Tilt Cove Exploration Drilling Program

Chapter 18: Conclusions

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Table of Contents

LIST OF TABLES

18.0 CONCLUSIONS

Suncor is proposing an exploration drilling program on EL 1161 in the Jeanne d'Arc Basin (the Project). The Project proposes the drilling up to 12 to 16 exploration and delineation / appraisal wells over the temporal scope of the Project.

This chapter provides the following:

- Summary of potential Project-related effects on selected VCs (Section 18.1)
- Summary of mitigation, monitoring, and follow-up proposed for the Project (Section 18.2)
- Summary of residual environmental effects, after mitigation has been applied, for the selected VCs (Section 18.3)
- Summary of predicted environmental changes and effects and their relationship to Federal jurisdiction and decisions (Section 18.4)
- Conclusion, including significance determinations for the selected VCs (Section 18.5)

18.1 Summary or Potential Effects

As discussed in Chapter 4, in consideration of the requirements of CEAA 2012 and guidance issued by the IAAC) (formerly the CEA Agency 2019; Appendix A), Stantec has developed EA methods for the preparation of this EIS. The method used to conduct the EA for the Project is based on a structured approach consistent with international best practices and with the method used by Stantec for EAs of projects assessed by IAAC.

The assessment methods used in the preparation of this EIS included an evaluation of the potential environmental effects for each VC that may arise during routine Project activities and potential accidental events as well as cumulative effects. VCs are environmental attributes associated with the Project that are of value or interest because they have been identified to be of concern to Indigenous peoples, regulatory agencies, Suncor, resource managers, scientists, key stakeholders, and/or the public. The following VCs were selected (refer to Table 4.1 for selection rationale):

- Atmospheric Environment
- Marine Fish and Fish Habitat
- Marine and Migratory Birds
- Marine Mammals and Sea Turtles
- Special Areas
- Indigenous Peoples
- Commercial Fisheries and Other Ocean Users

Potential effects were assessed for routine-Project activities, in accordance with the EIS Guidelines (CEA Agency 2019; Appendix A), which includes:

- MODU mobilization and drilling
  - mobilization, operation and demobilization of the MODU
  - establishment of a safety exclusion zone
  - light, heat, and sound emissions associated with MODU presence and operation
  - waste and water management, including discharge of drill muds and cuttings, and other discharges and emissions
- Geophysical (including VSP), geological, geotechnical, and environmental surveys
- Well evaluation and testing
- Well decommissioning, suspension and abandonment
- Supply and servicing
  - loading, refueling and operation of marine support vessels (i.e., for re-supply and transfer of materials, fuel and equipment; on-site safety during drilling activities; and transit between the supply base and the MODU)
  - helicopter support (i.e., for crew transport and delivery of light supplies and equipment)

A summary of potential interactions between the VCs and routine Project activities, which formed the basis for the effects analysis, are presented in Table 18.1. Each VC has a corresponding chapter (Chapters 8 to 14) in which potential environmental effects arising from interactions between the Project are identified and one or more measurable parameters are used to facilitate quantitative or qualitative assessment of those effects.

Potential effects from non-routine events (i.e., accidental events or malfunctions) are considered within the scope of the Project and include blowouts (uncontrolled release of hydrocarbons during drilling) as well as platform and vessel batch spills and releases (e.g., hydraulic fluid, drilling mud, diesel). Accidental releases, or “spills”, have the potential to occur in the offshore (e.g., during drilling) or nearshore (e.g., during supply vessel transit) environment. A summary of potential interactions between the VCs and non-routine events are presented in Table 18.1.

Effects of the environment on the Project, Chapter 17, considers how local environmental conditions and natural hazards (e.g., extreme weather) can affect the Project, including scenarios where these effects may cause accidental events which could therefore affect the environment. Potential adverse effects of the environment on a project are typically a function of environmental conditions (e.g., geology, ice conditions) that could affect the Project and Project design.

The implementation of mitigation measures to reduce or eliminate potential adverse effects are fully integrated into the effects assessment and summarized in Section 18.2. An overview of the effects analysis is presented in Section 18.3.

Table 18.1 Potential Project-VC Interactions and Effects

Planned Activity	Valued Component										
	Atmospheric Environment	Marine Fish and Fish Habitat (including Species at Risk)		Marine and Migratory Birds (including Species at Risk)		Marine Mammals and Sea Turtles (including Species at Risk)		Special Areas	Indigenous Peoples		Commercial Fisheries and Other Ocean Users
	Change in GHG Levels	Change in Risk of Mortality or Physical Injury	Change in Habitat Availability, Quality, and Use	Change in Risk of Mortality or Physical Injury	Change in Habitat Quality and Use	Change in Risk of Mortality or Physical Injury	Change in Habitat Quality and Use	Change in Habitat Quality	Change in Commercial-communal Fisheries	Change in Current Use of Lands and Resources for Traditional Purposes	Change in Availability of or Access to Resources
Routine Activities											
Presence and operation of a MODU (including drilling, associated safety zone, lights, and sound)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geophysical (including VSP) Surveys	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geological, Geological, Geotechnical and Environmental Surveys	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓
Discharges (e.g., drill muds / cuttings, liquid discharges)	–	✓	✓	✓	✓	–	✓	✓	✓	✓	✓
Well Testing and Flaring (including air emissions)	✓	–	–	✓	✓	–	–	–	–	✓	–
Well Decommissioning, Suspension and Abandonment	✓	–	✓	✓	✓	–	✓	✓	✓	–	✓
Supply and Servicing Operations (including helicopter transportation and Project supply vessel operations)	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Accidental Events											
Subsurface Incident	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Marine Diesel Spill	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vessel Spill on Transit Route	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓
SBM Spill	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes:
✓ = Potential interaction
– = No interaction

18.2 Summary of Mitigation, Monitoring and Follow-up

18.2.1 Mitigation Measures

The implementation of mitigation measures is proposed to reduce or eliminate potential adverse effects. Mitigation may include documented practices and measures proven effective in the past, as well as measures developed specifically for the Project. In some cases (e.g., fishing gear loss, major spills), compensation measures may be warranted. Each VC assessment indicates how the mitigation measures will reduce or eliminate potential adverse effects on the VC. A summary of standard mitigation and Project-specific commitments to be implemented is provided in Table 18.2.

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
General		
1	Contractors and subcontractors will be required to demonstrate conformance with the requirements that have been established, including environment, health and safety standards and performance requirements.	Section 2.11.3
2	A Certificate of Fitness will be obtained for the MODU from an independent third-party Certifying Authority prior to the commencement of drilling operations in accordance with the *Newfoundland Offshore Certificate of Fitness Regulations*.	Section 2.11.3
3	The observation, forecasting and reporting of physical environment data will be conducted in accordance with the *Offshore Physical Environment Guidelines* (NEB et al. 2008).	Section 2.11.3
4	Suncor and contractors working on the Project will regularly monitor weather forecasts to forewarn supply vessels, helicopters and the MODU of inclement weather or heavy fog before it poses a risk to their activities and operations. Extreme weather conditions that are outside the operating limits of supply vessels or helicopters will be avoided, if possible. Captains / Pilots will have the authority and obligation to suspend or modify operations in case of adverse weather or poor visibility that compromises the safety of supply vessel, helicopter, or MODU operations.	Section 2.11.3
5	Suncor will prepare and submit an Ice Management Plan as part of the application for Drilling Program Authorization as per the *Offshore Physical Environment Guidelines* (NEB et al. 2008). This Plan, which will form part of the Safety Plan submission, will include details on sea ice / iceberg monitoring and detection, and risk assessment, mitigation, and contingency procedures.	Section 2.11.3
6	Safe work practices will be implemented to reduce exposure of personnel to lightning risk (e.g., restriction of access to external areas on the MODU or supply vessel during thunder and lightning events).	Section 2.11.3
7	Prior to any drilling activity, Suncor will conduct a geohazard assessment for wellsites.	Section 2.11.3
8	Project-related damage to fishing gear, if any, will be compensated in accordance with the *Compensation Guidelines with Respecting Damages Relating to Offshore Petroleum Activity* (C-NLOPB and CNSOPB 2017).	Section 2.11.3 Section 13.3 Section 14.3
9	The Project will operate in accordance with applicable regulations.	Section 1.6
10	Suncor will continue to engage with Indigenous communities to share Project details and facilitate information sharing. This will be accomplished through the development and implementation of a Fisheries Communication Plan.	Section 13.3

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
11	A Fisheries Communication Plan will be implemented to facilitate coordinated communication with fishers (commercial fishers and Indigenous groups). Suncor will share Project details, as applicable, and determine the need for a fisheries liaison officer during mobilization and demobilization of the MODU. This engagement will be coordinated through One Ocean, Fish, Food and Allied Workers-Unifor, Ocean Choice International, Association of Seafood Producers, and Atlantic Groundfish Council.	Section 14.3
12	Suncor will maintain ongoing communications with the NAFO Secretariat, through DFO as the Canadian representative, regarding planned Project activities, including timely communication of drilling locations, safety zone, and well decommissioning, suspension and abandonment	Section 14.3
13	Suncor will contact DFO regarding timing and locations of planned DFO research (spring and fall RV surveys, longline halibut survey, and post-season crab survey).	Section 14.3
14	Suncor will contact DND regarding timing of planned offshore military exercises.	Section 14.3
15	Suncor will conduct a pre-drill survey at each wellsite to confirm the presence / absence of potential hazardous subsea infrastructure (e.g., cables, UXOs, shipwrecks) , the presence / absence of natural geohazards (e.g., shallow gas pockets), and the presence / absence of habitat-forming corals or sponges.	Section 12.4 Section 14.3 Section 17.2.1
16	An up-to-date version of information (such as Fisheries Communication Plan, results of follow-up and marine mammal and sea turtle monitoring, pre-drill survey results, SIMA, OSRP, well control strategies, and decommissioning, suspension and abandonment plans) will be posted via the Internet and Indigenous groups will be notified of the postings..	Section 18.2.2.6 Section 18.2.2.7
Presence and Operation of the MODU		
17	A safety zone will be established around the MODU in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations* SOR/2009-316.	Section 2.11.3 Section 13.3 Section 14.3
18	Suncor will provide details of the safety zone to the Marine Communication and Traffic Services for broadcasting and publishing in the Notices to Shipping and Notices to Mariners. Details of the safety zone will also be communicated during ongoing engagement with commercial and Indigenous fishers.	Section 2.11.3
19	To maintain navigational safety at all times during the Project, obstruction lights, navigation lights and foghorns will be kept in working condition on board the MODU and supply vessels. Radio communication systems will be in place and in working order for contacting other marine vessels as necessary.	Section 2.11.3 Section 14.3
20	The MODU will be equipped with local communication equipment to enable radio communication between the supply vessels and the MODU's bridge. Communication channels will also be put in place for internet access and enable communication between the MODU and shore.	Section 2.11.3
21	Suncor will conduct an imagery-based seabed survey at the proposed wellsite(s) to confirm the absence of shipwrecks, debris on the seafloor, unexploded ordnance, and sensitive environmental features, such as habitat-forming corals or sponges. The survey will be carried out prior to drilling and will encompass an area within a 500-m radius from the wellsite. If any environmental or anthropogenic sensitivities are identified during the survey, Suncor will notify the C-NLOPB immediately to discuss an appropriate course of action. This may involve further investigation and/or moving the wellsite if it is feasible to do so.	Section 2.11.3 Section 9.3.1.2 Section 9.6 Section 12.4
22	Variable speed drive equipment with high power consumption (e.g., gas compressors, water injection pumps) will be used to optimize energy efficiency	Section 8.4.2.1

