 4.6 | |
| Social and economic benefits of oil and gas activity | | ● | 7.1 | 13 |
| Climate change, Canada's commitments to GHG reduction, potential implications of exploratory drilling for these issues | ● | ● | 7.2 | 2, 14 |
| *Potential Unplanned Events* | | | | |
| Potential effects of oil spills on marine biota and human health | ● | ● | 4.3 | 3, 7-14 |
| Project-specific oil spill analysis and modelling (consider past work, and require future projects to model) | | ● | 4.3, 4.5 | 3 |
| Oil spill prevention measures (equipment and procedures) | ● | ● | 4.3 | 3 |
| Oil spill response / clean up (recovery) procedures and requirements (including capping stack availability, effectiveness and effects of dispersants) | ● | ● | 4.3, 4.5 | 3 |
| Provision of accurate and timely information in the event of a spill | ● | ● | 4.6 | 3 |
| Possible effects of spills on fisheries (direct and indirect effects) | ● | ● | 4.3 | 12 |
| Compensation for damages resulting from accidental events | ● | ● | 4.3 | 12 |
| *Cumulative Effects and General Effects Management* | | | | |
| Other past and on-going disturbances in the marine | ● | ● | 5.1 | 4-6 |

| Summary of Questions / Issues Raised* | Group(s) Raising Issue | | Regional Assessment Report Section(s) | Module(s) |
|---|---|---|---|---|
| | Indigenous | Stakeholder | | |
| environment and their implications for the baseline conditions (and future effects) | | | | |
| Development and consideration of scenarios of future exploratory drilling activity in the Study Area | ● | ● | 5.3.1 | 15 |
| Potential overlap / interaction of effects of drilling with other activities (seismic surveys, fisheries, shipping) | ● | ● | 5.3 | 1, 15 |
| Challenges of assessing and managing cumulative effects | ● | ● | 5.2.2 | |
| Risk assessment and associated planning and precautionary / adaptive management approaches | ● | ● | 5.4, 8.0 | |
| **Regulatory, Policy and Procedural Issues** | | | | |
| Nature and purpose of the Regional Assessment and its outcomes and use | ● | ● | 1.1, 1.4 | |
| Regional Assessment schedule | ● | ● | 1.2 | |
| Relationship of the Regional Assessment to future project IA reviews | ● | ● | 1.4, 8.1 | |
| Development, use and future maintenance of the GIS decision-support tool | ● | ● | 2.4, 3.5, 5.4, 8.2 | |
| Need for notification / consultation processes for future exploratory drilling projects even if exempt from project assessment | ● | ● | 8.1 | |
| Need for capacity funding and expertise to meaningfully participate in process, monitoring and follow-up aspects | ● | | 2.2.1, 8.1, 8.2 | |
| Role of the offshore regulator, including its independence and role in protecting the environment rather than promoting industry | ● | ● | 1.3 | 1-3 |
| Consultation with / involvement of Indigenous groups and individuals early and in all aspects of the process including in governance and oversight. | ● | | 2.2.4, 8.1-8.3 | |
| Other regulatory requirements | ● | ● | 1.2, 4.2, 4.3 | 1 |
| Offshore jurisdictions and transboundary considerations | ● | ● | 3.2, 3.3.1, 3.4, 8.3 | 1 |
| * Details on all of the Committee's engagement activities and summaries of all comments received at these sessions and through written input can be found on the Registry (See https://iaac-aeic.gc.ca/050/evaluations/proj/80156)<br><br>Note: In addition to the above, Chapter 6 provides a detailed overview of issues and concerns raised specifically by Indigenous groups during the Regional Assessment and indicates where and how there have been addressed. | | | | |

## 2.4 Design and Development of the Regional Assessment (Report and GIS Decision-support Tool)

In addition to helping define the overall focus and content of the Regional Assessment, the engagement program described above has also informed and influenced the overall nature and structure of this Regional Assessment Report.

As discussed in Chapter 1, the Committee understands that a primary rationale for initiating this Regional Assessment stemmed from perceived inefficiencies in the EA process for offshore exploratory drilling projects to date, which has resulted in voluminous Environmental Impact Statement (EIS) documents with a high degree of duplication, and for which there is a degree of EA participant fatigue and a desire for a more effective and

efficient approach. Indeed, a number of participants involved in the Regional Assessment have suggested and requested that it not be approached as a generic version of a typical, large project EIS, but rather have asked the Committee to explore innovative methods of presenting the required information in a more effective and efficient manner.

The planning and design of this Regional Assessment have therefore been approached with the objective of providing information and analysis in a clear, concise and well-organized manner, in order to help maximize efficiency and its readability and utility for all of its readers and users. The Regional Assessment process has therefore resulted in this Report which contains a description of the Committee and its activities, as well as presenting the overall findings, conclusions and recommendations of the assessment. This will be followed and supplemented by a series of separate technical supporting documents (modules) that provide additional information.

### 2.5 GIS Decision-Support Tool

Key to the Committee's approach of a comprehensive Regional Assessment process has been the development of the accompanying GIS decision-support tool, which houses each of the above described technical modules, and where the associated text is linked directly to regional-scale mapping and datasets within an interactive system. In addition to the pre-set regional-scale mapping for select environmental components, this system has built-in analytical abilities that allow the user to query and summarize select data at various spatial and/or temporal scales. It provides a high degree of functionality as opposed to a static paper report, while at the same time, considerably reducing the amount of standing text, tables and graphs required to describe the environmental component or issue in question.

Work to establish this system has been the responsibility of the Task Team and a contractor. As with any new application there have been challenges, including software limitations and adjustments, questions concerning data accessibility and compatibility, and timing considerations. These challenges and others have been met and the system as developed will place in the hands of resource managers and the public, a tool that will increase the collective understanding of the offshore environment and the implications of resource management decisions. The Committee is confident that if the GIS decision-support tool is adequately resourced and maintained over the long term, its evergreen nature and universal accessibility will provide an invaluable resource in the offshore assessment and management processes.

The intent of this section of the report is to provide an outline of the Committee's objective in establishing the GIS decision-support tool as well as an overview of the system's objectives, functionality, architecture, data holdings, and access requirements. The system is an integral part of the Committee's work, and is linked to, and can thus be considered in conjunction with, this Report.

**The Committee's Objective:** To create an operational framework to organize, communicate and comprehend the accumulated scientific and other knowledge in the offshore relevant to the planning and management of offshore oil and gas exploratory drilling activities in the Study Area.

### 2.5.1 Objectives

1) To build a system architecture that will accommodate regional spatial and non-spatial knowledge collected and created by a range of providers, including both government and non-government organizations.
2) To provide a user-friendly system available on the internet and accessible to the public that will give users the ability to interrogate and benefit from the analysis of the system's spatial and non-spatial knowledge in the Study Area.
3) To provide a capability to view geospatial information in conjunction with more substantive in-depth information provided in text format.
4) To facilitate greater public awareness and encourage more meaningful engagement with respect to all aspects of the offshore environment.

### 2.5.2 Functionality

1) The system has been designed to allow the user to identify instances where, for example exploratory drilling proposals are situated in close proximity to valued components (VCs) and therefore may require greater scrutiny / mitigation and/or avoidance.
2) The tool provides an ability to monitor change in the offshore environment and the implications this might hold for the scheduled land tenure process, and the mitigation measures that should be required for specific exploratory drilling proposals.
3) The tool allows users to see and analyze trends in the offshore environment, such as seabird population dynamics or changes in the fishery.
4) The time series information in the system should also improve the ability to forecast/model future states of the environment.
5) All of the foregoing functionality may enable more informed decisions on the location and spatial distribution of future offshore oil and gas activity in order to reduce risk, including providing the foundation for comprehensive risk assessments which must become a priority in the offshore.
6) Lastly, the system is also of value in the case of an unplanned event(s) in terms of supporting our collective ability to manage and respond.

### 2.5.3 System Architecture

The GIS decision-support tool utilizes a number of technologies to display and analyze geospatial data, along with report contents. These technologies include:

- CartoVista 6.2.7 (Server, Publisher and Viewer)
    - Supports geospatial data storage, web map services, client-side geospatial data visualization and map query
- SQL Server 2016
    - Supports data storage (geospatial and non-geospatial) and query by CartoVista and .NET web services
- Microsoft IIS 7
    - Provides web services hosting
- .NET Web Services

    - Custom web services support database query and retrieval
- Angular
    - Custom client-side user interface components

All application components are deployed on a secure multi-tier application framework powered by Window 2016 servers within an Amazon Web Services environment. All client-side components adhere to HTML5 standards.

### 2.5.4 Data Holdings

An overview of the various map layers that are currently available within the GIS decision-support tool are listed below, for general reference. Note that this list is current as of the date of writing, but is subject to continual evolution and amendments.

Layer contents are available for viewing within the application but cannot be altered or downloaded for other use. Similarly, user uploading of additional map layers to the application is also not available.

**Table 2.5 Data Holdings**

| |
|---|
| **Boundaries and Basemap Options** |
| 1) Study Area |
| 2) Canadian EEZ - 200 Mile Limit |
| 3) UNCLOS |
| 4) Canada – France (St Pierre and Miquelon) |
| 5) NL – NS offshore areas boundary |
| 6) C-NLOPB Land Tenure Zones |
| 7) Longitude and Latitude Graticules > One Degree |
| 8) Longitude and Latitude Graticules > Five Degree |
| 9) Ocean Basemap Labels |
| **Physical Environment** |
| 1) Bathymetry |
| 2) Atmospheric Light |
| **Biological Environment** |
| *Fish and Fish Habitat* |
| 1) Benthic Assemblage Areas |
| 2) Chlorophyll – A |
| a) Chlorophyll - A > Winter |
| b) Chlorophyll - A > Spring |
| c) Chlorophyll - A > Summer |
| d) Chlorophyll - A > Fall |
| 3) Coral and Sponges |
| a) Predictive Mapping |
| • Large Gorgonians |
| • Small Gorgonians |
| • Sea Pens |
| b) Species Distribution Modelling |
| • Large Gorgonians |

| |
|---|
| • Extrapolated Area - Large Gorgonians |
| • Small Gorgonians |
| • Extrapolated Area - Small Gorgonians |
| • Sea Pens |
| • Extrapolated Area - Sea Pens |
| • Sponges |
| • Extrapolated Area - Sponges |
| c) Presence, Absence |
| • Sponges > Domestic |
| • Sponges > International |
| • Large Gorgonians > Domestic |
| • Large Gorgonians > International |
| • Small Gorgonians > Domestic |
| • Small Gorgonians > International |
| • Sea Pens > Domestic |
| • Sea Pens > International |
| 4) Fish Species Distribution |
| a) DFO Fish Density by Species |
| • Sand Lance |
| • Capelin |
| • American Plaice |
| • Witch Flounder |
| • Atlantic Cod |
| • Greenland Halibut |
| • Redfish |
| • Yellowtail Flounder |
| • Common Grenadier |
| • Roughhead Grenadier |
| • Roundnose Grenadier |
| • Blue Hake |
| • Striped Wolffish |
| • Northern Wolffish |
| • Spotted Wolffish |
| • Mailed Sculpin |
| • Arctic Cod |
| b) EU Fish Density by Species |
| • American Plaice |
| • Atlantic Cod |
| • Greenland Halibut |
| • Golden Redfish |
| • Acadian Redfish |
| • Deep Water Redfish |
| • Roughhead Grenadier |
| • Snow Crab |
| • Shrimp (multiple species) |
| c) Fish Density by Functional Group |

| |
|---|
| • Forage Fish |
| • Large Benthivores |
| • Medium Benthivores |
| • Small Benthivores |
| • Piscivores |
| • Planktivores |
| • Plank-Piscivores |
| d) Fish Diversity, Evenness and Richness |
| • Diversity |
| • Evenness |
| • Richness |
| e) Species-Specific Information |
| • Swordfish Sightings |
| • Albacore Tuna Sightings |
| • Big Eye Tuna Sightings |
| • Blue Fin Tuna Sightings |
| *Marine Birds* |
| 1) Seabird Density (provides seasonal density maps for 42 seabird species and/or groups) |
| 2) Seabird Colonies (provides colony location information for 15 species) |
| 3) Sightings (select species) |
| • Barrows Golden Eye |
| • Common Eider |
| • Cormorants |
| • Harlequin Duck |
| • Northern Wheater |
| • Phalaropes |
| • Purple Sandpiper |
| • Red Knot, Buff-breasted Sandpiper, Piping Plover |
| • Whimbrel, American Golden-Plover, Lesser Yellow Legs |
| 4) Foraging Ranges (select species) |
| 5) Home Ranges (select species) |
| *Marine Mammals and Sea Turtles* |
| 1) Baleen Whale Sightings |
| 2) Toothed Whale Sightings |
| 3) Dolphin Sightings |
| 4) Sea Turtle Sightings |
| *Special Areas* |
| 1) Federally Designated Areas |
| a) Ecologically and Biologically Significant Areas |
| b) Significant Benthic Areas |
| c) Marine Protected Areas |
| d) Marine Refuges |
| e) Representative Marine Areas |
| f) Migratory Bird Sanctuaries |
| g) National Historic Sites |
| h) National Parks |
| 2) Provincially Designated Areas |

| |
|---|
| a) Provincial Historic Sites |
| b) Provincial Parks and Protected Areas |
| 3) Internationally Designated Areas |
| a) Vulnerable Marine Ecosystems |
| b) NAFO Fisheries Closure Areas |
| c) UNCBD Ecologically and Biologically Significant Areas |
| 4) Other Designated Areas |
| a) Important Bird Areas |
| b) UNESCO World Heritage Sites |
| c) Placentia Bay - Grand Banks Large Ocean Mapping Area |
| d) NL Bioregions |
| **Socioeconomic Environment** |
| *Marine Fisheries* |
| 1) Administrative Boundaries |
| a) NAFO Divisions |
| b) NAFO Unit Areas |
| c) NAFO Fisheries Footprint |
| d) NAFO Regulatory Area |
| e) Crab Management Areas |
| f) Shrimp Fishing Areas |
| g) Sealing Areas |
| 2) Domestic Commercial Fish Landings (statistics) |
| 3) Domestic Commercial Fishing Locations |
| a) Gear Type (provides locational data for fixed and mobile gear types) |
| b) Species (provides locational data for 92 individual species and/or groups) |
| c) DFO NL Fisheries Mapping (2004 to 2015) (provides fisheries information for nine species) |
| 4) International Fisheries > Fish Landings |
| 5) Aquaculture Facilites |
| 6) Indigenous Communities and Lands |
| a) Communities |
| b) Labrador Inuit Land Claims Area |
| c) Labrador Innu Land Claim Area |
| d) NunatuKavut Land Claim Area |
| 7) Marine Research |
| a) DFO RV Surveys |
| b) Crab Surveys |
| c) Halibut Surveys |
| d) Shark Surveys |
| 8) Petroleum-related Activity |
| a) Exploration Licenses |
| b) Production Licenses |
| c) Significant Discovery Licenses |
| d) Areas of Interest |
| e) Drilled Wells |
| f) 2D Seismic Surveys |
| g) 3D Seismic Surveys |
| h) Other Exploration Programs |
| i) Production Platforms |

| |
|---|
| j) Predicted Well Scenarios |
| 9) Shipwrecks and Legacy Sites |
| a) Shipwrecks |
| b) Legacy Sites |
| c) Explosive Dumpsites |
| 10) Other Marine Infrastructure |
| a) Subsea Cables |
| b) Small Craft Harbours |

### 2.5.5 Access Requirements

The GIS decision-support tool is intended for use on devices that provide a suitable form factor for simultaneously viewing report modules and geospatial data, such as a desktop and/or tablet, with a minimum width of 1024 pixels. The application is supported by the following list of internet browsers (latest available versions):

- Windows (7,10): Chrome, Firefox
- MacOS (10.x): Safari, Chrome, Firefox
- Apple iOS (iPad): Safari, Chrome, Firefox
- Android (tablet): Chrome, Firefox

### 2.5.6 Accessing the GIS Decision-Support Tool

The Regional Assessment GIS Decision-Support Tool is currently planned to be activated on-line **on February 3 2020**, and can be accessed through the following website link: *nloffshorestudy.iciinnovations.com*

Additional details on the Committee's planned public engagement activities on this system will also be provided at that time.

Any individuals or groups wishing to provide input on the GIS decision-support tool may do so, together with their comments on the Regional Assessment Report, on the on-line commenting tool at: *https://www.ceaa.gc.ca/050/evaluations/proj/80156/participation*

## 2.6 References

Amec (Amec Environment and Infrastructure) (2014). Eastern Newfoundland Strategic Environmental Assessment – Final Report. 670 pp. Available at: https://www.cnlopb.ca/sea/eastern

# 3 ENVIRONMENTAL SETTING

This chapter provides a high-level overview of the existing environmental[1] setting of the Regional Assessment Study Area. This is intended to provide background and context to the assessment by identifying the key components and activities that are most likely to be affected by offshore exploratory drilling in the Study Area, as identified through the various analytical and engagement activities undertaken by the Committee. This description is focussed primarily on the following Valued Components (VCs), which include those that have been identified and considered in previous and on-going environmental assessments (EAs) for exploratory drilling projects in this region and/or which cover the various items specified in the Regional Assessment Agreement:

1) Marine Fish and Fish Habitat (including species at risk);
2) Marine and Migratory Birds (including species at risk);
3) Marine Mammals and Sea Turtles (including species at risk);
4) Special Areas;
5) Indigenous Communities and Activities;
6) Fisheries and Other Ocean Uses;
7) Health, Social and Economic Conditions; and
8) Atmospheric Environment

The overview information in this chapter sets the stage for the Committee's identification of the key issues and potential effects associated with offshore exploratory drilling, as well as its evaluation of the adequacy and effectiveness of current mitigation and follow-up measures (Chapter 4), and ultimately, for the Committee's recommendations around how these issues should be addressed for future projects (Chapter 8).

## 3.1 Introduction and Overview

The Study Area encompasses a marine region of nearly 735,000 km$^2$ offshore Eastern Newfoundland, the closest point of which is located approximately 50 km from the eastern coastline of the Island of Newfoundland and over 250 km from the nearest point in Labrador.

The Study Area and its surrounding environments exhibit a diverse and dynamic physical, biological and socioeconomic setting, including a complex geology, variable bathymetric conditions (with water depths ranging from less than 100 m to nearly 5,000 m), as well as climatological and oceanographic conditions that reflect a relatively harsh yet productive marine environment. The region is also known to contain a variety of marine biota and their habitats, including fish, birds, mammals and sea turtles that move to, from and within the region based on their individual ranges, habitat preferences and life cycle activities. The result is a marine ecosystem that is rich, complex and dynamic in nature due to a variety of natural and anthropogenic influences. The Study Area is also used for a variety of human activities, including important commercial fisheries that are undertaken by both Canadian and international fishing interests, as well as a range of other ocean uses.

In addition to the overview presented in this chapter, further details on the existing physical, biological and socioeconomic environments of the Study Area will be provided in the GIS decision-support system (Modules 4

[1] Throughout this report, the terms "environment" and "environmental" are used to refer collectively to both the biophysical and socioeconomic environments.

to 6), which can be referred to for further technical information and detailed mapping, as well as for additional, detailed references and bibliographies and scientific names of species.

## 3.2 Biophysical Environment

Marine ecosystems are comprised of diverse and inter-related biological and physical elements that function and interact to form complex and often variable patterns of marine biota and habitat use across a seascape. The physical elements of marine habitats in shallower shelf areas, continental slopes and deep abyssal areas in the Study Area affect the presence, abundance and distribution of marine organisms, resulting in assemblages of species associated with particular habitat characteristics. Biological ecosystem elements span primary producers such as phytoplankton to consumers such as zooplankton, invertebrates, fish, birds, mammals and reptiles that have important roles in supporting regional biodiversity and overall marine productivity.

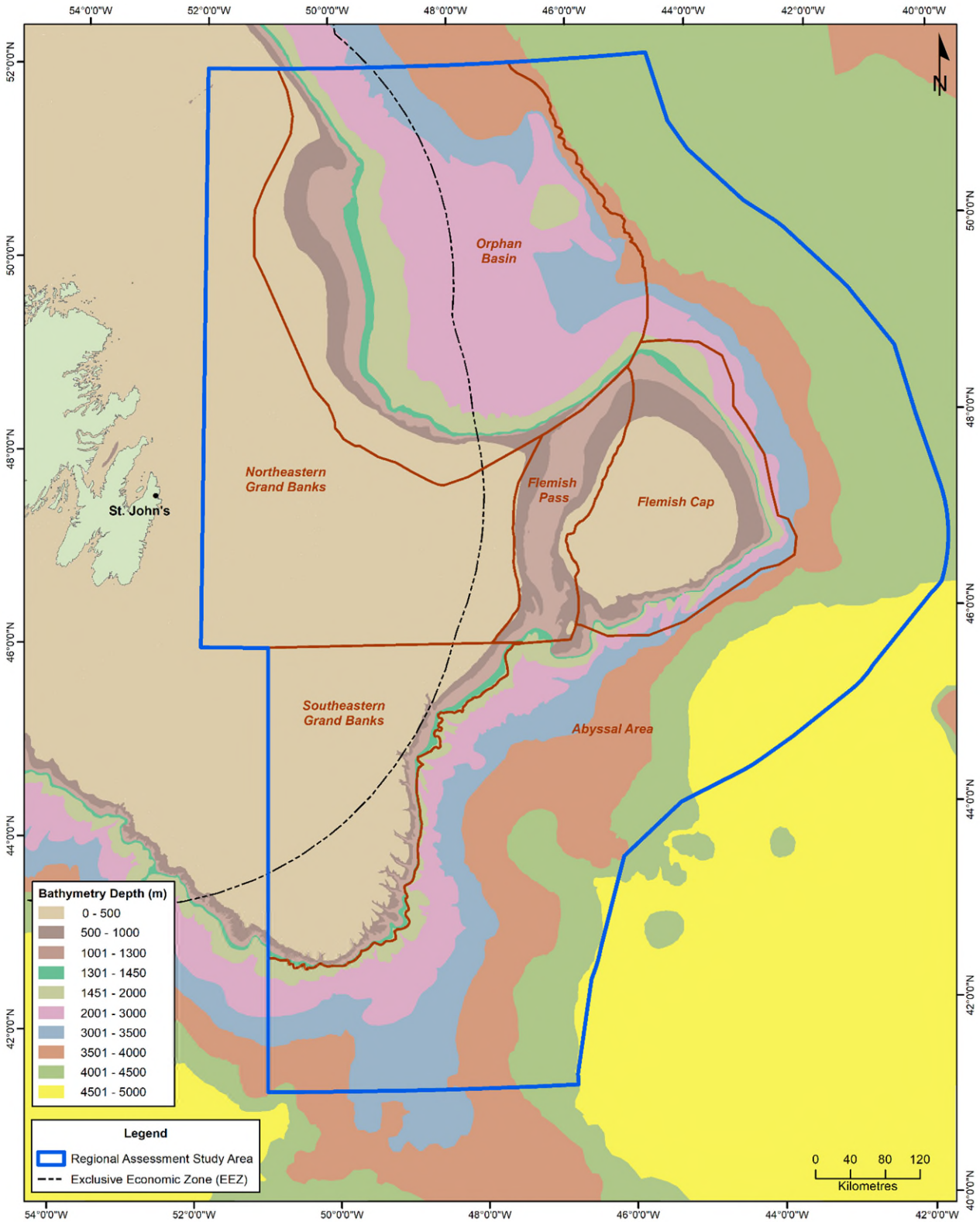
### 3.2.1 Marine Fish and Fish Habitat

This section provides a high level overview of marine fish and fish habitat within and around the Study Area, which includes parts of the Grand Banks, Orphan Basin, Flemish Cap and adjacent slope and deep-water habitats including the Flemish Pass and adjacent abyssal habitats (Figure 3.1). It includes consideration of relevant finfish and invertebrate species (both stable and at risk), as well as plankton, algae, marine plants, benthos and relevant components of their habitats (such as water and sediment), with further details and associated mapping provided in Module 5. The presence, abundance and distribution of particular fish species varies in space and time in the Study Area based on habitat characteristics (both abiotic and biotic) and variability and other influential factors across this rather large, diverse and dynamic marine ecosystem.

#### 3.2.1.1 Plankton, Macroalgae and Marine Plants

The plankton community is comprised of small free-floating microscopic marine plants (phytoplankton), invertebrates (zooplankton), vertebrate and invertebrate eggs and larvae, bacteria, fungi and viruses. Plankton comprise the most diverse and abundant life form in the ocean and form the foundation of marine food webs through primary and secondary production. On a regional scale, plankton abundance is typically linked to nutrient levels and associated abiotic processes, with relatively high areas of productivity occurring in upwelling areas along the continental shelf and within the Flemish Pass and Flemish Cap. The principal phytoplankton bloom in the Study Area typically occurs in the spring (April–May), followed by a second less intense bloom during the fall period. Associated with these blooms is an intense period (May-July) of growth, feeding and spawning of zooplankton which feed on the phytoplankton. Macroalgae and sea grasses also serve as important features of coastal marine habitats where they enhance productivity and provide refuge to marine organisms. Their occurrences are limited to shallower depths due to reliance on sunlight for photosynthesis (Melle et al. 2014).

**Figure 3.1 Primary Depth Zones and Bathymetric Features in the Study Area**



#### 3.2.1.2 Benthic Invertebrates

Benthic invertebrates represent a broad group of marine biota that associate with the seafloor and have important roles in ocean ecosystems. Some species, particularly snow crab and shrimp, are commercially important as fishery target species in the Study Area, and are ecologically-important as detritivores, filter feeders, prey species and carnivores in the facilitation of energy transfer through the ecosystem. Many benthic invertebrate species are relatively immobile and are thus often relatively sensitive to disturbance. Deep sea ecosystems, such as those in the Flemish Pass, include species that exhibit low metabolic rates, late maturity, low levels of recruitment, slow growth rates and long life spans, characteristics that make recovery from disturbance relatively slow (Roberts et al. 2006; Edinger et al. 2007; Murillo et al. 2011).

The distributions of benthic invertebrates are typically dependent on environmental parameters (Ramey and Snelgrove 2003). Many are either sessile or have limited mobility and therefore settle in areas that best support their growth, feeding and reproductive activities. Patterns of species abundance and distribution are linked to abiotic habitat characteristics, oceanographic conditions, predator-prey relationships and other factors (Edinger et al. 2007; Roberts et al. 2009; Baker et al. 2012; Murillo et al. 2016). Water depth is considered a primary predictor of invertebrate community assemblages, along with other influential environmental parameters such as substrate, slope, water temperature and currents. Given that the Study Area is characterized by considerably variable environmental parameters, it is also characterized by a wide variety of species and assemblages.

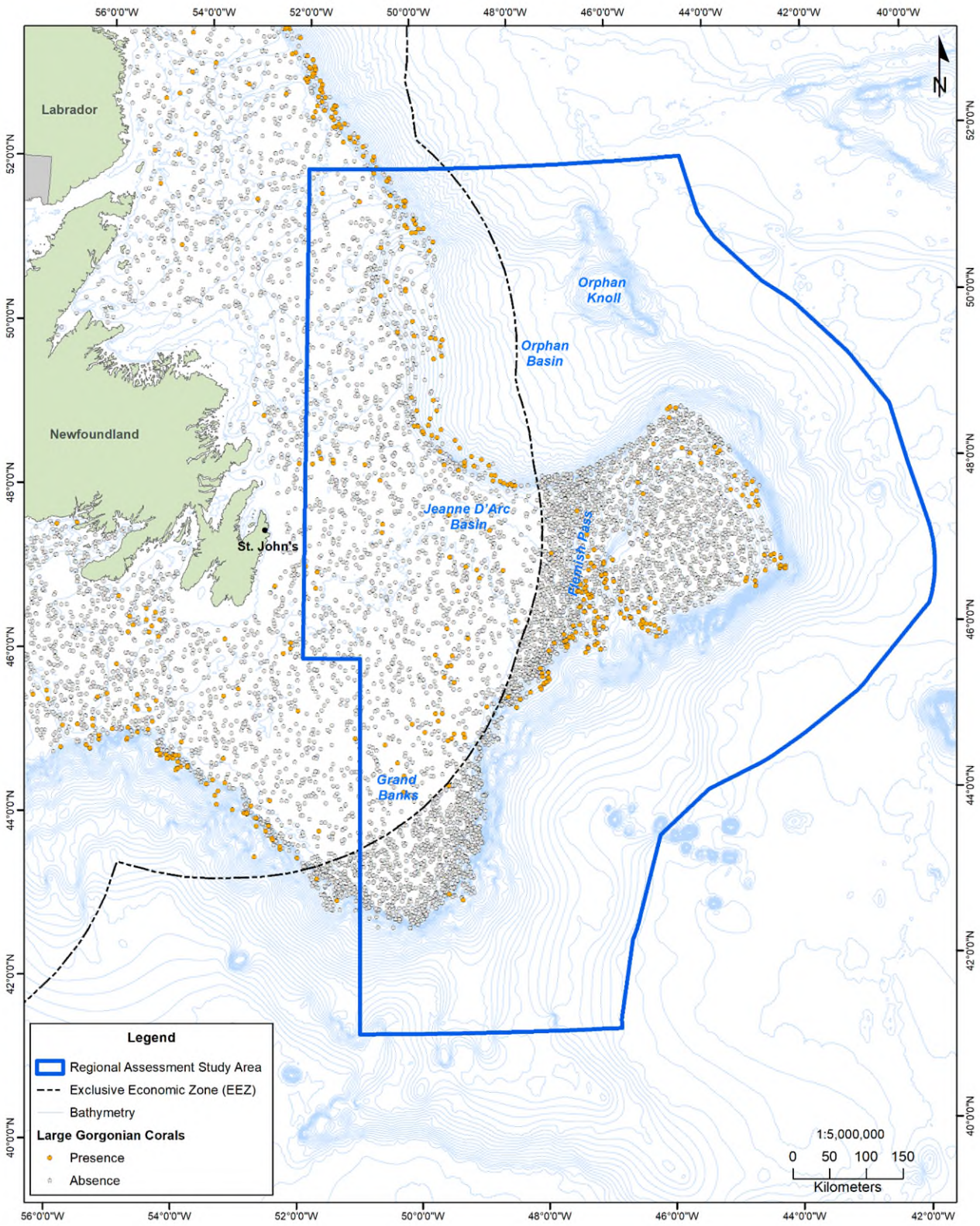
Benthic invertebrates in the Study Area are considerably variable in shape, size, structure and function, ranging from mobile species such as snow crab and shrimp to sedentary benthic communities of clams, scallops, sea stars, starfish, snails, worms, corals and sponges. Some species, such as snow crab and shrimp, exhibit migratory patterns that are often associated with depth, temperature and other environmental characteristics (Mullowney et al. 2017). For instance, snow crab move from hard substrate and colder waters to softer substrate and warmer waters in the winter/spring to molt and mate, while shrimp undergo vertical diurnal migration in response to light changes. Sessile species, such as corals and sponges, are more closely associated with depth and substrate in areas of relatively high productivity.

#### 3.2.1.3 Corals and Sponges

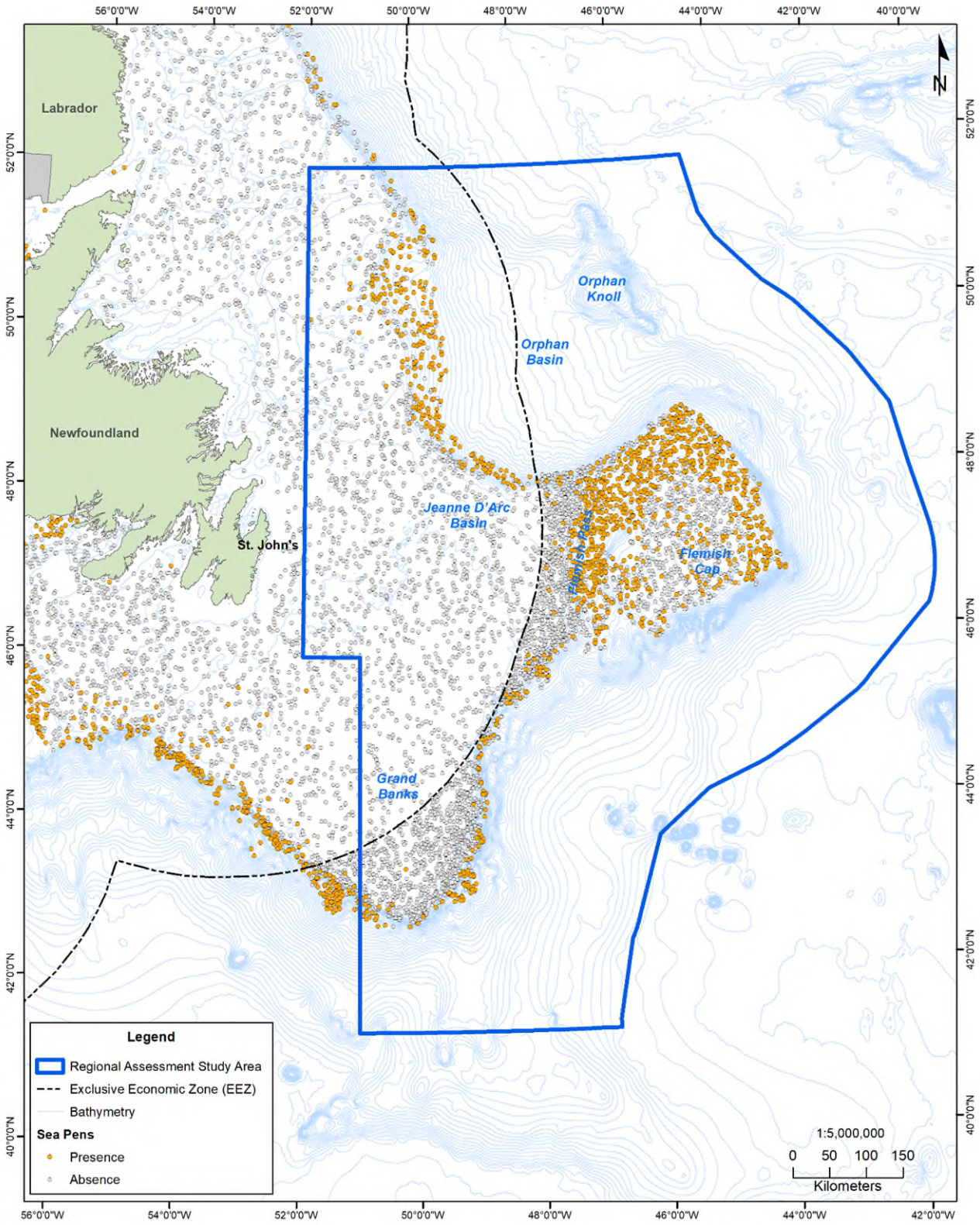
Deep-sea corals and sponges are of particular interest and concern, particularly due to their important ecological roles as complex habitat for a variety of marine species. These animals are particularly sensitive to the effects of offshore exploratory drilling and other anthropogenic stressors. Available information on corals and sponges in the Study Area indicates that the region contains a variety of these species, and has identifiable areas of known or potential occurrence based on bottom surveys and predictive modelling and mapping.

At least 56 species of corals and sea pens occur on the Flemish Cap, Flemish Pass and the Grand Banks, including various types of stony, soft (e.g., small and large gorgonians; sea pens) and black corals. The soft corals *Duva florida* and *Anthomastus spp*. are the most commonly caught deep water corals, exhibiting relatively high abundance in the water depth range of 600-900 m. The most common sea pens are *Antoptilum grandiflorum*, *Funiculina quadrangularis*, *Pennatula aculeata*, and *Halipteris finmarchica* (Wareham and Edinger 2007; Murillo et al. 2011, 2012, 2016).

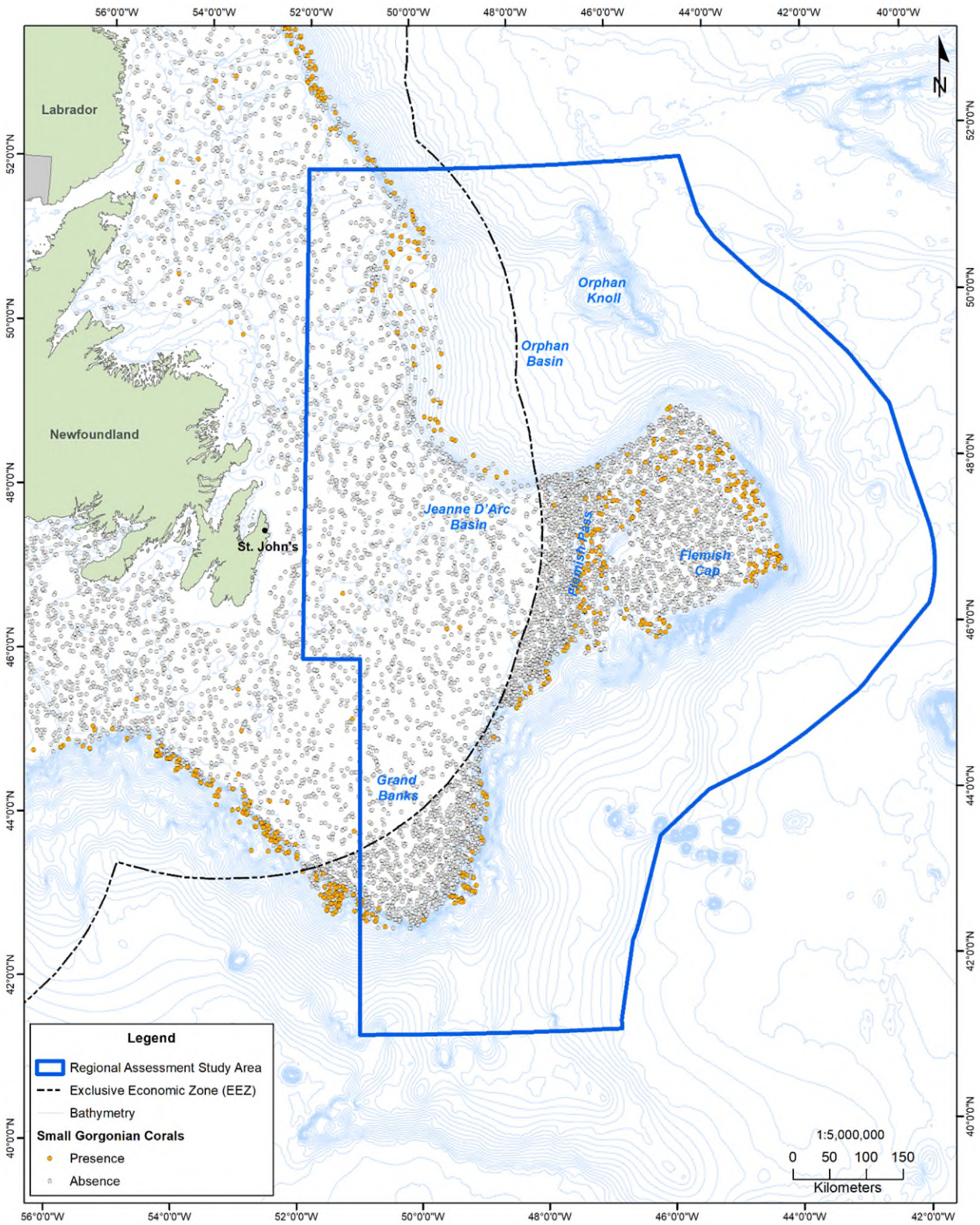
**Figure 3.2 Coral Presence in the Study Area Based on Previous Surveys**



**Coral Presence in the Study Area Based on Previous Surveys (*Continued*)**



**Coral Presence in the Study Area Based on Previous Surveys (*Continued*)**



The distribution of deep-sea corals in the Study Area is thought to be largely dependent on depth, substrate type, food availability and currents. As such, cold water corals are often concentrated along shelf edges and locations where there is sufficient movement of water rich in particulate organic matter, providing a continuous supply of food and preventing the accumulation of fine sediments thereby exposing hard substrates suitable for settlement. Research surveys and predictive modelling (Gullage et al. 2017) have shown that areas along and adjacent to the continental shelf, including locations along the Orphan Basin, Flemish Pass, Flemish Cap and Southern Grand Banks, are key areas in the Study Area for small and large gorgonian corals and sea pens. Large and small gorgonians are known to occur on the northeastern Newfoundland slope over a depth range of 100–1,300 m. Large gorgonians occur along the northeastern Newfoundland Shelf and eastern and southern side of the Flemish Cap, and small gorgonians occur along the northeastern Newfoundland Shelf, along the slopes of Flemish Pass and Flemish Cap, and southward along the shelf break to the tail of the Grand Banks. Sea pens are most prevalent along the northeastern Newfoundland Shelf, throughout the Flemish Pass, around the slopes of the Flemish Cap, and southward to the tail of the Grand Banks, typically at water depths ranging from 100 to 1,500 m (Figure 3.2) (Guijjaro et al. 2016; Gullage et al. 2017).

At least 60 sponge species occur in the Study Area. Sponges exhibit a wide depth range (100-1,500 m), with the highest biomass occurring in the northwest portion of the Study Area on the upper slopes of the Flemish Cap. The most abundant sponge species are the geodids (e.g., *Geodia barretti*, *Geodia macandrewii*, *Geodia phlegraei*, *Stryphnus ponderosus* and *Stelletta normani*) which are also the dominant sponge species in terms of biomass. Like corals, deep sea sponge distribution is also closely linked to factors such as depth, substrate, food availability, currents, temperature and salinity. Given their distinct habitat preferences, they often occur as distinct bands along depth contours where local environmental conditions are suitable for their growth. Sponges are found along the slope of the Grand Banks, the Flemish Pass, and the Flemish Cap, and are distributed from the northeastern Newfoundland Shelf to the western slope of the Flemish Pass, and down the eastern slope of the southern Grand Bank (Figure 3.3). Predictive modelling conducted for offshore Newfoundland and Labrador has also identified an area of the northeast Newfoundland Shelf, near the Orphan Basin, as one with a relatively high probability of sponge presence (Guijjaro et al. 2016).

Within the Study Area, a number of particularly important areas for corals and sponges have been identified through various scientific processes. Fisheries and Oceans Canada (DFO), for example, has identified various Significant Benthic Areas (SiBAs), which are regional habitats for which sponges, large and small gorgonian corals and/or sea pens are defining features.

SiBAs have been identified through DFO-led scientific processes, and have been delineated using known observations of corals and sponges from various research programs (e.g., DFO Research Vessel (RV) surveys and other scientific survey results from the peer-reviewed literature), along with spatial (kernel density) analysis and species distribution modelling to determine areas with relatively high densities and potential for presence. As part of this process, DFO has defined four types of SiBAs based on the dominant taxa: 1) sponges; 2) sea pens; 3) large gorgonian corals; and 4) small gorgonian corals. While these areas are not legally protected, they are particularly noteworthy for the occurrence of corals and sponges. The SiBAs that occur within the Study Area are situated primarily along the Northeast Newfoundland Slope and include areas associated with sea pens, sponges and large and small gorgonian corals (Figure 3.4). There is also a small SiBA associated with small gorgonian corals on the Grand Banks (Figure 3.4) (Kenchington et al. 2016a, 2016b).

**Figure 3.3 Sponge Presence in the Study Area Based on Previous Surveys**

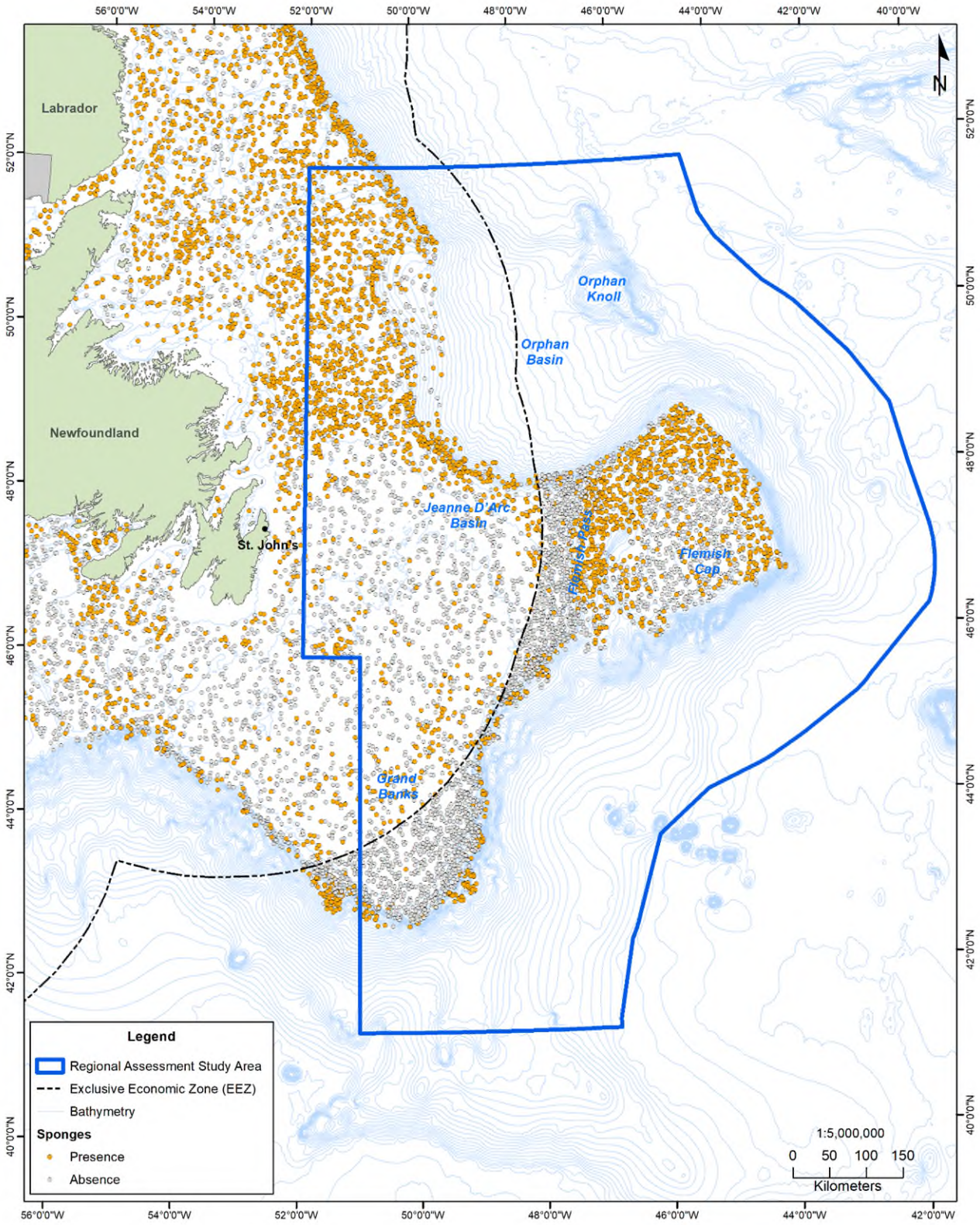
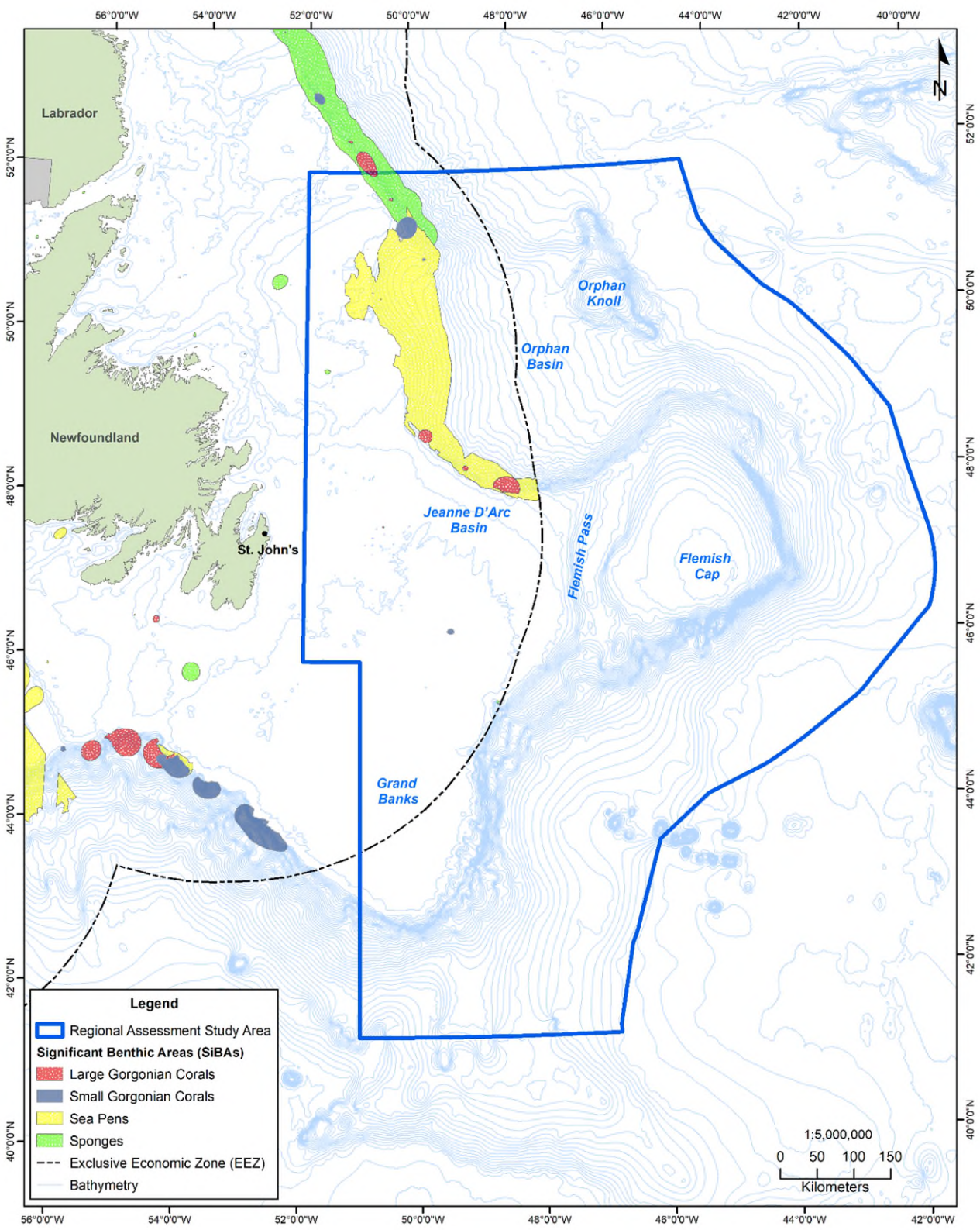


**Figure 3.4 Identified Significant Benthic Areas in the Study Area**



There have also been a number of Vulnerable Marine Ecosystems (VMEs) identified and delineated within the Study Area by the international community (including contributions from DFO). VMEs are defined as areas that contain relatively large concentrations of sensitive species such as corals (including seapens) and sponges and/or features that support these species. In 2006, the United Nations General Assembly (UNGA Resolution 61/105) called for the identification and protection of VMEs, which lead to the Northwest Atlantic Fisheries Organization (NAFO) identifying 27 areas covering 380,000 $km^2$ in the Northwest Atlantic as being vulnerable to bottom contact fishing gears. This subsequently resulted in the closure of several areas to bottom contact fishing around the Grand Banks, Flemish Pass and Flemish Cap in order to protect VME habitats. VME closure areas are divided into two categories: 1) seamount closures; and 2) sponge, coral, and seapen closures. Within the Study Area, there are 15 NAFO-identified VME closure areas, two associated with seamounts and 13 with corals, sponges and seapens. These VMEs are located primarily along the Flemish Pass and on the Flemish Cap, with one VME for corals identified toward the southern portion of the Grand Banks (Figure 3.5). NAFO has also delineated existing bottom fishing areas (footprint) to regulate fisheries that could cause a significant adverse impact on identified VMEs (Kenchington et al. 2016a, 2016b; DFO 2017a, 2017b).

