Equinor Canada Ltd.

Central Ridge Exploration Drilling Program

Abridged EIS

January 2020

TABLE OF CONTENTS

1.0 INTRODUCTION 19

1.1 Identification and Overview of Equinor Canada 19
1.1.1 Equinor Canada's Offshore Experience 20
1.1.2 Equinor Canada's Management System 21
1.1.3 Equinor Canada Contacts 22
1.2 Project Location and Overview 22
1.2.1 Project Location 22
1.2.2 Key Project Components and Activities 24
1.3 Regulatory Framework and the Role of Government 24
1.3.1 The Accord Act 24
1.3.2 Land Tenure and Licensing 24
1.3.3 Environmental Assessment under CEAA 2012 24
1.3.4 Other Potential Regulatory and Policy Requirements and Interests 25
1.4 Purpose and Organization of the EIS 25
1.5 Key Legislation, Regulations, and Associated Approvals 28
1.6 References 38

2.0 PROJECT DESCRIPTION 39

2.1 Project Scope 39
2.2 Purpose of the Project 39
2.3 Project Location and Designated Project Area 40
2.4 Resource Use and Environmental Features 43
2.5 Project Components and Activities 44
2.5.1 Drilling Installation and Activities 44
2.5.2 Geophysical, Environmental and Geotechnical Surveys 45
2.5.3 Formation Flow Test with Flaring 46
2.5.4 Well Decommissioning or Suspension 47
2.5.5 Supply and Servicing 48
2.6 Project Personnel 50
2.7 Project Schedule 51
2.8 Summary of Changes to the Project 52
2.9 Waste Discharges and Emissions 52
2.9.1 Air Emissions 53
2.9.2 Hazardous and Non-hazardous Wastes 54
2.9.3 Drilling Waste 55
2.9.3.1 Drilling Mud and Cement 55
2.9.3.2 Cement 58
2.9.4 Liquid Wastes 59
2.9.5 Heat, Light, and Sound Emissions 60
2.9.5.1 Light and Heat Emissions 60
2.9.5.2 Sound Emissions 61
2.10 Alternative Means of Carrying Out the Project 62

2.11 Environmental Planning and Management 62
2.11.1 Safety and Sustainability Policies 64
2.11.1.1 Our Approach to Safety 64
2.11.1.2 Our Approach to Sustainability 65
2.11.2 The Equinor Canada Management System 66
2.11.3 Environmental Planning 66
2.11.3.1 Project Planning, Assessment, and Implementation: Application of the Precautionary Principle 67
2.11.3.2 Environmental Management 68
2.11.3.3 Environmental Monitoring 68
2.12 References 69

3.0 REGULATORY, INDIGENOUS, AND STAKEHOLDER ENGAGEMENT 72

3.1 EIS Guidelines 72
3.2 Government Departments and Agencies 73
3.3 Engagement with Indigenous Groups 80
3.3.1 List of Indigenous Groups 81
3.3.2 Engagement with Newfoundland and Labrador Indigenous Groups 83
3.3.2.1 Labrador Inuit (Nunatsiavut Government) 83
3.3.2.2 Labrador Innu (Innu Nation) 84
3.3.2.3 NunatuKavut Community Council 86
3.3.2.4 Miawpukek First Nation 88
3.3.2.5 Qalipu Mi'kmaq First Nation 90
3.3.3 Engagement with Maritime Provinces Indigenous Groups 91
3.4 Stakeholder Meetings and Discussions 107
3.5 References 109

4.0 ENVIRONMENTAL ASSESSMENT SCOPE, APPROACH, AND METHODS 110

4.1 Scope of the Environmental Assessment and Factors Considered 110
4.2 Identification and Selection of Valued Components 112
4.3 Environmental Effects Assessment (Planned Project Components and Activities) 115
4.3.1 Environmental Assessment Study Areas and Effects Evaluation Criteria 115
4.3.2 Potential Environmental Changes, Effects, and Associated Parameters 118
4.3.3 Environmental Effects Assessment and Mitigation 119
4.3.4 Cumulative Environmental Effects 122
4.3.5 Accidental Events 122
4.4 Effects of the Environment on the Project 122
4.5 Modelling Results 122
4.5.1 Cuttings Modelling 122
4.5.2 Oil Spill Trajectory Modelling 123
4.6 References 124

5.0 EXISTING PHYSICAL ENVIRONMENT 125

5.1 Geology and Geomorphology 125

5.2 Bathymetry 125
5.3 Climatology 127
5.4 Air Quality 127
5.5 Oceanography 129
5.6 Ambient Noise 129
5.7 Ice Conditions 130
5.8 Climate Change 130
5.9 References 131

6.0 EXISTING BIOLOGICAL ENVIRONMENT 133

6.1 Marine Fish and Fish Habitat 133
6.1.1 Plankton, Plants and Macroalgae 133
6.1.2 Pelagic Macroinvertebrates 133
6.1.3 Benthic Invertebrates 134
6.1.4 Corals and Sponges 134
6.1.5 Finfish (Demersal and Pelagic Species) 141
6.1.6 Species at Risk 160
6.2 Marine and Migratory Birds 162
6.2.1 Seabirds 164
6.2.2 Species at Risk 196
6.2.3 Special Areas of Importance to Bird Species 197
6.3 Marine Mammals and Sea Turtles 200
6.3.1 Species at Risk 214
6.3.2 Special Areas of Importance to Marine Mammals and Sea Turtles 220
6.4 Special Areas 221
6.5 References 241

7.0 EXISTING HUMAN ENVIRONMENT 248

7.1 Commercial Fisheries 248
7.2 Other Human Components and Activities 249
7.2.1 Marine Research 249
7.2.2 Marine Shipping 254
7.2.3 Offshore Oil and Gas Activity 255
7.3 Indigenous Communities and Activities 255
7.3.1 Concerns Expressed by Indigenous Groups 258
7.3.2 Newfoundland and Labrador Indigenous Groups 261
7.3.3 Mi'kmaq of Nova Scotia 276
7.3.4 Mi'kmaq of Prince Edward Island 291
7.3.5 Indigenous Peoples of New Brunswick 293
7.3.5.1 Mi'gmaq of New Brunswick 293
7.3.5.2 Wolastoqiyik of New Brunswick 301
7.3.5.3 Peskotomuhkati Nation (Passamaquoddy) 308
7.3.6 Mi'kmaq and Innu of Québec 309
7.3.6.1 Mi'gmaq First Nations of Québec 309
7.3.6.2 Innu First Nations of Québec 316

7.4 Other Aspects of the Human Environment 320
7.5 References 324
7.5.1 Personal Communications 324
7.5.2 Literature Cited 324

8.0 MARINE FISH AND FISH HABITAT: ENVIRONMENTAL EFFECTS ASSESSMENT 332

8.1 Environmental Assessment Study Areas and Effects Evaluation Criteria 332
8.2 Potential Environmental Changes, Effects, and Associated Parameters 333
8.3 Environmental Effects Assessment and Mitigation 334
8.3.1 Approach and Methods 334
8.3.2 Summary of Key Mitigation 334
8.3.3 Presence and Operation of Drilling Installation 336
8.3.4 Drilling and Associated Marine Discharges 338
8.3.5 Formation Flow Testing with Flaring 340
8.3.6 Wellhead Decommissioning 341
8.3.7 Project-related Surveys 341
8.3.8 Supply and Servicing 342
8.4 Species at Risk: Overview of Potential Effects 343
8.5 Significance of Residual Environmental Effects 346
8.6 Environmental Monitoring and Follow-up 346
8.7 References 355

9.0 MARINE AND MIGRATORY BIRDS: ENVIRONMENTAL EFFECTS ASSESSMENT 358

9.1 Environmental Assessment Study Areas and Effects Assessment Criteria 358
9.2 Potential Environmental Changes, Effects, and Associated Parameters 359
9.3 Environmental Effects Assessment and Mitigation 359
9.3.1 Approach and Methods 359
9.3.2 Summary of Key Mitigations 360
9.3.3 Presence and Operation of Drilling Installation 360
9.3.4 Drilling and Associated Marine Discharges 362
9.3.5 Formation Flow Testing with Flaring 362
9.3.6 Wellhead Decommissioning 363
9.3.7 Project-related Surveys 364
9.3.8 Supply and Servicing 364
9.4 Species at Risk: Overview of Potential Effects 365
9.5 Significance of Residual Environmental Effects 369
9.6 Environmental Monitoring and Follow-up 369
9.7 References 378

10.0 MARINE MAMMALS AND SEA TURTLES: ENVIRONMENTAL EFFECTS ASSESSMENT 380

10.1 Environmental Assessment Study Areas and Effects Assessment Criteria 380
10.2 Potential Environmental Changes, Effects, and Associated Parameters 381

10.3 Environmental Effects Assessment and Mitigation 382
10.3.1 Approach and Methods 382
10.3.2 Summary of Key Mitigation 382
10.3.3 Presence and Operation of Drilling Installation 383
10.3.4 Drilling and Associated Marine Discharges 385
10.3.5 Formation Flow Testing with Flaring 385
10.3.6 Wellhead Decommissioning 386
10.3.7 Project-related Surveys 386
10.3.8 Supply and Servicing 387
10.4 Species at Risk: Overview of Potential Effects 388
10.5 Significance of Residual Environmental Effects 392
10.6 Environmental Monitoring and Follow-up 392
10.7 References 401

11.0 SPECIAL AREAS: ENVIRONMENTAL EFFECTS ASSESSMENT 402

11.1 Special Areas Overlapping with ELs 1159 and 1160 402
11.2 Environmental Assessment Study Areas and Effects Assessment Criteria 402
11.3 Potential Environmental Changes, Effects, and Associated Parameters 409
11.4 Environmental Effects Assessment and Mitigation 409
11.4.1 Approach and Methods 409
11.4.2 Summary of Key Mitigation 409
11.4.3 Environmental Effects Assessment (All Project Components and Activities) 410
11.4.3.1 Potential Zones of Influence 411
11.5 Significance of Residual Environmental Effects 414
11.6 Environmental Monitoring and Follow-up 415
11.7 References 420

12.0 INDIGENOUS COMMUNITIES AND ACTIVITIES: ENVIRONMENTAL EFFECTS ASSESSMENT 421

12.1 Environmental Assessment Study Areas and Effects Evaluation Criteria 421
12.2 Potential Environmental Changes, Effects, and Associated Parameters 422
12.3 Environmental Effects Assessment and Mitigation 423
12.4 Significance of Residual Environmental Effects 424
12.5 Environmental Monitoring and Follow-up 425

13.0 COMMERCIAL FISHERIES AND OTHER OCEAN USERS: ENVIRONMENTAL EFFECTS ASSESSMENT 433

13.1 Environmental Assessment Study Areas and Effects Evaluation Criteria 433
13.2 Potential Environmental Changes, Effects, and Associated Parameters 434
13.3 Environmental Effects Assessment and Mitigation 435
13.3.1 Approach and Methods 435
13.3.2 Summary of Key Mitigation 435

13.3.3 Presence and Operation of Drilling Installation (Including Drilling and Associated Discharges) 436
13.3.4 Formation Flow Testing with Flaring 437
13.3.5 Wellhead Decommissioning 438
13.3.6 Surveys 439
13.3.7 Supply and Servicing 439
13.4 Significance of Residual Environmental Effects 440
13.5 Environmental Monitoring and Follow-up 440
13.6 References 449

14.0 CUMULATIVE ENVIRONMENTAL EFFECTS 450

14.1 Approach and Methods 450
14.1.1 Identification of Valued Components 450
14.1.2 Spatial and Temporal Boundaries 451
14.1.3 Sources of Potential Cumulative Effects 451
14.1.4 Assessing Cumulative Effects on Each VC 457
14.2 Marine Fish and Fish Habitat (including Species at Risk) 457
14.3 Marine and Migratory Birds (including Species at Risk) 458
14.4 Marine Mammals and Sea Turtles (including Species at Risk) 459
14.5 Special Areas 460
14.6 Indigenous Communities and Activities 462
14.7 Commercial Fisheries and Other Ocean Users 463
14.8 Monitoring and Follow-up 464
14.9 References 464

15.0 ACCIDENTAL EVENTS 465

15.1 Spill Prevention and Response 465
15.2 Potential Accidental Event Scenarios 468
15.3 Spill Risk and Probabilities 469
15.4 Fate and Behaviour of Potential Spills 472
15.4.1 Applicability of EL 1135 (shallow-water) and EL 1134 (deep-water) Modelling for Illustrative Purposes 473
15.4.2 Stochastic Modelling Results 474
15.4.3 Deterministic Results 482
15.5 Environmental Effects Assessment 488
15.5.1 Marine Fish and Fish Habitat (including Species at Risk) 488
15.5.2 Marine and Migratory Birds (including Species at Risk) 490
15.5.3 Marine Mammals and Sea Turtles (including Species at Risk) 491
15.5.4 Special Areas 492
15.5.5 Indigenous Communities and Activities 493
15.5.6 Commercial Fisheries and Other Ocean Users 495
15.6 References 495

16.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT 499

16.1 Key Environmental Considerations 499
16.2 Assessing and Mitigation Potential Effects of the Environment on the Project 500
16.3 Residual Effects Summary 501

17.0 ENVIRONMENTAL ASSESSMENT SUMMARY AND CONCLUSIONS 503

17.1 Summary of Potential Effects 503
17.2 Summary of Mitigation and Commitments 503
17.3 Residual Environmental Effects 513
17.4 Environmental Monitoring and Observations 514
17.5 Conclusion 519
17.6 References 519

LIST OF APPENDICES

Appendix A Central Ridge EIS Guidelines
Appendix B Table of Concordance with EIS Guidelines

LIST OF FIGURES

Figure 1-1 Project Area 23
Figure 2-1 Project Area 41
Figure 2-2 Typical Offshore Drilling Installations: Semisubmersible and Drill Ship 45
Figure 4-1 Environmental Assessment Study Areas 117
Figure 5-1 Bathymetry of the Project Area 126
Figure 6-1 Summary of Coral Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources 136
Figure 6-2 Summary of Sponge Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources 137
Figure 6-3 Summary of Sea Pen Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources 138
Figure 6-4 Summary of Large Gorgonian Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources 139
Figure 6-5 Summary of Small Gorgonian Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources 140
Figure 6-6 Capelin Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 145
Figure 6-7 Lanternfish Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 146
Figure 6-8 Sand Lance Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 147
Figure 6-9 Deepwater Redfish Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 148
Figure 6-10 American Plaice Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 149
Figure 6-11 Sculpin (*Triglops* sp.) Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 150

Figure 6-12 Hookear Sculpin Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 151
Figure 6-13 Yellowtail Flounder Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 152
Figure 6-14 Common Grenadier Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 153
Figure 6-15 Greenland Halibut Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 154
Figure 6-16 Vahl's Eelpout Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 155
Figure 6-17 Eelpout (*Lycodes* sp.) Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 156
Figure 6-18 Blue Hake Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 157
Figure 6-19 Roughhead Grenadier Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 158
Figure 6-20 Longnose Eel Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016) 159
Figure 6-21 Seabird Colony Locations Eastern Newfoundland 165
Figure 6-22 Seasonal Distribution of ECSAS Cormorant Observations in the Waters off Eastern Newfoundland (2001 to 2017) 182
Figure 6-23 Seasonal Distribution of ECSAS Northern Gannet Observations in the Waters off Eastern Newfoundland (2001 to 2017) 183
Figure 6-24 Seasonal Distribution of ECSAS Phalarope Observations in the Waters off Eastern Newfoundland (2001 to 2017) 184
Figure 6-25 Seasonal Distribution of ECSAS Black-legged Kittiwake Observations in the Waters off Eastern Newfoundland (2001 to 2017) 185
Figure 6-26 Seasonal Distribution of ECSAS Large Gull Observations in the Waters off Eastern Newfoundland (2001 to 2017) 186
Figure 6-27 Seasonal Distribution of ECSAS Tern Observations in the Waters off Eastern Newfoundland (2001 to 2017) 187
Figure 6-28 Seasonal Distribution of ECSAS Dovekie Observations in the Waters off Eastern Newfoundland (2001 to 2017) 188
Figure 6-29 Seasonal Distribution of ECSAS Murre Observations in the Waters off Eastern Newfoundland (2001 to 2017) 189
Figure 6-30 Seasonal Distribution of ECSAS Other Alcid Observations in the Waters off Eastern Newfoundland (2001 to 2017) 190
Figure 6-31 Seasonal Distribution of ECSAS Jaeger and Skua Observations in the Waters off Eastern Newfoundland (2001 to 2017) 191
Figure 6-32 Seasonal Distribution of ECSAS Northern Fulmar Observations in the Waters off Eastern Newfoundland (2001 to 2017) 192
Figure 6-33 Seasonal Distribution of ECSAS Shearwater Observations in the Waters off Eastern Newfoundland (2001 to 2017) 193
Figure 6-34 Seasonal Distribution of ECSAS Storm-petrel Observations in the Waters Off Eastern Newfoundland (2001 to 2017) 194
Figure 6-35 Seasonal Distribution of ECSAS Waterfowl Observations in the Waters off Eastern Newfoundland (2001 to 2017) 195
Figure 6-36 Opportunistic Sightings of Non-Species at Risk Mysticetes (1952 to 2017) 202

Figure 6-37 Opportunistic Sightings of Unidentified Mysticetes (1980 to 2017) 203
Figure 6-38 Humpback Whale Sightings in Eastern NL Offshore Area 204
Figure 6-39 Minke Whale Sightings in Eastern NL Offshore Area 205
Figure 6-40 Sei Whale Sightings in Eastern NL Offshore Area 206
Figure 6-41 Opportunistic Sightings of Non-Species at Risk Odontocetes (1958 to 2017) 207
Figure 6-42 Opportunistic Sightings of Unidentified Odontocetes (1958 to 2017) 208
Figure 6-43 Atlantic White-sided Dolphin Sightings in Eastern NL Offshore Area 209
Figure 6-44 Long-finned Pilot Whale Sightings in Eastern NL Offshore Area 210
Figure 6-45 Short-beaked Common Dolphin Sightings in Eastern NL Offshore Area 211
Figure 6-46 Sperm Whale Sightings in Eastern NL Offshore Area 212
Figure 6-47 White-beaked Dolphin Sightings in Eastern NL Offshore Area 213
Figure 6-48 Opportunistic Sightings of Listed Marine Mammals (1867 to 2017) 215
Figure 6-49 Fin Whale Sightings in Eastern NL Offshore Area 216
Figure 6-50 Harbour Porpoise Sightings in Eastern NL Offshore Area 217
Figure 6-51 Killer Whale Sightings in Eastern NL Offshore Area 218
Figure 6-52 Northern Bottlenose Whale Sightings in Eastern NL Offshore Area 219
Figure 6-53 Special Areas in Eastern Newfoundland and Labrador 222
Figure 7-1 Domestic Commercial Harvesting Locations and Intensity, All Species, All Gear Types, All Months 2011 to 2017 250
Figure 7-2 Domestic Commercial Harvesting Locations and Intensity, Snow Crab, All Months 2011 to 2017 251
Figure 7-3 Domestic Commercial Harvesting Locations and Intensity, Northern Shrimp, All Months 2011 to 2017 252
Figure 7-4 Domestic Commercial Harvesting Locations and Intensity, Greenland Halibut, All Months 2011 to 2017 253
Figure 7-5 Known Shipwreck and Legacy Sites in Offshore Newfoundland and Labrador 321
Figure 7-6 Major Vessel Routes in the Vicinity of the Project Area 322
Figure 7-7 Marine Cables in the Vicinity of the Project Area 323
Figure 11-1 Special Areas in Eastern Newfoundland 403
Figure 11-2 Potential Zones of Influence Around ELs 1159 and 1160 Associated with Light, Sound, and Drill Cuttings 412
Figure 14-1 Other Projects and Activities Considered in the Cumulative Effects Assessment (Including Distances from Project Area – Northern Section) 455
Figure 14-2 Other Projects and Activities Considered in the Cumulative Effects Assessment (Including Distances from Project Area – Southern Section) 456
Figure 15-1 Annual probability of surface oil thickness >0.04 µm (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1135 (shallow-water) site 475
Figure 15-2 Annual probability of average surface oil thickness >0.04 µm (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1134 (deep-water) site 476
Figure 15-3 Annual probability of dissolved hydrocarbon concentrations >1 µg/L at some depth in the water column (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1135 (shallow-water) site 477
Figure 15-4 Annual probability of dissolved hydrocarbon concentrations >1 µg/L at some depth in the water column (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1134 (deep-water) site 478

Figure 15-5 Annual probability of shoreline contact >1 g/m² (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1135 (shallow-water) site 479
Figure 15-6 Annual probability of shoreline contact >1 g/m² (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1134 (deep-water) site 480
Figure 15-7 Mass balance plots of the 95th percentile surface oil thickness cases resulting from a 113-day blowout at EL 1135 484
Figure 15-8 Mass balance plots of the 95th percentile water column contamination cases resulting from a 113-day blowout at EL 1135 484
Figure 15-9 Mass balance plots of the 95th percentile shoreline contact cases resulting from a 113-day blowout at EL 1135 485
Figure 15-10 Mass balance plots of the 95th percentile shoreline contact cases resulting from a 113-day blowout at EL 1134 485
Figure 15-11 Mass balance plots of the EL 1135 release site marine diesel batch spills of 1,000 L 486
Figure 15-12 Mass balance plots of the EL 1134 release site marine diesel batch spills of 1,000 L 486

LIST OF TABLES

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines 29
Table 2.1 Project Area – Northern Section Coordinates 42
Table 2.2 Project Area – Southern Section Coordinates 42
Table 2.3 Exploration Licence 1159 – Corner Point Coordinates 42
Table 2.4 Exploration Licence 1160 – Corner Point Coordinates 43
Table 2.5 Schedule – For a Single Well Drilling Campaign 52
Table 2.6 Drill Mud and Cuttings Discharge Volumes 56
Table 2.7 Summary of Alternative Means 62
Table 3.1 Meetings and Discussions with Government Departments and Agencies 73
Table 3.2 Engagement Activities with Nunatsiavut Government 83
Table 3.3 Engagement Activities with Innu Nation 84
Table 3.4 Engagement Activities with Innu Nation 86
Table 3.5 Engagement Activities with Miawpukek First Nation 88
Table 3.6 Engagement Activities with Qalipu Mi-kmaq First Nation Band (QMFNB) 90
Table 3.7 Engagement with Indigenous Groups – Nova Scotia 92
Table 3.8 Engagement with Indigenous Groups – New Brunswick 96
Table 3.9 Engagement with Indigenous Groups – Prince Edward Island 101
Table 3.10 Engagement with Indigenous Groups – Québec 103
Table 3.11 Meetings and Discussions with Stakeholder Organizations 107
Table 4.1 Identified VCs and the Rationale for their Selection 113
Table 4.2 Summary of Potential Interactions on Valued Components 118
Table 4.3 Environmental Effects Descriptors 121
Table 5.1 2017 Facility Reported CAC Emissions (NPRI Reporting) – NL Offshore Area Production Platforms 128
Table 5.2 2017 Facility Reported GHG Emissions – NL Offshore Area Production Facilities and Drill Rigs 128
Table 6.1 Summary of Known and Potential Coral / Sponge Occurrence in ELs 1159 and 1160 135

Table 6.2 Summary of Depth Categories used to Present Canadian RV Survey Data (2001 to 2016) 141
Table 6.3 Summary of Key Fish Species from all Canadian RV Survey Sets Collected within the Project Area (2011 to 2016) (includes Shelf and Slope Species) 142
Table 6.4 Numerically Dominant Fish Species (95% of Overall Abundance) in the Project Area – Northern Section by Depth Zone (Canadian RV Surveys, 2011 to 2016) 142
Table 6.5 Numerically Dominant Fish Species (95% of Overall Abundance) in the Project Area – Southern Section by Depth Zone (Canadian RV Surveys, 2011 to 2016) 144
Table 6.6 Marine Fish Species at Risk that are Known to or May Occur within the Project Area 160
Table 6.7 Cormorant Colony Locations in Eastern Newfoundland 166
Table 6.8 Northern Gannet Colony Locations in Eastern Newfoundland 166
Table 6.9 Gull Colony Locations in Eastern Newfoundland 167
Table 6.10 Tern Colony Locations in Eastern Newfoundland 175
Table 6.11 Alcid Colony Locations in Eastern Newfoundland 178
Table 6.12 Northern Fulmar Colony Locations in Eastern Newfoundland 180
Table 6.13 Leach's Storm-petrel Colony Locations in Eastern Newfoundland 180
Table 6.14 Marine Bird Species Designated at Risk on the IUCN Red List but not Federally or Provincially 196
Table 6.15 Important Bird Areas in Eastern Newfoundland 197
Table 6.16 Opportunistic Sightings of Non-Species at Risk Mysticetes Reported in the Project Area 200
Table 6.17 Opportunistic Sightings of Non-Species at Risk Odontocetes Reported in the Project Area 201
Table 6.18 Opportunistic Sightings of Listed Marine Mammals and Sea Turtles Reported in the Project Area (1758 to 2017) 214
Table 6.19 Proximity of Ecologically and Biologically Significant Areas off Eastern Newfoundland and their Relevance to Marine Mammals and Sea Turtles 220
Table 6.20 Marine Protected Areas in Newfoundland and Labrador 223
Table 6.21 Federal Fisheries Closure Areas off Eastern Newfoundland 223
Table 6.22 Marine Refuges 224
Table 6.23 Ecologically and Biologically Significant Areas off Eastern Newfoundland 224
Table 6.24 Refined PB / GB LOMA EBSAs 226
Table 6.25 Convention on Biological Diversity EBSAs 227
Table 6.26 Preliminary Representative Marine Areas off Eastern Newfoundland 228
Table 6.27 Vulnerable Marine Ecosystems off Eastern Newfoundland 229
Table 6.28 NAFO Fisheries Closure Areas off Eastern Newfoundland 230
Table 6.29 Lobster Area Closures 235
Table 6.30 Snow Crab Stewardship Exclusion Zones 235
Table 6.31 Migratory Bird Sanctuaries in Newfoundland 235
Table 6.32 Important Bird Areas in Eastern Newfoundland 236
Table 6.33 Coastal National Parks and Historic Sites in Eastern Newfoundland 238
Table 6.34 Coastal Provincial Ecological Reserves in Eastern Newfoundland 239
Table 6.35 Coastal Provincial Parks and Protected Areas in Eastern Newfoundland 240
Table 6.36 Coastal Provincial Historic Sites in Eastern Newfoundland 240
Table 6.37 World Heritage Sites in Newfoundland and Labrador 241
Table 7.1 Proposed Schedule of DFO Research Vessel Surveys, 2019 254
Table 7.2 Indigenous Groups in the Maritime Provinces and Quebec 255
Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles 261

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles 276
Table 7.5 Mi'kmaq of Prince Edward Island Community Profiles 291
Table 7.6 Mi'gmaq of New Brunswick Community Profiles 293
Table 7.7 Wolastoqiyik of New Brunswick Community Profiles....301
Table 7.8 Peskotomuhkati of New Brunswick Community Profile 308
Table 7.9 Québec Indigenous Groups Community Profiles 309
Table 7.10 Québec Indigenous Groups Community Profiles 316
Table 8.1 Marine Fish Species at Risk: Potential Interactions with Project Components by Life History Stage 343
Table 8.2 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1159 347
Table 8.3 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1160 351
Table 9.1 Marine and Migratory Bird Species at Risk: Analysis of Potential Environmental Interactions and Effects 365
Table 9.2 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1159 370
Table 9.3 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1160 374
Table 10.1 Marine Mammal and Sea Turtle Species at Risk: Analysis of Potential Environmental Interactions and Effects 389
Table 10.2 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1159 393
Table 10.3 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1160 397
Table 11.1 Special Areas Minimum Distances to ELs 1159 and 1160 404
Table 11.2 Special Areas Overlapping with ELs 1159 and 1160 408
Table 11.3 Environmental Effects Assessment Summary: Special Areas – EL 1159 416
Table 11.4 Environmental Effects Assessment Summary: Special Areas – EL 1160 418
Table 12.1 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1159 426
Table 12.2 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1160 429
Table 13.1 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1159 441
Table 13.2 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1160 445
Table 14.1 Overview of Other Projects and Activities Considered in the Cumulative Effects Assessment 452
Table 14.2 Potential Interactions with Other Projects and Activities Considered in the Cumulative Effects Assessment 457
Table 14.3 Special Areas Overlapping with Project Area and ELs 1159 and 1160 460
Table 15.1 Newfoundland and Labrador Offshore Exploration and Production Oil Spills (1997 to 2018) 470
Table 15.2 Oil Types in Spills in Offshore Newfoundland and Labrador 471
Table 15.3 Spill Volumes for Exploration in Newfoundland and Labrador 471
Table 15.4 Spill Volumes for Development / Production in Newfoundland and Labrador 471

Table 15.5 Summary of Synthetic Based Drilling Fluid Spills that Occurred Offshore Newfoundland and Labrador Between 1997 and 2017 472
Table 15.6 Summary of Spill Trajectory Modelling 473
Table 15.7 Summary of Predicted Areas of Threshold Exceedance (km²) for Surface and Water Column, and Lengths (km) of Shoreline Oil Predicted to have the Potential to be Affected 481
Table 15.8 Shoreline Contamination Predicted Probabilities and Minimum Time for Oil Exposure Exceeding 1 g/m² 482
Table 15.9 Summary of the Mass Balance Information for All Representative Scenarios at EL 1135 (shallow-water) 487
Table 15.10 Summary of the Mass Balance Information for All Representative Scenarios at EL 1134 (deep-water) 487
Table 17.1 Potential Project-VC Interactions Summary 504
Table 17.2 Summary of Mitigation and Commitments 508
Table 17.3 Summary of Residual Environmental Effects for Routine Operations, Accidental Events, and Cumulative Effects 514
Table 17.4 Summary of Monitoring Programs for Routine Project Activities 516

List of Abbreviations and Acronyms

2D	Two-Dimensional
3D	Three-Dimensional
4D	Four-Dimensional
Accord Acts	*Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*
ADW	Approval to Drill a Well
AGC	Atlantic Groundfish Council
AICFI	Atlantic Integrated Commercial Fisheries Initiative
AIOC	Alderon Iron Ore Corp.
AMIK	(Agence Mamu Innu Kaikusseht)
ASP	Association of Seafood Producers
AUV	Autonomous underwater vehicle
BOP	Blow-out preventer
CAC	Criteria air contaminants
CDPDJ	Commission des droits de la personne et des droits de la jeunesse
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
CEA Agency	Canadian Environmental Assessment Agency
CEPA	*Canadian Environmental Protection Act*
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
CNSOPB	Canada Nova Scotia Offshore Petroleum Board
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2 eq	Carbon dioxide equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPAWS	Canadian Parks and Wilderness Society
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DP	Dynamic positioning
EA	Environmental assessment
EBSA	Ecologically and Biologically Significant Area
ECCC	Environment and Climate Change Canada
ECSAS	Eastern Canadian Seabirds at Sea

EEM	Environmental effects monitoring
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EL	Exploration Licenses
ENGO	Environmental non-governmental organizations
EPA	Eastern Project Area
EPCMP	Environmental Protection and Compliance Monitoring Plan
EPP	Environmental Protection Plan
FCA	Fisheries Closure Areas
FCS	Food, social or ceremonial
FFAW-Unifor	Fish, Food and Allied Workers-Union
FLO	Fisheries Liaison Officer
FPSO	Floating production, storage and offloading
GEAC	Groundfish Enterprise Allocation Council
GESAMP	United Nations Group of Experts on Scientific Aspects of Marine Environmental Protection
GHG	Greenhouse gas
HQP	Hydro-Québec Production
IBA	Important Bird Areas
IIAS	Newfoundland and Labrador Intergovernmental and Indigenous Affairs Secretariat
IMO	International Maritime Organization
INAC	(Indian and Northern Affairs Canada)
IUCN	International Union for Conservation of Nature
JDB	Jeanne d'Arc Basin
km	Kilometre
KMKNO	Kwilmu'kw Maw-Klusuaqn Negotiation Office
LMG	Listuguj Mi'gmaq Government
LOMA	Large Ocean Management Area
LSA	Local Study Area
MARPOL	International Convention for the Prevention of Pollution from Ships
MBCA	*Migratory Birds Convention Act*
MCPEI	Mi'kmaq Confederacy of Prince Edward Island
MFN	Miawpukek First Nation
MMAFMA	Mi'gmaq Maliseet Aboriginal Fisheries Management Association
MMO	Marine mammal observer

MMS	Mi'gmawei Mawiomi Secretariat
MOG	Micmacs Of Gesgapegiag
MPA	Marine Protected Area
MRCN	Musée régional de la Côte-Nord
MRI	Marshall Response Initiative
m	Metre
Mt	Megatonne
MTI	Mi'gmawe'l Tplu'taqnn Inc.
NAFO	Northwest Atlantic Fisheries Organization
NCC	NunatuKavut Community Council
NEB	National Energy Board
NG	Nunatsiavut Government
NL	Newfoundland and Labrador
NL ESA	NL *Endangered Species Act*
NM	Nautical mile
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxide
NOIA	Newfoundland and Labrador Oceans Industry Association
NPA	Northern Project Area
NRCan	Natural Resources Canada
OA	Operations Authorization
OBIS	Ocean Biogeographic Information System
OCI	Ocean Choice International
OCSG	Offshore Chemical Selection Guidelines
OIM	Offshore installation manager
OWTG	Offshore Waste Treatment Guidelines
PAAN	Protected Areas Association of Newfoundland
PL	Production Licence
$PM_{2.5}$	Particulate Matter less than 2.5 microns
QMFNB	Qalipu Mi'kmaq First Nation Band
RMRI	Risk Management Research Institute
ROV	Remotely Operated Vehicle
RSA	Regional Study Area
RSF	Religious Society of Friends
RV	Research Vessel

SAR	Species at risk
SARA	*Species at Risk Act*
SBM	Synthetic-based mud
SCC	Supreme Court of Canada
SDL	Significant Discovery Licence
SEM	Sikumiut Environmental Management
SIMA	Spill Impact Mitigation Assessment
SOCC	Species of conservation concern
SOCP	Statement of Canadian Practice with respect to the Mitigation of Geophysical Sound in the Marine Environment
SPA	Southern Project Area
SPOC	Single Point of Contact
t	Tonne
TAC	Total Allowable Catch
TPM	Total particulate matter
UINR	Unama'ki Institute of Natural Resources
UNCBD	United Nations Convention on Biological Diversity
UNFAO	United Nations Food and Agriculture Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
VBNC	Voisey's Bay Nickel Company Limited
VC	Valued component
VME	Vulnerable Marine Ecosystem
VOC	Volatile organic compounds
VSP	Vertical seismic profiling
WBM	Water-based Mud
WNNB	Wolastoqey Nation in New Brunswick
WWF	World Wildlife Fund
ZOI	Zone of Influence

1.0 INTRODUCTION

Equinor Canada Ltd. (Equinor Canada), on behalf of its partners, Husky Oil Operations Limited (Husky Energy) and Suncor Energy Offshore Exploration Partnership (Suncor Energy), is proposing to undertake an exploration drilling program on Exploration Licenses (ELs) 1159 and 1160 in the Central Ridge Area, located offshore Newfoundland and Labrador (NL) and approximately 375 km east of St. John's, NL.

The drilling, testing, and abandonment of offshore exploratory wells in the first drilling program for an area set out in one or more ELs issued in accordance with the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* is a designated project under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). This document has been prepared to address the information requirements pursuant to CEAA 2012 and its regulations, as well as the requirements under the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (the Accord Acts). It is also intended to assist other regulatory agencies, Indigenous groups and the public to determine their interest and participation in the EA process.

Equinor Canada submitted an Environmental Impact Statement (EIS) for the Flemish Pass Exploration Drilling Program (the Flemish Pass EIS) in December 2017 and was released from the CEAA 2012 assessment process, with conditions, in April 2019. ELs 1159 and 1160 are within the Project Area assessed in the Flemish Pass EIS and the Agency has determined that an Abridged EIS is required for any exploration drilling to be conducted in these two ELs.

This Abridged EIS has been prepared as per the Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Central Ridge Exploration Drilling Project, Equinor Canada Ltd. (CEA Agency 2019) (Appendix A). A Table of Concordance between this document and these Guidelines is provided as Appendix B.

1.1 Identification and Overview of Equinor Canada

Equinor Canada is an international energy company focused on upstream exploration and production activities. It is a Norwegian-based company with operations in more than 30 countries. The company employs over 20,000 individuals worldwide and creates value through safe and efficient operations, innovative solutions and technology. Since 1972, Equinor Canada has explored, developed, and produced oil and gas on the Norwegian continental shelf. In the last 40 years, the company has become the world's largest offshore operator and the second largest supplier of natural gas to the European market. Equinor Canada is 67% owned by the Norwegian State and is listed on the Oslo and New York Stock Exchanges, and is headquartered in Stavanger, Norway.

Equinor Canada is an active player in the corporation's global portfolio. In 1996, Equinor Canada established a Canadian headquarters in Calgary, Alberta, and a local office in St. John's, Newfoundland. Equinor Canada currently owns interests in several exploration, development, and production licenses offshore Newfoundland. As of February 2019, Equinor Canada is the operator of nine ELs and seven significant discovery licences (SDLs), and is an interest holder in three ELs, 30 SDLs, and seven

production licences (PLs) including Terra Nova, Hibernia, Hibernia South Extension, and Hebron production operations (C-NLOPB 2018, 2019a, 2019b). Equinor Canada continues to apply experience from work on the Norwegian Continental Shelf.

Equinor Canada views change in the oil and gas industry as an opportunity to shape and improve the energy industry of tomorrow. Equinor Canada aims to set an example for how the oil and gas industry must develop, show leadership, and point the way to bolder and better solutions. The company is actively shaping its portfolio to deliver high value with a low carbon footprint and aims to be recognised as the most carbon-efficient oil and gas producer, committed to creating lasting value for communities.

Equinor Canada's approach to sustainability is based on the following principles and themes:

- Preventing harm to local environments
- Creating local opportunities
- Respecting human rights
- Being open and transparent
- Aiming for outstanding resource efficiency

1.1.1 Equinor Canada's Offshore Experience

Equinor Canada applies its extensive offshore experience from work on the Norwegian Continental Shelf to its operations offshore Newfoundland, where the company has been present since 1996, when Norsk Hydro first acquired assets. Norsk Hydro's Oil & Gas Division merged with Equinor in 2007. Equinor Canada undertook its first drilling and geophysical program activities offshore Newfoundland in 2008, and had its first offshore oil discovery in 2009 with Mizzen in the Flemish Pass Basin area. Following the Mizzen discovery, Equinor Canada continued its geophysical and exploration drilling activities. Additional geophysical surveys were undertaken offshore Newfoundland in 2011, 2012, and 2014. Further exploration drilling in the Flemish Pass area in 2013 resulted in the Harpoon and Bay du Nord discoveries. Equinor Canada continued its exploration and appraisal drilling program in the Flemish Pass area through a 19-month drilling program which began in the fall 2015, during which a total of nine exploration and/or appraisal wells were drilled. The 19-month drilling program resulted in two oil discoveries at the Bay de Verde and Baccalieu prospects. In 2017, Equinor Canada completed a two-well exploration drilling campaign offshore Newfoundland. Offshore Newfoundland, Equinor Statoil Canada has drilled more than 15 wells in the Flemish Pass area. Since the Flemish Pass EIS was submitted, Equinor Canada undertook a seabed survey in the Flemish Pass area in 2018. In the summer of 2019 two programs were carried out; one to retrieve abandoned wellheads and one to do geotechnical surveys.

1.1.2 Equinor Canada's Management System

Equinor Canada's offshore Newfoundland operations conform to Equinor Canada's corporate management system, which is the set of principles, policies, processes, and requirements that support the organization in fulfilling the tasks required to achieve its objectives. This management system has three main objectives:

1. Contribute to safe, reliable, and efficient operations and enable us to comply with external and internal requirements
2. Help us to incorporate our values, our people, and our leadership principles in everything we do
3. Support our business performance through high-quality decision making, fast and precise execution, and continuous learning

The governing documentation in Equinor Canada's management system is structured in three levels: (1) fundamentals, (2) requirements, and (3) recommendations.

Fundamentals are essential regulations for the company and are valid company-wide. They describe what the company wants to achieve and include values, principles, commitments, and mandates.

Requirements are used to manage risks and to provide safe and efficient operations. They describe what the company needs to comply with when performing tasks. Requirements are set out in various company organization management and control documents, work processes, work requirement documents, technical requirement documents, system and operation documents, key control documents and emergency response plan documents.

Recommendations support people when performing tasks and enable compliance with fundamentals or requirements. They describe suggestions or proposals for the best course of action and are based on the collective learning and experience in the company.

Equinor Canada's management plan encompasses specific components. For drilling programs, these would include, but not be limited to, pollution prevention policies and procedures, and plans for emergency response, spill response, waste management and environmental monitoring.

Compliance means to follow external and internal requirements and to achieve the required performance. The management system is used systematically in day-to-day work. Training in the use of the work processes is part of this systematic approach. When performing a specific activity, it is necessary to consider risks. A risk assessment may lead to a need for improvement or to evaluate an application for dispensation and/or regulatory equivalency from governing documentation. Leadership is also required in order to achieve compliance. This includes communicating the management system, acting as a role model, and coaching the organization in the use of the management system. Equinor Canada regularly tests how well the Management System is working through an assurance process, which includes self-assessments, verifications, and audits.

Equinor Canada complies with applicable laws, acts in an ethical, sustainable and socially responsible manner, practises good corporate governance and respects internationally recognised human rights.

Equinor Canada maintains an open dialogue on ethical issues – both internally and externally. Open, honest, and accurate communication is essential to the company's integrity and business success.

Equinor Canada uses a variety of tools that will help to communicate required environmental commitments and mitigations identified for a project during its operations. Notwithstanding its internal processes and requirements for managing, monitoring, and reporting on its environmental performance, Equinor Canada will also adhere to all the applicable legislative and regulatory requirements that pertain to this Project, including terms and conditions imposed as conditions of associated EA review and approval for the Project, and will monitor and report on these in accordance with applicable regulatory procedures or other relevant requirements.

Further information on Equinor Canada and its associated environmental planning and management policies, systems, and procedures in provided in Section 2.11.

1.1.3 Equinor Canada Contacts

Equinor Canada operates an office in St. John's NL, where Equinor Canada's offshore NL activities are managed and key technical staff located.

The principal Equinor Canada contacts concerning exploration drilling on ELs 1159 and 1160 are as follows:

Primary Contact for EA:

Terry Forkheim
Senior Environment and Regulatory Advisor
Equinor Canada Ltd.
3600, 308 4th Avenue SW, Calgary, Alberta, T2P 0H7
Tel: (587) 233-0560

Primary Contacts for Offshore NL Operations:

Unni Fjær
Vice-President, Offshore NL
Equinor Canada Ltd.
2 Steers Cove, Level 2, St. John's, NL, A1C 6J5
Tel: (709) 726-9091

1.2 Project Location and Overview

1.2.1 Project Location

ELs 1159 and 1160 (the Project) are within the area previously assessed in the Flemish Pass EIS (Figure 1-1); that EIS has a Project Area of approximately 100,800 square kilometres (km²), divided into the Northern Section and Southern Section. EL 1160 is located within the Project Area – Southern Section, while EL 1159 is located within both the Project Area – Northern Section and Project Area – Southern Section (see Section 2.3 for detail on the Project location).

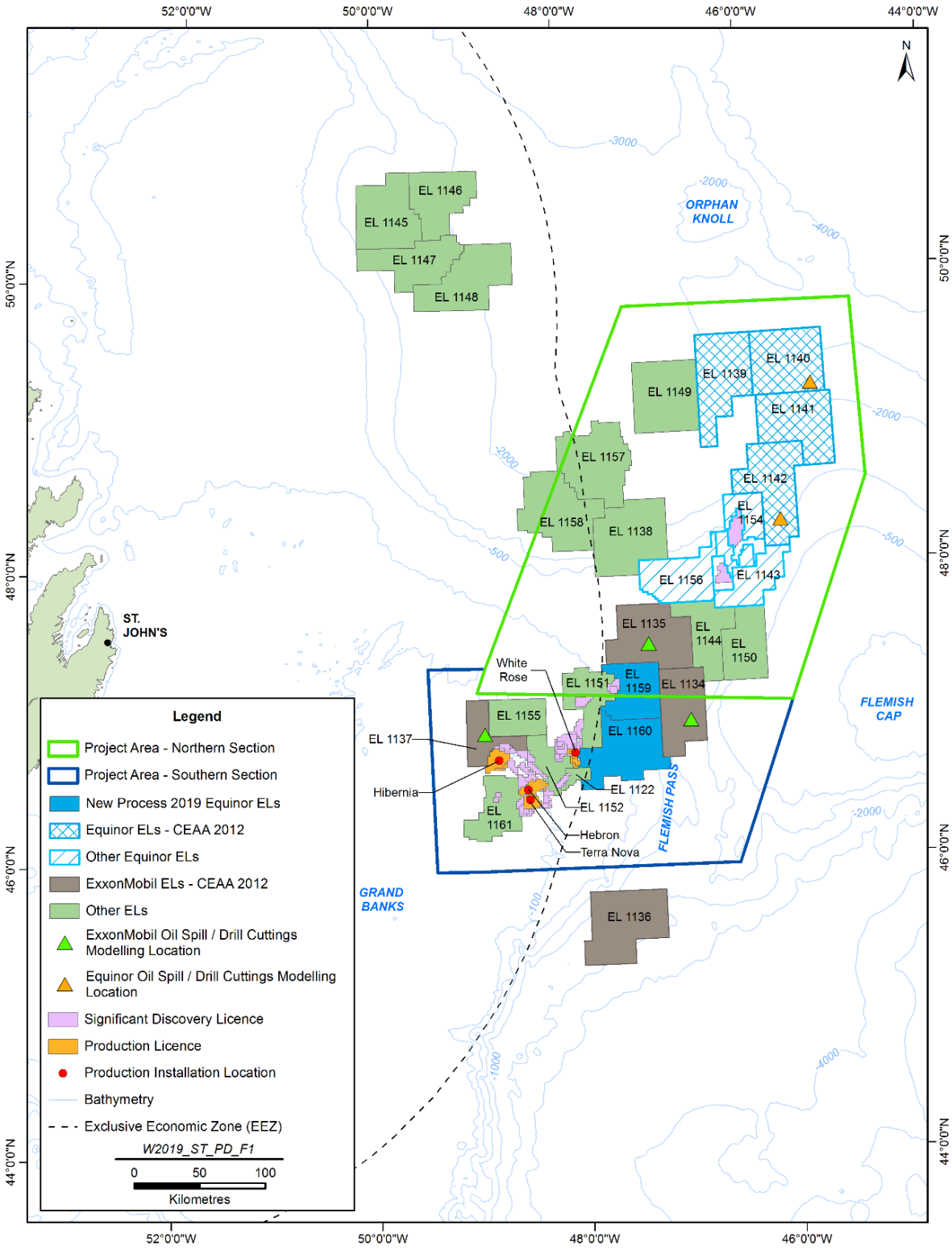


Figure 1-1 Project Area

1.2.2 Key Project Components and Activities

The scope, as identified in this document, includes the mobilization and operation of drilling installations, drilling activities, supporting ancillary activities to drilling programs, and well decommissioning or suspension. The components and activities are summarized in Section 2.5. It is unlikely to have drilling installations completing exploration drilling in the same area, but there may be efficiency by having a "top hole" installation completing riserless operations while a second installation performs reservoir drilling with blowout preventer (BOP) installed on another well. Operations with two dynamic positioning (DP) drilling installations requires a minimum spacing of 500 metres (m). Therefore, simultaneous operations in the Project Area could occur on each of the ELs, but it is unlikely the wells would be close enough to each other to have overlapping impacts.

1.3 Regulatory Framework and the Role of Government

The Project will require a number of approvals and authorizations under applicable regulatory processes, as summarized in the following sections.

1.3.1 The Accord Act

As outlined on the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) website (C-NLOPB n.d.), their role, under the Accord Acts, is to regulate oil and gas exploration and development in the Canada-NL Offshore Area, oversee compliance with regulatory requirements for worker safety, environmental protection and safety, conservation of the resource, land tenure, and Canada-NL benefits. These processes are administered under various legislation, regulations, guidelines, and memoranda of understanding.

1.3.2 Land Tenure and Licensing

The Canada-NL Offshore Area, as defined in the Accord Acts, includes those lands within Canada's 200 nautical mile (NM) Exclusive Economic Zone (EEZ) or to the edge of the continental margin, whichever is greater. EL 1159 is located beyond Canada's EEZ on the outer continental shelf, while EL 1160 has portions within and beyond Canada's EEZ (Figure 1-1). Other activities, such as vessel traffic, will take place within the 200 NM EEZ. In addition, CEAA 2012 defines "federal lands" as including *"(i) the internal waters of Canada, in any area of the sea not within a province, (ii) the territorial sea of Canada, in any area of the sea not within a province, (iii) the exclusive economic zone of Canada, and (iv) the continental shelf of Canada."*. Therefore, pursuant to CEAA 2012, exploration drilling on ELs 1159 and 1160 will be carried out on federal lands.

1.3.3 Environmental Assessment under CEAA 2012

Schedule I of the *Regulations Designating Physical Activities* designates "*The drilling, testing and abandonment of offshore exploratory wells in the first drilling program in an area set out in one or more exploration licences issued in accordance with the Canada-Newfoundland and Labrador Atlantic Accord Implementation Act or the Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act"* as a designated project under CEAA 2012.

1.3.4 Other Potential Regulatory and Policy Requirements and Interests

Key relevant legislation, regulations and guidelines applicable to proposed exploration drilling on ELs 1159 and 1160 are also outlined in Section 1.5.

Federal and provincial government departments and agencies, which may have regulatory responsibilities, information, and advice regarding exploration drilling activities on ELs 1159 and 1160 pursuant to their associated legislation and mandates include the following:

- Fisheries and Oceans Canada (DFO)
- Environment and Climate Change Canada (ECCC)
- Transport Canada
- Department of National Defence (DND)
- NL Department of Municipal Affairs and Environment
- NL Department of Fisheries and Land Resources
- NL Department of Natural Resources

Legislation, and regulations thereunder, that may be relevant and subsequently required regulatory approvals include the following:

- Accord Acts and its associated Regulations and Guidelines (as discussed above)
- *Fisheries Act*
- *Canadian Environmental Protection Act (CEPA)*
- *Oceans Act*
- *Canadian Navigable Waters Act (CNWA)*
- *Canada Shipping Act, 2001*
- *Migratory Birds Convention Act*
- *Species at Risk Act (SARA)*
- *NL Endangered Species Act (NL ESA)*
- *NL Seabird Ecological Reserve Regulations*

1.4 Purpose and Organization of the EIS

This abridged EIS has been developed and is being submitted by Equinor Canada, as the Operator of the Project, in accordance with the provisions and requirements of CEAA 2012 and the Accord Acts and in full compliance with the EIS Guidelines issued for the Project by the CEA Agency in July 2019.

The preparation and submission of the EIS is an important step in the EA review process for this

Project. It provides the required information on the Project and its potential environmental effects and associated mitigation, including the:

- Project purpose
- Project description (components, activities, schedule)
- Project alternatives
- Changes to the Project that may be caused by the environment

- Existing environmental setting (biophysical and socio-economic) Government, stakeholder, and Indigenous engagement activities, including the various comments provided
- Environmental effects of the Project (planned activities and potential malfunctions or accidents)
- Mitigation measures to avoid or reduce environmental effects
- Residual effects and their significance
- Cumulative environmental effects
- Any proposed environmental monitoring and follow-up activities

The EIS will form the basis for further review, consideration and discussion of the Project and those items identified by regulatory agencies, Indigenous groups, stakeholders and interested public as part of the EA process. Based on the results of the EA and the associated reviews and input, the Government of Canada will eventually decide whether the Project can proceed, including associated terms and conditions.

The EIS has been prepared and structured as per the Central Ridge EIS Guidelines to provide the results of the EA and other required information in a clear, concise, and well-organized manner, in keeping with current EA practice and with a view to ensuring overall readability and utility for all stakeholders. As the scope, Project Area, and VCs for ELs 1159 and 1160 are the same as those identified in the Flemish Pass EIS; this document relies on information summarized from the Flemish Pass EIS (Statoil 2017), with updated information provided where applicable (see Section 4.3.2 for a description of the methods applied to this EIS). Note that the effects assessment from the approved Flemish Pass EIA is applicable to the Central Ridge ELs.

Chapter 1 (Introduction) identifies the Proponent, provides a general overview of the Project and its location, outlines the regulatory context for the Project and its EA, describes the purpose of the EIS and the organization of the document, and outlines the legislation and regulations that will affect the Project.

Chapter 2 (Project Description) describes the scope and purpose of the Project, including its location, key components and activities, personnel, and schedule. It also outlines the potential environmental emissions and Project alternatives, as well as Equinor Canada's safety and sustainability policies and the environmental planning.

Chapter 3 (Regulatory, Indigenous, and Stakeholder Engagement) describes the EIS Guidelines that informed this EIS. It also includes Equinor Canada's Project-related engagement activities with Indigenous groups and stakeholders.

Chapter 4 (EA Scope, Approach, and Methods) outlines the scope of the EA, including the factors considered and their scope, the selection of Valued Components (VCs), and the approach and methods used to conduct the assessment.

Chapter 5 (Existing Physical Environment) provides a description of the physical features of the Project Area, including geology, bathymetry, oceanography and ambient noise.

Chapter 6 (Existing Biological Environment) describes marine fish and fish habitat, marine and migratory birds, marine mammals and sea turtles, and Special Areas that may occur within the Project Area.

Chapter 7 (Existing Human Environment) outlines the various cultural and socioeconomic components of the Project Area, including commercial fisheries, other activities such as marine shipping and oil and gas activity, and Indigenous activities.

Chapter 8 (Marine Fish and Fish Habitat: Environmental Effects Assessment) outlines the environmental effects assessment for marine fish and fish habitat. The EA study areas, potential effects and their assessment, mitigation, and monitoring are described.

Chapter 9 (Marine and Migratory Birds: Environmental Effects Assessment) describes the EA study areas, potential environmental changes, methods, key mitigation, and follow-up activities for Marine and Migratory Birds.

Chapter 10 (Marine Mammals and Sea Turtles: Environmental Effects Assessment) describes the potential environmental effects on Marine Mammal and Sea Turtles including the study areas, approach and methods, mitigation and significance of residual effects.

Chapter 11 (Special Areas: Environmental Effects Assessment) outlines the effects assessment for Special Areas overlapping the Project area and includes a description of study areas, potential changes, methods, mitigation, and monitoring.

Chapter 12 (Indigenous Communities and Activities: Environmental Effects Assessment) describes the effects assessment for Indigenous Communities and Activities. This chapter includes information on the study areas and the criteria used to evaluate the effects, potential changes, significance of residual effects, and follow-up.

Chapter 13 (Commercial Fisheries and Other Ocean Users: Environmental Effects Assessment) outlines the study areas, potential effects and methods used to assess the environmental effects on Commercial Fisheries and Other Ocean Users. Also includes are descriptions of the significance on residual effects and monitoring.

Chapter 14 (Cumulative Environmental Effects) assesses and evaluates the potential environmental effects resulting from the Project in combination with other physical activities that have been or may be carried out.

Chapter 15 (Accidental Events) outlines the possible accidental events that could occur as a result of the Project. This section includes the prevention of accidents, emergency response plans, and the potential effects of accidental events on the VCs.

Chapter 16 (Effects of the Environment on the Project) describes how environmental conditions and factors have or may influence the design and execution of the Project, and the various planning, design and operational measures that will be taken to help protect human health and safety and the environment in that regard.

Chapter 17 (*EIS Summary and Conclusions*) summarizes the residual effects of the Project on the selected VCs as well as the follow-up mitigation and monitoring commitments.

1.5 Key Legislation, Regulations, and Associated Approvals

All petroleum-related work or activity in the Canada-NL Offshore Area requires an Operating Licence and an Operations Authorization (OA) issued by the C-NLOPB. In accordance with the Accord Acts and Section 6 of the *Newfoundland Offshore Petroleum Drilling and Production Regulations* prior to the issuance of an OA, the following information must be submitted by an operator and approved by the C-NLOPB:

- EA Report
- Canada-NL Benefits Plan
- Safety Plan
- Environmental Protection Plan (EPP)
- Emergency Response and Spill Contingency Plans
- Evidence of Financial Responsibility
- Certificate of Fitness for the proposed equipment / facilities used to carry out drilling activities

For each well in an approved drilling program, an Approval to Drill a Well (ADW) is required. The ADW provides specific details about the drilling program and well design. An ADW covers the operations on a well up to, and including, the termination of the well, which may be suspension or abandonment of the well. A wellsite-geohazard seabed survey (also known as a wellsite survey) must be completed prior to the issuance of such an ADW. Other approvals, notifications or records required for exploration drilling include formation flow testing, abandonment, or suspension of a well.

There are also a number of associated Regulations under the Accord Acts which govern specific exploration or development activities, as well as various guidelines (some of which have been jointly developed with the National Energy Board (NEB) and/or the Canada Nova Scotia Offshore Petroleum Board) that are intended to address specific environmental, health, safety and economic issues related to offshore petroleum exploration and production activities.

Additional oversight for environmental protection and safety of operations is provided by regulations and guidelines issued by the C-NLOPB, and jointly with the Canada Nova Scotia Offshore Petroleum Board (CNSOPB) and/or NEB. For exploration drilling programs, the *Newfoundland Offshore Drilling and Production Regulations* govern drilling activities and establish the framework for safety and environmental protection. Environmental guidelines to support drilling programs include *Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands* (OCSG) (NEB et al. 2009), *Offshore Waste Treatment Guidelines* (OWTG) (NEB et al. 2010) and *Environmental Protection Plan Guidelines* (NEB et al. 2011).

Key relevant legislation, regulations and guidelines applicable to the exploration drilling on ELs 1159 and 1160 are outlined in Table 1.1 below.

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
Specific to Oil and Gas Activities in the Canada-NL Offshore Area			
Accord Acts	C-NLOPB	The C-NLOPB is responsible, on behalf of the Governments of Canada and NL, for petroleum resource management in the Canada-NL Offshore Area. The Accord Acts, administered by the C-NLOPB, govern all petroleum operations in that offshore area. The mandate of the C-NLOPB is to interpret and apply the provisions of the Accord Acts to all activities of operators in the Canada-NL Offshore Area and to oversee operator compliance with those statutory provisions. The C-NLOPB's role is to facilitate the exploration for and development of petroleum resources in the Canada-NL Offshore Area in a manner that is consistent with the C-NLOPB's mandate including: • health and safety of workers • environmental protection • effective management of land tenure; • maximum hydrocarbon recovery and value • Canada/NL benefits	The various regulations and guidelines described below have been developed and issued under the Accord Acts (and in some cases, also with other relevant legislation) The regulatory approvals and authorizations identified below may also be required pursuant to Section 138(1)(b) of the *Canada-Newfoundland Atlantic Accord Implementation Act* and Section 134(1)(b) of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* and the various regulations made under the Accord Acts.
Accord Act Regulations	C-NLOPB	A number of Regulations made under the Accord Acts may be relevant to offshore oil and gas exploration drilling and associated activities, including the following: • *Certificate of Fitness Regulations* • *Drilling and Production Regulations* • *Marine Installations and Structures Transitional Regulations* • *Marine Installations and Structures Occupational Health and Safety Transitional Regulations* • *Offshore Petroleum Administrative Monetary Penalties Regulations* • *Offshore Petroleum Cost Recovery Regulations* • *Offshore Petroleum Financial Requirements Regulations* • *Oil and Gas Operations Regulations* • *Petroleum Geophysical Operations Regulations* • *Petroleum Installations Regulations*	The regulatory approvals and authorizations identified below may also be required pursuant to the relevant sections of the Accord Acts and/or one or more Regulations made under the Accord Acts. An Operating Licence, for example, is a prerequisite for oil and gas activity in the Canada-NL Offshore Area that involves fieldwork. The statutory requirements pertaining to Operating Licences are specified in Sections 137 and 138 of the Atlantic Accord Act and in the *Newfoundland Offshore Area Oil and Gas Operations Regulations.*

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
			There are also three types of authorizations administered by the C-NLOPB: 1) OA 2) Geophysical Program Authorization 3) Diving Program Authorization An OA may include authorization for a drilling program, production project, well operations or other activities or components that are not covered by other types of authorizations. Also, operators applying to undertake a geophysical program, a wellsite seabed survey, vertical seismic profiling (VSP), an electromagnetic program, any other type of geological or geophysical program (including those that do not involve fieldwork), a geotechnical program or an environmental program, may apply for a Geophysical Program Authorization. C-NLOPB approvals may also involve the approval of certain documents, plans or other matters as specified by the legislation or regulations, or the approval of specific activities conducted under an earlier authorization. These include an: • ADW • Approval to Alter the Condition of a Well • Approval of a Formation Flow Testing Program

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
			• Approval of a Canada-NL Benefits Plan Of relevance to this Project, an ADW is required for operations involving drilling within or under the marine environment. An ADW covers the operations on a well up to, and including, the termination of the well, which itself could include suspension, abandonment, or completion. A wellsite seabed survey must be completed prior to the issuance of such an ADW. If the well is to be tested, Approval of a Formation Flow Testing Program is also required in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations*.
OWTG	C-NLOPB	These guidelines outline recommended practices for the management of waste materials from oil and gas drilling and production facilities operating in the Canada-NL Offshore Area. The OWTG were prepared in consideration of the offshore waste / effluent management approaches of other jurisdictions, as well as available waste treatment technologies, environmental compliance requirements, and the results of environmental effects monitoring (EEM) programs in Canada and internationally. The OWTG specify performance expectations for the following types of discharges (NEB et al. 2010): • emissions to air • produced water and sand • drilling muds and solids • storage displacement water • bilge water, ballast water and deck drainage • well treatment fluids • cooling water	Adherence to OWTG

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
		• desalination brine • sewage and food wastes • water for testing of fire control systems • discharges associated with subsea systems • naturally occurring radioactive material	
Drilling and Production Guidelines (updated August 2017)	C-NLOPB	These guidelines were developed and implemented by the C-NLOPB and CNSOPB to provide criteria for compliance requirements for operators planning to conduct offshore drilling activities on the east coast of Canada. Offshore oil and gas activities that involve drilling (including exploration and production) must be in compliance with the Drilling and Production Guidelines, in order to attain an ADW and an OA. These guidelines are based on past experiences in offshore oil and gas, legislation from the C-NLOPB, and from industry best practice. These guidelines provide direction and compliance standards for all aspects of offshore exploration drilling, including, but not limited to: • well approval applications • well installations, facilities, support craft • drilling fluid systems • riser specifications • drilling practices • formation flow testing equipment • well control • well casing and cementing design and processes • well abandonment • flaring • surveys • reporting and data requirements The guidelines also cover aspects of production activities, should production be planned in the case of a discovery.	Adherence to Drilling and Production Guidelines

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
OCGS *for Drilling and Production Activities on Frontier Lands*	C-NLOPB	These guidelines provide a framework for chemical selection that reduces the potential for environmental effects from the discharge of chemicals used in offshore drilling and production operations. The framework incorporates criteria for environmental acceptability that were originally developed by the Oslo and Paris Commissions for the North Sea. An operator must meet the minimum expectations outlined in the OCSG as part of the authorization for work or activity related to offshore oil and gas exploration and production.	Adherence to OCSG
Compensation Guidelines Respecting Damage Relating to Offshore Petroleum Activity (updated November 2017)	C-NLOPB	These guidelines describe compensation sources available to potential claimants for loss or damage related to petroleum activity offshore NL and outline the regulatory and administrative roles which the C-NLOPB exercises respecting compensation payments for actual loss or damage directly attributable to offshore operators.	Adherence to Guidelines
Environmental Protection Plan Guidelines	C-NLOPB	These guidelines assist operators in developing EPP to meet the requirements of Sections 6 and 9 of the *Drilling and Production Regulations*	Adherence to Guidelines
Canada-Newfoundland and Labrador Exploration Benefits Plan Guidance	C-NLOPB	This document provides an operator engaged in petroleum exploration activities, including geophysical, geotechnical, and drilling, in the Canada-NL Offshore Area with guidance for the preparation of a Canada-NL Benefits Plan (Benefits Plan) which is required under Section 45 of the Accord Acts. The guidance also addresses related contracting, expenditure, and employment reporting requirements.	Adherence to Guidance

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
Geophysical, Geological, Environmental and Geotechnical Program Guidelines (Updated October 2018)	C-NLOPB	These Guidelines have been prepared to assist Applicants who wish to conduct geophysical, geological, geotechnical, or environmental programs within the offshore area.	Adherence to Guidelines and associated Geophysical Program Authorization
Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (SOCP)	DFO / ECCC/ C-NLOPB	The SOCP specifies the minimum mitigation requirements that must be met during the planning and conduct of marine geophysical surveys, in order to reduce effects on life in the oceans. These mitigation measures can be applied to VSP operations. These requirements focus on planning and monitoring measures to avoid interactions with marine mammal and sea turtle species at risk (SAR) where possible and reduce adverse effects on SAR and marine populations.	Adherence to SOCP
Guidelines Respecting Financial Requirements (amended August 2017)	C-NLOPB	Operators wishing to conduct work or activity in the Canada-NL Offshore Area are required to provide proof of financial responsibility in a form and amount satisfactory to the C-NLOPB. These regulations and guidelines provide guidance to operators in providing proof of financial requirements regarding authorization being sought for work or activity relating to drilling, development, decommissioning or other operations in the offshore areas.	Adherence to Guidelines
Other Guidelines	C-NLOPB	Other Guidelines administrated by the C-NLOPB that do or may apply to aspects of this Project include: • Measures to Project and Monitor Seabirds in Petroleum-Related Activity in the Canada – NL Offshore Area • Atlantic Canada Standby Vessel Guidelines • Cost Recovery Guidelines • Data Acquisition and Reporting Guidelines	Adherence to Guidelines as applicable

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
		• Incident Reporting and Investigation Guidelines • *Measurement Under Drilling and Production Regulations* • Monitoring and Reporting • Physical Environmental Programs • Research and Development Expenditures • Safety Plan Guidelines • Transboundary Crewing	
Other Relevant Legislation			
CEAA 2012	CEA Agency	"The drilling, testing and abandonment of offshore exploratory wells in the first drilling program in an area set out in one or more exploration licences" is included in the list of designated activities under CEAA 2012. On April 17, 2019, the Flemish Pass Exploration Drilling Project was approved (with conditions) by the federal Minister of Environment in a Decision Statement issued under Section 54 of the *CEAA 2012*. The CEA Agency determined an EIS is required for this Project.	The Project is located within the Project Area assessed under the Flemish Pass EIS. The CEA Agency determined that an EA is required for exploration drilling activities associated with ELs 1159 and 1160; albeit in an "abridged" format.
Canadian Environmental Protection Act, 1999 (CEPA, 1999)	ECCC	CEPA, 1999 pertains to pollution prevention and the protection of the environment and human health in order to contribute to sustainable development. Among other items, CEPA, 1999 provides a wide range of tools to manage toxic substances, and other pollution and wastes, including disposal at sea.	Disposal at Sea Permits (under the *Disposal at Sea Regulations* pursuant to CEPA, 1999) have not been required in the past for operational discharges of drill muds or cuttings. Therefore, such a permit is not anticipated to be required in support of the Project.
Energy Safety and Security Act (S.C. 2015, c. 4)	Natural Resources Canada (NRCan)	Introduced in Parliament as Bill C-22, *Energy Safety and Security Act* received Royal Assent on February 26, 2015 and came into effect on February 26, 2016. *Energy Safety and Security Act* aims to strengthen the safety and security of offshore oil production through improved oil spill prevention, response, accountability, and transparency and amends the Accord Acts and the *Canadian Oil and Gas Operations Act* with the intent of updating, strengthening, and increasing the level of transparency of the liability regime that is applicable to spills and debris in the offshore areas. The Act also	Financial Responsibility and Financial Resources requirements have increased. Specific additional relevance to be determined, but likely to have specific implications for spill prevention and response.

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
		promotes harmonization of the EA process for offshore oil and gas projects and includes provisions to allow the offshore petroleum boards to enable them to conduct EAs under CEAA 2012.	
Fisheries Act	DFO ECCC (administers Section 36, specifically)	The *Fisheries Act* contains provisions for the protection of fish, shellfish, crustaceans, marine mammals, and their habitats. The *Fisheries Act* has been amended to return to comprehensive protection against harming all fish and fish habitat; strengthen the role of Indigenous peoples in project reviews, monitoring and policy development; and clarify and modernize enforcement powers	Authorization from the Minister of Fisheries and Oceans under section 35(2) of the *Fisheries Act* has not been required in the past for offshore exploration drilling projects. Therefore, such an authorization is not anticipated to be required in support of the Project.
Migratory Birds Convention Act (MBCA)	ECCC	Under the MBCA, it is illegal to kill migratory bird species not listed as game birds or destroy their eggs or young. The Act also prohibits the deposit of oil, oil wastes or other substance harmful to migratory birds in waters or area frequented by migratory birds.	The salvage of stranded birds during offshore Project operations will require a handling permit under section 4(1) of the *Migratory Birds Regulations* pursuant to the MBCA.
Canadian Navigable Waters Act (CNWA)	Transport Canada	The CNWA has been updated to define all waters as a “navigable”.	No applicable permitting requirements under the CNWA have been identified for the Project, as the Project Area is located offshore, outside of the Scheduled Waters specified in the CNWA.
Canada Shipping Act	Transport Canada	The *Canada Shipping Act, 2001* and related regulations set out the requirements for safety and environmental protection for Canadian vessels and their operator	Project components and activities will be required to comply with the relevant requirements of the Act and its Regulations.
Oceans Act	DFO	The *Oceans Act* provides for the integrated planning and management of ocean activities and legislates the marine protected areas (MPA) program, integrated management program, and marine ecosystem health program. MPAs are designated under the authority of the *Oceans Act*.	No applicable permitting requirements have been identified for the Project.

Table 1.1 Summary of Key Relevant Legislation, Regulations, and Guidelines

Legislation / Regulation / Guideline	Regulatory Authority	Overview	Potentially Applicable Permitting Requirement(s)
Species at Risk Act (SARA)	DFO / ECCC / Parks Canada	SARA is intended to protect SAR in Canada and their "critical habitat" (as defined by SARA). The main provisions of the Act are scientific assessment and listing of species, species recovery, protection of critical habitat, compensation, permits and enforcement. The Act also provides for development of official recovery plans for species found to be most at risk, and management plans for species of special concern. Under the Act, operators are required to complete an assessment of the environment and demonstrate that no harm will occur to listed species, their residences or critical habitat or identify adverse effects on specific listed wildlife species and their critical habitat, followed by the identification of mitigation measures to avoid or reduce effects. All activities must be in compliance with SARA. Section 32 of the Act provides a complete list of prohibitions.	Under certain circumstances, the Minister of Fisheries and Oceans may issue a permit under section 73 of SARA authorizing an activity that has potential to affect a listed aquatic species, part of its critical habitat, or the residences of its individuals. However, such a permit is not anticipated to be required in support of the Project.
NL Endangered Species Act (NL ESA)	NL Department of Fisheries and Land Resources	The NL ESA provides special protection for plant and animal species considered to be endangered, threatened, or vulnerable in the province. The Act applies to species, sub-species and populations that are native to the province, but does not include marine fish, bacteria, and viruses. It also does not apply to introduced species, except in extraordinary circumstances. Designation under the Act follows recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the Species Status Advisory Committee on the appropriate assessment of a species. Currently there are 43 species, subspecies, and populations listed under the Act. Eighteen of these species are listed as endangered, ten are listed as threatened and fifteen are listed as vulnerable.	No applicable permitting requirements have been identified for the Project.
Seabird Ecological Reserve Regulations, NLR 66/97	NL Department of Fisheries and Land Resources	Prohibit or limit industrial development and certain activities that can cause disturbance to breeding seabirds, including hiking, boat traffic and low-flying aircraft near the colonies during the breeding season.	No applicable permitting requirements have been identified for the Project.

1.6 References

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2.0 PROJECT DESCRIPTION

2.1 Project Scope

The scope of the exploration drilling on ELs 1159 and 1160 includes the drilling, testing and decommissioning / abandonment of exploratory wells (including delineation wells) using one or more drilling installations, as well as associated exploration and supporting activities. Delineation and appraisal wells refer to the same activity. The appraisal phase follows a successful exploration drilling program and consists of drilling delineation wells to determine the size of the oil or gas field (Schlumberger 2018). The distance between individual exploration well varies as they are dependent on the results from initial wells and geophysical programs. Delineation / appraisal wells are typically completed within a radius of approximately 20 kilometres (km) from the initial exploration well.

The Flemish Pass EIS Decision Statement approved up to 24 wells; no additional wells would be drilled with the inclusion of ELs 1159 and 1160. Up to 12 wells could be drilled in total on EL 1159 and EL 1160, and the total number of wells for the Flemish Pass and Central Ridge ELs (i.e., ELs 1139, 1140, 1141, 1142, 1159, and 1160) would not exceed 24 as per the Flemish Pass EIS Decision Statement. To summarize – 24 wells total for all six ELs, with up to six in any one EL.

2.2 Purpose of the Project

In November 2018, Equinor Canada was awarded ELs 1159 and 1160 in the Central Ridge area of the Canada-NL Offshore Area (C-NLOPB 2018).

The purpose of exploration drilling is to determine the potential for oil and gas resources on Equinor Canada-held land holdings within the Project Area. Exploration/delineation drilling is required to determine the presence, nature and volume of potential oil and gas resources within the ELs. Exploration drilling activities on ELs 1159 and 1160 also enables the licence interest holders to meet the work expenditure commitments that must be fulfilled over the term of the licence.

Exploration drilling allows oil and gas discoveries to maintain production and meet global energy demands. Equinor Canada-held land holdings within the Project Area have the potential to contain important and commercially significant hydrocarbon resources. Exploration drilling is expected to result in economic, social and technological benefits at the regional level. This includes contributing to energy diversity and supply. Oil continues to play an important part in meeting energy demands and exploration is necessary to enable oil and gas companies to maintain production. In addition, revenues and economic benefits generated from oil production form a significant part of the NL economic and provincial government revenues.

As an operator, Equinor Canada recognizes that oil and gas will be an important part of the energy mix for decades to come and that global energy systems must be transformed to become more sustainable. Sustainability management is an integral part of Equinor Canada’s overall management system (Statoil 2016a). Equinor Canada also aims to be recognized as the most carbon-efficient oil and gas producer, committed to creating lasting value for communities (Statoil 2016b). Equinor Canada actively works to

reduce climate emissions, including carbon dioxide (CO_2), nitrogen oxide (NO_X), sulphur oxide (SO_x) and non-methane volatile organic compounds (VOCs).

Equinor Canada's lease purchases represent the amount of money that Equinor Canada has committed to spending exploring hydrocarbons in the offshore, and on research and development, education and training, within the first six years of the EL term. This expenditure can benefit the provincial economy and communities through capital expenditures, wages, and supplies and services contracts with local providers. In addition to the Project-specific benefits for the provincial economy and communities, Equinor Canada has made investments in youth talent development and the local NL society for more than 10 years.

2.3 Project Location and Designated Project Area

A project area is defined as the overall geographic area within which all components and activities will take place. As illustrated in Figure 2-1, the Project Area, as assessed in the Flemish Pass and Eastern Newfoundland EISs, includes Equinor Canada ELs 1159 and 1160 where exploration drilling activities may be carried out. The previously assessed Project Area also encompasses other existing Equinor Canada operated licences and partner operated licences. The Project Area includes a surrounding area to account for planned and potential ancillary and support activities at, or around, relevant well sites.

As defined in the Flemish Pass and Eastern Newfoundland EISs, the Project Area, which has an area of approximately 100,800 km², is divided into the Northern Section and Southern Section. EL 1160 is located within the Project Area – Southern Section, while EL 1159 is located within both the Project Area – Northern Section and Project Area – Southern Section (Figure 2-1). For the purposes of this Abridged EIS for exploration drilling on ELs 1159 and 1160, the same Project Area is being used.

Safety zones around drilling installations are approximately 1 km² for a drill ship using dynamic positioning (DP) and 12 km² for a semi-submersible requiring anchors.

The corner point coordinates for the Project Area – Northern Section and Southern Section are provided in Tables 2.1 and 2.2 below. The corner point coordinates and water depth ranges for ELs 1159 and 1160 are presented in Tables 2.3 and 2.4, respectively. Water depths in EL 1159 range from approximately 90 m to 930 m, and EL 1160 ranges from approximately 40 m to 1,020 m. Average water depths in ELs 1159 and 1160 are approximately 350 m and 260 m, respectively. Specific drilling locations cannot be identified at this time as they will be based on the interpretation of seismic data, which is an ongoing activity, and the results for each drilled well within the Project Area.

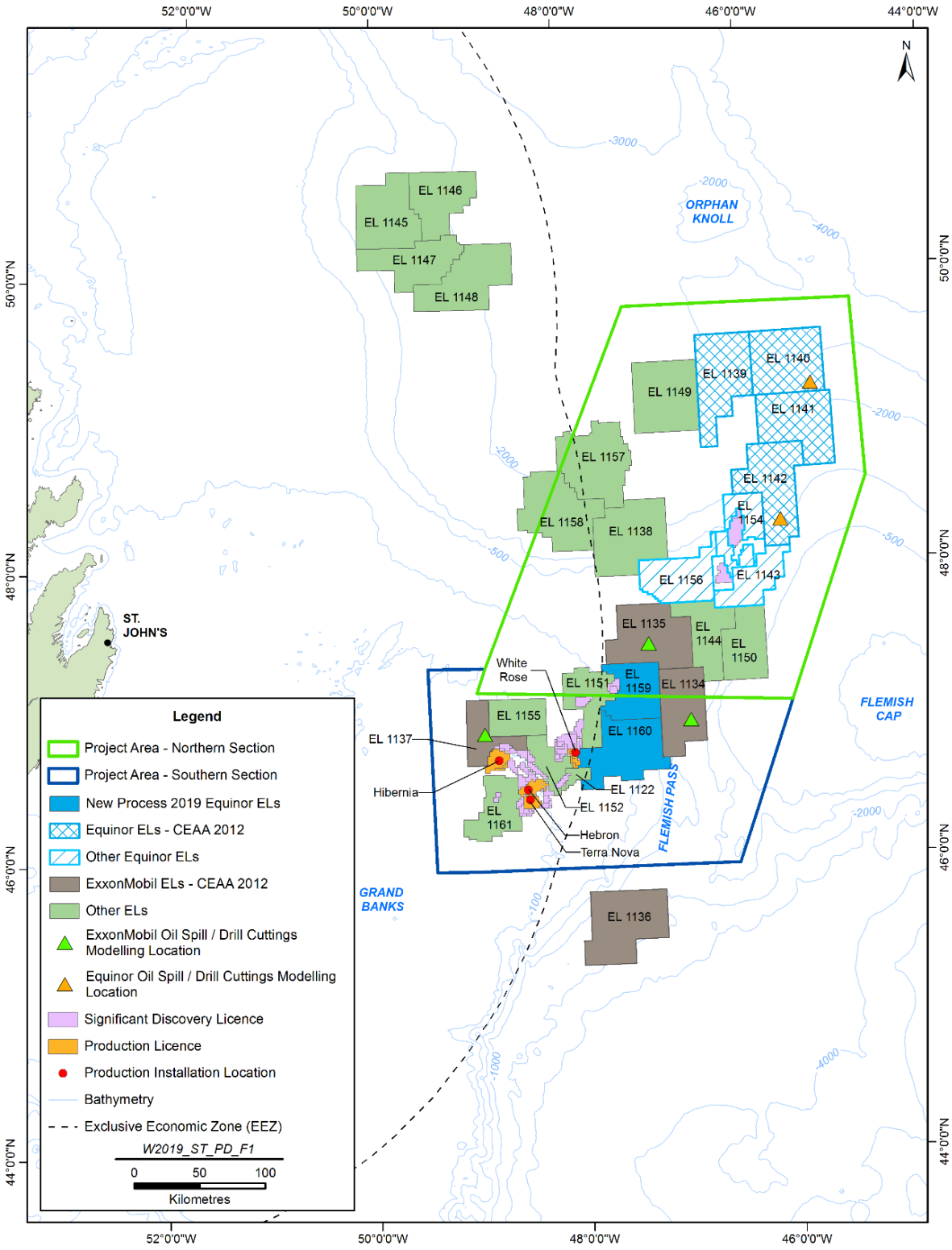


Figure 2-1 Project Area

Table 2.1 Project Area – Northern Section Coordinates

Project Area Vertices	Coordinates – NAD83 UTM ZONE 22N			
	Longitude (DMS)	Latitude (DMS)	Easting (m)	Northing (m)
A	44° 56' 48" W	49° 47' 31" N	935562	5533101
B	44° 55' 21" W	48° 34' 30" N	948190	5398059
C	45° 49' 04" W	47° 04' 57" N	893344	5227380
G	48° 59' 13" W	47° 12' 49" N	652421	5230868
I	47° 21' 04" W	49° 49' 18" N	762440	5525202

Table 2.2 Project Area – Southern Section Coordinates

Project Area Vertices	Coordinates – NAD83 UTM ZONE 22N			
	Longitude (DMS)	Latitude (DMS)	Easting (m)	Northing (m)
C	45° 49' 04" W	47° 04' 57" N	893344	5227380
D	46° 26' 02" W	45° 59' 28" N	853605	5103218
E	49° 25' 01" W	45° 59' 42" N	622584	5094695
F	49° 28' 29" W	47° 23' 03" N	615122	5248990
G	48° 59' 13" W	47° 12' 49" N	652421	5230868
H	48° 54' 10" W	47° 22' 44" N	658314	5249404

Table 2.3 Exploration Licence 1159 – Corner Point Coordinates

Coordinates – NAD83 UTM ZONE 22N	
Longitude (DMS)	Latitude (DMS)
47°00’W	47°10’N
47°15’W	47°10’N
47°30’W	47°10’N
47°00’W	47°20’N
47°15’W	47°20’N
47°30’W	47°20’N
47°00’W	47°30’N
47°15’W	47°30’N
47°30’W	47°30’N
Notes: Coordinates provided by C-NLOPB Land Registry (C-NLOPB 2019a) Water depths range from 90 m to 930 m	

Table 2.4 Exploration Licence 1160 – Corner Point Coordinates

Coordinates – NAD83 UTM ZONE 22N	
Longitude (DMS)	**Latitude (DMS)**
47°00'W	46°40'N
47°15'W	46°40'N
47°30'W	46°40'N
47°45'W	46°40'N
47°00'W	46°50'N
47°15'W	46°50'N
47°30'W	46°50'N
47°45'W	46°50'N
47°00'W	47°00'N
47°15'W	47°00'N
47°30'W	47°00'N
47°30'W	47°10'N
Notes: Coordinates provided by C-NLOPB Land Registry (C-NLOPB 2019b) Water depths range from 40 m to 1,020 m	

2.4 Resource Use and Environmental Features

Resource use is characterized by commercial fishing and oil and gas exploration and production activities. The commercial fishery occurs year-round at some level, with greatest level of activity from April to August. The main commercially harvested species within and around the Project Area are snow crab, yellowtail flounder, turbot / Greenland halibut, redfish, northern shrimp, American plaice, and halibut. There are no documented food, social, or ceremonial licences within or in the vicinity of the Project Area. Chapter 7 provides additional details on the commercial fishery in the vicinity of the Project Area. Oil and gas exploration and production activities are the other main uses of resources in the region; related activities include geophysical surveys and drilling programs undertaken during exploration programs, and ongoing production activities at Hibernia, Terra Nova, White Rose, and Hebron (first oil scheduled in December in 2017).

A range of other activities also take place in the region. General shipping traffic, fisheries survey programs undertaken by DFO and/or industry, marine research surveys conducted by government and/or educational institutions, and naval training exercises are the primary examples. There are several marine cable networks in the region and a fibre optic cable network connecting the Hibernia and Hebron Platforms. There is no other major existing infrastructure.

The Project Area - Northern Section overlaps with portions of one Ecologically and Biologically Significant Area (EBSA), three Vulnerable Marine Ecosystems (VMEs), and eight Northwest Atlantic Fisheries Organization (NAFO) Fisheries Closure Areas (FCAs), none of which have associated prohibitions of offshore exploration activities. The Project Area - Southern Section overlaps with the same EBSA, two VMEs, and one NAFO FCA, which have no prohibitions of oil and gas exploration activities. By their nature and definition, some of the VME areas and FCAs overlap and outline the same areas within the Project Area. Section 6.4 provides additional details on special areas in the vicinity of the Project.

2.5 Project Components and Activities

The scope, as identified in this document, includes the mobilization and operation of drilling installations, drilling activities, supporting ancillary activities to drilling programs, and well decommissioning or suspension. The components and activities are summarized in the subsections below.

2.5.1 Drilling Installation and Activities

Exploration and delineation / appraisal wells are drilled to confirm the presence, or delineate the extent, of oil and gas resources at specific locations. Exploration wells are drilled to determine whether areas of interest identified from previous geophysical surveys and other information contain oil and gas resources. Depending on the results of these wells, an operator may then drill delineation / appraisal wells into different parts of the identified hydrocarbon accumulation to confirm its size and the characteristics of the hydrocarbons found.

Specific wellsite locations are not currently defined and will be selected as planning and design activities move forward. Detailed well design has likewise not yet been completed, and will depend on various factors including water depth, reservoir potential and its geological properties. Individual well designs will be developed and submitted for approval to the C-NLOPB as required per the applicable authorization and approvals processes.

Wells may be drilled using a semi-submersible drilling installation or drillship (Figure 2-2). The type of installation chosen will be based primarily on the characteristics of the physical environment at the proposed drill site, particularly water depth, expected drilling depth, and expected weather and ice conditions and associated mobility requirements. Drilling installations and vessels selected will meet the operational and environmental capabilities needed for the associated exploration activities and will meet all regulatory requirements. For the purposes of environmental effects analysis, it is assumed that there may be up to two drilling installations actively engaged in drilling activities in the Project Area (i.e., any of the Flemish Pass ELs) at any one time. A drilling installation can either be moored in position over the drilling site using mooring lines and anchors (generally in shallower water depths up to 500 m) or maintained on station by a DP system (generally in deeper water greater than 500 m).

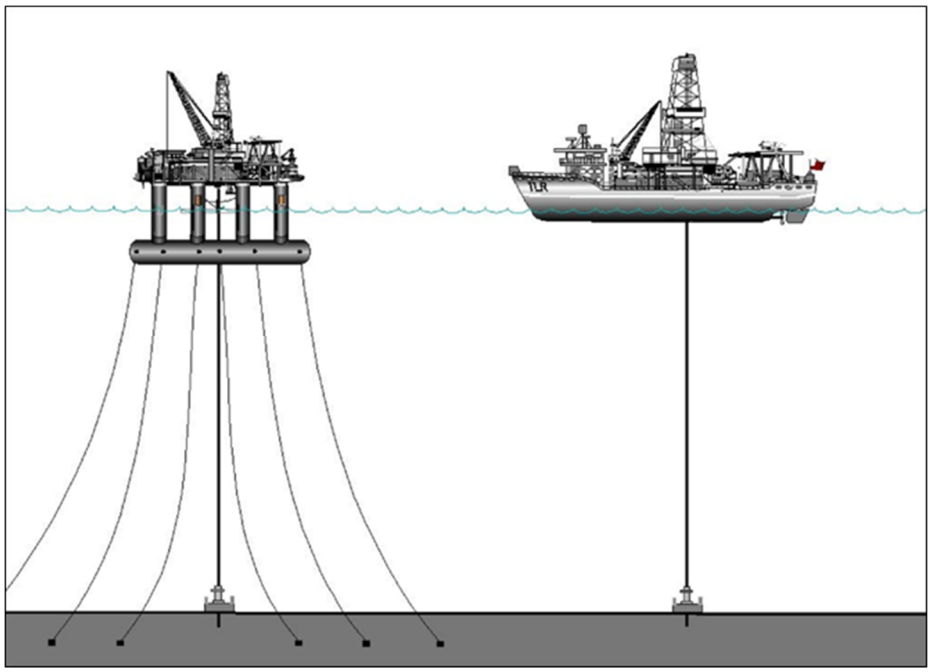


Figure 2-2 Typical Offshore Drilling Installations: Semisubmersible and Drill Ship

Equinor Canada will complete coral and sponge surveys at each well location, as well as 50 m around each anchor pattern, where applicable, at least three months prior to drilling activities. Site-specific survey details will be outlined in the *Coral and Sponge Survey Plans*, which will be provided to the C-NLOPB and DFO for their review and acceptance prior to commencing the survey. If corals and sponges are identified, then a risk assessment will be completed. After the survey is complete, Equinor Canada will prepare *Coral and Sponge Survey Results and Risk Assessment Reports*, which will be provided to the C-NLOPB and DFO for their review and acceptance at least 60 days prior to commencing drilling.

Once an appropriate wellsite has been identified and the permits and regulatory approvals have been granted for a drilling campaign, the drilling installation will be mobilized to the wellsite location, after which the drilling of a well will be implemented in a number of stages. A safety zone is established around the drilling installation for the protection of the drilling installation and other equipment and for the safety of other ocean users.

2.5.2 Geophysical, Environmental and Geotechnical Surveys

Geophysical / Geohazard / Wellsite and Seabed Surveys: These surveys may be conducted prior to drilling to assess the potential for hazards (such as possible obstructions or seabed instability), which may include seismic sound sources, multibeam echo sounders, side scan sonar, sub-bottom profilers, and video equipment. A pre-drill coral survey will also be undertaken, using similar equipment listed above, to confirm the presence or absence of sensitive marine habitat (e.g., corals, sponges). Multiple streamer geophysical surveys including, but not limited to, conventional two-dimensional (2D) and three-dimensional (3D) seismic surveys, would not be included in the designated Project.

Vertical Seismic Profiling (VSP) survey is often undertaken following completion of drilling a well to correlate seismic data to well depth. A VSP survey is undertaken by placing a receiver (geophones) down the well at pre-determined depths, with a sound source (usually mid-sized air source arrays) suspended from the drilling installation. Walk-away VSP surveys may also be undertaken, which involve placing a sound source on a vessel, which then moves away while operating the sound source at pre-determined distances from the borehole receiver. Data is recorded at multiple intervals down the well, and the information assists in determining and confirming the depth of the drilled well and for reconciling drilling information with that obtained through geophysical survey work. VSP surveys are typically short-term activities (usually several days duration), with the sound source firing often limited to just a few hours. They also use sound sources that are considerably smaller than those used in regional geophysical surveys for oil and gas in the offshore.

Geotechnical Surveys: These surveys measure the physical properties of the seabed and subsoil through the collection of sediment samples and in-situ testing. Methods to collect the samples typically include drilled boreholes or gravity coring. In-situ testing is done through cone penetration testing and pore pressure measurements. Installation of piezometers in boreholes to measure soil properties may also be carried out. Piezometers could be left in place to collect data for up to 12 months or longer. Geotechnical surveys may occur throughout the temporal scope and at any time of the year, using dedicated vessels provided by marine geotechnical specialist suppliers.

Remotely Operated Vehicles (ROV) / Autonomous Underwater Vehicle (AUV) Surveys: They may be used to conduct visual inspections (camera equipped) of activities and components. ROV surveys may also be used during pre-drill surveys and before marine installations to determine presence / absence of physical objects on the seafloor, as described earlier. They may also be used during the surveys described above to support drilling operations. They will be conducted throughout the temporal scope and at any time of the year using vessels of opportunity.

Environmental Surveys: May also be conducted to collect samples to analyze the physical, chemical, and biological aspects of the selected drilling area. Sampling is typically carried out from a support / supply vessel or a dedicated vessel suitable to the survey. Environmental surveys may include oceanography, meteorology, and ice / iceberg surveys. It can also include biota, water, and sediment sample collection, and ROV-video or drop camera surveys. Environmental surveys may occur throughout the temporal scope and at any time of the year using vessels of opportunity, typically taking 5 to 20 days to complete.

2.5.3 Formation Flow Test with Flaring

A formation flow test may be carried out on wells where hydrocarbons are discovered, and additional reservoir data is needed. During such testing, fluids from the reservoir are flowed back to the drilling installation, measured and if, required stored for future analysis. Produced hydrocarbons and some produced water from the reservoir are flared using high-efficiency burners. Flaring would be continuous and last between two to five days. If there is a larger amount of produced water than can be flared, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge or shipped onshore for disposal.

Equinor Canada will use third-party well testing contractors. Most suppliers for well testing equipment / services have their own burner technology that has been tested and quantified for liquid fallout (i.e., oil phase) and emissions (e.g., carbon monoxide [CO], CO_2, nitrogen oxides [NO_X], hydrocarbons). Documented fallout and combustion efficiencies for burners on the market from major suppliers are typically 99.9%.

An alternative to formation flow testing with flaring exists and may be used on exploration wells to gather similar data. These types of tests, called Formation Testing While Tripping, may be conducted without the need to flare. Formation flow testing would only be carried out on exploration wells where hydrocarbons are discovered and additional information on the specific characteristics of the find is therefore required. The specific nature and duration of any such formation flow testing is dependent upon various factors, but is typically in the order of two to three days, although this may be of longer duration (up to five days) depending on the characteristics of the hydrocarbons found and the analysis being undertaken.

2.5.4 Well Decommissioning or Suspension

Once drilling and formation flow testing (if required) is completed, the offshore wells drilled will be decommissioned or suspended. These activities typically involve the isolation of the wellbore by placing cement plugs and/or mechanical devices, at various depths, and in some cases, the casing is cut and removed just below the surface of the seafloor and equipment removed. In certain circumstances, the well may be suspended, in accordance with C-NLOPB requirements, for future re-entry. This is similar to the decommissioning process, but the wellhead is not removed, and a suspension cap is installed to protect the wellhead connector.

The approach undertaken will be based largely upon the water depths at the well site and associated technical considerations, as follows:

- In water depths less than 500 m, the wellhead will be removed by using the drilling installation to cut the wellhead below the seafloor and return it to the installation.
- In water depths between 500 m and 1,500 m, wellheads will be removed by cutting the wellhead externally, leaving a portion of the casing above the seafloor. A supply vessel or well intervention vessel using a ROV and an exterior diamond wire cutting saw will be used to cut and remove the wellheads above the sea floor. Cutting of the wellheads above the seafloor will be completed as close to the natural seabed as practicably and technically feasible. A pipe stub with a maximum height of approximately 0.85 m will remain above the seabed. While current technology has a limit of 0.85 m of casing remaining above the seafloor, cutting as close to the seafloor will be attempted.
- In water depths greater than 1,500 m, the wellhead will remain in place and will not be removed (maximum water depths in EL 1159 and EL 1160 are approximately 930 m and 1,020 m, respectively, therefore this wellhead abandonment option is not likely to be applicable).

Well decommissioning will be carried out as per Equinor Canada’s standard internal procedures, as well as applicable industry practice and in compliance with relevant regulatory requirements. These activities

will adhere to the requirements set out under the *Newfoundland Offshore Petroleum Drilling and Production Regulations*. Wells will be monitored (typically using an ROV to ensure the areas are free of equipment and obstructions) and inspected in accordance with applicable regulatory requirements at the time of their decommissioning.

2.5.5 Supply and Servicing

Supply vessels and helicopters will be used to transport personnel, equipment and materials to and from a drilling installation. Supply vessels will make regular trips to the drilling installation throughout the drilling program, and a dedicated stand-by vessel may also attend to the installation throughout the campaign. Personnel will be transported to and from the drilling installation by supply vessel or helicopter, according to work schedules and rotations, workforce numbers, distances and other factors.

It is expected that offshore supply vessel and aircraft (helicopter) services will be based in St. John's, NL. Existing facilities in eastern Newfoundland will be used, as well as for the supply and disposal of materials, such as drilling fluids, for fueling and other supply, support and logistical functions. Aircraft support will be based at the St. John's International Airport. The shore-based facilities are owned and operated by independent third-party service providers, service multiple operators and their activities, and were developed and operate in accordance with relevant regulatory requirements and approvals. They are also certified as compliant port facilities under the Marine Transportation Security Act. Third-party services and support will be procured through a competitive bid process in accordance with the requirements of the Accord Acts. Exploration drilling associated with ELs 1159 and 1160 will not require or result in upgrades or the development and use of new infrastructure at these established shore base facilities.

The following Project vessels are likely to be engaged during the Project life

- Two to three support / supply vessels for drilling installation(s)
- Geophysical vessels (e.g., wellsite / geohazard surveys; VSP surveys)
- Seabed survey vessels (e.g., MBES surveys, SSS, SBP, magnetometer)
- Geotechnical vessels (e.g., soil investigation programs, cone penetration testing, piezometers)
- Construction / light intervention vessels for wellhead decommissioning activities
- Vessels of opportunity capable of undertaking environmental sampling
- Vessels of opportunity equipped with ROVs / AUVs, and the deployment of ROVs / AUVs
- Vessels engaged in ice management operations (only when iceberg conditions warrant) (typically contracted from existing support vessels servicing offshore oil and gas activities)
- Support / picket vessels for any of the above

It is anticipated that an average of eight to ten vessel transits per month will occur in support of a drilling campaign using one drilling installation. Based on data from the St. John's Port Authority (R. McCarthy pers. comm. 2016), eight to ten transits per month from a previous exploration drilling program in the Flemish Pass area accounted for approximately 8% of total vessel traffic in St. John's Harbour. Therefore, it is anticipated that the Project will not result in an increase in the number of vessel transits over previous levels. Vessels used in the Canada-NL Offshore Area are typically part of a pool of supply

vessels supporting ongoing oil and gas activity. These are specialized vessels which operate under specific regulatory and training requirements.

From 2010 to 2015, a total of 1,300 to 1,601 (1,358 in 2015) vessel transits in and out of the Port of St. John's were recorded, of which 749 to 1,027 annual transits were offshore energy vessels (R. McCarthy, pers. comm. 2016). A similar exploration program's contribution to 2015 vessel transits represents approximately 8 percent of traffic in St. John's Harbour, and is expected to remain at this level.

Supply vessels supporting the Project will transit in a straight-line approach to and from a port to a drilling installation, a common industry practice for energy efficiency employed for over 30 years by operators with facilities offshore Newfoundland. Specific routes may vary at times based on the location of the active drilling installation(s), the shore-based support facility being used, environmental conditions (including weather and ice), and other logistical factors. For example, should the facilities in the port of St. John's be inaccessible, or if the port facility cannot service the drilling program, other existing supply facilities in the province may be used.

Icebreaking activities consist of towing of icebergs that are feasible to be towed, no breaking of ice occurs. The towing activity is highly variable year to year in time and scale so no predictions can be made as to the extent and duration of this activity.

The rig and supply vessels are diesel-powered and the fuel is delivered via supply vessels. The rig typically consumes approximately 40 m^3 per day, depending on weather conditions for station keeping (dynamic positioning).

Transfer of bulk materials such as mud and fuel are completed by the supply vessels which load in St. John's and then transfer alongside the rig via bulk hoses. These hoses have weak-link auto seal couplings to minimize the amount of discharge if they are pulled away from the rig.

Drinking and industrial water requirements are outlined in the C-NLOPB TOSH Regulations, and the quantity required is not specified. An example is as follows:

a. The primary means of supplying potable water involves the use of an Alpha Laval type ORCA Offshore fresh water generating system for converting seawater to freshwater.

b. The secondary means is through the bunkering of the "potable water" from supply vessels when required.

Every employer must provide potable water for drinking, personal washing and food preparation that meets the standards set out in the Guidelines for Canadian Drinking Water Quality, published by Health Canada. Equinor will meet these guidelines.

Ballast water is water used to maintain the stability of an offshore facility. In typical practice, ballast water is segregated from ship's bilge and should not be contaminated with oil. Where ballast water is segregated and no contamination with oil is suspected, ballast water may be discharged without treatment or monitoring.

The C-NLOPB requirements for ballast water discharges are as follows:

- Ballast water that is to be discharged to sea, if it is known or suspected to be contaminated with oil, should be treated such that the residual oil concentration does not exceed 15 mg/L

Where oil contamination is known or suspected to exist, the operator should devise a methodology for sampling of the water to be discharged such that the samples are representative of the oil-in-water concentrations in the discharge. The methodology for sampling and analysis of oil in water should be in accordance with Standard Methods for the Examination of Water and Wastewater, 20th Edition (or as amended or updated), 5520 Oil and Grease, 5520 C Partition-Infrared Method and 5520 F Hydrocarbons. Equinor commits to following these guidelines.

Helicopter support will be used for crew transfers to and from the drilling installation. Helicopter support will be supplied by a third-party licensed operator under contract to the Operator. An estimated one to three helicopter transits per day will be required. However, helicopter transit does not occur every day as flights may be grounded due to weather and/or technical matters. Helicopter support will be based out of St. John's and operate out of the St. John's International Airport. Aviation is regulated by Transport Canada and includes regulations and operational requirements for helicopter flight traffic. The C-NLOPB has also implemented specific operations requirements for helicopter flight traffic (e.g., lighting, hours of operation) when servicing offshore installations. Helicopters supporting the Project will transit to and from the Project using routes commonly used over the past 30 years of oil and gas activities and generally follow the shortest straight line between locations.

2.6 Project Personnel

Each drilling campaign will be managed by Equinor Canada's multidisciplinary drilling team in the St. John's, NL office. The team will include members of Equinor Canada's global drilling organization who are responsible for delivering the Company's standardized approach to exploration drilling programs. Certain members of the drilling team work offshore. The team will be led by the Drilling Supervisor, who is responsible for coordinated the overall execution of the drilling program and providing oversight of well-related operations. The Drilling Supervisor reports to the Equinor Canada onshore well superintendent, who is responsible for supervising the execution of the approved drilling program. Contractors will also be retained for specific work components, including but not limited to delivery and operation of the drilling installation, onshore supply base support, supply and operation of supply vessels, and helicopter services. The drilling installation contractor, during drilling operations, employs the largest number of personnel associated with a drilling program. Typically, between 120-160 persons may work on the drilling installation during a drilling program. Offshore drilling contractor roles include the offshore installation manager (OIM), labourers, technicians, and health, safety and environment personnel. The Equinor Canada Drilling Supervisor will work with the drilling contractor's OIM on the drilling installation to provide safe and efficient drilling operations, and supervision of compliance with Company and local regulatory requirements. Equinor Canada and contractor personnel are highly trained to carry out their specific roles.

2.7 Project Schedule

Exploration drilling activities associated with ELs 1159 and 1160, including well decommissioning, will be aligned with the EL period terms and will end once regulatory obligations and commitments have been met and the licence has either reverted to the Crown or is converted to an SDL. The Project is scoped for a period of 10 years (i.e., 2020 to 2029), providing an adequate and conservative timeframe within which activities may occur. Exploration drilling campaigns may progress year-to-year and from well-to-well based on the results and evaluation of previously drilled wells, interpretation of geophysical data, and Equinor Canada's exploration requirements, with activities being carried out throughout the year. It is assumed that exploration drilling activities on ELs 1159 and 1160 can occur at any time of the year.

For a single drilling campaign in any single year, the following is an estimate of the timelines involved from mobilization to demobilization.

- Wellsite (geohazard) Survey – for deep-water locations, this would use existing 3D geophysical data; for shallow water locations, a separate geohazard survey may need to be completed. This is normally completed three months to one year in advance and typically takes between 7 to 21 days to complete per well location
- Installation of transponders for DP system – up to 18 hours once vessel is on location (can be done weeks in advance of the drilling installation transiting to site)
- Pre-drill coral survey – normally at least three months in advance; may take 1-2 days to complete per well location
- Drilling installation transit to site and ballasting – dependent on whether it is DP or anchored (two to six days, assuming transit from the Avalon peninsula)
- Drilling the well – 35 to 65 days (depending on weather, operational delays; depth of water); includes well suspension and or abandonment activities
- Demobilization – a few hours to a day; includes pulling the BOP and either moving to another well location or leaving the Project Area
- Wellhead removal – normally up to two days per wellhead, depending on water depth and methods employed

Table 2.5 provides a timeframe estimate for activities associated with drilling a single well. Therefore, if more than one well was to be drilled in any one year, the timeframe would be sequential and additive to that presented in Table 2.5. Note that activities may be longer or shorter in duration, and activities, such as geohazard or pre-drill coral surveys, may occur earlier in the schedule depending on the availability of equipment and regulatory authorizations. For a multi-well drilling campaign, the wellsite survey / pre-drill coral survey and drilling activities would be repeated. Regulatory approval and stakeholder engagement include all wells in a drilling campaign and are therefore not repeated for each well in a given campaign.

Table 2.5 Schedule – For a Single Well Drilling Campaign

Task	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Regulatory Approvals																
Stakeholder Engagement																
Well Selection and Design																
Pre-drill Coral Survey and/or Wellsite (Geohazard) Survey																
Logistics Preparation																
Drilling a single well (may include formation flow test) and well decommissioning																
End-of-well regulatory reporting																

2.8 Summary of Changes to the Project

The nature of exploration drilling means that, during the EA stage, the Project description does not include a detailed “design” and proposal of particular components, as a development project might. Rather, this exploration drilling project is based on standard and typical equipment and methods in compliance with regulatory standards. This means that the Project description (Chapter 2) has not been subject to any specific “design changes” as a result of these engagement initiatives and their outcomes.

2.9 Waste Discharges and Emissions

The primary waste discharges and emissions associated with exploration drilling on ELs 1159 and 1160 include the following:

- Air emissions
- Hazardous and non-hazardous waste
- Drilling waste
- Liquid discharges
- Heat, light and sound emissions

As mentioned in Section 1.4.1, Equinor Canada will prepare an EPP and submit to the C-NLOPB for review as part of the OA application process. The EPP will provide details regarding the management of wastes, discharges and emissions for the drilling campaign and is specific to the drilling installation. The EPP will be prepared in accordance with the EPP Guidelines (NEB et. al 2011).

Chemicals used for drilling operations will be screened in accordance with Equinor Canada’s chemical management and selection process that adheres to the OCSG (NEB et al. 2009). The chemical selection and management process will be included in the EPP. The EPP will also include the procedures and processes for handling, storage, transfer and disposal of wastes during exploration drilling activities.

The water management system will be dependent on the configuration of the drilling installation's water system. The water system will manage water and waste-water streams, such as potable water, bilge and deck drainage, ballast water, grey / black water, cooling water, and fire control water. The nature and management of waste streams is summarized in Section 2.9.4 below.

2.9.1 Air Emissions

There is no change to the proposed components / activities, and the number of wells between ELs 1159 and 1160 and the Flemish Pass ELs 1139 to 1142 will not increase above the number approved in the Flemish Pass Decision Statement (i.e., 24).

Air emissions from the drilling installation and other drilling activities will regularly occur during program execution. The main source of atmospheric emissions will be the exhausts of the drilling installation, flaring (should it occur during a formation flow test), and the supply vessels and helicopters.

The primary source of atmospheric emissions for the Project include exhaust gases from the combustion of fuel in engines powering the drilling installation, offshore supply vessels, and helicopters. Depending on the type of formation flow test carried out, atmospheric emissions could result if a formation flow test with flaring is undertaken. For the purposes of EA regarding estimation of air emissions, it is assumed that flaring will be required. Typically flaring during a formation flow test is two to three days; however, if an extended flow test is required (depending on data requirements), flaring could last up to five days (refer to Section 2.5.2.4). Should flaring be required, it will be carried out in accordance with provisions of the Drilling and Production Guidelines (C-NLOPB and CNSOPB 2017).

Activities that will result in air emissions, including criteria air contaminants (CACs) and greenhouse gas (GHG), include:

- Drilling installation, vessel and helicopter traffic (CO, nitrogen dioxide [NO_2], total particulate matter [TPM], sulphur dioxide [SO_2], VOCs, GHGs)
- Power generation (CO, NO2, TPM, SO2, VOCs, GHGs)
- Formation flow testing with flaring (CO, NO_2, TPM, GHGs)

Activities associated with ELs 1159 and 1160 will operate in accordance with the *Canadian Environmental Protection Act*, through the National Ambient Air Quality Objectives for specified CACs, the Ambient Air Quality Standard for fine particulate (less than 2.5 microns; $PM_{2.5}$), and the International Maritime Organization's (IMO) relevant regulations and emission limits under the International Convention for the Prevention of Pollution from Ships (MARPOL). The IMO is also considering mandatory energy efficiency measures on vessels and data collection systems, which will further reduce GHG emissions in the offshore.

Provincially, air emissions, including CACs, are regulated under the NL *Air Pollution Control Regulations* and GHGs under the *Management of Greenhouse Gas Act*.

The sulphur content in the diesel fuel used will meet the *Sulphur in Diesel Fuel Regulations* for each regulated activity and will comply with the sulfur limits in fuels for large marine diesel engines, in

accordance with the *Vessel Pollution and Dangerous Chemicals Regulations* under the *Canada Shipping Act*, *2001*.

Beginning on January 1, 2019, the federal government will implement an output-based carbon pricing system for industrial facilities across Canada (Government of Canada 2018) for New Brunswick, Ontario, Manitoba, Saskatchewan, Yukon, Nunavut, and Prince Edward Island (Bennett Jones LLP 2018). Other provinces, including NL, have their own systems that have been accepted by ECCC. The NL *Management of Greenhouse Gas Reporting Regulations*, made under the *Management of Greenhouse Gas Act*, specifies the industrial sectors to which the Regulations apply. In addition to the Regulations, the Government of NL has a proposed carbon pricing plan that would set performance standards (i.e., GHG targets) for large industrial facilities (Gov NL 2018). Currently, offshore oil and gas activities are not subject to the Regulations or the *Management of Greenhouse Gas Act*; however, the proposed carbon pricing plan indicates that amendments are proposed to the Regulations to include offshore oil and gas activities.

On a federal level, GHG emission reduction targets have also been set and include the following (ECCC 2018a):

- A 17% reduction below the 2005 emission levels by 2020 (under the 2009 Copenhagen Accord)
- A 30% reduction below the 2005 emission levels by 2030 (2015 submission to the United Nations Framework Convention on Climate Change)

The total annual reported GHG emissions for the province of NL and for Canada were acquired from ECCC GHG Emissions Reporting Program, 2015 Facility GHG Emissions by province and territory (ECCC 2018b). The total annual provincial and national GHG emissions for 2016, as presented in the National Inventory Report, 1990-2016: GHG Sources and Sinks in Canada (ECCC 2018b), are 10.8 megatonnes of carbon dioxide equivalents (Mt CO_2 eq) and 704 Mt CO_2 eq, respectively. The total predicted annual equivalent CO_2 emissions for Project-related exploration drilling activities (including the drilling installation, helicopters, and supply vessels) range from 126,214 to 180,869 tonnes of carbon dioxide equivalents (t CO_2 eq) and therefore represent 1.17% to 1.67% of NL's average annual GHG emissions and 0.018% to 0.026% of Canada's average annual reported GHG emissions. During formation flow testing with flaring, a total of 131,437 to 186,091 t CO_2 eq per year could be emitted, which would therefore represent 1.22% to 1.72% of NL's average annual GHG emissions and 0.019% to 0.026% of Canada's average annual reported GHG emissions. These represent the total potential emissions from all components and activities associated with exploration drilling, including flaring.

2.9.2 Hazardous and Non-hazardous Wastes

The potential types of hazardous and non-hazardous waste produced from exploration drilling activities on ELs 1159 and 1160 are is summarized below.

As outlined in Section 2.9, the Equinor Canada EPP will include plans for the management of waste material during a drilling campaign. Hazardous wastes generated, including dangerous goods, will be stored in designated areas in appropriate containers/containment for transport to shore in compliance with the *Transportation of Dangerous Goods Act* and its regulations. Applicable approvals for the

transportation, handling and temporary storage, of these hazardous wastes will be obtained as required. Hazardous wastes that may be produced and require management include oily wastes (e.g., filters, rags and waste oil), waste chemicals and containers, batteries, biomedical waste and spent drilling fluids. Biomedical waste will be collected onboard by health professionals and stored in special containers before being sent to shore for incineration.

Non-hazardous wastes generated that are not allowed to be disposed overboard, will be stored in appropriate containers onboard, and transported back to shore. Non-hazardous wastes include domestic wastes, packaging material, scrap metal and other recyclables such as waste plastic.

Hazardous and non-hazardous wastes shipped to shore for disposal will be collected on-shore by a third-party contractor for disposal of the waste at an approved facility and in compliance with federal and provincial regulations and requirements.

2.9.3 Drilling Waste

2.9.3.1 Drilling Mud and Cement

A combination of water-based mud (WBM) and synthetic-based mud (SBM) will be used to drill the wells. Wastes generated from drilling include drilling muds and cuttings that retain a portion of the drilling mud. Drilling wastes will be disposed of in accordance with the OWTG (NEB et al. 2010).

WBM is comprised primarily of water, barite, and bentonite. Salt or fresh water is the carrier liquid for WBM. WBM and SBM additives could typically include barite, bentonite or other clays, silicates, lignite, caustic soda, sodium carbonate/bicarbonate, inorganic salts, surfactants, corrosion inhibitors, lubricants and other additives for unique drilling problems such as viscosity and mobility (Thomas 1984; GESAMP 1993). Chemicals used in drilling muds (SBM and WBM) are screened in accordance with Equinor Canada's chemical screening and management practices per the OCSG (NEB et al. 2009) and are classified under the offshore chemical notification system as substances which pose little or no risk to the environment.

Barite (barium sulphate) is used to control mud density, which helps balance formation pressures within the well. Bentonite clay is a viscosifier, which thickens the mud to suspend and carry drill cuttings to the surface.

The carrier fluid in SBM is a synthetic base fluid which can be made up of internal olefins, alpha olefins, polyalphaolefins, paraffins, esters or blends of these materials (BP 2016). Offshore Newfoundland, most operators currently use PureDrill IA35-LV as the base fluid for SBM (Petro-Canada 2017).

The initial surface sections are normally drilled riserless with WBM, with cuttings and water-based fluids discharged at depth. Water-based cuttings are discharged for the first sections of the well and in accordance with the OWTG. Once the riser is connected, SBM is generally used. Synthetic-based cuttings are treated prior to discharge to the sea as per the OWTG. For SBM cuttings, the drilling installation will be equipped with solids control equipment for cuttings management for the treatment of the SBM cuttings prior to discharge. Typically, a combination of shale shakers and cuttings dryers /

centrifuges are used to collect the SBM from the cuttings and treat SBM cuttings. Shale shakers are a system of fine and course mesh screens that collect cuttings while enabling the fluid to pass through for collection. The cuttings are sent to a cuttings dryer or high speed centrifuge which separates the drilling fluid from the cuttings. The treated cuttings are discharged overboard when the base oil retained on cuttings is below a threshold of 6.9 g/100g or less oil on wet solids. Excess or spent SBM that can no longer be used is sent to shore for disposal at an approved waste management facility. Per the C-NLOPB OA process, Equinor Canada will assess available drill cuttings treatment technology with the intent of using proven and practicable best technology considering that technologies may change over the temporal scope.

Typical drill mud and cuttings discharge volumes for different hole sections and mud type are summarized in Table 2.6.

Table 2.6 Drill Mud and Cuttings Discharge Volumes

Open Hole Section (Hole Diameter in inches)	Casing OD Section length (m)	Casing ID Mud type	Cuttings Volume per day	
			Metric ton[1]	m³
2,700 m Water Depth - Northern Project Area Modelling Location				
Conductor (42)	75	Seawater/WBM	207.7	80
Surface (26)	700	Seawater/WBM	675	260
Intermediate (17.5)	1,500	SBM	363.4	140
Production (12.25)	2,200	SBM	155.8	60
Total WBM Cuttings Discharge (NPA Well)[2]			882.6	340
Total SBM Cuttings Discharge (NPA Well)[2]			519.2	200
WBM Cuttings Discharge Rate (per well section/per day)[3]				
Conductor			69.2	26.7
Surface			112.5	43.3
SBM Cuttings Discharge Rate (per well section/per day)[3]				
Intermediate			36.3	14
Production			9.7	3.75
SBM retained on cuttings[4]			35.8	13.8
TOTAL Cuttings Volume Discharge (NPA Well)			1,401.8	540
1,100 m Water Depth - Eastern Project Area Modelling Location				
Conductor (42)	75	Seawater/WBM	207.7	80
Surface (26)	750	Seawater/WBM	363.4	140
Intermediate (17.5)	1,500	SBM	324.5	125
Production (12.25)	2,300	SBM	246.6	95
Total WBM Cuttings Discharge (EPA Well)			571.1	220
SBM Cuttings Discharge (EPA Well)			571.1	220
WBM Cuttings Discharge Rate (per well section/per day)				
Conductor			103.8	40
Surface			181.7	70
SBM Cuttings Discharge Rate (per well section/per day)				
Intermediate			40.6	15.6

Table 2.6 Drill Mud and Cuttings Discharge Volumes

Open Hole Section (Hole Diameter in inches)	Casing OD Section length (m)	Casing ID Mud type	Cuttings Volume per day	
			Metric ton[1]	m³
Production			24.7	9.5
SBM retained on cuttings[4]			39.4	15.2
TOTAL Cuttings Volume Discharge (EPA Well)			1,142.2	440
362 m Water Depth - Southern Project Area Modelling Location				
Conductor (42)	75	Seawater/WBM	207.7	80
Surface (26)	750	Seawater/WBM	324.5	125
Intermediate (17.5)	1,700	SBM	207.7	80
Production (12.25)	2,300	SBM	65	25
Total WBM Cuttings Discharge (SPA Well)			532.18	205
Total SBM Cuttings Discharge (SPA Well)			272.58	105
WBM Cuttings Discharge Rate (per well section/per day)				
Conductor			103.8	40
Surface			162.3	62.5
SBM Cuttings Discharge Rate (per well section/per day)				
Intermediate			26	10
Production			6.5	2.5
SBM retained on cuttings[4]			18.8	7.2
TOTAL Cuttings Volume Discharge (SPA Well)			804.76	310
89 m Water Depth - Jeanne d'Arc Basin (JDB) Modelling Location				
Conductor (42)	79	Seawater/WBM	238.8	92
Surface (26)	379	Seawater/WBM	345.3	133
Intermediate (17.5)	1,729	SBM	449.1	173
Production (12.25)	2,838	SBM	184.3	71
WBM Cuttings Discharge (JDB Well)			584.1	225
SBM Cuttings Discharge (JDB Well)			633.4	244
WBM Cuttings Discharge Rate (per well section/per day)				
Conductor			119.4	46
Surface			172.6	66.5
SBM Cuttings Discharge Rate (per well section/per day)				
Intermediate			56.1	21.6
Production			18.4	7.1
SBM retained on cuttings[4]			43.7	16.8
TOTAL Cuttings Volume Discharge (JBD Well)			1,217.5	469
1,175 m Water Depth – Flemish Pass South Modelling Location				
Conductor (42)	75	Seawater/WBM	207.7	80
Surface (28)	400	Seawater/WBM	402.4	155
Intermediate (17.5)	900	SBM	207.7	80
Production (12.25)	2,265	SBM	272.6	105
WBM Cuttings Discharge (EL 1134)			610.1	235

Table 2.6 Drill Mud and Cuttings Discharge Volumes

Open Hole Section (Hole Diameter in inches)	Casing OD Section length (m)	Casing ID Mud type	Cuttings Volume per day	
			Metric ton[1]	m³
SBM Cuttings Discharge (EL 1134)			480.3	185
WBM Cuttings Discharge Rate (per well section/per day)				
Conductor			103.8	40
Surface			103.8	40
SBM Cuttings Discharge Rate (per well section/per day)				
Intermediate			69.2	26.7
Production			19.5	7.5
SBM retained on cuttings[4]			33.1	12.8
TOTAL Cuttings Volume Discharge (EL 1134)			1,090.3	420

Notes:
NPA = Northern Project Area; EPA = Eastern Project Area; SPA = Southern Project Area; JDB = Jeanne d'Arc Basin
[1]The model assumes specific weight of 2,596 kg/m³.
[2]This total is the volume for the entire well. For example, the NPA well in its entirety would discharge 340 m³ of WBM, and 200 m³ of SBM.
[3]These discharge rates are completed for each section of the well, as amounts will be discharged at different rates for each hole section, as opposed to being discharged equally throughout the well completion.
[4] SBM retained on cuttings based on 6.9 g / 100 g.

2.9.3.2 Cement

Cement constitutes a part of the well barrier envelope and is used during casing installation and plug and abandonment. For the initial riserless sections of the well, a spacer fluid is typically pumped ahead of the cement which is pumped down the drillstring and up the outside of the casing, with cement (and spacer fluid) returned to the seabed in riserless sections. For casing operations with the riser installed, cementing / drilling fluid interface is returned up the riser to the rig. For most casing cement jobs, the cement / spacer mud / mud interface will be left in the annulus; exceptions include lines and plugs, where cement may be circulated back to surface. After every cementing operation, the cement unit must be cleaned / rinsed to prevent cement from hardening in the mixing tanks and liners. Each cleaning operation typically results in a discharge of approximately 1.5 m³ of water (80%) and residual cement slurry (20%) below surface. For a typical well, there are three to four casing cement jobs and several plug and abandonment (two to six) plugs. Therefore, total cement slurry discharges from a typical well operation ranges between 7.5 and 15 m³. During initial commissioning and testing of a cementing unit, a small volume "test mix" may also be performed (less than 10 m³), which is also discharged to sea. Unused cement bulks and cementing additives are returned to shore for future re-use or disposed of at an approved facility.

Drilled (hard) cement during the operation are discharged to seabed / sea when riserless. When drilling with the riser installed, drilled cement is processed by shakers and discharged overboard or captured in cutting skips and transported to shore. Although unlikely, cement unit failures, premature set up of cement, or environmental conditions (weather) may require a cement job to be aborted. If this occurs when drilling riserless, the cement is circulated out of the well to seabed. However, if the riser is installed,

the cement is circulated out of well via the riser and may be discharged at surface. In this instance, a maximum of 200 m³ of cement slurry and 20 m³ of water-based spacer fluids could be discharged.

2.9.4 Liquid Wastes

Liquid waste generated from exploration drilling activities on ELs 1159 and 1160 are summarized below.

Products that have the potential to be discharged to the marine environment will be selected in accordance with the OCSG (NEB et al. 2009), the purpose of which is to reduce the potential environmental effects from the discharge of chemicals used in offshore drilling and production operations. The following liquid wastes, if generated, will be treated and managed in accordance with the OWTG (NEB et al. 2010):

- Produced water – formation flow test may result in produced water, including formation fluids, being brought to the surface, in which case it may be flared or treated on the drilling installation in accordance with the OWTG prior to discharge.
- Bilge and deck drainage water – bilge water is seawater that enters parts of the drilling installation, passing through pieces of equipment as it does so. Deck drainage water occurs on the surface decks of the drilling installation, resulting from precipitation and sea spray, as well as operational activities such as wash-down, fire control testing or equipment testing. Bilge and deck drainage water often can come in contact with equipment and machinery and may be contaminated with oil. As provided for in the OWTG, the limit of residual oil concentration in the water is 15 mg/L if it is to be discharged. Bilge and deck drainage water will be managed in accordance with the OWTG.
- Ballast water – ballast water is loaded into and discharged from drilling installation and supply vessels as required for stability and balance (e.g., managing inclement weather conditions). Ballast water is stored in dedicated tanks on the vessel and does not make contact with oil or equipment. Ballast water will be discharged according to IMO *Ballast Water Management Regulations*, and Transport Canada's *Ballast Water Control and Management Regulations*, and the OWTG.
- Grey / black water (sewage) – grey water will be generated from galley, washing, and laundry facilities, and black water will be generated from the accommodation areas (sewage). Consistent with the OWTG, sewage will be macerated so that particles are less than 6 mm in size prior to discharge.
- Cooling water – cooling water may be used to cool equipment and engines on the drilling installation. If required, a small volume of seawater is pumped onto the drilling installation and passed over or through equipment and engines using heat exchangers. The seawater may be treated with biocides or through electrolysis to prevent microbiotic contamination of machinery. Due to the temporary nature of exploration drilling, biocides are not typically required in cooling water systems, which is more applicable to offshore oil and gas production facilities. A common exploration drilling activity that may require the use of biocides is during well decommissioning; however, biocides would be added to seawater contained in the wellbore and therefore would not enter the marine environment. If biocides are used, they will be selected using Equinor Canada's chemical selection system and

consistent with the OCSG and will be discharged in accordance with the OWTG. The temperature of the discharged cooling water will be warmer than the receiving seawater, but the seawater temperature will quickly achieve background levels.

- Fire control water – fire prevention and response systems, including a dedicated fire water system, will be used on the drilling installation and supply vessels.
- BOP testing fluids - To facilitate proper functioning of the BOP for safe well operations, a regular program of function testing and pressure testing the BOP mechanism is required. Function testing is carried out every seven days, while pressure testing is carried out every 14 to 21 days, depending upon ongoing drilling installation operations. BOP systems use a water-based hydraulic fluid. Typically, the BOP fluid consists of fresh water and a solution of water-based Erifon and glycol. Approximately 35 m³ of this solution could be discharged per month during testing. Occasionally, it may be required to disconnect the Lower Marine Riser Package from the subsea BOP and move the drilling installation to a safe location when weather events pass through the area, or to pull the BOP to surface if maintenance is required. When the BOP is disconnected, the fluid contained in the subsea accumulator bottles may be discharged. The total estimated control fluid discharged in each disconnection of the Lower Marine Riser Package is approximately 0.7 m³. The total estimated control fluid discharged in each BOP pull is approximately 3.3 m³. BOP fluids are screened for acceptability prior to use
- Food waste – food waste will be reduced prior to discharge, in accordance with the OWTG.
- Well treatment fluids - if well treatment fluids were generated then they would be treated until the oil in water concentration was ≤15 mg/L or transferred to shore for treatment / disposal.
- Liquid wastes, such as waste chemicals, cooking oils or lubricating oils, that do not meet the performance, sampling and analysis targets set out in the OWTG are stored and transported to shore for disposal at an approved facility.