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
23	High-efficiency equipment will be used for power generation, if available	Section 8.4.2.1
24	Sulphur content in diesel fuel used for the Project will meet the *Sulphur in Diesel Fuel Regulations* and will comply with the sulphur limits in fuels for large marine diesel engines, per the *Vessel Pollution and Dangerous Chemicals Regulations*	Section 8.4.2.1
25	The Project will use ultra-low sulphur diesel fuel wherever practicable and available as it will reduce the potential for adverse local air quality effects	Section 8.4.2.1
26	Artificial lighting will be reduced, where possible with consideration of safety and associated operational requirements. Lighting reductions may include avoiding use of unnecessary lighting, shading, and directing lights towards the deck	Section 9.3.1.2 Section 9.7 Section 10.3 Section 12.4
27	To reduce the potential spread of invasive species, ballast water will be managed in consideration of applicable Canadian and international ballast water management requirements (e.g., Canada's *Ballast Water Regulations*)	Section 9.3.1.2 Section 9.7
28	Suncor will develop a protocol for systematic, daily searches for seabirds stranded on the MODU and supply vessels, which will include the documentation of search effort. Seabirds found will be recovered, rehabilitated, released and documented in accordance with the methods in Procedures for Handling and Documenting Stranded Birds Encountered on Infrastructure Offshore Atlantic Canada (ECCC 2017a). Suncor will provide training in these protocols and procedures. A Seabird Handling Permit will be obtained from ECCC-CWS annually. In accordance with ECCC requirements, an annual report and all occurrence data that summarizes stranded and/or seabird handling occurrences will be submitted to ECCC.	Section 10.3.1.2 Section 12.4
Geophysical (including VSP), Geological, Geotechnical and Environmental Surveys		
29	VSP activities will be planned and conducted in consideration of relevant regulations and guidance including the SOCP (DFO 2007) and C-NLOPB Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2019)	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2
30	Passive acoustic monitoring will be implemented, or equivalent technology, and visual monitoring by marine mammal and sea turtle observers during vertical seismic surveys.	Section 2.11.3 Section 10.3.1.2
31	A ramp-up procedure for VSP surveys will be carried out where seismic source elements are gradually increased over a period of approximately 30 minutes until the operating level is achieved. This measure, as outlined in the SOCP (DFO 2007) and C-NLOPB (2019) guideline, is intended to reduce potential change in risk of injury to marine animals (including fishes and invertebrates, marine mammals, and marine birds) in close proximity to the sound source at the start of the activity. A gradual increase in emitted sound levels is intended to provide an opportunity for mobile organisms to move away before potentially injury-inducing sound levels are achieved close to the sound source.	Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2
32	VSP activities will be planned to avoid dispersing aggregations of fish from known spawning areas and diverting fish from known migration corridors as detailed in Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2019).	Section 9.3.1.2
33	Marine Mammal Observers (MMOs) will monitor and report on marine mammal and sea turtle sightings during surveys and will implement shutdown and ramp-up procedures during VSP surveys	Section 11.3.1.2

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
34	MMOs will implement a pre-ramp up watch of 60 minutes prior to ramp-up for a VSP survey. The longer 60-minute pre-ramp up watch versus the minimum 30-minute period required in the SOCP will be used to account for the longer dive times of beaked whales (and other deep-diving marine mammals) expected to occur in the Project Area. This period is recommended by DFO (Moors-Murphy and Theriault 2017) in a recent review of the SOCP.	Section 11.3.1.2
35	Shut down procedures (i.e., shutdown of source array) will be implemented during VSP surveys if a marine mammal or sea turtle listed as endangered or threatened on Schedule 1 of SARA, as well as any beaked whale species, is observed within 500 m of the air gun array.	Section 11.3.1.2
Well Testing and Flaring		
36	High-efficiency burners (flare tip) will be used when flaring is required, if available	Section 8.4.2.1
37	Well testing, if carried out, will be subject to Suncor's well test assurance process, which is designed to promote safe and efficient well test operations	Section 8.4.2.1
38	If flaring is required for well testing, Suncor will discuss flaring plans with the C-NLOPB including steps to reduce adverse effects on migratory birds. This may involve restricting flaring to the minimum required to characterize the wells' hydrocarbon potential and as necessary for the safety of the operation, reducing flaring during periods of migratory bird vulnerability, and the use of a water curtain to deter birds from the general vicinity of the flare.	Section 10.3.1.2
Discharges		
30	Air emissions from the Project will adhere to applicable regulations and standards.	Section 2.11.3 Section 8.4.2.1
40	Offshore waste discharges and emissions associated with the Project (i.e., operational discharges and emissions from the MODU and supply vessels) will be managed in accordance with relevant regulations and municipal bylaws as applicable, such as the OWTG (NEB et al. 2010) and MARPOL, of which Canada has incorporated provisions under various sections of the *Canada Shipping Act*. Waste discharges not meeting legal requirements will not be discharged to the ocean and will be brought to shore for disposal. Furthermore, a Project-specific EPP and waste management plan will be developed to prevent unauthorized waste discharges (refer to Section 2.10 for details on waste discharges and management).	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2 Section 12.4
41	Selection and screening of chemicals to be discharged, including drill fluids, will be in accordance with the OCSG (NEB et al. 2009). Where feasible, lower toxicity drilling muds and biodegradable and environmentally friendly properties and cements will be used. The chemical components of drilling fluids, where feasible, will be those that have been rated as less hazardous under the OCNS and/or Pose Little or No Risk to the Environment by the Convention for the Protection of the Marine Environment of the North-East Atlantic.	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2 Section 12.4
42	SBM drill cuttings will be returned to the MODU and treated in accordance with the OWTG before being discharged into the marine environment. The concentration of SBM on cuttings will be monitored onboard the MODU, and in accordance with OWTG. No excess or spent SBM will be discharged, and any of this excess or spent SBM that cannot be reused will be brought back to shore for disposal. WBM drill cuttings will be discharged without treatment.	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2 Section 12.4
43	Excess cement may be discharged to the seabed during the initial phases of the well, which will be drilled without a riser. Unused cement bulks and additives will be transported to shore for future re-use or disposed at an approved facility.	Section 2.11.3

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
44	Small amounts of produced water may be flared. If volumes of produced water are large, some produced water may be brought onto the MODU for treatment and shipped to shore for disposal.	Section 2.11.3
45	Deck drainage and bilge water will be discharged according to the OWTG which state that deck drainage and bilge water can only be discharged if the residual oil concentration of the water does not exceed 15 mg/L.	Section 2.11.3
46	Ballast water will be discharged according to IMO *Ballast Water Management Regulations* and Transport Canada's *Ballast Water Control and Management Regulations.* The MODU will carry out ballast tank flushing prior to arriving in Canadian waters.	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2
47	Putrescible solid waste, specifically food waste generated offshore on the MODU and supply vessels, will be disposed of according to OWTG and MARPOL requirements. Management of kitchen waste will be conducted in accordance with MARPOL and OWTG. There will be no discharge of macerated food waste within 3 NM from land.	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2 Section 12.4
48	Waste discharges that do not meet regulatory requirements will be delivered to the shore base for appropriate disposal at approved facilities. Project-specific EPP and WMP will be designed to prevent unauthorized waste discharges (Section 2.7 provides additional information on waste discharges and management).	Section 2.7 Section 12.4
49	Sewage will be managed in accordance with MARPOL and in line with the OWTG prior to discharge.	Section 2.11.3
50	Cooling water will be discharged in line with the OWTG, which states that any biocides used in cooling water are selected in line with a chemical management system developed in line with the OCSG.	Section 2.11.3
51	BOP fluids and any other discharges from the subsea control equipment will be discharged according to OWTG and OCSG.	Section 2.11.3
52	Liquid wastes, not approved for discharge in OWTG such as waste chemicals, cooking oils or lubricating oils, will be transported onshore for transfer to an approved disposal facility.	Section 2.11.3
53	Biomedical waste will be collected onboard by the doctor or medic and stored in special containers before being transported onshore for incineration.	Section 2.11.3
54	Transfer of hazardous wastes will be conducted according to the *Transportation of Dangerous Goods Act.* Any applicable approvals for the transportation, handling, and temporary storage of these hazardous wastes will be obtained as required.	Section 2.11.3 Section 9.3.1.2 Section 10.3.1.2 Section 11.3.1.2 Section 12.4
Supply and Servicing Operations		
55	Supply vessels will undergo Suncor's internal verification process and where required, additional external inspections / audits (e.g., C-NLOPB pre-authorization inspections) in preparation for the Project.	Section 2.11.3
56	Supply vessels will use existing shipping lanes as practicable; where these do not exist, supply vessels will follow a straight-line approach to and from the Project Area.	Section 2.11.3 Section 11.3.1.2 Section 13.3 Section 14.3

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
57	During transit to and from the Project Area, supply vessels will travel at vessel speeds not exceeding 22 km/hour (12 knots), except as needed in the case of an emergency. If marine mammals or sea turtles are observed by vessel crews, they will reduce speed and/or alter course if practicable to avoid a collision. More specifically, supply vessels will reduce speed to a maximum of 13 km/hour (7 knots) when a marine mammal or sea turtle is observed or reported within 400 m of a supply vessel, except if not feasible for safety reasons.	Section 2.11.3 Section 11.3.1.2 Section 13.3 Section 14.3
58	Lighting on supply vessels will be reduced to an extent that will not compromise safety of operations. This may include avoiding use of unnecessary lighting, shading lights, and directing lights towards the deck.	Section 2.11.3 Section 12.4
59	Air emission sources associated with vessels will adhere to applicable limits set out in Canada's V*essel Pollution and Dangerous Chemicals Regulations* under the *Canada Shipping Act, 2001.*	Section 8.4.2.1
60	The regional CWS office will be contacted for separation distances and altitudes between helicopters transiting to and from the MODU and migratory bird nesting colonies, as per CWS guidelines (Government of Canada 2018) and routes will comply with provincial *Seabird Ecological Reserve Regulations*, 2015. Specific details will be provided in the Project EPP.	Section 10.3.1.2 Section 12.4
61	Supply vessel routes transiting to and from the MODU will be planned to avoid passing within 300 m of migratory bird nesting colonies during the nesting period and will comply with provincial *Seabird Ecological Reserve Regulations*, 2015 and federal guidelines in order to minimize disturbance to colonies (ECCC 2017b). Specific details will be provided in the Project EPP.	Section 10.3.1.2 Section 12.4
Well Decommissioning, Suspension and Abandonment		
62	A seabed survey will be conducted at the end of a drilling program using an ROV to inspect the seabed for debris.	Section 2.11.3
63	Well decommissioning, suspension and abandonment for this Project will be carried out as per applicable industry practice and in compliance with relevant regulatory requirements. Once wells have been drilled to total depth and well evaluation programs completed (if applicable), the well will be plugged and abandoned in line with applicable Suncor practices and C-NLOPB requirements. The final well decommissioning, suspension and abandonment program has not yet been finalized. However, these details will be confirmed to the C-NLOPB as planning for the Project continues.	Section 2.11.3 Section 9.3.1.2 Section 12.4 Section 14.3
64	Suncor's well decommissioning, suspension and abandonment plan, including a wellhead abandonment strategy, is on file with the C-NLOPB. If it is proposed that a specific wellhead be abandoned on the seafloor in a manner that could potentially interfere with commercial fishing, the strategy will be developed in consultation with Indigenous groups and commercial fishers.	Section 14.3
65	Suncor will communicate the locations of abandoned wellheads (if applicable) to Indigenous and non-Indigenous fishers and the Canadian Hydrographic Services for future nautical charts.	Section 13.3 Section 14.3
Accidental Events		
66	Suncor will implement multiple preventative and response barriers to manage risk of incidents occurring and mitigate potential consequences. See Section 2.5 and 16.5.3 for specific information on well control and blowout prevention, and Section 16.5 for a description of Suncor's contingency planning and emergency response measures.	Section 2.5 Section 16.5.3 Section 16.5 Section 16.6.3 Section 16.6.4