Traditionally, information on the distribution of cold-water corals and sponges in offshore Newfoundland and Labrador has been obtained primarily through bottom trawl surveys, commercial fisheries observer programs, and dedicated surveys using remotely operated vehicles (ROV). These methods have been somewhat restrictive in that they are relatively costly, have limited efficacy to investigate large areas, are limited by geology and bottom surface structure, and are largely focussed on areas with high fishing effort. Most of the available information obtained through these surveys is therefore restricted along the continental shelf, resulting in large portions of the continental slope and abyssal plains within the Study Area being essentially uninvestigated.

In those areas that have not yet been sampled directly, species distribution models (SDMs) may be used to help understand the potential presence, abundance and habitat associations of those species. The SDMs allow cost-effective predictive modelling and mapping to be completed over large areas using existing environmental data without the use of potentially destructive survey techniques. In the Study Area, this approach has been used to generate SDMs for coral functional groups and individual species in order to predict their distributions throughout the Newfoundland and Labrador offshore. The results of this modelling suggest that, in general, the areas of highest habitat suitability in the Study Area are located along the continental shelf break and within canyons on the upper continental shelf. This includes locations along the edge of the southwest Grand Banks, the outer edges of the Flemish Cap, along the continental shelf surrounding the Orphan Basin, and along the sections of the edge of the continental shelf extending from Orphan Spur (Figure 3.6, Gullage et al. 2017). The patterns and variations in habitat suitability identified by the modelling had not been previously described in the region. The modelling of the various functional group classifications identified habitats on the abyssal plain as being unsuitable for coral species, while extrapolating larger portions of the continental shelf as potentially suitable habitat. When compared to *in situ* observations, it was found that the habitat suitability results delineated by the SDMs fit closely to those identified through previous survey information (Gullage et al. 2017; Kenchington et al. 2016a, 2016b, 2019). As such, the results of the modelling provides useful information on the potential presence of these sensitive species in the Study Area, supplementing previous survey coverage in this area at a regional scale that fits well with the nature and objectives of this Regional Assessment.

**Figure 3.5 Identified Vulnerable Marine Ecosystems and Fisheries Closures in the Study Area**

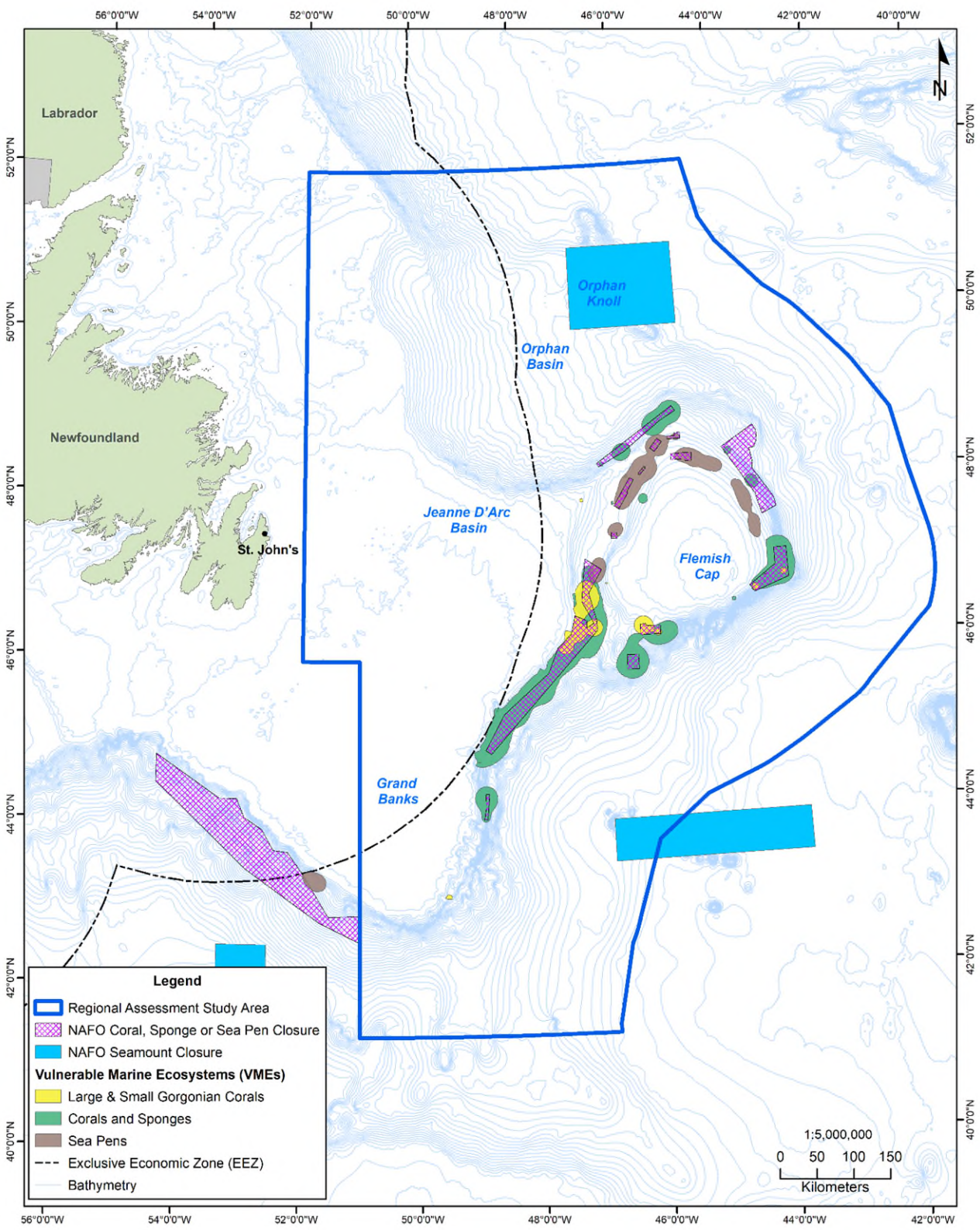
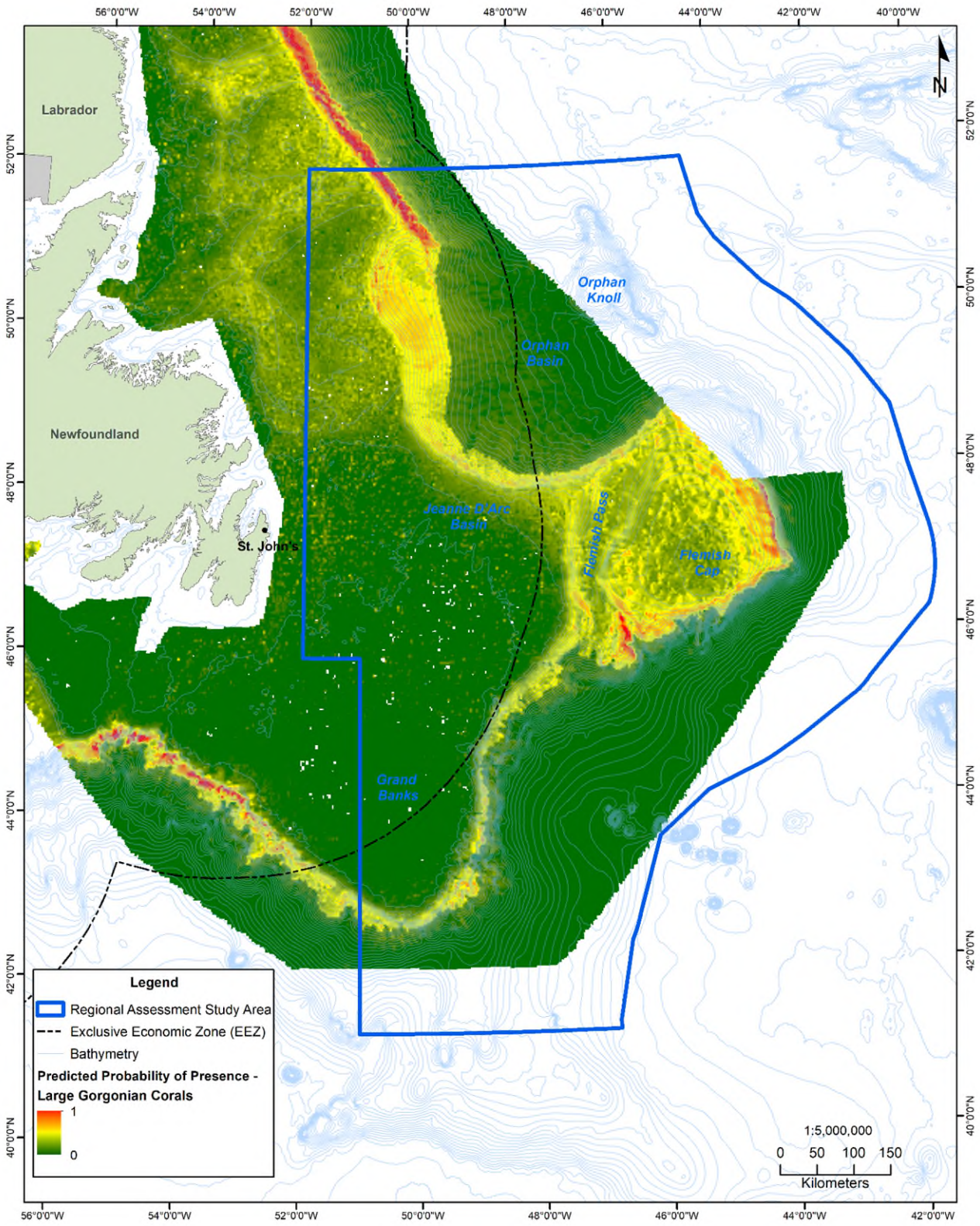
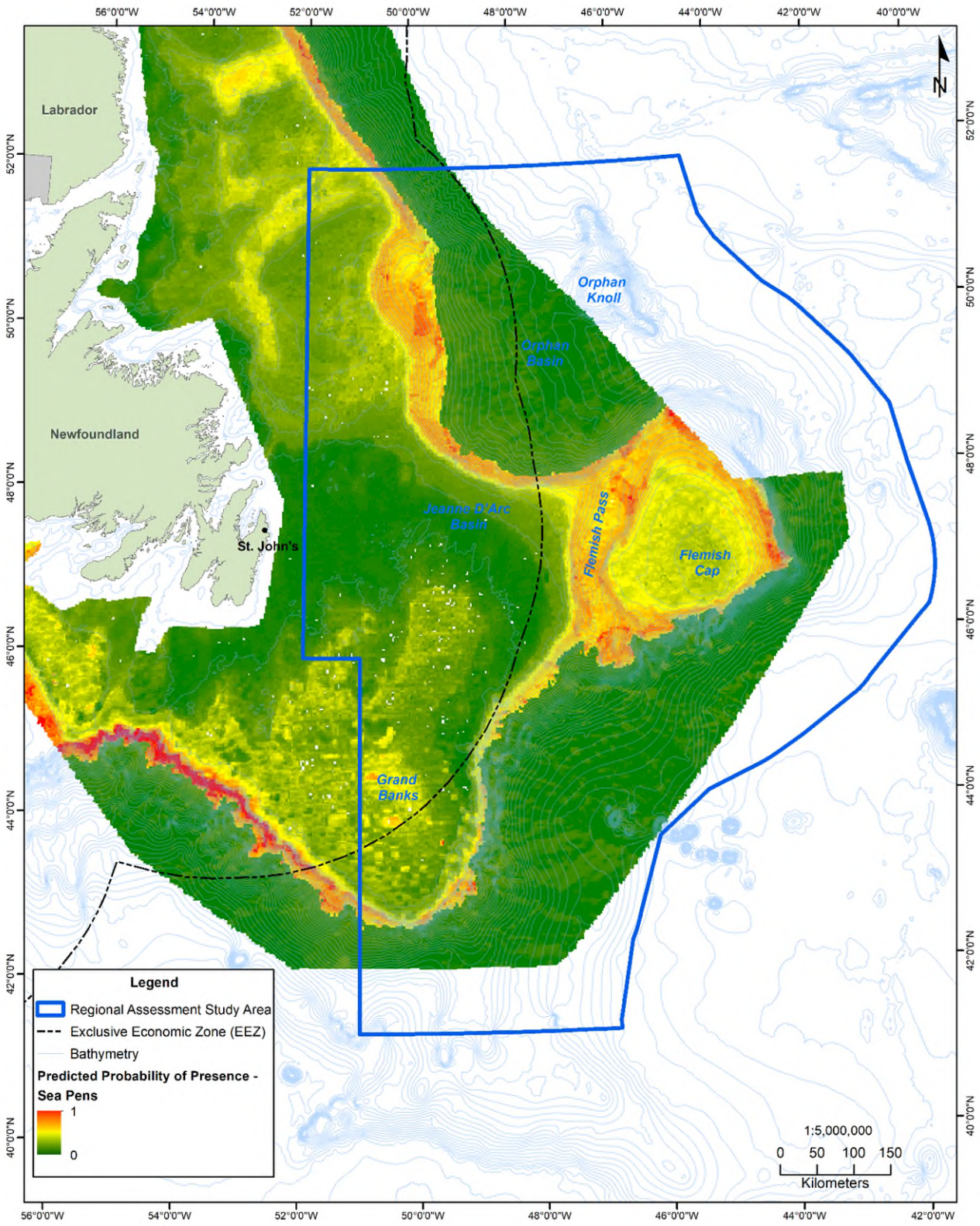


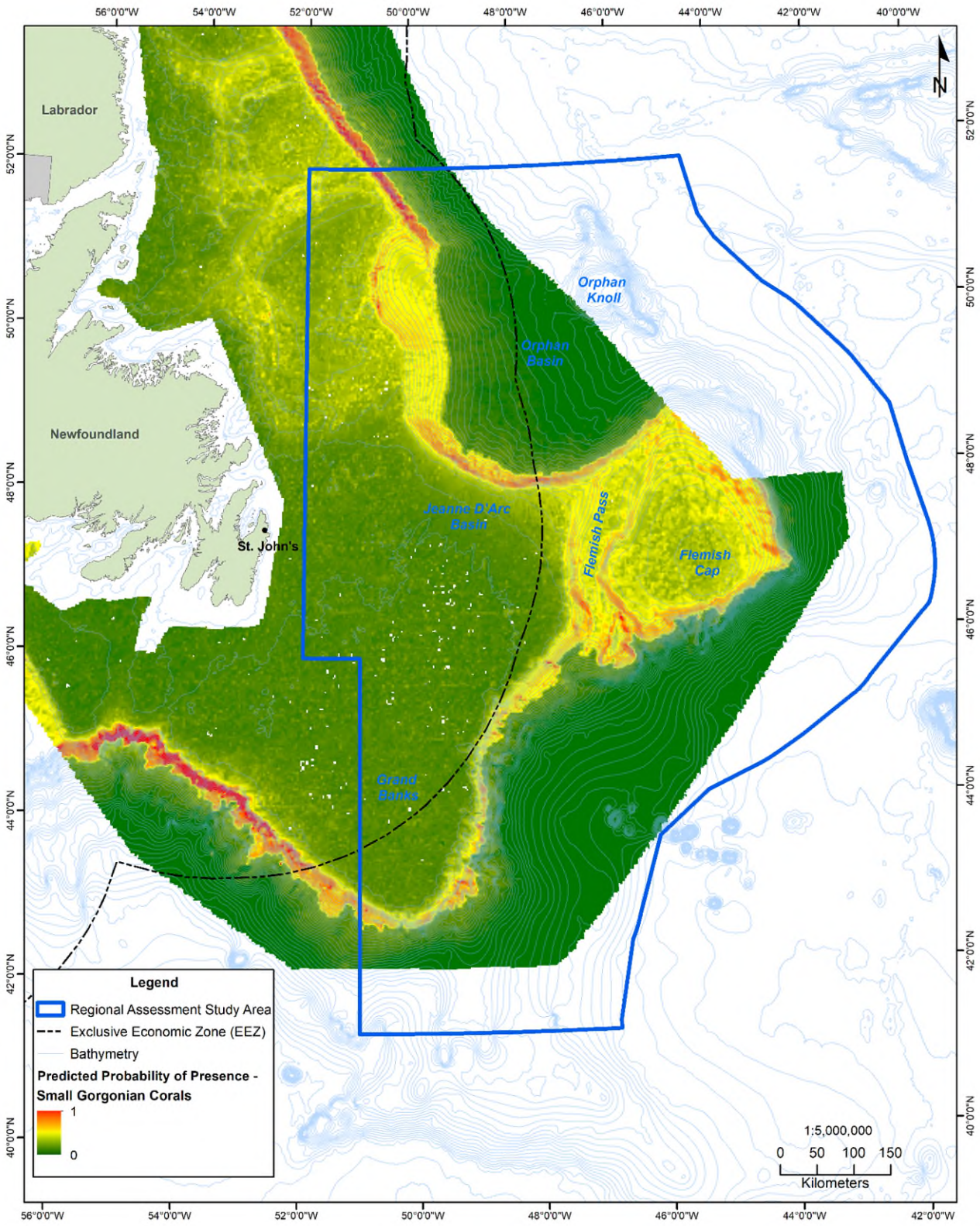
**Figure 3.6 Predictive Modelling and Mapping for Corals in the Study Area**



**Predictive Modelling and Mapping for Corals in the Study Area (*Continued*)**



**Predictive Modelling and Mapping for Corals in the Study Area (*Continued*)**



#### 3.2.1.4 Finfish

Marine finfish exhibit a broad range of ecological roles, habitat requirements and morphologies, with a variety of demersal and pelagic marine fish species occurring in the Study Area either year-round or seasonally. These often form definable species assemblages that are associated with particular depth zones and other oceanographic and/or habitat conditions. Across the region and its various habitat types (see earlier Figure 3.1), a variety of fish species and assemblages occur, with "shallow water" groups found primarily on the shelves and upper slopes of the Grand Banks (such as capelin, sand lance, yellowtail flounder, deepwater redfish), giving way to "deeper water" assemblages on the middle and deeper slopes of the Grand Banks and the Flemish Pass (including lanternfish, grenadier species) and finally to "deep slope-abyssal assemblages" (such as blue hake, roughhead and armed grenadier and skates). Species distributions and assemblages can also vary seasonally across the region and within the water column due to changing oceanographic and other abiotic conditions, and according to the various habitat preferences and life history components of particular species and their inter-relationships with each other and their habitats (Gomes et al. 1992; Mahon et al. 1998; Kenchington et al. 2013; Amec 2014; Murillo et al. 2016; Nogueira et al. 2015, 2016, 2017). The Study Area hosts a number of commercially relevant fish and shellfish species which are important for both Canadian and international fishers.

Aggregate examinations of the fish communities from Canadian RV surveys also provide an indication of ecologically important areas within the Study Area. For example, fish species richness and diversity were both highest in the Flemish Pass and along the northern slope of the Grand Banks. Similar trends in fish species evenness were also observed. Overall fish abundance was also highest along the Northern Slope of the Grand Banks. However, while higher along the eastern slope of the Flemish Pass, fish abundance was found to be relatively low within the Flemish Pass itself. These areas are often coincident with other formally designated areas such as several Ecologically and Biologically Sensitive Areas (EBSAs) and fisheries closure / coral protection zones (Section 3.2.4) (Wells et al. 2017, 2019; DFO 2019a). In contrast, the shallow areas of the Grand Banks were found to be relatively poor for all fish community measures, while the eastern slope of the Grand Banks was poor for richness and abundance.

The various finfish species that are found in the Study Area exhibit diverse reproductive strategies that include demersal spawning (such as skates, capelin and wolffish) and broadcast spawning (Atlantic cod, white hake) as well as more specialized strategies such as diadromy (Atlantic salmon, American eels) and birth to live young (sharks and redfish). Juveniles of these species may settle into nursery areas that provide protection from predation. In many cases, spawning migrations take fish species well beyond the Newfoundland and Labrador offshore to freshwater rivers, more shallow waters or tropical locations, whereas others are able to fulfill their whole life cycle in the area. Of those that remain, most are spring and early summer spawners, although a few spawn in winter such as roughhead grenadier and skate species (Scott and Scott 1988; Coad and Reist 2018).

Within the Study Area, a variety of migration patterns at various scales are used by resident and transient species. These include small scale local migrations to those that extend for up to hundreds of kilometers, the reasons for which may vary from seasonal movements, to spawning migrations, to feeding aggregations. Key migration strategies used by finfish found in the Study Area include:

- Migrations from offshore wintering habitats to shallow coastal areas in summer (cod and capelin);

- Summer feeding migrations from southerly latitudes into the Study Area by large warm water pelagic species such as tunas, swordfish and a variety of sharks;

- Migrations of freshwater spawners like Atlantic salmon, which may transit through the Study Area between offshore feeding migrations and their natal rivers; and

- Catadromous migrations of American eel that may pass through offshore environments as they migrate between freshwater rearing environments and the Sargasso Sea spawning areas.

The migrations of finfish species may therefore extend well beyond the Study Area. For example, Atlantic salmon populations that migrate through the Study Area to feeding aggregations off Greenland could originate from rivers on the coast of Newfoundland and the Maritime Provinces (Reddin and Friedland 1993; Reddin 2006), whereas some large pelagics (such as sharks) have migration pathways that carry them across extensive portions of the Atlantic Ocean (Dewar et al. 2011; Curtis et al. 2014).

#### 3.2.1.5 Species at Risk and Otherwise of Conservation Concern

The Regional Assessment considers species that are secure as well as those listed as being at risk and provided with protection under Canadian (federal *Species at Risk Act* - *SARA*) and provincial (Newfoundland and Labrador *Endangered Species Act* - NL *ESA*) legislation, or as identified by "arm's length" organizations such as the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the International Union for the Conservation of Nature (IUCN) as species of conservation concern. There are currently four *SARA* (Schedule 1) listed and one NL *ESA* listed species that do or may occur within the Study Area, including striped (Atlantic), northern (broadhead) and spotted wolffish, as well as the white shark and the American eel. There are 30 species found in the North Atlantic that have a conservation designation under one or more of *SARA*, COSEWIC, NL *ESA*, and/or the IUCN.

All three wolffish species are found on the slopes of the Grand Banks primarily, as well as in the Flemish Pass and throughout the northeast Newfoundland slope. Striped wolffish are found on the shelf on the Grand Banks as well, while spotted and northern wolffish are typically only found on the slopes. Further north, all three species inhabit the continental shelf. White sharks are not known to breed in the Study Area, but some undertake migrations to feed in the rich areas off the Grand Banks. This species prefers relatively warmer water, and mostly remain in the Gulf Stream south of the Grand Banks (COSEWIC 2013a, 2013b, 2013c; DFO 2018).

Under the *SARA*, critical habitat is defined as the habitat that is necessary for the survival or recovery of listed extirpated, endangered, or threatened species, and that is identified in a recovery strategy or action plan. The legislation also defines habitat for aquatic species at risk as spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced. Critical habitat has been delineated for the spotted and northern wolffish as part of their recovery and management plans. These delineated areas are located along the northeast Newfoundland slope, and are based on known temperature, depth and sea bottom types and the known habitat associations for these species (DFO 2018).

In addition to those species that are listed as being at risk or otherwise designated as being of conservation concern, a number of other species have been identified by Indigenous groups or others as being of particular cultural significance.

Atlantic salmon are an anadramous species that breed and spend the early part of their life cycle in freshwater systems, occurring throughout some 2,500 rivers in Atlantic Canada, eastern Québec and the northeastern seaboard of the United States freshwater systems. They leave their natal rivers during May or June as smolt and spend from one to four years in the marine environment before returning to their natal rivers to spawn as adults (Spares et al. 2007; COSEWIC 2010a; Lefevre et al. 2012; Windsor et al. 2012; Strom et al. 2017: Soto et al. 2018). While considerable research has been conducted on the freshwater portion of their life history, significantly less is known about the period after they leave their natal rivers and undertake migrations through, and overwinter in, the marine environment. Atlantic salmon populations in eastern Canada are listed as being from "special concern" to "endangered", and many populations are experiencing a decline in abundance with low return rates to their natal rivers to spawn. Marine survival is thought to be a contributing factor to recently observed declines in populations, but the mechanism for this is poorly understood (Bradbury et al. 2015, 2016).

Atlantic salmon are known to overwinter in the Labrador Sea, which is just north of the Study Area, and may see their migration route to their over wintering habitat passing directly through the eastern portion of this region (Reddin and Friedland 1993; Reddin 2006). There has, however, been limited research to date on this, and the information that is available through past studies is not at a resolution that allows for an identification and understanding of particular areas that are used by Atlantic salmon in the Study Area. Recently, acoustic and satellite tagging programs and other research have been conducted to obtain further information on the marine life stage of Atlantic salmon. DFO has also been involved in recent Atlantic salmon research in this region, including acoustic tagging in various areas, with tracking of tagged animals through nearby coastal acoustic receiver arrays as well as a series of receivers around Newfoundland and Labrador and in the Gulf of St. Lawrence and the Cabot Strait. DFO has also partnered with various groups to conduct satellite tagging off the coast of Greenland to gain a better knowledge of the migration routes adults take from their over wintering habitat back to their natal river to spawn. DFO also plans to deploy a series of acoustic receivers along the western edge of the Orphan Basin, directly within the northern portion of the Study Area, to track Atlantic salmon as they move through the area. In a further effort to expand on this current research, the Environmental Studies Research Fund (ESRF) recently completed a call for Expressions of Interest (EOI) related to developing a program of research aimed to determine the presence of Atlantic salmon in Eastern Canadian offshore regions to better inform regulatory decisions in the offshore oil and gas sector.

American eels are a catadromous species, spawning in salt water and living most of their lives in estuaries or freshwater. All individuals spawn in the Sargasso Sea, with spawning migrations occurring in the fall when adult eels leave their fresh water environments to migrate across the Continental Shelf waters before traversing through deeper waters to reach their spawning habitats. American eels spawn from February to April after which the adult eels die, and eggs and larvae float north in the Gulf Stream and eventually metamorphose into glass eels. Before reaching estuaries, eels will gain pigmentation and then move into freshwater or estuarine systems where they will live for approximately 9 to 22 years before returning to salt water to spawn. This species is most likely to be present in the Study Area during their migration back to their freshwater habitats as they follow the Gulf Stream and move northward. The American eel is designated as "threatened" by COSEWIC, and as "vulnerable" under the NL *ESA*. Populations throughout their range in Canada have declined since the 1950s, and as American eels inhabit freshwater, estuaries and the ocean at various points in their lives, there are

numerous, varied threats to this species. Like Atlantic salmon, there is lack of current information on the marine life stages of this species, and the locations and timing of their presence in the Study Area is largely unknown (COSEWIC 2012a; Cairns et al. 2014; Rypina et al. 2016; Westerberg et al. 2017).

Swordfish are large pelagic predators that are present throughout most of the Atlantic Ocean that are capable of large scale migrations, with their breeding and rearing grounds located in the Gulf of Mexico and on the eastern shelf of the United States. They are occasional visitors to the waters of the Study Area, typically in the warmer months (June to October) when they may come to feed in the rich waters off the Grand Banks (Govoni et al. 2003). They are, however, mainly associated with the warmer waters of the Gulf Stream and therefore are not observed north of the Grand Banks due to the colder Labrador Current (Sedberry and Loefer 2001). Their known distribution is derived primarily from fisheries catch data, satellite tagging studies and other sightings, which indicate that their presence is primarily focussed on the edge of the Grand Banks to the south, and in surface waters over deeper ocean areas. However, a small number of observations have been made on the Grand Banks, the Flemish Cap and inside the Orphan Basin. Swordfish migrate vertically on a daily basis, occupying surface waters during the day and migrating up to 400 m deep at night (Lerner et al. 2013). Several Indigenous groups have commercial communal licenses for swordfish (Section 3.3.2), with the majority of recorded catches in NAFO Division 3O and 3N to the south of the Grand Banks. Although there has been some research through tagging studies to increase the knowledge of this species, their highly migratory and transboundary nature pose challenges in that regard. On-going studies include coordinated international sampling and research around stock boundaries, and mixing and reproductive behaviours.

Tuna are also large pelagic predators capable of large migrations, with three species occasionally recorded in Canadian waters: albacore, bigeye and Atlantic bluefin tuna. Much like swordfish, these species are broadly distributed in the Atlantic Ocean, with breeding habitat in tropical and sub-tropical waters to the south or in the Mediterranean and migrations to Canadian waters to feed on various fish species. They typically remain within the warmer waters of the Gulf Stream and are usually observed to the south and east of the Grand Banks over deeper waters. Atlantic bluefin tuna are listed as endangered by COSEWIC (Collette et al. 2011a, 2011b; COSEWIC 2011). Various Indigenous groups have commercial communal licences for tuna species, with catches occurring primarily to the south of the Grand Banks.

### 3.2.2 Marine and Migratory Birds

A variety of marine and migratory bird species occur within the Study Area and in adjacent marine and coastal regions. This includes seabirds and other avifauna that inhabit the region at particular or extended periods for breeding, feeding, migration and other activities. Eastern Newfoundland has important bird habitats along the coastline and elsewhere in the province. The federal *Migratory Birds Convention Act* and its regulations protect most migratory birds found in Canada and wildlife in Newfoundland and Labrador is also managed under the provincial *Wildlife Act* and its regulations. The federal *SARA* and/or provincial NL *ESA* legislation also protect avian species at risk and their habitats, including species known, or have potential, to occur in or near the Study Area. In addition to these legal protections, avifauna also have intrinsic ecological and socioeconomic value (e.g., tourism, hunting, etc.).

Marine-associated birds that may occur within the Study Area and its adjacent environments can be generally divided into three categories: seabirds, waterfowl and divers, and shorebirds. In addition, there are many landbird species associated with coastal habitats or which migrate nocturnally over marine waters, most

frequently in the fall. The timing of species presence and density varies considerably depending on the species. Some taxa are abundant year-round (e.g., large gulls and kittiwakes, many alcid species, fulmars, and shearwaters) while some are more likely to be present in particular seasons (e.g., phalaropes, gannets and terns).

#### 3.2.2.1 Seabirds

Seabirds are long-lived species with low fecundity, delayed recruitment and low rates of population growth. A diverse assemblage of seabirds occur in the marine waters off Eastern Newfoundland including cormorants, gannets, phalaropes, gulls, terns, alcids (auks), jaegers and skuas, and tubenoses (fulmars, petrels and shearwaters). Many of these taxa nest along the coastline of Eastern Newfoundland. Diversity peaks from May to July when northern hemisphere species overlap with those visiting from the southern hemisphere (Huettman and Diamond 2000; Hedd et al., 2012). The highest abundance of seabirds occurs in November (driven mainly by high numbers of Northern Fulmars and Black-legged Kittiwakes. Abundance is also high in early spring to summer (April to July) due to large numbers of Dovekies (migrating to their colonies in Greenland in April), murres, Leach's Storm-petrels and shearwaters. The distribution of seabirds in the Study Area changes seasonally: most of the study area is used from April to July, but from August to November densities tend to shift to the western part of the Study Area (Bolduc et al. 2018). Although information is more limited it appears that seabirds also heavily use the Study Area from December to March.

Leach's Storm-petrels are the most abundant breeding seabird in Newfoundland. They are a surface-feeding bird that undertakes long foraging flights from breeding colonies to feed nocturnally in deep waters off the continental shelf. Canada has a global responsibility for the species; more than 60 percent of the world's Leach's Storm-petrels breed in Canada. IUCN listed the species as globally vulnerable in 2018 due to population declines, particularly in Newfoundland. Population declines of between 40 and 55 percent have been observed at all three of Newfoundland's largest Leach's Storm-Petrel colonies, including Baccalieu Island which is the largest colony in the world. The causes of Leach's Storm-petrel population decline are multi-faceted, but offshore activities are often considered to be a contributing factor. Foraging ranges of at least three of the largest Leach's Storm-Petrel colonies in eastern Canada overlap with Canadian offshore oil and gas fields during the breeding season. Many seabirds, including Leach's Storm-petrels, aggregate around offshore structures, such as platforms and vessels, as they are attracted to their night lighting, food availability and other visual cues. This behaviour increases their risk of mortality due to collisions with or strandings on structures, predation by avian predators, incineration from flares, disorientation, and increased energy expenditure. Leach's Storm-petrel is the most frequently recorded species stranding on offshore platforms (90 percent of reports), with peak strandings occurring in September and October. This coincides with the fledging period, suggesting that many Leach's Storm-petrels affected are recent fledglings.

**Figure 3.7 Seasonal Seabird Density Mapping in the Study Area**

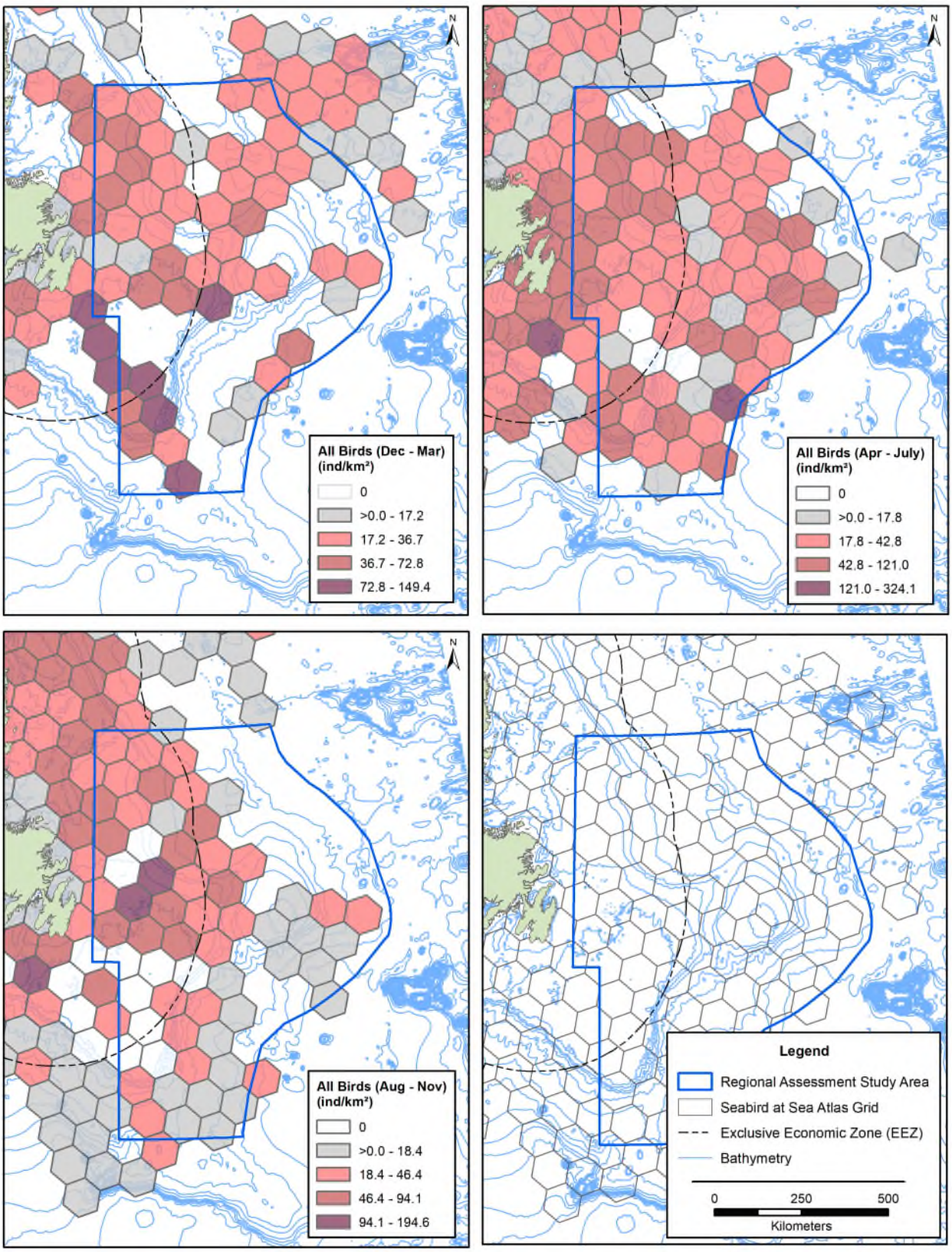
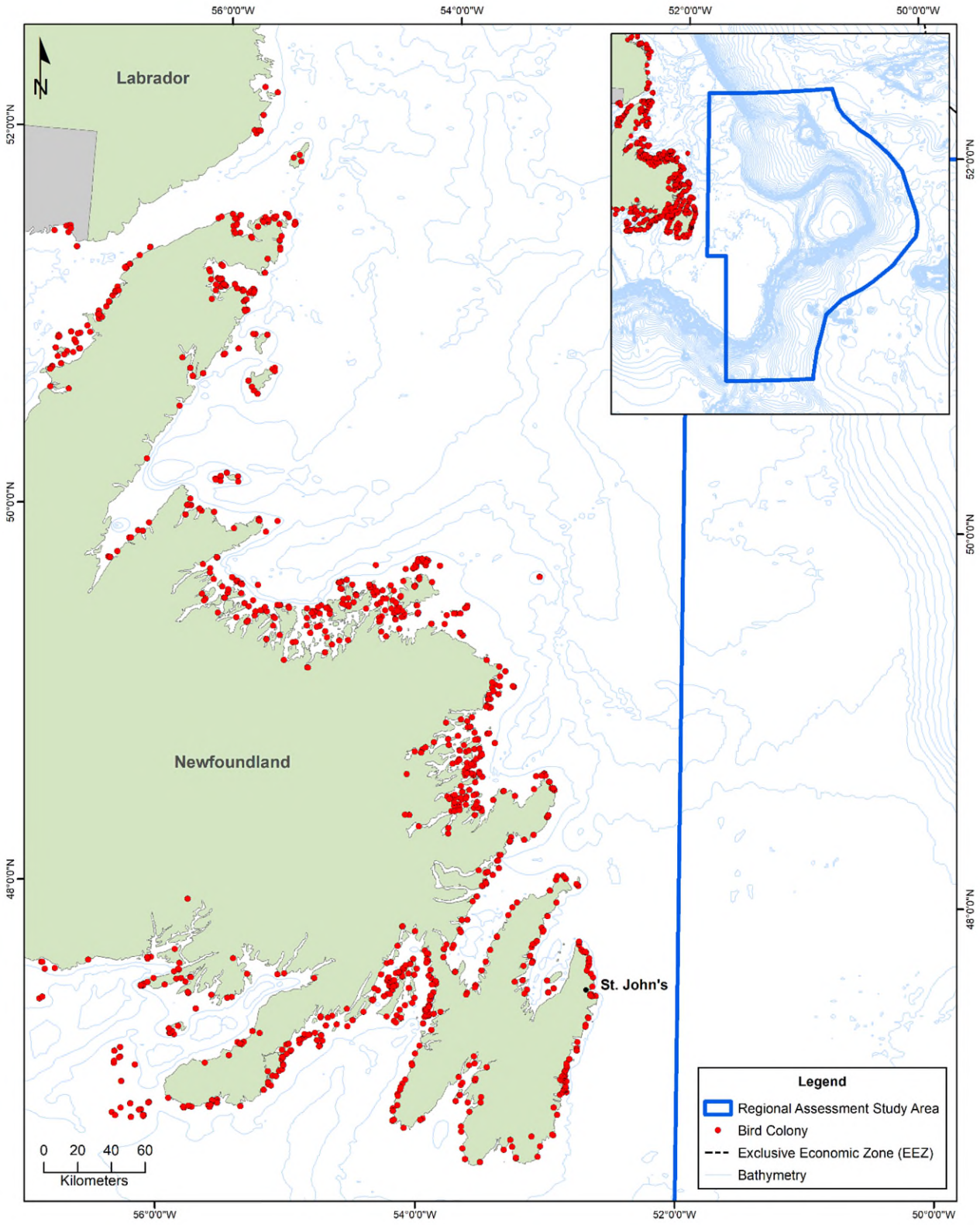


**Figure 3.8 Seabird Colony Locations in Eastern Newfoundland**



The Newfoundland and Labrador Shelves and adjacent pelagic waters provide important, non-breeding habitat for regionally and globally significant populations of diving alcids, including Common Murre, Thick-billed Murre and Dovekie. Common Murres from large Newfoundland and Labrador breeding colonies over-winter locally in offshore regions of the Grand Banks. Millions of Thick-billed Murres from Canadian Arctic and North Atlantic colonies aggregate in winter within the Labrador Sea and Grand Banks region. Thick-billed Murres from Greenland and Iceland are of international conservation concern due to declining breeding populations and some of those populations have been Red-Listed by the IUCN. Millions of Dovekies from globally significant breeding colonies in Greenland also migrate through the Labrador Sea in fall, to access wintering grounds on the Grand Banks. Alcids are particularly vulnerable to oiling as they spend much of their time on the ocean's surface relative to more aerial species due to their high wing-load (and high cost of flight). They tend to congregate over relatively small, productive areas and their sensitivity to oiling is highest during the post-breeding moulting period.

The Study Area also provides important wintering habitat for Black-legged Kittiwakes from breeding populations spanning the North Atlantic. This species has undergone widespread decline in the last decade and is regionally Red-Listed (IUCN) in much of its range. This region is also an important foraging area for species breeding in the Southern Hemisphere during their austral winter such as the Sooty and Great Shearwaters.

#### 3.2.2.2 Waterfowl and Divers

Waterfowl (geese and ducks) and divers (loons and grebes) spend much of their time on the water's surface. Ducks include dabbling ducks (primarily inland breeders), diving ducks, and sea ducks. Most species of sea ducks spend much of the year at sea (generally close to shore). Waterfowl occur in large numbers in marine habitats off Eastern Newfoundland, especially during the winter months. However, they tend to prefer more coastal habitats and are unlikely to occur frequently in the offshore parts of the Study Area. Sea ducks (*Merginae*) and loons (*Gaviidae*) have the highest potential to occur in the Study Area, while geese, dabbling ducks, diving ducks and grebes are less likely to occur offshore. The most abundant year-round waterfowl species in coastal Newfoundland is the Common Eider, which breeds in several small colonies along the coast (Goudie et al. 2000). In addition, a large proportion of Common Eiders that breed in eastern Arctic Canada overwinter in coastal waters of Newfoundland (Mosbech et al. 2006; Gilliland et al 2009; Gilliland and Robertson 2009). Common Eiders and other sea ducks such as scoters and Long-tailed Ducks occur in large flocks (or rafts) off the coast from autumn to spring. Large wintering aggregations of eiders occur along the northern and eastern coasts of Newfoundland.

#### 3.2.2.3 Shorebirds

More than 25 species of shorebirds occur in Newfoundland and Labrador for at least part of the year, and may pass through parts of the Study Area. Shorebirds forage in shoreline habitats such as beaches, tidal flats, rocky ledges, saltmarshes and coastal barrens during migration. Due to their preference for coastal habitats, shorebirds are infrequent visitors to the offshore area, occurring primarily in the fall during migration. While a number of species, such as Least Sandpiper, Spotted Sandpiper, Greater Yellowlegs, Piping Plover, Semipalmated Plover, Eastern Willet, Wilson's Snipe, American Woodcock and Killdeer nest in Newfoundland (Warkentin and Newton 2009), others are present only during migration.

#### 3.2.2.4 Species at Risk and Otherwise of Conservation Concern

Few avian species at risk or species of conservation concern are likely to occur in the Study Area. The Ivory Gull (listed as endangered under *SARA*) is associated with pack ice. Recent tracking data suggests they may only go as far south as offshore of northern and northeastern Newfoundland in winter and are unlikely to occur within the Study Area. Two waterfowl species at risk, the Barrow's Goldeneye and Harlequin Duck, are listed as Special Concern under *SARA*. They occur in the marine environment, mainly outside of the breeding season. Like other waterfowl species, they prefer coastal areas and are unlikely to be present in the Eastern Newfoundland offshore. Thus, the greatest, but still limited, potential for these species at risk is during the winter months. Red-necked Phalaropes, assessed by COSEWIC as a species of conservation concern, have been observed in small numbers in offshore waters from April to July.

Other avian species at risk or species that are otherwise of conservation concern that occur in Newfoundland are shorebirds and landbirds, and are unlikely to be found in the Study Area except perhaps during migration in the fall. Some species listed as being at risk globally (IUCN) use the Study Area. While they are not listed provincially or federally, the Study Area provides foraging habitat for at-risk populations of species breeding outside Canada. For example, Black-legged Kittiwakes (IUCN vulnerable) and Atlantic Puffins (IUCN Near-threatened) overwinter from Europe, and Sooty Shearwaters (IUCN Near-threatened) overwinter from the Southern Hemisphere, and Leach's Storm-petrel (IUCN vulnerable), is identified as a species of conservation concern by Environment and Climate Change Canada (ECCC) and uses the Study Area year-round.

#### 3.2.2.5 Key Areas and Times

Summer months see the greatest abundance of seabird species breeding in Newfoundland (Bolduc 2018). Breeding colonies for marine and migratory birds in Newfoundland and Labrador occur mainly in coastal areas and on offshore islands. Some islands, such as the Funk Islands, can be over 50 km offshore. During the breeding season, seabirds tend to concentrate around nesting colonies, although large numbers of non-breeding birds may still be found offshore. The Study Area is outside of the foraging range of most species during the breeding season, with the exception of Leach's Storm-petrels (Hedd et al. 2018). These birds travel hundreds of kilometers from their colonies on multi-day foraging trips and overlap with the Study Area. Some Southern Hemisphere-breeding species spend the summer months (austral non-breeding season) in the Study Area, including large numbers of Great Shearwaters. In the winter months, certain groups are absent or scarce, such as gannets, terns, cormorants and phalaropes. Tens of millions of Dovekies travel several thousand kilometers from their breeding grounds to their core winter distribution within the highly productive waters off Eastern Newfoundland (Fort et al. 2012, 2013). These waters support a large proportion of Great Skuas from Iceland and the shelf edge off Newfoundland, is particularly important to wintering kittiwakes. Most of Eastern Canada's population of Common Murres and approximately a third of the region's Thick-billed Murres overwinter in the waters off Eastern Newfoundland.

There are a number of designated Special Areas in and near the Study Area that provide important habitat for marine birds during all or some parts of the year. For example, there are two federal Migratory Bird Sanctuaries (MBS) along the eastern coast of Newfoundland: Île aux Canes and Shepherd Island, both of which support large numbers of breeding Common Eiders. Terra Nova MBS, which is inland, provides important habitat for shorebirds and both Common and Arctic Terns. The east coast of Newfoundland also contains five Ecological Reserves which provide critical habitat for breeding seabirds: 1) Funk Island (significant for Common Murres,

Northern Gannets and other species), Baccalieu Island (also designated an EBSA and is the largest Leach's Storm-petrel colony in the world), Witless Bay (significant numbers of breeding Atlantic Puffins and other species including Common Murre, Black-legged Kittiwakes, Gulls), Mistaken Point (wintering area for large numbers of Common Eiders, important for Purple Sandpipers), and Eastport MPA (multiple species). Finally, a total of 21 Important Bird Areas have been identified in this region.

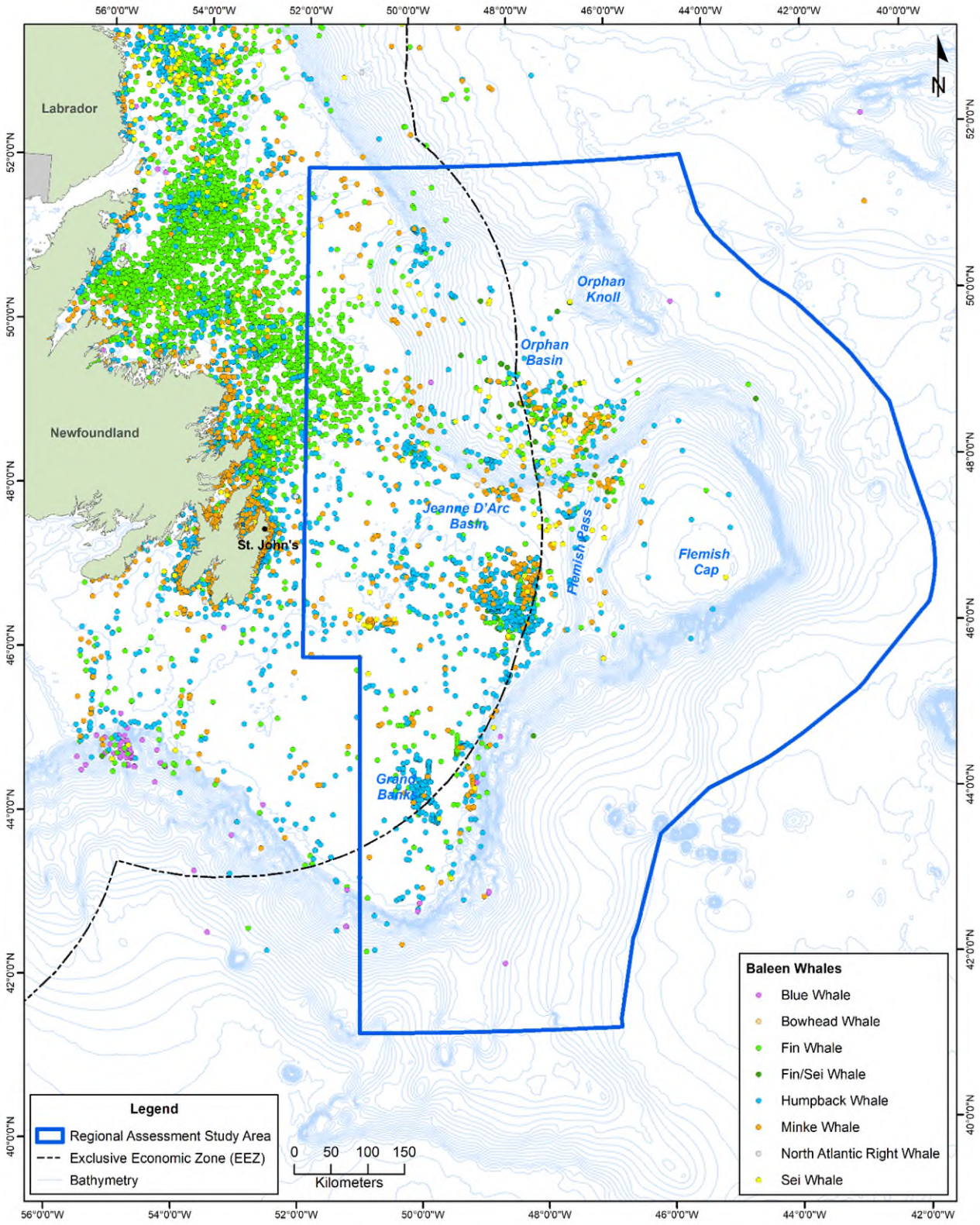
Offshore, there are a number of designated EBSAs in or near the Study Area (Section 3.2.4). The EBSA criteria for selection and ranking includes biodiversity, density and importance to reproduction and survival of seabirds. For example, the Southeast Shoal has large, diverse aggregations of seabirds that forage in offshore spawning areas on major prey species. This EBSA has the highest benthic biomass in the Grand Banks, which leads to large feeding aggregations of marine birds and fish species. Orphan Spur, Virgin Rocks, the Northeast Slope and Baccalieu Island (previously mentioned) also provide important foraging habitat for a suite of marine birds in using offshore waters. The Eastern Avalon EBSA includes Witless Bay, which is used by large numbers of seabirds. Finally, the United Nations Convention on Biological Diversity (UNCBD) has designated several International EBSAs which are important to seabirds, including Southern Labrador Sea, which was designated due to its importance as wintering habitat for Black-legged Kittiwake and Thick-billed Murre and as breeding habitat for Leach's Storm-petrel.