2.9.5 Heat, Light, and Sound Emissions

Heat, light and sound emissions generated from exploration drilling activities on ELs 1159 and 1160 are summarized in the subsequent subsections below.

Sound emissions will typically be generated during regular drilling operations and geophysical surveys. Light emissions will be generated at night on the drilling installation, through flaring when required during a formation flow test. Heat will be generated primarily through exhaust.

2.9.5.1 Light and Heat Emissions

Exploration drilling activities will present several sources of artificial light. The duration at any one location will be less than 65 days, with some lighting operating 24 hours a day. This includes navigation and deck lighting for the drilling installation and supply vessels necessary for maritime safety and crew safety requirements.

Flaring activity during a formation flow test will generate light and thermal emissions. Formation flow testing, as described in Section 2.5.2.4 is generally carried out on a temporary basis at the end of drilling

operations. During formation flow testing, it is possible that short, intermittent periods of flaring can last up to three days, or up to five days if an extended flow test is required.

Heat emissions generated by engines and flaring will be dissipated to the atmosphere without likely interactions to receptors.

2.9.5.2 Sound Emissions

Sound will be generated underwater during the operation of the drilling installation and supply vessels. The level of sound will be dependent on the type of drilling installation being used and method of positioning. Underwater sound generated from a drilling installation is continuous during a drilling program, while underwater sound from VSP operations is a temporary sound source (e.g., typically completed within 48 hours [refer to Section 2.5.2.5]). The extent to which sound travels is determined by water depth, salinity, and temperature. An overview of underwater ambient sound and sound from drilling operations is described below, and is based on two Project-specific reports:

- Eastern Newfoundland Drilling Noise Assessment: Qualitative Assessment of Radiated Sound Levels and Acoustic Propagation Conditions (Quijano et al. 2017)
- Marine Mammals and Sound Sources in the Flemish Pass: Analysis from 2014 and 2015 Acoustic Recordings (Maxner et al. 2017)

Quijano et al. (2017) includes: a summary of ambient noise levels in the Project Area based on data collected along Canada's east coast in 2015/2016; a summary of environmental parameters in the Eastern Newfoundland Exploration Drilling Project Area; the expected underwater source levels based on the type of drilling installation, DP systems and VSP arrays likely to be used; and a qualitative comparison of environmental properties and expected source levels between the Project Area and specifications and those considered in the acoustic modeling conducted for the Scotian Basin Exploration Drilling Project (Zykov 2016; Quijano et al. 2017). The estimated sound levels attributable to the operation of the drilling installation were qualitatively assessed by comparison to the previously modelled Scotian Basin Exploration Drilling Project (Zykov 2016), as the water depths and geoacoustic profiles in the deep-water sites for the proposed activity are similar to those from the Scotian Basin project.

Maxner et al. (2017) reviews acoustic recordings collected by Statoil (Equinor Canada) in the Flemish Pass between June and October 2014, and from May to September 2015. The data were analyzed to characterize the baseline soundscape, identify the presence of marine mammals, and characterize the soundscape during Statoil's (Equinor Canada's) 2014-2016 drilling program. Drilling operations by the semi-submersible West Hercules generated sound levels similar to those previously reported for the Stena IceMAX off Nova Scotia.

There is low potential for two drilling installations to be active at the same time as part of the Project, due primarily to commercial and logistical factors. There is therefore very little possibility that two drilling installations would operate at the same time in proximity to one another. However, the environmental effects assessment considered this potential occurrence, in order to be conservative and fully inclusive

of all such possible scenarios, including the potential for “overlapping” or combined environmental effects to a VC resulting from multiple, concurrent drilling campaigns.

Atmospheric sound is not of concern given the anticipated low levels of atmospheric sound emissions, the limited transmission of underwater sound above the surface and location of receptors. Helicopter traffic will generate atmospheric sound at the airport, in transit and at the drilling installation. However, with the use of the existing St. John’s International Airport, potential effects on human receptors is reduced. Helicopters are required to avoid Important Bird Areas (IBAs), so potential interactions with birds are reduced. Given the distance from the Project Area to shore (over 250 km) and occupational and safety requirements on the drilling installation, there will be no likely interaction with human receptors.

2.10 Alternative Means of Carrying Out the Project

Table 2.7 provides a summary of alternative options that are were carried forward in the Flemish Pass EIS and are applicable to exploration drilling on ELs 1159 and 1160.

2.11 Environmental Planning and Management

Equinor Canada has a clear goal to facilitate sustainable development and is committed to reducing environmental effects. This section introduces Equinor Canada’s Safety and Sustainability policy, the Management System and how it will be implemented for the Project.

Equinor Canada will implement and adhere to relevant environmental mitigation requirements outlined in applicable legislation and regulations, including those committed to in this EIS, and eventually required as enforceable conditions of an EA approval. This will include requiring its contactors and subcontracts to implement and adhere to those mitigation measures and compliance standards that apply to their specific work scopes, which will be required and enforced through its relevant commercial and contractual arrangements with these providers or goods and services to the Project.

Table 2.7 Summary of Alternative Means

Component	Alternatives Considered	Technically Feasible	Economically Feasible	Environmental Effects	Carried Forward in the Flemish Pass EIS
Choice of drilling fluid	WBM	NO Technically inferior at deeper sections of well	NO Potential economic increases if used at deeper sections of well	WBM acceptable for upper hole sections; SBM acceptable for lower well sections. For both options, it is assumed appropriate controls are implemented and OSCG is followed. Both options considered in assessment of potential environmental effects.	✓
	SBM	YES	YES		✓

Table 2.7 Summary of Alternative Means

Component	Alternatives Considered	Technically Feasible	Economically Feasible	Environmental Effects	Carried Forward in the Flemish Pass EIS
Choice of drilling unit	Semi-submersible	YES	YES	Both options considered acceptable assuming appropriate controls are implemented.	✓
	Drill ship	YES	YES		✓
Management of drilling wastes – WBM	Disposal at sea	YES	YES	Localized effects on seafloor.	✓
	Disposal on shore	YES	NO	N/A	✗
	Offshore re-injection	YES	NO	N/A	✗
Management of drilling wastes – SBM	Disposal at sea	YES	YES	Localized effects on seafloor.	✓
	Disposal on shore	YES	YES Increased costs from increased transportation and operational delays	Increase in GHG emissions, larger environmental footprint.	✗
	Offshore re-injection	YES	NO	N/A	✗
Water management and location of final effluent discharge points	N/A – Discharge points on a drilling installation are fixed and cannot be changed or re-configured. A drilling installation has yet to be selected, and therefore alternative locations for effluent discharge points are not available.				
Chemical selection	Chemicals that have the potential to be discharged to the marine environment will be selected in accordance with the Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Land (NEB et al. 2009) to ensure they have a minimal effect on the receiving environment. This occurs prior to drilling; at that time alternatives may be assessed.				
Offshore drilling installation lighting	No or limited lighting	NO	NO	N/A	✗
	Standard lighting	YES	YES	Potential localized effects on migratory birds.	✓
	Spectral modified lighting	NO	NO	N/A	✗
	No flaring	N/A – Not considered as an option due to regulatory and safety requirements			

Table 2.7 Summary of Alternative Means

Component	Alternatives Considered	Technically Feasible	Economically Feasible	Environmental Effects	Carried Forward in the Flemish Pass EIS
Formation flow testing and nighttime flaring	Reduced flaring (no flaring at night or during low-visibility weather)	YES However, potential to result in compromised data from formation flow tests; increased safety risk	YES However, increased cost and potential schedule extension	Reduced potential effects compared with standard flaring.	✗
	Flaring as required	YES	YES	Potential localized effects on migratory birds.	✓
	Formation testing while tripping	YES	YES	No flaring required.	✓

2.11.1 Safety and Sustainability Policies

Equinor Canada's Safety and Sustainability policies are two of several policies included in the Equinor Canada Book (Equinor Canada 2018), which forms the foundation of how we conduct our business. We will use natural resources efficiently and will provide energy which supports sustainable development.

2.11.1.1 Our Approach to Safety

We will ensure safe operations, which protect people, the environment, communities and material assets. We believe that accidents can be prevented.

We are committed to:

- Integrating safety in the way we do business
- Improving safety performance in all our activities
- Demonstrating the importance of safety through hands-on leadership and behaviour
- Openness in all safety issues and active engagement with stakeholders

How we work:

- We take responsibility for the safety of ourselves and others
- We work systematically to understand and manage risk
- We provide our people with the necessary resources, equipment and training to deliver in accordance with their designated responsibilities
- We cooperate with our contractors and suppliers on the basis of mutual respect
- We stop unsafe acts and operations

- We aim for a safe and attractive working environment characterized by respect, trust and cooperation
- We monitor risk related to the working environment, and we monitor the occupational health of our people
- We establish work processes as well as goals and performance indicators to control, measure and improve these processes
- We run safety improvement processes based on surveys and risk assessments, and we involve our people in this work
- If accidents occur, our emergency response organization will do its utmost to reduce injury and loss. Saving lives is our highest priority
- We transform lessons learned into improved safety measures through continuous learning

2.11.1.2 Our Approach to Sustainability

We contribute to sustainable development through our core activities wherever we work. We use natural resources efficiently and provide energy which supports sustainable development.

We are committed to:

- Integrating sustainability in the way we do business
- Contributing to the development of sustainable energy systems and technology
- Making decisions based on the way they affect our interests as well as the interests of the societies and the ecosystems in which we operate
- Respecting human rights and labour standards
- Ensuring anti-corruption and transparency on all sustainability issues and active engagement with stakeholders
- Contributing to local content by developing skills and opportunities in the societies in which we operate

How we work:

- We identify and manage environmental and social risks and opportunities based on stakeholder dialogue, as well as risk and impact assessments
- We apply clean and efficient technologies to reduce the negative environmental impact of existing operations
- We work to limit GHG emissions
- We respect international labour standards and the rights of Indigenous peoples
- We promote transparency through support for international industry standards, and by publishing our income, expenditures and taxes in all the countries in which we operate
- We hire and develop local people and promote local sourcing
- We ensure that local suppliers comply with applicable laws and meet our expectations and standards
- We work with others to help establish sustainable local enterprises and support the efforts of our suppliers to close gaps in order to meet our standards

- We exchange experience with national partners and support education and skill building in oil- and gas-related disciplines to build lasting capacity
- We undertake sustainable social investment projects in affected communities so that they can share in the benefits provided by our activities

2.11.2 The Equinor Canada Management System

The Equinor Canada management system defines how we work and describes how we lead and perform our activities. Our management system has three main objectives:

1. Contribute to safe, reliable and efficient operations and enable us to comply with external and internal requirements
2. Help us to incorporate our values, people and leadership principles in everything we do
3. Support our business performance through high-quality decision-making, fast and precise execution, and continuous learning (Equinor Canada 2018)

Commitment to and compliance with our management system are a requirement.

Sustainability in Equinor Canada means responsible environmental, social and economic performance enabling business resilience. The sustainability function in Equinor Canada includes these elements:

- Balance reliable energy supply and climate impact
- Aim for outstanding resource efficiency
- Prevent harm to local environment
- Create lasting local value
- Respect for human rights
- Lead an open and transparent business

The Equinor Canada environmental management system (EMS) is fully compatible with recognized environmental management standards including ISO 14001.

2.11.3 Environmental Planning

As part of its project planning and as a requirement of the C-NLOPB OA process, Equinor Canada will submit the following documents to the C-NLOPB:

- Safety Plan
- Environmental Protection and Compliance Monitoring Plan (EPCMP)
- Oil Spill Response Plan
- Emergency Response Plan
- Spill Impact Mitigation Assessment (SIMA) (previously referred to as Net Environmental Benefit Analysis)

2.11.3.1 Project Planning, Assessment, and Implementation: Application of the Precautionary Principle

The consideration of environmental issues from the earliest stages of project planning and design and throughout eventual implementation is an integral and fully integrated part of Equinor Canada's approach to its petroleum exploration programs and other activities.

As illustrated throughout this EIS, potential environmental issues and interactions that may be associated with the Project can be avoided or reduced through the use of good planning and sound operational practices and procedures. These practices and procedures are supported by standard mitigation measures that are well established and outlined in relevant regulatory procedures and guidelines, and which have been routinely and effectively applied to similar offshore exploration programs carried out in the Canada-NL Offshore Area and internationally for decades. For this Project, these standard mitigation measures will be implemented through and/or supplemented by operator-specific policies and procedures that have been identified through this EIS, and through the various post-EA regulatory review processes that will apply to the Project (see Section 1.3). The Project will not likely result in significant adverse environmental effects due to the implementation of these environmental protection measures.

In planning and designing the Project and throughout the course of the EA, including the environmental effects analysis and the identification of mitigation included in this EIS, Equinor Canada has applied a precautionary approach to assessing and attempting to avoid or reduce adverse environmental effects. This has included consideration of the precautionary principle, which was defined by the 1992 Rio Declaration on Environment and Development (Principle 15) as follows:

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

As illustrated throughout the EIS, the Project does not require or propose the use of new or different equipment, methods or other technologies during its planned components and activities. Rather, it uses standard and proven exploration components and methods, for which potential environmental issues are well understood and fully manageable through existing and effective mitigation measures. Withstanding this, the application of a precautionary approach is reflected in a number of aspects of Project planning and design, and in the conduct of the EA reported herein.

In addition to operator-derived and implemented mitigation measures and precautionary approaches, an added layer of such precaution comes from the various post-EA regulatory review and planning processes that will apply to this exploration drilling program. The regulatory review and approval processes and other requirements that apply to oil and gas activities in the Canada-NL Offshore Area are amongst the most rigorous and stringent in the world, and operators are required to demonstrate that they have the ability and capacity to undertake such activities in a safe and environmentally responsible manner through various project design measures, operational procedures, and response mechanisms. As part of its regulatory review and decision-making regarding drilling programs and other activities in this jurisdiction, for example, the C-NLOPB receives and considers information from

operators that detail the proposed drilling locations and activities, the equipment and procedures involved, and the qualifications and training of personnel. The C-NLOPB's regulatory approval process is two-tiered in nature and requires, firstly, an authorization of the overall drilling program in the form of an OA, and secondly, a well approval in the form of an ADW for each well to be drilled.

Equinor Canada will obtain the required permits, approvals and authorizations for the Project, and the company and its contractors will comply with these and relevant regulations and guidelines in planning and implementing the exploration program that is the subject of this EIS. This includes the various mitigation measures identified and committed to in the sections that follow, the implementation and effectiveness of which will be directed, managed and monitored in accordance with the Equinor Canada's applicable policies and procedures.

2.11.3.2 Environmental Management

Where the environmental effects analyses have identified potentially significant environmental effects that cannot be avoided, mitigation measures have been proposed. Such measures should remove, reduce or manage the effect to a point where the residual significance of that environmental effect is reduced to an acceptable level. Mitigation has also been recommended in order that environmental effects remain 'not significant'. Chapters 8 to 13 and 15 provide a summary of mitigation and management measures identified during the EIS process on a topic by topic basis.

These commitments will be integrated into the EPCMP. The full EPCMP will be implemented in accordance with the relevant regulatory requirements and submitted to the C-NLOPB in accordance with its OA requirements. The EPCMP is a working document that details:

1. Roles, responsibilities and chain of command for drilling personnel, and contractors or sub-contractors in respect of environmental management for the protection of the environment and operation of the Project
2. Mitigation measures as identified in the EIS to prevent significant adverse effects to the receiving environment
3. Pollution prevention measures
4. Measures to reduce, recycle, reuse and dispose of waste streams

2.11.3.3 Environmental Monitoring

Monitoring is an important activity for measuring performance against the environmental regulatory and corporate requirements. Monitoring enables the assessment of progress against goals as well as the gathering of information to track overall environmental performance. There are three inter-related drivers in such monitoring:

- Regulatory requirements
- Corporate and Project expectations and goals
- Validation of EIS predictions

Monitoring can therefore be split into two broad categories: compliance monitoring; and potential environmental effects monitoring (EEM).

Compliance monitoring involves the monitoring of emissions, discharges, and waste generations against performance standards or regulatory requirements as set out the Project EPCMP. Details of compliance monitoring and reporting is described in Section 17.4.

EEM, if required, will be used to validate EIS predictions. If required, an EEM plan will be submitted to C-NLOPB for review and acceptance prior to the start of the first drilling campaign. Further information is provided in Section 17.4.

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3.0 REGULATORY, INDIGENOUS, AND STAKEHOLDER ENGAGEMENT

Engagement is a key component of Equinor Canada's approach to the planning and implementation of its offshore programs. Engagement with government departments and agencies, Indigenous groups and stakeholders associated with exploration drilling activities commenced in 2016 for the adjacent ELs 1159 and 1160.

3.1 EIS Guidelines

EIS guidelines for the EIS for the Project (CEA Agency 2019) were issued to Equinor Canada on July 5, 2019, to guide the planning and preparation of this EIS. The EIS Guidelines specify various information requirements and potential issues that are to be addressed in the EISs, including required information and analysis around the Project Description, aspects of the existing biophysical and socioeconomic environments, Indigenous and stakeholder engagement, potential environmental issues and interactions, mitigation, and other items. The Guidelines have therefore formed a key part of the issues scoping component of EIS planning and preparation.

The EIS Guidelines also outline a number of general principles (Sections 2.2 and 2.3) and specific requirements around public participation and engagement with Indigenous groups as part of the EA process for the Project. This includes the following:

> *The EIS will describe the ongoing and proposed public participation activities that the proponent will undertake or that it has already conducted on the project. It will provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process. The EIS will indicate the methods used, where the consultation was held, the persons and organizations consulted, the concerns voiced and the extent to which this information was incorporated in the design of the project as well as in the EIS. The EIS will provide a summary of key issues raised related to the project and its potential effects to the environment as well as describe any outstanding issues and ways to address them. (Section 4).*
>
> *The proponent will structure its engagement activities to provide adequate time for groups to review and comment on the relevant information. Engagement activities are to be appropriate to the groups' needs, arranged through discussions with the groups and in keeping with established consultation protocols, where available. The EIS will describe all efforts, successful or not, taken to solicit the information required from groups to support the preparation of the EIS.*
>
> *With respect to engagement activities, the EIS will document:*
>
> - *the engagement activities undertaken with each group prior to the submission of the EIS, including the date and means of engagement (e.g., meeting, mail, telephone);*
> - *document the main issues and comments raised during the engagement activities by each group and the proponent's responses (effort should be made to collating like issues together along VCs identified in the EIS);*
> - *any future planned engagement activities;*

- *where and how Indigenous groups' perspectives were integrated into and/or contributed to decisions regarding the project, design, operation, decommissioning, suspension abandonment, follow-up and monitoring and associated potential effects (paragraph 5(1)(c)) and the associated mitigation utilized to manage those effects. The effects and mitigation measures should be clearly linked to VCs in the EIS as well as to specific project components or activities; and*
- *how engagement activities by the proponent allowed groups to understand the project and evaluate its impacts on their communities, activities, potential or established Aboriginal or Treaty rights. Where impacts are identified, provide a discussion of how those would be managed or mitigated (and provide this information for each Indigenous group separately). (Section 5)*

These and other procedures and requirements for engagement are also reflected and referenced throughout the EIS Guidelines, including specifications about the conduct of these activities, and the manner in which their outcomes are to be used in the planning and completion of the EIS. This EIS has been completed and submitted in accordance with the above referenced EIS Guidelines.

3.2 Government Departments and Agencies

Equinor Canada conducted engagement activities with various federal and provincial government departments and agencies during the development of the Flemish Pass EIS. A summary of Project-related engagement activities with federal and provincial government departments or agencies is summarized in Table 3.1, with a focus on any meetings and other associated discussions.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
October 26, 2017	CEA Agency	Conference Call	Discuss timing of submission of EIS.
December 15, 2017	CEA Agency	Conference Call	Discuss status of conformance review.
February 7, 2018	C-NLOPB, Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC) and CEA Agency	Workshop	Spill modelling workshop hosted by Equinor Canada and ExxonMobil
February 16, 2018	CEA Agency	Incoming Email	CEA Agency provided submissions from various stakeholders (i.e., FFAW-Unifor, Newfoundland and Labrador Oil & Gas Industries Association [NOIA], members of the public) on the EIS.
February 20, 2018	CEA Agency	In Person Meeting	Discuss the overall timeline of the EA.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
February 20, 2018	CEA Agency	Incoming Email	CEA Agency provided EIS review submissions from select Indigenous groups (i.e., Mi'gmawei Mawiomi Secretariat, Kwilmu'kw Maw-klusuaqn Negotiation Office, NunatuKavut Community Council, Nunatsiavut Government, Première Nation des Innus de Nutashkuan (Nutashkuan), Qalipu Mi'kmaq First Nation, Sipekne'katik First Nation, and Mi'gmawe'l Tplu'taqnn Inc.
February 20, 2018	CEA Agency	Incoming Email	CEA Agency provided EIS review submissions from select government departments and agencies (i.e., C-NLOPB, ECCC, Transport Canada and Natural Resources Canada).
February 22, 2018	CEA Agency	Outgoing Email	Equinor Canada provided the CEA Agency with an updated engagement log.
March 1, 2018	CEA Agency	Incoming Email	CEA Agency provided amended EIS review submission from Nutashkuan on the EIS.
March 5, 2018	CEA Agency	Incoming Email	CEA Agency provided translations of the original and amended EIS review submissions from Nutashkuan.
March 8, 2018	CEA Agency	Incoming Email	CEA Agency provided EIS review submission from DFO.
March 9, 2018	CEA Agency	Incoming and Outgoing Phone Calls	Discuss the status of IRs and potential receival date.
March 13, 2018	CEA Agency	Incoming Email / Letter	CEA Agency sent Round 1 (Part 1) IRs.
March 19, 2018	CEA Agency	Incoming Email	CEA Agency requested copies of documents outlined in comment ECCC-03.
March 20, 2018	CEA Agency	Incoming Email	CEA Agency provided EIS review submission from Elsipogtog.
March 22, 2018	CEA Agency	Incoming Email	CEA Agency provided notification that Round 1 (Part 1) IRs/CLs are posted on the CEA Registry website.
March 26, 2018	CEA Agency	Incoming Email	CEA Agency provided the EIS review submission from Wolastoqey Nation in New Brunswick.
March 29, 2018	CEA Agency	Incoming Email	CEA Agency provided an editorial comment regarding a draft document that was noted in DFO's EIS review submission.
April 3, 2018	CEA Agency	Incoming Email	CEA Agency provided the EIS review submission from Miawpukek First Nation.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
April 16, 2018	CEA Agency	Incoming Email	CEA Agency provided the EIS review submission from Les Innus de Ekuanitshit.
April 24, 2018	CEA Agency	Incoming Email / Letter	CEA Agency sent Round 1 (Part 2) IRs.
April 25, 2018	CEA Agency	Incoming Email	CEA Agency provided updated Round 1 (Part 2) IRs.
May 1, 2018	CEA Agency	Conference Call	CEA Agency called a meeting to discuss logistics/formatting aspects associated with upcoming IR submittal.
May 1, 2018	CEA Agency	Incoming Email	CEA Agency requested permission to use or reproduce materials from the EIS for their Regional Environmental Assessment.
May 8, 2018	CEA Agency	Incoming Email	CEA Agency provided an example of a recent IR submission by another operator.
May 15, 2018	CEA Agency	Outgoing Email / Letter	Equinor Canada submitted responses to Round 1 (Part 1) IRs.
May 16, 2018	CEA Agency	Incoming Email	CEA Agency acknowledge receipt of the Round 1 (Part 1) responses.
May 22, 2018	CEA Agency	Incoming Email	CEA Agency contacted Equinor Canada regarding an upcoming request for information.
May 24, 2018	CEA Agency	Incoming Letter	CEA Agency sent a letter outlining a formal request for information regarding correspondence between Equinor Canada and CEA Agency regarding the Flemish Pass Exploration Drilling Program since January 1, 2017.
June 1, 2018	CEA Agency	Incoming Email	CEA Agency provided a copy of the joint presentations and meeting summary notes from the consultation meeting that occurred in Moncton, New Brunswick on April 12, 2018, Québec City, Québec on April 18, 2018 and St. John's, Newfoundland and Labrador on April 20,2018.
June 7, 2018	CEA Agency	Incoming Email / Letter	CEA Agency provided a letter outlining the results of the conformity review of Round 1 (Part 1) IRs.
June 8, 2018	CEA Agency	Conference Call	CEA Agency and Equinor Canada held a conference call to discuss recent conformity review.
June 8, 2018	CEA Agency	Outgoing Phone Call	Equinor Canada requested that the CEA Agency provides written summary of the feedback that was provided in the June 8, 2018 conference call.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
June 8, 2018	CEA Agency	Incoming Email	CEA Agency provided a written summary of key points from the June 8, 2018 conference call.
June 8, 2018	CEA Agency	Outgoing Email	Equinor Canada provided the CEA Agency with an updated engagement log.
June 13, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to the CEA Agency information request from May 24, 2018.
June 17, 2018	CEA Agency	Incoming Email	CEA Agency emailed Equinor Canada regarding specific information associated with coral and sponge surveys.
June 26, 2018	CEA Agency	Conference Call	CEA Agency and Equinor Canada held a conference call to discuss coral and sponge surveys, and the request emailed from CEA Agency on June 17, 2018.
July 5, 2018	CEA Agency	Outgoing Email / Letter	Equinor Canada submitted responses to Round 1 (Parts 1 and 2) IRs.
July 6, 2018	CEA Agency	Incoming Email	CEA Agency acknowledged receipt of Round 1 (Parts 1 and 2) IRs.
July 16, 2018	C-NLOPB	In Person Meeting	Equinor Canada provided the C-NLOPB an IR status update.
July 20, 2018	CEA Agency	Incoming Phone Call	CEA Agency left a voice message for Equinor Canada regarding the conformity review of Round 1(Parts 1 and 2) IRs, and that IR responses would be provided to Indigenous groups for review.
July 20, 2018	CEA Agency	Incoming Email / Letter	CEA Agency provided a letter outlining the results of the conformity review of Round 1 (Parts 1 and 2) IRs.
July 23, 2018	CEA Agency	Outgoing Phone Call	Equinor Canada contacted CEA Agency to obtain clarification regarding IR review notification by Indigenous groups and stakeholders.
August 14, 2018	CEA Agency	Outgoing Phone Call	Equinor Canada contacted CEA Agency for a general update regarding status of IRs.
August 27, 2018	CEA Agency	Incoming Email / Letter	CEA Agency provided Round 2 (Part 1) IRs.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
September 5, 2018	C-NLOPB, DFO, ECCC, Health Canada, CEA Agency, Natural Resources Canada, Transport Canada and CEA Agency	Workshop	Spill modelling workshop hosted by Equinor Canada, ExxonMobil and Nexen.
September 11, 2018	CEA Agency	Incoming Email	CEA Agency provided IR review submissions from Indigenous groups.
September 12, 2018	CEA Agency	Incoming Email	CEA Agency provided IR review submissions from government departments and agencies.
September 21, 2018	CEA Agency	Incoming Email	CEA Agency requested a number of areas requiring confirmation / clarification, as well as graphics, for the draft EA Report.
October 3, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to CEA Agency's request from September 21, 2018.
October 3, 2018	CEA Agency	Outgoing Email / Letter	Equinor Canada submitted responses to Round 2 (Part 1) IRs.
October 3, 2018	CEA Agency	Incoming Email	CEA Agency acknowledged receipt of Round 2 (Part 1) IRs.
October 9, 2018	CEA Agency	Incoming Email / Letter	CEA Agency provided Round 2 (Part 2) IRs.
October 12, 2018	CEA Agency	Outgoing Phone Call	Equinor Canada contacted CEA Agency to obtain clarification on Round 2 (Part 2) IRs.
October 17, 2018	CEA Agency	In Person Meeting	Equinor Canada met with CEA Agency for a general EA discussion and update, and also specifically discussed recent Round 2 (Part 2) IRs.
October 18, 2018	CEA Agency	Incoming Email / Letter	CEA Agency provided a letter outlining the results of the conformity review of Round 2 (Part 1) IRs.
October 22, 2018	CEA Agency	Conference Call	Equinor Canada and CEA Agency had a conference call to obtain clarification on Round 2 (Part 2) IRs.
October 25, 2018	C-NLOPB	In Person Meeting	Equinor Canada provided the C-NLOPB an EA status update.
October 25, 2018	CEA Agency	Incoming Email	CEA Agency requested a number of areas requiring confirmation/clarification for the draft EA Report.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
November 2, 2018	CEA Agency	Incoming Email	CEA Agency requested a number of areas requiring confirmation/clarification for the draft EA Report.
November 5, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to CEA Agency's request from October 25, 2018.
November 5, 2018	CEA Agency	Incoming Phone Call	CEA Agency indicated that response provided on November 5, 2018 required revision.
November 9, 2018	CEA Agency	Incoming Email	CEA Agency requested a number of areas requiring confirmation/clarification for the draft EA Report.
November 9, 2018	CEA Agency	Incoming Email	CEA Agency provided IR review submissions from Nunatsiavut Government and Wolastoqey Nation in New Brunswick.
November 9, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to CEA Agency's request from November 2, 2018.
November 12, 2018	CEA Agency	Outgoing Email	Equinor Canada provided updated responses to file emailed on November 9, 2018.
November 13, 2018	CEA Agency	Outgoing Email	Equinor Canada provided updated responses to file emailed on November 5, 2018.
November 16, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to CEA Agency's request from November 9, 2018.
November 19, 2018	CEA Agency	Outgoing Email / Letter	Equinor Canada submitted responses to Round 2 (Part 2) IRs.
November 20, 2018	CEA Agency	Incoming Email	CEA Agency acknowledged receipt of Round 2 (Part 2) IRs.
November 20, 2018	CEA Agency	Incoming Email	CEA Agency requested a number of areas requiring confirmation/clarification for the draft EA Report.
November 21, 2018	CEA Agency	Outgoing Phone Call	Equinor Canada contacted CEA Agency to discuss two new ELs that were awarded and EA options.
November 23, 2018	CEA Agency	Outgoing Phone Call	Follow-up phone call from November 21, 2018.
November 25, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to CEA Agency's request from November 20, 2018.
November 25, 2018	CEA Agency	Incoming Email / Letter	CEA Agency provided a letter outlining the results of the conformity review of Round 2 (Part 2) IRs.
December 4, 2018	CEA Agency	Incoming Email	CEA Agency requested a number of areas requiring confirmation/clarification for the draft EA Report.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
December 17, 2018	CEA Agency	Outgoing Email	Equinor Canada responded to CEA Agency's request from December 4, 2018.
December 19, 2018	CEA Agency	Incoming Email	CEA Agency provided IR review submissions from Kwilmu'kw Maw-klusuaqn Negotiation Office and Wolastoqey Nation in New Brunswick.
January 8, 2019	CEA Agency	Incoming Email	CEA Agency requested figures for draft EA report.
January 22, 2019	CEA Agency	Outgoing Email	Equinor Canada provided figures to CEA Agency requested on January 8, 2019.
January 23, 2019	CEA Agency and C-NLOPB	In Person Meeting	Equinor Canada met with CEA Agency and C-NLOPB to discuss EA approval options for recently awarded ELs 1159 and 1160.
January 24, 25 and 29, 2019	CEA Agency	Incoming and Outgoing Emails	CEA Agency requested clarification regarding spill modelling probabilities, and Equinor Canada responded.
February 14, 2019	CEA Agency	Incoming Email	CEA Agency informed Equinor Canada that joint comment period on the draft EA Report (Flemish Pass) and potential conditions has been announced.
March 29, 2019	CEA Agency	Outgoing Phone Call	Equinor Canada contacted the CEA Agency regarding the French Project Description Summary submittal. The CEA Agency indicated that they would accept the French Project Description Summary within 10 days of submitting the Project Description and English Project Description Summary.
March 29, 2019	C-NLOPB	In Person Meeting	Equinor Canada provided the C-NLOPB an overview of the Central Ridge Project Description.
March 29, 2019	CEA Agency	Outgoing Letter / Email	Equinor Canada submitted a cover letter, Project Description, and English Project Description Summary for the Central Ridge Area to the CEA Agency.
March 29, 2019	CEA Agency	Incoming Email	CEA Agency acknowledged receipt of the Project Description, and English Project Description Summary for the Central Ridge Area. The CEA Agency indicated they would contact Equinor Canada by April 8, 2019.
April 1, 2019	CEA Agency	Outgoing Email	Equinor Canada provided the CEA Agency with a copy of the pre-Project Description letters that were submitted to Indigenous Groups.

Table 3.1 Meetings and Discussions with Government Departments and Agencies

Date	Department or Agency	Type of Engagement	Purpose and Focus
April 1, 2019	C-NLOPB	Outgoing Email	Equinor Canada provided the C-NLOPB with a copy of the pre-Project Description letters that were submitted to Indigenous Groups.
April 2, 2019	CEA Agency	Outgoing Email	Equinor Canada submitted the French Project Description Summary for the Central Ridge Area to the CEA Agency.
April 2, 2019	CEA Agency	Incoming Email	The CEA Agency acknowledged receipt of the French Project Description Summary for the Central Ridge Area.
April 5, 2019	CEA Agency	Incoming Email	The CEA Agency provided feedback regarding the Central Ridge Area Project Description and Project Description Summary.
April 17, 2019	CEA Agency	Incoming Letter / Email	The CEA Agency provided a letter and decision statement associated with the Flemish Pass Exploration Drilling Program to Equinor Canada.
April 26, 2019	CEA Agency	Outgoing Phone Call	Equinor Canada contacted the CEA Agency to determine if the CEA Agency has received any correspondence and/or feedback from Indigenous Groups regarding the pre-Project Description notification letters that were sent. The CEA Agency indicated they would check and get back to Equinor Canada.

3.3 Engagement with Indigenous Groups

Equinor Canada will continue to engage with Indigenous groups by building upon previous engagement undertaken for the adjacent ELs 1159 and 1160 between 2017 and 2019. Equinor has relied on the engagement carried out for the Flemish Pass and will continue to engage regarding the Central Ridge project when opportunities arise.

Equinor has conducted significant engagement with the 41 Indigenous Groups identified by the CEA Agency in the EA guidelines on the Flemish Pass project. In addition to attending individual meetings requested by Indigenous groups (between September 2017 and July 2019) Equinor, along with other oil and gas operators in Atlantic Canada, held two series of one-day workshops (six in total, in three cities) where information regarding their proposed exploration drilling projects was presented in detail. Presentations and discussions have focused on the concerns and interests that have been expressed by Indigenous groups on an ongoing basis, including, but not limited to:

- Details of the proposed project and draft EIS document
- Indigenous knowledge
- Atlantic salmon and other species of cultural and ecological importance
- Environmental effects mitigation and monitoring

- Cumulative effects
- Proposed plans for emergency preparedness and response, such as emergency response plans, training and certification, blow-out preventers, oil spill modelling, oil spill response plans; and, well control measures, such as capping stacks and relief wells.
- Well plugging and abandonment
- Ongoing communication with Indigenous groups

Equinor has reviewed all previous Indigenous group submissions on their proposed Flemish Pass exploration project, as well as Indigenous group submissions on three other proposed exploration projects and has participated in the review and response of numerous information requests by Indigenous groups. As described in Table 3.2 below, Equinor provided Indigenous groups with a summary of the Project in March 2019 and requested comments. No comments have been received to date, as most Indigenous groups prefer to wait to review the draft EIS provided by the CEA Agency and provide their comments through the Crown consultation process. The lack of preliminary feedback focused on Central Ridge could also be due to the number and similarity of the exploration drilling projects in the offshore of eastern Newfoundland and the amount of engagement and consultation that has occurred regarding these projects since 2016. An update on the progress of the Central Ridge Project was presented to Indigenous groups at a recent round of workshops in September 2019, and the presentations were shared with Indigenous groups in November 2019.

Equinor believes they have a good understanding of the concerns and interests expressed by Indigenous groups to date on similar projects, (see Table 3.2 below) and that understanding continues to accumulate through ongoing discussions with Indigenous groups. As Equinor moves forward in the EA process for Central Ridge, they remain open and available to meet with interested Indigenous groups to discuss any additional concerns and/or interests, and how those may be addressed.

3.3.1 List of Indigenous Groups

Pursuant to EIS Guidelines and amendments (CEA Agency 2016, 2017a, 2017b), Equinor Canada engaged with the following 41 Indigenous groups regarding proposed exploration drilling activities during the Flemish Pass EIS for the Project Area which includes ELs 1159 and 1160:

Newfoundland and Labrador

- Nunatsiavut Government
- Innu Nation
- NunatuKavut Community Council (NCC)
- Qalipu First Nation (QFN)
- Miawpukek First Nation (MFN)

Nova Scotia

- 11 Mi’kmaq First Nation groups represented by Kwilmu’kw Maw-klusuaqn Negotiation Office (KMKNO):
  - Acadia First Nation
  - Annapolis Valley First Nation

  - Bear River First Nation
  - Eskasoni First Nation
  - Glooscap First Nation
  - Membertou First Nation
  - Paq'tnkek Mi'kmaw Nation
  - Pictou Landing First Nation
  - Potlotek First Nation
  - Wagmatcook First Nation
  - We'koqma'q First Nation
  - Millbrook First Nation
  - Sipekne'katik First Nation

New Brunswick

- Eight Mi'gmaq First Nations represented by Mi'gmawe'l Tplu'taqnn Inc. (MTI):
  - Fort Folly First Nation
  - Eel Ground First Nation
  - Pabineau First Nation
  - Esgenoôpetitj First Nation
  - Buctouche First Nation
  - Indian Island First Nation
  - Eel River Bar First Nation
  - Metepnagiag Mi'kmaq First Nation
- Elsipogtog First Nation
- Six Maliseet First Nation groups represented by Wolastoqey Nation in New Brunswick (WNNB):
  - Kingsclear First Nation
  - Madawaska Maliseet First Nation
  - Oromocto First Nation
  - Saint Mary's First Nation
  - Tobique First Nation
  - Woodstock First Nation
  - Peskotomuhkati Nation at Skutik (Passamaquoddy)

Prince Edward Island

- Two Mi'kmaq First Nation groups represented by Mi'kmaq Confederacy of Prince Edward Island (MCPEI):
  - Abegweit First Nation
  - Lennox Island First Nation

Québec

- Three Mi'gmaq First Nation groups represented by Mi'gmawei Mawiomi Secretariat (MMS):

  - Micmacs of Gesgapegiag
  - La Nation Micmac de Gespeg
  - Listuguj Mi'gmaq Government
- Les Innus de Ekuanitshit
- Première Nation des Innus de Nutashkuan

3.3.2 Engagement with Newfoundland and Labrador Indigenous Groups

3.3.2.1 Labrador Inuit (Nunatsiavut Government)

A summary of engagement initiatives with Nunatsiavut Government (NG) to date is provided in Table 3.2.

Table 3.2 Engagement Activities with Nunatsiavut Government

Date	Engagement Activity	Details
January 5, 2018	Outgoing Email	Equinor Canada provided notification of EIS review period for ELs 1159 and 1160.
January 25, 2018	Outgoing Email	Equinor Canada requested phone meeting to discuss any outstanding information needs, and follow-up on potential meeting with Equinor Canada and other offshore operators.
January 26, 2018	Incoming Email	NG responded to January 26, 2018 email indicating that EIS review was in progress and no requirement to meet at this time.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 20, 2018	Workshop	Equinor Canada (and four other operators) participated in CEA Agency organized workshop with Indigenous groups in St. John's to discuss project details including emergency preparedness and response, environmental monitoring, well control measures and well abandonment, as well as concerns and interests of Indigenous groups.
May 25, 2018	Outgoing Email	Follow-up with information requested at workshops.
June 5, 2018	Outgoing Email	Equinor Canada (along with ExxonMobil, Husky, BP and Nexen) provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).

Table 3.2 Engagement Activities with Nunatsiavut Government

Date	Engagement Activity	Details
August 27, 2018	Incoming Email	NG confirmed attendance at St. John's workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for St. John's workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for St. John's workshop.
October 10, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment.
October 25, 2018	Outgoing Email	Provided presentations from St. John's workshop and oil modeling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore eastern NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 14, 2019	Incoming Email	Received feedback from NG on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 23, 2019	Workshop	Presentation of preliminary details/update on development of Central Ridge EIS. NOTE: NG unable to attend.
November 10, 2019	Outgoing Email	Shared presentations from September 23, 2019 workshop in St. John's.

3.3.2.2 Labrador Innu (Innu Nation)

A summary of engagement initiatives with Innu Nation to date is provided in Table 3.3.

Table 3.3 Engagement Activities with Innu Nation

Date	Engagement Activity	Details
January 25, 2018	Outgoing Email	Equinor Canada requested phone meeting to discuss any outstanding information needs, and follow-up on potential meeting with Equinor Canada and other offshore operators.

Table 3.3 Engagement Activities with Innu Nation

Date	Engagement Activity	Details
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 20, 2018	Workshop	Innu Nation attended a CEA Agency organized workshop in St. John's, NL that included Indigenous groups, offshore operators and select government departments and agencies. Topics discussed included - project details, emergency preparedness and response, environmental monitoring, well control measures and well abandonment, as well as concerns and interests raised by Indigenous groups.
May 25, 2018	Outgoing Email	Follow-up with information requested at workshops
June 5, 2018	Outgoing Email	Equinor Canada (along with ExxonMobil, Husky, BP and Nexen) provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 28, 2018	Incoming Email	Innu Nation confirmed attendance at Moncton workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 10, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil modeling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore eastern NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.

Table 3.3 Engagement Activities with Innu Nation

Date	Engagement Activity	Details
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 23, 2019	Workshop	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 23, 2019 workshop in St. John's, including update on Central Ridge EIS.

3.3.2.3 NunatuKavut Community Council

A summary of engagement initiatives with NunatuKavut Community Council (NCC) to date is provided in Table 3.4.

Table 3.4 Engagement Activities with Innu Nation

Date	Type of Engagement	Purpose and Focus
January 25, 2018	Outgoing Email	Equinor Canada requested phone meeting to discuss any outstanding information needs, and follow-up on potential meeting with Equinor Canada and other offshore operators.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
February 1, 2018	Outgoing Email	Equinor Canada sent NCC a follow-up email requesting potential meeting dates.
February 12, 2018	Incoming Email	NCC requested to meet with Equinor Canada to discuss potential effects of Flemish Pass Exploration Drilling Program and benefits.
March 28, 2018	In Person Meeting	NCC and Equinor Canada, along with ExxonMobil, participated in a meeting in Halifax, NS. Discussion focused on current stages of the projects, potential for economic development, interest in Indigenous Knowledge study and engagement support.
April 4, 2018	Incoming Email	NCC provided information to Equinor Canada regarding their businesses for future opportunities.

Table 3.4 Engagement Activities with Innu Nation

Date	Type of Engagement	Purpose and Focus
April 20, 2018	Workshop	NCC attended a CEA Agency organized meeting in St. John's, NL that included Indigenous groups, offshore operators and select government departments and agencies. Topics discussed included - project details, emergency preparedness and response, environmental monitoring, well control measures and well abandonment, as well as concerns and interests raised by Indigenous groups.
May 25, 2018	Outgoing Email	Follow-up with information requested at workshops.
June 5, 2018	Outgoing Email	Equinor Canada (along with ExxonMobil, Husky, BP and Nexen) provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
August 27, 2018	Incoming Email	NCC confirmed participation at St. John's workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for St. John's workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for St. John's workshop.
October 10, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from St. John's workshop and oil modeling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore eastern NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.

Table 3.4 Engagement Activities with Innu Nation

Date	Type of Engagement	Purpose and Focus
September 23, 2019	Workshop - SJ	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 23, 2019 workshop in St. John's, including update on Central Ridge EIS.

3.3.2.4 Miawpukek First Nation

A summary of engagement initiatives with Miawpukek First Nation (MFN) to date is provided in Table 3.5.

Table 3.5 Engagement Activities with Miawpukek First Nation

Date	Engagement Activity	Details
January 10, 2018	Incoming Email	MFN emailed Statoil, Equinor, Husky, Nexen, BP and ExxonMobil regarding their proposed offshore EAs requesting a consultation and engagement work plan, and to suspend the EA process until MFN has signed an agreement with the offshore operators to support the consultation and engagement plan.
January 25, 2018	Outgoing Email	Equinor Canada emailed MFN and requested phone meeting to discuss any outstanding information needs, and follow up on potential meeting with Equinor Canada and other operators.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
January 31, 2018 – September 2019		Ongoing discussion between MFN and Equinor (as well as four other oil and gas operators – eventually expanded to eight) regarding engagement participation support, an Indigenous Knowledge Study and community investment.
February 1, 2018	Outgoing and Incoming Emails	Equinor Canada emailed MFN (follow up to January 25, 2018 email) offering to meet in March with Nexen, BP, ExxonMobil and Statoil and requesting potential meeting dates. MFN responded and indicated they would provide dates.
February 9, 2018	Incoming Email / Letter	All operators received a letter from MFN, dated January 31, 2018, regarding capacity funding, salmon, impacts to Aboriginal rights
March 15 and July 3, 2018	Outgoing and Incoming Emails	Various emails exchanged between Equinor (and other operators) and MFN to arrange a meeting date between Equinor (and other operators) and MFN in Conne River.

Table 3.5 Engagement Activities with Miawpukek First Nation

Date	Engagement Activity	Details
April 20, 2018	Workshop	Representatives of MFN attended a CEAA-organized oil and gas workshop and Equinor provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
July 17, 2018	Face-to Face Meeting	Equinor Canada, along with four other operators, met in Conne River with the Chief and other representatives of the MFN. Issues discussed included project details, emergency preparedness and response, environmental monitoring, well control measures and well abandonment, economic development and community investment.
July 17, 2018	Outgoing Email	Shared draft meeting summary from July 17 for comments.
August 6, 2018	Incoming Email / Letter	Follow-up letter from July 17 meeting in Conne River – outlining a workplan and timeline.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
August 27, 2018	Incoming Email	MFN confirmed participation at St. John’s workshop.
September 28, 2018	Outgoing Email	Information and follow-up for St. John’s workshop
October 3, 2018	Outgoing Email / Letter	Request for MFN to respond to correspondence from August 9 and September 11.
October 9, 2018	Outgoing Email	Information and follow-up for St. John’s workshop
October 10, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from St. John’s workshop and oil modeling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.

Table 3.5 Engagement Activities with Miawpukek First Nation

Date	Engagement Activity	Details
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
August 1, 2019	Incoming Email	Miawpukek responded to Equinor (et al) letter of December 7, 2018 regarding an engagement agreement
September 23, 2019	Workshop - SJ	Presentation of preliminary details/update on development of Central Ridge EIS. Note: Miawpukek unable to attend meeting.
September 23, 2019	Outgoing Email	Equinor (et al) responded to Miawpukek First Nation's letter of August 1, 2019 regarding clarifications on the engagement agreement
September 24, 2019	Incoming email	Miawpukek's response to the above email regarding the engagement agreement.
November 10, 2019	Outgoing Email	Shared presentations from September 23, 2019 workshop in St. John's, including update on Central Ridge EIS.

3.3.2.5 Qalipu Mi'kmaq First Nation

A summary of engagement initiatives with Qalipu Mi'kmaq First Nation Band (QMFNB) to date is provided in Table 3.6.

Table 3.6 Engagement Activities with Qalipu Mi-kmaq First Nation Band (QMFNB)

Date	Engagement Activity	Details
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
February 6, 2018	Outgoing Email	Equinor Canada emailed QFN with an offer to meet to discuss the project.
February 9, 2018	Incoming Email / Letter	Equinor Canada received a letter from QFN regarding capacity funding.
April 20, 2018	Workshop	Representatives of QFN attended a CEAA-organized oil and gas workshop and Equinor provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 25, 2018	Outgoing Email	Follow-up with information requested at workshops.

Table 3.6 Engagement Activities with Qalipu Mi-kmaq First Nation Band (QMFNB)

Date	Engagement Activity	Details
June 5, 2018	Outgoing Email	Equinor Canada (along with ExxonMobil, Husky, BP and Nexen) provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 4, 2018	Incoming Email	QFN confirmed participation at St. John's workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for St. John's workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for St. John's workshop.
October 10, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from St. John's workshop and oil modeling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 14, 2019	Incoming Email	Received feedback from Qalipu First Nation on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 23, 2019	Workshop - SJ	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 23, 2019 workshop in St. John's, including update on Central Ridge EIS.

3.3.3 Engagement with Maritime Provinces Indigenous Groups

A summary of engagement initiatives with the various Indigenous groups in Nova Scotia, New Brunswick, and Prince Edward Island is provided in Tables 3.8 to 3.11.

Table 3.7 Engagement with Indigenous Groups – Nova Scotia

Date	Engagement Activity	Details
Kwilmu'kw Maw-Klusuaqn Negotiation Office (KMKNO): representing the Nova Scotia Mi'kmaw communities of Acadia, Bear River, Annapolis Valley, Glooscap, Pictou Landing, Paq'tnkek, Potlotek, We'koqma'q, Membertou, Eskasoni, Wagmatcook		
September 8, 2017	Face-to-face meeting: Millbrook, NS	Discussed Flemish Pass project proposal, shared Atlantic salmon report.
November 7, 2017	Incoming Email	KMKNO emailed Equinor Canada and raised concerns that there was not enough information on tagging and migration route research.
January 11, 2018	Outgoing Email	Email to confirm if any addition information is available regarding commercial communal licences as per original request on October 19, 2017.
January 15, 2018	Conference Call	Equinor Canada and KMKNO discussed salmon report review, commercial-communal licences and EIS review.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
February 9, 2018	Incoming Phone Call	KMKNO called Equinor Canada and requested to meet to discuss the Unama'ki Institute of Natural Resources (UINR) review of the salmon report.
February 13, 2018	Incoming Email	KMKNO provided UINR review of salmon report to Equinor Canada.
February 14, 2018	Incoming Email	KMKNO provided Equinor Canada a revised copy of the UINR review.
February 15, 2018	Conference Call	KMKNO and Equinor Canada held a conference call to discuss findings and conclusions/recommendations of UINR salmon report.
April 12, 2018	Workshop	Representatives of KMKNO attended a CEAA-organized oil and gas workshop in Moncton, NB that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided presentation from the April 12 workshop.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore eastern NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).

Table 3.7 Engagement with Indigenous Groups – Nova Scotia

Date	Engagement Activity	Details
September 21, 2018	Incoming Email	KMKNO confirmed participation at Moncton workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 18, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil modeling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency. In addition to providing a letter to KMKNO, letters were also provided to each Indigenous group represented by KMKNO.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 15, 2019	Telephone Call	Provided feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.
Sipekne'katik First Nation		
October 24, 2017	Outgoing Email	Equinor Canada emailed Sipekne'katik First Nation to determine if the community was exercising its commercial-communal licences in relation to the proposed project.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.

Table 3.7 Engagement with Indigenous Groups – Nova Scotia

Date	Engagement Activity	Details
May 28, 2018	Outgoing Email	Provided presentation from April 12 workshop.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
June 11, 2018 to July 26, 2018	Incoming and Outgoing Emails	Series of emails between Equinor Canada and Consultation Coordinator to plan a meeting in July between Sipekne'katik First Nation, Equinor Canada and other operators in September. This meeting did not occur.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 9, 2018	Outgoing Email	Provided follow-up information on Moncton workshop.
September 29, 2018	Incoming Email	Sipekne’katik Firs Nation unable to attend Moncton workshop.
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS. Note: Sipekne’katik First Nation did not respond to workshop invitation.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.
Millbrook First Nation		
November 10, 2017	Incoming Email	Millbrook First Nation responded to Equinor Canada’s email indicating interest in meeting to discuss the project, consultation and funding.

Table 3.7 Engagement with Indigenous Groups – Nova Scotia

Date	Engagement Activity	Details
November 15, 2017	Outgoing Email	Equinor Canada provided an email update regarding the project status, as well as contact information for CEA Agency funding and suggested times to meet.
December 8, 2017	Conference Call	Millbrook First Nation and Equinor Canada participated in conference call to discuss engagement. Millbrook First Nation to bring forward potential meeting times.
December 8, 2017	Outgoing Email	Various items emailed to Millbrook First Nation including project overview letters, salmon report and request for commercial-communal licence activity.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 20, 2018	Workshop	Representatives of Millbrook First Nation attended a CEAA-organized oil and gas workshop in St. John's that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided presentation from April 20 workshop in St. John's.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
August 29, 2018	Incoming Email	Millbrook First Nation confirmed participation in Moncton workshop.
September 28 and October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 18, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.

Table 3.7 Engagement with Indigenous Groups – Nova Scotia

Date	Engagement Activity	Details
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS. Note – Millbrook First Nation did not respond to workshop invitation.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.

Table 3.8 Engagement with Indigenous Groups – New Brunswick

Date	Engagement Activity	Details
Mi'gmawe'l Tplu'taqnn Inc. (MTI): representing the New Brunswick Mi'kmaw communities of Amlamgog (Fort Folly), Natoaganeg (Eel Ground), Oinpegitjoig (Pabineau), Esgenoôpetitj (Burnt Church), Tjipõgtõtjg (Bouctouche), L'nui Menikuk (Indian Island), Ugpi'ganjig (Eel River Bar) and Metepenagiag (Red Bank)		
September 20, 2017	Face-to-face meeting: Moncton	Met with MTI to discuss project proposal and Atlantic salmon issues.
January – April 2018	Ongoing discussions	Capacity funding and Indigenous Knowledge study discussions (joint with ExxonMobil)
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 12, 2018	Workshop	Representatives of MTI attended a CEAA-organized oil and gas workshop in Moncton, NB that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided presentation from workshop in Moncton.

Table 3.8 Engagement with Indigenous Groups – New Brunswick

Date	Engagement Activity	Details
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
June 4-29, 2019	Various Emails	Correspondence with MTI regarding progress of the Indigenous Knowledge study.
August 14, 2018	Incoming Email	Received Indigenous Knowledge study from MTI.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
August 28, 2018	Incoming Email	MTI confirmed participation in Moncton workshop.
September 14, 2018	Outgoing Email / Letter	Letter to MTI acknowledging receipt of Indigenous Knowledge study and providing copy to CEAA.
September 28, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 18, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil spill modelling fact sheet
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Project Description that will be submitted to the CEA Agency. In addition to providing a letter to MTI, letters were also provided to each Indigenous group represented by MTI.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
August 8, 2019	Incoming Email	MTI provided feedback on Indigenous Fisheries Communications Plan.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.

Table 3.8 Engagement with Indigenous Groups – New Brunswick

Date	Engagement Activity	Details
Wolastoqey Nation in New Brunswick (WNNB): representing Madawaska Maliseet First Nation, Tobique First Nation, Kingsclear First Nation, St. Mary's First Nation, Woodstock First Nation and Oromocto First Nation		
September 19, 2017	Face-to-face meeting: Fredericton	Met with WNNB to discuss potential project and Atlantic salmon issues.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 12, 2018	Workshop	Representatives of WNNB attended a CEAA-organized oil and gas workshop in Moncton, NB that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided presentation from April workshop.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 28, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 2, 2018	Incoming Email	WNNB confirmed participation at Moncton workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 18, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency. In addition to providing a letter to WNNB, letters were also provided to each Indigenous group represented by WNNB.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.

Table 3.8 Engagement with Indigenous Groups – New Brunswick

Date	Engagement Activity	Details
May 15, 2019	Incoming Email	WNNB provided feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.
Peskotomuhkati Nation at Skutik (Passamaquoddy)		
January 5, 2018	Outgoing Email	Notification of EIS review.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 12, 2018	Workshop	Representatives of Passamaquoddy attended a CEAA-organized oil and gas workshop in Moncton, NB that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided presentation from April workshop.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 28, 2018	Incoming Email	Passamaquoddy confirms participation at Moncton workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 18, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.

Table 3.8 Engagement with Indigenous Groups – New Brunswick

Date	Engagement Activity	Details
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.
Elsipogtog First Nation		
June 13, 2017	Outgoing Email / Letter	Equinor Canada contacted Elsipogtog First Nation to provide an overview of the project and seeking input by July 12, 2017.
June 29, 2017	Outgoing Phone Call	Equinor Canada left a voice message regarding confirmation of receipt of June 13, 2017 letter.
January 5, 2018	Outgoing Email	Notification of EIS review.
January 15, 2018	Outgoing Phone Call	Equinor Canada contacted Elsipogtog to confirm that emails have been received and offered to set up a meeting.
January 16, 2018	Outgoing Email	Equinor Canada provided links to project information.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
March 6 – April 10, 2018	Incoming and Outgoing Emails	A serious of emails were exchanged between Equinor (and four other companies) and Elsipogtog First Nation attempting to agree on a date and details for a meeting with Elsipogtog First Nation in their community. No agreement was reached.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 29, 2018	Outgoing Email	Equinor Canada re-sent the invitation to the joint workshops occurring in October.

Table 3.8 Engagement with Indigenous Groups – New Brunswick

Date	Engagement Activity	Details
October 2, 2018	Incoming Email	Elsipogtog confirmed that they would not be attending the October workshops.
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 1, 2019	Incoming and Outgoing Emails	Elsipogtog contacted Equinor Canada regarding the March 28, 2019 Central Ridge notification letter requesting clarification. Equinor Canada responded to Elsipogtog and provided clarification on the purpose of the letter.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan. Reminder to provide feedback on draft plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS. Note – Elsipogtog First Nation did not respond to workshop invitation.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.

Table 3.9 Engagement with Indigenous Groups – Prince Edward Island

Date	Type of Engagement	Purpose and Focus
Mi'kmaq Confederacy of Prince Edward Island (MCPEI): represents the PEI Mi'kmaw communities of Lennox Island and Abegweit.		
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 12, 2018	Workshop	Representatives of MCPEI attended a CEAA-organized oil and gas workshop in Moncton, NB that included Indigenous groups, offshore operators and select government

Table 3.9 Engagement with Indigenous Groups – Prince Edward Island

Date	Type of Engagement	Purpose and Focus
		departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided presentation from April 12 workshop.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 26, 2018	Incoming Email	MCPEI confirms participation at Moncton workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Moncton workshop.
October 18, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Moncton workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency. In addition to providing a letter to MCPEI, letters were also provided to each Indigenous group represented by MCPEI.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS. Note – MCPEI was unable to attend the workshop.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.

Table 3.10 Engagement with Indigenous Groups – Québec

Date	Type of Engagement	Purpose and Focus
Les Innus de Ekuanitshit (Ekuanitshit)		
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 18, 2018	Workshop	Representatives of Ekuanitshit First Nation attended a CEAA-organized oil and gas workshop in Quebec City that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided response to question from Québec City workshop and presentations in French and English.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 28 and October 3, 2018	Outgoing Email	Provided follow-up information for Québec City workshop.
October 4, 2018	Outgoing Email	Inquiring whether or not Innu translation is required or not for the workshop.
October 5, 2018	Incoming Email	Ekuanitshit confirmed that Chief Pietacho will not be attending, however, two community members will participate in the workshop.
October 12, 2018	Incoming Email	Ekuanitshit community members unable to attend workshop.
October 25, 2018	Outgoing Email	Provided presentations from Québec workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Reminder email to provide feedback on draft Indigenous Fisheries Communications Plan.

Table 3.10 Engagement with Indigenous Groups – Québec

Date	Type of Engagement	Purpose and Focus
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 27, 2019	Workshop – Quebec City	Presentation of preliminary details/update on development of Central Ridge EIS. Note – Ekuanitshit First Nation did not attend the workshop.
November 10, 2019	Outgoing Email	Shared presentations from September 27, 2019 workshop in Quebec City, including update on Central Ridge EIS.
Première Nation des Innus de Nutashkuan (Nutashkuan)		
January 8, 2018	Incoming Email	Nutashkuan requested hard copies of EIS and extension of review period.
January 18, 2018	Outgoing Email	Provided notification that hardcopies of the EIS were sent.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 18, 2018	Workshop	Representatives of Nutashkuan First Nation attended a CEAA-organized oil and gas workshop in Quebec City that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided response to question from Québec City workshop and presentations in French and English.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
August 28, 2018	Incoming Email	Nutashkuan confirms attendance at Québec workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for Québec City workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Québec City workshop.
October 15, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment

Table 3.10 Engagement with Indigenous Groups – Québec

Date	Type of Engagement	Purpose and Focus
October 25, 2018	Outgoing Email	Provided presentations from Québec workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency.
April 4, 2019	Incoming Email	Nutashkuan contacted Equinor Canada and acknowledged receipt of the advanced letter associated with the Project Description. Nutashkuan inquired whether there will be a new EA for the Central Ridge Area, and if that is the case then more justification is required due to the distance of ELs 1159 and 1160 from the ELs associated with the Flemish Pass EA.
April 17, 2019	Outgoing Email	Equinor Canada responded to Nutashkuan by email and clarified the intent of the letter, and that Nutashkuan will have the opportunity to comment and express their views once the Project Description is posted on the CEA Registry.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
April 23, 2019	Incoming Email	Provided feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 27, 2019	Workshop – Quebec City	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 27, 2019 workshop in Quebec City, including update on Central Ridge EIS.
Mi'gmawei Mawiomi Secretariat (MMS): represents the Gaspe Mi'kmaw communities of Listiguj, Gespeg and Gesgapegiag		
January 24, 2018	Incoming Email	MMS emailed Equinor Canada to set up a date to review files, and meeting to be after February 5, 2018.
January 31, 2018	Outgoing Email	Equinor Canada provided a table of exploration projects for various offshore operators and indicated EA status. Also informed that offshore operators are open to meeting to discuss any questions of concern regarding the projects, including any Indigenous Knowledge for inclusion in the EA.
April 18, 2018	Workshop	Representatives of MMS attended a CEAA-organized oil and gas workshop in Quebec City that included Indigenous groups, offshore operators and select government departments and Agencies. Equinor (and four other oil and gas operators) provided a presentation and discussed issues related to the

Table 3.10 Engagement with Indigenous Groups – Québec

Date	Type of Engagement	Purpose and Focus
		regulatory process, exploration wells, environmental monitoring, safety, oil spill prevention and response.
May 28, 2018	Outgoing Email	Provided response to question from Québec City workshop and presentations in French and English.
June 5, 2018	Outgoing Email	Provided update on EA status for all offshore NL project.
July 23, 2018	Outgoing Phone Call	Equinor Canada contacted MMS with a general status update on all offshore exploration projects.
August 27, 2018	Outgoing Email	Joint workshop invitation sent to all 41 Indigenous groups – proposed workshops in St. John's (October 10-11), Québec City (October 15-16) and Moncton (October 18-19).
September 4, 2018	Incoming Email	MMS confirms attendance at Québec workshop.
September 28, 2018	Outgoing Email	Provided follow-up information for Québec workshop.
October 3, 2018	Outgoing Email	Provided follow-up information for Québec workshop.
October 15, 2018	Workshop	Information exchange and dialogue on: project updates; follow-up from April 2018 workshops; environmental effects monitoring; emergency prevention; emergency response - oil spill response planning, source control, response options; well abandonment
October 25, 2018	Outgoing Email	Provided presentations from Québec workshop and oil spill modelling fact sheet.
November 15, 2018	Outgoing Email	Provided update on EA status for all offshore NL projects.
December 13, 2018	Outgoing Email	Provided summaries from all three October workshops.
March 28, 2019	Outgoing Email / Letter	Provided advanced notification regarding the Central Ridge Project Description that will be submitted to the CEA Agency. In addition to providing a letter to MMS, letters were also provided to each Indigenous group represented by MMS.
April 15, 2019	Outgoing Email	Provided draft Indigenous Fisheries Communications Plan and requested feedback by May 15, 2019.
May 16, 2019	Outgoing Email	Sent reminder to provide feedback on draft Indigenous Fisheries Communications Plan.
June 7, 2019	Outgoing Email	Shared Engagement Feedback Report on draft Indigenous Fisheries Communications Plan.
June 28, 2019	Outgoing Email	Shared final copy of Indigenous Fisheries Communications Plan w feedback incorporated.
September 25, 2019	Workshop - Moncton	Presentation of preliminary details/update on development of Central Ridge EIS.
November 10, 2019	Outgoing Email	Shared presentations from September 25, 2019 workshop in Moncton, including update on Central Ridge EIS.

3.4 Stakeholder Meetings and Discussions

Key stakeholders and environmental non-governmental organizations (ENGOs) that have historically been engaged in or have an interest in offshore oil and gas operations in NL include Nature NL, World Wildlife Fund (WWF), Canadian Parks and Wilderness Society (CPAWS) and Sierra Club (NL Chapter).

Key fish harvesters and processors include the Fish, Food and Allied Workers-Union (FFAW-Unifor), Ocean Choice International (OCI), Association of Seafood Producers (ASP) and Atlantic Groundfish Council (AGC) [formerly the Groundfish Enterprise Allocation Council (GEAC)].

Equinor Canada contacted stakeholders prior to submitting the Central Ridge Project Description to the CEA Agency. Discussions with stakeholder groups and others are included in Table 3.12, which includes engagement up to May 3, 2019.

Table 3.11 Meetings and Discussions with Stakeholder Organizations

Date	Organization	Type of Engagement	Purpose and Focus
December 12, 2017	FFAW-Unifor and One Ocean	In Person Meeting	Review of EIS submittal. Seeking to gather feedback from the participants.
January 8, 2018	FFAW-Unifor and One Ocean	Outgoing Email	Notification of EIS review.
February 5, 2018	FFAW-Unifor and One Ocean	Incoming Email	FFAW-Unifor and One Ocean requested hard copies of EIS and appendices.
March 29, 2019	One Ocean	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	FFAW-Unifor	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	ASP	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	AGC (formerly the GEAC)	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	OCI	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	CPAWS	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	Nature NL	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	PAAN	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.

Table 3.11 Meetings and Discussions with Stakeholder Organizations

Date	Organization	Type of Engagement	Purpose and Focus
March 29, 2019	Sierra Club (NL Chapter)	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019	WWF	Outgoing Email	Provided advanced email notification regarding the Project Description that will be submitted to the CEA Agency.
March 29, 2019 and April 1, 2019	FFAW-Unifor	Incoming and Outgoing Emails	March 29, 2019: FFAW-Unifor contacted Equinor Canada and inquired whether the Project Description will include fisheries catch data. April 1, 2019: Equinor Canada responded to the FFAW-Unifor's email and indicated that Appendix E of the Project Description will include domestic catch data.
May 25, 2019 July 19 – 24, 2019	FFAW-Unifor, Ocean Choice, Association of Seafood Producers, Atlantic Groundfish Council	Outgoing emails	Offered to meet to discuss this project in late May and July.

3.5 References

CEA Agency. 2016. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* – Statoil Canada Ltd. Flemish Pass Exploration Drilling Program. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80129/116854E.pdf. Accessed: August 19, 2019.

CEA Agency. 2017a. Additional Information Requirements Regarding Engagement with Indigenous Groups. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80129/118946E.pdf. Accessed: August 19, 2019.

CEA Agency. 2017b. Additional Information Requirements Regarding Engagement with the Passamaquoddy of New Brunswick. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80129/119742E.pdf. Accessed: August 19, 2019.

CEA (Canadian Environmental Assessment) Agency. 2018a. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the West Flemish Pass Exploration Drilling Project – Chevron Canada Limited. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80161/126381E.pdf. Accessed: August 13, 2019.

CEA (Canadian Environmental Assessment) Agency. 2018b. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Southeastern Newfoundland Offshore Exploration Drilling Project – ExxonMobil Canada Ltd. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80158/125931E.pdf. Accessed: August 13, 2019.

CEA (Canadian Environmental Assessment) Agency. 2018c. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Newfoundland Orphan Basin Exploration Drilling Project – BP Canada Energy Group ULC. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80147/121808E.pdf. Accessed: August 13, 2019.

CEA (Canadian Environmental Assessment) Agency. 2019. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Central Ridge Exploration Drilling Project – Equinor Canada Ltd. Available at: https://ceaa-acee.gc.ca/050/evaluations/document/130732?culture=en-CA. Accessed: August 19, 2019.

4.0 ENVIRONMENTAL ASSESSMENT SCOPE, APPROACH, AND METHODS

4.1 Scope of the Environmental Assessment and Factors Considered

This EIS has been planned, prepared, and submitted in accordance with requirements of CEAA 2012, as well as the Project-specific *Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012 for the Central Ridge Exploration Drilling Project, Equinor Canada Ltd.* issued by the Canadian Environmental Assessment Agency in July 2019 and other generic EA guidance documents issued by the CEA Agency as cited herein.

The scope of the Project for the purposes of the EA includes each of the components and activities defined and described in Chapter 2 of this EIS and as specified in Section 3.1 of the EIS Guidelines, namely:

- *the mobilization, operation, and demobilization of Mobile Offshore Drilling Units(s) designed for year-round operations for the drilling, testing and abandonment of up to 24 wells (including those proposed for the Flemish Pass Exploration Drilling Project) in Exploration Licences 1159 and 1160 operated by Equinor Canada Ltd., including consideration of proposed safety exclusion zones. Drilling may occur in various water depths under consideration, using Mobile Offshore Drilling Unit(s), and with multiple drilling installations operating simultaneously*
  - *VSP surveys and in-water works (e.g., wellsite surveys) to support the specific exploration wells under consideration, but excluding surveys potentially required to support conduct of the EA (e.g., environmental baseline surveys) and surveys related to the broader delineation of resources*
  - *the 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 transport between the supply base and drilling unit(s) and helicopter support (i.e., for crew transport and delivery of light supplies and equipment) including transportation to the drilling unit(s)*

CEAA 2012 includes the following definitions and specifications related to assessing the environmental effects of a designated project, which are relevant to the overall scope of the assessment, and which have guided the planning and development of the EIS:

> *[E] environment means the components of the Earth, and includes*
>
> (a) land, water, and air, including all layers of the atmosphere;
> (b) all organic and inorganic matter and living organisms; and
> (c) the interacting natural systems that include components referred to in paragraphs (a) and (b)

5 (1) For the purposes of this Act, the environmental effects that are to be taken into account in relation to an act or thing, a physical activity, a designated project, or a project are

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

(i) fish and fish habitat as defined in subsection 2(1) 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;

(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.

In addition, other types of 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 another Act of Parliament. In the case of this Project, Equinor Canada will require authorizations from the C-NLOPB under the Accord Acts in order for the Project to proceed. Therefore, the following environmental effects are also taken into account in the EIS:

(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.

As defined in Section 19(1) of CEAA 2012 and specified in Section 3.2 of the EIS Guidelines, the following factors are considered and addressed in the EIS:

(a) the environmental effects of the designated project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project and any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;
(b) the significance of the effects referred to in paragraph (a);
(c) comments from the public
(d) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;
(e) the requirements of the follow-up program in respect of the designated project;
(f) the purpose of the designated project;
(g) alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means;
(h) any change to the designated project that may be caused by the environment;
(i) the results of any relevant study conducted by a committee established under section 73 or 74; and
(j) any other matter relevant to the EA that the responsible authority, or — if the EA is referred to a review panel — the Minister, requires to be taken into account.

These factors have been considered and addressed in establishing the scope, focus, and spatial and temporal boundaries of the analysis and the overall content of this EIS. The EIS has been prepared in compliance with the requirements of CEAA 2012, the EIS Guidelines, and the Accord Acts. A detailed Table of Concordance outlining these requirements and indicating where and how each item is addressed in the EIS is provided as Appendix B.

4.2 Identification and Selection of Valued Components

The VCs were identified and selected based on several key considerations and inputs including the EIS Guidelines (CEA Agency 2019), regulatory guidance and Indigenous and stakeholder engagement.

As mentioned in Section 3, engagement related to Equinor Canada's exploration drilling activities is ongoing and commenced in 2016. No additional information has been brought forward from engagement that would suggest a change in VCs. In addition, the CEA Agency recently issued EIS Guidelines for various other exploration drilling programs (e.g., Chevron's West Flemish Pass Exploration Drilling Project [CEA Agency 2018a], ExxonMobil's Southeastern Newfoundland Offshore Exploration Drilling Project [CEA Agency 2018b], BP's Newfoundland Orphan Basin Exploration Drilling Project [CEA Agency 2018c]), and the VCs identified are the same as those identified for ELs 1159 and 1160.

The VCs selected for ELs 1159 and 1160 are:

- Marine Fish and Fish Habitat (including Species at Risk (SAR))
- Marine and Migratory Birds (including SAR)
- Marine Mammals and Sea Turtles (including SAR)
- Special Areas
- Indigenous Communities and Activities
- Commercial Fisheries and Other Ocean Users

The rationale for the selection of these VCs is further described in Table 4.1.

Table 4.1 Identified VCs and the Rationale for their Selection

Valued Component	Rationale
Marine Fish and Fish Habitat	• Fish resources are an important consideration in the EA of the proposed activities that occur within, and that may affect, the marine environment. • This VC includes relevant fish species, as well as plankton, algae, marine plants, benthos, and relevant components of their habitats (such as water and sediment), given the clear interrelationships between these environmental components • The consideration of Marine Fish and Fish Habitat within a single VC is in keeping with current and standard practice, and provides for a more comprehensive, holistic approach while at the same time reducing unnecessary repetition • The VC (description of the existing environment and effects assessment) also gives specific consideration to any particular species that have been identified by regulatory agencies, stakeholder groups or Indigenous communities. • Specifically, Indigenous Groups identified Atlantic salmon, swordfish, cod, turbot, snow crab and American eel as fish species that are important and valued for commercial and/or traditional purposes. • Although the EIS Guidelines specify (in Section 6.3.2) “marine plants” as potential VC for the EIS, these have been considered as part of the overall Marine Fish and Fish Habitat VC, for the reasons outlined above
Marine and Migratory Birds	• A variety of avifauna species inhabit the marine environments off eastern Newfoundland at various times of the year • Birds are important from an ecological, social, and economic perspective, as they often function near the top of the food chain, and may be vulnerable to certain types of environmental disturbance • They are also an important resource for various recreational and tourism related pursuits. • Indigenous groups indicated that marine and migratory bird species and their eggs are used for traditional land and resource use activities

Table 4.1 Identified VCs and the Rationale for their Selection

Valued Component	Rationale
Marine Mammals and Sea Turtles	• Marine mammals (including whales, dolphins, and seals) have been and remain an important element of the environmental and socio-cultural settings of the province and elsewhere in Atlantic Canada • These species are important from an ecological perspective, with a number of marine mammal species having been designated as SAR under Canadian legislation • Some species are also important and valued due to current traditional / commercial (seal harvests) and recreational (whale watching) uses • The VC (description of the existing environment and effects assessment) also gives specific consideration to any particular species that have been identified by regulatory agencies, stakeholder groups or Indigenous communities. • Indigenous Groups identified species, such as beluga, Atlantic blue and North Atlantic right whales as being important for cultural reasons, as well as noting that seals were used for traditional land and resource use activities • Although sea turtles are generally uncommon in the region, they are also included as part of this VC given their rare and often protected status
Special Areas	• Several locations within the Canada-NL Offshore Area and beyond have been designated as special or sensitive areas due to their ecological characteristics and importance • Some of these areas are protected under provincial and/or federal legislation and others are protected under international maritime agreements
Indigenous Communities and Activities	• A number of Indigenous groups reside in NL, and in parts of the Maritimes Provinces (Nova Scotia, New Brunswick, PEI) and Quebec • As illustrated in Chapter 7, the components and activities that comprise this Project will be located at some considerable distance from the communities, activities and other known interests associated with each of these groups. It may, however, potentially affect marine-associated species and other resources that are used by these groups, and which move through, and thus may interact with, the Project's anticipated environmental zone of influence (ZOI) • This VC is included in the EIS as specified in and required by the EIS Guidelines, and to address the requirements of Section 5(1)(c) of CEAA 2012
Commercial Fisheries and Other Ocean Users	• Marine commercial fisheries are key elements that have shaped the history and socioeconomic character of NL and are important aspects of the current economic and socio-cultural fabrics of the province and other parts of Canada • Commercial fisheries in this region are extensive and diverse and involve a range of species and gear types at various times of the year. Fishing activities are undertaken in and around the Project Area by fishing interests from NL (including several Indigenous organizations), Canadian and international fishing enterprises • Other activities take place in parts of the Project Area and adjacent areas on either a year-round or seasonal basis, including other oil and gas related activities, general vessel traffic, research, and military exercises

4.3 Environmental Effects Assessment (Planned Project Components and Activities)

The following sections describe the EA approach and methodology that is used to conduct the environmental effects assessments presented in this EIS, including each of the key stages and components. The EA structure and methods used are in keeping with current EA approaches and practice in Canada, including under CEAA 2012.

As specified in Part 1, Section 4.3 of the EIS Guidelines, the EA approach and methodology used for the EIS addresses the following general items:

- Identifying the activities and components of the project
- Predicting potential changes to the environment
- Predicting and evaluating the likely effects on identified VCs
- Identifying technically and economically feasible mitigation measures for significant adverse environmental effects
- Determining residual environmental effects
- Considering cumulative effects of the project in combination with other physical activities that have been or will be carried out
- Determining the potential significance of residual environmental effects following the implementation of mitigation measures

The description of the existing environment as presented in Chapters 5 to 7 of the EIS forms the environmental baseline from which Project-related environmental changes and resulting effects on the VCs are assessed and evaluated. This includes the corresponding identification and development of technically and economically feasible mitigation to avoid or reduce potential adverse effects. The assessment of potential environmental effects is, therefore, based on the approach of identifying and describing whether, how and to what degree the “without Project” conditions for the identified VC may change as a result of the Project.

The environmental effects assessments for each VC follow the EA methods and specific stages outlined below, with each step of the analysis completed and reported in its own individual sub-section.

4.3.1 Environmental Assessment Study Areas and Effects Evaluation Criteria

EA Study Areas (spatial and temporal boundaries) have been established to direct and focus the environmental effects assessment for each VC. The boundaries are informed by the nature, scale, timing and other characteristics of the Project and the existing environmental setting, and potential environmental interactions. In addition, the boundaries for the EIS include consideration of Agency guidance, and the results of Equinor Canada’s engagement with government departments and agencies, Indigenous and stakeholder groups.

Three types of spatial assessment boundaries are used in the EIS to reflect the various means by which the Project may interact with and potentially change the environment (Figure 4-1). More detailed descriptions of the EA Study Areas for this Project are described as:

Project Area: This is the overall geographic area within which planned Project-related components and activities will take place, as described in the Project Description (Chapter 2) and based on those aspects that are considered to be within the defined scope of the Project for EA purposes (Section 2.1). The Project Area is an overall polygon previously assessed in the Flemish Pass EIS and covers ELs 1159 and 1160 where exploration drilling activities may be carried out as part of the Project.

Local Study Area (LSA): The LSA is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160.

Regional Study Area (RSA): In addition to planned Project environment interactions, from an ecological and socioeconomic perspective, the environmental effects assessments also recognize and consider the characteristics, distributions, and movements of the individual VCs under consideration, including the larger regional areas within which they occur and function. The EA assesses potential effects to marine biota (individuals and populations) and human activities which are known or likely to occur in the LSA for the VC in question, but also considers the overall extent of affected individuals and populations during the time period at which they may be affected by planned Project components and activities. In addition to the potential environmental effects of planned Project components and activities (Chapter 2) and their emissions and discharges (see LSA definition above), the EIS also considers and assesses the potential effects of accidental events or malfunctions that may be associated with the Project, including the potential nature and geographic extent of an oil spill (see Chapter 15).

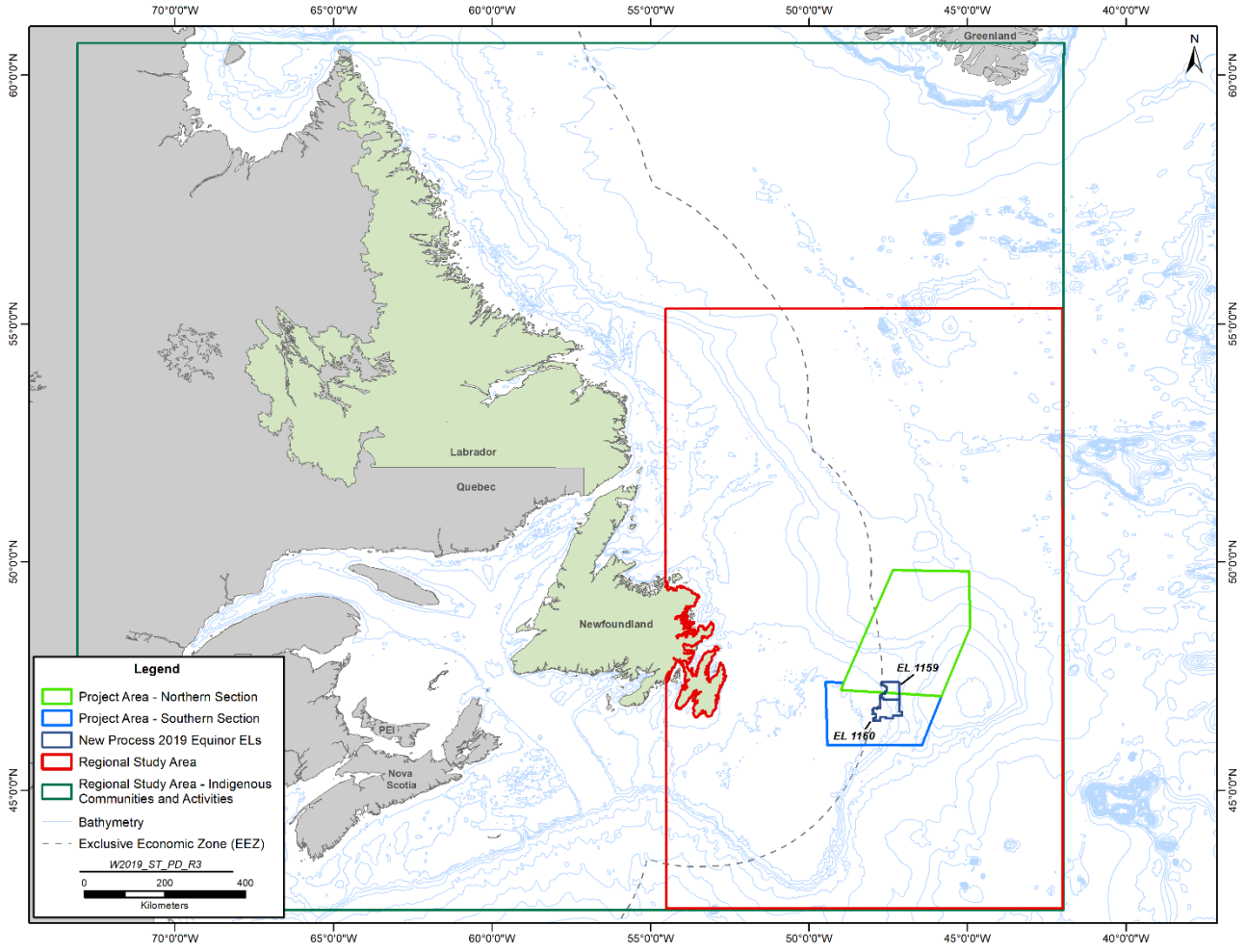


Figure 4-1 Environmental Assessment Study Areas

Significance definitions are developed and used on a VC-specific basis within this EIS. Significant environmental effects are considered to be those adverse effects that will cause a change in the VC that will alter its status or integrity beyond an acceptable level. An environmental effect that does not meet the defined criteria is considered not significant. The development of the significance criteria used in this assessment includes consideration of (where available and relevant) applicable legislation and regulations, standards, guidelines, objectives and/or policies and management plans relevant to such determinations. For the biophysical VCs, the significance definitions include such factors as potential detectable declines in the overall abundance of marine biota or changes in their spatial and temporal distributions in the assessment areas over multiple generations, possible adverse effects to the overall abundance, distribution and health of a SAR and its eventual recovery, and changes to the ecological and socio-cultural characteristics of special marine areas and thus to their overall integrity or value. For the socioeconomic VCs, significance is linked to the potential for, and degree and duration of, detectable effects on people and communities, including on the overall nature, location or timing of activities and

their economic and cultural value, on people's health and well-being, and other relevant concepts and considerations as appropriate.

4.3.2 Potential Environmental Changes, Effects, and Associated Parameters

In order to identify and focus on key environmental issues and interactions in the EIS, the effects assessment initially identifies the various questions and issues that have been raised with regard to the Project and its potential effects on each VC. This includes those issues that have been referenced in the EIS Guidelines and through Equinor Canada's governmental, Indigenous, and stakeholder engagement activities (as outlined in Chapter 3).

The environmental effects assessment identifies and focuses on likely environmental interactions between the Project and the VC, and then, on associated Project-induced environmental changes (such as alterations to the physical environment due to Project-related disturbances or emissions) and resulting effects of these changes on the VC. Each VC assessment identifies a number of associated parameters, which are generally defined as an important aspect or characteristic of the VC which, if changed as a result of the Project, may result in an adverse effect to the VC. For each VC, a summary of these potential interactions and associated parameters will be presented in a table.

As described in Sections 2.1, 2.3, and 4.2, the scope, Project Area and VCs for ELs 1159 and 1160 are the same as those identified in the Flemish Pass EIS. The information in Chapters 8 to 13 below brings forward key aspects and updated information, if applicable, since the submittal of the Flemish Pass EIS.

An overview of the identified potential interactions between the VC and each of the main Project components and activities is also provided (in table form) to focus and frame the environmental effects assessment. Table 4.2 outlines the components or activities that were assessed for each VC.

Table 4.2 Summary of Potential Interactions on Valued Components

Component or Activity	Valued Components					
	Marine Fish and Fish Habitat	Marine and Migratory Birds	Marine Mammals and Sea Turtles	Special Areas	Indigenous Communities and Activities	Commercial Fisheries and Other Ocean Users
Presence and Operation of Drilling Installation	•	•	•	•		•
Drilling and Associated Marine Discharges	•	•	•	•		•
Formation Flow Testing with Flaring	•	•	•			

Table 4.2 Summary of Potential Interactions on Valued Components

Component or Activity	Valued Components					
	Marine Fish and Fish Habitat	Marine and Migratory Birds	Marine Mammals and Sea Turtles	Special Areas	Indigenous Communities and Activities	Commercial Fisheries and Other Ocean Users
Wellhead Decommissioning	•		•	•		•
Geophysical, Geohazard, Wellsite, Seabed and VSP Surveys	•	•	•	•		•
Geological, Geotechnical and Environmental Surveys	•		•			•
Supply and Servicing	•	•	•			•

4.3.3 Environmental Effects Assessment and Mitigation

The environmental effects assessment for each VC predicts and evaluates the nature and degree of changes to, and resulting effects on, the existing (baseline) environment that may potentially occur as a result of planned Project activities. The current condition of the pre-Project environment as a result of other natural and anthropogenic factors - and thus, its likely sensitivity or resiliency to further disturbance or change - has been integrally considered in the environmental effects analyses presented in this EIS. The assessment is also based on a recognition that environmental components and systems are not static, but rather are constantly changing over time both naturally and as a result of human activities and influences.

The application of mitigation measures is also considered in a fully integrated manner in the environmental effects assessment for each VC. This includes technically and economically feasible mitigation measures that are or can be incorporated into Project planning and design, as well as those that are identified as part of the effects analysis to avoid or reduce potential adverse environmental effects. Where applicable, the EIS also discusses cases where the implementation of identified mitigation may be the responsibility of parties other than Equinor Canada, as well as instances where potential mitigation measures were considered and rejected, including the rationale for these decisions. Relevant information and findings from scientific literature, results of EEM from similar activities, and other sources of information are used to guide and inform the assessment and evaluation of environmental effects and the identification and proposal of mitigation.

Mitigation measures are presented throughout the environmental effects assessment sections of the EIS (Chapters 8 to 13) and are summarized in Table 17.2. These include general and issue-specific

mitigation measures that have been identified and proposed based upon current industry best practices and standards, applicable regulatory requirements, those suggested through Equinor Canada engagement with regulatory authorities, stakeholders and Indigenous groups (Chapter 3), and as defined through the professional judgment of Equinor Canada and EIS study team. The application of these mitigation measures is considered in a fully integrated manner in the environmental effects assessment, and the EIS identifies and commits to mitigations that are intended to help avoid or reduce any and all predicted adverse effects (whether potentially significant or not) wherever possible and feasible.

A detailed list of the planned mitigation measures that will be implemented during the Project to avoid or reduce adverse environmental effects is provided in Table 17.2 of the EIS. It should be noted that in most cases any one proposed mitigation measure will be relevant to avoiding or reducing multiple – and in some cases, all – of the predicted effects of the Project on any particular VC. For example, the mitigation commitment that "operational discharges will be treated prior to release in accordance with the OWTG (NEB et al. 2010) and other applicable regulations and standards" will be relevant to mitigating potential effects on marine fish and fish habitat and on many of the other VCs that were considered in the EIS. It is therefore typically not required to attempt to link each individual mitigation measure to a particular predicted environmental effect. The "Summary of Mitigation and Commitments" provided in Table 17.2 does link particular mitigation measures to individual VCs, where possible and applicable. Equinor Canada is also developing and will use an "EA Commitments Tracking Register" to identify and track the implementation of each of the mitigation measures and other commitments made in the EIS and/or that may otherwise be required as a result of the EA review of the Project.

The environmental effects assessment is therefore focused on assessing and describing the likely residual environmental effects of the Project – namely, those which may occur following the implementation of mitigation measures. The effects assessment for each VC is structured to consider and address planned Project components or activities, as follows:

- Presence and Operation of a Drilling Installation (including lights, noise, air emissions, anchoring)
- Drilling and Associated Marine Discharges
- Formation Flow Testing with Flaring
- Wellhead Decommissioning
- Geophysical / Geohazard / Wellsite / Seabed and VSP Surveys
- Geological / Geotechnical / Environmental Surveys
- Supply and Servicing

The effects assessment considers available and relevant scientific, community, stakeholder, and Indigenous knowledge in the analysis of possible Project-related environmental changes to the VC that may result through one or more mechanisms or pathways. It also recognizes and considers the interactions and interrelationships between environmental components and systems and predicted environmental effects, where relevant.

The predicted residual environmental effects of the Project are determined and described based on a number of standard and widely accepted environmental effects criteria listed and defined in Table 4.3.

Table 4.3 Environmental Effects Descriptors

Descriptor	Definition / Ratings
Nature / Direction of the Effect	Positive, Adverse, or Neutral (as compared to baseline environment)
Magnitude	The degree of change from baseline conditions in the affected area, as defined below. *For all VCs:* *Negligible*: Although there is potential for a Project-VC interaction, there would be no detectable effect *For the biophysical VCs*: *Low*: A detectable change that is within the range of natural variability, with no associated adverse effect on the viability of the affected population. *Medium*: A detectable change that is beyond the range of natural variability, but with no associated adverse effect on the viability of the affected population. *High*: A detectable change that is beyond the range of natural variability, with an adverse effect on the viability of the affected population. *For the socioeconomic VCs* *Low*: A detectable change that is within the range of natural variability, with no associated adverse effect on the overall nature, intensity, quality / health or value of the affected component or activity. *Medium*: A detectable change that is beyond the range of natural variability, but with no associated adverse effect on the overall nature, intensity, quality / health or value of the affected component or activity. *High*: A detectable change that is beyond the range of natural variability, with an adverse effect on the overall nature, intensity, quality / heath or value of the affected component or activity.
Geographic Extent	The spatial area within which an environmental effect will likely occur *L* Localized, In immediate vicinity of the activity *PA / LSA* Within Project Area / Within LSA *RSA* Within RSA and/or beyond
Duration	The period of time over which an environmental effect will likely be evident *S* Short term (for duration of the activity, or for duration of accidental event) *M* Medium term (beyond duration of activity up to end of Project, or for duration of threshold exceedance of accidental event – weeks or months) *L* Long term (beyond Project duration of activity, or beyond the duration of threshold exceedance for accidental events - years) *P* Permanent (recovery to baseline conditions unlikely)
Frequency	How often an environmental effect will likely occur (continuous, or at specific time intervals) *N* Not likely to occur *O* Occurs once *S* Occurs sporadically *R* Occurs on a regular basis *C* Occurs continuously

Table 4.3 Environmental Effects Descriptors

Descriptor	Definition / Ratings
Reversibility	The ability of an environmental component to return to an equal or improved condition once the disturbance(s) has ended. *R* Reversible (Will eventually recover to baseline conditions) *I* Irreversible (Permanent)
Certainty	Confidence in the effects prediction *L* Low level of confidence *M* Moderate level of confidence *H* High level of confidence

4.3.4 Cumulative Environmental Effects

Chapter 14 takes exploration drilling activities on ELs 1159 and 1160 into consideration from a cumulative effects perspective. The Flemish Pass EIS environmental effects analysis considered the drilling of up to 30 wells. Wells to be drilled on ELs 1159 and 1160 would be captured within the 30-well count assessed within the Flemish Pass EIS and located within the Project Area. No additional wells beyond the 24 wells approved in the Flemish Pass EIS Decision Statement would be drilled with the inclusion of ELs 1159 and 1160.

4.3.5 Accidental Events

The EIS also assesses and evaluates the potential environmental effects that may be associated with possible accidental events that may occur as a result of the Project. Given their location within the previously assessed Project Area, results from existing modelling exercises are used to provide context in assessment of the VCs. These assessments for all VCs are reported together in Chapter 15.

4.4 Effects of the Environment on the Project

Chapter 16 considers environmental factors, including climatological and meteorological conditions (wind, precipitation, fog, and visibility), oceanographic conditions (waves, currents), seasonal presence of sea ice and icebergs, geology and seismicity, and other environmental features and conditions. It also describes how these issues will be considered and addressed as part of ongoing and future planning, design, and eventual implementation. This includes discussing how relevant engineering and environmental design criteria, industry standards, guidelines, and regulatory conditions will be applied and will be relevant to the mitigation of such Effects of the Environment on the Project.

4.5 Modelling Results

4.5.1 Cuttings Modelling

The Flemish Pass and Eastern Newfoundland EISs completed drill cuttings dispersion modelling in five locations within the Project Area, which are illustrated in Figure 1-1. . Cuttings above the 1.5 mm and

6.5 mm thresholds are not expected to be deposited in an even layer but in patches due to variations in ambient ocean currents.

Regarding the applicability of previous modelling inputs for the Flemish Pass to ELs 1159 and 1160, the releases modelled in the Flemish Pass study are considered representative of other potential releases in the Project Area. The currents and winds that occur at the northern Flemish Pass location are similar to those found within the Project Area. In general, the boundary set up by the Labrador Current and the Gulf Stream has the potential to result in dynamic currents, however general flow would be towards the east.

For the three deep water locations in the Project Area – Northern Section with depths of 2,700 m, 1,100 m and 362 m very little of the SBM cuttings reach the seabed within the model domain; these cuttings will drift for several days and travel for distances on the order of 20 to 200 km. Maximum WBM cuttings thickness is highest across all seasons less than 100 m to 500 m from the wellsite. Modelling locations (except in EL 1135) used ocean current measurements for the drill cuttings model. The model runs on EL 1135 used input currents derived using the WebDrogue CECOM (Canadian East Coast Ocean Model) and model, and tidal predictions..As described in Section 2.3, water depths for ELs 1159 and 1160 range from approximately 40 m to 1,020 m. Modelling results from ELs 1134, 1135, 1137, and 1142 are suitable to apply to ELs 1159 and 1160; therefore, modelling of these ELs will not be carried out.

4.5.2 Oil Spill Trajectory Modelling

The Flemish Pass and Eastern Newfoundland EISs completed spill trajectory modelling of eight unmitigated subsurface blowouts with varying locations, water depths, spill rates and durations, seven of which are applicable and valid for ELs 1159 and 1160 and therefore modelling of these Els will not be carried out. The Flemish Pass and Eastern Newfoundland EISs completed spill trajectory modelling of 10 unmitigated batch spills with varying locations, water depths and volumes, eight of which are applicable and valid for ELs 1159 and 1160 and therefore modelling of these ELs will not be carried out. Further discussion on oil spill modelling and the representative location used to illustrate the trajectory resulting from a subsea blowout is provided in Section 15.4.

4.6 References

CEA (Canadian Environmental Assessment) Agency. 2018a. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the West Flemish Pass Exploration Drilling Project – Chevron Canada Limited. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80161/126381E.pdf. Accessed: August 13, 2019.

CEA (Canadian Environmental Assessment) Agency. 2018b. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Southeastern Newfoundland Offshore Exploration Drilling Project – ExxonMobil Canada Ltd. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80158/125931E.pdf. Accessed: August 13, 2019.

CEA (Canadian Environmental Assessment) Agency. 2018c. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Newfoundland Orphan Basin Exploration Drilling Project – BP Canada Energy Group ULC. Available at: https://www.ceaa-acee.gc.ca/050/documents/p80147/121808E.pdf. Accessed: August 13, 2019.

CEA (Canadian Environmental Assessment) Agency. 2019. Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012 for the Central Ridge Exploration Drilling Project – Equinor Canada Ltd. Available at: https://ceaa-acee.gc.ca/050/evaluations/document/130732?culture=en-CA. Accessed: August 19, 2019.

NEB (National Energy Board), CNSOPB (Canada Nova Scotia Offshore Petroleum Board) and C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2010. Offshore Waste Treatment Guidelines. Available at: https://www.neb-one.gc.ca/bts/ctrg/gnthr/2010ffshrwstgd/2010ffshrwstgd-eng.pdf. Accessed: August 8, 2019.

5.0 EXISTING PHYSICAL ENVIRONMENT

5.1 Geology and Geomorphology

The geology of the eastern Newfoundland offshore area is complex and dynamic, and the current bedrock and surficial characteristics of the area have been shaped by various natural and human factors and processes over time. Located on the eastern continental shelf, this area was formed by extension during the breakup of Pangea and the opening of the Atlantic Ocean during the Late Triassic to mid-Cretaceous and is underlain by pre-rift basement rocks (Fader et al. 1989). Rifting, combined with salt tectonics in the area, created a complex series of Mesozoic rift basins that are separated by basement highs along the central to outer shelf. The resulting combination of stratigraphy, structure and timing have been conducive to hydrocarbon generation and entrapment (Bell and Campbell 1990). The main sedimentary basins in the area include the Orphan, Flemish Pass, Jeanne d'Arc, and Carson (Fader et al. 1989). The primary reservoirs are located in the shallow marine and fluvial shale and sandstone deposited during the Late Jurassic and Early Cretaceous periods of the Mesozoic Era.

All of the Eastern Canadian continental shelf has been strongly influenced by Quaternary glaciation, which has resulted in an erosional morphology (Piper 1991). This glaciation produced a variety of glacial deposits, including sands and gravels, which are generally present as a veneer, basinal muds, muddy sands and gravels, glaciomarine sediments, and glacial drift sediments. In and around the Project Area, the identified deposits have been classified as the Grand Banks Sand and Gravel and Adolphus Sand and Gravel (Piper et al. 1988). Seabed features in the area include iceberg scouring, sand ridges and waves, shell beds, pockmarks, and seabed depressions of unknown origin (Cameron and Best 1985).

Canada's eastern continental margin is tectonically passive, and seismicity is relatively rare throughout much of the region. Natural Resources Canada (NRCan) (2017a) estimates that approximately 450 earthquakes occur each year in Eastern Canada. Seismicity generally occurs randomly along the Grand Banks margin. The most recent edition of the Seismic Hazard Map prepared by NRCan (2017b) indicates that the Project Area has been classified as having a low seismic hazard. According to the National Earthquake Database (NRCan 2017c) there have been seven seismic events recorded within the boundaries of the Project Area in the 1985 to 2017 period. The magnitudes of these events have been fairly low, ranging from 3.0 to 4.5, with an average magnitude of 3.9 and a median magnitude of 4.0. All of the recorded events have epicentres in the southwest portion of the Project Area and are likely related to the various tectonic lineaments in the area.

5.2 Bathymetry

The Project Area primarily includes the Flemish Pass, and water depths in the two ELs range from 100 to 900 m (Figure 5-1). The potential vessel and aircraft traffic routes and western portions of the Project Area cross the Grand Banks, a region with average depths of approximately 75 m, which extend to approximately 350 km east of St. John's to the 200 m depth contour and then a further 50 km east to the 1,000 m depth contour. To the east of the Grand Banks lies the Flemish Pass, with depths of almost 1,300 m. On the eastern side of the Flemish Pass, water depths rise again to the Flemish Cap, a large bathymetric feature of approximately 50,000 km² with depths rising back up to approximately 130 m.

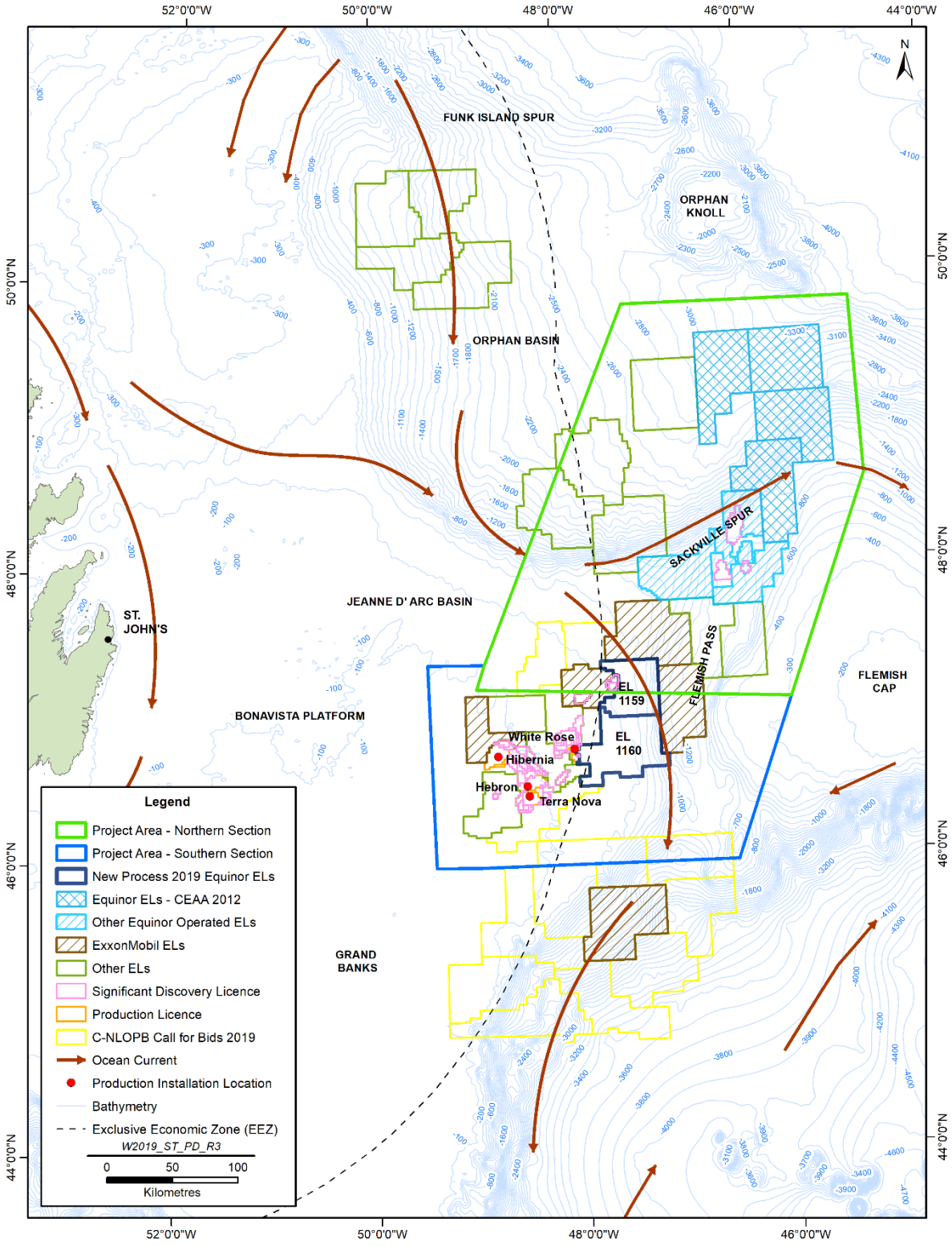


Figure 5-1 Bathymetry of the Project Area

5.3 Climatology

Existing and available climatological information for sites within the Project Area indicate that air temperatures are coolest in January or February and warmest from July through September. Air temperatures exhibit strong seasonal variations and also vary by geography. Daily mean values can range from -5°C in winter to 18°C in summer. Prevailing winds in the area are from the west to northwest in winter and from the southwest in summer. Extreme wind gusts greater than 51 m/s (100 knots) have been measured in winter and in association with tropical and post-tropical weather systems (Bowyer 1995). Mean hourly wind speeds can range from 6 m/s in summer to 13 m/s in winter. Extreme wind speeds in winter can reach 36 m/s or more (based on available climatology MSC50 data created by Oceanweather).

Precipitation varies within localized regions of the Project Area. Rain or drizzle can occur at any time of year and is most likely to occur with southerly or south-westerly winds. Snow and freezing rain are possible any time from October through May, and snow can accompany winds of any direction. Freezing rain is most common with easterly or north-easterly winds, and frequently persists for days in the spring along the East Coast. There is also a year-round potential for thunderstorms and hail, with hail most likely in winter, and thunderstorms most frequently reported in summer. In general, visibility is most favourable in fall and winter and most frequently restricted in summer and spring with some of the highest occurrences of marine fog in North America (AMEC 2014).

5.4 Air Quality

The existing ambient air quality within the Project Area can be generally categorized as good and is occasionally and locally influenced by exhaust emissions from existing oil production facilities and supporting activities (e.g., support vessels and helicopters), exploration activities and associated support activities (e.g. support vessels and helicopters), and other marine vessel traffic. The following production facilities are located within the Project Area:

- Terra Nova FPSO
- Hibernia Platform
- Sea Rose FPSO
- Hebron Platform

The following approved exploration projects are located within the Project Area:

- Eastern Newfoundland Offshore Exploration Drilling Program, ExxonMobil Canada Ltd.
- Flemish Pass Exploration Drilling, Equinor Canada Ltd. (formerly known as Statoil Canada Ltd.)
- Flemish Pass Exploration Drilling, CNOOC Petroleum North America ULC (formerly known as Nexen Energy ULC)

The following proposed exploration projects are located within the Project Area:

- Newfoundland Orphan Basin Exploration Drilling Program, BP Canada Energy Group
- Husky Exploration Drilling Project, Husky Oil Operations Ltd.

To characterize the existing ambient air quality surrounding the Project Area, data was acquired from the National Pollutant Release Inventory (NPRI) Reporting program for CAC (i.e., CO, NO_2, SO_2, TPM, particulate matter less than 10 and 2.5 microns in diameter ($PM_{2.5}$, PM_{10}), and VOCs). The NPRI program is legislated under the *Canadian Environmental Protection Act* (CEPA), and requires each facility meeting specified reporting triggers, to report their emissions to ECCC on an annual basis. An overview of the emissions reported from sources within the Project Area for the 2017 reporting year (the most recent such data available) are provided in Table 5.1. These sources included the operation of Terra Nova, Hibernia, White Rose, and Hebron. No data was reported from the two drilling rigs (TransOcean Henry Goodrich and TransOcean Barrents) known to be operating offshore Newfoundland, nor was data reported from any offshore exploration activities.

Table 5.1 2017 Facility Reported CAC Emissions (NPRI Reporting) – NL Offshore Area Production Platforms

Facility	Air Emissions (tonnes/year)					
	CO	NO_2	TPM	PM_{10}	$PM_{2.5}$	VOC
Terra Nova	694	2,183	208	204	204	2,642
Hibernia	1,740	1,113	175	174	174	1,005
White Rose	505	2,782	130	130	130	422
Hebron	141	53	17	16	16	58
Source: ECCC (2019a)						

As the Jeanne d'Arc Basin (JDB) is not known to contain sour gas, emissions of sulphur dioxide and hydrogen sulphide have not been reported.

Emissions of GHGs from facilities meeting specific emission thresholds are also reported on an annual basis to ECCC, through the GHG Emissions Reporting Program. Reported GHG data was available for the oil production facilities located within the Project Area (Terra Nova, Hibernia, White Rose, and Hebron) and for two drill rigs (TransOcean Henry Goodrich and TransOcean Barents) known to be operating offshore Newfoundland in the 2107 reporting year. An overview of the available 2017 reported emissions for each of the exiting emission sources are provided in Table 5.2.

Table 5.2 2017 Facility Reported GHG Emissions – NL Offshore Area Production Facilities and Drill Rigs

Facility	GHG Emissions (tonnesCO_{2eq}/year)			
	CO_2	CH_4	N_2O	Total
Terra Nova	587,587	32,444	9,774	629,806
Hibernia	536,172	41,475	3,298	580,945
White Rose	378,666	26,968	12,447	418,081
Hebron	22,732	4,547	404	27,684
TransOcean Henry Goodrich	27,916	39	566	28,521
TransOcean Barrents	24,080	34	492	24,605
Source: ECCC (2019b)				

Occasional influences from marine vessel traffic in the Project Area would also affect the air quality at the Project site. Such emissions however are regulated by the IMO through MARPOL.

5.5 Oceanography

Within the Project Area and surrounding area, the largest seas are typically found farthest offshore, usually during the winter season. For the Orphan Basin to the north, mean significant wave heights range from about 1.7 m in July to 4.3 m in July, with maximum significant wave heights ranging 6.3 m in July to 15.9 m in January (AMEC 2014). Circulation, which includes the continental shelf waters, is dominated by a generally southward flow of the cold Labrador Current, which includes an inshore branch that flows along the Newfoundland coast at speeds approximately 10 cm/s and an offshore branch flowing along the outer edge of the Grand Banks. The inshore branch sometimes meanders over the Grand Banks. The offshore branch of the Labrador Current flows over the upper Continental Slope at depth, and through the Flemish Pass with average speeds of about 20 to 25 cm/s. Over parts of the Grand Banks, the mean currents are generally weak (less than 10 cm/s) and flow southward, dominated by wind-induced and tidal current variability. Average sea surface temperatures generally range from 0°C to 7°C in February to 10°C to 16°C in summer, whereas near-bottom sea temperatures generally range from 3°C to 4°C on average year-round. Average sea surface salinities range from about 32 psu to the south to almost 34 psu to the north. Near-bottom salinities are typically around 34 psu in both summer and winter (AMEC 2014).

5.6 Ambient Noise

The existing noise environment or sound-scape of the Project Area is characterized by a degree of existing atmospheric and underwater noise, resulting from natural conditions and processes, such as weather and wave action, marine mammals, as well as from other human activities that occur in parts of the Project Area on either a continuous basis (i.e., existing petroleum production platforms in the Project Area - Southern Section) or those which are more intermittent and transient in nature, such as fishing activity, other oil and exploration programs, and marine transportation.

There are four identifiable sources in the Project Area that may have long term effects on the soundscape:

1. Fin whales: Fin whales sing from October to March on the Grand Banks. They seem to favour the shallow waters on the Grand Banks compared to the deeper waters off the continental shelf. Their constant notes raise the total sound level in the 10-45 Hz band by 5-10 dB in winter across the Grand Banks and Scotian Shelf. Whales close to a recorder can temporarily increase the one-minute sound levels to 130 or 140 dB re 1 µPa.
2. Platforms: Oil and gas exploration and production activities and the associated support vessels increased the SPL in the band of approximately 40-225 Hz by 15-20 dB at ranges of 35 km from a collection of three platforms in shallow water, and 8-10 dB for a single dynamically positioned drilling installation 13 km away in deep water. The sound levels in the band of 225-2,250 Hz were elevated 5-10 dB in both locations. The production platforms are continuous noise sources that cause permanent elevations in the background sound levels. The West Hercules produced tonal sounds that increased the broadband received

levels at 13 km by 8-10 dB. The tonal sounds were detectable 230 km away; however, they did not increase the broadband sound levels.

3. Geophysical Surveys: Geophysical surveys are known to be one of the most intense sound sources in the ocean (McCauley et al. 2000, Gordon et al. 2003, Nieukirk et al. 2012). The geophysical surveys detected at Station 17 and Station 19 were over 100 km from the recorders and still a dominant sound source. Geophysical array sound's peak frequency is near 50 Hz (Dragoset 1984); however, the frequency range increases as the source vessel gets closer to a measurement location. The measurements reported here included energy up to 1 kHz.
4. Ambient: Median sound levels increase 3-5 dB in the winter due to higher wind speeds and storms. The peak frequency band for wind noise is 200-2,000 Hz.

5.7 Ice Conditions

The Project Area is subject to seasonal intrusions of sea ice and icebergs, as well as vessel icing during particular meteorological conditions. Sea ice and iceberg conditions vary each year and by location. Conditions are influenced by colder or milder winter conditions over Newfoundland and the surrounding waters, and seasonal wind patterns. Cold and dry winds from the west through north have the effect of moving ice further offshore, while north-easterly winds tend to bring ice towards shore. Sea ice is possible as early as the first week of January and in thicknesses up to 30 cm. By the end of March, most of the ice is thin first year (30 to 70 cm) ice, with patches of medium (70 to 120 cm) and thick (greater than 120 cm) first year ice. Generally, sea ice begins to retreat over the entire area by mid-April. By early May, the southern Grand Banks and Flemish Cap areas are generally ice-free. At the beginning of June, there is a risk of small areas of thick first year ice and occasionally old ice (ice which has survived at least one summer's melt) in the northern parts of the Orphan Basin. In general, the Project Area could be considered ice-free by mid-May, but this does vary year to year. The iceberg season may typically last from March to July and comprise growlers (less than 1 m height) to very large (100 to 200 m in length) icebergs. Ice islands, broken away from an Arctic ice shelf, may have areas of a few thousand square metres to 500 km², although they do not occur every year. The International Ice Patrol annual count of icebergs south of 48°N is highly variable but has an annual mean of approximately 550 icebergs and range from 0 to 2,202 icebergs (based on data thru 2006) (AMEC 2014). There is also potential for landfast ice nearshore. Landfast ice has the potential to influence conditions within the potential vessel and aircraft traffic routes near to St. John's; however, it is unlikely to be a factor in the Project Area itself.

5.8 Climate Change

Climate change will likely have some influence on all aspects of the climate system (atmosphere, ocean, cryosphere) over time, although the magnitude and timing of these impacts will vary regionally and across variables. On a global scale, there are three impacts of climate change for which long-term trends are already being observed and future projections are in general agreement, though there remains substantial regional variability, including locations that exhibit trends counter to the global mean (Stocker et al. 2013). The first is that average global temperatures (air and ocean) are increasing, with more extreme warming occurring in the Arctic. The second is that the hydrologic cycle is intensifying as

warmer air can hold more moisture, implying that precipitation events on average will tend to be more intense (though not necessarily more frequent) in the future. The third impact is that the mean global sea level is rising.

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6.0 EXISTING BIOLOGICAL ENVIRONMENT

There are a wide range of fish, marine mammals, and marine birds that could occur in the Project Area. Some of these species are listed as species of conservation interest under SARA and assessed as at-risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

6.1 Marine Fish and Fish Habitat

6.1.1 Plankton, Plants and Macroalgae

Plankton, including fish larvae (ichthyoplankton) and pelagic invertebrates in the vicinity of the Project Area, are similar to those described in the Eastern Newfoundland SEA (AMEC 2014, Section 4.2.1.3). The discussion that follows is, based on the nature of this environmental component and the existing information sources used, necessarily regional in scope.

Plankton comprise the largest and most diverse ecosystem component on earth, representing the microscopic organisms that are passively distributed by currents. Organisms in this group include picoplankton (organisms between 0.2 and 2.0 µm in diameter including prokaryotes and eukaryotes), phytoplankton (microscopic plants), zooplankton (small animals) including invertebrate and vertebrate embryos and larvae, as well as viruses and phages (Legendre and Rassoulzadegan 1995; Suttle 2005). Plankton include the most basal levels of the marine food web and include photosynthetic organisms that are consumed by planktivores, who in turn are often prey items for larger organisms. The majority of primary plankton productivity occurs in the light-infused epipelagic zone (0-200 m water depth) (Licandro et al. 2015), but this productivity is also transferred to the benthos on the ocean's bottom through sinking biomass and waste (Legendre and Rassoulzadegan 1995). Ichthyoplankton tend to be distributed according to environmental variables, such as temperature and salinity, and therefore are more evenly distributed across pelagic habitats (Pepin and Anderson 1997).

The Project Area is generally too deep to support macroalgae and seagrass colonization and growth. While some seaweeds can be found on the Grand Bank up to 100 m, these areas have few plant species and low biomass (AMEC 2014).

6.1.2 Pelagic Macroinvertebrates

Pelagic macroinvertebrates include animals that live exclusively in the pelagic environment or swim up from the benthos to feed. In their review of available trawl data from the Flemish Cap, Vázquez et al. (2013) compiled percentage of hauls for each species or group captured from 1977-2012 (no biomass, seasonal timing or locations were provided). Although sampling was variable and modified throughout this time period, the data provide a summary overview of the most prevalent Flemish Cap pelagic species of macroinvertebrates sampled during Canadian and European Union (EU) surveys (1977-2012) as compiled by Vázquez et al. (2013). Among collected pelagic macroinvertebrates, species such as the northern shortfin squid and northern shrimp were observed in as many as 77% and 94% of survey trawls conducted in 2003, and the percentage of trawls capturing these species has subsequently declined to 17% and 59%, respectively, in 2012 (Vázquez et al. 2013).

In addition to the high proportion of small crustaceans (copepods and shrimp) that live in the pelagic environment, a variety of gelatinous animals can be found here. For example, pelagic tunicates include salps, pyrosomes and doliolids, are gelatinous, free-floating, filter feeding animals found as single individuals or assembled into colonies. Other groups of gelatinous animals include pelagic cnidarians and ctenophores (jellyfish).

6.1.3 Benthic Invertebrates

Benthic invertebrate species known to occur within the Project Area include polychaetes, whelks, echinoderms, isopods, crustaceans, and molluscs. Previous studies have shown that the Project Area is host to a wide range of benthic species depending on the habitat type (AMEC 2014). Epifaunal communities of the Flemish Pass were characterized during the NEREIDA program where Beazley and Kenchington (2015) identified 527 species from 400-1,400 m depths. Sponges and cnidarians represented the highest number of taxa followed by arthropods echinoderms, and molluscs (Beazley and Kenchington 2015).

6.1.4 Corals and Sponges

Murillo et al. (2011) characterized coral distributions for the Grand Banks beyond the Canadian EEZ and observed that soft corals, gorgonian corals, sea pens, and black corals were characteristic species for the Flemish Pass. Deep-water corals, sponges, and sea pens have been recorded within the Project Area, primarily in the vicinity of the Flemish Pass and around the edges of the Grand Banks and Flemish Cap (AMEC 2014). These organisms increase habitat complexity, provide habitat to fin fish and shellfish species. Corals identified in the Project Area include alcyonaceans, pennatulaceans, scleratcinians, and antipatharians. These coral species are noted as being of conservation interest due to their role in marine habitat development, and their sensitivity to stressors on the environment, including anthropogenic impacts such as fishing and oil and gas activities (DFO 2015; Statoil 2016). For deep areas of the Flemish Pass and Flemish Cap, habitat complexity decreases with depth with higher prevalence of mud substrates. The presence of structure forming sponges and corals is key to supporting benthic communities (Beazley et al. 2013) because they provide habitat, refuge and foraging areas for a variety of species. Echinoderms, in particular suspension feeding brittlestars, are highly responsive to presence of structure forming sponge grounds (Beazley et al. 2013; Beazley and Kenchington 2015). In the Flemish Pass, this is evidenced by the shift in benthic communities (between 1,000-1,300 m) that corresponds to a distinct change in the density of sponges.

Bottom trawling and video surveys have identified over 50 species of corals and sea pens within and around the Project Area along the shelf of the Flemish Cap, Flemish Pass and northeast slope of the Grand Banks (Wareham 2009; Murillo et al. 2011; Beazley et al. 2013, Vàzquez et al. 2013; Baillon et al. 2014a, 2014b; Beazley and Kenchington 2015). Within the Project Area, coral biomass is mainly distributed along the slopes of the Flemish Pass, Flemish Cap, and Grand Bank, with fewer observations on the Grand Bank Shelf and on top of the Flemish Cap (Murillo et al. 2011). Coral biomass was highest between 600-900 m along the northern Flemish Cap, Flemish Pass, and Northeast Grand Bank shelf and was associated with warm, more saline waters with silty sand substrates (Murillo et al. 2011, 2016).

At least 32 species of sponges have also been observed in and adjacent to the Project Area (Murillo et al. 2012; Beazley et al. 2013; Knudby et al. 2013; Beazley and Kenchington 2015). Sponge samples captured by trawls may disintegrate before reaching the surface for identification (Knudby et al. 2013) due to their fragile nature and the damaging effects of trawls. As a result, many samples are not identified to species in DFO and NAFO trawl surveys, and there is a potential that sponge species richness is somewhat different than reported.

Table 6.1 provides a summary of known and potential coral / sponge occurrence in ELs 1159 and 1160. Coral distribution is illustrated in Figure 6-1. Sponge distribution is illustrated in Figure 6-2. Sea pen distribution is illustrated in Figure 6-3. Large gorgonian distribution is illustrated in Figure 6-4. Small gorgonian distribution is illustrated in Figure 6-5.