Table 18.2 Summary of Standard and Project Specific Mitigation Measures

No.	Proponent Commitments	EIS Reference
67	As noted in Section 16.4.1, the Project will operate under Project-specific OSRP, which will be submitted to the C-NLOPB prior to the start of drilling activity as part of the OA process. The OSRP will specify tactical response methods, procedures and strategies for safely responding to different spill scenarios. Tactical response methods that will be considered following a spill incident include but are not limited to: surveillance and monitoring, mechanical dispersion, containment and recovery; chemical dispersion; in-situ burning; and wildlife measures. See Section 16.4 for details on emergency management and spill response.	Section 16.5 Section 16.5.1 Section 16.6.3 Section 16.6.4
68	Suncor will prepare a SIMA, an evaluation applied to an oil spill to aid in the selection of the appropriate spill response(s) that results in the best overall recovery of resources of concern (either ecological, socio-economic and/or cultural). Suncor will develop their SIMA as per the Guidelines on Implementing Spill Impact Mitigation Assessment (IPIECA-API-IOGP 2017). Suncor will consider all feasible response options that would be potentially effective in the Project Area and will develop their SIMA in consultation with ECCC, the Canadian Science Table, and the C-NLOPB.	Section 16.5.6 Section 16.6.2 Section 16.6.3 Section 16.6.4
69	Suncor will develop a Wildlife Monitoring Plan and, for incidents where wildlife is threatened, engage specialized expertise to implement the Plan, including the recovery and rehabilitation of wildlife species as needed (refer to Section 16.4.5 for Suncor's wildlife monitoring response approach).	Section 16.5.5 Section 15.6.2 Section 16.6.3
70	A Fisheries Communication Plan will be used to facilitate coordinated communication, including procedures for informing commercial fishers of an accidental event and planned response. Emphasis will be on timely communication, allowing fishers to haul out gear from affected areas, reducing potential of fouling of fishing gear. This engagement will be coordinated through One Ocean, FFAW-Unifor, OCI, ASP, and Atlantic Groundfish Council.	Section 16.6.6
71	Actual loss or damage, which includes income, will be compensated in accordance with industry best practices in the NL offshore and relevant guidance material including the Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activities (C-NLOPB and CNSOPB 2017) (applicable if a spill results in gear loss or damage), Canadian East Coast Offshore Operators Non-attributable Fisheries Damage Compensation Program (CAPP 2017), and the Geophysical, Geological, Environmental, and Geotechnical Program Guidelines (C-NLOPB 2019), the latter of which indicates that operators should implement a gear and/or vessel damage compensation program.	Section 16.6.5 Section 16.6.6
72	Communication with fishers, including procedures for informing Indigenous groups of an accidental event. Timely communication will be important, thereby providing fishers with the opportunity to remove gear from the affected areas and reducing the potential for fouling of fishing gear. In the event of Project-related damage to fishing gear, fishers will be compensated in accordance with the Compensation Guidelines with Respect to Damages Relating to Offshore Petroleum Activity (C-NLOPB and CNSOPB 2017).	Section 16.6.5
73	Suncor will maintain ongoing communications with the NAFO Secretariat, through DFO as the Canadian representative, regarding the occurrence of an accidental event, including timely communication on restricted access zones and applicable buffers.	Section 16.6.6

18.2.2 Monitoring and Follow-up

As per CEAA 2012, a follow-up program is a program for "verifying the accuracy of the EA of a designated project" and "determining the effectiveness of any mitigation measures." Given offshore NL has a long history of oil and gas exploration and well-established oil production operations, most potential environmental interactions are well understood, and standard mitigation is well known. Proposed monitoring and follow-up programs are described below.

18.2.2.1 Atmospheric Environment

Based on the information presented in the EIS, and the conclusion of the effects assessment, no specific follow-up or monitoring related to the atmospheric environment is considered necessary in relation to the Project.

18.2.2.2 Marine Fish and Fish Habitat

As noted in Section 9.3.2, Suncor will conduct a pre-drilling visual seabed survey at proposed drilling locations to confirm the presence / absence of sensitive biological communities (e.g., corals and sponges). The visual surveys will also be used to confirm the absence of shipwrecks, debris on the seafloor, and unexploded ordnance. If any environmental sensitivities are identified during the survey, Suncor will notify the C-NLOPB to discuss an appropriate course of action. This may involve further investigation and/or moving the wellsite if feasible. If sensitive environmental features are found during the pre-drill survey, a follow-up program will be determined in consultation with the C-NLOPB and DFO. Results will be posted on the internet and indigenous groups informed of the posting.

18.2.2.3 Marine and Migratory Birds

For the duration of the drilling program for each well:

- Systematic searches for stranded birds will be carried out daily on the MODU and supply vessels, per Guidance for Developing Systematic Stranded Bird Survey Protocols for Vessels and Platforms (ECCC-CWS 2021).This effort will be documented by trained personnel according to search protocols designed specifically for each facility as per Standard for Observers Conducting Seabird Surveys at Sea, and for Trainers Providing Instruction on Seabird Survey Methods (ECCC 2020)
- Retrieval, rehabilitation, release and documentation of stranded birds will be conducted according to *Procedures for Handling and Documenting Stranded Birds Encountered on Infrastructure Offshore Atlantic Canada* (ECCC 2017a) and associated permit conditions under the MBCA authorizing the capture and handling of migratory birds;

Results of the monitoring program will be submitted to CWS.

18.2.2.4 Marine Mammals and Sea Turtles

Suncor will develop a marine mammal and sea turtle monitoring plan to be implemented during geophysical (including VSP), geological, geotechnical and environmental surveys as outlined in Section 11.3.2. The Plan will include MMO requirements, shutdown, and ramp-up procedures and reporting requirements. The following monitoring and mitigation measures will be implemented:

- MMOs will monitor and report on marine mammal and sea turtle sightings during geophysical (including VSP), geological, geotechnical and environmental surveys to implement shutdown and ramp-up procedures.
- A ramp-up procedure will be implemented before any VSP activity begins.
- MMOs will implement a pre-ramp up watch of 60 minutes prior to ramp-up. Ramp-up will be delayed if any marine mammal or sea turtle is detected within 500 m of the air gun array.
- Shut-down procedures will be implemented if a marine mammal or sea turtle listed as endangered or threatened on Schedule 1 of SARA, as well as any beaked whale species, is observed within 500 m of the air gun array.
- Supply vessels will use existing shipping lanes as practicable; where these do not exist, supply vessels will follow a straight-line approach to and from the Project Area.
- During transit to and from the Project Area, supply vessels will travel at vessel speeds not exceeding 22 km/hour (12 knots), except as needed in the case of an emergency.
- If marine mammals or sea turtles are observed by vessel crews, they will reduce speed and/or alter course if practicable to avoid a collision.
- Supply vessels will be required to reduce speed to a maximum of 13 km/hour (7 knots) when a marine mammal or sea turtle is observed or reported within 400 m of the supply vessel (except if not feasible for safety reasons). Vessels may also alter course if practicable to avoid collision with a marine mammal (or sea turtle).

A report of the observational program will be submitted annually to the C-NLOPB and DFO, including documentation of marine mammal and sea turtle sightings. Results of the marine mammal and sea turtle monitoring plan will be shared via the Internet. In the unlikely event of a Project vessel collision with a marine mammal or sea turtle, Suncor will contact DFO through their 24-hour emergency contact number (1-888-895-3003). Results will be posted on the Internet and Indigenous groups informed of the positing.

18.2.2.5 Special Areas

As noted in Section 9.3.2, Suncor will conduct an imagery-based seabed survey at the proposed wellsite(s) to identify sensitive environmental features, such as habitat-forming corals or sponges, prior to drilling. If any environmental sensitivities are identified during the survey, Suncor will notify the C-NLOPB to discuss an appropriate course of action. This may involve further investigation and/or moving the wellsite if feasible. If sensitive environmental features are found during the pre-drill survey, a follow-up program will be determined in consultation with the C-NLOPB and DFO. Results will be posted on the internet and indigenous groups informed of the posting.

18.2.2.6 Indigenous Peoples

No follow-up and monitoring are proposed for routine Project activities. This is based on several factors, including the high level of confidence for a prediction of no significant adverse environmental effects on Indigenous communities and activities, the implementation of standard mitigation, and ongoing engagement with Indigenous communities, including the development and implementation of a Fisheries Communication Plan. Results of follow-up and marine mammal and sea turtles monitoring will be made available to Indigenous groups.

18.2.2.7 Commercial Fisheries and Other Ocean Users

Given the high level of confidence for a prediction of no significant adverse environmental effects on commercial fisheries and other ocean users, and the implementation of standard mitigation, including ongoing engagement with fisheries stakeholders and other ocean users and the implementation of a Fisheries Communication Plan, no follow-up and monitoring are proposed for routine Project activities.

18.3 Summary of Residual Environmental Effects

Chapters 8 to 14 of this EIS present the residual environmental effects for routine operations for each VC. Table 18.3 summarizes the residual effect findings for each VC and indicates the significance of these effects. Chapter 16 of this EIS presents the residual environmental effects for accidental events for each VC. Table 18.4 summarizes the residual effect findings for each VC and indicates the significance of these effects. Where an effect is predicted to be significant (refer to Chapters 8 to 14 for significance criteria for each VC), the likelihood of that effect occurring is also presented.

Table 18.3 Summary of Residual Effects for Routine Operations

Valued Components	Area of Federal Jurisdiction (CEAA, 2012 s.5 "environmental effect")	Potential Effect	Project Activity	Mitigation Reference (refer to Table 18.2)	Residual Effect Characterization					Ecological / Socio Economic Context	Significance of Residual Effect	Likelihood of Significant Effect
					Magnitude	Geographic Extent	Duration	Frequency	Reversibility			
Atmospheric Environment		Change in GHG Levels	Presence and Operation of a MODU	Refer to Section 8.4	M	G	MT	C	IR	D	N	N/A
			Geophysical (including VSP) Surveys		M	G	ST	IR	IR	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		M	G	ST	IR	IR	D	N	N/A
			Discharge		-	-	-	-	-	-		-
			Well Testing and Flaring		M	G	ST	IR	IR	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		M	G	ST	IR	R	D	N	N/A
			Supply and Servicing Operations		M	G	MT	R	IR	D	N	N/A
Marine Fish and Fish Habitat	s. 5(1)(a)(i)	Change in Risk of Mortality or Physical Injury	Presence and Operation of a MODU	Refer to Section 9.3	L	PA	MT	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		L	PA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		L	PA	ST	IR	R	D	N	N/A
			Discharges		L	PA	ST	IR	R	D	N	N/A
		Change in Habitat Availability, Quality, and Use	Presence and Operation of a MODU		L	PA	MT	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		L	PA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		L	PA	ST	IR	R	D	N	N/A
			Discharges		M	PA	MT	IR	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		L	PA	ST-P	IR	R	D	N	N/A
			Supply and Servicing		L	PA	ST-MT	IR	R	D	N	N/A
Marine and Migratory Birds	s. 5(1)(a)(iii)	Change in Risk of Mortality or Physical Injury	Presence and Operation of a MODU	Refer to Section 10.3	L	LAA	ST	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		N-L	PA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Discharges		L	PA	ST	IR	R	D	N	N/A
			Well Testing and Flaring		L	PA	ST	IR	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		N	PA	ST	IR	R	D	N	N/A
			Supply and Servicing		L	LAA	ST	IR	R	D	N	N/A