### 3.2.3 Marine Mammals and Sea Turtles

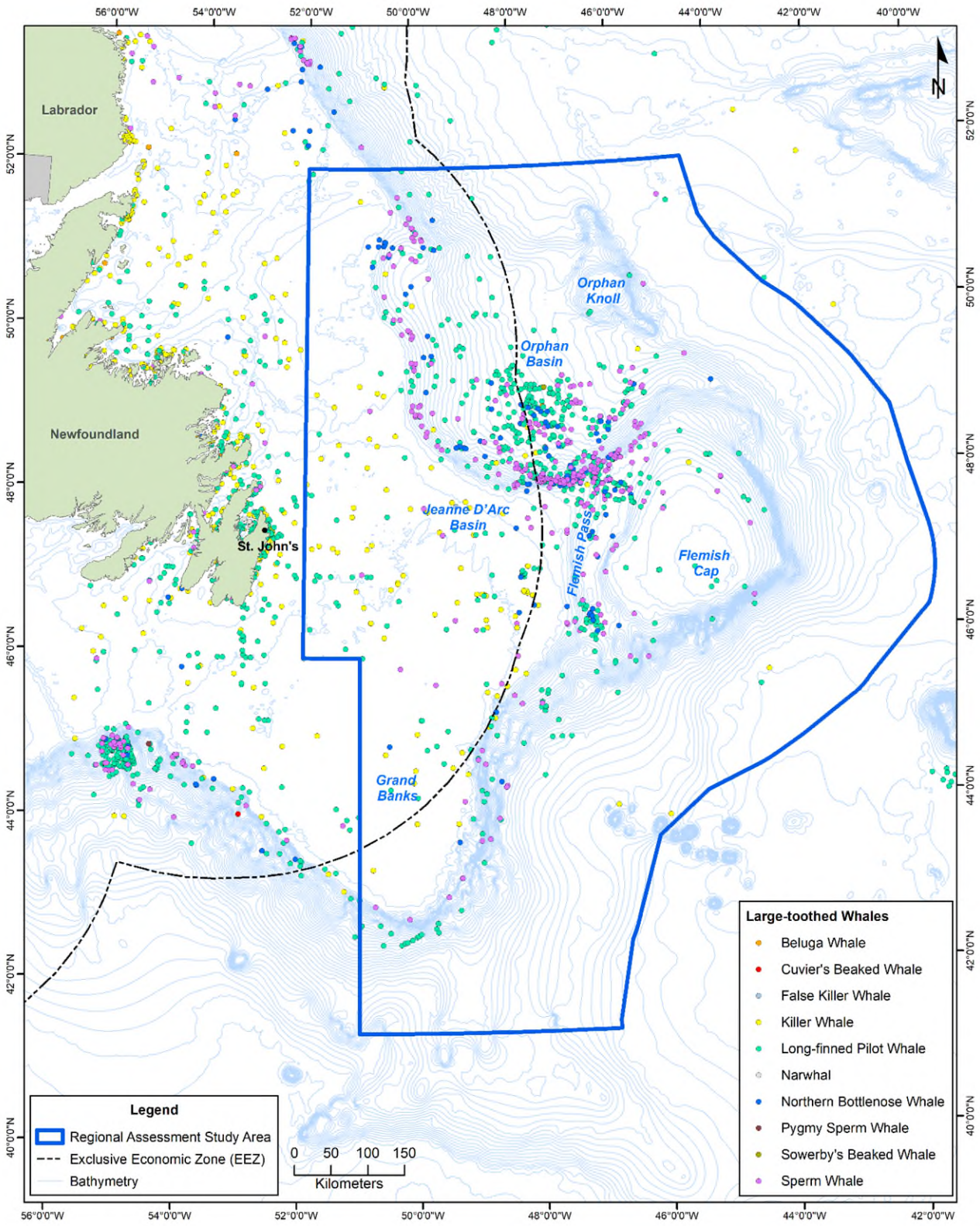
A variety of marine mammals and sea turtle species occur within the Study Area. The existing and available information indicates that marine mammal (cetacean) species that are known or considered likely to be present include a number of mysticetes (baleen whales), odontocetes (toothed whales, dolphins and porpoises) and pinnipeds (seals), with several sea turtle species having also been observed. These species differ considerably in their likelihood of presence in the region, and in particular, the locations and habitat types that they utilize and the times at which they occur in or pass through the region. Much of the information available on marine mammals and sea turtle presence in the Study Area comes from the DFO sightings database which is described in the next section. Although the overall abundance of marine mammals in the Study Area is highest from late spring to autumn, some species may be present year-round. Many of these species are considered to be at risk or otherwise of special conservation concern, although there are no formally designated critical habitats for any of these species in or near the Study Area.

Baleen whales are large cetaceans that are characterized by having plates of baleen to filter food items from seawater. Species that are known or considered likely to occur in the region with some degree of regularity include humpback, minke, fin, sei, blue and North Atlantic right whales. Baleen whales are most abundant in the summer months overall, although some species such as minke and blue whales may occur in the area year-round. Within the Study Area, most sightings of baleen whales have generally occurred along the Grand Banks and continental slope, with some species (such as sei whales) preferring pelagic environments. Blue whales and North Atlantic right whales are listed under *SARA* as endangered, while the fin whale is listed as being of special concern. Sei whales have been assessed as endangered by COSEWIC but do not currently have a *SARA* listing (Government of Canada 2019).

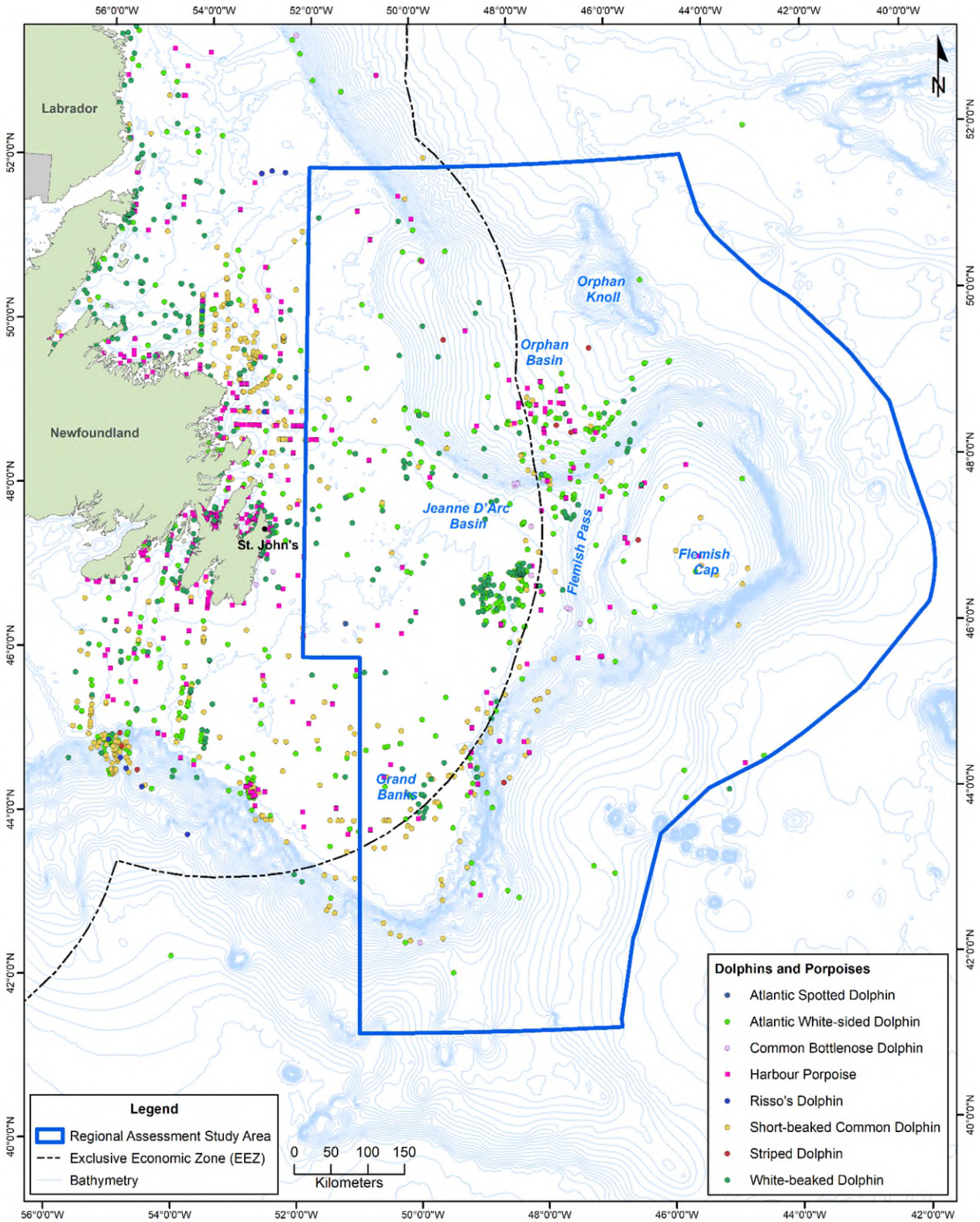
**Figure 3.9 Marine Mammal and Sea Turtle Sightings in the Study Area**



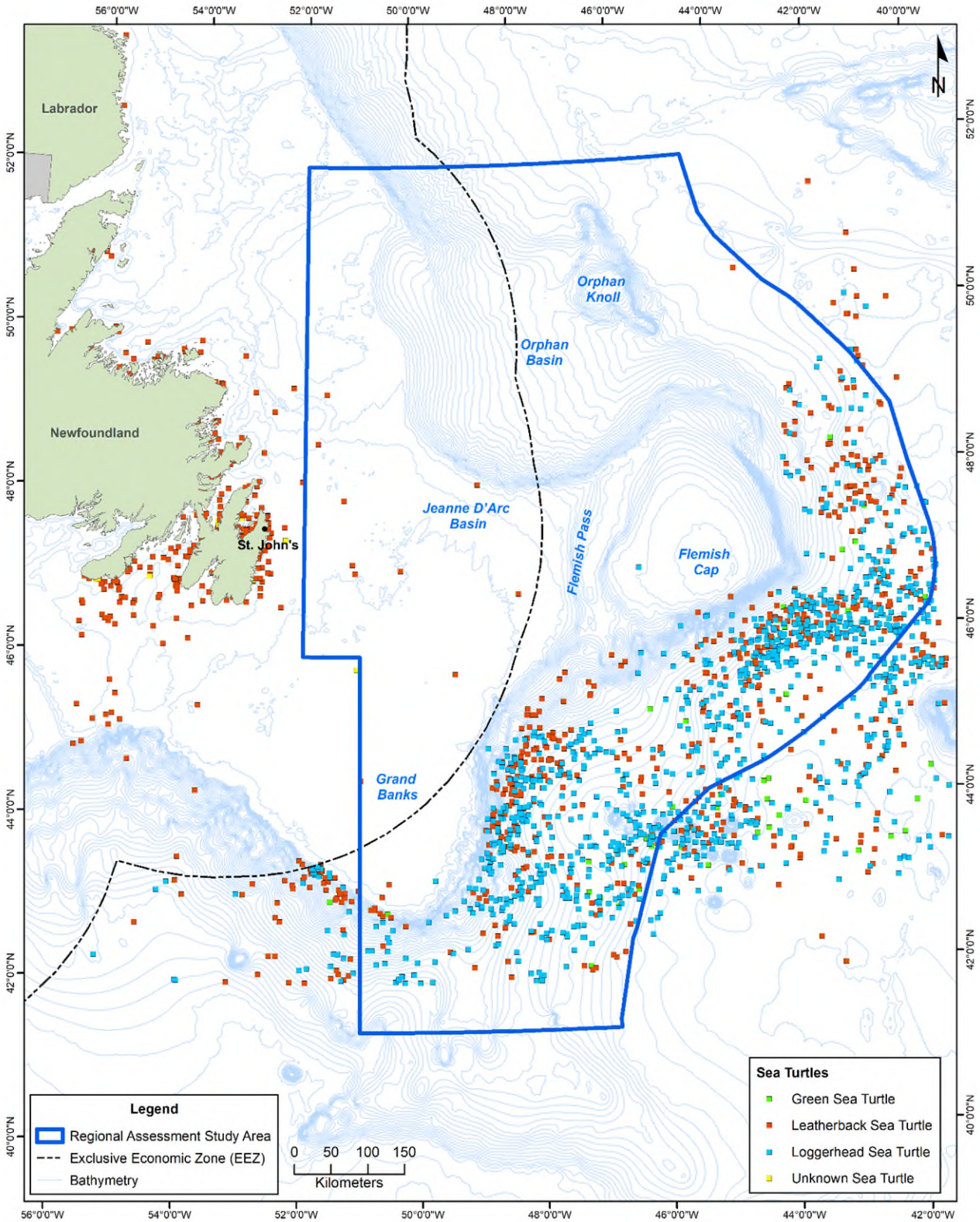
**Marine Mammal and Sea Turtle Sightings in the Study Area (*Continued*)**



**Marine Mammal and Sea Turtle Sightings in the Study Area (*Continued*)**



**Marine Mammal and Sea Turtle Sightings in the Study Area (*Continued*)**



Toothed whales, including dolphins and porpoises, that occur within the Study Area include: long-finned pilot whales, killer whales, beluga whales, Sowerby's beaked whales, northern bottlenose whales and sperm whales, as well as the short-beaked dolphin, Risso's dolphin, Atlantic white-sided dolphin, white-beaked dolphin, striped dolphin, common bottlenose dolphin and harbour porpoise. Most of these species are thought to be year-round residents of the Study Area, with the exception of Risso's and common bottlenose dolphins which are found only in the summer months, and beluga whales which are observed in the winter.

Toothed whales vary considerably in their habitat preferences, with some such as beluga whale preferring coastal / estuarine habitats (COSEWIC 2006), while beaked and sperm whales prefer deeper water habitats further from shore (Gowans 2002; Amec 2014). Overall, within the Study Area, sightings of dolphin and porpoise species have occurred primarily along the continental shelf, with a cluster of sightings occurring along shelf areas west and northwest of the Flemish Pass. With the exception of killer whales (whose sightings distribution is along most of the continental shelf in the region), most occurrences for other toothed whale species (sperm whale, northern bottlenose whale) occur along the Northeast Slope within the Study Area. Five species of toothed whales found in the Study Area are considered to be species at risk, with: northern bottlenose whale listed as endangered under *SARA* (Scotian shelf population) and being of special concern by COSEWIC (Davis Strait-Baffin Bay-Labrador population); beluga whale (St. Lawrence Estuary population) listed as endangered under *SARA* and by COSEWIC; Sowerby's beaked whale listed as being of special concern under *SARA* and by COSEWIC; and killer whale (Northwest Atlantic / Eastern Arctic population) and harbour porpoise being assessed as being of special concern by COSEWIC but not currently having *SARA* listings (Government of Canada 2019).

Seals that are known to occur in the Study Area include harp seal, harbour seal, hooded seal and grey seal. In general, each of these seal species can occur at most times of the year. Seal species can vary in their habitat preferences. For example, while harp and hooded seals both use the southern portion of pack ice to give birth and nurse their pups, hooded seals move to deeper waters of the shelf edge and slope following pupping, while harp seals remain in shallower waters of the continental shelf (Andersen et al. 2013; Hamill et al. 2015).

Although relatively infrequent visitors to the Study Area overall, a number of sea turtle species have been observed in the region including leatherback, loggerhead, hawksbill, green and Kemp's Ridley sea turtles, although leatherback and logger head sea turtles occur more regularly (Amec 2014). Where sea turtles are present, they are most abundant in the area during the summer months, when the Grand Banks and surrounding waters provide important feeding habitat, and they are typically absent from the area between December and April. While loggerhead and leatherback sea turtles have primarily been sighted in coastal areas off Newfoundland and Labrador, they prefer offshore habitats and are likely to occur periodically within the Study Area (COSEWIC 2010b; 2012b). Both loggerhead and leatherback sea turtles are listed as endangered under *SARA* and by COSEWIC (Government of Canada 2019).

As described further in the next section, a number of EBSAs have been identified within or near the Study Area by DFO or by the UNCBD for which the criteria for their identification, evaluation and selection has included their importance to marine mammals in terms of biodiversity, density and importance for reproduction and survival (Templeman 2007; UNCBD 2019) Eight EBSAs located within the Study Area have been noted as important feeding and/or seasonal refuge areas for marine mammals or sea turtles (Baccalieu Island; Eastern Avalon; Lilly Canyon-Carson Canyon; Southeast Shoal; Northeast Slope; Slopes of the Flemish Cap and Grand Bank; Southeast Shoal and Adjacent Areas of the Tail of the Grand Banks; and the Southern Pack Ice).

### 3.2.4 Special Areas

A number of on-land, marine and coastal areas within and off Eastern Newfoundland have been formally designated as protected under provincial, federal or other legislation and processes, or have been identified through relevant forums and processes as being otherwise special or sensitive due to their ecological or socio-cultural characteristics and importance. Detailed information on these special areas, including their definitions, the rationale and processes for their designation, and their key characteristics, is provided in Module 5.

Existing special areas that overlap with the Study Area include those that have been identified and designated by national (Figure 3.10) and international (Figure 3.11) organizations, as follows:

*Government of Canada*

a) *Ecologically and Biologically Significant Areas (EBSAs):* DFO - 1) Southeast Shoal, 2) Virgin Rocks, 3) Lily Canyon/Carson Canyon, 4) Northeast Slope, 5) Orphan Spur, 6) Eastern Avalon, 7) Baccalieu Island (DFO 2004, 2013, 2016, 2019a; Templeman 2007; Wells et al. 2017).

b) *Marine Refuge Areas:* DFO – 1) Northeast Newfoundland Slope Closure (DFO 2017a); and

c) *SiBAs:* DFO – Approximately 12 areas have been identified as SiBAs for sponges, sea pens, and both small and large gorgonian corals within the Study Area (Kenchington et al. 2016a ; DFO 2017b, 2017c).

*International*

a) *VMEs:* NAFO –Approximately 28 areas have been identified as VMEs for corals, sponges, and sea pens within the Study Area (NAFO 2016);

b) *NAFO Fisheries Closures*: NAFO – 1) Tail of the Bank (1); 2) Flemish Pass / Eastern Canyon (2); 3) Beothuk Knoll (3); 4) Eastern Flemish Cap (4); 5) Northeast Flemish Cap (5); 6) Sackville Spur (6); 7) Northern Flemish Cap (7,8,9); 8) Northwest Flemish Cap (10,11,12); 10) Beothuk Knoll (13); 11) Orphan Knoll Seamounts; 12) Newfoundland Seamounts (NAFO 2019a); and

c) *International EBSAs*: UNCBD -1) Seabird Foraging Zone in the Southern Labrador Sea, 2) Orphan Knoll, 3) Slopes of the Flemish Cap and Grand Bank, 4) Southeast Shoal and Adjacent Area on the Tail of the Grand Banks (UNCBD 2019).

Although there are no prohibitions or other restrictions on offshore oil and gas exploratory drilling within each of the types of special areas currently found within the Study Area, they do represent areas that have been highlighted through applicable scientific processes as containing important environmental features and characteristics. Of particular interest in this Regional Assessment is therefore the potential for future drilling activities to adversely affect the important and defining ecological features, processes and integrity of any marine or coastal locations that are designated as special areas, including their associated human use and value.

**Figure 3.10 Federally Designated Special Areas within the Study Area**

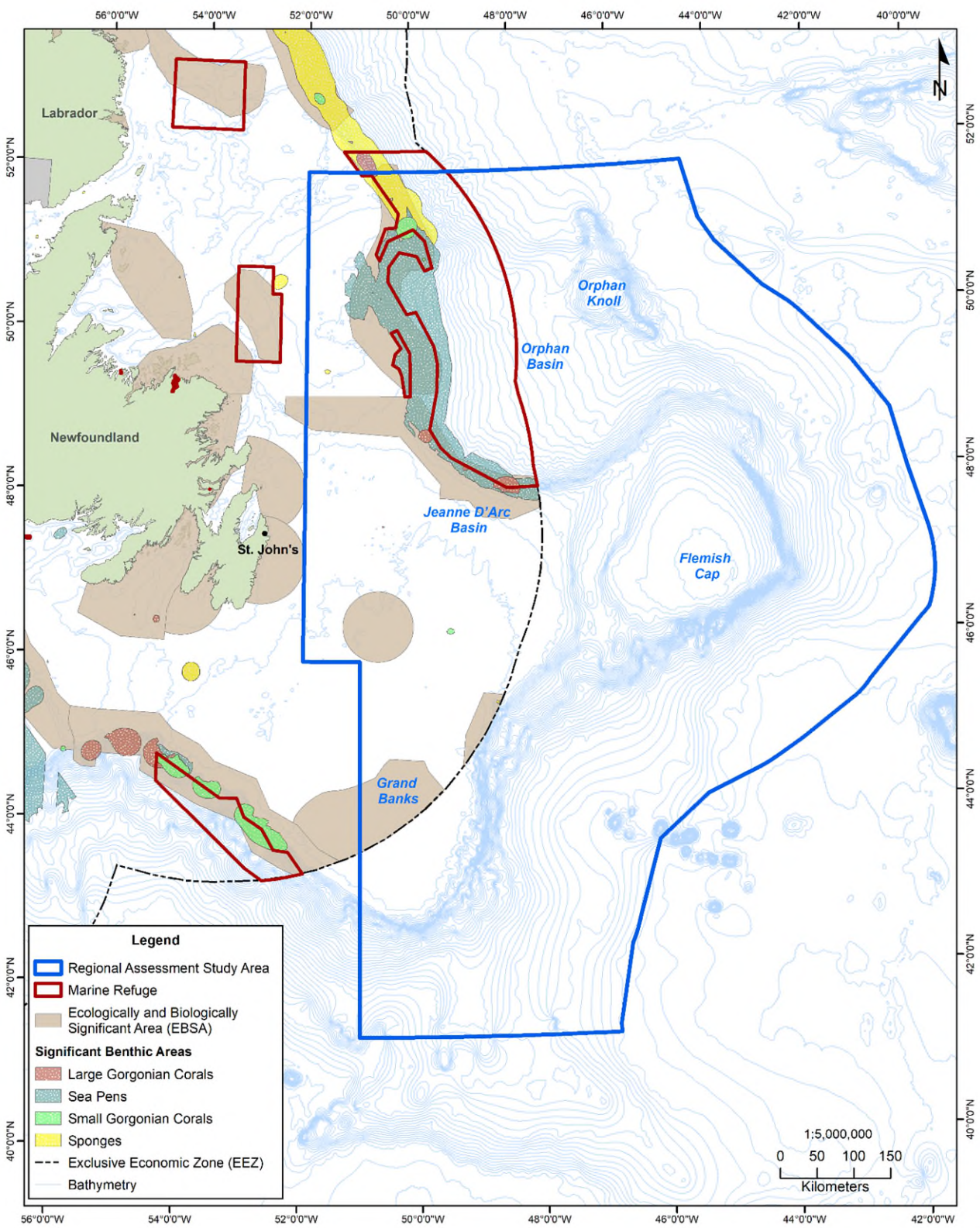
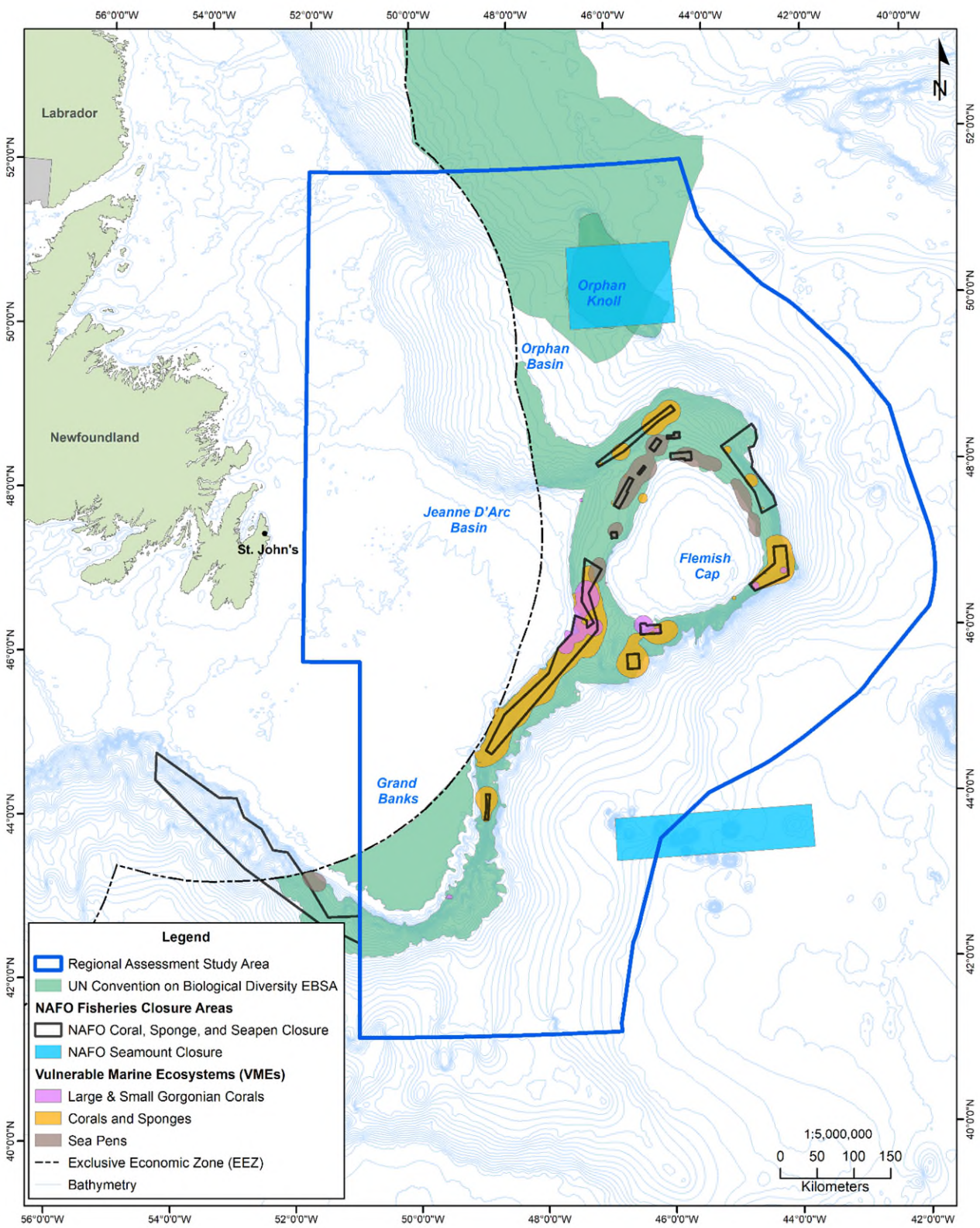


**Figure 3.11 Internationally Designated Special Areas within the Study Area**



The Study Area does not overlap directly with any of the existing provincial or federal Parks or Historic Sites (including World Heritage Sites), Representative Marine Areas, Ecological Reserves, Wildlife Reserves, Marine Protected Areas or Areas of Interest, Migratory Bird Sanctuaries, Important Bird Areas (IBAs) or other locations that have been designated as protected offshore or in coastal area on the Island of Newfoundland. Of particular concern, however, is the potential for the environmental effects of exploratory drilling within the Study Area to extend to and thus adversely affect adjacent special areas in the offshore and coastal environments, particularly in the case of an accidental event such as an oil spill.

While certain special areas have been identified within the Study Area, these are not static designations and new areas have the potential to be added or some may be modified over time. For example, NAFO fisheries closure areas are reviewed and updated annually, a process through which areas can be amended, added or removed. While there are currently no designated Marine Protected Areas (MPAs) within the Study Area, DFO is currently developing an MPA Network for this region, and once that network is released it could potentially identify Areas of Interest (AOIs) within the Study Area that may eventually become MPAs.

## 3.3 Socioeconomic Environment

The Study Area is also used for a variety of human activities, including important, diverse and dynamic commercial fisheries as well as a number of other marine uses.

### 3.3.1 Fisheries

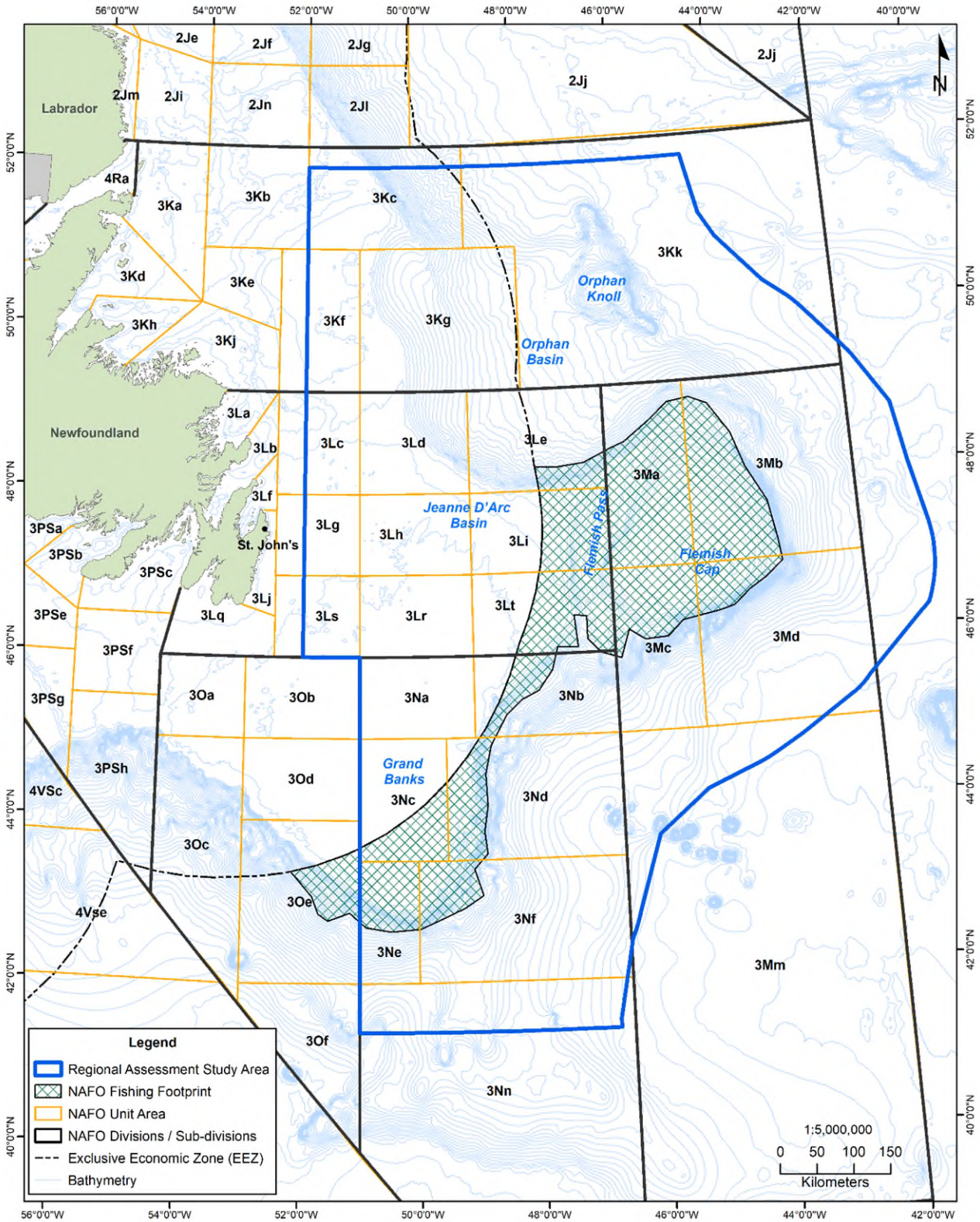
Commercial fisheries off Eastern Newfoundland are managed by both the federal DFO, primarily within the 200 nautical mile Canadian Exclusive Economic Zone (EEZ) and across the continental shelf for benthic invertebrates, and by NAFO, primarily beyond the EEZ and for a number of “straddling stocks” which span domestic and international waters. Aquaculture operations and other activities in coastal areas may also fall under provincial jurisdiction.

For administrative purposes, the Northwest Atlantic is divided into a series of NAFO Divisions / Subdivisions and Unit Areas, and although fish harvesting activities and fisheries management responsibilities do extend across these areas and their boundaries, they are generally used to regulate and describe fishing activity. The Study Area overlaps with four NAFO Divisions (3KLMN) and 24 associated NAFO Unit Areas within these Divisions, as well as various other fishery-specific administrative zones such as those for crab and shrimp (Figure 3.12).

#### 3.3.1.1 Commercial Fisheries (Domestic)

Commercial fisheries in the Study Area are undertaken by a variety of participants, including both Canadian and international fishing vessels, and involve a range of species and gear types at different locations and times throughout the region. While the fisheries in much of the Study Area were dominated by groundfish (primarily cod) harvesting until the early 1990s, the initiation of a fishing moratorium in 1992 saw key shellfish species, mainly northern shrimp and snow crab, replacing these traditional groundfish fisheries. Although groundfish quantities declined, as did the number of fish harvesters in the province, the landed value of the overall catch in Newfoundland and Labrador has remained relatively steady or even increased in some cases, owing to the higher-value species pursued after 1992. These trends are described further in the overview of historic fisheries and associated catch statistics presented in Module 6.

**Figure 3.12 NAFO Divisions and Unit Areas within the Study Area and the NAFO Fisheries Footprint**



Much of the information available on domestic commercial fisheries summarized here comes from DFO provided datasets (landings statistics and geospatial information) which are described in the next section.

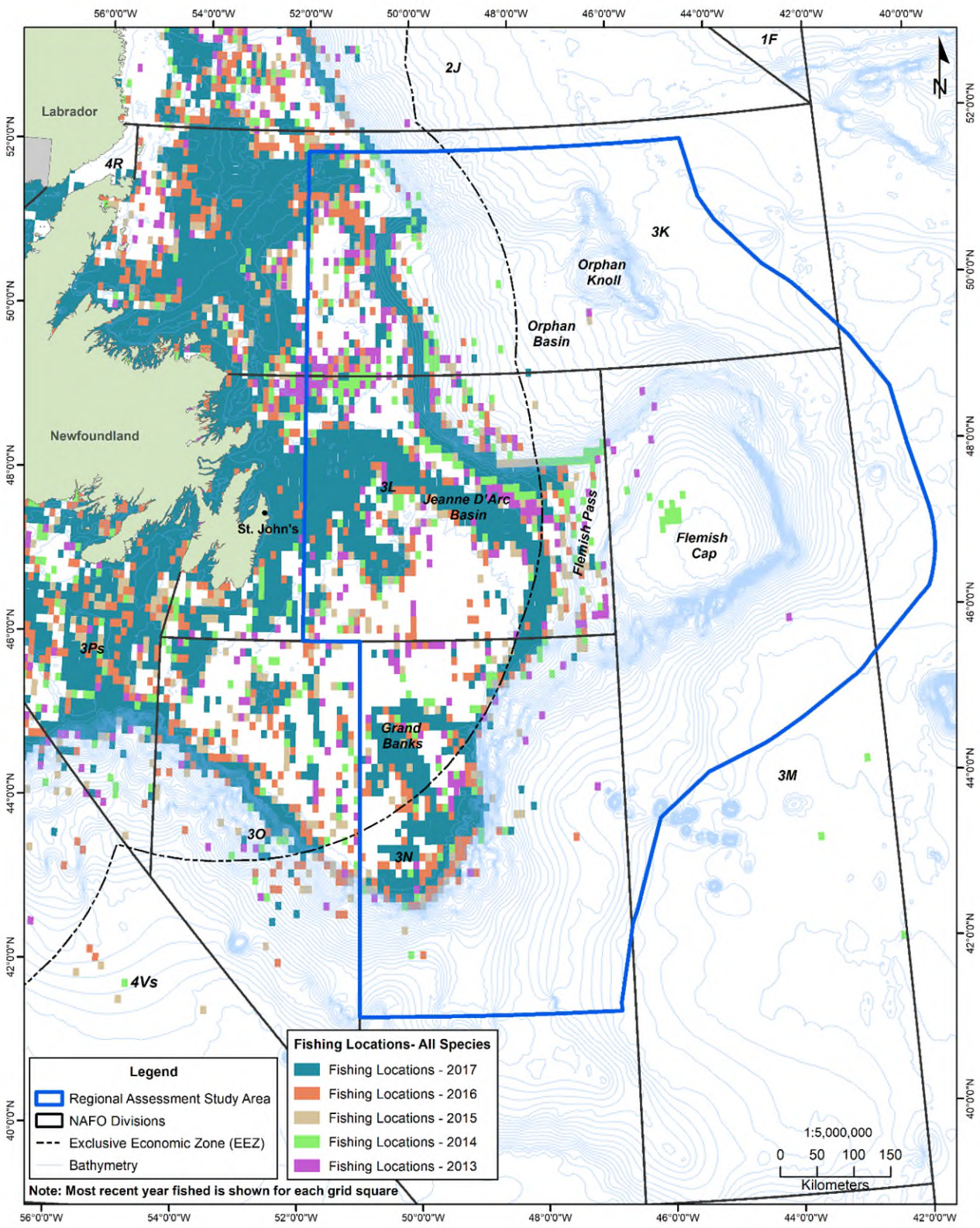
The available DFO fish landings (weight and value) statistics for the last five year period (up to 2017), which include domestic and foreign fish harvests that are landed in Canada, indicate that the commercial fishery in the Study Area in recent years has been dominated by snow crab and Northern shrimp. Some shrimp fisheries have now been halted for conservation reasons, however, such as the closures of NAFO Divisions 3NO (1995), 3M (2010) and 3L (2015) due to steadily declining stock health (DFO 2019b; NAFO 2019b). Other key species include groundfish such as Greenland halibut, redfish, yellowtail flounder, American plaice and Atlantic cod in some areas, as well as deep-sea clams (Figure 3.13).

Within the Study Area, a great deal of the commercial harvesting activity within the EEZ takes place along the slopes of the Continental Shelf. The geographic extent of this fishing activity extends along the Northeast Newfoundland and Labrador Shelf near the Orphan Basin, down through the Flemish Pass and along the tail of the Grand Banks. Relatively high levels of fishing activity in recent years have taken place along the tail of the Grand Banks, along with some areas of the Grand Banks within 3L closer to the Island of Newfoundland. Outside of the EEZ, commercial fishing effort is concentrated primarily along parts of the Flemish Cap and adjacent slope areas. The tail of the Grand Banks is also an area that has been subject to considerable fishing activity by international parties in recent years.

Commercial fisheries in the Study Area include both directed and by-catch fisheries that utilize a variety of fixed (such as for snow crab and Greenland halibut) and mobile (including for shrimp) gear types. Fishing activity occurs in the Study Area year-round, but has been mostly concentrated in the April to September period in recent years. Whereas some species such as certain groundfish and shrimp are harvested year-round, others such as snow crab are seasonal and occur primarily in the spring and summer months (typically April to August). Overall, the region is characterized by a rather complex spatial and temporal pattern of fishing activity that is changing continuously, which makes it difficult to generalize about the nature, location and timing of fishing activity in this region for the purposes of the Regional Assessment.

A recurring theme that was raised throughout the Regional Assessment engagement process (Section 2.2) was around the inherently dynamic nature of the fishery, and the resulting need to understand what the fishery looks like today, but also, to include an historical perspective and to consider on-going and likely future changes to fishing activities and patterns in the Study Area. Fishing industry representatives have noted that continuing changes within the marine environment are affecting the distribution and availability of several species, a recent example of which is the closure of the Northern shrimp fishery in Divisions 3LM, and the increasingly fragile status of this species to the north. As the marine environment continues to warm, fishers expect that they will be able to fish more for groundfish, as in pre-moratorium times, and similarly, extended warm water periods may increase the prevalence of high-value large pelagic species (i.e., swordfish and tunas). They also noted that these and other potential changes, such as if a directed fishery for cod were to resume, will result in an increased use of mobile gear. Although the potential for new and evolving fisheries in the Study Area will depend on a range of factors, including biological (species presence, abundance, status) and socioeconomic (market demand and price, skills and equipment costs) considerations and related resource management and regulatory decisions, any associated changes in the nature and spatial and temporal distributions of the fishery in the Study Area may in turn affect its potential for interactions with future offshore oil and exploratory drilling activities.

**Figure 3.13 Overview of Domestic Commercial Fishing Activity in the Study Area (2013-2017)**



Seal harvesting also occurs off Eastern Newfoundland, with most activity occurring in the spring on "The Front", which is an area off the coast that extends to the outer extent of the pack ice.

Aquaculture has been a growing industry in Newfoundland and Labrador, and a number of active fish farming operations exist in coastal areas on the Island of Newfoundland, primarily in Notre Dame Bay and on the Connaigre Peninsula outside the Study Area.

#### 3.3.1.2 Indigenous Fisheries

Indigenous groups also hold DFO commercial fishing licences within NAFO Divisions that overlap with the Study Area, including licences that permit access to a variety of species and locations within NAFO 3KLMNO. These are commercial licences issued by the federal government under the *Fisheries Act* and associated *Aboriginal Communal Fisheries Licencing Regulations*, which allow Indigenous groups to commercially fish or to designate persons or vessels to fish on their behalf. In addition to Newfoundland and Labrador based Indigenous fisheries, several First Nations in the DFO Maritimes and Gulf Regions hold communal licences which permit access to NAFO Subarea 3 fisheries (such as for swordfish). There are no documented food, social, or ceremonial licences within or near the Study Area. Further information is provided below in Section 3.3.2.

#### 3.3.1.3 Fisheries Surveys

A number of fisheries science survey programs are also undertaken off Eastern Newfoundland by government and/or industry to aid with stock assessments and management decisions. These include DFO Multispecies RV Trawl Surveys, which comprise annual (spring and fall) standardized bottom-trawl surveys to collect information for managing and monitoring fish resources in the Newfoundland and Labrador Region. There is also an annual Industry - DFO Collaborative Post-season Trap Survey for snow crab in NAFO Divisions 2J, 3KLOPs and 4R, which is conducted using commercial and modified snow crab traps at established trap stations starting in late August or early September after the commercial snow crab season has ended. Other such surveys that do or may overlap with the Study Area include an Atlantic halibut survey that is conducted in the May to July period in NAFO Division 3N by DFO-Maritimes in partnership with fishing organizations.

#### 3.3.1.4 Recreational Fisheries

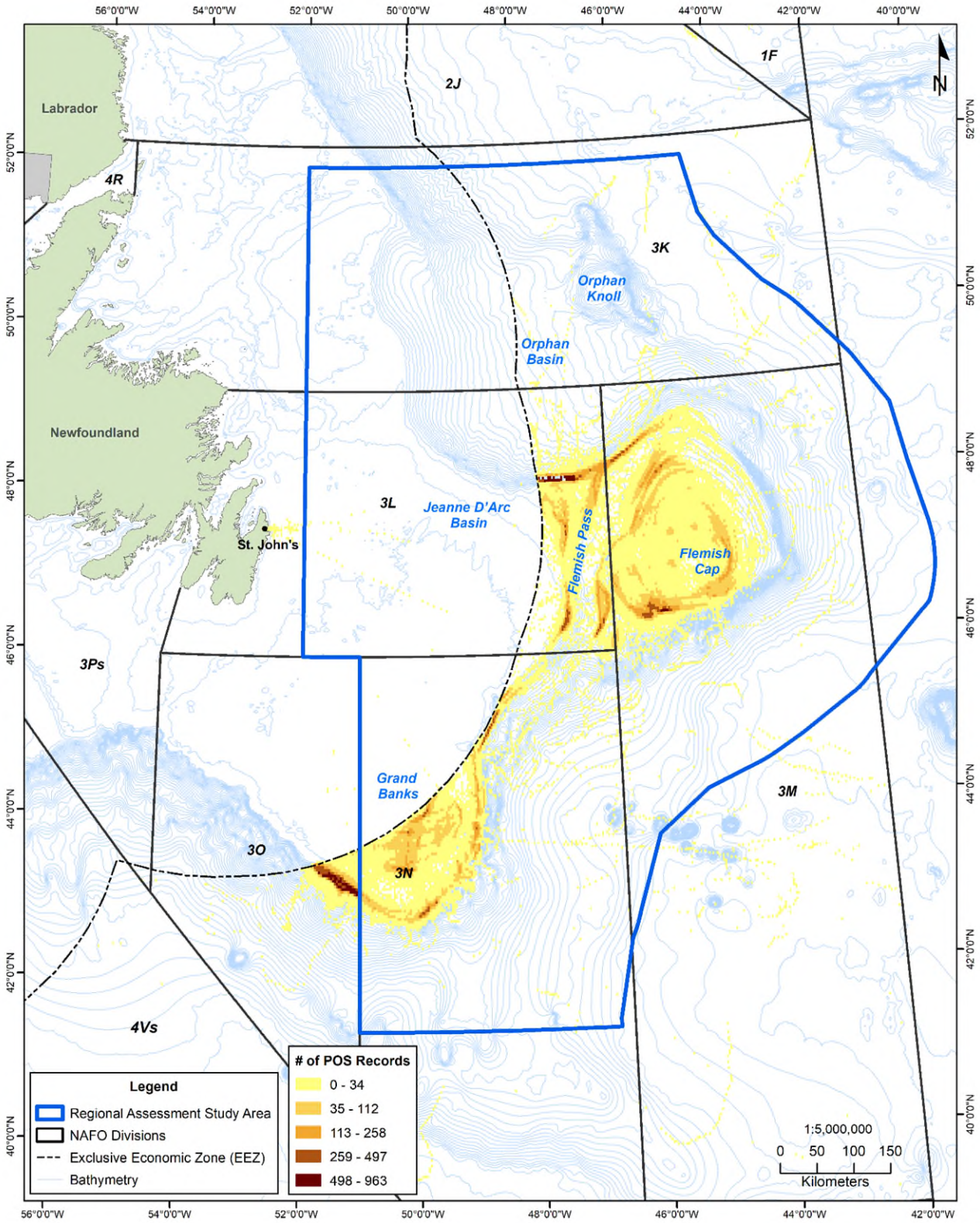
Recreational fishing takes place in both coastal and inland waters around the Island of Newfoundland and the coastal areas of Labrador. A marine food fishery for groundfish has also been allowed in recent years for specific periods during the summer and fall, which is open to both residents and non-residents. Owing to the Study Area's distance from shore, no recreational or food fishery activities are known or expected to occur within this offshore region itself.

#### 3.3.1.5 Commercial Fisheries (International)

The waters of the Study Area have also long been the focus of commercial fishing activity by the fleets of many foreign countries, particularly in the areas beyond the 200-nautical-mile EEZ and within the NAFO Regulatory Area (NRA). The NRA is some 2,707,895 $km^2$ in size (or 41 percent of the total NAFO Convention Area) and comprises that part of the Northwest Atlantic high seas located adjacent to Canada's 200 nautical mile EEZ (Amec 2014). Fishing activity in the NRA targets a range of species, and the current NAFO fisheries statistics indicate

that the main species caught by foreign fishing vessels in the NAFO Divisions that overlap with the Study Area include: Atlantic cod, redfish, Greenland halibut, skate, yellowtail flounder and other groundfish species. The main countries that have recorded landings in the NRA besides Canada include: Spain, Portugal, Russia, the Faroe Islands, Estonia, and Norway. NAFO has also defined its primary bottom fishing footprint in the area, which covers parts of the nose and tail of the Grand Banks and is some 120,048 $km^2$ in size (Figure 3.14).

**Figure 3.14 Overview of International Commercial Fishing Activity in the Study Area (2014-2018)**



### 3.3.2 Indigenous Communities and Activities

A number of Indigenous groups residing in Newfoundland and Labrador and in parts of the Maritimes Provinces (Nova Scotia, New Brunswick, Prince Edward Island) and Québec (Table 3.1) have indicated interests and concerns related to the environmental effects of exploratory drilling activities off Newfoundland and Labrador, and have participated in the Regional Assessment or in previous project-specific EAs for proposed offshore exploratory projects in this region.

**Table 3.1 Indigenous Groups in Eastern Canada Participating in the Regional Assessment**

| Province | Indigenous Groups |
|---|---|
| *Newfoundland and Labrador* | Labrador Inuit (Nunatsiavut Government) |
| | Labrador Innu (Innu Nation) |
| | NunatuKavut Community Council |
| | Miawpukek First Nation |
| | Qalipu First Nation |
| *Nova Scotia* | 11 Mi'kmaq First Nation communities represented by Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO): |
| | - Acadia First Nation |
| | - Annapolis Valley First Nation |
| | - Bear River First Nation |
| | - Eskasoni First Nation |
| | - Glooscap First Nation |
| | - Membertou First Nation |
| | - Paqtnkek Mi'kmaw Nation |
| | - Pictou Landing First Nation |
| | - Potlotek First Nation |
| | - Wagmatcook First Nation |
| | - We'koqma'q First Nation |
| | Millbrook First Nation |
| | Sipekne'katik First Nation |
| *New Brunswick* | Eight Mi'gmaq First Nations communities represented by Mi'gmawe'l Tplu'taqnn Inc. (MTI) |
| | - Fort Folly First Nation |
| | - Eel Ground First Nation |
| | - Pabineau First Nation |
| | - Esgenoôpetitj First Nation |
| | - Buctouche First Nation |
| | - Indian Island First Nation |
| | - Eel River Bar First Nation |
| | - Metepnagiag Mi'kmaq First Nation |
| | Elsipogtog First Nation |
| | Six Wolastoqey First Nation communities represented by Wolastoqey Nation of New Brunswick (WNNB): |
| | - Kingsclear First Nation |
| | - Madawaska Maliseet First Nation |
| | - Oromocto First Nation |
| | - Saint Mary's First Nation |
| | - Tobique First Nation |

| Province | Indigenous Groups |
|---|---|
| | - Woodstock First Nation |
| | Peskotomuhkati Nation at Skutik (Passamaquoddy) |
| *Prince Edward Island* | Two Mi'kmaq First Nation communities represented by Mi'kmaq Confederacy of PEI (MCPEI) |
| | Abegweit First Nation |
| | Lennox Island First Nation |
| *Québec* | Three Mi'gmaq First Nation communities represented by Mi'gmawei Mawiomi Secretariat (MMS) |
| | - Micmas of Gesgapegiag |
| | - La Nation Micmac de Gespeg |
| | - Listuguj Mi'gmaq Government |
| | Two Innu First Nation communities |
| | - Conseil des Innu de Ekuanitshit |
| | - Première Nation des Innus de Nutashkuan |

The closest Indigenous community to the Study Area is the Miawpukek First Nation, located at Conne River on the south coast of Newfoundland about 250 km to the west.

A number of these Indigenous groups claim Aboriginal Rights and/or Title to areas of Newfoundland and Labrador, and the rights assertions and land claims of several groups are in varying stages of progress, negotiation, and settlement. In addition, each of the previously identified Indigenous groups in New Brunswick, Nova Scotia, Prince Edward Island and Québec assert or have established rights to specific lands and resources within their traditional territories, which are likewise at varying stages of recognition and settlement.

The information provided and available for this Regional Assessment does not indicate, however, that any Indigenous group holds, claims or asserts Aboriginal or Treaty Rights, or otherwise undertake traditional activities within or near the Study Area, pursuant to Section 35 of the *Constitution Act, 1982.* However, most of the Indigenous groups listed above hold food, social and ceremonial (FSC) fishing licences elsewhere and/or communal-commercial fishing licences for multiple fish species, which in some cases include migratory species that may be present in or move through parts of the Study Area.