Table 6.1 Summary of Known and Potential Coral / Sponge Occurrence in ELs 1159 and 1160

Exploration License	Known Presence and Distribution Based on Existing Information	Data Source(s)	Summary of Known or Potential Presence and Distribution
EL 1159 (90 m to 930 m)	Sponges: • Unidentified species Corals: • Sea pens • Gorgonian corals	Canadian RV Data Knudby et al. (2013) Murillo et al. (2012)	• Regional datasets indicate presence of sponges, sea pens with few observations of gorgonian corals
EL1160 (40 m to 1,120 m)	Sponges: • Unidentified species Corals: • Sea pens • Gorgonian corals	Canadian RV Data Knudby et al. (2013) Murillo et al. (2012)	• Regional datasets indicate presence of sponges, sea pens with few observations of gorgonian corals

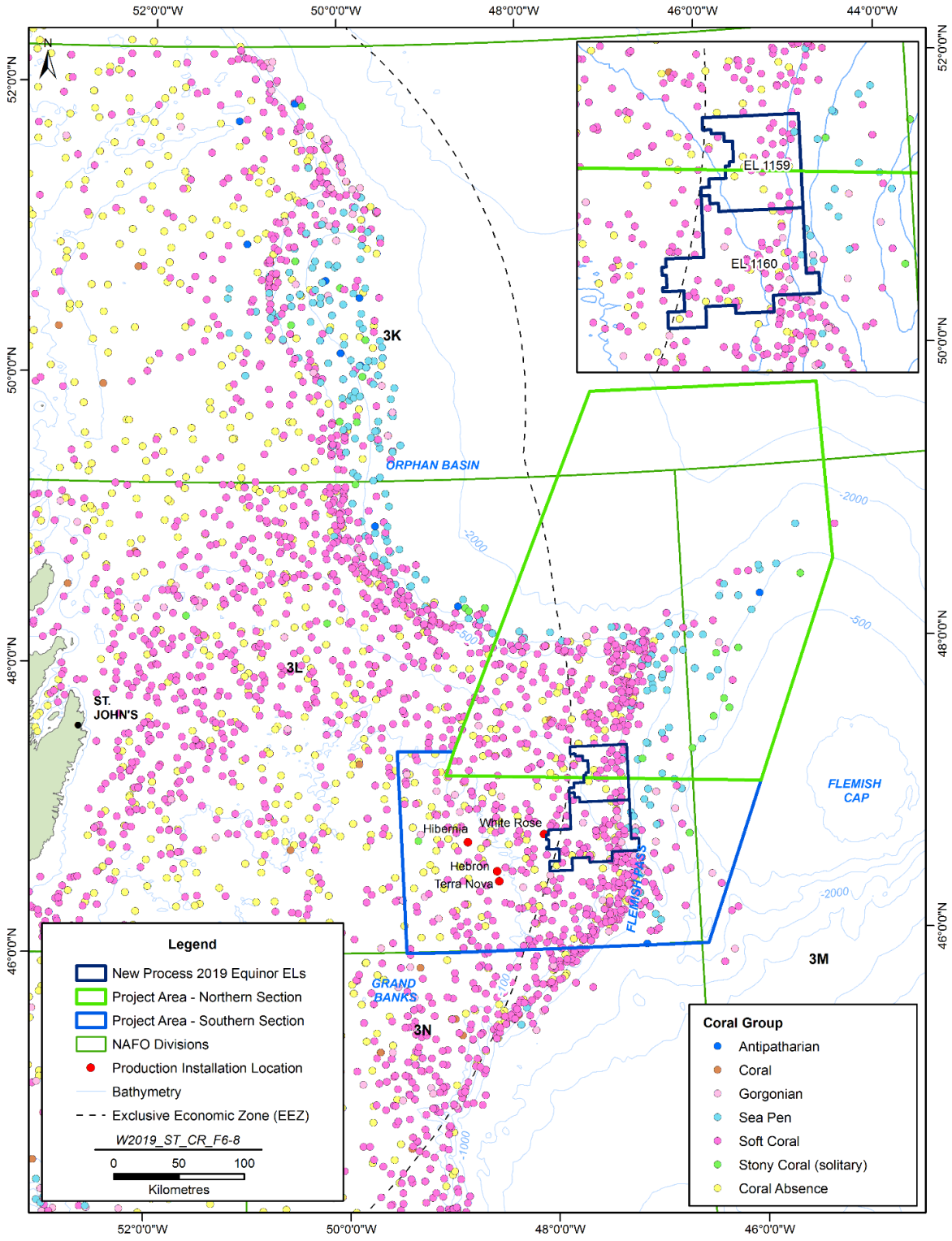


Figure 6-1 Summary of Coral Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources

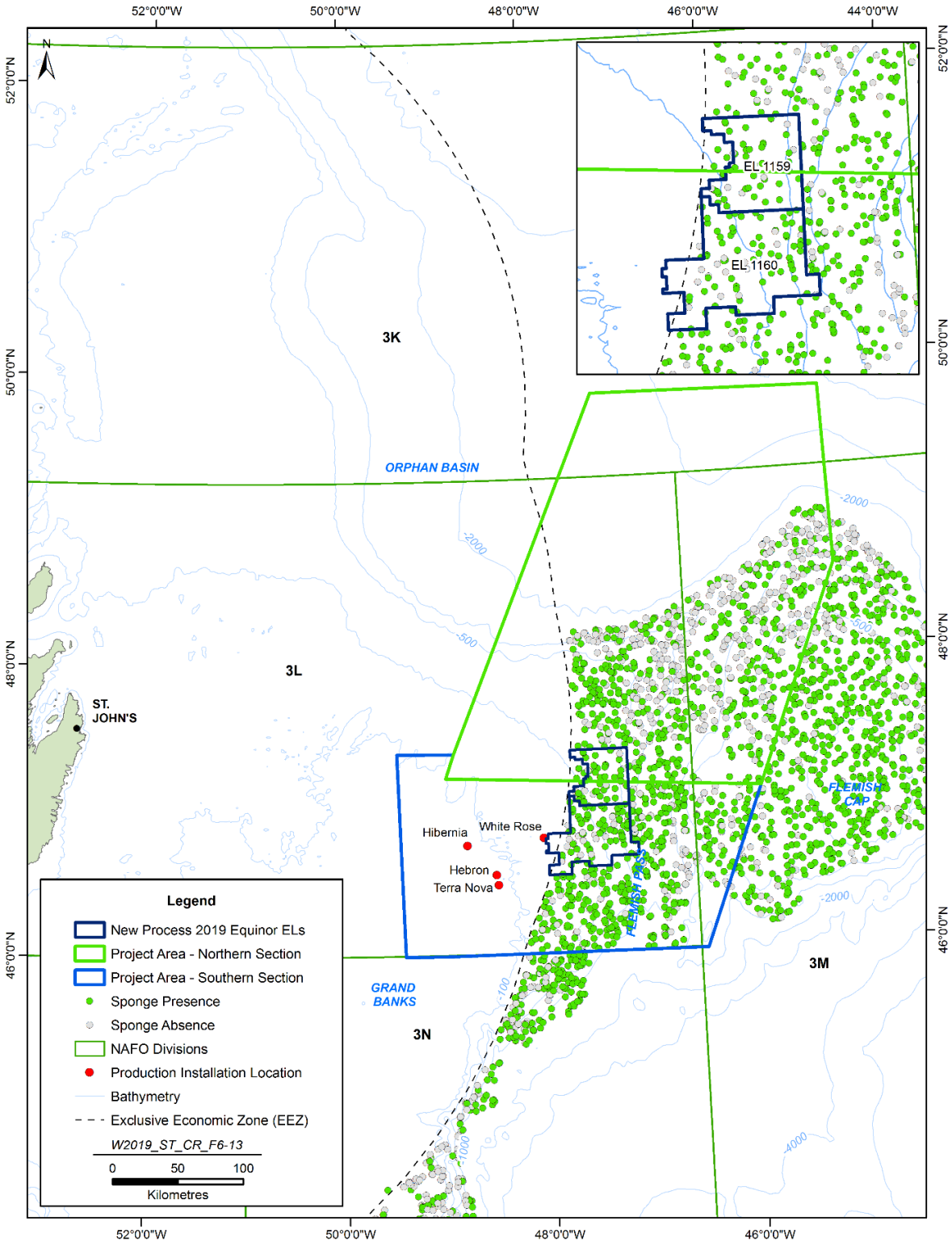


Figure 6-2 Summary of Sponge Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources

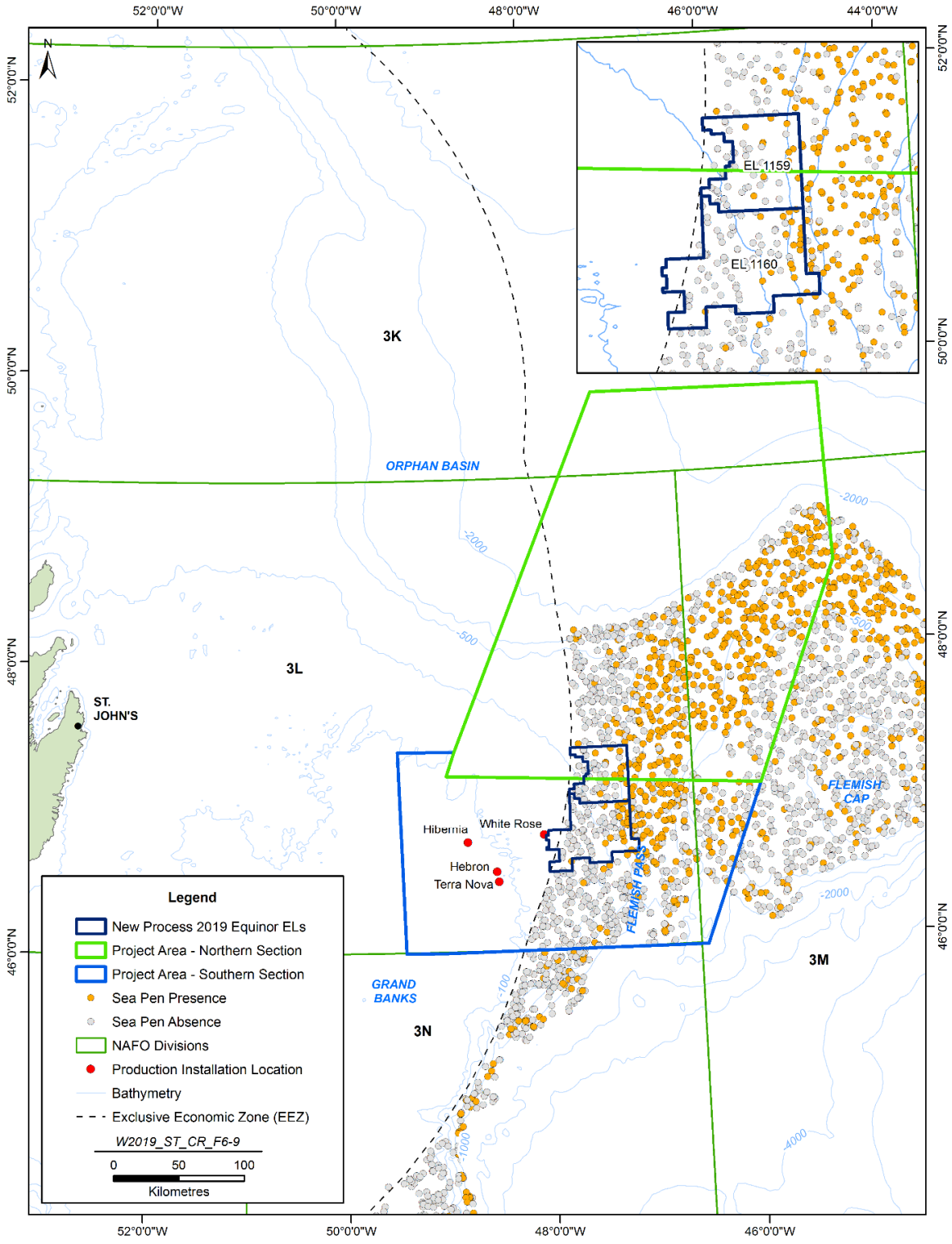


Figure 6-3 Summary of Sea Pen Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources

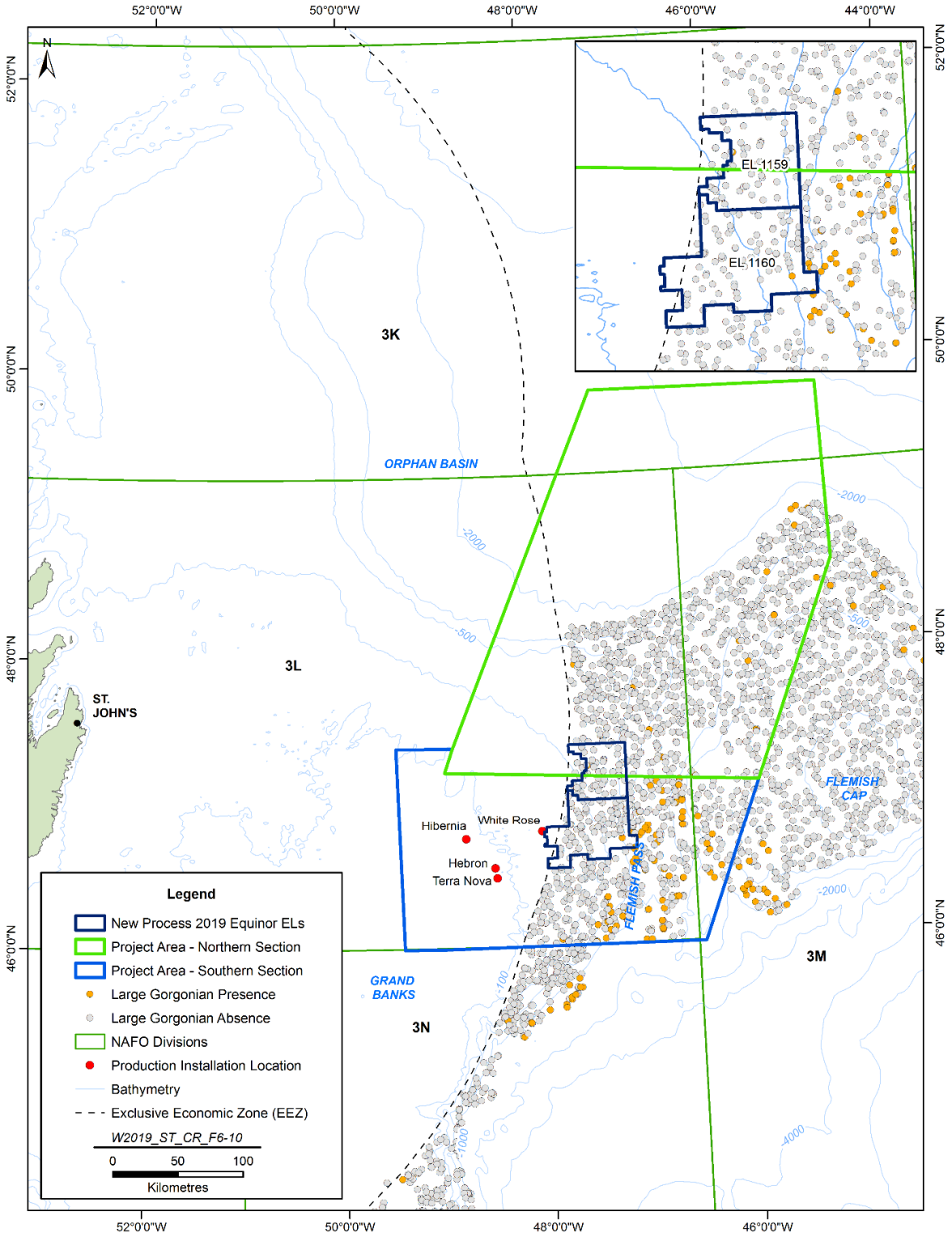


Figure 6-4 Summary of Large Gorgonian Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources

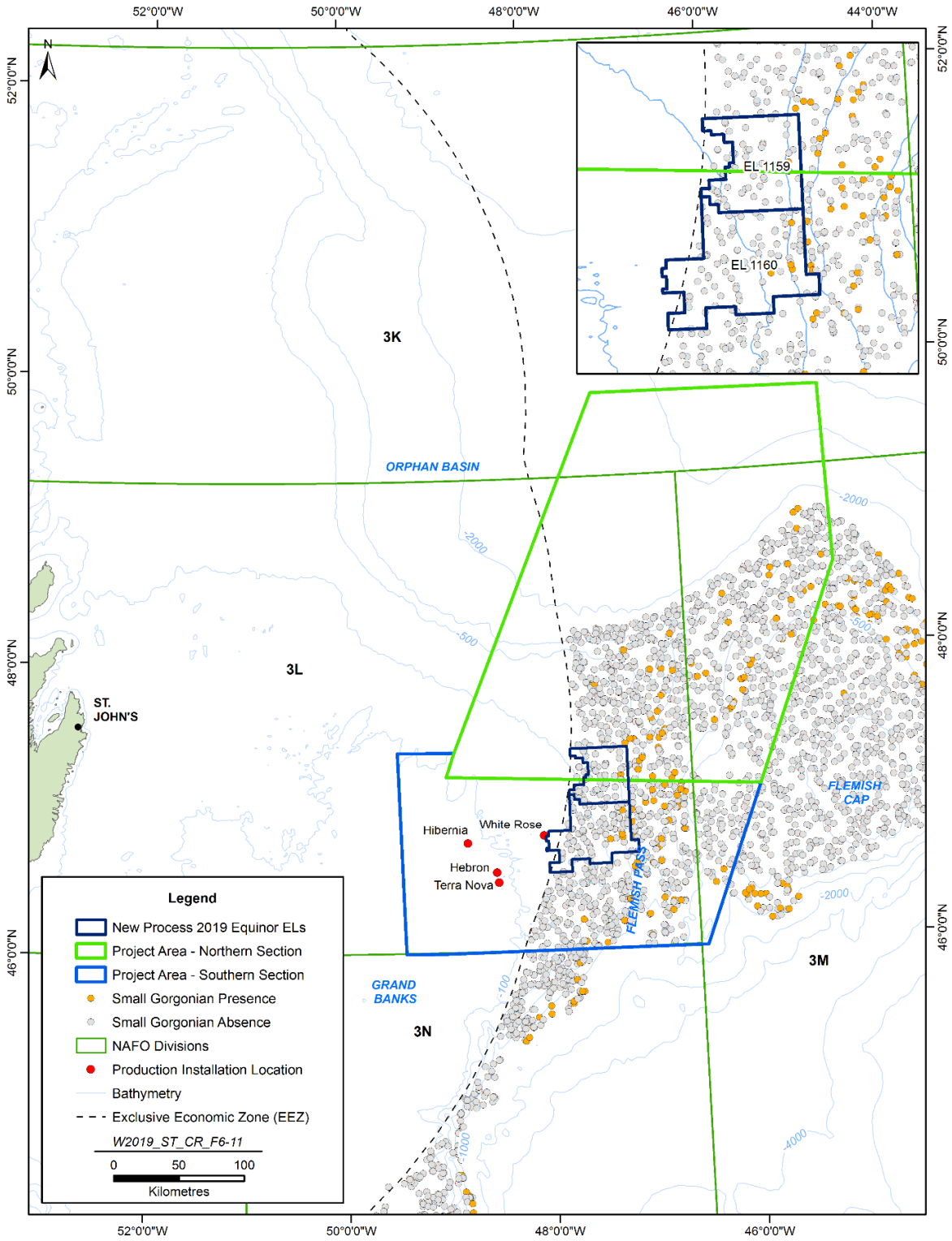


Figure 6-5 Summary of Small Gorgonian Distributions in and Around the Project Area Compiled from Canadian RV Data and Literature Sources

6.1.5 Finfish (Demersal and Pelagic Species)

This section summarizes data from Canadian research vessel (RV) surveys. Data are available for up to 2016 and the Tables 6.2 to 6.5 and Figures 6-6 to 6-20 below have been updated to reflect the most current data available.

Table 6.2 Summary of Depth Categories used to Present Canadian RV Survey Data (2001 to 2016)

Project Area	Depth Zone	Area / Proportion of Survey	Mean Abundance/Tow	Number of Species to make up 95% of catch	Dominant Species (% of Total Catch)
Project Area – Northern Section (203 tows)	Shelf / Slope Edge (0-250 m)	8.8	232	5	Capelin (46.9%)
	Shallow Slope (251-600 m)	18.7	395	8	Deepwater redfish (70.6%)
	Middle Slope (601-1,000 m)	10.0	30	12	Lanternfish (44.1%)
	Middle-Deep Slope (1,001-1,300 m)	13.9	<1	4	Roughhead grenadier (43.2%)
	Deep Slope (1,301-1,450 m)	1.25	<1	4	Roughhead grenadier (60.9%)
Project Area – Southern Section (338 tows)	Shelf / Slope Edge (0-250 m)	62.4	1,242	4	Sand Lance (67.8%)
	Shallow Slope (251-600 m)	15.2	352	5	Deepwater Redfish (86.6%)
	Middle Slope (601-1,000 m)	19.6	8	10	Deepwater Redfish (30.7%)
	Middle-Deep Slope (1,001-1,300 m)	0.22	<1	5	Roughhead Grenadier (45.1%)
	Deep Slope (1,301-1,450 m)	2.56	<1	5	Roundnose Grenadier (43.5%)

Table 6.3 Summary of Key Fish Species from all Canadian RV Survey Sets Collected within the Project Area (2011 to 2016) (includes Shelf and Slope Species)

Project Area	Common Name	Scientific Name	Mean Abundance / Tow	Contribution to Total Catch
Project Area – Northern Section (203 tows)	Deepwater redfish	*Sebastes mentella*	421	37.4%
	Capelin	*Mallotus villosus*	262	23.2%
	American plaice	*Hippoglossoides platessoides*	192	17.0%
	Lanternfish	Myctophidae (F)	89	7.9%
	Sand lance	*Ammodytes dubius*	41	3.6%
	Greenland halibut	*Reinhardtius hippoglossoides*	20	1.8%
	Atlantic cod	Gadus morhua	15	1.4%
	Roughhead grenadier	*Macrourus berglax*	14	1.2%
	Roundnose grenadier	*Coryphaenoides rupestris*	8	0.7%
	Thorny skate	*Amblyraja radiata*	6	0.6%
	Longnose eel	*Synaphobranchus kaupii*	6	0.5%
Project Area – Southern Section (338 tows)	Sand lance	*Ammodytes dubius*	1,247	55.0%
	Capelin	*Mallotus villosus*	385	17.0%
	Deepwater redfish	*Sebastes mentella*	373	16.5%
	American plaice	*Hippoglossoides platessoides*	107	4.7%
	Yellowtail flounder	*Pleuronectes ferruginea*	26	1.2%
	Lanternfish	Myctophidae (F)	20	0.9%

Table 6.4 Numerically Dominant Fish Species (95% of Overall Abundance) in the Project Area – Northern Section by Depth Zone (Canadian RV Surveys, 2011 to 2016)

Depth Zone	Common Name	Scientific Name	Mean Abundance / Tow	Contribution to Total Catch
Shelf / Slope Edge (0-250 m)	Capelin	*Mallotus villosus*	232	46.9%
	American plaice	*Hippoglossoides platessoides*	175	35.4%
	Sand lance	*Ammodytes dubius*	41	8.2%
	Deepwater redfish	*Sebastes mentella*	19	3.9%
	Greenland halibut	*Reinhardtius hippoglossoides*	6	1.2%

Table 6.4 Numerically Dominant Fish Species (95% of Overall Abundance) in the Project Area – Northern Section by Depth Zone (Canadian RV Surveys, 2011 to 2016)

Depth Zone	Common Name	Scientific Name	Mean Abundance / Tow	Contribution to Total Catch
Shallow Edge (251-600 m)	Deepwater redfish	*Sebastes mentella*	395	70.6%
	Lanternfish	Myctophidae (F)	58	10.4%
	Capelin	*Mallotus villosus*	28	5.0%
	American plaice	*Hippoglossoides platessoides*	15	2.8%
	Atlantic cod	Gadus morhua	14	2.6%
	Greenland halibut	*Reinhardtius hippoglossoides*	11	2.0%
	Roughhead grenadier	*Macrourus berglax*	7	1.3%
	Common grenadier	*Nezumia bairdii*	3	0.6%
Middle Slope (601-1,000 m)	Lanternfish	Myctophidae (F)	30	44.1%
	Roundnose grenadier	*Coryphaenoides rupestris*	7	10.1%
	Deepwater redfish	*Sebastes mentella*	7	9.6%
	Roughhead grenadier	*Macrourus berglax*	6	8.5%
	Blue hake	*Antimora rostrata*	4	6.3%
	Longnose eel	*Synaphobranchus kaupii*	3	4.6%
	Greenland halibut	*Reinhardtius hippoglossoides*	3	4.1%
	Common grenadier	*Nezumia bairdii*	2	3.1%
	American plaice	*Hippoglossoides platessoides*	1	1.6%
	Capelin	*Mallotus villosus*	1	1.5%
	Witch flounder	Glyptocephalus cynoglossus	1	1.3%
	Scaled lancetfish	*Notolepis rissoi kroyeri*	1	0.8%
Middle-Deep Slope (1,001-1,300 m)	Roughhead grenadier	*Macrourus berglax*	<1	43.2%
	Roundnose grenadier	*Coryphaenoides rupestris*	<1	25.5%
	Greenland halibut	*Reinhardtius hippoglossoides*	<1	23.7%
	Black dogfish	*Centroscyllium fabricii*	<1	3.2%
Deep Slope (1,301-1,450 m)	Roughhead grenadier	*Macrourus berglax*	<1	60.9%
	Greenland halibut	*Reinhardtius hippoglossoides*	<1	23.2%
	Roundnose grenadier	*Coryphaenoides rupestris*	<1	10.1%
	Jensen's skate	*Raja jenseni*	<1	2.9%

Table 6.5 Numerically Dominant Fish Species (95% of Overall Abundance) in the Project Area – Southern Section by Depth Zone (Canadian RV Surveys, 2011 to 2016)

Depth Zone	Common Name	Scientific Name	Mean Abundance / Tow	Contribution to Total Catch
Shelf / Slope Edge (0-250 m)	Sand lance	*Ammodytes dubius*	1,242	67.8%
	Capelin	*Mallotus villosus*	376	20.5%
	American plaice	*Hippoglossoides platessoides*	100	5.5%
	Yellowtail flounder	*Pleuronectes ferruginea*	26	1.4%
Shallow Edge (251-600 m)	Deepwater redfish	*Sebastes mentella*	352	86.6%
	Lanternfishes (NS)	Myctophidae (F)	14	3.4%
	Capelin	*Mallotus villosus*	9	2.2%
	American plaice	*Hippoglossoides platessoides*	6	1.6%
	Roughhead grenadier	*Macrourus berglax*	6	1.5%
Middle Slope (601-1,000 m)	Deepwater redfish	*Sebastes mentella*	8	30.7%
	Lanternfishes (NS)	Myctophidae (F)	6	25.3%
	Roughhead Grenadier	*Macrourus berglax*	5	19.2%
	Blue hake	*Antimora rostrata*	2	8.5%
	Roundnose grenadier	*Coryphaenoides rupestris*	1	3.4%
	Longnose eel	*Synaphobranchus kaupii*	1	2.6%
	Greenland halibut	*Reinhardtius hippoglossoides*	<1	1.8%
	Common grenadier	*Nezumia bairdii*	<1	1.5%
	Black dogfish	*Centroscyllium fabricii*	<1	1.3%
	Blacksmelt goitre	*Bathylagus euryops*	<1	1.2%
Middle-Deep Slope (1,001-1,300 m)	Roughhead Grenadier	Macrourus berglax	<1	51.7%
	Roundnose grenadier	Coryphaenoides rupestris	<1	30.0%
	Greenland halibut	*Reinhardtius hippoglossoides*	<1	11.3%
	Black dogfish	*Centroscyllium fabricii*	<1	2.9%
	Deepsea Cat Shark	*Apristurus profundorum*	<1	51.7%
Deep Slope (1,301-1,450 m)	Roughhead Grenadier	Macrourus berglax	<1	51.7%
	Roundnose grenadier	Coryphaenoides rupestris	<1	30.0%
	Greenland halibut	*Reinhardtius hippoglossoides*	<1	11.3%
	Black dogfish	*Centroscyllium fabricii*	<1	2.9%

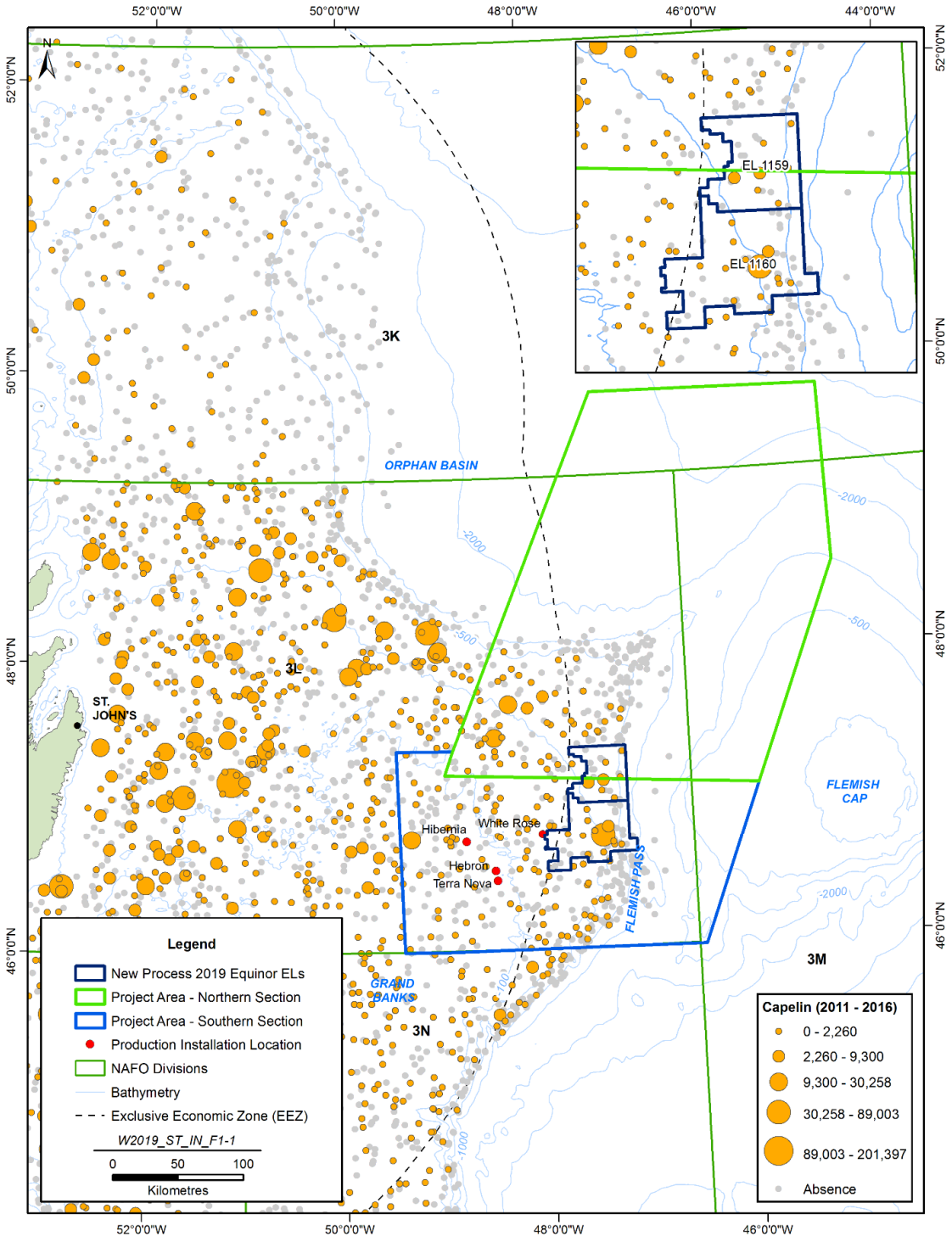


Figure 6-6 Capelin Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

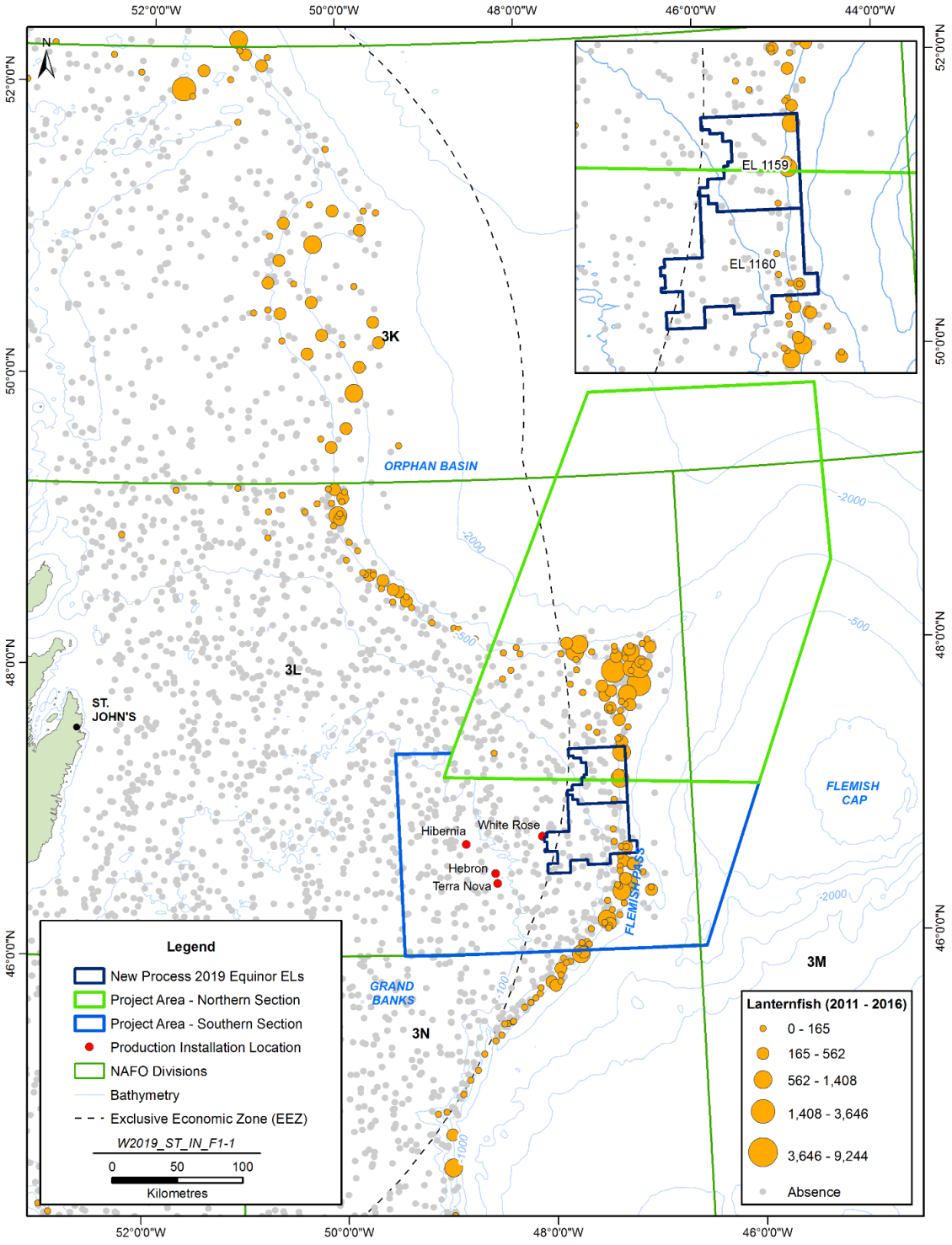


Figure 6-7 Lanternfish Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

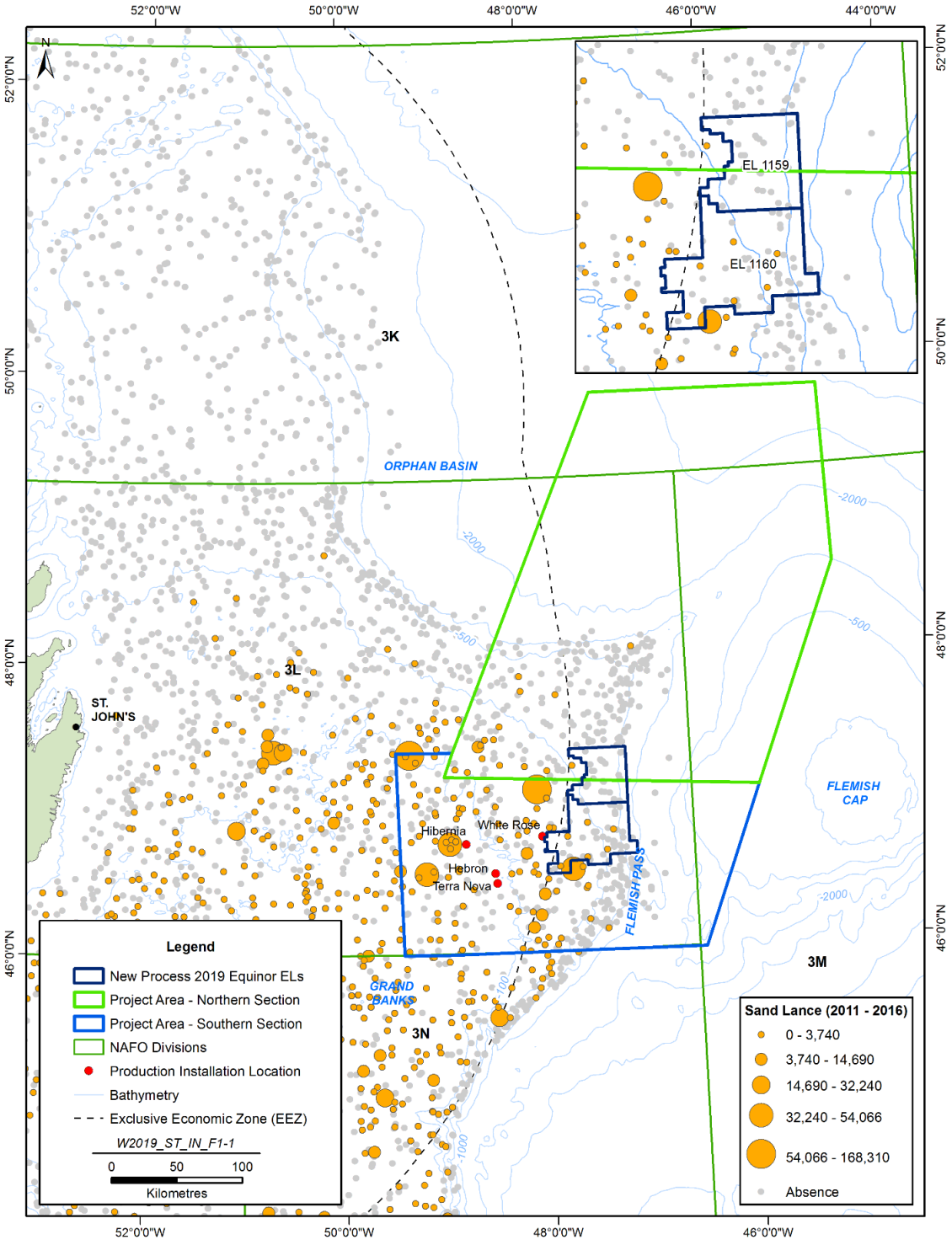


Figure 6-8 Sand Lance Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

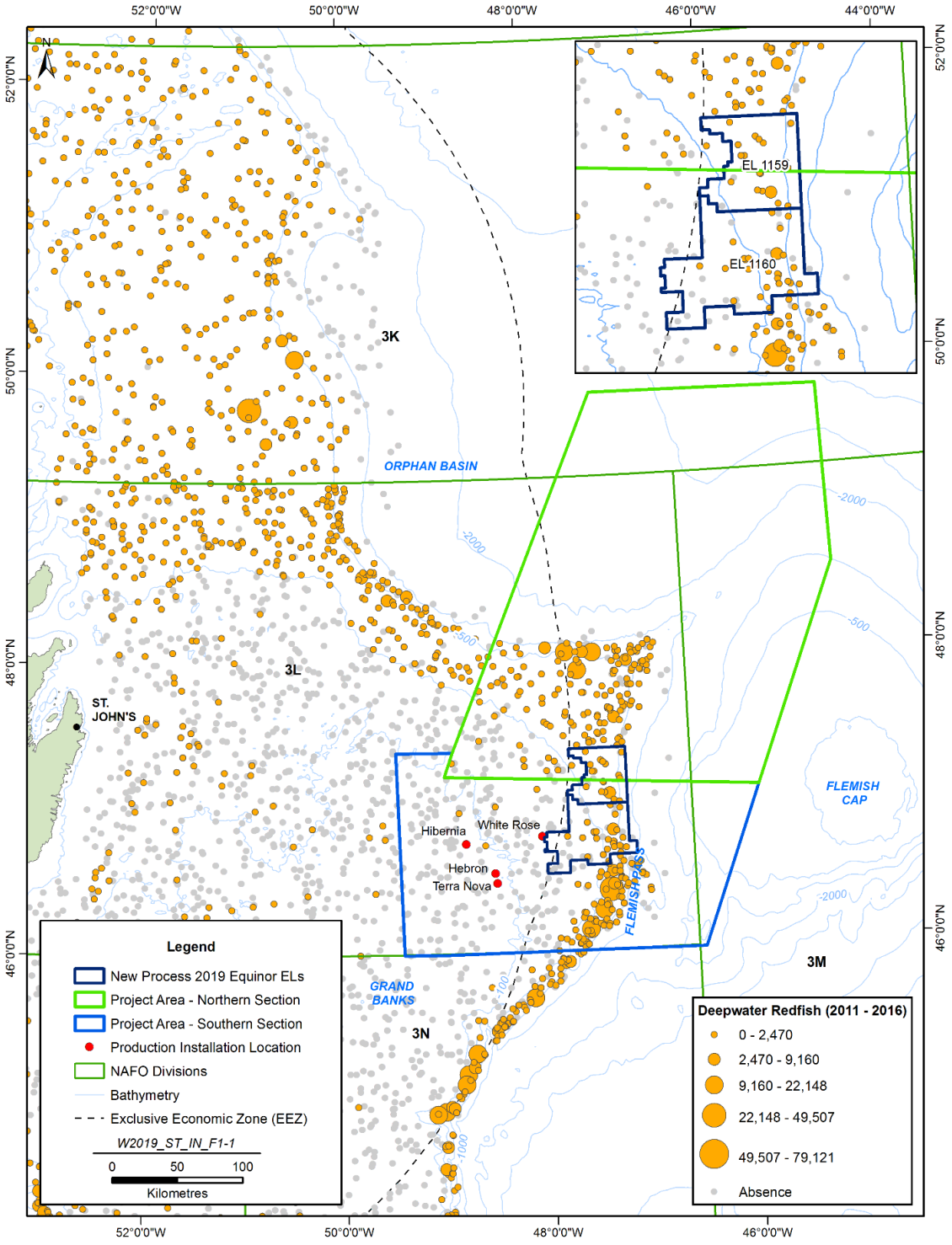


Figure 6-9 Deepwater Redfish Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

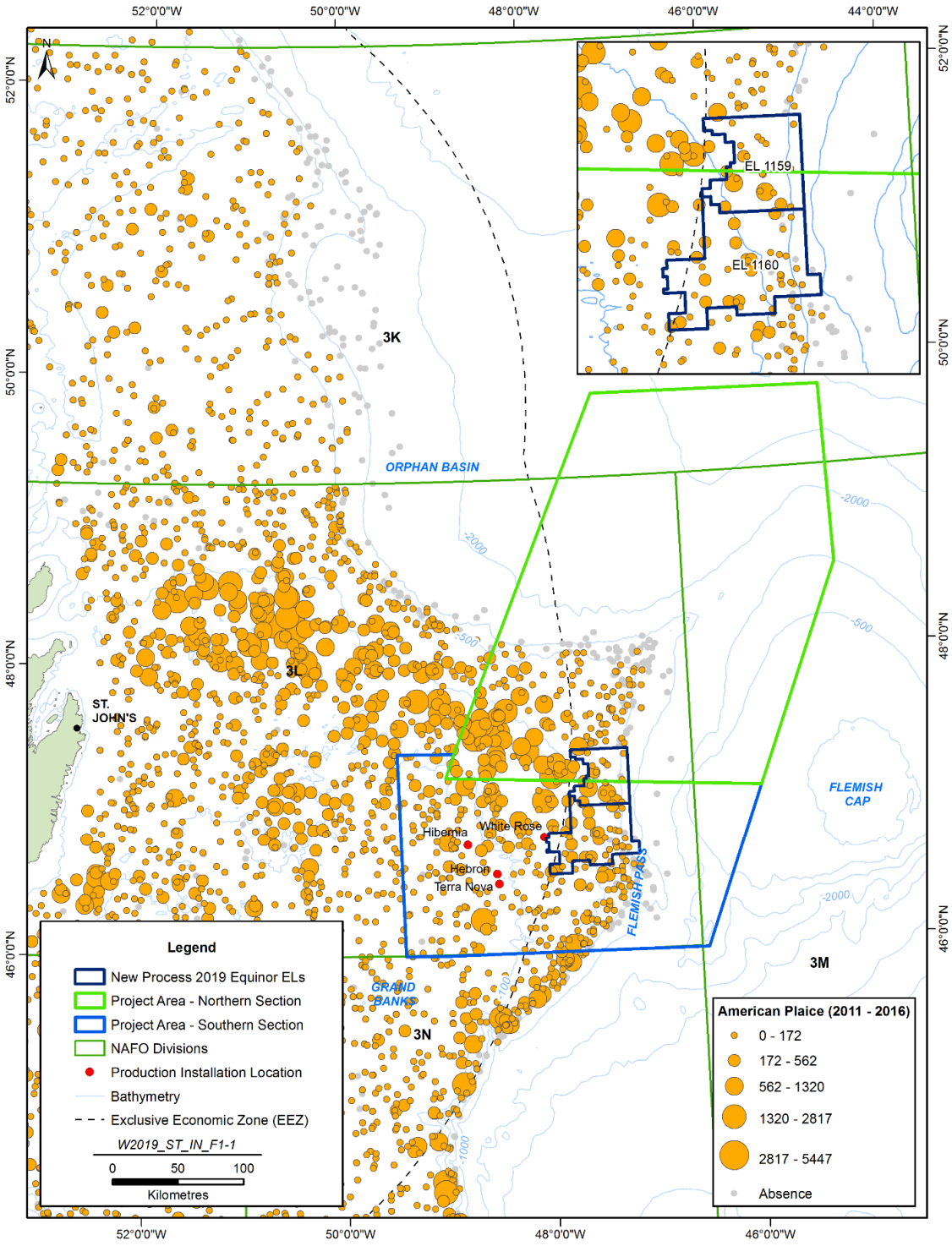


Figure 6-10 American Plaice Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

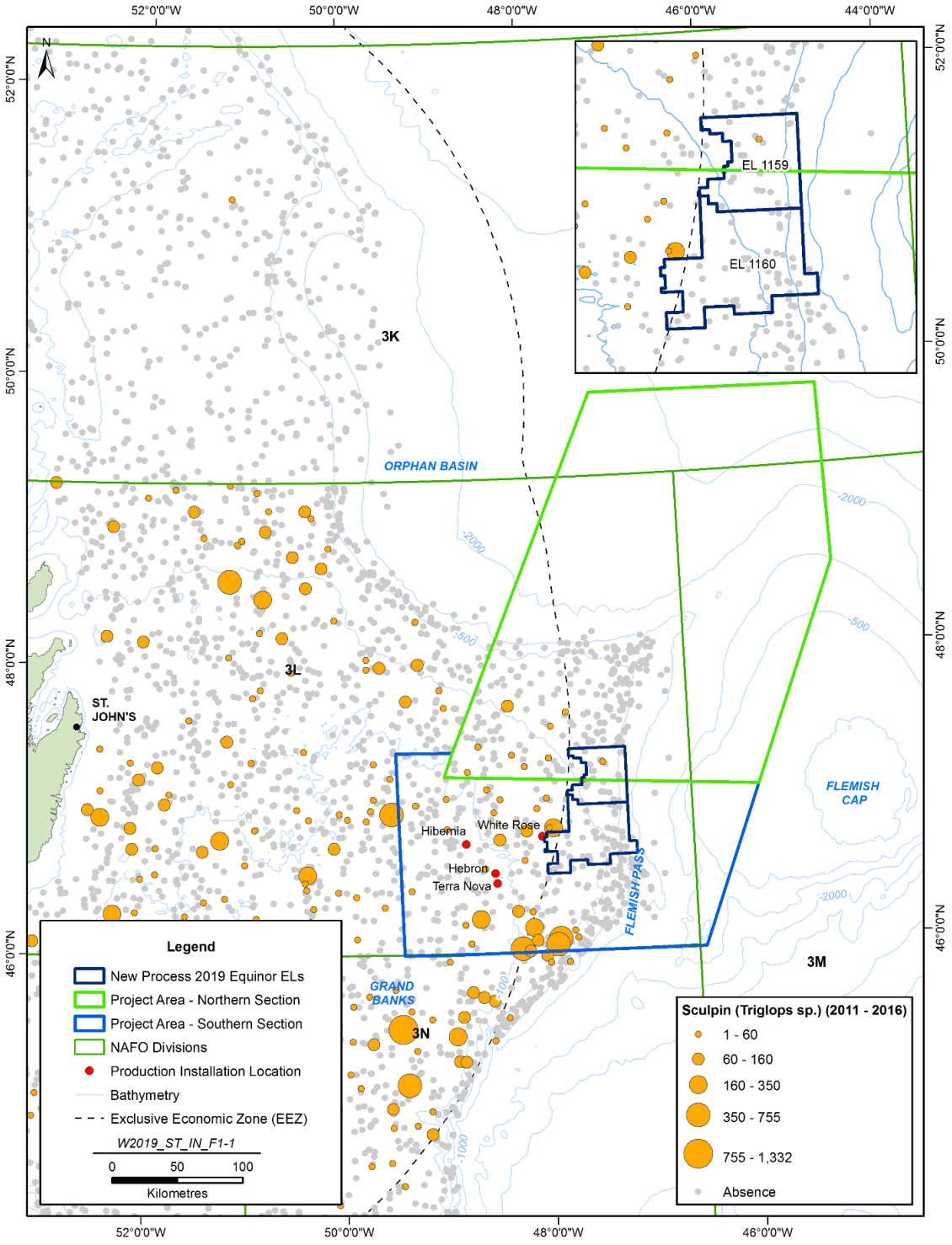


Figure 6-11 Sculpin (*Triglops* sp.) Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

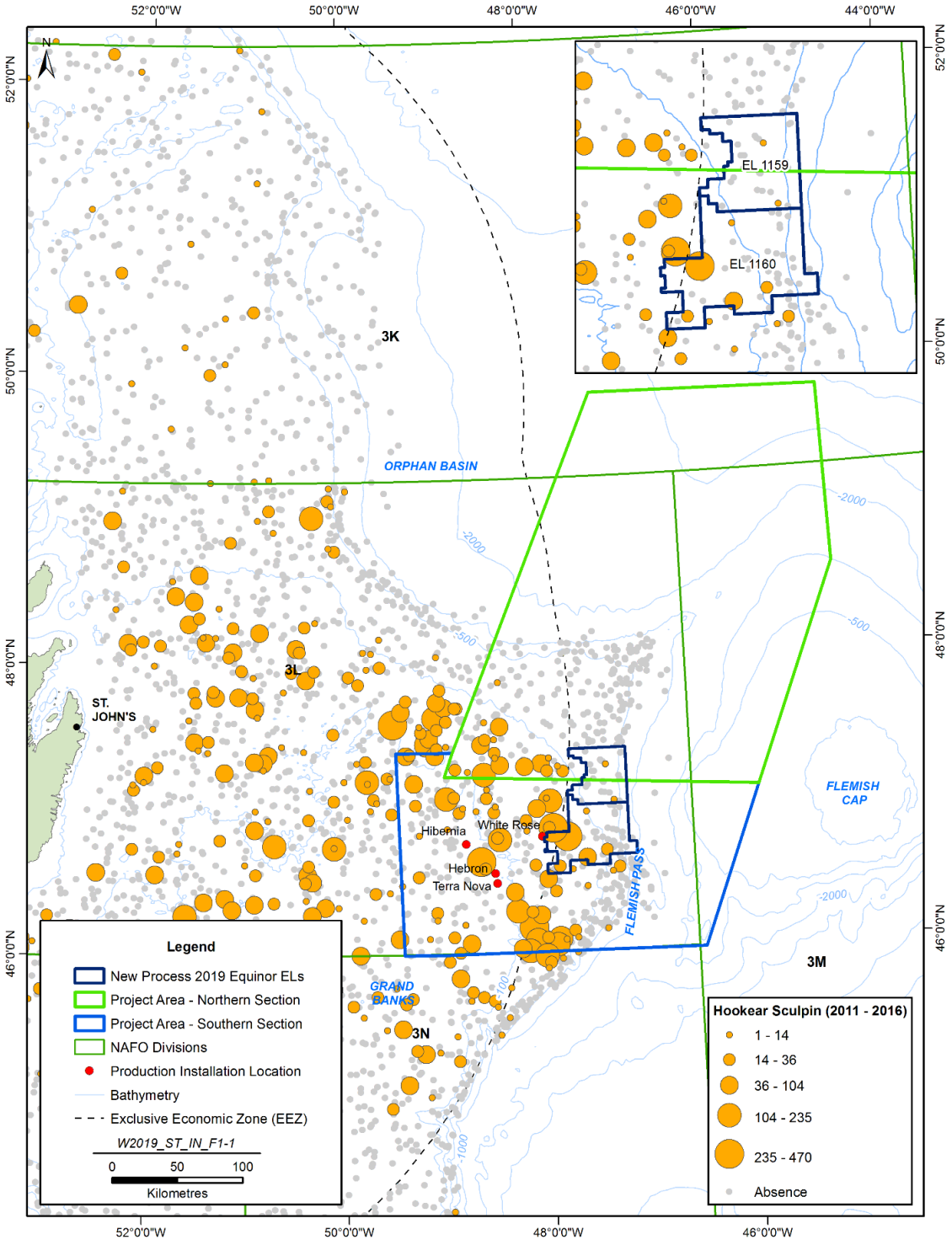


Figure 6-12 Hookear Sculpin Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

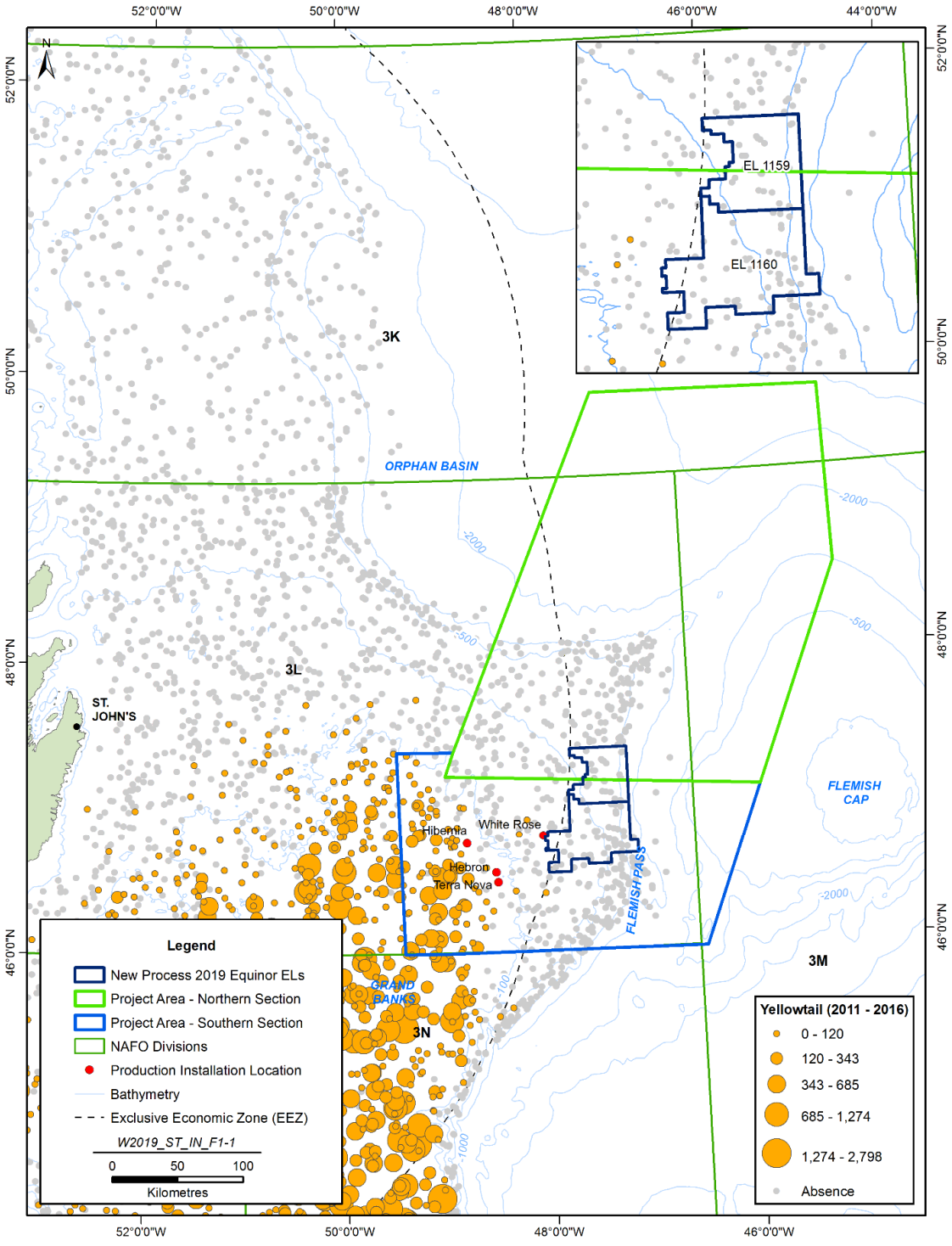


Figure 6-13 Yellowtail Flounder Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

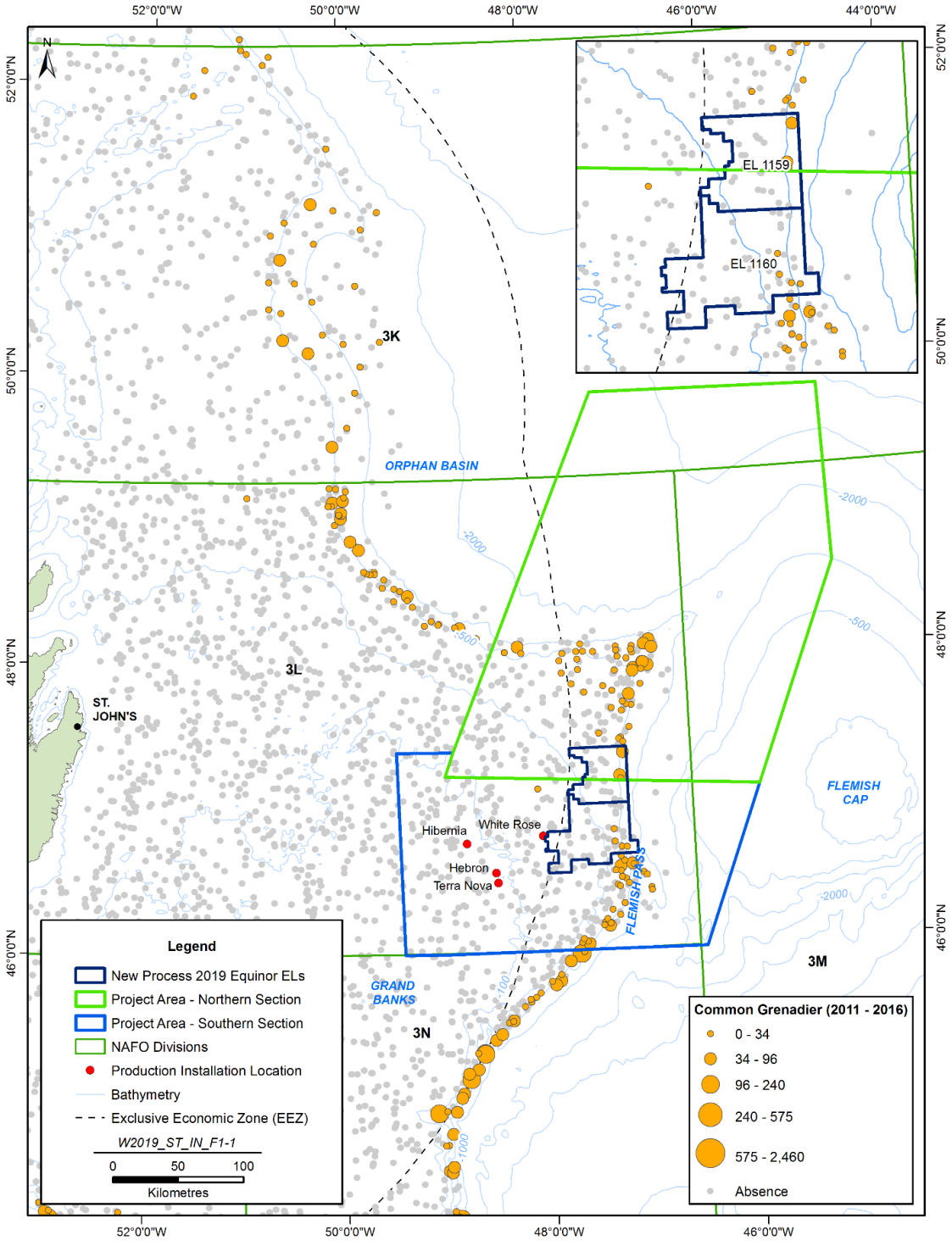


Figure 6-14 Common Grenadier Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

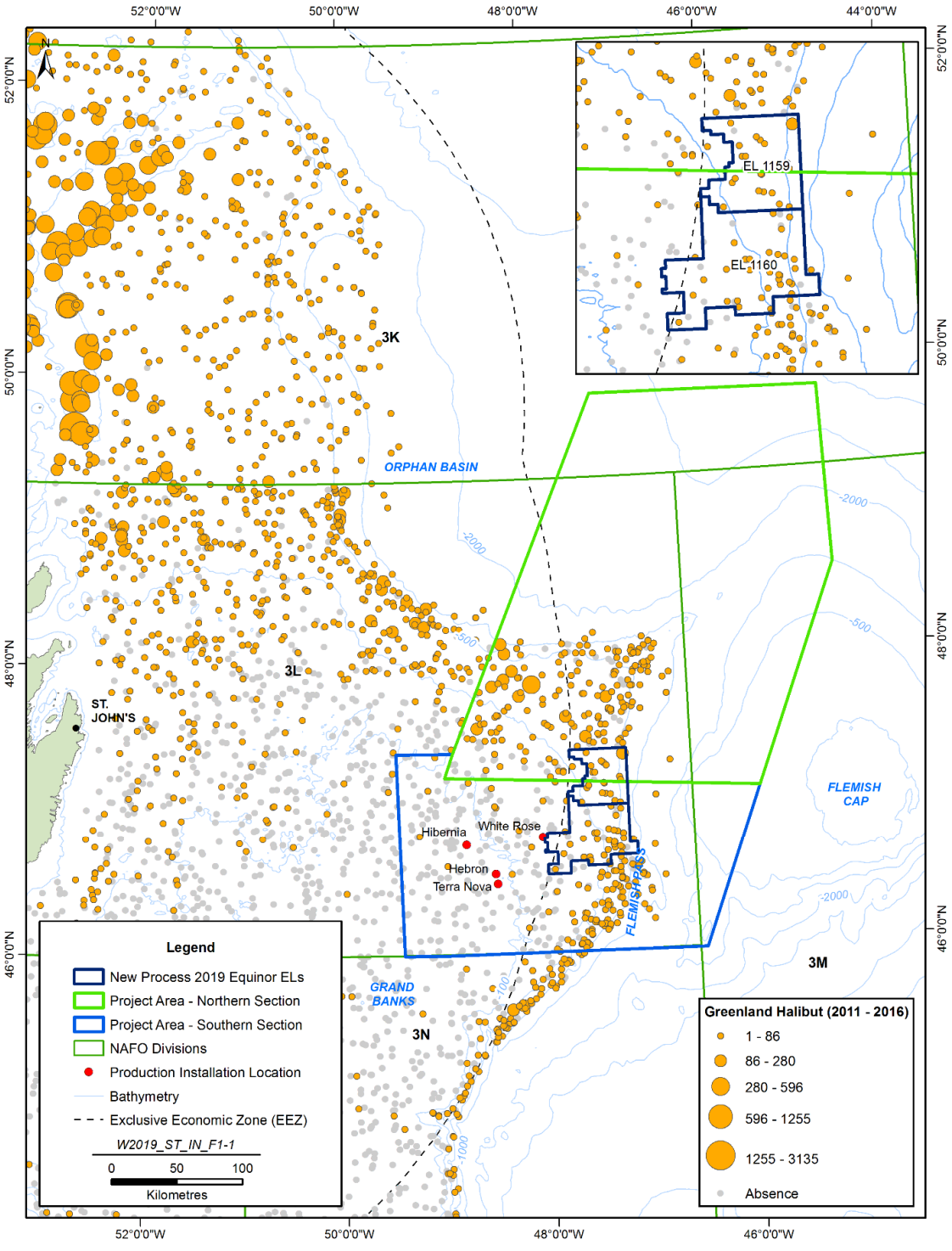


Figure 6-15 Greenland Halibut Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

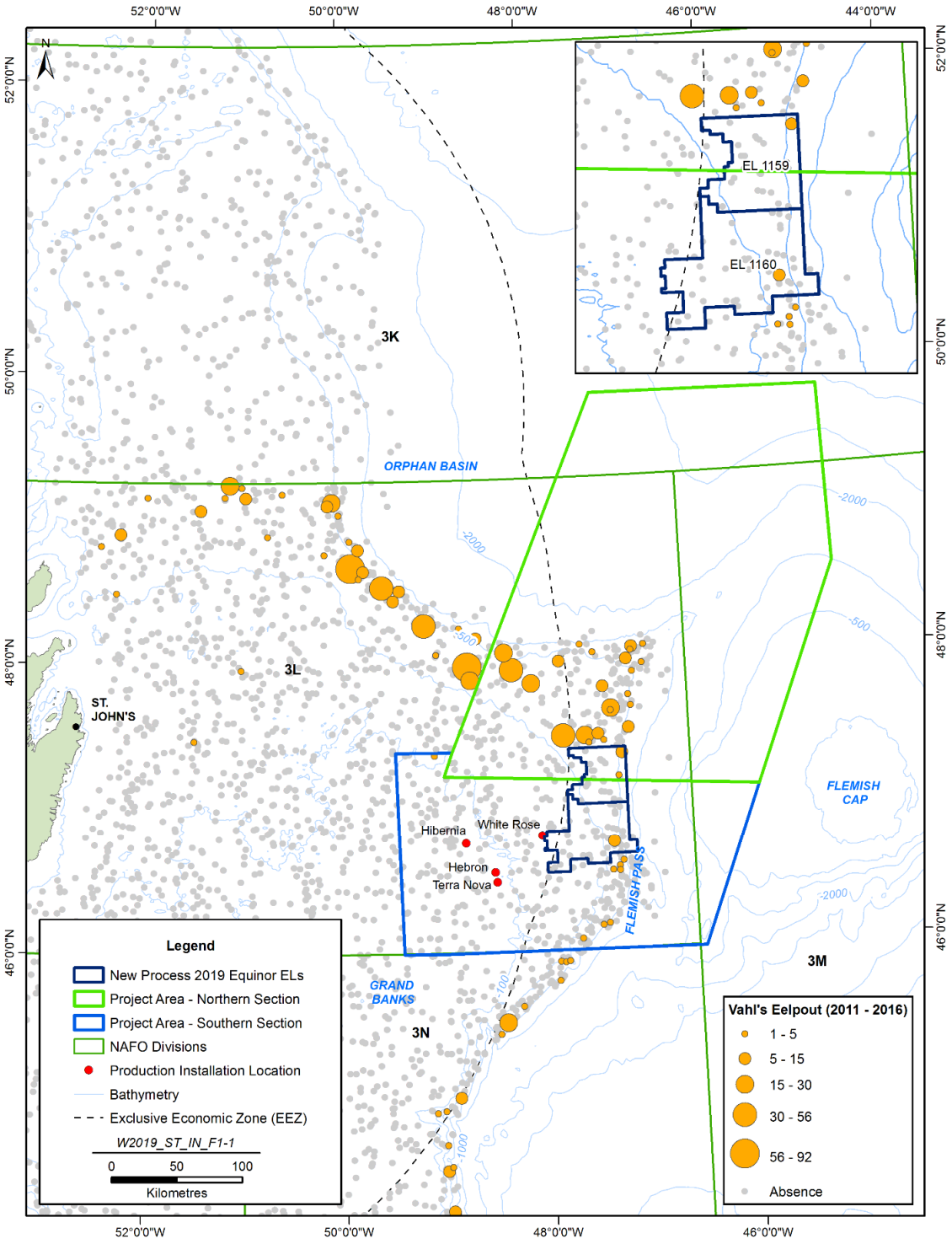


Figure 6-16 Vahl's Eelpout Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

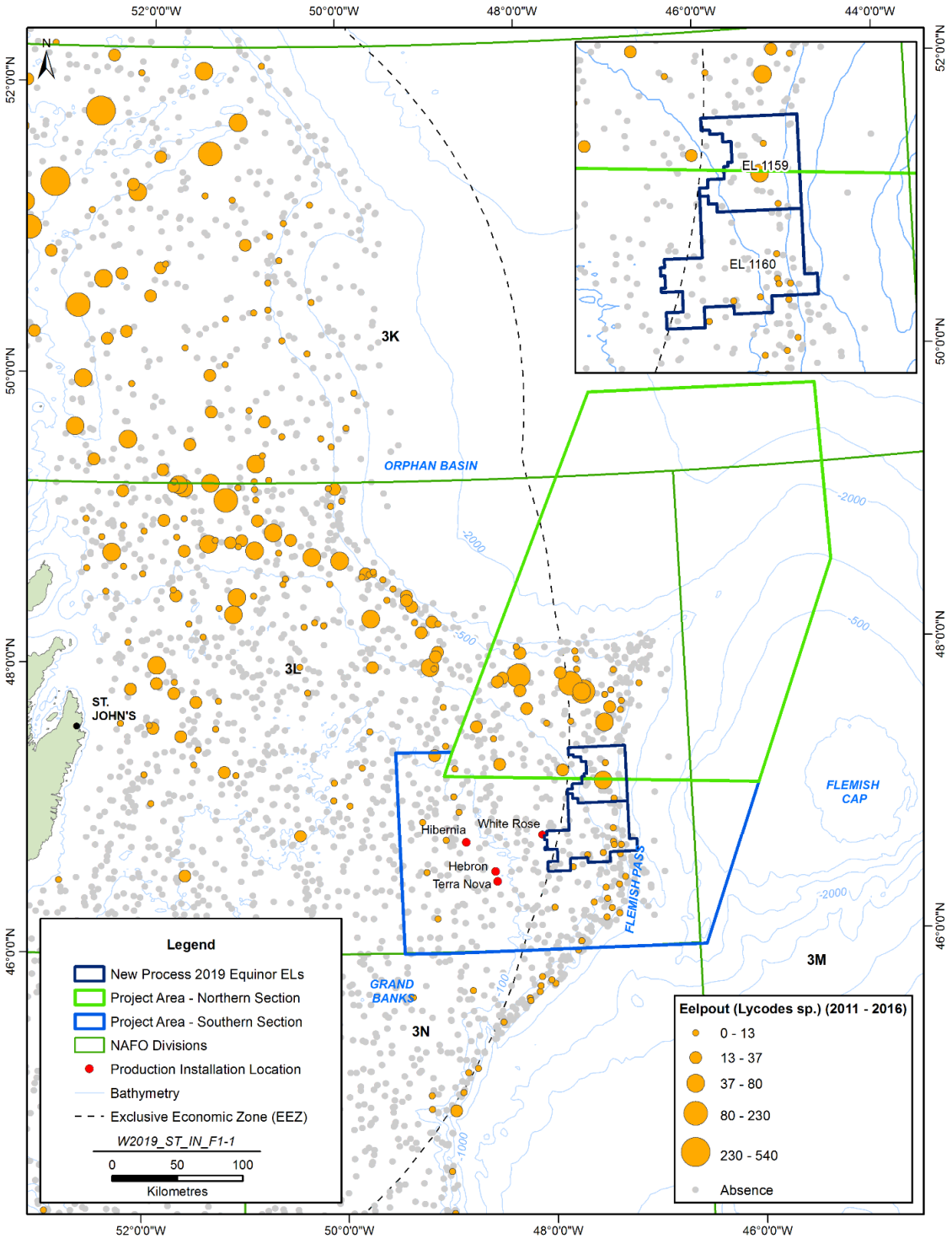


Figure 6-17 Eelpout (*Lycodes* sp.) Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

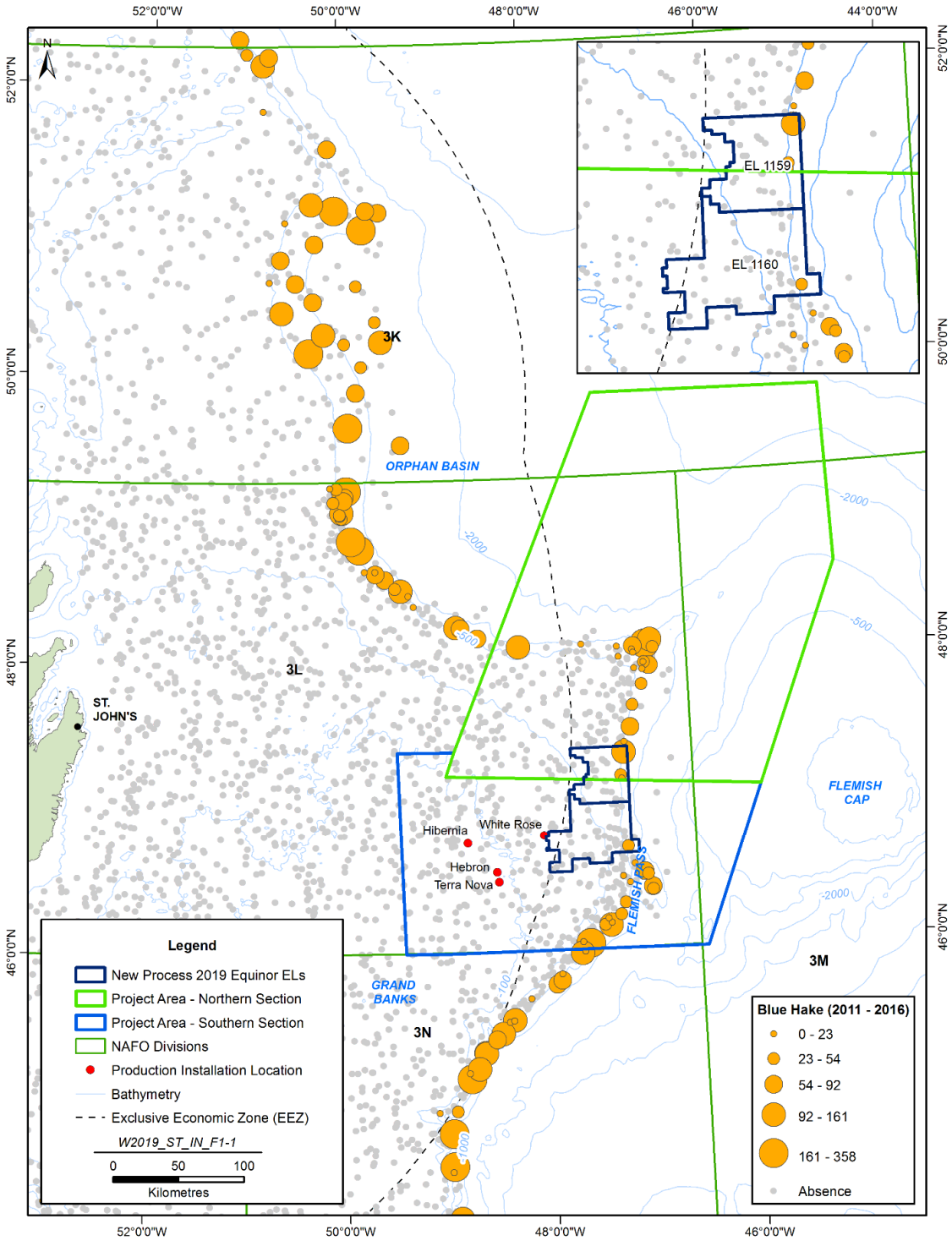


Figure 6-18 Blue Hake Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

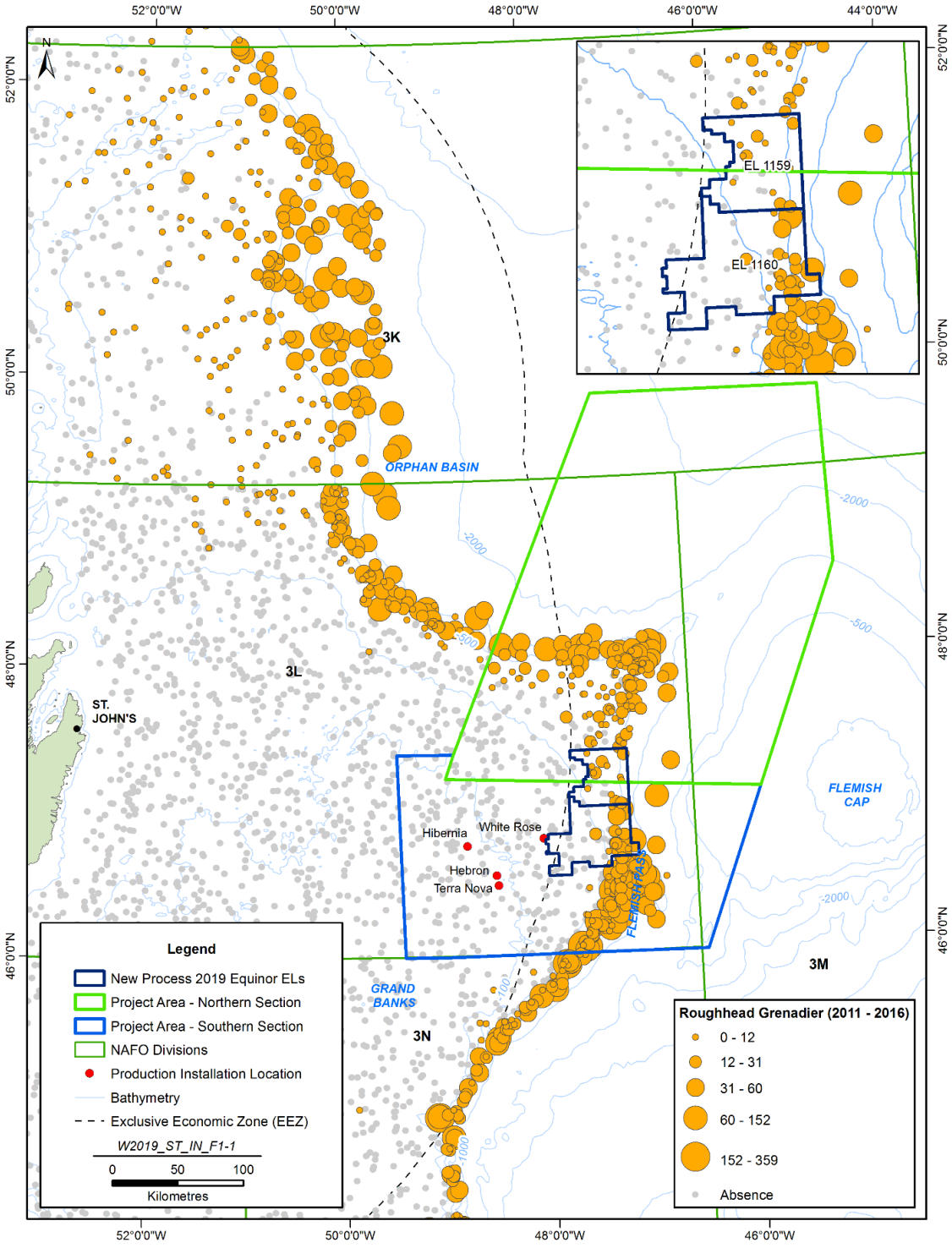


Figure 6-19 Roughhead Grenadier Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

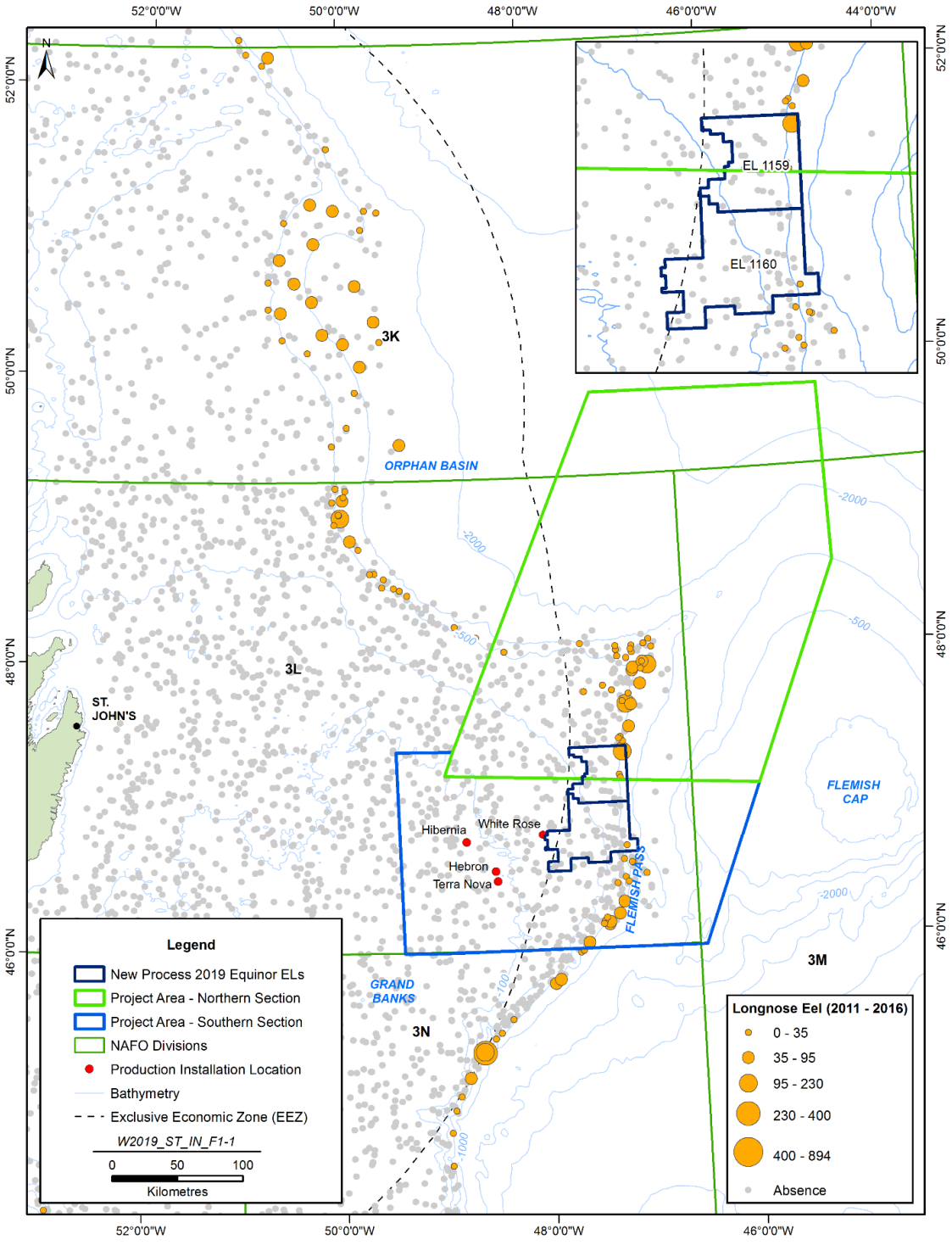


Figure 6-20 Longnose Eel Distribution and Abundance as Compiled from Canadian RV Trawl Survey Data (2011 to 2016)

6.1.6 Species at Risk

Twenty-nine species with conservation designations may occur within the Project Area (Table 6.6); however, only five are listed under NL ESA or SARA legislation. These are the white shark (SARA: Endangered), northern (SARA: Threatened), spotted (SARA: Threatened) and striped (SARA: Species of Concern) wolffish and American eel (NL ESA: Vulnerable). Additionally, there are five new species that IUCN has added to this inventory since 2014 that may be found in the Project Area (Table 6.6). These are black dogfish, lanternfish, Atlantic hagfish, Atlantic halibut, and spiny tail skate. Three of these (black dogfish, lanternfish and Atlantic hagfish) only carry IUCN designations of "Least Concern", whereas the Atlantic halibut and spinytail skate are designated by IUCN as Endangered and Vulnerable, respectively.

Table 6.6 Marine Fish Species at Risk that are Known to or May Occur within the Project Area

Species		Status / Designation [1,2]				Relevant Population (Where Applicable)
Common Name	Scientific Name	NL ESA	SARA	COSEWIC	IUCN	
Striped wolffish	*Anarhichas lupus*		SC	SC		
Northern wolffish	*Anarhichas denticulatus*		T	T		
Spotted wolffish	*Anarhichas minor*		T	T		
American eel	*Anguilla rostrata*	V		T	E	Global (IUCN)
Blue shark	*Prionace glauca*			SC	NT	Atlantic (COSEWIC); Global (IUCN)
Basking shark	*Cetorhinus maximus*			SC	V	Atlantic (COSEWIC); Global (IUCN)
Black dogfish	*Centroscyllium fabricii*				LC	Global (IUCN)
Atlantic cod	*Gadus morhua*			E	V	Newfoundland and Labrador (COSEWIC); Global (IUCN)
Cusk	*Brosme brosme*			E		
Porbeagle	*Lamna nasus*			E	V	Global (IUCN)
Shortfin mako	*Isurus oxyrinchus*			T	V	Atlantic (COSEWIC); Global (IUCN)
White shark	*Carcharodon carcharias*		E	E	V	Atlantic (COSEWIC/SARA); Global (IUCN)
Roughhead grenadier	*Macrourus berglax*			SC		
Roundnose grenadier	*Coryphaenoides rupestris*			E	CE	Global (IUCN)
Lanternfish	*Myctophidae*				LC	Global (IUCN)

Table 6.6 Marine Fish Species at Risk that are Known to or May Occur within the Project Area

Species		Status / Designation [1,2]				Relevant Population (Where Applicable)
Common Name	Scientific Name	NL ESA	SARA	COSEWIC	IUCN	
Atlantic hagfish	*Myxine glutinosa*				LC	Global (IUCN)
American plaice	*Hippoglossoides platessoides*			T		Newfoundland and Labrador (COSEWIC)
Atlantic halibut	*Hippoglossus hippoglossus*			NR	E	Global (IUCN)
Barndoor skate	*Dipturus laevis*			NR	E	Global (IUCN)
Smooth skate	*Malacoraja senta*			E	E	Funk Island Deep (COSEWIC); Global (IUCN)
Spinytail skate	*Bathyraja spinicauda*				NT, V	Global, Northwest Atlantic (IUCN)
Thorny skate	*Amblyraja radiata*			SC	V	Canada, Global (IUCN)
Winter skate	*Leucoraja ocellata*			E	E	Eastern Scotian Shelf – Newfoundland (COSEWIC); Global (IUCN)
Atlantic salmon	*Salmo salar*			T, SC, E	LC	South Newfoundland, Quebec Eastern North Shore, Quebec Western North Shore, Anicosti Island, Inner St. Lawrence, Gaspe-Southern Gulf of St. Lawrence, Eastern Cape Breton, Nova Scotia Southern Upland (COSEWIC); Global (IUCN)
Atlantic bluefin tuna	*Thunnus thynnus*			E	E	Global (IUCN)
Bigeye tuna	*Thunnus obesus*				V	Global (IUCN)
Acadian redfish	*Sebastes fasciatus*			T	E	Atlantic (COSEWIC);
						Global (IUCN)
Deepwater redfish	*Sebastes mentella*			T	LC	Northern (COSEWIC);
						Global (IUCN)
Spiny dogfish	*Squalus acanthias*			SC	V	Atlantic (COSEWIC);
						Global (IUCN)

Notes:
[1] Not at Risk (NR), Least Concern (LC), Vulnerable (V), Near Threatened (NT), Special Concern (SC), Threatened (T), Endangered (E), Critically Endangered (CE)
[2] Multiple designations refer to multiple populations or sub-populations

6.2 Marine and Migratory Birds

The coastline of eastern and southern NL and the waters offshore provide important habitat for various species of marine-associated birds. The nutrient-rich Grand Banks and Flemish Cap regions are important feeding areas for dozens of marine bird species and are of importance to planktivorous species including storm-petrels, shearwaters and dovekies due to the abundance of food in this area (Barrett et al. 2006; Fort *et al.* 2012, 2013). Marine-associated birds in this area can be roughly divided into 1) seabirds, 2) waterfowl and divers, and 3) shorebirds. These groups are considered to be the most vulnerable to perturbation because they spend much of their life in the marine environment.

A diverse assemblage of seabirds can be found in the marine waters off eastern Newfoundland at all times of year, including cormorants, gannets, phalaropes, gulls, terns, alcids (auks), jaegers and skuas, and tubenoses (fulmars, petrels and shearwaters). Seabirds are at their highest density during the spring and summer months, when species are migrating and zooplankton productivity is highest (Templeman 2010; AMEC 2014). Other species with potential to occur within the Project Area include puffins, razorbills, phalarope, skua, and jaeger.

Cormorants generally feed within a few kilometres of their colony or roost location and rarely venture far from the coast at any time of year, and so their abundance is low. Few of the cormorant sightings were far from shore and all were in the winter months and none within or near the Project Area.

The northern gannet is a highly pelagic species, spending most of its time in continental shelf waters and coming ashore only to breed in large, dense, colonies. Gannets are most likely to be present in the area from March to November, because the majority of the population overwinters in the Gulf of Maine and further south (Montevecchi et al. 2012; Mowbray 2002). However, they have been observed in the waters off Newfoundland at all times of year.

Phalaropes spend most of the year offshore. They breed in Arctic tundra during the summer months and typically overwinter south of Canada, occurring most frequently in the area during migration. The red-necked phalarope has been assessed by COSEWIC as a species of Special Concern. Phalarope sightings were infrequent in summer and fall and even rarer in winter, and no sightings were reported in the region during the spring surveys. Although most of the sightings were not identified to species level, of those that were identified most were red phalarope, which is known to be the more pelagic of the two species (Tracy et al. 2002).

There are six species of gulls found commonly off the coast of eastern Newfoundland: herring, great black-backed and ring-billed gulls and black-legged kittiwakes occur in temperate areas year-round, while Iceland and glaucous gulls nest in the Arctic and are only found in the region outside the breeding season. Other species, including the Arctic-nesting Sabine's and ivory gulls, as well as laughing, black-headed and lesser black-backed Gulls, occur infrequently in eastern Newfoundland. The ivory gull is listed as Endangered under both the provincial NL ESA and the federal SARA. Outside of the breeding season, most gull species are associated with coastal areas, while Sabine's gull, ivory gull and black-legged kittiwake tend to be found further offshore. A recent tracking study of black-legged kittiwakes has shown that the Northwest Atlantic, and, in particular the shelf edge off Newfoundland, is an important wintering area for kittiwakes, with most of the Atlantic population overwintering in this region

(Frederiksen et al. 2012). Gulls and kittiwakes were both commonly observed in the area year-round. Most of the large gulls identified to species level were great black-backed gull, herring gull, and in the winter months, Iceland gull and glaucous gull. Kittiwakes and great black-backed gulls were among the most commonly reported species during bird surveys conducted for Statoil within and near the Flemish Pass in the summer and winter months (Statoil 2015a, 2015b). Ivory gulls were reported on two occasions from bird surveys conducted during Statoil's drilling campaign at EL 1112 in the winter months (Statoil 2015a).

Terns are typically found in coastal environments, seldom seen far from shore except for Arctic Terns, which tend to be highly pelagic during migration (Hatch 2002; Nisbet 2002; Cuthbert and Wires 1999). They were infrequently observed in the spring and summer, and essentially absent in the fall and winter. While most tern sightings could not be identified to species level, both common and Arctic terns have been observed in the waters of eastern Newfoundland (ECSAS 2016).

Six members of the alcid (auk) family occur in the Project Area and surrounding region: dovekie, razorbill, common murre, thick-billed murre, Atlantic puffin and black guillemot. The dovekie is a largely Arctic-nesting species, while the other five species breed in eastern Newfoundland. Among seabirds, murres and dovekies spend a large proportion of their time on the water relative to more aerial species (Wiese and Ryan 2003; Wilhelm et al. 2007; Fifield et al. 2009) and congregate over relatively small, productive areas, such as around the Grand Banks (Gaston et al. 2011; Hedd et al. 2011; Montevecchi et al. 2012). The core winter distribution of the world's dovekie population lies within the waters off eastern Newfoundland (Fort et al. 2013). Most of the eastern Canadian population of common murres and over a third of the region's thick-billed murres also congregate in this region in the winter months (McFarlane Tranquilla et al. 2013).

Five species of jaegers and skuas regularly occur off eastern Newfoundland: pomarine jaeger, parasitic jaeger, long-tailed jaeger, great skua and south polar skua. Non-breeders are found offshore year-round. In the winter months, the waters off eastern Canada support a large proportion of the Icelandic population of great skuas (Magnusdottir et al. 2012).

Outside the breeding season, fulmars and shearwaters are found in offshore waters and spend most of their time in the air, at or near the water's surface. The northern fulmar is common year-round in the waters off eastern Newfoundland. Shearwaters are most common overall in offshore Newfoundland in the summer and fall months, particularly on the east and northeast Grand Banks (Fifield et al. 2009). Most of the world's population of great shearwaters is found in the northwest Atlantic in the summer months, outside of their austral breeding season (Brown 1986). In the summer months, northern fulmars and great shearwaters are among the most commonly observed species in seabird surveys conducted for Statoil (Statoil 2015b; Fugro EMU 2015).

Two species of storm-petrels are found in the waters off eastern Newfoundland (Leach's storm-petrel and Wilson's storm-petrel). Storm-petrels are found in offshore environments year-round, often following ships and fishing boats (Huntington et al. 1996). Leach's storm-petrel is the species most frequently found stranded on platforms and vessels off eastern Newfoundland; of 135 birds found between 2012 and 2015, 111 were Leach's storm-petrels, (e.g., Thomas et al. 2014; McTavish and Lang 2015, unpublished migratory bird salvage reports provided by Statoil). The majority of strandings (more than

80%) occurred in September and October, corresponding with the departure of fledglings from the breeding colonies (Davis et al. 2015). They are commonly observed in the summer months and regularly seen in the spring and fall, but are uncommon in winter.

Waterfowl observations were scarce in the waters off eastern Newfoundland, but the most frequently observed species was common eider, followed by long-tailed duck; loons (common and red-throated), scoters (white-winged, surf and black) and a handful of other duck species were infrequently observed.

Marine shoreline habitats, such as sandy mudflats and coastal barrens, are used by foraging shorebirds during migration, but they are not typically found offshore. Therefore, shorebirds are considered to be very infrequent visitors to the region, primarily in the fall months. Small groups of unidentified shorebirds were observed during night time surveys conducted at two offshore production platforms in October 2015 (McTavish and Lang 2015, unpublished migratory bird salvage reports provided by Statoil).

Refer to Appendix D (Section 2) of the Project Description for additional information and figures associated with marine and migratory birds.

6.2.1 Seabirds

An overview of seabird colony locations in eastern Newfoundland is illustrated in Figure 6-21. The Flemish Pass EIS included Eastern Canadian Seabirds at Sea (ECSAS) data up to 2016, which was obtained from Canadian Wildlife Service (CWS), however, information where available for 2017 and the seabird colony-specific tables and figures originally provided in the Flemish Pass EIS have been updated in Tables 6.7 to 6.13 and Figures 6-22 to 6-35.

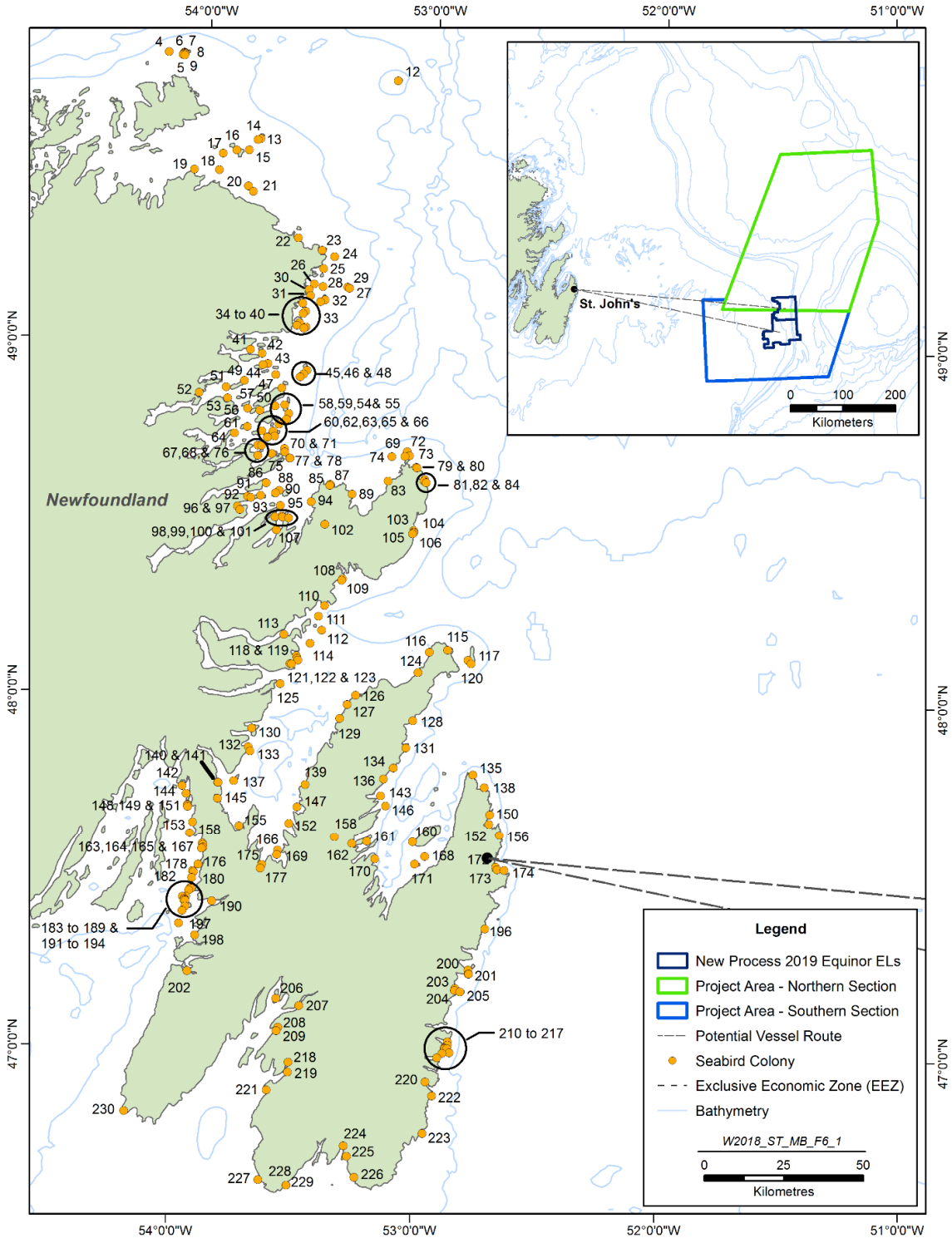


Figure 6-21 Seabird Colony Locations Eastern Newfoundland

Table 6.7 Cormorant Colony Locations in Eastern Newfoundland

Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
Penguin Island, South	21	60	Pairs	2005
Little Shag Rock	35	12	Pairs	2005
Big Shag Rock	36	50	Pairs	2005
Brown Store Islet	67	300	Individuals	2005
Gull Island, Cape Bonavista	69	50	Individuals	2005
Harbour Grace Islands	146	50	Individuals	2005
Green Island (CB)	199	50	Individuals	2005
Renews Island	222	50	Individuals	2005
Cape St. Mary's	230	20	Individuals	2015

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

Table 6.8 Northern Gannet Colony Locations in Eastern Newfoundland

Colony Name	Colony #1	Colony Size	Survey Unit	Year Surveyed
Funk Island	12	10,198	Pairs	2014
Baccalieu Island	120	3,241	Pairs	2014
Cape St. Mary's	230	13,515	Pairs	2013

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
Black-legged Kittiwake	Funk Island	12	118	Pair	2017
	Gull Island, Cape Freels	24	300	Individual	2005
	Grassy Shag Rock, Offer Gooseberry	46	750	Individual	2005
	Double Shag Island	48	50	Individual	2005
	Gull Island, Cape Bonavista	69	750	Individual	2015
	Stone Island	74	300	Individual	2005
	Little Denier Island	78	300	Individual	2005
	South of Spillars Point	79	750	Individual	2005
	North Bird Island	81	50	Individual	2015
	Black Head	83	300	Individual	2005
	Bird, South	84	50	Individual	2015
	Unnamed I. in from Ragged rocks	103	300	Individual	2005
	Ragged Islands, North	104	300	Individual	2005
	Ragged Islands, Middle	105	50	Individual	2005
	Green Island	108	50	Individual	2005
	Unnamed I. inside Green Island (off Salvage Head)	109	300	Individual	2005
	Maiden Island	110	208	Pair	2005
	Green Island, Trinity Bay	112	51	Pair	2005
	Cliff west of Red Head	115	50	Individual	2005
	Baccalieu Island	120	5,096	Pair	2012
	Copper Island, south of Verge Island	121	300	Individual	2005
	Green Islands, north of Long Island	125	50	Individual	2005
	Unnamed I. in St. Jones Harbour	130	750	Individual	2005
	Bradley's Cove	131	1001	Individual	2005
	Copper Island, Trinity Bay	133	300	Individual	2005
	Spout Cove	134	50	Individual	2005
	West Shag Islands, Bull Arm	140	43	Pair	2005
	East Shag Islands, Bull Arm	141	300	Individual	2005
	Goose Island, south	142	788	Pair	2005
	Carbonear Island	143	300	Individual	2005
	Unnamed I. in Rantem Harbour	145	300	Individual	2005
	Harbour Grace Islands	146	1001	Individual	2005

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Red Rocks	147	300	Individual	2005
	Church Cove	150	1333	Pair	2012
	Torbay, Sculpin Point	152	218	Pair	2012
	Hopeall Island	153	50	Individual	2005
	Brigus Lookout cliff	170	300	Individual	2005
	Freshwater Bay	172	820	Pair	2006
	Deadmans Bay	173	2866	Pair	2006
	Blackhead	174	350	Individual	2005
	Miners Point	196	1001	Individual	2005
	Gull Island	200	4,658	Pair	2017
	Green Island	201	2,188	Pair	2007
	Great Island	205	6,547	Pair	2015
	Goose Island, Ferryland	211	50	Individual	2005
	Cape Ballard	223	50	Individual	2005
	The Drook/Mistaken Point	226	4,170	Pair	2009
	Cape Pine	228	575	Pair	2005
	Cape St. Mary's	230	10,000	Pair	2005
Herring Gull	Funk Island	12	150	Pair	2011
	Penguin Island, North	20	50	Individual	2005
	Penguin Island, South	21	300	Individual	2005
	Southern Cat Island	22	300	Individual	2005
	Middle Bill Island	23	300	Individual	2005
	Gull Island, Cape Freels	24	50	Individual	2005
	Cape Island	25	5	Individual	2005
	Cabot Island, North	27	50	Individual	2005
	Pouch Island	28	250	Individual	2015
	Butterfly Islets	33	50	Individual	2005
	Bennetts Low Island	34	50	Individual	2005
	Little Shag Rock	35	50	Individual	2005
	Big Shag Rock	36	300	Individual	2005
	Southwest Island	42	50	Individual	2005
	Small unnamed I. northeast of Deer Island	43	300	Individual	2005
	Double Shag Island	48	50	Individual	2005

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Small unnamed I. west of Lockers Flat Island	51	50	Individual	2005
	Great Black Island, unnamed I. north and west of Gulch Island	54	50	Individual	2005
	Black Island, St. Brendan's	58	50	Individual	2005
	Puffin Island	59	50	Individual	2005
	Shag Rock, Varket Channel	60	50	Individual	2005
	Brown Store Islet	67	300	Individual	2005
	Gull Island, Cape Bonavista	69	50	Individual	2005
	Green Island, Cape Bonavista	73	750	Individual	2005
	Unnamed I. east of Sailors Island	75	300	Individual	2005
	Little Denier Island	78	50	Individual	2005
	North Bird Island	81	70	Individual	2015
	Elliston Point Island	82	33	Individual	2015
	Bird, South	84	24	Individual	2015
	North unnamed I. in Castle Cove	85	300	Individual	2005
	South unnamed I. in Castle Cove	87	300	Individual	2005
	South of Fish Point Gulch	89	50	Individual	2005
	Middle Long Island	90	50	Individual	2005
	Copper Island	91	50	Individual	2005
	Red Cliff Island	94	300	Individual	2005
	Mouse Island, Sweet Bay	98	50	Individual	2005
	Lakeman Island	101	50	Individual	2005
	Unnamed I. in from Ragged Rocks	103	50	Individual	2005
	Ragged Islands, North	104	50	Individual	2005
	Unnamed I. northeast of Wolf Island	107	50	Individual	2005
	Green Island	108	50	Individual	2005
	Unnamed I. inside Green Island (off Salvage Head)	109	300	Individual	2005
	Ragged Islands, west	111	300	Individual	2005
	Green Island, Trinity Bay	112	1,001	Individual	2005
	Duck Island (TB)	114	2	Individual	2005
	Verge Island	119	1,001	Individual	2005

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Baccalieu Island	120	46	Pair	2012
	Perlican Island	124	750	Individual	2005
	Green Islands, N of Long Island	125	50	Individual	2005
	Hants Head	126	50	Individual	2005
	Unnamed I. rock off of Kings Head	127	50	Individual	2005
	Sugar Loaf	129	50	Individual	2005
	Unnamed I. in St. Jones Harbour	130	50	Individual	2005
	Copper Island, Trinity Bay	133	300	Individual	2005
	Pigeon Island	135	300	Individual	2005
	Stack in Shoe Cove	138	50	Individual	2005
	Goose Island, South	142	300	Individual	2005
	Carbonear Island	143	750	Individual	2005
	Duck Island, East	144	300	Individual	2005
	Harbour Grace Islands	146	1,001	Individual	2005
	Unnamed I. east of Grassy Island	148	50	Individual	2005
	Grassy Island	149	300	Individual	2005
	Woody Island, Southern Harbour	151	300	Individual	2005
	Hopeall Island	153	300	Individual	2005
	Salls Island	154	5	Individual	2005
	Unnamed I. off Bellevue Beach PP	155	300	Individual	2005
	Logy Bay	156	50	Individual	2005
	Stearin Island (off Corbin Head)	158	50	Individual	2007
	Little Harbour Island	159	300	Individual	2005
	The Bell	160	50	Individual	2005
	Fergus Island	161	750	Individual	2005
	Dildo Islands, north	166	1	Pair	2005
	Shag Roost	167	1	Pair	2005
	Little Bell Island	168	750	Individual	2005
	Kelly’s Island	171	50	Individual	2005
	Freshwater Bay	172	3	Individual	2010
	Deadmans Bay	173	21	Individual	2010
	Fair Haven Island	176	50	Individual	2005
	Trinny Cove Islands, off Trinny Cove [1]	178	300	Individual	2005

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Trinny Cove Islands, off Trinny Cove [2]	180	50	Individual	2005
	Grassy Islands, Brine Islands, West	183	50	Individual	2006
	Unnamed I. west of Woody	185	50	Individual	2005
	North Green Island	187	300	Individual	2005
	Harbour Island	188	750	Individual	2005
	Graves Island	189	300	Individual	2005
	Harbour Island, Iona Islands	191	750	Individual	2005
	Unnamed I. off Graves Island	192	50	Individual	2005
	Hole in the Wall Island	194	50	Individual	2005
	Fox Island	197	750	Individual	2005
	Green Island (CB)	199	5	Individual	2005
	Gull Island	200	1,881	Pair	2011
	Green Island	201	100	Pair	2011
	Ship Island	203	175	Individual	2015
	Pee Pee Island	204	300	Individual	2005
	Pee Pee Island	204	77	Pair	2012
	Great Island	205	1,640	Pair	2012
	Goose Island, Ferryland	211	300	Individual	2005
	Wrens Island	212	50	Individual	2005
	Costellos Island	213	50	Individual	2005
	Bois Island	214	300	Individual	2005
	Crow Island, near Ferryland Head	216	300	Individual	2005
	South Head	217	50	Individual	2005
	The Drook/Mistaken Point	226	12	Pair	2005
	Cape Pine Head	229	7	Pair	2005
	Cape St. Mary's	230	39	Pair	2011
Great Black-backed Gull	Funk Island	12	75	Direct count	2011
	Small Island	14	50	Individual	2006
	Coleman Island	15	50	Individual	2006
	Penguin Island, North	20	50	Individual	2005
	Penguin Island, South	21	50	Individual	2005
	Southern Cat Island	22	300	Individual	2005
	Middle Bill Island	23	5	Individual	2005

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Gull Island, Cape Freels	24	50	Individual	2005
	Cape Island	25	5	Individual	2005
	Honey Pot Island	26	5	Individual	2005
	Cabot Island, North	27	50	Individual	2005
	Pouch Island	28	300	Individual	2005
	Green Island, Wesleyville	31	50	Individual	2015
	Butterfly Islets	33	23	Individual	2005
	Big Shag Rock	36	50	Individual	2005
	Main Rock, Greenspond	38	50	Individual	2005
	Horse Island	39	5	Individual	2005
	Copper Island	40	50	Individual	2005
	Small unnamed I. NE of Deer Island	43	5	Individual	2005
	Grassy Shag Rock, Offer Gooseberry	46	50	Individual	2005
	Deer Shag Islets	47	5	Individual	2005
	Flat Rock, Lockers Reach	49	50	Individual	2005
	Unnamed Is. inside Inner Gooseberry Islands, East	50	50	Individual	2005
	Small unnamed I. west of Lockers Flat Island	51	5	Individual	2005
	Small unnamed I. outside Great Content Cove	53	50	Individual	2005
	Unnamed I. north of Great Black Island and west of Gulch Island	54	5	Individual	2005
	Unnamed I. south of Lakeman Island	56	5	Individual	2005
	Black Island, St. Brendan's	58	50	Individual	2005
	Puffin Island	59	50	Individual	2005
	Shag Rock, Varket Channel	60	50	Individual	2005
	Lackington Rock	62	50	Individual	2005
	Unnamed I. northeast of Long Reach Island	64	5	Individual	2005
	Unnamed I. southwest of Ship Island	65	5	Individual	2005
	Brown Store Islet	67	50	Individual	2005
	Gull Island, Cape Bonavista	69	51	Individual	2015
	Green Island, Cape Bonavista	73	2	Individual	2015

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Unnamed I. east of Sailors Island	75	50	Individual	2005
	Little Denier Island	78	50	Individual	2005
	Bird, South	84	1	Individual	2015
	North unnamed I. in Castle Cove	85	50	Individual	2005
	Long Island, Middle	90	50	Individual	2005
	Copper Island	91	50	Individual	2005
	Red Cliff Island	94	50	Individual	2005
	Unnamed I. north of Chance Head	95	50	Individual	2005
	Southern Den	96	50	Individual	2005
	Mouse Island, Sweet Bay	98	50	Individual	2005
	Gull Island, Sweet Bay	100	5	Individual	2005
	Unnamed I. in from Ragged Rocks,	103	50	Individual	2005
	Ragged Islands, North	104	50	Individual	2005
	Ragged Islands, South	106	50	Individual	2005
	Unnamed I. northeast of Wolf Island	107	50	Individual	2005
	Green Island	108	5	Individual	2005
	Unnamed I. inside Green Island (off Salvage Head)	109	50	Individual	2005
	Ragged Islands, West	111	300	Individual	2005
	Green Island, Trinity Bay	112	50	Individual	2005
	Duck Island	114	5	Individual	2005
	Red Head, cliff west of	115	50	Individual	2005
	Verge Island	119	50	Individual	2005
	Baccalieu Island	120	2	Boat estimate	2012
	Perlican Island	124	50	Individual	2005
	Green Islands, north of Long Island	125	300	Individual	2005
	Copper Island, Trinity Bay	133	5	Individual	2005
	Spout Cove	134	5	Individual	2005
	Goose Island, South	142	50	Individual	2005
	Duck Island, East	144	50	Individual	2005
	Unnamed I. east of Grassy Island	148	5	Individual	2005
	Woody Island, Southern Harbour	151	50	Individual	2005
	Hopeall Island	153	50	Individual	2005

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Salls Island	154	5	Individual	2005
	Unnamed I. off Bellevue Beach PP	155	300	Individual	2005
	Stearin Island (off Corbin Head)	158	50	Individual	2007
	Little Harbour Island	159	50	Individual	2005
	The Bell	160	50	Individual	2005
	Fergus Island	161	50	Individual	2005
	Little Bell Island	168	50	Individual	2005
	Freshwater Bay	172	6	Individual	2005
	Deadmans Bay	173	6	Individual	2005
	Fair Haven Island	176	5	Individual	2005
	Trinny Cove Islands, off Trinny Cove [1]	178	5	Individual	2005
	Trinny Cove Islands, off Trinny Cove [2]	180	5	Individual	2005
	Grassy Islands, Brine Islands, West	183	50	Individual	2006
	Unnamed I. west of Woody	185	50	Individual	2005
	East Green Island	186	300	Individual	2005
	North Green Island	187	300	Individual	2005
	Unnamed I. off Graves Island	192	50	Individual	2005
	Little Island (Iona Islands)	193	1	Pair	2005
	Hole in the Wall Island	194	50	Individual	2005
	Green Island (CB)	199	50	Individual	2005
	Gull Island	200	33	Ground count	2011
	Green Island	201	20	Estimate	2011
	Ship Island	203	50	Individual	2005
	Pee Pee Island	204	3	Ground count	2012
	Great Island	205	9	Ground count	2012
	Kerwan Point, Newbridge	207	2	Pair	2005
	Goose Island, Ferryland	211	50	Individual	2005
	Wrens Island	212	5	Individual	2005
	Bois Island	214	50	Individual	2005
	Crow Island, near Ferryland Head	216	50	Individual	2005
	Cape Pine Head	229	1	Pair	2005
	Cape St. Mary’s	230	7	Pair	2011

Table 6.9 Gull Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
Ring-billed Gull	Coleman Island	15	300	Individual	2006
	Pouch Island	28	50	Individual	2005
	Tinker Rocks	30	148	Pair	2005
	Bennetts Low Island	34	300	Individual	2005
	Unnamed I. in Willis Reach	55	300	Individual	2005
	Green Island, Cape Bonavista	73	350	Individual r	2015
	Red Cliff Island	94	17	Pair	2005
	Mustard Bowl Island	99	50	Individual	2005
	Goose Island, South	142	304	Pair	2005
	Grassy Islands, Brine Islands, West	183	300	Individual	2006
	Crawley Island	190	992	Pair	2005
	The Neck at Isaac Heads	198	300	Individual	2005
	Kerwan Point (Newbridge)	207	2	Pair	2005
	O'Donnells	209	321	Pair	2005
	Biscay Bay Pond	224	23	Pair	2005

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

Table 6.10 Tern Colony Locations in Eastern Newfoundland

Colony Name	Colony #1	Colony Size	Survey Unit	Year Surveyed
Wadham Island, Offer	13	63	Individual	2006
Coleman Island	15	85	Pair	2006
Pigeon Island	16	28	Pair	2006
Duck Island, N (near Fogo)	17	20	Pair	2006
Muddy Shag Island	18	12	Pair	2006
Penguin Island, South	21	80	Pair	2005
Pouch Island	28	1	Pair	2005
Tinker Rocks	30	476	Pair	2005
Bennetts Low Island	34	10	Pair	2005
Unnamed I. in Greenspond Harbour	37	100	Pair	2005
Horse Island	39	8	Pair	2005

Table 6.10 Tern Colony Locations in Eastern Newfoundland

Colony Name	Colony #1	Colony Size	Survey Unit	Year Surveyed
Unnamed I. southwest of Goodwithy Harbour	41	60	Pair	2005
Southwest Island	42	155	Pair	2005
Small unnamed I, north of Deer Island	44	70	Pair	2005
Deer Shag Islets	47	30	Pair	2005
Unnamed Is. inside Inner Gooseberry Islands, East	50	260	Pair	2005
Small unnamed I. west of Lockers Flat Island	51	105	Pair	2005
Unnamed I. off Hare Bay	52	45	Pair	2005
Unnamed I. in Willis Reach	55	25	Pair	2005
Unnamed I. rock southwest of Cottel Island	57	18	Pair	2005
Small unnamed I. 1 km east of Hare Island	61	20	Pair	2005
Unnamed I. northeast of Morris Island	63	198	Pair	2005
Unnamed I. northeast of Long Reach Island	64	78	Pair	2005
Unnamed I. southeast of Shoe Island	66	13	Pair	2005
Shag Islands, Outer	70	200	Pair	2005
Green Island, Cape Bonavista	73	565	Pair	2005
Unnamed I. north of Baldric Head	76	65	Pair	2005
North unnamed I. in Castle Cove	85	2	Pair	2005
Swale Island Shag Rock	86	23	Pair	2005
Long Island	88	225	Pair	2005
Little Harbour Gull Rock	92	175	Pair	2005
Mermaid Rock	93	35	Pair	2005
Red Cliff Island	94	115	Pair	2005
Unnamed Is. in Lion’s Den, Terra Nova NP	97	125	Pair	2005
Mustard Bowl Island	99	100	Pair	2005
Unnamed I. northeast of Wolf Island	107	50	Pair	2005
Maiden Island	110	3250	Pair	2005
Long Harbour, unnamed I. west of	113	15	Pair	2005
Sgeir Island	116	325	Pair	2005
Grassy Island North of Verge Island	118	9	Pair	2005
Copper Island, South of Verge Island	121	2	Pair	2005
Rocks northeast of East Random Head	122	10	Pair	2005
Unnamed I. in Random Head Harbour	123	15	Pair	2005
Gull Island, Conception Bay	128	105	Pair	2005

Table 6.10 Tern Colony Locations in Eastern Newfoundland

Colony Name	Colony #1	Colony Size	Survey Unit	Year Surveyed
Harbour Rocks, Shoal Bay	132	49	Pair	2005
Spout Cove	134	15	Pair	2005
Unnamed I. in Salmon Cove	136	83	Pair	2005
Bull Island	137	38	Pair	2005
Unnamed I. off Islington	139	130	Pair	2005
Unnamed I. in Rantem Harbour	145	80	Pair	2005
Salls Island	154	3	Pair	2005
Spaniards Bay Spit	162	14	Pair	2005
Grassy Island, Little Pinchgut	164	4	Pair	2005
Rock southwest of Dildo Islands	169	1	Pair	2005
Upper Island, Chapel Arm	175	1	Pair	2005
Inside Chapel Arm	177	8	Pair	2005
Trinny Cove Islands, off Trinny Cove [2]	180	9	Pair	2005
Trinny Cove Islands, off Trinny Cove Head	182	51	Pair	2005
Phillips Island, southeast Placentia	202	10	Pair	2005
Point in Pinchgut Tickle	206	58	Pair	2005
Kerwan Point (Newbridge)	207	82	Pair	2005
Small unnamed I. in O'Donnells lagoon	208	111	Pair	2005
O'Donnells	209	41	Pair	2005
Stone Islands	210	25	Pair	2005
Hares Ears	215	18	Pair	2005
Riverhead	218	13	Pair	2005
Coote Pond	219	90	Pair	2005
Renews Harbour	220	125	Pair	2005
Point La Haye	221	2	Pair	2005
Biscay Bay Pond	224	1	Pair	2005
Unnamed I. in Portugal Cove Pond	225	10	Pair	2005

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

Table 6.11 Alcid Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
Atlantic Puffin	Funk Island	12	2,000	Pair	1988
	Small Island	14	6,190	Pair	2001
	Coleman Island	15	950	Pair	1984
	Pigeon Island	16	20	Pair	1973
	Penguin Island, South	21	755	Pair	2013
	Unnamed I. east of Cape Bonavista	72	350	Pair	2011
	Little Denier	77	1,000	Pair	2011
	Spillars Point	80	250	Pair	1985
	North Bird Island	81	1,000	Pair	1987
	Elliston Point Island	82	400	Pair	1985
	Bird, South	84	1,000	Pair	1985
	Green Island, Trinity Bay	102	1,277	Pair	2005
	Duck Island, Trinity Bay	114	3,000	Pair	2005
	Baccalieu Island	120	75,000	Pair	2005
	Gull Island	200	118,401	Pair	2012
	Green Island	201	9,300	Pair	1979
	Pee Pee Island	204	1,850	Pair	2010
	Great Island	205	174,491	Pair	2011
	The Drook/Mistaken Point	226	79	Pair	2005
	Cape Pine Head	229	259	Pair	2005
Common Murre	Funk Island	12	472,259	Pair	2009
	Cabot Island, South	29	9,897	Pair	2009
	Baccalieu Island	120	1,441	Individual	2012
	Gull Island	200	11,795	Individual	2016
	Green Island	201	250,000	Pair	2007
	Great Island	205	1,037	Pair	2015
	The Drook/Mistaken Point	226	84	Pair	2009
	Western Head	227	27	Pair	1985
	Cape Pine Head	229	9	Pair	2005
	Cape St. Mary's	230	15,484	Pair	2007
Thick-billed Murre	Funk Island	12	250	Pair	1980
	Baccalieu Island	120	73	Individual	2012
	Gull Island	200	1	Pair	2012
	Green Island	201	242	Pair	2004

Table 6.11 Alcid Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Cape St. Mary's	230	1,000	Pair	2012
Razorbill	Funk Island	12	200	Pair	1980
	Small Island	14	273	Pair	2001
	Coleman Island	15	10	Pair	1984
	Cabot Island, South	29	4	Pair	2017
	Puffin Island	117	50	Pair	2012
	Baccalieu Island	120	406	Pair	2012
	Gull Island	200	159	Individual	2017
	Green Island	201	170	Pair	1979
	Ship Island	203	12	Individual	2015
	Pee Pee Island	204	31	Individual	2015
	Great Island	205	201	Pair	2015
	The Drook/Mistaken Point	226	72	Pair	2009
	Western Head	227	7	Pair	1985
	Cape Pine Head	229	189	Pair	1985
	Cape St. Mary's	230	100	Pair	1979
Black Guillemot	Funk Island	12	1	Pair	1988
	Coleman Island	15	25	Pair	1984
	Offer Gooseberry Island	45	13	Pair	1945
	Brown Store Islet	67	2	Pair	1989
	Unnamed I. east of Brown Store Islet	68	3	Pair	1989
	Shag Islands	71	20	Pair	1974
	South of Spillars Point	79	25	Pair	1985
	Puffin Island	117	30	Pair	2012
	Baccalieu Island	120	113	Pair	2012
	Bull Island	137	8	Pair	1945
	Grassy Island	149	4	Pair	1974
	Tinker Islet	163	1	Pair	1974
	Unnamed I., Little Pinchgut,	165	10	Pair	1974
	Little Bell Island	168	125	Pair	1984
	Kelly's Island	171	100	Pair	1984
	Freshwater Bay	172	30	Individual	2006
	Deadmans Bay	173	10	Individual	2005
	Trinny Cove Islands, off Trinny Cove	178	36	Individual	2015

Table 6.11 Alcid Colony Locations in Eastern Newfoundland

Common Name	Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
	Trinny Cove Islands, off Trinny Cove Head	182	2	Pair	1974
	Grassy Islands, Brine Islands, East	184	1	Pair	1974
	Gull Island	200	6	Pair	2017
	Ship Island	203	11	Individual	2015
	Pee Pee Island	204	1	Pair	2015
	Great Island	205	1	Pair	2015
	Bois Island	214	20	Pair	1984
	The Drook/Mistaken Point	226	17	Individual	2009
	Western Head	227	20	Pair	1985
	Cape Pine Head	228	5	Pair	2005

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

Table 6.12 Northern Fulmar Colony Locations in Eastern Newfoundland

Colony Name	Colony #[1]	Colony size	Survey Unit	Year Surveyed
Funk Island	12	40	Pair	2017
Baccalieu Island	120	13	Pair	2003
Gull Island	200	12	Pair	2016
Green Island	201	1	Pair	1988
Ship Island	203	42	Pair	2015
Great Island	205	5	Pair	2015
Cape St. Mary's	230	9	Pair	1998

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

Table 6.13 Leach's Storm-petrel Colony Locations in Eastern Newfoundland

Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
White Islands	1	400	Pair	1943
Rouge Island	2	1,000	Pair	1943
Isle Aux Canes	3	300	Pair	1986
Storehouse Islets	4	100	Pair	1984

Table 6.13 Leach's Storm-petrel Colony Locations in Eastern Newfoundland

Colony Name	Colony #[1]	Colony Size	Survey Unit	Year Surveyed
Single Turr Cliff	5	1,523	Pair	2014
Double Turr Cliff	6	2,444	Pair	2014
Hennessey Island	7	9	Pair	2014
Bakeapple Island	8	2,317	Pair	2014
Little Bakeapple	9	113	Pair	2014
Wadhams Harbour Island	10	200	Pair	2012
Puffin Island (Little Fogo Islands)	11	396	Pair	2014
Small Island	14	1,038	Pair	2001
Coleman Island	15	5,000	Pair	1984
Ladle Island	19	20	Pair	1985
Penguin Island, North	20	200	Pair	1984
Penguin Island, South	21	7,800	Pair	1979
Cabot Island, North	27	100	Pair	1945
Flower Island	32	75	Pair	1945
Butterfly Islets	33	200	Pair	1967
Big Shag Rock	36	1,000	Pair	1980
Offer Gooseberry Island	45	100	Pair	1945
Shag Islands	71	1,700	Pair	1974
Green Island, Cape Bonavista	73	10	Pair	1945
Little Denier Island	78	1,300	Pair	1975
Bird, South	84	50	Pair	1985
Copper Island	91	10	Pair	1987
Green Island, Trinity Bay	112	1	Pair	2005
Baccalieu Island	120	1,977,692	Pair	2013
Wreck Island, Garia Bay	157	100	Pair	1944
Ramea Columbier Island	179	1,000	Pair	1989
Pass Island	181	100	Pair	1978
Penguin Islands	195	100	Pair	1978
Gull Island	200	179,743	Pair	2012
Green Island	201	20	Pair	1979
Great Island	205	134,139	Pair	2011

Note:
1. Refer to Figure 6-21 for colony locations corresponding to each Colony #.
Source: Data obtained from Atlantic Canada Colonial Waterbird Database (CWS 2017).