Table 18.3 Summary of Residual Effects for Routine Operations

Valued Components	Area of Federal Jurisdiction (CEAA, 2012 s.5 "environmental effect")	Potential Effect	Project Activity	Mitigation Reference (refer to Table 18.2)	Residual Effect Characterization					Ecological / Socio Economic Context	Significance of Residual Effect	Likelihood of Significant Effect
					Magnitude	Geographic Extent	Duration	Frequency	Reversibility			
Marine and Migratory Birds	s. 5(1)(a)(iii)	Change in Habitat Quality and Use	Presence and Operation of a MODU	Refer to Section 10.3	L	LAA	ST	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		N	PA	ST	UL	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		L	PA	ST	IR	R	D	N	N/A
			Discharges		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Well Testing and Flaring		L	PA	ST	IR	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		N	PA	ST	IR	R	D	N	N/A
			Supply and Servicing		L	LAA	ST	IR	R	D	N	N/A
Marine Mammals and Sea Turtles	s. 5(1)(a)(ii)	Change in Risk of Mortality or Injury	Presence and Operation of a MODU	Refer to Section 11.3	N	PA	ST-MT	UL	R	D	N	N/A
			Geophysical (including VSP) Surveys		N-L	PA-LAA	ST-MT	UL	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		N-L	PA	ST-MT	UL	R	D	N	N/A
			Supply and Servicing		N-L	LAA	ST-MT	UL	R	D	N	N/A
		Change in Habitat Quality and Use	Presence and Operation of a MODU		L	PA-LAA	ST-MT	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		L	PA-LAA	ST-MT	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		L	PA	ST-MT	IR	R	D	N	N/A
			Discharges		N	PA	ST	UL	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		N	PA	ST	UL	R	D	N	N/A
			Supply and Servicing		L	LAA	ST-MT	IR	R	D	N	N/A
Special Areas	s. 5(1)(b)(i)	Change in Habitat Quality	Presence and Operation of a MODU	Refer to Section 12.4	L	PA	MT	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		L	PA-LAA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		L	PA	ST	IR	R	D	N	N/A
			Discharges		L	PA	MT	IR	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		L	PA	ST	IR	R-I	D	N	N/A
			Supply and Servicing		L	LAA	ST-MT	IR	R	D	N	N/A

Table 18.3 Summary of Residual Effects for Routine Operations

Valued Components	Area of Federal Jurisdiction (CEAA, 2012 s.5 "environmental effect")	Potential Effect	Project Activity	Mitigation Reference (refer to Table 18.2)	Residual Effect Characterization					Ecological / Socio Economic Context	Significance of Residual Effect	Likelihood of Significant Effect
					Magnitude	Geographic Extent	Duration	Frequency	Reversibility			
Indigenous Peoples	s.5(1)(c)(i) s.5(1)(c)(iii)	Change in Commercial-communal Fisheries	Presence and Operation of a MODU	Refer to Section 13.3	N-L	RAA	ST	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		N-L	RAA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		N-L	PA	ST	IR	R	D	N	N/A
			Discharges		N-L	RAA	MT	IR	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		N-L	PA	ST-P	IR	R-I	D	N	N/A
			Supply and Servicing		N-L	RAA	ST	IR	R	D	N	N/A
	s.5(1)(c)(i) s.5(1)(c)(iii)	Change in Current Use of Lands and Resources for Traditional Purposes	Presence and Operation of a MODU		N-L	RAA	ST	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		N-L	RAA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		N-L	PA	ST	IR	R	D	N	N/A
			Discharges		N-L	RAA	ST	IR	R	D	N	N/A
			Well Testing and Flaring		N	RAA	ST	IR	R	D	N	N/A
			Supply and Servicing		N-L	RAA	ST	IR	R	D	N	N/A
Commercial Fisheries and Other Ocean Users	s. 5(2)(b)(i)	Change in Availability of Resources	Presence and Operation of a MODU	Refer to Section 14.3	L	PA	ST	IR	R	D	N	N/A
			Geophysical (including VSP) Surveys		L	PA	ST	IR	R	D	N	N/A
			Geological, Geological, Geotechnical and Environmental Surveys		L	PA	ST	IR	R	D	N	N/A
			Discharges		L	PA	ST	IR	R	D	N	N/A
			Well Decommissioning, Suspension and Abandonment		L	PA	ST-P	IR	R-I	D	N	N/A
			Supply and Servicing		L	LAA	ST	R	R	D	N	N/A
Key:					**Magnitude:** N: Negligible L: Low M: Moderate H: High	**Geographic Extent:** PA: Project Area LAA: Local Assessment Area RAA: Regional Assessment Area G; Global (GHGs only)	**Duration:** ST: Short-term MT: Medium-term LT: Long-term P: Permanent	**Frequency:** UL: Unlikely S: Single event IR: Irregular event R: Regular event C: Continuous	**Reversibility:** R: Reversible I: Irreversible	**Ecological/Socio-Economic Context:** D: Disturbed U: Undisturbed	**Significance:** S: Significant N: Not Significant	**Likelihood:** U: Unlikely L: Likely N/A: Not applicable

Table 18.3 Summary of Residual Effects for Routine Operations

Valued Components	Area of Federal Jurisdiction (CEAA, 2012 s.5 "environmental effect")	Potential Effect	Project Activity	Mitigation Reference (refer to Table 18.2)	Residual Effect Characterization					Ecological / Socio Economic Context	Significance of Residual Effect	Likelihood of Significant Effect
					Magnitude	Geographic Extent	Duration	Frequency	Reversibility			

Notes:

VC-specific definitions included for each VC in Chapters 8 to 14.

Environmental Effects under CEAA 2012:

5(1)

(a) a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:

- (i) fish as defined in section 2 of the *Fisheries Act*,
- (ii) aquatic species as defined in subsection 2(1) of the *Species at Risk Act*,
- (iii) migratory birds as defined in subsection 2(1) of the *Migratory Birds Convention Act*, 1994, and
- (iv) any other component of the environment that is set out in Schedule 2 of [CEAA 2012];

(b) a change that may be caused to the environment that would occur

- (i) on federal lands,
- (ii) in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out, or
- (iii) outside Canada; and

(c) with respect to Aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on

- (i) health and socio-economic conditions,
- (ii) physical and cultural heritage,
- (iii) the current use of lands and resources for traditional purposes, or
- (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Certain additional environmental effects must be considered under section 5(2) of CEAA 2012 where the carrying out of the physical activity, the designated project, or the project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than CEAA 2012.

5(2)

(a) a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project; and

(b) an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on

- (i) health and socio-economic conditions,
- (ii) physical and cultural heritage, or
- (iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Table 18.4 Summary of Residual Effects for Accidental Events

Valued Components	Area of Federal Jurisdiction (CEAA, 2012 s.5 "environmental effect")	Potential Effect	Accidental Event Scenario	Mitigation Reference (refer to Table 18.2)	Residual Effect Characterization					Ecological / Socio Economic Context	Significance of Residual Effect	Likelihood of Significant Effect
					Magnitude	Geographic Extent	Duration	Frequency	Reversibility			
Marine Fish and Fish Habitat	s. 5(1)(a)(i)	Change in Risk of Mortality or Physical Injury / Change in Habitat Availability, Quality, and Use	Well Blowout Incident	Section 16.6.1	M-H	RAA*	LT	UL	R	D	N	N/A
			Marine Diesel Spill		L	RAA	ST-MT	UL	R	D	N	N/A
			Vessel Spill on Transit		L	RAA	ST-MT	UL	R	D	N	N/A
			SBM Spill		L	PA	ST-LT	UL	R	D	N	N/A
Marine and Migratory Birds	s. 5(1)(a)(iii)	Change in Risk of Mortality or Physical Injury / Change in Habitat Quality and Use	Well Blowout Incident	Section 16.6.2	H	RAA*	ST-MT	UL	R	D	S	U
			Marine Diesel Spill		L	LAA	ST	UL	R	D	S	U
			Vessel Spill on Transit		L	LAA	ST	UL	R	D	S	U
			SBM Spill		L	LAA	ST	UL	R	D	N	N/A
Marine Mammals and Sea Turtles	s. 5(1)(a)(ii)	Change in Risk of Mortality or Physical Injury / Change in Habitat Quality and Use	Well Blowout Incident	Section 16.6.3	M	RAA	MT-LT	UL	R	D	N	N/A
			Marine Diesel Spill		L	LAA	ST	UL	R	D	N	N/A
			Vessel Spill on Transit		L	LAA	ST	UL	R	D	N	N/A
			SBM Spill		L	PA	ST	UL	R	D	N	N/A
Special Areas	s. 5(1)(b)(i)	Change in Habitat Quality	Well Blowout Incident	Section 16.6.4	H	RAA	ST-MT	UL	R	D	S	U
			Marine Diesel Spill		L	LAA	ST	UL	R	D	N	N/A
			Vessel Spill on Transit		L	LAA	ST	UL	R	D	N	N/A
			SBM Spill		L	PA	ST-LT	UL	R	D	N	N/A
Indigenous Peoples	s.5(1)(c)(i) s.5(1)(c)(iii)	Change in Commercial-communal Fisheries / Change in Current Use of Lands and Resources for Traditional Purposes	Well Blowout Incident	Section 16.6.5	M-H	RAA	MT-LT	UL	R	D	S	U
			Marine Diesel Spill		L	LAA	ST	UL	R	D	N	N/A
			Vessel Spill on Transit		L	LAA	ST	UL	R	D	N	N/A
			SBM Spill		N-L	PA	ST	UL	R	D	N	N/A
Commercial Fisheries and Other Ocean Users	s. 5(2)(b)(i)	Change in Availability of Resources	Well Blowout Incident	Section 15.6.6	M-H	RAA*	MT-LT	UL	R	D	N	N/A
			Marine Diesel Spill		L	RAA	ST-MT	UL	R	D	N	N/A
			Vessel Spill on Transit		L	RAA	ST-MT	UL	R	D	N	N/A
			SBM Spill		L	PA	ST	UL	R	D	N	N/A

Notes:

* In certain scenarios, effects may extend beyond the RAA.

See Table 18.3 for key.

18.4 Summary of Predicted Environmental Changes and Effects and Their Relationship to Federal Jurisdiction and Decisions

The EIS assesses and evaluates the potential environmental changes and resulting environmental effects that may result from the Project, pursuant to sections 5(1) and 5(2) of CEAA 2012. Residual environmental effects from routine Project-related activities and from accidental events are summarized in Table 18.3 and Table 18.4, respectively. Table 18.5 summarizes the changes that may be caused by the Project on the components of the environment listed in sections 5(1)(a) and (b) of CEAA 2012, including those that are directly linked or necessarily incidental to federal decisions that would allow the Project to proceed. Details of the changes noted in Table 18.5 are provided below in Sections 18.4.1 through 18.4.3. Conclusions in this section are summarized from the detailed analyses in Chapters 8 through 17 and are categorized as:

- Changes to components of the environment within federal jurisdiction
- Changes to the environment that would occur on federal lands, in another province, or outside Canada
- Changes to the environment that are directly linked or necessarily incidental to federal decisions

Table 18.5 Summary of Changes to the Environment from Routine Activities and Unplanned (Accidental) Events

Topic	Changes
Changes to Components of the Environment within Federal Jurisdiction	
Marine Fish and Fish Habitat (including species at risk)	• Change in Mortality or Physical Injury • Change in Habitat Availability, Quality, and Use
Marine and Migratory Birds (including species at risk)	• Change in Risk of Mortality or Physical Injury • Change in Habitat Quality and Use
Marine Mammals and Sea Turtles (including species at risk)	• Change in Risk of Mortality or Physical Injury • Change in Habitat Quality and Use
Changes to the Environment that Would Occur on Federal or Transboundary Lands	
Special Areas	• Change in Habitat Quality
Indigenous Peoples	• Change in Commercial Communal Fisheries • Change in Current Use of Lands and Resources for Traditional Purposes
Commercial Fisheries and Other Ocean Uses	• Change in Availability of Resources or Operating Environment
Changes to the Environment that are Directly Linked or Necessarily Incidental to Federal Decisions	
Accord Acts Authorizations (Operations Authorization and Well Approval under the Accord Acts and *Newfoundland and Labrador Offshore Petroleum Drilling and Production Regulations*)	• Operations Authorizations and Well Approvals under the Accord Acts sanction offshore exploration drilling projects in their entirety. Therefore, the changes to the environment associated with Project activities and components are directly linked or necessarily incidental to these authorizations.
Authorization under section 35(2)(d) of the *Fisheries Act* (if applicable)	• Change in risk of mortality or physical injury and/or change in habitat availability, quality, and use that constitutes serious harm to fish that are part of or support a commercial, recreational, or Indigenous fishery, or to fish that support such a fishery.