Indigenous peoples have a constitutionally protected right to fish for FSC purposes. Although there are no documented FSC licences within the Study Area itself, there are Indigenous groups fishing adjacent to and near the Study Area for migratory species under their FSC licences. Innu Nation and the Nunatsiavut Government hold the nearest FSC licenses to the Study Area in NAFO Division 2J, which include licences for Atlantic salmon, trout and Arctic char (Ball 2019 pers comm). NunatuKavut Community Council have the right to fish under FSC near the South Coast of Labrador and Upper Lake Melville for migratory species including Atlantic salmon, Arctic char and Atlantic cod (Ball 2019 pers comm; Amec 2018). Miawpukek First Nation holds an FSC licence for NAFO Division 3Ps which is to the west of the Study Area that includes species such as mackerel, herring, Atlantic cod, American eel, smelt and capelin (Ball 2019 pers comm; Amec 2018). Indigenous groups in the Maritimes and Québec also hold FSC licenses for a variety of species, including in many cases for migratory species that may occur in the Study Area such as: Atlantic salmon, blue shark, blueback herring, gaspereau (alewife), American shad, American eel, smelt, mackerel and herring as well as several species of groundfish (Atlantic cod, catfish, haddock, halibut, flounder and pollock) (Amec 2018; Ball 2019 pers comm; Howe 2019 pers comm; Leonard 2019 pers comm).

As noted above in Section 3.3.1.2, communal-commercial fishing licences are allocated to many Indigenous groups to facilitate their participation in the general commercial fishery. Several Indigenous groups in Newfoundland and Labrador, Nova Scotia and New Brunswick hold communal-commercial licences for a variety of species within all or some of the NAFO Divisions (3KLMN), which overlap with the Study Area. This includes Innu Nation (3KLMN), the Nunatsiavut Government (3KLMN), NunatuKavut Community Council (3KL), Miawpukek First Nation (3KLN) and Qalipu First Nation (3KL) (Amec 2018; Ball 2019 pers comm; Lewis et al 2018; Leonard 2019 pers comm). The Mi'kmaq Alsumk Mowimsikik Koqoey Association, a joint association between Miawpukek and Qalipu First Nations, also has a licence for 3KLN (Amec 2018; Leonard, 2019 pers comm). In the Maritime Provinces, communal-commercial licences for NAFO areas 3LMN are held by the Acadia, Glooscap, Millbrook, Sipekne'katik, Wagmatcook and We'koqma'q First Nations in Nova Scotia and the Fort Folly, Woodstock and Saint Mary's First Nations in New Brunswick (Amec 2018; Howe 2019 pers comm; Leonard 2019 pers comm). Several groups also hold communal-commercial licences that permit access to NAFO Subarea 3 for swordfish (Okanagan Nation Alliance 2011; Amec 2018; Howe 2019 pers comm). Other species caught under these licences include groundfish, herring, mackerel and various tuna species, with eel and gaspereau/alewife constituting a large part of catches for groups in the Maritimes and halibut, turbot and white hake for Newfoundland and Labrador groups (Amec 2018; Ball 2019 pers comm; Larochelle 2019 pers comm; Leonard 2019 pers comm).

As noted above, notwithstanding the lack of direct overlap between the Study Area and the traditional territories and activities of any Indigenous group, a key area of focus and interest for these communities has been around how any changes in the biophysical environment as a result of exploratory drilling and associated activities off Eastern Newfoundland may affect migratory resources that are used for traditional purposes. In particular, there are questions and concerns around whether any marine-associated species that are known to be used for traditional purposes by these groups may migrate through the Study Area and may therefore be affected by exploratory drilling and associated activities, with possible resulting implications for their eventual availability or quality for traditional harvesting and consumption by these groups within their traditional territories. Through the Regional Assessment process, these concerns have been raised in relation to specific migrating species of commercial, cultural and subsistence importance, particularly Atlantic salmon but also swordfish, tuna, American eel, migratory birds and seals, as well as species of cultural significance, such as the North Atlantic right whale.

### 3.3.3 Other Marine Activities

A variety of other human activities also take place in and near the Study Area on either a year-round or seasonal basis. General shipping traffic within and through the region includes marine tanker traffic and supply vessels associated with the existing offshore oil production and exploration activities, as well as cargo ships, fishing vessel transits and other vessel traffic. Large scale marine shipping is mainly limited to sea ports with the required infrastructure and services for larger vessels. St. John's is the primary supply centre for the offshore oil and gas industry, and functions as a container terminal, fishing port and a cruise ship port-of-call as well as being used for military activity, ship repair, industrial fabrication and seafood landing. The Eastern Newfoundland coastline is also home to several hundred small and medium sized harbours. A number of marine shipping routes, particularly those related to trans-Atlantic voyages, cross through the Study Area.

Naval training exercises may also occur at times in the Study Area. There are also known and potential unexploded ordnance (UXO) sites in the Atlantic Ocean, which include shipwrecks and submarines as well as munitions dump sites (Figure 3.15).

There is one known explosive dumpsite, two submarine legacy sites and 25 shipwrecks located within the Study Area. A number of existing marine cables also cross through or near the region. These are typically fiber-optic cables that link North America to Europe and other countries to provide high-speed internet and telecommunication services. The majority of the cables present within the Study Area are quite old and have since been abandoned on the sea floor, but there are currently four active cables that overlap with at least a portion of the Study Area.

The Study Area is also subject to considerable oil and gas exploration activity, including geophysical surveys and drilling programs, with hundreds of thousands of kilometers of seismic survey data collected and several hundred wells having been drilled to date. As of the date of writing there were 29 Exploration Licences, 53 Significant Discovery Licences, and 12 Production Licences in the Study Area (Figure 3.16). Offshore oil production activities have also been occurring since the 1990s, including several existing oilfields in the Jeanne d'Arc Basin (Hibernia, Terra Nova, White Rose, Hebron). These offshore oil and gas exploration and production activities include a variety of ancillary and supporting activities as well, including supply bases at Bay Bulls and St. John's, and associated supply vessel and aircraft traffic to and from offshore platforms and other associated infrastructure.

Marine-based tourism and recreational activities occur along the coastline of Eastern Newfoundland and elsewhere. Many boat tours, sea kayaking routes, coastal hiking trails, marinas, beaches, bird watching areas, campsites, trailer parks and picnic sites are located in coastal areas. Cruise vessel traffic is also present around Newfoundland and Labrador, primarily during the summer and fall seasons and concentrated in and near St. John's.

### 3.3.4 Health, Social and Economic Conditions (Newfoundland and Labrador)

The population of Newfoundland and Labrador in July 2019 totalled 521,524 persons. The Island of Newfoundland comprises less than 30 percent of the province's total land mass, but is home to nearly 95 percent of its population, with over 40 percent of the total population living in the St. John's Census Metropolitan Area on the Northeast Avalon. The provincial economy has expanded in the last 20 years due to growth in both the offshore oil and gas sector (mainly in Eastern Newfoundland) and mining (primarily in Labrador). High commodity prices have encouraged development of natural resource extraction projects, resulting in large capital investments, and subsequent royalties have been the source of strong employment, increased incomes and enhanced government revenues. The province's total gross domestic product in 2017 equalled approximately $30.3 billion, of which the goods producing sector contributed approximately 43 percent (including 15.6 percent from oil extraction and processing), while the services producing sector accounted for the remaining 57 percent. In 2017 the province had a labour force participation rate of 59 percent, an unemployment rate of 14.8 percent, and saw overall capital investments of over $10.9 million that year (NLDOF 2019). Eastern Newfoundland, and the Northeast Avalon in particular, are affected by oil and gas exploration and development activity and its fluctuations, but the region has a relatively diverse economy owing to the presence of other sectors including transportation, healthcare, education, government services, and tourism.

**Figure 3.15 Known UXO Sites in the Study Area**

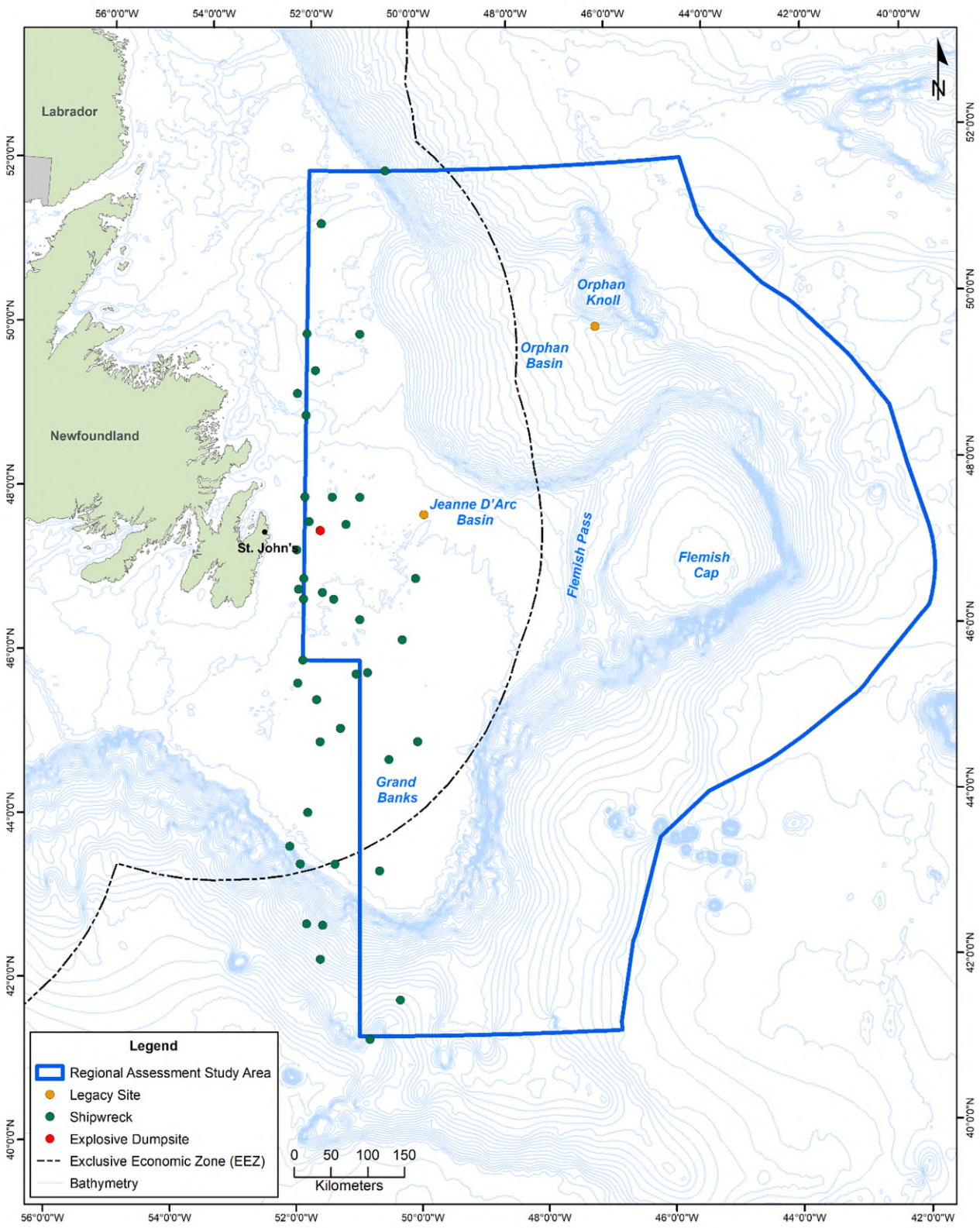
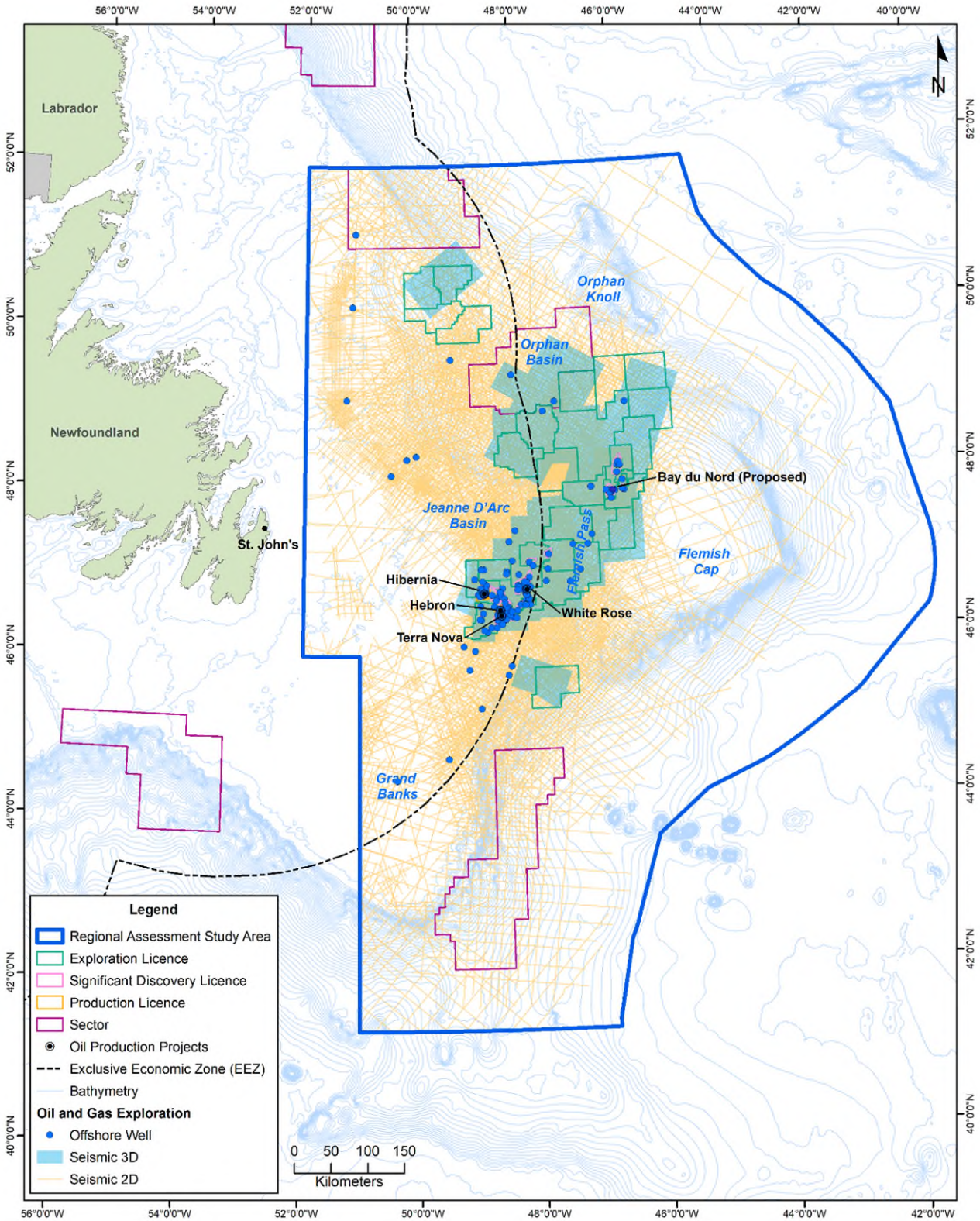


**Figure 3.16 Current Oil and Gas Licences, Production Projects and Previously Completed Wells and Seismic Surveys in the Study Area**



Addition information on existing health and social and economic conditions, and the relationship of the province's offshore oil and gas industry to these, is provided in Chapter 7.

## 3.4 Data Availability, Gaps and Opportunities

The following sections highlight and describe overall information and availability and gaps for the Study Area, focussed on the various environmental components and issues upon which the Regional Assessment is focussed, and with specific consideration of the type and level of such information that is relevant to and required for the purposes of this assessment.

### 3.4.1 Biophysical Environment

#### 3.4.1.1 Marine Fish and Fish Habitat

Information on marine fish and fish habitat in the Study Area is derived from a variety of sources, with a focus on available regional-scale data that allowed for the identification and understanding of key environmental characteristics and potential sensitivities that have the most relevance to the potential effects of offshore exploratory drilling and to the objectives of this Regional Assessment.

For plankton, the most relevant, regional-scale dataset is satellite imagery from the Moderate Resolution Imaging Spectroradiometer (MODIS) which highlights chlorophyll-a concentrations, an indicator of primary productivity and phytoplankton distribution on a regional scale. While useful as an overall indication of spatial and temporal distributions, MODIS does not take into account other physical, chemical or biological factors that may affect plankton distribution. Moreover, there are limited directed studies on plankton in the region, and these somewhat dated studies focus primarily on inshore areas, and are species- and site-specific. There is some uncertainty associated with plankton in this region, principally with respect to how they are affected by seasonal variation in the distribution of water masses and the physical, chemical, and biological oceanographic conditions within the marine environment.

The distribution and abundance of demersal fish and invertebrates within large portions of the Study Area are relatively well studied through annual standardized multi-species government RV surveys by the Government of Canada (DFO) within the EEZ, and by NAFO and the European Union (EU) outside the EEZ on the Flemish Cap and southeastern portion of the Grand Banks. These datasets form a key component of the analysis and existing environment descriptions provided in the Regional Assessment, and were used to describe benthic invertebrates and finfish distributions throughout the region.

The DFO RV dataset is regional in scope, comprehensive in nature, and provides significant coverage of the western sections of the Study Area. Data collection has been conducted annually during the Spring and Fall periods for the last 40 + years with coverage within Canada's EEZ and along the Flemish Pass. As the surveys are undertaken only in the Spring and Fall periods, they do not provide insights into species distributions at other times of the year. In addition, the use of bottom trawls means that the gear can only be used on certain substrate types and at certain depths, thereby introducing bias in the dataset towards certain species and habitat types. This type of gear is also not conducive to collecting data on larval or pelagic life stages of certain species of fish, or for data on fish that are found in the pelagic zone or upper water column (such as capelin or Atlantic salmon).

The Spanish EU RV data set provides additional data coverage over the Flemish Cap and tail of the Grand Banks, and is also collected via random stratified trawl surveys. In addition to issues and limitations referenced above, the most significant limitation with this information source is that the resulting dataset is not available in its entirety, but rather is only available in a summarized format in published reports from which high level results can be discerned (and maps re-digitized as required). The data themselves have been released only in small segments for particular environmental components which limits the ability to conduct any sort of customized analysis.

While these two RV datasets have some limitations, are not directly comparable in a quantitative manner and do not necessarily provide comprehensive and comparable coverage in all areas of interest, they collectively provide a good source of information for understanding of the key faunal communities and the processes that influence their presence and distribution in the Study Area.

For benthic invertebrates, including corals and sponges, there is a lack of survey coverage in many parts of the Study Area, and the often site-specific nature of these species and their habitat associations limits the ability to make overall regional-scale generalizations about the Study Area. The DFO and EU RV datasets serve as the best, regional-scale source of information on benthic invertebrates, but the above described considerations regarding the timing, geographic coverage and gear type used in these surveys (including for the recovery and identification of particular species) has implications for the completeness of this dataset. As discussed above in Section 3.2.1.3, the use of SDMs to model and map the potential distributions of benthic species (especially corals and sponges) represents a very useful method for understanding the potential occurrence and distributions of key species on a regional scale. However, predicted coral and sponge distributions cannot be confirmed without further sampling.

Although considerable research has been conducted on the freshwater portion of the life history of Atlantic salmon, including through fish tagging programs, stock assessment, smolt surveys and scale sampling programs, far less is known about their life history once they leave their natal rivers and undertake at sea migrations to their over wintering grounds in the North Atlantic Ocean. While there is some information available on the spatial and temporal distribution of Atlantic salmon at sea, the resolution of this information is low and much of the information currently available is quite dated. As the potential effects of offshore activities have recently become an area of key concern to many Indigenous groups and others, this has led to the implementation of acoustic and satellite tagging programs and other research in the marine environment to obtain further information on the marine life stage of Atlantic salmon. In an effort to expand on this current research, the ESRF recently completed a call for EOIs related to developing a program of research aimed to determine the presence of Atlantic salmon in Eastern Canadian offshore regions to help better inform regulatory decision making in the offshore oil and gas sector.

In summary, therefore, the overall difficulty of studying offshore species and the inherent complexity of these ecological system leaves various key information gaps, even in relatively well researched areas. There is a particular paucity of available data from the very deep, abyssal habitats beyond the continental slope in the eastern part of the Study Area. Even within some of the more well studied areas (such as the shelf and upper slope), there remains a somewhat poor understanding of many species that are not of commercial importance. For example, studies of benthic invertebrate communities are few, and have been limited to very small scales and areas. Such studies, while extremely valuable, do not lend themselves well to characterizing overall regions, components and key relationships that have implications throughout the food chain, depending on a particular

species' particular ecological role and importance. Similarly, many of the large pelagics that use the Study Area seasonally are also not well understood, but are not easily studied and tracked under current monitoring initiatives and operate at large spatial scales that are influenced by many ecological and anthropogenic phenomena. Also, the sensitivity of some sessile faunal groups (corals and sponges) to oil and gas activities remains somewhat poorly studied. An emerging and challenging characteristic of fish and fish habitat are their dynamic nature. Regime shifts and climate change can and will continue to alter our current understanding (e.g., distribution, behaviour, abundance, ecological and commercial importance, sensitivity etc.) of these species, their habitats and their interactions.

#### 3.4.1.2 Marine and Migratory Birds

A key source of regional-scale information on the spatial and temporal distribution of seabirds within and around the Study Area is Environment and Climate Change Canada's (ECCC's) *Seabirds At Sea Atlas*. This information source provides corrected seasonal density estimates of species (or species groups) at a resolution of 100 km wide hexagon cells based on data collected by the Canadian Wildlife Service (CWS) through the Eastern Canada Seabirds At Sea (ECSAS) program. The ECSAS database contains at-sea seabird survey data collected by trained and experienced observers from ships of opportunity using a standardized protocol. For some species with few observations, raw sightings from the ECSAS database are mapped to better understand their occurrence within the region. Additional information on the spatial distribution and movements of seabirds within the Study Area was obtained from tracking data, including both raw data and processed data products showing core use. The Atlantic Region Colonial Waterbird database maintained by CWS also provides information on colony size and the location of breeding seabirds.

Most of the available information on waterfowl / divers and shorebirds comes from the existing and available literature and data, with some exceptions. For example, aerial survey data of Harlequin Ducks are used to assess winter use around Newfoundland, and the Winter Common Eider survey database are used to examine coastal water use for this species. Aerial survey data of Purple Sandpipers are used to examine winter distribution around Newfoundland, whereas year-round sightings of *SARA* listed shorebird species from 1999 – 2019 can be obtained from the Atlantic Canada Shorebird Survey (ACSS).

In general, the information that has been gathered and used for this Regional Assessment provides a good, general understanding of the distribution and abundance of marine birds in the Study Area, and is capable of highlighting important and critical use of this area at various times of year. However, there are some data gaps that need to be addressed. The ECSAS databased contains some spatial-temporal gaps, particularly in NAFO Divisions 3O and 3N throughout the year (southern part of the Grand Banks, which includes Whale Bank, Whale Deep, Southeast Shoal, Carson Canyon and Tail of the Grand Banks) and in 3L (northern part of Grand Banks) in autumn (Sept-Nov). The Flemish Cap area is also not well-covered in the autumn (Sept – Nov) and winter (Dec – Feb) periods. Overall, survey coverage along the shelf break and in deeper waters could be improved throughout the Study Area. Although the ECSAS database includes data from 2006 to the present, the Atlas itself uses data up to and including that collected in 2016. While this represents the most current data products on seabird density within the overall region, it is hoped that the Atlas will be updated in the near future. Increased spatial and temporal survey coverage will allow for more complex analyses at finer resolution than the relatively coarse 100 km-wide hexagons currently presented. CWS also recognizes that some species are not captured adequately during at-sea surveys due to timing and location of surveys. For example, little is known about phalaropes' migration routes north to breeding colonies in the Arctic. Furthermore, more tracking data is needed to

understand movement during migration pre and post breeding, which would help to pinpoint timing. For example, understanding the movement of Leach's Storm-petrels departing breeding colonies and their overlap with the Offshore Oil and Gas platforms. A better understand of Glaucous Gull movements from breeding colonies in Labrador and further north and their use of the Study Area in winter may help to elucidate reasons for their population declines.

Moving forward, the CWS is currently working to produce predictive density surface models for four species (Black-legged Kittiwake, Northern Fulmar, Dovekie, Thick-billed Murre) in summer (June to August) and autumn (September to November) for arctic and subarctic waters at resolutions of 10 by 10km, which would cover most of the Study Area. CWS's goal is to produce predictive density maps for as many species as possible for all seasons, but these products are several years away from being completed. CWS has also indicated that they are working towards filling the spatio-temporal data gaps in at-sea surveys and developing approaches to include aerial surveys and industry-collected data in the predictive density maps.

CWS also has plans to deploy electronic tags on various species in the Study Area to further help fill knowledge gaps. This includes Glaucous Gulls, which are suffering from significant population declines in the high Arctic and Labrador and that use the Study Area extensively. Using both at-sea surveys and telemetry data to inform the distribution and abundance of marine birds in this area provides a more complete picture, as these two information sources are complementary. Tracking data provides information on birds of known colony origin, but this is generally limited to breeding individuals of particular colonies and includes only a subset of species which make up the avian biodiversity of the region. By contrast, at-sea survey data provides information on most species and age-classes, but the source populations are unknown, coastal species are under-represented and survey coverage may be incomplete. With new technologies, CWS now has the capability to deploy electronic tags on species previously too small to monitor (such as Leach's Storm-petrel). This provides valuable new information on their distribution and habitat use.

#### 3.4.1.3 Marine Mammals and Sea Turtles

A key source of information used in previous EAs for offshore exploratory drilling projects in the Study Area is the DFO Marine Mammals Sightings Database, which includes sightings from the late 1940s to 2016. Although somewhat useful and informative at a regional scale, there are several caveats associated with this dataset which must be noted.

Because the data collection is not standardized across surveys, and the sightings effort is not quantified, the data cannot be used to estimate species abundance or density. A lack of sightings may reflect a deficiency of survey effort in a given area and cannot be interpreted as absence of a particular species, and similarly, a cluster of sightings may reflect high survey effort rather than a large number of individuals in a particular area. In addition, observers may have varying degrees of experience and expertise in marine mammal identification, and the data have not been completely error-checked and the quality of some of the information is therefore unknown. Most sightings are collected on an opportunistic basis, with the data being gathered from platforms of opportunity that were vessel-based, and the possible negative or positive reactions by cetaceans to such vessels have not yet been factored into the data. Numbers sighted have also not been verified, especially in light of the significant differences in detectability between species. For completeness, these data represent an amalgamation of sightings from a variety of years and seasons, but the effort is not necessarily consistent among seasons, years, and areas, and there are gaps between years. Finally, many sightings could not be identified to the species level

due to factors such as distance or poor visibility, and these have been assigned to the smallest taxonomic group possible. In addition to the DFO Marine Mammals Sightings Database, the Ocean Biogeographic Information System (OBIS) was also used as a data source to provide additional coverage and sightings data that may not be included in the DFO database. OBIS is a data sharing portal containing observer data on thousands of marine species including marine mammals and sea turtles.

DFO scientists are currently developing SDMs to help identify and predict priority areas in which to target and enhance monitoring efforts for various species of marine mammals in the Study Area. Once available, this research will enable a more a standardized approach to identifying marine mammal distribution on a regional scale. Some species specific work has been completed and published however, work is currently under way by DFO to develop these models for additional cetacean species as well as functional groups.

#### 3.4.1.4 Special Areas

For those areas that are formally designated or otherwise identified as important, sensitive or protected under federal or provincial government legislation or other means, there is information and detailed mapping available regarding their presence, location, size and important ecological and socioeconomic features and value. Most of these areas have also been subject to considerable study and analysis as part of the processes that led up to their designation. It is important to note that the identification and delineation of special areas in the Study Area is an on-going process, and so this information is subject to change over time. Therefore, there is the potential for special areas to be added, removed or modified. Of particular note, DFO is currently developing an MPA Network, the coverage of which will include offshore Newfoundland and Labrador. Once this network is released, it may identify new AOIs that may overlap with the Study Area, and which may eventually become MPAs.

### 3.4.2 Socioeconomic Environment

#### 3.4.2.1 Indigenous Communities and Activities

Existing, published information on Indigenous groups and their communities and activities may be obtained through a variety of sources, including available community profiles and other statistics from relevant government sources such as Crown-Indigenous Relations and Northern Affairs Canada, Statistics Canada and from the websites and other information sources released by individual Indigenous groups themselves. Information on fishing licences held by Indigenous groups is available from DFO, and given the geographic distribution of the various Indigenous communities listed above, this involves seeking and analysing data from various DFO Regions (Newfoundland and Labrador, Maritimes, Gulf, and Québec). These datasets, including their age, format and completeness, were found to vary somewhat between sources, and there were some gaps identified in the available information such as a lack of FSC or commercial fishing data for some groups, species and fishing areas. The Regional Assessment engagement process therefore provided an important and useful opportunity to obtain additional information and to verify existing data sources, and to update this information as required.

#### 3.4.2.2 Fisheries and Other Socioeconomic Components

Commercial fisheries data from DFO Statistical Services is the primary data source available to provide a description of domestic commercial fishing activity that takes place in offshore Newfoundland and Labrador. DFO provides a catch landings dataset, which provides data on the quantity of catch (kg) and landed value (CAD $) which can be used to describe fisheries by NAFO Unit Areas or Divisions, and then by species, year, month, gear type and other variables. The finest spatial resolution this dataset provides is to the NAFO Unit Area level, and the most recent year for which these data are currently available is 2017.

DFO also provides a geospatial dataset that allows for a generalized mapping of commercial fish harvesting locations, which is currently provided as an aggregated data set that gives a general indication of fishing areas (by species, gear types, fleet and other pre-determined categories and data classes) for individual grid "cells" that are approximately 6 x 4 nautical miles in size. The DFO datasets record and report domestic and foreign fish harvests that are landed in Canada. This dataset does not have weight or values associated with the recorded harvests, and the most recent data available as of the time of writing are again for the year 2017.

It is important to note that the commercial fisheries datasets provided by DFO, particularly in recent years, are substantially redacted by DFO for confidentiality reasons prior to their release to external users. This redaction results in the removal of considerable detail from the data, to the point that is unable to provide an accurate and complete picture of important fisheries, nor to facilitate direct comparisons between years and across individual fisheries. The timing and age of these data are also an issue, as the most recent data available at any given time are usually at least two years old.

Information on international commercial fisheries is provided by NAFO in the form of the STATLANT 21A and 21B datasets, which describe fish catches by weight (t) for fisheries occurring within and outside of the EEZ and within the NRA. Based on the variables provided in these datasets, data can be organized to present information by country, NAFO Division, species, year, and month. These data are only presented at the NAFO Division level, which limits the ability to identify and understand international fisheries at finer spatial scales, and can tend to lump together fishing activity for both coastal (e.g., lobster and other shellfish) and offshore operations.

For the purposes of the Regional Assessment, geospatial fisheries data were also provided by NAFO in the form of vessel monitoring system (VMS) data for fishing vessels operating within the NRA. Vessel position reports for vessels travelling between 0.5 and 5 knots (indicative of fishing activity) were combined and then gridded into cells to show various pre-set categories of fishing intensity across the area in question. The dataset provides information on fishing activity levels, by month for the years 2014 to 2018, but does not indicate species, gear type or other factors. This is, however, the first instance where such international fisheries data have been made available for use in an environmental assessment in the Newfoundland and Labrador offshore area, and therefore represents an important first step in filling this long-standing data gap.

As noted previously, commercial fisheries in this region are geographically extensive, dynamic and complex in nature, and so it can be quite challenging to identify and describe overall regional patterns of commercial fishing and possible future conditions and trends. Supplementing data with input from the fishing industry, based on consultations with harvesters and fishing organizations regarding key species, areas, and times, is key in helping to address these gaps and uncertainties.

Information regarding other ocean users has also been incorporated into the Regional Assessment where possible. Some key data sources include seismic data acquisition and well data provided by the C-NLOPB, along with mapping files and information on current licences that exist offshore and other oil and gas related activities. Datasets have also been provided by the Department of National Defence to highlight known locations of shipwrecks and UXO sites within the Study Area. Currently, there is very little available and validated data regarding subsea cables within the offshore environment, and maps typically are compiled using multiple sources.

## 3.5 Committee Findings and Recommendations

### 3.5.1 Incorporating and Adapting to New Knowledge

1) **The Committee recommends that the Regional Assessment (including its associated GIS decision-support tool) must be viewed and used as a "living" and "evergreen" product that is reviewed annually and updated as required, which should include identifying and incorporating new or updated information that is relevant to the assessment**. Future updates of the Regional Assessment should include any new, relevant information on the existing biophysical and socioeconomic environments of the Study Area, as well as new knowledge regarding the effects of offshore exploratory drilling and the effectiveness of mitigation, including the findings of relevant environmental monitoring and follow-up programs, oil spill modelling and analysis, and other studies (see also Chapter 4).

   In this way, the Regional Assessment is intended to help facilitate an adaptive management approach for future exploratory drilling projects in the Study Area through regular updates of the information and analysis contained herein and of the associated mitigation and follow—up requirements that apply to future exploratory drilling projects in the Study Area as required.

2) **In the course of completing its work, the Committee has become aware of a number of on-going or planned studies or scientific reviews that should be incorporated into future updates of the Regional Assessment immediately upon their completion**. These include, but may not be limited to, the following:

   a) Proposed ESRF research relevant to the Regional Assessment, including on Atlantic salmon presence and timing in the Study Area
   b) On-going ECCC – CWS species-specific predictive modelling for seabirds
   c) On-going DFO marine mammals species distribution modelling
   d) Any on-going or upcoming Indigenous Knowledge studies completed for offshore oil and gas exploratory drilling.

Throughout the Regional Assessment it has been made clear that Atlantic salmon are of great importance to Indigenous groups and others, and there is a current lack of complete and up to date knowledge about their presence, distribution and timing in the marine environment of the Study Area.

3) **The Committee recommends that DFO increase and accelerate its research on Atlantic salmon to help address this important issue. It is further recommended that DFO develop its research plan in**

**collaboration with Indigenous and stakeholder groups, and communicate its research plan and the eventual findings of that research to these groups.**

4) **The Committee recommends that ECCC, in partnership with other relevant stakeholders including the oil and gas industry, increase its research into the seasonal presence of Leach's Storm-petrels and other relevant species in the Study Area and on the species' behaviour and susceptibility to lights from drilling platforms and vessels, including the potential role of offshore operations in recently observed population declines**.

The Committee notes that the implementation of these and other recommended research programs to fill identified data gaps will require that relevant departments, agencies and organizations ensure that adequate and appropriate resources and funding are available to complete these programs.

### 3.5.2 Improving Data Quality and Availability

There are issues around the timing, format and content of the commercial fisheries data developed and distributed by DFO Statistical Services, which have affected their utility for providing a comprehensive and up-to-date overview of domestic commercial fishing activity in the Study Area for the purposes of the Regional Assessment. These issues were raised by various parties and data users throughout the process.

5) **It is recommended that the commercial fisheries data (landings statistics and geospatial information) be made available by DFO in a more timely, accessible, and useful manner. This includes making these data publicly available through a website or other such means as opposed to requiring users to make individual data requests to DFO.**

The format of the DFO fisheries geospatial data is also problematic, as many users have been unable to use the datasets to provide an indication of spatial fishing intensity or importance (especially by catch weights or value). While the confidentiality concerns associated with these data are recognized, the heavy redaction of the datasets in recent years has significantly compromised their utility for understanding and describing fishing activity types, areas and timing on even a regional scale.

6) **It is therefore also recommended that DFO explore alternative means of packaging and providing this information to help resolve or reduce the current issues around confidentiality and associated data redaction.** One suggested approach would be for DFO to develop a series of standardized mapping products for the Study Area from the complete (or a more complete) dataset at an appropriate scale, and to provide these as GIS mapping (shape) files for public use. This may help avoid the confidentiality concerns associated with the release of the detailed, raw dataset itself.

During the Regional Assessment engagement activities, it has also become clear that other parties, particularly fisheries companies and organizations, have considerable information on key fishing areas and times in the Study Area that would be relevant to the Regional Assessment, and to the planning and conduct of future oil and gas activities in the region. These data are, understandably, considered to be commercially sensitive and are thus treated as confidential by their owners. It was not possible within the timing and scope of the Regional Assessment to fully address these issues and facilitate the public release and use of this information.

7) **It is recommended that representatives of the oil and gas industry, applicable regulatory and resource management agencies (including the C-NLOPB and DFO) and the fishing industry work together, through the One Ocean initiative, to develop and implement a protocol for gathering, documenting and sharing this information and knowledge to better understand key fishing activities, areas and times on a regional scale**. This information will likely be useful in helping to reduce adverse interactions between these industries in the future through improved planning and engagement, and should be incorporated into future updates of the Regional Assessment.

Further related to the above, the Committee and other participants in the Regional Assessment have also recognized that the available environmental and fisheries datasets can inevitably provide only a partial picture of the biophysical and socioeconomic environments of the Study Area. A number of key information gaps remain, and it is important to supplement the available data with additional, qualitative information gathered through direct discussions with those that are knowledgeable about the marine environment of the Study Area, including persons involved in the fishing industry. This would include gathering and mapping regional-scale information on fishing activity, as well as traditional and/or local knowledge on key environmental components, areas and potential sensitivities (such as spawning and nursery areas and other locations that support important life stages for marine biota) that would be relevant to planning and conducting future offshore oil and gas activity in the Study Area.

8) **It is recommended that representatives of the oil and gas industry, applicable regulatory and resource management agencies (including the C-NLOPB, DFO and ECCC), Indigenous groups and the fishing industry work together to develop and implement a protocol for gathering, documenting and sharing information and knowledge about key environmental components and sensitivities in the Study Area (through associated mapping at an appropriate and an acceptable scale of detail) for future use by interested parties. This information should be incorporated into future updates of the Regional Assessment.**

9) **It is recommended that DFO-NL Region's marine mammals and sea turtles sightings dataset be made publicly accessible (along with a detailed description of the dataset and what it contains including any limitations) as opposed to requiring users to make individual requests to DFO for these data.**

10) **It is recommended that DFO develop, communicate and implement standards / certifications for marine mammal observers that set out specific training and experience requirements for these personnel.**

Chapter 8 provides a summary of the main outcomes and recommendations resulting from the Regional Assessment.

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# 4 POTENTIAL EFFECTS AND THEIR MANAGEMENT

The sections that follow describe the various issues and potential effects associated with offshore exploratory drilling that the Committee has identified through its work, as well as evaluating the adequacy and effectiveness of the mitigation and follow-up measures that are typically applied to such activities. This information and analysis then set the stage for the formulation of the Committee's recommendations around how identified issues should be addressed for future exploratory drilling projects.

## 4.1 Issues and Interactions

The main components and activities that are associated with offshore exploratory drilling in the Study Area, and the primary emissions or other disturbances that may be associated with them, include:

a) The general presence, movement and operation of drill rigs and supporting and supply vessels, aircraft and other equipment;

b) Drilling activities and the associated discharge and deposition of drill cuttings, fluids and cement into the marine environment;

c) Light, heat and noise emissions into the atmospheric and marine environments resulting from the operation and movement of rigs and vessels, positioning systems, other equipment, vertical seismic profiling (VSP) surveys, flaring, and eventual wellhead removal;

d) Air emissions from drill rigs, vessel and aircraft traffic and other equipment (such as power generation) and their exhausts, as well as from well testing / flaring and other activities;

e) The generation of other liquid discharges (such as bilge water, deck drainage, ballast water, grey / black water, blow-out preventer (BOP) control / testing fluid, produced water) and solid waste materials;

f) Eventual well abandonment or suspension activities, including the potential removal or long-term presence of seabed infrastructure; and

g) Potential accidental events, including possible spills of hydrocarbons or other substances from a drill rig or associated vessel activities through batch spills or a subsea or surface blowout, or other incidents such as dropped objects / equipment or collisions.

The analysis and engagement activities undertaken as part of this Regional Assessment have indicated that some of the primary effects of concern that may result from these activities (planned or accidental) and emissions include:

a) Effects on air or water quality due to discharges from drill rigs or vessels, which may cause health effects on marine biota through direct contamination or by otherwise affecting their food sources or habitats;

b) Contamination, smothering or other alteration of marine habitats and benthic organisms due to physical disturbance of the substrate, sedimentation and the discharge and deposition of drilling wastes (fluids, cuttings, cement);

c) Avoidance of areas by marine biota due to underwater noise or other disturbances, which may alter their presence and abundance as well as disturbing migration, feeding or other activities;

d) Attraction of marine biota to drill rigs and vessels due to lighting or organic wastes, resulting in increased potential for injury, mortality, contamination or other interactions (such as collisions);

e) Effects on fisheries and other marine activities and users due to possible biophysical effects on the marine environment, including resulting changes in resource abundance, distribution or quality;

f) Direct or indirect interactions with protected and other identified special areas in the marine environment, and associated effects on their important and defining characteristics, and thus, on their ecological integrity or human use and value;

g) Interference with fishing and other marine activities due to reduced access to preferred locations and times, with resulting decreases in activity success, efficiency, value or enjoyment; and

h) Damage to fishing gear, vessels or other equipment and infrastructure as a result of direct interactions with offshore exploratory activities (equipment or discharges).

To date, these issues and effects have formed the primary focus of previous and on-going environmental assessments (EAs) for offshore exploratory drilling projects in the Study Area. These EA findings are summarized briefly below, as background to the analysis undertaken by, and the subsequent recommendations of, the Committee.

## 4.2 Effects of Planned Exploratory Drilling Activities

For the most part, these EAs and the resulting EA decisions have concluded that the potential effects of offshore exploration drilling in the Study Area are relatively well understood and entail relatively minor, localized and temporary disturbances at any one location and time. They have also indicated that, with the implementation of typical and industry standard mitigation (see Section 4.5), are unlikely to result in significant adverse effects on any aspect of the environment.

### 4.2.1 Marine Biota and Their Habitats

#### 4.2.1.1 Presence and Operation of Drill Rigs

The presence and operation of a drill rig at an individual well site results in the introduction of a number of disturbances into the marine environment, including underwater noise and vibrations, light emissions and other discharges, as well as resulting in possible issues related to aquatic invasive species. Drilling itself, and any anchoring of the drill rig, also results in direct interaction with the seabed and could in turn adversely affect sensitive benthic biota or habitats in the immediate area (footprint). Potential effects on coral and sponge

aggregations are however, typically avoided through the completion of pre-spud wellsite surveys of the seabed, with appropriate mitigation (such as set-back distances through the relocation of the well itself) applied as required. All associated discharges such as wastewater, sewage, deck drainage, ballast, and air emissions from the drill rig must also be managed in accordance with applicable regulations and guidelines.

The presence of lighting and any organic waste emissions may result in some localized behavioural (attraction and aggregation) effects to marine biota, which increases the potential for interactions and adverse effects such as contamination or strandings / collisions. For marine birds in particular, platform and vessel attraction associated with lighting and increased foraging opportunities can lead to increased potential for mortality or injury due to collisions, disorientation and potential predation, particularly in the spring and fall migration periods and during particular meteorological conditions such as fog or inclement weather. Any future exploratory activities within the Study Area itself will be situated at least 50 (and in most cases, several hundred) kilometers offshore, which is far from coastal breeding sites and other identified special and sensitive coastal areas for birds. This is also well beyond the ranges of most species that nest in Newfoundland and Labrador, and of migrating birds which tend to fly closer to land. There are also some species that spend considerable time in the offshore marine environment and are therefore particularly vulnerable to disturbance. While the attraction of birds to offshore platforms and resulting injury or mortality has been identified as an important area of concern, it is often noted in these EAs that the short-term nature of a drill rig's presence and operation at a particular site, and the localized zone of visibility of such lighting (typically up to 5 km, see Module 8), reduces the potential for interactions and resulting effects. Mitigation measures such as minimizing the amount (and adjusting the intensity, duration and frequency) of artificial lighting to the degree possible, as well as protocols for locating and releasing any birds that may become stranded on offshore installations, can also help reduce any such effects.

Based on the underwater sound levels typically generated by a drill rig and the sound level thresholds identified in the literature (Modules 2 and 9), it is often considered unlikely that marine mammals or sea turtles would be exposed to sound levels from drilling that are capable of causing injury. Given the overall abundance of these species in the Study Area, associated seasonal variations in their presence, and the fact that individuals may move away from the immediate areas of disturbance, the potential for interaction with the operating drill rig and its noise emissions is often considered to be low, and is temporary in nature. It is possible that temporary behavioral changes will occur within some proximity to an operating drill rig in response to these increased levels of underwater noise, depending on various factors including species, location, season, and characteristics of the sound source. These may include interference with communication, alterations in activity or localized avoidance responses (Module 9).

#### 4.2.1.2 Drilling and Associated Marine Discharges

The primary disturbances associated with drilling activity itself are related to the discharge of water-based muds (WBMs) and associated cuttings during the initial drilling phases, and the eventual discharge of synthetic-based mud (SBM) and associated cuttings from the drill rig following their treatment and marine disposal, in accordance with applicable requirements. Drilling fluids themselves are essentially non-toxic, and these and all other chemicals used are required to be selected and used in accordance with applicable regulatory requirements and operator procedures. The marine disposal and deposition of drill cuttings (and any residual fluids) may cause a degree of accumulation on the seabed, but drill cuttings modelling carried out for previous and on-going EAs typically shows that the formed cuttings pile will be limited in size and distribution, with limited

areas in which the cuttings pile thicknesses exceed the established thresholds for creation of anoxic areas and smothering of benthic species (Modules 2 and 7). Any cuttings accumulations on the seabed are also eventually recolonized following the completion of the well.

#### 4.2.1.3 Vertical Seismic Profiling

VSP surveys are typically short-term activities, with seismic source activation usually limited to just a few hours, and localized in nature (occurring at the wellsite). Underwater noise resulting from the use of seismic equipment during VSP activities may result in temporary displacement of some marine species, particularly marine mammals, but is not usually predicted to result in injury or mortality. These seismic emissions are mainly directed downwards into the well, with limited horizontal range, and VSP surveys typically use sound levels that are lower than the larger seismic (geophysical) surveys that occur throughout the region. Mobile species may temporarily avoid areas of VSP operations, reducing the potential for adverse interactions. Standard mitigations such as an initial "ramp up" phase are also applied to increase initial avoidance behaviors by marine biota.

#### 4.2.1.4 Well Testing and Evaluation

The potential effects of well flow testing and associated flaring are related primarily to light and atmospheric emissions, and possible discharges of treated produced water, as required. During well flow testing, oil and small quantities of produced water may be periodically flared, resulting in air and light emissions. The amounts of produced water associated with exploration drilling are typically much lower than those from oil production, and any quantities that are in excess of the flare capacity must be treated in accordance with applicable regulatory guidelines, and disposed of at the well site.

#### 4.2.1.5 Well Abandonment or Suspension

Eventual well abandonment or suspension and the associated removal of the wellhead using mechanical means, if required, results in some short term, low magnitude emissions of noise and light. Wellhead recovery is conducted at depth, and in adherence to the requirements set out under the *Newfoundland Offshore Petroleum Drilling and Production Regulations*. Individual marine animals that are sensitive to lighting and noise emissions may temporarily avoid the area during these activities.

#### 4.2.1.6 Supply and Servicing

During an offshore exploration drilling program in the Study Area, supply vessels and aircraft make regular transits from one or more on-land supply bases in Eastern Newfoundland to the active drill rig, resulting in a degree of associated noise, lighting and other discharges such as wastewater emissions. These supply and service activities occur throughout a drilling campaign, but are generally in keeping with the overall marine traffic that has occurred throughout the region for decades. Supply vessel traffic utilizes existing and established routes wherever possible, and vessels maintain a steady course and safe vessel speed to reduce the risk of a vessel strike. All vessels and aircraft must adhere to applicable environmental and safety regulations and guidelines that apply to their activities and any associated discharges. The transitory nature of these activities helps to ensure that any discharges do not accumulate in any single area.

### 4.2.2 Special Areas

Changes to the environment as a result of offshore oil and gas activities and their potential, resulting effects on identified special areas may be both direct and indirect in nature. The conduct of oil and gas exploration activities directly within or near such areas may, for example, have adverse implications for these locations and their important and defining ecological and sociocultural characteristics. Biophysical effects resulting from oil and gas exploration or other human activities may also "spread" to adjacent special areas by affecting the actual or perceived water quality and marine fish, birds, mammals or other components that move to and through these areas. Any resulting decrease in the real or perceived integrity of these areas in the short or long term may also affect their ecological or societal importance, use and value. Previous EAs have generally concluded, however, that the overall and defining features and characteristics of any special areas that overlap with or occur in the vicinity of a proposed drilling project will not be materially and adversely affected by such activities, as these activities are characterized by small footprints and are temporary in nature. In addition, the implementation of mitigation measures is intended to avoid or reduce any disturbances and resulting effects to overlapping or adjacent special areas.

### 4.2.3 Indigenous Communities and Activities

Recent EAs have concluded that given the nature, location and duration of exploratory drilling activities in the Study Area, they are unlikely to have adverse effects on people and communities, including Indigenous groups. As most such activities take place in the offshore marine environment, often several hundred kilometers from land, and because their associated emissions are expected to be quite localized and short-term in nature, the assumptions are that these effects are unlikely to extend to or affect the health, well-being or other socioeconomic conditions of Indigenous peoples. Indigenous peoples are not known to undertake any traditional activities within the Study Area. These EAs have also concluded that few of the marine-associated migratory species that are known to be used by these Indigenous groups originate from or spend time within the Study Area. Of any species that do or may do so, these EAs have concluded that the potential is extremely remote for any degree of connection between individuals within the region and those which would be harvested by Indigenous communities for traditional purposes hundreds of kilometers away. As a result, recent EAs have found that there is little potential for the availability or quality of resources that are currently used for traditional purposes by Indigenous groups to be reduced or negatively affected by offshore exploratory drilling in a way and to a degree that would alter the nature, location, timing, intensity or value of these activities by Indigenous peoples.

While the above summarizes the findings of previous project-specific EAs, additional information on Indigenous concerns and perspectives around the potential effects of exploratory drilling in the Study Area are provided elsewhere in this Regional Assessment Report, particularly in Chapter 6.

### 4.2.4 Fisheries and Other Ocean Uses

Potential effects on fisheries and other ocean uses relate primarily to a loss of access to areas and resources due to the presence of a temporary safety zone around drilling equipment during exploration activities, as well as potential interactions with fishing equipment, and effects on the quality and availability of commercial fish resources. These interactions and potential effects may result in lost time, reduced catch volumes, lower economic returns on catches, and increased operational costs for fishers and other ocean users in the area.

Recent EAs have generally concluded, however, that the localized nature and short-term duration of exploration drilling activities, and the implementation of standard mitigation measures, will avoid or reduce the occurrence and magnitude of any such effects. Although the presence of an individual drill rig and its safety zone and other planned activities will temporarily reduce access in certain areas, these interferences are localized and of limited geographic extent as compared to the total fishing areas available in the region, as well as being temporary and reversible once drilling activity ceases at a well site. To help mitigate such effects, various communication protocols are implemented (Section 4.5.1). In the event of fishing gear damage, the operator must also implement a fishing gear damage compensation program.

### 4.2.5 Atmospheric Emissions

Existing ambient air quality within the Study Area can be generally categorized as good, and is likely occasionally and locally influenced by exhaust emissions from marine vessel and aircraft traffic and from the operations of the existing oil production platforms and other sources. Atmospheric emissions resulting from exploratory drilling and associated activities include exhaust gasses and particulates from the operation of internal combustion engines, gas turbines, and boilers, as well as emissions from the storage and flaring of hydrocarbons during well testing (Module 2). Recent EAs for offshore exploratory drilling have included estimates of the air emissions that may be associated with the proposed project in question (Module 2). These have generally found that such activities will produce a localized, transient effect on air quality, and due to the distance from shore, effects on onshore areas and receptors are unlikely. In addition, since predicted greenhouse gas (GHG) emissions from an individual project are low and insignificant in comparison to GHG targets, individual drilling programs have virtually no effect on current estimates of future global climate change (Section 7.2).