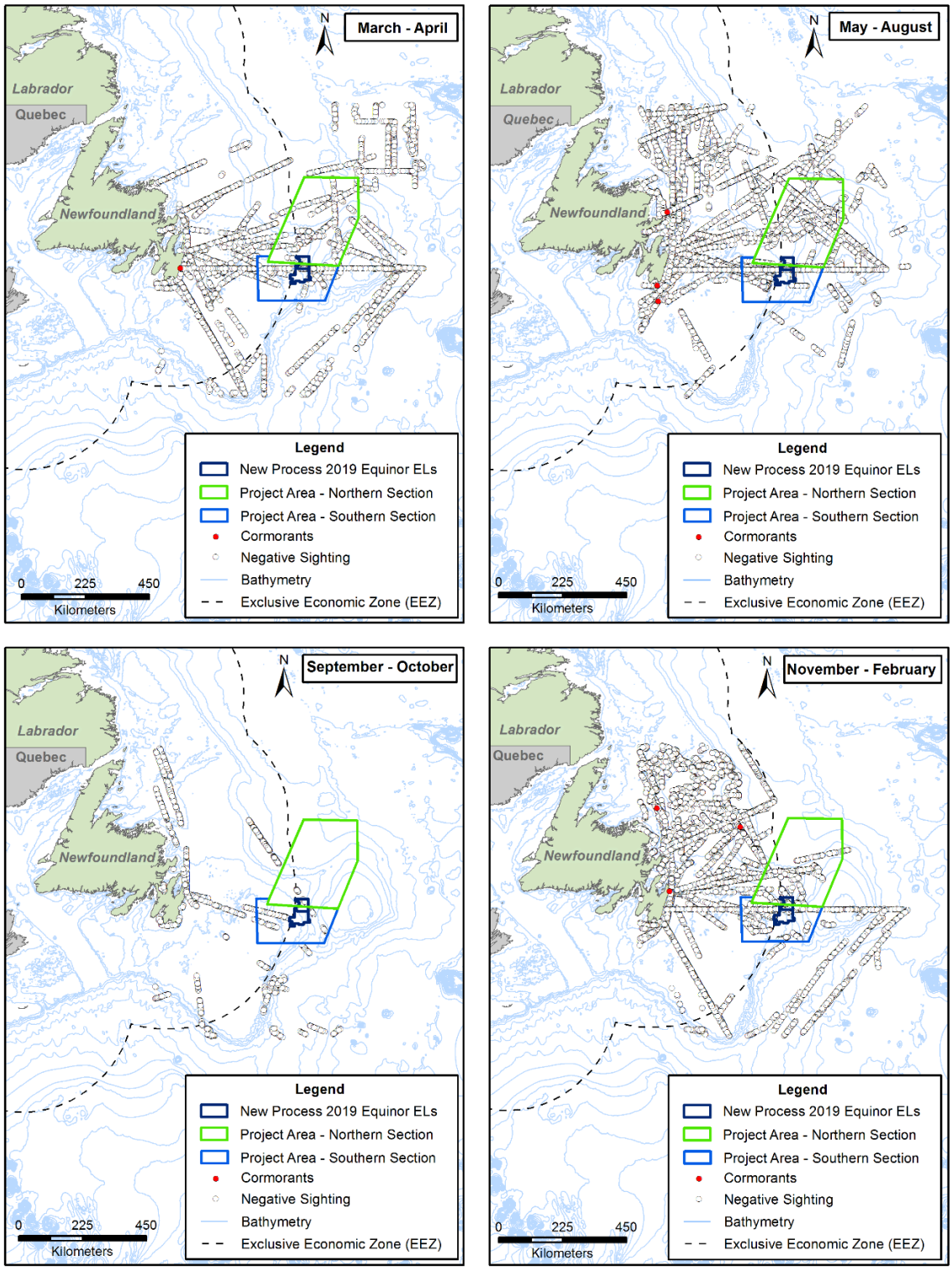


Figure 6-22 Seasonal Distribution of ECSAS Cormorant Observations in the Waters off Eastern Newfoundland (2001 to 2017)

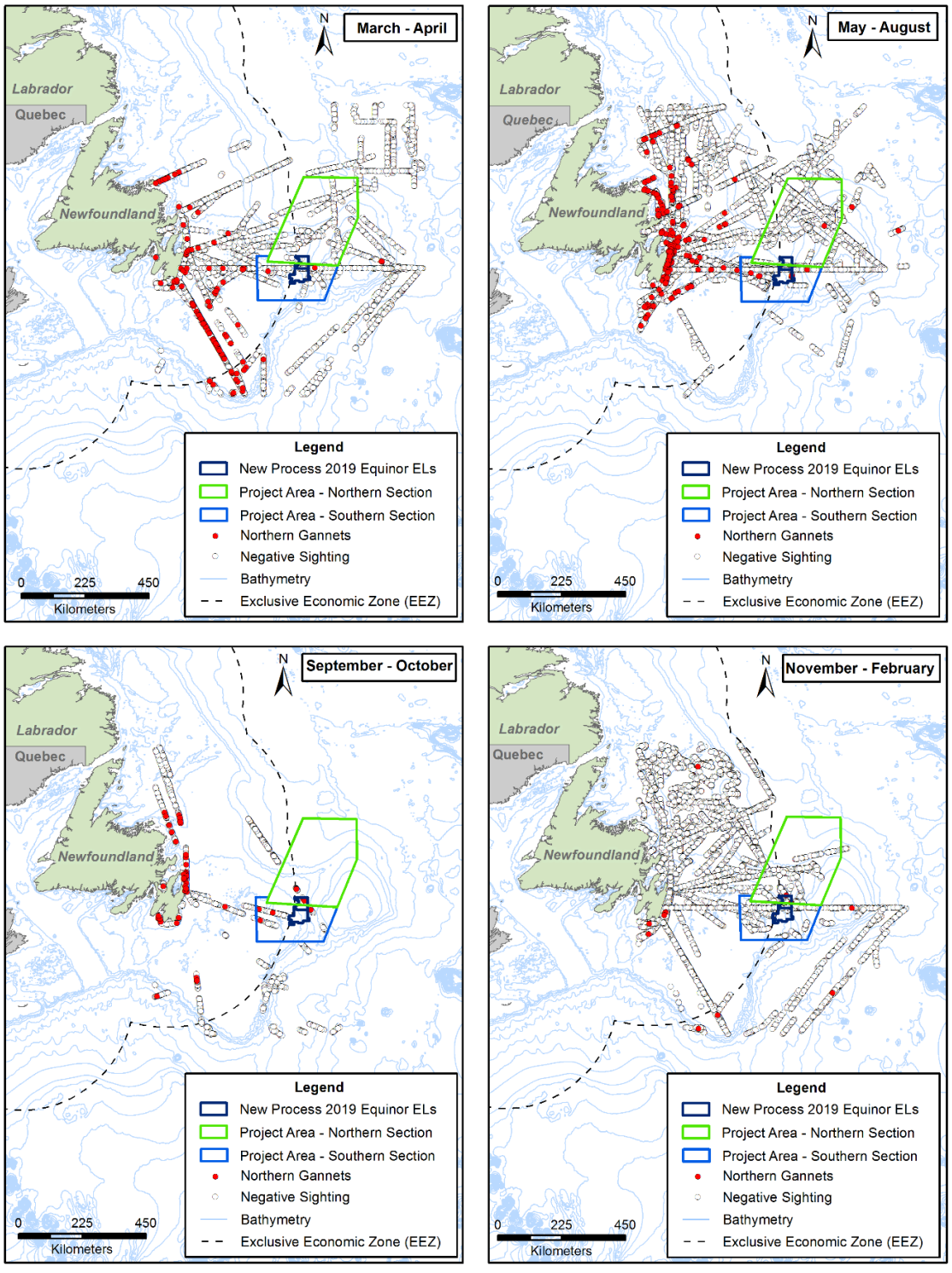


Figure 6-23 Seasonal Distribution of ECSAS Northern Gannet Observations in the Waters off Eastern Newfoundland (2001 to 2017)

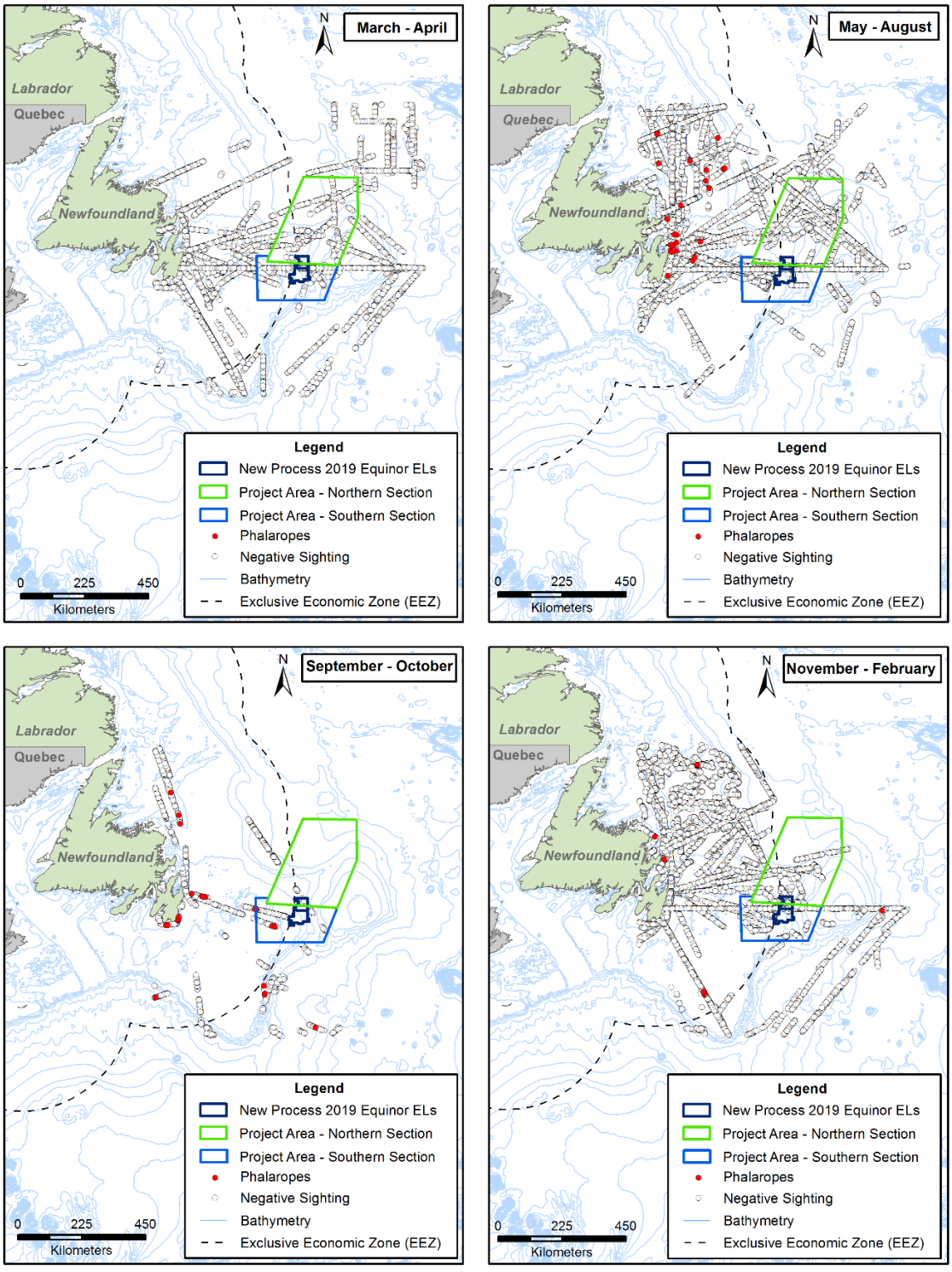


Figure 6-24 Seasonal Distribution of ECSAS Phalarope Observations in the Waters off Eastern Newfoundland (2001 to 2017)

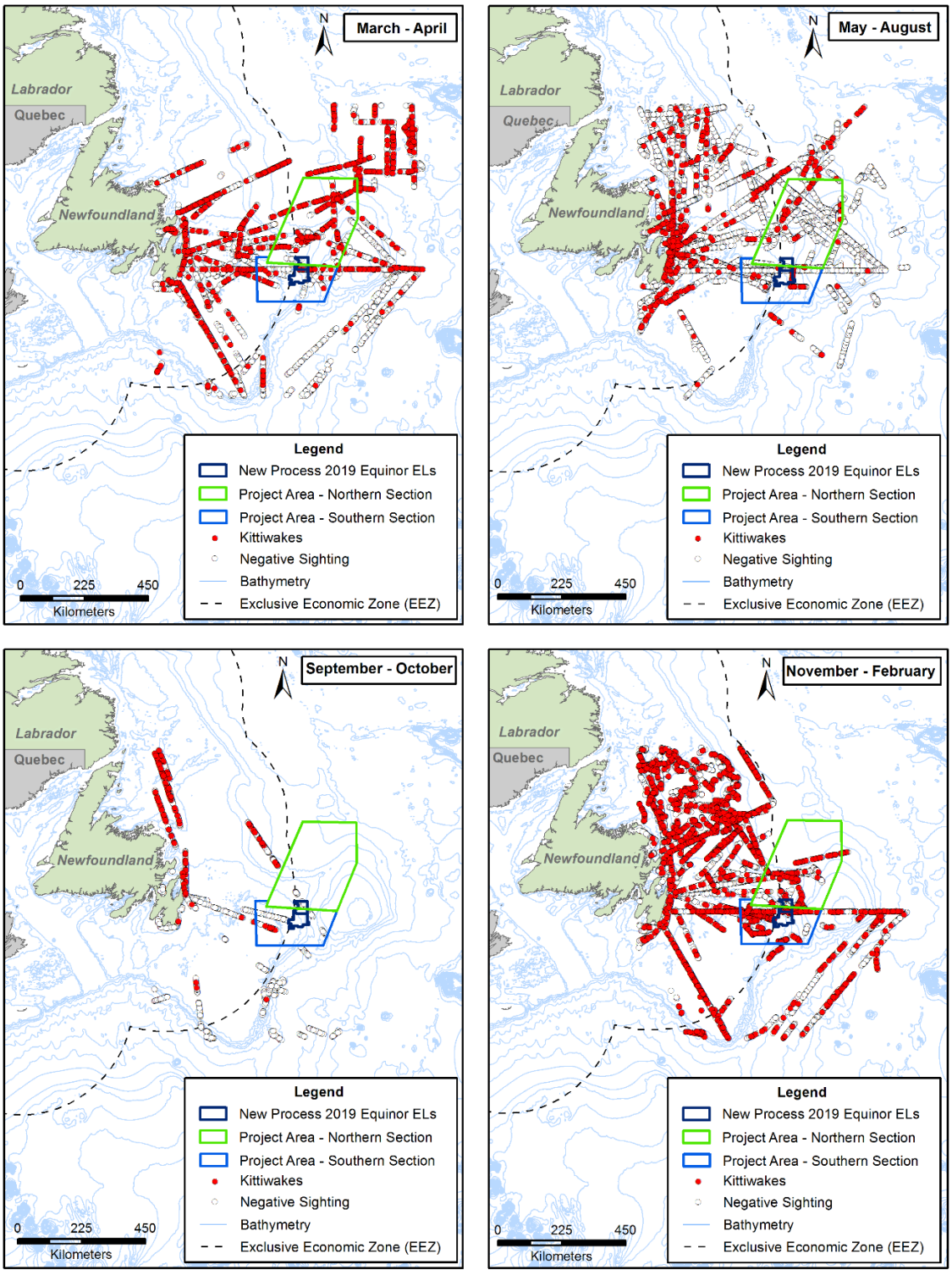


Figure 6-25 Seasonal Distribution of ECSAS Black-legged Kittiwake Observations in the Waters off Eastern Newfoundland (2001 to 2017)

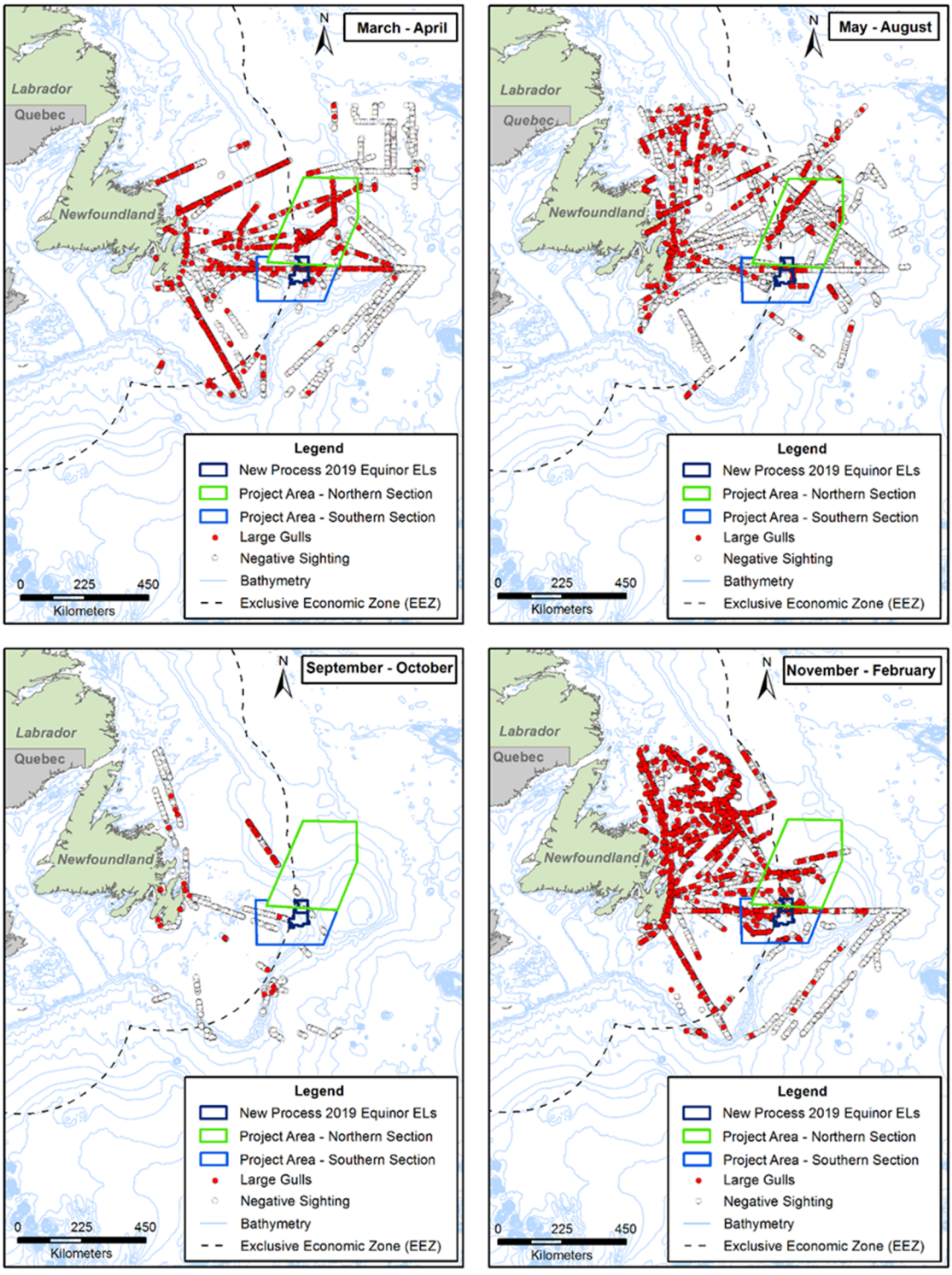


Figure 6-26 Seasonal Distribution of ECSAS Large Gull Observations in the Waters off Eastern Newfoundland (2001 to 2017)

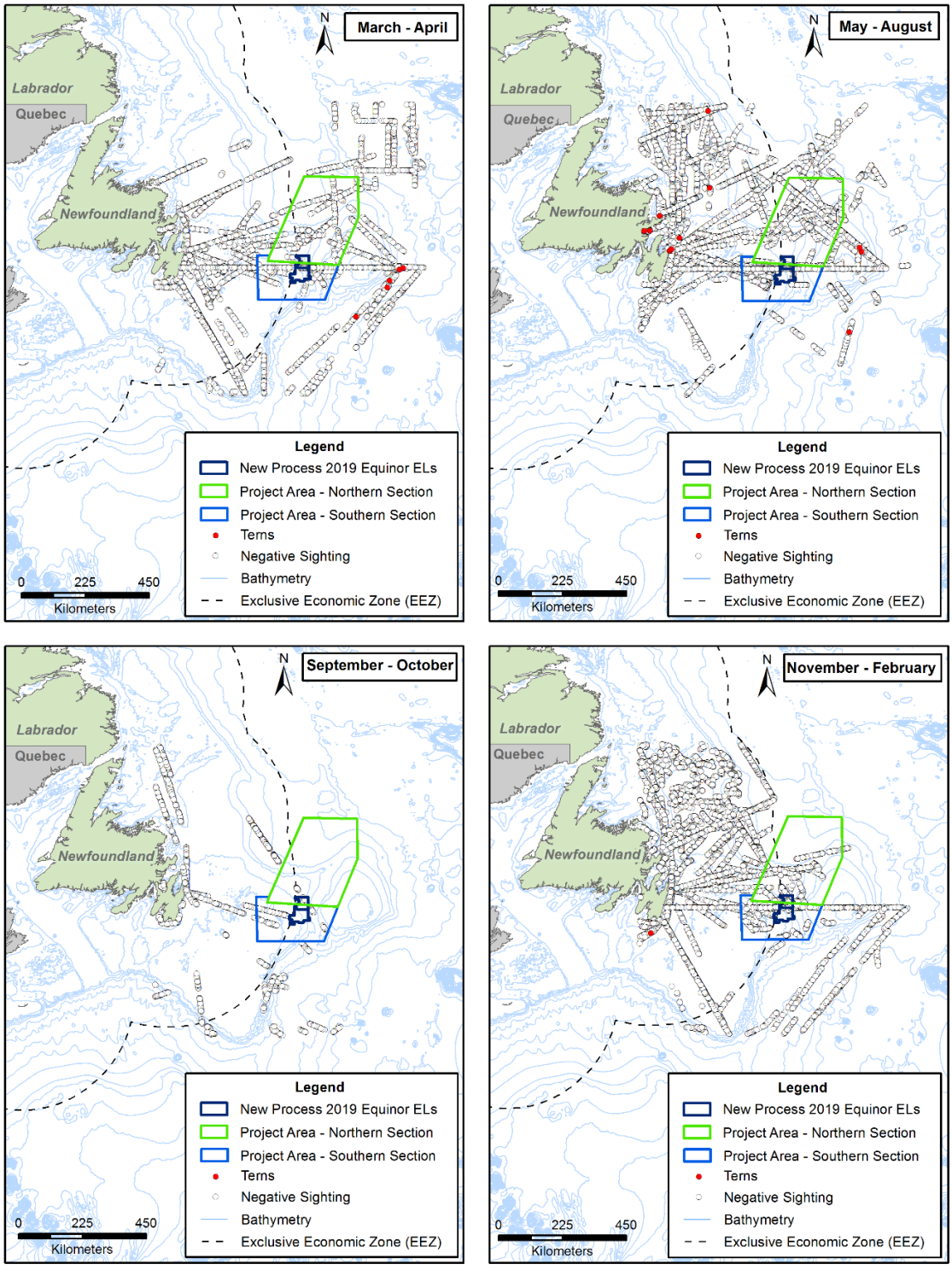


Figure 6-27 Seasonal Distribution of ECSAS Tern Observations in the Waters off Eastern Newfoundland (2001 to 2017)

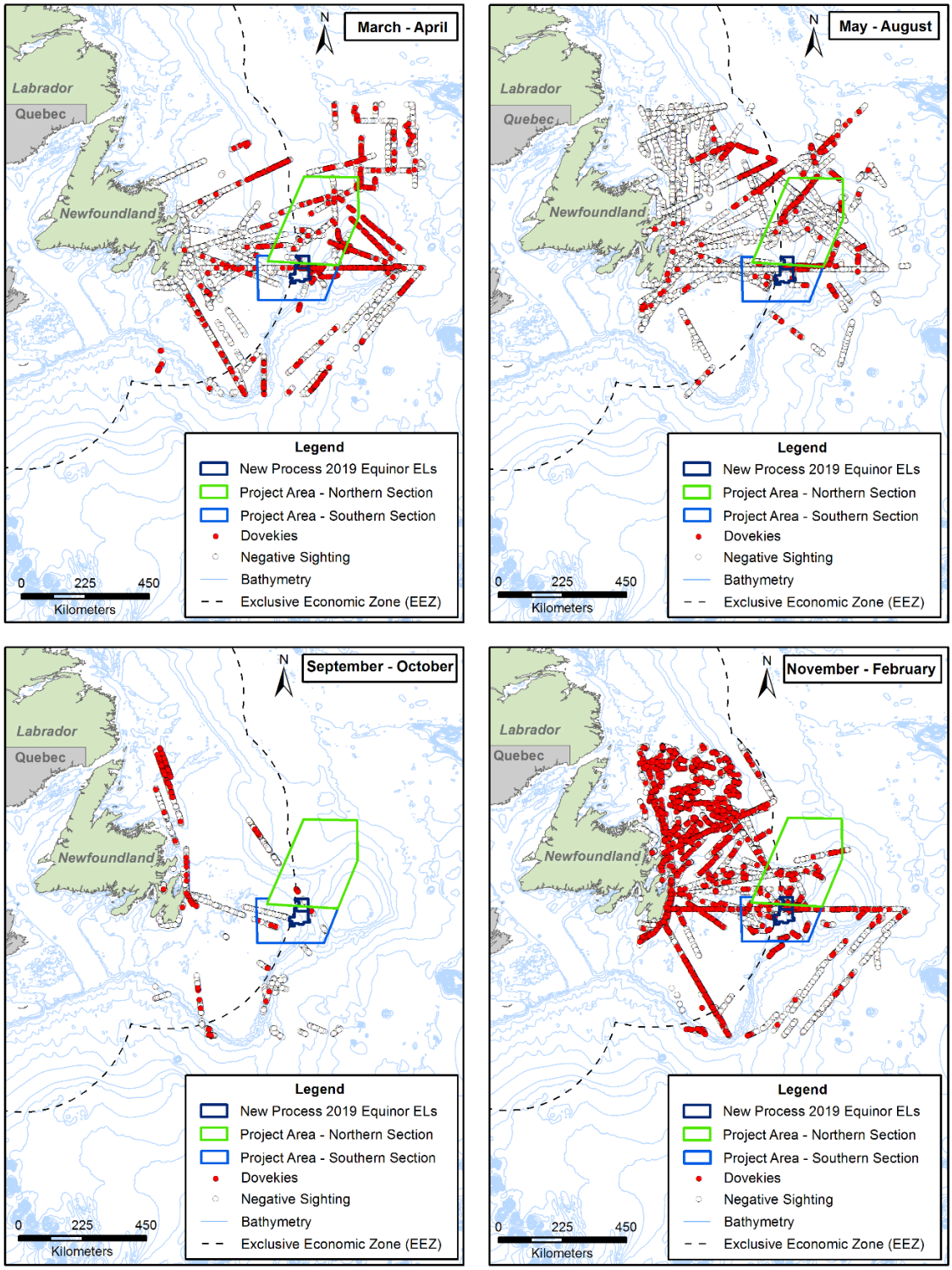


Figure 6-28 Seasonal Distribution of ECSAS Dovekie Observations in the Waters off Eastern Newfoundland (2001 to 2017)

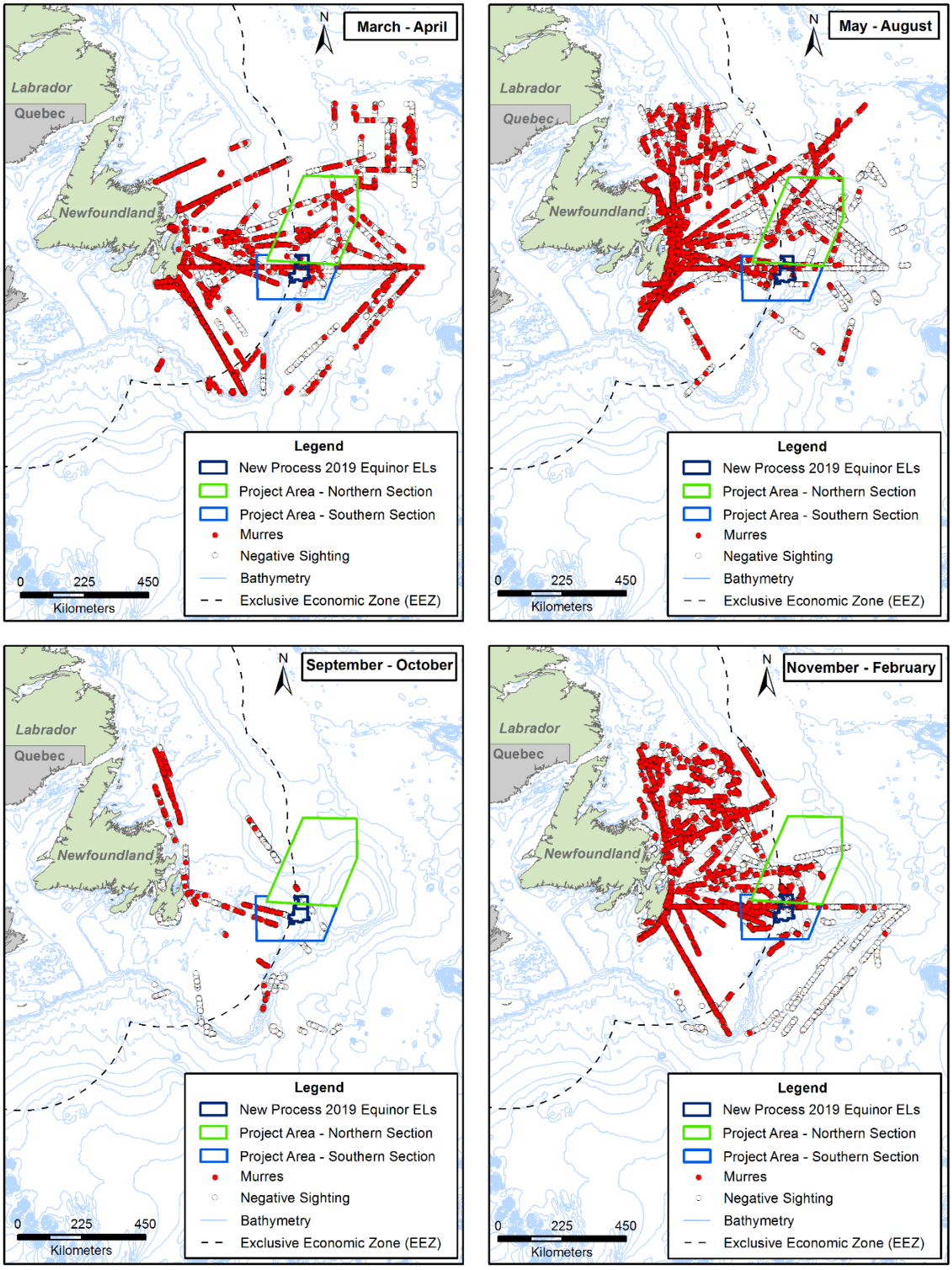


Figure 6-29 Seasonal Distribution of ECSAS Murre Observations in the Waters off Eastern Newfoundland (2001 to 2017)

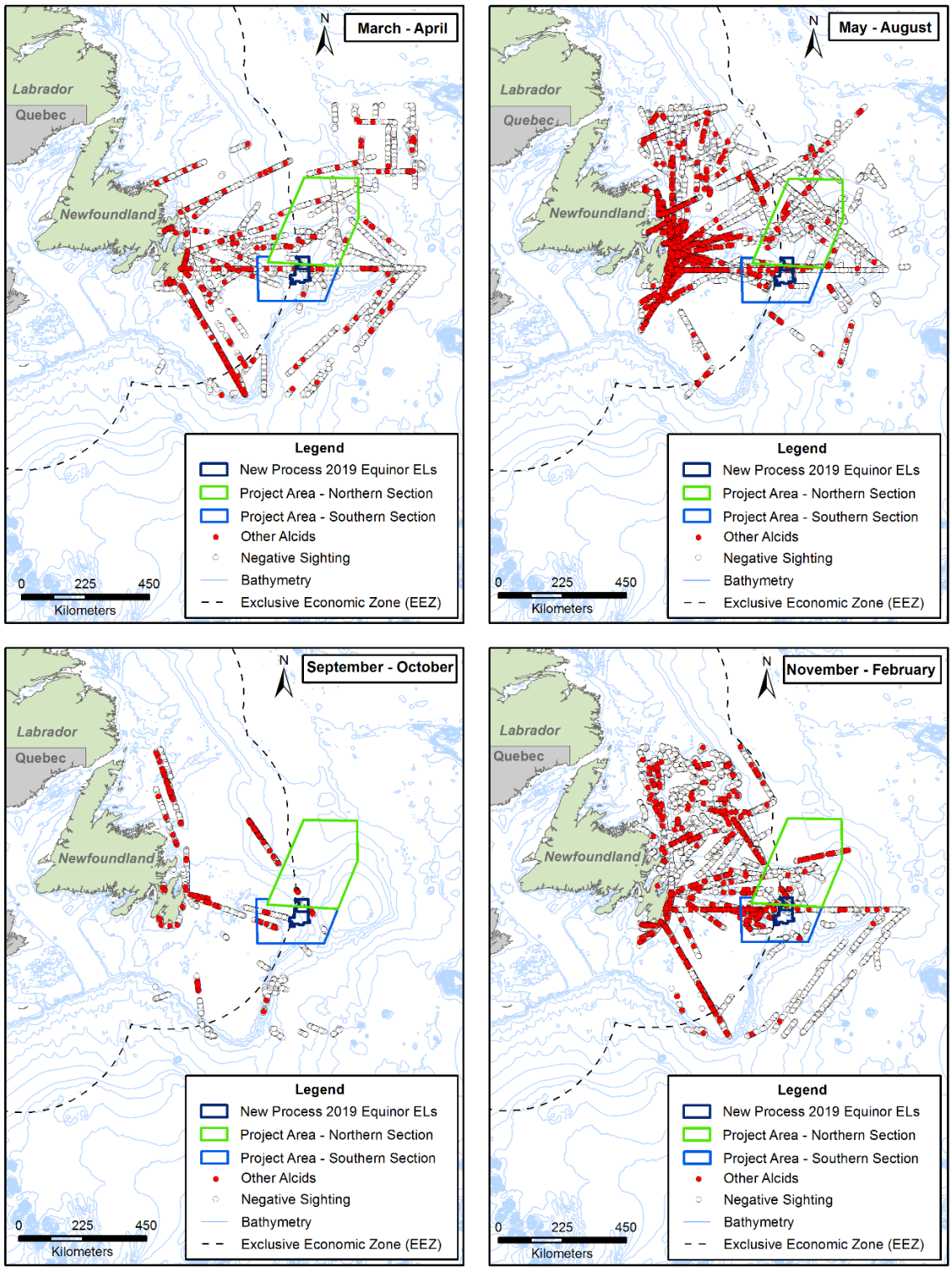


Figure 6-30 Seasonal Distribution of ECSAS Other Alcid Observations in the Waters off Eastern Newfoundland (2001 to 2017)

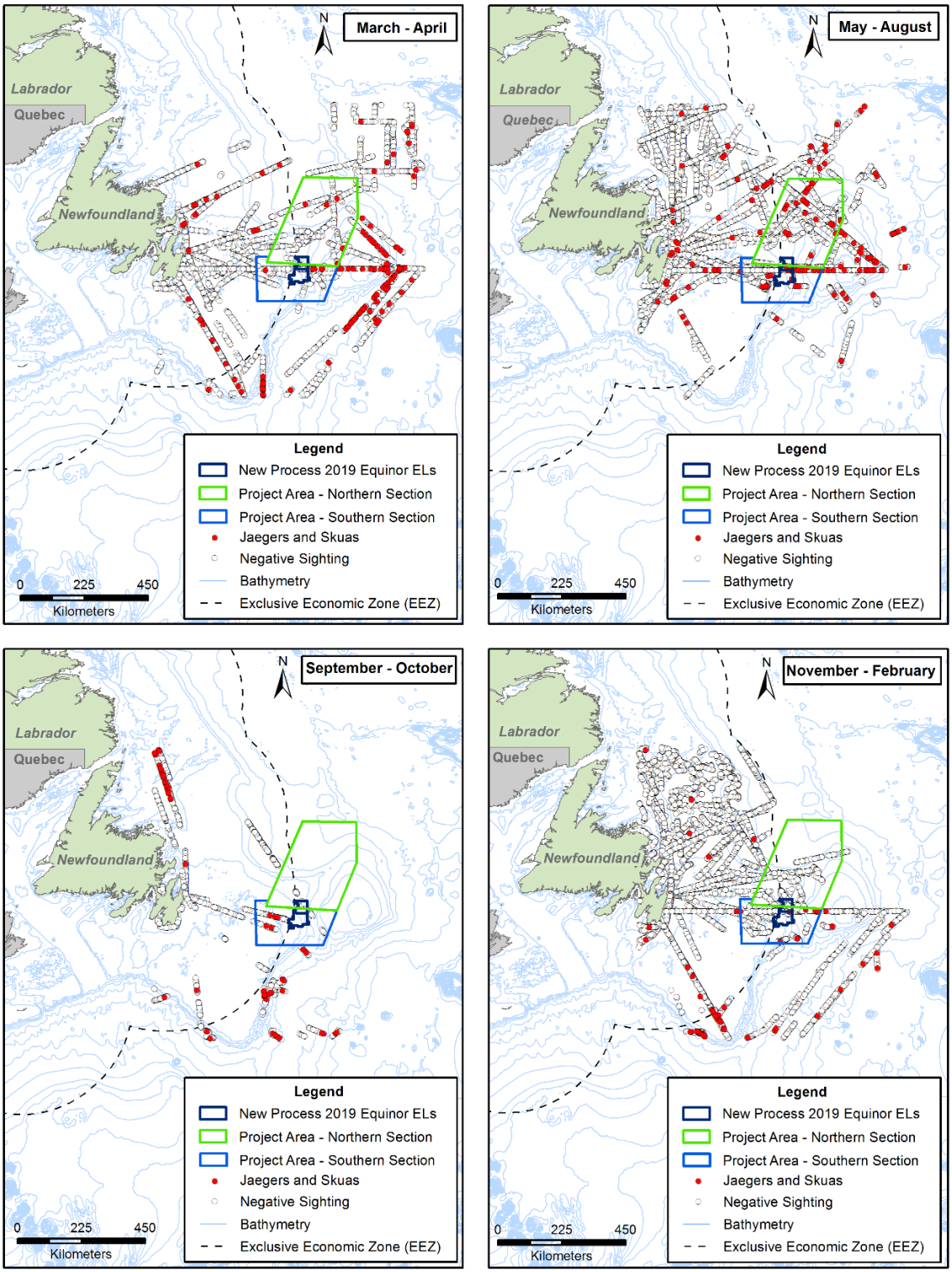


Figure 6-31 Seasonal Distribution of ECSAS Jaeger and Skua Observations in the Waters off Eastern Newfoundland (2001 to 2017)

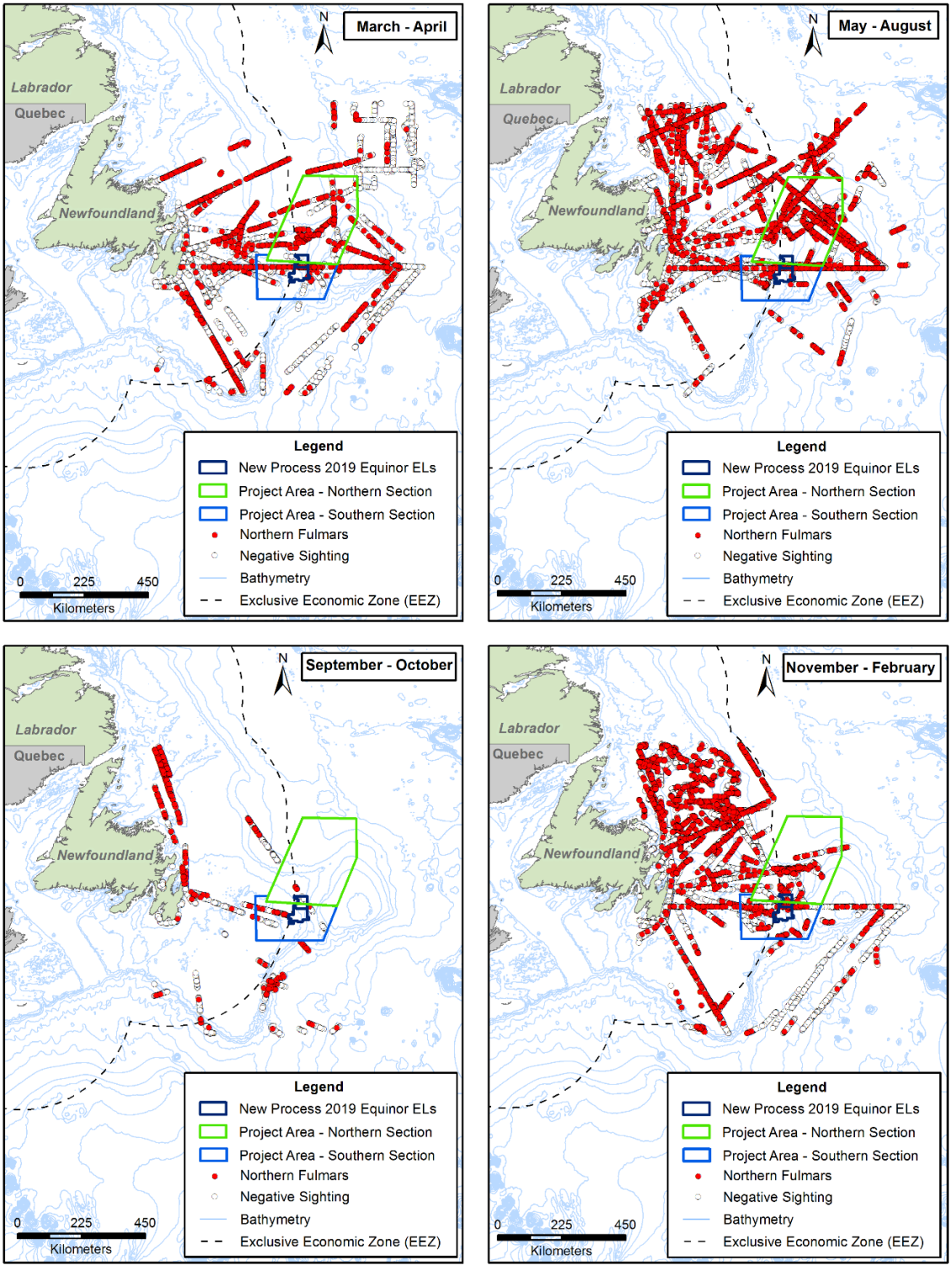


Figure 6-32 Seasonal Distribution of ECSAS Northern Fulmar Observations in the Waters off Eastern Newfoundland (2001 to 2017)

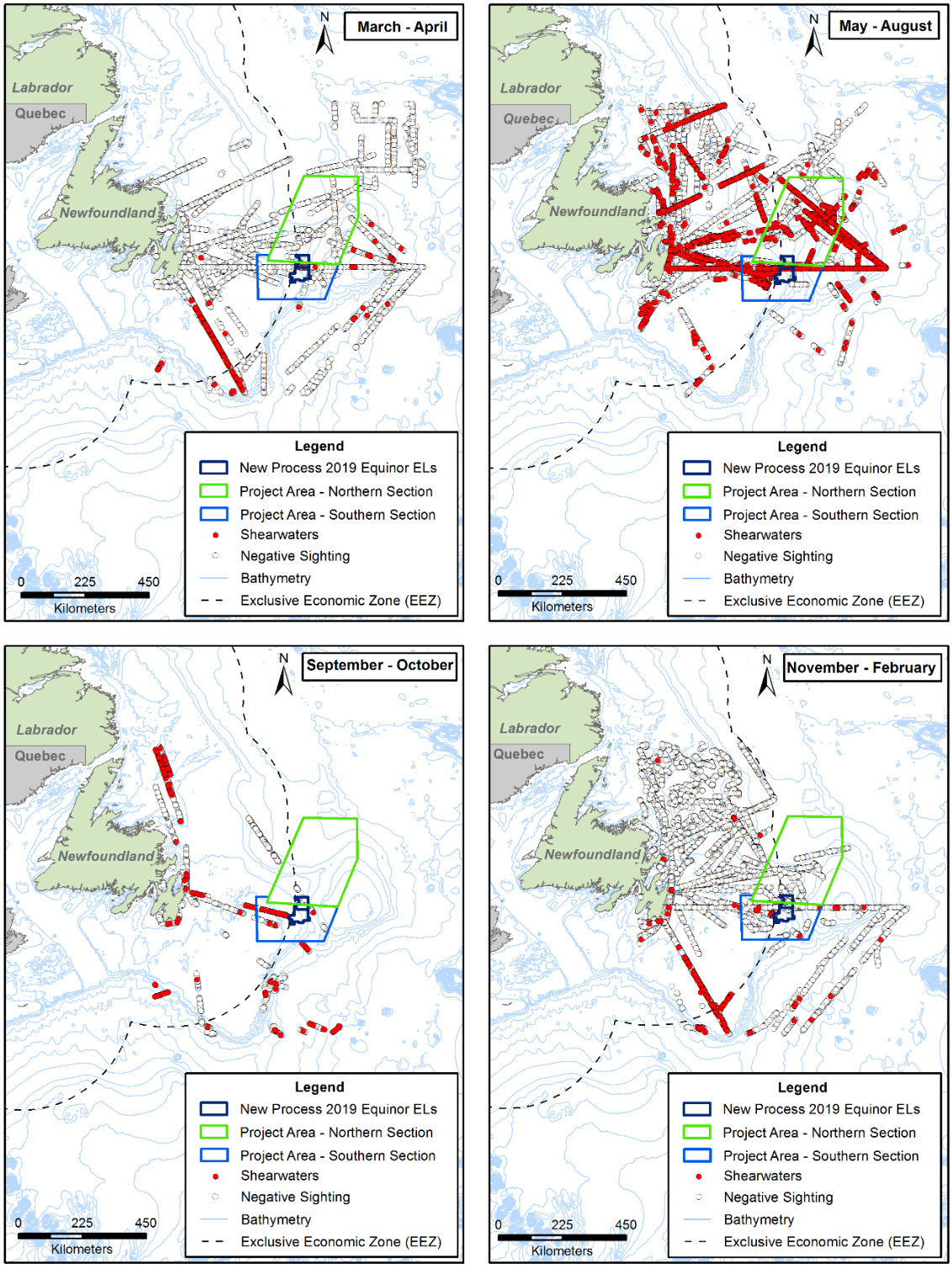


Figure 6-33 Seasonal Distribution of ECSAS Shearwater Observations in the Waters off Eastern Newfoundland (2001 to 2017)

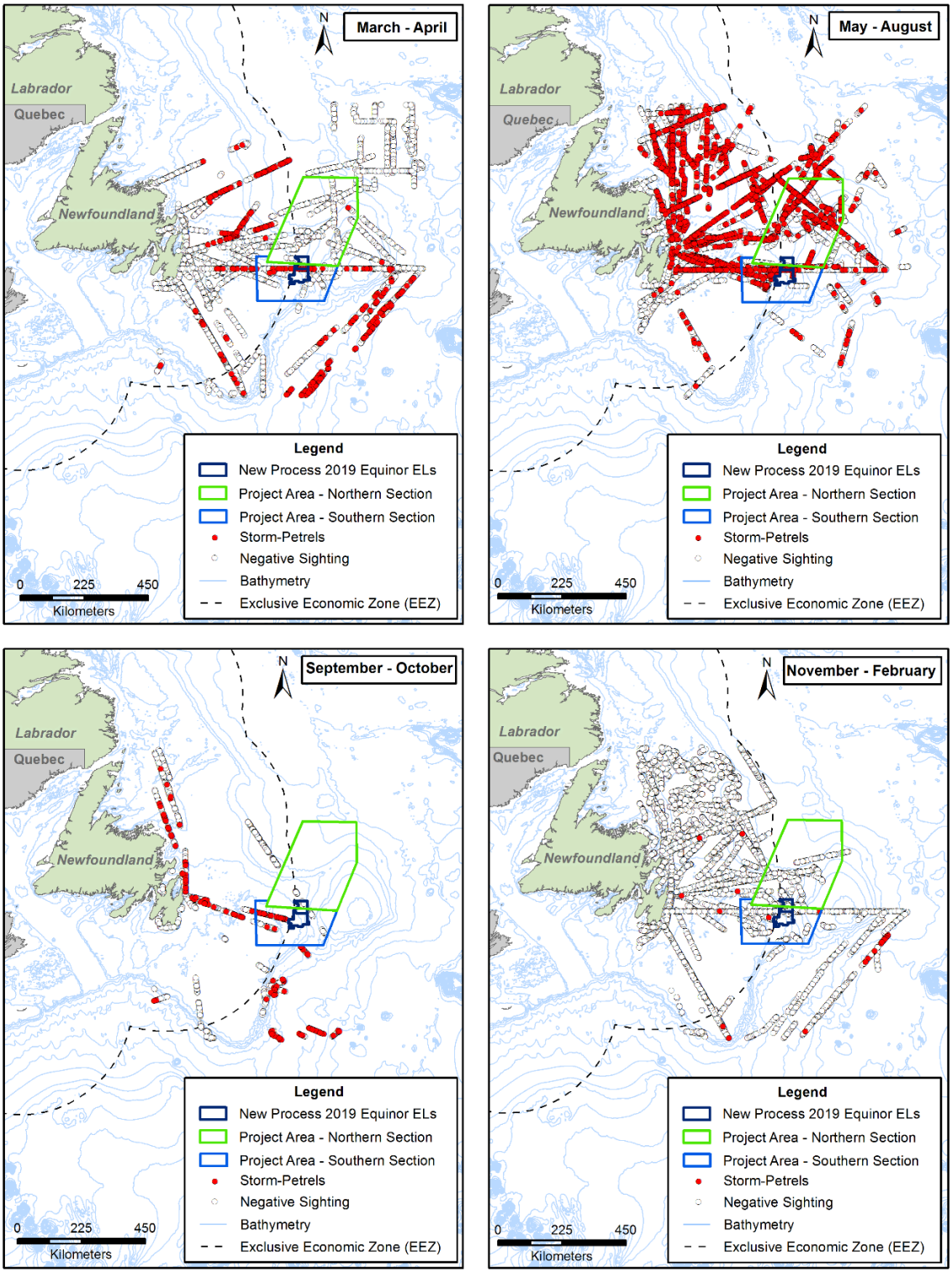


Figure 6-34 Seasonal Distribution of ECSAS Storm-petrel Observations in the Waters Off Eastern Newfoundland (2001 to 2017)

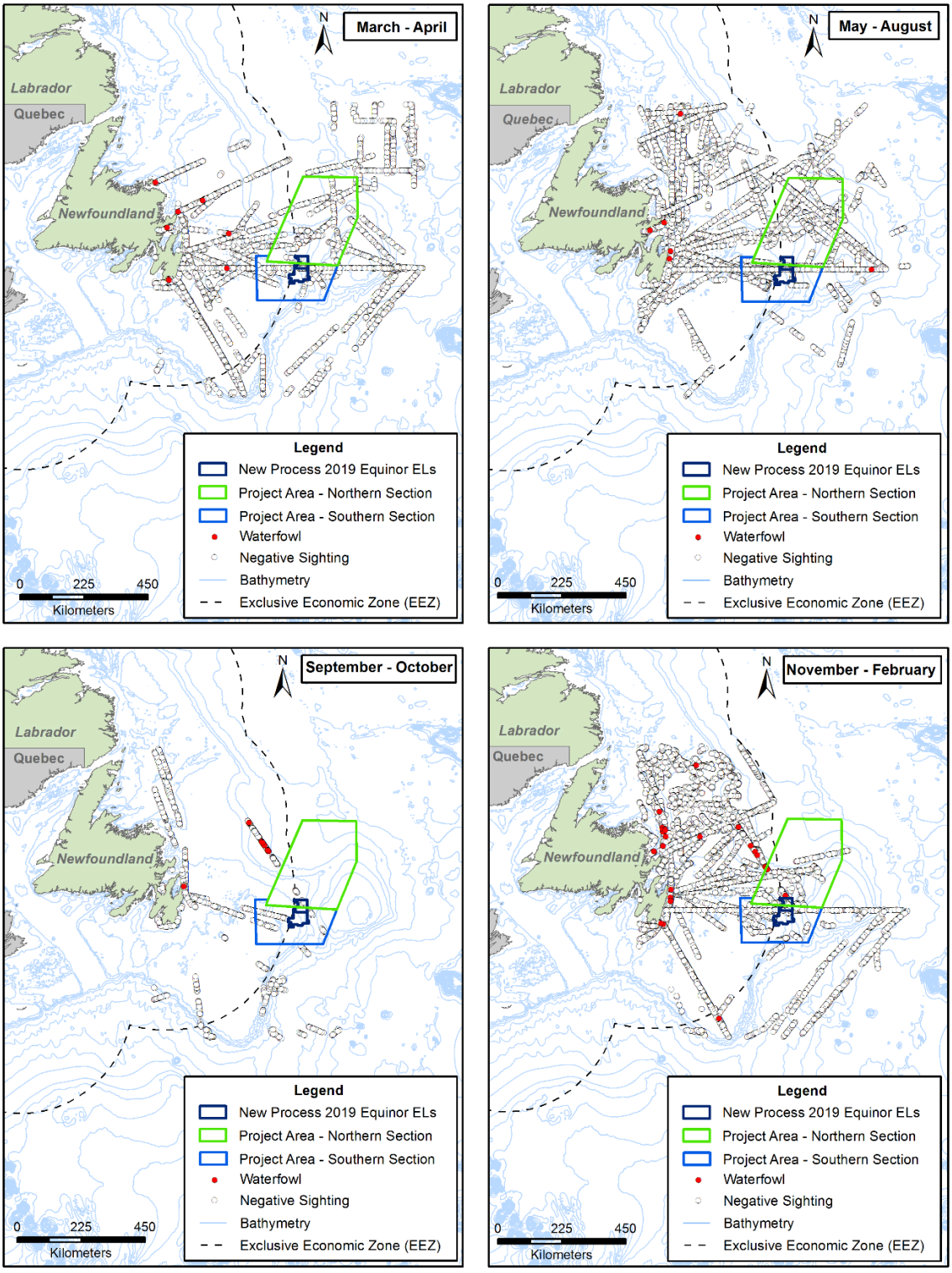


Figure 6-35 Seasonal Distribution of ECSAS Waterfowl Observations in the Waters off Eastern Newfoundland (2001 to 2017)

6.2.2 Species at Risk

There are no new Schedule 1 SARA-listed species since the Flemish Pass EIS was submitted.

There is a potential for Ross's gull (SARA Schedule 1 - Threatened; COSEWIC - Threatened), ivory gull (SARA Schedule 1 - Endangered; COSEWIC - Endangered), and piping plover (SARA Schedule 1 - Endangered; COSEWIC - Endangered) to occur offshore in the Project Area. Migratory bird SAR that are unlikely to occur offshore include chimney swift (SARA Schedule 1 - Threatened; COSEWIC - Threatened), barn swallow (SARA Schedule 1 - Threatened; COSEWIC - Threatened), rusty blackbird (SARA Schedule 1 - Special Concern; COSEWIC - Special Concern), Newfoundland red crossbill (SARA Schedule 1 - Threatened; COSEWIC - Endangered), common nighthawk (SARA Schedule 1 - Threatened; COSEWIC – Special Concern), red knot (SARA Schedule 1 - Endangered; COSEWIC - Endangered), roseate tern (SARA Schedule 1 - Endangered; COSEWIC - Endangered), and olive-sided flycatcher (SARA Schedule 1 - Threatened; COSEWIC – Special Concern). There are marine bird species that are designated as at risk on the International Union for Conservation of Nature (IUCN) Red List, but are not designated as at risk either federally or provincially; only two have high potential for presence in around the Project Area (Leach's storm-petrel and black-legged kittiwake) (see Table 6.14).

Table 6.14 Marine Bird Species Designated at Risk on the IUCN Red List but not Federally or Provincially

Common Name	IUCN Red List Status[1]	Habitat and Distribution in Newfoundland	Potential Presence in or Around Project Area
Long-tailed Duck	Vulnerable	Coastal waters	Low
Bermuda Petrel	Endangered	Grand Banks and waters to the south and east[2]	Low
Zino's Petrel	Endangered	Warm waters off the continental shelf[3]	Low
Desertas (Bugio) Petrel	Vulnerable	Warm waters off the continental shelf[3,4]	Low
Leach's Storm-Petrel	Vulnerable	Continental shelf and adjacent waters	High
Black-legged Kittiwake	Vulnerable	Continental shelf and adjacent waters	High
Atlantic Puffin	Vulnerable	Continental shelf	Low

Notes:
[1] BirdLife International (2018)
[2] Madeiros et al. (2014),
[3] Ramos et al. (2016),
[4] Ramirez et al. (2013).

6.2.3 Special Areas of Importance to Bird Species

The IBAs in eastern Newfoundland outlined in Section 6.2.5 of the Flemish Pass EIS remain applicable and valid and are outlined in Table 6.15.

Table 6.15 Important Bird Areas in Eastern Newfoundland

IBA Name	Area (km^3)	Location	Importance to Marine and Migratory Birds
Funk Island (NF004)	135.18	An island off northeastern Newfoundland, situated approximately 60 km from shore.	• Major concentration of nesting seabirds • Globally significant common murre population • Large numbers of northern gannets • Provincially protected Seabird Ecological Reserve; as such, access to the island is restricted to scientific researchers. Overlaps with Fogo Shelf EBSA.
Wadham Islands and adjacent Marine Area (NF013)	159.23	Located near Fogo Island, approximately 40 km offshore, this IBA includes 7 main islands and several smaller rocks and shoals.	• Globally significant number of wintering Common eider (approximately 25,000 counted in a 1995 survey) • Large numbers of nesting Atlantic puffin, Leach's storm-petrel and razorbill. • Overlaps with Fogo Shelf EBSA.
Cape Freels Coastline and Cabot Island (NF025)	334.48	Located at the head of Bonavista Bay, this IBA includes several small islands and shoals.	• Up to 25,000 wintering common eiders have been reported between the Cape Freels coastline and Wadham Islands • Large numbers of nesting common murres, as well as some pairs of razorbills • Historic records of breeding Atlantic puffins, although none were recorded in recent EC-CWS surveys.
Terra Nova National Park (NF017)	655.56	Situated on the inner reaches of Bonavista Bay. Much of the area is forested, but there are numerous lakes and wetlands, as well as a significant coastal component.	• Numerous forest species nest here, including two subspecies with restricted ranges: the federally-listed red crossbill (*percna* ssp.) and ovenbird (*furvoir* ssp.). • Shorebirds, gulls and waterfowl can be seen on the flats at the outlet of Big Brook, as well as Newman Sound. • At least six tern colonies (common and Arctic tern), totaling between 1000 and 1500 pairs. • Also a federally designated Migratory Bird Sanctuary (MBS) and National Park.
Grates Point (NF019)	66.55	The northern tip of the Bay de Verde Peninsula, which separates Trinity Bay from Conception Bay.	• Large number of wintering common eiders (up to 12,000 individuals, but typically around 2,800) • Other wintering species include black-legged kittiwake, thick-billed murre and dovekie • Atlantic puffin and northern gannet are present in the summer months.

Table 6.15 Important Bird Areas in Eastern Newfoundland

IBA Name	Area (km^3)	Location	Importance to Marine and Migratory Birds
Baccalieu Island (NF003)	45.22	Located 5.5 km from the northern tip of the Avalon Peninsula.	• Greatest seabird abundance and diversity in Eastern North America • World's largest colony of Leach's storm-petrels, including 70% of the North American population. • Significant numbers of breeding Atlantic puffin, black-legged kittiwake and northern gannet • Smaller numbers of nesting common murre, thick-billed murre, razorbill, black guillemot, northern fulmar, herring gull and great black-backed gull • Like Funk Island, a provincially designated Seabird Ecological Reserve
Cape St. Francis (NF021)	70.21	Located at the northern tip of the Avalon Peninsula.	• Winter congregating area for common eiders; up to 5,000 individuals recorded • Purple sandpipers regularly observed along the rocky shoreline in the winter
Quidi Vidi Lake (NF022)	7.0	Situated within St. John's city limits, and fed by the Virginia River and Rennies River.	• Important daytime resting site for gulls from late fall to early spring, including significant numbers of herring, great black-backed, Iceland, glaucous and common black-headed gulls. • Locally rare ring-billed gull, mew gull and lesser black-backed gull occasionally reported. • Waterfowl including American black ducks, mallards and northern pintails are common here in the winter, subsisting on food handouts from people.
Witless Bay Islands (NF002)	62.08	Composed of four small islands off the east coast of the Avalon Peninsula.	• Provincially designated Seabird Ecological Reserve • Globally significant numbers of breeding seabirds, including more than half of the eastern North American population of Atlantic puffins and almost 10% of the global Leach's storm-petrel population • Large numbers of nesting common murres, black-legged kittiwakes and herring gulls • great black-back gulls, northern fulmars, thick-billed murres, razorbills and black guillemots nest in smaller numbers • During the fall migration, surrounding marine area is important to sea ducks including white-winged scoter, surf scoter, long-tailed duck and common eider

Table 6.15 Important Bird Areas in Eastern Newfoundland

IBA Name	Area (km³)	Location	Importance to Marine and Migratory Birds
Mistaken Point (NF024)	102.77	Located near the southeastern corner of the Avalon Peninsula.	• Important wintering area for up to 12,000 common eiders • Continentally significant numbers of wintering Purple Sandpiper (>1% of North American population) • Small numbers of overwintering ruddy turnstone, far north of its usual wintering range • Nesting black-legged kittiwake, common murre and razorbill • Designated as a Provincial Ecological Reserve and United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage Site because of its rich fossil deposits
Cape St. Mary's (NF001)	329.39	Located at the entrance to Placentia Bay on the southwestern Avalon Peninsula.	• Significant numbers of nesting Northern Gannet (> 2% of global population) • Large numbers of Common murre and black-legged kittiwake, and smaller numbers of nesting thick-billed murre, razorbill, great cormorant and double-crested cormorant • herring gull, great black-backed gull and black guillemot historically reported nesting • In the winter, large numbers of migrating sea ducks including scoters, common eider, long-tailed duck and the endangered harlequin duck • Small numbers of harlequin duck during summer, moulting season in some years. • Designated as a provincial Seabird Ecological Reserve. Overlaps with Placentia Bay EBSA.
Placentia Bay (NF028)	1398.05	Includes the eastern half of Placentia Bay in southeastern Newfoundland (between the Avalon and Burin peninsulas), and extends out 25 km from shore	• Exceptional feeding area for seabirds during the summer capelin spawning season • More than 100,000 shearwaters recorded in a single survey (mostly greater and sooty shearwater, some Manx shearwater) • Large numbers of other species breeding at Cape St. Mary's feed here, including northern gannet, black-legged kittiwake, Atlantic puffin, thick-billed murre and common murre • Large numbers of feeding pomarine and parasitic jaegers • More than 1,000 wintering common eiders • Overlaps with Placentia Bay EBSA.
Cape Pine and St. Shotts Barren (NF015)	57.4	Located on the southern tip of the Avalon Peninsula.	• Large, possibly globally significant numbers of American golden-plover during their fall migration (August to mid-October) • Dozens of whimbrel during fall migration
Source: Important Bird Areas of Canada (Bird Studies Canada 2016); Atlantic Canada Colonial Waterbird database (CWS 2016)			

6.3 Marine Mammals and Sea Turtles

Marine mammals and sea turtles that are known to occur in offshore Newfoundland include: an estimated 23 species of cetaceans (whales, dolphins, and porpoises), of which 7 are mysticetes (baleen whales), and 16 are odontocetes (toothed whales); 4 species of phocids (seals); and 4 species of sea turtles. While some species of marine mammals remain in the waters off Newfoundland year-round, many marine mammals and sea turtles arrive in the late spring and early summer and remain until the fall.

Seven species of baleen whales have been identified as having the potential to occur in or near the Project Area, based on their known occurrence in the overall eastern Newfoundland offshore region. Humpback, fin, minke, and sei are the most common. While some species of baleen whales can be observed in the waters off Newfoundland year-round (blue, fin, humpback, and minke whales), most individuals of all species arrive in the late spring and early summer and remain until fall. Several species migrate to lower latitudes in the winter months, returning to the productive waters off Newfoundland in the spring to feed (AMEC 2014).

The odontocetes are comprised of the toothed whales, dolphins, and porpoises. There are 16 species of odontocetes that, based on direct sighting information or known occurrence, have the potential to occur in or near the Project Area. Several species of odontocetes have the potential to occur in the region seasonally, namely the common bottlenose dolphin, short-beaked common dolphin, and striped dolphin, while others have the potential to be found year-round.

Four species of seals have the potential to occur off eastern Newfoundland (grey seal, bearded seal, harp seal, and hooded seal). There are no pinniped SAR expected to occur in the Project Area.

Sea turtle distribution in coastal waters is highly seasonal and location-dependent. Although sea turtles are likely uncommon transients in the Project Area, five species have the potential to occur there on occasion, based on known sightings or expected occurrence off eastern Newfoundland (leatherback sea turtle, loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle; and hawksbill sea turtle). While the leatherback and loggerhead sea turtles have been regularly found in the Project Area, the green sea turtle, hawksbill sea turtle and Kemp's ridley sea turtle have occasionally been found in the waters off eastern Canada in the summer months (ExxonMobil 2018).

Current sighting data are incorporated into the Tables 6.16 and 6.17 and Figures 6-36 to 6-47 below.

Table 6.16 Opportunistic Sightings of Non-Species at Risk Mysticetes Reported in the Project Area

Common Name	Project Area – Northern Section	Project Area – Southern Section
Humpback whale	163	644
Minke whale	92	104
Sei whale	17	38
Unidentified mysticetes	115	239
Source: DFO, OBIS, Statoil (records span 1952 to 2015); C-NLOPB records (2016, 2017)		

Table 6.17 Opportunistic Sightings of Non-Species at Risk Odontocetes Reported in the Project Area

Common Name	Project Area – Northern Section	Project Area – Southern Section
Atlantic spotted dolphin	0	0
Atlantic white-sided dolphin	8	1
Common bottlenose dolphin	10	7
False killer whale	0	0
Long-finned pilot whale	342	357
Risso's dolphin	0	0
Short-beaked common dolphin	11	6
Sperm whale	163	22
Spinner dolphin	0	0
Striped dolphin	4	0
White-beaked dolphin	22	76
Unidentified odontocete	258	197
Source: DFO, OBIS, Statoil (records span 1958 to 2015); C-NLOPB records (2016, 2017)		

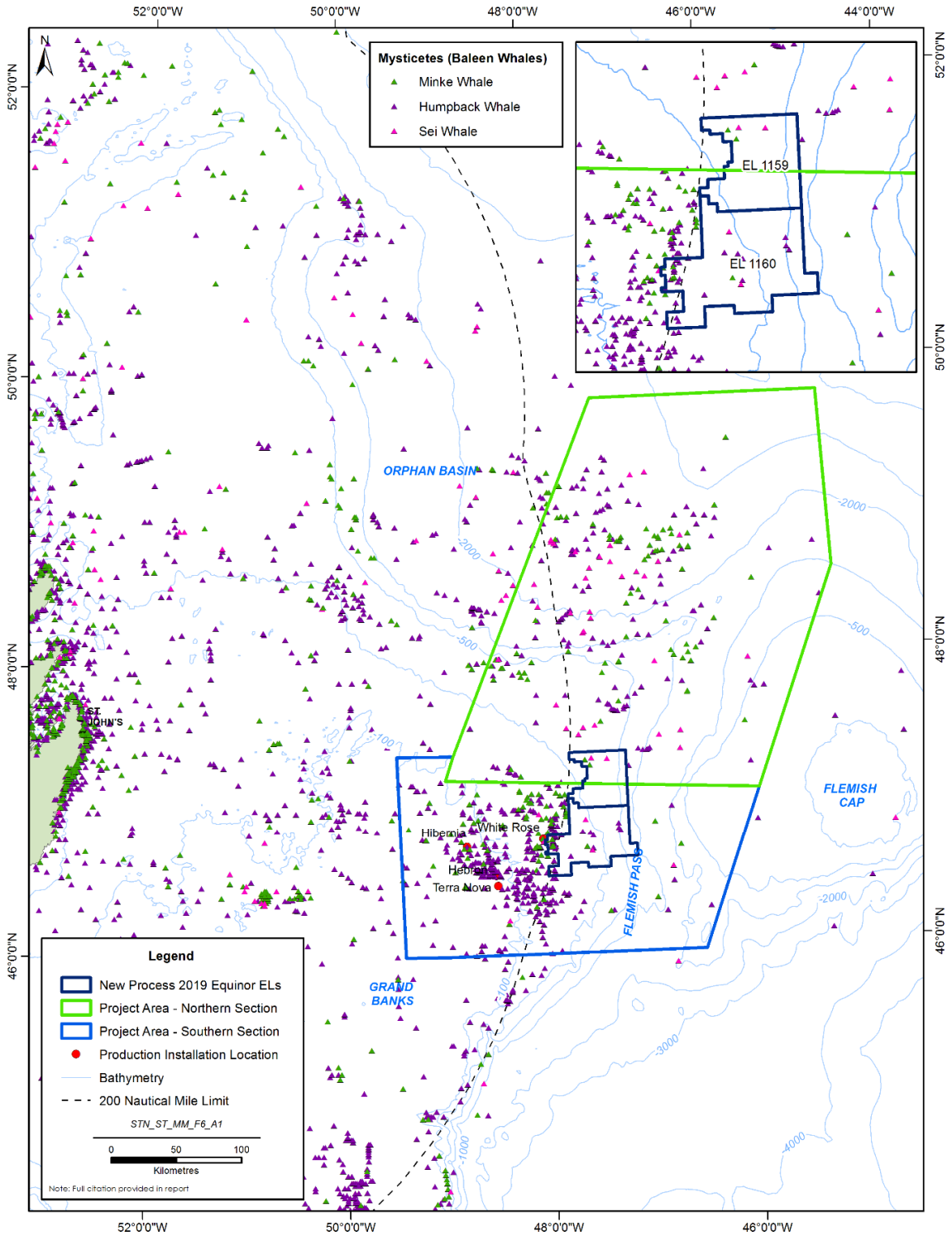


Figure 6-36 Opportunistic Sightings of Non-Species at Risk Mysticetes (1952 to 2017)

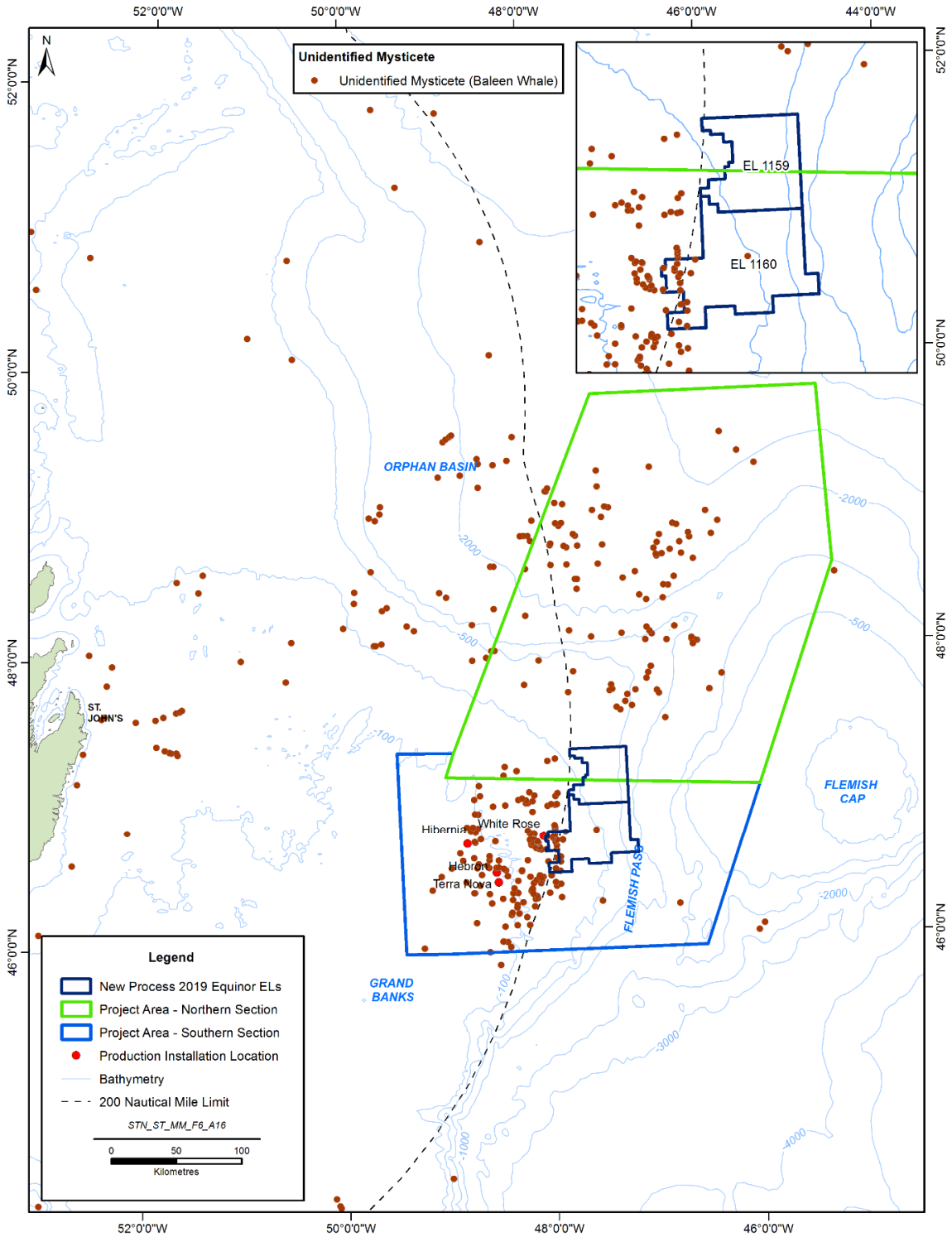


Figure 6-37 Opportunistic Sightings of Unidentified Mysticetes (1980 to 2017)

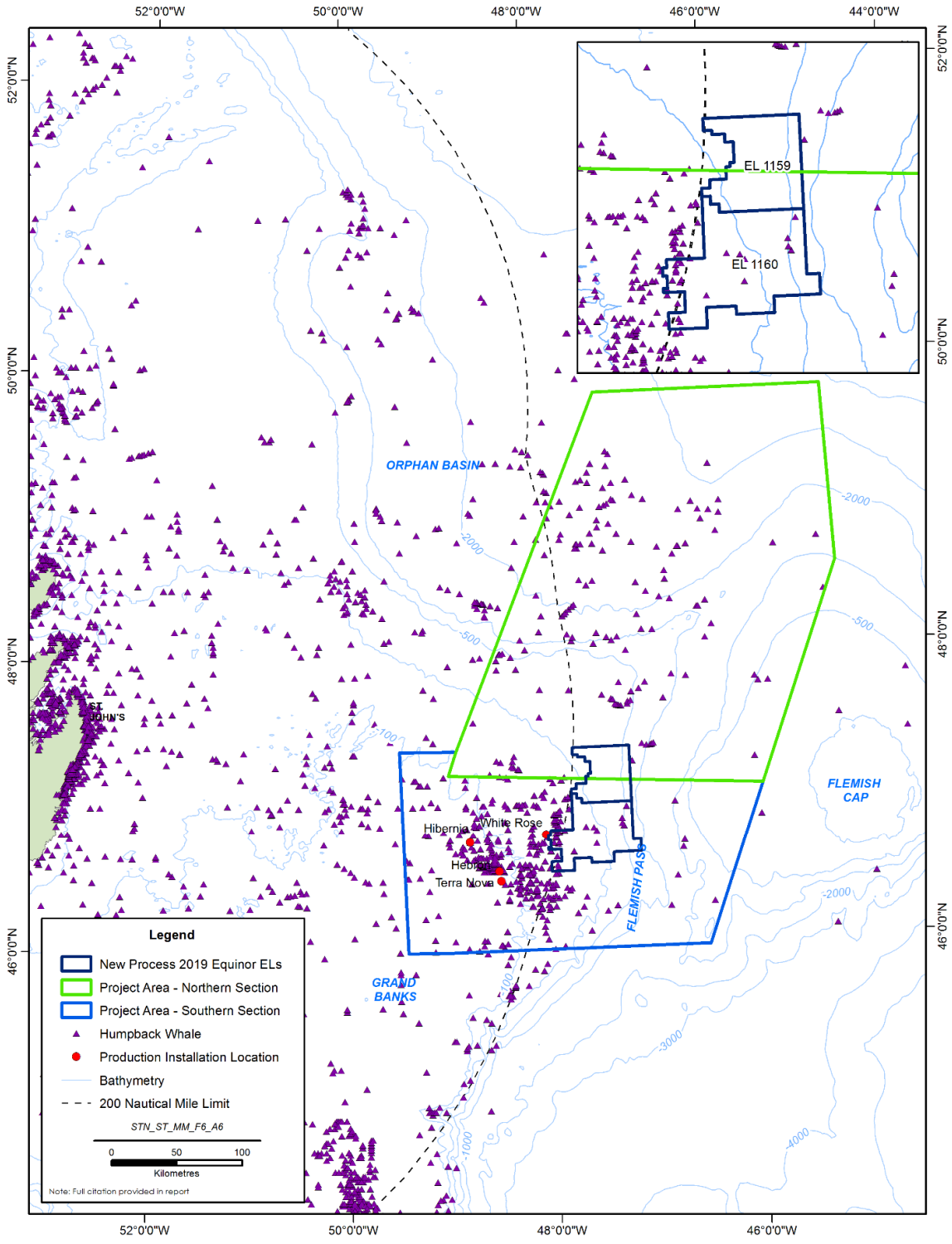


Figure 6-38 Humpback Whale Sightings in Eastern NL Offshore Area

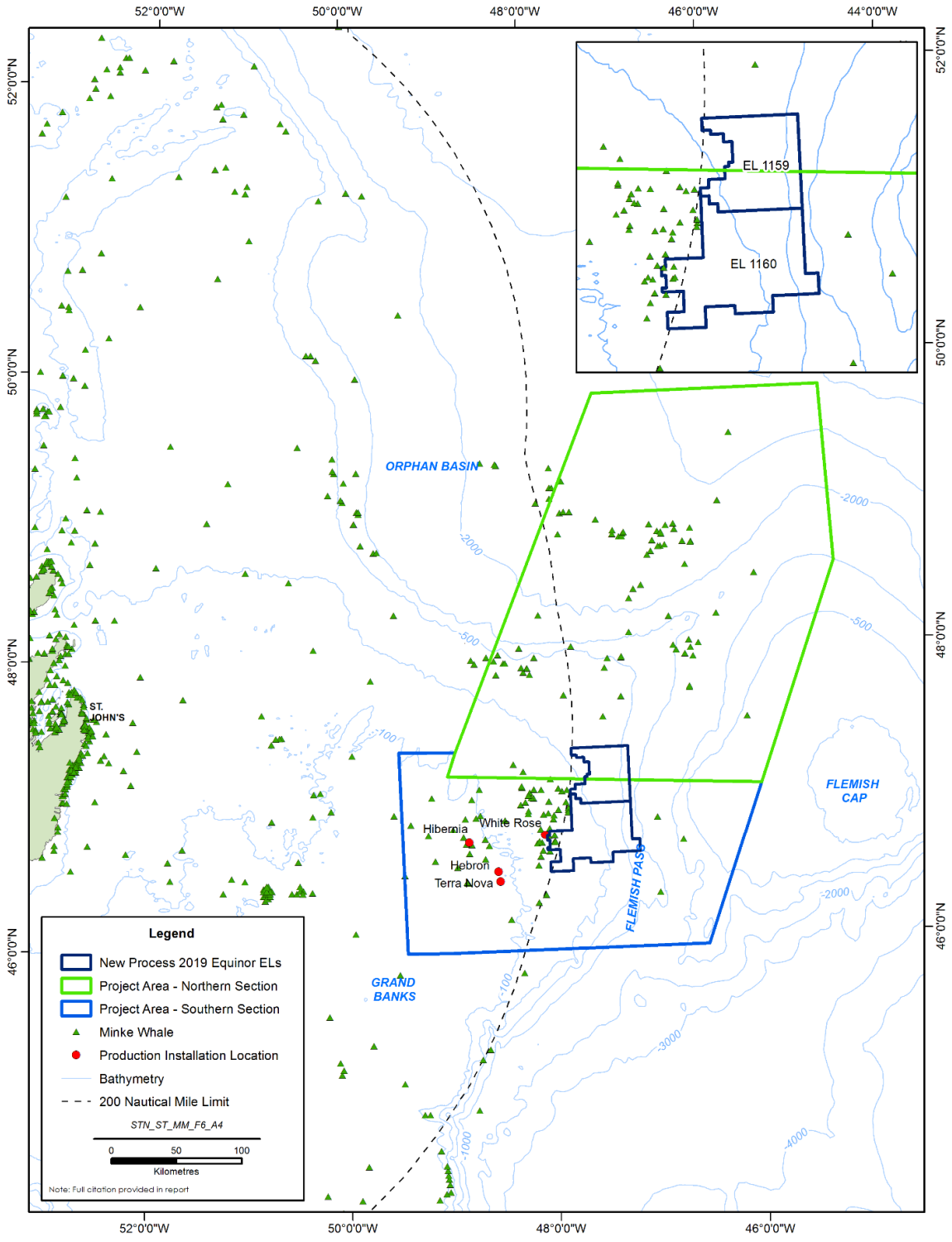


Figure 6-39 Minke Whale Sightings in Eastern NL Offshore Area

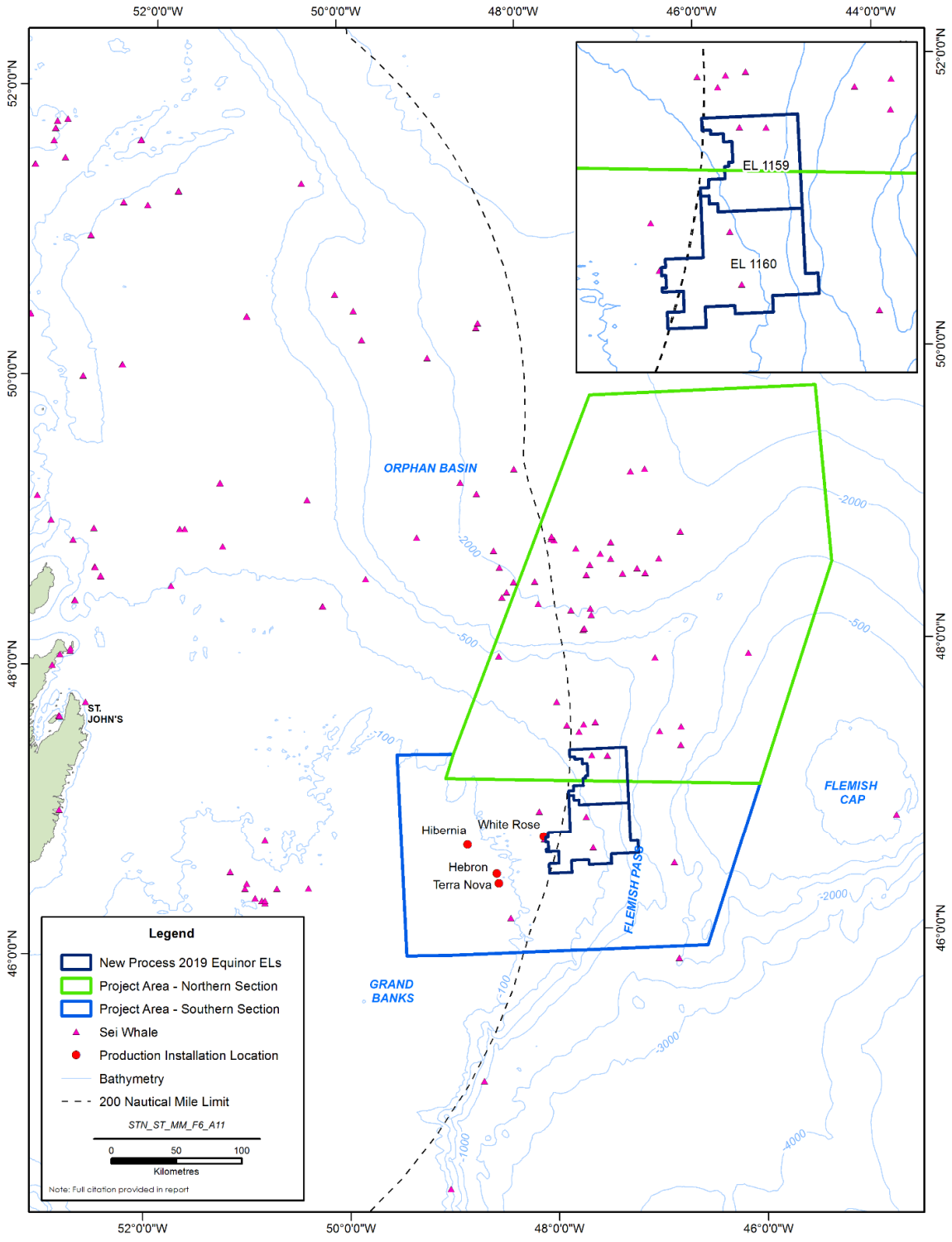


Figure 6-40 Sei Whale Sightings in Eastern NL Offshore Area

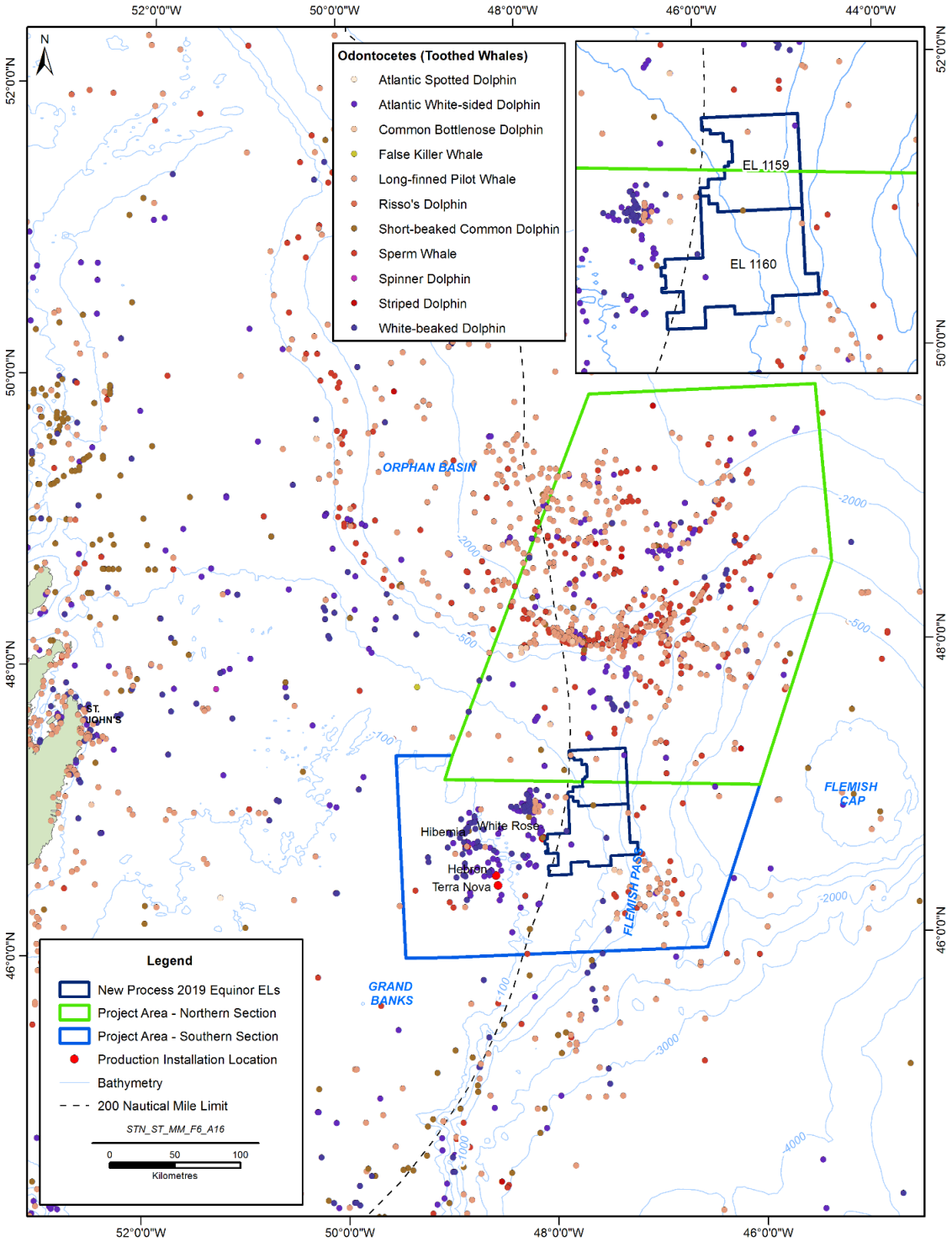


Figure 6-41 Opportunistic Sightings of Non-Species at Risk Odontocetes (1958 to 2017)

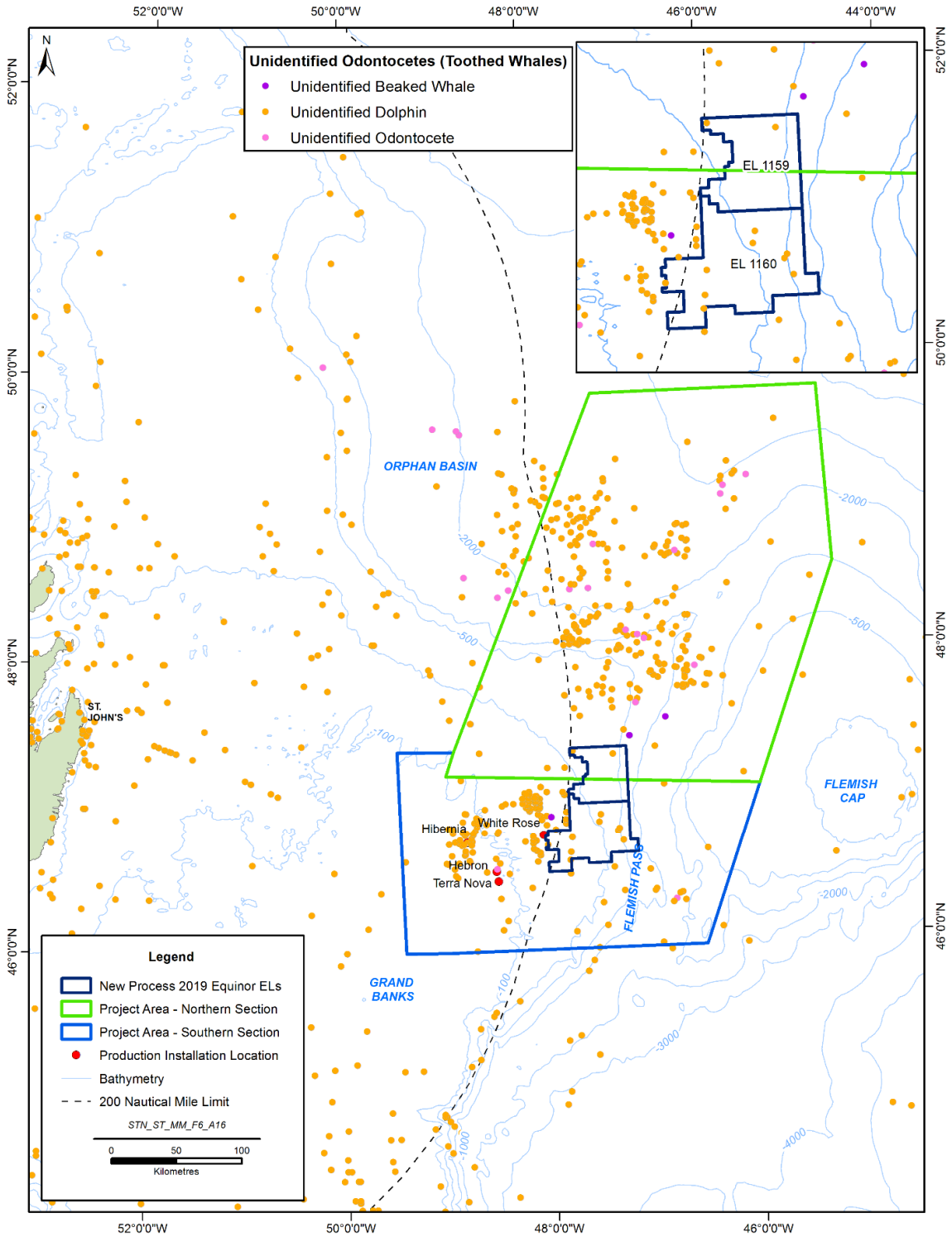


Figure 6-42 Opportunistic Sightings of Unidentified Odontocetes (1958 to 2017)

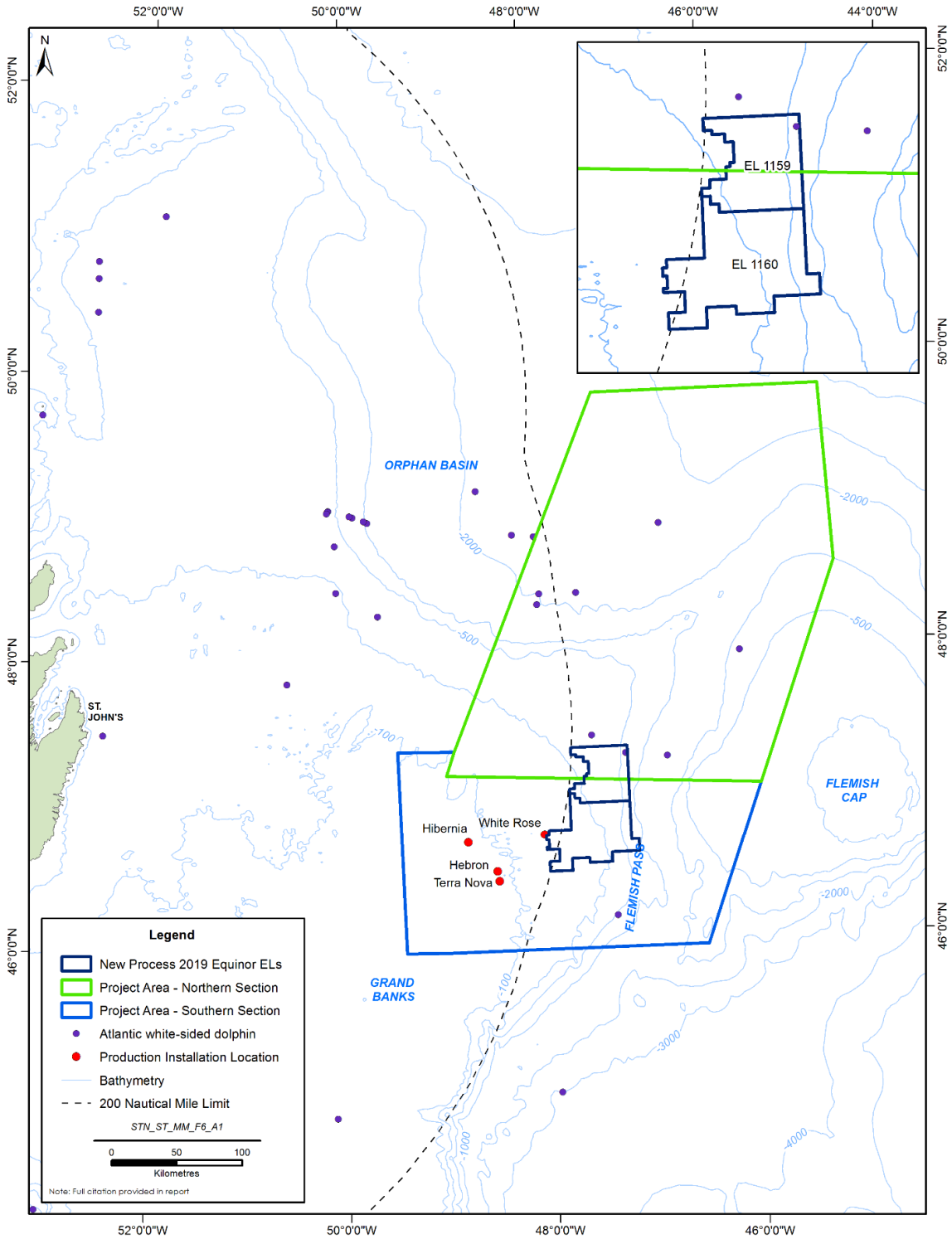


Figure 6-43 Atlantic White-sided Dolphin Sightings in Eastern NL Offshore Area

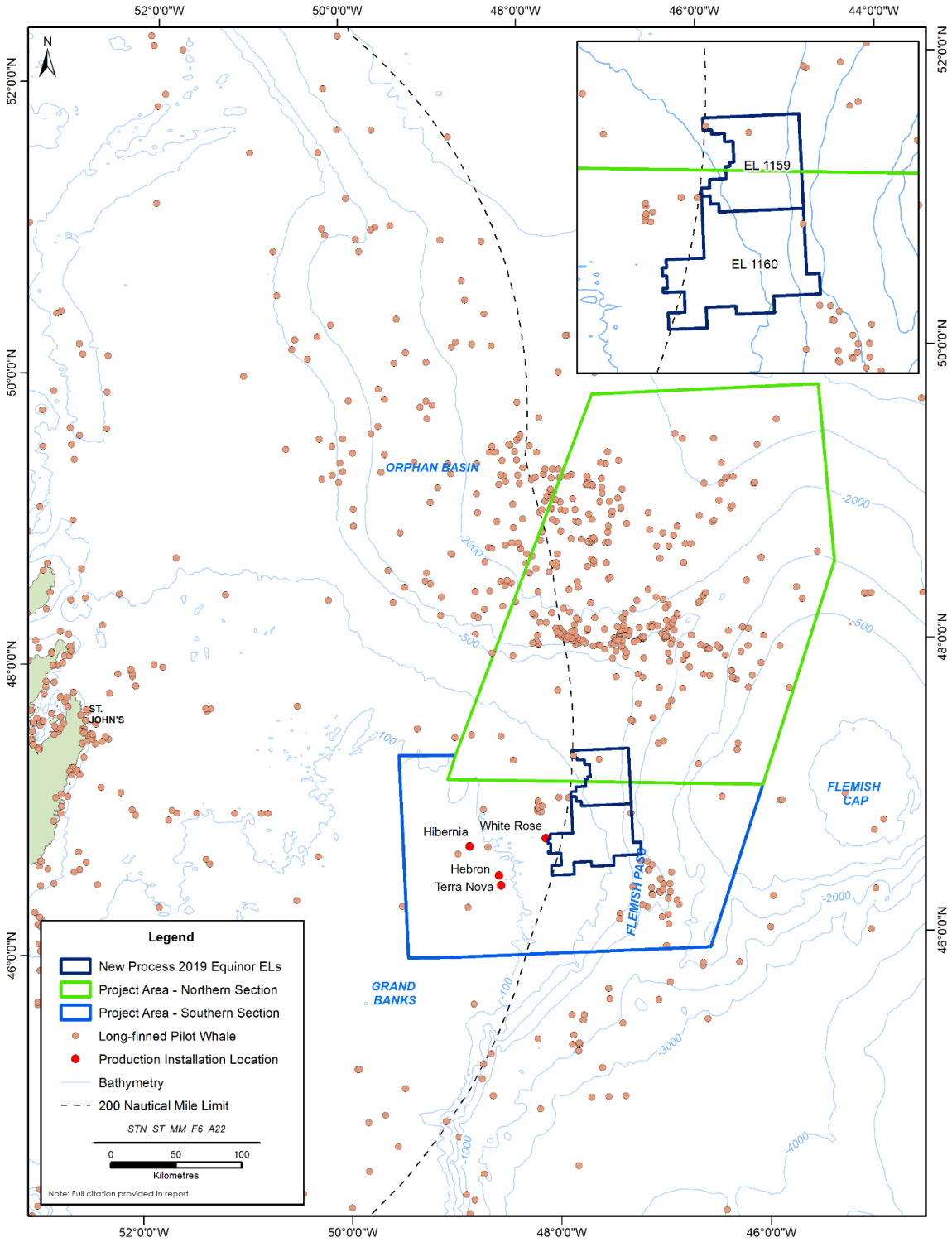


Figure 6-44 Long-finned Pilot Whale Sightings in Eastern NL Offshore Area

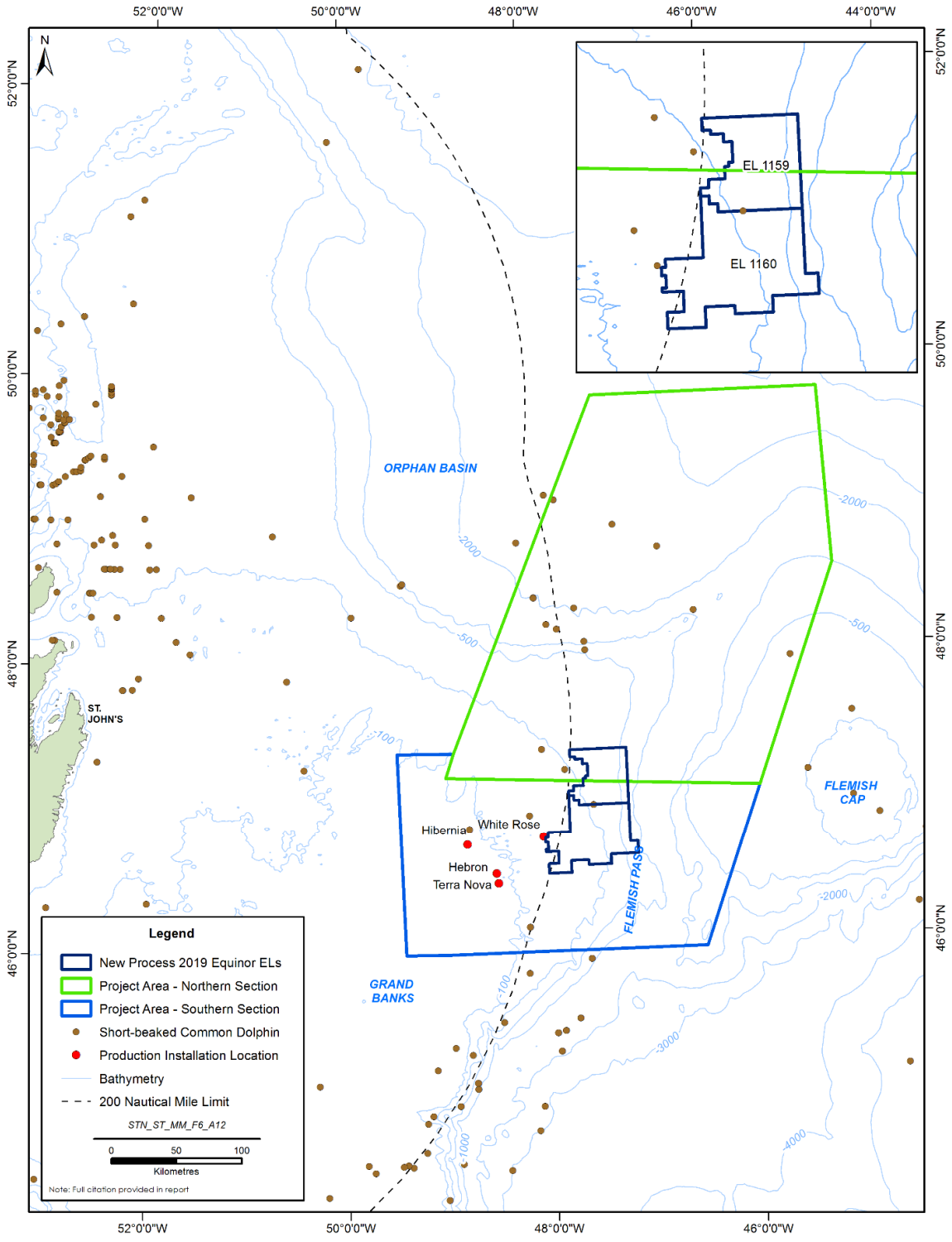


Figure 6-45 Short-beaked Common Dolphin Sightings in Eastern NL Offshore Area

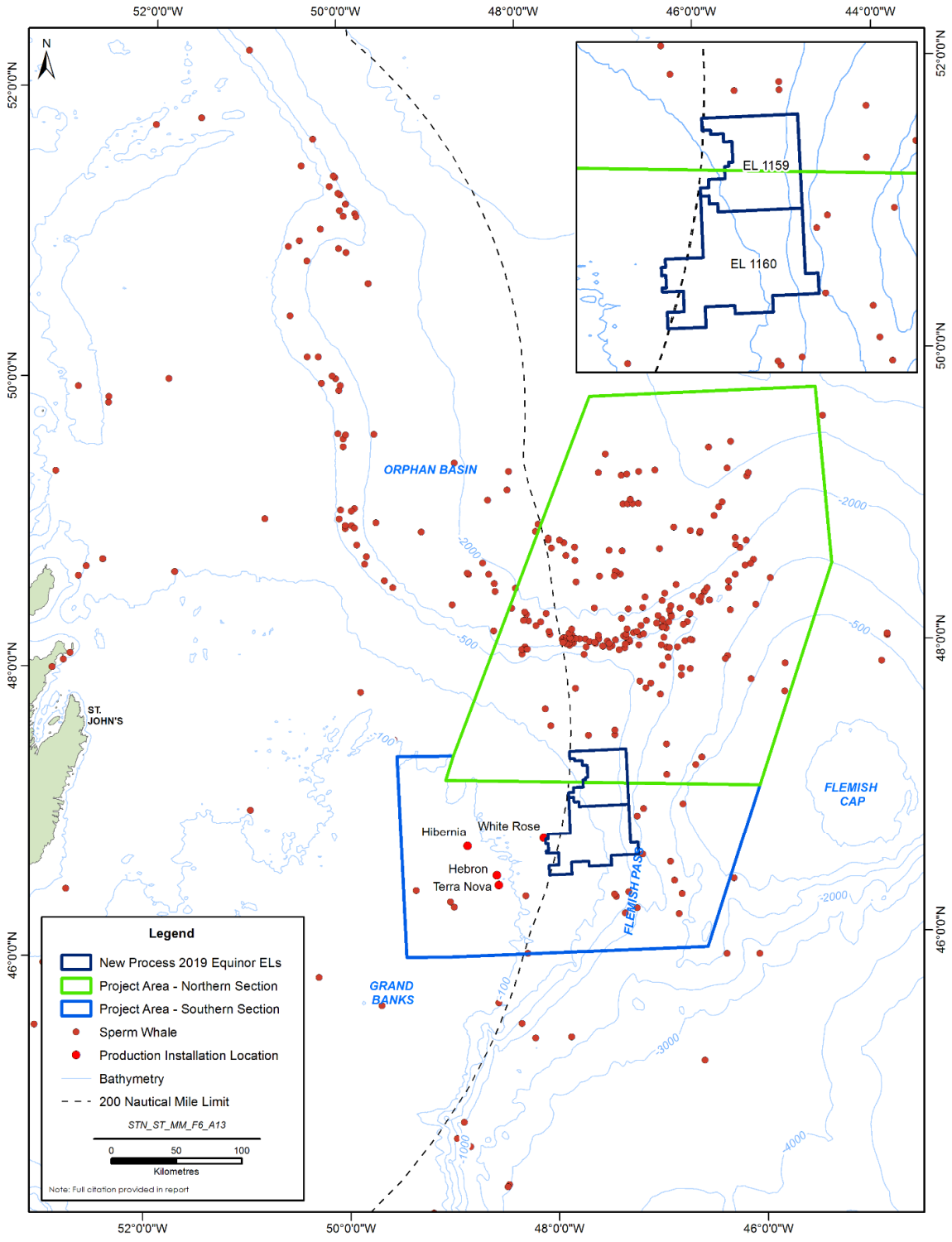


Figure 6-46 Sperm Whale Sightings in Eastern NL Offshore Area

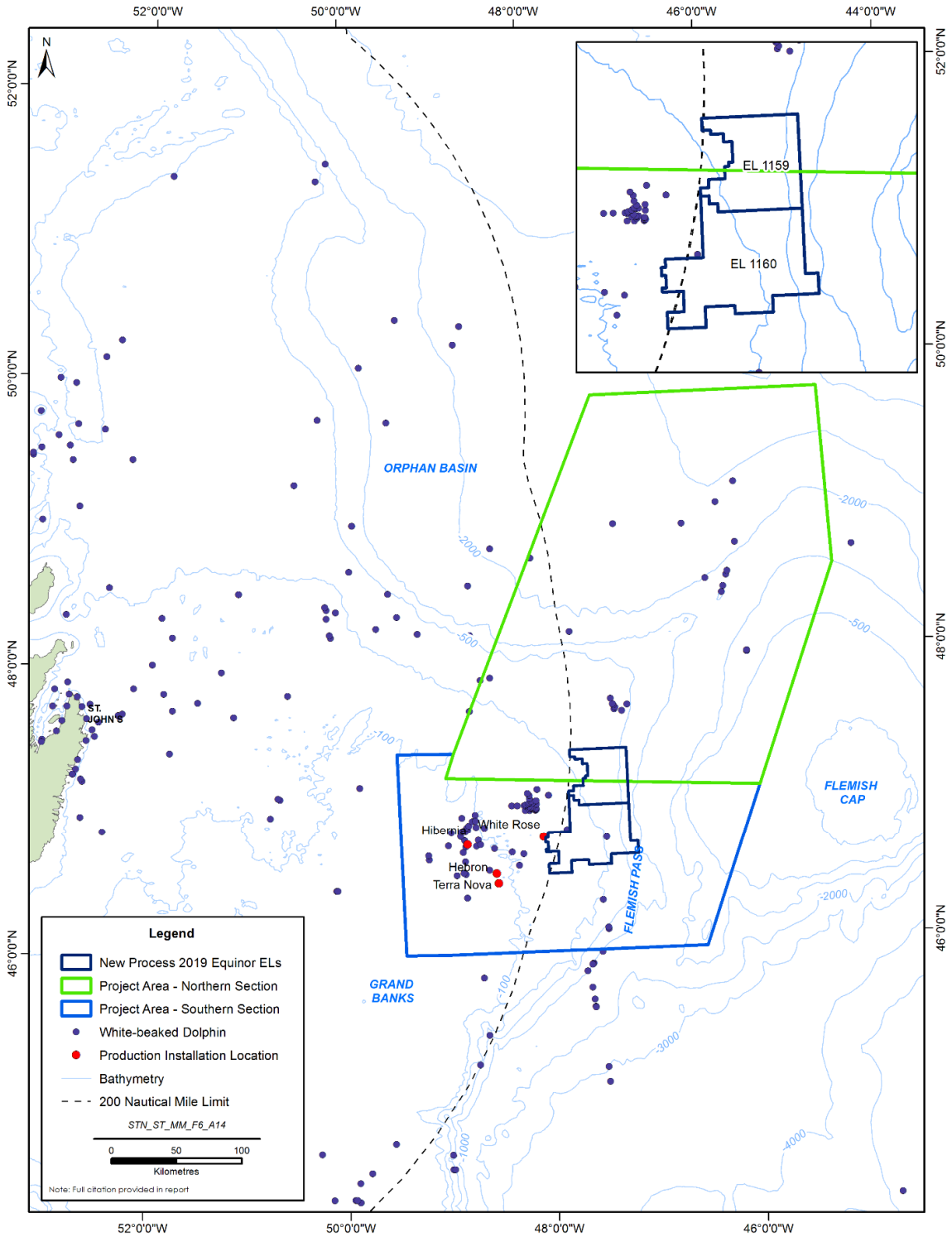


Figure 6-47 White-beaked Dolphin Sightings in Eastern NL Offshore Area

6.3.1 Species at Risk

Current sightings data are available and are incorporated into the Table 6.18 and Figures 6-48 to 6-52 below. There are no new Schedule 1 SARA-listed species since the Flemish Pass EIS was submitted. There are no new marine mammals or sea turtles considered at risk since the Flemish Pass EIS.

Table 6.18 Opportunistic Sightings of Listed Marine Mammals and Sea Turtles Reported in the Project Area (1758 to 2017)

Common Name	Project Area – Northern Section	Project Area – Southern Section
Beluga whale	1	0
Blue whale	0	0
Bowhead whale	0	0
Fin whale	86	83
Harbour porpoise	29	7
Killer whale	8	16
North Atlantic right whale	1	0
Northern bottlenose whale	54	12
Sowerby's beaked whale	1	0
Unidentified beaked whale	2	2
Loggerhead sea turtle	0	2
Leatherback sea turtle	0	1

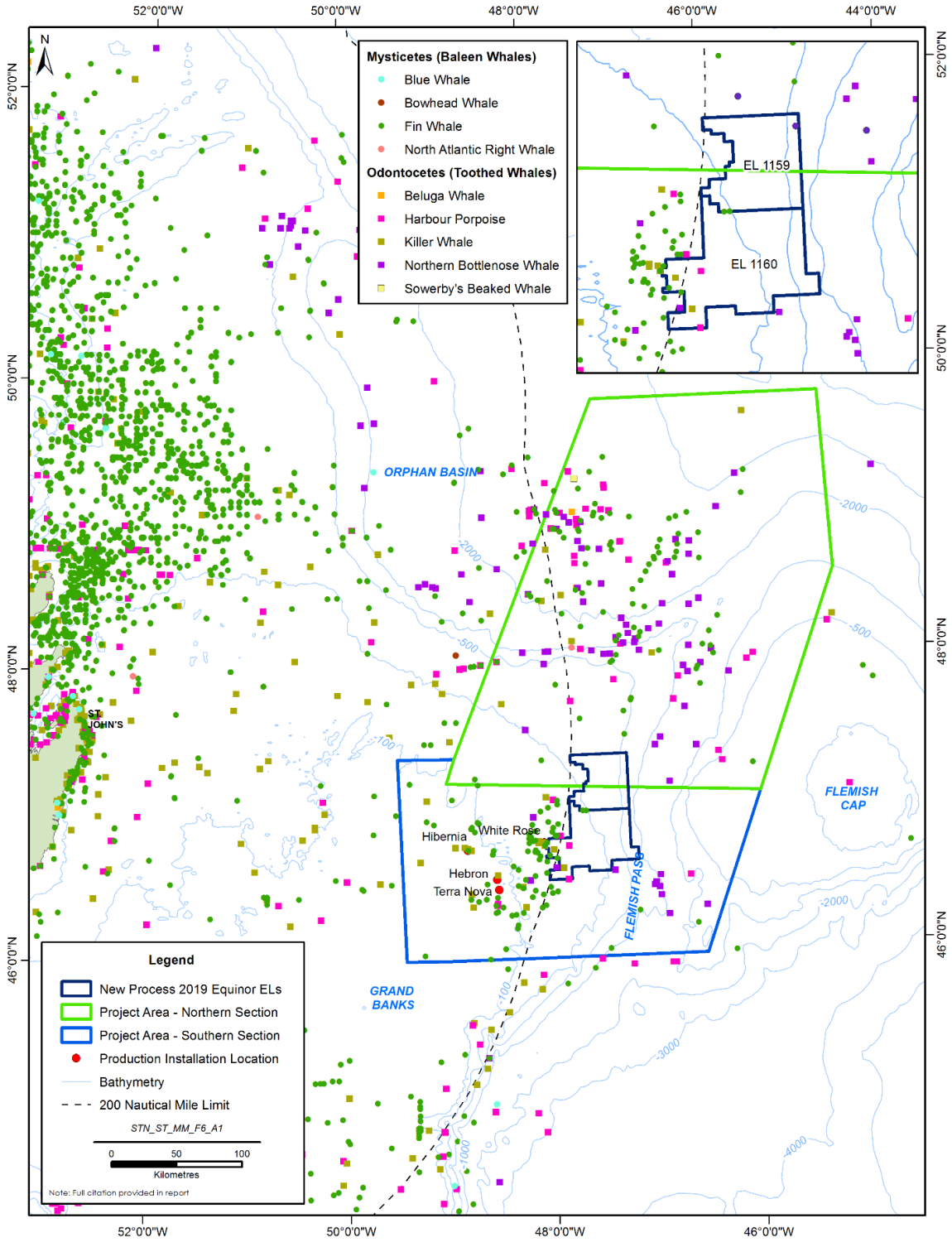


Figure 6-48 Opportunistic Sightings of Listed Marine Mammals (1867 to 2017)

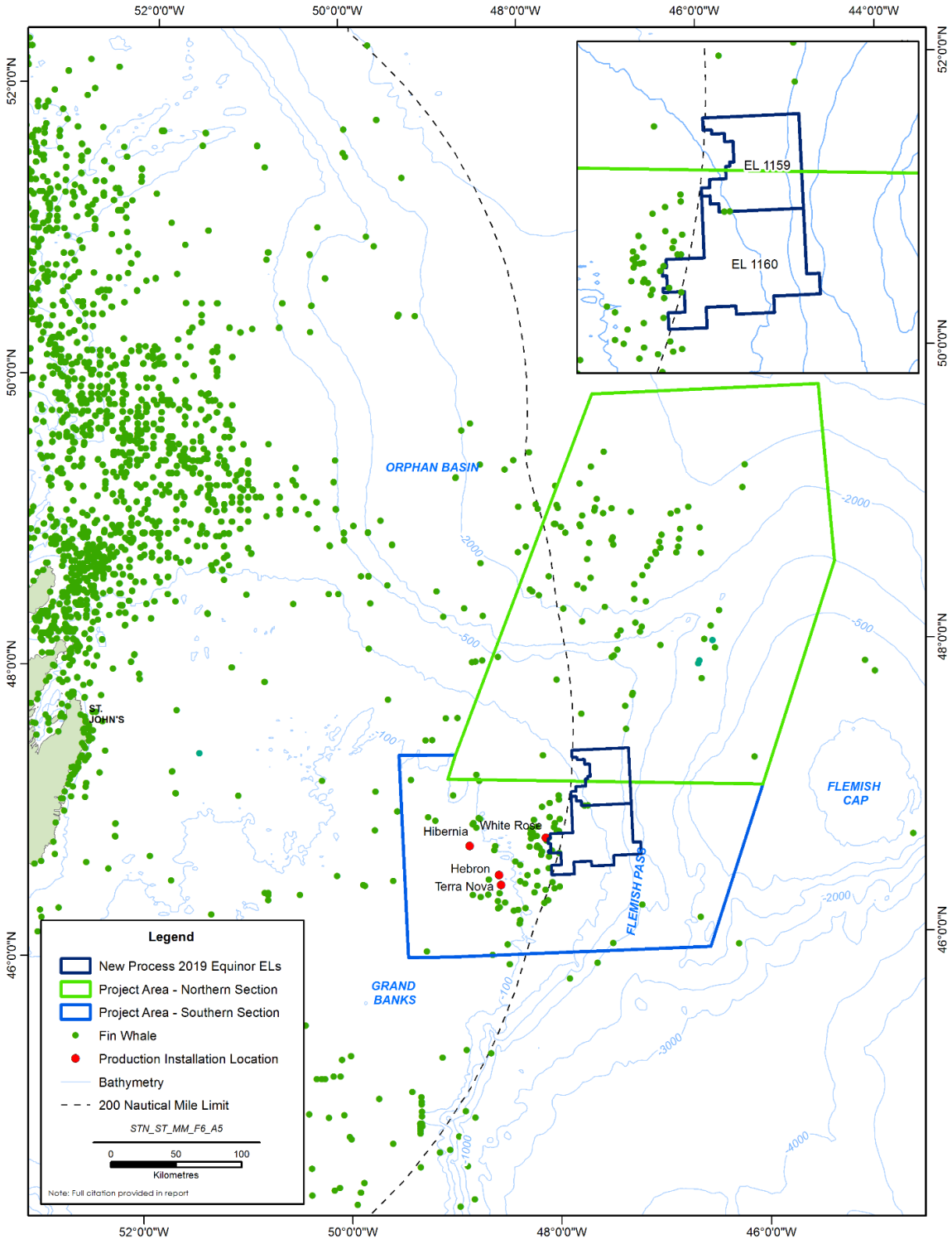


Figure 6-49 Fin Whale Sightings in Eastern NL Offshore Area

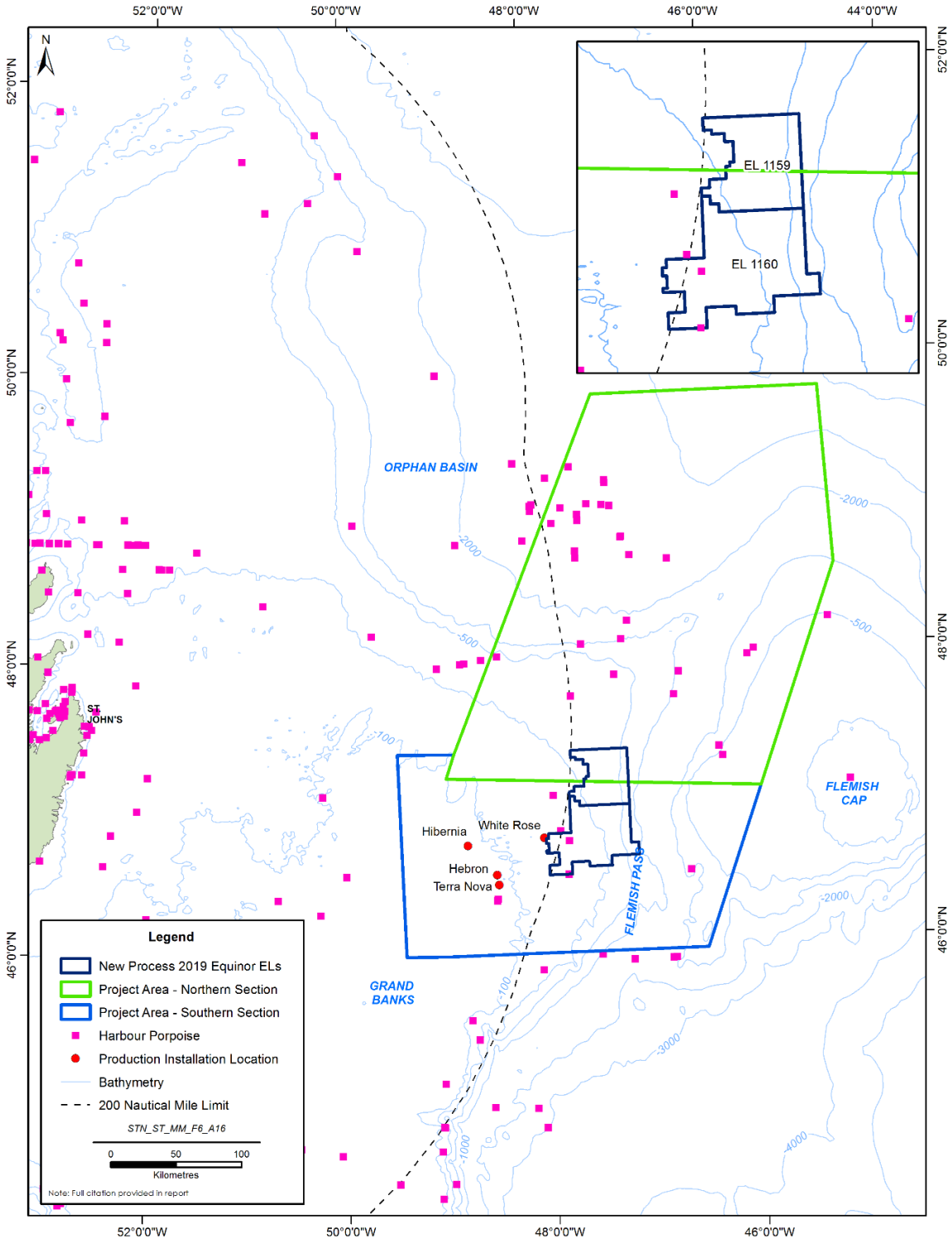


Figure 6-50 Harbour Porpoise Sightings in Eastern NL Offshore Area

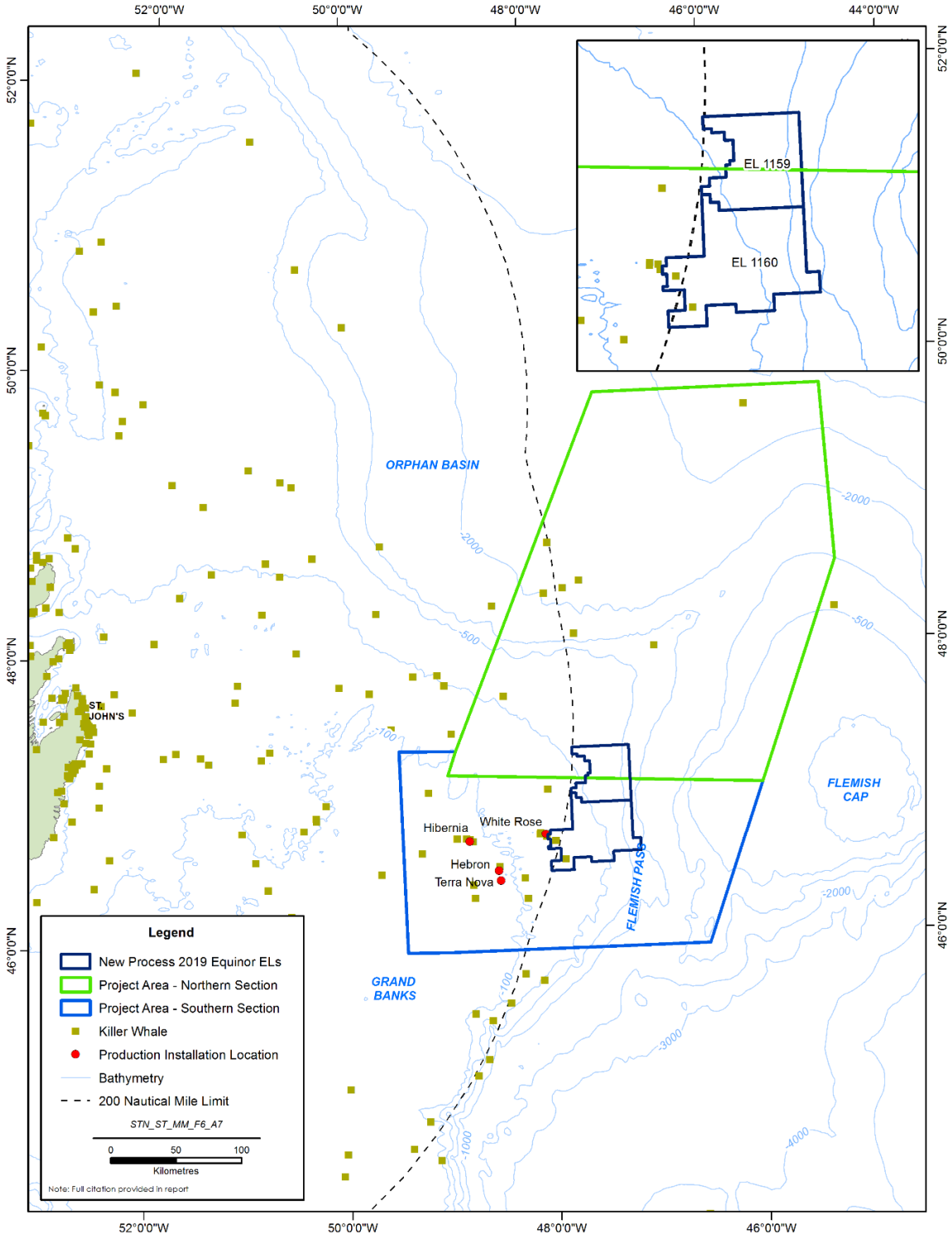


Figure 6-51 Killer Whale Sightings in Eastern NL Offshore Area

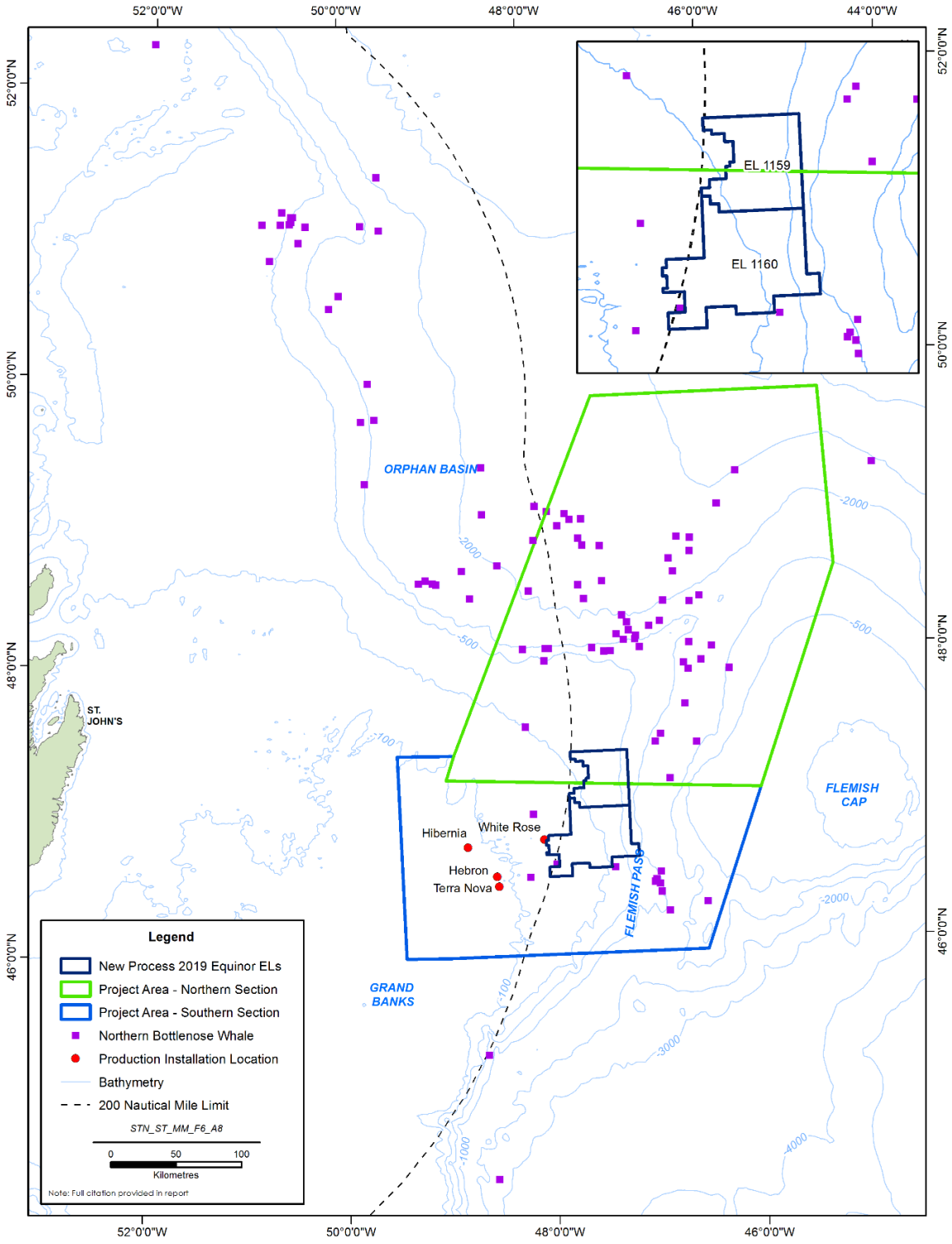


Figure 6-52 Northern Bottlenose Whale Sightings in Eastern NL Offshore Area

6.3.2 Special Areas of Importance to Marine Mammals and Sea Turtles

The EBSAs off eastern Newfoundland and their relevance to marine mammals and sea turtles are listed in Table 6.19 below.