18.4.1 Changes to Components of the Environment within Federal Jurisdiction

An EA is required, under section 5(1)(a) of CEAA 2012, to consider changes that may be caused to the following components of the environment that are within federal jurisdiction (i.e., within the legislative authority of Parliament): fish, as defined in section 2 of the *Fisheries Act*; aquatic species, as defined in section 2(1) of SARA; and migratory birds, as defined in section 2(1) of the MBCA. An assessment for these components is provided in Chapter 9 (Marine Fish and Fish Habitat), Chapter 10 (Marine and Migratory Birds), and Chapter 11 (Marine Mammals and Sea Turtles) and is summarized below.

Marine Fish and Fish Habitat

Potential effects of Project activities and components on marine fish and fish habitat include change in risk of mortality, injury, or health, and change in fish habitat availability, quality, and use.

A change in risk of mortality, injury, or health for individual marine fishes and invertebrates may result from potential interactions with the presence and operation of a MODU, geophysical (including VSP), geological, geotechnical and environmental surveys, and discharges. The presence and operation of a MODU and VSP surveys may affect sound levels and the quality of the underwater acoustic environment. Changes in mortality or injury may occur from acute changes in sound pressure and/or particle motion for fishes and invertebrates exposed to high sound levels in close proximity to the VSP array. Artificial lighting emissions from the MODU may also increase predation and foraging opportunities for fish. Aquatic invasive species may be transported through ballast water or on the hulls of ships and the MODU. Introduction of invasive species may compete for food resources, potentially resulting in changes to fish health. Drill cuttings discharges that settle on the seafloor may bury and smother low mobility benthic organisms.

A change in habitat availability, quality and use for marine fishes and invertebrates may result from the operation and presence of the MODU, geophysical (including VSP), geological, geotechnical and environmental surveys, Project-related discharges, well decommissioning, suspension and abandonment, and supply and servicing operations. The operation of the MODU will result in light and sound emissions into the water column, and sound emissions into the seabed which result in substrate vibration. Use of anchors for the MODU will result in localized disturbance to the seabed. VSP surveys are predicted to temporarily generate high levels of underwater sound in the water column. During supply and servicing operations, underwater sound associated with vessel movement will be generated. Depending on the well decommissioning, suspension and abandonment program, which has yet to be defined (refer to Section 2.4.4), potential removal of the wellhead structure(s) could generate underwater sound, and potential decommissioning, suspension and abandonment of the wellhead(s) in place could cause a change in benthic habitat.

There are 23 species of fish listed as species at risk or otherwise of conservation concern with the potential to occur within the Project Area. This includes species listed under SARA, COSEWIC, and the NL ESA (Table 9.4). Four of these species are formally protected at the federal level on Schedule 1 under SARA and are further assessed: white shark, spotted wolffish, northern wolffish, and Atlantic wolffish.

Northern, spotted, and Atlantic wolffish are demersal species that potentially occur within the Project Area. As all three species are on Schedule 1 under SARA, a proposed recovery strategy for northern wolffish and spotted wolffish (both Endangered) and a management plan for the Atlantic wolffish (Special Concern) have been prepared to promote recovery of population levels (DFO 2020). Critical habitat has been identified for northern and spotted wolffish along the Northeast Newfoundland Shelf and Slope, to the north of the Project Area (DFO 2020). No overlap exists between the identified critical habitat and the Project Area (see Section 6.1.3.5.1). It is unlikely that wolffish would be affected by MODU-associated sound or VSP activities, and wolffish also do not have swim bladders and are therefore only potentially susceptible to the particle motion component of seismic airgun sound. Different Project activities could potentially interact with wolffish at various life stages as eggs and adults are benthic, and larvae are pelagic, and a change in risk of mortality or physical injury or a change in habitat quality and use could result. However, with the use of mitigation described above and detailed in Sections 9.3.1.2 and 9.3.2.2, and the low spatial and temporal nature of effects, interactions with wolffish species in the Project Area would be localized and short-term. DFO (2020) indicates that while oil and gas exploration and production may have potential effects on wolffish from discharges, it would be highly localized and minor at the population level.

White sharks are large pelagic predators that may migrate through the Project Area. As shown in Section 6.1.3.5.2, Ocearch has tracked individual named sharks into the Project Area (Ocearch 2019). As apex predators, white sharks are vulnerable to bioaccumulation of contaminants through their position in the food web (COSEWIC 2006; Marsili et al. 2016) and contaminants may be transferred to offspring through maternal offloading (Lyons et al. 2013). Marsili et al. (2016) found relatively high levels of polycyclic aromatic hydrocarbons in white sharks relative to other top marine predators off South Africa where there are frequent oil shipping routes. White shark muscle and liver tissue were also found to have higher levels of polychlorinated biphenyls and chlorinated hydrocarbon pesticides relative to other fishes in the Bay of Fundy-Gulf of Maine area (Zitko et al. 1972; COSEWIC 2006). No negative health effects were observed in white sharks off South Africa with high arsenic and mercury concentrations that would be toxic to other fish, suggesting they may have natural protective mechanisms (Merly et al. 2019). Although health impacts of toxins has not been well studied in sharks, accumulation of contaminants may have hormone-disrupting effects (Marsili et al. 2016). As this species is highly mobile, with widely available prey, and with no critical habitat identified in the Project Area or RAA, white sharks are unlikely to be adversely affected by the Project with the implementation of mitigation measures identified in Sections 9.3.1.2 and 9.3.2.2.

Project activities are mainly adverse to marine fish and fish habitat but of low magnitude and generally localized to the Project Area. Effects on fish habitat from the presence and operation of the MODU are considered medium-term as various sound and light emissions and discharges occur irregularly over the life of the Project. Predicted spatial extent of effects from supply and servicing and VSP activities range from the Project Area and the vessel transit route, due to the transit route to supply bases and spatial extents of sound effects. Predicted duration of effects are variable across Project activities, ranging from short-term VSP activities to long-term for effects from drilling discharges. Drill cuttings discharge is anticipated to be of moderate magnitude considering the burial and sediment alteration effects of the deposition area. As recovery times for sensitive benthic species (e.g., corals and sponges) may take years, the duration of discharge effects is considered long-term. However, the localized geographic extent of drilling discharges and low distribution of corals and sponges within the Project Area reduces the overall potential effects on these species and associated biogenic habitat. It is predicted that recovery to baseline

conditions would be long-term for drill cuttings discharge. Effects on habitat availability, quality and use associated with well decommissioning, suspension and abandonment may be permanent if the wellhead is left in place intact on the seafloor. With this exception, potential Project effects are predicted to be reversible with eventual recovery to baseline conditions after Project completion. Results from the first ten years of EEM at the adjacent Terra Nova field indicate that biological effects from ten years of development drilling, which were longer in duration and more extensive than exploration drilling activities described in this EIS, are limited and highly localized where they did occur (Neff et al. 2014). Environmental effects monitoring at the adjacent Terra Nova development field (Suncor 2019) have shown results are consistent with predictions made in the original EIS (Suncor 1996) conducted for the project.

With implementation of mitigation and environmental protection measures, the residual environmental effects on marine fish and fish habitat are predicted to be not significant. Project activities are predicted to result in adverse environmental effects from exploration drilling emissions and discharges through changes in risk of mortality, injury or health and changes in habitat availability, quality, and use. However, predicted effects on marine fish and fish habitat are generally spatially or temporally limited due to the low magnitude or short-term nature of predicted effects. The resulting number of individuals or amount of habitat potentially affected by Project activities is not predicted to result in population-level effects on marine fish. The Project will not result in a detectable decline in overall abundance or changes to the spatial and temporal distributions of fish and invertebrate populations in the Project Area or RAA. Similarly, potential interactions between species of conservation concern and Project activities is limited through the implementation of mitigation and environmental protection measures. Routine Project activities also do not overlap with proposed critical habitats for northern and spotted wolffish. Project activities are not predicted to have implications on the overall abundance, distribution, or health of marine fish SAR or their eventual recovery. Potential for further effects on other ecological and socio-economic VCs through food web linkages and fisheries effects is limited as potential for population-level effects is low and changes to fish habitat are spatially limited.

Marine and Migratory Birds

The presence and operation of a MODU and supply vessels has the greatest potential to result in changes to risk of mortality or physical injury for marine and migratory birds. Some of these species are known to concentrate around drilling and production platforms as a result of artificial lighting at night, food, and other visual cues. This attraction to platforms potentially makes marine and migratory birds vulnerable to increased risk of mortality due to physical strikes with structures, stranding on the MODU or supply vessels, predation by other marine bird species, and incineration from flares (Wiese et al. 2001; Ronconi et al. 2015). As well as direct (e.g., strikes) and indirect interactions with the MODU and supply vessels, the Project has potential to result in a change in risk of mortality or physical injury for marine and migratory birds through exposure to residual hydrocarbons associated with drill muds, cuttings and other discharges, exposure to underwater sound caused by VSP operations (although the likelihood of such an exposure is limited by the short duration of VSP operations combined with the short duration of submersion by diving marine birds), and collisions with transiting helicopters.

A change in habitat quality and use for marine and migratory birds could potentially occur as a result of Project activities, particularly due to the influence of artificial lighting, discharges and atmospheric and

underwater sound associated with the MODU and supply vessels. These changes in the marine habitat could potentially influence bird behaviour, most likely resulting in attraction. Helicopter traffic also has the potential to affect habitat quality and use by marine and migratory birds.

As discussed in Section 6.2.4 (and summarized in Table 10.4), there is low potential for SAR or SOCC to interact with the Project because of these species' low densities in the Project Area, LAA, and RAA (with the exception of Leach's storm-petrel and black-legged kittiwake, which are designated vulnerable on the IUCN Red List) and because there are no critical habitats or nesting sites of SAR or SOCC in the RAA. The MODU and supply vessels may potentially provide a temporary rest platform benefiting red knot, buff-breasted sandpiper, and peregrine falcon in passage migration. Ivory gull and Ross's gull are associated with pack ice, which is uncommon as far south and east as the Project Area or LAA (including supply vessel route) and limited to late winter. These areas are outside the current range of piping plover, harlequin duck, and Barrow's goldeneye, which are very rare in the LAA, but if individuals occur during moult migration or seasonal migration, they may benefit from sheltering from wind and waves by the MODU or supply vessels. Red-necked phalarope, which is more likely to be found offshore than most of the listed bird SAR, is not known to be attracted to offshore vessels or platforms. As discussed in Section 6.2.2.6, the RAA is at the northern periphery of the ranges of Bermuda, Desertas and Zino's petrels where they occasionally occur in very low numbers, and, except for Bermuda petrel, do not venture out of the warm waters of the North Atlantic Drift (northern component of the Gulf Stream).

Major threats identified in associated recovery strategies and action plans for these bird SAR are: predation at the nesting colony, competition for nesting habitat, erosion or fire at the nesting colony, flooding or pollution of coastal habitats, hunting, at-sea pollution, climate change (rising sea levels and food webs), competition with commercial fisheries, fisheries bycatch, and disease. Given the distance of most Project activities occurring offshore, Project effects with these bird SAR are expected to be negligible in magnitude, but low for Leach's storm-petrel, and are most likely to occur during this species' post-breeding dispersal or migration activities. The Project is not predicted to result in direct or indirect effects on the survival or recovery of federally listed species. Mitigation proposed to reduce light emissions, recover stranded birds, manage discharges, and restrict supply vessel and helicopter routes (refer to Section 10.3.1.2) will help to protect bird SAR.