## 4.3 Effects of Unplanned (Accidental) Events

The Committee recognizes that of particular concern to governments, Indigenous groups, stakeholder organizations and the general public is the potential for an unplanned event such as an oil spill to occur during offshore drilling activities, and the possible effects of any such incident. Accidental events that may be associated with offshore drilling activities include potential spills, which may occur as a result of a blowout (subsea or surface) or take the form of batch spills of hydrocarbons or other substances from a drill rig or associated vessel activities, such as during fuel transfers. These possible accidental events may vary considerably in terms of their nature, scale, duration and potential consequences.

### 4.3.1 Spill Prevention

Prevention is obviously the most effective way of avoiding the potentially serious consequences of a spill event. Under the various regulatory processes that apply to offshore exploratory drilling in the Study Area (Module 1), operators are required to demonstrate that they have the ability and capacity to undertake such activities in a safe and environmentally responsible manner through various project design measures, operational procedures and response mechanisms. While the oil spill probability analysis, completed for recent EAs and as part of this Regional Assessment (Module 3), indicate that a large spill is an extremely unlikely occurrence due to these spill prevention procedures required of, and implemented by each operator, the number and magnitude of recent spills in the Study Area is a clear reminder that, despite best efforts, such accidental events do occur.

### 4.3.2 Potential Effects

Accidental events such as oil spills can have important, adverse effects on marine biota, including fish, birds, mammals and turtles, leading to potential changes in their presence, abundance, distribution and health (both individuals and possibly, populations). Exposure to accidental spills from a drill rig or vessel can affect marine animals directly through physical exposure or ingestion, with associated mortality, injury or other health related effects, as well as indirectly by affecting their habitats and food sources.

The potential effects of an accidental release of hydrocarbons in the marine environment on marine fish and fish habitat are largely dependent on a variety of biotic (species, life history, behaviour, resistance) and abiotic (oceanographic conditions, exposure duration, oil type, oil treatment methods) factors. Marine birds are amongst the biota most at risk from oil spills, as they spend much of their time upon the surface of the ocean. In the event of a spill, and depending upon spill and area specific factors, coastal birds may also be at risk on beaches and in intertidal zones. Marine mammals and sea turtles may experience a change in mortality or injury (acute or immediate effects) if directly exposed to accidentally released hydrocarbons or associated volatiles and aerosols. They may experience a change in health (sub-lethal effects) from direct contact with hydrocarbons or consumption of contaminated prey. An important concern is also the possibility of large amounts of discharged oil to extend to and reach special areas, and in doing so, to have adverse effects on their various defining ecological and socio-cultural features. Indigenous communities and their activities may also be adversely affected by such an accidental event, should any spilled oil reach their communities and traditional areas, or if important migratory species are affected. Finally, potential effects on commercial fisheries and other ocean users from such an accidental event may include a temporary loss of access to fishing areas or fish species resulting in reduced fishing efficiency and value, as well as possible damage to fishing gear, facilities or vessels and actual or perceived reductions in the quality of fisheries resources with resulting market / price effects.

### 4.3.3 Spill Behaviours and Response Measures

The fate and behaviour of spilled petroleum is dependent on the type and specific properties of the hydrocarbons involved, the depth at which the petroleum is released, the rate of release, the total volume released, the physical/chemical/biological conditions in the receiving environment at the time of the spill, and meteorological and oceanographic conditions at the well site and in the surrounding environment at the time of the spill (i.e., wind speed and direction, wave height and period, current speed and direction, water and air temperature, and the presence of ice). Previous EAs for proposed drilling programs in the Study Area have included a project- and site-specific analysis of oil spill probabilities, as well as of oceanographic conditions at the drill site and hydrocarbon properties which are used to carry out detailed trajectory modelling studies of the likely behaviour of possible (hypothetical) oil spills (Module 3). A typical, overall finding of these recent analyses is that most spilled oil will travel eastwards, with minimal potential for shoreline contact, although given their project and site specific inputs to such modeling their specific findings about the fate and behavior, and thus the likely geographic extent and duration of their footprints, this has been found to be quite variable.

It is also noteworthy that, in order to be conservative, past oil spill modelling studies for exploratory drilling programs in the Study Area have assessed “unmitigated” potential spill events, and have therefore not included consideration of potential spill response procedures. In reality, operators are required to have oil spill response plans and procedures in place that demonstrate they have the ability to respond to a spill in an effective and timely manner (Module 3). Determining the appropriate tiered response level and method to address such an

incident is also dependent upon several factors including, but not limited to, the type of incident, location, size or volume of spill, time of year, weather, sea state, and resource availability. In evaluating the various response options, operators are required to undertake a Spill Impact Mitigation Assessment (SIMA) prior to drilling to identify spill response options that will be implemented in the case of a spill to provide for the best opportunities to minimize the ecological, socio-economic and cultural impact of an oil spill through the development of a safe and effective response strategy. Response tools and strategies in the event of an oil spill may include:

a) Surveillance and monitoring;
b) Mechanical containment and recovery;
c) Chemical dispersion;
d) In situ burning;
e) Natural dispersion and degradation; and
f) Shoreline protection and recovery.

The potential effects of accidental spill events are assessed and evaluated in consideration of the modelling results and the required, and committed to, prevention and response measures.

### 4.4 Effects of the Environment on Exploratory Drilling Activities in the Study Area

The physical environmental setting of an area is an important consideration in the planning, review and conduct of offshore oil and gas exploratory drilling activities. An appropriate understanding, and careful consideration, of environmental characteristics and phenomena such as winds, waves, currents, ice, precipitation and other factors is required so that offshore activities can be designed and implemented appropriately, and in a manner that helps ensure that human health and safety and the environment, as well as ensuring that equipment and infrastructure are protected. This includes avoiding or reducing the potential for any incidents and accidents that may occur as a result of unplanned interactions between oil and gas operations and the physical environment of the marine area in question.

Some of the key environmental factors that could adversely affect the planning and conduct of offshore exploratory drilling and associated activities in the Study Area include severe weather conditions (such as high winds, low visibility and freezing precipitation), superstructure icing, extreme waves and ocean currents, as well as sea ice and icebergs (Module 4). Seismicity and geological stability are also considerations, although such events have a low probability of occurrence.

The primary mitigation measures for such potential effects include appropriate engineering design and equipment selection, and adherence to applicable regulatory requirements and guidelines, operational procedures, and standard offshore industry practices (Modules 1 and 2). Additionally, as exploration drilling activities have a relatively short duration and do not involve the development of fixed offshore infrastructure, the likelihood of an extreme event and associated effects occurring are greatly reduced.

Appropriate design and operational standards and regulations (Module 2) must be adhered to, and meteorological, oceanographic and ice conditions constantly monitored and considered in planning and decision-making throughout the life of an offshore drilling project. These measures help to reduce the potential for, and possible magnitude of, any adverse effects of the environment on such activities.

## 4.5 Mitigation, Monitoring and Follow-up

Mitigation measures are means to eliminate, reduce, control or offset the adverse effects of a project, and includes restitution for any damage caused by those effects through replacement, restoration, compensation or any other means.

Monitoring programs are often implemented to confirm and demonstrate compliance with relevant obligations or commitments, and may be undertaken to meet associated regulatory requirements (such as may be required as a result of project authorizations) or as part of corporate systems and applicable operational practices.

Follow-up programs are those that may be required and implemented to verify effects predictions and/or the effectiveness of implemented mitigation measures.

### 4.5.1 Mitigation

Experience with the EA reviews of exploratory drilling projects in the Study Area to date indicated that there are a number of typical and fairly standard mitigation measures that are often applied to these activities. Indeed, there is a high degree of commonality across projects and assessments in terms of those mitigations that are usually identified and committed by proponents in their Environmental Impact Statement (EIS) documentation, and/or across the various decision statements issued by government for such projects which outline the conditions of EA approval.

It is also noteworthy that such measures are typically identified and proposed to address a number of potential effects across a variety of environmental components, and are therefore not typically species- or activity-specific in nature.

A high-level and abridged overview of these typical mitigation measures is provided below (Further details can be found in recent EISs and in the associated EA decisions issued by IAAC – see https://www.iaac-aeic.gc.ca/050/evaluations/index?culture=en-CA)

1) Minimizing discharges and emissions from planned drilling operations and associated activities, including compliance with relevant regulations and standards.

2) Treatment of operational discharges into the marine environment prior to release in compliance with the *Offshore Waste Treatment Guidelines* and other applicable regulations and standards.

3) Installation and use of oil water separators to treat contained deck drainage, with collected oil stored and disposed of properly.

4) Selection and screening of chemicals under the *Offshore Chemical Selection Guidelines for Drilling and Production Activities on Frontier Lands*.

5) Appropriate handling, storage, transportation and on-shore disposal of solid and hazardous wastes.

6) The selection of non-toxic drilling fluids, including the use of WBMs wherever possible and technically feasible.

7) Return of SBM-associated drill cuttings to the drill rig for treatment in accordance with relevant guidelines and requirements before their below surface discharge to the marine environment. Disposal of spent or excess SBMs that are not re-used at an approved on-shore facility.

8) Pre-drilling surveys of the seabed at the wellsite to assess the potential presence of hazards and sensitive benthic micro-habitats (such as corals), and the application of an appropriate set-back distance or other approved avoidance approaches if such species, sensitive habitats or hazards are found.

9) Inspections of ship hulls, drill rigs and equipment for alien invasive species and associated follow-up maintenance. Maximizing the use of local vessels, rigs and equipment where possible.

10) Avoiding or minimizing flaring (frequency and duration), and the use of high efficiency burners where flaring is required. Notification of the appropriate authorities of any plans to flare. Flaring as early as possible during daylight hours, and installation and operation of a water curtain around the flare.

11) Treatment of any significant amounts of produced water encountered prior to its discharge, in accordance with relevant regulatory requirements.

12) Minimizing the amount, and adjusting the intensity, duration and frequency, of artificial lighting to the extent possible without compromising safety.

13) Minimizing the amount of associated vessel and aircraft traffic, the use of existing and common travel routes where possible, and reduced vessel speeds especially when a marine mammal or sea turtle is in proximity to a supply vessel, except if not feasible for safety reasons. Any collisions with marine mammals are to be reported to Fisheries and Oceans Canada (DFO).

14) Avoidance of low-level aircraft operations wherever possible, with specific conditions around distances and heights when in proximity to identified important areas for birds.

15) Implementation of protocols for the collection and release of marine birds that become stranded on offshore installations, in accordance with associated regulatory guidance and permit requirements.

16) Compliance with the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* in the design and implementation of VSP surveys, and implementation of associated procedures with respect to sound levels, start up and shut-down procedures when marine mammals and sea turtles are present, and the establishment and monitoring of a safety zone for these animals.

17) On-going information gathering and analysis regarding fishing areas and times and continued monitoring of fishing activity.

18) Establishment and communication of safety zones around drill rigs and any required anchoring, in accordance with relevant regulations.

19) Active and continuous communications and coordination with other marine users and key agencies and organizations. This includes the preparation of Fisheries Communication Plans by operators to facilitate coordinated communication with fishers, which includes procedures for informing commercial fishers and Indigenous groups of planned activities (including several weeks notice prior to starting a well), location of safety zones, anticipated vessel schedules and routes, locations of suspended or abandoned wells, determination of fisheries liaison officer (FLO) and guide vessel needs, notifications of an accidental event and any associated health risks, and appropriate response procedures. This plan is developed in consultation with Indigenous groups and commercial fishers.

20) Issuance of Notices to Mariners and other notifications / direct industry communications.

21) Provision of information on the locations of any wellheads left in place to fish harvesters and other marine users, and to appropriate authorities for inclusion on nautical charts and for communications such as Notices to Shipping.

22) Development and implementation of a well and wellhead abandonment plan and submission to the Canada-Newfoundland Offshore Petroleum Board (C-NLOPB) for acceptance at least 30 days prior to abandonment of each well. If wellhead abandonment may interfere with fisheries, the plan must be developed considering the views of commercial fishers and Indigenous groups, as identified by DFO.

23) Establishment, communication and implementation of a fishing gear damage or loss compensation program as per the applicable C-NLOPB Guidelines.

24) Development and implementation of spill prevention and response plans and procedures, including notification requirements for spill events. These plans must be developed in conjunction with Indigenous groups, reviewed and approved by the C-NLOPB, and reviewed, updated and exercised regularly.

25) Development and implementation of other required plans and programs, including for physical environment monitoring; for the suspension of operations in respect to adverse meteorological and oceanographic conditions; collision and hazard avoidance; ice management; well control; capping stack availability and deployment procedures; and environmental effects monitoring in the event of a spill.

Recent EA decisions have also required that the operator develop and submit schedules for its planned project activities, and for the implementation of each condition of EA approval, with notification of any revisions and on-going maintenance of records to demonstrate compliance with these conditions. Operators must also confirm their intent to participate in research pertaining to the presence of Atlantic salmon in the Eastern Canadian offshore areas, and update the Board and Indigenous groups annually on related research activities. There is also considerable focus in operator's EA commitments or in the conditions of EA approval on on-going communications and engagement with Indigenous and stakeholder groups, including in the development of required plans, and in the on-going identification and management of issues during project implementation through an "adaptive management" approach. This includes requirements that various plans, schedules and

strategies outlined above be posted to the internet, along with the results of associated survey and monitoring studies, and that Indigenous groups be notified of the availability of these documents.

### 4.5.2 Monitoring and Follow-up

Project-specific EAs for proposed exploratory drilling programs offshore Eastern Newfoundland have also included a number of fairly standard monitoring and follow-up programs, which are summarized below.

Requirements for compliance monitoring for offshore exploratory drilling projects are outlined in the *Offshore Waste Treatment Guidelines* and the *Environmental Protection Plan Guidelines* administered by the C-NLOPB. Operators' related plans detail the compliance monitoring procedures, and reporting requirements that it will follow, and these must be reviewed and accepted by the C-NLOPB in order to obtain an Operations Authorization (OA). An operator is also responsible for reporting to the C-NLOPB in accordance with the *Drilling and Production Regulations* and *Data Acquisition and Reporting Guidelines*, which describe the operational testing, measurement, monitoring and reporting requirements to be conducted during an exploration drilling program. Any incidents must be reported in accordance with the *Incident Reporting and Investigation Guidelines* (Module 1).

Monitoring and follow-up requirements that have been included in recent EISs or EA approval conditions include:

1) *Drill Cuttings*: For every well drilled, the operator must measure the concentration of SBM retained on discharged drill cuttings as described in the *Offshore Waste Treatment Guidelines* to verify that this meets the relevant performance targets and report the results to the C-NLOPB.

2) *Sediment Deposition and Benthic Habitats:* For the first well in each Exploration Licence (EL), any well located in an area determined by seabed surveys to be sensitive benthic habitat, any well located within a special area designated as such due to the presence of sensitive coral and sponge species, or any well located near such a special area for which drill cuttings modelling predicts possible adverse effects on the area, the operator must develop and implement, in consultation with DFO and the C-NLOPB, follow-up that includes: a) measurement of sediment deposition extent and thickness post-drilling to verify the drill waste deposition modeling predictions; b) benthic fauna surveys to verify the effectiveness of mitigation measures; and c) reporting, including a comparison of modelling results to in situ results, within 60 days to the C-NLOPB.

3) *Underwater Noise:* For the first well in each EL, the operator must develop and implement, in consultation with DFO and the C-NLOPB, a follow-up program that describes how underwater noise levels will be monitored through field measurement during the drilling program, and the provision of that information prior to the start of the drilling program.

4) *Marine and Migratory Birds*: Prior to the start of a drilling program and in consultation with Environment and Climate Change Canada (ECCC) and the C-NLOPB, the operator must develop and implement a follow-up program for the duration of the drilling program that includes: a) daily monitoring for the presence of marine birds from the drilling installation using a trained observer following ECCC's Eastern Canada Seabirds at Sea (ECSAS) standardized protocol for pelagic seabird surveys; and b) daily

monitoring from the drilling installation and supply vessels for the presence of stranded birds, with ECCC's procedures for handling and documenting stranded birds being followed.

5) *Marine Mammals and Sea Turtles*: The development and implementation of an operational monitoring program for marine mammals during VSP surveys, in consultation with applicable regulatory authorities. These typically include the following: a) A trained marine mammal observer (MMO) will be onboard to record marine mammal and sea turtle sightings during VSP survey operations; b) Visual monitoring for the presence of marine mammals and sea turtles will occur within a pre-determined exclusion zone during VSP operations where a seismic sound source array is used; c) Observational / shutdown procedures will be implemented in accordance with the *Statement of Canadian Practice* (SOCP) for marine mammals and sea turtles; and d) Submission of a report of the observational program annually to the C-NLOPB and DFO, including documentation of marine mammal and sea turtle sightings.

Information on any required follow-up programs must be developed and submitted to the C-NLOPB prior to their implementation, including information on the methodology, location, frequency, timing and duration of monitoring associated with the follow-up program, as well as requirements for reporting on its results, including any variation from EA effects predictions that would require the implementation of new or modified mitigation. The follow-up program is also updated as required in consultation with relevant authorities. In addition, within 90 days of the end of each calendar year of a multi-year drilling program, the operator must submit to the C-NLOPB and the IAAC a report outlining its activities to comply with the EA approval, any consultations undertaken and an indication of how concerns were addressed, and providing the results of the follow-up and any additional mitigation requirements.

### 4.6 Committee Findings and Recommendations

As noted in Section 4.2 above, recent project-specific EAs for offshore exploratory drilling programs in the Study Area (and their resulting EA decisions) have concluded that their potential effects are relatively well understood, and that these entail relatively minor, localized and temporary disturbances at any one location and time. They have also concluded that, with the implementation of the various mitigation measures summarized above in Section 4.5, these activities are unlikely to result in significant adverse effects on any aspect of the environment.

The Committee has taken the approach of considering, and then building upon as required, the findings of these previous project-specific EAs, and have used these as the initial basis and 'frame of reference" for the Regional Assessment. This report therefore does not repeat or seek to redo the detailed project-specific effects assessments carried out to date, the key findings of which are summarized in Section 4.2 above. Indeed, the work of the Committee, including its associated analysis of information (such as the effects overviews and associated literature reviews provided in Modules 7-14) and its engagement activities (Chapter 2) has not indicated that the effects of exploratory drilling are likely to be different in overall nature or degree than those predicted in recent project-specific EAs. As a generic and regional-scale analysis of the potential effects of exploratory drilling activities in the Study Area, the key focus of the Committee's analysis and engagement activities has been on identifying whether there are any particular issues, areas or other situations that may require new or enhanced mitigation and follow-up measures for future drilling activities to address important and outstanding concerns.

### 4.6.1 Identifying and Implementing Generic Requirements for All Future Exploratory Drilling Projects

A considerable focus of the Committee's analysis and engagement activities was on identifying and evaluating the various mitigation measures that have been and should be applied to exploratory drilling projects in the Study Area to help avoid or reduce adverse effects, as well as associated monitoring and follow-up initiatives. At several of the TAG sessions in September 2019 (Section 2.2.4) various identified and/or required mitigation measures in recent CEAA 2012 project EAs, as summarized in the previous sections, were presented and discussed to identify any instances where new or enhanced mitigation or follow-up requirements may be warranted. For the most part, no major issues were raised regarding these "standard" measures, and there was general support for continuing to require and implement them for future projects. In a number of cases, proposed refinements and additions to these measures were suggested, and form the basis for some of the Committee's recommendations as outlined below.

1) **The Committee recommends that the various mitigation and follow-up measures that have been included as conditions of EA approval for recent exploratory drilling projects in the Study Area under CEAA 2012 (as summarized in Section 4.5 above) be requirements for all future exploratory drilling projects in the Study Area**.

In addition to these standard mitigation and follow-up requirements, it is recommended that:

2) **Operators undertaking exploratory drilling activity in the Study Area be required to assign trained (to ECCC-CWS standards, once finalized) and experienced seabird observers on drill rigs and supply vessels, whose primary responsibility is to make observations and collect seabird survey data during these activities**. This would include Stranded Seabird Surveys developed and undertaken in collaboration with ECCC-CWS, as well as Stationary Platform Seabird Surveys and Moving Vessel Seabird Surveys according to established ECCC-CWS protocols. The information collected must also be recorded and reported according to data protocols and formats established by ECCC-CWS to help facilitate the integrity of the data and its incorporation and use in regional seabird datasets maintained by ECCC-CWS and others.

Currently there is a requirement for operators to develop and submit Fisheries Communication Plans in consultation with Indigenous groups and commercial fishers.

3) **It is recommended that operators be required to prepare and submit their Fisheries Communication Plan at the time of, and as part of, their application for an Operations Authorization (OA) from the C-NLOPB, in order to ensure its timely development and implementation. The communication measures outlined in that Plan should be implemented throughout the OA review and approval process, as well as during the planning and conduct of the proposed exploratory drilling program in question.**

Currently there is a requirement that these Fisheries Communication Plans include procedures for informing commercial fishers and Indigenous groups of planned drilling activities.

4) **It is recommended that operators commence the notification process at least two months prior to starting a well (as opposed to the two weeks notice that has previously been specified), and provide subsequent updates and information as these become available. Operators should also be required**

**to demonstrate that (and how) they will provide more timely notifications to these parties regarding planned rig movements.**

5) **It is recommended that operators be required to demonstrate concrete, measurable steps to minimize light attraction effects on migratory birds, including the following (which include some measures covered in Section 4.5 above, along with several additional mitigation and monitoring requirements):**

   a. Reduce the amount of artificial lighting by adjusting the intensity, duration and frequency of the artificial lighting to the extent possible without compromising safety;
   b. Document any changes made to lighting regimes to allow for an evaluation of the effectiveness of the mitigation on light attraction;
   c. Support/conduct research to identify changes in light spectrum, type, and/or intensity that may further reduce attraction for storm-petrels and other seabirds;
   d. Notify the C-NLOPB at least 30 days in advance of non-emergency flaring to allow the Board to determine whether flaring would occur during a period of migratory bird vulnerability and determine how the operator plans to avoid adverse environmental effects on migratory birds;
   e. In order to reduce effects on birds and associated air emissions, limit flaring to the length of time required to characterize the wells' hydrocarbon potential and as necessary for the safety of the operation;
   f. Minimize the number of flaring events, to the extent feasible, during nighttime and poor weather conditions, as well as during seasonal periods of bird vulnerability; and
   g. When flaring occurs, have a dedicated Seabird Observer monitor and document bird behaviour around the flare, and assess the effectiveness of flare shields and water curtains in mitigating flare-bird interactions, as applicable.

6) **In addition to observer-based monitoring (see above), operators should incorporate new technologies (e.g. radar, infrared imaging, high definition aerial surveys, telemetry studies, etc.) as they become available into their seabird monitoring programs to complement research on, and mitigation of, light attraction.** Outcomes of this enhanced monitoring could include:
   a. Greater ability to quantify the cause and effects of light attraction
   b. Guidance on the development of mitigation strategies
   c. Establishment of tools required for monitoring effectiveness of mitigation.

7) **It is recommended that operators include general awareness regarding seabird strandings as part of their overall training / orientation programs for offshore workers.**

8) **It is recommended that ECCC-CWS develop, in consultation with industry, protocols for systematic surveys of stranded birds on offshore platforms and vessels, and work with operators to implement these protocols on offshore platforms and vessels.**

### 4.6.2 Identifying and Implementing Additional or Enhanced Requirements

No federal or provincial government department or agency has established or proposed particular areas or times which should be excluded from future exploratory drilling activities in the Study Area. Nor has any such authority provided any basis (through information or analysis) upon which to define specific locations, times or other

situations where particular, additional or enhanced mitigation or follow-up requirements should be applied to future drilling activities in this region. Other interests have suggested establishing exclusion zones in the Study Area, but have not provided a supporting scientific basis for their identification. The respective regulatory authorities did not support these suggestions at this time (although a recommendation around additional analysis for future exploratory drilling activities in the Northeast Newfoundland Slope Marine Refuge is provided below).

***Consequently, the Committee is not recommending that any portions of the Study Area be excluded from exploratory drilling activities at this time.***

Through its analysis and engagement activities, the Committee has, however, identified and considered a number of areas that have been defined through previous scientific processes as being of particular importance and potential sensitivity, and for which it feels that a precautionary approach is particularly warranted. In some cases, these identified "special areas" have restrictions in place for other types of human activities within them (such as bottom-contact fisheries) but offshore oil and gas activities are currently permitted.

9) **The Committee recommends that for any future exploratory drilling activities in the Study Area that are proposed to occur within a currently defined Marine Refuge (DFO) or a Northwest Atlantic Fisheries Organization (NAFO) Fisheries Closure Area, any exemption from the federal Impact Assessment process (see Section 8.1) be contingent on the operator demonstrating that any risks to intended biodiversity / conservation outcomes of that area will be avoided or mitigated**

   **Specifically, it is recommended that the operator be required to outline, in its project notification to the Impact Assessment Agency of Canada (IAAC), its plans (to be developed in consultation with DFO) to address any effects of these activities on the various environmental characteristics and sensitivities present within the special area(s). In the case of a Marine Refuge, it is recommended that the operator be required to provide evidence in that submission that the Minister of DFO is satisfied that that risks to intended biodiversity outcomes are avoided or mitigated as per existing DFO policy, and that this determination by DFO be made on clearly defined criteria which should be clearly referenced in the above noted documentation.**

Through its analysis, the Committee has also identified parts of the Study Area where there is a significant lack of available information. While the availability and quality of environmental information varies considerably across different components and locations, there is a particular scarcity of data in the easternmost (abyssal) portions of the Study Area. The Committee understands that, while it is not possible to know with certainty where there will be future exploratory interest by the oil and gas industry, and possible future calls for bids by the C-NLOPB, various factors (such as the availability of geophysical data for these areas) makes it unlikely that they will be subject to proposed exploratory drilling activity in the reasonably foreseeable future.

10) **It is recommended that the C-NLOPB specifically consider overall information availability, data gaps and associated environmental risks in future decisions around whether and when to issue licences in these data deficient areas as part of its scheduled land tenure process.**

11) **For each of the various types of identified special areas found within the Study Area (Marine Refuges, Fisheries Closure Areas, Ecologically and Biologically Significant Areas (EBSAs), Sensitive Benthic Areas (SiBAs), Vulnerable Marine Ecosystems (VMEs), it is recommended that the relevant authorities accelerate scientific review and analysis of these areas to determine if their various components and characteristics warrant additional protection, mitigation or follow-up measures for any future exploratory activity that may take place within them.**

The Committee also recognizes that the establishment of special areas in the Study Area is an on-going process, which may see new areas or types of areas being designated, whereas others may be removed or otherwise changed in the future. This should be considered and incorporated as part of planned future updates to the Regional Assessment. Moreover, the above described proposed requirements may also be revisited during future annual updates to the Regional Assessment based on new information that becomes available and is incorporated, and/or as additional analysis around exploratory drilling effects and mitigation are completed by the relevant authorities.

### 4.6.3 Identifying Other Initiatives and Requirements

12) **For any proposed exploratory drilling projects in the Study Area that do not require project-specific impact assessment under the *Impact Assessment Act* as a result of this Regional Assessment, it is recommended that the C-NLOPB continue to ensure that adequate and appropriate modelling is completed or otherwise in place regarding: a) drill cuttings and their dispersion, and b) the predicted fate and behaviour of potential petroleum spills, and that these be included as part of its authorizations and approvals processes for the drilling program in question.**

13) **As part of the notification of Indigenous groups in the event of an offshore spill, it is recommended that the C-NLOPB require that operators include any associated imagery around the nature and extent of the spill, and information on any affected marine biota.**

The Committee understands that DFO has initiated a review of the potential effects of offshore exploratory drilling activities on sensitive benthic environments (i.e., corals and sponges), and of relevant avoidance and mitigation measures and follow-up programs, which will be reviewed under the Canadian Science Advisory Secretariat (CSAS) process in early 2020. This review will form the basis of specific guidance for the protection of corals and sponges, to be implemented during future exploratory drilling programs offshore Newfoundland and Labrador.

14) **The Committee recommends that once DFO's forthcoming additional guidance on mitigating effects to corals and sponges has been developed and released, these measures be incorporated into a future update of this Regional Assessment.**

The Committee also understands that DFO has been working with other organizations to better understand how underwater noise affects marine species and the associated mitigation of the effects of seismic sound in the marine environment. In 2007 the Government of Canada introduced the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (SOCP), which sets out minimum standard mitigation requirements for seismic survey operations in Canada in an effort to mitigate potential negative

population-level effects on marine species. Since that time, there have been advances in knowledge on such effects, and DFO has undertaken a scientific review process to review and evaluate recent published scientific information (including guidelines, protocols, and science advice) applicable to the development of mitigation measures in the SOCP. In light of this new information, the Committee understands the Department is evaluating whether to update the SOCP.

15) **Should the SOCP be revised as a result of DFO's on-going review of it, it is recommended that any new mitigations/standards be included in future update of this Regional Assessment.**

Chapter 8 provides a summary of the main outcomes and recommendations resulting from the Regional Assessment.

The Committee notes that the development of the GIS decision support tool will only remain a worthwhile investment if governments continue to support its evolution. This should extend beyond simply updating the existing datasets to include accessing the best available scientific information and data in support of decision making processes. The tool must also be used for other related purposes such as assigning the relative risk of different drilling proposals based on the valued components potentially at risk. Necessarily, these risk assessments should be integral to government's decision making related to the selection of land for licencing under the scheduled land tenure process. Initially these risk assessments may be qualitative in nature but should quickly become quantitative. This can be achieved through convening an independent scientific review panel consisting of government and university experts to assign relative quantitative risk values for different ecological units in the offshore.

Assigning risk was beyond the timing and resources of the Committee but remains a fundamental requirement to guide future decision making around the sustainable use of offshore resources. The GIS decision support tool for the first time puts within the hands of resource managers a means to identify and analyze the multitude of factors at play in this region. This task is a priority given the expected pace of future petroleum exploration and development.

### 4.6.4 Regional Assessment Oversight Committee

The importance of developing and maintaining a "living and "evergreen" Regional Assessment was often raised during Indigenous and stakeholder engagement sessions. The opportunity to review and update new information, including scientific data, Indigenous Knowledge, industry changes and regulatory reform was identified as a key priority, as was creating a mechanism to guide the future development and use of the Regional Assessment into the future.

16) **The Regional Assessment Committee recommends establishing an Oversight Committee to ensure that new information is identified and examined on an annual basis to determine its applicability to offshore exploratory drilling, and to ensure that the Regional Assessment remains current and valid into the future. It is also recommended that the Oversight Committee have representation from Indigenous groups, environmental groups, the fishing and oil and gas industries and others. Indigenous communities clearly articulated the need for such a committee with Indigenous representation.**

The Committee recommends that the Impact Assessment Agency of Canada (IAAC) take the lead on establishing the Oversight Committee. The primary mandate of that Committee will be to provide an ongoing and consistent oversight and advisory function for using and updating this Regional Assessment. The Oversight Committee should report to senior representatives of each of the parties that were signatories to the Regional Assessment Agreement, and be supported by IAAC staff. While it is recognized that the role of this Oversight Committee will likely evolve, it is recommended that its initial establishment and Terms of Reference should include the following.

Members of the Oversight Committee should be selected using a merit-based application process and include representation from the fishing industry, oil and gas industry, Indigenous governments / organizations and environmental groups. The Oversight Committee should have established links with other IAAC committees including the Indigenous Advisory Committee and the Technical Advisory Committee on Science and Knowledge.

The Oversight Committee should be involved in the following:

a) An annual review and update of the Regional Assessment including any associated updates to the Ministerial regulation (as required).
b) Reviewing and incorporating any and all new publications and other information sources and data that would be relevant to offshore exploratory drilling activity in the Study Area and its effects, including industry, governmental and academic research activities.
c) Annually track and report the progress of the implementation of the Regional Assessment recommendations.
d) Oversee the maintenance and further development of the GIS decision-support tool, including its associated datasets and analytical functionality and its associated use by relevant regulatory and resource management agencies in future risk analysis and environmental protection planning.
e) Review, evaluate, and provide advice on the IAAC's overall Regional Assessment procedures and policies, as informed by any associated lessons learned through the completion of this Regional Assessment, as well as the manner and effectiveness with which the assessment is being used to inform decision-making.

The Oversight Committee should submit an annual report to the Ministers by December 31st of each year.

The establishment of the Regional Assessment Oversight Committee will provide the IAAC and others with the necessary mechanism to ensure the Regional Assessment remains valid and up to date, and is fulfilling its intended function of informing decision-making.

# 5 CUMULATIVE EFFECTS

The effects of an individual project or activity can overlap and interact with each other and with other natural and anthropogenic disturbances in a region to bring about cumulative effects, which have been defined as "a change in the environment caused by multiple interactions among human activities and natural processes that accumulate across time and space" (CCME 2014). A cumulative effects assessment involves attempting to understand and address the overall (total) effects to a component or system resulting from all relevant past, present and reasonably foreseeable activities and other sources of perturbation and change in a region.

Cumulative effects are inherently difficult to assess and manage (Piper 2001; Foley et al 2017), particularly through individual project-specific assessments and decisions (Bonnell and Storey 2000; Cooper and Sheate 2004; Duinker and Grieg 2006). Regional Assessments are, however, often considered to offer a more comprehensive and proactive approach to considering the cumulative effects of multiple, independent activities and disturbances in a region by informing better planning and decision-making processes (Harriman and Noble 2008; CCME 2009; Gunn and Noble 2009; Duinker et al 2012).

This Regional Assessment considers the overall effects of past, on-going and future exploratory drilling activities in the Study Area. This includes cumulative effects resulting from the total effect of multiple drilling programs in the region over time, as well as from the effects of exploratory drilling in combination with those of other types of human activities and sources of environmental change. This includes consideration of the following factors and concepts, which have long been considered to form the basis for a causal model of cumulative effects: 1) sources of effect, 2) processes of effect accumulation, and 3) resulting types of cumulative effects (Spaling and Smit 1993).

The objective of this component of the Regional Assessment is to identify any potential issues with regard to cumulative effects at the regional scale and at an early stage, in order to help facilitate their consideration and future management through appropriate planning processes.

## 5.1 Sources of Cumulative Effects (Past, Present and Future Activities and Influences)

The marine environment of the Study Area has been, and continues to be, affected by a variety of natural and anthropogenic influences. These include (Table 5.1): past and on-going petroleum exploration (drilling, seismic and others) and production (Hibernia, Terra Nova, White Rose and Hebron) activities; commercial fishing (both domestic and international) (Section 3.3 and Module 6); general vessel traffic within and through the area (Section 3.3 and Module 6); and other human activities (both planned and routine, and illegal activities and accidental events), as well as the effects of climate change and other natural and human-induced disturbances. These have all collectively influenced the presence, distribution, abundance, and health of marine biota in the Study Area (Section 3.2 and Module 5), as well as the nature, intensity, distribution, timing and value of human activities such as commercial fisheries (Section 3.3 and Module 6). The effects of previous and on-going activities and other sources of environmental change are thus reflected in the existing (baseline) conditions of the Study Area, as well as influencing the overall sensitivity or resiliency of a particular component or system to further disturbance.

**Table 5.1 On-Going and Future Projects and Activities in the Study Area**

| Project / Activity | Description and Spatial and Temporal Considerations |
|---|---|
| Hibernia Oilfield | • Discovered in 1979, the Hibernia Oilfield is operated by the Hibernia Management and Development Company Ltd. (HMDC), and is located approximately 315 km east-southeast of St. John's, NL.<br>• The development phase of that project commenced in late 1990 and continued until the mating of the GBS and its topsides at Bull Arm NL in 1997, after which the platform was towed to and installed at its site on the Grand Banks in June of that year and commenced production in November 1997.<br>• With current estimated recoverable reserves of approximately 1.64 billion barrels, commercial production from the Hibernia field commenced in November 1997 and is on-going.<br>• In recent years, the project has been further expanded to include the Hibernia South Extension Unit, from which production commenced in 2011.<br>• On June 26, 2019, HMDC spud a delineation well in the North West Wedge part of the field. HMDC Hibernia K-39 was followed by a sidetrack well K39Z in August. The results remain privileged until December 2019.<br>• Based on approved development plans for this development, it is expected to continue until 2047. |
| Terra Nova Oilfield | • Discovered in 1984 and declared a significant discovery in 1985, this oilfield has reserve estimates of approximately 500 million barrels of recoverable oil.<br>• The Terra Nova Project is currently in operation by Suncor Energy Inc. using a floating production storage and offloading (FPSO) vessel, and is located approximately 350 km southeast of St. John's and 35 km southeast of Hibernia.<br>• Dry-dock construction of the Terra Nova FPSO vessel began in early 1999, and it arrived at Bull Arm in May 2000 where outfitting, hook-up and commissioning of the vessel took place.<br>• The FPSO arrived at the oilfield in August 2001 and began producing oil in January 2002.<br>• Based on approved development plans for this development, it is expected to continue until 2031. |
| White Rose Oilfield and Extensions | • Discovered in 1984, a significant discovery licence for the field was issued in January 2004. It is located about 350 km east-southeast of St. John's, and 50 km from the Hibernia and Terra Nova fields.<br>• Husky Energy is the Operator and majority owner of the White Rose field and satellite extensions. First oil was produced on November 15, 2005.<br>• Estimated recoverable reserves include approximately 400 million barrels for the White Rose Oilfield and Extensions and 64 million barrels for the North Amethyst field<br>• The original White Rose field was developed using subsea technology, consisting of three drill centres tied back to an FPSO vessel. Production is provided by subsea wells in the Southern and Central drill centres while surplus gas is re-injected into the Northern Drill Centre for future extraction. The North Amethyst and South White Rose extensions all produce back to the SeaRose FPSO.<br>• The West White Rose Project will access further resources to the west of the field, using a fixed rig tied back to the existing SeaRose FPSO. First oil is expected in 2022.<br>• Based on approved development plans for this development, it is expected to continue until 2031. |
| Hebron Oilfield | • First discovered in 1980, this oilfield is estimated to contain more than 700 million barrels of recoverable resources. |

| Project / Activity | Description and Spatial and Temporal Considerations |
|---|---|
| | • The Hebron Platform was towed to field in June 2017. The project is designed for an oil production rate of 150,000 barrels of oil per day.<br>• First oil from the Hebron Project occurred in late November 2017.<br>• Based on approved development plans for this development, it is expected to continue until 2047. |
| Bay du Nord Oilfield (Proposed) | • Equinor Canada Ltd. and its partner Husky Oil Operations Limited continue to evaluate development of the Bay du Nord project consisting of the Bay du Nord (2013), Bay de Verde (2015) Baccalieu (2016) discoveries.<br>• This development has an estimated recoverable resource of 300 million barrels with potential first oil in 2025 and an estimated production life of 12-20 years. |
| Offshore Petroleum Exploration – Seismic / Geophysical | • Past oil and gas exploration activity in the Study Area has also included the collection of approximately 499,549 line km of two-dimensional (2D) and 133,201 $km^2$ of three-dimensional (3D) seismic data from 1964 to 2019 (see Modules 1 and 2).<br>• As part of this Regional Assessment, the C-NLOPB has completed an assessment of historical seismic acquisition in the Study Area to help predict potential future seismic acquisition over the 2020-2028 period (see below, and Module 15).<br>• Total 2D and 3D seismic acquisition projections for the 2020-2028 period were derived from historical statistics for annual rates of seismic acquisition. Given the cyclic nature of acquisition, modern (post implementation of Scheduled Land Tenure) and historical rates were compared. Using historical statistics, a projected total of 80,289 km of 2D and 29,970 $km^2$ of 3D seismic data could be acquired during the 2020-2028 period.<br>• Using post implementation of Scheduled Land Tenure statistics, a projected total of 136,140 km of 2D and 82,293 $km^2$ of 3D seismic data could be acquired during that time period.<br>• Given that the Study Area has excellent seismic coverage, it is likely that acquisition over the 2020-2028 period will be focused on 3D acquisition and/or Controlled Source Electromagnetic (CSEM) surveys over exploration licences on offer or acquired in a Call for Bids. |
| Commercial Fishing Activity | • Commercial fisheries in the Study Area are extensive and diverse, and are undertaken by variety of participants, including both Canadian and international fishing vessels, and involve a range of species and gear types at different locations and times throughout the region.<br>• Within the Study Area, a great deal of the commercial harvesting activity within the exclusive economic zone (EEZ) takes place along the slopes of the Continental Shelf.<br>• The geographic extent of this fishing activity extends along the Northeast Newfoundland and Labrador Shelf near the Orphan Basin, down through the Flemish Pass and along the tail of the Grand Banks. Relatively high levels of fishing activity in recent years have taken place along the tail of the Grand Banks, along with some areas of the Grand Banks within 3L closer to the Island of Newfoundland (Section 3.3.1 and Module 6).<br>• Outside of the EEZ, commercial fishing effort is concentrated primarily along parts of the Flemish Cap and adjacent slope areas. The tail of the Grand Banks is also an area that has been subject to considerable fishing activity by international parties in recent years (Section 3.3.1 and Module 6). |
| Marine Vessel Traffic | • Marine traffic occurs throughout the Study Area, primarily as a result of international shipping vessels moving throughout the Atlantic Ocean, including within the Study Area.<br>• Mapping is available showing overall shipping density based on recorded vessel movements throughout offshore Newfoundland and Labrador (DFO 2019).<br>• The available data show that high intensity shipping lanes occur along the south coast of the Island of Newfoundland, and between the Avalon Peninsula and the Grand Banks. This likely represents vessel movements from St. John's Harbour to the producing oil and gas |

| Project / Activity | Description and Spatial and Temporal Considerations |
|---|---|
| | platforms. There are also shipping lanes into Placentia Bay, which include tanker traffic to and from the existing oil refinery at Come by Chance.<br>• There is also a public website that displays marine traffic density (Marine Traffic 2019), which contains data from global ship positioning and movements.<br>• This source shows that the southern portions of the Study Area have relatively high density traffic lanes associated with international shipping. High density lanes also occur between the producing oil fields and the port of St. John's, along with Placentia Bay,<br>• There are also relatively high densities of vessels along the continental shelf and Flemish Cap, likely associated with fishing activity.<br>• Figures provided in a later section provide an overview of offshore marine traffic in the Study Area. |
| Offshore Lighting | • Artificial lighting offshore Newfoundland and Labrador is comprised primarily of lighting from vessels, and offshore installations and other infrastructure.<br>• A light pollution map is available online that identifies light sources globally based on nighttime satellite images (Falchi et al. 2016; Light Pollution Map 2019).<br>• This map (included in the GIS decision-support tool) illustrates that the primary sources of offshore light within the Study Area are associated with the four producing oil fields, which are flaring as they produce oil.<br>• The mapping also shows that there are no other significant sources of light within the Study Area.<br>• Figures provided in a later section provide an overview of offshore lighting in the Study Area. |

### 5.1.1 Marine Fish and Fish Habitat

There have been considerable shifts in the nature, distribution and functioning of marine fish and fish habitat in the Study Area over the past several decades. This has included declines in groundfish species linked to changing water temperatures combined with overharvesting in the late 1980s into the mid-1990s (Kulka 2011; Christensen et al 2014; Nogueira et al 2017). This coincided with an increase in some prey species, including snow crab and shrimp, on the Grand Banks and Flemish Cap. These prey species have, in turn, seen recent declines in response to recovering groundfish stocks and other factors (Nogueira et al 2015, 2017). Commercial fishing efforts continue to influence commercial and non-commercial fish populations in the Northwest Atlantic (Edinger et al 2007; Clark et al 2016; Nogueira et al 2017), as well as affecting corals and sponges which are sensitive, habitat forming species that are distributed primarily on the slopes of the Grand Banks and Flemish Cap (Edinger et al 2007; Clark et al 2016; Guijarro et al 2016; Ragnarsson et al 2017). Oceanographic variability due to climate change has also had implications for all trophic levels, resulting in increased plankton and fish productivity during warm periods and the reverse in cold conditions (Drinkwater et al 2014).

These and other natural and human-induced changes in the marine environment have affected both the presence and distribution of marine fish and invertebrates in the Study Area, as well as the health of these populations and thus their potential sensitivity to further disturbance (Module 5). While some species are stable and appear to be increasing, others have seen rapid declines in recent years, as evidenced by relatively low biomass for Northern shrimp in parts of the Study Area and the resulting closure of commercial fishery for this species in some areas (Section 3.3 and Module 6). As also described previously (Section 3.2 and Module 5), there are currently four Species at Risk Act (SARA) (Schedule 1) listed and one NL Endangered Species Act (ESA) listed species that do or may occur within the Study Area, including striped (Atlantic), northern (broadhead) and spotted wolffish, as well as the white shark and the American eel. There are 30 species found in the North

Atlantic that have a conservation designation under these or other legislation and processes, for which various natural and anthropogenic factors and influences have affected these species and have contributed to their current "at risk" designations.

Past and on-going projects and activities have also affected marine fish and fish habitat in the Study Area, and have therefore had implications for the presence and health of these species in the region, including direct effects on fish resources and habitats through commercial fishing activity, as well as the various discharges and other disturbances associated with offshore oil and gas and marine vessel activity throughout the region. Table 5.2 provides an overview of previous, on-going and potential projects and activities which have or may affect marine biota in the Study Area, as well as some of the main potential effects that these may have on these VCs.

**Table 5.2 Other Projects and Activities and their Potential Effects on Marine Biota in the Study Area**

| Project / Activity | Potential Effects (On one or more Biological VCs) | | | | Key Activities and Disturbances Leading to Effects | Spatial and Temporal Considerations |
|---|---|---|---|---|---|---|
| | Change in Mortality / Injury Levels and Health | Change in Presence / Abundance and Distributions (Behavioural Effects) | Change in Habitat Use, Availability and Quality | Change in Food Availability or Quality | | |
| Oil Production Projects (Existing and Proposed) | • | • | • | • | • Seabed disturbance due to preparation and installation of subsea equipment and infrastructure.<br>• Discharges into the marine environment (e.g., treated produced water, bilge, deck drainage, grey / black water, others).<br>• Atmospheric emissions from operations / equipment use.<br>• Long-term presence and operation of equipment and infrastructure (including associated noise, lights, flaring, etc.).<br>• Noise, lights and other emissions and interferences from supply vessel and aircraft traffic.<br>• Possible accidental spills of oil or other materials. | • Current operations are concentrated in the Jeanne d'Arc Basin in the west-central part of the Study Area.<br>• These production projects and their associated effects are long-term in nature due to the operational lifespans of these developments. |

| Project / Activity | Potential Effects (On one or more Biological VCs) | | | | Key Activities and Disturbances Leading to Effects | Spatial and Temporal Considerations |
|---|---|---|---|---|---|---|
| | Change in Mortality / Injury Levels and Health | Change in Presence / Abundance and Distributions (Behavioural Effects) | Change in Habitat Use, Availability and Quality | Change in Food Availability or Quality | | |
| Offshore Petroleum Exploration – Seismic / Geophysical | ● | ● | ● | ● | • Release of sound energy pulses into the marine environment from seismic surveys<br>• Vessel traffic and associated noise, lights and other discharges. | • The often extensive survey areas covered by some types of offshore seismic surveys and underwater sound propagation can increase the potential for spatial interactions between their effects and those of other activities.<br>• Most seismic survey activities operate for a short period of time in any one location.<br>• While seismic programs are typically proposed as multi-year programs that can cover quite large offshore areas, the particular type and level of activity conducted each year can also vary and is usually a fraction of the overall scope assessed. |
| Offshore Petroleum Exploration – Drilling | ● | ● | ● | ● | • See Section 1.3 and Module 2 | • Drilling and other types of exploration activities are typically relatively short-term and localized activities.<br>• This can reduce the potential for individuals and populations to be affected simultaneously and repeatedly by multiple projects and activities<br>• While some of the emissions and associated effects of drilling are localized, others (such as underwater noise) can be quite extensive in nature. |

| Project / Activity | Potential Effects (On one or more Biological VCs) | | | | Key Activities and Disturbances Leading to Effects | Spatial and Temporal Considerations |
|---|---|---|---|---|---|---|
| | Change in Mortality / Injury Levels and Health | Change in Presence / Abundance and Distributions (Behavioural Effects) | Change in Habitat Use, Availability and Quality | Change in Food Availability or Quality | | |
| Fishing Activity | ● | ● | ● | ● | • Fishing leading to direct mortality of fish resources<br>• Use of fishing gear and resulting entanglement of marine birds or mammals<br>• Habitat alteration (bottom contact fisheries)<br>• Vessel traffic and associated noise, lights and other discharges (leading to attraction or avoidance behaviours) | • Commercial fishing activity in the Study Area is geographically extensive and diverse.<br>• These fisheries involve a variety of participants, species, gear types, and occur year round |
| Other Marine Vessel Traffic | ● | ● | | | • Vessel traffic and associated noise, lights and other discharges | • Occurs throughout the Study Area year-round.<br>• Vessel movements are highly transitory with limited environmental effects, minimizing potential effects in any particular location and time. |
| Hunting Activity | ● | | | | • Some types of marine birds (specifically, murres and waterfowl) can experience change in mortality / injury levels due to hunting. | • Although hunting is restricted to nearshore areas, some birds are highly mobile and individuals that occur in the Study Area may also be at risk of mortality due to hunting |

### 5.1.2 Marine and Migratory Birds

The waters off Eastern Newfoundland provide important habitats and feeding areas for various marine-associated birds, some of which breed along the province's coastline (Section 3.2 and Module 5). Although they do not regularly occur in the offshore environment, landbirds and shorebirds may pass through the area during spring and fall migration or during storm events. The distribution, abundance and health of marine and migratory birds and their populations are often influenced by both natural phenomena such as weather, food availability

and oceanographic variation, as well as human activities and their associated disturbances including hunting, fishing activity, vessel traffic, offshore structures and pollution. Past and on-going projects and activities have also affected marine and migratory birds in the Study Area (see previous Tables 5.1 and 5.2) and have therefore had implications for the presence and health of these species in the region, particularly through the artificial lighting, flaring and various marine discharges associated with offshore oil and gas activity and general marine vessel traffic throughout the region. In addition to any local disturbances, migratory bird species may also be affected by a variety of activities and associated effects within their often very extensive ranges, including hunting, pesticides and pollution.

In general, the populations of most marine-associated bird species occurring off Eastern Newfoundland are considered stable overall (Section 3.2, Module 5), although the Leach's Storm-petrel, for example, has seen considerable decline in recent years (Wilhelm et al 2015) as have some other species. That species is thought to be particularly vulnerable to the effects of offshore activities through attraction to artificial light sources resulting in collision and strandings. In addition, because they may forage hundreds of kilometres from the nest site during the breeding season (Pollet et al 2014) there may be risk of exposure of adults and eggs to oil from spills and routine discharges (Morandin and O'Hara 2016). There is no identified and designated critical habitat for avian species at risk within the Study Area, and Ivory Gull and Red-necked Phalarope are the only such species that have the potential to be found in the region on any regular basis. The Ivory Gull is generally associated with pack ice, and as such, it is more likely to occur in the northern portion of the Study Area.

### 5.1.3 Marine Mammals and Sea Turtles

The previous and potential effects of offshore projects and activities on marine mammals and sea turtles relate primarily to underwater noise, as well as other emissions and interactions which may affect these species and their habitats (Section 4.1 and Module 9). As a result of existing marine activities in the Study Area (see Tables 5.1 and 5.2) and naturally occurring oceanographic sounds, the region's underwater environment is likely already quite noisy at particular locations and times (Module 2). Marine mammals and sea turtles may also be affected by other natural factors and processes, as well as the disturbances which may be associated with other types of human activities in the marine environment. These include general vessel traffic and commercial fishing activity, which may result in effects due to vessel strikes, entrapment and entanglement in fishing gear, collisions with marine vessels, and through pollution and other environmental effects. The widespread and migratory nature of marine mammals and sea turtles increases the potential for individuals and populations to be affected by multiple disturbances in various locations, and thus, for cumulative effects to occur. This is reflected in the fact that many of the marine mammals and sea turtles species found in the Study Area have been designated (and are therefore protected) as species at risk or are otherwise of conservation concern (Section 3.2 and Module 5).