Table 6.19 Proximity of Ecologically and Biologically Significant Areas off Eastern Newfoundland and their Relevance to Marine Mammals and Sea Turtles

Special Areas	Name	Relevance / Importance to Marine Mammals or Sea Turtles	Area
EBSAs	Northeast Shelf and Slope	Concentrations of cetaceans and pinnipeds.	13,885 km²
	Lilly Canyon-Carson Canyon	Aggregation and refuge / overwintering area for cetaceans and pinnipeds.	1,145 km²
	Eastern Avalon Coast	Cetaceans, leatherback sea turtles and seals feed in the area from spring to fall.	1,683 km²
	Southeast Shoal and Tail of the Banks	Highest benthic biomass in the Grand Banks; aggregation and feeding habitat for cetaceans.	30,935 km²
	Notre Dame Channel	Recognized for cetacean feeding and migration. Harp seals feed in the area during winter.	6,222 km²
	Fogo Shelf	Important cetacean feeding areas. Several areas of marine mammal presence.	9,403 km²
	Placentia Bay Extension	High level of biodiversity. Supports a high biomass of marine mammals. High aggregation of cetaceans and leatherback sea turtles in the spring and summer. Harbour seals use area year-round. Important feeding area from spring to fall for many cetaceans (especially humpback whales and porpoises). Important for reproduction of harbour seals. Possible migratory path for leatherback sea turtles.	7,693 km²
	Southwest Shelf Edge and Slope	Many marine mammals and leatherback sea turtles aggregate here in summer.	16,644 km²
	Labrador Marginal Trough	Potential corridor for several marine mammal species. Part of the highest probability of use for harp seal whelping and feeding. Aggregations of cetaceans in summer and fall.	16,952 km²
	St. Pierre Bank	Feeding areas for cetaceans.	5,482 km²
	Laurentian Channel and Slope	Used by cetaceans moving in and out of the Gulf of St. Lawrence.	17,140 km²
	Hamilton Inlet	Harp seals whelp on pack ice in the area. Fall and winter-feeding area for ringed seals.	11,038 km²
	Southern Pack Ice	Seasonal pack ice is recognized for its importance to marine mammals.	N/A

Table 6.19 Proximity of Ecologically and Biologically Significant Areas off Eastern Newfoundland and their Relevance to Marine Mammals and Sea Turtles

Special Areas	Name	Relevance / Importance to Marine Mammals or Sea Turtles	Area
Preliminary RMA	South Grand Bank Area	Feeding area for aggregations of cetaceans and leatherback turtles. Area overlaps with Southeast Shoal and Tail of the Banks EBSA.	18,201 km²
Sources: Templeman (2007); CPAWS (2018); DFO (2013, 2016a)			

6.4 Special Areas

Currently, there are no known Marine Protected Areas (MPAs) within the vicinity of the Project Area. However, nationally DFO is increasing the number of MPAs. This initiative includes the marine waters off NL. Multiple areas within offshore Newfoundland have been designated as environmentally sensitive.

In addition to Canadian-designated EBSAs, NAFO has identified a number of areas as VMEs for deep-water corals and sponges in the offshore region, including many canyons around the continental shelf, seamounts, and knolls. The Newfoundland Seamounts and the Beothuk Knoll have been identified as potential VMEs (NAFO 2008). The VMEs are closed to bottom trawling activities in the area, to manage habitat for corals such as gorgonians, black corals, sea pens, and sponges. These areas were created in response to the known sensitivity of corals and sponges, particularly gorgonians and black corals that cannot reattach themselves to substrate after disturbance (NAFO 2009). In the NL offshore area, there are no areas identified where drilling cannot occur. While DFO and NAFO have identified EBSAs and VMEs, there are no restrictions in these areas regarding drilling activity. The C-NLOPB requires mitigation be put in place to reduce potential effects on sensitive marine organisms (e.g., corals). Refer to Section 2.4.1 for information regarding pre-drill coral / sponge surveys.

Figure 6-53 below outlines the special areas in eastern Newfoundland. Tables 6.20 to 6.37 provide information on each of the areas.

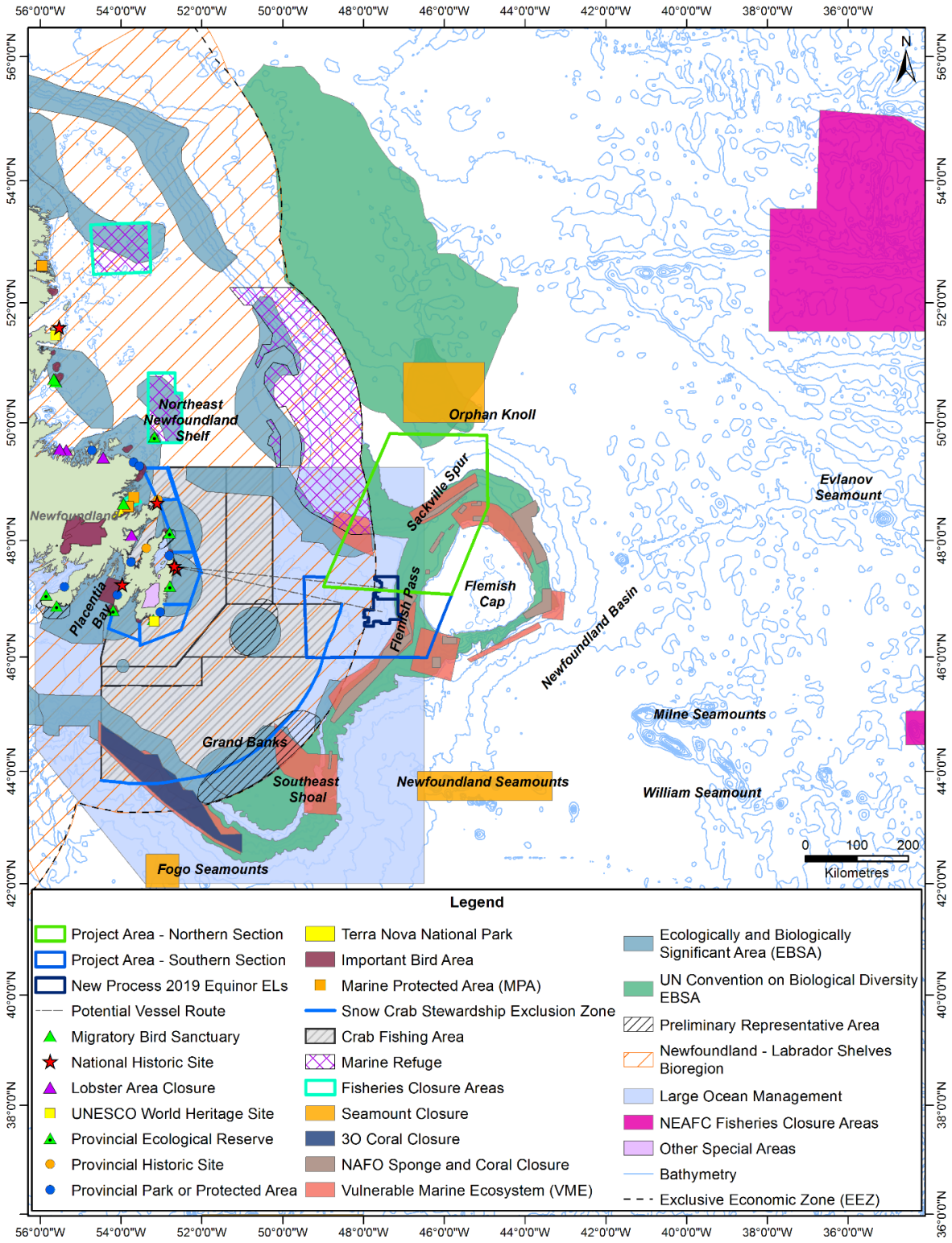


Figure 6-53 Special Areas in Eastern Newfoundland and Labrador

Table 6.20 Marine Protected Areas in Newfoundland and Labrador

MPA	Rationale for Identification / Designation	Area
Eastport-Duck Islands MPA Eastport-Round Island MPA	Established in 2005 to limit fishing with an aim to provide a viable American lobster population and to protect other threatened or endangered species.	2.1 km² on 2 islands
Gilbert Bay MPA	Established in 2005 to conserve one of the few coastal concentrations of northern cod in the Newfoundland region and to indirectly protect other species and habitats.	60 km²
Laurentian Channel AOI	Designated as an AOI in 2010. Highest concentration of black dogfish and only pupping area in Canadian waters. Important spawning, nursing and feeding area for variety of species including porbeagle shark, and smooth skate. Critical migration route for marine mammals moving in and out of Gulf of St. Lawrence. Two SAR (i.e., northern wolffish and leatherback sea turtle) found in area. One of the highest concentrations of sea pens (soft feather-shaped corals) in the NL Shelves Bioregion.	11,619 km²
Source: EMPAAC (2013); DFO (2016b, 2017)		

Table 6.21 Federal Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Area
Eastport Peninsula Lobster Management Area	In 1995, Eastport Peninsula lobster fishers voluntarily limited lobster fishing in an area of Bonavista Bay to protect prime lobster habitat. In 1997, DFO provided protection through the *Fisheries Act* and designated two portions of the area as MPAs under the *Oceans Act*.	400 km²
Funk Island Deep Box	In 2002, DFO closed (through the *Fisheries Act*) an area of the Funk Island Deep to gillnetting to protect bottom habitat. DFO also closed the area to small vessel bottom trawling in 2005. The fishing industry has voluntarily closed the area to the large vessel shrimp fleet.	7,272 km²
Hawke Box	In 2002 at the request of local fishers, DFO closed a portion of the Hawke Channel to trawling and gillnetting (under the *Fisheries Act*) and expanded the area in 2003. The area remained open to seasonal snow crab pot fishing. Closure was a precautionary measure primarily to sustain the crab fishery and secondarily to conserve cod known to aggregate there.	8,610 km²
Source: DFO (2007, 2014); EMPAAC (2013)		

Table 6.22 Marine Refuges

Marine Refuge	Rationale for Identification/Designation	Area
Northeast Newfoundland Slope Closure (formerly known as Tobin's Point)	Dense aggregations of large, structure-forming cold-water corals provide niche space for other organisms. Prohibitions for all bottom contact fishing activities.	46,833 km²
Hawke Channel Closure	The Hawke Channel seafloor is an important habitat for groundfish including Greenland halibut. The Refuge also protects habitat of depleted species such as Atlantic wolffish. Bottom trawl, gillnet and longline fishing activities are prohibited.	8,837 km²
Funk Island Deep Closure	Conserves seafloor habitat important to Atlantic cod. Bottom trawl, gillnet and longline fishing activities are prohibited.	7,274 km²
Source: DFO (2019)		

Table 6.23 Ecologically and Biologically Significant Areas off Eastern Newfoundland

EBSA	Rationale for Identification/Designation	Area
Northeast Shelf and Slope	High aggregations of Greenland halibut and spotted wolfish, which congregate in spring. Concentrations of cetaceans, pinnipeds and corals.	13,885 km²
Virgin Rocks	High aggregations of capelin and other spawning groundfish such as Atlantic cod, American plaice and yellowtail flounder. Seabird feeding areas. Unique geological features and habitat.	6,843 km²
Orphan Spur	High concentrations of corals. Densities of sharks and species of conservation concern (SOCC) (e.g., northern, spotted and striped wolffish, skates, roundnose grenadier, American plaice, redfish).	21,569 km²
Lilly Canyon-Carson Canyon	Concentration, reproduction and feeding area for Iceland scallop. Aggregation and refuge/overwintering for cetaceans and pinnipeds.	1,145 km²
Eastern Avalon Coast	Seabird feeding areas. Cetaceans, leatherback turtles and seals feed in the area from spring to fall.	1,683 km²
Southeast Shoal and Tail of the Banks	Highest benthic biomass in the Grand Banks; aggregation, feeding, breeding and/or nursery habitats for capelin, yellowtail, cetaceans, seabirds, American plaice and Atlantic cod. Reproduction of striped wolffish. Unique populations of species. Unique sandy habitat with important glacial history.	30,935 km²
Notre Dame Channel	Recognized for cetacean feeding and migration. Frequented by several species of seabirds. Harp seals feed in the area during winter.	6,222 km²
Smith Sound	Atlantic cod use the area for spawning and nursery grounds and as an overwintering refuge.	148 km²

Table 6.23 Ecologically and Biologically Significant Areas off Eastern Newfoundland

EBSA	Rationale for Identification/Designation	Area
Fogo Shelf	Funk Island, the largest common murre colony in the western North Atlantic and the only northern gannet breeding colony in the NL Shelves Bioregion. Other bird species aggregations. Abundance of beach and sub-tidal capelin spawning areas. Important cetacean feeding areas. Several areas of marine mammals' presence.	9,403 km²
Placentia Bay Extension	High level of biodiversity. Supports important seabird breeding areas and a high biomass of birds and mammals. High aggregation of cetaceans and leatherback sea turtles in the spring and summer. Otters and harbour seals use area year-round. Important feeding area from spring to fall for many seabird species and cetaceans (especially humpbacks and porpoises). Important for reproduction of many seabird species, harbour seals and otters. Possible migratory path for leatherback turtles.	7,693 km²
Labrador Slope	High diversity of corals, sponges, rare or endangered species, core species and fish functional groups. Rare or endangered species: Atlantic, spotted and northern wolffish. Significant concentrations of roundnose grenadier, skates, northern shrimp, Greenland halibut, redfish, Atlantic cod and American plaice.	29,746 km²
Southwest Shelf Edge and Slope	Critical to a wide variety of seabirds, providing the highest density of pelagic seabird feeding within the PBGB-LOMA. Many marine mammals and leatherback sea turtles aggregate in summer.	16,644 km²
Grey Islands	Important for waterfowl and seabirds in coastal areas and on the shelf. Common eider and harlequin duck occur in high concentrations. Important breeding colonies for great black-backed gulls, herring gulls and terns. High diversity of seabird species aggregate along the inner shelf area.	11,301 km²
Labrador Marginal Trough	Core fish species and various marine mammals. High densities of shrimp, snow crab, Greenland halibut, American plaice, witch flounder and capelin. Potential corridor for several fish and mammal species. Part of the highest probability of use for harp seal whelping and feeding. Aggregations of plank piscivores, and small and medium benthivores. Aggregations of cetaceans in summer and fall. Important for seabirds including murres, black-backed kittiwake, great black-backed gull, herring gull, northern fulmar, Atlantic puffin, skuas, jaegers, Sooty Shearwater and the endangered Ivory Gull.	16,952 km²
St. Pierre Bank	Highest and only concentration of sea scallops on the Grand Banks. High concentration of spiny dogfish and northern most extent of the species. Feeding areas for cetaceans.	5,482 km²
Laurentian Channel and Slope	The sole pupping grounds of black dogfish off Canada. Important juvenile/nursery area for smooth skates. Used by cetaceans moving in and out of the Gulf of St. Lawrence.	17,140 km²
Gilbert Bay	Important habitat of genetically distinct Gilbert Bay Atlantic cod species. An MPA was established in 2005. Habitat of Arctic charr and Atlantic salmon. Capelin spawning area.	359 km²

Table 6.23 Ecologically and Biologically Significant Areas off Eastern Newfoundland

EBSA	Rationale for Identification/Designation	Area
Hamilton Inlet	Habitat of capelin, Atlantic salmon and seabirds. Capelin spawning areas. Harp seal whelp on pack ice in the area. Fall and winter feeding area for ringed seals. Important area for a number of species of seabirds, waterfowl, gulls, and fulmars including species of special concern: the harlequin duck.	11,038 km²
Southern Pack Ice	Seasonal pack ice recognized for its importance to marine mammals and seabirds.	N/A
Source: Templeman (2007); DFO (2013, 2016e); AMEC (2014)		

Table 6.24 Refined PB / GB LOMA EBSAs

EBSA	Approximate Delineated Area	
	2007	2017
Northeast Slope	13,885 km²	19,731 km²
Virgin Rocks	6,843 km²	7,294 km²
Lilly Canyon-Carson Canyon	1,145 km²	2,180 km²
Southeast Shoal	30,935 km²	15,402 km²
Eastern Avalon	1,683 km²	5,948 km²
Southwest Slope	16,644 km²	25,181 km²
Smith Sound	148 km²	547 km²
Placentia Bay	7,693 km²	13,539 km²
Laurentian Channel	17,140 km²	19,545 km²
Haddock Channel Sponges	Not applicable	490 km²
South Coast	Not applicable	6,876 km²
St. Mary’s Bay	Not applicable	3,989 km²
Bonavista Bay	Not applicable	3,141 km²
Baccalieu Island	Not applicable	6,922 km²
Source: Wells (2018)		

Table 6.25 Convention on Biological Diversity EBSAs

EBSA	Rationale for Identification/Designation	Area
Labrador Sea Deep Convection Area	The only North-West Atlantic site where winter convection exchanges surface and deep ocean waters. Provides mid-water overwintering refuge for pre-adult *Calanus finmarchicus*, a key species for zooplankton populations of the Labrador Shelf and downstream areas. Annual variability in convection results in significant yearly change through ecosystems of the North-West Atlantic.	Approximately 43,278 km². Not a fixed geographic area but delineated annually by physical oceanographic properties
Seabird Foraging Zone in the Southern Labrador Sea	Supports globally significant populations of marine vertebrates, including an estimated 40 million seabirds annually. Important foraging habitat for seabirds, including 20 populations of over-wintering black-legged kittiwakes (*Rissa tridactyla*), thick-billed murres (*Uria lombia*) and breeding Leach's storm-petrels (*Oceanodroma leucorhoa*). Encompasses the pelagic zone of the Orphan Basin, continental shelf, slope and offshore waters inside and outside the Canadian EEZ.	152,841 km²
Orphan Knoll	Seamounts typically support endemic populations and unique faunal assemblages. This seamount is an island of hard substratum with uniquely complex habitats that rise from the seafloor of the surrounding deep, soft sediments of the Orphan Basin. Although close to the adjacent continental slopes, Orphan Knoll is much deeper and appears to have distinctive fauna. Fragile and long-lived corals and sponges have been observed and a Taylor Cone circulation provides a mechanism for retention of larvae.	12,742 km²
Slopes of the Flemish Cap and Grand Bank	Contains most of the aggregations of indicator species for VMEs in the NAFO Regulatory Area. Includes NAFO closures to protect corals and sponges and a component of Greenland halibut fishery grounds in international waters. A high diversity of marine taxa, including threatened and listed species, are found within the EBSA.	87,817 km²
Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank	The shoal is a very productive ecosystem, providing a shallow, relatively warm, sandy habitat. The shoal is an ancient beach relic that provides an offshore capelin-spawning ground and spawning area for Atlantic wolffish, Atlantic cod, and American plaice, as well as a yellowtail flounder nursery. The shoal is also home to unique populations of blue mussels and wedge clams. The Tail provides an important feeding area for humpback and fin whales and large numbers of seabirds (UNCBD 2019).	
Source: UNCBD (2017)		

Table 6.26 Preliminary Representative Marine Areas off Eastern Newfoundland

Preliminary RMA	Rationale for Identification/Designation	Area
Virgin Rocks	Unique geological features and habitat within the PBGB-LOMA. Important spawning habitat for Atlantic cod, American plaice and yellowtail flounder. Congregation area for capelin. Congregation and feeding area for seabirds. Large winter colonies of common eiders. Area overlaps with Virgin Rocks EBSA.	6,740 km²
South Grand Bank Area	Relatively high coral species richness. High fish species richness. Significant groundfish biomass. Unique species biodiversity includes seabirds, Fea's petrel and other rare birds. Feeding area for aggregations of seabirds, cetaceans and leatherback turtles. Area overlaps with Southeast Shoal and Tail of the Banks EBSA.	18,201 km²
Northwestern Conception Bay	Capelin spawn in high concentrations. Greatest abundance and diversity of seabird species in eastern North America. Largest seabird island and greatest diversity of breeding seabirds in the province. Largest Leach's storm-petrel breeding colony in the world. One of six known breeding colonies of Northern Gannets in North America. One of four islands in eastern Canada where northern fulmars breed. Area overlaps with Baccalieu Island and Grates Point IBAs.	608 km²
Southern Coast of Burin Peninsula and Southeastern Placentia Bay	Globally significant concentrations of seabirds such as Leach's storm-petrel. Largest concentration of nesting Manx shearwaters in North America and the only North American location where the species nests regularly. Other seabirds and gulls nest in the area. Area overlaps with Placentia Bay Extension EBSA, Cape St. Mary's Ecological Reserve and Cape St. Mary's EBSA.	1,357 km²
Source: CPAWS (2009); AMEC (2014)		

Table 6.27 Vulnerable Marine Ecosystems off Eastern Newfoundland

VME	Rationale for Identification/Designation	Area
Sackville Spur	High density of sponges.	3,961 km²
Northern Flemish Cap	High density of sea pens, soft corals and black corals and, to a lesser extent, solitary stony corals and small gorgonians. Vulnerable fish species: northern wolffish and spiny dogfish.	6,650 km²
Northeast Shelf and Slope (within Canadian EEZ)	Abundance of gorgonian and black corals.	4,150 km²
Southern Flemish Pass to Eastern Canyons	Large gorgonians and high density of sponges. Vulnerable fish species: striped wolffish, redfish, spiny tailed skate, northern wolffish, some black dogfish, deep-sea cat shark.	7,928 km²
Beothuk Knoll	Abundant gorgonian corals and high density of sponges. Vulnerable fish species: northern wolffish, spiny tailed skate, roundnose grenadier, deep-sea cat shark, black dogfish.	6,685 km²
Deep Water Coral Area	An area where deep-water coral VMEs are considered likely.	1,502 km²
Flemish Cap East	Large gorgonians and high density of sponges. Vulnerable fish species: black dogfish and smooth skate.	2,098 km²
South East Shoal and Adjacent Shelf Edge/Canyons	Unique spawning grounds on South East Shoal, marine mammal feeding grounds, long-lived and relict bivalve populations in sandy shoal habitat. Vulnerable fish species: spawning capelin, northern wolffish, redfish, striped and spotted wolffish, roundnose grenadier, black dogfish.	11,930 km²
Division 3O Coral Area Closure	Existing closure based on coral concentrations, high density of sea pens and solitary stony corals. Vulnerable fish species: white hake, redfish, black dogfish, smooth skate and deep-sea cat shark.	16,877 km²
Source: WG-EAFM (2008)		

Table 6.28 NAFO Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Closure Period	Area
Sackville Spur (6)	• Closed to protect high coral and sponge concentrations. • The Sackville Spur is an elongate sediment drift feature that extends from the Grand Banks across the northern limit of the Flemish Pass and along the northern slope of the Flemish Cap. Its southern flank gently slopes to/ward the 900 m isobath in the Flemish Pass, and steeper northern flank extends to the floor of the Orphan Basin at 2,500 m depth. • Dominant sponge species are demosponges of the order Astrophorida. Geodiids (mostly *Geodia barretti*), *Stelletta normani* and *Stryphnus ponderosus* occur in the deeper water. These large-sized sponges sometimes grow to more than 25 cm in diameter. The upper limit of the sponges is at about 1,300 m depth and extending down to about 1,800 m. These sponge grounds host a high diversity and abundance of associated megafaunal species.	January 1, 2010 to December 31, 2020	992 km²
Northern Flemish Cap (7)	• Together identified as NAFO Coral Closures, these areas were closed to protect high coral and sponge concentrations. • The Flemish Cap is a plateau of approximately 200 km radius at the 500 m isobath, with depths of less than 150 m at its centre and separated from the Grand Banks by the approximately 1,200 m deep Flemish Pass. • Flemish Cap has a patch of sand at its centre, in the shallower water, but most of the Cap is covered with muddy sand and sandy mud. • Sea pens are key biophysical components of soft-bottom VME indicator elements in the NAFO regulatory area. Aggregations of sea pens, known as “fields”, provide important structure in low-relief sand and mud habitats where there is little physical habitat complexity. Fields provide refuge for small planktonic and benthic invertebrates that may be preyed upon by fish. A system of sea pen VME indicator species has been identified extending around the edge of the Flemish Cap. Crinoids and cerianthids and black corals have been found associated with this sea pen system. Sponges, sea pens, cerianthids and crinoids are also found outside the FCA.	January 1, 2010 to December 31, 2020	259 km²
Northern Flemish Cap (8)		January 1, 2010 to December 31, 2020	98 km²
Northern Flemish Cap (9)		January 1, 2010 to December 31, 2020	128 km²
Northwest Flemish Cap (10)		January 1, 2010 to December 31, 2020	317 km²
Northwest Flemish Cap (11)		January 1, 2010 to December 31, 2020	61 km²
Northwest Flemish Cap (12)		January 1. 2014 to December 31, 2020	35 km²

Table 6.28 NAFO Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Closure Period	Area
Flemish Pass/Eastern Canyon (2)	• Closed to protect extensive sponge grounds. • Area was expanded to protect large gorgonian corals in the Flemish Pass. • The Flemish Pass, approximately 1,200 m deep, separates the Flemish Cap from the Grand Banks. Includes canyons on the eastern slope of the Grand Banks, a portion of Flemish Pass in the south, and western slope of the Flemish Cap. Straddles the 2,000 m NAFO fishing footprint on the slopes except on Flemish Cap. • The Flemish Pass contains sandy muds with accumulations of pebbles and stones apparently deposited by icebergs floating along this course. The area has complex hydrography owing to the occurrence of two water masses. VME indicator elements include canyons and shelf-indenting canyons. • Biological composition is similar to the Sackville Spur. These sponge grounds have been shown to house high species diversity compared with non-sponge ground habitat at similar depths. Some sponge, large gorgonians and seapen VMEs have also been identified outside the FCA.	January 1, 2010 to December 31, 2020	5,418 km²
Orphan Knoll	• Closed to protect seamounts. • Orphan Knoll is a single peak, with depths of a minimum of 1,800 m. Mounds are found at depths of between 1,800 and 2,300 m. Einarsson Mound is 1,500 to 2,000 m wide and 300 m tall, and Nader Mound is between 400 and 800 m wide and 300 m tall, including the height of the base which is covered in sediment. • Physical properties indicate that mid-depth waters above Orphan Knoll are in a boundary region between outflow from the Labrador Sea (subpolar gyre) and northward flow of the North Atlantic Current (subtropical gyre). • A west-east gradient in nutrients is likely related to water mass differences between the Orphan Basin and the area east of the Orphan Knoll. • The Orphan Basin-Orphan Knoll region is biologically rich and complex, and strongly influenced by local processes and advection. Coral, including stony coral, and sponges observed on the flanks. Near-bottom anti-cyclonic circulation could have important implications for the benthic community.	January 1, 2007 until December 31, 2020	15,815 km²

Table 6.28 NAFO Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Closure Period	Area
Northeast Flemish Cap (5)	• Closed to protect high coral and sponge concentrations. • See Northern and Northwest Flemish Cap. The complexity of the bottom is increased along the southern slope of the Flemish Cap by numerous submarine canyons and steep cliffs. Steep flanks are the important VME indicator element in this area. The FCA straddles the NAFO fishing footprint. • This FCA encompasses a gradient of benthic communities, transitioning from coral dominated communities at approximately 2,450 m depth, corals intermixed with sponges around 2,000 m, sponge dominated grounds at 1,500 m, and a diverse community of corals, sponges and other benthic taxa at approximately 1,300 m depth.	January 1, 2010 until December 31, 2020	2,892 km²
Eastern Flemish Cap (14)	• Closed due to significant concentrations of sea pens, a VME indicator species.	January 1, 2017 to December 31, 2018	239 km²
Beothuk Knoll (13)	• Closed to protect high coral and sponge concentrations. • Physical VME indicator elements include the Beothuk Knoll, steep flanks and canyons with heads greater than 400 m.	January 1, 2015 until December 31, 2020	340 km²
Eastern Flemish Cap (4)	• Closed to protect high coral and sponge concentrations. • See Northern, Northwest and Northeast Flemish Cap. High densities of the stalked crinoids *Gephyrocrinus grimaldii* together with several structure-forming sponges inside the FCA. A sponge and large gorgonian VME indicator element has been identified outside the FCA. Crinoids and cerianthids have also been found in this area.	January 1, 2010 until December 31, 2020	1,563 km²
Beothuk Knoll (3)	• Closed to protect high coral and sponge concentrations. • Beothuk Knoll is a discrete steep-sided plateau that forms an abrupt projection from the southwest edge of Flemish Cap. Adjacent sediment drifts consist of sands. Beothuk Knoll has an iceberg turbate with isolated deep-water scours. Knolls are recognized as VME indicator elements. • Sponge and large gorgonian VMEs have been identified outside this FCA.	January 1, 2010 to December 31, 2020	309 km²

Table 6.28 NAFO Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Closure Period	Area
Tail of the Bank (1)	• Closed to protect high coral and sponge concentrations. • The Tail of the Bank is a small FCA on the continental slope of the tail of the Grand Banks straddling the fishing footprint around 2,000 m in depth. • Deep-sea sponge grounds are aggregations of large sponges that develop under certain geological, hydrological and biological conditions to form structural habitat. More recent studies to the south of this FCA identified significant concentrations of erect bryozoans, large sea squirts (*Boltenia ovifera*) and small gorgonian VME indicator species, along with crinoids and cerianthids.	January 1, 2010 to December 31, 2020	144 km²
Newfoundland Seamounts	• Closed to protect seamounts. • The Newfoundland Seamounts include six seamount peaks all with summits deeper than 2,400 m, with most of the area being deeper than 3,500 m. These seamounts were volcanically active in the late Cretaceous period. • Seamounts are uniquely complex habitats that rise into bathyal and epi-pelagic depths. In general, seamounts owing to their isolation tend to support endemic populations and unique faunal assemblages.	2007-01-01 until 2020-12-31	15,494 km²
3O Coral Area Closure	• Closed to protect corals. • The 3O FCA is located on the continental slope from 800 m and is the only FCA that straddles national and international waters. The area includes mostly soft bottoms with rocky outcrops. • Sea pen and small gorgonian VME indicator species have been identified near the FCA and species distribution models indicate a high probability of sea pens. • VME indicator elements are present: shelf-indenting canyons and canyons with heads of greater than 400 m in depth in the FCA have potential to have VME indicator species.	January 1, 2008 to December 31, 2020	13,995 km²

Table 6.28 NAFO Fisheries Closure Areas off Eastern Newfoundland

Closure Area	Rationale for Identification/Designation	Closure Period	Area
Fogo Seamounts (1)	• Two of the Fogo Seamounts, both below 4,000 m depth, were closed by NAFO as VME indicator elements, with high probability of containing VME indicator species. • Two seamounts located on oceanic crust southwest of the Grand Banks, which form a broad zone of basaltic volcanoes. Most of the Fogo seamounts are deeper than 2,000 m.	January 1, 2009 to December 31, 2020	4,522 km²
Fogo Seamounts (2)		January 1, 2009 to December 31, 2020	4,616 km²
Source: NAFO (2015, 2016a, 2016b); FAO (2016a, 2016b)			

Table 6.29 Lobster Area Closures

Closure	Rationale for Identification/Designation
Mouse Island	Lobster fishing is prohibited in seven areas (totaling 94 km²) around coastal Newfoundland to protect lobster spawning habitat and increase egg production. Five of these Lobster Area Closures are located in Eastern Newfoundland but are outside of the Project Area and traffic routes.
Glover's Harbour	
Gander Bay	
Gooseberry Island	
Penguin Islands	
Source: DFO (2017)	

Table 6.30 Snow Crab Stewardship Exclusion Zones

Closure Area	Rationale for Identification/Designation
Crab Fishing Area 5A Inner	Snow crab fishing is prohibited in various Stewardship Exclusion Zones including portions of Bonavista Bay, Trinity Bay, Conception Bay, the Eastern Avalon and St. Mary's Bay as well as near shore fishing areas.
Crab Fishing Area 5A Outer	
Crab Fishing Area 6A Inner	
Crab Fishing Area 6A Outer	
Crab Fishing Area 6B	
Crab Fishing Area 6C	
Crab Fishing Area 8A	
Crab Fishing Area – 8BX	
Crab Fishing Area 9A	
Crab Fishing Area Near Shore	
Source: DFO (2015)	

Table 6.31 Migratory Bird Sanctuaries in Newfoundland

MBS	Rationale for Identification/Designation	Area
Terra Nova	Designated in 1967 to protect an area adjacent to Terra Nova National Park. About 30 shorebird, waterfowl and seabird species. Important sanctuary during fall migration. Shorebirds frequent tidal flats during summer and early fall. Newman Sound is an important area for waterfowl species year-round.	12 km²
Shepherd Island	Designated in 1991 to protect one of the largest breeding sites (together with Île aux Canes) for common eider in insular Newfoundland.	0.18 km²
Île aux Canes	Designated in 1991 to protect nesting colonies of common eider. Together with Shepherd Island, one of the largest breeding sites for the common eider in insular Newfoundland.	1.62 km²
Source: EC (2016)		

Table 6.32 Important Bird Areas in Eastern Newfoundland

IBA Name	Area (km²)	Location	Importance to Marine and Migratory Birds
Funk Island (NF004)	135.18	An island off northeastern Newfoundland, situated approximately 60 km from shore.	Major concentration of nesting seabirds Globally significant common murre population Large numbers of northern gannets Provincially protected Seabird Ecological Reserve; as such, access to the island is restricted to scientific researchers. Overlaps with Fogo Shelf EBSA.
Wadham Islands and adjacent Marine Area (NF013)	159.23	Located near Fogo Island, approximately 40 km offshore, this IBA includes 7 main islands and several smaller rocks and shoals.	Globally significant number of wintering common eider (approximately 25,000 counted in a 1995 survey) Large numbers of nesting Atlantic puffin, Leach's storm-petrel and razorbill. Overlaps with Fogo Shelf EBSA.
Cape Freels Coastline and Cabot Island (NF025)	334.48	Located at the head of Bonavista Bay, this IBA includes several small islands and shoals.	Up to 25,000 wintering Common Eiders have been reported between the Cape Freels coastline and Wadham Islands Large numbers of nesting common murres, as well as some pairs of razorbills Historic records of breeding Atlantic puffins, although none were recorded in recent EC-CWS surveys.
Terra Nova National Park (NF017)	655.56	Situated on the inner reaches of Bonavista Bay. Much of the area is forested, but there are numerous lakes and wetlands, as well as a significant coastal component.	Numerous forest species nest here, including two subspecies with restricted ranges: the federally-listed red crossbill (*percna* ssp.) and ovenbird (*furvoir* ssp.). Shorebirds, gulls and waterfowl can be seen on the flats at the outlet of Big Brook, as well as Newman Sound. At least six tern colonies (common and Arctic tern), totalling between 1000 and 1500 pairs. Also a federally designated Migratory Bird Sanctuary (MBS) and National Park.
Grates Point (NF019)	66.55	The northern tip of the Bay de Verde Peninsula, which separates Trinity Bay from Conception Bay.	Large number of wintering common eiders (up to 12,000 individuals, but typically around 2,800) Other wintering species include black-legged kittiwake, thick-billed murre and dovekie Atlantic puffin and northern gannet are present in the summer months.
Cape St. Francis (NF021)	70.21	Located at the northern tip of the Avalon Peninsula.	Winter congregating area for common eiders; up to 5000 individuals recorded Purple sandpipers regularly observed along the rocky shoreline in the winter

Table 6.32 Important Bird Areas in Eastern Newfoundland

IBA Name	Area (km²)	Location	Importance to Marine and Migratory Birds
Baccalieu Island (NF003)	45.22	Located 5.5 km from the northern tip of the Avalon Peninsula.	Greatest seabird abundance and diversity in Eastern North America World's largest colony of Leach's storm-petrels, including 70 percent of the North American population. Significant numbers of breeding Atlantic puffin, black-legged kittiwake and northern gannet Smaller numbers of nesting common murre, thick-billed murre, razorbill, black guillemot, northern fulmar, herring gull and great black-backed gull Like Funk Island, a provincially designated Seabird Ecological Reserve
Quidi Vidi Lake (NF022)	7.0	Situated within St. John's city limits, and fed by the Virginia River and Rennies River.	Important daytime resting site for gulls from late fall to early spring, including significant numbers of herring, great black-backed, Iceland, glaucous and common black-headed gulls. Locally rare ring-billed gull, mew gull and lesser black-backed gull occasionally reported. Waterfowl including American black ducks, mallards and northern pintails are common here in the winter, subsisting on food handouts from people.
Witless Bay Islands (NF002)	62.08	Composed of four small islands off the east coast of the Avalon Peninsula.	Provincially designated Seabird Ecological Reserve Globally significant numbers of breeding seabirds, including more than half of the eastern North American population of Atlantic puffins and almost 10% of the global Leach's storm-petrel population Large numbers of nesting common murres, black-legged kittiwakes and herring gulls Great black-back gulls, northern fulmars, Thick-billed murres, razorbills and black guillemots nest in smaller numbers During the fall migration, surrounding marine area is important to sea ducks including white-winged scoter, surf scoter, long-tailed duck and common eider
Mistaken Point (NF024)	102.77	Located near the southeastern corner of the Avalon Peninsula.	Important wintering area for up to 12,000 common eiders Continentally significant numbers of wintering purple sandpiper (> 1% of North American population) Small numbers of overwintering ruddy turnstone, far north of its usual wintering range Nesting black-legged kittiwake, common murre and razorbill Designated as a Provincial Ecological Reserve and UNESCO World Heritage Site because of its rich fossil deposits

Table 6.32 Important Bird Areas in Eastern Newfoundland

IBA Name	Area (km²)	Location	Importance to Marine and Migratory Birds
Cape St. Mary's (NF001)	329.39	Located at the entrance to Placentia Bay on the southwestern Avalon Peninsula.	Significant numbers of nesting northern gannet (> 2% of global population) Large numbers of common murre and black-legged kittiwake, and smaller numbers of nesting thick-billed murre, razorbill, great cormorant and double-crested cormorant Herring gull, great black-backed gull and black guillemot historically reported nesting In the winter, large numbers of migrating sea ducks including scoters, common eider, long-tailed duck and the endangered harlequin duck Small numbers of harlequin duck during summer, moulting season in some years. Designated as a provincial Seabird Ecological Reserve. Overlaps with Placentia Bay EBSA.
Placentia Bay (NF028)	1398.05	Includes the eastern half of Placentia Bay in southeastern Newfoundland (between the Avalon and Burin peninsulas), and extends out 25 km from shore	Exceptional feeding area for seabirds during the summer capelin spawning season More than 100,000 shearwaters recorded in a single survey (mostly greater and sooty shearwater, some manx shearwater) Large numbers of other species breeding at Cape St. Mary's feed here, including northern gannet, black-legged kittiwake, Atlantic puffin, thick-billed murre and common murre Large numbers of feeding pomarine and parasitic jaegers More than 1,000 wintering Common Eiders Overlaps with Placentia Bay EBSA.
Cape Pine and St. Shotts Barren (NF015)	57.4	Located on the southern tip of the Avalon Peninsula.	Large, possibly globally significant numbers of American golden-plover during their fall migration (August to mid-October) Dozens of whimbrel during fall migration
Source: Bird Studies Canada (2016); CWS (2016)			

Table 6.33 Coastal National Parks and Historic Sites in Eastern Newfoundland

Park/National Historic Site	Rationale for Identification/Designation	Area
Cape Spear National Historic Site	Restored historical lighthouse and lighthouse keepers home on most eastern point of North America.	N/A
Signal Hill National Historic Site	Historic site of wireless communication and military defence of St. John's Harbour.	N/A
Ryan Premises National Historic Site	Restored merchant's premises, displaying artifacts focusing on traditional Newfoundland seafaring life.	N/A

Table 6.33 Coastal National Parks and Historic Sites in Eastern Newfoundland

Park/National Historic Site	Rationale for Identification/Designation	Area
Castle Hill National Historic Site	Restored site of 17th and 18th century French and English fortifications representing battles over Newfoundland fisheries resources.	N/A
Terra Nova National Park	Protects 400 km² of boreal forest and rocky coastlines as a representative example of Natural Region 35: Eastern Newfoundland Atlantic Region.	399 km²
Source: Amec (2014); Parks Canada (2008, 2016)		

Table 6.34 Coastal Provincial Ecological Reserves in Eastern Newfoundland

Reserve	Rationale for Identification/Designation	Area
Witless Bay Seabird Ecological Reserve	Established as a wildlife reserve in 1964 and designated as an ecological reserve (under new legislation) in 1983. Large number of bird species. North America's largest puffin colony. Second largest Leach's storm-petrel colony in the world.	30.5 km² on four islands
Baccalieu Island Seabird Ecological Reserve	Established as a provisional ecological reserve in 1991, to protect breeding seabird habitat, and granted full status in 1995. Has more breeding seabirds than any other area of the province. Largest Leach's storm-petrel colony in the world. Second largest Atlantic puffin colony in North America.	22.9 km²
Mistaken Point Fossil Ecological Reserve	Established as a provisional ecological reserve in 1984 to protect fossils of the Earth's oldest complex life forms. Permanent designation in 1987. Reserve area expanded in 2009. Designated as a UNESCO World Heritage Site in 2016.	5.7 km²
Funk Island Seabird Ecological Reserve	Established as a wildlife reserve in 1964 to protect the largest colony of common murre in the Western North Atlantic. Designated as an ecological reserve (under new legislation) in 1983.	5.4 km²
Cape St. Mary's Seabird Ecological Reserve	Established as an ecological reserve in 1993 to protect major breeding seabird colonies. More than 65,000 birds in breeding season (April to October). Offshore waters are important wintering area for a number of duck species.	66.8 km²
Lawn Bay Seabird Ecological Reserve (Middle Lawn, Swale, and Colombier Islands)	Established as a provisional ecological reserve in 2009, to protect the habitat of thousands of nesting seabirds, and granted full status in 2015. Significant colony of Leach's storm-petrel. Middle Lawn Island is the only known colony of manx shearwater in North America.	3.8 km² on three islands
Fortune Head Fossil Ecological Reserve	Established as a provisional ecological reserve in 1990, to protect fossils representing the geological boundary between the Precambrian Era and the Cambrian Period, and granted full status in 1992.	2.4 km²
Sources: Amec (2014); DOEC (2016a); UNESCO (2017)		

Table 6.35 Coastal Provincial Parks and Protected Areas in Eastern Newfoundland

Park/Protected Area	Rationale for Identification/Designation	Area
Marine Drive Provincial Park Reserve	Protects an area representative of the Northeastern Barrens Subregion. Park Type: Reserve.	6.17 km²
Chance Cove Provincial Park	Protects a large area including the coast where one can view whales, seabirds and seals. Natural or scenic attraction. Park Type: Day use.	20.68 km²
Dungeon Provincial Park	Protects a beach with a collapsed sea cave and natural archway carved by sea action. Natural or scenic attraction. Park Type: Day use.	0.02 km²
Bellevue Beach Provincial Park Reserve	Protects a sand and beach-rock bar, saltmarsh and barachois habitat used by migrating shorebirds. Park Type: Reserve.	1.16 km²
Gooseberry Cove Provincial Park	Protects a sandy beach with grassy back shore. Natural or scenic attraction. Park Type: Day use.	0.05 km²
Windmill Bight Provincial Park Reserve	Protects a plateau bog as an element of provincial Ecoregion 7. Park Type: Reserve.	2.86 km²
Deadman's Bay Provincial Park	Protects a sandy beach. Iceberg watching. Natural or scenic attraction. Park Type: Day use.	0.70 km²
Dildo Run Provincial Park	Protects a rocky coastline with rolling hills and valleys. Park Type: Camping.	3.28 km²
Frenchman's Cove Provincial Park	Protects an area adjacent to a large barachois, sand and mud flats, mixed forest and tidal lagoons. Diverse population of shore birds and waterfowl. Park Type: Camping.	0.51 km²
Source: DOEC (2016b)		

Table 6.36 Coastal Provincial Historic Sites in Eastern Newfoundland

Historic Site	Rationale for Identification/Designation	Area
Heart's Content Cable Station	The first permanent telegraph cable between Europe and North America was connected at this site in 1866. Displays communications technology used until the 1960s.	n/a
Cape Bonavista Lighthouse	Historic lighthouse, built in 1843, includes traditional seal oil fueled catoptric light apparatus used in the 1800s. Also demonstrates the work of light keepers of the period.	n/a
Source: DBTCRD (2016)		

Table 6.37 World Heritage Sites in Newfoundland and Labrador

World Heritage Site	Rationale for Identification/Designation	Area
Red Bay Basque Whaling Station National Historic Site	Earliest, most comprehensive and best preserved example of a pre-industrial whaling station. Established by Basque mariners in the 16th century, the site includes land-based remains of infrastructure (buried) and underwater wrecks of whaling ships.	3.13 km²
L'Anse aux Meadows National Historic Site	Excavated remains of an 11th century habitation are evidence of the only site established by Vikings in North America and the first European presence on the American continent.	80.56 km²
Gros Morne National Park	Rare visible example of process of continental drift; deep ocean crust and the earth's mantle are exposed. Also outstanding examples of glaciation (e.g., fjords, glacial valleys).	1,805 km²
Mistaken Point Provincial Ecological Reserve	The oldest known assemblages of large fossils are contained in a 17 km-long strip of rugged coastal cliffs. These marine fossils, dating to the Ediacaran Period (580-560 million years ago), illustrate the appearance of large, biologically complex organisms on earth.	1.46 km²
Source: UNESCO (2017)		

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7.0 EXISTING HUMAN ENVIRONMENT

7.1 Commercial Fisheries

Within the Project Area, commercial fishing is one of the main socioeconomic activities. The waters of the Canada-NL Offshore Area, and specifically the area of the Grand Banks, are productive for marine life, and home to a number of commercially important fish species. Domestic fisheries for groundfish, shellfish and invertebrates, and pelagic species occur in the Canada-NL Offshore Area, with northern shrimp and snow crab historically providing the majority of commercial landings after the collapse of groundfish stocks in the 1990s. The Project Area is located within NAFO Subdivisions 3KLMNO, occupying less than 30% of 3KLMNO, which historically have been areas of commercial fishing activity.

Within the Project Area, there is a higher rate of fishing activity, as this area is located on the edge of the Grand Banks and is a prominent area for commercial fishing activity. This area is dominated by a high amount of northern shrimp and snow crab landings, yellowtail flounder; Greenland halibut, redfish, American plaice, and other groundfish species have landings within this area as well. Other species such as herring, capelin, sea urchins, scallops, and lobster have landings recorded in waters that encompass the larger RSA around the Project Area.

In terms of timing of commercial fishing activities, April to August are the months in which commercial fishing in the Canada-NL Offshore Area is most active, with fishing activities gradually slowing down in the fall and winter. This is driven primarily by the snow crab fishing season, which takes place from April to August. Other fisheries such as those for northern shrimp and groundfish species occur year-round, but are predominantly active during the summer months, when ocean productivity is higher.

Research activities also have the potential to occur year-round. DFO conducts annual research surveys in the spring and fall in the Canada-NL Offshore Area. This includes DFO's Atlantic Zone Monitoring Program, the RAPID Climate Change Program Study, and the post-season trap survey for snow crab in partnership with FFAQ-Unifor. These research activities occur throughout various NAFO divisions in the Canada-NL Offshore Area, including the Project Area. Military activities do not have a set schedule but can be scheduled to occur at any time of the year. The Canada-NL Offshore Area has been subject to offshore oil and gas activity for over 30 years, and there has been some level of activity in the Project Area during this timeframe. Other oil and gas activities will, and have the potential to be, occurring during the temporal scope.

ELs 1159 and 1160 are within NAFO Division 3L. General fishing distribution and activity for most species has remained consistent since the Flemish Pass EIS. Quotas for fisheries typically change annually. Shrimp Fishing Area 7 (NAFO Division 3L) has been under a moratorium since 2015, both within the 200 NM EEZ and outside the EEZ (which is regulated by NAFO). There is no commercial northern shrimp fishery in NAFO 3L planned for 2019 (NAFO 2017; DFO 2019).

The fisheries quotas allocated to NAFO vessels for 2019 are described in NAFO/COM Doc 19/01 (NAFO 2019). This document indicates total allowable catches (TAC) of 12,242 tonnes (t) for Greenland halibut and 46,600 t for redfish. Of these amounts, 1,836 t of Greenland halibut TAC and 14,210 t of redfish TAC have been allocated to Canadian vessels. Domestically, the most recent fisheries management

decision for snow crab has set the current TAC for the 2018 fishing season in NAFO Divisions 3LNO at 18,840 t (DFO 2018); no quota has been set for 2019 at time of this writing. For international fishing operations, the data cannot provide definitive information as to what extent quota allocations will be taken in the Project Area. It does indicate that there will be a need to coordinate Equinor Canada's offshore operations with both domestic and foreign fishing vessels in the Project Area.

Domestic (i.e., Canadian) geospatial catch data, as obtained from DFO, for all species (and all gear types over all months) from 2011 to 2017 are illustrated in Figure 7-1. Harvest data for snow crab, northern shrimp, and Greenland halibut is illustrated in Figures 7-2 to 7-4. The general fishing distribution and pattern of fishing activity is consistent with that documented in the Flemish Pass EIS. While quotas for fisheries change from [fishing] season to season, the harvest locations and general fishing trends remain consistent.

7.2 Other Human Components and Activities

7.2.1 Marine Research

DFO conducts multispecies RV trawl surveys in various NAFO Divisions, including 3L. Equinor Canada will contact DFO regarding timing and locations of planned RV surveys. The annual Industry-DFO Collaborative Post-season Trap Survey for snow crab in NAFO Divisions 2J3KLOPs4R starts in late August or early September after the commercial snow crab season has ended. The location of the set stations changes on an annual basis. There have been a few stations outside the 200 NM EEZ that have been surveyed in the past. ELs 1159 and 1160 are within the NAFO Fisheries "Footprint", an area within the NAFO Regulatory Area defined by bottom-fishing activity intensity by NAFO vessels over a 20-year period (NAFO 2009). Table 7.1 below outlines the proposed DFO RV survey schedule for 2019.

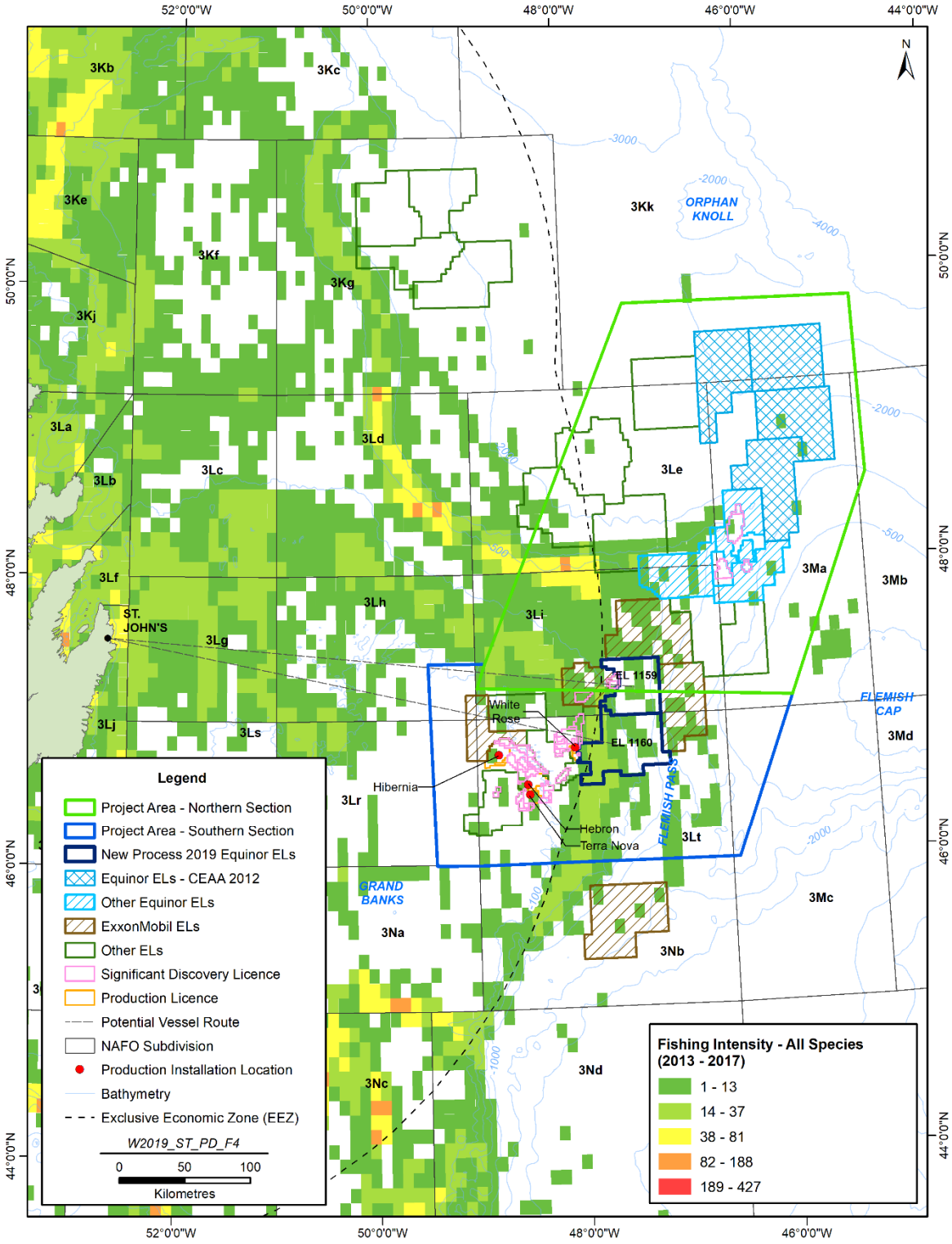


Figure 7-1 Domestic Commercial Harvesting Locations and Intensity, All Species, All Gear Types, All Months 2011 to 2017

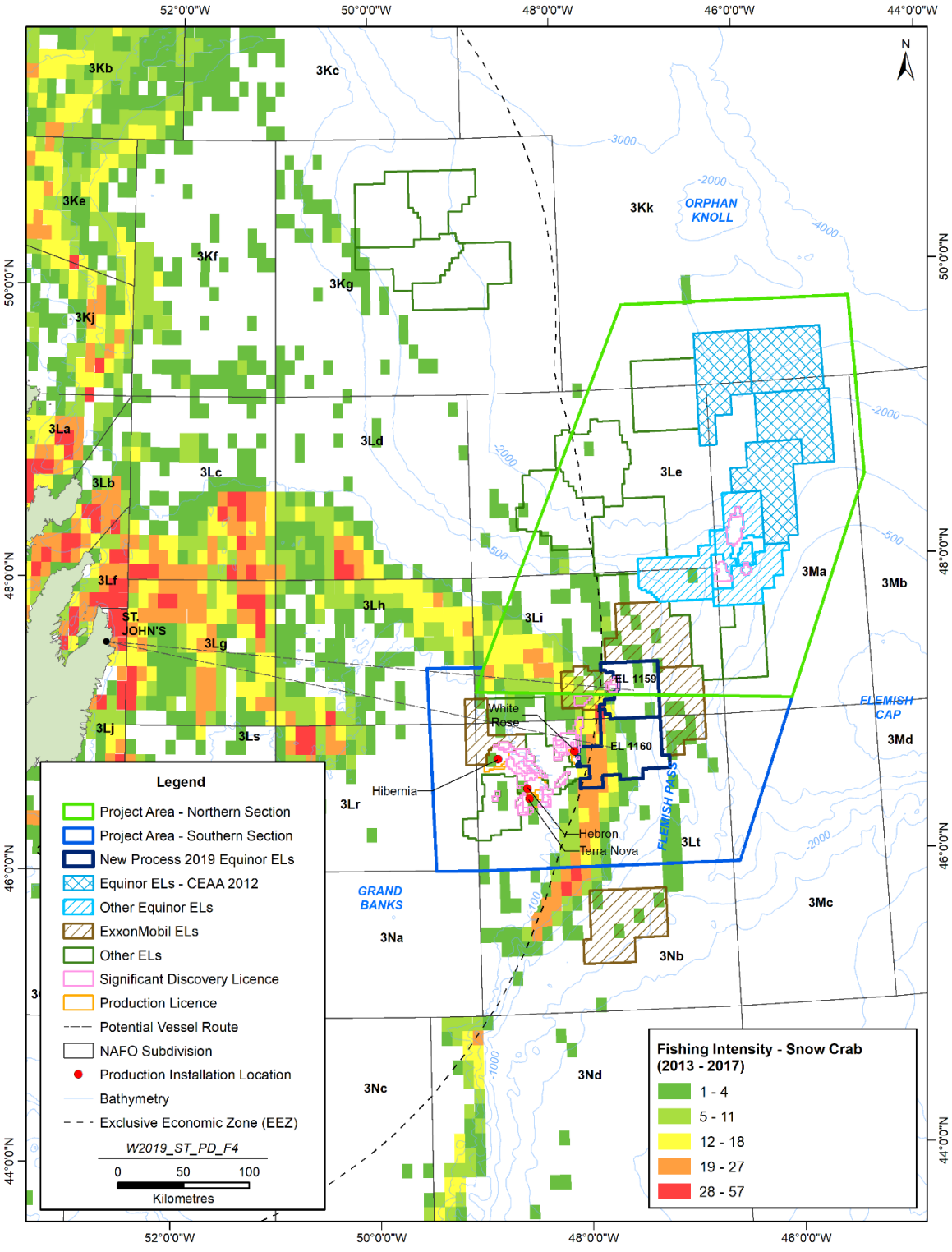


Figure 7-2 Domestic Commercial Harvesting Locations and Intensity, Snow Crab, All Months 2011 to 2017

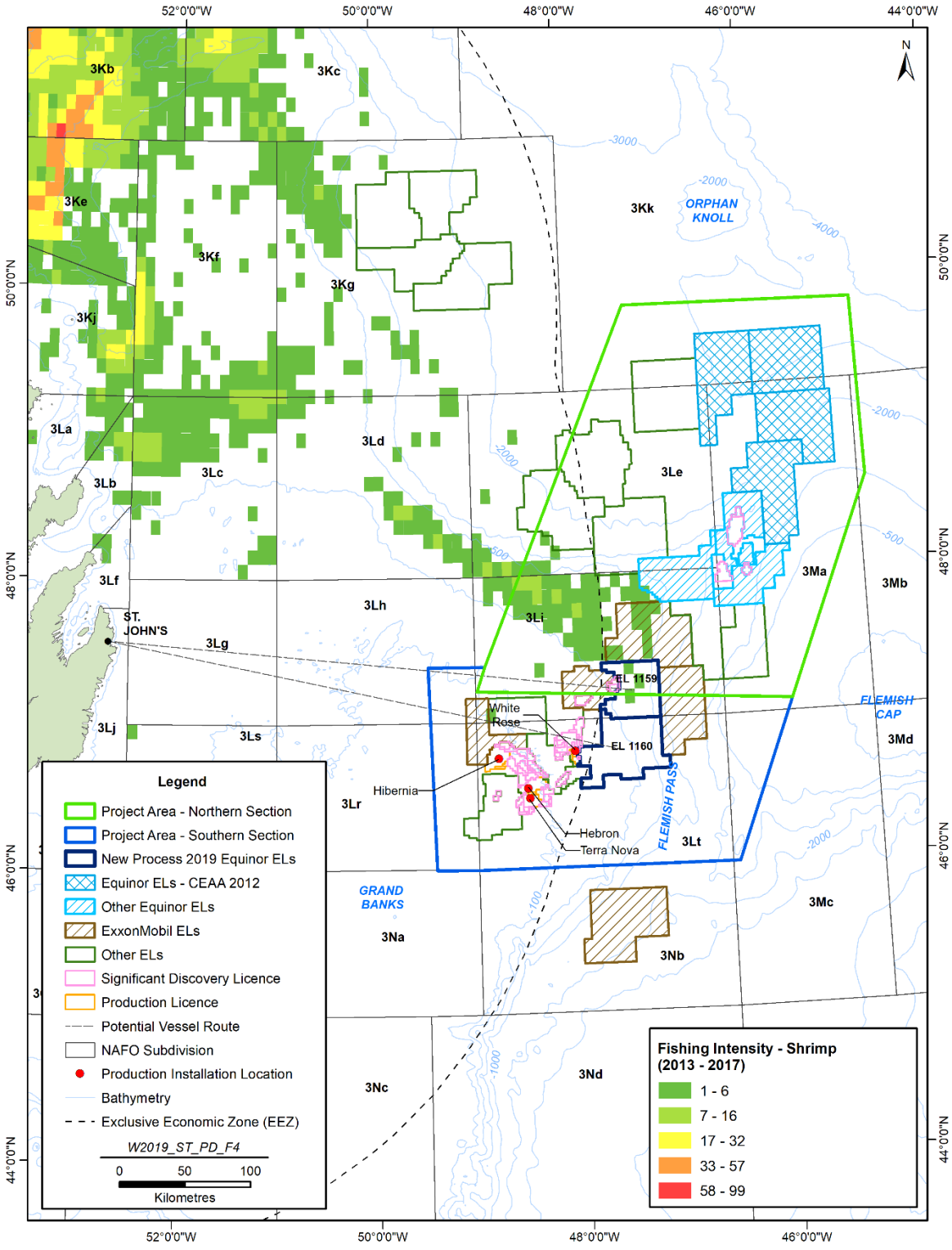


Figure 7-3 Domestic Commercial Harvesting Locations and Intensity, Northern Shrimp, All Months 2011 to 2017

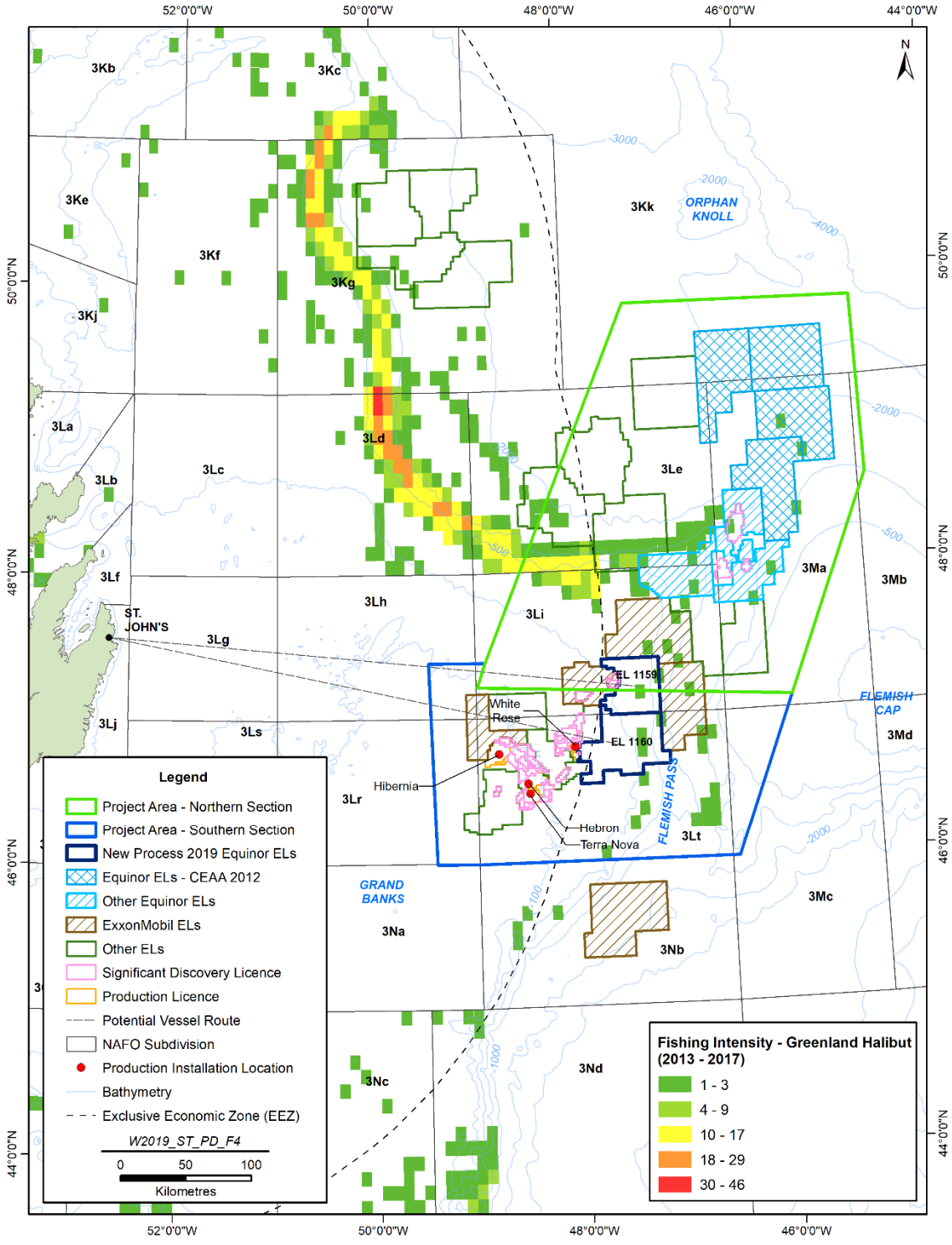


Figure 7-4 Domestic Commercial Harvesting Locations and Intensity, Greenland Halibut, All Months 2011 to 2017

Table 7.1 Proposed Schedule of DFO Research Vessel Surveys, 2019

Vessel	Activity	NAFO Divisions	Planned Start Date	Planned End Date
Needler	NL Spring Survey	3P	March 28	April 9
		3P	April 10	April 18
		3P + 3O	April 23	May 7
		3O + 3N	May 8	May 21
		3L + 3N	May 22	June 4
		TBD	June 5	June 18
	Shellfish Survey	3N	August 30	September 10
	NL Fall Survey	3O	September 11	September 24
		3O + 3N	September 25	October 8
		3N + 3L	October 9	October 22
		3L	October 23	November 5
		3K + 3L	November 6	November 19
Teleost	NL Spring Atlantic Zone Monitoring Program (AZMP)	3L	March 27	April 18
	Calibrations	3P + 3LMNO	April 23	April 29
	Capelin Survey	3KL	April 30	May 20
	NL Fall Survey	2H	October 9	October 23
		2H + 2J	October 23	November 5
		2J	November 6	November 19
		3K	November 19	December 3
		3K	December 4	December 20
Vladykov	Cod Tagging	3L	April 23	May 4
	Cod Tagging	3K	July 2	July 15
	Trinity Bay Ecosystem	3L	August 14	August 22
	Trinity Bay Ecosystem	3L	September 20	September 27
	Cod Tagging	3L	October 16	October 28
Source: L. Mello, pers comm 2019				

7.2.2 Marine Shipping

In 2017, St. John's Harbour had approximately 1,344 vessel arrivals, of which approximately 55% were related to the offshore energy industry (B. McCarthy, pers. comm. 2018).

7.2.3 Offshore Oil and Gas Activity

As of March 4, 2019, 470 wells have been drilled, including 171 exploration wells, 57 delineation wells and 242 development wells (C-NLOPB 2019e).

7.3 Indigenous Communities and Activities

This section identifies and describes the various Indigenous groups throughout Newfoundland and Labrador, the Maritime Provinces, and Québec who have been identified by the CEA Agency as having interests related to exploration drilling activities and its potential environmental effects, including potential interactions with their commercial and current traditional hunting and fishing activities. Indigenous groups have also expressed concerns regarding potential impacts to their socio-economic conditions, culture and health.

Indigenous groups that reside in Newfoundland and Labrador include:

- Labrador Inuit (Nunatsiavut Government)
- Labrador Innu (Innu Nation)
- NCC
- QFN
- MFN

Other Indigenous groups in the Maritime Provinces and Quebec and their identified potential interests in the Project are outlined in Table 7.2.

Table 7.2 Indigenous Groups in the Maritime Provinces and Quebec

Province	Group	Identified Interest
Prince Edward Island	Abegweit First Nation	Commercial-Communal Swordfish Licence in NAFO Division 3, 4, 5
	Lennox Island First Nation	
Nova Scotia	Paq'tnkek*	Commercial-Communal Swordfish Licence in NAFO Division 3, 4, 5
	Pictou Landing*	
	Wagmatcook*	
	Millbrook*	
Quebec	Conseil des Montagnais de Natashquan	Asserted Aboriginal right to fish for food, social, and ceremonial purposes where that right could be affected by effects to the Atlantic salmon population(s) identified as endangered by COSEWIC
	Conseil des Innus de Ekuanitshit	
	La Nation Micmac de Gespeg	
	Listuguj Mi'gmaq Government	
	Micmacs of Gesgapegiag	

Table 7.2 Indigenous Groups in the Maritime Provinces and Quebec

Province	Group	Identified Interest
New Brunswick	Elsipogtog First Nation	Asserted Aboriginal right to fish for food, social, and ceremonial purposes where that right could be affected by effects to the Atlantic salmon population(s) identified as endangered by COSEWIC
	Buctouche First Nation	
	Eel Ground First Nation	
	Eel River Bar First Nation	
	Esgenoôpetitj First Nation	
	Fort Folly First Nation	
	Indian Island First Nation	
	Metepenagiag Mi'kmaq Nation	
	Pabineau First Nation	
	Kingsclear First Nation	
	Madawaska Maliseet First Nation	
	Oromocto First Nation	
	Saint Mary's First Nation	
	Tobique First Nation	
	Woodstock First Nation	
	Passamaquoddy	
Nova Scotia	Acadia First Nation	Asserted Aboriginal right to fish for food, social, and ceremonial purposes where that right could be affected by effects to the Atlantic salmon population(s) identified as endangered by COSEWIC
	Annapolis Valley First Nation	
	Bear River First Nation	
	Eskasoni First Nation	
	Glooscap First Nation	
	Membertou First Nation	
	Paq'tnkek Mi'kmaw Nation*	
	Pictou Landing First Nation*	
	Potlotek First Nation	
	Wagmatcook First Nation*	
	Waycobah First Nation	
	Millbrook First Nation*	
	Sipekne'katik First Nation	
*Indigenous groups that have commercial-communal swordfish licences that overlap the Project Area and may also be exercising rights related to endangered Atlantic Salmon		

Section 5 of the Central Ridge EIS Guidelines (Part 2) (Appendix A) directs Equinor Canada to engage with 41 Indigenous groups in NL, NS, New Brunswick (NB), Prince Edward Island (PEI), and Québec (QC). The EIS Guidelines indicate that the EIS is to provide information on baseline conditions of these identified groups to facilitate an assessment of Project effects upon any potential or established Aboriginal or treaty rights under section 35 of the *Constitution Act, 1982*. The EIS Guidelines also indicate that the EIS is to address potential Project effects on the following, as outlined in paragraph 5(1)(c) of CEAA 2012:

- Health and socioeconomic conditions
- Physical and cultural heritage
- The current use of lands and resources for traditional purposes
- Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance

As illustrated in Chapter 2 and throughout this section of the EIS, the Project components and activities will be located at a considerable distance from Indigenous groups and many of their harvesting activities and other known interests. However, the various Indigenous groups identified in the EIS Guidelines have asserted or established section 35 rights to harvest for food, social or ceremonial (FSC) purposes or to earn a moderate livelihood in their traditional territories. Various groups hold commercial-communal fishing licences for NAFO areas that overlap with the Project Area. In addition, migratory species (including fish, birds and mammals) that move through the Flemish Pass may potentially be affected by Project activities and these species may be harvested by Indigenous groups in coastal areas through FSC fishing, commercial-communal fishing or through other harvesting activities.

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. Indigenous people continue to engage in traditional land and resource use practices, although the location, species and methods of harvesting may have changed over time.

In Canada, Section 35 rights to harvest for FSC purposes or to earn a moderate livelihood have been affirmed in various Supreme Court of Canada (SCC) decisions, such as the “Sparrow decision” (1990), and the “Marshall decision” (1999). DFO issues two types of communal fishing licenses to Indigenous groups in the Atlantic region: FSC and commercial-communal. These licenses are held under the name of the Indigenous community, not under the name of a specific individual. Traditional harvesting (including FSC fishing) is an important component of Indigenous culture and sustenance, and central to community social and ceremonial activities. Revenue from commercial-communal licences may be used to provide programs and services in Indigenous communities.

In 1992, DFO introduced the Aboriginal Fisheries Strategy to provide a regulatory framework for FSC fishing. In Canada, following conservation measures, fishing for FSC purposes takes precedence over other fisheries, including commercial and recreational fisheries.

Following the Marshall decision in 1999, DFO implemented the Marshall Response Initiative (MRI) in 2000 to provide increased Indigenous access to the commercial fishery through commercial-communal licenses. Fisheries programs developed in response to the Marshall decision were provided to identified beneficiaries of the Peace and Friendship Treaties (34 Mi'kmaq communities in Nova Scotia, PEI, New Brunswick and the Gaspe Peninsula of Quebec, six Wolastoqiyik First Nations, and the Peskotomuhkati at Skutik – DFO website). In 2007, the MRI was replaced by the Atlantic Integrated Commercial Fisheries Initiative (AICFI) to sustain the public investment in Indigenous commercial fisheries. with capacity-building support for commercial-communal fisheries and Indigenous participation in fisheries co-management (DFO 2012a, DFO 2012b, DFO 2012c).

Since the inception of the MRI and AICFI initiatives, the value of commercial-communal fisheries has increased, and growth is anticipated to continue. In the Atlantic region, commercial-communal fisheries contribute $100 million to the economies of Indigenous communities annually. Commercial-communal fisheries are a high percentage of sole-sourced revenue for many Indigenous groups. Community ventures, social programs, and benefits are often funded from revenue generated by commercial-communal fisheries. Therefore, potential effects on commercial-communal fisheries may be broader than direct and indirect economic effects upon communities (DFO 2012d, DFO 2012b, DFO 2012c).

Through ongoing engagement and consultation for this Project and other offshore activities, Indigenous groups have communicated that their interests and concerns also extend beyond potential interactions and effects on commercial-communal and FSC fishing practices. Several species that could occur in the eastern NL offshore area (and potentially interact with Project activities) are also of cultural or spiritual significance to Indigenous peoples. These may include species that have been traditionally harvested for food, medicinal, social or ceremonial purposes, and may also hold other cultural value. These concerns also relate to species that have value as contributing to ecosystem sustainability and which, if adversely impacted, could potentially affect asserted or established Indigenous rights.

7.3.1 Concerns Expressed by Indigenous Groups

In addition to the interests and concerns regarding impacts to fishing outlined above, Indigenous groups have outlined a number of broader concerns that may not necessarily fit within the structure of this EIS. As outlined in Chapter 3, Equinor has been engaging with Indigenous groups in the Atlantic region since 2016, and believe they have a good understanding of the concerns brought forward by those Indigenous groups that have participated in the environmental assessment process, and have expressed their intention to remain engaged throughout drilling operations. These concerns, and how Equinor is involved in addressing or mitigating those concerns, are outlined. It should be noted that these concerns are broad in scope, and were expressed by the majority of Indigenous groups and are therefore, not attributable to any specific Indigenous group.

CONCERNS EXPRESSED BY INDIGENOUS GROUPS

Atlantic Salmon (and other culturally important species):

Potential impacts of exploration drilling (both operations and potential accidents) on Atlantic Salmon populations that may migrate and over-winter in the Project Area. These populations return to their natal rivers and streams where they could be harvested for traditional purposes (FSC - food, social, ceremonial fisheries). Some of these populations are listed under the Species at Risk Act (SARA), and in many cases, Indigenous communities do not harvest for FSC purposes, due to ecological concerns.

Other culturally important species of concern to Indigenous groups include American eel, swordfish, tuna, ground fish, lobster, crab, sea turtles, sharks and marine mammals.

Action/Mitigation:

Equinor recognizes the importance of salmon to Indigenous groups in the Atlantic region, as well as the uncertainty associated with the known presence and activities of Atlantic salmon in the project areas. Equinor, along with other oil and gas companies provides funding to the Environmental Science Research Fund (ESRF) for studies related to environmental and social issues related to decision-making for oil and gas projects. The ESRF has released an expression of interest for research in this area that involves Indigenous peoples.

Equinor sponsored a salmon tagging study which tagged fish near Greenland. The data has been collected but not analyzed. We will share this with Indigenous groups when it is complete.

Potential Impacts to Indigenous Fisheries:

Impacts from operations and potential incidents or spills that may result in adverse environmental effects on traditional, commercial and commercial communal fisheries. For example, many concerns and questions were raised regarding behavioural impacts on Atlantic salmon and other species, and of the impact of operations such as underwater noise, light, vibration and changes to water quality.

Action/mitigation:

Equinor will continue to share information with Indigenous groups regarding any environmental monitoring information related to operations and has developed a communication protocol to inform Indigenous groups in the event of an emergency.

While there are no active fisheries in the immediate project area, Equinor will continue to work with Indigenous fishers to minimize any potential impact on their ability to exercise their rights to fish.

Cumulative Effects:

There is a perceived lack of a comprehensive approach to analyzing, understanding and addressing the potential for cumulative impacts of so many proposed projects in the region on the environment, and on Indigenous rights. It is anticipated that the current Regional Assessment underway in Atlantic Canada will address cumulative effects.

Action/Mitigation:

Equinor is participating in the Regional Assessment where a more regional and multi-faceted approach is being taken to examining cumulative effects of multiple projects and interactions with other ocean users. Equinor will apply any applicable new learnings from the regional assessment to their exploration drilling project.

Indigenous Knowledge:

The Environmental Impact Statement (EIS) and project implementation should consider and integrate Indigenous traditional and ecological knowledge regarding aquatic, nearshore and offshore environments.

Indigenous Groups recognize the complexity of gathering and applying or integrating Indigenous Knowledge in EIS and further, to operations. Many issues must be considered, such as confidentiality and protection of data, where data is managed/maintained, access to data, and lifespan of data.

Action/Mitigation:

Equinor has endeavoured to gather and collect Indigenous Knowledge, where available, throughout its engagement with Indigenous Groups, and recognizes the importance of considering Indigenous Knowledge in its operations. Equinor is supporting an Atlantic-wide proposal to fund a number of Indigenous Knowledge studies through the ESRF.

Environmental Impacts:

In addition to concerns regarding potential impacts to fishing and fishing rights, Indigenous Groups have concerns regarding effects of exploration drilling operations on the marine environment, including changes to water quality, fish and fish habitat, marine plants, migratory birds and marine mammals and increased contributions to atmospheric emissions.

Actions/Mitigations:

Potential impacts to the environment are addressed through the EIS's analysis of valued components, please see chapters 8-13 in this document.

Lack of Original and Recent Baseline Studies:

Indigenous groups have observed that the EIS's submitted to date have relied on existing data and studies, some of them outdated. Indigenous groups would like to see original/new baseline studies done for all of the exploration projects.

Actions/Mitigation:

Equinor has collected baseline data such as corals, bathymetry, and geotechnical for the Bay du Nord project for which the assessment process commenced in 2018 and is ongoing. This example illustrates the lead time involved in acquiring relevant baseline data as Bay du Nord is years away from construction; for the exploration projects planned for the near future that opportunity does not exist. However, pre-spud data (seabed surveys) was collected for a number of wells drilled in the area as part of our normal requirements for drilling exploration wells and will be collected for any future wells drilled on the area as indicated in the EIS. These data contribute to the dataset which will be available in the future for projects in the area.

Compensation:

Indigenous groups understand that there are CNLOPB guidelines in place for loss or damage to fishing gear and vessels, or in the case of an emergency. However, specific compensation concerns of Indigenous groups relate to the following:

- potential impacts on commercial communal fisheries. The impacts on commercial communal fisheries would be different than a "regular" commercial licence because the licences are "owned" by the Band (community) itself, they are not transferrable, cannot be sold, and the profits are often used to sustain employment, programs and services, and community infrastructure; and,
- potential impacts on food, social and ceremonial fisheries.

Actions/Mitigations:

Equinor abides by the CNLOPB Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity. In addition, Equinor would consider any damages to Aboriginal fishing activity resulting from an environmental impact on a case-by-case basis and in consultation with Indigenous groups.

Oil Spill Response:

A number of concerns have been expressed by Indigenous groups regarding oil spill response, including:

- Concerns about oil reaching shoreline, impacting fisheries and traditional territories.
- Companies need to demonstrate the accuracy of probability calculation and trajectories of oil spills.
- Capping stacks – a capping stack located and maintained in Atlantic Canada.
- How can Indigenous groups/communities be involved in emergency response?
- Concerns expressed regarding contamination or fish taint from an oil spill and how this impacts not only consumption, but also perception and cultural norms.

Actions/Mitigations:

Since 2016, Equinor has worked with Indigenous groups in Atlantic Canada to increase technical expertise and awareness of industry and company standards that are in place to prevent an emergency incident; and, to manage an incident, should one occur. Equinor has participated in six workshops with Indigenous groups where emergency preparedness and oil spill response has been discussed in detail, including – management practices, oil spill modelling, capping stacks and other technology, and the oil spill response Incident Command System (ICS).

To ensure Indigenous are informed of operational activity during exploratory drilling, Equinor, along with four other oil and gas companies, developed an Indigenous Fisheries Communications Plan in consultation with Indigenous groups that also includes a protocol for communicating with Indigenous groups in the event of an emergency.

Environmental Monitoring:

Indigenous groups want to see comprehensive monitoring and follow-up programs, including research and data collection related to impacts on Indigenous groups – e.g. fish and fish habitat, birds and marine mammals.

Indigenous groups would like to be involved with environmental monitoring; and, to be kept informed of results of environmental monitoring programs throughout the exploration drilling program, and in the event of an incident or spill that may result in adverse environmental effects.

Action/Mitigation:

During operations, Equinor will share the results of environmental monitoring with Indigenous groups through monthly operational updates. At the conclusion of exploration drilling, and once results are available, Equinor will share final environmental monitoring results with Indigenous groups.

Communication and Ongoing Involvement of Indigenous Groups:

Indigenous groups want to be actively informed of activities and outcomes during operations, and in the event of an incident or spill that may result in adverse environmental effects.

Action/Mitigation:

Equinor, along with four other oil and gas companies, consulted with Indigenous groups from May-July 2019 to develop an Indigenous Fisheries Communication Plan for exploratory drilling. This plan outlines a process and content for regular operational updates during the drilling campaign, as well as outreach to Indigenous groups in the unlikely event of an emergency.

Tables 7.3 to 7.10 provide an overview of available information on the history and current socioeconomic conditions of each of the 41 identified Indigenous groups, focused on aspects that may have potential to interact with the Project and / or which are otherwise specified in the EIS Guidelines. Given that the Project is in the offshore NL marine environment and located at a considerable distance from the Indigenous communities listed in the EIS Guidelines (Appendix A), the description of baseline conditions, with specific reference to harvesting activity and the current use of land and resources for traditional purposes (i.e., 5(1)(c)(iii) of CEAA 2012), focuses on marine associated species of importance to Indigenous peoples, including species of importance for both FSC fishing and commercial-communal fishing.

7.3.2 Newfoundland and Labrador Indigenous Groups

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Labrador Inuit (Nunatsiavut Government)	
Location and Proximity to Project Area	The traditional territory of the Labrador Inuit extends from Cape Chidley in the north, to south of Groswater Bay in Labrador and includes a portion of the offshore area adjacent to northern QC (C. Sheppard, pers comm 2018). To the west, it extends to the QC-Labrador border. To the east, it includes the adjacent Tidal Waters of the Labrador coast, extending 12 NM offshore to encompass the marine area referred to as the “Zone” in Schedule 2A of the Labrador Inuit Land Claims Agreement (LILCA) (NG 2005). The Labrador Inuit Settlement Area (LISA) is approximately 1,033 km

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
	from the Project Area. Nunatsiavut Government beneficiaries live in the Inuit communities Nain, Hopedale, Makkovik, Postville and Rigolet, and elsewhere.
General Overview	The Nunatsiavut Government, an Inuit regional self-government, was established following three decades of land claims negotiations between the Labrador Inuit Association (LIA) and the Governments of Canada and NL. On December 1, 2005, the LILCA came into effect, establishing land ownership, resource-sharing, self-government and delivery of programs and services within the LISA, and providing for harvesting rights within and outside of the LISA in interior, coastal, and offshore areas of northern Labrador. The LISA is comprised of approximately 72,520 km² of land in northern Labrador, of which 48,690 km² is within the Labrador Sea. The LILCA is a modern, comprehensive treaty and land claims agreement within the meaning of sections 25 and 35 of the *Constitution Act, 1982*. The LILCA gives the Nunatsiavut Government power and authority including administration, control, development, conservation and management of Labrador Inuit Lands (LIL) (15,799 km²). The Project does not overlap with lands covered by the treaty. The Nunatsiavut Government represents Labrador Inuit beneficiaries who live in the five Inuit communities: Nunainguk (Nain), Agvitok (Hopedale), Maggovik (Makkovik), KipukKak (Postville) and Tikigiaksaugusik (Rigolet) and elsewhere (spelling provided by D.M. Webb). The Nunatsiavut Government also includes two Inuit Community Corporations that provide representation in the Nunatsiavut Assembly for members living outside of the LISA. These are the NunaKatiget Inuit Community Corporation that serves beneficiaries residing in Happy Valley-Goose Bay (HV-GB) and Mud Lake and the Sivunivut Inuit Community Corporation serving beneficiaries residing in North West River and Sheshatshiu (Sivunivut 2018). Some of the five Inuit communities are experiencing population growth while others have declined. From 2011 to 2016, the populations of Hopedale and Makkovik increased while the populations of Nain, Postville, and Rigolet decreased. The population of most of the Labrador Inuit communities is relatively young as the percentage of population under 15 years of age (between 18% and 23A%) is higher and the median age (31 to 41.2 years) is lower than that of the NL population in general (i.e., 14.3% below 15 years and median age of 46 years) (Felt et al. 2012; Statistics Canada 2017; Nunatsiavut Government 2018). The Nunatsiavut Government reports that there are 7,133 beneficiaries of LILCA Canada-wide (C. Sheppard, pers comm 2018).

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	The Nunatsiavut Government provides community infrastructure and services such as schools, firefighting, drinking water, recreation, health care, home care, health promotion, healing and mental health services to the Labrador Inuit communities. Policing is provided by the RCMP. The Labrador Inuit communities are accessible seasonally (from July to November) by ferries operated by the Government of NL and Nunatsiavut Group of Companies (NGC). Regional airlines such as Air Borealis provide air transportation year-round (Statoil 2017). Labrador Winter Trails (funded by Provincial Government) provides grooming services for public trails to several communities throughout the winter. The NGC provides airline, helicopter, marine cargo, construction and other services to residents and industries such as mining and tourism. Common health-related issues across communities include, heart disease, diabetes, arthritis, high blood pressure, cancer, tuberculosis, high cholesterol, obesity, cigarette smoking, alcohol consumption, food insecurity, access to affordable housing and access to health services. Major employers include the Nunatsiavut Government, NGC, Torngat Fisheries Co-op, Inuit Community Governments, Torngat Regional Housing Association and the Voisey's Bay Mine / Mill near Nain. As described in more detail below, the Nunatsiavut Government has commercial-communal licences for a variety of fish and marine species. The Torngat Fish Producers Co-operative owns and operates seafood processing plants in Nain and Makkovik (C. Sheppard, pers comm 2018).
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	The Labrador Inuit are descendants of the pre-historic Thule people. The Labrador Inuit are culturally and linguistically part of the Inuit peoples who occupy the Arctic and parts of the sub-Arctic, from Alaska east across northern Canada, Greenland and the Arctic edges of the former Soviet Union. The Labrador Inuit are the most southernly expansion of this culture (Fitzhugh 1977; Nunatsiavut Government 2018). The pre-contact Inuit lifestyle included harvesting throughout the year for food, clothing, shelter and tools and seasonal migration to follow the movements of the animals and fish upon which the Inuit depended. European immigration and establishment of Moravian missions beginning in 1771 and Hudson's Bay Company (HBC) fur-trading posts beginning in the 1830s resulted in permanent communities and dramatic changes in traditional Inuit culture, settlement, and subsistence patterns. In the late 19th century and early part of the 20th century, Inuit became increasingly involved in the market economy and adapted new practices to earn income from industries focused on trapping and seal harvesting, as well as fishing for cod, char, and salmon (Brice-Bennett 1977; Kaplan 2012). Based on current research, 3,424 archaeological sites have been identified within LIL, LISA and Torngat Mountains National Park. There are no known physical, cultural or heritage sites within or near or near the Project Area (C. Sheppard, pers comm 2018).

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	Many Labrador Inuit continue to undertake traditional land and resource use activities within the LISA, including hunting, fishing, and trapping. Key species, identified as being harvested by 50% or more households in 2007, included Atlantic salmon, Arctic char, caribou, eider ducks and eggs (Felt et al. 2012). Caribou are currently under a harvesting ban but each year a quota is approved for sharing among Indigenous groups. Traditional food has important value beyond market criteria, because its cultural, social and nutritional qualities are an integral part of the Inuit lifestyle. In a 2012 health survey, 90% of Labrador Inuit (15 years of age and older) indicated that they had participated in hunting, fishing, trapping or gathering plants in the previous 12 months (Statistics Canada 2015). Fishing activity is dispersed throughout the Labrador Shelf area, and is extensively fished for crab, rock cod, cod, Arctic char, sculpins, mussels, winkles and sea urchins (Sikumiut Environmental Management [SEM] 2008). Capelin is harvested for food within coastal waters around Hopedale, Postville, Sandy Beach, and Rapid Point area (SEM 2008). Capelin can be harvested in all communities and base camps. Salmon are also harvested by the Labrador Inuit (C. Sheppard, pers comm 2018). Although there is no commercial salmon fishery, an Indigenous traditional fishery for Atlantic salmon exists in Labrador. In 2012, approximately 14,200 salmon (36 t) were harvested by Labrador Indigenous Groups (DFO 2015). Migratory birds are also an important part of the Labrador Inuit harvest. The Labrador Inuit traditionally harvest eider and black ducks, ptarmigan/grouse, Canada goose, murres, mergansers, scoters and loons. Important areas for migratory birds along the north coast of Labrador include areas from north of Hopedale to the former community of Davis Inlet, Island Harbour Bay, Tunungayualok Island, Mugford Tickle to Cape Kiglapait, Okak Bay, Tasiuyuk Bay, Napartok Bay to Kangalaksiorvik Fjord, Kaipokok Bay, White Bear Island, Hare Islands, Windsor Harbour south the Byron's Bay, Turnavik Islands area, Ailik Islands, Cape Makkovik, Island Harbour Bay, Dunn's Island, Adlavik and Ironbound Islands, Jako's Bight, Makkovik Bay, Jeanette Bay, Groswater Bay and Back Bay (Brice-Bennett 1977). Other IBAs and surrounding waters used by the Labrador Inuit for traditional harvesting activities include the waters and islands of the Backway, Table Bay and St. Peter's Bay where sea ducks are harvested, and the waters of Point Amour where sea ducks and murres (also called turrs) are harvested (Intervale Associates Inc. 2012). Following the ice break-up in spring, the Inuit hunt or net harp seals as well as ringed, harbour, grey and bearded seals in the outer island areas and in the bays as the seals move with the tide. Important harbour seal harvesting areas include Tunungayualok Island and area, Shoal Tickle, Big Bay, Flowers Bay, Kikkektak and Ivjogiktok Islands, Okak Bay, Tasiuyak Bay, Amitok Island, Illuviktalik Island, Iglusuaktaliak Island, Tikkigaksuk Peninsula, Napartok Bay, Seal Bight, Cod Bag Harbour, Shark Gut Harbour, Saglek Fjord, Kaipokok Bay, Big Brook, Jeanette Bay (including Sandy Cove), and Jako's Bight. Grey seal harvesting occurs in areas around Tunungayualok Island and near Tasiuyak Bay (Brice-Bennett 1977; SEM 2008). Labrador Inuit also harvest seals within Hamilton Inlet and Lake Melville and in Back Bay, Head of Groswater Bay, Black Island, Island Harbour Bay, Jako's Bight, Makkovik Bay, Adlavik Bay, Saglek Fjord and Kanairiktok Bay (Brice-Bennett 1977; SEM 2008).

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
	Ringed seals are harvested for subsistence purposes in the early spring. Important ringed seal harvesting areas include locations from Hare's Ears and The Highlands to Back Bay, Groswater Bay in The Channel area, Double Mer, areas around Drunken Harbour Point and the Advalik Islands, Napartok Bay, Hebron Fjord, Saglek Fjord, Kangalaksiorvik Fjord, Okak Bay, Tasiuyak Bay, Mugford Bay, Anchorstock Bight, Aulatsivik Island area, Tunungayualok Island, Nain Bay, Voisey's Bay, Tikkoatokak Bay, Webb Bay, Anaktalak Bay, areas around Hopedale, Flowers Bay to Island Harbour Bay, and the Turnavik Islands (Brice-Bennett 1977; SEM 2008).
Commercial-Communal Fishing	The Nunatsiavut Government currently holds several commercial-communal fishing licences. Groundfish licences are held for NAFO Divisions 2GHJ, 3KL and Greenland halibut may be harvested in 2+3K, 3LMNO and 0B. Seal licences permit harvesting in Sealing Areas 4 through 33, which includes all of Atlantic Canada. Scallop licenses have been issued for Scallop Area 1 off the coast of northern Labrador. Snow crab licences include Snow Crab Areas 1 and 2 (Lake Melville Area) as well as an exploratory licence for NAFO 2H (Northern Labrador). Northern shrimp licences are held for Shrimp Areas 4 and 5 (Central Labrador). The group also has an Arctic char licence for the area from Cape Rouge to Cape Chidley in Northern Labrador (D. Ball, pers comm 2018; Statoil 2017).
Food, Social, Ceremonial Fishing	The Nunatsiavut Government holds FSC fishing licences for salmon, trout, and Arctic char throughout the LISA. These three species as well as smelt and seal may be harvested in the Upper Lake Melville Area. As per the LILCA, beneficiaries have the right to harvest at any time of the year throughout the LISA for any species or stock of fish or aquatic plant, up to the quantity needed for their food, social and ceremonial purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Labrador Inuit have established Aboriginal rights under section 35 of the *Constitution Act* 1982, and beneficiaries of the LILCA have treaty rights within the LISA as set out in the Agreement, including the right to harvest species throughout the LISA. In addition, the Agreement allows for a negotiated arrangement for Beneficiaries residing in Labrador, outside of LISA, to harvest for food social and ceremonial purposes in tidal waters of Upper Lake Melville, outside of LISA (12E area). The Aboriginal and treaty rights of the Labrador Inuit do not extend to the lands and waters in or near the Project Area.
Labrador Innu (Innu Nation)	
Location and Proximity to Project Area	The Labrador Innu claim Aboriginal rights and title to much of Labrador and parts of Québec. The Labrador Innu primarily reside in two communities: Sheshatshiu in central Labrador and Natuashish on the North Coast of Labrador. Small numbers of Innu also reside in HV-GB. Sheshatshiu is approximately 1,088 km from the Project Area and Natuashish is approximately 1,286 km from the Project Area.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
General Overview	In 1978, the Labrador Innu land claim was accepted for negotiation by the Government of Canada. In 1991, following the completion of a land use and occupancy study, formal negotiations with the Governments of Canada and NL began. In 1996, a self-government framework agreement was signed and ratified in 1997. In 2008, the Government of NL and Innu Nation announced the Tshash Petapen (translated as "New Dawn") Agreement, which resolved key issues related to the land claim, as well as impacts and benefits related to past and proposed hydroelectric developments in Labrador (Newfoundland and Labrador Intergovernmental and Indigenous Affairs Secretariat [IIAS] 2018). The three parties have completed detailed agreements, including a Land Rights Agreement-in-Principle (AIP), which was signed in 2011. Under the AIP, areas of Labrador have been designated as Labrador Innu Lands (LIL, Category 1), Labrador Innu Settlement Area (LISA, Category 2), Permit-Free Hunting Area (Category 3) or other designated lands under the AIP. The AIP is not legally binding and forms the basis of ongoing treaty negotiations that will result in a Final Agreement (IIAS 2018; Indian and Northern Affairs Canada [INAC] 2018; Heritage NL 2018). The Project does not overlap with lands claimed by the Labrador Innu. The Sheshatshiu Innu and the Mushuau Innu of Natuashish are represented by Innu Nation in land claims negotiations and on other matters of common interest (INAC 2018). Sheshatshiu, located in central Labrador, was formerly part of North West River. In 1979, the Innu formed the community of Sheshatshiu, which is now a First Nation reserve with an elected Chief and Band Council (INAC 2017). The community of Natuashish was formed following the Innu's relocation from the community of Utshimassit (Davis Inlet). Natuashish is a reserve with an elected Chief and Band Council (INAC 2018). The March 2018 registered population of the Labrador Innu was 2,728. Approximately 90% live on-reserve. Small numbers of Innu also reside in HV-GB and elsewhere. In 2016, the median age of the population of both First Nations (approximately 21.5 years) was less than half of that of the NL population in general (46 years) and the percentage of individuals below 15 years of age in Sheshatshiu (36.3%) and Natuashish (40.1%) was three times higher than that of the NL population (14.3%) (Statistics Canada 2017).
Health and Socioeconomic Conditions	Sheshatshiu and Natuashish are relatively small communities that offer services and infrastructure to their members and residents. Sheshatshiu is 40 km by road from the regional service centre of HVGB and is accessible year-round. The Natuashish community is approximately 300 km north of HVGB and is only accessible by plane or boat. Band Council and other agencies provide infrastructure and services such as schools, community recreation facilities, policing, firefighting and health care to both communities. Within Sheshatshiu, the RCMP and Health Canada have established a Sheshatshiu Crisis Intervention Team. The Labrador Grenfell Regional Health Authority provides health and community services to both communities. In Sheshatshiu, the Health Authority and the Sheshatshiu Innu Health Commission operate a community health clinic with basic trauma and resuscitation equipment (Statoil 2017). In Natuashish, the Health Authority, in partnership with Mushuau Innu Health Commission, operates a community health clinic with an emergency room bed, basic trauma and resuscitation equipment and a defibrillator (Statoil 2017). Health issues within the communities include diabetes, youth mortality, teenage pregnancy and Fetal Alcohol Spectrum Disorder.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
	The Innu Business Development Centre was created in 2001 to establish businesses and contribute to Innu communities. The Centre maintains a database of registered Innu businesses to facilitate business opportunities, and approximately 125 businesses were registered in April 2018. Innu Nation has invested in a range of businesses and partnerships to provide services mainly in construction and industrial supply (Innu Business Development Centre 2018). Sheshatshiu Innu First Nation Band Council is a major employer. Major employers in Natuashish include the Mushuau Innu First Nation Band Council, Mushuau Innu Health Commission, Mushuau Innu General Store and the Natuashish Hotel. Other major employers include Voisey's Bay and Muskrat Falls. As described in more detail below, Innu Nation holds several commercial-communal licences for a variety of fish and marine species. Ueushuk Fisheries Ltd. holds a mid-shore groundfish licence for various areas and a shrimp licence.
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	The Labrador Innu are descendants of Algonkian-speaking hunter-gatherers (Heritage NL 2018). The Innu were traditionally a nomadic people whose movements responded to the seasons and migrations of the animals (e.g., caribou) they relied upon for food and clothing. Labrador Innu culture and heritage are focused on their relationship to game animals most especially caribou, which is the focus of their philosophical and spiritual beliefs. For the Innu, Kanipinikassikueu (caribou master) is considered to the most powerful of the animal masters. Archaeologists have documented Innu presence as early 1,500 A.D. at interior sites from Northwest River to Davis Inlet in Labrador. The Innu gathered in coastal areas in summer and spent the winter in the interior. During the 19th century, the life of the Innu people began to change with the establishment of European fur-trading posts and permanent settlements in Labrador (Fitzhugh 1977; Heritage NL 2018). Nearly 500 Innu archaeological sites are known to be located throughout northern, central and western Labrador. The identified sites are in inland and coastal areas and were often discovered in relation to developments such as communities, roads, railways, and mining areas. There are no known physical, cultural or heritage sites within or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes Marine Mammal Harvesting	Following establishment of a permanent settlement in Sheshatshiu, women and children began to remain in the community for most of the year and men spent less time on the land harvesting and trapping. Nonetheless, the Sheshatshiu Innu continued to harvest a range of resources including caribou, black bear, small game and fish, in a relatively wide-ranging area not necessarily restricted to the lands and waterways surrounding the community (Nalcor 2011). An Outpost Program was established in the 1970s to help finance travel by Innu families to and from camps in the interior of Labrador and to enable Innu to travel into the country as an educational opportunity and community activity and to practice their traditional activities. In a 1997 study, approximately 42% of the Innu Nation population that participated in the survey indicated that they partake in country-based harvests year-round. Spring is the most active season, with 48% of participants spending at least one week on the land hunting, fishing and gathering wild foods (Nalcor 2011). The Labrador Innu currently undertake land and resource use activities on their traditional lands within Labrador. The core areas traditionally used by Sheshatshiu Innu are the headwaters of Eagle River, the area bounded by Winnokapau Lake, Smallwood Reservoir, Seal Lake and Nipishish Lake, Shipiskan Lake, Snegamook

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
	Lake and Shapio Lake and parts of Québec. More recently, Labrador Innu have also harvested along the Trans Labrador Highway (TLH) between HV-GB and western Labrador. Various travel routes such as roads, snowmobile trails, walking trails, canoe and motorboat routes used by Labrador Innu have been recorded in southern Labrador, with a relatively high number of travel routes near the TLH between Churchill Falls and HV-GB and near Lake Melville (Alderon Iron Ore Corp [AIOC] 2012). In 2010, an Innu traditional land use study was conducted for a travel corridor from central to western Labrador, for the period between 1990 and 2010. In this study, Innu stated that caribou is the priority large animal and caribou harvesting holds high cultural importance. Innu identified caribou harvesting sites in the study area between Tshiashku-nipi (Gull Lake) and Churchill Falls. Small animals and partridge harvested in the study area included snowshoe hare, porcupine, spruce grouse, ruffed grouse, and willow ptarmigan. A variety of furbearing animals were trapped, snared and shot within the study area including beaver, muskrat, river otter, marten, mink, red fox, and Canada lynx. For small game, beaver was the priority animal (mainly for edible meat) followed by marten. No kill sites were reported by respondents for weasel or wolf. A variety of migratory waterfowl were harvested in the study area including American black duck, black scoter, Canada goose, common loon, northern pintail, blue-winged teal, Harlequin duck, long-tailed duck, merganser, and surf scoter (Innu Nation 2010). The Innu hunt goose and duck near the TLH west of Churchill Falls, along the Churchill River and near Dominion Lake. Migratory waterfowl have been harvested around Crooks Lake and Parke Lake in southeastern Labrador, the shoreline of Lake Melville, along several roads between HVGB and Sheshatshiu, on the south side of the Churchill River at Gull island, the Eagle River plateau, the Mud Lake/Upper Lake Melville area and near Sheshatshiu and North West River (AIOC 2012). IBAs and surrounding waters are known to be used by the Labrador Innu as part of their traditional harvesting areas and include the waters and islands of the Backway, Table Bay, St. Peter's Bay and the waters of Point Amour, which are used for sea duck and murre harvesting. Eider ducks, murres, and other species harvested around the Labrador Shelf, are an important source of food for Indigenous people (Intervale Associates Inc. 2012). Although there is limited publicly available information, it is understood that Innu harvest seals in coastal areas in the spring, summer and fall (Voisey's Bay Nickel Company Limited [VBNC] 1997).

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Commercial-Communal Fishing	Innu Nation holds commercial-communal licences for groundfish in NAFO 0, 2GHJ, 3KL, groundfish (mobile gear) in NAFO 2GHJ, 3KL, mackerel and capelin in Fishing Areas 1 to 11 (northern Labrador to Burgeo) and shrimp in Shrimp Area 4, which is roughly from Rigolet to Postville. Ueushuk Fisheries Limited holds a mid-shore groundfish licence for various areas. This provides for harvesting a variety of species, including Greenland halibut in NAFO 2+3K, 3LMNO and 0B; skates in 3LNO and in 3Ps, 4X, 5Y, 5Z (j,m) with by-catch permitted in several other areas; white hake in 3NO and 3Ps with by-catch permitted in other areas; Atlantic halibut in NAFO 3NOPs and 4VWX+5Zc with a science quota and a competitive reserve in other areas; and haddock in 5Z (j,m) with by-catch permitted in other areas. Ueushuk Fisheries also holds a shrimp licence for Shrimp Fishing Areas 6 and 7, which include areas from southern Labrador to southwest NL (D. Ball, pers comm 2018; Statoil 2017).
Food, Social, Ceremonial Fishing	Innu Nation holds FSC fishing licences for Sheshatshiu and Natuashish. The Sheshatshiu licence includes salmon, trout, and Arctic char in the area from Fish Cove Point north to Cape Harrison (between Rigolet and Postville), including Lake Melville and the inland waters of Little Lake and Grand Lake. The Natuashish FSC licence permits harvesting salmon, trout, and Arctic char in tidal waters of Labrador extending north and east from Cape Harrigan inclusive of Big Bay and south and east of Anaktalik Bay inclusive of Anaktalik and Anaktalik Bays, and the inland waters of Sango Pond and Big Sango Lake (D. Ball, pers comm 2018; Statoil 2017).
Asserted or Established Aboriginal and / or Treaty Rights	Innu Nation asserts Aboriginal rights to land and resources within Labrador and to resources along the Labrador coast, including the right to hunt, fish, and gather throughout its traditional territory. This claim does not extend to the lands or waters in or near the Project Area.
NunatuKavut Community Council (NCC)	
Location and Proximity to Project Area	The NCC claims traditional territory that extends from central to southeastern Labrador. NCC members primarily reside in southern and central Labrador, along the southeast coast. The territory is approximately 800 km from the Project Area.
General Overview	Originally established as the Labrador Metis Association in 1985, the NCC is the governing body of a membership of over 6,000 persons who reside primarily in southeastern and central Labrador and who are collectively known as the Southern Inuit of NunatuKavut. The NCC has asserted a land claim covering most of central and southeastern Labrador. While this claim has not been accepted for negotiation by the federal and provincial governments, on July 12, 2018, the Government of Canada and the NCC committed to work together to advance reconciliation and renew their relationship based on recognition of rights, respect, co-operation and partnership. The Project Area does not overlap with lands claimed by NCC. NCC members live throughout Labrador and elsewhere, mainly in communities along the southeast coast from Hamilton Inlet south to the Labrador Straits, including the towns of Cartwright, Charlottetown, Port Hope Simpson, St. Lewis and Mary's Harbour and the communities of Paradise River, Black Tickle-Domino, Norman Bay, Pinsent's Arm, Williams Harbour, and Lodge Bay, as well as in central and western Labrador and elsewhere. Census data are not available specifically for NCC members as a group. In 2016, the population of the identified communities ranged from 15 or fewer to 427, with five communities (Paradise River, Pinsent's Arm, William's Harbour, Norman Bay and

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
	Lodge Bay) having fewer than 100 people. Where data are available, the median age is somewhat comparable to, or higher than the NL population in general (Statistics Canada 2017).
Health and Socioeconomic Conditions	The availability of community infrastructure within each community varies. For example, some communities have road access, airstrips, basic municipal services and nursing clinics, while others lack these services and residents must travel to other communities to access them (Martin et al. 2012). Health, policing, and education services also vary among the communities. RCMP travel to communities periodically from locations such as Mary's Harbour and Cartwright (Martin et al. 2012). Most communities have schools, but Paradise River, William's Harbour, Pinsent's Arm and Lodge Bay do not. Students from Pinsent's Arm and Lodge Bay travel to St. Mary's All Grade School in Mary's Harbour (Martin et al. 2012). Many of the communities have medical clinics, operated by Labrador-Grenfell Regional Health Authority. Clinics typically provide primary health care services and are staffed with nurses (Nalcor 2011). Generally, a physician and dentist visit each community every six weeks. A 2012 Health Needs Assessment outlined common health concerns such as high blood pressure, allergies, high cholesterol, arthritis, asthma, and diabetes. The NCC is invested in seasonal and year-round businesses including accommodations, convenience stores, and gas bars. As described in more detail below, the NCC holds several commercial-communal fishing licences for a variety of fish and marine species. The major employer in southern Labrador communities is the fishery. Employing hundreds of individuals, the Labrador Fisherman's Union Shrimp Company Ltd. has processing facilities in Cartwright, Charlottetown, Pinsent's Arm, Mary's Harbour and L'Anse au Loup (LFUSLC 2014). NDC Fisheries Limited hold quotas for 450,000 lbs. of snow crab as well as shrimp quotas and is required to hire NunatuKavut members as crew.
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	In the 17th century, the Labrador Inuit first encountered Europeans. In southern Labrador, these interactions were based on trade with seasonal fishers and whalers, with the first European trading post being established in North West River in 1743 to 1744. Intermarriage between the Labrador Inuit and European fur traders resulted in a generation of people of mixed descent who were born as early as 1775. Over time the population grew, and settlements were established throughout central and southern Labrador (Nalcor 2010; NCC 2018; Heritage NL 2018). Nearly 800 Inuit and Thule archaeological sites have been identified in northern, central and southern Labrador (the latter being the core area where most NCC members reside, and which is the focus of their land claim) and on the top of the Northern Peninsula on the island of Newfoundland. No known physical, cultural or heritage sites are located within or near the Project Area.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	Members of the NCC place a high value on the importance of traditional foods, both in terms of their nutritional attributes and their cultural value. Members continue to rely upon the resources of the land, water and sea, and are known to undertake land and resource use activities throughout southern Labrador. They use the land in several ways as expressed through their movement along the overland and aquatic travel corridors, meeting in community gathering places, the establishment of habitation sites, trapper tilts and seasonal and permanent settlements (Clark and Mitchell 2010; Nalcor 2011; Martin et al. 2012). In 2014, the Iron Ore Company of Canada (IOC) gathered information from NCC members in Labrador West regarding their current land and resource use activities. Information gained from this study indicates that NCC members living in that region currently undertake a variety of land and resource use activities including hunting (i.e., big game, small game and waterfowl), trapping, fishing, ice fishing, cutting firewood and saw logs, collecting berries and medicinal plants, camping, boating, snowmobiling and all-terrain vehicle use. These activities occur throughout the western Labrador region, including areas adjacent to Labrador City and Wabush as well as at other locations along the TLH, roadways, the railway and snowmobile trails, near the Smallwood Reservoir and elsewhere. Some NCC members have cabins in Labrador West and around the Smallwood Reservoir but a larger number of cabins are located in central Labrador near their communities of origin (Amec 2014). In this data collection exercise, 53% of Labrador West NCC members (of the 30 who participated in the survey) reported consuming traditional foods weekly. Species consumed include: moose, caribou, bear, ptarmigan, grouse, hare, ducks, geese, porcupine, beaver, muskrat, squirrel, salmon, cod, trout, seal, partridgeberries, blueberries, bakeapples, black currants, red currants and squash berries. It should be noted that marine species (e.g., cod, salmon, seal) are not available in Labrador West and thus are harvested in coastal areas (Amec 2014). A 2012 land use study also showed that members of NCC travel on the land and sea by truck, snowmobile, boat, foot, dog-team and snowshoes. Use of automobiles is currently the main mode of travel for accessing land use areas. In addition, NCC members use a network of snowmobile trails that connect North West River, HV-GB, Mud Lake and Churchill Falls with other communities in Labrador, including Labrador City, Wabush and Cartwright. These roads and trails are used by many Labrador residents, both Indigenous and non-Indigenous, for travel as well as to access land and resource use areas (NCC 2010; AIOC 2012). Traditional migratory bird harvesting areas in Labrador include the waters and islands of the Backway, Table Bay and St. Peter's Bay, which are used for sea duck harvesting and the waters of Point Amour, which are used for sea duck and murre harvesting. The NCC has developed annual Spring Bird/Egg Harvest and Conservation Guidelines, which specify opening and closing dates, seasonal harvest of birds and gull eggs per household and associated restrictions. Members of NCC harvest a variety of birds, including geese and migratory birds such as black ducks (Intervale Associates Inc. 2012; AIOC 2012; NCC 2018). Members of NCC harvest marine mammals, with seals providing income and a source of meat.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Commercial-Communal Fishing	The NCC is engaged in commercial-communal fishing with licences held by the NCC or Nunacor Development Corporation (NDC) Fisheries Limited. The NCC holds seal harvesting licences in Sealing Areas 4 to 33 (all of Atlantic Canada). NDC Fisheries operates enterprises for groundfish in NAFO 2GHJ, 3KL and 4RS; scallop in Scallop Areas 1 and 2 (most of coastal Labrador); shrimp in Shrimp Area 6 (southern Labrador and northern Newfoundland; whelk in NAFO 2J; holds licences for northern shrimp, snow crab, capelin, herring and toad crab in southern Labrador; and bait in the Area of Home Port (D. Ball, pers comm 2018; Statoil 2017).
Food, Social, Ceremonial Fishing	The NCC holds FSC fishing licences for a variety of species. A licence for salmon, trout, Arctic char, Atlantic cod, rock cod, herring, scallop, whelk, smelt, and seal is held for a coastal area from Fish Cove Point to Cape Charles (central to southern Labrador). The NCC also holds a licence for salmon, trout, and Arctic char in the tidal waters of Upper Lake Melville. The Atlantic salmon fishery remains an integral part of the way of life. NCC members have been documented as fishing throughout central and southeastern Labrador, including around HVGB, Grand Lake and its tributaries, Sebaskachu Bay and Sebaskachu River, Mud Lake, Traverspine River, the mouths of Caroline Brook, McKenzie River and lakes south of the Churchill River, including Minipi Lake and Dominion Lake (AIOC 2012; D. Ball, pers comm 2018; Statoil 2017). The NCC also holds a licence for seals, which are harvested on the coast from Fish Cove Point to Cape Charles (NCC 2010; AIOC 2012; D. Ball, pers comm 2018; Statoil 2017).
Asserted or Established Aboriginal and / or Treaty Rights	The NCC asserts Aboriginal and treaty rights to land and resources within Labrador and to resources along the Labrador coast, including the right to hunt, fish, and gather throughout its traditional territory. This claim does not extend to the lands or waters in or near the Project Area.
Qalipu Mi'kmaq First Nation (QMFN) Band	
Location and Proximity to Project Area	QMFN Band members live in 67 communities throughout NL and in other areas. The Band's main administrative office is in Corner Brook and satellite offices are in Glenwood, Grand Falls-Windsor and St. George's (QMFN 2016; INAC 2018). QMFN communities are approximately 795 km from the Project Area.
General Overview	In 1972, the Federation of Newfoundland Indians (FNI) was formed with the primary goal of obtaining recognition for Mi'kmaq people in NL under the *Indian Act*. In 2008, the Government of Canada signed an agreement with the FNI to establish a landless Band for the Mi'kmaq of NL. The Agreement is not a treaty within the meaning of section 25 and section 35 of the *Constitution Act*, 1982. The signed Agreement initiated the enrolment process for the Mi'kmaq of Newfoundland (QMFN 2016; INAC 2018). In September 2011, QMFN was established as an Indian Band under the *Indian Act* and 23,877 members were found eligible and registered as founding members (QMFN 2016). It is anticipated that the founding member list will be finalized in 2018 (INAC 2018). The QMFN has not signed treaties with the Crown and there is currently no land base associated with the QMFN Band.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	As QMFN members live in an identified 67 communities throughout NL and these communities are not exclusively occupied by Qalipu Mi'kmaq, consolidated information on infrastructure and services, economic conditions, and community health is not readily available. Members access services and programs provided by municipal and provincial agencies, private businesses and service agencies in communities and regions where they reside. QMFN has identified health concerns such as chronic disease including diabetes, mental health and addictions, and communicable diseases. Economic and corporate development are led by the Qalipu Development Corporation (QDC) (QMFN 2016). QMFN has several wholly-owned commercial enterprises including Mi'kmaq Commercial Fisheries Incorporated (MCF), Qalipu Management Services Incorporated (QMS), Qalipu Marine Holdings (QMH) and Qalipu Project Support Services Limited (QPSS). Business partnerships have been negotiated and implemented between QMFN and several different construction firms. Marine Contractors Inc. Qalipu was created as a partnership between QMFN and Marine Construction to enable QMFN to bid on civil construction opportunities from Emera NL. Other business entities are Qalipu Project Support Services, Qalipu Safety and Industrial Supply, and Eastern Door Logistics. In 2016 to 2017, the QMFN earned revenues of $10.2 million and had total expenditures of $9.6 million (QMFN 2017). As described in more detail below, the QMFN and MCF holds several commercial-communal fishing licenses for a variety of fish and marine species. The QMFN and the MFN have a joint fisheries initiative, Mi'kmaq Alsumk Moiwimsikik Koqoey Association (MAMKA) which holds commercial-communal licenses for different fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Historical evidence demonstrates that the Mi'kmaq were living in NL by the 16th century; by the 17th century there are increasing historical references (Heritage NL 2018). Limited publicly-available information exists on historic and cultural Qalipu sites; however, one has been identified (seal rocks near the Town of St. George's on the west coast (St. George's Indian Band 2017). Currently, 21 known Mi'kmaq archaeological sites exist in interior and coastal NL between the Port au Port Peninsula and Clarenville (Inside NL Archaeology 2013). In terms of culture, QMFN's practices and resources are focused on the lands and waters of the Island of Newfoundland. There are no known physical, cultural or heritage sites within or near the Project Area.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	The QMFN undertake current land and resource use activities on their traditional lands which are extensive areas of land, sea, and water. Important sources of traditional food include moose, caribou, partridge, snowshoe hare, salmon, trout, eel, shellfish, and wild berries. Migratory birds, seals, and groundfish are harvested but of lesser importance. Groundfish, pelagic fish, shellfish, and seal harvesting are also of importance to the Mi'kmaq on the west coast of NL. Qalipu Natural Resources is undertaking studies to understand and monitor specific species, including Arctic hare, woodland caribou, elver and glass eel, commercial eel, Atlantic salmon, and eelgrass, as well as invasive species such as golden star tunicate and the European green crab. Qalipu Natural Resources is also engaged in a DFO Aboriginal Fisheries Guardian Program in western and central NL (Emera NL 2013; QMFN 2016; QMFN 2017). Harvesting birds such as murre (also called turr) and seals are also considered important traditional activities.
Commercial-Communal Fishing	QMFN and MCF hold commercial-communal fishing licences. These include groundfish licences in NAFO 2J, 3Pn, 4RST, 2GHJ and 3KL. The QMFN also has licences to harvest lobster in Lobster Areas 4B, 13A, 13B (eastern and western NL) and snow crab in Snow Crab Areas 4, 12, 12C, 12E and 12F (eastern and western NL). Various mackerel fishing licences are held in Mackerel Areas 1-11, 3-8, 4, 13 and 13B (coastal Labrador, and eastern and western NL). The Qalipu has licences for herring for Herring Area 13 (western NL); squid in Squid Areas 4 and 13 (eastern to western NL); scallop in Scallop Area 13 (western NL); capelin in Capelin Areas 1-11 and 13 (northern Labrador to western NL); whelk in Whelk Area 13 (western NL); shrimp in Shrimp Area 6 (northern NL) and licences to harvest bait in the Area of Home Port or Lobster Area. Qalipu First Nation also has licences for eel and smelt (D. Ball, pers comm 2018; Statoil 2017; QMFN 2017). MAMKA also holds commercial-communal licences for a variety of species including groundfish in NAFO 2GHJ, 3KL, 3Pn, 3Ps in offshore NL and 4RST in western NL; whelk in NAFO 3Ps; snow crab in Snow Crab Areas 10, 11, 12 C and 12E (southern and western NL); herring in Herring Areas 10 and 13 (Placentia Bay and western NL); capelin in Capelin Area 10 (Placentia Bay); lobster in Lobster Areas 13A and 13B (western NL); and bait in the Area of Home Port or Lobster Area. MAMKA also hold a commercial-communal scallop licence (D. Ball, pers comm 2018; Statoil 2017).
Food, Social, Ceremonial Fishing	No information is available for FSC licences for the QMFN.
Asserted or Established Aboriginal and / or Treaty Rights	It is Equinor Canada's understanding that the QMFN Band has not asserted or established Aboriginal or treaty rights in relation to the lands and waters in or near the Project Area.
Miawpukek First Nation (MFN)	
Location and Proximity to Project Area	Miawpukek Mi'kamawey Mawi'omi First Nation (Miawpukek First Nation or MFN) is comprised of one reserve, the Samiajij Miawpukek reserve, located at the mouth of the Conne River on the south coast of the Island of Newfoundland (BP 2017; Statoil 2017). The community is approximately 640 km from the Project Area.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
General Overview	According to traditional oral history, the Samiajij Miawpukek community was established in 1870. It was officially designated as Samiajij Miawpukek Indian Reserve under the *Indian Act* in 1987 (MFN 2018). In 2004, self-government framework agreement negotiations began between MFN and the federal and provincial governments and an agreement was signed in 2005. In 2013, MFN signed a Self-Government AIP with the governments of Canada and NL. The AIP is not a treaty or a land claims agreement within the meaning of sections 25 and 35 of the *Constitution Act, 1982*. The Agreement was an important step towards self-government and planning and management of economic opportunities and delivery of services to address community needs in culture and language, education, health, child and family services, land management, resource management, licensing, regulation and operation of business, and administration of justice. Progress is being made toward a final agreement (Government of NL 2013; MFN 2018; INAC 2018). The March 2018 registered population of MFN was 3,041 (INAC 2017). Approximately 27% live on-reserve. In 2016, the reserve population was 956, an increase of 3.9% since 2011. Overall, the population is younger than the NL population (Statistics Canada 2017; INAC 2018).
Health and Socioeconomic Conditions	The MFN community is accessible year-round by road. In 2017, the MFN opened a new school in the community, accommodating 180 students from kindergarten to grade 12. The school also includes a dental office and daycare centre. Conne River Health and Social Services provides access to community health services, including a medical clinic, wellness centre, youth centre, nutrition centre, ambulance services and on-call nurses. The MFN community owns and operates small businesses such as Christmas tree farms, hunting camps and small fisheries, and the Miawpukek Gas Bar and Convenience Store (INAC 2012). The community has also partnered with several outside communities and corporations in ventures including tourism and aquaculture (INAC 2012). The MFN community also owns and operates the Jipuijij'kuei Kuespem Nature Park which provides camping, kayak/canoe rentals, walking trails and float plane charters (Explore NL 2010). As described in more detail below, the MFN holds several commercial-communal licenses for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Some historical evidence demonstrates that the Mi'kmaq were present in NL by the 16th century; by the 17th century there are increasing historical references (Heritage NL 2018). Currently, 21 known Mi'kmaq archaeological sites exist in interior and coastal NL between the Port au Port Peninsula and Clarenville (Inside NL Archaeology 2013). There are no known physical, cultural or heritage sites in or near the Project area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq continue to use extensive areas of land, sea, and water for recreational and subsistence purposes such as hunting for caribou, moose, partridge and snowshoe hares; fishing for species such as Atlantic salmon; and harvesting of wild berries (Emera NL 2013). Salmon is important not only as a food source but is also important to the traditions and cultural identity of MFN. Harvesting birds such as murre (also called turr) and seals are also considered important traditional activities.