The residual effects of the Project on marine and migratory bird SAR are predicted to be adverse, negligible in magnitude (low for Leach's storm-petrel), extend to the LAA, an unlikely event, short term in duration, and reversible.

The greatest potential for environmental effects on marine and migratory birds is related to artificial lighting associated with presence and operation of a MODU which may result in nocturnal attraction and stranding of birds (including Leach's storm-petrels) on the MODU. This will be mitigated through the development and implementation of protocols and training (ECCC 2020) for systematic, daily searches (ECCC-CWS 2021), and for recovery, rehabilitation, and release of birds adhering to protocols detailed in ECCC's *Procedures for Handling and Documenting Stranded Birds Encountered on Infrastructure Offshore Atlantic Canada* (ECCC 2017a). As described in Chapter 8, significant effects to fish resources are not expected to occur as a result of the Project, and so changes in the availability, location, or quality of food sources for marine birds are not likely.

Based on the nature of the interactions between the Project and marine and migratory birds, and the planned implementation of mitigation, and residual changes to risk of mortality or physical injury, or to habitat quality and use, the Project is not likely to result in significant adverse effects on marine and migratory birds. Although Project-related components, activities and emissions may result in some localized, short-term effects with marine and migratory birds in parts of the Project Area and LAA primarily as a result of bird attraction to offshore lighting and other components, the Project is not predicted to result in a detectable decline in overall bird abundance or changes in the spatial and temporal distributions of bird populations within this area. The potential for interactions between individuals of SAR and the Project is limited, and no identified critical habitat is present in the Project Area, LAA, or RAA. The Project is therefore not predicted to jeopardize the overall abundance, distribution, or health of SAR. With mitigation and environmental protection measures, the residual environmental effects on marine and migratory birds (including SAR) are predicted to be not significant.

Marine Mammals and Sea Turtles

There are two primary pathways from Project activities that may result in change in the risk of mortality or physical injury for marine mammals and sea turtles: vessel strikes and underwater sound generated by Project activities. The supply vessels transiting to and from the Project Area have the potential to collide with marine mammals or turtles, resulting in injury or mortality. The pathway of effect in the case of a vessel strike is the physical contact with a supply vessel. Underwater sound generated by VSP operations and other Project activities has the potential to cause temporary hearing changes (TTS) in marine mammals or sea turtles, and there is the possibility of permanent hearing damage (PTS). Auditory injury from MODU operations, including support vessels, is considered unlikely. There have been no reported cases of marine mammal or sea turtle mortalities that have been causally linked to sounds generated during oil and gas exploration activities.

A change in habitat quality and use for marine mammals and sea turtles may occur from Project activities, particularly due to the underwater sound generated by the MODU, geophysical (including VSP), geological, geotechnical and environmental surveys, and supply vessels. Marine mammals detect and produce sounds both passively and actively to communicate, locate prey and predators, navigate, and gather information about their surroundings (Richardson et al. 1995; Nowacek et al. 2007; Tyack 2008; Shannon et al. 2016). It is unknown how important underwater sound is to sea turtles, but it is likely less important than for marine mammals. Anthropogenic sound from vessel traffic and other offshore exploration activities has the potential to cause adverse effects on marine mammals and sea turtles. This assessment focuses on disturbance or the potential changes in behaviour and distribution of animals that could be of sufficient magnitude to be “biologically important”. Communication masking of marine mammals is also considered, where a sound of interest is obscured by interfering sounds at a similar frequency.

As discussed in Section 6.3.7 and summarized in Table 11.5, with the likely exception of fin whales, there is generally low potential for SAR or SOCC to interact with Project activities because these species are thought to occur infrequently in the Project Area, LAA, and (generally the) RAA, and because critical habitat has not been identified for marine mammals and sea turtles in the Project Area or LAA. Critical habitat has been proposed for leatherback sea turtles in Placentia Bay (i.e., within the RAA) but there is negligible potential for interaction with routine Project activities and sea turtles which occur in this area.

Relevant threats identified for marine mammals and sea turtles at risk in associated recovery strategies and action plans under SARA include acoustic disturbance, marine pollution, and vessel strikes. Mitigation measures proposed to reduce disturbance from underwater sound associated with VSP air gun source arrays, manage discharges, and reduce supply vessel speeds (refer to Sections 11.3.1.2 and 11.3.2.2) will help to protect marine mammal and sea turtle species at risk. SAR marine mammal and turtle species are highly mobile, and many have large distributional ranges and undertake long migrations. Large seasonal and even daily variations in abundance within the Project Area are therefore likely, and the potential for overlap and interaction with Project activities is likely to be temporary. The Project will not occur in any identified concentration areas or critical habitat although it is acknowledged that detailed and systematic marine mammal (and sea turtle) baseline data are lacking. While there is limited potential for Project activities to increase the risk of mortality or injury in SAR, there is potential for sound from Project activities to result in a change in habitat use (i.e., avoidance response). Based on available information (including acoustic modelling), as well as the frequency and duration of Project activities, avoidance responses exhibited by SAR species are generally predicted to be short-term and localized.

The residual effects of the Project on marine mammal and sea turtle species at risk are predicted to be adverse, low in magnitude, generally localized to the Project Area but possibly extending into the LAA, an unlikely to perhaps irregular event, short- to medium-term in duration, and reversible.

The greatest potential for environmental effects on marine mammals and sea turtles related to underwater sound is from the MODU and supply vessels and to a lesser extent from the short duration geophysical (including VSP), geological, geotechnical and environmental surveys. It is possible that marine mammals may exhibit localized and temporary avoidance of the MODU, supply vessels, and geophysical (including VSP), geological, geotechnical and environmental surveys. Similarly, in the unlikely event that a sea turtle occurred in the Project Area, there could be localized avoidance of Project activities. The risk of injury and mortality from vessel strikes is considered low. supply vessels will maintain a constant course and speed whenever possible and reduce speed to a maximum of 7 knots when a marine mammal or sea turtle is observed or reported within 400 m of the supply vessel (except if not feasible for safety reasons). Similarly, the likelihood of a marine mammal and sea turtle incurring permanent hearing impairment and physical injury from exposure to air gun pulses from VSP surveys is low, given the short duration of the activity and the implementation of mitigation measures. In summary, with the implementation of the various mitigation measures, the Project is not predicted to result in adverse population-level environmental effects on marine mammals and sea turtles, including species at risk.

Based on the nature of the interactions between the Project and marine mammals and sea turtles, the planned implementation of mitigation measures, and predicted residual changes to risk of mortality or injury, and to habitat quality and use, the Project is unlikely to result in significant adverse effects on marine mammals and sea turtles. Although Project-related activities may result in localized, short-term effects on some marine mammals and possibly sea turtles in the Project Area and LAA, the number of individuals that may be affected, and the temporary and reversible nature of these effects, indicates that the Project will not result in a detectable decline in overall marine mammal and sea turtle abundance or long-term changes in the spatial and temporal distributions of marine mammal and sea turtle populations. The potential for interactions between most species at risk and the Project is limited, although there is greater potential for Project interactions with fin whales. Nonetheless, effects on species at risk are predicted to be temporary,

generally low in magnitude given the planned mitigation measures; there is no identified critical habitat in the Project Area or LAA. The Project is therefore not predicted to jeopardize the overall abundance, distribution, or health of species at risk. With mitigation and environmental protection measures, the residual environmental effects on marine mammals and sea turtles (including species at risk) are predicted to be not significant.

18.4.2 Changes to the Environment that would Occur in Federal Lands, in Another Province, or Outside Canada

Changes that may be caused to the environment that would occur on federal lands, in another province, or outside of Canada are required for consideration in an EA, under section 5(1)(b) of CEAA 2012. Project activities and components described within the scope of this EIS have the potential to result in changes to the environment that would occur on federal lands, including federal submerged lands (i.e., the seabed) and the federal waters and airspace above those lands.

18.4.2.1 Special Areas

The Project has potential to result in residual adverse effects through a change in habitat quality for special areas within the LAA. This includes a Snow Crab Exclusion Zone and two SiBAs for gorgonian corals that intersect the Project Area. A second Snow Crab Exclusion Zone, two EBSAs, an IBA, a candidate NMCA and two NHSs (Signal Hill NHS and Cape Spear NHS) also exist along the supply vessel route between the Project Area and the shore base. As Suncor will comply with regulations and industry standards for offshore oil and gas activities in Newfoundland and Labrador and employ various mitigation measures (Section 12.4.1.1), the residual adverse environmental effects would be low in magnitude for most Project components and activities. These effects would primarily occur within the Project Area, be short-term to permanent in duration, occurring irregularly, mainly reversible and occur within disturbed ecological and socio-economic settings.

The residual environmental effects of a change in habitat quality on special areas are considered reversible. Though the recovery rate of corals from drill cutting sedimentation would be slow, recovery begins relatively quickly after drilling stops and benthic habitats are expected to recover in one to two years. This combined with mitigation to reduce potential effects on benthic habitats, indicates that effects will not likely result in permanent habitat loss. This is supported by the environmental effects monitoring programs conducted in the eastern Newfoundland offshore area.

With mitigation and environmental protection measures established and applied to Project activities, residual environmental effects on special areas are predicted to be not significant.

18.4.2.2 Indigenous Peoples

As prescribed in the EIS Guidelines and in CEAA 2012, the VC considers the following:

- Health and socio-economic conditions
- Physical and cultural heritage

- Current use of lands and resources for traditional purposes
- Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance

The key interaction between the Project and these Indigenous groups is related to the potential effects to commercial-communal and food, social, and ceremonial (FSC) fishing through a change in access to and/or availability of harvested species. Several Indigenous communities hold commercial-communal or FSC licences for fishing areas in the RAA or for species that may migrate through the RAA. Although there is no documented FSC licences within the Project Area, some species targeted in FSC fisheries are anadromous and can potentially migrate through the Project Area. This VC also considers the indirect effects on socio-economic conditions that may subsequently occur as a result of impacts to the commercial-communal and FSC fisheries.

To date, no Indigenous community has indicated that they actively fish in the Project Area or LAA, although this does not necessarily mean they will not do so in the future. Although there is no known FSC fishing or harvesting taking place in the Project Area, routine Project activities could interact with migratory fish, bird, or mammal species that may be harvested by Indigenous communities from onshore / nearshore harvesting sites. Adverse effects on fishing or harvesting activities could indirectly lead to changes in health, socio-economic, and well-being conditions or cultural heritage of affected Indigenous communities.

The nearest Indigenous community to the Project Area is the Qalipu Mi'kmaq First Nation located approximately 445 km away, on the island of Newfoundland. There are no known physical and cultural sites, including structures, sites, or things of historical, archaeological, paleontological, or architectural significance within the Project Area or the LAA, and therefore, there are no pathways of effects from routine Project activities to these areas.

Commercial-communal and FSC fishing activities are described in Section 7.4.7. Within the RAA, the following species are harvested for commercial-communal purposes: arctic char, capelin, clam, eel, lobster, groundfish (e.g., Atlantic and Greenland halibut, hake), herring, mackerel, smelt, seal, shrimp, snow crab, swordfish, skate, toad crab, tuna, quahaug, and whelk. Shrimp, snow crab, and groundfish are key species harvested within the RAA by Indigenous groups based in Newfoundland and Labrador for commercial purposes. Several Indigenous groups from the Maritime provinces also have commercial-communal licences to fish for swordfish and tuna in the RAA.