### 5.1.4 Special Areas

The current environmental conditions within the existing, identified special areas in the Study Area reflect the occurrence and effects of past and ongoing anthropogenic activities and natural processes within and beyond their boundaries, as well as those that may have affected the larger natural and socioeconomic features and processes that characterize and influence them. Special areas are identified and designated in order to recognize their importance or to protect particularly important or sensitive environmental components. In certain cases, this is based on the objective of conserving the presently pristine nature of these areas or to otherwise ensure

that important ecological processes and features are recognized and remain intact (eg, Ecologically and Biologically Significant Areas). In other cases, their designation is intended to help prevent further damage to already affected and sensitive environmental features and components (eg, Fisheries Closure Areas) (Section 3.2, Module 5).

The four existing offshore oil projects in the Study Area have well-defined footprints, which do not overlap directly with any existing special areas. Although some types of offshore activities such as exploratory drilling are typically relatively short-term and localized activities and associated disturbances, some environmental disturbances (such as under water noise) resulting from these activities can be quite extensive, as can other types of marine activities and their associated disturbances (such as seismic programs, marine vessel traffic, and commercial fishing activity) (Table 5.2). This can increase the potential for such activities to occur within or otherwise affect identified special areas.

### 5.1.5 Indigenous Communities and Activities

A number of Indigenous groups residing in Newfoundland and Labrador and in parts of the Maritime Provinces (Nova Scotia, New Brunswick, Prince Edward Island) and Québec have indicated interests and concerns related to the effects of exploratory drilling activities off Eastern Newfoundland, and have participated in the Regional Assessment (Chapter 2). Other past and on-going projects and activities in Eastern Canada have, to varying degrees, interacted with and affected Indigenous communities and activities, depending on their location, nature and scale in relation to the communities, activities and other components and interests of individual Indigenous groups. Given the overall distances between the Study Area and the various projects and activities within it (Table 5.1) and these Indigenous communities, there is limited potential for direct interaction between these effects and Indigenous communities and activities. Of key concern, however, is the potential for projects and activities in the Study Area to interact with and affect migratory marine-associated species that are used by or otherwise important to Indigenous peoples elsewhere in Eastern Canada.

### 5.1.6 Fisheries and Other Socioeconomic Components

Commercial fisheries off Eastern Newfoundland and elsewhere have seen important changes over the past decades, with the collapse in groundfish stocks and associated moratoria in the early 1990s and resulting shift in emphasis towards shellfish species. Continuing changes within the marine environment are affecting the availability of some key species such as Northern shrimp (Section 3.2), and as the marine environment continues to warm, fishers expect that they will be able to fish more for groundfish as well as a potential increase in the prevalence of high-value large pelagic species (swordfish and tunas). While the overall value of the commercial fishery in the Study Area has remained high in recent years, the effects of oil and gas related activities have been raised as a key area of concern by the fishing industry (Section 2.2).

The four existing oil and gas production projects off Eastern Newfoundland have established safety zones around them, which restrict access to defined areas for fishers and other ocean uses, and which are continuous and long-term in nature given the operational lifespans of these developments. Although the lengthy temporal scope of these operations and associated exclusions creates the potential for interactions with commercial fishers and other ocean uses, some of these projects have been operating since the 1990s and are thus an established and known part of the seascape offshore Newfoundland and Labrador. Safety zones from these fields and around active oil and exploration activities in the Study Area individually occupy a relatively small footprint in

comparison to available fishing areas off Eastern Newfoundland, with the latter being short-term and transitory at any one location. While these may individually result in direct disturbance to fishing activity, damage to equipment, and effects on marine resources or other disturbances, of particular concern is the potential cumulative effects of multiple projects and activities (and associated fisheries exclusions and interference) over time on a regional scale.

Other past and on-going projects and activities and other influences in Newfoundland and Labrador and elsewhere have likewise affected and contributed to the existing health and social and economic conditions of the province and other parts of Eastern Canada, an overview of which is provided in Chapter 7.

### 5.1.7 Atmospheric Environment

Existing ambient air quality within and around the Study Area can be generally categorized as good (Modules 2 and 14), but is likely occasionally and locally influenced by emissions from a variety of human activities within and beyond the Study Area, including offshore oil and gas exploration activities (seismic, drilling, and others), the operation of existing offshore oil production operations in the Jeanne d'Arc Basin (see Table 5.1), and other marine vessel traffic (including fishing vessels) in the area. While the atmospheric emissions from any individual project or activity theoretically have the potential to interact and accumulate with those from other sources, the short-term and transient nature of these activities and thus their air emissions, as well as the low levels of air emissions resulting from these activities, limits the potential for direct interaction (Module 14).

## 5.2 Potential Interactions and Accumulation of Effects

After identifying and considering the various current and potential future activities and other sources of environmental change in a region (Section 5.1), a cumulative effects assessment then evaluates the potential for such effects to overlap in space and time and/or to affect the same individuals or populations in a defined region. Individual effects can accumulate and interact in a number of ways to result in cumulative effects (Spaling and Smit 1993; Crain et al 2008):

1) *Additive Effects*: Where the total effect is equal to the sum of those that have contributed to it (eg, incremental loss of habitat, the combined area of fisheries exclusion due to multiple rigs and safety zones)

2) *Interactive (Synergistic) Effects*: Where the total effect is different in nature or degree from the sum of the individual effects that have contributed to it (eg, biomagnification of toxins, exceedance of ecological thresholds)

### 5.2.1 Spatial and Temporal Distribution of Drilling Activities and Effects

A number of factors serve to help prevent or limit the potential for offshore exploratory drilling activities and their effects from overlapping or otherwise interacting with those of other projects and activities in the Study Area.

There is, for example, a degree of natural separation between an individual drilling project and other oil and gas and unrelated activities in a region, due to a variety of regulatory and practical considerations. Drilling may only

take place in accordance with an Exploration Licence (EL) issued by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), which gives the operator the exclusive right to conduct exploration drilling within that geographic area for the defined time period. In addition, the required safety zones around an active drill rig, which the *Drilling and Production Regulations* require be at least 500 m from the outer edge of the installation, prohibits other marine activities from occurring in close proximity to these. There is also only a limited number of drill rigs worldwide that are capable of operating in the Study Area, and so overall rig availability also limits the potential for multiple drilling operations occurring simultaneously and in close proximity to each other. Finally, while a successful drilling campaign resulting in a hydrocarbon discovery is the objective of any such program, in reality the majority of wells drilled on any one EL do not result in such a find and therefore do not result in further exploration drilling within that immediate area (Modules 2 and 15). These factors can help reduce the potential for the effects of a drilling project to overlap with those of other nearby activities, and thus, for individuals and populations to be affected simultaneously and repeatedly by multiple projects and activities.

This typical separation of exploratory drilling activities in space and time is reflected in the statistics available from the C-NLOPB in its Schedule of Wells, which was updated in September 2019 (C-NLOPB 2019). These data indicate that there have been a total of 162 exploration and delineation wells drilled in the Study Area (approximately 733,600 $km^2$) to date (Figures 5.1 and 5.2), with a density of 0.0002 wells per square kilometer in the region. These wells were spudded between July 1971 and August 2019. Of these, 106 (66 percent) were exploration wells and 56 (34 percent) were delineation wells. The maximum number of wells drilled per year was 12, with an average of 3.3 wells drilled annually over this period (Figure 5.1). Historical information and statistics from the C-NLOPB indicate that approximately 0.74 exploration wells are drilled per EL in the Canada-NL Offshore Area (Module 15).

**Figure 5.1 Number of Exploration and Delineation Wells Drilled Per Year in the Study Area**

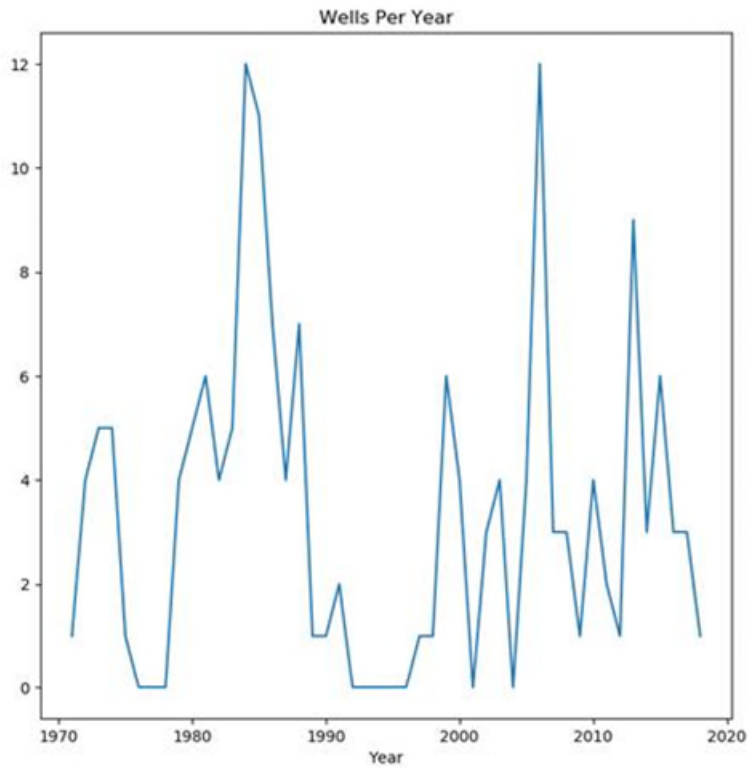
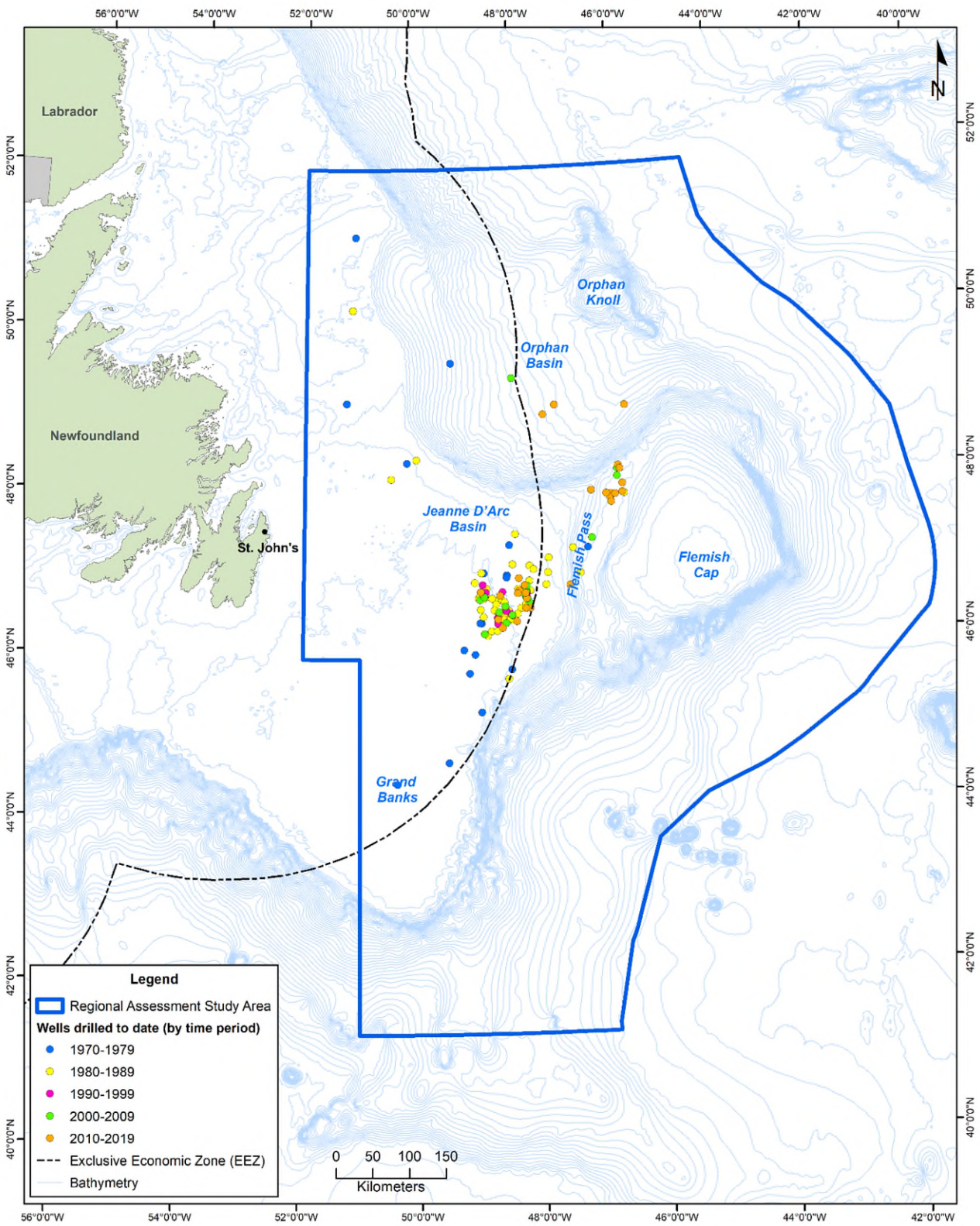


**Figure 5.2 Exploration and Delineation Wells Drilled to Date in the Study Area (By Decade)**



The available data also allow for a general analysis of the distances and time between individual wells. The graph below shows the distance (in km) and time (in years) between each such well and its closest neighbouring well in the Study Area, with further summary statistics presented in Table 5.3.

**Figure 5.3 Distances and Times Between Each Individual Well and the Closest Neighbouring Well in the Study Area (*Left* – All exploration and delineation wells, *Right* – Exploration wells only)**

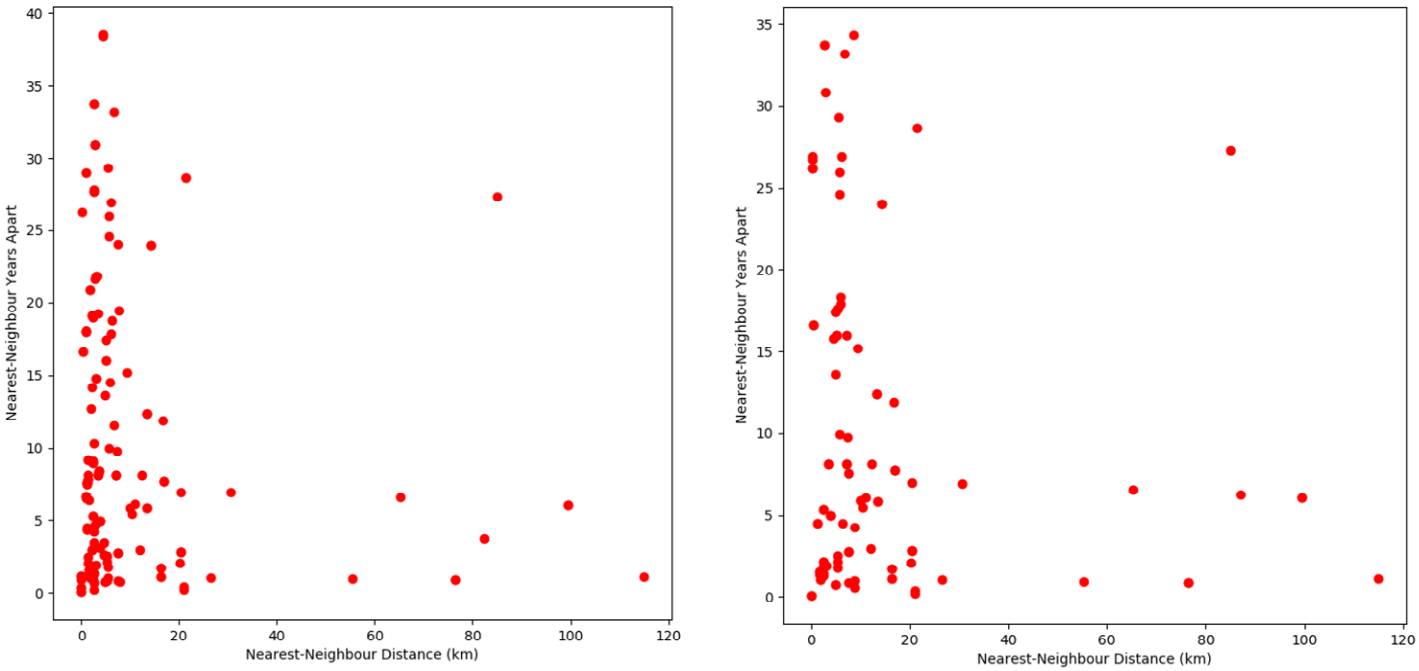



**Table 5.3 Summary of Well Proximity (Distance and Time) to Other Wells in the Study Area**

| Measure | # |
|---|---|
| # / % of wells with at least one well within 1 km | 10 wells (6 percent) |
| # / % of wells with at least one well within 5 km | 98 wells (60 percent) |
| # / % of wells with at least one well within 10 km | 125 wells (77 percent) |
| For wells with at least one well within 1 km: | 10 wells |
| Mean number of years between each well and all of those within 1 km of it: | 6.4 years |
| For wells with at least one well within 5 km: | 98 wells |
| Mean number of years between each well and all of those within 5 km of it: | 10.3 years |
| For wells with at least one well within 10 km: | 125 wells |
| Mean number of years between each well and all of those within 10 km of it: | 10.8 years |

The data also allow for calculations of the maximum number of wells drilled to date within certain sized areas in the Study Area and the temporal span within which these were drilled, as summarized in the table below.

**Table 5.4 Greatest Number of Wells Drilled within Various Geographic Areas Inside the Study Area**

| Radius (km) | Area (km$^2$) | Greatest Number of Wells Within that Area | Years Between First and Most Recent Well Within That Area |
|---|---|---|---|
| 1 | 3.14 | 5 | 2 |

| Radius (km) | Area (km$^2$) | Greatest Number of Wells Within that Area | Years Between First and Most Recent Well Within That Area |
|---|---|---|---|
| 2 | 12.6 | 8 | 10 |
| 5 | 78.5 | 16 | 22 |
| 10 | 314.2 | 26 | 24 |
| 25 | 1,963.5 | 46 | 35 |

The data therefore show that even where there is a spatial "clustering" of wells drilled in the Study Area to date, there is typically little temporal crowding (eg, wells within 1 km of each other show average temporal separation of 6.4 years), which potentially has implications for the amount of recovery time available to any affected environmental and socioeconomic components.

### 5.2.2 Effects, Interactions and Key Areas of Uncertainty

As described in Section 4.2, many of the effects of planned offshore exploratory drilling activities are often considered to be relatively low in magnitude and localized and short-term in nature, and therefore have a relatively limited spatial and temporal zone of influence. On the other hand, while there may be little potential for the direct "footprint" or other environmental disturbances resulting from exploratory drilling to extend to and accumulate with those of other projects and activities, some such disturbances (such as underwater noise from a drill rig's positioning system or Vertical Seismic Profile (VSP) surveys) may extend for tens of kilometers or more in certain situations. In addition, the often extensive areas covered by some types of marine activities and their emissions (e.g., offshore seismic surveys) can further increase the potential for spatial interactions between their effects and those of other projects and activities in the marine environment. It is also recognized that the widespread and highly migratory nature of some marine species and fisheries activities increases the potential for these components to be affected by multiple perturbations in various locations within a region.

These and other factors often make assessing and evaluating the cumulative effects of multiple activities in the marine environment quite challenging as a result of uncertainty stemming from incomplete information and knowledge around a number of key areas , including:

1) The nature, intensity, distribution and timing of future projects and activities and their effects (and thus, the potential for overlap).

2) The specific location, abundance and movements of certain marine species of concern (including affected individuals and populations) and of key activities such as fisheries (and thus their potential to be affected by multiple disturbances).

3) The current condition or health of specific species resulting from natural factors and/or from past and on-going disturbances and other influences.

4) The occurrence and persistence of effects in marine ecosystems and thus, their availability to accumulate with the effects of subsequent activities and disturbances, and

5) The response of some components and systems to multiple and accumulating sources of environmental stress (including the definition of any associated ecological thresholds). This includes the implications of

direct interactions and effects (such as contamination or habitat loss), but also of multiple and concurrent disturbance effects (such as repeated exclusion from key habitats during sensitive life history activities).

On the latter item, it has been noted that the concept of "ecological thresholds" is a key one in determining an ecosystem's response to multiple, accumulating sources of stress, but that these have been almost impossible to define on the basis of available science (Duinker and Grieg 2006; Duinker et al 2012).

With consideration of the inevitable complexity and uncertainty associated with assessing cumulative effects - including around the intensity, distribution and timing of future activities and their effects and possible ecosystem responses to these - the Committee's focus has again been on "planning" and "precaution" rather than "prediction" or any associated modelling of such effects (see Section 1.5). Specifically, the intent is to identify any particular areas of concern with regard to cumulative effects in the Study Area, and to provide recommendations around how these might be avoided or reduced through improved future planning.

## 5.3 Cumulative Effects Assessment

### 5.3.1 Future Exploratory Drilling Activity in the Study Area

Although it is rarely possible to define with any degree of certainty the nature, intensity and spatial and temporal distribution of future activities in a region for the purposes of assessing cumulative effects, the systematic development and consideration of potential scenarios of future activities is one approach upon which to base such an assessment (Duinker and Greig 2007; Duinker et al 2012). In order to provide an indication of the potential intensity and distribution of future exploratory drilling activity in the Study Area for the purposes of the Regional Assessment, the C-NLOPB completed an initial, predictive exercise, the methods and outcomes of which are provided in Module 15 and summarized below.

The analysis was conducted by the C-NLOPB using historical averages as a means to understand potential future activity levels. The focus of the exercise was to determine possible future exploration drilling based on typical drilling rates. Using the C-NLOPB's Scheduled Land Tenure System as a basis to predict Calls for Bids in the analysis period (2020-2028), Minimum, Medium and Maximum success rates were applied to each Call for Bids in order to calculate an estimate of active ELs in each scenario. Next, using the number of ELs forecast in each scenario, historical drilling averages were applied to generally predict the number of exploration wells that may be drilled. In terms of drilling, 53, 70 and 77 exploration wells were projected for the Minimum, Medium and Maximum Scenarios, respectively. The exercise also involved predicting the likely geographic distribution of these potential future wells for each of the Minimum, Medium and Maximum Scenarios. In general, a predominant area of activity was common to all three Scenarios, with the well concentration increasing from Minimum to Maximum. In all three Scenarios, exploration drilling activity is predicted to be higher in the Eastern Newfoundland and Jeanne d'Arc Regions, and lower in the North Eastern Newfoundland and South Eastern Newfoundland Regions (Figures 5.4 to 5.6).

It should be emphasized that all information and analysis presented in the projections of potential oil and gas activity is for illustrative purposes only and does not reflect planned or scheduled activities. Other methodologies and future forecasts could result in a different set of outcomes and configurations.

**Figure 5.4 Potential Exploratory Wells in the Study Area (2020-2028) – Minimum Scenario**

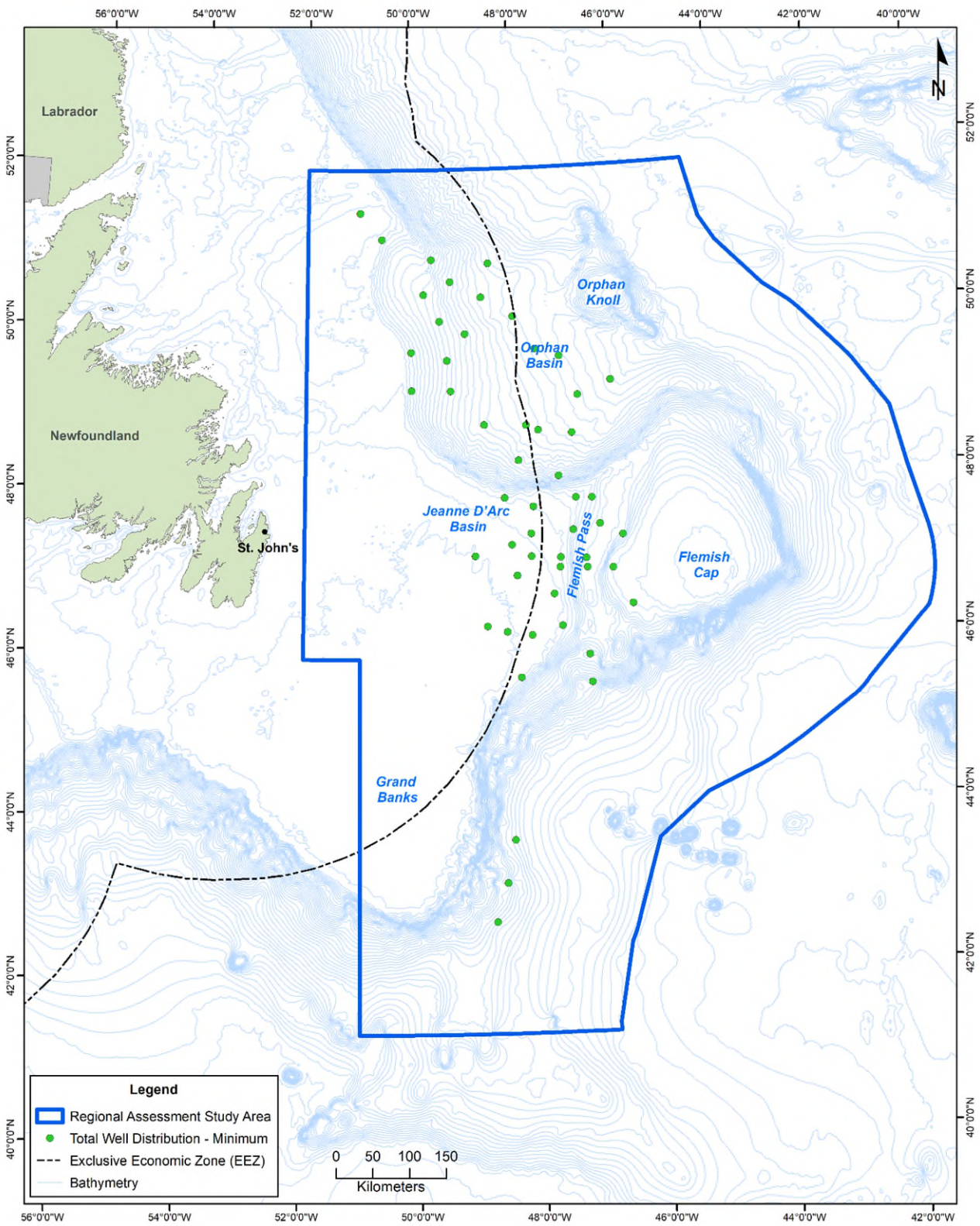


**Figure 5.5 Potential Exploratory Wells in the Study Area (2020-2028) – Medium Scenario**

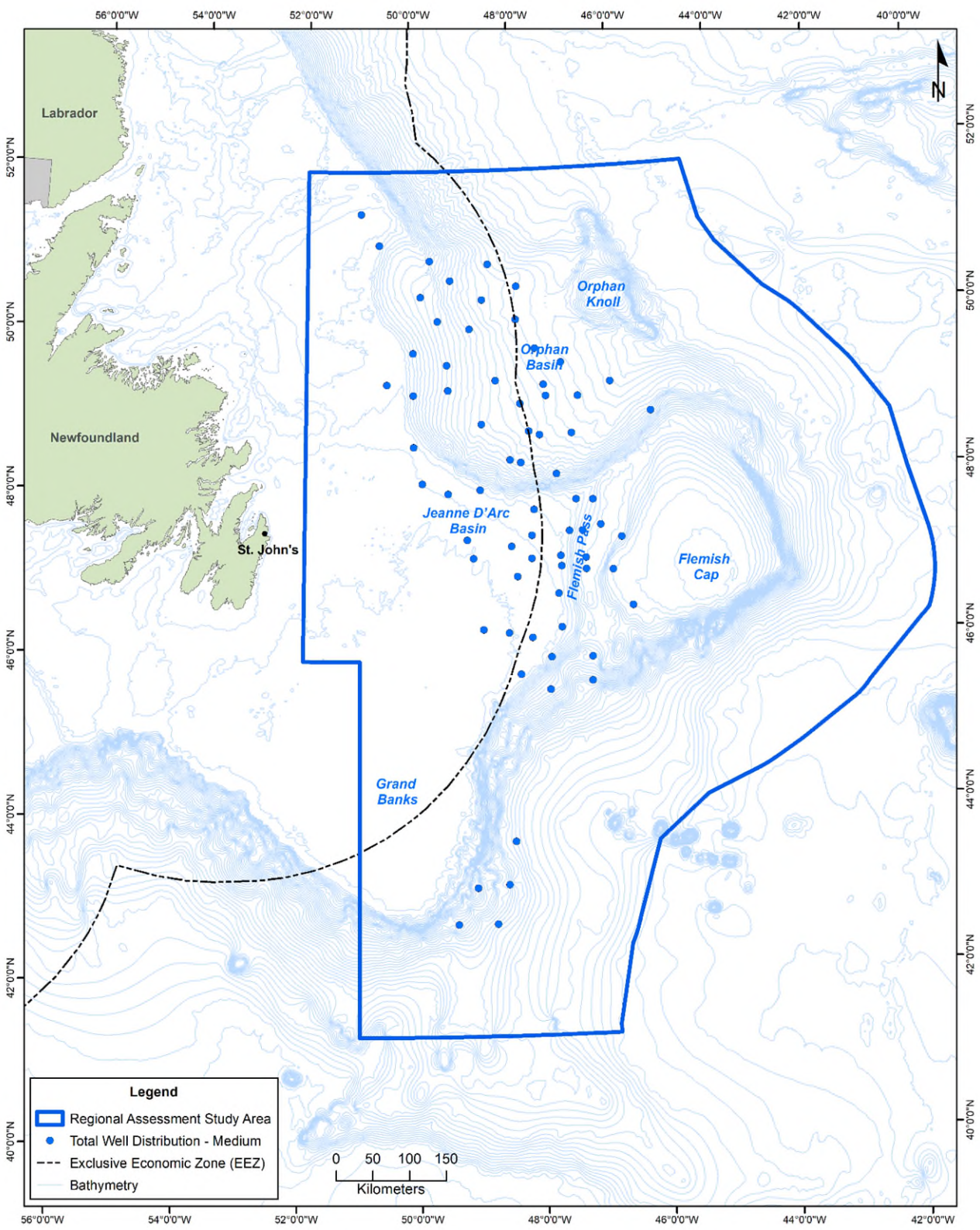
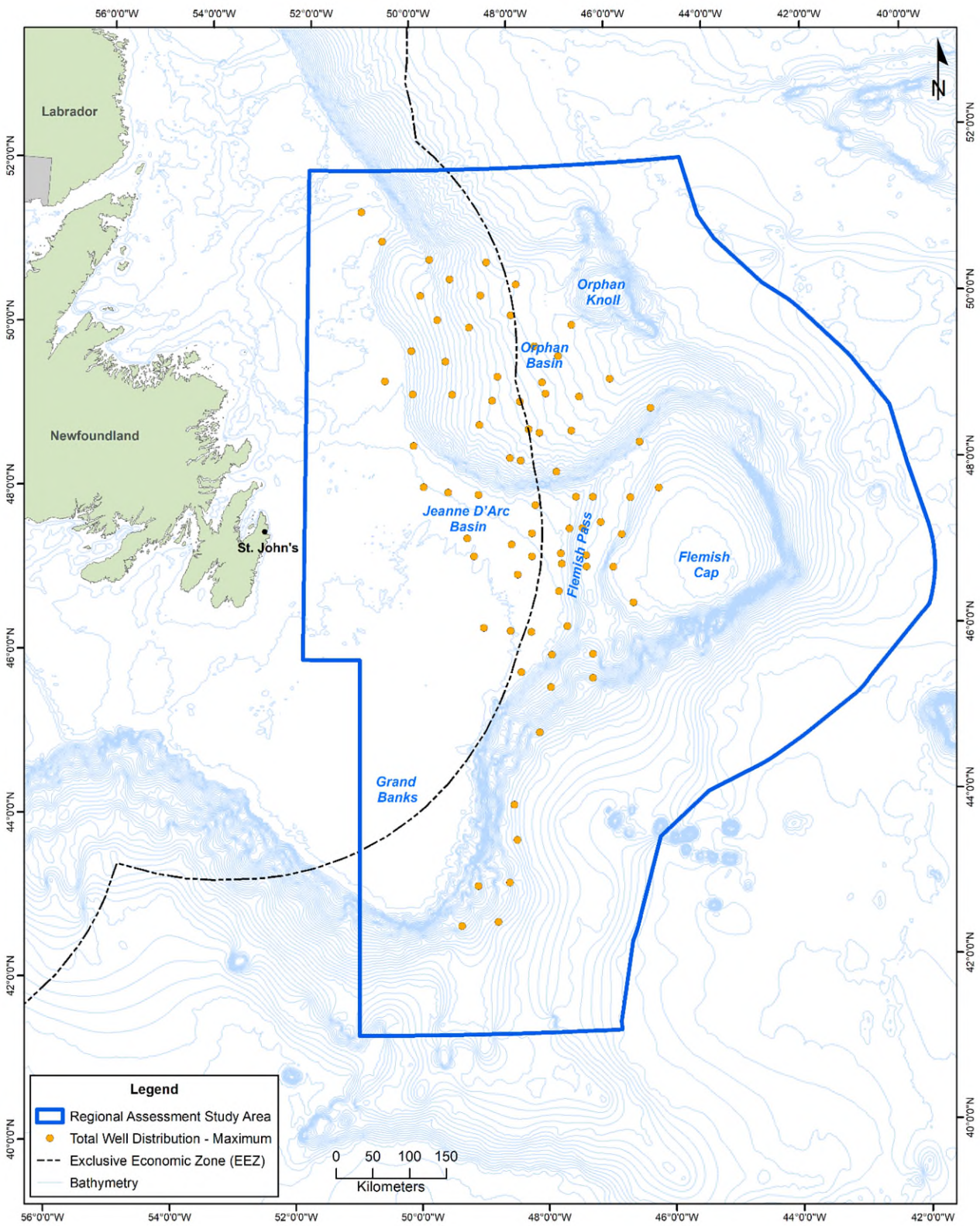


**Figure 5.6 Potential Exploratory Wells in the Study Area (2020-2028) – Maximum Scenario**



### 5.3.2 Potential Contributors to Cumulative Effects from Exploratory Drilling

As noted in Section 4.2, many of the effects of planned offshore exploratory drilling activities are often considered to be relatively low in magnitude and localized and short-term in nature, and therefore have a relatively limited spatial and temporal zone of influence. In other cases, however, environmental disturbances and associated effects from these activities can be quite spatially extensive or persistent in the marine environment, which increase the potential for interaction with other effects. Some of the main potential contributors to cumulative effects resulting from these activities, as identified by the Committee through its analysis and engagement activities are summarized in the table below.

**Table 5.5 Some Primary Potential Contributors to Cumulative Effects from Exploratory Drilling**

| Disturbances / Effects | Primary Receptor(s) | Spatial and Temporal Considerations |
|---|---|---|
| Drilling Fluids and Cuttings (seabed footprints) | Marine Fish and Fish Habitat | • Modelling completed for recent exploratory drilling projects in the Study Area indicates that the primary cuttings footprints (that is those with visible thicknesses on the order of 1 mm or above), generally extend from 100 m to 2,000 m from the wellsite (Modules 2 and 7).<br>• For those studies where probable no-effect thresholds (PNET) are reported, areas above a PNET of 1.5 mm thicknesses generally range from about 0.03 to 0.07 $km^2$ or distances that range from approximately 85 m to 550 m from the wellsite itself. A typical area might be considered to be about 250 m x 250 m. These areas are generally centred about the wellsite though sometimes they are offset by several hundred metres. Areas reported above a PNET of 6.5 mm range from about 0.01 to 0.06 $km^2$, or 55 m to 400 m, although generally not above 175 m (Modules 2 and 7).<br>• Visual surveys conducted using remotely operated vehicles after single exploration wells offshore Nova Scotia verified the zone of drill waste deposition to be generally consistent with predictive modelling, with the greatest evidence of deposition observed within 30 m (Stantec 2019) to 75 m (Stantec 2017) from the wellhead. Evidence of sediment deposition was observed out to approximately 325 m from the wellhead (Stantec 2019) and the distribution, species types, and relative numbers of macrofauna observed during post-drill surveys were similar to those observed during pre-drill surveys (Stantec 2016, 2017, 2019).<br>• Recovery of areas of biological effect from drill cuttings discharge varies considerably, as it is influenced by disturbance size and frequency, distance to source colonizers and local environmental conditions (Gates and Jones 2012).<br>• In most cases there is substantial recovery in the megabenthic community within one to four years after the discharge (Neff et al. 2000; Hurley and Ellis 2004; Jones et al. 2012; Ellis et al. 2012; Tait et al. 2016; IOGP 2016). However, benthic recovery is generally expected to take longer at greater depths and in colder waters due to lower rates of metabolism and growth (Gates and Jones 2012; Cordes et al. 2016; Henry et al. 2017). |
| Lighting | Marine and Migratory Birds | • The distance at which offshore lighting may be visible (and thus, its likely zone of influence for stranding) may be 5 km or more (Poot et al. 2008; Rodríguez et al. 2015).<br>• Visibility range is often influenced by lighting type, intensity and positioning (Reed et al. 1985; Jones and Francis 2003; Marquenie et al. 2008, 2013) and the |

| Disturbances / Effects | Primary Receptor(s) | Spatial and Temporal Considerations |
|---|---|---|
| | | highest risk of attraction occurs when poor weather (e.g., fog, precipitation, low cloud cover) coincides with bird migration periods (Wiese et al. 2001; Montevecchi 2006; Ronconi et al. 2015; Davis et al. 2017).<br>• Stranded bird monitoring studies between 2003 and 2014 from offshore production facilities and drill rigs offshore Newfoundland indicated strong seasonality to stranding events, with 95% of strandings occurring during September and October (Davis et al. 2017). |
| Underwater Noise (Drilling) | Marine Mammals and Sea Turtles | • The distance from an exploration drilling operation where sound levels exceed published thresholds for injury or disturbance of marine mammals depends on the specific source, animal hearing group, water depth, season and depth where measurements are made (Module 9).<br>• Acoustic modelling for an exploration drilling program in the Flemish Pass predicted that underwater sound from drilling activities could reach sound pressure levels that could induce behavioural effects in marine mammals as far away as approximately 57 km from the drill rig (Matthews et al. 2017).<br>• Similar modelling conducted for a drilling program offshore Nova Scotia predicted these sound pressure level thresholds could be reached more than 150 km away from the drill rig under certain seasonal oceanographic conditions (Zykov 2016). However, acoustic monitoring to validate this predictive modelling, which included deployment of acoustic recorders at varying distances from the drill rig, could not detect a signal from the drill rig 145 km away (Martin et al. 2019a) suggesting the predictive footprint of underwater sound may have been overestimated by the modelling.<br>• Measurements performed at the seabed during deep water drilling off Nova Scotia using the Stena IceMax found that sound levels 13 km away were well below the disturbance threshold (MacDonnell 2017) as were sound levels at the seabed 20 km from the West Hercules (Martin et al 2019b). These results agreed with acoustic propagation modeling predictions, and it is expected that sound levels measured closer to the sea surface would have been higher. |
| Underwater Noise (VSP) | Marine Mammals and Sea Turtles | • Vertical Seismic Profile (VSP) surveys generate short duration broadband impulse sounds with high peak source levels (220-255 dB re 1 µPa at 1 m) (Nowacek et al. 2007). VSP surveys usually take approximately one to two days to complete.<br>• Most studies suggest that if behavioural effects on fish from underwater sound are brief and outside a critical period, they are not expected to result in biological or physical effects (McCauley et al. 2000a, 2000b; Dalen 2007).<br>• However, the implications of measurable displacement of fish (as demonstrated in some studies measuring catch rates) are not fully understood (Streever et al. 2016). |
| Safety Zones (exclusion of other marine activities) | Fisheries and Other Ocean Uses | • Throughout the duration of an offshore drilling program in the Canada-NL Offshore Area, other marine vessel traffic is restricted within a defined area surrounding the drill rig as a safety precaution.<br>• As specified in the *Newfoundland Offshore Petroleum Drilling and Production Regulations,* this safety zone is usually the greater of either the area within a 500 m radius of the rig or, if the unit is anchored, a zone 50 m from the anchor pattern as per the requirements of the Collision Regulations under the Canada Shipping Act, 2001. |

| Disturbances / Effects | Primary Receptor(s) | Spatial and Temporal Considerations |
|---|---|---|
| | | • Although the specific timing and duration of work on any individual well can vary considerably, each well typically requires between approximately 45 to 160 days for drilling and evaluation (including potential well testing) and associated well abandonment or suspension. |

### 5.3.3 Other Projects and Activities in the Study Area

In addition to the predicted location and timing of future oil and gas exploratory drilling and associated activities in the Study Area described above, the cumulative effects assessment also considers other projects, and activities that may contribute to cumulative effects in the Study Area (see earlier Table 5.1). Where the particular locations and/or geographic extents of these other projects and activities are defined and known, this information is summarized in the Figures that follow, which also show the relationship of these to the predicted exploratory wells for the 2020-2028 period (Maximum Scenario).

### 5.3.4 Key Areas of Potential Activity and Effects Interaction and Overlap

Based on the scenarios of future exploratory drilling in the Study Area and the available mapping and other information pertaining to other projects and activities in the region (Figures 5.7 to 5.11), Table 5.6 highlights a number of areas where there is a potential for overlap between these activities, and thus, for which there is an enhanced potential for cumulative effects as a result of exploratory drilling projects in combination with other activities in the region.

**Figure 5.7 Locations of Existing and Proposed Oil Production Platforms in the Study Area in Relation to Predicted Exploratory Wells (2020-2028, Maximum Scenario)**

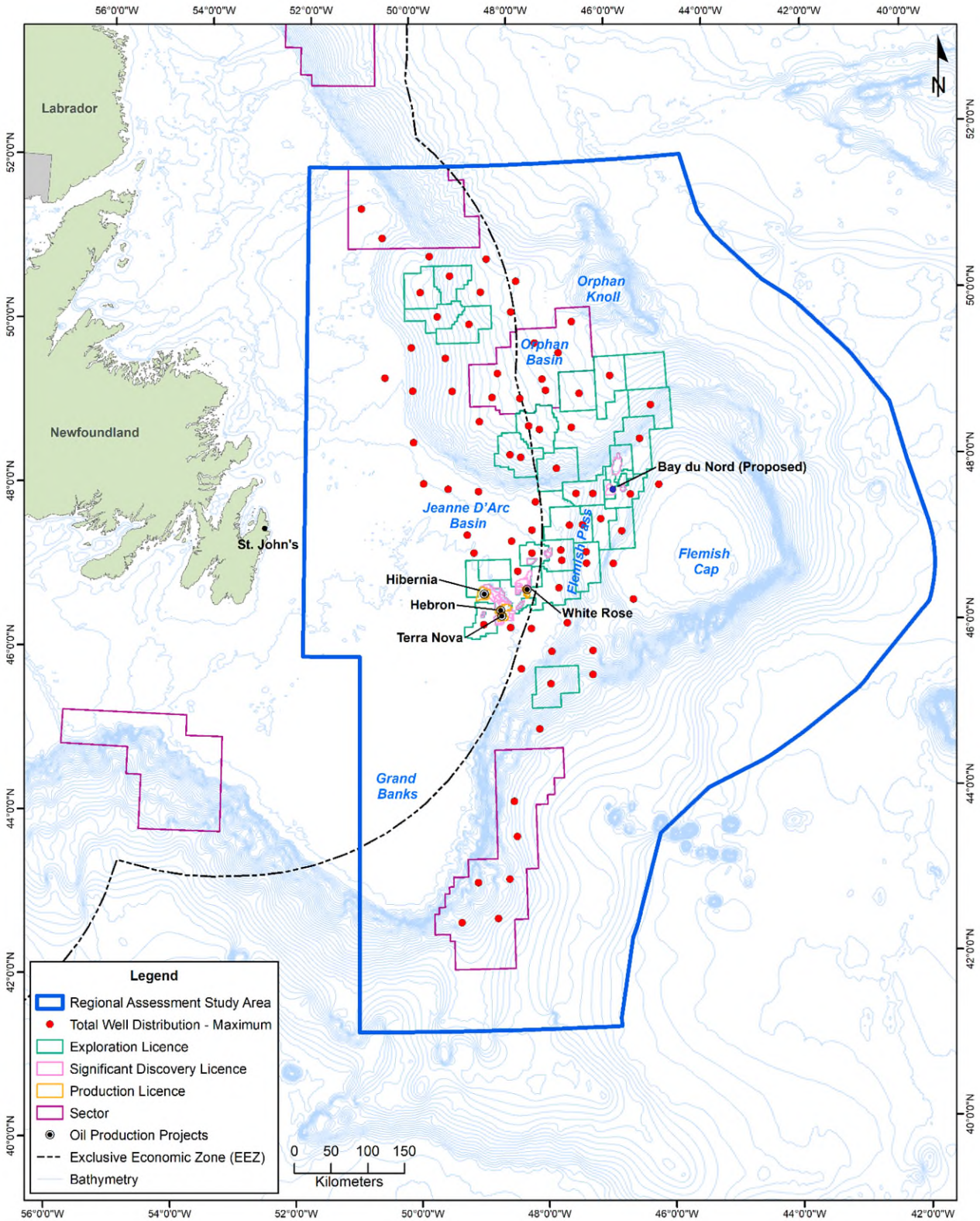


**Figure 5.8 Key Domestic Commercial Fishing Areas in the Study Area in Relation to Predicted Exploratory Wells (2020-2028, Maximum Scenario)**

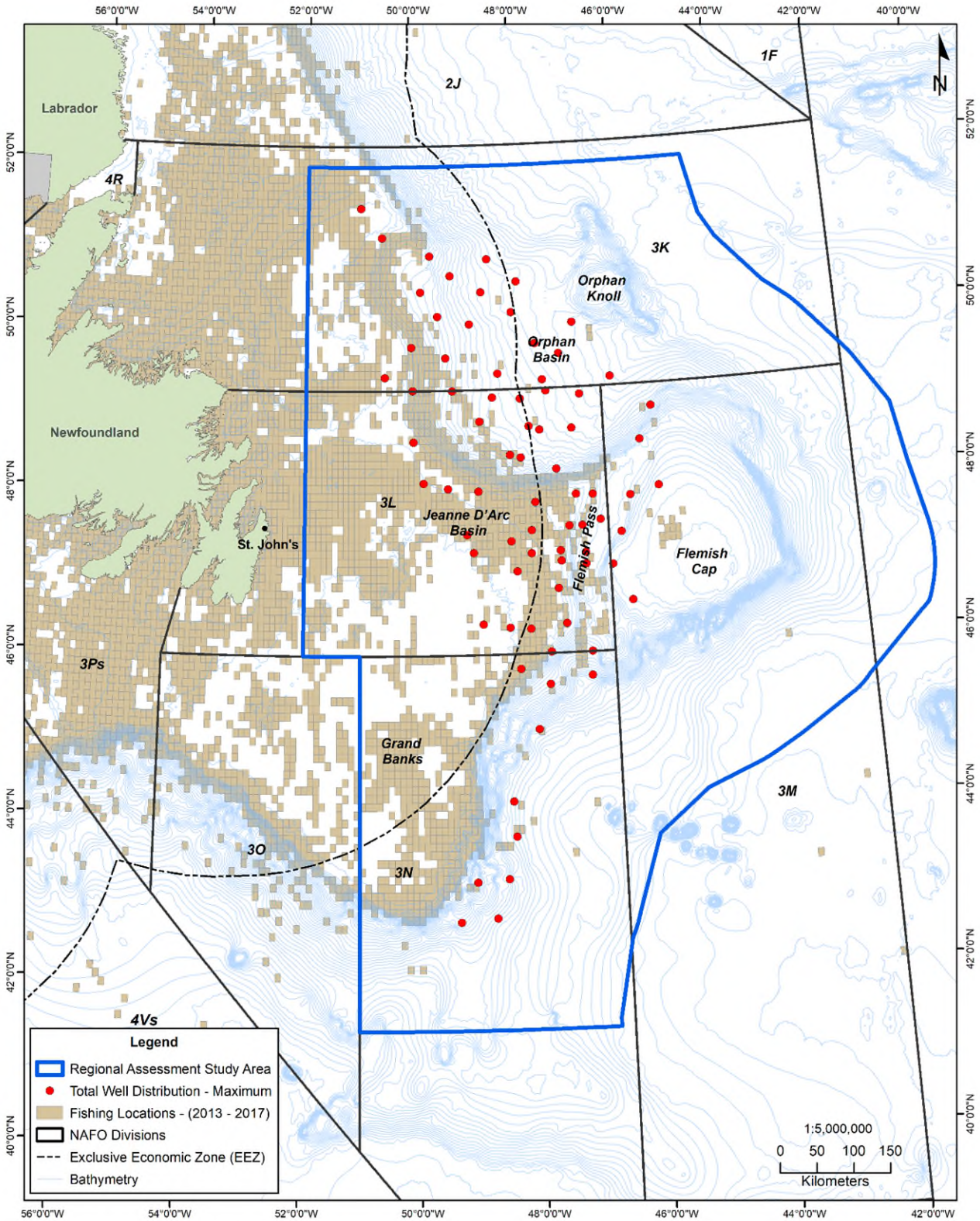


**Figure 5.9 Key International Commercial Fishing Areas in the Study Area in Relation to Predicted Exploratory Wells (2020-2028, Maximum Scenario)**

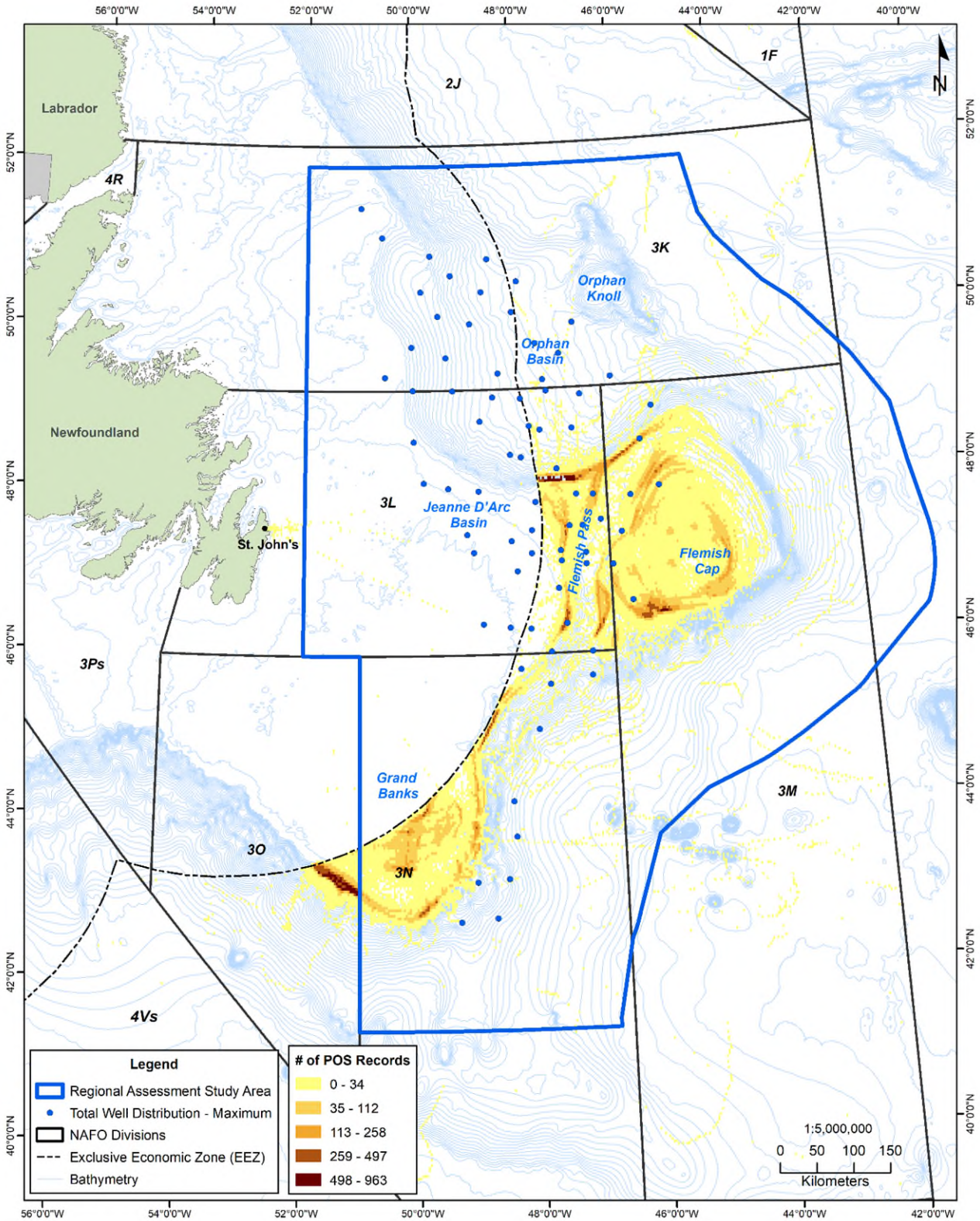


**Figure 5.10 Marine Vessel Traffic in the Study Area in Relation to Predicted Exploratory Wells (2020-2028, Maximum Scenario)**