Table 7.3 Newfoundland and Labrador Indigenous Groups Community Profiles

Community Indicator	Description
Commercial-Communal Fishing	MFN is engaged in commercial-communal fishing through its own licences and those held by MAMKA. MFN holds commercial-communal licences for groundfish in NAFO 2GHJ, 3KL, 3Pn and 3Ps, groundfish (mobile gear) in 2GHJ, 3KL, 3Pn, 3Ps, 4R, bluefin tuna in NAFO 3LNOP-Atlantic and seal in Areas 4 to 33 (all of Atlantic Canada). The First Nation also holds licences for sea cucumber and whelk in NAFO 3Ps (southern NL); capelin in Areas 1-11 and 10 (northern Labrador to southern NL); herring in Area 11 (southern NL); mackerel in Areas 10, 11 and 1-11 (northern Labrador to southern Newfoundland); snow crab in Areas 10 and 11 (southern NL); and squid in Squid Area 10 (Placentia Bay). The MFN also holds licences for other tuna species, swordfish, scallop, and bait. In addition, MFN also holds tuna and swordfish licences for the Scotia-Fundy region (D. Ball, pers comm 2018; Statoil 2017).
Food, Social, Ceremonial Fishing	MFN holds FSC licences in the coastal waters of 3Ps, which is in southern NL. This licence includes scallop, lobster, mackerel, herring, rainbow trout, brook trout, Atlantic cod, eel, smelt, capelin, harp seal grey seal, snow crab, and redfish (D. Ball, pers comm 2018; Statoil 2017).
Asserted or Established Aboriginal and / or Treaty Rights	MFN asserts Aboriginal rights to fish in waters near or adjacent to Conne River, Newfoundland. MFN has not asserted or established Aboriginal or treaty rights in relation to the lands and waters in or near the Project Area.

7.3.3 Mi'kmaq of Nova Scotia

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Acadia First Nation	
Location and Proximity to Project Area	Acadia First Nation, which is centred in Queen's County in southwestern NS, has five reserves (i.e., Yarmouth 33, Ponhook Lake 10, Medway River 11, Wildcat 12, and Gold River 21) between Yarmouth and Halifax. These reserves are approximately 1,527 km from the Project Area.
General Overview	Acadia First Nation is represented by the ANSMC. The March 2018 registered population of Acadia First Nation was 1,545. Approximately 15% (232 individuals) live on-reserve (INAC 2018). The median age of the on-reserve population ranges from 33.8 to 38.2 years, approximately 10% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017). No data are available for Medway River Reserve.
Health and Socioeconomic Conditions	The availability of infrastructure within each community varies. In general, Acadia First Nation has experienced infrastructure growth over the past decade, including the development of housing and roads (Acadia First Nation n.d.). Development and operation of community infrastructure, such as administrative buildings, health centres and gaming facilities, provide services and employment for community members and revenue for the First Nation.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
	Acadia First Nation holds commercial-communal licences for a variety of fish and marine species. Kespuwick Resources, established in 2001, has 53 harvesting licences for 13 species (Acadia First Nation 2018).
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Indigenous artifacts have been found along the Mersey River in Queen's County. An interpretive centre is being developed to display archaeological and cultural history of the First Nation. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). The practice of salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). American eel is also harvested within Aboriginal rights-based fisheries. The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Acadia First Nation holds commercial-communal licences for species including crab, groundfish, herring, lobster, mackerel, sea scallop, quahaug, clam and tuna. Lobster is licenced for LFAs 33 and 34. These licences are located inshore and offshore NS, and thus not within or near the Project Area.
Food, Social, Ceremonial Fishing	Acadia First Nation holds FSC fishing licences for blue shark, blueback herring, brook trout, catfish, cod, crab (other than snow crab), eel, gaspereau, haddock, halibut, herring, lobster, mackerel, mussel, periwinkle, pollock, quahaug, rainbow trout, razor clams, scallop, seals, shad, smallmouth bass, smelt, soft-shell clams, squid, striped bass, and tomcod). Seventeen species are harvested in inland and tidal waters of NS. Acadia First Nation also hold an FSC licence for NAFO Units in and around NS to harvest groundfish, lobster and crab (other than snow crab). There are no location restrictions on fishing eel, shad and smelt. Acadia First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Annapolis Valley First Nation	
Location and Proximity to Project Area	Annapolis Valley First Nation has two reserves located in Kings County in southwestern NS. The reserves are approximately 1,371 km from the Project Area.
General Overview	Annapolis Valley First Nation is represented by the ANSMC. The March 2018 registered population of Annapolis Valley First Nation was 292. Approximately 40% (119 individuals) live on-reserve (INAC 2018). The median age of the population of the reserves range from 29.5 to 37.2 years, approximately 12% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	The Annapolis Valley First Nation Health Centre, established in 1998, has a registered community health nurse, access to prevention and weight control programs, foot care clinics, prenatal programs, massage therapy, physical activity programs, drug and alcohol abuse prevention, suicide prevention, injury / illness prevention and health and wellness promotion. The reserves do not have police detachments or fire halls (Annapolis Valley First Nation n.d.). Economic enterprises include Annapolis Valley First Nation Gaming, Annapolis Valley First Nation Smoke Shop, and Annapolis Valley First Nation Gas Bar. Annapolis Valley First Nation holds commercial-communal licences for a variety of fish and marine species. The Annapolis Valley Commercial Fisheries enterprise operates one lobster fishing boat.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Annapolis Royal and surrounding areas have a long history of Mi'kmaq presence and archeologists have identified several settlement patterns. When Europeans arrived, the Mi'kmaq lived in Annapolis Valley and their lifestyles were heavily influenced by the seasonal patterns of the ecosystems and a strong connection to the land. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Annapolis Valley First Nation holds commercial-communal licences for sea urchins, groundfish, herring, lobster, and sea scallop for inshore and offshore NS, and these do not intersect with the Project Area.
Food, Social, Ceremonial Fishing	Annapolis Valley First Nation holds FSC licences for brown trout, clams, eel, flounder, gaspereau, halibut, herring, lobster, mackerel, mussels, pollock, rainbow trout, scallop, shad, smelt, speckled trout. Fish and shellfish species, including trout, mussels, clams, mackerel, and herring are harvested in tidal waters of NS. Annapolis First Nation also holds an FSC licence to fish for groundfish, lobster and scallop in NAFO units in and around NS. Annapolis Valley First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes. As these licences are for areas around NS, none are located within or near the Project Area.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Bear River First Nation	
Location and Proximity to Project Area	Bear River First Nation (also known as L'sitkuk Mainland) is located in the Annapolis Valley between Annapolis Royal and Digby. Bear River has three reserves: Bear River, Bear River 6A (known as Lequille), and Bear River 6B (known as Graywood) (KMKNO n.d.; INAC 2018). Bear River First Nation is approximately 1,462 km from the Project Area.
General Overview	The Bear River reserve was founded in 1801, with 1,000 acres set aside for the Mi'kmaq in the County of Annapolis and an additional 600 acres requested at the forks of the river (Mainland Mi'kmaq Development Inc. 2016). Bear River First Nation is represented by the ANSMC. The March 2018 registered population of Bear River First Nation was 343. Approximately 32% (111 individuals) live on-reserve (INAC 2018). The median age (i.e., 29.7 years) of the population was approximately 16% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	The majority of community members live on Bear River 6 (Mainland Mi'kmaq Development Inc. 2016). Community infrastructure includes Treaty Gas Bar, a seasonal Heritage and Cultural Centre, a Learning Centre that provides space for educational activities, and a Health Centre. An RCMP satellite office recently opened, and there are plans for a Fitness Centre. Revenue is generated through the Gas Bar and Heritage and Cultural Centre. As described in more detail below, Bear River First Nation holds commercial-communal licences for lobster and tuna.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	For thousands of years, the Bear River Mi'kmaq have lived and travelled in what is now known as Digby and Annapolis counties. As early as 1612, the Mi'kmaq have been recorded as harvesting resources in the Annapolis River and French Bay (Bay of Fundy) (Mainland Mi'kmaq Development Inc. 2016). The traditional economy was based on hunting, fishing, and gathering, with people travelling a great deal in search of game. Bear River appeared to have been a capital village for the southwestern bands and central meeting place for the Mi'kmaq due to the location on traditional water routes. Bear River First Nation members are known for their artwork, specializing in embroidering porcupine quills on birchbark, leatherwork, and basketry (Mainland Mi'kmaq Development Inc. 2016). The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Commercial-Communal Fishing	Bear River First Nation holds commercial-communal licences for lobster and tuna. These licences are located inshore and offshore NS and do not overlap with the Project Area.
Food, Social, Ceremonial Fishing	Bear River First Nation holds FSC fishing licences for bar clams, crab, eel, gaspereau, groundfish, herring, landlocked salmon, lobster, mackerel, mussels, quahaug, razor clams, scallop, seals, shad, smallmouth bass, smelt, soft-shell clams, striped bass, and trout. These include licences to harvest species within the inland and tidal waters of NS. Bear River holds a licence to fish for other species in NAFO units in and around NS. Species include groundfish, lobster and crab (other than snow crab). There are no restrictions on the fishing of eel, shad and smelt. Bear River First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes. None of these licences overlap with the Project Area.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Eskasoni First Nation	
Location and Proximity to Project Area	Eskasoni First Nation is comprised of three reserves (Eskasoni 3, Eskasoni 3A, and Malagawatch 4) located along the shore of the Bras d'Or Lakes in Cape Breton. Eskasoni First Nation is approximately 1,043 km from the Project Area.
General Overview	Eskasoni First Nation is represented by the ANSMC. The March 2018 registered population of Eskasoni First Nation was 4,535. Approximately 85% (3,857 individuals) live on-reserve (INAC 2018). The median age of the population (i.e., 23.5 years) is approximately 22% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Eskasoni First Nation has community-owned infrastructure including a school for students from kindergarten to grade 12, a supermarket, ice rink, a cultural centre, and a fire department. The community operates Crane Cove Seafoods, which has 13 vessels. More than 100 community members are employed in fishing, with an additional 35 working in the processing plant. Eskasoni First Nation holds commercial-communal licences for a variety of fish and marine species. Harvesting takes place throughout NS from Ingonish to Yarmouth.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Eskasoni First Nation was first chartered in 1832 and became an official reserve in 1834. The population of Eskasoni grew in the 1940s because of a Department of Indian Affairs policy to centralize Indigenous people (Eskasoni First Nation n.d.). Eskasoni First Nation began controlling their own affairs in the 1950s and a Band Council was established in 1958 (Eskasoni First Nation n.d.). The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Eskasoni First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, mackerel, and shrimp. These licences are in inshore and offshore areas of NS.
Food, Social, Ceremonial Fishing	Eskasoni First Nation holds FSC fishing licences for clams, cod, eel, flounder, haddock, herring, lobster, mackerel, mussels, quahaug, salmon, scallop, shad, smelt, and trout within the inland and tidal waters of Cape Breton. Eskasoni holds a FSC licence to fish other species including groundfish and lobster in NAFO units in and around NS. Eskasoni First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Glooscap First Nation	
Location and Proximity to Project Area	Glooscap First Nation, comprised of one reserve (Glooscap 35), is located northwest of Halifax near Hantsport, approximately 1,340 km from the Project Area.
General Overview	Glooscap First Nation is represented by the ANSMC. The March 2018 registered population of Glooscap First Nation was 380. Approximately 25% (95 individuals) live on-reserve (INAC 2018). The median age (i.e., 32.5 years) is approximately 13% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Although there are no schools on-reserve, the Glooscap First Nation has appointed an education director to oversee primary and secondary education for on-reserve members who attend school off-reserve. Health care services are provided through an on-reserve health and healing centre. Glooscap Ventures, created in 2014, is responsible for on-reserve businesses including a variety store / gas bar, gaming facility, and commercial fisheries. The First Nation is in the process of developing Glooscap Landing, a 27-acre parcel of land along Highway 101 for retail purposes. Glooscap First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	In June 1984, Glooscap First Nation (formerly known as Horton) became the thirteenth Mi'kmaq band in NS. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	Glooscap First Nation's traditional activity is focused on harvesting marine species. The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Glooscap First Nation holds commercial-communal licences for groundfish, lobster, mackerel, swordfish, and tuna. Most of these licences are located inshore and offshore NS. Glooscap holds commercial-communal licences for swordfish and tuna within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Glooscap First Nation holds FSC fishing licences for brown bullhead, chain pickerel, cod, eel, flounder, gaspereau, haddock, halibut, lake whitefish, lobster, mackerel, mussels, pollock, scallop, shad, smallmouth bass, smelt, soft-shell clams, striped bass, trout, white perch, white sucker fish, and yellow perch. These include harvesting in the inland and tidal waters of NS. Glooscap First Nation also holds a FSC licence to fish for other species, including groundfish and lobster, in NAFO units in and around NS. There are no restrictions on the fishing of eel, shad and smelt. Glooscap First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Membertou First Nation	
Location and Proximity to Project Area	Membertou First Nation is comprised of four reserves (i.e., Membertou 28B, Sydney 28A, Caribou Marsh 29, and Malagawatch 4) located in northeastern and southwestern Sydney. Membertou First Nation is 1,004 km from the Project Area.
General Overview	Membertou First Nation is represented by the ANSMC. The March 2018 registered population of Membertou First Nation was 1,534. Approximately 60% (920 individuals) live on-reserve (INAC 2018). The median age of the population (i.e., 26.9 years) is approximately 19% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Membertou First Nation has a gas station, church, medical clinic, community centre, band office, boxing gym, a business park which includes the Membertou Trade and Convention Centre, Membertou Heritage Park and Petroglyphs Gift Shop, hotel, a restaurant, Membertou Entertainment Centre, and other private businesses. Membertou has a school, Maupeltuewey Kina'matno'kuom, for kindergarten to grade 6 and a Sport and Wellness Centre. Membertou First Nation owns and operates First Fishermen Seafoods. Membertou First Nation holds several commercial-communal licences for a variety of fish and marine species.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Membertou First Nation, formerly Kings Road Reserve, was originally located along the banks of Sydney Harbour. In 1926, it was moved to its present location. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Membertou First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, mackerel, sea scallop, sea urchins, shrimp and tuna. Most of these licences are located inshore and offshore NS. Membertou holds commercial-communal licences for tuna within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Membertou First Nation holds FSC fishing licences for clams, cod, crabs, eel, flounder, haddock, halibut, lobster, mackerel, mussels, oysters, pollock, quahaugs, salmon, scallop, smelt, and striped bass. These include harvesting in the tidal waters of Cape Breton and the Bras d'Or Lakes. Membertou First Nation holds an FSC licence to fish for other species in defined NAFO units in and around NS, including lobster and scallop. Membertou First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Paq'tnkek Mi'kmaw Nation	
Location and Proximity to Project Area	Paq'tnkek Mi'kmaw Nation is comprised of three reserves (i.e., Franklin Manor 22, Paq'tnkek-Niktuek 23, and Welnek 38) located southeast of Amherst and east of Antigonish. Paq'tnkek Mi'kmaw Nation is approximately 1,135 km from the Project Area.
General Overview	Paq'tnkek Mi'kmaw Nation is represented by the ANSMC. The March 2018 registered population of Paq'tnkek Mi'kmaw Nation was 595. Approximately 70% (421 individuals) live on-reserve (INAC 2018). The median age (i.e., 24.4 years) of the population is approximately 21% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	The Paq'tnkek Pre-School has been in operation in Afton, NS since the early 1980s. The Paq'tnkek Health Centre, which opened in 2008, is a multi-purpose facility that delivers health programs to the community, as well as offering a boardroom, classrooms, and space for private functions. An Economic Development Department manages development including the Paq'tnkek Entertainment Centre. The First Nation holds commercial-communal licences for a variety of fish and marine species, and Paq'tnkek Fisheries Enterprise employs 20 community members.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Paq'tnkek, meaning "by the bay", was established in March 1820 in Antigonish County, and (given its central location) has been a traditional stopping point for Mi'kmaq travelling to and from Unama'ki and a location where Chiefs would meet (Paq'tnkek Mi'kmaw Nation n.d.). The Paq'tnkek engage in important cultural and traditional practices, such as harvesting eels, salmon, and rabbits. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Paq'tnkek Mi'kmaw Nation holds commercial-communal licences, for sea urchins for areas of inshore NS. Paq'tnkek holds commercial-communal licences for swordfish within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Paq'tnkek Mi'kmaw Nation members harvest marine fish and shellfish resources along the coast, including along the southern Chedabucto coastline where the waters generally do not freeze, offering unimpeded fishing during the winter months (Mi'kma'ki All Points Service 2013). Mackerel, herring, cod, haddock, urchins, mussels, oysters, clams are harvested on the Chedabucto coastline, and snow crab are fished in deeper waters (Mi'kma'ki All Points Service 2013). Freshwater species include salmon, trout, and eel (Mi'kma'ki All Points Service 2013). Paq'tnkek Mi'kmaw Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Pictou Landing First Nation	
Location and Proximity to Project Area	Pictou Landing First Nation is located on the south shore of the Northumberland Strait in Pictou County. The reserves include Franklin Manor 22 (also affiliated with Paq'tnkek Mi'kmaw Nation), Fisher's Grant 24, Boat Harbour West 37, Fisher's Grant 24G, and Merigomish Harbour 31. Pictou Landing First Nation is approximately 1,201 km from the Project Area.
General Overview	Pictou Landing First Nation is represented by the ANSMC. The March 2018 registered population of Pictou Landing First Nation was 668. Approximately 73% of these (487 individuals) live on-reserve (INAC 2018). The median age (i.e., 28.4 years) of the population is approximately 17% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	The community has a church, gas bar, health centre, and primary to Grade 6 elementary school, Pictou Landing First Nation School. Pictou Landing First Nation holds commercial-communal licences for a variety of fish and marine species. Fishing is the main industry, and close to 100 people (full / part time) are employed each year in harvesting lobster, rock crab, snow crab, mackerel, herring and tuna.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Pictou Landing First Nation lived, on a seasonal basis, in and around a small tidal estuary connected by a narrow channel to the Northumberland Strait. The area provided a variety of resources including fish, eels, crustaceans, and shellfish as well as areas for harvesting and trapping near the shore. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Pictou Landing First Nation holds commercial-communal licences for gaspereau, clams, crab, eel, groundfish, herring, lobster, mackerel, oysters, sea scallop, seal, smelts, squid, swordfish, and tuna. Most of these licences are located inshore and offshore NS and NB, with licences for swordfish in NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Pictou Landing First Nation holds FSC licences for lobster, salmon, striped bass, and trout. Pictou Landing First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Potlotek First Nation	
Location and Proximity to Project Area	Potlotek First Nation is comprised of two reserves (Chapel Island 5 and Malagawatch 4) located southwest of Sydney. Potlotek First Nation is approximately 1,058 km from the Project Area.
General Overview	Potlotek First Nation is represented by the ANSMC. The March 2018 registered population of Potlotek First Nation was 739. Approximately 76% (562 individuals) live on-reserve (INAC 2018). The median age (i.e., 24.2 years) of the population is approximately 21% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	Potlotek First Nation has a day care, preschool program, and Mi'kmawey School. Other facilities include the Chapel Island Community Hall / Kateri Chapel, youth centre, RCMP building, medical centre, a store / gas bar and fire hall. Potlotek First Nation holds commercial-communal licences for a variety of fish and marine species. Fisheries is a key industry, including oyster cultivation. Apaqtukewaq Fisheries Co-op was formed in 1995, with four members employed fulltime in the co-op and seven during the peak season. Apaqtukewaq also manages lobster, snow crab, and tuna fishing.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Potlotek First Nation is a traditional meeting place for Mi'kmaq in the Maritimes and is one of the oldest reserves in Cape Breton. The Chapel Island Reserve, formerly Barra Head, became a reserve in 1834, following the receipt of a land grant. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Potlotek First Nation holds commercial-communal licences for gaspereau, herring, eel, crab, groundfish, lobster, sea urchins and shrimp. These licences are located inshore and offshore NS and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Potlotek First Nation holds FSC fishing licences for capelin, cod, eel, flounder, haddock, herring, lobster, mackerel, mussels, pollock, quahaug, salmon, scallop, shad, smelt, soft-shell clams, striped bass, and trout. These species are harvested in inland and tidal waters of mainland NS and Cape Breton. Potlotek holds a FSC licence to fish for other species including lobster and scallop in NAFO units in and around NS. Potlotek First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Wagmatcook First Nation	
Location and Proximity to Project Area	Wagmatcook First Nation is comprised of three reserves (Malagawatch 4, Margaree 25, and Wagmatcook 1) located within the Bras d'Or Lakes region of Cape Breton. Wagmatcook First Nation is approximately 1,061 km from the Project Area.
General Overview	Wagmatcook First Nation is represented by the ANSMC. The March 2018 registered population of Wagmatcook First Nation was 878. Approximately 74% (645 individuals) live on-reserve (INAC 2018). The median age (i.e., 25.6 years) of the population is approximately 20% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	Wagmatcook First Nation has a day care centre, kindergarten to Grade 12 First Nation school, and a fire hall. Community services and economic initiatives include a gas station, restaurant, grocery store, wharf and warehouse, Cultural and Heritage Centre, post office and community cable television network. Wagmatcook First Nation holds commercial-communal licences for a variety of fish and marine species. The commercial fishery, established in 1990, is an important communally-owned industry that employs up to 41 people each season.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Wagmatcook First Nation holds commercial-communal licences for crab, groundfish, lobster, mackerel, sea urchins, squid, and swordfish. Most of these licences are for inshore and offshore NS. Wagmatcook First Nation holds commercial-communal licences for swordfish in NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Wagmatcook First Nation holds FSC fishing licences for cod, eel, flounder, haddock, herring, lobster, mackerel, mussels, pollock, salmon, scallop, shad, smelt, striped bass, and trout within the tidal waters of Cape Breton. Wagmatcook First Nation holds licences to harvest lobster around Cape Breton in LFAs 27, 28, 29 and 30. Wagmatcook First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
We'ko'kmaq (Waycobah) First Nation	
Location and Proximity to Project Area	We'ko'kmaq (Waycobah) First Nation is comprised of two reserves (Malagawatch 4 and Whycocomagh 2) located within the village of Whycocomagh in Cape Breton. Waycobah First Nation is approximately 1,080 km from the Project Area.
General Overview	Waycobah First Nation is represented by the ANSMC. The March 2018 registered population of Waycobah First Nation was 1,000. Approximately 89% (886 individuals) live on-reserve (INAC 2018). The median age (i.e., 23.1 years) of the population is approximately 22% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	Community infrastructure includes a primary-12 school, health centre, RCMP station, and volunteer fire department. Economic initiatives include a convenience store and gas bar, fitness centre, and a gaming centre. Waycobah First Nation holds commercial-communal licences for lobster, shrimp, crab, groundfish, and elver (eel), as well as inactive licences for tuna, whelk, urchin, mackerel, and herring. In 2011, a trout farm, owned by Cold Water Fisheries, was re-established in Waycobah and most staff are Waycobah First Nation members.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Waycobah First Nation (formerly We'ko'kmaq) was first established in the early 1800s. In the 1940s, the community experienced a decline in population with many members moving to the community of Eskasoni. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Waycobah First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, mackerel, sea urchin, shrimp, and swordfish. Most of these licences are located inshore and offshore NS, with swordfish licences in NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Waycobah First Nation holds FSC fishing licences for clams, cod, eel, flounder, haddock, herring, lobster, mackerel, mussels, pollock, quahaug, salmon, scallop, shad, smelt, and trout for the tidal waters of Cape Breton. Waycobah First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Millbrook First Nation	
Location and Proximity to Project Area	Millbrook First Nation has seven reserves. Truro 27A, Truro 27B, Truro 27C and Millbrook 27 are near Truro, and Beaver Lake 17, Cole Harbour 30, and Sheet Harbour 36, near Halifax. Millbrook First Nation is approximately 1,260 km from the Project Area.
General Overview	Since 2016, Millbrook First Nation has chosen to independently represent itself in consultation and is not currently represented by the ANSMC. Millbrook First Nation asserts the same rights as other Mi'kmaq communities in NS. The March 2018 registered population of Millbrook First Nation was 1,868. Approximately 48% (894 individuals) live on-reserve (INAC 2018). The median age (i.e., 32.4 years) of the population is approximately 13% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	Facilities and services include the band office, community hall, ballfield, gym, early education centre, health centre, senior's centre and a church. Economic initiatives include the fishing industry, apartment buildings, a gaming centre, and a retail park. Millbrook First Nation holds commercial-communal licences for a variety of fish and marine species. Millbrook Fisheries is an important part of the local economy, with eight vessels, 52 commercial-communal licences province-wide, and more than 40 employees throughout the year.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	During the late 1700s and the early 1800s, the Mi'kmaq near Truro settled along the banks of the Salmon River and were later relocated to their current reserve at Millbrook. The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Millbrook First Nation holds commercial-communal licences for crab, groundfish, hagfish, herring, lobster, mackerel, sea urchins, swordfish, and tuna. Most of these licences are for inshore and offshore NS. Millbrook First Nation holds commercial-communal licences for tuna and swordfish within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Millbrook First Nation holds FSC fishing licences for brown trout, chain pickerel, eel, grey trout, herring, lake trout, lobster, mackerel, ocean quahaug, oysters, rainbow trout, salmon, scallop, smallmouth bass, smelt, speckled trout, and striped bass in inland and tidal waters of NS, including the tidal water of the Bay of Fundy. Millbrook First Nation holds an FSC licence to fish for herring, lobster, mackerel, ocean quahaug, oysters, and scallops in NAFO units in and around NS. Millbrook First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Sipekne'katik First Nation	
Location and Proximity to Project Area	Sipekne'katik First Nation (also known as Indian Brook or Shubenacadie) is comprised of five reserves (Indian Brook 14, Wallace Hills 14A, Shubenacadie 13A, Pennal 19, and New Ross 20) in Hants County, near Shubenacadie. Sipekne'katik First Nation is approximately 1,281 km from the Project Area.
General Overview	In 2013, Sipekne'katik First Nation chose to independently represent itself in consultation, and currently is not represented by the ANSMC. The First Nation asserts the same rights as other Mi'kmaq communities in NS.

Table 7.4 Mi'kmaq of Nova Scotia Community Profiles

Community Indicator	Description
	The March 2018 registered population of Sipekne'katik First Nation was 2,692. Approximately 48% live on-reserve (INAC 2018). The median age (i.e., 27.7 years) of the population is approximately 21% below that of NS in general, which was 45.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Sipekne'katik First Nation has a primary-12 school, the gas bar, tobacco shop, gaming room and convenience store, a multi-purpose centre, the Sipekne'katik Entertainment Centre and the Sipekne'katik Health Centre. The fishery is an important industry for the community, and Sipekne'katik First Nation holds 33 commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	In 1820, Sipekne'katik First Nation was officially established as a reserve and given the name 'Indian Brook'. According to Mi'kmaq oral history, this area has been used for centuries as a sacred site to prepare for ceremonies and for harvesting and fishing trips. In 1752, one of the most important Peace and Friendship Treaties was signed at Shubenacadie District (Sipekn'katik First Nation 2016). The Project does not overlap with the traditional territory of the Mi'kmaq of NS, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of NS harvest Atlantic salmon as part of their Aboriginal right to fish for FSC purposes (UINR 2018). Salmon fishing creates opportunities for traditional knowledge sharing and expressing Mi'kmaq values of sharing catches with the community, and other uses specific to salmon that cannot be replaced by harvesting other species (UINR 2018). The Mi'kmaq of NS also harvest American eel within Aboriginal rights-based, treaty rights-based and commercial fisheries. In addition to a rich food source, American eel is also used for medicinal purposes.
Commercial-Communal Fishing	Sipekne'katik First Nation holds commercial-communal licences for crab, groundfish, lobster, sea scallop, sea urchins, swordfish and tuna. Most of these licences are located inshore and offshore NS. Sipekne'katik also holds commercial-communal licences for swordfish and tuna within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Sipekne'katik First Nation holds FSC fishing licences for bar clams, crab (other than snow crab), eel, gaspereau, herring, landlocked salmon, lobster, mackerel, mussels, quahaugs, razor clams, salmon, scallop, seals, shad, smallmouth bass, smelt, soft-shell clams, striped bass, trout, and unspecified groundfish. Harvesting occurs in inland and tidal waters of NS. Sipekne'katik First Nation holds an FSC licence for crab, lobster, scallops and unspecified groundfish in NAFO units in and around NS. There are no restrictions on the fishing of eel, shad and smelt. Sipekne'katik First Nation also has an Aboriginal right to fish for Atlantic salmon for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of NS possess Aboriginal and Treaty rights, including a right to fish for a "moderate livelihood", which flows from the Peace and Friendship Treaties; and, an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

7.3.4 Mi'kmaq of Prince Edward Island

Table 7.5 Mi'kmaq of Prince Edward Island Community Profiles

Community Indicator	Description
Abegweit First Nation	
Location and Proximity to Project Area	Abegweit First Nation is comprised of three reserves (Morell Rear Reserve 2; Rocky Pont Reserve 3; and Scotchfort Reserve 4), on the eastern portion of PEI, approximately 1,199 km from the Project Area.
General Overview	Abegweit First Nation is governed by an elected Chief and two Councillors and represented by the MCPEI in consultation and engagement. The March 2018 registered population of Abegweit First Nation was 381. Approximately 57% (218 individuals) live on-reserve (INAC 2018). The median age of the population of the three reserves ranges from 27.0 to 32.2 years, approximately 15% below that of PEI in general, which was 44.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Abegweit First Nation plays a substantial role in education from Kindergarten to Grade 12. The Mi'kmaq Wellness Centre has an interdisciplinary team consisting of a registered nurse, licenced practical nurse, registered dietician, native alcohol and drug addiction counselor, and community health representative. Abegweit First Nation operates several businesses and community initiatives including Epekwit Gas Bar, Redstone Truck and Marine, commercial fisheries, Epekwit Gardens and Preserves, Abegweit Biodiversity and Enhancement Hatchery, Stream Enhancement, and Forestry. Abegweit First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Abegweit First Nation was created following the separation of PEI Mi'kmaq bands in 1972. The first election for the Abegweit First Nation occurred in May 1972. The Project does not overlap with the traditional territory of the Mi'kmaq of PEI, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of PEI are known to occupy and use the land and waters around PEI, including use for travel corridors, land-based harvesting and fishing for traditional purposes. Refer below for details on FSC fishing practices.
Commercial-Communal Fishing	Abegweit First Nation holds commercial-communal licences for clams, crab, eel, groundfish, herring, lobster, mackerel, mussels, oysters, quahuags, sea scallop, seal, silverside, smelts, squid, swordfish, and tuna. Most licences are located in inshore and offshore PEI. Abegweit holds commercial-communal licences for swordfish within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Abegweit First Nation holds FSC licences for clams, eel, gaspereau, herring, lobster, mackerel, mussels, oysters, quahaug, rock crab, salmon, scallops, seals, silversides, smelts, striped bass, toad crab, and trout. Abegweit First Nation has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.

Table 7.5 Mi'kmaq of Prince Edward Island Community Profiles

Community Indicator	Description
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of PEI have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and assert an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Lennox Island First Nation	
Location and Proximity to Project Area	Lennox Island First Nation has one reserve, on the northwestern portion of PEI, facing the Gulf of St. Lawrence approximately 1,265 km from the Project Area.
General Overview	Lennox Island First Nation is represented in consultation and engagement by the MCPEI. The March 2018 registered population of Lennox Island First Nation was 967. Approximately 41% (393 individuals) live on-reserve (INAC 2018). The median age (i.e., 29.9 years) of the population is approximately 15% below that of PEI in general, which was 44.5 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Lennox Island First Nation has an elementary school, health centre, and fire department. The Lennox Island Development Corporation was established to further economic development and expansion of community businesses and resources. Lennox Island First Nation holds commercial-communal licences for a variety of fish and marine species. Fisherman's Pride Inc. harvests and sells inshore seafood. Minigoo Fisheries, established in 2010, processes lobster for international markets.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'kmaq of PEI, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'kmaq of PEI are known to occupy and use the land and waters around PEI, including use for travel corridors, land harvesting and fishing for traditional purposes. Refer below for details on FSC fishing practices.
Commercial-Communal Fishing	Lennox Island First Nation holds commercial-communal licences for clams, crab, eel, groundfish, herring, lobster, mackerel, mussels, quahaug, oysters, sea scallop, seal, shark, silverside, smelts, squid, swordfish, tuna, and whelks. Most of these licences are located inshore and offshore PEI. Lennox Island First Nation also holds commercial-communal licences for swordfish within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Lennox Island First Nation holds FSC licences for clams, eel, gaspereau, groundfish, herring, lobster, mackerel, mussels, oysters, quahaug, rock crab, salmon, seals, smelt, and trout. The First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'kmaq of PEI have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and assert an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

7.3.5 Indigenous Peoples of New Brunswick

7.3.5.1 Mi'gmaq of New Brunswick

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
Elsipogtog First Nation	
Location and Proximity to Project Area	Elsipogtog First Nation has two reserves (Richibucto and Soegao) located near Rexton and Moncton. Elsipogtog First Nation is approximately 1,348 km from the Project Area.
General Overview	Elsipogtog First Nation is affiliated with the MAWIW Council (the governing body for Elsipogtog, Tobique and Esgenoôpetitj) (Energy East Pipeline Ltd. 2016). The March 2018 registered population of Elsipogtog First Nation was 3,365. Approximately 77% (2,576 individuals) live on-reserve (INAC 2018). The median age (i.e., 29.9 years) of the population is approximately 16% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Richibucto Reserve has a school for Kindergarten to Grade 8, a police detachment, and fire hall. The two primary economic development initiatives are a supermarket and pharmacy.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Elsipogtog First Nation holds commercial-communal licences for gaspereau, clams, crab, eel, groundfish, herring, lobster, mackerel, mussels, oysters, quahaugs, sea scallop, seal, smelts, and tuna. These licences are issued for inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Elsipogtog First Nation holds FSC licences for clams, eel, gaspereau, herring, lobster, mackerel, mussels, oysters, quahaug, rock crab, salmon, scallops, seals, shad, smelts, striped bass, and trout. The First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood," which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to waters in or near the Project Area.
Amlamgog (Fort Folly) First Nation	
Location and Proximity to Project Area	Fort Folly First Nation has one reserve, located near Dorchester in Westmorland County, approximately 1,331 km from the Project Area.
General Overview	Fort Folly First Nation is affiliated with the North Shore MicMac District Council and is represented in consultation and engagement by MTI.

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
	The March 2018 registered population of Fort Folly First Nation was 131. Approximately 27% (35 individuals) live on-reserve (INAC 2018). The median age (i.e., 46.0 years) of the population is similar to that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Fort Folly First Nation has a school offering a head start and kindergarten program. Fort Folly First Nation holds commercial-communal licences for a variety of fish and marine species. The First Nation supports economic development in the fishing industry, with two lobster boats, one of which also carries a scallop licence.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	In 1918, community members from the Fort Folly lands were relocated to the Robinson land outside of Richibucto. The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Fort Folly First Nation holds commercial-communal licences for groundfish, lobster, sea scallop, swordfish, and tuna. Most of these licences are located inshore and offshore NS and NB. Fort Folly holds commercial-communal licences for swordfish and tuna in NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Fort Folly First Nation holds FSC fishing licences for LFA 35 (Bay of Fundy) for lobster. Fort Folly First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to harvest for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to harvest for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Natoaganeg (Eel Ground) First Nation	
Location and Proximity to Project Area	Eel Ground First Nation has three reserves (Big Hole Tract 8, Eel Ground 2, and Renous 12) located along the Miramichi River near Newcastle. Eel Ground First Nation is approximately 1,389 km from the Project Area.
General Overview	Eel Ground First Nation is affiliated with the North Shore MicMac District Council and represented in consultation and engagement by MTI. The March 2018 registered population of Eel Ground First Nation was 1,062. Approximately 54% (577 individuals) live on-reserve (INAC 2018). The median age (i.e., 31.0 years) of the population is approximately 15% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Eel Ground First Nation has a band hall, community development centre, group home and health centre. In 2015, the First Nation built a school to accommodate students from kindergarten to grade 8. Economic initiatives include a lumber production business. Eel Ground First Nation holds commercial-communal licences for a variety of fish and marine species.

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Eel Ground First Nation holds commercial-communal licences for gaspereau, groundfish, herring, lobster, mackerel, oysters, sea urchins, snow crab, and soft-shell clams. These licences are located inshore and offshore NS and NB and thus not near the Project Area.
Food, Social, Ceremonial Fishing	Eel Ground First Nation holds FSC licences for clams, mussels, eel, gaspereau, herring, mackerel, oysters, quahaug, salmon, shad, smelts, striped bass, and brook trout. Eel Ground First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Oinpegitjoig (Pabineau) First Nation	
Location and Proximity to Project Area	Pabineau First Nation has one reserve, located south of Bathurst approximately 1,380 km from the Project Area.
General Overview	Pabineau First Nation is affiliated with the North Shore MicMac District Council (Energy East Pipeline Ltd. 2016) and represented in consultation and engagement by MTI. The March 2018 registered population of Pabineau First Nation was 318. Approximately 33% (104 individuals) live on-reserve (INAC 2018). The median age (i.e., 35.5 years) of the population is approximately 10% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Pabineau First Nation has a police detachment. An Economic Development Officer works to increase local employment. Pabineau First Nation owns and operates a seafood restaurant and a smoke shop and gas bar. Pabineau First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
	and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Pabineau First Nation holds commercial-communal licences for crab, groundfish, herring, mackerel, oysters, sea scallop, and tuna. These licences are for inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Pabineau First Nation holds FSC licences including for clams, herring, mackerel, mussels, oysters, salmon, and trout. Pabineau First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Esgenoôpetitj (Burnt Church) First Nation	
Location and Proximity to Project Area	Esgenoôpetitj First Nation has three reserves (Esgenoôpetitj Indian Reserve 14, Pokemouche 13, and Tabusintac 9), located southwest of the village of Neguac in Kent County. Esgenoôpetitj is approximately 1,345 km from the Project Area.
General Overview	Esgenoôpetitj First Nation is affiliated with the MAWIW Council (Energy East Pipeline Ltd. 2016) and represented in consultation and engagement by MTI. The March 2018 registered population of Esgenoôpetitj First Nation was 1,927. Approximately 69% (1,337 individuals) live on-reserve (INAC 2018). The median age (i.e., 30.6 years) of the population is approximately 15% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Esgenoôpetitj First Nation has a school for Kindergarten to Grade 8 and a fire hall. Esgenoôpetitj First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Esgenoôpetitj First Nation holds commercial-communal licences for clams, crab, eel, groundfish, herring, lobster, mackerel, mussels, oysters, quahaug, smelts, and tuna for inshore and offshore NS and NB and these do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Esgenoôpetitj First Nation holds FSC licences for clams, quahaug, eel, herring, lobster, mackerel, mussels, oysters, salmon, smelts, striped bass, and brook trout. Esgenoôpetitj First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
Tjipõgtõtjg (Bouctuche) First Nation	
Location and Proximity to Project Area	Buctouche First Nation has one reserve (Buctouche 16) located near the town of Buctouche. Buctouche First Nation is approximately 1,337 km from the Project Area.
General Overview	Buctouche First Nation is affiliated with the North Shore MicMac District Council (Energy East Pipeline Ltd. 2016) and is represented in consultation and engagement by MTI. The March 2018 registered population of Buctouche First Nation was 124. Approximately 65% (80 individuals) live on-reserve (INAC 2018). The median age (i.e., 28.2 years) of the population is approximately 18% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Buctouche First Nation has a kindergarten, pre-school, and a fire hall. The Buctouche MicMac Band Forestry Department administers the distribution of the royalties that are received from the Band's annual allocation by the province of NB. Buctouche First Nation also owns and operates a gas bar. Buctouche First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Buctouche First Nation was established in 1810. It was abandoned in 1924 until a family moved back to the reserve in 1958. Traditional fishing, trapping, and harvesting territories extended to the western portion of PEI, through the coast of NB from the Miramichi Bay along the Northumberland Strait, southeast between NS on the Bay of Fundy to Maine. In the winter, the traditional territory also encompassed inland areas around Fredericton, Grand Lake, Moncton and Miramichi (Buctouche First Nation n.d.). The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Buctouche First Nation holds commercial-communal licences for gaspereau, clams, crab, groundfish, herring, lobster, mackerel, oysters, sea scallop, seal, shark, smelts, and tuna. These licences are located in inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Buctouche First Nation holds FSC licences for clams, eel, mackerel, oysters, salmon, striped bass, and brook trout. Buctouche First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
L'nui Menikuk (Indian Island) First Nation	
Location and Proximity to Project Area	Indian Island First Nation has one reserve located near Miramichi Bay on the eastern coast of NB. Indian Island First Nation is approximately 1,333 km from the Project Area.

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
General Overview	Indian Island First Nation is affiliated with the North Shore MicMac District Council (Energy East Pipeline Ltd. 2016) and is represented in consultation and engagement by the MTI. The March 2018 registered population of Indian Island First Nation was 200. Approximately 54% (108 individuals) live on-reserve (INAC 2018). The median age (i.e., 29.0 years) of the population is approximately 16% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	The Indian Island Aquaculture Development Corporation has been producing oysters since 2007 and currently has approximately 2.6 million oysters on-site in various stages of growth. The Development Corporation employs five seasonal employees with additional students in the summer; employees are community members. Indian Island First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Indian Island First Nation holds commercial-communal licences for gaspereau, crab, eel, groundfish, herring, lobster, mackerel, oysters, sea scallop, smelts, snow crab, and tuna. These licences are located in inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Indian Island First Nation holds FSC licences for clams, mussels, eels, gaspereau, herring, lobster, mackerel, oysters, quahaug, rock crab, salmon, smelts, striped bass, and trout. Indian Island First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Ugpi'ganjig (Eel River Bar) First Nation	
Location and Proximity to Project Area	Eel River Bar First Nation is comprised of three reserves (Eel River 3, Indian Ranch, and Moose Meadows 4) located near Dalhousie. Eel River Bar First Nation is approximately 1,425 km from the Project Area.

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
General Overview	Eel River Bar First Nation is affiliated with the North Shore MicMac District Council (Energy East Pipeline Ltd. 2016) and is represented in consultation and engagement by the MTI. The March 2018 registered population of Eel River Bar First Nation was 747. Approximately 47% (348 individuals) live on- reserve (INAC 2018). The median age of the population of the reserves ranges from 33.1 to 33.7 years, approximately 12% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Eel River Bar First Nation operates a pre-school. The community continues to make a living from traditional resource-based industries, such as fishing and forestry, and non-traditional sectors such as local government, housing construction, trades, small business, and band-based business operations. Eel River Bar First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The area around the Benjamin and Eel Rivers was traditionally used by Mi'gmaq families as a summer encampment for completing their annual migration. The Benjamin River was a rich farming area and the Eel River provided a variety of fish. The area provided access to Heron Island, where it is thought that traditional burials took place. Historically, Eel River Bar First Nation would harvest resources of the land, ocean, lakes and rivers which provided a variety of fish, seals, shellfish, moose, deer, bear, small animals, and birds. The community would fish in the waters of the Bay of Chaleur and dig for clams on the shores of Eel River Bar. In 1963, due to the construction of a dam, flooding resulted in the loss of fishing and clam harvesting along Eel River (Eel River Bar First Nation 2018). The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Eel River Bar First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, mackerel, mussels, oysters, sea scallop, shrimp, smelts, and tuna. These licences are for inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Eel River Bar First Nation holds FSC licences for soft-shell clams, herring, salmon, striped bass, lobster, and rock crab. Eel River Bar First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

Table 7.6 Mi'gmaq of New Brunswick Community Profiles

Community Indicator	Description
Metepenagiag Mi'kmaq Nation (Red Bank)	
Location and Proximity to Project Area	Metepenagiag Mi'kmaq Nation has four reserves. These include Big Hole Tract 8 (North Half), Indian Point 1, Red Bank 4, and Red Bank 7, on the Miramichi River near Newcastle. Metepngiag First Nation is approximately 1,404 km from the Project Area.
General Overview	Metepenagiag Mi'kmaq Nation is affiliated with the North Shore Micmac District Council (Energy East Pipeline Ltd. 2016) and is represented in consultation and engagement by MTI. The March 2018 registered population of Metepenagiag Mi'kmaq Nation was 690. Approximately 64% (444 individuals) live on-reserve (INAC 2018). The median age of the population of these reserves ranges from 36.9 to 37.2 years, approximately 9% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Metepenagiag School serves students from kindergarten to Grade 6. Metepenagiag Mi'kmaq Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Traditionally, the Miramichi River served as a travel route and meeting place for the Mi'kmaq people in NB (Madawaska Maliseet First Nation n.d.). Metepenagiag Mi'kmaq Nation has developed a heritage park, which contains two important Indigenous heritage archeological sites: the Augustine Mound National Historic Site and Oxbow National Historic Site. Archeological findings at these sites prove that this location has been continuously inhabited by the Mi'gmaq people for over 3,000 years. The Project does not overlap with the traditional territory of the Mi'gmaq of NB, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Mi'gmaq of NB are known to occupy and use the land and waters around NB primarily for travel corridors, harvesting and fishing for traditional purposes. Salmon and American eel have been identified as species of particular importance to the Mi'gmaq of NB. Refer below for information on FSC fishing practices.
Commercial-Communal Fishing	Metepenagiag Mi'kmaq Nation holds 18 commercial-communal licences for alewives / gaspereau, rock crab, herring, lobster, mackerel, oysters, scallops, shrimp, and snow crabs. Lobster is licenced for LFA 25.
Food, Social, Ceremonial Fishing	Metepenagiag Mi'kmaq Nation holds FSC licences for eel, salmon, shad, striped bass, and brook trout. Metepenagiag Mi'kmaq Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Mi'gmaq of NB have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

7.3.5.2 Wolastoqiyik of New Brunswick

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Kingsclear First Nation	
Location and Proximity to Project Area	Kingsclear First Nation is comprised of two reserves - The Brothers 18 [also affiliated with Woodstock First Nation, Tobique First Nation, and Madawaska First Nation], as well as Kingsclear 6 which is located in York County along the Saint John River directly downstream of the Mactaquac Dam. The Brothers 18 is a Wolastoqey reserve composed of 2 small islands situated above the Reversing Falls inside the city limits of Saint John, NB. This reserve is located in tidal waters at the mouth of the Kennebecasis River in close proximity to the Bay of Fundy (Maliseet First Nations, 2016). Kingsclear First Nation is approximately 1,507 km from the Project Area.
General Overview	Kingsclear is affiliated with the Wolastoqey Tribal Council. Kingsclear is represented in consultation through their RDCC, although WNNB offers technical advice on consultation (WNNB 2018). The March 2018 registered population of Kingsclear First Nation was 1,046. Approximately 70% (735 individuals) live on-reserve (INAC 2018). The median age (i.e., 31.8 years) of the population is approximately 14% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Kingsclear has a health centre, fire department, convenience store and band-operated school. Kingsclear First Nation is engaged in the forestry industry, and the allocation is generally cut by contractors under agreement with the First Nation. Kingsclear First Nation holds commercial-communal licences for a variety of fish and marine species. Kingsclear has been exploring opportunities to expand the fishing industry, whale watching tourism, and guided tours along the Saint John River (Kingsclear First Nation 2014).
Physical and Cultural Heritage (including archaeological, paleontological, historical orarchitectural sites)	The community of Kingsclear was officially founded in 1795 (Nicholas 2005). However, the history of the Wolastoqiyik in this area goes back thousands of years as evidenced by the discovery of a fluted point approximately 11,000 years old (Kingsclear First Nation 2014). Prior to settling at the current location, many Wolastoqiyik in this region lived in a village called Ekwpahak, located a few miles downriver from Kingsclear. Wolastoqiyik lived here during the late spring and summer when they speared salmon, bass, and sturgeon; planted and tended maize fields; and gathered foods such as fiddleheads, berries, butternuts, and grapes (Nicholas 2005). The Project does not overlap with the traditional territory of the Wolastoqiyik, therefore there are no known physical, cultural or heritage sites in or near the Project Area aside from the Atlantic Ocean itself which the Wolastoqiyik consider to be an important cultural waterscape (see above discussion). Further analysis of the important array of physical and cultural heritage associated with Kingsclear First Nation is beyond the scope of this summary description (WNNB 2018).

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	The Wolastoqiyik were known to be traditional hunters, trappers, horticulturalists, gatherers, and fishermen / fisherwomen who travelled throughout the Saint John River valley and adjacent interior and coastal regions depending on the season to find sustenance, shelter, and to trade with Europeans and other Indigenous nations (WNNB 2018). Wolastoqey First Nations have traditionally, and continue to harvest, hunt and consume traditional foods including moose, deer, fish, fiddleheads and berries, and use resources from the local landscape for medicinal and ceremonial purposes. Salmon is historically and culturally important to the Wolastoqey Nation. Refer below for information on FSC fishing.
Commercial-Communal Fishing	Kingsclear First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, sea scallop, and sea urchins. These licences are located inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Kingsclear First Nation holds FSC fishing licences for striped bass and lobster. Harvesting of striped bass is limited to the portion of the Saint John River from head of the tide at McKinley Ferry to the Mactaquac Dam. Lobster harvesting occurs in LFA 36 and 38, located along the NB coastal area. Kingsclear First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Wolastoqiyik have a right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Madawaska Maliseet First Nation	
Location and Proximity to Project Area	Madawaska First Nation is comprised of two reserves - The Brothers 18 [a reserve also affiliated with Kingsclear First Nation, Tobique First Nation, and Woodstock First Nation] as well as St. Basile 10 which is located along the Saint John River near the mouth of the Madawaska River (WNNB 2018). Madawaska First Nation is located approximately 1,579 km from the Project Area.
General Overview	Madawaska is affiliated with the Wolastoqey Tribal Council and represented in consultation through their RDCC, although WNNB offers technical advice on consultation files (WNNB 2018). The March 2018 registered population of Madawaska Maliseet First Nation was 375. Approximately 41% (154 individuals) live on-reserve (INAC 2018). The median age (i.e., 45.6 years) of the population is similar to that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	The community has a Health Centre, which is staffed by a doctor and a nurse (WNNB 2018). The Madawaska Maliseet Economic Development Corporation is focused on business development. Businesses include Grey Rock Power Centre (along the Trans-Canada Highway), which has gas stations, restaurants, car dealerships, and the Grey Rock Casino (WNNB 2018). Madawaska Maliseet First Nation holds commercial-communal licences for a variety of fish and marine species.

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Historic writings record Wolastoqiyik at the mouth of the Madawaska as early as the 1690s, and oral traditions indicate a much longer Wolastoqey tenure in the region (WNNB 2018). The Project does not overlap with the traditional territory of the Wolastoqiyik, therefore there are no known physical, cultural or heritage sites in or near the Project Area aside from the Atlantic Ocean itself which the Wolastoqiyik consider to be an important cultural waterscape (see above discussion). Further analysis of the important array of physical and cultural heritage associated with Madawaska Maliseet First Nation is beyond the scope of this document (WNNB 2018).
Current Use of Lands and Resources for Traditional Purposes	The Wolastoqiyik were known to be traditional hunters, trappers, horticulturalists, gatherers, and fishermen / fisherwomen who travelled throughout the Saint John River valley and adjacent interior and coastal regions depending on the season to find sustenance, shelter, and to trade with Europeans and other Indigenous nations (WNNB 2018). Wolastoqey First Nations have traditionally harvested, and continue to harvest, hunt and consume traditional foods including moose, deer, fish, fiddleheads and berries, and to use resources from the local landscape for medicinal and ceremonial purposes. Refer below for information on FSC fishing.
Commercial-Communal Fishing	Madawaska Maliseet First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, mackerel, and sea scallop for inshore and offshore areas of NS and NB.
Food, Social, Ceremonial Fishing	Madawaska Maliseet First Nation holds FSC licences for lobster, salmon, brook trout and lake trout. Madawaska First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Wolastoqiyik have a right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Oromocto First Nation	
Location and Proximity to Project Area	Oromocto First Nation has one reserve (Oromocto 26) located in Sunbury County near the mouth of the Oromocto River (WNNB 2018). It is approximately 1,481 km from the Project Area.
General Overview	Oromocto First Nation is affiliated with the Wolastoqey Tribal Council (Energy East Pipeline Ltd. 2016). Oromocto is represented in consultation through their RDCC, although WNNB offers technical advice on consultation files (WNNB 2018). The March 2018 registered population of Oromocto First Nation was 707. Approximately 45% (321 individuals) live on-reserve (INAC 2018). The median age (i.e., 29.2 years) of the population is approximately 16% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Oromocto First Nation has a health centre and a pre-school. Oromocto has fisheries and forestry departments and also holds commercial-communal licences for a variety of fish and marine species.

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Although land at Oromocto was not set aside as a reserve until 1895, there had been a Wolastoqey settlement in the area since at least 1835 (Pawling 2017). Moreover, a Wolastoqey burial site in the community that was unearthed and looted by non-Indigenous road construction workers circa 1842 contained remains and burial items from the early contact period (circa 16th or 17th century) (Gesner 1842). The Project does not overlap with the traditional territory of the Wolastoqiyik, therefore there are no known physical, cultural or heritage sites in or near the Project Area aside from the Atlantic Ocean itself which the Wolastoqiyik consider to be an important cultural waterscape (see above discussion). Further analysis of the important array of physical and cultural heritage associated with Oromocto First Nation is beyond the scope of this document (WNNB 2018).
Current Use of Lands and Resources for Traditional Purposes	The Wolastoqiyik were known to be traditional hunters, trappers, horticulturalists, gatherers, and fishermen / fisherwomen who travelled throughout the Saint John River valley and adjacent regions depending on the season to find sustenance, shelter, and to trade with Europeans and other Indigenous nations (WNNB 2018). Wolastoqey First Nations have traditionally, and continue to harvest, hunt and consume traditional foods including moose, deer, fish, fiddleheads and berries, and use resources from the local landscape for medicinal and ceremonial purposes. Refer below for information on FSC fishing.
Commercial-Communal Fishing	Oromocto First Nation holds commercial-communal licences for groundfish, herring, lobster, sea scallop, and sea urchins. These licences are located inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Oromocto First Nation holds FSC fishing licences for burbot, catfish, chub, eel, gaspereau, lamprey, lobster, muskellunge, perch (white and yellow), pickerel, pike, shad, smelt, striped bass, striped bass, sturgeon, sucker fish, sunfish, trout, and whitefish. Most of these species are harvested within inland and tidal areas in NB. Lobster are harvested in LFA 36, in the Inner Bay of Fundy. Oromocto First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Wolastoqiyik have a right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Tobique First Nation	
Location and Proximity to Project Area	Tobique First Nation is comprised of two reserves - the Brothers 18 near Saint John, and Tobique 20 in Victoria County at the mouth of the Tobique River. Tobique First Nation is approximately 1,547 km from the Project Area.
General Overview	Tobique First Nation is affiliated with MAWIW Council (Energy East Pipeline Ltd. 2016). Tobique is represented in consultation through their RDCC, although WNNB offers technical advice on consultation files. The March 2018 registered population of Tobique First Nation was 2,469. Approximately 63% (1,552 individuals) live on-reserve (INAC 2018). The median age (i.e., 31.9 years) of the population is approximately 14% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	Tobique First Nation has a wellness centre and a school for students from kindergarten to Grade 8. Community-owned enterprises include a gaming centre, bingo hall, restaurants, youth centre and a convenience store and gas bar. There are several other community businesses, including tobacco shops, take-out restaurants, and convenience stores. Tobique First Nation holds commercial-communal licences for a variety of fish and marine species.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Wolastoqiyik were known to be traditional hunters, trappers, horticulturalists, gatherers, and fishermen / fisherwomen who travelled throughout the Saint John River valley and adjacent interior and coastal regions depending on the season to find sustenance, shelter, and to trade with Europeans and other Indigenous nations. Lands were initially set aside for the Wolastoqiyik along the Wolastoq at the mouth of the Tobique River by the NB government in the early 19th century. The Tobique reserve is now much smaller than the initial lands set aside by the colonial government as non-Indigenous squatters unlawfully took ownership of a large portion of reserve lands in the 19th century, and hydroelectric dams flooded additional lands in the 20th century (Cuthbertson 2015; Maliseet First Nations 2016). The Project does not overlap with the traditional territory of the Wolastoqiyik, therefore there are no known physical, cultural or heritage sites in or near the Project Area aside from the Atlantic Ocean itself which the Wolastoqiyik consider to be an important cultural waterscape (see above discussion). Further analysis of the important array of physical and cultural heritage associated with Tobique First Nation is beyond the scope of this summary description (WNNB 2018).
Current Use of Lands and Resources for Traditional Purposes	Wolastoqey First Nations have traditionally, and continue to harvest, hunt and consume traditional foods including moose, deer, fish, fiddleheads and berries, and use local natural resources from for medicinal and ceremonial purposes. Refer below for information on FSC fishing.
Commercial-Communal Fishing	Tobique First Nation holds commercial-communal licences for crab, groundfish, herring, lobster, quahaug, mackerel, sea scallop, and sea urchin. These licences are located inshore and offshore NS and NB and do not overlap the Project Area.
Food, Social, Ceremonial Fishing	Tobique First Nation holds FSC licences for smallmouth bass. Tobique First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Wolastoqiyik have a right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
St. Mary’s First Nation	
Location and Proximity to Project Area	St. Mary’s First Nation has two reserves (Devon and St. Mary’s 24) in the Saint John River Valley near Fredericton, approximately 1,490 km from the Project Area.

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
General Overview	St. Mary's First Nation is affiliated with the Saint John River Valley Tribal Council (Energy East Pipeline Ltd. 2016). St. Mary's is represented in consultation through their RDCC, although WNNB offers technical advice on consultation files (WNNB 2018). The March 2018 registered population of St. Mary's First Nation was 1,928. Approximately 46% (881 individuals) live on-reserve (INAC 2018). The median age (i.e., 27.9 years) of the population is approximately 18% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	The Chief Harold Sappier Memorial Elementary provides education for students from kindergarten to Grade 5. Businesses include the St. Mary's Entertainment Centre, St. Mary's Retail Sales and St. Mary's Tree Service. St. Mary's started a logging program in 1998. The program is self-sufficient and has sustained itself on the royalties that the program generates. St. Mary's First Nation holds commercial-communal licences for a variety of fish and marine species. St. Mary's First Nation currently owns six active commercial fishing vessels.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The Wolastoqiyik were known to be traditional hunters, trappers, horticulturalists, gatherers, and fishermen / fisherwomen who travelled throughout the Saint John River valley and adjacent interior and coastal regions depending on the season to find sustenance, shelter, and to trade with Europeans and other Indigenous nations (WNNB 2018). Although the St. Mary's community was not officially recognized by the colonial government until 1867, the first painting of a wigwam on the site was dated 1818. The site was thought to be of regular use as a campground since the 1800s. Many of the Wolastoqiyik settled at St. Mary's maintained the migratory aspects of their traditional lifestyle by hunting, fishing and trapping when they could, and by traveling each summer to other areas within and beyond the St. John River Valley to make and sell their wares (Nicholas 2005). The Project does not overlap with the traditional territory of the Wolastoqiyik, therefore there are no known physical, cultural or heritage sites in or near the Project Area aside from the Atlantic Ocean itself which the Wolastoqiyik consider to be an important cultural waterscape (WNNB 2018).
Current Use of Lands and Resources for Traditional Purposes	Wolastoqey First Nations have traditionally, and continue to harvest, hunt and consume traditional foods including moose, deer, fish, fiddleheads and berries, and use resources from the local landscape for medicinal and ceremonial purposes. Refer below for information on FSC fishing.
Commercial-Communal Fishing	St. Mary's First Nation holds commercial-communal licences for herring, lobster, sea scallop, sea urchin, shrimp, and swordfish. Most of these licences are located inshore and offshore NS and NB. St. Mary's holds commercial-communal licences for swordfish within NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	St. Mary's First Nation holds FSC fishing licences for eels, gaspereau, groundfish, lobster, scallop, shad, smallmouth bass, soft-shell clams, striped bass, and trout. St. Mary's First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Asserted or Established Aboriginal and / or Treaty Rights	The Wolastoqiyik have a right to fish for a “moderate livelihood”, which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.
Woodstock First Nation	
Location and Proximity to Project Area	Woodstock First Nation has two reserves (The Brothers 18 [also affiliated with Kingsclear, Tobique and Madawaska Maliseet First Nation communities] and Woodstock 23), located on the Saint John River near Woodstock approximately 1,557 km from the Project Area.
General Overview	Woodstock First Nation is affiliated with the Saint John River Valley Tribal Council (Energy East Pipeline Ltd. 2016). Woodstock represents itself in consultation and engagement. The March 2018 registered population of Woodstock First Nation was 1,072. Approximately 27% (291 individuals) live on-reserve (INAC 2018). The median age (i.e., 36.9 years) of the population is approximately 9% below that of NB in general, which was 45.7 years in 2016 (Statistics Canada 2017).
Health and Socioeconomic Conditions	Woodstock First Nation has a pre-school. Economic enterprises include three gas stations / convenience stores, Eagle’s Nest Gaming Palace, and Woodstock First Nation Logging. Woodstock First Nation holds commercial-communal licences for a variety of fish and marine species. The fishing industry has been an important source of revenue and employment for the First Nation. The fishing enterprise harvests scallop, lobster, sea urchins, swordfish, and tuna.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	The people of Woodstock First Nation are descendants of the Wulustukwiak people who have traditionally occupied southwestern NB along the Saint John River to Kittery, Maine, USA. The Project does not overlap with the traditional territory of the Wolastoqiyik, therefore there are no known physical, cultural or heritage sites in or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	Wolastoqey First Nations have traditionally, and continue to harvest, and consume traditional foods including moose, deer, fish, fiddleheads and berries, and use resources from the local landscape for medicinal and ceremonial purposes. Refer below for information on FSC fishing.
Commercial-Communal Fishing	Woodstock First Nation holds commercial-communal licences for groundfish, herring, lobster, sea scallop, sea urchins, swordfish and tuna. Most of these licences are located inshore and offshore NS and NB, with licences for swordfish and tuna in NAFO Unit 3LM in offshore NL.
Food, Social, Ceremonial Fishing	Woodstock First Nation holds FSC fishing licences for eels, gaspereau, lobster, scallop, smallmouth bass, smelt, striped bass, and trout. These include FSC licences for inland and tidal areas of NB. Woodstock First Nation holds an FSC licence to fish for other species such as lobster and scallop in NAFO units in and around NB. Woodstock First Nation also has an Aboriginal right to fish for Atlantic salmon (outer Bay of Fundy population) for FSC purposes.

Table 7.7 Wolastoqiyik of New Brunswick Community Profiles

Community Indicator	Description
Asserted or Established Aboriginal and / or Treaty Rights	The Wolastoqiyik have a right to fish for a “moderate livelihood” which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

7.3.5.3 Peskotomuhkati Nation (Passamaquoddy)

Table 7.8 Peskotomuhkati of New Brunswick Community Profile

Community Indicator	Description
Peskotomuhkati Nation at Skutik (Passamaquoddy)	
Location and Proximity to Project Area	Peskotomuhkati Nation at Skutik is located in St. Andrews approximately 1,550 km from the Project Area.
General Overview	The homeland of the Peskotomuhkati people is located along the Passamaquoddy Bay, with drainage area of the Schoodic (St. Croix) River and the Fundy Islands (Religious Society of Friends [RSF] n.d.). In 2013, it was estimated that the Schoodic Band numbered 300 members in NB. At least three Peskotomuhkati Reserves were established in Charlotte County, NB in the 19th and early 20th centuries, including the Schoodic Reserve, located in present day Milltown, NB. This community was established in 1785 on land adjacent to the Schoodic Falls, which was an important fishing place and tribal burial ground. The Canoose Reserve was established in 1851 at the confluence of the Canoose and Schoodic Rivers. The St. Croix Reserve was created in 1881 on the St. Croix River, near the outlet to the Chiputneticook Lakes. At least two other tracts of land, located at Qonasqamkuk (St. Andrews) and Grand Manan Island, known to be Peskotomuhkati gathering places, were the subject of various petitions for reserve status, but were never formalized as reserve lands (RSF n.d.). Reserve lands became occupied by British Loyalist settlers while the Peskotomuhkati were absent during seasonal harvesting and fishing migrations (RSF n.d.). A claim submitted to the Canadian government has currently been accepted for review (INAC 2017). No census information is available specifically for Peskotomuhkati Nation in NB.
Health and Socioeconomic Conditions	Limited information is available on the health and socioeconomic conditions of the Peskotomuhkati as a group because they do not live on a reserve or in a separate community.
Physical and Cultural Heritage (including archaeological, paleontological, historical or architectural sites)	Evidence shows that the ancestors of the Peskotomuhkati have inhabited their traditional territory for the last 13,000 years from Machias, Maine to Point Lepreau, NB (RSF n.d.). The point of land jutting into Passamaquoddy Bay (now occupied by the Town of St. Andrews, NB), was an important meeting place where sacred ceremonies, burial of chiefs and other activities occurred. The Project does not overlap with the traditional territory of Peskotomuhkati, therefore there are no known physical, cultural or heritage sites in or near the Project Area.

Table 7.8 Peskotomuhkati of New Brunswick Community Profile

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	Seasonal journeys within their traditional territory extended inland north along the Schoodic River to the Chipputnecook Lakes, and typically involved harvesting various natural resources at different times of the year. In the spring, many Peskotomuhkati people occupied a field at Salmon Falls on the Schoodic River, taking advantage of the runs up-river by salmon, eels, and alewives. Much of the harvest was processed/dried for the following winter. Passamaquoddy Bay was also important for its abundance of pollock (RSF n.d.).
Commercial-Communal Fishing	Peskotomuhkati Nation has no commercial-communal licences.
Food, Social, Ceremonial Fishing	Peskotomuhkati Nation has an Aboriginal right to fish for FSC purposes.
Asserted or Established Aboriginal and / or Treaty Rights	The Peskotomuhkati's claim has been accepted for review by the Canadian government (INAC 2017). The Peskotomuhkati have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an aboriginal right to fish for FSC purposes. These rights do not extend to lands or waters in or near the Project Area.

7.3.6 Mi'kmaq and Innu of Québec

7.3.6.1 Mi'gmaq First Nations of Québec

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Micmacs de Gesgapegiag	
Location and Proximity to Project Area	Micmacs de Gesgapegiag is comprised of one reserve, located on the south shore of the Gaspé Peninsula, at the intersection of the Gesgapegiag River estuary and the Baie des Chaleurs. The reserve is approximately 1,389 km from the Project Area.
General Overview	The Micmacs de Gesgapegiag has a Chief and eight Councillors and is represented by the MMS in land claims negotiations and consultation and engagement. The March 2018 population of Micmacs de Gesgapegiag was 1,538 (INAC 2018). Approximately 45% live on-reserve. The population of the Gesgapegiag community decreased between 2011 and 2016, which may be attributed to lower birth rates or possibly out-migration as approximately half of the registered population live off-reserve (Nexen 2018). The on-reserve population is younger than that of the QC population, as a whole (Statistics Canada 2017; INAC 2018; Micmacs Of Gesgapegiag [MOG] 2018).

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Health and Socioeconomic Conditions	The Micmacs de Gesgapegiag Band Council and other agencies provide services and infrastructure to the community in education, health care, social services, public security (fire and police), public works, economic development (e.g., forestry and commercial fisheries), addictions treatment and employment. Identified health issues include healing, diabetes, mental health and addictions. The Wejgwapniag School provides primary and secondary education. Established in 1996, the Gesgapegiag Health and Community Services provides programs and services through a medical centre, healing lodge, and youth centre (MOG 2018). In addition, there is also a treatment centre in Gesgapegiag, the Mawiomi Treatment Centre, which specializes in the treatment of substance, drug, and alcohol abuse (Statoil 2017). The Walgwan Treatment Centre is one of a network of nine First Nation treatment centres in Canada that provide culturally-based treatment services for dependence on solvents and other substances as well as addictive behavior to First Nations and Inuit youth (Statoil 2017). The Micmacs de Gesgapegiag are active in the forestry industry, through a Forest Management Agreement with the provincial government to harvest 15,000 cubic meters of softwood to be sold to a local sawmill (MOG 2018). The Band's forestry industry employs 25 to 30 individuals on a seasonal basis. Other economic activities include construction, tourism, handicraft production and outfitting services for sport fishing and hunting (Commission des droits de la personne et des droits de la jeunesse [CDPDJ] 2009). In 2011, the largest employer was Public Administration, employing approximately 42% of the workforce. As described in more detail below, the Micmacs de Gesgapegiag has an agreement with the provincial government for communal fishing which occurs primarily in the Cascapedia River mouth as well as in the Petite riviere Cascapedia and its mouth (Mi'gmaq Maliseet Aboriginal Fisheries Management Association [MMAFMA] 2017). Established in 2012, theMMAFMA, in partnership with the QC School of Fisheries and Aquaculture, assists the Micmacs de Gesgapegiag in commercial fishing initiatives. The MMAFMA has a commercial fishing vessel and administers training programs for fishing mackerel, herring and bluefin tuna, pelagic species for which it holds commercial-communal licenses. The boat is also used for training programs in groundfish (Atlantic halibut, Greenland halibut, redfish) fisheries through a program with QC School of Fisheries and Aquaculture. The Micmac de Gesgapegiag are also engaged in a joint aquaculture initiative to grow and process kelp products. The Micmacs de Gesgapegiag co-manage sport salmon fishing in the Cascapedia River through Société Cascapedia inc. (MOG 2018; Samon Quebec 2017). The Gesgapegiag Fisheries Department (GFD) manages the Band's participation in commercial seafood harvesting. The GFD employs 48 registered First Nations members and nine non-Indigenous people in the fishing industry, seasonally. Fishers harvest lobster, shrimp, and crab off the coast of the Gaspe Peninsula.

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Traditionally, the Mi'gmaq lived by hunting, fishing, and gathering throughout their territory which included the southeastern portion of the Gaspe Peninsula, NS, PEI, most of NB and southern NL. As fishers, hunters and gatherers, the people used their intimate knowledge of the land and seasonal cycles of vegetation, animals and fish to meet their physical and spiritual needs. Mi'gmaq hunters and fishers were also known to travel to Anticosti Island and the shore of the North Coast and the Magdalen Islands (CDPDJ 2009). Traditional camps of the QC Mi'kmaq were located along the shores of the St. Lawrence River. There are no known physical, cultural or heritage sites within or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	Historically, the Mi'gmaq of the Gulf of St. Lawrence region harvested various fish species through the seasons. The fishing season began in the spring with the break-up of shore and river ice when the Mi'gmaq moved to coastal areas and river mouths such as the estuaries of the Restigouche and Cascapédia Rivers that flow into the Baie des Chaleurs. Fishing began with shallow water fish species exposed by the melting ice, the most important of which was winter flounder. The next fishing period included spawning runs of fish that were migrating from fresh water to the sea or the reverse. These species included smelt in March, alewife in April and sturgeon in May. Typically, salmon were harvested in May as well as July and August, eel in September, and Atlantic tomcod as late as December (CIE 2014). Fish spawning seasons were accompanied by the spring migration of seabird species that nested in the same areas. Seabird eggs were also collected from offshore islands in spring and seabird harvesting took place in early fall during the southern migration. During spring and summer, the Mi'gmaq harvested marine shellfish including oysters, scallops, quahogs, clams, American lobster, and northern crab. Oysters harvested from the southern Gulf of St. Lawrence were used for food and the shells were used for wampum (currency). During whelping season, the Mi'kmaq also harvested marine mammals such as walrus and seal on the Gaspe Peninsula (CIE 2014). The Micmacs de Gesgapegiag traditionally used Atlantic salmon for barter, spiritual or ceremonial practices, bait (salmon skin), and crafts. Salmon fishing methods evolved from harpoons to gill nets and cages for communal fishing and fly-fishing rods for recreational fishing. Fishing occurred from late May to early November. Members of Gesgapegiag have caught salmon in the mouth of the Cascapédia River and upstream, as well as in neighbouring rivers (Petite rivière Cascapédia, Bonaventure, Nouvelle and Hall) (MMAFMA 2017). Annual subsistence harvests of salmon by the Micmacs de Gesgapegiag in the Cascapédia River were reported for the 1984-2008 period. Gesgapegiag has not taken salmon in the Cascapédia River since 2009 pursuant to an agreement with the Government of QC to cease fishing salmon in return for monetary compensation (MMAFMA 2017). Eel harvesting is a traditional Mi'gmaq activity, beginning in May and ending when the ice cover forms. According to members of the Micmacs de Gesgapegiag, eel is mostly taken in the mouth and estuary of the Cascapédia River. Harvesting sites extend along the coast from Carleton to Bonaventure, including the Nouvelle area (MMAFMA 2017). Cod fishing is also considered important to the economic and cultural landscape of the Gaspé Peninsula but is now restricted because of low cod stocks. Members of the Micmacs de Gesgapegiag have also reported that striped bass is mostly captured as by-catch in the Cascapédia River estuary and along the

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
	shoreline near Carleton and New Richmond. Striped bass is generally harvested between May and October and consumed or used as bait to catch smelt. The marine area of the Banc des Américains is of economic, ecological and cultural importance for the Mi'kmaq communities. The area and its periphery are used to harvest crab, lobster, mackerel, herring, cod, and waterfowl (MMAFMA 2017).
Commercial-Communal Fishing	The Micmacs de Gesgapegiag holds commercial-communal licences for cod, turbot, halibut, mackerel, shrimp and winter flounder (Morrison 2018).
Food, Social, Ceremonial Fishing	The Micmacs de Gesgapegiag participate in fishing for FSC purposes. The First Nation has an agreement with the provincial government for communal fishing, which occurs principally in the Cascapedia River mouth as well as the Petite riviere Cascapedia and its mouth (MMAFMA 2017).
Asserted or Established Aboriginal and / or Treaty Rights	The MMS signed a Framework Agreement for a comprehensive claim with Canada (2012) that includes the Gaspe Peninsula and westward down the St. Lawrence River as well as Anticosti Island. Mi'gmaq First Nations have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. The asserted or established Aboriginal and treaty rights of the Mi'gmaq do not extend to lands or waters in or near the Project Area.
La Nation Micmac de Gespeg	
Location and Proximity to Project Area	La Nation Micmac de Gespeg has no land base; members live throughout the Gaspe Peninsula and in other areas. La Nation Micmac de Gespeg is approximately 1,287 km from the Project Area.
General Overview	La Nation Micmac de Gespeg is governed by a Chief and eight Councillors and is also represented by the MMS in matters relating to land claims negotiations, and consultation and engagement (INAC 2015; INAC 2018). The March 2018 population of La Nation Micmac de Gespeg was 829, living throughout the Gaspé Peninsula and in other areas. No additional census information is available specifically for La Nation Micmac de Gespeg.
Health and Socioeconomic Conditions	Publicly-available information of the health and socioeconomic conditions of La Nation Micmac de Gespeg could not be found. As described in more detail below, La Nation Micmac de Gespeg is active in commercial fisheries through the MMAFMA. The MMAFMA has a commercial fishing vessel and administers training programs for fishing mackerel, herring and bluefin tuna, pelagic species for which it holds commercial-communal licenses. The boat is also used for training programs in groundfish (Atlantic halibut, Greenland halibut, redfish) fisheries through a program with QC School of Fisheries and Aquaculture. La Nation Micmac de Gespeg is also engaged in a joint aquaculture initiative to grow and process kelp products.
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Traditionally, the Mi'gmaq lived by hunting, fishing, and gathering throughout their territory which included the southeastern portion of the Gaspe Peninsula, NS, PEI, most of NB and southern NL. As fishers, hunters and gatherers, the people used their intimate knowledge of the land and seasonal cycles of vegetation, animals and fish to meet their physical and spiritual needs. Mi'gmaq hunters and fishers were also known to travel to Anticosti Island and the shore of the North Coast and the Magdalen Islands (CDPDJ 2009). Traditional camps of the QC Mi'gmaq were located along the shores of the St. Lawrence River. There are no known physical, cultural or heritage sites within or near the Project Area.

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Current Use of Lands and Resources for Traditional Purposes	Traditionally, various fish species have been fished by the Mi'gmaq in the Gulf of St. Lawrence through the seasons. The fishing season began in the spring with the break-up of shore and river ice when the Mi'gmaq moved to coastal areas and river mouths such as the estuaries of the Restigouche and Cascapédia Rivers that flow into the Baie des Chaleurs. Fishing began with shallow water fish species exposed by the melting ice, the most important of which was winter flounder. The next fishing period included spawning runs of fish that were migrating from fresh water to the sea or the reverse. These species included smelt in March, alewife in April and sturgeon in May. Typically, salmon were harvested in May as well as July and August, eel in September, and Atlantic tomcod as late as December (CIE 2014). Fish spawning seasons were accompanied by the spring migration of seabird species that nested in the same areas. Seabird eggs were also collected from offshore islands in spring and seabird harvesting took place in early fall during the southern migration. During spring and summer, the Mi'kmaq harvested marine shellfish including oysters, scallops, quahogs, clams, American lobster, and northern crab. Oysters harvested from the southern Gulf of St. Lawrence were used for food and the shells were used for wampum (currency). During whelping season, the Mi'kmaq also harvested marine mammals such as walrus and seal (CIE 2014). La Nation Micmac de Gespeg traditionally used Atlantic salmon for barter, spiritual or ceremonial practices, bait (salmon skin), and crafts. Salmon fishing methods have evolved from harpoons to gill nets and cages for communal fishing and fly-fishing rods for recreational fishing. Fishing occurred from late May to early November. Members of La Nation Micmac de Gespeg took salmon in the Saint-Jean, Dartmouth, York, and Malbaie Rivers, and in the mouth of the Dartmouth River (MMAFMA 2017). Eel harvesting is a traditional Mi'gmaq activity, beginning in May and ending when the ice cover forms. Eel harvesting sites reported by La Nation Micmac de Gespeg include the shoreline between Gaspé and Percé. Cod fishing is also considered important to the economic and cultural landscape of the Gaspé Peninsula but is now restricted because of low cod stocks. According to some members of La Nation Micmac de Gespeg, cod is often taken in the Gaspé Bay, at the northern extremity, as well as along the southern part, along the Sandy Beach pier. Other fishing areas identified by La Nation Mimac de Gespeg include Rivière-au-Renard, the Malbaie River estuary, Percé and the Banc des Américains. Members of La Nation Micmac de Gespeg harvest striped bass at locations between Gaspé and the Malbaie River estuary generally between May and October. Other fishing areas identified by La Nation Micmac de Gespeg include Rivière-au-Renard, the Malbaie River estuary, Percé and the Banc des Américains.
Commercial-Communal Fishing	The MMAFMA holds several commercial-communal licenses for mackerel, herring, and bluefin tuna (Nexen 2018). Commercial harvesting of groundfish (e.g., Atlantic halibut, Greenland halibut, redfish) is planned.
Food, Social, Ceremonial Fishing	La Nation Micmac de Gespeg participate in fishing for FSC purposes. The First Nation has an agreement with the provincial government for harvesting salmon on the Saint-Jean, Dartmouth, and York Rivers. Most of the salmon harvested is distributed to elders. Eel harvesting sites reported by La Nation Micmac de Gespeg include the shoreline between Gaspé and Percé.

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Asserted or Established Aboriginal and / or Treaty Rights	The MMS signed a Framework Agreement for a comprehensive claim with Canada (2012) that includes the Gaspe Peninsula and westward down the St. Lawrence River as well as Anticosti Island. Mi'gmaq First Nations have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. The asserted or established Aboriginal and treaty rights of the Mi'gmaq do not extend to lands or waters in or near the Project Area.
Listuguj	
Location and Proximity to Project Area	Listuguj is comprised of one reserve, located at the mouth of the Restigouche River in the southwestern area of the Gaspé Peninsula (INAC 2018). Listuguj is approximately 1,449 km from the Project Area.
General Overview	Listuguj is governed by a Chief and eight Councillors and is also represented by MMS in matters relating to land claims negotiations, and consultation and engagement (INAC 2015; INAC 2018). The Listuguj reserve was established in 1853. The March 2018, Listuguj population was 4,061. Approximately 50% live on-reserve. The population of Listuguj decreased from 2011 to 2016, which may be a result of out-migration because half of the registered population live off-reserve. The population of the Listuguj is younger than that of QC population, as a whole (Statistics Canada 2017; INAC 2018).
Health and Socioeconomic Conditions	Listuguj Mi'gmaq Government (LMG) and other agencies provide community members with facilities and programs in housing, education, community and social services, health, community health, women's shelter, long-term care facility for the elderly, a youth group home, fire safety, policing, restorative justice, drinking water, wastewater management, solid waste management, roads and natural resource management. The Alaqsite'w Gitpu School, established in 1997, accommodates 250 students from nursery to grade 8 (LMG 2017). The Band Council provides additional educational support through the Post-Secondary Student Support Program and Mi'kmaq language and culture programs (LMG 2017). The community also has a variety of community health services, provided by the Listuguj Community Health Services, including the Listuguj Health Centre, women's shelter, a long-term care facility for the elderly and a youth group home (LMG 2016). Identified health and social issues include chronic illness, mental health and addictions, diabetes, foster care, care of the elderly, physical inactivity and family issues. The LMG is actively involved in the forestry industry, with community members being employed in the LMG silviculture and forestry operations and as independent loggers (LMG 2016). In 2011, the largest employer in the Listuguj community was Public Administration, employing approximately 31% of the workforce. As described in more detail below, Listugui holds commercial-communal fishing licences for a variety of fish and marine species. Listuguj Fisheries directly employs community members and owns 13 fishing vessels (Listuguj Fisheries 2014). Listuguj Fisheries is also involved in fisheries training and policy development (Listuguj Fisheries 2014).

Table 7.9 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Traditionally, the Mi'gmaq lived by hunting, fishing, and gathering throughout their territory which included the southeastern portion of the Gaspe Peninsula, NS, PEI, most of NB and southern NL. As fishers, hunters and gatherers, the people used their intimate knowledge of the land and seasonal cycles of vegetation, animals and fish to meet their physical and spiritual needs. Mi'gmaq harvesters and fishers were also known to travel to Anticosti Island and the shore of the North Coast and the Magdalen Islands (CDPDJ 2009). Traditional camps of the QC Mi'gmaq were located along the shores of the St. Lawrence River. No known physical, cultural or heritage sites are within or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	Traditionally, various fish species have been fished by the Mi'gmaq in the Gulf of St. Lawrence through the seasons. The fishing season began in the spring with the break-up of shore and river ice when the Mi'gmaq moved to coastal areas and river mouths such as the estuaries of the Restigouche and Cascapédia Rivers that flow into the Baie des Chaleurs. Fishing began with shallow water fish species exposed by the melting ice, the most important of which was winter flounder. The next fishing period included spawning runs of fish that were migrating from fresh water to the sea or the reverse. These species included smelt in March, alewife in April and sturgeon in May. Typically, salmon were harvested in May as well as July and August, eel in September, and Atlantic tomcod as late as December (CIE 2014). Fish spawning seasons were accompanied by the spring migration of seabird species that nested in the same areas. Seabird eggs were also collected from offshore islands in spring and seabird harvesting took place in early fall during the southern migration. During spring and summer, the Mi'gmaq harvested marine shellfish including oysters, scallops, quahogs, clams, American lobster, and northern crab. Oysters harvested from the southern Gulf of St. Lawrence were used for food and the shells were used for wampum (currency). During whelping season, the Mi'gmaq also harvested marine mammals such as walrus and seal (CIE 2014). Since 1984, Listuguj has taken approximately 1,000 salmon annually in the Restigouche River for subsistence purposes. Eel harvesting is a traditional Mi'gmaq activity that begins in May and ends when the ice cover forms (MMAFMA 2017).
Commercial-Communal Fishing	Listuguj holds commercial fishing licences for cod, turbot and halibut and commercial-communal licenses for snow crab (Morrison 2018).
Food, Social, Ceremonial Fishing	Listuguj participates in communal fishing for FSC purposes with licenses to harvest salmon and lobster (Statoil 2017).
Asserted or Established Aboriginal and / or Treaty Rights	The MMS signed a Framework Agreement for a comprehensive claim with Canada (2012) that includes the Gaspe Peninsula and westward down the St. Lawrence River as well as Anticosti Island. Mi'gmaq First Nations have a right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties and an Aboriginal right to fish for FSC purposes. The asserted or established Aboriginal and treaty rights of the Mi'gmaq do not extend to lands or waters in or near the Project Area

7.3.6.2 Innu First Nations of Québec

Table 7.10 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Les Innus de Ekuanitshit	
Location and Proximity to Project Area	Les Innus de Ekuanitshit is comprised of one reserve, at the confluence of the Mingan River and the Gulf of St. Lawrence. Ekuanitshit community is approximately 1,247 km from the Project Area.
General Overview	Les Innus de Ekuanitshit is governed by a Band Council with a Chief and four Councillors and is represented by the MICT. The Mingan reserve was established in 1963 for the Innus de Ekuanitshit and settled mainly by Innu families who traditionally travelled the Magpie, Saint-Jean, and Romaine Rivers (Musée régional de la Côte-Nord [MRCN] 2010; INAC 2018). The September 2018 population of Les Innus de Ekuanitshit was 655. Approximately 92% live on reserve. The population of the Mingan Reserve has increased since the 2011 census. The median age is at least 10 years younger than the median age of the QC population (Statistics Canada 2017; INAC 2018). The percentage of population under 15 years of age is also higher than that of the general QC population (Statistics Canada 2017; INAC 2018).
Health and Socioeconomic Conditions	The Conseil des Innus de Ekuanitshit and other agencies provide community members with social development, finance and administration, patient services, social services, technical services, advisory services and health care. Ecole Teueikan accommodates students from pre-kindergarten to grade 4. A health centre provides emergency and preventive care and community health services. Five nurses are available on-reserve, and a nutritionist, psychologist and dentist visit regularly. The Conseil des Innus de Ekuanitshit is responsible for the provision of health services to community members, after this responsibility was transferred by Health Canada. The Innu Mukutan Economic Development Corporation is responsible for economic development for Innu communities under its jurisdiction, including Les Innus de Ekuanitshit. The main economic activities include arts and handicrafts, commercial fishing, outfitting (fishing for salmon, ouananiche, and brook trout), tourism, trapping and service businesses. In 2011, the largest employer for community members was Public Administration, employing approximately 31% of the workforce. As described in more detail below, economic activity includes commercial fishing. Les Innus de Ekuanitshit operate six boats and its commercial fishing activities employ approximately 40 persons on a full- or part-time basis (Nexen 2018). Les Innus de Ekuanitshit commercially harvest scallops, crab, halibut, sea cucumber and whelk.
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Innu culture and heritage are based on their relationship with game and fish and the seasonal migrations and locations of various species, including caribou and salmon. The Innu people traditionally travelled over a vast territory encompassing the entire St. Lawrence catchment area between the Saguenay-Lac-Saint-Jean and Labrador. Families also occasionally crossed the St. Lawrence Estuary to hunt in the Bas-du-Fleuve area (MRCN 2010; Verreault et al. 2013). Les Innus de Ekuanitshit participate in a spring harvest of migratory birds, seal and Atlantic salmon (Englobe 2018). Numerous coastal sites exist dating from approximately a thousand years ago demonstrate intensive spring harvesting of migratory bird species, including the Canada Goose and common eider (Englobe 2018). Of the approximately 8,000 archaeological sites discovered in QC, over 1,600 are in traditional Innu territory.

Table 7.10 Québec Indigenous Groups Community Profiles

Community Indicator	Description
	Two important Innu sites have been discovered. The first is approximately 60 km from the coast, on the northern shore of Lake Jourdain, and was used as a staging area for lengthy portages. The second site, on the shore of the Jean-Pierre River, demonstrates Innu relationships with groups to the West, North-West and North (MRCN 2010). These archaeological sites are located along the shores of lakes and rivers that were used as encampment areas and travel routes for the Innu. No known physical, cultural or heritage sites are within or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	Traditional hunting, fishing and gathering activities continue to support the domestic economy as well as local traditions for the Innus de Ekuanitshit (Englobe 2018). The Innu continue to use the resources of the St. Lawrence River for food and communal purposes. Activities include fishing for Atlantic salmon, herring, and brook trout; collecting goose eggs in the peat bogs between the River and its tributaries; collecting eggs of other bird species on the islands; hunting waterfowl (e.g., goose and black guillemot); gathering edible plants (e.g., black crowberry and small cranberries) that grow along the River banks and in the peat bogs; fishing for lobster and scallops with harpoons; and collecting other shellfish along the coast (Agence Mamu Innu Kaikusseht [AMIK] 2016; CIE 2014). Fishing, mainly for Atlantic salmon, traditionally played and continues to play, an important role in Innu life on the North Shore of the St. Lawrence River and estuary. The Innus de Ekuanitshit have identified 35 harvesting areas and 21 camps for salmon fishing along the Romaine River and its main tributary, the Puyjalon River. The Innus de Ekuanitshit also harvest salmon in the Jupitagon, Magpie, Saint-Jean, Mingan and Manitou Rivers. Harpoons and fishing rods are used to take salmon in the Manitou River, while nets were used in the Romaine River. Salmon fishing (subsistence and sport) in the Romaine River is now closed because of the scarcity of the population (Hydro-Québec Production [HQP] 2007; Charest et al. 2012; Ministère des Forêts, de la Faune et des Parcs 2017). Salmon fishing appears to be more valued by the Innus de Ekuanitshit for social and cultural reasons than economic ones, although the latter should not be under-estimated because salmon remains an important source of high-quality food. A 2013 study of fishing and community management of salmon by the Innus of Ekuanitshit concluded that, for those who took part, the most important values were sharing and respect, shown through conservation and avoiding waste (HQP 2007; CIE 2014). On the Romaine River, immediately downstream of Grande Chute, hunting is practiced by the Innus de Ekuanitshit in a long corridor using motorized canoe and snowmobile. Trapping focuses on beaver and certain other furbearers (e.g., otter, muskrat). Canada geese, small game, and salmon are also harvested. Various species of ducks are harvested in areas such as Grande Hermine Bay, west of Baie-Johan-Beetz, and in the mouths of the Romaine and Mingan Rivers (HQP 2007).
Commercial-Communal Fishing	Les Innus de Ekuanitshit have commercial-communal licences in its own name, as a member of the Agence Mamu Innu Kaikusseht, and through the Pecheries Shipek fishing company. These three entities have commercial-communal fishing licences for several species of fish and shellfish (Ekuanitshit Innu Council, pers. comm. 2018).
Food, Social, Ceremonial Fishing	Les Innus de Ekuanitshit has no FSC licenses. However, Atlantic salmon, herring, brook trout, lobster, scallop and other shellfish are known to be important species for FSC purposes.

Table 7.10 Québec Indigenous Groups Community Profiles

Community Indicator	Description
Asserted or Established Aboriginal and / or Treaty Rights	Les Innus de Ekuanitshit assert Aboriginal rights, including the right to hunt, fish, and gather throughout its traditional territory. Les Innus de Ekuanitshit claim a territory that extends over parts of Labrador and QC, including Anticosti Island in the Gulf of St. Lawrence. The asserted or established Aboriginal and treaty rights do not extend to lands or waters in or near the Project Area.
Première Nation des Innus de Nutashkuan	
Location and Proximity to Project Area	The Première Nation des Innus de Nutashkuan has one reserve, located at the mouth of the Natashquan River in the Gulf of St. Lawrence. The Nutashkuan reserve is approximately 1,086 km from the Project Area.
General Overview	The Première Nation des Innus de Nutashkuan is governed by a Chief and four Councillors and is represented by MICT (INAC 2018). The Nutashkuan reserve was established in 1952. The March 2018 population of the Première Nation des Innus de Nutashkuan was 1,168. Approximately 91% lived on-reserve. The on-reserve population declined slightly in 2016. In 2016, the median age of the on-reserve population was approximately 10 years younger than the median age of the QC population (Statistics Canada 2017). The percentage of the population under 15 years of age was also higher than that of the general QC population (Statistics Canada 2017).
Health and Socioeconomic Conditions	The Band Council and other agencies provide community members with education, medical care, fire protection, social development, finance and administration, patient services, social services, technical services and advisory services. Ecole Uauitshitun accommodates students from kindergarten to secondary V (grade 11). A health centre provides front-line, emergency, and preventive health services as well as community health services. Patients requiring hospitalization are transferred to regional centres. Five nurses are available on-reserve, and a nutritionist, psychologist and dentist visit regularly. The Première Nation des Innus de Nutashkuan has managed health services since this responsibility was transferred by Health Canada. Identified health issues include type 2 diabetes, obesity, and addictions. The Première Nation des Innus de Nutashkuan has established an Economic Development Office. Economic initiatives include handicraft production, trapping, tourism, construction, transportation, outfitting and forestry. In 2011, the largest employer for community members was Public Administration, employing approximately 31% of the workforce. The First Nation has commercial fishing enterprises, with several fishing licences. The Première Nation des Innus de Nutashkuan fish crab, clams, lobster and groundfish commercially and owns two fishing vessels (Nexen 2018). Pêcheries Commerciales Nutashkuan, which was established by the Band Council in 1994, employs between six and 25 individuals (First Nations of Quebec and Labrador Economic Development Commission 2010).
Physical and Cultural Heritage (including archaeological, paleontological, historical, or architectural sites)	Innu culture and heritage are based on their relationship with game and fish and the seasonal migrations and locations of various species, including caribou and salmon. The Innu people traditionally travelled over a vast territory encompassing the entire St. Lawrence catchment area between the Saguenay-Lac-Saint-Jean and part of Labrador. Families also occasionally crossed the St. Lawrence Estuary to hunt in the Bas-du-Fleuve area (MRCN 2010; Verreault et al. 2013). The spring harvest for migratory birds, seal harvesting, and fishing for Atlantic salmon has been practiced

Table 7.10 Québec Indigenous Groups Community Profiles

Community Indicator	Description
	by the Innus de Nutashkuan for several thousand years. Numerous coastal sites exist dating from approximately a thousand years ago demonstrating intensive spring harvesting of migratory bird species, including the Canada Goose and common eider (Englobe 2018). Of the approximately 8,000 archaeological sites discovered in QC, over 1,600 are in the traditional territory of the Innus de Nutashkuan. Two important Innu sites have been discovered, including one on an island located in the western part of the Nitassinan of Nutashkuan. No known physical, cultural or heritage sites are within or near the Project Area.
Current Use of Lands and Resources for Traditional Purposes	The Innus de Nutashkuan continue to use the resources of the St. Lawrence River for food and communal purposes. Activities include fishing for Atlantic salmon, herring, and brook trout; collecting goose eggs in the peat bogs between the River and its tributaries; collecting eggs of other bird species on the islands; hunting waterfowl (e.g., goose and black guillemot); gathering edible plants (e.g., black crowberry, small cranberries, red berries and cloudberries) that grow along the River banks and in the peat bogs; fishing for lobster and scallops with harpoons; and collecting other shellfish along the coast (AMIK 2016; CIE 2014). Fishing, including fishing for Atlantic salmon, played and continues to play an important role in Innu life on the North Shore of the St. Lawrence River, estuary, and Gulf. The waterways contemporarily used by the Première Nation des Innus de Nutashkuan, in addition to the Gulf of St. Lawrence, include the Natashquan, Romaine, De la Corneille, Piashti, Quetachou, Nabisipi and Aguanish Rivers. The southern portion of the land use area extends from the coast to Wakeham, Forgues, Pauline and Métivier Lakes. Trapping and small game hunting in that area is facilitated by good transportation routes (Route 138 and many snowmobile trails) and even terrain. Along the shore, west of Baie-Johan-Beetz, harvesting activities occur up to the Havre-Saint-Pierre region. Lobster and scallops are taken from Nickerson Bay. Canada geese and eider are harvested from the shoreline or by motorized boat, and waterfowl are harvested along the shore. Many harvesting areas and encampments are located at the Grande Hermine and Nickerson Bays, as well as on the coastal plain of the Romaine River, on either side of Route 138. Beaver trapping and gathering of small fruit occur on the Romaine coastal plain. Porcupine is often harvested near the shore along Route 138 and other roads leading north. The contemporary land use model of the Première Nation des Innus de Nutashkuan is similar to that of the Innus de Ekuanitshit. Members from both communities at times harvest together or rely one another (HQP 2007). The Première Nation des Innus de Nutashkuan has continued to be mobile and still cover a large territory but travels are not as expansive as they have been historically.
Commercial-Communal Fishing	The Première Nation des Innus de Nutashkuan has commercial-communal licenses. The fisheries cover several areas and species including cod, Atlantic halibut, Greenland halibut, fluke, mackerel, herring, groundfish, whelk, lobster, Arctic surf clam crab and scallop (Innu First Nation of Nutashkuan, pers. comm. 2018).
Food, Social, Ceremonial Fishing	The Première Nation des Innus de Nutashkuan has no FSC licenses. However, Atlantic salmon, herring, brook trout, lobster, scallops, and other shellfish are understood to be important FSC species for the Innu.

Table 7.10 Québec Indigenous Groups Community Profiles

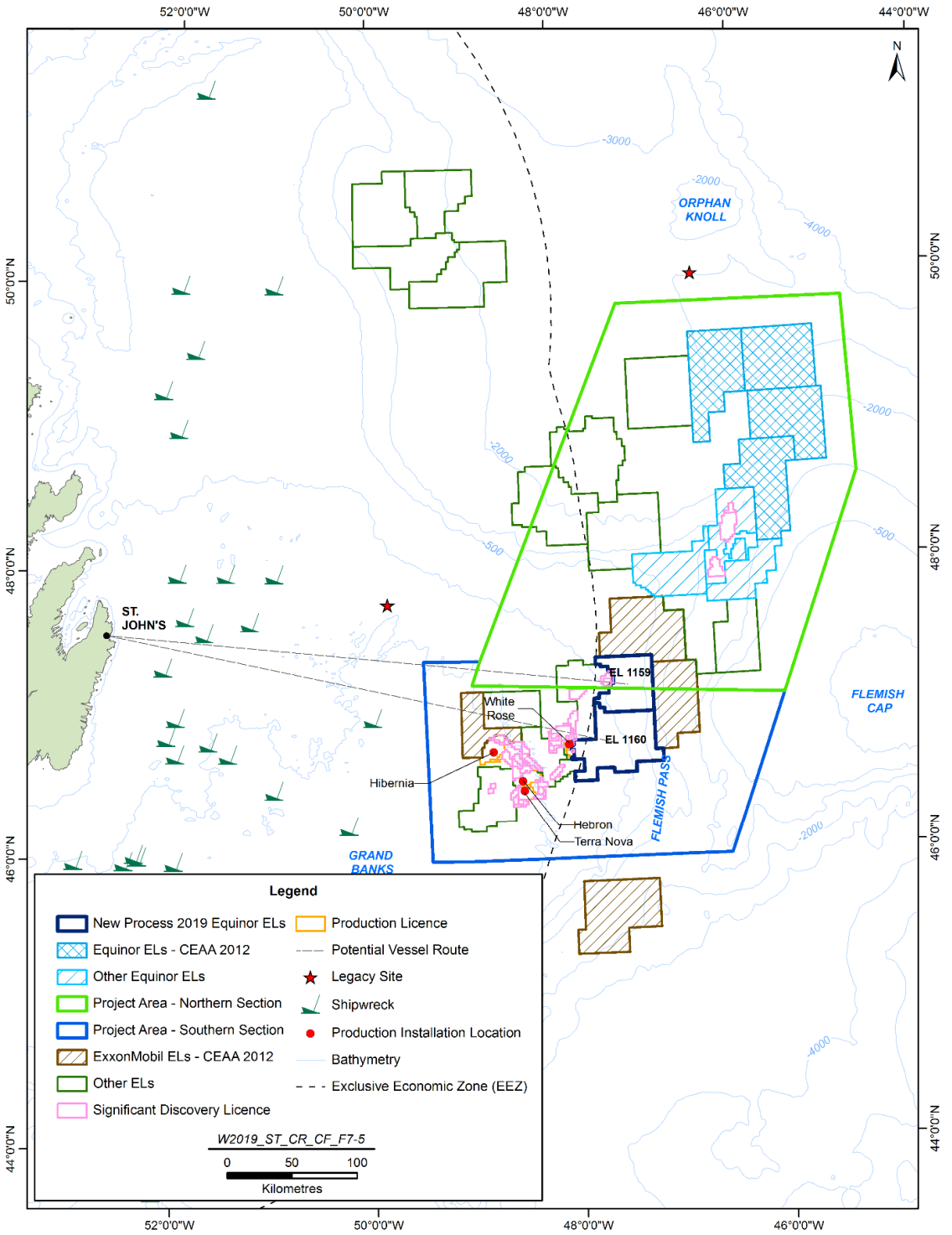
Community Indicator	Description
Asserted or Established Aboriginal and / or Treaty Rights	The Première Nation des Innus de Nutashkuan asserts Aboriginal rights, including the right to hunt, fish, and gather throughout its Nitassinan. The Première Nation des Innus de Nutashkuan claim a territory that extends over parts of Labrador and QC, including part of Anticosti Island and Jacques Cartier Strait in the Gulf of St. Lawrence. The asserted or established Aboriginal and treaty rights do not extend to lands or waters in or near the Project Area.

7.4 Other Aspects of the Human Environment

The Project Area is over 300 km away from St. John's, Newfoundland and Labrador, which is the closest community to the Project. There are no known permanent, seasonal, or temporary residences in the vicinity of the Project Area; the nearest permanent residence is within the City of St. John's. The only residences that would be associated with the Project are the temporary living accommodations on drilling units and supply vessels. The Project is not expected to affect human health conditions for Indigenous or non-Indigenous persons living in Newfoundland and Labrador or elsewhere.

The only known sites occurring in offshore Newfoundland and Labrador that would be considered to contain physical and/or cultural heritage are limited to shipwrecks that may be present in the Project Area and RSA. Locations of shipwrecks within the Project Area and RSA are shown on Figure 7-5. In the past, many sites across Canada have been used for military training and weapons testing by DND. Legacy sites exist across Canada's coastline where unexploded ordnance (UXO) may remain, and there are 1,100 known UXO sites off Canada's east coast (Amec 2014). Figure 7-5 depicts legacy sites off Newfoundland and Labrador, relevant to the Project Area and RSA. Currently, there are no identified shipwrecks or legacy sites within the Project Area.

There are no other known structures, sites, or things of known historical, archaeological, paleontological, or architectural significance, within the Project Area. The Project is not predicted to interact with onshore archaeological resources or heritage areas. Common vessel traffic routes in the Project Area and surrounding area are illustrated in Figure 7-6. Marine cables are depicted in Figure 7-7.



Source: Defence Construction Canada (2016)

Figure 7-5 Known Shipwreck and Legacy Sites in Offshore Newfoundland and Labrador

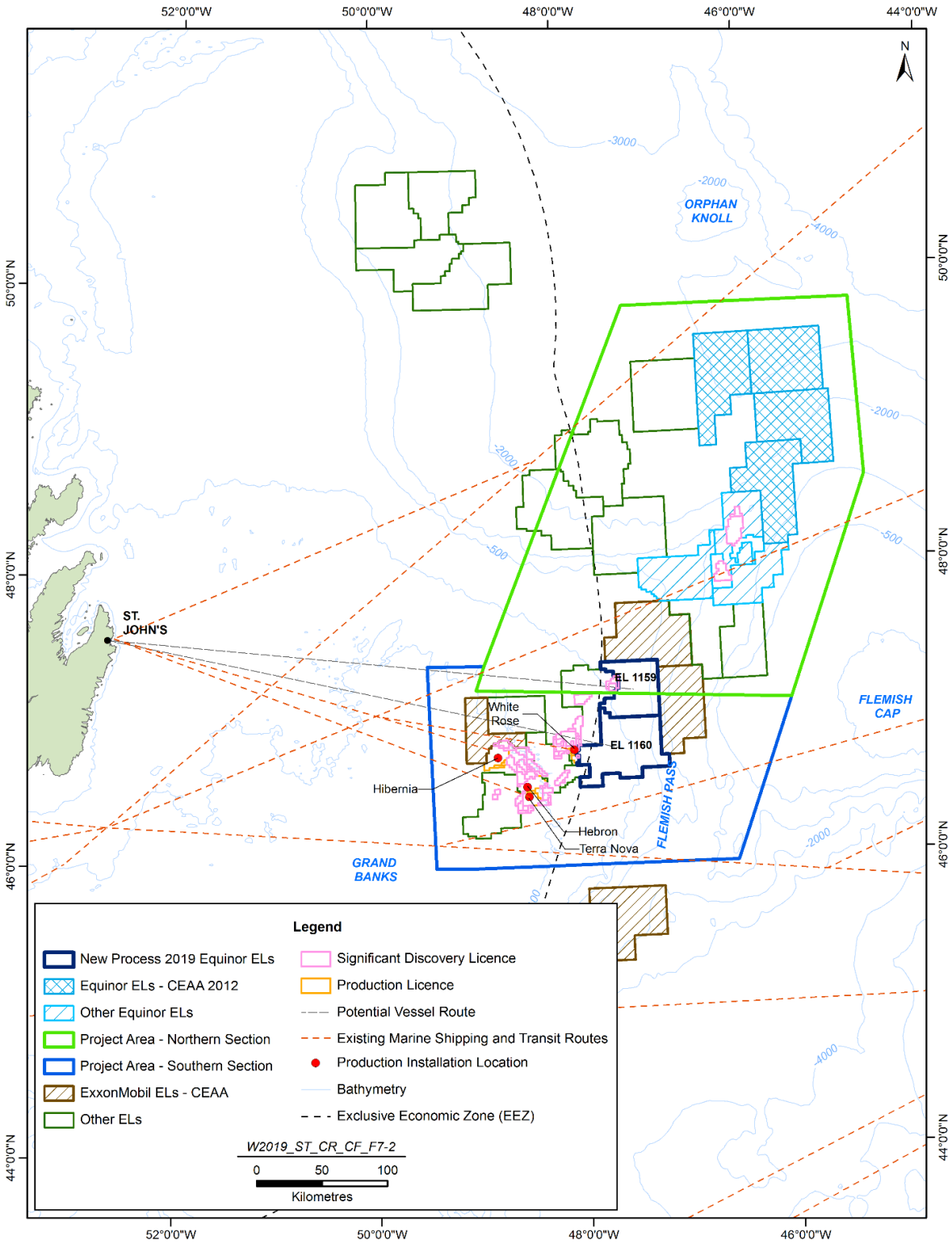


Figure 7-6 Major Vessel Routes in the Vicinity of the Project Area

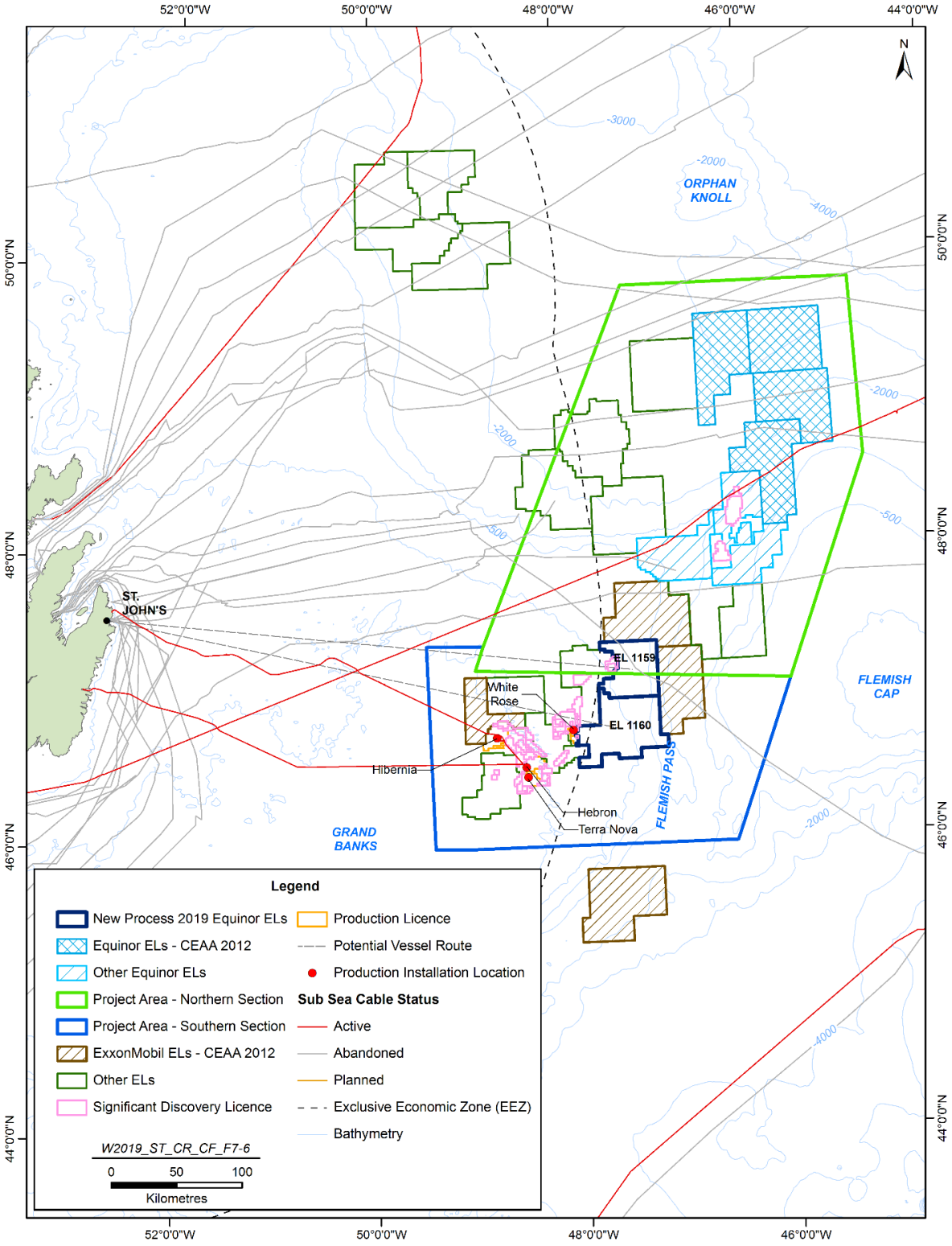


Figure 7-7 Marine Cables in the Vicinity of the Project Area

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8.0 MARINE FISH AND FISH HABITAT: ENVIRONMENTAL EFFECTS ASSESSMENT

Marine fish and their habitats are important considerations in the EA of activities that occur within, and that may affect, the marine environment. The Project Area and surrounding marine environments are known to be used by a diversity of marine biota. The presence, abundance and distribution of marine fish species and associated habitat characteristics (both abiotic and biotic) vary considerably across this rather large and diverse marine environment, which transitions from relatively shallow shelf zones, through the continental slope to deep areas. These areas are used by fish and invertebrate species of commercial, cultural, and/or ecological importance and support regionally important areas of biodiversity and marine productivity.

For the purpose of this EIS, this VC includes consideration of relevant fish species (both stable and at risk), as well as plankton, algae, marine plants, benthos, and relevant components of their habitats (such as water and sediment), given the clear interrelationships between these environmental components. The consideration of these components within a single VC is in keeping with current and standard EA practice, and provides for a more comprehensive, holistic approach, while at the same time reducing unnecessary repetition. Although identified fish SAR are considered integrally within the environmental effects assessment for this VC, these species are given special attention and emphasis in the identification, analysis and evaluation of potential environmental effects and required mitigation measures herein.

8.1 Environmental Assessment Study Areas and Effects Evaluation Criteria

This section defines the Study Areas (spatial and temporal boundaries) for the environmental effects assessment for this VC. A number of spatial assessment boundaries have been defined for the environmental effects assessment of this VC, which reflect the varying ways and scales in which the Project may influence marine fish and their habitats.

Within the Project Area itself, potential effects are expected to be direct in nature and associated with the specific environmental interactions that may be associated with planned Project activities. While the Project Area is defined as an overall polygon that encompasses such activities over the course of the Project, the various components and activities associated with the drilling of each individual well and other planned components will occupy fairly small areas within this overall Project Area, as described in Chapter 2. At the larger local and regional scales around the Project Area, however, the environmental effects assessment also considers the larger potential environmental zones of influence (ZOIs) of the Project (including both planned activities and potential accidental events), and the characteristics, distributions and movements of the various fish species and habitats that comprise this VC, as described below. The Project Area and RSA are the same as described in Section 4.3.1. The LSA for the marine fish and fish habitat VC is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160.

The temporal boundaries for the effects assessment encompass the frequency and duration of Project-related (in-field) activities in the Project Area (Chapter 2), as well as the likely timing of resulting

environmental effects. In conducting the assessment, special consideration is also given to timing of VC presence within the Project and Assessment Areas, including important or sensitive time periods.

It is within the above spatial and temporal boundaries that the potential environmental effects on this VC resulting from planned Project components and activities and their significance are assessed and evaluated.

Significant environmental effects are considered to be those that could cause a change in a VC that would alter its status or integrity beyond an acceptable and sustainable level. For the purposes of this EA, significant environmental effects on Marine Fish and Fish Habitat are defined as those that would cause one or more of the following:

- A detectable decline in overall fish abundance or change in the spatial and temporal distributions of fish populations within the overall RSA over multiple generations
- An alteration or destruction of fish habitat which results in serious harm to fish resources that support a commercial, recreational, or Indigenous fishery in the RSA
- Effects to a designated (protected) SAR or its critical habitat such that the overall abundance, distribution and health of that species and its eventual recovery within the RSA is adversely affected

The possible environmental effects of accidental events on Marine Fish and Fish Habitat are assessed and evaluated in Chapter 15 (Accidental Events).

8.2 Potential Environmental Changes, Effects, and Associated Parameters

The key potential environmental interactions between planned offshore oil and gas activities and marine fish and their habitats include the following (adapted from AMEC 2014):

- The possible destruction, contamination or alteration of marine habitats and benthic organisms due to the discharge and deposition of drill cuttings and/or fluids, the deployment and use of other equipment, and possibly the introduction and spread of aquatic invasive species
- Potential contamination of fish / invertebrates and their habitats due to other environmental discharges during planned oil and gas exploration drilling and other associated survey and support activities
- The attraction of marine fish to the drilling installation and vessels, with increased potential for injury, mortality, contamination, or other interactions
- Possible temporary avoidance of areas by marine fish due to underwater noise or other disturbances, which may alter their presence and abundance as well as disturbing movements / migration, feeding, or other activities
- Possible changes in the availability, distribution, or quality of feed sources and/or habitats for fish and invertebrates as a result of planned activities and their associated environmental emissions
- Possible injury, mortality, or other disturbances to marine fish as a result of exposure to noise within the water column during wellsite surveys or VSP survey activity

As a result of these identified environmental interactions, issues identified in the EIS Guidelines, and concerns raised through consultation and engagement, the assessment of environmental effects on Marine Fish and Fish Habitat is focused on the following potential environmental effects:

- Change in Habitat Availability and Quality
- Change in Fish Mortality, Injury, Health
- Change in Fish Presence and Abundance (Behavioural Effects)

8.3 Environmental Effects Assessment and Mitigation

8.3.1 Approach and Methods

The analysis and description of the potential environmental effects of the Project on this VC are based on consideration of the nature, scale and timing of the Project's planned components and activities (Chapter 2), and the existing environment for this VC (Section 6.1). This analysis has focused first on identifying key potential Project-VC interactions and, in particular, anticipated changes to the existing biophysical environment resulting from planned Project activities and emissions that may, through one or more associated pathways, lead either directly or indirectly to overall effects on the presence, abundance, diversity, health or other aspects of fish and fish habitat at the individual and/or population levels. In doing so, the assessment for this VC considers what is known and can reasonably be deduced about the presence, abundance and distribution of fish species and habitats with and around the LSA and broader RSA, with a focus on important or sensitive species and components, and those with the potential to be affected by the Project. In some cases, the assessment is based on specific information on planned Project activities and their environmental interactions. In other cases, the environmental effects assessment reflects a more regional, issues-based and "mitigation-centric" approach. This is the case given both the current stage of Project planning and design (i.e., specific wellsite locations are not yet determined and defined) and the existence of effective mitigation measures to avoid or reduce potential adverse environmental effects. In terms of the latter, many of these mitigation measures are standard in the offshore oil and gas sector off Newfoundland and Labrador and elsewhere (due to regulatory requirements or otherwise) and are proven to help avoid or reduce such effects.

8.3.2 Summary of Key Mitigation

Key mitigation measures that will be implemented to help avoid or reduce potential environmental effects on Marine Fish and fish Habitat include:

- Use of existing and common vessel and aircraft travel routes for vessels and helicopters will be used where possible and practicable
- Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols
- Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards
- The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG

- During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal
- Appropriate handling, storage, transportation, and on-shore disposal of solid and hazardous waste
- Prior to the start of a drilling campaign, a pre-drill coral survey will be undertaken. The Coral and Sponge Survey Plans for individual surveys will be submitted submit to the C-NLOPB and DFO for their review and acceptance prior to implementing the survey. The Coral and Sponge Survey Plans will contain detailed, site-specific information which may include the following:
  - Survey methodology (e.g., equipment used and specifications, resolution, and ROV targets);
  - Survey schedule (e.g., anticipated start date and duration);
  - Survey team (e.g., geophysical mapping technician, ROV technicians, and marine biologists / scientists);
  - Survey area around the well sites, mooring and anchors, and rationale for determining the survey area (i.e., using information from the drill cuttings dispersion modelling);
  - If corals and sponges and are identified, then a risk assessment will be completed, which may include aspects such as size, abundance, degree of exposure, and condition, Documentation (e.g., species, abundance, condition, size, and substrate conditions). Potential mitigation includes relocation of the well and/or relocation of cuttings discharge through a subsea cuttings transport system. A report summarizing the coral mapping, risk assessment and planned mitigation measures (if corals are identified) will be prepared and submitted to the C-NLOPB / DFO for review and acceptance. The report is referred to as the Coral and Sponge Survey Results and Risk Assessment Report, which will be submitted to the C-NLOPB and DFO for their review and acceptance prior to commencing drilling. Equinor Canada is committed to preparing Coral and Sponge Survey Plans and Coral and Sponge Survey Results and Risk Assessment Reports for surveys that occur over the temporal scope of the EIS.
- Relocation of well and/or redirection of WBM cuttings discharge in the event that the pre-drill coral survey and risk assessment identifies mitigation required to protect sensitive benthic habitat (i.e., corals and sponges)
- SBM-related drill cuttings will be returned to the drilling installation and treated in accordance with the OWTG before being discharged to the marine environment. WBM-related drill cuttings will be discharged without treatment
- Use of explosives will not be employed for removal of wellheads
- At the time of decommissioning a well, the well will be inspected in accordance with applicable regulatory requirements

Given the importance of Atlantic salmon to FSC activities, multiple collaborative efforts are being pursued to address knowledge gaps regarding Atlantic salmon migration. These include initiation of new potential studies with Petroleum Research Newfoundland and Labrador (PRNL), Environmental Studies

Research Fund (ESRF), as well as participating in existing planned studies such as the Atlantic Salmon tagging program being completed by the Atlantic Salmon Federation (ASF). Discussions are ongoing with Indigenous organizations, such as the Unama'ki Institute of Natural Resources (UINR) and the Mi'kmaw Conservation Group (MCG), to generate a short list of potential research activities to address Indigenous concerns regarding knowledge / data gaps.

8.3.3 Presence and Operation of Drilling Installation

The potential environmental effects of presence and operation of the drilling installation are primarily related to underwater noise and vibrations, light emissions and other environmental discharges, interactions with the benthic environment, and aquatic invasive species. It is unlikely that more than one exploration project will operate concurrently in the same area (see Section 1.2.2).

The presence of the drilling installation in combination with lighting effects will have localized positive effects on fish abundance and diversity by creating a "reef effect" that aggregates plankton and increases invertebrate colonization, resulting in increased local productivity and food sources.

Zooplankton do not have high avoidance capability to discharges in water as their horizontal movements are controlled by oceanographic conditions. While many forage fish species are motile and capable of avoidance responses, their early life stages likely have low avoidance abilities similar to other plankton. Herring larvae and early life stages of capelin have shown sensitivities to hydrocarbons (Paine et al. 1992; Frantzena et al. 2012; Ingvarsdóttir et al. 2012). Discharged sewage and food wastes may enhance primary and secondary production (Peterson et al. 1996; Wilewska-Bien et al. 2016).

It is assumed that the broadband source levels for a drilling installation (drill ship or semi-submersible) will be approximately 197 dB re 1 µPa @ 1 m (Zykov 2016). Continuous operation noises or DP may result in localized area avoidance; however, fish may remain in the area for relatively higher foraging opportunities. The key factors associated with the effects of noise on fish is the type and level of sound, pressure level, distance, duration and whether the fish use their swim bladder for hearing. Popper et al. (2014) suggest that the risk of fish mortality for all species is low when exposed to continuous sounds such as vessel engine sounds, but that recoverable injuries may occur for fish whose swim bladders are involved in hearing (primarily pressure detection) when exposed to sound levels of 170 dB rms for 48 hours and that temporary threshold shifts may occur for these same fish when exposed to 158 dB rms for 12 hours. While typical sound levels at a drilling installation would exceed recoverable thresholds over specific time periods, the exposure time and proximity to this noise would be very limited and would change rapidly as the fish would move away after the initial sound was generated.

Guidelines for continuous sounds were based on a minimal number of studies, the recognition that fish will respond to sound, and their hearing sensitivity (Popper et al. 2014). Quantitative metrics or guidelines for assessing behavioural effects of sound on fish do not exist, and the aforementioned metrics do not apply to fish species with no swim bladder (e.g., flatfish) or those with swim bladders that are not involved in hearing (e.g., Atlantic salmon). Sound levels from both the drilling installation and VSP are expected to dissipate rapidly with distance from the source.

Safety zones around drilling operations may also afford localized, short-term protection to species that are otherwise exposed to overfishing. Direct contact with the seabed will occur if anchoring is used rather than DP; however, underwater surveys will be conducted prior to anchoring operations to confirm that anchors are not set in sensitive coral or sponge habitats. As the Project Area is within an area of low seabed complexity, the installation of subsea infrastructure will introduce hard substrate and habitat complexity, thereby potentially providing opportunities for colonization and increased distribution of benthic species that have pelagic eggs or larvae. This effect would be temporary for the length of drill operations, but the combination of increased colonization opportunities and local enrichment may support faster recovery in an otherwise slow recovering environment, particularly if the infrastructure supported connectivity to areas that were previously inaccessible by benthic invertebrates. Although given the relatively short-term duration of drilling activities, this effect would likely be minor and recovery would follow typical succession patterns of deep sea areas.

Lighting and other environmental discharges (including organic waste material) associated with the drilling installation may also result in the short-term and localized attraction of some individual fish. There is the potential for temporary positive effects from the creation of increased availability of shelter and food for juveniles around the drilling installation and decreased fishing pressure on adults within the safety zone. There is also a potential for short-term exposure and subsequent potential uptake of contaminants from waste discharge.

As with any ocean-going vessel, the presence and operation of Project-related drilling installations and vessels could result in the accidental introduction of aquatic invasive species through ballast water exchange or on the hull of vessels. Aquatic invasive species can threaten aquatic ecosystems by creating competition for habitat and food resources and introducing new diseases. The likelihood of introduction of invasive species will depend on recent sailing history and operational practices (e.g., cleaning schedule, ballast water management) of the vessels. Supply and service vessels will likely be sourced from locally-based ships, although drilling installations and speciality vessels used for survey work may be internationally sourced and therefore have a higher risk of introducing invasive species from other marine areas. To reduce the risk of invasive species introduction, Project vessels carrying ballast water will comply with the *Canada Shipping Act, 2001* and associated *Ballast Water Control and Management Regulations*, as well as International Maritime Organization anti-fouling guidelines.

The interactions described above may result in changes to habitat availability and quality, fish mortality / injury risk and fish health, and fish presence and abundance. The nature, timing, geographical extent and duration of Drilling Installation and Activities for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The MODUs under consideration are the same (i.e., a drillship or semi-submersible), drilling would occur over a similar time frame (i.e., 35 to 65 days), and drilling could occur throughout the year, anywhere within the ELs. Therefore, the effects of the Drilling Installation and Activities are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling Installation and Activities on Marine Fish and Fish Habitat (including zooplankton and forage fish species) is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude,

localized and within the Project Area, short to medium term in duration, occurring on a regular basis and reversible, with a high level of confidence

8.3.4 Drilling and Associated Marine Discharges

The primary interactions from discharge of drill cuttings include cuttings deposition and potential seabed disturbance (smothering habitat), chemical toxicity, and bioaccumulation (uptake of contaminants by fish and the presence or perception of taint). Drilling waste discharges will adhere to the requirements for cuttings treatment and discharge guidelines in the OWTG. Overall, WBMs have varied effects on marine organisms, but due to the non-toxic nature of the drilling mud components (Neff 2010), they are not likely to result in toxicity (Holdway 2002; Trannum et al. 2010, 2011; Bakke et al. 2013; Purser 2015). The relatively high dilution and dispersion of drill mud and cuttings particles also indicates that there should not likely be substantial interaction with pelagic species. In some cases, decreased light penetration caused by the turbidity of the cuttings plume may temporary decrease primary production of phytoplankton and/or particles may clog the gills or digestive tract of zooplankton located within the cuttings plume (IOGP 2016). However, minor periodic increases in turbidity would not substantially alter primary production or zooplankton assemblages due to the high dispersion of particles, and the localized and short-term exposure of plankton to these particles (Neff 2010).

Discharge of drilling fluids and associated drilling cuttings may affect the benthic environment, with immobile or sessile bivalve and infaunal species being particularly sensitive to burial or drilling mud deposition. However, the high dispersal of the low toxicity and non-bioaccumulating drill cuttings has relatively low potential for adverse environmental effects. Drill cuttings dispersion modelling was conducted at three locations in the Project Area – Northern Section and two locations in the Project Area – Southern Section. The modelling results include maps of predicted thickness footprints, including PNET scales, and tabulations of the amount of material settled and mean and maximum thicknesses (see Section 4.5.1). The patchiness seen is due to: a) the variation in the (hourly) ambient ocean current encountered - since the cuttings are discharged in time steps ranging from 1 minute to 1 hour (depending on particle type) over a period of days as per the assumed discharge schedule, they will encounter different currents and hence experience different displacement; and b) the randomness of the dispersion components (in x, y, and z directions). Each sequence of these currents determines where the material settles, and given that the materials are in effect released in sequence, there will, to varying degree, be some corresponding grouping together or patchiness observed.