As described in Sections 7.4.7.2, various species are harvested by Indigenous groups in the RAA for FSC purposes, including but not limited to Arctic char, Atlantic salmon, bass, blue shark, clams, capelin, cod, crab, eel, gaspereau, herring, lobster, mackerel, mussel, periwinkle, quahaug, razor clams, redfish, scallops, shad, smelt, soft-shell clams, squid, trout, and tomcod. In general, these FSC species would be harvested in the nearshore and/or freshwater systems and would not interact with Project activities. However, American eel and Atlantic salmon are migratory species which could potentially migrate through the Project Area at some point in their life cycle. Life histories of these species and their importance to Indigenous peoples are discussed in Section 6.1.3.6.

Over the course of EAs for recently proposed offshore exploration drilling projects, specific concerns about potential effects on swordfish, bluefin tuna, Atlantic salmon and American eel have been raised by various Indigenous communities and organizations and therefore potential effects of routine Project activities on these species is discussed in Section 13.3.4.

Marine and migratory birds and eggs are commonly harvested by Indigenous communities from the shore and nearshore areas, and include geese (e.g., Canada goose), ducks (e.g., northern pintail, blue-winged teal, Harlequin duck, common eider), loons (e.g., common loon), gulls, murres (also referred to as turrs), mergansers and scoters. Game birds (e.g., ptarmigan, grouse), although also commonly harvested by Indigenous communities, are not migratory nor do they use the marine environment therefore there is no predicted Project-interaction with game birds; game birds are not discussed further in this VC.

Between late March and mid-May, harp, grey, hooded and ringed seals are harvested by Indigenous groups in Newfoundland and Labrador. Seals may be harvested as part of the commercial-communal fishery or for FSC purposes (the latter of which could occur year-round).

Commercial-communal fishing activity includes deploying, setting, retrieving / hauling, and / or accessing gear in designated fishing grounds, and travel to and from those fishing grounds. A change in commercial-communal fisheries would most likely occur from Project interactions that might interrupt or prevent that process (e.g., having grounds closed to fishing, impediments to or from fishing grounds, lost or damaged fishing gear, or lost or reduced catch), are the focus of this assessment. Furthermore, for many Indigenous communities, commercial-communal fishing activities represent an important revenue source. Many Indigenous communities rely on revenue generated from commercial-communal fishing to fund community ventures, social programs and benefits, and therefore, indirect socio-economic effects are also qualitatively considered in this assessment. Project interactions which could interrupt or prevent commercial-communal fishing could result in reduced revenue for a community and affect community spending and investment in infrastructure, services and/or programs.

A change in commercial-communal fisheries could occur as a result of Project activities affecting the marine environment, including drilling (underwater sound effects on commercial-communal fisheries species), VSP (underwater sound effects on commercial-communal fisheries species), discharges (effects on water and sediment quality for commercial-communal fisheries), well decommissioning, suspension and abandonment (potential interference with commercial-communal fishing) and supply and servicing (supply vessels disturbing marine fish or damaging fisheries gear or equipment).

Current use of lands and resources for traditional purposes includes harvesting activities to collect resources that provide nourishment, or for use in traditional ceremonies and social events. Indigenous peoples have historically relied on harvesting a variety of species (e.g., fish, birds, marine mammals, wildlife, plants) for sustenance, medicine, spiritual and cultural practices, and for trade. Although, Suncor is not aware of FSC fishing occurring in the Project Area, migratory fish, bird and/or mammal species that may be traditionally harvested by Indigenous communities (or species linked to these harvested species [e.g., prey species]) elsewhere, may migrate through the Project Area and interact with the Project. This may therefore affect the quality or availability of these resources upon which Indigenous communities may depend and could potentially result in a change in current use of resources for traditional purposes. The

pathway for a Project effect causing a change in the current use of lands and resources for traditional purposes is therefore tied to effects on migratory species which may occur in the Project Area or LAA.

A change in current use of lands and resources for traditional purposes could occur as a result of Project activities affecting the marine environment, including the presence and operation of a MODU (underwater sound effects on FSC fisheries species), VSP (underwater sound effects on FSC fisheries species), discharges (effects on water and sediment quality for FSC fisheries, effects on marine and migratory birds), well testing and flaring (risk of mortality for marine and migratory birds), and supply and servicing (helicopters and supply vessels disturbing marine and migratory birds, and supply vessels disturbing marine fish or interfering with inshore fisheries).

Indigenous communities and organizations (over the course of environmental assessments for recently proposed offshore exploration drilling projects) have raised concerns about potential effects on swordfish, bluefin tuna, Atlantic salmon and American eel. Therefore, the potential effects of routine Project activities on these species are evaluated below, with a full assessment of Project interactions on marine fish and fish habitat provided in Section 9.3.

Swordfish

Miawpukek First Nation and several Indigenous communities in the Maritime provinces hold commercial-communal licences for swordfish in the RAA. Swordfish are highly migratory pelagic species that forage in Canadian waters from June to October (DFO 2015). The spawning and nursery habitats for swordfish are far away from the Project Area (e.g., Gulf of Mexico, eastern continental shelf of the United States (Arocha 2007). Additionally, the longline fishery for swordfish in the RAA occurs primarily on the southern Grand Banks, also distant from the Project Area or LAA.

Swordfish are highly visual predators (DFO 2015), and like many other pelagic fish, may be attracted to the MODU due in part to increased foraging opportunities (aggregation of prey species) and increased light emissions. Individual swordfish species may be attracted to Project infrastructure which may expose species to the emissions (sound, light) and discharges associated with drilling activities. Lights from the MODU or supply vessel are not projected into the water column far beyond the physical footprint of the MODU / vessels (i.e., within 100 m), limiting the area affected. Furthermore, based on hearing sensitivities of other large pelagic fish, swordfish are likely capable of detecting low frequency sounds and are expected to avoid high intensity sound levels thereby avoiding potential injury.

Potential interactions from Project-related activities with swordfish are expected to be low due to the limited seasonal distribution near the Project Area, their non-schooling behavior, and their capability to avoid adverse effects associated with underwater sound. Mitigation measures will be implemented to protect marine fish and fish habitat (e.g., waste management) which will also help reduce potential for adverse effects on swordfish.

Bluefin Tuna

Miawpukek First Nation and several Indigenous communities from the Maritime provinces hold commercial-communal licences for bluefin tuna and/or other tuna species in the RAA. Bluefin tuna are highly migratory species and seasonal migrants to Canadian waters. They are generally fished from July through December in the Scotian Shelf, Gulf of St. Lawrence, Bay of Fundy and Newfoundland waters with the occurrence and abundance of bluefin tuna in any one of these locations varying from one year to the next. There are no known spawning or rearing habitats for larval and juvenile stages in Canadian Waters (COSEWIC 2011).

Adult bluefin tuna are highly mobile (Hazen et al. 2016) and expected to avoid high intensity sound levels, thereby avoiding potential injury. Tuna are hearing generalists and are capable of detecting low frequency sounds in the range of 200 to 700 Hz with higher sensitivity to sounds between 200 to 400 Hz (Southwood et al. 2008). Project interactions with bluefin tuna are anticipated to be low due to the limited seasonal distribution and broad range of habitat locations, and its capability to avoid injury. Effects on prey species from routine Project activities are not predicted to occur such that it would affect foraging success of bluefin tuna. Mitigation measures will be implemented to protect marine fish and fish habitat (e.g., waste management) which will also help reduce potential for adverse effects on bluefin tuna.

Atlantic Salmon

Atlantic salmon has traditionally been a staple food for Indigenous peoples, although today, it is often reserved for special occasions given a lack of abundance and concern for local populations (Denny and Fanning 2016). There are several populations of Atlantic salmon which could be found in the RAA. Salmon of various ages may be found in the ocean (COSEWIC 2010), and migration routes can vary considerably due to variations in environmental conditions, such as sea surface temperature. Research vessel surveys have not identified salmon within the Project Area and, therefore, the potential for occurrence within the Project Area is considered low. Given recent concerns regarding the presence or absence of Atlantic salmon (*Salmo solar*) in areas of offshore oil and gas activity in eastern Canada, there are ongoing environmental and social studies on Atlantic salmon through the ESRF (2019). These studies and other research initiatives may help to provide additional data regarding the migration routes of salmon.

Should Atlantic salmon occur within the Project Area, it is likely that they would be migrating through and therefore would only be temporarily exposed to underwater sound emissions and discharges in the Project Area or LAA. Light from the MODU is not expected to penetrate the water column more than 50 m radius from the source (Davies et al. 2014) and is not anticipated to affect salmon. Atlantic salmon do not have special adaptations for hearing; however, they are sensitive to acoustic particle motion, particularly at frequencies below 200 Hz (Bui et al. 2013) and have been shown to avoid infrasound frequencies in freshwater environments (5 to 10 Hz) in controlled experiments. The MODU will produce low frequency sounds under water not unlike other vessels currently operating in the marine environment, including supertankers / container ships (7 to 70 Hz), medium-sized ships such as ferries (approximately 50 Hz), boats <30m in length (<300 Hz), and smaller ships such as support / supply vessels (20 to 1,000 Hz) (Peng et al. 2015). Underwater sound emissions from the MODU and supply vessels are not predicted to affect salmon, including during spawning migration to natal rivers. Mitigation measures will be implemented to

protect marine fish and fish habitat (e.g., waste management) which will also help reduce potential for adverse effects on Atlantic salmon.

American Eel

American eel is a catadromous fish (i.e., migrating down rivers to the sea to spawn) that lives primarily within freshwater and estuarine environments. It has a broad distribution throughout the northwest Atlantic Ocean, stretching from Venezuela to Greenland and Iceland, with the Canadian portion of this distribution including coastlines, freshwater habitats, estuaries, and coastal marine waters connected to Canada, up to the mid-Labrador coast (COSEWIC 2012).

American eel was not identified during 2007 to 2018 DFO research vessel surveys. The potential for occurrence within the Project Area is considered low. Little information is available on specific migration patterns of American eel. Should American eel occur within the Project Area, it is likely that they would be transported by currents on their way either to Greenland, Iceland, or to NL.

An assessment of recovery potential for America eel in Eastern Canada determined that oil and gas exploration (with a focus on seismic exploration) represented a negligible threat based on evidence of populations of American eel in the Newfoundland and Labrador region (Chaput et al. 2013). Boat and ship traffic were also noted as being a negligible threat to American eel in the Newfoundland and Labrador region (Chaput et al. 2013).

Studies have shown juvenile and adult American eel to exhibit a strong avoidance to lights (Hadderingh et al. 1992; Cullen and McCarthy 2000; Bruijs et al. 2002). As described above however, light from the MODU would be quickly attenuated through refraction and absorption, is not expected to penetrate the water column more than 50 m radius from the source (Davies et al. 2014). Artificial lighting from the MODU is therefore not expected to affect eel migration patterns.

Given the low likelihood of high densities of American eel migrating through the Project Area and the localized nature of effects from routine Project activities, the Project is not likely to have adverse effects on American eel. Mitigation measures will be implemented to protect marine fish and fish habitat (e.g., waste management) which will also help reduce potential for adverse effects on American eel.

The Project will result in adverse effects to a change in commercial-communal fisheries and change in current use of lands and resources for traditional purposes. The Project may interact with commercial-communal fishing (if fishing rights are exercised in the LAA) and/or targeted species, although these effects are not predicted to occur to the extent that there would be a measurable change in revenue that could result in a change in health or socio-economic conditions for an Indigenous community. Similarly, the Project may interact with marine species that could be considered important from a food, social or ceremonial perspective, although Project activities are not predicted to cause a change in quantity, quality or availability of traditional resources that could result in a change in current use of lands and resources for traditional purposes. In consideration of the implementation of mitigation, the residual effects are predicted to be negligible to low in magnitude for each Project activity, generally occur within the RAA (where Indigenous communities are located), be of short to long-term in duration, and be reversible.