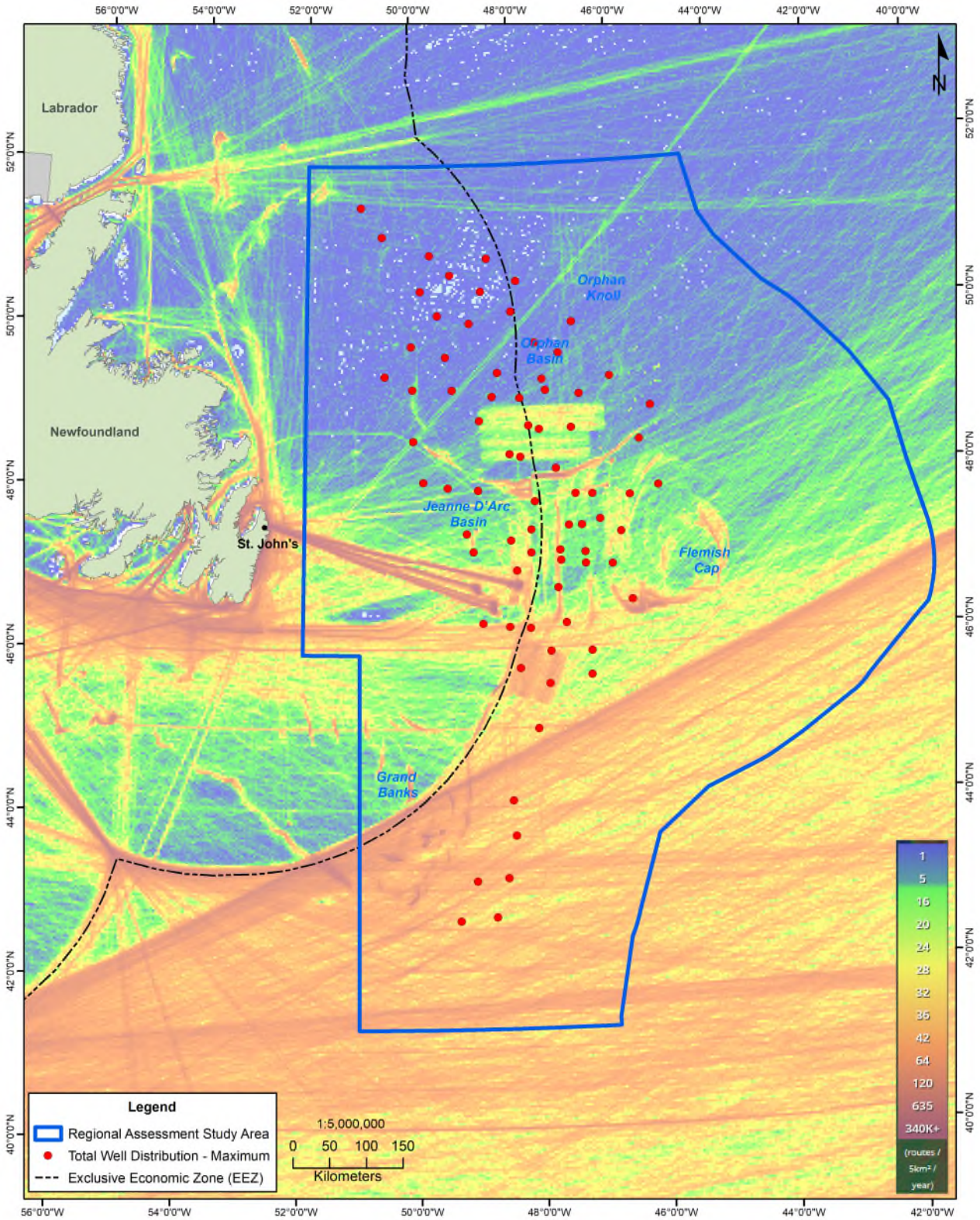


**Figure 5.11 Offshore Lighting in the Study Area in Relation to Predicted Exploratory Wells (2020-2028, Maximum Scenario)**

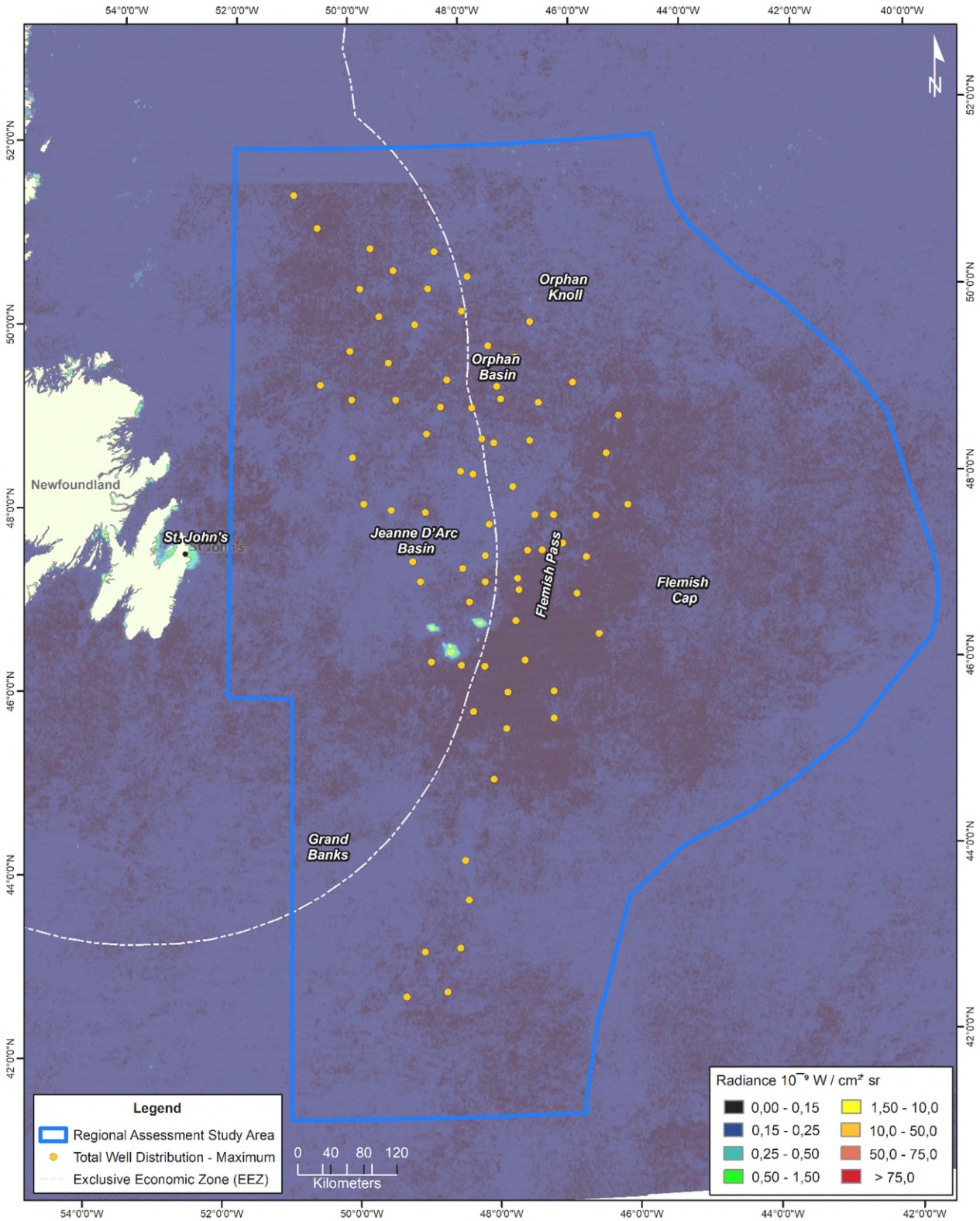


**Table 5.6 Potential Overlap of Predicted Exploratory Wells with On-Going and Future Activities in the Study Area**

| Project / Activity | Overview |
|---|---|
| Offshore Petroleum Exploration – Drilling | • To date there have been a total of 162 exploration and delineation wells drilled in the Study Area, which were spudded between July 1971 and August 2019 for an average of 3.3 wells drilled annually over this period with a density of 0.0002 wells per square kilometer. The available statistics indicate that approximately 0.74 exploration wells are drilled per EL in the Canada-NL Offshore Area.<br>• The predictive modelling of potential future exploratory drilling in the Study Area over the 2020-2028 period indicates that 53, 70 and 77 exploration wells were projected for the Minimum, Medium and Maximum Scenarios, respectively (Module 15).<br>• Assuming an equal number of wells drilled per year, this would result in approximately 5.9 wells and 8.6 wells being drilled annually for the Minimum and Maximum activity scenarios, respectively (ranging from an estimated 3,604 to 5,236 total drilling days over this period).<br>• In terms of the predicted spatial distribution of these possible exploratory drilling activities over this nine year period, the modelling shows a clear concentration of activity in the north-western and west-central portions of the Study Area, with anticipated drilling activity in the southern half of the Study Area being focussed primarily in a band along the slope of the Grand Banks. |
| **Future Exploratory Drilling and its Potential Overlap / Interaction With:** | |
| Offshore Petroleum Exploration – Seismic / Geophysical | • The predictive modelling of potential future seismic survey activity in the Study Area over the 2020-2028 period indicates that a total of up to 136,140 km of 2D and 82,293 $km^2$ of 3D seismic data could be acquired during the 2020-2028 period (Module 15).<br>• Assuming an equal amount of survey activity each year over that period, this would equate to approximately 15,127 km of 2D and 9,144 $km^2$ of 3D annually.<br>• Although it is not possible to know with certainty where such future seismic activity will take place, the available information (including the areas covered by existing seismic data) suggests that acquisition might be focused on 3D programs collected in advance of Call for Bids rounds (multi-client surveys) and/or 3D and CSEM surveys post licence award (exclusive surveys).<br>• While they can often cover relatively large areas overall, seismic survey activities are mobile in nature and most operate for a short period of time at any one location. |
| Existing (Hibernia, Terra Nova, White Rose, Hebron) and Proposed (Bay du Nord) Oil Production Projects | • The four existing oil production projects are concentrated in the Jeanne d'Arc Basin in the west-central part of the Study Area.<br>• Although it is recognized that the predictive exploration drilling scenarios developed by the C-NLOPB do not mean that future drilling will take place at these precise locations, the modelling does show that eight of the predicted 77 exploratory wells over 2020-2028 (for the Maximum Scenario) would occur within the Jeanne d'Arc Basin area, with each of these points being at least 20 km from either of the existing oil production projects.<br>• The modelling also suggests that the closest exploratory drilling well location to the proposed Bay du Nord production facility would be over 25 km away. |
| Commercial Fishing Activity | • Domestically, the areas of higher intensity fishing activities tend to occur along the slope of the Continental Shelf. This includes areas along the Northeast Newfoundland Slope, the Orphan Basin, Flemish Pass, and down to the Tail of the Grand Banks.<br>• Internationally (outside EEZ), areas of higher fishing intensity are also along shelf breaks, occurring north of the Flemish Pass near the Orphan Basin, within the Flemish Pass and down to the Tail of the Grand Banks, and on the Tail itself. The Flemish Cap is also an important fishing area, and there are areas of higher intensity fishing that occur in this area. |

| Project / Activity | Overview |
|---|---|
| | • The modelling suggests that the possible well locations in the northwest portion of the Study Area are in deeper waters that are not typically areas of higher fishing activity, and would therefore not overlap with key fishing areas.<br>• Predicted well locations along the nose of the Grand Banks and within the Flemish Pass would overlap with some areas that are considered important fishing grounds for both domestic and international fleets. This would be mainly in NAFO Division 3L along the slope of the Continental Shelf.<br>• Predicted well locations in the southern portion of the Study Area are also located in deeper waters, and currently would not appear to overlap with areas of intense domestic or international fisheries. |
| Marine Vessel Traffic | • Much of the vessel traffic within the Study Area occurs in the southern half, which primarily reflects vessels moving internationally from Europe to North America.<br>• There are also areas of higher intensity shipping around the Flemish Pass and Flemish Cap, which likely indicate fishing vessels in the area. There are also identified lanes of vessel movement from the producing platforms back to St. John's Harbour, and to Placentia Bay. This represents movement of supply vessels, shuttle tankers, as well as tankers that bring oil into Placentia Bay to be refined.<br>• Generally, the areas with higher concentrations of predicted wells fall in the northwestern portion of the Study Area, where there is generally a lower amount of shipping activity.<br>• Predicted well locations within the Flemish Pass and on the slope of the Flemish Cap would be subject to higher levels of vessel activity, due to increased presence of fishing vessels and seismic ships that may be operating in the area.<br>• Predicted well locations in the Jeanne d'Arc Basin would be subject to increased vessel presence in the form of supply vessels and shuttle tankers, which use established routes to and from the producing platforms.<br>• Predicted well locations in the southern half of the Study Area would be subject to higher levels of marine traffic, as there are a number of movements of vessels annually throughout the region. |
| Offshore Lighting | • Offshore lighting is currently related primarily to the four producing platforms, which are located in the Jeanne d'Arc Basin.<br>• Other offshore lights in the Study Area would likely be associated with vessels (e.g., seismic, fishing, shipping, etc.) moving intermittently throughout the region.<br>• The largest concentration of predicted wells would be in the northern and northwestern portion of the Study Area, along the Northeast Newfoundland Shelf and within the Orphan Basin, as well as within the Flemish Pass Area. |

## 5.4 Committee Findings and Recommendations

As described in the preceding sections, cumulative effects are inherently complex and challenging to assess and manage. While a Regional Assessment approach provides a more holistic and proactive approach to considering cumulative effects compared to project-specific assessments and decisions, the inevitable uncertainty around the nature, intensity and spatial and temporal distribution of future activities and their effects, and of environmental responses to various types and levels of past and future disturbance, continues to pose key challenges in that regard.

Although experience to date and the future exploratory drilling “scenarios” developed for use in this Regional Assessment do not suggest a high level of spatial and temporal clustering of activity and effects in the Study

Area, the above referenced uncertainty around future activities and the environment's response to these requires a degree of planning and precaution. It is noteworthy that while the Regional Assessment is intended (and has been able) to set out mitigation requirements for future projects, any attempt to manage the spatial and temporal distribution of future drilling activity in the Study Area requires a more proactive and holistic approach through associated policy and planning decisions by the federal and provincial governments if potential adverse effects are to be avoided or minimized.

By the time that an operator proposes an individual drilling program in the Study Area it will have received an EL from the C-NLOPB, and is in fact then obligated to drill within that licence to satisfy the associated requirements of same, by which time it is too late to influence the general pattern of drilling activity. Any attempt to proactively manage the intensity and spatial and temporal distribution of future exploratory drilling in the Study Area must therefore be implemented earlier in the sequence through the C-NLOPB's scheduled land tenure process, including associated decisions by Ministers about the location and distribution of sectors, eventual call for bids areas, and ultimately, any resulting ELs.

1) **It is recommended that the information and analysis provided in this Regional Assessment, including the associated GIS decision-support tool, be considered by the C-NLOPB in its future decisions as part of the scheduled land tenure process. This should include consideration of potential cumulative effects and their management (as required) through associated planning (licencing) decisions linked to the scheduled land tenure process, in consultation with relevant expert authorities.**

2) **In addition, as there is a clear relationship between the information contained in this Regional Assessment (and especially, the associated GIS decision-support tool) and the C-NLOPB's Strategic Environmental Assessments (SEAs) for Eastern Newfoundland, it is also recommended that the Board seek to utilize this tool as part of any future SEA updates (and to inform its associated licencing processes) to avoid unnecessary duplication.**

3) **It is recommended that as part of future updates to this Regional Assessment, the C-NLOPB undertake further development of the exploratory drilling scenarios described in the preceding sections, and generate periodic updates of those scenarios as new data become available.**

The Committee is also aware of DFO's recent Marine Spatial Planning (MSP) initiative for the Newfoundland and Labrador offshore. While it is recognized that the Regional Assessment and the MSP process have somewhat differing objectives and areas of focus, and have been on very different timeframes, there are clear relationships and potential synergies between these two initiatives.

4) **It is recommended that government assume responsibility for offshore-related cumulative effects assessment and management through a planning process directed by a dedicated agency. The DFO Marine Spatial Planning initiative might be considered as an appropriate vehicle through which to do this.**

Chapter 8 provides a summary of the main outcomes and recommendations resulting from the Regional Assessment.

## 5.5 References

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# 6 INTEGRATING INDIGENOUS KNOWLEDGE

Indigenous Knowledge (IK) is a worldview that has been and continues to be an important aspect of impact assessment (IA) and other regulatory, resource management and planning processes in Canada, including for the Regional Assessment. The Regional Assessment Agreement requires that IK with respect to offshore exploratory drilling be considered. This Chapter outlines how the Committee collaborated with Indigenous groups to integrate IK into the Regional Assessment and its findings and outcomes.

## 6.1 Definitions and Background

IK is described in the federal government's *Indigenous Knowledge Policy Framework for Proposed Project Reviews and Regulatory Decisions* (Government of Canada 2019), as follows:

> *Indigenous Knowledge enables a more complete understanding of Indigenous world views, Indigenous cultures, the environment, and the social, health and economic conditions of Indigenous peoples.*

In the context of IA, a useful and often quoted definition of IK is:

> *Knowledge about the environment, knowledge about the use of the environment, values about the environment, and the knowledge system itself* (Usher 2000).

An important perspective that the Regional Assessment Committee heard when discussing IK with Indigenous groups (Section 2.2.4) , and in particular from the Unama'ki Institute of Natural Resources, is the importance of the concept of Two-Eyed Seeing as a knowledge system. As described by Bartlett et al. (2012), Mi'kmaw Elder Albert Marshall brought forward the concept of Two-Eyed Seeing in 2004, as a perspective that weaves together Indigenous ways of knowing and western knowledge systems. Two-Eyed Seeing, as a function of IK, has not to date been included in recent and on-going offshore exploratory drilling assessments in Atlantic Canada.

In Atlantic Canada, IK studies have been conducted as part of the environmental assessment process for recent projects, as directed in their respective Environmental Impact Statement (EIS) guidelines and undertaken through protocols developed by several Indigenous groups such as the following:

- *Gina'masuti Mi'gmewei*: A guidebook for the successful collection, development and implementation of an Aboriginal Traditional Knowledge Study (Miawpukek First Nation 2010)

- The Assembly of Nova Scotia Mi'kmaq Chiefs has developed the *Mi'kmaq Ecological Knowledge Protocol* to provide guidance to Mi'kmaq Ecological Knowledge Studies (Kwilmu'kw Maw-klusuaqn Negotiation Office 2007); and

- The New Brunswick Mi'gmaq *Indigenous Knowledge Study Guide* v 4.0 was developed with the support of Mi'gmaq and Wolastoqiyik community members and leadership (Mi'gmag Sagamaq Mawiomi 2019).

In cases where specific guidance for the collection and use of IK has not been developed by a particular Indigenous community, other protocols such as the Committee on the Status of Endangered Wildlife in Canada *Aboriginal Traditional Knowledge Process and Protocols Guidelines* (COSEWIC 2010) and the Impact Assessment

Agency of Canada's reference guide on Considering Aboriginal Traditional Knowledge in Environmental Assessment conducted under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) (Canadian Environmental Assessment Agency 2015) are available. The latter document provides additional information and guidance on the definition and use of Aboriginal Traditional Knowledge (ATK) in environmental assessments, including:

> *ATK can be viewed as knowledge that is held by, and unique to, Aboriginal peoples … Generally, ATK is considered as a body of knowledge built up by a group of people through generations of living in close contact with nature. ATK is cumulative and dynamic. It builds upon the historic experiences of a people and adapts to social, economic, environmental, spiritual and political change.*
>
> *While those involved in environmental assessment will likely be most interested in traditional knowledge about the environment (or, traditional ecological knowledge), it must be understood to form a part of a larger body of knowledge which encompasses knowledge about cultural, environmental, economic, political and spiritual inter-relationships.*

## 6.2 Indigenous Knowledge Considered in Past Exploratory Drilling Projects in the Study Area

As a knowledge system, IK does not lend itself to being in one section of a report such as this. Rather it is a lens used to describe the environment and to describe and consider effects throughout an IA, for example. However, the consideration and use of IK as a belief system and worldview has not to date been the approach taken for offshore oil and gas projects in Atlantic Canada. Rather, IK has been gathered to identify areas, traditions and practices that are important to Indigenous groups and which require consideration in assessing and evaluating the potential adverse effects of development activities on the biophysical and socioeconomic environments.

Once gathered and documented, IK is often protected from being used for purposes other than the intended use, and is often considered to be confidential information. That being said, several offshore oil and gas operators have worked with Indigenous groups to identify and document IK for recent projects and their environmental assessments, some of which have been released publicly. For example, a recent study prepared for the Bay du Nord Oil Development Project, situated in Flemish Pass portion of the Study Area, reviewed relevant existing and publicly available IK information (First Nations Engineering Services Ltd 2018). That study found that communal commercial licenses are held by many Indigenous groups in the offshore, and that the Indigenous groups are concerned about potential effects on migratory marine species such as Atlantic salmon, swordfish, tuna, American eel, migratory birds and seals, as well as species of cultural significance, such as the North Atlantic right whale. These issues are in keeping with those identified by the Committee in its June 2019 Phase 1 Indigenous engagements (Section 2.2.4.1).

While not located in the Regional Assessment Study Area itself, the Nunatsiavut Government and NunatuKavut Community Council have also been active participants in collecting Traditional Knowledge as part of the on-going Strategic Environmental Assessment Update for the Labrador Shelf Offshore Area using methodologies agreed to by those communities.

## 6.3 Considering Indigenous Knowledge in the Regional Assessment

The Regional Assessment in general, and its Study Area in particular, create an interesting situation for the existence, nature, sharing and use of IK. In its engagement with Indigenous groups, the Committee was not made aware that any group holds, claims or asserts Aboriginal or Treaty rights or otherwise undertakes traditional activities within the proposed Study Area, pursuant to section 35 of the *Constitution Act, 1982*. Rather, as discussed above and in more detail in Sections 3.3.2 and 4.2.3 , one of the primary interests of Indigenous groups regarding current and future exploratory drilling activities in the Study Area relate to their potential adverse effects on migratory species that are used for traditional (including food, social and ceremonial (FSC)) purposes. Specifically, there are important concerns around whether any effects on these species during their time in the Study Area and the marine environment generally may have resulting implications for their eventual availability or quality for harvesting and consumption by Indigenous groups within their traditional territories elsewhere in Atlantic Canada or Québec.

Therefore, in this particular context, the existence, use and relevance of IK for the purposes of the Regional Assessment may relate less to direct knowledge about the environmental conditions of the Study Area itself resulting from a long-term traditional use and historical occupancy of this particular area and its resources, but rather, relates to knowledge about the overall nature and importance of these species. Furthermore, an important focus and outcome of the IK-related discussions held with Indigenous groups as part of this Regional Assessment has also been to provide and seek to incorporate an Indigenous worldview perspective around the potential effects of exploratory drilling on these resources, the environment and on Indigenous peoples cultures and way of life, as outlined in the preceding section.

### 6.3.1 Direction from the Technical Advisory Group

As described in Chapter 2, after five initial IK Technical Advisory Group sessions with Indigenous groups throughout the region in the Fall of 2019, the Regional Assessment Committee, in collaboration with Indigenous groups, held a day-long IK workshop on November 13, 2019. The objective was to work together to further explore the concept of Two-Eyed Seeing and to incorporate IK into the Regional Assessment Report in a way that reflects the values, views and information communicated to the Committee by participating Indigenous groups. The following overall concepts and principles were discussed throughout the day:

- Two-Eyed Seeing is a process. It is about how we know, rather than what we know.
- There are many ways of knowing.
- Two-Eyed Seeing should be recognized throughout the Regional Assessment Report rather than in one separate section.
- It is important to address power imbalances.

Participants at the workshop identified seven key areas of concern from an IK perspective that they felt should be addressed in the Regional Assessment and its recommendations, which are addressed in the subsections below.

Following the workshop, the Committee held a follow-up session with Indigenous groups on December 2, 2019 (Section 2.2.4.3) to share and discuss draft recommendations in the context of the concerns brought forward. The remainder of this section outlines these key areas of concern, the approach to addressing the issue or

requirement by applying the perspective of Two-Eyed Seeing, and identifies the particular sections of the Regional Assessment Report that further discuss each key area. This Chapter was shared with all 41 Indigenous groups for review and input on December 6, 2019, in advance of the release of the Draft Regional Assessment Report. For further detail, the notes from the IK Technical Advisory Group meetings, the workshop and follow-up session are posted on the Registry (see: https://iaac-aeic.gc.ca/050/evaluations/proj/80156).

#### 6.3.1.1 Assessing and Managing Cumulative Effects

Over the course of engaging with Indigenous groups, the Committee heard many times that cumulative effects in the Study Area are a concern, in particular with respect to the effects of exploratory drilling in combination with increased vessel traffic and increased risk of spills. Cumulative effects are discussed in Chapter 5, and future offshore exploratory drilling scenarios are summarized there and presented in detail in Module 15. Participants at the workshop suggested the following measures to address cumulative effects through the lens of Two-Eyed Seeing:

- Assess multiple industry effects through marine spatial mapping and identify interactions between effects on species of concern;
- Create a multi-stakeholder- / -rights-holder research group to integrate research and shift away from research being conducted in silos;
- Expand current thinking on cumulative effects to consider climate change (e.g., effects from large icebergs, large storms and waves, increasing water temperature/ocean acidity and concern about the impact of projects, and subsequent development, on emission levels); and
- Address cumulative effects and associated thresholds (i.e., level where impacts may be significant) of unreportable spills/allowable releases in an increasing industrial environment.

The Regional Assessment has considered and described the overall effects of past, on-going and future exploratory drilling activities in the Study Area, as well as those that may result from the effects of exploratory drilling in combination with other types of human activities, including seismic surveys, marine shipping, and fishing activity and other relevant natural and anthropogenic stressors in this marine ecosystem. The Committee recommends a proactive and holistic approach through associated policy and planning decisions by the federal and provincial governments to the management of cumulative effects. Specifically, the Committee has recommended that the information and analysis provided in this Regional Assessment be considered by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) in its future decisions as part of the scheduled land tenure process, which should include consideration of potential cumulative effects and their management. Moreover, the Geographic Information System (GIS) decision-support tool is intended to be updated regularly and will be useful in marine spatial mapping and linking the range of industrial activities to cumulative effects.

There are on-going or planned studies or scientific reviews that may inform the management of cumulative effects and which the Committee recommends incorporating into a future update of the Regional Assessment. For example, the Environmental Studies Research Fund (ESRF) is a research program which sponsors environmental and social studies related to oil and gas exploration and development in Canada. It is currently undertaking research on Atlantic salmon presence and timing in the Study Area. The ESRF Management Board is a multi-stakeholder body, with Indigenous representation, which provides strategic guidance to the program of research.

#### 6.3.1.2 Addressing Power Imbalances

The Committee also heard that power imbalances exist in IA and other regulatory and resource management processes as a result of barriers such as capacity issues, lack of resources including funding, and inadequate representation. Indigenous groups seek early and meaningful engagement and want to be fairly represented in these processes. Having Indigenous representation on the Regional Assessment Committee was an important way of building on existing relationships, of ensuring that Indigenous perspectives and concerns were brought directly to the Committee discussions and of engaging with Indigenous groups in a meaningful way. Within the Regional Assessment process, the Committee and the Agency attempted to increase this balance through several rounds of funding and engagement (Chapter 2), and working with Indigenous groups to collaborate on aspects of the Regional Assessment Report such as: IK submission and collaborating on this chapter of the Regional Assessment Report; reviewing preliminary drafts of certain modules and adding to the body of literature being included in the Report; reviewing and discussing draft meeting notes and draft recommendations; and reviewing and providing input on the draft recommendations of the Committee and eventually on the Draft Report.

Participants at the workshop suggested the following additional measures to address power imbalances through the lens of Two-Eyed Seeing:

- Educate people on the Indigenous context in Canada (such as rights and identity);
- Include Indigenous people alongside government when writing policy;
- Provide capacity to be meaningfully included in the process (attend meetings, preparation and debrief time) including funding for independent technical experts;
- Responsible Ministers should be accountable when making decisions that are not in line with consensus decisions made by committees such as this;
- Having direct involvement of Indigenous groups at the beginning of a process rather than at the draft or final report stage. This would require Indigenous representatives on the Committee and Indigenous people should have a say in who sits on the Committee, including using a consensus-based approach when doing Committee work; and
- Ensure that an obligation exists to share information promptly, for example on oil spills.

Recognizing that eliminating power imbalances requires institutional change beyond the reach of this Regional Assessment, the Committee has recommended Indigenous representation on a Regional Assessment Oversight Committee as a means to directly involve Indigenous people in reviewing and updating the Regional Assessment as well as having input into Regional Assessment procedures and policies going forward. The Committee also recommends establishing links between the Regional Assessment Oversight Committee and the Impact Assessment Agency of Canada (IAAC) Indigenous Advisory Committee. The recommendation requiring a Diversity Plan is a further mechanism for providing additional power to under-representative groups, one being Indigenous groups.

#### 6.3.1.3 The Need to Value Environment Over Economy

A concern brought forward by Indigenous groups at the outset of the Regional Assessment process was that efficiencies gained in a streamlined regulatory process for offshore exploratory drilling would come at the cost of environmental protection. A key stated objective of this Regional Assessment by governments is that it:

> *Will help to improve the effectiveness and efficiency of the assessment process for future exploratory drilling and associated activities in this region, while also ensuring the highest standards of environmental protection continue to be applied and maintained.*

Throughout the Regional Assessment process, and especially the Technical Advisory Group sessions which were attended by regulators, scientists, representatives of environmental groups and Indigenous communities, a wealth of information was brought forward to the Committee with respect to potential effects to the environment and possible mitigation and follow-up measures. Consistent with this information, the Committee heard from participants at the IK workshop, who suggested the following measures to address the concern of valuing economy over environment through the lens of Two-Eyed Seeing:

- The need to take a long-term view (seven-generation approach);
- Re-evaluate the regulations and policies that promote extracting hydrocarbons (which produce greenhouse gas emissions) in a climate crisis; and
- We must also consider that the environment has rights.

The Committee's strong view is that the Regional Assessment is not a means of removing important regulatory and oversight functions for future exploratory drilling activities in the Regional Assessment Study Area. In fact, the Committee has considered effects and current mitigation and follow-up, and has both recommended that the measures identified through recent environmental assessments be required and implemented for all future exploratory drilling projects in the Study Area, and has made recommendations to strengthen and improve these in particular circumstances.

The Regional Assessment is also intended to be a "living" and "evergreen" product that is reviewed annually and updated as required. This, in combination with the recommendation to create a Regional Assessment Oversight Committee with Indigenous representation, will create a process that takes a long-term view and adapts to changing conditions, information, issues and requirements. Finally, while the focus of this Regional Assessment is on exploratory drilling, the effects of any eventual extraction of hydrocarbons would be assessed in a separate process, including climate implications and sustainability of these productions projects.

#### 6.3.1.4 Building Adaptability Within Process

The ability to be flexible when changes to the environment or new information arises was also a concern brought forward by Indigenous groups. There is on-going research and a changing environment (i.e., fisheries, climate, industrial activities) that will be relevant to activities in the Study Area and their potential effects. Participants at the workshop suggested the following measures to adapt through the lens of Two-Eyed Seeing:

- Address timelines, as the approval process is too short
- It is important that there is a higher environmental standard for projects that do not require an impact assessment; and
- The need to show adaptability and flexibility (e.g., ensure capping stacks are available, change activities as required by seasons – more/less ice, altered timing of migrations, use of the environment by Indigenous Peoples, protection of sensitive areas).

The Committee was tasked with completing a Regional Assessment that would improve the efficiency and effectiveness of the environmental assessment process as it applies to oil and gas exploratory drilling, while at the same time ensuring the highest standards of environmental protection, meeting or exceeding the rigour and performance of the current environmental assessment and regulatory review process used for the approval of exploratory drilling (Regional Assessment Agreement, Appendix D, Section 1.1).

In order to build adaptability within the Regional Assessment process, the Committee recommends incorporating new information by reviewing and updating the Regional Assessment annually and by implementing a review period within which all interested parties can provide input to the IAAC determination of whether or not a proposed drilling program is in conformance with the regulation (and thus, whether it is or is not exempt from federal IA requirements). Furthermore, the Committee recommends establishing a Regional Assessment Oversight Committee, with Indigenous representation, to guide and coordinate regular review and update of the Regional Assessment and provide advice on the Regional Assessment procedures and policies.

#### 6.3.1.5 Protecting Areas of Significance

The Committee recognizes the sheer size and diversity of the Study Area and that there is not necessarily a "one size fits all" approach to environmental protection for all future exploratory drilling projects in the region. Through its analysis and engagement activities, the Committee has identified and considered a number of areas that have been defined through previous scientific processes as being of particular importance, potential sensitivity or uncertainty (including data gaps) for which it feels that a precautionary approach warrants specific recommendations regarding possible future exploratory drilling activity. Participants at the workshop suggested the following measures to address protection of areas of significance in the Study Area through the lens of Two-Eyed Seeing:

- Ensure appropriate protection of significant areas by establishing legislation, regulation, or policy for protection including prohibiting development, and ensure penalties for non-compliance; and
- Apply spatial and temporal exclusions to avoid, for example, migration periods of sensitive and important species.

The Committee has recommended that for any future exploratory drilling activities in the Study Area that are proposed to occur within a currently defined Marine Refuge (Fisheries and Oceans Canada, DFO) or a Northwest Atlantic Fisheries Organization (NAFO) Fisheries Closure Area, any exemption from the federal IA process should be contingent on the operator demonstrating that any risks to intended biodiversity / conservation outcomes of that area will be avoided or mitigated. Moreover, the Committee has recommended that the C-NLOPB specifically consider overall information availability, data gaps and associated environmental risks in future decisions around whether and when to issue licences in these data deficient areas as part of its scheduled land tenure process. Finally, for each of the various types of identified special areas found within the Study Area, it is recommended that the relevant authorities accelerate scientific review and analysis of these areas to determine if their various components and characteristics warrant additional mitigation or follow-up for any future exploratory activity that may take place within them.

#### 6.3.1.6 Addressing Knowledge Gaps

Although the Regional Assessment displays data in a dynamic and visual way through a GIS decision-support tool and presents some data which were not readily available previously, the reality and implications of knowledge gaps in the Study Area was highlighted in several discussions with Indigenous groups. Suggestions ranged from building the GIS decision-support tool using an ecosystem approach to establishing impact thresholds to applying a precautionary approach in areas where a deficit of information exists. More specifically, data availability regarding Atlantic salmon migration in the offshore has been raised as a significant concern by Indigenous groups throughout the region. Indigenous groups believe that regulators and proponents are ignoring current evidence regarding Atlantic salmon in the Study Area. Furthermore, there is a concern that anticipated studies may be used to delay decision-making associated with protecting Atlantic salmon. Participants at the IK workshop suggested the following measures to address knowledge gaps in the Study Area through the lens of Two-Eyed Seeing:

- Do not issue new calls for bids in data poor areas until knowledge gaps are resolved;
- Recognize that currently, IK reports are of limited value because there is no interaction with those who wrote them and no understanding of how Indigenous people adapt to changing circumstances;
- Apply conservation tariffs (and if they are already applied, increase them) and use them to address knowledge gaps. Create a Board with Indigenous representation to administer the funds;
- Apply the precautionary principle.

The Committee has stated in its recommendations that the Regional Assessment must be viewed and used as a "living" and "evergreen" product that is reviewed annually and updated as required. The Committee recommends identifying and incorporating new or updated information that is relevant to the assessment and becomes available following completion and submission of the Committee's Final Report such as results from upcoming Atlantic salmon research and IK studies being completed for offshore oil and gas exploratory drilling. The Committee also recommends that the C-NLOPB specifically consider overall information availability, data gaps and associated environmental risks in future decisions around whether and when to issue licences in these data deficient areas as part of its scheduled land tenure process.

#### 6.3.1.7 Promoting Meaningful Interaction Between Indigenous Groups and Industry

Although this concern was not directly addressed in the workshop due to lack of time, it is related to power imbalances as well as the concern of Indigenous groups around being engaged late in an assessment process. The Committee has taken steps to address this concern by recommending that in a submission seeking an exemption from IA requirements, the operator should demonstrate that it has undertaken engagement with Indigenous groups on the planned drilling program and also by recommending that a Regional Assessment Oversight Committee with Indigenous as well as industry representation be created.

### 6.4 Summary

The following table summarizes the various concerns raised by Indigenous groups and how they were examined through the lens of Two-Eyed Seeing, and where these have been addressed in the Regional Assessment Report.

**Table 6.1 Key Issues Raised and Where Addressed in the Regional Assessment**

| Issue / Theme | Where Addressed within the Report / Modules |
|---|---|
| Assessing Cumulative Effects | Chapter 5, Chapter 8, Module 15 |
| Addressing Power Imbalances | Chapter 2, Chapter 8 |
| The Need to Value Environment Over Economy | Chapter 7, Chapter 8 |
| Building Adaptability Within Processes | Chapter 8 |
| Protecting Areas of Significance | Chapter 3, Chapter 4, Chapter 8, Module 10 |
| Addressing Knowledge Gaps | Chapter 3, Chapter 8 |
| Promoting meaningful interaction between Indigenous groups and industry | Chapter 2, Chapter 6, Chapter 8 |

In summary, there has been extraordinary participation by Indigenous groups in this Regional Assessment. From the beginning of the process, the Committee intended to build relationships with those Indigenous groups who were interested in being involved. Over this engagement period, many concerns were brought forward. In hearing the different perspectives among communities in Atlantic Canada and Québec, the Committee gained more of an understanding of the breadth of concerns and the worldview that Indigenous people bring to this process. The significance of hearing about Two-Eyed Seeing and attempting to put it in action in the Regional Assessment process and throughout the Report was an important step in creating a model for future assessments and more meaningful involvement of Indigenous people.

## 6.5 References

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# 7 SUSTAINABILITY, CLIMATE CHANGE AND OTHER CONSIDERATIONS

## 7.1 Sustainability

The Regional Assessment Agreement requires consideration of the extent to which offshore exploratory drilling contributes to sustainability. The federal *Impact Assessment Act* defines sustainability as:

> *The ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits present and future generations.*

The Impact Assessment Agency of Canada (IAAC) has developed and released two documents outlining how to consider this factor in impact assessments and associated decisions:

1) *Interim Guidance*: *Considering the Extent to which a Project Contributes to Sustainability* (IAAC 2019a)
2) *Interim Framework*: *Implementation of the Sustainability Guidance* (IAAC 2019b)

These documents identify four key considerations and principles for assessing contribution to sustainability:

1) The interconnectedness and interdependence of human-ecological systems;
2) The wellbeing of present and future generations;
3) Maximizing overall benefits and minimizing adverse effects; and
4) Applying the precautionary principle and considering uncertainty and risk of irreversible harm.

### 7.1.1 Interconnectedness and Interdependence of Human-Ecological Systems

Throughout its engagement initiatives as part of this Regional Assessment, the Committee heard repeatedly that the current and historical residents of Newfoundland and Labrador and elsewhere in Eastern Canada have always had a strong connection to the sea and to the land. The economy and cultures of the province originated from, and have continued to maintain, a fundamental attachment to the various resources and land- and sea-scapes that characterize the region. Because of this, the natural and human environments of this place are inherently, intricately and permanently intertwined, and are central to the province's identity.

Indigenous peoples have depended on the land and the sea for millennia, and the cultures and economies of those that came later have similarly been reliant on and shaped by this environmental setting. Indigenous traditional harvesting including fishing and hunting has defined Indigenous peoples in the region and their cultures. Traditionally, many moved with the seasons and followed the migrations of species, then moved to the coast in summer to harvest fish, seals and seabirds. Others were primarily coastal dwellers and hunted seals, walrus, whales, Atlantic cod, char and Atlantic salmon at different seasons. Still other groups established semi-permanent and permanent settlements at resource-rich locations with summer villages close to waterways and along the sea coast, where fish were a main source of food including Atlantic salmon and sturgeon, as well as porpoises, whales, walrus, seals, lobster, squid, shellfish and American eel.

Fish resources were the first to be commercially exploited here nearly six centuries ago, and despite widespread and on-going changes in the industry, the commercial fishery remains a mainstay and key component of the Newfoundland and Labrador economy. The offshore oil and gas industry is a relative newcomer to the province,

with a history that spans just over five decades. This sector has, however, grown and evolved into a fundamental element of the province's economy and its socio-cultural identity, creating significant employment and business opportunities and allowing people to build good lives for themselves here. These activities and associated revenues also drive education, training and technology advancements, and contribute greatly to the provincial and federal tax bases (Module 13). These economic benefits, in turn, fund important public services and infrastructure investments that contribute greatly to the quality of life of residents, and are key to developing and maintaining a modern, affluent society. In addition to these commercial activities, recreational fishing and hunting and other marine-associated pursuits are also an integral part of the lifestyles of many Newfoundlanders and Labradoreans, and there is a strong connection to these resources and to the cultural experience of these activities. The marine environment also supports many other important commercial, recreational and socio-cultural components and activities in this province and beyond.

Given their use of, and dependence upon, a common marine environment, and the need to often occupy the same ocean space within a relatively short operating period each year, there is a clear potential for interaction between marine fisheries and other ocean uses and offshore oil and gas activities. As described in the preceding sections, these interactions may occur directly, through interference issues, or indirectly due to associated changes in the biophysical environment and thus the availability and quality of resources. There are therefore clear inter-relationships and inter-dependencies between the various, diverse components of these human-ecological systems, where changes in physical and biological characteristics and processes may in turn have implications for the social and economic conditions and health of people and communities, and vice versa. As a result of these interconnections, effects on one component may have implications for another, and thus for the overall sustainability of these human-ecological systems.

### 7.1.2 Well-being of Present and Future Generations

An overview of the primary issues and potential effects resulting from exploratory drilling and associated activities in the Study Area was provided earlier in Chapter 4. From a sustainability perspective, an important consideration is around whether, and if so how and to what degree, these effects may have either adverse or positive implications for the well being of present and future generations.

#### 7.1.2.1 Social and Economic Conditions

Newfoundland and Labrador has an important and growing offshore petroleum industry, and the socioeconomic benefits of this sector - of which exploratory drilling is but one facet - have been significant and long-term in nature. Over the past five decades (1966-2018), offshore petroleum related expenditures (including exploration, pre-development, development and production activities) have totalled nearly $63 billion, including over $9 billion in exploration spending during that period (C-NLOPB 2019). The oil and gas industry (including production, exploration and support activities) is currently the largest contributor to Newfoundland and Labrador's gross domestic product (GDP), accounting for 15.6 percent of the province's nominal GDP in 2017 (or, $4.7 billion). Over the past two decades, the oil and gas sector has accounted for 25 percent of provincial nominal GDP and 41 percent of the province's total exports (Government of NL 2019). Annual average employment in the industry in 2018 was approximately 5,200 person-years, or 2.3 percent of total provincial employment (NLDF 2019), with the industry also supporting more than 600 supply and service companies (CAPP 2019)

The offshore oil and gas industry therefore generates significant socioeconomic benefits to the province and to Canada, including direct investment (capital expenditures) in the billions of dollars, royalties, corporate taxes, and wages and taxes from employment and procurement. The industry paid $1.1 billion in provincial royalties during the 2018-2019 fiscal year and almost $3.5 billion over the period from 2015/16 to 2017/18 (Public Accounts, Consolidated Statement, Government of Newfoundland and Labrador). Cumulative royalties paid to the Government of Newfoundland and Labrador from 1997/98 to 2018/19 have totalled almost $22 billion. The industry has therefore, in combination with other sectors such as the fishery, contributed substantially to keeping the social fabric of Newfoundland and Labrador intact after the decline of the cod fishery in the 1990s. While many residents were forced to move away after the closure of the fishery, of those who stayed some were able to transfer their skills to the oil and gas sector. Despite the many positive socioeconomic contributions of this sector as described above, there have also been concerns raised at times about the potential negative implications of increased affluence and other social outcomes for individuals, families and communities and their overall well-being.

In 2018, the Newfoundland & Labrador Oil and Gas Industries Association (NOIA) engaged Mr. David Campbell of Jupia Consultants to undertake a study on the value of the Newfoundland and Labrador offshore oil and gas industry. According to this study, in 2017, the oil and gas industry generated 23,500 full-time equivalent jobs in the province (including direct, indirect, and induced jobs). This resulted in approximately $2 billion in labour income – which is 15 per cent of the provincial total – and $1.45 billion in consumer spending. Annual average employment in the industry in 2018 was approximately 5,200 person-years, or 2.3 percent of total provincial employment. The study also indicates that for every direct job in Newfoundland and Labrador in the oil and gas industry, 1.8 jobs are created in Canada (NOIA 2018). A substantial portion of the local benefits from the offshore petroleum industry activity accrues to companies providing goods and services to oil companies as well. The main types of businesses providing services to the offshore petroleum industry included services incidental to mining and oil and gas; miscellaneous business services; air transport; water transport; wholesaling; storage; and architectural, scientific, and engineering services. Within Newfoundland and Labrador, there now exists a large provincial supply and service sector. NOIA, the membership of which has grown to nearly 600 companies in 2017, represent the interests of this sector (Stantec 2019).

The 2018 NOIA Study also forecasts royalty and tax revenue to Newfoundland and Labrador to exceed $100 billion by 2045, with 56,000 jobs created in 2033. Labour income will more than double to $4.6 billion, as will consumer spending to $3.5 billion. In 2033, the oil and gas sector has the potential to generate more revenue for the province than the entire economy currently does. Similarly, under the scenario studied, the future impacts are significant across the country. By 2033, every direct job in Newfoundland and Labrador's oil and gas industry is expected to create 2.3 jobs in Canada. Forecasted impacts include $1.6 billion in labour income, $1.2 billion in consumer spending, and $3.3 billion in tax revenue, all in the rest of Canada (NOIA 2018).

In terms of the socioeconomic outcomes of oil and gas exploratory drilling itself, these activities do result in a number of important direct and indirect economic benefits, including the creation of employment and business opportunities over the course of their planning and operational phases. This includes direct employment by these operators and the establishment, maintenance and growth of their corporate offices in Newfoundland and Labrador. During 2017, $221.7 million was spent on exploration programs generating approximately 3,136 person-months of employment (C-NLOPB 2018). Exploratory drilling projects also result in the creation of contracting opportunities for the supply of goods and services throughout their planning and implementation phases, with associated employment, revenue and taxation benefits. In addition, these direct and indirect

employment and business benefits are further supplemented by "spin-off" economic benefits as these incomes and revenues move throughout the provincial and national economies. Oil companies working in Newfoundland and Labrador also make substantial contributions to local charities and community groups.

Exploratory drilling and associated activities also have technological and educational implications for the province in general and for the oil and gas sector in particular. This results in the development and transfer of skills and technology, as well as continuously adding to and advancing the industry's expertise and experience in conducting exploration drilling in new areas and conditions, and contributing information on the geological characteristics and overall hydrocarbon potential of this part of the Canada-NL Offshore Area.

Industry and government have maintained that further exploration offshore Newfoundland and Labrador is critical in order to identify and further understand the existence of currently unknown and undeveloped hydrocarbon reserves in the region. In February 2018 the Government of Newfoundland and Labrador released *Advance 2030 – A Plan for Growth in the Newfoundland and Labrador Oil and Gas Industry,* which envisions over 100 new exploratory wells drilled and multiple basins producing over 650,000 barrels per day from new and existing projects. Should exploratory drilling activities be successful in identifying important and commercially viable petroleum resources in the region, they can also lead to additional economic activity in Newfoundland and Labrador and elsewhere related to further exploration, and possibly, petroleum production activities. An important potential outcome of such exploration may also therefore be future development and growth in the province's offshore oil and gas sector and overall economy and broader benefits to Canada as a whole.

#### 7.1.2.2 Health and Well-Being

Human health and well-being are important considerations in any sustainability discussion, including with regard to both potential positive effects (as described above) but also any potential for adverse implications on the physical or social conditions of individuals and communities.

The health and safety of offshore workers is typically addressed through a variety of associated occupational requirements and regulations (see Modules 1 and 13), and is not typically considered within the scope of an environmental assessment (EA) review and approval. Other human physical health considerations that are relevant to offshore exploratory drilling relate to the potential for emissions from planned drilling activities, and especially from an unplanned event such as a spill, to reach and then negatively affect humans through environmental contamination, resource tainting or through direct interaction with equipment or infrastructure. Although drilling activities routinely generate a number of environmental emissions, the typically low magnitude and localized and short-term nature of these emissions, along with the offshore location of drilling projects, reduces the potential for them to reach and affect human receptors. Previous and on-going environmental effects monitoring (EEM) programs for offshore petroleum projects off Eastern Newfoundland have not indicated significant effects that would pose human health risks (Modules 7 and 13), and there are various regulations and guidelines in place that help avoid or control discharges from such activities and their effects (Modules 1 and 2). The various regulatory requirements that pertain to spill prevention are also intended to help avoid or reduce any such effects resulting from a large spill event, although it is clear that such an incident could have serious implications for the nature, intensity, distribution or value of recreational or commercial activities in the affected area.

In terms of social health and well-being, the nature, location and duration of offshore exploratory drilling activities typically means that these do not result in many of the socio-cultural issues that may be linked to larger-scale development projects. For example, an offshore drilling campaign is typically of short-term (measured in days) duration, occurs far offshore and primarily involves an existing workforce already involved in this sector. It therefore typically does not result in issues related to local hiring and associated effects, long-term separation of Newfoundland and Labrador workers from family, negative social interactions between workers and local residents and communities, implications for the quality and accessibility of community services and infrastructure, issues related to wage employment and increased incomes, and other such concerns.

### 7.1.3 Maximizing Overall Benefits and Minimizing Adverse Effects

#### 7.1.3.1 Maximizing Socioeconomic Benefits

An overview of the socioeconomic benefits of the Newfoundland and Labrador oil and gas industry in general, and of exploratory drilling and associated activities in particular, was provided in Section 7.1.2.