The estimated areas that may be affected by total drill cuttings (i.e., exceed the predicted no effects threshold [PNET]) are as follows:

- Northern Section
  - Greater than 1.5 millimetres (mm) – 0.025 to 0.103 km²; and
  - Greater than 6.5 mm – 0.0125 to 0.0325 km².
- Southern Section
  - Greater than 1.5 mm – 0.045 to 0.0625 km²; and
  - Greater than 6.5 mm – 0.01 to 0.025 km².

Expected distances above thresholds were based on mean deposition thickness for the purposes of the EIS as some coral species are more sensitive to sedimentation than others. It is noted that the 1.5 mm threshold is a conservative value that coincides with assessments on more sensitive coral species where injury from sedimentation was observed with sedimentation of less than 6.3 mm.

In the Project Area – Northern Section, approximately 99% of WBM drill cuttings settle less than 2 km from the drill centre under all season scenarios. Treated SBM drill cuttings released under the water surface become well dispersed, with greater than 97% of SBM drill cuttings settling outside the 32 km model area. In the modelled Eastern Project Area, relatively lower currents result in settling of discharged cuttings within 5 to 31 km of the wellhead for three of four seasonal scenarios, with the SBM drill cuttings drifting beyond the 32 km model in the June scenario. Due to the distance settled away from the well site, overall accumulation thicknesses are relatively low. In the Project Area – Southern Section, areas of accumulation for WBMs will occur within 2 km of the wellhead indicating that any physical or chemical effects on fish habitat will be relatively localized. While SBMs are discharged at relatively shallower depths in comparison to other modelled areas, overall average thickness is minimal (0.4 mm or less). However, there are some areas of accumulation that reach up to 3 mm within the model boundary indicating some potential localized disturbances to fish habitat. The physical and chemical effects of this volume of WBM and SBM drill cuttings over this area are anticipated to only have localized habitat disturbances, if any. The number of delineation / appraisal wells that Equinor Canada could drill on each EL is not known, as delineation / appraisal wells would be dependent on results of the initial exploration wells. It is also not feasible to assess the overlap of SBM as exploration well and delineation / appraisal well locations have not been selected. In assessing the concern for overlap of the cuttings dispersion, it should be noted that the purpose of a delineation / appraisal well is to evaluate the potential size of a prospect; therefore, the delineation / appraisal wells will likely be some distance from the original exploration well to enable better estimates of resource size. Since many of the ELs are more than 100 km², it would be reasonable to assume that each EL could contain multiple prospects and that delineation / appraisal wells or additional exploration wells on an EL could be also considerable distance from the initial exploration well evaluating unrelated prospects. Due to SBM cutting thicknesses predicted to be negligible, it is not anticipated that overlapping SBM cuttings will occur to a degree that exceeds the very conservative PNET. Because overall sedimentation is low, there is low potential for smothering effects or creating of oxygen depletion conditions, reducing potential recovery and recolonization times.

The use and eventual release of seawater and WBMs are not predicted to result in adverse environmental effects related to toxicity or bioaccumulation. When SBM is used (i.e., drilling the lower portions of each well), fluids and cuttings will be returned to the drilling installation for treatment before discharge below the water surface. It is not likely that the treated released SBM and SBM-associated drill cuttings will result in adverse effects associated with contamination of marine biota or habitats, as these materials have low toxicity, and localized biological effects (DeBlois et al. 2014).

Potential positive effects would last for the duration of the presence of underwater infrastructure. After removal, sessile species would likely decline but mobile opportunistic species would be supported for a short time. Due to the short-term duration of drilling activities, overall potential positive and negative

effects are likely limited. Therefore, recovery of the area would follow typical succession patterns of deep-sea areas.

The nature, timing, geographical extent and duration of Drilling and Associated Marine Discharges for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The wells will be drilled using WBMs in the first section and SBMs in the lower sections. Drilling waste discharges will adhere to the requirements for cuttings treatment and discharge guidelines in the OWTG. Therefore, the effects of the Drilling and Associated Marine Discharges are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling and Associated Marine Discharges on Marine Fish and Fish Habitat (including zooplankton and forage fish species) is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized and within the Project Area, medium to long term, regular in frequency, and reversible, with a high level of confidence.

8.3.5 Formation Flow Testing with Flaring

Based on formation flow testing completed to date in the Flemish Pass by Equinor Canada, no produced water has been encountered. Formation flow tests target hydrocarbon zones, and therefore encountering produced water is not expected. If a water-bearing zone were encountered, the formation flow test would be discontinued, and another interval targeted. The predicted environmental effects of formation flow testing with flaring are primarily related to short-term light and atmospheric emissions that may result in change in fish presence and abundance (based on formation flow testing completed to date in the Flemish Pass by Equinor Canada, no produced water has been encountered). Due to the low emission quantities, the temporary and short-term nature of air and light emissions, there will be limited potential interactions with fish or their habitat. The nature, timing, geographical extent and duration of Formation Flow Test with Flaring for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The formation flow test with flaring under consideration are the same (i.e., carried out on wells where hydrocarbons are discovered, and additional reservoir data are needed), flaring would be continuous and last between two to five days. Therefore, the effects of the Formation Flow Test with Flaring are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Formation Flow Test with Flaring on Marine Fish and Fish Habitat (including zooplankton and forage fish species) is considered applicable to this Project. An alternative to formation flow testing with flaring exists and may be used on exploration wells to gather similar data. These types of tests, called Formation Testing While Tripping, may be conducted without the need to flare. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, short term, sporadic in frequency, and reversible, with a high level of confidence.

8.3.6 Wellhead Decommissioning

Wellhead decommissioning will be conducted by cutting off the wellhead rather than blasting for environmental and safety reasons. Wellhead cutting will be conducted by an ROV and result in short term, low-magnitude emissions of noise and light. Fish will likely temporarily avoid the area during activities. The remaining seabed infrastructure may add small quantities of habitat heterogeneity to the existing environment and potentially aid in recolonization of benthic species and overall recovery. he nature, timing, geographical extent and duration of Well Decommissioning or Suspension for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The activities under consideration are the same (i.e., isolating the wellbore by placing cement plugs and/or mechanical devices, at various depths, and in some cases, cutting the casing and removing the casing just below the surface of the seafloor and removing equipment). Therefore, the effects of the Well Decommissioning or Suspension are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Well Decommissioning or Suspension on Marine Fish and Fish Habitat (including zooplankton and forage fish species) is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, negligible to low in magnitude, localized and within the Project Area, short term, sporadic in frequency, and reversible, with a high level of confidence.

8.3.7 Project-related Surveys

During a VSP, the receiver arrays are normally deployed into the wellbore. While it is possible that the receiver will be towed away from the drilling installation by a support vessel, it is preferred to hang it off the drilling installation. The duration will range from 12 hours up to 48 hours. Multiple streamer geophysical surveys including, but not limited to, conventional 2D and 3D seismic surveys, would not be included in the Project.

The predicted environmental effects of geophysical, geohazard, wellsite, and VSP surveys are primarily related to seismic noise that may result in changes to fish mortality / injury risk, fish health, and fish presence and abundance. The possible effects from the use of seismic sound energy in the marine environment may be behavioural (avoidance, other changes in distribution or activities) or involve injury to or mortality of individual fish. However, operations will be short-term and localized, and have reversible, low-magnitude effects. Noise and seismic emissions from VSP activities are mainly directed downwards into the well, with limited horizontal range. Mobile fish and invertebrate species are predicted to temporarily avoid areas of survey operations, minimizing potential interactions. Based on a comparison of threshold levels for fish injury (both mortal and recoverable) from a seismic airgun array (from Popper et al. 2014) and the potential distances to these threshold levels based on modelling done for the Scotian Basin Exploration Drilling Project (Zykov 2016), a conservative estimate of noise levels indicates that VSP surveys are not anticipated to exceed thresholds for fish injury beyond 500 m. Potential effects on zooplankton and forage fish species are limited for VSP surveys due to the localized and temporary nature of the activity. The geophysical sound source will go through a “ramp up” phase to increase initial fish and invertebrate avoidance to limit potential effects. Eggs, larvae and benthic

invertebrates adjacent to the sound source may be affected. However, due to the highly localized effects and short-term nature of operations, it will not have population effects.

While there may be some short-term behavioural effects to individual fish in the immediate vicinity of the survey activity, it is unlikely that fish will be displaced from key habitats or disrupted during key activities over extended areas or periods, or be otherwise affected in a manner that causes negative and detectable effects to fish populations in the region.

Most of these types of survey activities will not result in physical contact with the seabed and will therefore not directly interact with or disturb benthic animals or their habitats. When used, sediment sampling equipment will be in direct contact with the seabed and could potentially injure or cause mortality in fish, change habitat quantity or quality, and indirectly affect distribution and abundance; however, the small footprint of this temporary activity is not likely to cause any effects on population scales. Water sampling activities are not likely to have interactions with the seabed or fish. Underwater video surveys may have lighting and noise emissions; however, the temporary nature of the activity limits potential effects on the environment. Fish may also migrate away from the area while the short-term activity is ongoing.

The nature, timing, geographical extent and duration of Geophysical, Environmental and Geotechnical Surveys for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The surveys under consideration are the same (i.e., conducted prior to drilling to assess the potential for hazards [such as possible obstructions or seabed instability] and a pre-drill coral survey, which may include seismic sound sources, multibeam echo sounders, side scan sonar, sub-bottom profilers, and video equipment. Therefore, the effects of the Geophysical, Environmental and Geotechnical Surveys are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Geophysical, Environmental and Geotechnical Surveys on Marine Fish and Fish Habitat (including zooplankton and forage fish species) is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, negligible to low in magnitude, localized and within the Project Area, short term, sporadic in frequency, and reversible, with a high level of confidence.

8.3.8 Supply and Servicing

Helicopter use will have no direct interactions with fish and fish habitat. With respect to offshore supply vessels, exhaust emission levels will follow air quality regulations and guidelines. Similar to the drilling installation, offshore supply vessel wastewaters will be treated to reduce contaminant or hydrocarbon levels prior to discharge under MARPOL. Due to the transitory nature of vessels, discharges are not likely to accumulate in any area and the low volumes would likely become highly dispersed in the marine environment. The continuous noise and lighting from vessels would also be relatively low and result in temporary avoidance by fish. At monitoring stations near the Hibernia Platform, oil platforms and associated support vessels were the main noise source (Quijano et al. 2017). Although vessels were difficult to detect with multiple noise sources present, they were not considered a dominant sound source (Quijano et al. 2017). As with other emissions, the temporary interaction with any one area limits

potential noise and light interactions with fish. The nature, timing, geographical extent and duration of Supply and Servicing for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The supply vessels and helicopters under consideration are the same, based in St. John's, NL. Return transits would be the same for a single operating drilling installation (e.g., 8 to 10 return transits per month by the supply vessels). Therefore, the effects of the Supply and Servicing for ELs 1159 and 1160 are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Supply and Servicing for ELs 1159 and 1160 on Marine Fish and Fish Habitat (including zooplankton and forage fish species) is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, short term, regular in frequency, and reversible, with a high level of confidence.

8.4 Species at Risk: Overview of Potential Effects

A total of 19 fish species that are known or likely to occur within the LSA and 25 species in the RSA / combined area have been designated as SAR and have associated protections under provincial or national legislation (SARA, NL ESA), or have otherwise been identified as being of special conservation concern by COSEWIC or under other processes. These include several wolffish species, Atlantic cod, cusk, American eel, Atlantic salmon, American plaice, Bluefin tuna, and a number of species of grenadier, redfish, sharks, and skates. As with secure fish species, SAR may interact with Project activities based on occupation of various habitats at different life history stages (Table 8.1) and the same planned mitigation measures will be used to avoid or reduce such adverse interactions. Species that have been identified as being of special conservation concern by COSEWIC or under other processes that are not likely to overlap with the Project activities and are primarily concentrated outside the Project Area are not discussed, including winter skate and spiny dogfish.

Wolffish eggs and adults are associated with bottom habitats and the larvae live pelagically, therefore changes to habitat availability and quality, fish mortality / injury risk and fish health may result for these species from planned Project. No critical habitat has been established for these species; however, the Northeast Shelf and Slope EBSA is a known aggregation area for spotted wolffish. While activities associated with this Project could potentially occur within the EBSA, these are localized and short-term activities and environmental disturbances. Furthermore, there are high aggregations of wolffish species outside the Project Area and use of planned mitigation measures will avoid or reduce such adverse interactions with wolffish.

Table 8.1 Marine Fish Species at Risk: Potential Interactions with Project Components by Life History Stage

Eggs	Larvae	Juveniles / Adults	Project Component Potential Interaction
Freshwater			
• Atlantic salmon	• Atlantic salmon	• American eel	• No interaction

Table 8.1 Marine Fish Species at Risk: Potential Interactions with Project Components by Life History Stage

Marine - Demersal			
• Thorny skate • Barndoor skate • Smooth skate • Spinytail skate • Winter skate • Striped wolffish • Northern wolffish • Spotted wolffish • Common lumpfish • Atlantic hagfish	• Thorny skate • Barndoor skate • Smooth skate • Spinytail skate • Winter skate • Common lumpfish • Atlantic hagfish	• Atlantic cod • Cusk • American plaice • Roughhead grenadier • Roundnose grenadier • Thorny skate • Barndoor skate • Smooth skate • Spinytail skate • Winter skate • Spiny dogfish • Black dogfish • Acadian redfish • Deepwater redfish • Striped wolffish • Northern wolffish • Spotted wolffish • White hake • Common lumpfish • Lantern fish • Atlantic hagfish • Atlantic halibut	• Drilling and Associated Marine Discharges • Wellhead Decommissioning • VSP • Geological, Geotechnical, Wellhead, Seabed and Environmental Surveys
Marine - Pelagic			
• Atlantic cod • Cusk • Roughhead grenadier • Roundnose grenadier • American plaice • American eel • Atlantic bluefin tuna • White hake	• Atlantic cod • Cusk • Roughhead grenadier • Roundnose grenadier • American plaice • American eel • Atlantic bluefin tuna • Bigeye tuna • Acadian redfish • Deepwater redfish • Striped wolffish • Northern wolffish • Spotted wolffish • White hake • Atlantic halibut	• Atlantic salmon • Acadian redfish • Deepwater redfish • Atlantic bluefin tuna • Big eye tuna • Basking shark • Blue shark • Porbeagle • Shortfin mako • Spiny dogfish • Black dogfish • White shark • Common lumpfish • Lantern fish	• Presence and Operation of Drilling Installation • Drilling and Associated Marine Discharges • Formation Testing with Flaring • Geological, Geotechnical, Wellhead, Seabed and Environmental Surveys • Supply and Servicing

Early life stages of grenadier and plaice species live pelagically, therefore changes to habitat availability and quality, fish mortality / injury risk and fish health may result for these species from planned Project activities. Potential interactions with adults of grenadier, spiny dogfish and plaice species and all life stages of skate species would primarily be benthic in nature. American plaice and thorny skate that are widespread in shallow shelf areas may be disturbed in relation to drilling installation anchoring

(COSEWIC 2007, 2008, 2009). As predicted Project-related disturbances are localized and short-term and mitigation measures are implemented to reduce potential effects, there is limited potential for interaction with these species. Furthermore, areas of high aggregation outside the Project Area limits regional population effects on these species.

Early life stages of Atlantic cod and cusk and adult cod that live pelagically suggest that changes to habitat availability and quality, fish mortality / injury risk and fish health may result for these species from planned Project activities. Potential interactions with adult cod and cusk associated with bottom habitats indicate that benthic interactions may result in changes to fish habitat availability and quality, fish mortality/injury risk and fish presence and abundance for these species. As predicted Project-related disturbances are localized and short-term and mitigation measures are implemented to reduce potential effects, there is limited potential for interaction with these species. The mobile adult stages would also be able to avoid areas of potential short-term effects. The fact that areas of high aggregation are located outside the Project Area also limits regional population effects on these species.

Reddin and Shearer (1987), Reddin and Friedland (1993), Reddin (2006), and Sheehan et al. (2012) indicate that that no overwintering of Atlantic salmon has been confirmed by sampling. One of the tagged kelt from the outer Bay of Fundy migrated northward to Labrador via the Grand Bank and a second remained on the eastern edge of the Grand Bank (July) prior to the tag detaching. This area on the eastern edge of the Grand Bank is similar in location to the area of congregating salmon in the spring as they return to their home rivers. This data corroborates that this area may be an area of feeding prior to return migrations. No tags were shown migrating through the Project Area and the 99% utilization distributions for outer Bay of Fundy salmon also does not include the Project Area (Lacroix 2013). Lacroix (2013) also discusses the movement of inner Bay of Fundy salmon, and there is a negligible possibility they may occur within the Project Area.

Early life stages of American eel that live pelagically, and adult stages of American eel and Atlantic salmon that migrate through pelagic waters suggest that changes to habitat availability and quality, fish mortality / injury risk and fish health may result for these species from planned Project activities. As American eel use the continental shelves for migration, it is possible that adult American eels may travel through the shallow water depths of the Project Area. Mitigation strategies to avoid or reduce potential adverse effects of Project activities on American eel would be similar to mitigation strategies for other secure and at-risk marine fish species. However, because migration routes for Atlantic salmon and American eel do not reside wholly within the Project Area and can be variable based on environmental conditions, such as sea-surface temperatures, interactions may be limited, and overall risk is considered low to these species. Project-related disturbances are also localized and short-term with mitigation measures implemented to reduce potential effects. In addition, the limited interaction between salmon migrating within and near the Project Area and those post-smolt and adults feeding north in the Labrador Sea and kelts along the southern edge of the Grand Bank will most likely remain low given the predicted increases in surface sea temperatures (i.e., lower suitability) near the Project Area. As the potential for environmental effects of planned Project activities and overall risk to Atlantic salmon is low, it is predicted that the Project will not contribute to nor exacerbate declines to salmon populations.

Because the various life stages of Acadian and deepwater redfish, common lumpfish, white hake, and Atlantic halibut occupy both demersal and pelagic environments, Project activities may result in changes

to habitat availability and quality, fish mortality / injury risk and fish health and presence and abundance of these species. Previous studies indicate that adult redfish are able to avoid areas of disturbance (Popper and Hastings 2009). As predicted, Project-related disturbances are localized and short-term and mitigation measures are implemented to reduce potential effects, there is limited potential for interaction with these species. The presence of areas of high aggregation on the slopes outside the Project Area also limits regional population effects on these species.

Tuna and shark species are highly mobile pelagic species that may migrate though the Project Area. This suggests that changes to habitat availability and quality, fish mortality / injury risk and fish health may result for these species from planned Project activities. However, these species are highly mobile, and, with the implementation of mitigation measures, are unlikely to be adversely affected by the Project, and will not affect the residences of other key habitats of individuals or populations.

8.5 Significance of Residual Environmental Effects

With the implementation of mitigation measures, exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse environmental effects on Marine Fish and Fish Habitat. Individual environmental effects assessment summaries for planned activities for ELs 1159 and 1160 are in Tables 8.3 and 8.4, respectively.

8.6 Environmental Monitoring and Follow-up

Equinor Canada will obtain the required authorizations for the Project, and comply with applicable regulations, guidelines, and mitigation measures as identified and committed to in the preceding sections, the implementation of which will be planned, managed, and monitored in accordance with existing operational procedures and policies.

Based on the information presented in the EIS, and the conclusion of the effects assessment, a follow-up program will be undertaken in consideration of sensitive benthic habitat. Follow-up monitoring will occur if drilling is undertaken in the following circumstances:

1. Within an identified VME or FCA
2. Adjacent / near to an identified VME or FCA, such that drill cuttings dispersion model predicts that drill cuttings deposition may occur within the VME or FCA at levels above the biological effects threshold, or
3. In an area where the results of the pre-drill coral survey and risk assessment (DFO / C-NLOPB reviewed and accepted) indicate that monitoring is required

Given the transient nature of fish and demonstrated avoidance behaviours of fish to sound, it is unlikely that fish would remain in the immediate area long enough (i.e., 12-48 hrs) to be continuously exposed to levels that would result in temporary threshold shifts (TTS) in hearing (Popper et al. 2014). The planned application of key mitigation measures during Project activities, means that the potential for adverse environmental effects is low, and the overall level of confidence in the effects predictions and in the effectiveness of mitigation is moderate to high. No specific follow-up related to underwater noise is therefore considered necessary in relation to the Project.

Table 8.2 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1159 • Water depths within EL 1159 range from approximately 90 m to 930 m. • Within EL 1159 itself, regional datasets indicate presence of unidentified species of sponges, sea pens with few observations of gorgonian corals. • Distribution information on key species indicate that dominant species in the water depths are sand lance, deepwater redfish, American plaice, and capelin in bottom areas of the Project Area around EL 1159.	**Summary of Key Mitigation** • Use of existing and common vessel and aircraft travel routes for vessels and helicopters will be used where possible and practicable • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal • Appropriate handling, storage, transportation, and on-shore disposal of solid and hazardous waste • Prior to the start of a drilling campaign, a pre-drill coral survey will be undertaken. A report summarizing the coral mapping, risk assessment and planned mitigation measures (if corals are identified) will be prepared and submitted to the C-NLOPB / DFO for review and acceptance. Potential mitigation measures include relocation of the well and/or relocation of cuttings discharge through a subsea cuttings transport system • Relocation of well and/or redirection of WBM cuttings discharge in the event that the pre-drill coral survey and risk assessment identifies mitigation required to protect sensitive benthic habitat (i.e., corals and sponges) • SBM-related drill cuttings will be returned to the drilling installation and treated in accordance with the OWTG before being discharged to the marine environment. WBM-related drill cuttings will be discharged without treatment Use of explosives will not be employed for removal of wellheads At the time of decommissioning a well, the well will be inspected in accordance with applicable regulatory requirements

Table 8.2 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Presence and Operation of Drilling Installation	• Change in habitat availability and quality • Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	L-PA	S-M	R	R	H
Drilling and Associated Marine Discharges	• Change in habitat availability and quality • Change in fish mortality, injury, health • Change in fish presence and abundance)	A	L	L-PA	M-L	R	R	H
Formation Flow Testing with Flaring	• Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	L	S	S	R	H
Wellhead Decommissioning	• Change in habitat availability and quality • Change in fish presence and abundance	A	N-L	L	S	S	R	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	PA	S	S	R	H

Table 8.2 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geological, Geotechnical and Environmental Surveys	• Change in habitat availability and quality • Change in fish mortality, injury, health • Change in fish presence and abundance	A	N-L	L	S	S	R	H
Supply and Servicing	• Change in fish mortality, injury, health Change in fish presence and abundance	A	L	L	S	R	R	H

Evaluation of Significance

- Based on the nature and characteristics of exploration drilling on ELs 1159 and 1160 and the existing environment for this VC within the LSA and RSA, and with the planned implementation of mitigation, exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse effects on Marine Fish and Fish Habitat.
- Although components, activities and emissions may result in some localized, short-term interactions with fish and fish habitat in parts of the LSA, the number of individuals and habitat areas that may be affected, and the temporary and reversible nature of these interactions, means that exploration drilling on ELs 1159 and 1160 will not have overall ecological or population-level effects, and particularly, will not result in detectable decline in overall fish abundance or changes in the spatial and temporal distributions of fish populations within this area.
- For fish SAR, the potential for interactions between individuals of these species and exploration drilling on ELs 1159 and 1160 is limited, and no identified critical habitat is present in the LSA or RSA. Exploration drilling on ELs 1159 and 1160 will therefore not have implications for the overall abundance, distribution, or health of such species nor its eventual recovery. Exploration drilling on ELs 1159 and 1160 is not predicted to result in significant adverse effects on marine fish SAR.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 8.2 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY					
KEY					
Nature / Direction:		Frequency:		Certainty in Predictions:	
P	Positive	O	Occurs once	L	Low level of confidence
A	Adverse	S	Occurs sporadically	M	Moderate level of confidence
N	Neutral (or no effect)	R	Occurs on a regular basis	H	High level of confidence
		C	Occurs continuously		
Magnitude:		Duration:			
N	Negligible	S	Short-term (for duration of the activity)		
L	Low	M	Medium-term (beyond duration of the activity – weeks or months)	N/A	Not Applicable
M	Medium	L	Long- term (beyond duration of the activity – years)		
H	High	P	Permanent (recovery unlikely)		
Geographic Extent:		Reversibility:			
L	Localized, in immediate vicinity of activity				
PA	Within Project Area	R	Reversible (will recover to baseline)		
LSA	Within LSA	I	Irreversible (permanent)		
RSA	Within RSA or beyond				

Table 8.3 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1160 • Water depths within EL 1160 range from approximately 40 m to 1,022 m. • Within EL 1160 itself, regional datasets indicate presence of unidentified species of sponges, sea pens with few observations of gorgonian corals. • Distribution information on key species indicate that dominant species in the water depths are sand lance, deepwater redfish, American plaice, and capelin in bottom areas of the Project Area around EL 1160.	**Summary of Key Mitigation** • Use of existing and common vessel and aircraft travel routes for vessels and helicopters will be used where possible and practicable • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal • Appropriate handling, storage, transportation, and on-shore disposal of solid and hazardous waste • Prior to the start of a drilling campaign, a pre-drill coral survey will be undertaken. A report summarizing the coral mapping, risk assessment and planned mitigation measures (if corals are identified) will be prepared and submitted to the C-NLOPB / DFO for review and acceptance. Potential mitigation measures include relocation of the well and/or relocation of cuttings discharge through a subsea cuttings transport system • Relocation of well and/or redirection of WBM cuttings discharge in the event that the pre-drill coral survey and risk assessment identifies mitigation required to protect sensitive benthic habitat (i.e., corals and sponges) • SBM-related drill cuttings will be returned to the drilling installation and treated in accordance with the OWTG before being discharged to the marine environment. WBM-related drill cuttings will be discharged without treatment • Use of explosives will not be employed for removal of wellheads At the time of decommissioning a well, the well will be inspected in accordance with applicable regulatory requirements

Table 8.3 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Presence and Operation of Drilling Installation	• Change in habitat availability and quality • Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	L-PA	S-M	R	R	H
Drilling and Associated Marine Discharges	• Change in habitat availability and quality • Change in fish mortality, injury, health • Change in fish presence and abundance)	A	L	L-PA	M-L	R	R	H
Formation Flow Testing with Flaring	• Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	L	S	S	R	H
Wellhead Decommissioning	• Change in habitat availability and quality • Change in fish presence and abundance	A	N-L	L	• S	S	R	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	PA	S	S	R	H

Table 8.3 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geological, Geotechnical and Environmental Surveys	• Change in habitat availability and quality • Change in fish mortality, injury, health • Change in fish presence and abundance	A	N-L	L	S	S	R	H
Supply and Servicing	• Change in fish mortality, injury, health • Change in fish presence and abundance	A	L	L	S	R	R	H
Evaluation of Significance • Based on the nature and characteristics of exploration drilling on ELs 1159 and 1160 and the existing environment for this VC within the LSA and RSA, and with the planned implementation of mitigation, exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse effects on Marine Fish and Fish Habitat. • Although components, activities and emissions may result in some localized, short-term interactions with fish and fish habitat in parts of the LSA, the number of individuals and habitat areas that may be affected, and the temporary and reversible nature of these interactions, means that exploration drilling on ELs 1159 and 1160 will not have overall ecological or population-level effects, and particularly, will not result in detectable decline in overall fish abundance or changes in the spatial and temporal distributions of fish populations within this area. • For fish SAR, the potential for interactions between individuals of these species and exploration drilling on ELs 1159 and 1160 is limited, and no identified critical habitat is present in the LSA or RSA. Exploration drilling on ELs 1159 and 1160 will therefore not have implications for the overall abundance, distribution, or health of such species nor its eventual recovery. Exploration drilling on ELs 1159 and 1160 is not predicted to result in significant adverse effects on marine fish SAR. NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.								

Table 8.3 Environmental Effects Assessment Summary: Marine Fish and Fish Habitat – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY					
KEY					
Nature / Direction:		Frequency:		Certainty in Predictions:	
P	Positive	O	Occurs once	L	Low level of confidence
A	Adverse	S	Occurs sporadically	M	Moderate level of confidence
N	Neutral (or no effect)	R	Occurs on a regular basis		
		C	Occurs continuously	H	High level of confidence
Magnitude:					
N	Negligible	Duration:		N/A	Not Applicable
L	Low	S	Short-term (for duration of the activity)		
M	Medium	M	Medium-term (beyond duration of the activity – weeks or months)		
H	High				
		L	Long- term (beyond duration of the activity – years)		
Geographic Extent:		P	Permanent (recovery unlikely)		
L	Localized, in immediate vicinity of activity				
PA	Within Project Area	Reversibility:			
LSA	Within LSA	R	Reversible (will recover to baseline)		
RSA	Within RSA or beyond	I	Irreversible (permanent)		

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9.0 MARINE AND MIGRATORY BIRDS: ENVIRONMENTAL EFFECTS ASSESSMENT

The environment effects assessment of exploration drilling activities on Marine and Migratory Birds are summarized below.

9.1 Environmental Assessment Study Areas and Effects Assessment Criteria

This section defines the Study Areas (spatial and temporal boundaries) for the environmental effects assessment for this VC. A number of spatial assessment boundaries have been defined for the environmental effects assessment of this VC. They reflect the varying ways and scales in which the Project may influence marine-associated birds and their habitats.

Within the Project Area itself, potential effects are expected to be direct in nature and associated with the specific environmental interactions that may be associated with planned Project activities. While the Project Area is defined as an overall polygon that encompasses such activities over the course of the Project, the various components and activities associated with the drilling of each individual well and other planned components will occupy fairly small areas within this overall Project Area, as described in Chapter 2. At the larger local and regional scales around the Project Area; however, the environmental effects assessment also considers the larger potential environmental ZOIs of the Project (including both planned activities and potential accidental events), and the characteristics, distributions and movements of the various marine and migratory birds that comprise this VC, as described below. The Project Area and RSA are the same as described in Section 4.3.1. The LSA for the marine and migratory birds VC is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160.

The temporal boundaries for the effects assessment encompass the likely timing and duration of Project-related (in-field) activities in the Project Area, as well as the likely duration of resulting environmental effects (Chapter 2). In conducting the assessment, special consideration is also given to timing of VC presence within the Project and Assessment Areas, including important or sensitive periods. Section 6.2 provides details of marine and migratory bird species known to occur, and their timing of presence, within these areas.

It is within the above described spatial and temporal boundaries that the Project's potential environmental effects on this VC and their significance are assessed and evaluated.

For the purposes of this EA, significant environmental effects on Marine and Migratory Birds are defined as those that would cause one or more of the following:

- A detectable decline in overall bird abundance or change in the spatial and temporal distributions of bird populations within the overall RSA over multiple generations;
- Effects to a designated (protected) SAR or its critical habitat such that the overall abundance, distribution and health of that species and its eventual recovery within the RSA is adversely affected

9.2 Potential Environmental Changes, Effects, and Associated Parameters

The key potential environmental interactions between planned offshore oil and gas activities and Marine and Migratory Birds, include the following (adapted from AMEC 2014):

- Potential attraction of birds to offshore drilling installations and vessels, including their lights, flares or other light emissions, and waste discharges, resulting in possible injury or mortality (strikes, strandings, incineration, disorientation, increased energy expenditure)
- Possible injury of avifauna (particularly diving birds) due to exposure to noise within the water column during VSP or wellsite surveys using seismic sound sources or disruptions to and changes in their distributions and behaviours
- Changes in the presence, abundance, distribution, and/or health of birds (individuals and populations) resulting from direct exposure to waste discharges from installations or vessels (physical exposure, ingestion)
- Possible indirect effects due to changes in the availability, distribution, and/or quality of food sources or habitats for marine and migratory birds due to disturbances (noise, light) and/or waste discharges (such as drilling fluids, other liquid and solid waste materials).

As a result of these identified environmental interactions, issues identified in the EIS Guidelines, and concerns raised through consultations and engagement, the assessment of environmental effects on Marine and Migratory Birds (including SAR and species of conservation concern [SOCC]) is focused on the following potential environmental effects:

- Change in Mortality / Injury Levels and Bird Health (Individuals or Populations)
- Change in Avifauna Presence and Abundance (Behavioural Effects)
- Change in Habitat Availability and Quality
- Change in Food Availability or Quality

9.3 Environmental Effects Assessment and Mitigation

9.3.1 Approach and Methods

The environmental effects assessment for Marine and Migratory Birds requires an analysis of the potential interactions between the Project and the VC. Knowledge of the potential interactions obtained through a literature review is summarized and has been used to inform the effects analysis and the identification of applicable mitigation measures. More detailed reviews of these known and likely environmental issues and interactions are available through other sources, including the Eastern Newfoundland SEA (Amec 2014), Ellis et al. (2013) and Ronconi et al. (2015). Each planned component of the Project is considered in terms of its potential for effects on the VC, with a focus on the various potential environmental interactions and changes identified in the previous section.

9.3.2 Summary of Key Mitigations

Key mitigation measures that will be implemented in relation to the Project to help avoid or reduce potential environmental effects on Marine and Migratory Birds include:

- Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols
- Operational discharges will be treated prior to release in accordance with the OWTG (2016) and other applicable regulations and standards.
- The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG
- During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal
- Equinor Canada will avoid, where possible, established bird colonies. Helicopters will avoid known coastal seabird colonies per requirements of the NL Seabird Ecological Reserve Regulations, 2015
- During drilling operations, routine observations of seabirds, following the CWS protocols, will be undertaken from the drilling installation
- Routine searches for stranded birds will be conducted on the platform and supply vessels, and appropriate programs and protocols for the collection and release of marine and migratory birds will be implemented for birds that become stranded (i.e., “ECCC-CWS’s Oiled Birds Protocol and Protocol for Collecting Dead Birds from Platforms. Best Practices for Stranded Birds Encountered Offshore Atlantic Canada (Draft 2)” and Williams and Chardine (n.d.): The Leach’s storm-petrel: General Information and Handling Instructions). Equinor Canada is proposing to develop a seabird observation protocol applicable to exploration drilling activities in consultation with ECCC-Canadian Wildlife Service (CWS). Information outlined in the seabird observation protocol will be determined in consultation with ECCC-CWS, and aspects such as frequency of searches, reporting procedures, and training requirements will be included. Past Equinor Canada exploration drilling programs had a third party representative responsible for wildlife observation and reporting, which included birds. Equinor Canada intends on continuing with this practice for the exploration drilling program
- Equinor Canada will obtain a Seabird Handling permit from ECCC-CWS
- Sewage and kitchen waste will be macerated, in accordance with the OWTG to 6 mm particle size
- Operators are required to notify the C-NLOPB for plans to flare associated with formation flow testing for exploration drilling. The C-NLOPB then consults with ECCC-CWS to determine a safe timeline to proceed to reduce effects on migrating birds

9.3.3 Presence and Operation of Drilling Installation

The predicted environmental effects associated with the presence and operation of the drilling installation are primarily related to lighting and emissions that may result in changes in mortality / injury

levels, presence and abundance of avifauna, and food and habitat availability and quality. This includes the possible attraction of birds due to lighting, avoidance of the drilling installation due to sensory disturbance, and the creation of new foraging opportunities for predator species (e.g., through prey attraction due to organic waste disposal, creation of new “artificial reef” habitat). There may also be a slight increase in mortality / injury levels due to collisions, disorientation, and potential predation; however, the mortality rate is anticipated to be low as most stranded birds encountered on platforms and vessels are released successfully. Ellis et al. (2013) and Environment Canada (2015) noted that Leach’s storm-petrels were the most commonly found species stranded on vessels of various types, including fishing vessels, as well as oil and gas-related vessels. It is recognized that the Leach’s Storm-petrel is particularly attracted to anthropogenic light sources, and it is further recognized that the species is particularly vulnerable to effects of light attraction due to the Project, including during the breeding season due to their long foraging trips. However, the short-term nature (in any one location) of the Projects, relative to a production facility, means that the effects will consequently be short-term and transient in nature.

Overall, the planned presence and operation of the drilling installation in the Project Area is anticipated to be a negligible addition to the total amount of lighting in the overall offshore area, especially as compared to existing offshore activities such as fishing vessels, other petroleum exploration and production facilities, commercial traffic, and other vessel movements that regularly move to and through the Project Area. Drilling installations have fewer light sources than a production facility, and therefore, the potential for associated attraction effects will be smaller in magnitude. Further, the nature of the potential disturbance will be short-term in any location, as it is estimated that the drilling installation will be on location between 35 and 65 days to drill one well at a specific location. The distance at which Project-related lighting in the offshore environment will be visible (and thus, its likely zone of influence) may be up to 15 km (Rodríguez et al. 2014), but this will be influenced by site and time specific factors, as such disturbances appear to occur most frequently during periods of drizzle and fog and in overcast conditions.
Some localized and short-term behavioural effects (change in presence and abundance) are also likely to occur from the operation of the drilling installation; however, these effects will be localized, transient, and short-term in nature. Changes in habitat and food availability and quantity, if any, will also be on a localized scale and for a short-term duration. The nature, timing, geographical extent and duration of Drilling Installation and Activities for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The MODUs under consideration are the same (i.e., a drillship or semi-submersible), drilling would occur over a similar time frame (i.e., 35 to 65 days), and drilling could occur throughout the year, anywhere within the ELs. Therefore, the effects of the Drilling Installation and Activities are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling Installation and Activities on Marine Birds is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized and within the Project Area, short to medium term, regular in frequency, and reversible, with a moderate level of confidence.

9.3.4 Drilling and Associated Marine Discharges

The predicted environmental effects of drilling and associated marine discharges are primarily related to release of organic wastes, which may result in changes in mortality / injury levels, presence and abundance of avifauna, and food availability and quality. Organic waste will be reduced prior to discharge in accordance with the OWTG. Discharge of organic wastes (sewage and food scraps) may result in enhancement of the local food supply and attraction of birds to vessels and platforms. However, this potentially positive effect may be offset by increased exposure to risk of collision / strandings or predation as well as energetic costs due to deviation from normal movement / migration patterns. Proper waste management will reduce such effects of discharges of organic waste on birds. Hydrocarbon sheens that may occur from routine discharges (i.e., hydrocarbon concentrations of 0.01 to 1 µm thickness) may have an effect on habitat quality, albeit in the very short term, dispersing within 24 hours. The nature, timing, geographical extent and duration of Drilling and Associated Marine Discharges for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The wells will be drilled using WBMs in the first section and SBMs in the lower sections. Drilling waste discharges will adhere to the requirements for cuttings treatment and discharge guidelines in the OWTG. Therefore, the effects of the Drilling and Associated Marine Discharges are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling and Associated Marine Discharges on Marine and Migratory Birds is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, short term, sporadic in frequency, and reversible, with a medium level of confidence.

9.3.5 Formation Flow Testing with Flaring

The predicted environmental effects of formation flow testing with flaring are primarily related to attraction of birds to flares, which may result in changes in mortality / injury levels, and in presence and abundance of avifauna. Although there is some potential for the attraction of migratory landbirds, it is unlikely that large numbers of landbirds will be affected. Any flaring events conducted will occur several hundred kilometres offshore, far away from coastal breeding sites and IBAs and well beyond the foraging range of almost all species that nest in Newfoundland. Therefore, breeding birds are unlikely to be affected by this activity, with the potential exception of the Leach’s storm-petrel, which may forage thousands of kilometres from the nest site during the breeding season (Pollet et al. 2014).

While accurate assessment of mortality at offshore facilities may be difficult, no mass mortality events have ever been reported at offshore oil and gas operations in offshore Newfoundland. While the rarity of such events makes determination of trends difficult, these incidents tend to occur at night during migration season (April-May and September-October). They appear to be associated with a particular set of atmospheric conditions: foggy or misty, with low cloud cover may force birds to fly lower than they ordinarily would. Flares may provide misleading navigational cues to migrating birds, causing them to become disoriented and circle or fly into the light source, particularly in the absence of other visual cues (e.g., moonlight and stars) (Montevecchi 2006).

Formation flow testing with flaring may be required in one of every five wells drilled (therefore two total for this Project), where hydrocarbons are discovered and additional reservoir data is needed. However, there is the potential to complete formation testing while tripping (FTWT) which is an alternative to formation flow testing with flaring. It is unknown at this time if formation flow testing with flaring or FTWF will be completed. Formation flow testing with flaring may require up to three days of flaring, however, if an extended flow test is required then flaring would last up to five days. From a worst-case scenario perspective, it is assumed that both wells will require formation flow testing with flaring, therefore the total potential days of flaring is estimated to be between 6 and 10 days over a 10-year period. Water curtains are sometimes deployed during flaring operations to protect the drilling installation from the generated heat. Equinor Canada is not currently aware of any literature that suggests that water curtains are effective in preventing attraction of birds. Equinor Canada is proposing to develop a seabird observation protocol applicable to exploration drilling activities in consultation with ECCC-Canadian Wildlife Service (CWS). Information outlined in the seabird observation protocol will be determined in consultation with ECCC-CWS, and aspects such as frequency of searches, reporting procedures, and training requirements will be included.

The nature, timing, geographical extent and duration of Formation Flow Test with Flaring for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The formation flow test with flaring under consideration are the same (i.e., carried out on wells where hydrocarbons are discovered, and additional reservoir data are needed), flaring would be continuous and last between two to five days. Therefore, the effects of the Formation Flow Test with Flaring are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Formation Flow Test with Flaring on Marine Birds is considered applicable to this Project. An alternative to formation flow testing with flaring exists and may be used on exploration wells to gather similar data. These types of tests, called Formation Testing While Tripping, may be conducted without the need to flare. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized and within the Project Area, short term, sporadic in frequency, and reversible, with a moderate level of confidence.

9.3.6 Wellhead Decommissioning

No effects on Marine and Migratory Birds as a result of wellhead decommissioning are anticipated. Wellhead decommissioning is conducted underwater, at depth, and in adherence to the requirements set out under the *Newfoundland Offshore Petroleum Drilling and Production Regulations*. The nature, timing, geographical extent and duration of Well Decommissioning or Suspension for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The activities under consideration are the same (i.e., isolating the wellbore by placing cement plugs and/or mechanical devices, at various depths, and in some cases, cutting the casing and removing the casing just below the surface of the seafloor and removing equipment). Therefore, the effects of the Well Decommissioning or Suspension are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Well Decommissioning or Suspension on Marine Birds is considered applicable to this Project. In addition,

there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to have no adverse effect, with a high level of confidence.

9.3.7 Project-related Surveys

The predicted environmental effects of survey activities are primarily related to noise exposure from geophysical testing, which may result in changes in presence and abundance of avifauna, and potentially short-term injury. Deep-diving birds, such as alcids (including murres, dovekies, and puffins), as well as other bird species that forage underwater, may be at somewhat higher risk of injury or disruption due to exposure to underwater noise, such as that generated by seismic sound sources. VSP and geophysical, geohazard, wellsite and/or seabed surveys using 2D seismic arrays or other equipment will be conducted as required. However, these surveys will be short-term (normally completed in a matter of hours) and localized in nature. Marine and Migratory Birds are unlikely to be affected by the underwater sound energy that is associated with these activities as it is significantly lower when compared to other sources such as 3D seismic. Fish resources (the primary food source for marine and migratory birds in the offshore) are anticipated to be affected by geophysical survey activity. This potential effect is expected to be low in magnitude, localized, sporadic, and short-term. The nature, timing, geographical extent and duration of Geophysical, Environmental and Geotechnical Surveys for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The surveys under consideration are the same (i.e., conducted prior to drilling to assess the potential for hazards [such as possible obstructions or seabed instability] and a pre-drill coral survey, which may include seismic sound sources, multibeam echo sounders, side scan sonar, sub-bottom profilers, and video equipment. Therefore, the effects of the Geophysical, Environmental and Geotechnical Surveys are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Geophysical, Environmental and Geotechnical Surveys on Marine Birds is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, negligible in magnitude, localized and within the Project Area, short term, sporadic in frequency, and reversible, with a moderate level of confidence.

9.3.8 Supply and Servicing

The primary environmental effects of supply and servicing activities are related to potential disturbance due to vessel movements, release of organic wastes leading to increased food availability, and attraction / disorientation of birds due to lighting. The various bird species that occupy the Project Area and potential vessel and aircraft traffic routes will not likely be disturbed by vessel activity or associated aircraft use due to its short-term transitory nature, and because it will generally be in keeping with the overall marine traffic that has occurred throughout the region for years. The release of organic wastes by offshore vessels and activities can attract birds, which may increase the potential for interactions including risk of predation, collision and exposure to contaminants. However, this will be reduced with proper waste management practices and adherence to associated MARPOL requirements (e.g., food and sewage waste will not be discharged within 5.5 km (3 NM) of the coast). Potential effects due to

lighting on supply vessels, will be highly transient in nature. Overall, the presence of these vessels in the Canada-NL Offshore Area would result in a negligible addition of night lighting in this region. The nature, timing, geographical extent and duration of Supply and Servicing for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The supply vessels and helicopters under consideration are the same, based in St. John's, NL. Return transits would be the same for a single operating drilling installation (e.g., 8 to 10 return transits per month by the supply vessels). Therefore, the effects of the Supply and Servicing for ELs 1159 and 1160 are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Supply and Servicing for ELs 1159 and 1160 on Marine Birds is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, short term, regular in frequency, and reversible, with a high level of confidence.

9.4 Species at Risk: Overview of Potential Effects

The potential environmental interactions between the Project and bird SAR are the same as those for the Marine and Migratory Bird VC as a whole, as are the planned mitigation measures to avoid or reduce such adverse interactions.

Additional species-specific information and analysis related to the potential for the Project to interact with and affect each of these SAR is provided in the Table 9.1.

Table 9.1 Marine and Migratory Bird Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	NL ESA	SARA	COSEWIC	Summary of Presence and Potential Interactions
Barrow's Goldeneye (Eastern pop.)	Vulnerable	Special Concern (Schedule 1)	Special Concern	• Moults and winters in small numbers off the coast of Eastern Canada • Known to congregate in relatively small geographic areas in important shipping corridors, therefore considered to be particularly vulnerable to being affected by accidental spills (Schmelzer 2006) • Unlikely to be present in Project Area / LSA due to their preference for coastal habitats
Harlequin Duck (Eastern pop.)	Vulnerable	Special Concern (Schedule 1)	Special Concern	• Breed inland but occur in the coastal marine environment throughout the fall and winter months. Some non-breeding individuals may be found year-round at Cape St. Mary's • Unlikely to be present in Project Area / LSA due to their preference for coastal habitats

Table 9.1 Marine and Migratory Bird Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	NL ESA	SARA	COSEWIC	Summary of Presence and Potential Interactions
Ivory Gull	Endangered	Endangered (Schedule 1)	Endangered	• Breeds in the far north and winters offshore; found in small numbers in the waters off Eastern Newfoundland, typically among pack ice • No critical habitat exists in the Project area • Potentially present. Ivory Gulls are most likely to occur in areas of pack ice. • Ivory gulls were reported on two occasions in bird surveys conducted at the Bay de Verde Well Site in the winter of 2014-2015 (Statoil 2015)
Red-necked Phalarope	none	none	Special Concern	• Phalaropes come onshore only to breed, and occur in the coastal marine environment the rest of the year • Surface feeders, often congregating in areas such as upwellings which are associated with higher prey densities • Seen in small numbers during ECSAS surveys off eastern Newfoundland, although scarce in the winter and spring (ECSAS 2016)
Piping Plover (*Melodus* ssp.)	Endangered	Endangered (Schedule 1)	Endangered	• During the nesting season, Piping Plovers are found on sandy beaches along the coast • In Newfoundland, breeding population is concentrated in the southwest and western portions of the Island • Piping plovers are unlikely to be affected by typical Project activities due to their preference for coastal habitats, but accidental spills near breeding habitat could potentially be harmful
Red Knot (*Rufa* ssp.)	Endangered	Endangered (Schedule 1)	Endangered	• Arctic breeders. Newfoundland is not considered to be a major migratory stopover location; nonetheless, sightings have been reported around much of coastal Newfoundland • Unlikely to be present in Project Area / LSA due to their preference for coastal habitats

Table 9.1 Marine and Migratory Bird Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	NL ESA	SARA	COSEWIC	Summary of Presence and Potential Interactions
Buff-breasted Sandpiper	none	none	Special Concern	• Arctic breeders. Newfoundland is not considered to be a major migratory stopover location; nonetheless, sightings have been reported in parts of coastal Newfoundland • Unlikely to be present in Project Area / LSA due to their preference for coastal habitats
Peregrine Falcon	Vulnerable	Special Concern (Schedule 1)	Special Concern	• Migrates along the coast of Newfoundland during the fall (particularly the west coast), preying on concentrations of migrating shorebirds • Some evidence suggests they may be attracted to platforms due to the abundance of prey species • Typically found in more coastal areas, but an individual was observed near an offshore production platform in October 2015 (McTavish and Lang 2015)
Common Nighthawk	Threatened	Threatened (Schedule 1)	Threatened	• Does not breed in insular Newfoundland • Unlikely to occur regularly in the Project Area / LSA; however, a vagrant was observed offshore in November 2014 (Statoil 2015)
Gray-cheeked Thrush (*minimus* ssp.)	Threatened	none	Candidate Species (low priority)	• An inland species, therefore unlikely to be affected by offshore activities at most times of year • Unlikely to be found in the Project Area / LSA; however, during fall migration, like other nocturnal migrants, there is potential to be attracted to or disoriented by artificial light sources in the offshore environment
Olive-sided Flycatcher	Threatened	Threatened (Schedule 1)	Threatened	• An inland species, therefore unlikely to be affected by offshore activities at most times of year • Unlikely to be found in the Project Area / LSA; however, during fall migration, like other nocturnal migrants, there is potential to be attracted to or disoriented by artificial light sources in the offshore environment

Table 9.1 Marine and Migratory Bird Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	NL ESA	SARA	COSEWIC	Summary of Presence and Potential Interactions
Bobolink	Vulnerable	none	Threatened	• Uncommon in eastern Newfoundland. • An inland species, therefore unlikely to be affected by offshore activities at most times of year • Unlikely to be found in the Project Area / LSA; however, during fall migration, like other nocturnal migrants, there is potential to be attracted to or disoriented by artificial light sources in the offshore environment
Short-eared Owl	Vulnerable	Special Concern (Schedule 1)	Special Concern	• Typically nests in coastal barrens and grasslands, and suitable habitat occurs in much of coastal Newfoundland • Unlikely to occur regularly in the Project Area / LSA; however, a vagrant was observed near an offshore production platform in October 2015 (McTavish and Lang 2015)

The assessment of potential Project effects on marine and migratory birds necessarily focusses on those species designated under the federal *Species at Risk Act* and provincial *Endangered Species Act* that are likely to frequent the waters off eastern Newfoundland. Nevertheless, it is recognized that species of conservation concern not listed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or protected under federal or provincial legislation may be present in the Project Area. This potentially includes the Bermuda petrel, listed as “Endangered” by International Union for Conservation of Nature (IUCN) (BirdLife International 2016). Four additional marine-associated bird species classified on the IUCN Red List of Threatened Species as “Vulnerable” are known to occur in the Study Area; namely, the long-tailed duck, black-legged kittiwake, Atlantic puffin, and Leach’s storm-petrel.

There is no designated Critical Habitat for avian SAR in the Project Area. The only marine-associated avian SAR that have a degree of potential to occur in the Project Area / LSA are the ivory gull and red-necked phalarope, although because the former spends most of its time on pack ice, interactions with the Project are likely to be infrequent. Ivory gull and red-necked phalarope may be attracted by increased food availability from organic wastes generated by the drilling installation and support vessels; however, these species are not known to be susceptible to disorientation by artificial light sources, and no strandings of ivory gull or red-necked phalarope were reported in the survey reports provided by Equinor Canada.

During fall migration, there is some potential for peregrine falcons to be attracted to platforms because of the increase in prey availability, as they are attracted to flocks of migrating birds, and some nocturnally migrating landbird SAR may be attracted by the Project lighting; however, because it is situated hundreds of kilometres from shore, these landbird species are unlikely to occur with regularity in the Project Area / LSA.

As a result of the above analysis, and with the implementation of the various mitigation measures outlined in Sections 9.3.2, the Project is not considered likely to interact with or result in adverse effects upon SAR. The Project will not affect critical habitat for these species, nor is it likely to result in disturbance of coastal breeding colonies given its offshore location.

9.5 Significance of Residual Environmental Effects

With the implementation of mitigation measures, exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse environmental effects on Marine and Migratory Birds. Individual environmental effects summaries for planned activities for ELs 1159 and 1160 are in Tables 9.2 and 9.3, respectively.

9.6 Environmental Monitoring and Follow-up

Although no specific follow-up related to the Marine and Migratory Birds VC is considered necessary in relation to the Project, a monitoring and observation program is proposed. Personnel on board the drilling installation and/or vessels tasked with seabird observations, handling and reporting will be trained in the requirements outlined in the ECSAS protocol (Gjerdrum et al. 2012). Prior to implementation of the monitoring program, Equinor Canada will outline the requirements in its Environmental Compliance Monitoring Plans (ECMPs), which are required to be submitted to the C-NLOPB to obtain OAs. The seabird monitoring programs outlined in the ECMPs will take into consideration the latest information from ECCC.

A trained Environmental Observer will be onboard to record marine bird sightings during Project operations, which will be undertaken in accordance with CWS's monitoring protocol from fixed platforms. Regular searches of vessel decks will be undertaken and accepted protocols for the collection / handling of bird mortalities and release of birds that become stranded will be implemented. If a SAR is found alive (stranded) or dead on the drilling installation or supply vessel, a report will be sent to CWS for identification. A seabird observations report will be submitted to the C-NLOPB within 90 days of well suspension and/or decommissioning. An annual report summarizing stranded and/or seabird handling will be submitted to the CWS in accordance with the Seabird Handling permit requirements.

Table 9.2 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1159 • A variety of avifauna species occur within the marine and coastal environments off Eastern Newfoundland at various times of the year, including seabirds and other avifauna that inhabit the region at particular or extended periods for breeding, feeding, migration and other activities according to their individual life histories and habitat requirements. • Birds are highly mobile, and so information on their presence and distribution (spatially and temporally) is inherently regional in nature. • A number of important habitats for birds have also been identified at locations along the coastline of Newfoundland and Labrador, well outside of the area within which exploration drilling and associated activities are planned to occur.	**Summary of Key Mitigation** • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG (2016) and other applicable regulations and standards. • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal • Equinor Canada will avoid, where possible, established bird colonies. Helicopters will avoid known coastal seabird colonies per requirements of the NL *Seabird Ecological Reserve Regulations, 2015* • During drilling operations, routine observations of seabirds, following the CWS protocols will be undertaken from the drilling installation • Routine searches for stranded birds will be conducted on the platform and supply vessels, and appropriate programs and protocols for the collection and release of marine and migratory birds will be implemented for birds that become stranded (i.e., ECCC-CWS's "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada" [ECCC 2016] and Williams and Chardine "The Leach's storm-petrel - General Information and Handling Instructions" [no date; adapted in Appendix I of EC 2015]) • Equinor Canada will obtain a Seabird Handling permit from ECCC-CWS • Sewage and kitchen waste will be macerated, in accordance with the OWTG to 6 mm particle size • Operators are required to notify the C-NLOPB for plans to flare associated with formation flow testing for exploration drilling. The C-NLOPB then consults with ECCC-CWS to determine a safe timeline to proceed to reduce effects on migrating birds

Table 9.2 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Presence and Operation of Drilling Installation	• Change in mortality / injury levels and bird health • Change in avifauna presence and abundance • Change in habitat availability and quality • Change in food availability or quality	A	L	L-PA	S-M	R	R	M
Drilling and Associated Marine Discharges	• Change in mortality / injury levels and bird health • Change in food availability or quality	A	L	L	S	S	R	M
Formation Flow Testing with Flaring	• Change in mortality / injury levels and bird health	A	L	L-PA	S	S	R	M
Wellhead Decommissioning	• None expected	N	-	-	-	-	-	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Change in mortality / injury levels and bird health • Change in avifauna presence and abundance • Change in habitat availability and quality	A	N	L - PA	S	S	R	H

Table 9.2 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geological, Geotechnical and Environmental Surveys	• None expected	N	-	-	-	-	-	H
Supply and Servicing	• Change in mortality / injury levels and bird health • Change in avifauna presence and abundance	A	L	L	S	R	R	H

Evaluation of Significance

- Based on the nature and characteristics of exploration drilling on ELs 1159 and 1160 and the existing environment for this VC within the LSA and RSA, and with the planned implementation of mitigation, exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse effects on Marine and Migratory Birds.
- Although components, activities and emissions may result in some localized, short-term interactions with marine-associated avifauna in parts of the LSA, including bird attraction to offshore lighting and other components, the number of individuals that may be affected, and the temporary and reversible nature of these interactions, means that exploration drilling on ELs 1159 and 1160 will not have any overall ecological or population-level effects, and particularly, will not result in a detectable decline in overall bird abundance or changes in the spatial and temporal distributions of bird populations within this area
  With regard to avifauna SAR, ivory gull and red-necked phalarope are the only such species that are likely to be found in the Project Area. During fall migration, there is some potential for Peregrine Falcons and nocturnally migrating landbird SAR to be present and to be attracted to exploration drilling activities. However, the potential for interactions between individuals of these species and exploration drilling is limited, and no identified critical habitat is present in the LSA or RSA. Exploration drilling on ELs 1159 and 1160 will therefore not have implications for the overall abundance, distribution, or health of such SAR nor its eventual recovery. Exploration drilling on ELs 1159 and 1160 is therefore not likely to result in significant adverse effects on avian SAR.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 9.2 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY		
KEY		
Nature / Direction:	Frequency:	Certainty in Predictions:
P Positive	O Occurs once	L Low level of confidence
A Adverse	S Occurs sporadically	M Moderate level of confidence
N Neutral (or no effect)	R Occurs on a regular basis	H High level of confidence
	C Occurs continuously	
Magnitude:		N/A Not Applicable
N Negligible	Duration:	
L Low	S Short-term (for duration of the activity)	
M Medium	M Medium-term (beyond duration of the activity – weeks or months)	
H High	L Long- term (beyond duration of the activity – years)	
	P Permanent (recovery unlikely)	
Geographic Extent:		
L Localized, in immediate vicinity of activity		
PA Within Project Area	Reversibility:	
LSA Within LSA	R Reversible (will recover to baseline)	
RSA Within RSA or beyond	I Irreversible (permanent)	

Table 9.3 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1160 • A variety of avifauna species occur within the marine and coastal environments off Eastern Newfoundland at various times of the year, including seabirds and other avifauna that inhabit the region at particular or extended periods for breeding, feeding, migration and other activities according to their individual life histories and habitat requirements. • Birds are highly mobile, and so information on their presence and distribution (spatially and temporally) is inherently regional in nature. • A number of important habitats for birds have also been identified at locations along the coastline of Newfoundland and Labrador, well outside of the area within which exploration drilling and associated activities are planned to occur.	**Summary of Key Mitigation** • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG (2016) and other applicable regulations and standards. • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal • Equinor Canada will avoid, where possible, established bird colonies. Helicopters will avoid known coastal seabird colonies per requirements of the NL *Seabird Ecological Reserve Regulations, 2015* • During drilling operations, routine observations of seabirds, following the CWS protocols will be undertaken from the drilling installation • Routine searches for stranded birds will be conducted on the platform and supply vessels, and appropriate programs and protocols for the collection and release of marine and migratory birds will be implemented for birds that become stranded (i.e., ECCC-CWS's "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada" [ECCC 2016] and Williams and Chardine "The Leach's storm-petrel - General Information and Handling Instructions" [no date; adapted in Appendix I of EC 2015]) • Equinor Canada will obtain a Seabird Handling permit from ECCC-CWS • Sewage and kitchen waste will be macerated, in accordance with the OWTG to 6 mm particle size • Operators are required to notify the C-NLOPB for plans to flare associated with formation flow testing for exploration drilling. The C-NLOPB then consults with ECCC-CWS to determine a safe timeline to proceed to reduce effects on migrating birds

Table 9.3 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Presence and Operation of Drilling Installation	• Change in mortality / injury levels and bird health • Change in avifauna presence and abundance • Change in habitat availability and quality • Change in food availability or quality	A	L	L-PA	S-M	R	R	M
Drilling and Associated Marine Discharges	• Change in mortality / injury levels and bird health • Change in food availability or quality	A	L	L	S	S	R	M
Formation Flow Testing with Flaring	• Change in mortality / injury levels and bird health	A	L	L-PA	S	S	R	M
Wellhead Decommissioning	• None expected	N	-	-	-	-	-	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Change in mortality / injury levels and bird health • Change in avifauna presence and abundance • Change in habitat availability and quality	A	N	L - PA	S	S	R	H

Table 9.3 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geological, Geotechnical and Environmental Surveys	• None expected	N	-	-	-	-	-	H
Supply and Servicing	• Change in mortality / injury levels and bird health • Change in avifauna presence and abundance	A	L	L	S	R	R	H

Evaluation of Significance

- Based on the nature and characteristics of exploration drilling on ELs 1159 and 1160 and the existing environment for this VC within the LSA and RSA, and with the planned implementation of mitigation, exploration drilling is not likely to result in significant adverse effects on Marine and Migratory Birds.
- Although components, activities and emissions may result in some localized, short-term interactions with marine-associated avifauna in parts of the LSA, including bird attraction to offshore lighting and other components, the number of individuals that may be affected, and the temporary and reversible nature of these interactions, means that exploration drilling will not have any overall ecological or population-level effects, and particularly, will not result in a detectable decline in overall bird abundance or changes in the spatial and temporal distributions of bird populations within this area
- With regard to avifauna SAR, ivory gull and red-necked phalarope are the only such species that are likely to be found in the Project Area. During fall migration, there is some potential for Peregrine Falcons and nocturnally migrating landbird SAR to be present and to be attracted to exploration drilling activities. However, the potential for interactions between individuals of these species and exploration drilling is limited, and no identified critical habitat is present in the LSA or RSA. Exploration drilling on ELs 1159 and 1160 will therefore not have implications for the overall abundance, distribution, or health of such SAR nor its eventual recovery. Exploration drilling on ELs 1159 and 1160 is therefore not likely to result in significant adverse effects on avian SAR.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 9.3 Environmental Effects Assessment Summary: Marine and Migratory Birds – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY		
KEY		
Nature / Direction:	Frequency:	Certainty in Predictions:
P Positive	O Occurs once	L Low level of confidence
A Adverse	S Occurs sporadically	M Moderate level of confidence
N Neutral (or no effect)	R Occurs on a regular basis	H High level of confidence
	C Occurs continuously	
Magnitude:	Duration:	N/A Not Applicable
N Negligible	S Short-term (for duration of the activity)	
L Low	M Medium-term (beyond duration of the activity – weeks or months)	
M Medium	L Long- term (beyond duration of the activity – years)	
H High	P Permanent (recovery unlikely)	
Geographic Extent:		
L Localized, in immediate vicinity of activity		
PA Within Project Area	Reversibility:	
LSA Within LSA	R Reversible (will recover to baseline)	
RSA Within RSA or beyond	I Irreversible (permanent)	

9.7 References

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10.0 MARINE MAMMALS AND SEA TURTLES: ENVIRONMENTAL EFFECTS ASSESSMENT

Marine Mammals and Sea Turtles were selected as a VC for this EIS because of the potential for these species to interact with Project components and activities, and because of the ecological, economic, cultural, and recreational importance that are attributed to them by government departments and agencies, Indigenous and stakeholder groups and other interested parties. The assessment of potential Project effects on marine mammals and sea turtles is also required and conducted in accordance with the requirements of the EIS Guidelines.

Marine mammals and sea turtles that are found in the Regional Study Area (RSA) include: an estimated 23 species of cetaceans (whales, dolphins, and porpoises), of which 7 are mysticetes (baleen whales) and 16 are odontocetes (toothed whales); 4 species of phocids (seals); and 4 species of sea turtles. Of these species, 11 are designated at risk or otherwise have special conservation status. Several EBSAs, representing important foraging habitat and migratory routes for marine mammals and sea turtles (Templeman 2007), are also present in the region. No critical habitat for marine mammals or sea turtles has been designated in or near the Project Area.

10.1 Environmental Assessment Study Areas and Effects Assessment Criteria

This section defines the Study Areas (spatial and temporal boundaries) for the environmental effects assessment for this VC. A number of spatial assessment boundaries have been defined for the environmental effects assessment of this VC. They reflect the varying ways and scales in which the Project may influence marine mammals and sea turtles and their habitats.

Within the Project Area itself, potential effects are expected to be direct in nature and associated with the specific environmental interactions and other disturbances that may be associated with planned Project activities. While the Project Area is defined as an overall polygon that encompasses such activities over the course of the Project, the various components and activities associated with the drilling of each individual well and other planned components will occupy fairly small areas within this overall Project Area, as described in Chapter 2. At the larger local and regional scales around the Project Area, however, the environmental effects assessment also considers the larger potential environmental ZOIs of the Project, and the characteristics, distributions and movements of the various marine mammal and sea turtle species and habitats that comprise this VC, as described below. The Project Area and RSA are the same as described in Section 4.3.1. The LSA for the marine mammals and sea turtles and fish habitat VC is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160.

The temporal boundaries for the effects assessment encompass the likely timing and duration of Project-related (in-field) activities in the Project Area, as well as the likely duration of resulting environmental effects. In conducting the assessment, special consideration is also given to timing of VC presence within the Project and assessment areas, including important or sensitive periods. Section 6.3 provides information on marine mammal and sea turtle species known to occur within these areas.

It is within the above described spatial and temporal boundaries that the potential environmental effects on this VC resulting from planned Project components and activities and their significance are assessed and evaluated.

For the purposes of this EA, significant environmental effects on Marine Mammals and Sea Turtles are defined as those that are deemed likely to cause one or more of the following:

- A detectable decline in overall marine mammal or sea turtle abundance or change in the spatial and temporal distributions of populations within the overall RSA over multiple generations
- Effects to a designated (protected) SAR or its critical habitat such that the overall abundance, distribution and health of that species and its eventual recovery within the RSA is adversely affected

10.2 Potential Environmental Changes, Effects, and Associated Parameters

The key potential environmental interactions between planned offshore oil and gas activities and marine mammals and sea turtles – including the associated environmental changes and possible resulting environmental effects on this VC – include the following (as summarized and adapted from AMEC 2014):

- Temporary hearing impairment or permanent injury or mortality from exposure to loud underwater noise after coming into close contact with a Project-related underwater sound source (e.g., drilling, geophysical sound source) at or above threshold levels for onset of injury derived from published scientific literature or those used in relevant legislation
- Behavioural effects due to Project-related sound sources or other disturbances at or above threshold levels for onset of behavioural disturbance derived from published scientific literature or those used in relevant legislation. These may include alterations in the presence, abundance, and overall distribution (including avoidance) of marine mammals and sea turtles as well as modifications to their movements, feeding, communication patterns and other activities
- Interference with (and the masking of) sounds within the marine environment that originate from and/or are used by marine biota, such as in communication between individuals, the identification and detection of predators and prey, echolocation and other activities and requirements
- Potential for injury or mortality through collisions or other interactions with offshore survey and supply vessels, including possible attraction of individual animals
- Possible changes in the availability, distribution, or quality of feed sources and/or habitats for marine mammals and sea turtles

The EIS Guidelines also identify specific issues and potential effects on this VC that require consideration in the EIS, including:

- Mortality and other effects from vessel collisions and disturbance
- Direct and indirect effects cause by increased disturbance (e.g., noise, light, vibrations) including mortality, physical injury and behavioural changes (e.g., habitat avoidance,

disruption to feeding behaviour, deviation in migration routes, communication masking, discomfort and behavioural disturbance)

As a result of these potential effects, identified environmental interactions, issues identified in the EIS Guidelines, and concerns raised through consultations and engagement, the assessment environmental effects on Marine Mammals and Sea Turtles (including SAR) is focused on the following potential environmental effects:

- Change in Mortality or Injury (Underwater Noise)
- Change in Habitat Quality or Use (Behavioural Effects)
- Change in Mortality or Injury (Vessel Strikes)
- Change in Food Availability or Quality
- Change in Health (Contaminants)

10.3 Environmental Effects Assessment and Mitigation

10.3.1 Approach and Methods

The assessment of Project effects on Marine Mammals and Sea Turtles is informed by an understanding of the existing environment (predicted species' occurrence and potential for overlap with Project activities is described in Section 6.3; ambient underwater noise characteristics within the Project Area are described in Section 5.6), consideration of environmental assessments conducted for similar oil and gas activities in offshore Newfoundland and Labrador, and engagement with relevant agencies, Indigenous groups, stakeholders, and other interested parties. The marine mammal and sea turtle effects assessment has been undertaken based on an understanding of the planned Project components and activities at the time of EIS filing. Estimates of marine mammal and sea turtle species' densities, relative abundance, and seasonal distributions are not available specific to the boundaries of the Project Area, LSA or RSA and are likely variable year-to-year. As such, assessment of potential for interactions and effects is based on understanding of general species' presence and distribution in the region, both spatially and temporally (namely, regional opportunistic sightings databases for offshore Newfoundland).

10.3.2 Summary of Key Mitigation

The following mitigation measures and standard practices will be implemented during Project activities to reduce the potential adverse effects on marine mammals and sea turtles. Measures to mitigate potential environmental effects on marine fish species outlined in Section 8.3.2, will also reduce the potential for effects on prey for marine mammals and sea turtles.

The mitigation measures outlined below focus on reducing the potential interaction of vessel strikes and exposure to underwater noise at or above threshold levels for auditory injury and behavioural disturbance, as follows:

- Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable

- Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols
- Operational discharges will be treated prior to release in accordance with the OWTG (2016) and other applicable regulations and standards
- The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG
- Project associated vessel traffic will be approximately eight to ten trips per month to service one drilling installation. Vessels will maintain a steady course and safe vessel speed whenever possible
- Use of explosives will not be employed for removal of wellheads
- Passive acoustic monitoring will be implemented as per the condition in the Flemish Pass Decision statement.
- Implementation of a chemical management system that adheres to C-NLOPB requirements and discharge treatment in accordance with the OWTG and MARPOL, where applicable.
- As required in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines, mitigation measures applied during the Project's geophysical surveys will be consistent with those outlined in the Statement of Canadian Practice with respect to the Mitigation of Geophysical Sound in the Marine Environment (SOCP) (DFO 2007). The following is a partial list of those mitigation measures:
  - Trained marine mammal observers (MMOs) will be used to monitor and report on marine mammal and sea turtle sightings within 500 m during VSP and geophysical surveys where geophysical source arrays are used
  - A ramp-up of the source array (i.e., gradually increasing geophysical source elements over a period of at least 20 minutes until the operating level is achieved) will be conducted starting from a single source element
  - MMOs will implement a pre-ramp up watch of 30 minutes prior to the start of the air source. Ramp-up will be delayed if marine mammal or sea turtle is sighted within the safety zone
  - Shut down of the geophysical source array will occur if a marine mammal or sea turtle listed as endangered or threatened on SARA Schedule 1 is observed

10.3.3 Presence and Operation of Drilling Installation

The predicted environmental effects associated with presence and operation of a drilling installation are primarily related to increase in underwater noise that may result in a change in mortality or injury and change in habitat quality or use (behavioural effects). There is very little possibility that two drilling installations would operate at the same time in proximity to one another as part of the Project. In assessing the potential effects of underwater noise on marine mammal and sea turtle species, the EIS relied on literature source levels, the results of acoustic modelling for other projects (Zykov 2016), and field measurements during comparable drilling operations (Maxner et al. 2017; Quijano et al. 2017). In this case, marine mammals or sea turtles are not expected to be injured or killed as a result of underwater noise introduced during presence and operation of a drilling installation, nor is the quality or availability of their prey expected to be adversely affected.

Results from the Scotian Basin Exploration Drilling Project underwater sound modelling of operating drilling installations predicted that cumulative sound exposure levels (SELs) (over 24 hours) would decrease to below threshold values for potential marine mammal auditory injury at distances between 120 and 470 m from the source (depending on the species group and environmental conditions) (Zykov 2016). Marine mammals were not expected to remain within such close proximity of the operating drilling installation over the course of 24 hours. Similarly, peak sound pressure levels (SPLs) were predicted to decrease to below threshold values for permanent threshold shift at distances greater than 10 m from the operating drilling installation, and as such, exposure to underwater noise at levels capable of causing marine mammal auditory injury (using either the SPL or SEL metric) was deemed unlikely (Zykov 2016).

While exposure to injurious sound levels is unlikely, at received sound levels above 120 dB re 1 µPa (rms) (NOAA n.d.), marine mammals may exhibit a variety of behavioural responses. Results for the Scotian Basin Exploration Drilling Project modelling predicted that sound levels from an operating drilling installation would attenuate to below the NOAA behavioural disturbance thresholds (120 dB re 1 µPa RMS SPL) at distances from the source ranging from 23 km (in summer) to approximately 150 km (winter). That Project's location featured a strong surface channel, created by strong winter water temperature gradients that trapped acoustic energy at the surface, thereby reducing the amount of transmission loss. The most conservative winter sound speed profile for this Project exhibits a weaker surface channel compared to the February profile used in the Scotian Basin modelling; therefore, the surface channel is not expected to be as conductive to sound, and it will likely yield shorter distances to thresholds. Distances to thresholds for behavioural disturbance are also likely to be lower in shallow water sections of the Project Area. It is therefore reasonable to assume that some degree of change in habitat use in response to underwater noise is expected of individuals that occur within tens of kilometres of the drilling installation at the time of operation. The exact nature of behavioural response cannot be predicted but could include interference in communication, minor alterations in activity, or localized avoidance responses. The number of individuals affected is expected to be minimal relative to overall population sizes, effects will be of moderate duration (less for transient individuals), and there are no known concentration or critical habitat areas in the RSA.

The nature, timing, geographical extent and duration of Drilling Installation and Activities for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The MODUs under consideration are the same (i.e., a drillship or semi-submersible), drilling would occur over a similar time frame (i.e., 35 to 65 days), and drilling could occur throughout the year, anywhere within the ELs. Therefore, the effects of the Drilling Installation and Activities are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling Installation and Activities on Marine Mammals and Sea Turtles is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low to medium in magnitude, localized and within the Local Study Area, short to medium term, regular in frequency, and reversible, with a moderate to high level of confidence.

10.3.4 Drilling and Associated Marine Discharges

The predicted environmental effects to marine mammals and sea turtles associated with drilling and associated marine discharges is change in health (contaminants) related to routine discharges of drilling muds, drilling fluid, and cuttings associated with drilling activities. Chemicals used for drilling operations will be screened in accordance with a chemical management system that adheres to the C-NLOPB requirements. With the application of mitigation measures, the potential for changes in health and in food availability or quality as a result of drilling and marine discharges is predicted to be adverse but negligible. This conclusion has been determined with a high level of confidence, based on the implementation of industry-standard guidelines and best management practices and the limited potential for exposure of marine mammals and sea turtles to marine contaminants or contaminated prey. The nature, timing, geographical extent and duration of Drilling and Associated Marine Discharges for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The wells will be drilled using WBMs in the first section and SBMs in the lower sections. Drilling waste discharges will adhere to the requirements for cuttings treatment and discharge guidelines in the OWTG. Therefore, the effects of the Drilling and Associated Marine Discharges are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling and Associated Marine Discharges on Marine Mammals and Sea Turtles is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized and within the Project Area, short term, regular in frequency, and reversible, with a high level of confidence.

10.3.5 Formation Flow Testing with Flaring

Given compliance with OWTG requirements, the potential for changes in health and food availability or quality as a result of drilling and marine discharges is predicted to be adverse but negligible. The nature, timing, geographical extent and duration of formation flow test with flaring for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The formation flow test with flaring under consideration are the same (i.e., carried out on wells where hydrocarbons are discovered, and additional reservoir data are needed), flaring would be continuous and last between two to five days. Therefore, the effects of the Formation Flow Test with Flaring are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Formation Flow Test with Flaring on Marine Mammals and Sea Turtles is considered applicable to this Project. An alternative to formation flow testing with flaring exists and may be used on exploration wells to gather similar data. These types of tests, called Formation Testing While Tripping, may be conducted without the need to flare. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, negligible to low in magnitude, localized and within the Project Area, short term, sporadic in frequency, and reversible, with a high level of confidence.

10.3.6 Wellhead Decommissioning

During wellhead decommissioning, disturbance during mechanical removal of wellheads and presence of the ROV may result in temporary, localized avoidance by marine mammals and sea turtles within the immediate area surrounding the wellhead. Underwater noise will be produced by either the drilling installation or an alternative vessel capable of carrying out the decommissioning activity. Changes in marine fish health (and thus changes in marine mammal and sea turtle prey quality) are not expected. As such, potential interactions with marine mammals associated with this activity will be limited to change in habitat quality or use due to an increase in underwater noise during vessel transit and change in mortality or injury from vessel strike risk. The nature, timing, geographical extent and duration of Well Decommissioning or Suspension for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The activities under consideration are the same (i.e., isolating the wellbore by placing cement plugs and/or mechanical devices, at various depths, and in some cases, cutting the casing and removing the casing just below the surface of the seafloor and removing equipment). Therefore, the effects of the Well Decommissioning or Suspension are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Well Decommissioning or Suspension on Marine Mammals and Sea Turtles is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, negligible to low in magnitude, localized and within the Project Area, short term, sporadic in frequency, and reversible, with a high level of confidence.

10.3.7 Project-related Surveys

Underwater noise produced during VSP and other geophysical surveys have the potential for injury or mortality or behavioural changes in marine mammals and sea turtles. However, in this case, and particularly with the implementation of mitigation measures, injury or mortality is not predicted for marine mammals or sea turtles as a result of underwater noise from VSP and other geophysical surveys, nor is the quality or availability of their prey expected to be adversely affected. Some degree of change in habitat use in response to underwater noise is expected for individuals that occur within a few kilometres of the surveys at the time of operation. The exact nature of behavioural response cannot be predicted but could include, for example, interference in communication, minor alterations in activity, or localized avoidance responses. Avoidance responses, where they occur, will further reduce the potential for injury. The number of individual marine mammal and sea turtles affected is expected to be minimal relative to overall population sizes, effects will be localized and of short-term duration, and there are no known concentration or critical habitat areas in the Project Area. Geological, geotechnical, and environmental surveys have a low potential to affect Marine Mammals and Sea Turtles, resulting from changes in habitat quality or use, change in mortality / injury (vessel strikes), and change in food availability and quality. The nature, timing, geographical extent and duration of Geophysical, Environmental and Geotechnical Surveys for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The surveys under consideration are the same (i.e., conducted prior to drilling to assess the potential for hazards [such as possible obstructions or seabed instability] and a pre-drill coral survey, which may include seismic sound

sources, multibeam echo sounders, side scan sonar, sub-bottom profilers, and video equipment. Therefore, the effects of the Geophysical, Environmental and Geotechnical Surveys are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Geophysical, Environmental and Geotechnical Surveys on Marine Mammals and Sea Turtles is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, negligible to low in magnitude, localized and within the Local Study Area, short to medium term, sporadic in frequency, and reversible, with a high level of confidence.

10.3.8 Supply and Servicing

Marine transportation associated with support / supply / survey vessels will result in an increase in marine vessel traffic to, from and within the LSA and within the RSA overall, and an associated increase in underwater noise and vessel strike risk. Despite the lack of underwater sound modelling and uncertainty regarding noise thresholds for different species of marine mammals and sea turtles, potential for exposure is expected to be brief and transient in nature. While vessel strikes can and do have serious consequences for individuals involved, these events are rare on a per-vessel basis and only a small number of vessels relative to current vessel traffic volumes will be added in the RSA. If a vessel strike does occur, the vessel master will contact Canadian Coast Guard and Equinor Canada will contact DFO. The offshore Newfoundland area does not have prescribed speed limits or shipping lanes. Speed is set based on environmental conditions (e.g., wind, waves), distances and fuel efficiency and will follow operational best practices for the area. As standard practice, transits are typically completed at speeds of between 10 to 12 knots. Occasionally the vessels will transit at best possible speed which will generally be 13 to 14 knots.

For safety and environmental protection, drilling in offshore environments is preferentially conducted during the summer months, and it is not practical to avoid drilling from May through September. However, observations for marine mammals and sea turtles will be conducted during offshore activities and speeds will be reduced if marine mammals and/or sea turtles are observed in close proximity to the installation.

Helicopter support will be used for crew transfers out of St. John’s International Airport. Routine transportation activities associated with helicopter support have the potential to result in change in habitat quality or use for marine mammals and sea turtles as a result of sensory disturbances from the introduction of visual cues and noise. The nature, timing, geographical extent and duration of Supply and Servicing for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The supply vessels and helicopters under consideration are the same, based in St. John’s, NL. Return transits would be the same for a single operating drilling installation (e.g., 8 to 10 return transits per month by the supply vessels). Therefore, the effects of the Supply and Servicing for ELs 1159 and 1160 are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Supply and Servicing for ELs 1159 and 1160 on Marine Mammals and Sea Turtles is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change

the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized and within the Local Study Area, short term, regular in frequency, and reversible, with a high level of confidence.

10.4 Species at Risk: Overview of Potential Effects

Marine mammal and sea turtles listed as SAR are those species that are listed as endangered, threatened or of special concern under Schedule 1 of SARA (and are therefore, formally and legally protected) and/or which are otherwise designated by COSEWIC as endangered, threatened or of special concern. There are currently no marine mammal or sea turtle species listed under the NL ESA. Based on a review of scientific literature, status updates, other EAs, and records from marine surveys and sightings databases, there are nine marine mammals and two sea turtle SAR / SOCC that may occur in the Project Area and RSA, including the: beluga whale, blue whale, bowhead whale, fin whale, North Atlantic right whale, harbour porpoise, killer whale, northern bottlenose whale, Sowerby's beaked whale, and leatherback and loggerhead sea turtle (see Table 10.1).

Table 10.1 Marine Mammal and Sea Turtle Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	SARA Schedule 1 Status	COSEWIC Designation	Summary of Presence in Project Area / RSA	Potential for Occurrence and Interaction
Beluga whale (St. Lawrence Estuary population)	Threatened	Endangered	• Opportunistic Sightings in the Project Area: Rare • Opportunistic Sightings in the RSA: Rare • Timing of Presence in the Project Area: Infrequent visitor • Timing of Presence in the RSA: Infrequent visitor	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Low • Potential for Interaction with Project Activities: Low
Blue whale (Atlantic population)	Endangered	Endangered	• Opportunistic Sightings in the Project Area: None • Opportunistic Sightings in the RSA: Few • Timing of Presence in the Project Area: No occurrence • Timing of Presence in RSA: Infrequent visitor	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Low • Potential for Interaction with Project Activities: Low
Bowhead whale (Eastern Canada-West Greenland population)	Not Listed	Special Concern	• Opportunistic Sightings in the Project Area: None • Opportunistic Sightings in the RSA: Rare • Timing of Presence in the Project Area: Infrequent visitor • Timing of Presence in the RSA: Infrequent visitor	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Low • Potential for Interaction with Project Activities: Low
Fin whale (Atlantic Population)	Special Concern	Special Concern	• Opportunistic Sightings in the Project Area: Regular • Opportunistic Sightings in the RSA: Frequent • Timing of Presence in the Project Area: Seasonal (highest concentration from June to September) • Timing of Presence in the RSA: Seasonal (highest concentration from May to October)	• Potential for Occurrence in the Project Area: High • Potential for Occurrence in the RSA: High • Potential for Interaction with Project Activities: High
Harbour porpoise	Not Listed (Threatened on Schedule 2)	Special Concern	• Opportunistic Sightings in the Project Area: Few • Opportunistic Sightings in the RSA: Regular	• Potential for Occurrence in the Project Area: Moderate

Table 10.1 Marine Mammal and Sea Turtle Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	SARA Schedule 1 Status	COSEWIC Designation	Summary of Presence in Project Area / RSA	Potential for Occurrence and Interaction
(Northwest Atlantic subspecies)			• Timing of Presence in the Project Area: Seasonal (highest concentration from May to September) • Timing of Presence in the RSA: Seasonal (highest concentration from May to September)	• Potential for Occurrence in the RSA: Moderate • Potential for Interaction with Project Activities: Moderate
Killer whale (Northwest Atlantic population)	Not Listed	Special Concern	• Opportunistic Sightings in the Project Area: Rare • Opportunistic Sightings in the RSA: Regular • Timing of Presence in the Project Area: Seasonal (highest concentration from May to October) • Timing of Presence in the RSA: Seasonal (highest concentration from May to October)	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Moderate • Potential for Interaction with Project Activities: Low
North Atlantic right whale	Endangered	Endangered	• Opportunistic Sightings in the Project Area: Rare • Opportunistic Sightings in the RSA: Rare • Timing of Presence in the Project Area: Infrequent visitor • Timing of Presence in the RSA: Infrequent visitor	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Low • Potential for Interaction with Project Activities: Low
Northern bottlenose whale (1: Scotian Shelf population/ 2: Davis Strait-Baffin Bay-Labrador Sea population)	1: Endangered 2: Not Listed	1: Endangered 2: Special Concern	• Opportunistic Sightings in the Project Area: Regular • Opportunistic Sightings in the RSA: Regular • Timing of Presence in the Project Area: Seasonal (highest concentration from May to August) • Timing of Presence in the RSA: Seasonal (highest concentration from May to September)	• Potential for Occurrence in the Project Area: Moderate • Potential for Occurrence in the RSA: Moderate • Potential for Interaction with Project Activities: Moderate

Table 10.1 Marine Mammal and Sea Turtle Species at Risk: Analysis of Potential Environmental Interactions and Effects

Species	SARA Schedule 1 Status	COSEWIC Designation	Summary of Presence in Project Area / RSA	Potential for Occurrence and Interaction
Sowerby's beaked whale	Special Concern	Special Concern	• Opportunistic Sightings in the Project Area: Rare • Opportunistic Sightings in the RSA: • Timing of Presence in the Project Area: Infrequent visitor • Timing of Presence in the RSA: Infrequent visitor	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Low • Potential for Interaction with Project Activities: Low
Leatherback sea turtle	Endangered	Endangered	• Opportunistic Sightings in the Project Area: Rare • Opportunistic Sightings in the RSA: Regular • Timing of Presence in the Project Area: Infrequent Visitor • Timing of Presence in the RSA: Seasonal (highest concentration from April to October)	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Moderate • Potential for Interaction with Project Activities: Low
Loggerhead sea turtle	Not Listed	Endangered	• Opportunistic Sightings in the Project Area: Rare • Opportunistic Sightings in the RSA: Regular • Timing of Presence in the Project Area; Infrequent Visitor • Timing of Presence in the RSA: Seasonal (highest concentration from April to October)	• Potential for Occurrence in the Project Area: Low • Potential for Occurrence in the RSA: Moderate • Potential Interaction with Project Activities: Low

The information used in this section to describe the understood occurrence of marine mammal and sea turtle SAR in the Project Area, LSA and RSA is based on opportunistic sightings and does not represent year-round, systematic, or standardized effort, either spatially or temporally. Therefore, sightings records can support identification of potential presence of a species in the Eastern Newfoundland offshore area, but a lack of sightings should not be interpreted to represent a definite lack of species presence. Similarly, while some marine mammal or sea turtle species may be considered common to the area year-round, many species are also migratory, appearing seasonally, following prey movements, or simply passing through. Opportunistic data should therefore not be used to assess abundance, frequency, or seasonality because effort has not been uniformly applied at all times of year (i.e., lack of winter sightings may simply represent lower numbers of observers / surveys in the region). Most opportunistic sightings are reported from vessel-based platforms and the positive and/or negative reactions by cetaceans and sea turtles to these vessels have not been factored into the data considered. Opportunistic sightings are reported by individuals with various degrees of experience and expertise in marine mammal identification and the data have not been completely error-checked. The quality of some of the information, therefore, is unknown. Despite these caveats, this information is of value in identifying overall potential for species' presence in the region.

10.5 Significance of Residual Environmental Effects

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse environmental effects on Marine Mammals and Sea Turtles (including SAR). Individual environmental effects summaries for planned activities for ELs 1159 and 1160 are in Tables 10.2 and 10.3, respectively.

10.6 Environmental Monitoring and Follow-up

The following operational program for marine mammals will be implemented during geophysical surveys where a sound source is used, including VSP:

- A trained MMO will be onboard to record marine mammal and sea turtle sightings during Project operations
- A marine mammal and sea turtle monitoring plan will be submitted to the applicable regulators for review at least 30 days prior to the commencement of the first geophysical survey
- Visual monitoring for the presence of marine mammals and sea turtles within a pre-determined exclusion zone will take place during geophysical operations where an air source array is used
- Observational / shutdown procedures will follow the SOCP for Marine Mammals and Sea Turtles
- Passive acoustic monitoring will be implemented as per the condition in the Flemish Pass Decision statement.
- 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. Any vessel strikes involving marine mammals or sea turtles will be reported to DFO within 24 hours.

Table 10.2 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1159 • Species that may interact with exploration drilling include: 18 species of cetaceans, of which six species are mysticetes and 12 species are odontocetes; four species of phocids; and four species of sea turtles • These species are mobile and therefore their presence and distribution are regional and transient in nature.	**Summary of Key Mitigation** • Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG (2016) and other applicable regulations and standards • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • Project associated vessel traffic will be approximately eight to ten trips per month to service one drilling installation. Vessels will maintain a steady course and safe vessel speed whenever possible • Use of explosives will not be employed for removal of wellheads • Passive acoustic monitoring will be implemented as per the condition in the Flemish Pass Decision statement. • As required in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines, mitigation measures applied during geophysical surveys will be consistent with those outlined in the SOCP (DFO 2007). The following is a partial list of those mitigation measures: – Trained MMOs will be used to monitor and report on marine mammal and sea turtle sightings during VSP and geophysical surveys where geophysical source arrays are used – A ramp-up of the source array (i.e., gradually increasing geophysical source elements over a period of at least 20 minutes until the operating level is achieved) will be conducted starting from a single source element – MMOs will implement a pre-ramp up watch of 30 minutes prior to the start of the air source. Ramp-up will be delayed if marine mammal or sea turtle is sighted within the safety zone – Shut down of the geophysical source array will occur if a marine mammal or sea turtle listed as endangered or threatened on SARA Schedule 1 is observed

Table 10.2 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Presence and Operation of Drilling Installation	• Change in mortality or injury (underwater noise) • Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	L-M	PA-LSA	S-M	R	R	M
Drilling and Associated Marine Discharges	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality Change in health (contaminants)	A	L	L-PA	S	R	R	H
Formation Flow Testing with Flaring	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality Change in health (contaminants)	A	N-L	L-PA	S	S	R	H

Table 10.2 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Wellhead Decommissioning	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	N-L	L-PA	S	S	R	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Change in mortality or injury (underwater noise) • Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	N-L	L-LSA	S-M	S	R	H
Geological, Geotechnical and Environmental Surveys	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	N	L-PA	S	S	R	H
Supply and Servicing	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	L	L-LSA	S	R	R	H

Table 10.2 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY
Evaluation of Significance • Based on the nature and characteristics of exploration drilling and the existing environment for this VC within the LSA and RSA, and with the planned implementation of mitigation, exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse effects on Marine Mammals and Sea Turtles. • Although components, activities, and emissions may result in some localized, short-term interactions with individuals, the number of individuals and areas that may be affected, and the temporary and reversible nature of these interactions, means that exploration drilling will not have any overall ecological or population-level effects, and will not result in any detectable decline in overall abundance or changes in the spatial and temporal distributions of populations within the RSA. • For SAR, the potential for interactions between individuals of these species and exploration drilling is limited, and no identified critical habitat is present in the LSA or RSA. Exploration drilling on ELs 1159 and 1160 will therefore not have implications for the overall abundance, distribution, or health of any such species nor its eventual recovery within the RSA. Exploration drilling on ELs 1159 and 1160 is not predicted to result in significant adverse effects on marine mammal or sea turtle SAR. NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.
KEY Nature / Direction: P Positive A Adverse N Neutral (or no effect) Magnitude: N Negligible L Low M Medium H High Geographic Extent: L Localized, in immediate vicinity of activity PA Within Project Area LSA Within LSA RSA Within RSA or beyond Frequency: O Occurs once S Occurs sporadically R Occurs on a regular basis C Occurs continuously Duration: S Short-term (for duration of the activity) M Medium-term (beyond duration of the activity – weeks or months) L Long-term (beyond duration of the activity – years) P Permanent (recovery unlikely) Reversibility: R Reversible (will recover to baseline) I Irreversible (permanent) Certainty in Predictions: L Low level of confidence M Moderate level of confidence H High level of confidence N/A Not Applicable

Table 10.3 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1160 • Species that may interact with exploration drilling include: 18 species of cetaceans, of which six species are mysticetes and 12 species are odontocetes; four species of phocids; and four species of sea turtles • These species are mobile and therefore their presence and distribution are regional and transient in nature.	**Summary of Key Mitigation** • Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG (2016) and other applicable regulations and standards • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • Project associated vessel traffic will be approximately eight to ten trips per month to service one drilling installation. Vessels will maintain a steady course and safe vessel speed whenever possible • Use of explosives will not be employed for removal of wellheads • Passive acoustic monitoring will be implemented as per the condition in the Flemish Pass Decision statement. • As required in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines, mitigation measures applied during geophysical surveys will be consistent with those outlined in the SOCP (DFO 2007). The following is a partial list of those mitigation measures: – Trained MMOs will be used to monitor and report on marine mammal and sea turtle sightings during VSP and geophysical surveys where geophysical source arrays are used – A ramp-up of the source array (i.e., gradually increasing geophysical source elements over a period of at least 20 minutes until the operating level is achieved) starting from a single source element – MMOs will implement a pre-ramp up watch of 30 minutes prior to the start of the air source. Ramp-up will be delayed if marine mammal or sea turtle is sighted within the safety zone – Shut down of the geophysical source array if a marine mammal or sea turtle listed as endangered or threatened on SARA Schedule 1 is observed

Table 10.3 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Presence and Operation of Drilling Installation	• Change in mortality or injury (underwater noise) • Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	L-M	PA-LSA	S-M	R	R	M
Drilling and Associated Marine Discharges	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality • Change in health (contaminants)	A	L	L-PA	S	R	R	H
Formation Flow Testing with Flaring	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality • Change in health (contaminants)	A	N-L	L-PA	S	S	R	H

Table 10.3 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Wellhead Decommissioning	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	N-L	L-PA	S	S	R	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Change in mortality or injury (underwater noise) • Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	N-L	L-LSA	S-M	S	R	H
Geological, Geotechnical and Environmental Surveys	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	N	L-PA	S	S	R	H
Supply and Servicing	• Change in habitat quality or use (behavioural effects) • Change in mortality or injury (vessel strikes) • Change in food availability or quality	A	L	L-LSA	S	R	R	H

Table 10.3 Environmental Effects Assessment Summary: Marine Mammals and Sea Turtles – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY
Evaluation of Significance • Based on the nature and characteristics of exploration drilling and the existing environment for this VC within the LSA and RSA, and with the planned implementation of mitigation, exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse effects on Marine Mammals and Sea Turtles. • Although components, activities, and emissions may result in some localized, short-term interactions with individuals the number of individuals and areas that may be affected, and the temporary and reversible nature of these interactions, means that exploration drilling will not have any overall ecological or population-level effects, and will not result in any detectable decline in overall abundance or changes in the spatial and temporal distributions of populations within the RSA. • For SAR, the potential for interactions between individuals of these species and exploration drilling is limited, and no identified critical habitat is present in the LSA or RSA. Exploration drilling on ELs 1159 and 1160 will therefore not have implications for the overall abundance, distribution, or health of any such species nor its eventual recovery within the RSA. Exploration drilling on ELs 1159 and 1160 is not predicted to result in significant adverse effects on marine mammal or sea turtle SAR. NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.
KEY Nature / Direction: P Positive A Adverse N Neutral (or no effect) Magnitude: N Negligible L Low M Medium H High Geographic Extent: L Localized, in immediate vicinity of activity PA Within Project Area LSA Within LSA RSA Within RSA or beyond Frequency: O Occurs once S Occurs sporadically R Occurs on a regular basis C Occurs continuously Duration: S Short-term (for duration of the activity) M Medium-term (beyond duration of the activity – weeks or months) L Long-term (beyond duration of the activity – years) P Permanent (recovery unlikely) Reversibility: R Reversible (will recover to baseline) I Irreversible (permanent) Certainty in Predictions: L Low level of confidence M Moderate level of confidence H High level of confidence N/A Not Applicable

10.7 References

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11.0 SPECIAL AREAS: ENVIRONMENTAL EFFECTS ASSESSMENT

Special Areas in relation to ELs 1159 and 1160, are illustrated in Figure 11.1 below. Updated information associated with distances from ELs 1159 and 1160 to Special Areas is outlined in Table 11.1 below.

11.1 Special Areas Overlapping with ELs 1159 and 1160

Table 11.2 below outlines the Special Areas that overlap with ELs 1159 and 1160, as well as their defining features.

11.2 Environmental Assessment Study Areas and Effects Assessment Criteria

This section defines the Study Areas (spatial and temporal boundaries) for the environmental effects assessment for this VC. A number of spatial assessment boundaries have been defined for the environmental effects assessment of this VC, which reflect the varying ways and scales in which the Project may influence special areas.

Within the Project Area itself, potential effects are expected to be direct in nature and associated with the specific environmental interactions and other disturbances that may be associated with planned Project activities. While the Project Area is defined as an overall polygon that encompasses such activities over the course of the Project, the various components and activities associated with the drilling of each individual well and other planned components will occupy fairly small areas within this overall Project Area, as described in Chapter 2. At the larger local and regional scales around the Project Area, however, the environmental effects assessment also considers the larger potential environmental ZOIs of the Project. The Project Area and RSA are the same as described in Section 4.3.1. The LSA for the special areas VC is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160.

The temporal boundaries for the effects assessment encompass the likely timing and duration of Project-related (in-field) activities in the Project Area, as well as the likely duration of resulting environmental effects. In conducting the assessment, special consideration is also given to important or sensitive periods for the environmental features and processes and associated human uses of the special areas that comprise this VC.

It is within the above described spatial and temporal boundaries that the Project's potential environmental effects on this VC and their significance are assessed and evaluated.

Significant environmental effects for the Special Areas VC are defined as those that would cause:

- An adverse change in one or more of the important and defining ecological and sociocultural characteristics of such an area, resulting in a decrease in its overall integrity, value or use

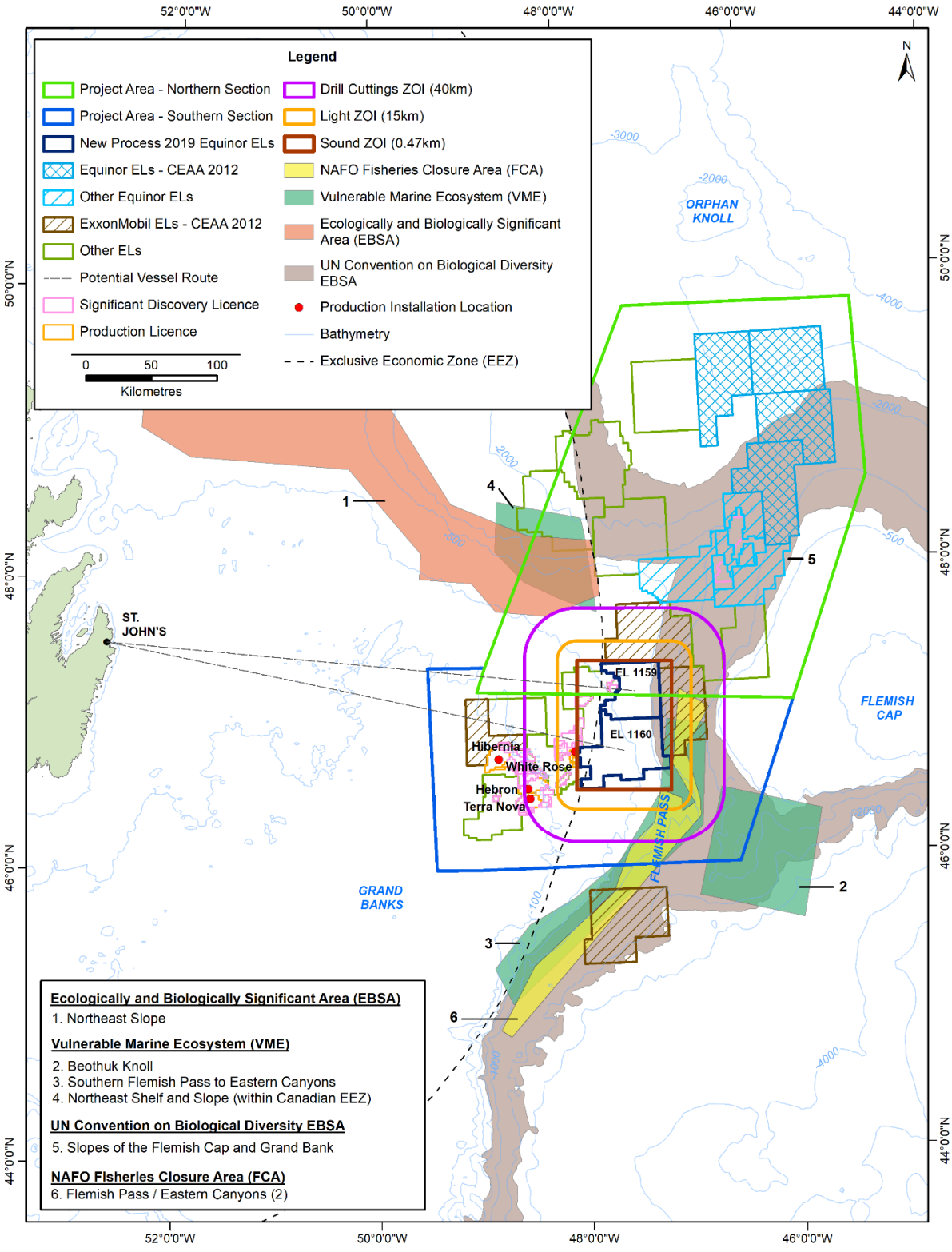


Figure 11-1 Special Areas in Eastern Newfoundland

Table 11.1 Special Areas Minimum Distances to ELs 1159 and 1160

Special Area	Minimum Distance (km)	
	EL 1159	EL 1160
Marine Protected Areas (MPA)		
Eastport – Duck Islands MPA	469	478
Eastport – Round Island MPA	474	480
Laurentian Channel MPA	700	672
Gilbert Bay MPA	827	853
Marine Refuges		
Northeast Newfoundland Slope Closure	82	117
Hawke Channel Closure	694	723
Funk Island Deep Closure	434	455
FCAs within the EEZ		
Eastport Lobster Management Area	455	464
Funk Island Deep Box	434	455
Hawke Box	694	723
Lobster Area Closures		
Mouse Island	625	638
Glover's Harbour	613	627
Gander Bay	546	561
Gooseberry Island	457	456
Penguin Islands	704	691
Snow Crab Stewardship Exclusion Zones		
Crab Fishing Area 5A (2 zones)	392	406
Crab Fishing Area 6A (2 zones)	390	393
Crab Fishing Area 6B	341	338
Crab Fishing Area 6C	327	316
Crab Fishing Area 8A	346	328
Crab Fishing Area – 8BX	62	44
Crab Fishing Area 9A (2 zones)	445	426
Near Shore (2 zones)	324	314
Canadian EBSAs		
Newfoundland and Labrador Shelves Bioregion EBSAs		
Orphan Spur	250	280
Notre Dame Channel	437	458
Fogo Shelf	448	465
Grey Islands	554	572
Gilbert Bay	798	824
Labrador Marginal Trough	711	740
Labrador Slope	632	663

Table 11.1 Special Areas Minimum Distances to ELs 1159 and 1160

Special Area	Minimum Distance (km)	
	EL 1159	EL 1160
Hamilton Inlet	867	894
Southern Pack Ice	NA	NA
Refined Placentia Bay/Grand Banks Large Ocean Management Area (PG/GB LOMA) EBSAs		
Northeast Slope	49	81
Virgin Rocks	187	159
Lilly Canyon-Carson Canyon	171	113
Southeast Shoal	304	246
Eastern Avalon	323	307
Southwest Slope	481	424
Smith Sound	425	429
Placentia Bay	459	446
Laurentian Channel	668	638
Haddock Channel Sponges	485	456
South Coast	715	702
St. Mary's Bay	432	415
Bonavista Bay	441	448
Baccalieu Island	330	331
Preliminary Representative Marine Areas (RMAs)		
Virgin Rocks	185	163
South Grand Bank Area	255	197
Northwestern Conception Bay	379	381
Southern Coast of Burin Peninsula and Southeastern Placentia Bay	572	555
Migratory Bird Sanctuaries		
Terra Nova	483	490
Ile aux Canes	684	703
Shephard Island	689	708
Coastal National Parks and Historic Sites		
Cape Spear National Historic Site	370	360
Signal Hill National Historic Site	374	365
Ryan Premises National Historic Site	426	436
Castle Hill National Historic Site	472	457
Terra Nova National Park	466	473
Coastal Provincial Ecological Reserves		
Witless Bay Seabird Ecological Reserve	382	368
Baccalieu Island Seabird Ecological Reserve	389	392
Mistaken Point Fossil Ecological Reserve	418	398
Funk Island Seabird Ecological Reserve	481	501

Table 11.1 Special Areas Minimum Distances to ELs 1159 and 1160

Special Area	Minimum Distance (km)	
	EL 1159	EL 1160
Cape St. Mary's Seabird Ecological Reserve	491	473
Lawn Bay Seabird Ecological Reserve (Middle Lawn, Swale, and Colombier Islands)	598	580
Fortune Head Fossil Ecological Reserve	616	599
Coastal Provincial Parks and Protected Areas		
Marine Drive Provincial Park Reserve	385	379
Chance Cove Provincial Park	404	384
Dungeon Provincial Park	424	435
Bellevue Beach Provincial Park Reserve	455	446
Gooseberry Cove Provincial Park	482	465
Windmill Bight Provincial Park Reserve	480	496
Deadman's Bay Provincial Park	492	508
Frenchman's Cove Provincial Park	580	565
Dildo Run Provincial Park	570	585
Coastal Provincial Historic Sites		
Cape Bonavista Lighthouse Historic Site	426	437
Heart's Content Cable Station Historic Site	428	424
United Nations Convention on Biological Diversity (UNCBD) EBSAs		
Labrador Sea Deep Convection Area	1075	1109
Seabird Foraging Zone in the Southern Labrador Sea	248	290
Orphan Knoll	297	339
Slopes of the Flemish Cap and Grand Bank	X	X
Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank	268	211
United Nations Food and Agriculture Organization (UNFAO) VMEs		
Northeast Shelf and Slope (within Canadian EEZ)	40	75
Sackville Spur	108	149
Northern Flemish Cap	151	180
Southern Flemish Pass to Eastern Canyons	4	X
Beothuk Knoll	70	41
Deep Water Coral Area	175	148
Flemish Cap East	275	268
South East Shoal and Adjacent Shelf Edge/Canyons	310	254
Division 3O Coral Closure	517	463
NAFO FCAs		
High Sponge and Coral Concentration Area Closures		
Tail of the Bank (1)	307	250
Flemish Pass/Eastern Canyon (2)	12	2

Table 11.1 Special Areas Minimum Distances to ELs 1159 and 1160

Special Area	Minimum Distance (km)	
	EL 1159	EL 1160
Beothuk Knoll (3)	129	94
Eastern Flemish Cap (4)	238	231
Northeast Flemish Cap (5)	241	264
Sackville Spur (6)	111	152
Northern Flemish Cap (7)	176	205
Northern Flemish Cap (8)	192	224
Northern Flemish Cap (9)	167	201
Northwest Flemish Cap (10)	76	109
Northwest Flemish Cap (11)	52	71
Northwest Flemish Cap (12)	130	163
Beothuk Knoll (13)	111	86
Eastern Flemish Cap (14)	237	249
Seamount Closures		
Orphan Knoll Seamount	292	331
Newfoundland Seamounts	336	292
Fogo Seamounts (1)	631	575
Fogo Seamounts (2)	727	669
30 Coral Area Closure	515	462
IBAs		
Quidi Vidi Lake	373	365
Witless Bay Islands	379	364
Cape St. Francis	378	374
Baccalieu Island	387	388
Grates Point	393	395
Mistaken Point	409	388
The Cape Pine and St. Shotts Barren	441	421
Placentia Bay	462	448
Terra Nova National Park	464	471
Funk Island	475	494
Cape Freels Coastline and Cabot Island	466	481
Cape St. Mary's	481	463
Wadham Islands and adjacent Marine Area	506	523
Corbin Island	566	549
Middle Lawn Island	598	580
Green Island	634	616
United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites		
Mistaken Point Ecological Reserve	417	396

Table 11.1 Special Areas Minimum Distances to ELs 1159 and 1160

Special Area	Minimum Distance (km)	
	EL 1159	EL 1160
Red Bay National Historic Site	793	815
L'Anse aux Meadows National Historic Site	730	752
Note: X indicates that the EL and special area intersect.		

Table 11.2 Special Areas Overlapping with ELs 1159 and 1160

Exploration Licence	Overlapping Special Areas	Defining Features
EL 1159	• UNCBD EBSA – Slopes of the Flemish Cap and Grand Bank	• Identification of the UNCBD EBSAs are part of an initiative to conserve global diversity. The Slopes of the Flemish Cap and Grand Bank EBSA contains most of the aggregations of indicator species for VMEs in the NAFO Regulatory Area. The area includes NAFO closures to protect corals and sponges and a component of Greenland halibut fishery grounds in international waters. A high diversity of marine taxa, including threatened and listed species, are found within the EBSA (UNCBD 2017).
EL 1160	• UNCBD EBSA – Slopes of the Flemish Cap and Grand Bank • UNFAO VME – Southern Flemish Pass to Eastern Canyons	• See above for UNCBD EBSA defining features. • The Southern Flemish Pass to Eastern Canyons VME includes large gorgonians and high density of sponges. Vulnerable fish species in the area include striped wolffish, redfish, spiny tailed skate, northern wolffish, some black dogfish and deep-sea cat shark (WG-EAFM 2008; UNFAO 2019).

Many of the special areas discussed and assessed here have been identified and/or designated based on their biophysical characteristics and processes or human uses and values. Thus, these special areas are inherently discussed and considered (either directly or indirectly) in various other effects assessment chapters, including Chapter 8: Marine Fish and Fish Habitat, Chapter 9: Marine and Migratory Birds, and Chapter 10: Marine Mammals and Sea Turtles. Special areas and their use are also considered in assessing the potential effects of the Project on cultural, tourism or recreational resources and activities in Chapter 13: Commercial Fisheries and Other Ocean Users.

This Chapter provides an assessment and evaluation of the potential effects of the Project on these identified special areas as a whole, including the overall biophysical and socioeconomic features, values, and uses that to form a key part of the rationale for their identification and designation. It therefore considers the potential for Project-related environmental changes within a predicted zone of influence to affect the overall and underlying characteristics, integrity, and value of these areas.

11.3 Potential Environmental Changes, Effects, and Associated Parameters

Changes to the environment because of offshore oil and gas activities and their potential effects on identified Special Areas may be both direct and indirect in nature and cause. The conduct of oil and gas exploration activities directly within or near such areas may have adverse implications for these locations and their important and defining ecological and socio-cultural characteristics. These interactions may occur through the possible presence of oil and gas exploration equipment, personnel, and activities within the Special Area in question, as well as the associated emissions and discharges from planned activities.

Biophysical effects resulting from oil and gas or other human activities within the RSA may also extend to adjacent Special Areas by affecting the marine fish, birds, mammals, or other environmental components that move to and through these areas. Any resulting decrease in the real or perceived integrity of these areas in the short or long term may also affect their ecological and/or societal importance, use and value.

As a result of these identified environmental interactions, issues identified in the EIS Guidelines and concerns raised through consultation and engagement, the assessment of environmental effects on Special Areas is focused on the following potential environmental effects:

- Change in Environmental Features and/or Processes
- Change in Human use and/or Societal Value

11.4 Environmental Effects Assessment and Mitigation

11.4.1 Approach and Methods

The effects assessment for this VC involved identifying and mapping the various types of special areas, describing the rationale for their identification (and possible protection, where applicable) and obtaining the most comprehensive and current data including their current boundaries and characteristics including known upcoming or recent changes to the status of these areas or their defined boundaries. Geo-spatial data related to each of the types of marine and coastal special areas were incorporated into a geodatabase in a GIS to measure and illustrate their location and extents in relation to the Project Area (marine areas and associated potential vessel and aircraft traffic routes). The effects also considered the nature and anticipated geographic extent of Project-related changes to the environment (as defined by the LSA), as described in the other relevant VC Chapters and elsewhere in the EIS.

11.4.2 Summary of Key Mitigation

Mitigation measures for special areas include:

- A pre-drill seabed survey will be conducted at the proposed well site(s) to confirm the absence of sensitive environmental features, such as habitat-forming corals or species at risk
- VSP activities will be planned and conducted in consideration of the SOCP
- Wells will be plugged and abandoned as per applicable C-NLOPB requirements

- Wellheads will be removed by mechanical means
- Supply vessels will use existing shipping lanes to the extent practicable
- Supply vessels speeds not exceeding 22 km/hour (12 knots) transiting to / from the Project Area (unless needed in the case of an emergency)
- Supply vessel routes will avoid passing within 300 m of migratory bird nesting colonies during the nesting period
- Project-related helicopter routes will avoid transiting near migratory bird nesting colonies and will comply with provincial Seabird Ecological Reserve Regulations, 2015 and ECCC's Avoidance Guidelines for seabird and waterbird colonies
- Systematic daily searches will e conducted for seabirds stranded on the MODU and supply vessels (protocol to be developed in conjunction with CWS)

As special areas are linked to the marine species that use them, other mitigation measures that are specific to marine fish and fish habitat, marine and migratory birds, and marine mammals and sea turtles will also be applied.

A description of each of the marine and coastal areas within and adjacent to the Project Area / LSA and RSA that have been designated as protected or identified as otherwise special or sensitive was provided in Section 6.4. The following sections provide an assessment and evaluation of the potential effects of the Project on these special areas. The previously identified mitigation measures are considered integrally within the environmental effects analysis, as relevant.

11.4.3 Environmental Effects Assessment (All Project Components and Activities)

Based on these various components and activities, some of the key potential environmental issues and potential environmental changes that may be associated with the Project are:

- The general presence of Project components (drilling installations, vessels, other equipment) and undertaking of exploration activities in the offshore environment resulting in noise and lighting emissions and associated environmental changes
- Possible effects on water quality and on the seabed (benthic) environment due to physical disturbance of the substrate (and associated sedimentation), the discharge and deposition of drill cuttings and fluids, and other drilling installation or vessel discharges
- Potential changes in the presence, abundance, diversity, and health of marine biota in the area due to potential behavioural effects or potential injury or mortality. This may include possible temporary avoidance of areas by marine fish, birds, mammals, and sea turtles due to underwater noise or other disturbances, which may alter their presence and abundance as well as disturbing movements / migration, feeding or other activities. There may also be possible attraction of marine fish, birds, mammals, and sea turtles to drilling installations and vessels, with increased potential for injury, mortality, or health effects

These or other environmental changes and potential biophysical effects resulting from planned Project components and activities may, in turn, have adverse effects on special areas by affecting their overall ecological characteristics, integrity, use and value. Project activities may also result in direct interference with, and possible reduced human access to, important and valued marine areas during Project activities

in certain locations, with possible decreases in these activities and their success, efficiency, value, or enjoyment.

Exploration activities will occur in an offshore marine area that is more than 300 km from the shoreline of eastern Newfoundland. These planned components and activities will therefore not occur within, or otherwise interact directly with any of the existing provincially-defined Special Areas, such as provincial ecological reserves, parks and protected areas and historic sites. Likewise, exploration drilling activities will not have a direct interaction with most federally designated areas (i.e., marine protected areas, fisheries closures within Canada's EEZ, migratory bird sanctuaries, national parks and historic sites). International designations, such as IBAs, will also not be directly affected. These areas, most regularly used by humans for recreation, subsistence or tourism activities, are located in coastal and onshore areas.

11.4.3.1 Potential Zones of Influence

Special Areas outside of the ELs 1159 and 1160 have the potential to be affected by extended effects associated with sound, lighting and drill cuttings. The methodology used to determine the potential ZOI boundaries is summarized below. As shown in Figure 11-2, ZOIs for sound, lighting and drill cuttings were applied to the outer boundaries of ELs 1159 and 1160. In lieu of applying ZOIs to individual ELs, which would result in separate ZOIs, one ZOI was selected for the two ELs. This approach results in a very conservative ZOI as the maximum boundary extents were selected.

Sound

Underwater sound modelling was completed by another operator for the Scotian Basin; the results are applicable to the Flemish Pass EIS ELs and therefore also ELs 1159 and 1160. These results indicated that predicted cumulative sound exposure levels (over 24 hours) associated with operating drilling installations would decrease to below threshold values for potential marine mammal auditory injury at distances between 120 m and 470 m from the source (Zykov 2016). Therefore 470 m was selected as a conservative ZOI for sound.

Taking into consideration the 470 m conservative ZOI for sound, exploration drilling activities associated with ELs 1159 and 1160 do not extend to any additional Special Areas.

Lighting

Bird colonies up to 15 km were susceptible to stranding due to light attraction, which suggests that attraction distances of anthropogenic light sources may be greater than 5 km (Rodríguez et al. 2014, 2015). It is noted that exploration drilling installations emit less light than a fully lit production platform, and therefore selecting 15 km as the ZOI is very conservative.

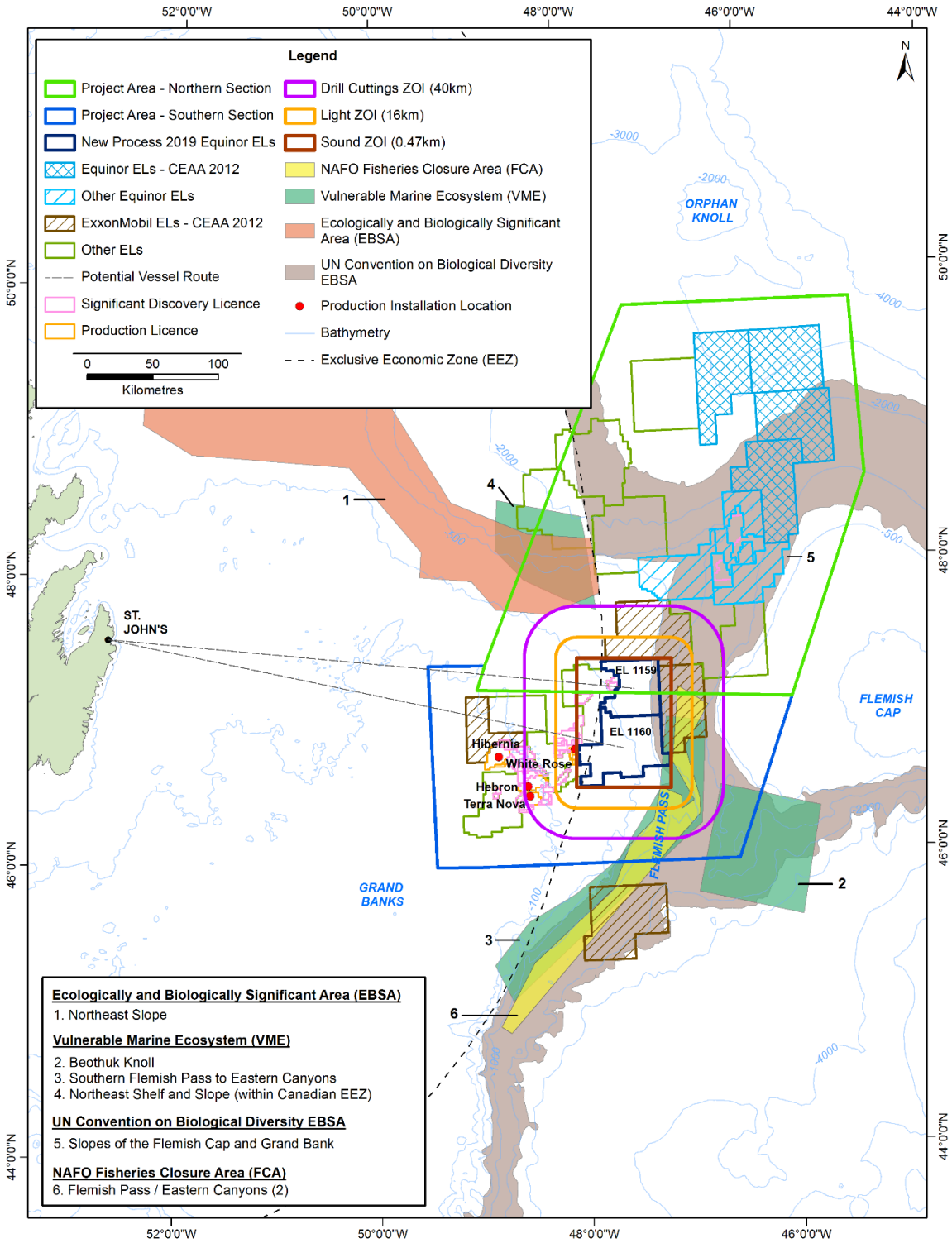


Figure 11-2 Potential Zones of Influence Around ELs 1159 and 1160 Associated with Light, Sound, and Drill Cuttings

Taking into consideration the 15 km conservative ZOI for lighting, exploration drilling activities associated with ELs 1159 and 1160 have the potential to extend to the NAFO FCA – Flemish Pass / Eastern Canyons (2).

Defining Features

NAFO FCA – Flemish Pass / Eastern Canyons (2) is closed to protect extensive sponge grounds and large gorgonian corals in the Flemish Pass.

Effects Assessment

Benthic species are not anticipated to be adversely affected by light due to distance to seafloor.

Drill Cuttings

Based on drill cuttings modelling completed for the Flemish Pass EIS, it was determined that 40 km at any of the modelled locations was the maximum distance that SBM drill cuttings may be detected. Therefore, 40 km was selected as a very conservative ZOI associated with drill cuttings.

Taking into consideration the 40 km conservative ZOI for drill cuttings, exploration drilling activities associated with ELs 1159 and 1160 have the potential to interact with benthic habitat (including sponges and corals where present) in the UNCBD EBSA - Slopes of the Flemish Cap and Grand Banks, the VME – Beothuk Knoll, VME – Northeast Shelf and Slope (within the Canadian EEZ) and NAFO FCA – Flemish Pass / Eastern Canyons (2).

Defining Features

The Slopes of the Flemish Cap and Grand Banks UNCBD EBSA contains most of the aggregations of indicator species for VMEs in the NAFO Regulatory Area and includes NAFO closures to protect corals and sponges and a component of Greenland halibut fishery grounds in international waters. A high diversity of marine taxa, including threatened and listed species, are also found within the EBSA.

The Beothuk Knoll VME was identified for abundant gorgonian corals and high density of sponges. Vulnerable fish species include northern wolffish, spiny tailed skate, roundnose grenadier, deep-sea cat shark, and black dogfish.

The Northeast Shelf and Slope (within the Canadian EEZ) VME has been identified due to an abundance of gorgonian and black corals.

Flemish Pass / Eastern Canyons (2) NAFO FCA is closed to protect extensive sponge grounds and large gorgonian corals in the Flemish Pass.

Effects Assessment

The potential effects of drill cuttings deposition include seabed disturbance (burial and smothering), chemical toxicity, and bioaccumulation (uptake of contaminants by fish and the presence or perception of taint). Benthic habitats are vulnerable to effects from deposition and accumulation on the ocean floor

and these effects are discussed in the following paragraphs. Other marine species, such as fish and mammals, may be vulnerable to the effects of contamination.

To mitigate contamination of marine species once drilling commences, WBM cuttings will be discharged and SBM cuttings will be returned to the drilling installation for recovery and reuse or treatment and discharge in accordance with the OWTG (NEB et al. 2010) and MARPOL. In addition, chemicals used in drilling muds will be selected in accordance with the OCSG (NEB et al. 2009).

The discharge of drill cuttings is one of the primary potential interactions with benthic habitats during offshore drilling programs. Due to the presence of high currents in the Flemish Pass, cuttings piles are more likely to disperse in a shorter timeframe. Bottom currents will likely further aid in cuttings dispersion in this area, reducing potential for long term effects due to burial by sediments.

In summary, the predicted environmental effects of drilling discharges on special areas identified for sensitive benthic habitats are primarily related to potential sedimentation and burial of benthic species (including corals and sponges). As discussed in Section 2.5.2, pre-drill coral and sponge surveys and risk assessments will be completed and mitigation measures, if required from the risk assessment, will be implemented prior to drilling (e.g., relocating wellsite, using a cuttings transport system). These effects are predicted to be adverse, low in magnitude, localized and within the Project Area, short to long term in duration, occurring sporadically to regularly and reversible, with these predications being made with a moderate to high level of confidence. With the implementation of appropriate mitigation measures, the overall magnitude of the effect of marine discharges on these special areas is anticipated to be low.

11.5 Significance of Residual Environmental Effects

Most special areas have been designated as such to protect important and sensitive benthic components and habitats from further disturbance due to certain types of bottom-dragging fishing activity, but their designations as such do not prohibit petroleum exploration activities in these areas. The planned drilling and associated activities will be characterized by a relatively small and temporary footprint, with mitigation measures planned to reduce potential effects to the marine benthic environment. In particular, a pre-drill survey will be undertaken to determine if corals / sponges are present within the potential ZOI as predicted by the drill cuttings model. Many of the other offshore survey activities that are planned to be undertaken will not result in any direct contact with the seabed and will therefore not physically disturb benthic animals or their habitats. Any seabed geological, geochemical or geotechnical sampling activities will likewise have a short duration, and those which involve contact with the seabed will have a small footprint.

Notwithstanding the overall size and extent of the Project Area itself, all exploration drilling activity carried out as part of the Project will occur within the boundaries of an EL, as defined in Section 2.3.