Residual effects from routine Project activities on Indigenous peoples are not predicted to result in a loss of access to or permanent loss of areas relied upon for traditional use practices. Adverse effects on socio-economic conditions of affected Indigenous communities are not predicted such that there would be an associated detectable and sustained decrease in the quality of life of a community, including for subpopulations within a community. A decrease in established employment and business activity in commercial-communal fisheries (e.g., due to fish mortality and/or dispersion of stocks) is not predicted such that there is a detectable adverse effect upon the economy of the affected Indigenous community, and damage to fishing gear would be mitigated. With mitigation and environmental protection measures, residual environmental effects on Indigenous peoples are predicted to be not significant.

18.4.2.3 Commercial Fisheries

Commercial fishing activity involves setting and retrieving gear in designated fishing grounds, as well as travel to and from those fishing grounds. Other ocean uses can include shipping and planned military activities, ocean research activities, and the presence of existing infrastructure on the seabed. Project interactions that might interrupt or prevent these activities include:

- Presence of the safety zone around the MODU which will impose temporary access restriction in areas that may overlap with known fishing grounds
- Sound emissions from the MODU, geophysical (including VSP), geological, geotechnical and environmental surveys and supply vessels, which may temporarily cause commercially fished species to avoid the area around the MODU, thus changing their availability as a resource
- Presence of a suspension cap or abandoned wellhead on the sea floor, which may cause fishers to avoid fishing in certain areas due to fear of damage to or loss of gear

The Project may result in residual adverse effects through a change in availability of or access to resources (including resources that may be used for commercial fishing activity, offshore marine research, and military training exercises). The designated safety zone (500 m radius from the well location or 50 m beyond an anchor point, whichever is larger) is established around the MODU in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations* to prevent collisions between the MODU and other vessels. It will result in an area of approximately 7 km² being inaccessible to fishing and other vessels for a period of up to 120 days per well. The residual environmental effects are assed in consideration of the implementation of applicable mitigation measures described in Section 14.3.2, and adherence to industry standards and best practices for offshore oil and gas activities. The residual adverse environmental effects on a change in availability of or access to resources are predicted to be low in magnitude, located within the Project Area and/or LAA (along transit route), short-term to permanent (if wellhead left in place) in duration, occurring at irregular intervals to continuous (for duration of drilling period), reversible to irreversible (if wellhead let in place), and primarily occurring within a disturbed setting.

Residual adverse effects from routine Project activities on commercial fisheries are not anticipated to result in local fishers being displaced or unable to use portions of the areas currently used for fishing for all or most of the season. It is not expected that local fishers will experience a change in availability of fishing resources such that they cannot be used at current levels within the RAA for more than one fishing season.

Likewise, for other ocean users, it is not expected they will be displaced or unable to use substantial portions of the areas currently used for one or more years.

Given the irregular schedule and short-term duration of drilling activities, the localized nature of Project interactions with commercial fishing activity, and the implementation of mitigation, such as communication with commercial fishers and other ocean users, and environmental protection measures, residual adverse environmental effects on commercial fisheries and other ocean users are predicted to be not significant.

18.4.3 Changes to the Environment that are Directly Linked or Necessarily Incidental to Federal Decisions

An EA is required under section 5(2)(a) of CEAA 2012 to consider additional changes that may be caused to the environment and that are directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the designated project. The primary regulatory approvals necessary to conduct an offshore drilling program are an OA (Drilling) and a Well Approval (ADW) pursuant to the Accord Acts and their regulations. A *Fisheries Act* authorization is not expected to be required in support of the Project, as Project activities and components are not predicted to result in harmful alteration, disruption or destruction (HADD) of fish habitat or cause the "death of fish" (other than fishing activities). Drill cuttings dispersion modelling was performed for the Project to assess the footprint, spatial extent, and thickness of discharged drill cuttings. Although drilling discharges will result in localized alteration of benthic habitat, these effects will not be permanent and are not anticipated to affect commercial, recreational, or Indigenous fishery species. Suncor will conduct seabed surveys at the proposed wellsites to confirm the absence of sensitive environmental features (e.g., habitat-forming coral or species at risk) at the chosen drilling locations.

This section focuses on changes to the environment other than those referred to under section 5(1)(a) and (b) of CEAA 2012, which are considered in Sections 18.4.1 and 18.4.2, respectively. The atmospheric environment (i.e., air quality, light and noise and GHG) is considered a VC in this EIS and a detailed assessment of potential environmental effects on GHGs and air quality, noise and lighting is provided in Chapter 8, and is summarized below.

Atmospheric Environment

The atmospheric environment is a pathway for the transport of air contaminants to marine, freshwater, terrestrial and human environments. Emissions will include CO_2, CO, SO_X, NO_X, PM, VOCs, and other GHGs. These emissions have the potential to increase global atmospheric GHG levels and to affect global climate change.

The total annual emissions from the Project were estimated based on the assumption that three to four wells could be drilled per year with one of the three wells being tested. Most of the annual air contaminant emission estimated from the Project were lower than those reported from the nearby production platforms, The maximum GLCs from the Project are not expected to exceed the NL Ambient Air Quality Criteria.

Project interactions that might impact this pathway are those that generate GHGs. GHGS will be generated by the following Project-related activities:

- Fuel combustion from engines associated with the MODU, supply vessels, fixed and mobile deck equipment, and helicopters (i.e., exhaust emissions)
- Potential flaring during well test activity, in the event that well testing is required

Over the term of the EL, there could be between zero and four wells drilled per year. Only one-third of the drilled wells will be tested, or approximately one per year. With those assumptions, the annual GHG emissions resulting from Project activities (drilling, vessel traffic, helicopter traffic, and well testing) could range from 0 to approximately 63 kt CO_2e/yr; approximately 44 kt CO_2e are attributed to the MODU and the rest are from vessels, helicopters, and flaring. These emissions represent approximately 0% to 0.46% of the total reported provincial GHG emissions for 2020 (9,500,000 tonnes CO_2e) and approximately 0% to 0.01% of the 2020 national emissions (672,000,000 tonnes CO_2e) (ECCC 2022).

The total GHG emissions of approximately 63 kt CO_2e/yr is in the “medium” magnitude category using Agency criteria and is less than the 500 kt threshold described in ECCC guidance (ECCC 2022). With the application of proposed mitigation and environmental protection measures, the residual environmental effects of a change in GHGs from Project activities and components, using the magnitude scale of low, medium, and high, as defined in Section 8.2.5, the Project is considered to have a medium (moderate) magnitude. Emissions of GHGs from Project activities would be low in comparison to provincial and national emissions.

Table 18.6 Summary of Changes to the Environment that are Potentially Contingent on Federal Decisions

Federal Decision	Changes (Potential Environmental Effects)	Affected VCs
Accord Acts Authorizations (OA and ADW under the Accord Acts and *Newfoundland and Labrador Offshore Petroleum Drilling and Production Regulations*)	Change in GHG Levels	• Atmospheric Environment
	Change in Risk of Mortality or Physical Injury	• Marine Fish and Fish Habitat • Marine and Migratory Birds • Marine Mammals and Sea Turtles
	Change in Habitat Availability, Quality and Use	• Marine Fish and Fish Habitat
	Change in Habitat Quality and Use	• Marine and Migratory Birds • Marine Mammals and Sea Turtles
	Change in Habitat Quality	• Special Areas
	Change in Commercial Communal Fishing or Change in Current Use of Lands and Resources for Traditional Purposes	• Indigenous Peoples
	Change in Availability of Resources or Operating Environment	• Commercial Fisheries and Other Ocean Uses

Federal Decision	Changes (Potential Environmental Effects)	Affected VCs
Fisheries Act Authorization (Authorization for Serious Harm to Fish under section 35(2)(d) of the *Fisheries Act*)	Change in Risk of Mortality or Physical Injury	• Marine Fish and Fish Habitat
	Change in Habitat Availability, Quality and Use	• Marine Fish and Fish Habitat

Project activities and components are not expected to result in changes to the environment that would have an effect on health conditions; physical and cultural heritage; or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance for Indigenous or non-Indigenous people, given the distance of the Project offshore NL. Effects on socio-economic conditions, however, may occur from the following potential changes to the environment:

- Change in risk of mortality or physical injury for fish
- Change in habitat quality and use for fish
- Change in availability of resources (for commercial and Indigenous fisheries)
- Change in traditional use for Indigenous people

Other suitable fish habitat and fishing areas are readily available throughout the RAA, and potential changes to the environment are anticipated to be temporary and localized around the MODU and supply vessels. Therefore, these potential changes to the environment are not anticipated to substantially affect socio-economic conditions for commercial or Indigenous fishers (refer to Chapters 13 and 14).

18.5 Conclusions

The significance of residual effects identified in Tables 18.3 and 18.4 are summarized in Table 18.7 for each VC for routine operations, accidental events, and cumulative effects, and, where applicable, the likelihood of significant residual adverse environmental effects occurring.

Table 18.7 Summary of Residual Environmental Effects for Routine Operations, Accidental Events and Cumulative Effects

VC	Routine Operations	Accidental Effects		Cumulative Effects
	Significance of Residual Environmental Effect	Significance of Residual Environmental Effect	Likelihood of Significant Effect	Significance of Residual Environmental Effect
Atmospheric Environment (GHGs)	N	-	-	N
Marine Fish and Fish Habitat	N	N	N/A	N
Marine and Migratory Birds	N	S	U	N
Marine Mammals and Sea Turtles	N	N	N/A	N
Special Areas	N	S	U	N

VC	Routine Operations	Accidental Effects		Cumulative Effects
	Significance of Residual Environmental Effect	Significance of Residual Environmental Effect	Likelihood of Significant Effect	Significance of Residual Environmental Effect
Indigenous Peoples	N	S	U	N
Commercial Fisheries and Other Ocean Uses	N	N	N/A	N

Key:
N = Not significant residual environmental effect (adverse)
S = Significant residual environmental effect (adverse)
U = Unlikely
N/A = Not Applicable

The environmental effects assessment for each VC examines the degree and nature of change to, and resulting effects on, the existing environment that may occur as a result of planned Project activities. In each case, a conservative indication of effects is provided, as it is based on the reasonable worst-case scenario of the characterized range of magnitude (range of natural variability). Mitigations, summarized in Table 18.2, have been proposed to reduce or eliminate adverse environmental effects for components of the Project scope. They include general Project mitigation measures, best management practices, and VC-specific mitigation measures. Residual adverse environmental effects of routine Project activities and components are predicted to be not significant for all VCs with the implementation of these proposed mitigation measures.

In the unlikely event of a Project-related accidental event resulting in the large-scale release of oil into the marine environment, a significant adverse effect is predicted for marine and migratory birds, special areas and Indigenous peoples and communities. In the event of a well blowout, Suncor would attempt direct intervention measures where appropriate and in consultation with regulators (e.g., capping stack, dispersants). The magnitude and extent of potential effects would be reduced with the application of spill response measures (Section 16.4); therefore, the risk of adverse effects would be reduced.

In summary, Suncor has a strong presence in NL. As operator of the Terra Nova Project since 2001, Suncor has consistently fulfilled its Benefits Plan commitments. This is evident in the high number of local residents employed in connection with the Terra Nova Development. There has been a demonstrated level of NL content on expenditures and significant dollars invested in education and training, research and development and community investment. Suncor is committed to fulfilling its obligations with respect to the statutory requirements outlined in section 45(2) of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act*. Over the course of the Project, Suncor will work with governments and industry to improve the domestic supply capability, as well as to support and encourage current suppliers, and the establishment of new suppliers in NL and Canada.

Suncor's policies, principles, and environmental management plans and procedures will allow the Project to be planned and completed in a manner that avoids or reduces potential environmental effects. Standard operating procedures and standard mitigation measures will be applied to effectively mitigate many of the potential adverse environmental effects identified in the EIS. Overall, with the implementation of the identified mitigation, adverse residual effects from routine Project activities is predicted to be not significant.

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