An important aspect of the C-NLOPB's mandate is the administration of the various provisions of the *Accord Acts* that pertain to industrial and employment benefits resulting from the exploration for, and development of, oil and gas resources in the Canada-NL Offshore Area (Module 1). This includes the creation and optimization of such benefits for Canada in general and the province of Newfoundland and Labrador in particular. The *Accord Acts* require that before any work or activity is authorized in this area, a Canada-Newfoundland and Labrador Benefits Plan must be submitted to, and approved by, the C-NLOPB. This plan must identify and describe the measures to be taken regarding the employment of Newfoundlanders and Labradorians and other Canadians, as well as providing manufacturers, consultants, contractors and service companies in the province and other parts of Canada with full and fair opportunity to participate on a competitive basis in the supply of goods and services to such a project. Other provincial and federal departments and other organizations are also involved in working with the industry and educational institutions to ensure there is training available for people who wish to work in the offshore industry in relevant fields, to maximize the local uptake and benefits of such opportunities.

#### 7.1.3.2 Minimizing Adverse Effects

An overview of the potential adverse effects of offshore exploratory drilling in the Study Area was provided in an earlier section of this report (Chapter 4), along with the various mitigation and follow-up measures that are typically required and implemented to avoid or reduce these. Previous EAs (and eventual EA decisions) for proposed exploratory drilling projects for offshore Eastern Newfoundland have generally concluded that such activities will entail localized and transient disturbances in the marine environment at any one location and time period, the potential effects of which will be effectively minimized through the various mitigations referenced therein. The general conclusion has typically been that the drilling project in question is not anticipated to disturb, displace, or otherwise affect marine fish, birds, mammals and sea turtles, Indigenous peoples, fisheries or other human components and activities in such a way that causes adverse, sustained and detectable effects to populations, species at risk or to the overall nature and value of human activities. Recent EAs submitted by operators, and associated EA decision statements by governments, have concluded that with the implementation of these mitigations, these exploratory drilling projects are not likely to result in adverse environmental effects.

Some participants in the Regional Assessment noted that although any one exploratory drilling project may not likely have significant, adverse environmental consequences, there are concerns that multiple such programs may collectively result in important cumulative effects. As described in further detail in Chapter 4, a key focus of the Regional Assessment has therefore been on assessing and evaluating the overall effects of past, on-going and future exploratory drilling activities in the Study Area, as well as those that may result from the effects of exploratory drilling in combination with other types of human activities, including seismic surveys, marine shipping, and fishing activity and other relevant natural and anthropogenic stressors in this marine ecosystem.

The marine environment of the Study Area has been, and continues to be, affected by a variety of natural and anthropogenic influences, including past and on-going petroleum exploration and production activities, commercial fishing, general vessel traffic, and other human activities as well as the effects of climate change and other natural and human-induced disturbances. These have all collectively influenced the presence, distribution, abundance, and health of marine biota in the Study Area, as well as the nature, intensity, distribution, timing and value of human activities such as commercial fisheries. These past and current stressors also influence the overall sensitivity or resiliency of this environment to further disturbance. In terms of future exploratory drilling projects specifically, to date, the type, level and spatial and temporal distribution of such activity does not suggest that there are issues around overlap and interaction between individual programs and their effects (Section 5.2). Historically, there has been an average of just over three exploratory wells spudded per year in the overall Canada-NL Offshore Area, although it is acknowledged that this could increase in the future given various industry and governmental initiatives and the focus on new basins in the Study Area (Module 1). Conversely, a dry well in a new play often has the effect of slowing down future exploration activity until results are understood and incorporated into basin modelling.

The effects of offshore exploratory drilling activities are often considered to be relatively low in magnitude and localized and short-term in nature, and there is a degree of "natural" temporal and spatial separation between activities due to safety, administrative and logistical factors (including limited global harsh environment rig availability). However, some activities (such as seismic surveys and some fisheries) and disturbances (such as underwater noise) can be quite geographically extensive, which can increase the potential for interactions between effects. The overall ranges and movements that characterize some marine species and activities also increases the potential for them to be affected by multiple disturbances. There is also often an incomplete knowledge about the responses of some environmental components to multiple and accumulating sources of stress (Chapter 5).

While various factors complicate the ability to assess - and particularly to manage - such cumulative effects, especially through project-specific impact assessments and decisions, the Regional Assessment and its associated recommendations have therefore sought to improve this by facilitating and informing better planning and decision-making approaches (Chapter 8), to help enhance the overall sustainability of offshore exploratory drilling activities in this region.

### 7.1.4 Precautionary Principle, Uncertainty and Risk of Irreversible Harm

Notwithstanding the views of some that the effects of offshore exploratory drilling are well understood and manageable through standard and proven mitigation measures, the Regional Assessment has found that there are still important and relevant concerns about the environmental implications of these activities, both individually and cumulatively. The Committee is therefore of the view that a measure of precaution is required

to guide the planning, regulatory review, and eventual implementation of these activities in the Study Area, both in terms of their planned components and activities, but also and especially, with regard to preventing a potential incident such as a large oil spill. This includes consideration of the precautionary principle, which was defined by the 1992 Rio Declaration on Environment and Development (Principle 15) as follows:

> *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation* (UNCED 1992).

In many ways, the analysis of effects and the identification of mitigation and follow-up requirements in this Regional Assessment has been based on a precautionary approach. As described in Chapter 3, there is a great deal of variability in the existence, coverage and quality of information on the existing environment of the Study Area. There are therefore gaps in several key areas, particularly given the size, diversity and complexity of the region. A lack of information on some components and issues means that assumptions must often be made that a species or activity is indeed present at particular locations and times, and is therefore "available" to be affected by future drilling activity. Similarly, the precautionary principle requires that certain mitigations (such as a pre-spud seabed survey and associated set-backs as required) be applied to all future wells in the Study Area, rather than only those located in identified high potential or sensitive areas of these species. The use of conservative environmental modelling and analysis (such as considering an "unmitigated" spill event) also represents a conservative and precautionary approach, as does the application of rigorous and often multi-layer regulatory review and compliance requirements and oversight measures in the design and implementation of exploratory drilling programs (Chapter 1 and Modules 1 and 2).

While the presence of data gaps and other uncertainty is inevitable given the scope and scale of the Regional Assessment (Chapter 1), through its analysis and engagement activities the Committee has attempted to identify key areas of uncertainty and risk, and has made a series of recommendations aimed at addressing these through on-going and future data collection and analysis. Where there is uncertainty or other concerns around the nature and magnitude of potential effects, the Committee has also made recommendations on how these should be addressed for future projects, often taking a precautionary approach where the type and level of risk involved warrants this.

Finally, and in terms of any associated risk of irreversible harm, the Committee recognizes that of particular concern to governments, Indigenous groups, stakeholders and the general public is the potential for an unplanned event, such as an oil spill, to occur during offshore drilling activities. Although these potential incidents have the potential to adversely affect any biophysical and socioeconomic components that come into contact with them, clearly the potential for, and possible magnitude and reversibility of, any such effects will depend on the specific nature and characteristics of the event. This includes the type and amount of material spilled, its eventual geographic extent, oceanographic conditions and the persistence of these materials in the environment. However, even if these effects are not permanently irreversible, they may last for years or even decades, which can seriously and fundamentally affect the natural environment and the well-being of people and communities. Although available statistics and required spill prevention measures suggest that a blowout event is an extremely unlikely occurrence, this issue is amongst the most important and commonly raised concern heard by the Committee (Chapter 2).

### 7.1.5 Summary and Conclusions

Discussions and determinations about the sustainability of a particular activity or decision must include consideration of a wide range of human and ecological factors, including those outlined above. Exploratory drilling is an important and required aspect of the oil and gas industry in Newfoundland and Labrador, which overall has provided significant socioeconomic benefits to this region and beyond. It is therefore key to the continuation and future growth of this sector, and thus to the economic sustainability of Newfoundland and Labrador at present. The adverse effects of individual exploratory drilling activities are, overall, not considered to be significant and are largely manageable through mitigation and follow-up measures included and described in this report. That being said, a number of important areas of concern, uncertainty and risk remain, which the Regional Assessment has sought to identify and make recommendations about in order to help address these in the future.

The Committee also notes that it is beyond its scope and mandate to make determinations about the overall sustainability of the oil and gas industry as a whole. While it is recognized that offshore exploratory drilling may lead to oil production – and indeed, that is its underlying objective – it does not necessarily do so. In the event that a particular exploratory drilling campaign leads to the discovery of commercially viable petroleum resources, and if the required licences are issued by the regulator, the potential effects and overall sustainability of that production project will require assessment and review under the appropriate, project-specific regulatory processes. Overall discussions, analysis and debates about the sustainability of the petroleum industry as a whole are also better placed within the larger public policy arenas, and addressed as required in the development of legislation, standards and guidelines by governments.

## 7.2 Relationship to Climate Change and Other Environmental Obligations

The Regional Assessment Agreement requires the Committee to consider the extent to which the effects of exploratory drilling projects hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change.

Environmental obligations are requirements applicable to the Government of Canada in domestic and international law, in relation to the protection of the natural environment. These obligations are set out domestically in federal legislation and regulations (with which compliance is a legal requirement). In international law, legally binding international instruments (e.g. conventions) to which Canada is a party can create environmental obligations. Commitments in respect of climate change are set out in legally binding and non-binding domestic and international instruments. This section uses the term "instruments" to refer collectively to the various legislation, regulations, policies, targets, plans and frameworks that Canada is a party to.

The IAAC has developed draft guidance for considering a project's effect on Canada's ability to meet its climate change and other obligations and commitments, which involves a two-step approach that includes:

1) Determining whether a project's effects could hinder or contribute to the Government of Canada's ability to meet an environmental obligation or climate change commitment; and

2) Determining the extent to which these effects could hinder or contribute to the Government of Canada's ability to meet the applicable obligation or commitment.

### 7.2.1 Canada's Environmental Obligations

Canada has numerous obligations related to the protection of the environment, which stem from a variety of agreements and protocols (Table 7.1), the majority of which are implemented through domestic legislation, regulation, policy, targets, plans or frameworks. Table 7.1 also summarizes the potential implications of exploratory drilling and associated activities in the Study Area for these applicable obligations and commitments.

**Table 7.1 Potential Implications of Offshore Exploratory Drilling on Canada's Ability to Meet its Environmental Obligations**

| Obligation | Relevant Potential Effect | Control Mechanism | Implications for Meeting Obligation |
|---|---|---|---|
| London Protocol | Operational discharges to the marine environment from drilling platform and support vessels. | Canada implements its London Protocol obligations via the Disposal at Sea provisions of the *Canadian Environmental Protection Act, 1999*. Sub-section 122(1) specifically excludes discharges from oil and gas operations from the definition of "disposal". | Neutral (neither hinders nor contributes to Canada's obligations) |
| Migratory Birds Convention | Birds are attracted to drilling platform lighting at night, leading to possible adverse effects, including injury or death. | Canada implements its Migratory Birds Convention obligations primarily via the *Migratory Birds Convention Act*, with which oil and gas operators must comply. | Potentially neutral, provided operators comply with the *Migratory Birds Convention Act* and implement associated mitigation and monitoring measures |
| United Nations Convention on Biological Diversity | Normal operations have not been shown to affect biodiversity.<br>Large oil spills, which have a low probability of occurrence (e.g. blowout) could affect abundance of affected species. | Canada has various legislation, with which oil and gas operations must comply, to protect biological diversity in the marine environment, including the *Species at Risk Act*, the *Oceans Act*, the *Fisheries Act* and the *Migratory Birds Convention Act*. | Neutral, provided operators comply with the legislation.<br><br>Small risk of hindering Canada's biodiversity obligations (with the exception of a large accidental hydrocarbon release, which is an unlikely event). |
| Montreal Protocol (Ozone) | None. Halon, which has been used in ship-board firefighting systems, is being phased out of use and is no longer used in the NL offshore. | Canada has implemented its Montreal Protocol obligations through the *Canadian Environmental Protection Act, 1999* and associated *Federal Halocarbon Regulations* and *Ozone-depleting Substances and Halocarbon Alternatives Regulations*. | Neutral. Ozone depletion is associated with halocarbons (e.g., HFCs, CFCs), the use of which has been phased out in Canada. |

| Obligation | Relevant Potential Effect | Control Mechanism | Implications for Meeting Obligation |
|---|---|---|---|
| The International Commission for the Conservation of Atlantic Tunas (ICCAT) | Tuna occur in the Study Area. Some people have expressed concern about potential effects of exploration drilling on tuna migration. | Proponents manage discharges and emissions in accordance with the C-NLOPB's *Offshore Waste Treatment Guidelines*. | Neutral. There have been no targeted studies, but general studies near production projects have not revealed any adverse effects on fish health. There are no known adverse effects of exploratory drilling on tuna. |
| Ballast Water International Convention | Vessels arriving from overseas destinations may introduce invasive species into the Northwest Atlantic. | Canada implements its Convention obligations via the *Ballast Water Control and Management Regulations* of the *Canada Shipping Act*. | Neutral, provided vessels comply with the regulations. |
| Agreement on Transboundary Movement of Hazardous Waste | None. | Not applicable to exploration drilling in the Study Area, which does not involve transboundary movement of hazardous waste. | Neutral. |
| Canada – U.S.A. Air Quality Agreement (acid rain, ozone) | None. | Canada has brought forward a Canada-wide Air Quality Management System (AQMS) that is a comprehensive approach for reducing air pollution. Canada implements its Air Quality Agreement obligations through the application of Canada-wide standards for air emissions. Canada also participates in a bi-lateral Air Quality Committee. | Neutral. Given the measures Canada has taken, and the approximately 1,200 km distance to the boundary with the United States of America, this agreement is largely irrelevant to exploratory drilling in the Study Area. |
| Boundary Waters Treaty | None. | The Boundary Water Treaty does not apply to oceans. | Neutral. |
| Ramsar Convention | None. | There are no Ramsar (wetland) sites within 1,000 km of the Study Area, including at any coastal areas that could be affected by an oil spill. | Neutral. |
| Gothenborg Protocol (Transboundary Air Pollution) | None | The Protocol is of interest to Canada because it addresses transboundary air pollution in the United Nations Economic Commission for Europe (UNECE) region, and is a key vehicle for reducing these pollutants, some of which may reach North America.<br>Canada has brought forward a Canada-wide AQMS that is a | Neutral. |

| Obligation | Relevant Potential Effect | Control Mechanism | Implications for Meeting Obligation |
|---|---|---|---|
| | | comprehensive approach for reducing air pollution. | |
| Minimata Convention (Mercury) | None. | Concerns mercury contamination of fish caught in fresh-water bodies. Not applicable to offshore exploratory drilling. | Neutral. |
| Vienna Convention (Ozone) | None | Similar to the Montreal Protocol, Canada implements its obligations through the *Canadian Environmental Protection Act, 1999* and associated *Federal Halocarbon Regulations* and *Ozone-depleting Substances and Halocarbon Alternatives Regulations*. | Neutral. |
| Stockholm Convention (Persistent Organic Pollutants) | None | At the federal level, key policies and legislation governing chemical substances in food, drugs, pesticides and products include the *Canadian Environmental Protection Act, 1999*, the *Pest Control Products Act* and the *Toxic Substances Management Policy*. | Neutral, provided proponents adhere to applicable requirements. Compounds that are prohibited for use in Canada cannot be used in exploration drilling in Canadian jurisdiction. |
| NAFO Convention | Reduced fishing opportunity | Canada is obliged to support and implement the NAFO convention and its goals. Canada accomplishes this through compliance with its various environmental protection legislation and policies, key ones being the *Fisheries Act*, the *Migratory Birds Convention Act*, the *Species at Risk Act* and other instruments listed in this table. | Neutral, provided proponents adhere to applicable requirements. |
| Polar Bear Conservation | None. | Polar bears do not typically occur in most parts of the Study Area. | Neutral. |
| MARPOL (International Convention for the Prevention of Pollution from Ships) | Vessel discharges may affect water quality. | Canada meets its MARPOL obligations primarily through application of the *Canada Shipping Act* and associated regulations. | Neutral, provided vessels comply with applicable regulations. |

| Obligation | Relevant Potential Effect | Control Mechanism | Implications for Meeting Obligation |
|---|---|---|---|
| Espoo Convention | Meeting applicable impact assessment (IA) requirements | Canada's meets its Espoo Convention obligations through various means, including the *Impact Assessment Act*. | Neutral, provided IA requirements are met. |
| UNCLOS (United Nations Convention on the Law of the Sea) | None. | Canada participates in the work of various bodies created under UNCLOS, including the International Seabed Authority (ISA), an organization created to administer the mineral resources of the Area (the seabed beyond national jurisdiction). | Neutral. There are no obligations specific to exploratory drilling. |
| Paris Agreement | Greenhouse gas (GHG) emissions from equipment and, if conducted, flaring. | As required under Article 4(19) of the Paris Agreement, Canada submitted its long-term low greenhouse gas development strategy to the United Nations Framework Convention on Climate Change in November 2016. | Hinder. Any project that emits GHGs contributes to Canada's overall emissions and therefore potentially hinders the ability to meet targets. |

### 7.2.2 Climate Change

Canada has committed, under the Paris Agreement, to reduce its GHG emissions by 30 percent below 2005 levels by the year 2030. There is also an overall effort to limit the global average temperature rise to below 2 degrees Celsius and pursue efforts to limit the increase to 1.5 degrees Celsius.

The Paris Agreement also aims to foster climate resilience and lower GHG development, as well as to move toward a lower carbon future. As required under Article 4(19) of the Paris Agreement, Canada submitted its long-term low greenhouse gas development strategy to the United Nations Framework Convention on Climate Change on November 19, 2016 at the Conference of the Parties (COP). This mid-century climate change strategy looks beyond 2030 to start a conversation on ways of reducing emissions for a cleaner, more sustainable future by 2050 (Government of Canada 2016).

Exploration is the first phase of the petroleum development cycle, and there are thus no upstream activities and therefore, no upstream emissions. Downstream emissions would occur only after oil is discovered, confirmed to be of sufficient quantity and quality to constitute a commercial discovery, and leading to a subsequent oilfield production project being proposed, approved and implemented. Based on data available from the C-NLOPB, 170 operators have drilled 229 exploration and delineation wells since 1966 in the Canada-NL Offshore Area, which have resulted in only five oil production projects being developed (Hibernia, Terra Nova, White Rose, Hebron) or proposed (Bay du Nord).

Exploration drilling produces atmospheric emissions from several sources, primarily:

- Fuel combustion from engines and other mechanical equipment aboard the drill rig, support vessels, and helicopters; and

- Flaring during well test activity, in the event that well testing is required.

Emissions from these activities are likely to include carbon dioxide ($CO_2$), carbon monoxide (CO), sulphur dioxides ($SO_X$), nitrogen (nitrous) oxides ($NO_X$), and particulate matter (PM). A number of these are GHGs and their combined effect is expressed in carbon dioxide equivalent ($CO2_e$). As described in Modules 2 and 14, recent EAs for offshore exploratory drilling programs in the Study Area have included estimates of the air emissions that may be associated with the proposed project in question, including calculations of these potential emissions by key component and activity based on the types of equipment that will or may be used and the planned duration and other characteristics of the program. It is also typical practice to base these calculations on reasonable worst-case scenarios, and thus estimates typically represent maximum-emission scenarios.

These assessments have generally found that predicted GHG emissions from an individual project are low and insignificant in comparison to GHG targets, and any individual drilling program would have virtually no effect on current estimates of future global climate change (see Modules 2 and 14). In the recent environmental assessment (EA) for CNOOC Petroleum North America ULC's Flemish Pass Exploration Drilling Project 2018-2028, calculations of potential GHG emissions from that proposed drilling program resulted in the following conclusion being made in the project's Environmental Impact Statement (EIS) (Amec 2018, p 745):

> *To provide context for the relative magnitude of Project GHG emissions, the total annual GHG emissions for 2015 for the Province of Newfoundland and Labrador was 10.3 Mt CO2e and the total Canadian GHG inventory was 722 Mt CO2e that same year… ; the Project represents approximately 0.29 percent of the provincial inventory and 0.004 percent of the national 2015 inventory. In 2015, 189 Mt CO2e was attributed to the oil and gas sector; the Project represents approximately 0.016 percent of the oil and gas sector GHG emissions in 2015.*

That EA also showed that the aggregate predicted GHG emissions from that project comprised 0.006 percent of federal target for 2030.

Under the federal Greenhouse Gas Reporting Program (GHGRP), the reporting threshold was recently reduced (from 50 kt to 10 kt of $CO_{2eq}$.), which resulted in a number of drill rigs operating offshore Newfoundland and Labrador reporting their GHG emissions (see *https://climate-change.canada.ca/facility-emissions/*)

Based on the GHG emissions estimates presented in recent EAs (as summarized in Module 2), the average GHG emissions for a single well drilling campaign are presented in Table 7.2. Using these estimated "per well" calculations, the table below also calculates the total potential GHG emissions associated with the drilling of 100 wells, as an indication of the total levels of GHG emissions that could be associated with future exploratory drilling activity in the Study Area in the coming period.

**Table 7.2 Potential GHG Emissions for a Single Exploratory Drilling Well and for 100 Wells**

| | |
|---|---|
| **Average GHG Emissions per Exploration Drilling Program[1] ($tCO_2e$/well)** | 52,641 – 61,806 |
| **Total GHG Emissions per 100 Exploration Drilling Programs ($tCO_2e$/100 wells)** | 5,264,103 – 6,180,603 |
| Note: [1]Includes routine and non-routine activities (e.g. well testing) | |

The cumulative GHG emissions for 100 new wells over the next 10-12 years were then converted to annual cumulative emissions to allow for comparison to the federal GHG targets (which are on an annual basis), the results of which are provided in Table 7.3. As indicated, the estimated annual GHG emissions for 100 wells are predicted to contribute 0.07 – 0.1 percent of the federal 2020 GHG target and 0.09 - 0.12 percent of the federal 2030 target.

**Table 7.3 Estimated Annual GHG Emissions from 100 Exploratory Wells in Comparison to Federal Targets**

| | **Calculated Annual GHG Emissions for 100 Wells ($MtCO_2e$/year)** | **Federal GHG Emissions Targets[1] ($MtCO_2e$/year)** | |
|---|---|---|---|
| | | **2020** | **2030** |
| | 0.439 – 0.618[3] | 607 | 513 |
| Contribution to GHG Targets | — | 0.07%-0.10% | 0.09%-0.12% |
| Sources [1] ECCC (2019)<br>[2] Total annual GHG emissions for 100 wells ranging over 10 to 12 years | | | |

### 7.2.3 Summary and Conclusions

Any activity that adds to Canada's atmospheric emissions potentially has some type and level of implications for the country's ability to remain within its emissions targets, and thus for Canada's ability to meet its climate change commitments. Emissions from the exploration drilling activity are not immaterial, but constitute a relatively small fraction of national GHG targets. Without a full analysis of all emitting sectors and their expected contributions for the target years, it is not possible to say precisely what the contribution of these emissions from exploratory drilling in the Study Area would be, nor their implications for Canada meeting its emission targets. Given the small portion of total emissions it would generate, it is considered unlikely that exploratory (and delineation) drilling itself would hinder Canada's ability to meet its emissions targets. The Committee has therefore not made a specific recommendation on this particular issue.

As reflected in the summary analysis provided above, it is also not likely that exploration drilling and associated activities would hinder Canada's ability to meet its other environmental obligations. However, a large unplanned release of oil, such as from a blowout, could hinder Canada's ability to meet its obligations under the United Nations Convention on Biological Diversity, if it were to cause widespread effects on wildlife (see Table 7.1). Based on the history of offshore exploration drilling, as well as numerous control mechanisms that are in place to prevent such incidents, this scenario is considered unlikely to occur.

## 7.3 Intersection of Sex and Gender with Other Identity Factors

The Regional Assessment Agreement requires consideration of the intersection of sex and gender with other identity factors. This section explores whether and how exploratory drilling and associated activities in the Study Area might affect different groups of people in different ways and to varying degrees, and to identify ways to address any such differences as well as to help ensure a more equitable distribution of benefits.

### 7.3.1 Relevance and Key Issues in Offshore Exploratory Drilling

IAAC has published *Interim Guidance: Gender-based Analysis Plus in Impact Assessment* (IAAC 2019c) that explains how to consider this factor in impact assessments and associated decision-making.

The potential gender-based analysis plus (GBA+) issues and approaches identified in the guidance tends to focus on long-term, large-scale development projects that may substantially affect people and communities. As noted previously in Section 7.1.3, this differs considerably from offshore exploratory drilling programs, which are typically short-term (measured in days) activities that occur far from land and have far less potential to result in these types and levels of adverse socioeconomic effects. They also primarily employ an existing workforce that may come from within or outside the province, where offshore workers typically rotate between onshore and offshore on a several week schedule. Therefore, exploratory drilling projects typically do not result in social issues common to larger, long-term onshore development projects (see earlier Section 7.1.2). These issues are therefore not prevalent in individual exploratory drilling projects.

The oil and gas industry in general (and particularly its offshore components and activities) has traditionally been male-dominated, and males have thus benefited disproportionately from employment-related benefits in the past. Within the Canada-NL Offshore Area, for example, the four producing projects (Hibernia, Terra Nova, White Rose, Hebron) collectively employed 658 female workers as of December 31, 2018, comprising 14 percent of their total workforce (Hibernia Management and Development Company, 2019; Terra Nova-Suncor Energy; 2019; ExxonMobil Canada Properties, 2019; Husky Energy 2019). There are now increasing opportunities for other genders to work in the industry, including at offshore sites or in the various shore-based functions that support offshore activities. Although females or people with diverse identities are increasingly working in the sector, both onshore and offshore, some barriers continue to exist (Stantec 2011). There is also evidence in some oil and gas jurisdictions of harassment and unhealthy gendered expectations for both men and women (Parkland Institute 2017).

Despite the disproportionate number of males employed in the industry, there are, however, success stories highlighting the achievements that some companies have made in gender equity. For example, PF Collins, a customs brokerage firm in St. John's, reports that 48 percent of the company's total staff and 54 percent of its management team are women (Stantec 2019). Another example is East Coast Catering, which provides food services for the oil and gas industry. Approximately 40 percent of that company's workforce are women, and 30 percent have self-identified as Indigenous. East Coast Catering is currently engaged in a number of extremely successful Indigenous joint venture partnerships in Newfoundland and Labrador, Nova Scotia and Ontario, the most recent example of which has been its partnership with the Mi'kmaq of Nova Scotia to provide services on two offshore facilities in Nova Scotia, a first of its kind in Canada's offshore (Stantec 2019). While there are no studies specific to the Newfoundland and Labrador oil and gas sector, studies conducted in other jurisdictions

show that, in many cases, women and other under-represented groups are more likely to be employed in industries that support oil and gas work such as catering, procurement or administration (IHS Global Inc. 2016).

Visible minorities have not been well represented in this industry to date. However, as companies strive to maximize their labour pool and enhance the diversity of their workforces, the involvement of visible minority groups in this industry is increasing.

The Benefits Plans required for offshore oil and gas development and production projects by the C-NLOPB include requirements for Diversity Plans, which will normally set out employment equity measures with an explicit objective to facilitate the participation of designated groups. These Diversity Plans will typically detail a proponent's policies and programs respecting gender equity, supportive work environments, anti-harassment, anti-discrimination, and affirmative action, as well as the various supports that operators and their contractors will employ to raise awareness of employment and business opportunities with various community groups and training institutions. These measures reduce or remove barriers and power imbalances that have traditionally prevented under-represented groups from participating in the industry. The C-NLOPB uses a number of key elements to assess the adequacy of a Diversity Plan. Operators must also report regularly on project employment by gender and by other categories, as well as describe the nature, implementation and outcomes of their associated recruitment and retention, workplace and community development programs designed to optimize the participation of women and other traditionally underrepresented groups in project related employment, training and business opportunities. Operator's diversity reports are publicly available online. Operators must also comply with applicable legislation, such as federal *Employment Equity Act*, and consider relevant guidance, such as the Federal Contractors Program, as appropriate when preparing its Diversity Plan. While such Diversity Plans are not required by the C-NLOPB for exploration drilling projects, most if not all offshore operators have their own human resources diversity policies to guide the hiring and workplace practices.

Indigenous peoples may experience effects differently from the general population, due to their unique cultural and historical context. This can include their cultures, traditions and their specific worldviews and belief and knowledge systems, including the manner in which they value the environment and in which they view potential effects to it (Chapter 6). In terms of potential benefits, for Indigenous peoples in particular, the resource sector is a major employer nationally but disparities remain within certain occupations including senior management positions.

Other groups that might experience effects differently include people with a physical or mental disability, or people that self-identify as lesbian, gay, bisexual, transgender, queer or other identities. While there are statistics available to quantify the number of persons from these diverse groups employed with producing oil projects in the industry overall, statistics of this nature for exploration activities in Newfoundland and Labrador are currently not available. As technology plays an increasing role in the offshore sector (such as through remote operation of many aspects of offshore facilities) there may be more opportunities for those with physical or other limitations to become further involved in this industry.

Educating students about the types of jobs that exist in the industry and prospects for employment in those roles is an important aspect of growing a more diverse workforce. To this end, the federal and provincial governments and industry organizations established the Petroleum Industry Human Resources Committee (PIHRC) in 1998. PIHRC is the primary industry resource for career information and the promotion of careers in the Newfoundland and Labrador oil and gas industry. It identifies labour market issues in the oil and gas sector

by drawing on current or commissioned research, and works with or through other agencies, such as government departments, school districts and educational institutions to provide information to students and others on opportunities and requirements. The industry and the Government of Newfoundland and Labrador work with educational institutions to ensure there is training available for people who wish to work offshore, in relevant fields. For exploratory drilling, benefits are usually in the form of training and employment opportunities, service contracts, or in the provision of supplies and services as needed during operations.

### 7.3.2 Summary and Conclusions

In the Newfoundland and Labrador oil and gas sector there are targeted recruiting systems in place to support underrepresented groups interested in working in the offshore. There are also diversity reporting requirements for the industry, although currently only for production projects which have far longer durations than short-term exploratory drilling projects. There is currently a lack of data regarding non-binary gender or other gender-identity factors among the current exploratory drilling work force; therefore, it is not known to what extent these groups are represented. Proponents will need to continue to advance hiring workplace policies and practices to increase and retain diverse workplaces. These types of actions can work to support systemic change that creates a sector in which opportunities are more equitably distributed.

## 7.4 Committee Findings and Recommendations

Each of the Committee's recommendations as outlined previously in Sections 3.5 and 4.6 and summarized in Chapter 8 are intended to help avoid or reduce the potential adverse effects of offshore exploratory drilling in the Study Area and/or enhance the potential socioeconomic benefits of these activities, and are therefore relevant to the various themes addressed in the preceding sections. In addition, the Committee recommends that:

1) **The Benefits Plans developed by operators for proposed exploratory drilling programs in the Study Area and submitted to the C-NLOPB be made publicly available (with allowances for any commercially sensitive information to be redacted as appropriate prior to release).**

2) **It is also recommended that Diversity Plans specific to exploratory drilling programs should be required by the C-NLOPB for future such programs in the Study Area, which should be made publicly available.**

## 7.5 References

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# 8 SUMMARY AND CONCLUSIONS

The following sections provide a summary of the main outcomes and recommendations resulting from the Regional Assessment.

The Committee understands that the federal Minister of the Environment and Climate Change intends to make a regulation, informed by the findings of this Regional Assessment (Section 1.4), which will set out the conditions that future exploratory drilling projects in the Study Area would need to meet in order to be exempt from federal impact assessment (IA) requirements under the *Impact Assessment Act.* In some cases, the Committee's recommendations are directed specifically to the federal Minister of the Environment and Climate Change for consideration in developing and implementing that regulation. In other cases, recommendations are directed to other federal or provincial government departments and agencies or other parties that will not likely form part of such a regulation, but rather, would be implemented in other ways.

It should be noted that the summary of the Committee's recommendations provided below reflects a consolidated and somewhat abridged version of these, with further details and context provided in Sections 3.5 and 4.6 of this report. In addition, the ordering (and thus, the numbering) of these recommendations in this section therefore does not correspond to their presentation earlier in this report.

## 8.1 Recommendations Relevant to the Ministerial Regulation

### 8.1.1 Recommended Requirements for Future Projects

The Committee recommends that the following measures be incorporated within the planned regulation as specific requirements for all future exploratory drilling activities in the Study Area seeking exemption from federal IA requirements:

1) **The various mitigation and follow-up measures that have been included as conditions of environmental assessment (EA) approval for recent exploratory drilling projects in the Study Area under the *Canadian Environmental Assessment Act,* 2012 (CEAA 2012) (as summarized earlier in Section 4.5) should be requirements for all future exploratory drilling projects in the Study Area** (Section 4.6.1, p 113).

2) **Operators undertaking exploratory drilling activity in the Study Area should be required to assign trained (to Environment and Climate Change Canada – Canadian Wildlife Service (ECCC-CWS) standards, once finalized) and experienced seabird observers on drill rigs and supply vessels, whose primary responsibility is to make observations and collect seabird survey data during these activities** (Section 4.6.1, p 113 ).

3) **Operators be required to prepare and submit their Fisheries Communication Plan at the time of, and as part of, their application for an Operations Authorization (OA) from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), in order to ensure its timely development and implementation. The communication measures outlined in that Plan should be implemented throughout the OA review and approval process, as well as during the planning and conduct of the proposed exploratory drilling program in question** (Section 4.6.1, p 113).

4) **Operators commence the notification process at least two months prior to starting a well (as opposed to the two weeks notice that has previously been specified), and provide subsequent updates and information as these become available. Operators should also be required to demonstrate that (and how) they will provide more timely notifications to these parties regarding planned rig movements** (Section 4.6.1, p 113).

5) **Operators be required to demonstrate concrete, measurable steps to minimize light attraction effects on migratory birds (including the additional mitigation and monitoring requirements outlined previously in Section 4.6)** (Section 4.6.1, p 114).

6) **In addition to observer-based monitoring, operators should incorporate new technologies (e.g. radar, infrared imaging, high definition aerial surveys, telemetry studies, etc.) as they become available into their seabird monitoring programs to complement research on, and mitigation of, light attraction** (Section 4.6.1, p 114).

7) **Operators include general awareness regarding seabird strandings as part of their overall training / orientation programs for offshore workers** (Section 4.6.1, p 114).

8) **For any future exploratory drilling activities in the Study Area that are proposed to occur within a currently defined Marine Refuge (Fisheries and Oceans Canada, DFO) or a Northwest Atlantic Fisheries Organization (Northwest Atlantic Fisheries Organization, NAFO) Fisheries Closure Area, any exemption from the federal IA process be contingent on the operator demonstrating that any risks to intended biodiversity / conservation outcomes of that area will be avoided or mitigated.**

   **Specifically, it is recommended that the operator be required to outline, in its project notification to the Impact Assessment Agency of Canada (IAAC) (see Section 8.1.2 below), its plans (to be developed in consultation with DFO) to address any effects of these activities on the various environmental characteristics and sensitivities present within the special area(s). In the case of a Marine Refuge, it is recommended that the operator be required to provide evidence in that submission that the Minister of DFO is satisfied that that risks to intended biodiversity outcomes are avoided or mitigated as per existing DFO policy, and that this determination by DFO be made on clearly defined criteria which should be clearly referenced in the above** (Section 4.6.2, p 115).

### 8.1.2 Procedural Recommendations: Improving Transparency

The recommendations provided below relate to the development and implementation of the Ministerial Regulation, and have not been provided in an earlier section of this report.

9) **The Committee recommends that the IAAC consult with Indigenous and stakeholder groups and the public in the development of the above referenced Ministerial Regulation.**

Throughout the Regional Assessment process, the Committee has heard concerns from some Indigenous and stakeholder groups that the potential removal of IA requirements for future exploratory drilling projects in the Study Area will mean that there is no process for interested and potentially affected parties to be aware of, nor consulted on, future projects. There were therefore repeated calls to ensure that there remains an adequate

public notification and input process for future such projects even in the absence of a detailed project-specific assessment.

10) **It is therefore recommended that any such regulation, and the associated procedures for seeking and confirming such an exemption, include and address the following:**

    a) **The operator seeking such an exemption be required to provide a notification and description of its proposed exploratory drilling activities to the IAAC.**

    b) **In that submission, the operator provide details clearly demonstrating its planned compliance with the conditions for exemption as outlined in that regulation (or demonstrated equivalencies for any measures that are clearly shown to be not technically or economically feasible for that particular program). The operator must also demonstrate that it has undertaken engagement with Indigenous and stakeholder groups on the planned exploratory drilling program in question, including describing the nature and outcomes of that engagement.**

    c) **This submission by an operator be announced publicly and made available by the IAAC on its Registry for a 30 day public review period within which all interested parties will have the opportunity to provide input to the IAAC in making the determination referenced below.**

    d) **Once a determination has been made by the IAAC whether or not the proposed exploratory drilling program in question is in conformance with the regulation (and thus, whether it is or is not exempt from federal IA requirements), a notification of this outcome be announced publicly and made available by the IAAC on its Registry.**

11) **If, as described above, a determination is made that a proposed drilling program is in conformance with the regulation and thus is exempt from federal impact assessment requirements, it is recommended that such an exemption be linked to a defined time period (grandfathered), such as for the duration of the Exploration Licence in question**. This will help allow the operator to plan and implement its drilling program with early and on-going clarity on its obligations, even in the event that there is a future change to the regulation.

12) **For any proposed exploratory drilling activities in the Study Area that are not in conformance with the aforementioned regulation, and are thus considered to be a designated project that requires individual IA review, it is recommended that this project-specific IA be scoped to focus on the particular issue(s) that led to requiring this impact assessment (namely, the specific area of non-conformity with the conditions for exemption as outlined in the regulation). This scoping should be clearly reflected in and facilitated through the eventual project-specific guidelines developed and issued by the IAAC.**

### 8.2 Updating and Implementing the Regional Assessment and the Ministerial Regulation

13) **It is recommended that the Regional Assessment (including its associated Geographic Information System (GIS) decision-support tool) must be viewed and used as a "living" and "evergreen" product**

**that is reviewed annually and updated as required, which should include identifying and incorporating new or updated information that is relevant to the assessment** (Section 3.5.1, p 89).

14) **It is recommended that the above referenced Ministerial Regulation be reviewed and updated as required based on the availability of new information or analysis obtained through an update to this Regional Assessment. The process for updating the regulation should include consultation with Indigenous and stakeholder groups and the public** .

15) **It is recommended that within four months of the submission of the Regional Assessment Committee's Final Report, the Parties that were signatories to the Regional Assessment Agreement develop and publicly communicate their plans for the long-term housing, maintenance and use of the Regional Assessment and its associated GIS decision-support tool to Indigenous and stakeholder groups.** This should include the development and implementation of clearly defined and documented procedures for future updates to the Regional Assessment, including: a) specifying the roles and responsibilities of other government departments and agencies in such updates through detailed and binding MOUs and associated annual workplans; b) associated data standards and protocols; and c) ensuring that adequate funding and resources are available and committed to by all responsible organizations .

16) **The Committee also recommends that all parties with responsibility for one or more recommendations of this Regional Assessment provide regular (annual) updates on the status and implementation of these** .

17) **It is recommended that a "Regional Assessment Oversight Committee" be established to provide an on-going and consistent oversight and advisory function for the use and future updating of this Regional Assessment**. This Committee should report to senior representatives of each of the Parties that were signatories to the Regional Assessment Agreement, and be supported by IAAC staff, and will provide advice on and help guide (Section 4.6.4, p 117):

a) The annual review and updating of the Regional Assessment, and the consideration and incorporation of these updates in the review and updating of the associated Ministerial regulation (as required);

b) Tracking and reporting annually on the progress of the implementation of the Regional Assessment recommendations;

c) The maintenance and further development of the GIS decision-support tool, including its associated datasets and analytical functionality; and

d) Reviewing, evaluating and providing advice on the IAAC's overall Regional Assessment procedures and policies, as informed by the experiences of and any associated lessons learned from this assessment, as well as the manner and effectiveness with which these assessments are being used to inform decision-making.

18) **It is recommended that this Committee comprise a variety of interests and areas of expertise, including representatives of Indigenous groups, the fishing and oil and gas industries and environmental organizations, selected through established, merit based, application processes**. **The Oversight Committee should also have established links with other IAAC advisory committees, including the Indigenous Advisory Committee and the Technical Advisory Committee on Science and Knowledge** (Section 4.6.4, p 117).

### 8.3 Recommendations Directed to Other Parties

The Committee recommends that the following be implemented by other federal or provincial departments and agencies or other organizations as identified herein:

19) **In the course of completing its work, the Committee has become aware of a number of on-going or planned studies or scientific reviews that should be incorporated into future updates of the Regional Assessment immediately upon their completion (see earlier list in Section 3.5)** (Section 3.5.1, p 89).

20) **It is recommended that DFO increase and accelerate its research on Atlantic salmon to help address this important issue. It is further recommended that DFO develop its research plan in collaboration with Indigenous and stakeholder groups, and communicate its research plan and the eventual findings of that research to these groups** (Section 3.5.1, p 89).

21) **It is recommended that ECCC, in partnership with other relevant stakeholders including the oil and gas industry, increase its research into the seasonal presence of Leach's Storm-petrels and other relevant species in the Study Area and on the species' behaviour and susceptibility to lights from drilling platforms and vessels, including the potential role of offshore operations in recently observed population declines** (Section 3.5.1, p 90).

22) **It is recommended that the commercial fisheries data (landings statistics and geospatial information) be made available by DFO in a more timely, accessible, and useful manner. This includes making these data publicly available through a website or other such means as opposed to requiring users to make individual data requests to DFO** (Section 3.5.2, p 90).

23) **It is also recommended that DFO explore alternative means of packaging and providing this commercial fisheries data to help resolve or reduce the current issues around confidentiality and associated data redaction** (Section 3.5.2, p 90).

24) **It is recommended that representatives of the oil and gas industry, applicable regulatory and resource management agencies (including the C-NLOPB and DFO) and the fishing industry work together, through the One Ocean initiative, to develop and implement a protocol for gathering, documenting and sharing this information and knowledge to better understand key fishing activities, areas and times on a regional scale** (Section 3.5.2, p 91).

25) **It is recommended that representatives of the oil and gas industry, applicable regulatory and resource management agencies (including the C-NLOPB, DFO and ECCC), Indigenous groups and the fishing industry work together to develop and implement a protocol for gathering, documenting and sharing**

**information and knowledge about key environmental components and sensitivities in the Study Area (through associated mapping at an appropriate and an acceptable scale of detail) for future use by interested parties. This information should be incorporated into future updates of the Regional Assessment** (Section 3.5.2, p 91).

26) **It is recommended that DFO-NL Region's marine mammals and sea turtles sightings dataset be made publicly accessible (along with a detailed description of the dataset and what it contains including any limitations) as opposed to requiring users to make individual requests to DFO for these data** (Section 3.5.2, p 91).

27) **It is recommended that DFO develop, communicate and implement standards / certifications for marine mammal observers that set out specific training and experience requirements for these personnel** (Section 3.5.2, p 91).

28) **It is recommended that ECCC-CWS develop, in consultation with industry, protocols for systematic surveys of stranded birds on offshore platforms and vessels, and work with operators to implement these protocols on offshore platforms and vessels** (Section 4.6.1, p 114).

29) **It is recommended that the C-NLOPB specifically consider overall information availability, data gaps and associated environmental risks in future decisions around whether and when to issue licences in data deficient areas as part of its scheduled land tenure process** (Section 4.6.2, p 115).

30) **For each of the various types of identified special areas found within the Study Area (Marine Refuges, Fisheries Closure Areas, Ecologically and Biologically Significant Areas (EBSAs), Sensitive Benthic Areas (SiBAs), Vulnerable Marine Ecosystems (VMEs)), it is recommended that the relevant authorities accelerate scientific review and analysis of these areas to determine if their various components and characteristics warrant additional protection, mitigation or follow-up measures for any future exploratory activity that may take place within them** (Section 4.6.2, p 116).

31) **For any proposed exploratory drilling projects in the Study Area that do not require project-specific IA review under the *Impact Assessment Act* as a result of this Regional Assessment, it is recommended that the C-NLOPB continue to ensure that adequate and appropriate modelling is completed or otherwise in place regarding: a) drill cuttings and their dispersion, and b) the predicted fate and behaviour of potential petroleum spills, and that these be included as part of its authorizations and approvals processes for the drilling program in question** (Section 4.6.3, p 116).

32) **As part of the notification of Indigenous groups in the event of an offshore spill, it is recommended that the C-NLOPB require that operators include any associated imagery around the nature and extent of the spill, and information on any affected marine biota** (Section 4.6.3, p 116).

33) **It is recommended that once DFO's forthcoming additional guidance on mitigating effects to corals and sponges has been developed and released, these measures be incorporated into a future update of this Regional Assessment** (Section 4.6.3, p 116).

34) **Should the *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* be revised as a result of DFO's on-going review of it, it is recommended that any**

**new mitigations/standards be included in future update of this Regional Assessment** (Section 4.6.3, p 117).

35) **It is recommended that the information and analysis provided in this Regional Assessment, including the associated GIS decision-support tool, be considered by the C-NLOPB in its future decisions as part of the scheduled land tenure process. This should include consideration of potential cumulative effects and their management (as required) through associated planning (licencing) decisions linked to the scheduled land tenure process, in consultation with relevant expert authorities** (Section 5.4, p 147).

36) **As there is a clear relationship between the information contained in this Regional Assessment (and especially, the associated GIS decision-support tool) and the C-NLOPB's Strategic Environmental Assessments (SEAs) for Eastern Newfoundland, it is also recommended that the Board seek to utilize this tool as part of any future SEA updates (and to inform its associated licencing processes) to avoid unnecessary duplication** (Section 5.4, p 147).

37) **It is recommended that as part of future updates to this Regional Assessment, the C-NLOPB undertake further development of the exploratory drilling scenarios described in the preceding sections, and generate periodic updates of those scenarios as new data become available** (Section 5.4, p 147).

38) **It is recommended that government assume responsibility for offshore-related cumulative effects assessment and management through a planning process directed by a dedicated agency. The DFO Marine Spatial Planning initiative might be considered as an appropriate vehicle through which to do this** (Section 5.4, p 147).

39) **It is recommended that the Benefits Plans developed by operators for proposed exploratory drilling programs in the Study Area and submitted to the C-NLOPB be made publicly available (with allowances for any commercially sensitive information to be redacted as appropriate prior to release)** (Section 7.4, p 179).

40) **It is recommended that Diversity Plans specific to exploratory drilling programs should be required by the C-NLOPB for future such programs in the Study Area, which should be made publicly available** (Section 7.4, p 179).

### 8.4 Conclusion

The Committee believes that its recommendations provide a sound basis for a new regulatory framework for future offshore oil and gas exploratory activities in the Study Area. The report also provides a number of new processes and initiatives that are designed to ensure that the proposed framework is further developed and improved.

By undertaking a comprehensive, regional-scale analysis the Committee feels that efficiency is served by establishing the criteria that will need to be met by future exploratory drilling projects before they receive regulatory approval, while reducing the need for lengthy, project-specific IA reports that to date have rarely added new information or findings to the decision-making process. The measures that are required before approval of exploratory drilling is granted reflect current best practice and help to increase transparency of the approval process for both industry and other stakeholders, while at the same time identifying specific

environmental protection requirements for future exploratory drilling in the Study Area. Increasing the efficiency of the IA process does not mean that operators receive a "free pass" to drill. Their obligations to meet environmental, safety, communications, and economic and social benefits requirements are intended to be more stringent under the anticipated Regional Assessment Regulation than was the case under the former project-specific EA process. Where operators are unable to meet the requirements of the Regional Assessment Regulation, they will be subject to project IA requirements as is presently the case.

The Committee's recommendations, which are grouped into three broad categories, offer the opportunity for continuous improvement and development of the Regional Assessment process and, by extension, more effective assessment, decision-making and management of offshore oil and gas exploratory drilling.

Fundamental to the Regional Assessment is the recognition that if it is to perform as a planning tool it needs to be a "living" document – reviewed and updated on a regular basis, with any implications for the IA process subsequently being reflected in changes, as necessary, to the associated Regulation. To ensure that this occurs, the Committee's recommendations include that an Oversight Committee be established, comprising Indigenous and stakeholder interests, with responsibility for ensuring that the Regional Assessment remains current and incorporates the best information and practices available. As input into that updating process, this Report identifies: 1) a number of on-going studies, information from which, when it becomes available, could be highly relevant to the Regional Assessment; 2) a number of important data gaps and recommendations on how these might be addressed; and 3) a number of recommendations for procedural changes that would see new data incorporated into the Regional Assessment in a more timely and effective fashion.

As part of its efficiency and effectiveness mandate, and in keeping with the goal of maintaining the currency of the Regional Assessment, it incorporates a GIS decision-support tool, which allows rapid access to visual displays of data relevant to the assessment. Integrated with these data is a body of text that includes: baseline data and existing knowledge on individual environmental and socioeconomic elements; descriptive summaries of offshore exploratory drilling activities and regulatory processes; and information on potential environmental and social effects of exploratory drilling activities and a range of measures to manage those effects.

The GIS platform developed is a first attempt at developing a decision-support tool that the Committee believes has the potential for further development and even greater utility. By bringing information together in this format it allows decision-makers and other users a better understanding of the "what, where and when" (often in a dynamic fashion) of offshore activities, the environment within which these activities occur, and the interrelationships between them. The Committee believes that consolidating this information in one place, along with the system's user-friendly format and the expectation that it will be maintained, is a valuable addition to the IA process. In addition, the Committee believes that the analytical potential of this GIS tool must continue to be developed, for example, to help establish a better scientific basis for risk assessment of exploratory drilling within the Study Area and a firmer foundation for policy and management regarding offshore exploration and development.

The Committee was faced with the dilemma of whether or not to recommend that certain areas within the Study Area should be closed to exploratory drilling, as was advocated by a number of participants. As outlined in the report, no government agency with offshore environmental responsibility provided advice that supported designating such exclusion areas or offered recommendations for additional mitigative measures within such areas. It is clear, however, that more needs to be done to ensure and demonstrate that sensitive areas are

getting the protection they require. This includes encouraging scientists to have a more public and transparent approach to the work they do, thereby allowing Indigenous groups, stakeholders and others to have a better understanding of the science that goes into policy and management decisions.

The Report is intended as both a decision-support and a planning tool. One example is the treatment of cumulative effects. In this case the Committee had neither the time nor the capacity to evaluate cumulative effects in a predictive / quantitative sense, but rather the focus of the assessment was from a planning perspective with the outcome being a suggested mechanism by which cumulative effects might best be managed.

We encourage readers to remember that exploratory drilling is the focus of the study, and the nature and scale of it and its associated activities and effects need to be considered in context. For example, the evidence for climate change is acknowledged and moving to a reduced dependence on fossil fuels is recognized as one of a number of actions that could have beneficial effects. The Committee was specifically charged with considering the implications of offshore drilling for Canada's commitments to meet its greenhouse gas (GHG) emissions targets. In this case, GHG emissions from exploratory drilling were predicted to make only a small contribution to total emission levels and as such are unlikely to affect Canada's ability to meet such targets. While there are no specific recommendations being made in this regard, it is recognized that GHG emissions are important and that there are more appropriate places to tackle this issue than in this Regional Assessment.

One of the most important aspects of the Regional Assessment was with respect to the engagement process adopted. Notwithstanding the short timeframe given to complete this work, every effort was made to make the process open, transparent, participative and fully inclusive. Many Indigenous groups and stakeholders gave generously of their time and experience to contribute to the assessment, and the Committee is truly grateful for their perspectives. Given the range of views the Committee heard, not all contributions have found their way into specific recommendations, but this notwithstanding all views were listened to and were carefully considered in the preparation of the report. The Committee is firmly of the belief that governments must continue to adopt a fully inclusive approach of this type to this and other similar decision-making processes if a better understanding of different perspectives is to be achieved and more collaborative and consensual outcomes are to result.

As noted, this is the first Regional Assessment to be undertaken under federal IA legislation in Canada, and others will follow. A number of important lessons have been learned from this exercise that could be useful both to subsequent assessments, and to the ongoing maintenance and development of this Regional Assessment. A summary of these lessons learned will be included in the Final Report, rather than this draft, as there may be additional items to be included following the public review and final revision stages of this assessment process.