The offshore vessel and aircraft activity within the Project Area and to and from eastern Newfoundland will be generally in keeping with, and may make a relatively minor contribution to, the overall marine vessel activity occurring in the region for many years. Supporting vessels that are involved in exploration drilling activities will travel in an essentially straight line between a drilling installation operating within

an EL (see Section 2.4.5) in the Project Area and the established supply facility in eastern Newfoundland, recognizing that specific routes may vary at times based on the location of the active drilling installation(s) and to avoid sea-ice. The planning and conduct of vessel traffic will be undertaken in consideration of these factors, relevant regulatory requirements, and through established cooperative processes that involve discussions and communications between the oil and gas sector, fishing industry and other ocean users.

The changes associated with components and activities are predicted to be neutral to adverse, negligible to low in magnitude, localized and within the Project Area, short to medium term duration, occurring sporadically to regularly in frequency, and reversible, with a high level of confidence. As described for the biophysical VCs (Chapters 8 to 10), exploration drilling activities on Els 1159 and 1160 are not expected to result in significant adverse effects upon marine fish, birds, mammals, sea turtles, SAR or their habitats. It will therefore not significantly affect the ecological features, processes and integrity of any marine or coastal locations that are designated as Special Areas, nor their human use and societal value.

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse environmental effects on Special Areas. Individual environmental effects summaries for planned activities to ELs 1159 and 1160 are in Tables 11.3 and 11.4, respectively.

11.6 Environmental Monitoring and Follow-up

The various environmental monitoring and follow-up initiatives outlined earlier in relation to relevant components of the biophysical environment will be indirectly applicable to Special Areas.

Follow-up monitoring will occur if drilling is undertaken in the following circumstances:

1. Within an identified VME or FCA
2. Adjacent / near to an identified VME or FCA, such that drill cuttings dispersion model predicts that drill cuttings deposition may occur within the VME or FCA at levels above the biological effects threshold, or
3. In an area where the results of the pre-drill coral survey and risk assessment (DFO/C-NLOPB reviewed and accepted) indicate that monitoring is required

The purpose of the follow-up monitoring program would be to determine the effectiveness of mitigation measures in protecting the sensitive benthic habitat.

Table 11.3 Environmental Effects Assessment Summary: Special Areas – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context – EL 1159 • A number of marine and coastal areas in Newfoundland and Labrador have been designated as protected under provincial, federal and/or other legislation or agreements due to their biological/ecological or socio-cultural characteristics and importance, and other areas have been formally identified as being special or sensitive through relevant processes and initiatives. • Special areas designation or identification is often directly related to the existing physical and biological environment, including marine fish and fish habitat, marine and migratory birds and marine mammals and sea turtles (including SAR) or socio-cultural values such as economy, culture, history or recreation, which are also covered in other sections. • EL 1159 overlaps with Slopes of the Flemish Cap and Grand Bank EBSA and Southern Flemish Pass to Eastern Canyons VME.	**Summary of Key Mitigation** • Mitigation measures that are designed to avoid or reduce the effects of planned Project components and activities on marine biota, habitats and other marine users will also reduce effects on to special areas • Pre-drilling coral survey and risk assessment. Industry best practice approach in areas with potentially high concentrations of cold-water corals

Project Component or Activity	Potential Environmental Effects	Residual Environmental Effects Summary Descriptors						
		Nature / Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Certainty
Presence and Operation of Drilling Installation	• Possible direct interactions with special areas • Possible effects through associated changes to the biophysical environment • Possible interactions (interference or disturbances) with other human activities	A	N-L	L-PA	S-M	R	R	H
Drilling and Associated Marine Discharges		A	N-L	L-PA	S-M	R	R	H
Formation Flow Testing with Flaring		N	-	-	-	-	-	H
Wellhead Decommissioning		A	N-L	L	S	S	R	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys		A	N-L	L-PA	S	S	R	H

Table 11.3 Environmental Effects Assessment Summary: Special Areas – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geological, Geotechnical and Environmental Surveys		N	-	-	-	-	-	H
Supply and Servicing		N	-	-	-	-	-	H

Evaluation of Significance

- Oil and gas exploration activities are not prohibited within special areas that overlap with the Project Area.
- For the various special areas that overlap with the Project Area (offshore and associated vessel traffic routes), the overall and defining physical, biological, and socioeconomic environments within these areas will not be adversely affected by exploration drilling on ELs 1159 and 1160.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

KEY

Nature / Direction:
- P Positive
- A Adverse
- N Neutral (or no effect)

Magnitude:
- N Negligible
- L Low
- M Medium
- H High

Geographic Extent:
- L Localized, in immediate vicinity of activity
- PA Within Project Area
- LSA Within LSA
- RSA Within RSA or beyond

Frequency:
- O Occurs once
- S Occurs sporadically
- R Occurs on a regular basis
- C Occurs continuously

Duration:
- S Short term (for duration of the activity)
- M Medium term (beyond duration of the activity – weeks or months)
- L Long term (beyond duration of the activity – years)
- P Permanent (recovery unlikely)

Reversibility:
- R Reversible (will recover to baseline)
- I Irreversible (permanent)

Certainty in Predictions:
- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

- N/A Not Applicable

Table 11.4 Environmental Effects Assessment Summary: Special Areas – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context – EL 1160 • A number of marine and coastal areas in Newfoundland and Labrador have been designated as protected under provincial, federal and/or other legislation or agreements due to their biological/ecological or socio-cultural characteristics and importance, and other areas have been formally identified as being special or sensitive through relevant processes and initiatives. • Special areas designation or identification is often directly related to the existing physical and biological environment, including marine fish and fish habitat, marine and migratory birds and marine mammals and sea turtles (including SAR) or socio-cultural values such as economy, culture, history or recreation, which are also covered in other sections. • EL 1160 overlaps with Slopes of the Flemish Cap and Grand Bank EBSA and Southern Flemish Pass to Eastern Canyons VME.	**Summary of Key Mitigation** • Mitigation measures that are designed to avoid or reduce the effects of planned Project components and activities on marine biota, habitats and other marine users will also reduce effects on to special areas • Pre-drilling coral survey and risk assessment. Industry best practice approach in areas with potentially high concentrations of cold-water corals

Project Component or Activity	Potential Environmental Effects	Residual Environmental Effects Summary Descriptors						
		Nature / Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Certainty
Presence and Operation of Drilling Installation	• Possible direct interactions with special areas • Possible effects through associated changes to the biophysical environment • Possible interactions (interference or disturbances) with other human activities	A	N-L	L-PA	S-M	R	R	H
Drilling and Associated Marine Discharges		A	N-L	L-PA	S-M	R	R	H
Formation Flow Testing with Flaring		N	-	-	-	-	-	H
Wellhead Decommissioning		A	N-L	L	S	S	R	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys		A	N-L	L-PA	S	S	R	H

Table 11.4 Environmental Effects Assessment Summary: Special Areas – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geological, Geotechnical and Environmental Surveys		N	-	-	-	-	-	H
Supply and Servicing		N	-	-	-	-	-	H

Evaluation of Significance

- Oil and gas exploration activities are not prohibited within special areas that overlap with the Project Area.
- For the various special areas that overlap with the Project Area (offshore and associated vessel traffic routes), the overall and defining physical, biological, and socioeconomic environments within these areas will not be adversely affected by exploration drilling on ELs 1159 and 1160.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

KEY

Nature / Direction:
P Positive
A Adverse
N Neutral (or no effect)

Magnitude:
N Negligible
L Low
M Medium
H High

Geographic Extent:
L Localized, in immediate vicinity of activity
PA Within Project Area
LSA Within LSA
RSA Within RSA or beyond

Frequency:
O Occurs once
S Occurs sporadically
R Occurs on a regular basis
C Occurs continuously

Duration:
S Short term (for duration of the activity)
M Medium term (beyond duration of the activity – weeks or months)
L Long term (beyond duration of the activity – years)
P Permanent (recovery unlikely)

Reversibility:
R Reversible (will recover to baseline)
I Irreversible (permanent)

Certainty in Predictions:
L Low level of confidence
M Moderate level of confidence
H High level of confidence

N/A Not Applicable

11.7 References

NEB (National Energy Board), CNSOPB (Canada Nova Scotia Offshore Petroleum Board) and C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2009. Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands. Available at: https://www.neb-one.gc.ca/bts/ctrg/gnthr/2009ffshrchmclgd/2009ffshrchmclgd-eng.pdf. Accessed: August 8, 2019.

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12.0 INDIGENOUS COMMUNITIES AND ACTIVITIES: ENVIRONMENTAL EFFECTS ASSESSMENT

The environment effects assessment of exploration drilling activities on Indigenous Communities and Activities are provided below.

12.1 Environmental Assessment Study Areas and Effects Evaluation Criteria

This section defines the Study Areas (spatial and temporal boundaries) for the environmental effects assessment for this VC. A number of spatial assessment boundaries have been defined for the environmental effects assessment of this VC, which reflect the varying ways and scales in which the Project may influence Indigenous communities and activities.

Within the Project Area itself, potential effects are expected to be direct in nature and associated with the specific environmental interactions and other disturbances that may be associated with planned Project activities. While the Project Area is defined as an overall polygon that encompasses such activities over the course of the Project, the various components and activities associated with the drilling of each individual well and other planned components will occupy fairly small areas within this overall Project Area, as described in Chapter 2. At the larger local and regional scales around the Project Area, however, the environmental effects assessment also considers the larger potential environmental ZOIs of the Project. The Project Area is the same as described in Section 4.3.1. The LSA for the Indigenous communities and activities VC is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160. The RSA for the Indigenous Communities and Activities VC is defined as:

> *RSA*: In addition to these Project- and disturbance-related factors, the environmental effects assessment for this VC also recognizes and considers the spatial distribution and overall geographic extent of the various Indigenous communities and activities under consideration, as well as the distribution and movements of the various marine-associated resources that are used for traditional purposes by these communities (see Figure 4-1). As noted above, this includes the location of a number of Indigenous communities and their activities throughout Eastern Canada.

The temporal boundaries for the effects assessment for this VC also encompass the likely timing and duration of Project-related (in-field) exploration activities in the Project Area, as well as the likely duration of potential environmental effects. In conducting the assessment, special consideration is also given to important or sensitive periods for the environmental and socio-cultural features, processes and activities that comprise or are associated with this VC.

It is within the above described spatial and temporal boundaries that the Project's potential environmental effects on this VC and their significance are assessed and evaluated.

Significant environmental effects for this VC are defined as those that would result from the Project and cause one or more of the following outcomes:

- A negative change in the overall nature, location or timing of current land and resource use activities for traditional purposes by one or more Indigenous communities, resulting in a reduction in overall activity levels and/or the cultural value of such activities
- A reduction in the quality of ambient air, water, fish, wildlife, or other resources at concentrations that will result in human health risks, with an associated and detectable increase in the incidence of human (physical) health issues. Note that given the distance to the Project Area (more than 300 km offshore Newfoundland and Labrador), a human health risk assessment was not required
- Adverse effects on the social health and well-being and other socioeconomic conditions of affected Indigenous communities, such that there are associated, detectable and sustained decreases in the real or perceived quality of life of a population
- A decrease in established employment and business activity in one or more economic sectors such that there is a detectable adverse effect upon the economy of the affected Indigenous community over multiple years
- The destruction or disturbance of a structure, site or thing that is of historical, archaeological, paleontological, or architectural significance to an Indigenous community without the appropriate documentation or salvage and retrieval of the culture and the information it contains, and without prior approval from the relevant regulatory authority

12.2 Potential Environmental Changes, Effects, and Associated Parameters

The presence of drilling installations and the conduct of these exploration activities is not anticipated to interact directly with or adversely affect Indigenous Communities and Activities, as the Project Area is in an offshore marine environment, hundreds of kilometres from land and away from any Indigenous community. Indirect effects may occur if the exploration drilling activities adversely limit access to communal commercial fishing due to safety zone, affect fish and wildlife, as these biophysical effects may in turn reduce the availability or quality of such resources and their use for traditional purposes.

As a result of these identified environmental interactions, issues identified in the EIS Guidelines and concerns raised through engagement, the assessment of environmental effects on Indigenous communities and their activities is focused on the following potential environmental effects:

- Change in Health and Socioeconomic Conditions
- Change in the Current Use of Lands and Resources for Traditional Purposes
- Change in Physical and Cultural Heritage and Change in any Structure, Site, or Thing that is of Historical, Archaeological, Paleontological or Architectural Significance

The assessment of potential Project effects on this VC included a general approach of “overlaying” the Project components and activities (Chapter 2) and the anticipated environmental zones of influence associated with these (the LSA) with input from Indigenous communities, including historical / traditional and cultural information and publicly available information to identify potential interactions with and resulting effects on this VC. Potential interactions between the Project and the VC are identified and analysed, the need for mitigation considered, and the significance of residual effects determined and

evaluated. A variety of publicly available information sources and engagement with communities were used to understand and describe the various Indigenous communities and activities that may potentially be affected by the Project (Section 7.3). The Operator respects and values the input received from Indigenous communities and remains committed to further engagement. It also encourages identified Indigenous groups to provide input and information that they may have as part of their involvement in EA-related engagement processes and opportunities provided by the CEAA 2012 EA process. At future engagement opportunities Indigenous groups will be asked how the effects of changes to the environment might affect particular sub-populations (e.g., women, youth, elders, specific families) within their groups.

12.3 Environmental Effects Assessment and Mitigation

Most activities will take place in an offshore marine environment, hundreds of kilometres from land and away from any Indigenous community. Emissions and discharges and environmental interactions will be localized and short-term in nature (Chapters 8 to 11 and 13) and are unlikely to extend to or affect the physical or social health and well-being or other socioeconomic conditions of Indigenous communities.

Equinor Canada will continue to communicate with relevant Indigenous communities and representative organizations, through established and/or informal engagement processes, as required and requested. The specific nature, frequency, subject matter and format of such future engagement will be determined in discussion with the Indigenous organization and outlined in an Indigenous Communities Fisheries Communication Plan.

Equinor Canada will develop the Indigenous Communities Fisheries Communication Plan in consultation with Indigenous Groups. The Plan will include a protocol for regular, ongoing operational communications between Equinor Canada and Indigenous groups during routine exploration drilling operations, as well as in the unlikely case of a major spill. The Plan will also contain communication requirements in the unlikely event of an incident and a feedback mechanism for Indigenous harvesters, which will allow Equinor Canada to consider adaptive management strategies should issues arise that were not predicted in the EIS. In addition, if monitoring is undertaken and once environmental monitoring data is available, Equinor Canada commits to meet with interested Indigenous groups to share and discuss the results of environmental monitoring programs. Frequency of ongoing communications, contact points, and an appropriate feedback mechanism will be determined through engagement by Equinor Canada with Indigenous groups.

The components and activities will be located a considerable distance (hundreds of kilometres) from Indigenous communities, and from the traditional territories associated with each of these groups. Equinor Canada is not aware that these or other Indigenous groups assert Aboriginal or Treaty rights or otherwise undertake traditional activities within or near the Project Area and LSA, pursuant to Section 35 of the *Constitution Act, 1982*. Although fishing enterprises associated with several of these organizations undertake commercial fishing activity for various species within NAFO Divisions that overlap parts of the Project Area, it is understood that most of these organizations (including those in NL) undertake fishing activities off eastern Newfoundland through commercial licences issued by the federal government under the *Fisheries Act* and its associated *Aboriginal Communal Fisheries Licencing Regulation*, as well as other government policies and strategies that are designed to involve

Indigenous groups in commercial fisheries in Canada. As “traditional use” is (as outlined above) generally understood to mean activities that have been exercised (and are being exercised) by an identifiable Indigenous community since before European contact or control of a specific area, these contemporary, commercial land and resource use activities within the LSA may not be considered traditional in that they are not a continuation of ancestral activities that took place historically within this area offshore eastern Newfoundland. The planned components and activities, and the environmental emissions / disturbances and associated environmental changes resulting from these (as defined through the LSA), will therefore not directly interfere with or otherwise interact with the current use of lands and resources for traditional purposes by Indigenous communities. Exploration drilling activities will not have adverse effects on such activities as they do not occur within or near the LSA at any time of the year.

The environmental effects analysis also indicates there is limited potential for marine associated species that are known to be used by the identified Indigenous groups to occur within the Project Area / LSA prior to moving to any area of traditional use (e.g., Atlantic salmon [various populations]). The implementation of the mitigation measures will reduce direct or indirect potential effects on these resources (see Section 8.4). Exploration drilling activities will not have an adverse effect on the availability or quality of resources that are currently used for traditional purposes by Indigenous groups to a nature and to a degree that would alter the nature, location, timing, intensity or value of these activities or the health or heritage of any Indigenous community.

The Project Area and LSA are not known to contain resources of historical, archaeological, paleontological, or architectural significance, and given its location far offshore eastern Newfoundland, are not likely to contain such resources or materials that are relevant to and valued by Indigenous groups. Based on the nature, location, extent and duration of planned activities and the associated emission and discharges, the Project will not interact with nor adversely affect physical and cultural sites, including structures, sites, or things of historical, archaeological, paleontological, or architectural significance.

Project-related emissions and discharges and environmental interactions will be localized and short-term in nature (Chapter 8 to 10) and are unlikely to extend to or affect the physical or social health and well-being or other socioeconomic conditions of an Indigenous community. Fishing enterprises associated with Indigenous groups undertake commercial fishing activities off Eastern Newfoundland. While there are no FSC licences within or near the Project Area / LSA, engagement with Indigenous groups indicated that Atlantic salmon, swordfish, and bluefin tuna are species of interest. There are no predicted significant adverse impacts of the Project on these species.

12.4 Significance of Residual Environmental Effects

Given the nature, location and timing of various activities and associated environmental interactions, it is not anticipated to have significant adverse effects on Indigenous Communities and Activities. This also includes sub-populations within Indigenous groups. The nature, timing, geographical extent and duration Project-related activities for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS (e.g., the MODUs under consideration are the same (i.e., a drillship or semi-submersible), drilling would occur over a similar time frame (i.e., 35 to 65 days), drilling could occur throughout the year, anywhere within the ELs, the use of

WBMs and SBMs is the same, proposed supporting surveys are the same, the supply vessel and helicopter support are the same, and well decommissioning would be the same). Therefore, the effects of project-related activities are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS of Project-related activities on Indigenous Communities and Activities is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to have no adverse effect, with a high level of confidence. Individual environmental effects summaries for planned activities to ELs 1159 and 1160 are in Tables 12.1 and 12.2, respectively.

12.5 Environmental Monitoring and Follow-up

The various environmental monitoring initiatives outlined earlier in relation to relevant components of the biophysical environment will also be indirectly applicable to this VC. Based on a current review of existing, publicly available information and engagement conducted with Indigenous groups to date, no additional and specific environmental monitoring or follow-up is considered necessary in relation to this VC, as no residual effects are anticipated.

Equinor Canada will continue to communicate with Indigenous groups through established and/or information engagement processes, as required and requested. The specific nature, frequency, subject matter, and format of such future engagement will be determined in discussion with the Indigenous groups and outlined in an Indigenous Communities Fisheries Communication Plan (FCP). Indigenous groups will be invited to participate in the development of the Indigenous Communities FCP, which will likely include aspects such as, but not limited to, communication objectives, list of participants and key contacts, EA update process that provides specific information of planned offshore operational activities for that year and provides opportunity for feedback and further exchange of information on specific aspects of interest, and expectations for communications during the unlikely event of a major spill.

Equinor Canada will share its plans for monitoring and follow-up programs with Indigenous groups during upcoming and ongoing engagement. Throughout all phases of the Project, Equinor Canada will continue to engage with interested Indigenous groups and provide updates regarding the implementation of monitoring and follow-up programs, and will share the results of these programs.

As noted in Chapter 3, numerous Indigenous groups indicated a desire to review the EIS before being able to provide further input regarding their interests and concerns. Equinor Canada remains committed to ongoing engagement.

Table 12.1 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1159 • There are no communities or other aspects of the physical / cultural heritage and other socio-economic components and activities of any Indigenous groups located within or near the Project Area / LSA, including EL 1159. • Other past and on-going projects and activities in Eastern Canada have, to varying degrees, interacted with and affected Indigenous communities and activities, depending on their location, nature, and scale in relation to the communities, activities and other components and interests of individual groups. • The description of the socioeconomic characteristics of these Indigenous communities provided in the EIS inherently reflects any such past and on-going activities and effects	**Summary of Key Mitigation** • Mitigation measures that are outlined elsewhere in this EIS will serve to avoid or reduce environmental emissions, disturbances and resulting environmental changes by reducing the nature, degree, extent and duration of these changes, and therefore reducing the potential for these to interact with and adversely affect the various components and activities that comprise this VC • A copy of the Abridged EIS will be sent to Indigenous groups and stakeholders identified in Chapter 3 • Equinor Canada will follow up with Indigenous groups and stakeholders on questions arising from the Abridged EIS • Equinor Canada will continue to communicate with relevant Indigenous communities and representative organizations, through established and/or informal engagement processes, as required and requested. The specific nature, frequency, subject matter and format of such future engagement will be determined in discussion with the Indigenous organization and outlined in an Indigenous Communities Fisheries Communication Plan

Project Component or Activity	Potential Environmental Effects	Residual Environmental Effects Summary Descriptors						
		Nature / Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Certainty
Presence and Operation of Drilling Installation	• Possible direct interactions (interference or disturbances) with Indigenous communities and their activities Possible effects through associated changes to the biophysical environment (health, resource availability or quality)	N	-	-	-	-	-	H

Table 12.1 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Drilling and Associated Marine Discharges	• As above	N	-	-	-	-	-	H
Formation Flow Testing with Flaring	• As above	N	-	-	-	-	-	H
Wellhead Decommissioning	• As above	N	-	-	-	-	-	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• As above	N	-	-	-	-	-	H
Geological, Geotechnical and Environmental Surveys	• As above	N	-	-	-	-	-	H
Supply and Servicing	• As above	N	-	-	-	-	-	H

Evaluation of Significance

- As there are no Indigenous communities or other aspects of the physical / cultural heritage and other socioeconomic components and activities of these groups located within or near the Project Area / LSA, and because the environmental changes and effects of exploration drilling will not otherwise extend to and affect lands and resources that are currently used by these groups for traditional purposes, exploration drilling on ELs 1159 and 1160 will not have adverse effects on this VC.
- The planned components and activities associated with ELs 1159 and 1160 will therefore not likely have significant adverse effects upon Indigenous communities and their activities.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 12.1 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY			
KEY			
Nature / Direction:		Certainty in Predictions:	
P	Positive	L	Low level of confidence
A	Adverse	M	Moderate level of confidence
N	Neutral (or no effect)	H	High level of confidence

Table 12.2 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1160 • There are no communities or other aspects of the physical / cultural heritage and other socioeconomic components and activities of any Indigenous groups located within or near the Project Area / LSA, including EL 1160 • Other past and on-going projects and activities in Eastern Canada have, to varying degrees, interacted with and affected Indigenous communities and activities, depending on their location, nature, and scale in relation to the communities, activities and other components and interests of individual groups. • The description of the socioeconomic characteristics of these Indigenous communities provided in the EIS inherently reflects any such past and on-going activities and effects	**Summary of Key Mitigation** • Mitigation measures that are outlined elsewhere in this EIS will serve to avoid or reduce environmental emissions, disturbances and resulting environmental changes by reducing the nature, degree, extent and duration of these changes, and therefore reducing the potential for these to interact with and adversely affect the various components and activities that comprise this VC • A copy of the EA update will be sent to Indigenous groups and stakeholders identified in Chapter 3. Equinor Canada will follow up with Indigenous groups and stakeholders on questions arising from the EA update • Equinor Canada will continue to communicate with relevant Indigenous communities and representative organizations, through established and/or informal engagement processes, as required and requested. The specific nature, frequency, subject matter and format of such future engagement will be determined in discussion with the Indigenous organization and outlined in an Indigenous Communities Fisheries Communication Plan

Project Component or Activity	Potential Environmental Effects	Residual Environmental Effects Summary Descriptors						
		Nature / Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Certainty
Presence and Operation of Drilling Installation	• Possible direct interactions (interference or disturbances) with Indigenous communities and their activities Possible effects through associated changes to the biophysical environment (health, resource availability or quality)	N	-	-	-	-	-	H

Table 12.2 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Drilling and Associated Marine Discharges	• As above	N	-	-	-	-	-	H
Formation Flow Testing with Flaring	• As above	N	-	-	-	-	-	H
Wellhead Decommissioning	• As above	N	-	-	-	-	-	H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• As above	N	-	-	-	-	-	H
Geological, Geotechnical and Environmental Surveys	• As above	N	-	-	-	-	-	H
Supply and Servicing	• As above	N	-	-	-	-	-	H

Evaluation of Significance

- As there are no Indigenous communities or other aspects of the physical / cultural heritage and other socioeconomic components and activities of these groups located within or near the Project Area / LSA, and because the environmental changes and effects of exploration drilling will not otherwise extend to and affect lands and resources that are currently used by these groups for traditional purposes, exploration drilling on ELs 1159 and 1160 will not have adverse effects on this VC.
- The planned components and activities associated with ELs 1159 and 1160 will therefore not likely have significant adverse effects upon Indigenous communities and their activities.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 12.2 Environmental Effects Assessment Summary: Indigenous Communities and Activities – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY			
KEY			
Nature / Direction:		Certainty in Predictions:	
P	Positive	L	Low level of confidence
A	Adverse	M	Moderate level of confidence
N	Neutral (or no effect)	H	High level of confidence

Equinor Canada will, in accordance with its commitment to ongoing engagement with identified Indigenous groups, also continue to review these inputs and perspectives as the planning and eventual implementation of the Project progress and will consider them in its Project-related planning and decision-making as applicable. Project implementation will also include on-going communication and cooperation mechanisms involving key organizations and Indigenous groups throughout its operational life, as discussed in this EIS. These are intended to allow for continued discussion of Project related activities and issues as they may arise during its implementation, as well as to cooperatively and collaboratively plan and implement required (adaptive) management measures throughout the life of the Project.

Equinor Canada will continue to communicate with relevant Indigenous communities and organizations, through established and/or informal engagement processes, as required and requested. The specific nature, frequency, subject matter and format of such future engagement will be determined in discussion with the Indigenous organizations and outlined in an Indigenous Communities Fisheries Communication Plan. Indigenous communities or community designated representative organizations will be invited to participate in the development of the Plan, which will be reflective of the nature of the Project. The plan would likely include:

- Communication objectives
- List of participants and key contacts
- EA update process that provides specific information of planned offshore operational activities for that year and provides opportunity for feedback and further exchange of information on specific aspects of interest
- Expectations for communications during the unlikely event of a major spill (Note- accidental events effects assessment is provided in Chapter 15).

13.0 COMMERCIAL FISHERIES AND OTHER OCEAN USERS: ENVIRONMENTAL EFFECTS ASSESSMENT

The environment effects assessment of exploration drilling activities on Commercial Fisheries and Other Ocean Users are summarized below.

13.1 Environmental Assessment Study Areas and Effects Evaluation Criteria

This section defines the Study Areas (spatial and temporal boundaries) for the environmental effects assessment for this VC. A number of spatial assessment boundaries have been defined for the environmental effects assessment of this VC, which reflect the varying ways and scales in which the Project may influence commercial fishing activity and other ocean uses.

Within the Project Area itself, potential effects are expected to be direct in nature and associated with the specific environmental interactions that may be associated with planned Project activities. While the Project Area is defined as an overall polygon that encompasses such activities over the course of the Project, the various components and activities associated with the drilling of each individual well and other planned components will occupy fairly small areas within this overall Project Area, as described in Chapter 2. At the larger local and regional scales around the Project Area; however, the environmental effects assessment also considers the larger potential environmental ZOIs of the Project (including both planned activities and potential accidental events). The Project Area and RSA as are the same as described in Section 4.3.1. The LSA for the commercial fisheries and other ocean users VC is the same as the Project Area plus the transit route. Routine activities will occur within ELs 1159 and 1160 and the existing (previously assessed) Project Area provides the buffer for any activities that occur at the very edge of ELs 1159 and 1160.

The temporal boundaries, as described in Section 2.3, for the effects assessment encompass the likely timing and duration of Project-related (in-field) activities in the Project Area, as well as the likely duration of resulting environmental effects. In conducting the assessment, consideration is given to timing and seasonality of VC-related activity within the Project and Assessment Areas, including important or sensitive time periods. Chapter 7 provides details of commercial fisheries and other ocean users and their timing of occurrence within these areas and indicates that while commercial fishing and other ocean uses occur year-round within the Project Area / LSA and RSA, the most active period is typically during the summer months.

It is within the above spatial and temporal boundaries that the potential environmental effects on this VC resulting from planned Project components and activities and their significance are assessed and evaluated.

Significant environmental effects are considered to be those that cause an adverse change in a VC that would alter its status or integrity beyond an acceptable and sustainable level. For the purposes of this EA, significant environmental effects on Commercial Fisheries and Other Ocean Users are defined as those that would cause one or more of the following outcomes:

- A detectable reduction in the overall economic returns generated from commercial fisheries or other ocean activities within the RSA over one or more years; and/or
- A detectable decrease in overall activity levels and/or the enjoyment or cultural value of recreational activities within the RSA for a community or region over multiple years

13.2 Potential Environmental Changes, Effects, and Associated Parameters

A variety of commercial fishing activity for multiple fish species takes place within the Project Area / LSA and RSA, with the summer months usually being the times when offshore Newfoundland and Labrador experiences the most ocean use / activity. Important commercial fisheries include those for snow crab and northern shrimp. Other commercial fisheries that occur in the area include those for clams, cockles, capelin, Greenland and Atlantic halibut, yellowtail flounder, and pelagic species such as swordfish and various species of tuna.

Potential interactions between offshore oil and gas exploration activities and Commercial Fisheries and Other Ocean Users can occur both directly and indirectly. Key potential interactions have been identified based on previous EAs conducted for similar projects and activities in the Canada-NL Offshore Area, including the Eastern Newfoundland SEA (AMEC 2014), and include:

- Possible damage to fishing gear, vessels, equipment, or other components as a result of direct interactions between equipment or emissions and these other ocean users
- Loss of access to important and established fishing grounds, or other areas of potential marine use, as a result of activities, and associated decreases in value (economic or otherwise) of these activities
- Possible indirect effects on Commercial Fisheries and Other Ocean Users due to biophysical effects on the presence, abundance, distribution, or quality of marine fish species or other resources
- Possible interference with scheduled government / industry research activities, including direct disturbance and/or effects on research results and associated management decisions

As a result of these identified environmental interactions, issues identified in the EIS Guidelines and concerns raised through consultation and engagement, the assessment of environmental effects on Commercial Fisheries and Other Ocean Users is focused on the following potential environmental effects:

- Direct interference, resulting in a change in the distribution, intensity and/or functions (effectiveness / efficiency) of Commercial Fishing and Other Ocean Users
- Damage to fishing gear, vessels, and other equipment and components
- Change in the abundance distribution and quality of marine resources, resulting in a change in distribution, intensity and/or function (effectiveness / efficiency) of Commercial Fishing and Other Ocean Uses

13.3 Environmental Effects Assessment and Mitigation

13.3.1 Approach and Methods

The potential effects of the Project on this VC are assessed by first identifying the potential interactions between Project components and activities and the various aspects of this VC. These are identified and evaluated through a review and analysis of the existing and available information on the current nature, distribution and timing of commercial fisheries and other marine activities in the Project Area/LSA and RSA, as provided in Chapter 7 of this EIS, as well as relevant scientific literature on the effects of oil and gas exploration projects on the various aspects of this VC. Each planned component of the Project is considered in terms of its potential to result in environmental changes that may have associated environmental effects on the VC, with a focus on the various potential environmental interactions and changes identified in the previous section and integrating mitigation measures throughout the effects analysis. Project-related residual effects are then characterized and evaluated for significance. This VC also relates to, and overlaps with, other components of the environment, as potential effects to fishing activity, for example, may result from changes in the availability and quality of Marine Fish and Fish Habitat (Chapter 8). These potential inter-relationships are considered throughout the environmental effects assessment for this VC, with cross referencing as relevant.

13.3.2 Summary of Key Mitigation

Key mitigation measures that will be implemented in relation to the Project to help avoid or reduce potential environmental effects on Commercial Fisheries and Other Ocean Users include:

- Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable
- Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols
- Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards.
- The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG
- During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal
- Appropriate handling, storage, transportation, and on-shore disposal of solid and hazardous waste
- Establishment of a safety zone around drilling installations in accordance with the Newfoundland Offshore Petroleum Drilling and Production Regulations SOR/2009-316
- Issuance of Notices to Shipping, Notice to Mariners (where appropriate) regarding planned Project activities

- Ongoing communication with commercial fishers through One Ocean, FFAW-Unifor and seafood producers regarding planned project activities, including timely communication of drilling locations, safety zone, and decommissioned wellheads. This information will also be communicated to Indigenous fishers in accordance with the Indigenous Communities Fisheries Communication Plans (herein referred to as the Plans)
- 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 decommissioned wellsites
- In accordance with the One Ocean "Risk Management Matrix Guidelines," the need for a Fisheries Liaison Officer (FLO) and/or fisheries guide vessels during drilling installation movement from port to its offshore location will be determined in consideration of the guidelines. Use of a FLO during geophysical programs will also be determined in consideration of these guidelines
- A single point of contact (SPOC) will be established during Project activities to facilitate communications between fishers and Equinor Canada regarding gear loss / damage and other compensation matters
- A compensation program for damages resulting from Project activities will be developed and implemented. This compensation program will be developed in consideration of C-NLOPB guidelines, including the Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activities (March 2002) and as revised. This program will outline compensation procedures for actual loss or damages to commercial fishers, including Commercial-communal fishers, attributable to Equinor Canada resulting from a spill or debris, or expenses incurred in taking remedial action. Actual loss or damage includes loss of income or future income; loss of hunting, fishing, or gathering opportunities; and costs and expenses incurred for action taken to remedy a situation involving a spill, including measure to control or clean a spill
- Suspended and/or abandoned wellsite locations will be communicated to the appropriate authorities for inclusion on nautical charts for use by commercial fishers and other mariners
- DFO will be contacted regarding timing and locations of planned DFO research surveys
- DND will be contacted regarding timing of planned offshore military exercises

These mitigation measures are considered in a fully integrated manner throughout the environmental effects analysis that follows. Measures to prevent or reduce potential adverse environmental effects on Marine Fish and Fish Habitat (Chapter 8) will also be indirectly relevant to this VC.

13.3.3 Presence and Operation of Drilling Installation (Including Drilling and Associated Discharges)

The effects of underwater noise associated with the MODU and drilling on marine fish species have been assessed in the Marine Fish and Fish Habitat VC, and it was concluded that there would not be a significant residual environmental effect on marine fish species (including commercial fish species). Therefore, underwater noise is likely to have only limited indirect effects on catch rates and associated economic value for commercial fishers. It is therefore unlikely that marine resources will be affected or disrupted due to presence of the drilling installation and associated drilling activities in a manner and to

a degree that would then translate into effects on the overall availability or quality of a marine resource, and thus, on the overall nature, intensity or value of related commercial activity.

The presence and operation of the drilling installation and the safety zone may require commercial fishers and other oceans users (e.g., research surveys) to reroute, relocate or reschedule their activities. Given the short-term and localized nature of these planned activities, and in consideration of the implementation of communication protocols, such as Notices to Shipping, and the relatively small footprint of the safety zone, it is predicted there will be no measurable adverse effects on other ocean users resulting from the presence and operation of the drilling installation and associated drilling activities.

With implementation of mitigation measures, the overall magnitude of the effect of drilling and marine-associated discharges on Commercial Fisheries and Other Ocean Users is anticipated to be low. The nature, timing, geographical extent and duration of Drilling Installation and Activities (Including Drilling and Associated Discharges) for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The MODUs under consideration are the same (i.e., a drillship or semi-submersible), drilling would occur over a similar time frame (i.e., 35 to 65 days), drilling could occur throughout the year, anywhere within the ELs, WBMs would be used in the first section and SBMs would be used in lower sections, and drilling waste discharges will adhere to the requirements for cuttings treatment and discharge guidelines in the OWTG. Therefore, the effects of the Drilling Installation and Activities (Including Drilling and Associated Discharges) are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Drilling Installation and Activities (Including Drilling and Associated Discharges) on Commercial Fisheries and Other Ocean Users is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, short to medium term, regular to continuous in frequency, and reversible, with a high level of confidence. The localized and short-term nature of these disturbances at any one location and time considerably reduces the potential for detectable, adverse effects upon the commercial fishery and other ocean users.

13.3.4 Formation Flow Testing with Flaring

Formation flow testing, including associated flaring activity, is not expected to have adverse interactions with or effects on Commercial Fisheries and Other Ocean Users. When well fluids are sent through the wellbore and to the drilling installation for testing, it is in a closed casing and does not interact with the surrounding marine environment. Likewise, flaring is not anticipated to have an interaction with commercial fishing activity and other ocean users, as it will take place above the drilling installation and will therefore not come into contact with commercial fishing activities or resources, nor have an interaction that would result in an effect on other ocean users.

The nature, timing, geographical extent and duration of Formation Flow Test with Flaring for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The formation flow test with flaring under consideration are the same (i.e., carried out on wells where hydrocarbons are discovered, and additional reservoir data are needed),

flaring would be continuous and last between two to five days. Therefore, the effects of the Formation Flow Test with Flaring are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Formation Flow Test with Flaring on Commercial Fisheries and Other Ocean Users is considered applicable to this Project. An alternative to formation flow testing with flaring exists and may be used on exploration wells to gather similar data. These types of tests, called Formation Testing While Tripping, may be conducted without the need to flare.

13.3.5 Wellhead Decommissioning

As described in Section 2.5.4, wellhead decommissioning plans will be based largely upon the water depths at the well site and associated technical considerations. In water depths less than 500 m, the wellhead will be cut below the seafloor and removed, with no potential for interaction with fishing gear. In water depths between 500 m and 1,500 m, the wellhead will be removed with a portion of the casing (approximately 0.85 m) remaining above the seafloor.

There are circumstances where a wellhead may be left for one or two years and sometimes longer, however normally the plan is to cut them off as soon as logistically possible.

The duration the wellhead is left in place is based on two main factors:

1. The availability of the ROV vessel, light invention vessel (LIV) or inspection, maintenance and repair (IMR) vessel and cutting equipment. Vessels capable of working at deep-water locations and with the equipment required are not always readily available and require some procurement and mobilization time.
2. The time of year the well was drilled. The vessels have limited weather operational windows meaning that the summer season is most efficient and safest time to perform the operation.

In water depths greater than 1,500 m, the wellhead will remain in place permanently and will not be removed. However, since maximum water depths in EL 1159 and EL 1160 are approximately 930 m and 1,020 m, respectively, this wellhead abandonment option is not likely to be applicable to wells drilled in these ELs.

Equinor Canada will provide locations for each decommissioned well to the Canadian Hydrographic Service (CHS). CHS will then issue a Navigational Warning and Notice to Mariners. Equinor Canada is not aware of any issues regarding wellheads left in place in the offshore Newfoundland.

Equinor Canada will also provide the locations for each decommissioned well to fishers, enabling mobile-gear and fixed-gear fishers to avoid these locations. The nature, timing, geographical extent and duration of Well Decommissioning or Suspension for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The activities under consideration are the same (i.e., isolating the wellbore by placing cement plugs and/or mechanical devices, at various depths, and in some cases, cutting the casing and removing the casing just below the surface of the seafloor and removing equipment). Therefore, the effects of the Well Decommissioning or Suspension are not considered specific or unique to this Project and the analysis

and conclusions of the Flemish Pass EIS related to the effects of Well Decommissioning or Suspension on Commercial Fisheries and Other Ocean Users is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, long term, continuous in frequency, and reversible, with a high level of confidence.

13.3.6 Surveys

The effects of underwater noise associated with surveys on marine fish species have been assessed in the Marine Fish and Fish Habitat VC, and it was concluded that there would not be a significant residual environmental effect on marine fish species (including commercial fish species). Therefore, underwater noise is likely to have only limited indirect effects on catch rates and associated economic value for commercial fishers.

Some surveys that use geophysics, such as VSP and wellsite surveys, can result in direct interference with commercial fishing activity because the sound waves have the potential to interact with fishing gear (e.g., crab pots) that may already be set in an area where surveying is taking place. However, due to the transient and localized nature of surveys, and their short-term duration, gear damage is not likely. Similarly, although there is a potential for interaction with research gear, and other vessels, the likelihood is low due to the nature of the activity.

The nature, timing, geographical extent and duration of Geophysical, Environmental and Geotechnical Surveys for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The surveys under consideration are the same (i.e., conducted prior to drilling to assess the potential for hazards [such as possible obstructions or seabed instability] and a pre-drill coral survey, which may include seismic sound sources, multibeam echo sounders, side scan sonar, sub-bottom profilers, and video equipment. Therefore, the effects of the Geophysical, Environmental and Geotechnical Surveys are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Geophysical, Environmental and Geotechnical Surveys on Commercial Fisheries and Other Ocean Users is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, short term, sporadic in frequency, and reversible, with a high level of confidence.

13.3.7 Supply and Servicing

The contribution to existing offshore supply vessel and helicopter traffic serving the offshore industry will be negligible and will continue at approximately the same level as current traffic supporting Equinor Canada’s ongoing exploration activities in the region. Vessels are expected to follow general rules of the sea to avoid conflicts. The nature, timing, geographical extent and duration of Well Decommissioning or Suspension for ELs 1159 and 1160 will be substantively similar to this activity as assessed in the existing Flemish Pass Exploration Drilling Project EIS. The activities under consideration are the same (i.e., isolating the wellbore by placing cement plugs and/or mechanical devices, at various depths, and

in some cases, cutting the casing and removing the casing just below the surface of the seafloor and removing equipment). Therefore, the effects of the Well Decommissioning or Suspension are not considered specific or unique to this Project and the analysis and conclusions of the Flemish Pass EIS related to the effects of Well Decommissioning or Suspension on Commercial Fisheries and Other Ocean Users is considered applicable to this Project. In addition, there is no new information available for ELs 1159 or 1160 that would change the applicability of the previous effects assessment. As further described in the Flemish Pass EIS, these changes are predicted to be adverse, low in magnitude, localized, long term, continuous in frequency, and reversible, with a high level of confidence.

13.4 Significance of Residual Environmental Effects

With the implementation of mitigation measures, exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse effects on Commercial Fisheries and Other Ocean Users. Individual environmental effects summaries for planned activities to ELs 1159 and 1160 are in Tables 13.1 and 13.2, respectively.

13.5 Environmental Monitoring and Follow-up

As documented previously in this Chapter, Equinor Canada has committed to a number of measures and on-going processes to avoid or reduce the potential for adverse interactions with, and effects upon, fisheries and other marine activities and users. These include on-going communication and cooperation mechanisms throughout the operational life of the Project (Section 13.3.2). These are intended to allow an on-going discussion of Project-related activities and issues as they may arise during Project implementation, and cooperative and collaborative planning and implementation of required management measures throughout the life of the Project.

Given the high level of confidence regarding the prediction of not significant adverse environmental effects on commercial fisheries or other ocean uses in the Project Area/LSA or RSAs, and the implementation of mitigation, no follow-up is proposed to be implemented for routine Project activities.

Table 13.1 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1159 • A variety of commercial fishing activity for multiple fish species takes place within the Project Area / LSA and RSA, with the summer months usually being the times when offshore Newfoundland and Labrador experiences the most ocean use / activity. • Important commercial fisheries include those for snow crab and northern shrimp. Other commercial fisheries that occur in the area include those for clams, cockles, capelin, Greenland and Atlantic halibut, yellowtail flounder, and pelagic species such as swordfish and various species of tuna. • Recent decades have seen important and widespread changes in the fishing industry due to natural (climate change) and human (other anthropogenic activities), which have influenced the nature, intensity, distribution, and timing of fisheries into his region. • There are also possible future changes in the fisheries off Eastern Newfoundland, such as a possible resurgence of groundfish activities, which are relevant to the characteristics of the VC over the lifespan of this Project.	**Summary of Key Mitigation** • Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards. • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal • Appropriate handling, storage, transportation, and on-shore disposal of solid and hazardous waste • Establishment of a safety zone around drilling installations in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations* SOR/2009-316 • Issuance of Notices to Shipping, Notice to Mariners (where appropriate) regarding planned Project activities • Ongoing communication with commercial fishers through One Ocean, FFAW-Unifor and seafood producers regarding planned project activities, including timely communication of drilling locations, safety zone, and decommissioned wellheads. This information will also be communicated to Indigenous fishers in accordance with the Indigenous Communities Fisheries Communication Plan • 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 decommissioned wellsites • In accordance with the One Ocean “Risk Management Matrix Guidelines,” the need for a FLO and/or fisheries guide vessels during drilling installation movement from port to its offshore location will be determined in consideration of the guidelines. Use of a FLO during geophysical programs will also be determined in consideration of these guidelines • A SPOC will be established during Project activities to facilitate communications between fishers and Equinor Canada regarding gear loss/damage and other compensation matters • Develop and implement a compensation program for damages resulting from Project activities. This compensation program will be developed in consideration of C-NLOPB guidelines, including the Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity (C-NLOPB and

Table 13.1 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
• EL 1159 overlaps with NAFO Division 3L. • Fishing activity during the 2011 to 2016 period occurred generally within the April to December timeframe, with the highest landings by weight and value occurring in the April to July period.	CNSOPB 2017) and as revised. This program will outline compensation procedures for actual loss or damages to commercial fishers, including Commercial-communal fishers, attributable to Equinor Canada resulting from a spill or debris, or expenses incurred in taking remedial action. Actual loss or damage includes loss of income or future income; loss of hunting, fishing, or gathering opportunities; and costs and expenses incurred for action taken to remedy a situation involving a spill, including measure to control or clean a spill • The communication of suspended and/or abandoned wellsite locations to the appropriate authorities for inclusion on nautical charts for use by commercial fishers and other mariners • Contact DFO regarding timing and locations of planned DFO research surveys • Contact DND regarding timing of planned offshore military exercises

Project Component or Activity	Potential Environmental Effects	Residual Environmental Effects Summary Descriptors						
		Nature / Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Certainty
Presence and Operation of Drilling Installation	• Direct interference • Change in resource abundance, location, quality	A	L	L	S	C	R	H
Drilling and Associated Marine Discharges	• Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	R	R	H
Formation Flow Testing with Flaring	• None expected	N	-	-	-	-		H
Wellhead Decommissioning	• Direct interference • Damage to equipment	A	L	L	L	C	R	H

Table 13.1 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Direct interference • Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	S	R	H
Geological, Geotechnical and Environmental Surveys	• Direct interference • Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	S	R	H
Supply and Servicing	• Direct interference • Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	R	R	H

Evaluation of Significance

- Exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse environmental effects on Commercial Fisheries and Other Ocean Users. The establishment of a safety zone around the drilling installation may temporarily displace commercial fishers and other activities from accessing certain localized areas but is unlikely to have an overall and detectable economic effect on any industry within the RSA.
- The implementation of standard mitigation measures for Commercial Fisheries and Other Ocean Users, such as gear damage compensation, establishment of a safety zone around the drilling installation, presence and active advice of a FLO as required, Notice to Shippers and Notice to Mariners, and other communications are expected to further reduce the potential for interactions and effects.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 13.1 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1159

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY		
KEY		
Nature / Direction:	Frequency:	Certainty in Predictions:
P Positive	O Occurs once	L Low level of confidence
A Adverse	S Occurs sporadically	M Moderate level of confidence
N Neutral (or no effect)	R Occurs on a regular basis	H High level of confidence
	C Occurs continuously	
Magnitude:		N/A Not Applicable
N Negligible	Duration:	
L Low	S Short-term (for duration of the activity)	
M Medium	M Medium-term (beyond duration of the activity – weeks or months)	
H High	L Long-term (beyond duration of the activity – years)	
Geographic Extent:	P Permanent (recovery unlikely)	
L Localized, in immediate vicinity of activity		
PA Within Project Area	Reversibility:	
LSA Within LSA	R Reversible (will recover to baseline)	
RSA Within RSA or beyond	I Irreversible (permanent)	

Table 13.2 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
Summary of Existing Conditions and Ecological and Social Context: EL 1160 • A variety of commercial fishing activity for multiple fish species takes place within the Project Area / LSA and RSA, with the summer months usually being the times when offshore Newfoundland and Labrador experiences the most ocean use / activity. • Important commercial fisheries include those for snow crab and northern shrimp. Other commercial fisheries that occur in the area include those for clams, cockles, capelin, Greenland and Atlantic halibut, yellowtail flounder, and pelagic species such as swordfish and various species of tuna. • Recent decades have seen important and widespread changes in the fishing industry due to natural (climate change) and human (other anthropogenic activities), which have influenced the nature, intensity, distribution, and timing of fisheries into his region. • There are also possible future changes in the fisheries off Eastern Newfoundland, such as a possible resurgence of groundfish activities, which are relevant to the characteristics of the VC over the lifespan of this Project.	**Summary of Key Mitigation** • Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable • Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols • Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards. • The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG • During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge, or shipped to shore for appropriate disposal • Appropriate handling, storage, transportation, and on-shore disposal of solid and hazardous waste • Establishment of a safety zone around drilling installations in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations* SOR/2009-316 • Issuance of Notices to Shipping, Notice to Mariners (where appropriate) regarding planned Project activities • Ongoing communication with commercial fishers through One Ocean, FFAW-Unifor and seafood producers regarding planned project activities, including timely communication of drilling locations, safety zone, and decommissioned wellheads. This information will also be communicated to Indigenous fishers in accordance with the Indigenous Communities Fisheries Communication Plan • 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 decommissioned wellsites • In accordance with the One Ocean “Risk Management Matrix Guidelines,” the need for a FLO and / or fisheries guide vessels during drilling installation movement from port to its offshore location will be determined in consideration of the guidelines. Use of a FLO during geophysical programs will also be determined in consideration of these guidelines • A SPOC will be established during Project activities to facilitate communications between fishers and Equinor Canada regarding gear loss/damage and other compensation matters • Develop and implement a compensation program for damages resulting from Project activities. This compensation program will be developed in consideration of C-NLOPB guidelines, including the Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity (C-NLOPB

Table 13.2 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY	
• EL 1160 overlaps with NAFO Division 3L. • Fishing activity during the 2011 to 2016 period occurred generally within the April to December timeframe, with the highest landings by weight and value occurring in the April to July period.	and CNSOPB 2017) and as revised. This program will outline compensation procedures for actual loss or damages to commercial fishers, including Commercial-communal fishers, attributable to Equinor Canada resulting from a spill or debris, or expenses incurred in taking remedial action. Actual loss or damage includes loss of income or future income; loss of hunting, fishing, or gathering opportunities; and costs and expenses incurred for action taken to remedy a situation involving a spill, including measure to control or clean a spill • The communication of suspended and/or abandoned wellsite locations to the appropriate authorities for inclusion on nautical charts for use by commercial fishers and other mariners • Contact DFO regarding timing and locations of planned DFO research surveys • Contact DND regarding timing of planned offshore military exercises

Project Component or Activity	Potential Environmental Effects	Residual Environmental Effects Summary Descriptors						
		Nature / Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Certainty
Presence and Operation of Drilling Installation	• Direct interference • Change in resource abundance, location, quality	A	L	L	S	C	R	H
Drilling and Associated Marine Discharges	• Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	R	R	H
Formation Flow Testing with Flaring	• None expected	N	-	-	-	-		H
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Direct interference • Damage to equipment Change in resource abundance, location, quality	A	L	L	S	S	R	H
Wellhead Decommissioning	• Direct interference • Damage to equipment	A	L	L	L	C	R	H

Table 13.2 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY								
Project Component or Activity	**Potential Environmental Effects**	**Residual Environmental Effects Summary Descriptors**						
		Nature / Direction	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Certainty**
Geophysical, Geohazard, Wellsite Seabed and VSP Surveys	• Direct interference • Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	S	R	H
Geological, Geotechnical and Environmental Surveys	• Direct interference • Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	S	R	H
Supply and Servicing	• Direct interference • Damage to equipment • Change in resource abundance, location, quality	A	L	L	S	R	R	H

Evaluation of Significance

- Exploration drilling on ELs 1159 and 1160 is not likely to result in significant adverse environmental effects on Commercial Fisheries and Other Ocean Users. The establishment of a safety zone around the drilling installation may temporarily displace commercial fishers and other activities from accessing certain localized areas but is unlikely to have an overall and detectable economic effect on any industry within the RSA.
- The implementation of standard mitigation measures for Commercial Fisheries and Other Ocean Users, such as gear damage compensation, establishment of a safety zone around the drilling installation, presence and active advice of a FLO as required, Notice to Shippers and Notice to Mariners, and other communications are expected to further reduce the potential for interactions and effects.

NOTE: The environmental effects assessment for accidental events is presented separately in Section 15.

Table 13.2 Environmental Effects Assessment Summary: Commercial Fisheries and Other Ocean Users – EL 1160

ENVIRONMENTAL EFFECTS ASSESSMENT SUMMARY		
KEY		
Nature / Direction:	Frequency:	Certainty in Predictions:
P Positive	O Occurs once	L Low level of confidence
A Adverse	S Occurs sporadically	M Moderate level of confidence
N Neutral (or no effect)	R Occurs on a regular basis	H High level of confidence
	C Occurs continuously	
Magnitude:		N/A Not Applicable
N Negligible	Duration:	
L Low	S Short-term (for duration of the activity)	
M Medium	M Medium-term (beyond duration of the activity – weeks or months)	
H High	L Long-term (beyond duration of the activity – years)	
Geographic Extent:	P Permanent (recovery unlikely)	
L Localized, in immediate vicinity of activity		
PA Within Project Area	Reversibility:	
LSA Within LSA	R Reversible (will recover to baseline)	
RSA Within RSA or beyond	I Irreversible (permanent)	

13.6 References

AMEC (AMEC Environment & Infrastructure). 2014. Eastern Newfoundland Strategic Environmental Assessment. Prepared for the Canada-Newfoundland Offshore Petroleum Board. Available at: https://www.cnlopb.ca/sea/eastern/. Accessed: August 13, 2019.

C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board) and CNSOPB (Canada-Nova Scotia Offshore Petroleum Board). 2017. Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity. November 2017. Available at: http://www.cnlopb.ca/pdfs/guidelines/compgle.pdf?lbisphpreq=1.

14.0 CUMULATIVE ENVIRONMENTAL EFFECTS

The Flemish Pass EIS environmental effects analysis considered the drilling of up to 30 wells. Wells to be drilled on ELs 1159 and 1160 will be captured within this 30-well count and located within the Project Area. No additional wells (to the 30 assessed) will be drilled with the inclusion of ELs 1159 and 1160. The approval granted 24 wells, up to six wells per EL.

14.1 Approach and Methods

As noted in the EIS Guidelines (Section 7.6.3), cumulative effects "*are defined as changes to the environment due to the project combined with the existence of other past, present and reasonably foreseeable physical activities. Cumulative effects may result if:*

- The implementation of the project may cause direct residual adverse effects on the VC, taking into account the application of technically and economically feasible mitigation measures
- The same VC may be affected by other past, present and future physical activities"

As also specified in the EIS Guidelines, the approach and methods used in undertaking the cumulative effects assessment are based on the guidance provided in the following Canadian Environmental Assessment Agency (2014, 2015) documents:

- Operational Policy Statement Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012 and
- Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012

The cumulative environmental effects assessment considers the overall total effect on the VCs as a result of the Project's predicted residual environmental effects (as described in the preceding chapters) and those of other relevant projects and activities.

14.1.1 Identification of Valued Components

The VCs to be considered in the cumulative effects assessment include the following:

- Marine Fish and Fish Habitat (including SAR)
- Marine and Migratory Birds (including SAR)
- Marine Mammals and Sea Turtles (including SAR)
- Special Area
- Indigenous Communities and Activities
- Commercial Fisheries and Other Ocean Users

14.1.2 Spatial and Temporal Boundaries

The EIS Guidelines (Section 7.6.3) state that the EIS will "identify and justify the spatial and temporal boundaries for the cumulative effect assessment for each VC selected". The Guidelines also state that "the boundaries for the cumulative effects assessments will generally be different for each VC considered", noting that "these cumulative effects boundaries will also generally be larger than the boundaries for the corresponding project effects."

For all VCs, the spatial and temporal boundaries used for the cumulative effects assessment are consistent with those established and used for the Project-specific effects assessment (see earlier RSA definitions, Section 4.3). This is the case because these boundaries were defined to incorporate:

- The likely geographic and temporal ZOIs of the Project and its environmental effects
- The overall geographic extents and distribution patterns of the various biota and human activities that comprise the VCs under consideration and which may therefore be affected by the Project and its environmental effects
- The other projects and activities and associated environmental effects that may affect the same individuals or populations as those affected by the Project (whether these occur within or outside the RSA itself)

As described in Section 4.3 (EA Approach and Methods), the RSAs defined for the VCs have also been established to be larger than the likely and predicted extent of Project-related effects, in order to account for the larger movements and distributions of the various biological and socioeconomic components that may be affected by the Project. The RSAs therefore also consider and incorporate the overall distributions and movements, as applicable, of potentially affected individuals and populations during the time period which they may be affected by the Project, and thus, for which they may be affected cumulatively as a result of other projects and activities and effects occurring within these areas and ranges.

The effects assessment therefore includes an "environment-focused" approach to determining and defining spatial and temporal boundaries for the analysis, focusing on and considering the overall nature and geographic and temporal dimensions of the affected environmental components, while also considering the nature and location of the other projects and activities that may potentially contribute to the cumulative effects on the VC within these spatial (ecological or socio-economic) boundaries.

14.1.3 Sources of Potential Cumulative Effects

A general list of other projects and activities that are considered in the cumulative effects assessment is provided in Table 14.1 below and includes various ongoing and future projects and activities off eastern Newfoundland and elsewhere. Figures 14-1 and 14-2 identify the locations of known and defined projects and activities. This includes, for example, the locations of the four offshore production projects, the location of the proposed Bay du Nord development project, commercial fishing activity, and other human components and activities.

Table 14.1 Overview of Other Projects and Activities Considered in the Cumulative Effects Assessment

Project / Activity	Overview
Hibernia	• Discovered in 1979, the Hibernia Oilfield is operated by the Hibernia Management and Development Company Ltd. and is located approximately 315 km east-southeast of St. John's, NL. • The development phase of that project commenced in late 1990 and continued until the mating of the Gravity Based Structure and its topsides at Bull Arm NL in 1997, after which the platform was towed to and installed at its site on the Grand Banks in June of that year. • With estimated recoverable reserves of approximately 1.4 billion barrels, commercial production from the Hibernia field commenced in November 1997 and is on-going. • In recent years, the project has been further expanded to include the Hibernia Southern Extension, from which production commenced in 2011. • This ongoing project is located approximately 51 km from the closest edge of the Project Area - Northern Section and is within the Project Area - Southern Section. • Hibernia is located approximately 86 km from EL 1159 and 60 km from EL 1160. • Production activities at Hibernia are planned to extend throughout the temporal duration of exploration drilling activities on ELs 1159 and 1160.
Terra Nova	• Discovered in 1984 and declared a significant discovery in 1985, this oilfield has reserve estimates of approximately 500 million barrels of recoverable oil. • The Terra Nova Project is currently in operation by Suncor Energy Inc. using a floating production, storage, and offloading (FPSO) facility, and is located approximately 350 km southeast of St. John's and 35 km southeast of Hibernia. • Production from the FPSO began in January 2002. • This on-going project is located approximately 80 km from the closest edge of the Project Area - Northern Section and is within the Project Area - Southern Section. • Terra Nova is located approximately 86 km from EL 1159 and 40 km from EL 1160. • Production activities at Terra Nova are planned to extend throughout the temporal duration of exploration drilling activities on ELs 1159 and 1160.
White Rose and Extension Project	• Discovered in 1984, an SDL for the field was issued in January 2004. • It is located approximately 350 km east-southeast of St. John's, and approximately 50 km from the Hibernia and Terra Nova fields. • The White Rose oilfield and its satellite extensions are operated by Husky Energy Inc. using an FPSO, and first oil was produced in November 2005 followed by the North Amethyst expansion in May 2010. • This on-going project is located approximately 44 km from the closest edge of the Project Area - Northern Section and is within the Project Area - Southern Section. • White Rose is located approximately 36 km from EL 1159 and 2 km from EL 1160. • Production activities at White Rose are planned to extend throughout the temporal duration of exploration drilling activities on ELs 1159 and 1160.

Table 14.1 Overview of Other Projects and Activities Considered in the Cumulative Effects Assessment

Project / Activity	Overview
Hebron	• First discovered in 1980, this oilfield is estimated to contain more than 700 million barrels of recoverable resources. • The Hebron Platform was towed to field in June 2017. The Project is designed for an oil production rate of 150,000 barrels of oil per day. • First oil from the Hebron Project is expected by the end of 2017. • This project is located approximately 73 km from the closest edge of the Project Area - Northern Section and is within the Project Area - Southern Section. • Hebron is located approximately 82 km from EL 1159 and 40 km from EL 1160. • Production activities at Hebron are planned to extend throughout the temporal duration of exploration drilling activities on ELs 1159 and 1160.
Proposed Bay du Nord Development Project	• Discovered in 2013 and an SDL was issued in November 2017. • The proposed project would be operated by Equinor Canada. • This proposed project has yet to receive sanction by Equinor Canada. • This project is proposed and is currently going through an EA, with a Project Description filed in June 2018 and the CEA Agency issuing a *Notice of Commencement of an Environmental Assessment* in August 2018. An EIS associated with this proposed project is not currently available on the CEA Registry. • If the proposed project is executed, then it will be located approximately 450 km east-northeast of St. John's, NL. • The area associated with the core development area is anticipated to be well-defined (i.e., 450 km²), while the broader project area has an estimated area of approximately 4,900 km² and is associated with potential future development. The footprint of proposed facilities on the seabed, based on the current stage of design, only covers an area of approximately 7 km². • The proposed project is a subsea development, which may include multiple templates and/or individual satellite wells tied back via flowlines to the FPSO installation. The total number of wells for the core development is estimated to be between 10 and 30 wells. • The proposed Bay du Nord development project is located approximately 39 km from EL 1159 and 80 km from EL 1160. • *Note: The majority of information above is from the Bay du Nord project description (Equinor Canada 2018), and information may be updated in the Bay du Nord EIS.*
Offshore Petroleum Exploration – Drilling	• The eastern Newfoundland offshore area is also subject to ongoing and planned offshore exploration drilling programs which were in progress or being subject to EA review or recently approved as of the time of writing (see https://www.cnlopb.ca/assessments/). • As of March 4, 2019, a total of 470 wells have been drilled in the Canada-NL Offshore Area, including 171 exploration wells, 57 delineation wells, and 242 development wells (C-NLOPB 2019b). • The type and amount of offshore exploration activity can vary considerably from year to year throughout the eastern Newfoundland offshore. • Over the period of January 1, 2015 to March 4, 2019, 12 exploration wells were drilled (C-NLOPB 2019b).

Table 14.1 Overview of Other Projects and Activities Considered in the Cumulative Effects Assessment

Project / Activity	Overview
Offshore Petroleum Exploration – Geophysical and Other Exploration Activities	• Offshore geophysical survey programs are often planned and conducted to get an overall understanding of regional geology and hydrocarbon potential, and to help identify sites or zones that may warrant further investigation, such as through eventual exploration drilling activities (see below). • These may include 2D, 3D and possibly four-dimensional (4D) geophysical data acquisition, as well as associated geochemical, environmental, and geotechnical survey activities. • While exploration projects and activities are typically proposed and approved through the EA process as multi-year programs that can cover quite large offshore areas, the type and level of activity conducted each year can also vary and is usually a fraction of the overall scope assessed. • For general illustration, over the period 2014 to 2017, approximately 1.8 million km of geophysical survey data (2D, 3D, and other) was collected in the eastern Newfoundland offshore region, and approximately 160,000 km of geophysical survey data was collected in the JDB (C-NLOPB 2018). • There are a number of offshore geophysical programs off the eastern Newfoundland offshore area that were in progress, being subject to EA review or recently approved as of the time of writing this document (see https://www.cnlopb.ca/assessments/).
Fishing Activity	• Commercial fisheries within and around the Project are extensive and diverse, as described in detail (including associated mapping) (see Section 7).
Other Marine Vessel Traffic	• This includes tanker traffic and supply vessels associated with the existing offshore oil developments, as well as cargo ships and fishing vessel transits (see Section 7).
Hunting Activity	• Wildlife (especially seabird) populations off Newfoundland and Labrador are subject to hunting activity. • Although little or no hunting activity is expected to occur in the far offshore locations that comprise the Project Area, these activities do affect the bird and seal populations that occur in, and move to and through, the region.

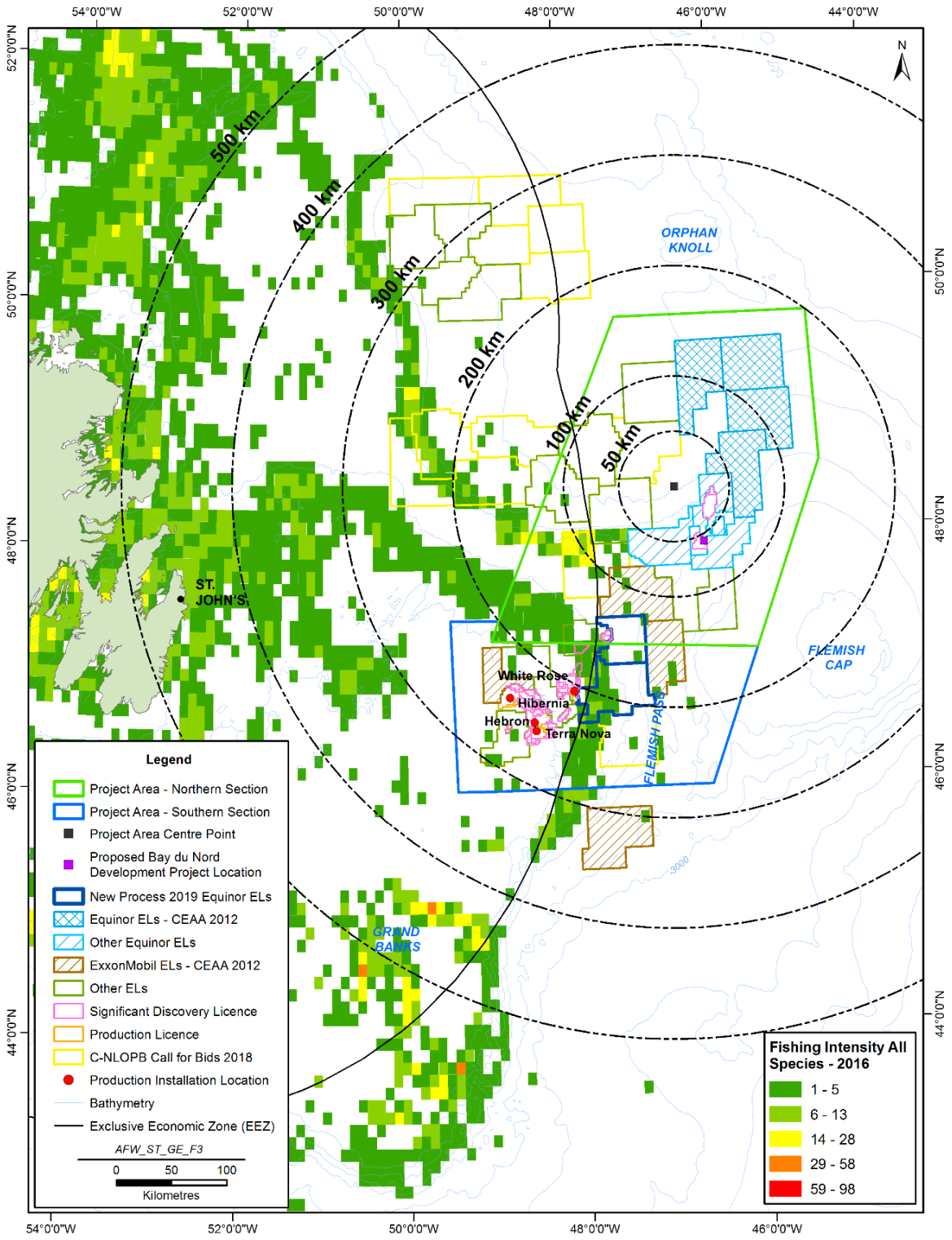


Figure 14-1 Other Projects and Activities Considered in the Cumulative Effects Assessment (Including Distances from Project Area – Northern Section)

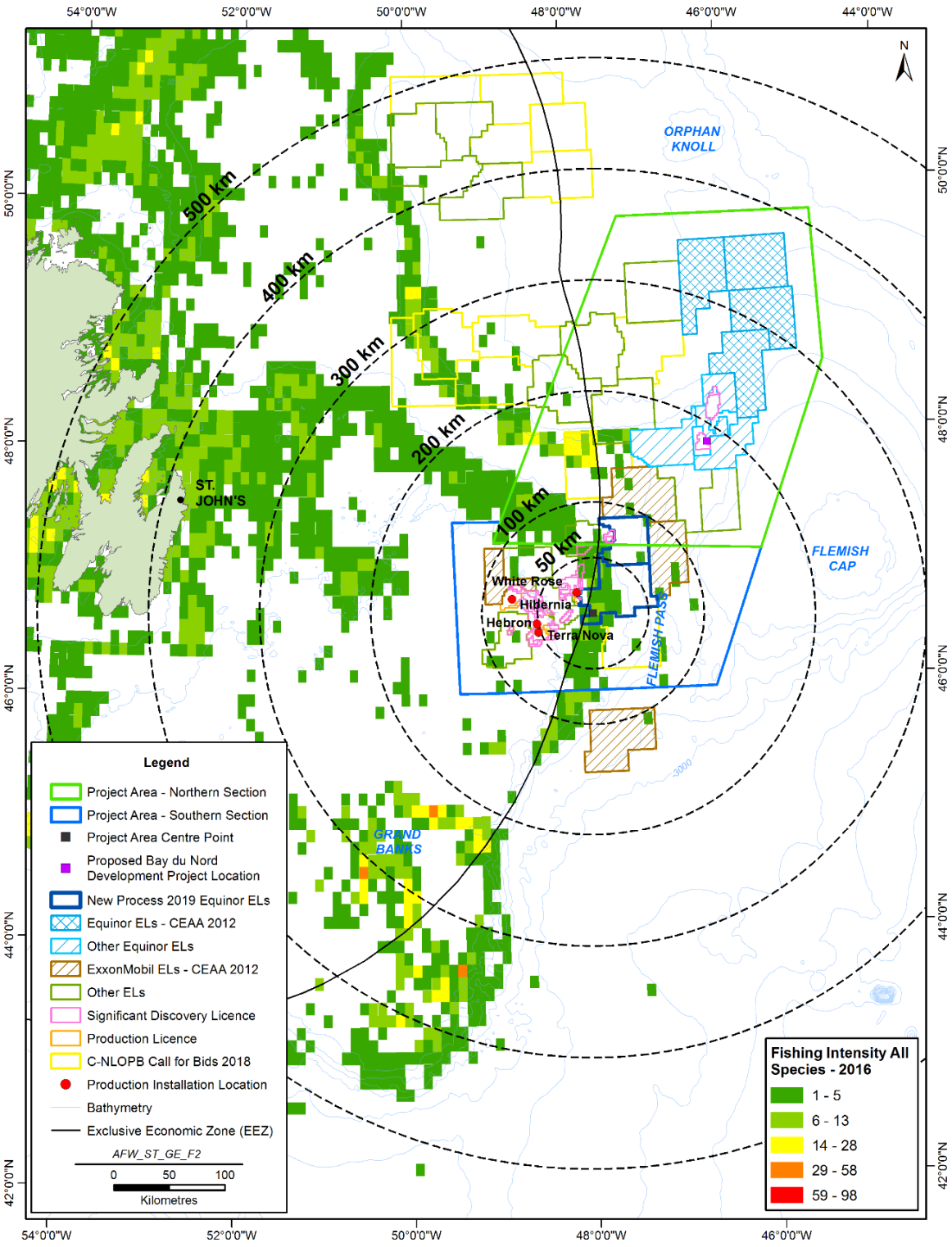


Figure 14-2 Other Projects and Activities Considered in the Cumulative Effects Assessment (Including Distances from Project Area – Southern Section)

14.1.4 Assessing Cumulative Effects on Each VC

Other future projects and activities that are relevant to the VC and its cumulative effects assessment are outlined in Table 14.2.

Table 14.2 Potential Interactions with Other Projects and Activities Considered in the Cumulative Effects Assessment

Project / Activity	VCs Potentially Affected					
	Marine Fish and Fish Habitat	Marine and Migratory Birds	Marine Mammals and Sea Turtles	Special Areas	Indigenous Communities and Activities	Commercial Fisheries and Other Ocean users
Hibernia	●	●	●	●	●	●
Terra Nova	●	●	●	●	●	●
White Rose and Extension Project	●	●	●	●	●	●
Hebron	●	●	●	●	●	●
Proposed Bay du Nord Development Project	●	●	●	●	●	●
Offshore Petroleum Exploration – Geophysical and Other Exploration Activities	●	●	●	●	●	●
Offshore Petroleum Exploration – Drilling	●	●	●	●	●	●
Fishing Activity	●	●	●	●	●	
Other Marine Vessel Traffic	●	●	●	●	●	●
Hunting Activity		●	●		●	

14.2 Marine Fish and Fish Habitat (including Species at Risk)

Potential interactions with Marine Fish and Fish Habitat as a result of exploration drilling on ELs 1159 and 1160 are primarily related to underwater sound, light emissions, marine discharges, and direct interaction with the benthic environment. Potential interactions will, however, short-term and localized in nature, and are not expected to have overall (population level) adverse effects on fish. Potential effects on corals and sponges will be reduced or avoided by implementing mitigation measures such as completing pre-drill surveys.

There are currently four operational production facilities offshore Newfoundland (i.e., Hibernia, Terra Nova, White Rose and Hebron) in the Project Area – Southern Section, each of which will contribute somewhat to environmental effects on Marine Fish and Fish Habitat. However, ongoing EEM programs for these projects have generally demonstrated a localized (i.e., less than 10 km) geographic extent for the project-induced changes on fish habitat. It assumed that Hebron and the proposed Bay du Nord

development project (located in the Project Area – Northern Section) will have similar ZOIs. This suggests a limited potential for cumulative effects to occur between exploration drilling activities carried out on ELs 1159 and 1160 and these ongoing petroleum production projects.

It is acknowledged that White Rose is located approximately 2 km from the closest edge of EL 1160. However, this production facility has a safety zone of approximately 95 km², and the South White Rose Extension has a safety zone of 9 km², which would aid in increasing the separation distance between exploration drilling activities and production, and in turn reduce the potential for cumulative effects to Marine Fish and Fish Habitat.

Exploration drilling activities carried out on ELs 1159 and 1160 will operate for a short period of time in any one location, resulting in a short-term disturbance within a relatively limited ZOI. This will reduce the potential for individuals and populations to be affected through multiple interactions with exploration drilling activities on ELs 1159 and 1160 and other activities in the marine environment, and for species to be affected simultaneously and repeatedly by multiple projects and activities. As part of the planning and implementation of its activities, Equinor Canada will continue to communicate with relevant marine users and other stakeholders, including other oil and gas exploration companies and other marine users operating in the area, to make a reasonable effort to provide appropriate spatial and temporal separation that is maintained as required for operational, regulatory and safety reasons. This, along with the other planned mitigation measures (see Appendices F and I of the Project Description) that will be implemented, will reduce the potential for and degree of associated cumulative effects on Marine Fish and Fish Habitat.

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse cumulative environmental effects on Marine Fish and Fish Habitat (including SAR) in combination with other projects and activities that have been or will be carried out.

14.3 Marine and Migratory Birds (including Species at Risk)

Potential interactions with Marine and Migratory Birds as a result of exploration drilling on ELs 1159 and 1160 are primarily related to potential attraction and/or disorientation of birds due to artificial light sources associated with the drilling installation and vessels. Potential interactions with marine birds will, however, entail a localized and short-term disturbance at any one location and time, which reduces the potential for individuals and populations to be affected repeatedly through multiple interactions with ELs 1159 and 1160, as well as the potential for, and degree and duration of, overlap between the effects of exploration drilling on ELs 1159 and 1160 and other activities in the marine environment.

It is acknowledged that White Rose is located approximately 2 km from the closest edge of EL 1160. However, this production facility has a safety zone of approximately 95 km², and the South White Rose Extension has a safety zone of 9 km², which would aid in increasing the separation distance between exploration drilling activities and production, and in turn reduce the potential for cumulative effects to Marine and Migratory Birds.

ELs 1159 and 1160 are located within, or partially within, the Project Area – Southern Section, and there is potential for cumulative effects to result from the combined effects of exploration drilling on ELs 1159 and 1160 and other offshore exploration and production activities, marine traffic, and commercial fishing activity. All four production facilitations (i.e., Hibernia, Terra Nova, White Rose and Hebron) are located within the Project Area – Southern Section. Although these are long-term operations with similarly long-term environmental disturbances, the localized nature of these effects, and the short-term and localized environmental disturbances that may result from adjacent activities associated with exploration drilling activities on ELs 1159 and 1160, will reduce the potential for cumulative effects to occur. It assumed that Hebron and the proposed Bay du Nord development project (located in the Project Area – Northern Section) will have similar ZOIs. This suggests a limited potential for cumulative effects to Marine and Migratory Birds and from exploration drilling activities carried out on ELs 1159 and 1160 and these ongoing petroleum production projects.

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse cumulative environmental effects on Marine and Migratory Birds (including SAR) in combination with other projects and activities that have been or will be carried out.

14.4 Marine Mammals and Sea Turtles (including Species at Risk)

Potential interactions with Marine Mammals and Sea Turtles as a result of exploration drilling on ELs 1159 and 1160 are primarily related to possible injury or disturbance from the movement and sound associated with the drilling installation and vessels. However, potential interactions are likely to be highly transient and temporary for individual marine mammals and sea turtles, especially in consideration of anticipated large-scale daily and seasonal fluctuations within the assessment areas and alternate habitats available throughout the RSA.

Other projects and activities that may affect Marine Mammals and Sea Turtles include commercial fishing, marine traffic, other exploration drilling and activities, and production facilities. Safety zones are required between offshore oil and gas activities, which help reduce the degree to which the potential environmental ZOIs from sound may overlap and interact in space and time. There is, however, the potential that underwater sound produced from these activities may extend beyond these established safety zones and interact spatially with those of other projects and activities. Individual marine mammals and sea turtles may also be exposed to multiple sources of underwater sound while in the RSA due to their widespread, mobile, and migratory nature, which could increase the risk of mortality or physical injury and may result in behavioural changes in individuals exposed to multiple sound sources.

The four production facilities have vessel traffic occurring year-round, which results in a continuous sound source, however, levels from these activities are below those expected to cause auditory injury (Zykov 2016). Sound generated by exploration drilling and geophysical surveys is temporary and relatively short-term in nature. As it is assumed that Hebron and the proposed Bay du Nord development project (located in the Project Area – Northern Section) will have similar ZOIs, there is a limited potential for cumulative effects to Marine Mammals and Sea Turtles from exploration drilling activities carried out on ELs 1159 and 1160 and these ongoing petroleum production projects.

It is acknowledged that White Rose is located approximately 2 km from the closest edge of EL 1160. However, this production facility has a safety zone of approximately 95 km², and the South White Rose Extension has a safety zone of 9 km², which would aid in increasing the separation distance between exploration drilling activities and production, and in turn reduce the potential for cumulative effects to Marine Mammals and Sea Turtles.

Project vessel traffic within the RSA and vessel traffic associated with other projects and activities pose a risk of mortality or physical injury to marine mammals and sea turtles due to the increased potential for vessel strikes. Vessel traffic associated with ELs 1159 and 1160 is short-term and transient in nature, which limits the potential for vessel strikes.

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse cumulative environmental effects on Marine Mammals and Sea Turtles (including SAR) in combination with other projects and activities that have been or will be carried out.

14.5 Special Areas

Many of the Special Areas in eastern Newfoundland are in the nearshore and onshore areas and will therefore not have direct contact with exploration drilling activities on ELs 1159 and 1160. Several Special Areas, or portions of them, overlap with the Project Area and potential traffic routes including but not limited to EBSAs, VMEs, NAFO FCAs (refer to Section 6). Exploration drilling activities are not prohibited from occurring in these Special Areas.

The Special Areas that overlap with the Project Area and ELs 1159 and 1160 are outlined in Table 14.3 below.

Table 14.3 Special Areas Overlapping with Project Area and ELs 1159 and 1160

Special Area		Project Area		Exploration Licence	
Type	**Name**	**Northern Section**	**Southern Section**	**EL 1159**	**EL 1160**
EBSA	Northeast Shelf and Slope	Overlaps	Overlaps	-	-
UNCBD EBSA	Seabird Foraging Zone in the Southern Labrador Sea	Overlaps	-	-	-
	Slopes of the Flemish Cap and Grand Bank	Overlaps	Overlaps	Overlaps	Overlaps
VME	Northeast Shelf and Slope (within Canadian EEZ)	Overlaps	-	-	-
	Sackville Spur	Overlaps	-	-	-
	Northern Flemish Cap	Overlaps	-	-	-
	Southern Flemish Pass to Eastern Canyons	-	Overlaps	-	Overlaps
	Beothuk Knoll	-	Overlaps	-	-

Table 14.3 Special Areas Overlapping with Project Area and ELs 1159 and 1160

Special Area		Project Area		Exploration Licence	
Type	**Name**	**Northern Section**	**Southern Section**	**EL 1159**	**EL 1160**
NAFO FCA	Northwest Flemish Cap (10)	Overlaps	-	-	-
	Northwest Flemish Cap (11)	Overlaps	-	-	-
	Northwest Flemish Cap (12)	Overlaps	-	-	-
	Flemish Pass / Eastern Canyon (2)	Overlaps	Overlaps	-	-
	Sackville Spur (6)	Overlaps	-	-	-
	Northern Flemish Cap (7)	Overlaps	-	-	-
	Northern Flemish Cap (8)	Overlaps	-	-	-
	Northern Flemish Cap (9)	Overlaps	-	-	-
Snow Crab Stewardship Exclusion Zone	Crab Fishing Area 8B	Overlaps	-	-	-

The four production facilities (i.e., Hibernia, Terra Nova, White Rose, and Hebron) do not overlap with any Special Areas. However, other projects and activities such as exploration drilling on other ELs may interact spatially. Several other existing and active ELs in this region overlap with portions of these or other Special Areas. The specific location and timing of other offshore exploration activities in the region over the 10-year temporal duration is not known and cannot be defined; however, these activities are short-term in nature and have a relatively limited ZOI, and mitigation measures will be implemented. It assumed that the proposed Bay du Nord development project (located in the Project Area – Northern Section) and Hebron will have similar ZOIs, which suggests a limited potential for cumulative effects to Special Areas from exploration drilling activities carried out on ELs 1159 and 1160 and these ongoing petroleum production projects. In addition, while other general marine traffic occurs throughout the Newfoundland offshore and is likely to intersect with EBSAs and VMEs that overlap the Project Area, vessel traffic is intermittent and transient at any one location and time, with negligible contributions to cumulative effects on an area.

It is acknowledged that White Rose is located approximately 2 km from the closest edge of EL 1160. However, this production facility has a safety zone of approximately 95 km², and the South White Rose Extension has a safety zone of 9 km², which would aid in increasing the separation distance between exploration drilling activities and production, and in turn reduce the potential for cumulative effects to Special Areas.

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse cumulative environmental effects on Special Areas in combination with other projects and activities that have been or will be carried out.

14.6 Indigenous Communities and Activities

There are no documented FSC licenses within the Project Area / LSA and Indigenous groups do not otherwise undertake the current use of lands and resources for traditional purposes within or near this area. There are also no other known aspects of the physical and cultural heritage of these groups located in proximity to, or which may otherwise be affected by, exploration drilling activities on ELs 1159 and 1160.

Equinor Canada is aware that a number of Indigenous communities hold commercial communal swordfish licences for NAFO areas 3O, 3M, and 3N, which overlap or are near the Project Area. Additionally, other fishing enterprises associated with Indigenous groups undertake commercial fishing activities off eastern Newfoundland. Equinor Canada has engaged associated licence holders as part of the Flemish Pass EIS. To date, no Indigenous community has specifically provided information that they actively fish in the Project Area at the current time. However, this does not mean that those Indigenous communities will not exercise their right to fish in those areas in the future. However, at the current time there appears to be no potential for interaction with commercial communal fishery licence holders. It is assumed that the proposed Bay du Nord development project (located in the Project Area – Northern Section) will have a similar ZOI to the Hebron Project. This suggests a limited potential for cumulative effects to Indigenous Communities and Activities from exploration drilling activities carried out on ELs 1159 and 1160 and these ongoing petroleum production projects.

No residual effects (direct nor indirect) on the current use of lands and resources for traditional purposes by any group are therefore anticipated as a result of exploration drilling on ELs 1159 and 1160.

Exploration drilling activities and geophysical surveys also implement safety zones during program activities. It is possible for multiple exploration operations to occur within the Project Area or RSA at a given time during the 10-year temporal duration. The implementation of multiple safety zones, depending on proximity to one another, could result in a (cumulatively) larger area restricted to commercial fishers and other ocean users. However, exploration drilling and geophysical surveys are relatively short-term and localized in nature.

The environmental effects analysis also indicates that few of the marine species that are known to be used by Indigenous groups migrate through the Project Area/LSA and are thus likely to be affected by activities and disturbances, and the implementation of the various environmental mitigation measures will serve to further address direct or indirect potential effects on these resources. There is therefore limited potential for the availability or quality of resources that are currently used for traditional purposes by Indigenous groups to be reduced or negatively affected in other ways as a result of the Project, especially to a nature and to a degree that would alter the nature, location, timing, intensity or value of these activities or the health or heritage of Indigenous peoples.

Exploration drilling activities on ELs 1159 and 1160 are not anticipated to result in residual environmental effects on Indigenous Communities and Activities and will therefore not result in or contribute to cumulative effects to this VC.

14.7 Commercial Fisheries and Other Ocean Users

Other projects and activities that may affect Commercial Fisheries and Other Ocean Users include other exploration drilling and activities and production facilities. The dynamic nature of fishing and other marine based activity throughout the region (in terms of locations, seasons, gear types, and key species) makes it difficult to predict specific areas and times from year-to-year for both domestic and foreign fleets, and thus, the potential for interactions between separate projects, activities and their effects.

Production facilities have established safety zones that occupy a relatively small footprint in comparison to available fishing grounds. Supply vessel activity associated with production facilities is year-round, however, operators have established communication protocols to mitigate interactions with commercial fish harvesters and other ocean users.

Exploration drilling activities and geophysical surveys also implement safety zones during program activities. It is possible for multiple exploration operations to occur within the Project Area or RSA at a given time during the 10-year temporal duration. The implementation of multiple safety zones, depending on proximity to one another, could result in a (cumulatively) larger area restricted to commercial fishers and other ocean users. However, exploration drilling and geophysical surveys are relatively short-term and localized in nature.

The presence of supply vessels, domestic and foreign fishing vessels, and marine traffic associated with other industries (shipping, military, research) are also sources of potential interactions with fishing vessels and activities within the Project Area and RSA. The volume of marine traffic associated with ongoing offshore activities, if increased over time, could potentially cause adverse effects on commercial fish harvesting activity and other ocean use. These supply vessel routes have been established over time. Supply vessel traffic represents a small component of total marine traffic in the region, is expected to occupy a low proportion of the total available fishing area and is inherently short-term and transitory in nature.

There is relatively more existing and planned marine-based activity occurring within the Project Area – Southern Section than the Project Area – Northern Section. The four production facilities are located in the JDB. White Rose is the closest producing facility; minimum distances from ELs 1159 and 1160 are approximately 36 km and 2 km, respectively. As Hebron and the proposed Bay du Nord development project (located in the Project Area – Northern Section) are assumed to have similar ZOIs, a limited potential for cumulative effects to Commercial Fisheries and Other Ocean Users is predicted from the exploration drilling activities carried out on ELs 1159 and 1160 and the ongoing petroleum production projects. While production facilities may have their own effects on commercial fishing activity, such as the creation of safety zones, and supply vessel traffic, it is not anticipated that effects on commercial fishing activity and other marine users from those producing fields will interact cumulatively with potential environmental effects of exploration drilling on ELs 1159 and 1160.

The Project Area – Southern Section has higher levels of marine traffic than other areas offshore Newfoundland, mostly due to the presence of established oil and gas production facilities, and higher volumes of marine research, commercial fishing, and shipping activities (see Section 7). This has the potential to result in cumulative effects due to the increase in supply vessel traffic related to exploration

drilling on ELs 1159 and 1160. However, supply vessel traffic will only contribute a small increase to the marine traffic that already occurs within the Project Area - Southern Section. Due to the short-term nature of Project activities and transient nature of supply vessel operations, and common traffic routes and communications protocols that have been in operation for years, it is not anticipated that this Project will result in or contribute to detectable, adverse cumulative effects on Commercial Fisheries and Other Ocean Users.

Exploration drilling activities on ELs 1159 and 1160 are not likely to result in significant adverse cumulative environmental effects on Commercial Fisheries and Other Ocean Users in combination with other projects and activities that have been or will be carried out.

14.8 Monitoring and Follow-up

VC-specific mitigation measures, monitoring, and follow-up were identified for exploration drilling activities on ELs 1159 and 1160. No additional or revised mitigation measures, monitoring or follow-up is required or proposed.

14.9 References

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15.0 ACCIDENTAL EVENTS

15.1 Spill Prevention and Response

Equinor Canada maintains a strong commitment to health, safety and environmental stewardship. Central to this commitment is a corporate Safety, Security, Health and Environment management system.

Prevention is the most effective way to avoid environmental effects from accidental spills. Standard operating procedures to reduce or eliminate the chance of a spill, even in the case of equipment failure, will be instituted for hydrocarbon handling operations. Routine maintenance and testing schedules will be established for the drilling program, with attention paid to well control, product storage and handling, and fuel transfer systems. Prior to exploration, practices for operating in poor weather, high sea state, or sea ice or iceberg conditions will be established. Good communications and sound marine practices for offshore supply vessels will also improve the ability to prevent spills.

Prior to initiation of the exploration drilling program, an operator must submit an application to the C-NLOPB for authorizations such as an ADW and an OA. Among other things, the applications include details on hazard identification and commitments for environmental protection, including spill prevention and response.

There are several control measures that are designed and implemented during drilling to maintain well control and reduce risk of a well blowout. These control measures include mechanical controls and barriers that are implemented as part of well design (e.g., steel casing, blowout preventer), and drilling and monitoring procedures. In the event that this primary barrier fails, secondary barriers such as the BOP system can be used to regain well control. A BOP is a critical piece of safety equipment which houses a system of high-pressure valves that prevent water or hydrocarbons from escaping into the environment in the event of an emergency or equipment failure. The BOP and other pressure control equipment are tested regularly in accordance with the Drilling and Production Guidelines (C-NLOPB and CNSOPB 2017).

In the event that well control measures fail to control the well, a capping stack may be required. A capping stack is a specialized piece of equipment used to “cap” (i.e., stop or divert) well flow while work is being undertaken to permanently kill the well (e.g., through relief well drilling). Capping stacks are designed to withstand the maximum anticipated wellhead pressure to stop the spill and/or divert the flow to surface vessels for management and recovery of the hydrocarbons. Equinor will prepare a Well Capping and Containment Plan which will describe the initiation, mobilization, and deployment of a capping stack and other containment equipment to the wellsite. Capping stack equipment would be sourced through Equinor’s membership with OSRL. The OSRL Capping Stack Systems (CSS) are located at four strategic locations around the world. If a subsea blowout occurs OSRL would be immediately activated via the 24-hour emergency phone number.

It is anticipated that a capping stack would be sourced from Norway and/or Brazil and that the capping stack could be mobilized and deployed within 36 days of the incident occurring. Capping of a well is estimated to take between 18 and 36 days. The lower end of the time range is the scenario that includes mobilization of a capping stack from Norway in the summer, with optimal weather for rapid transit and

installation, and transport direct to the wellsite (no port call) for installation. The 36 days scenario assumes mobilization of the secondary capping stack from Brazil in the winter, reduced transit speeds due to ice and weather, inclusion of a port call for testing and commissioning prior to mobilizing to the wellsite and a longer installation time due to technical or weather delays. The precise duration for cap installation and closure would be highly dependent on a number of factors including sea states and local conditions specific to the incident. The Operator would mobilize and install the capping stack as rapidly as safely possible. In the event of a blowout, Equinor's emergency response processes require the initiation of mobilization of both capping stacks in Norway and Brazil, although the capping stack in Norway is considered the primary stack as it is closest with the shortest transit time. For the purposes of the spill trajectory modelling, the longest capping duration (36 days) was assumed to be conservative.

OSRL recently developed an Air Freightable Capping System and is now capable of air freighting the OSRL capping stack system (CSS) to the region. However, Equinor's preferred option would be to mobilize the CSS by vessel, as several activities are required to occur prior to installing the CSS on a well, including site assessment / preparation and debris removal.

The Rapid Cap™ capping stack equipment, available through Halliburton, is also capable of air freight transportation. The Operators' assessment concluded that the Rapid Cap™ equipment does not provide incremental benefit relative to the existing CSS available through their membership in OSRL.

Proper environmental operating practices will be assured through regular inspections and audits of the drilling installation. The general awareness of offshore workers will be increased through training, seminars and safety meetings. Personnel will be encouraged to report potential problems and 'near miss' incidents in an attempt to avoid a re-occurrence that could result in a loss of containment or other release of petroleum or other hydrocarbons.

In the unlikely event of an accidental event, Equinor Canada's emergency response philosophy is to minimize the impact of an emergency on people, environment, and the corporation. Prior to commencement of drilling operations, contingency plans will be developed that will serve as the guidelines for the company's response to an emergency. Contingency plans will be developed to address emergencies that will be identified in operations-specific hazard and risk analyses. The plans will outline the necessary procedures, personnel, equipment and logistics support required to respond to an emergency incident in a safe, prompt, coordinated manner. The plans will be distributed to designated personnel who will be responsible for emergency response actions. The content of the plans will contain sufficient detail to enable personnel to respond in a coordinated and effective manner.

The following contingency plans will therefore be developed and implemented for the Project:

- Offshore Emergency Response Plan: Provides specific role descriptions for personal for a number of potential emergencies; detailed response measures for a number of identified potential emergencies; response equipment/gear list, including location, evacuation criteria and process; and provides a link between offshore operations and onshore responders
- Collision Avoidance Plan: Identifies potential collision situations involving the drilling installation, describes communications with other vessels and lists actions to be taken on the drilling installation in the event the vessel does not respond

- Ice Management Plan: Defines how personnel will monitor the movement of icebergs and pack ice approaching the Project Area and describes procedures for responding to threats including countermeasures such as iceberg deflection (Refer to Section 16.2 of the EIS for more information on ice management)
- Oil Spill Response Plan (OSRP): Defines procedures for first response to spills originating at the Drilling Installation and includes consideration of various spill response tactics within the context of a Spill Impact Mitigation Assessment
- Well Containment Plan: Describes the procedures and operations associated with subsea source control and containment and includes a Well Capping Plan and a Relief Well Contingency Plan

The OSRP will describe various spill response tactics that may be undertaken in the event of a spill, including: natural attenuation / degradation (no-response); mechanical containment (e.g., booms, skimmers) and recovery; in situ burning; and chemical dispersion (surface application and subsea injection). A Spill Impact Mitigation Assessment (SIMA) will evaluate benefits and drawbacks of different response tactics, considering feasibility and effectiveness of implementation in different spill scenarios and prevailing conditions.

In situ burning and chemical dispersion require C-NLOPB authorization prior to implementation. In situ burning involves collecting oil on the sea surface using vessels and fire-resistant booms until it reaches a thickness that supports combustion, at which point it is ignited in a controlled burn. In situ burning produces plumes of smoke, which is predominantly carbon dioxide and water, but also contains particulate matter and combustion by-products (e.g., nitrogen dioxide, sulphur dioxide, carbon monoxide) (Ferek et al. 1997). Typically, after in situ burning occurs, a burn residue remains on the water surface which may sink through the water column once cooled (Moller 1992; Buist 1995). Toxicity of the water under the burn area has been found to be similar to the toxicity of an unburned oil slick (Daykin et al. 1994). A rapid renewal of the surface microlayer after in situ burning is expected, with the long-term net loss of biomass expected to be minimal or non-existent (ADEC et al. 2008).

Chemical dispersion, whether by surface application or subsea dispersant injection, can rapidly reduce the volume of oil on the sea surface and accelerate the natural bioremediation process (Coelho et al. 2017). By promoting dissipation of oil in the water column, dispersant use reduces the potential for surface oil to reach ecologically sensitive areas, but also temporarily results in elevated exposure of organisms to in-water concentrations of oil in the immediate area of treatment. However, research and monitoring has shown that these exposures are rapidly mitigated by effects of dilution and microbial degradation of the dispersed oil (Coelho et al. 2017). The overall toxicity of dispersed oil and effects on aquatic organisms are determined primarily by the toxicity of the oil, exposure time, and sensitivity of aquatic organisms (which can vary amongst life stages) (Coelho et al. 2017). Dispersed oil rapidly dilutes (Cormack and Nichols 1977; McAuliffe et al. 1980; Daling and Indrebo 1996; French McCay and Payne 2001; French McCay et al. 2006), and concentrations above known toxicity thresholds do not persist for more than a few hours after effective dispersant application. Equinor will not use dispersants without prior regulatory approval. If dispersant use is advisable in the event of a spill (as informed by a SIMA process), Statoil will seek approval from the C-NLOPB Chief Conservation Officer.

Emergency preparedness also requires directed training and response exercises. Designated Equinor Canada personnel, including contractors, will receive directed emergency training. A regular program

of response exercises will also be conducted to encourage readiness of personnel. These exercises will contribute to continuing familiarization of personnel with emergency procedures, test preparedness of personnel, and provide a means of developing continued improvement to emergency procedures.

15.2 Potential Accidental Event Scenarios

A number of potential accidental event scenarios that could occur during drilling activity have been identified based on historic industry trends/incidents and the proposed Project. These include accidental events due to natural hazards (e.g., icebergs, hurricanes, submarine landslides), vessel collision, dropped objects, loss of drilling installation stability or structural integrity and loss of well control leading to a blowout. The consequences of accidental events may be health and safety related (i.e., injury or death of personnel) and/or loss of containment of hydrocarbons or other chemicals and release to the environment. There are a number of preventative measure, barriers and controls in place to prevent accidental events including the robust design of drilling installation/vessels, training of personnel, operational procedures and processes as detailed in the management system and oversight.

There is potential for a spill to occur as a result of most accidental event scenarios. Two accidental spill scenarios were selected for spill fate and behaviour modelling based on consideration of Project activities and potential environmental risk: These spill scenarios are considered representative of credible worst-case spill scenarios that could result from an accidental event and include:

- Batch diesel spill
- Subsurface blowout

A loss of well control resulting in a subsurface blowout with a continuous release of oil represents the worst-case scenario for an accidental spill event. Equinor Canada has various mechanisms, such as a BOP, in place to prevent a loss of well control. Therefore, the risk of a subsea blowout occurring is extremely low. However, in the extremely unlikely event of a subsea blowout, hydrocarbons such as crude oil and gas condensate could be released into marine waters. The duration of a blowout, and therefore resulting volume spilled and geographic extent affected will be limited due to the implementation of emergency response measures developed in the Offshore Emergency Response Plan and the Oil Spill Response Plan.

Spills attributed to causes other than blowouts account for the vast majority of spills related to offshore exploration and production and these spills are also more likely to be smaller, with an average volume of less than 200 bbl. Batch spills, which can occur from a drilling installation or offshore supply vessel, are generally instantaneous or short-duration discharges that can involve the release of different types of hydrocarbons including diesel, hydraulic fluid, aviation fuel, or drilling fluids. These spills can occur accidentally during handling or transfer of cargo, or equipment malfunction. They can also occur as a result of a hose or tank failure during refuelling activities.

Vessel collisions were not modelled; however, there have been no near-shore supply vessel groundings or spills over the more than 30 years of oil and gas exploration in the Canada-NL Offshore Area. A nearshore spill event would result in oil moving east and would not contact the shoreline, which is supported by the *Quantitative Assessment of Oil Spill Risk for the South Coast of Newfoundland and Labrador (Phase 1)* (RMRI 2006) that was prepared for Transport Canada. This conclusion is further

supported by modelling completed by CNOOC Petroleum North America ULC (formerly Nexen Energy ULC [Nexen]), which involved a release of approximately 750,000 L from a vessel collision between St. John's, NL and their project area (Nexen 2018). The modelled vessel collision release migrated to the east and did not cause any shoreline oiling (Nexen 2018). Based on this, re-modelling of a vessel collision is not anticipated for ELs 1159 and 1160.

SBM spills were not modelled for the Flemish Pass EIS, nor were they modelled for ELs 1159 and 1160. Nexen modelled a surface release of 64 m³ and subsurface releases of 255 m³ and 89 m³ (Nexen 2018); modelling locations had water depths of 378 m and 1,137 m, which are applicable and valid for ELs 1159 and 1160 as water depths range from approximately 40 m to 1,020 m. Based on this, re-modelling of SBM spills is not anticipated for ELs 1159 and 1160.

If a riser was lost, Equinor Canada would work directly with the C-NLOPB, prepare an incident investigation report, and implement decisions made by the C-NLOPB and other applicable regulators (e.g., DFO, ECCC). If other equipment was lost, every effort would be made to retrieve the equipment. Equinor Canada has a robust risk management system, which includes completing a comprehensive risk assessment prior to commencing work scopes. A risk assessment would be completed prior to executing exploration drilling. If inert objects such as, but not limited to, ROVs, sampling equipment are lost then every effort would be made to retrieve the equipment, however, if the equipment could not be retrieved for technical or safety reasons, then the equipment would be deemed inert and sit on the seabed. Equinor Canada intends on taking a proactive approach and ensuring that adequate mitigation measures are identified to prevent dropped objects. Dropped objects were determined to be a low probability event with no significant environmental effect.

15.3 Spill Risk and Probabilities

Spill risk and probabilities were calculated based on number of wells (i.e., 30) and drilling duration (i.e., 35 to 65 days), the same well count and drilling duration as ELs 1159 and 1160. The results of the oil spill probability analyses show that the probability of a well blowout is extremely low (3×10^{-6}, or 1 in 333,333 chance of occurring) or other large release (more than 100 L) is very low (8.5×10^{-3}, or 1 in 118 chance of occurring); that is, blowouts and other large spills from offshore exploration wells are quite rare. The probability of an oil spill is inevitably greater for small spills (up to 100 L) as compared to larger spills, including batch and sub-surface releases. Based on world-wide statistics and C-NLOPB data for spill frequency type and volume, the annual frequency of a batch spill of any volume - from very small to the largest probable batch diesel spill volume of 126 bbl is 0.045 per well for a 35-day drilling period, and 0.084 per well for a 65-day drilling period. The probability of a subsurface release for a single well is less than 0.000003. The probabilities increase with the number of wells. Overall, analysis indicated the probabilities of spillage are very low and if accidental release does occur, the spill volumes are likely to be relatively small.

Tables 15.1 to 15.4 provide updated Canada-NL Offshore spill data to the end of 2017. A summary of synthetic based drilling fluid spills reported to the C-NLOPB between 1997 and 2017 are outlined in Table 15.5 below (C-NLOPB n.d.). Based on the information in Table 15.6, 50 synthetic drilling fluid spills were reported between 1997 and 2017 with a total of 301,404.1 L; the majority of spills (i.e., 86.0%) were less than 5,000 L, with 60% of those being less than 1,000 L.

Table 15.1 Newfoundland and Labrador Offshore Exploration and Production Oil Spills (1997 to 2018)

Year	Exploration						Development & Production						Total					
	Spill Number			Bbl.			Spill Number			Bbl			Spill Number			Bbl		
	HC	SBM	All	HC	SBM	All	HC	SBM	All	HC	SBM	All	HC	SBM	All	HC	SBM	All
1997	1	0	1	0.25	0.00	0.25	10	0	10	10.64	0.00	10.64	11	0	11	10.89	0.00	10.89
1998	4	0	4	20.10	0.00	20.10	22	2	24	3.70	12.63	16.33	26	2	28	23.80	12.63	36.43
1999	24	0	24	12.36	0.00	12.36	14	9	23	5.67	46.37	52.04	38	9	47	18.03	46.37	64.40
2000	1	0	1	1.01	0.00	1.01	4	5	9	0.40	29.56	29.96	5	5	10	1.40	29.56	30.97
2001	0	0	0	0.00	0.00	0.00	15	2	17	0.82	35.22	36.04	15	2	17	0.82	35.22	36.04
2002	1	0	1	0.01	0.00	0.01	23	2	25	0.19	77.05	77.24	24	2	26	0.19	77.05	77.24
2003	3	1	4	0.92	27.68	28.60	17	4	21	1.52	167.48	169.00	20	5	25	2.44	195.15	197.60
2004	0	0	0	0.00	0.00	0.00	50	6	56	1,043.50	679.95	1,723.46	50	6	56	1,043.50	679.95	1,723.46
2005	0	0	0	0.00	0.00	0.00	38	2	40	1.19	25.35	26.54	38	2	40	1.19	25.35	26.54
2006	3	1	4	0.10	3.77	3.87	29	5	34	3.87	19.06	22.93	32	6	38	3.97	22.84	26.81
2007	0	1	1	0.00	465.45	465.45	37	1	38	0.61	6.85	7.46	37	2	39	0.61	472.30	472.91
2008	1	0	1	0.00	0.00	0.00	34	1	35	30.25	0.63	30.88	35	1	36	30.25	0.63	30.88
2009	4	1	5	0.06	0.01	0.07	35	1	36	1.80	0.00	1.80	39	2	41	1.86	0.01	1.87
2010	3	0	3	0.02	0.00	0.02	16	0	16	1.16	0.00	1.16	19	0	19	1.19	0.00	1.19
2011	2	4	6	0.25	180.78	181.03	34	4	38	3.43	28.94	32.37	36	8	44	3.69	209.72	213.41
2012	0	1	1	0.00	0.17	0.17	7	0	7	0.07	0.00	0.07	7	1	8	0.07	0.17	0.24
2013	0	0	0	0.00	0.00	0.00	11	2	13	39.33	1.40	40.73	11	2	13	39.33	1.40	40.73
2014	0	1	1	0.00	5.41	5.41	10	3	13	1.44	6.76	8.21	10	4	14	1.44	12.17	13.61
2015	1	1	2	0.00	92.8	92.8	1	1	2	0.02	0.90	0.92	2	2	4	0.02	93.71	93.73
2016	1	0	1	0.013	0	0.013	3	0	3	0.00	0.00	0.0	4	0	4	0.015	0.00	0.015
2017	0	0	0	0	0	0	6	1	7	0.007	0.015	0.022	6	1	7	0.007	0.015	0.022
2018	0	0	0	0	0	0	5	2	7	1,575.16	176.14	1,751.30	5	2	7	1,575.16	176.14	1,751.30
Total	**49**	**11**	**60**	**35.09**	**776.07**	**811.16**	**421**	**53**	**474**	**2,724.78**	**1,314.31**	**4,039.09**	**470**	**64**	**534**	**2,759.87**	**2,090.39**	**4,850.29**
Avg	2.2	0.5	2.7	1.60	35.28	36.87	19.1	2.4	21.5	123.85	59.74	183.60	21.4	2.9	24.2	125.45	95.02	220.47

Data extracted from C-NLOPB spill statistics (https://www.cnlopb.ca/information/statistics/) and includes up to December 28, 2018; HC = Hydrocarbon; SBM = Synthetic-based [drilling] mud

Table 15.2 Oil Types in Spills in Offshore Newfoundland and Labrador

Oil Type	Exploration		Development & Production	
	% Incidents	% Total Volume	% Incidents	% Total Volume
Synthetic Oils/Fluids	18.6%	95.6%	10.9%	32.4%
Crude Oil/Condensate	37.3%	2.1%	27.5%	66.8%
Hydraulic/Lubricating Oil	23.7%	0.1%	35.8%	0.5%
Diesel and Jet Fuel	10.2%	2.1%	6.4%	0.1%
Other Types (Oil)	10.2%	0.1%	19.3%	0.2%

Table 15.3 Spill Volumes for Exploration in Newfoundland and Labrador

Volume Category (bbl.)	% Total Spills >1 L					% Total All Spills (w/<1 L)
	Crude Oil/ Condensate	Diesel/Jet Fuel	Hydraulic/ Lube Oil	Synthetic Oils/Fluids	Other Types (Oil)	
0.00001-0.00009	-	-	-	-	-	2.3%
0.0001-0.0009	-	-	-	-	-	4.5%
0.001-0.009	-	-	-	-	-	6.8%
0.01-0.09	40.0%	10.0%	87.5%	27.3%%	50.0%	34.1%
0.1-0.9	0.0%	30.0%	12.5%	0.0%	50.0%	13.6%
1-9	60.0%	50.0%	0.0%	27.3%%	0.0%	25.0%
10-99	0.0%	10.0%	0.0%	27.3%%	0.0%	9.1%
100-999	0.0%	0.0%	0.0%	18.2%	0.0%	4.5%
1,000-9,999	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 15.4 Spill Volumes for Development / Production in Newfoundland and Labrador

Volume Category (bbl)	% Total Spills (>1 L)					% Total All Spills (w/<1 L)
	Crude Oil/ Condensate	Diesel/Jet Fuel	Hydraulic/ Lube Oil	Synthetic Oils/Fluids	Other Types (Oil)	
0.00001-0.00009	-	-	-	-	-	0.0%
0.0001-0.0009	-	-	-	-	-	0.0%
0.001-0.009	3.2%	0.0%	5.5%	0.0%	4.2%	3.2%
0.01-0.09	58.7%	73.7%	64.4%	23.3%	70.8%	56.3%
0.1-0.9	23.8%	15.8%	21.9%	16.3%	25.0%	21.2%
1-9	7.9%	10.5%	8.2%	25.6%	0.0%	10.8%
10-99	3.2%	0.0%	0.0%	27.9%	0.0%	6.3%

Table 15.4 Spill Volumes for Development / Production in Newfoundland and Labrador

Volume Category (bbl)	% Total Spills (>1 L)					% Total All Spills (w/<1 L)
	Crude Oil/ Condensate	Diesel/Jet Fuel	Hydraulic/ Lube Oil	Synthetic Oils/Fluids	Other Types (Oil)	
100-999	0.0%	0.0%	0.0%	7.0%	0.0%	1.4%
1,000-9,999	3.2%	0.0%	0.0%	0.0%	0.0%	0.9%

Table 15.5 Summary of Synthetic Based Drilling Fluid Spills that Occurred Offshore Newfoundland and Labrador Between 1997 and 2017

Amount Spilled	# of spills	% of spills	volume (L)	% of volume
0-1,000 L	30	60.0%	7,666.1	2.5%
1,000 - 5,000 L	13	26.0%	37,283.0	12.4%
5,000 - 10,000 L	1	2.0%	9,000.0	3.0%
10,000 - 20,000 L	2	4.0%	26,755.0	8.9%
20,000 - 30,000 L	2	4.0%	50,100.0	16.6%
30,000 - 40,000 L	0	0.0%	0.0	0.0%
40,000 - 50,000 L	0	0.0%	0.0	0.0%
50,000 - 60,000 L	0	0.0%	0.0	0.0%
60,000 - 70,000 L	0	0.0%	0.0	0.0%
70,000 - 80,000 L	1	2.0%	74,000.0	24.6%
80,000 - 90,000 L	0	0.0%	0.0	0.0%
90,000 - 100,000 L	1	2.0%	96,600.0	32.0%
Total	**50**	**100.0%**	**301,404.1**	**100.0%**

15.4 Fate and Behaviour of Potential Spills

A thorough overview of fate and behaviour of potential spills is included in Section 15.4 of the Flemish Pass and Eastern Newfoundland EISs, and Section 7.1 of the EL 1134 Addendum and is applicable and valid for ELs 1159 and 1160. Modelling was completed on 18 unmitigated scenarios involving various water depths, spill rates, locations, and durations (Table 15.6; Figure 1-1). Out of the 18 scenarios modelled, 15 of them are applicable to ELs 1159 and 1160 based on water depths and spill rates. In addition, all modelled unmitigated subsurface blowouts and batch spills resulted in the same predictions (i.e., surface oil would move eastward due to prevailing westerly winds), and therefore modelling specific to ELs 1159 and 1160 has not been carried out.

Spill trajectory models provide a predictive tool, are not carried out in real-time, and are not for a specific event. As drilling could occur anywhere on an EL, the selected location is representative of an entire EL, allowing proponents to conduct effects assessments for a broader Project Area. The Flemish Pass EIS and IR rounds stated and confirmed that the conclusions of effects for all these hypothetical

scenarios may be considered representative of other potential releases in the Project Area. Note that all scenarios assume an unmitigated spill, which is unrealistic since response efforts would commence soon after any spill.

Table 15.6 Summary of Spill Trajectory Modelling

Exploration Licence	Water Depth	Product Type	Spill Rate	Duration	Total Volume
Subsurface Blowouts					
EL 1134*	1,175 m	Crude	6,010 m³/d	30 days	180,300 m³
EL 1134*	1,175 m	Crude	6,010 m³/d	113 days	679,130 m³
EL 1135*	362 m	Crude	24,802 m³/d	30 days	744,062 m³
EL 1135*	362 m	Crude	24,802 m³/d	113 days	2,802,633 m³
EL 1137*	89 m	Crude	4,165 m³/d	30 days	124,964 m³
EL 1137*	89 m	Crude	4,165 m³/d	113 days	470,603 m³
EL 1140	2,700 m	Crude	4,980 m³/d	36 days	179,280 m³
EL 1142*	1,100 m	Crude	15,000 m³/d	113 days	1,695,000 m³
Batch Spills					
EL 1134*	1,175 m	Diesel	N/A	Instantaneous	100 L
EL 1134*	1,175 m	Diesel	N/A	Instantaneous	1,000 L
EL 1135*	362 m	Diesel	N/A	Instantaneous	100 L
EL 1135*	362 m	Diesel	N/A	Instantaneous	1,000 L
EL 1137*	89 m	Diesel	N/A	Instantaneous	100 L
EL 1137*	89 m	Diesel	N/A	Instantaneous	1,000 L
EL 1140	2,700 m	Diesel	N/A	Instantaneous	100 L
EL 1140	2,700 m	Diesel	N/A	Instantaneous	1,000 L
EL 1142*	1,100 m	Diesel	N/A	Instantaneous	100 L
EL 1142*	1,100 m	Diesel	N/A	Instantaneous	1,000 L
Note: Scenarios marked with * can be applied to ELs 1159 and 1160 due to water depths and estimated spill rates.					

As discussed further below, the results of the hypothetical releases modelled for the Flemish Pass and Eastern Newfoundland EISs were consistent with the results of modelling previously conducted for other exploration and production projects in the general area.

15.4.1 Applicability of EL 1135 (shallow-water) and EL 1134 (deep-water) Modelling for Illustrative Purposes

Water depths in EL 1159 range from approximately 90 m to 930 m, and in EL 1160 range from approximately 40 m to 1,020 m. Average water depths in ELs 1159 and 1160 are approximately 350 m and 260 m, respectively. Given the range of depths that have been modelled within the Project Area (i.e., 89 m to 2,700 m), all depths within ELs 1159 and 1160 have been covered. While the full range of modelling that has occurred within the Project Area will inform the assessment of potential

environmental effects of the Project and are available in the Flemish Pass EIS, for illustration purposes, modelling conducted for EL 1135 and El 1134 are included in the Abridged EIS are a representative shallow-water and deep-water release location, respectively. The water depths in ELs 1159 and 1160 correspond to modelled water depths at EL 1135 and EL 1134.

Regarding the applicability of previous modelling inputs for the Flemish Pass to ELs 1159 and 1160, the releases modelled in the Flemish Pass study are considered representative of other potential releases in the Project Area. The currents and winds that occur at the northern Flemish Pass location are similar to those found within the Project Area. In general, the boundary set up by the Labrador Current and the Gulf Stream has the potential to result in dynamic currents, however general flow would be towards the east.

Estimated spill rates from EL 1135 are relatively high, essentially representing a “worst-case” scenario. EL 1159 is immediately south of, and shares a boundary with, EL 1135, with the spill location on EL 1135 approximately 20 km north of the EL 1159 northern boundary. EL 1134 is adjacent to ELs 1159 and 1160 (east side). Given the general trend indicated by previous models for oil to move in a southward direction (i.e., thresholds are most likely to be exceeded to the east and south of the release sites) with the Labrador Current (until it meets Gulf Stream, which is south of the Project Area [and ELs 1159 and 1160]), a spill from EL 1159 or EL 1160 is expected to follow the same general trajectory (predominantly north to the Gulf Stream). Therefore, EL 1135 and EL 1134 provide model results to illustrate the trajectory of a potential oil spill from EL 1159 or EL 1160; however, there are numerous models that are applicable to ELs 1159 and 1160 and any drilling locations within them.

15.4.2 Stochastic Modelling Results

A 113-day release was modelled at the sites to represent longer duration response associated with drilling a relief well and was modelled for 160 days. Summaries of the stochastic analyses of potential surface oil exposure and water column contamination by dissolved hydrocarbons depict areas with the highest potential likelihood (>90%) to exceed thresholds to the east and south of the release sites for both EL 1135 and EL 1134. Much lower probabilities of threshold exceedance are predicted to the north and west (<25%) (Figures 15-1 to 15-6). Environmental forcing mechanisms (i.e., wind and currents) and the long timeframe modelled (160 days) allowed for the transport of highly weathered oil (>50 days old) at extremely conservative (low) thresholds outside of the model domain.

Due to the volume of oil released and the duration modelled, the hypothetical 113-day scenarios were predicted to have the potential to make contact with a long length of shoreline. The probability of oil making contact with shoreline above 1 g/m² from the 113-day release at EL 1135 was approximately <10% in the vicinity of the southern coast of the Avalon Peninsula. The oil that is predicted to make contact with shorelines is expected to be weathered, as minimum time estimates for first shoreline oil exposure range from 30 to 31 days from EL 1135 and 8 to 27 days from EL 1134, depending on the location and season (Tables 15.7 and 15.8). The oil that did make its way to shore would likely be patchy and discontinuous. Oil from the subsurface releases is transported by subsurface currents, which have higher potential to transport subsurface oil to the west and southwest prior to surfacing than do surface currents.

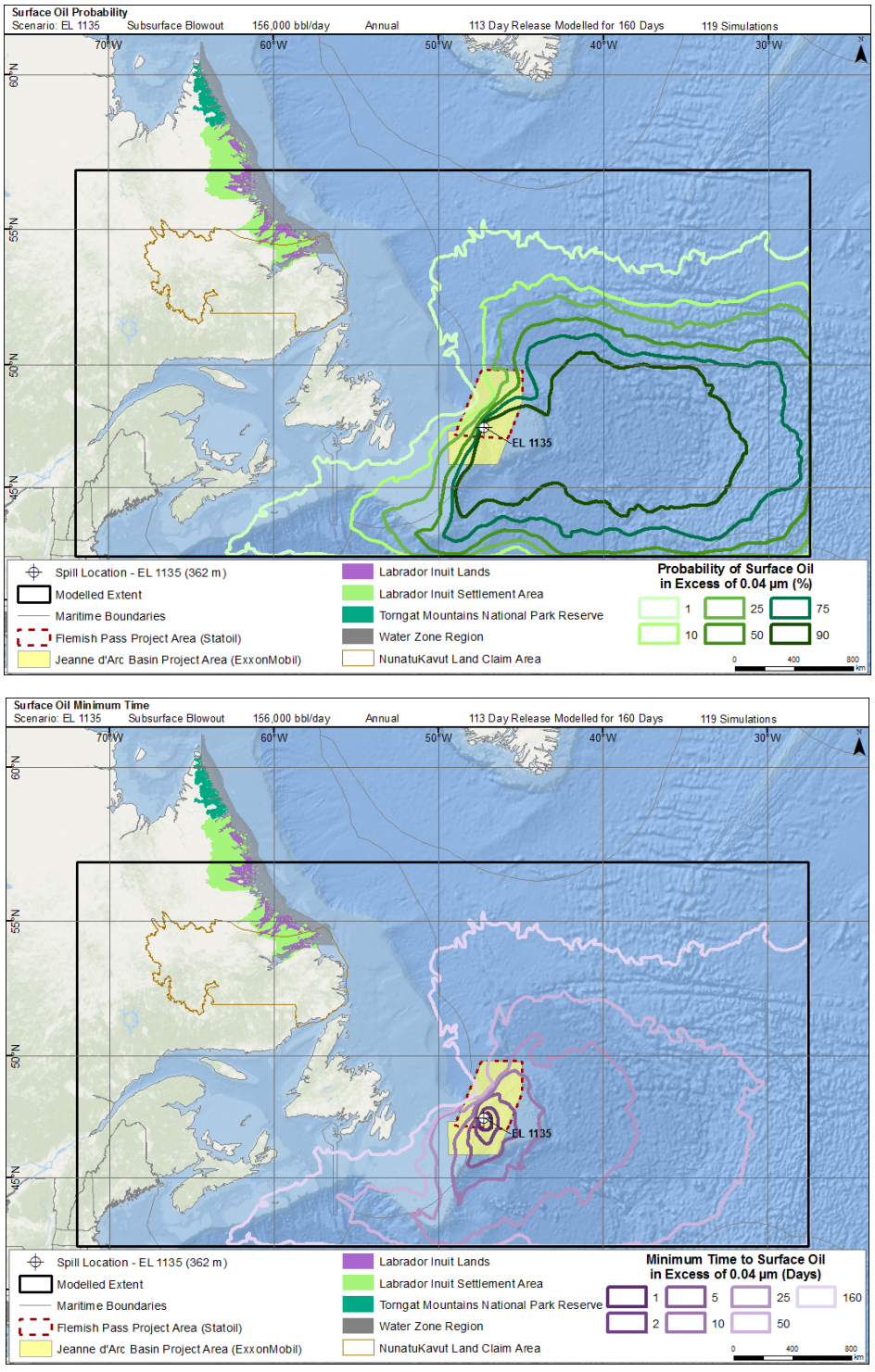


Figure 15-1 Annual probability of surface oil thickness >0.04 µm (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1135 (shallow-water) site

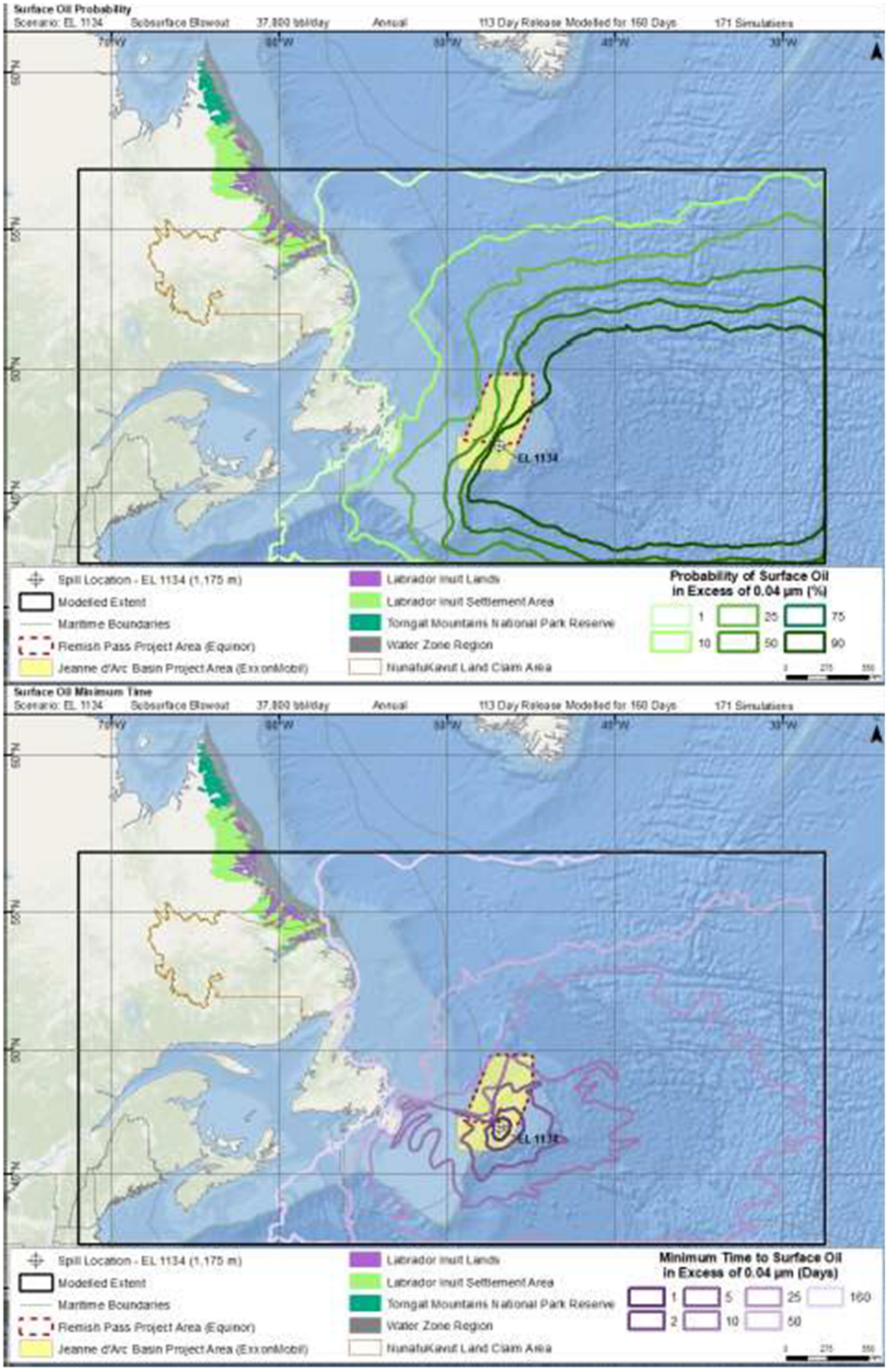


Figure 15-2 Annual probability of average surface oil thickness >0.04 µm (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1134 (deep-water) site

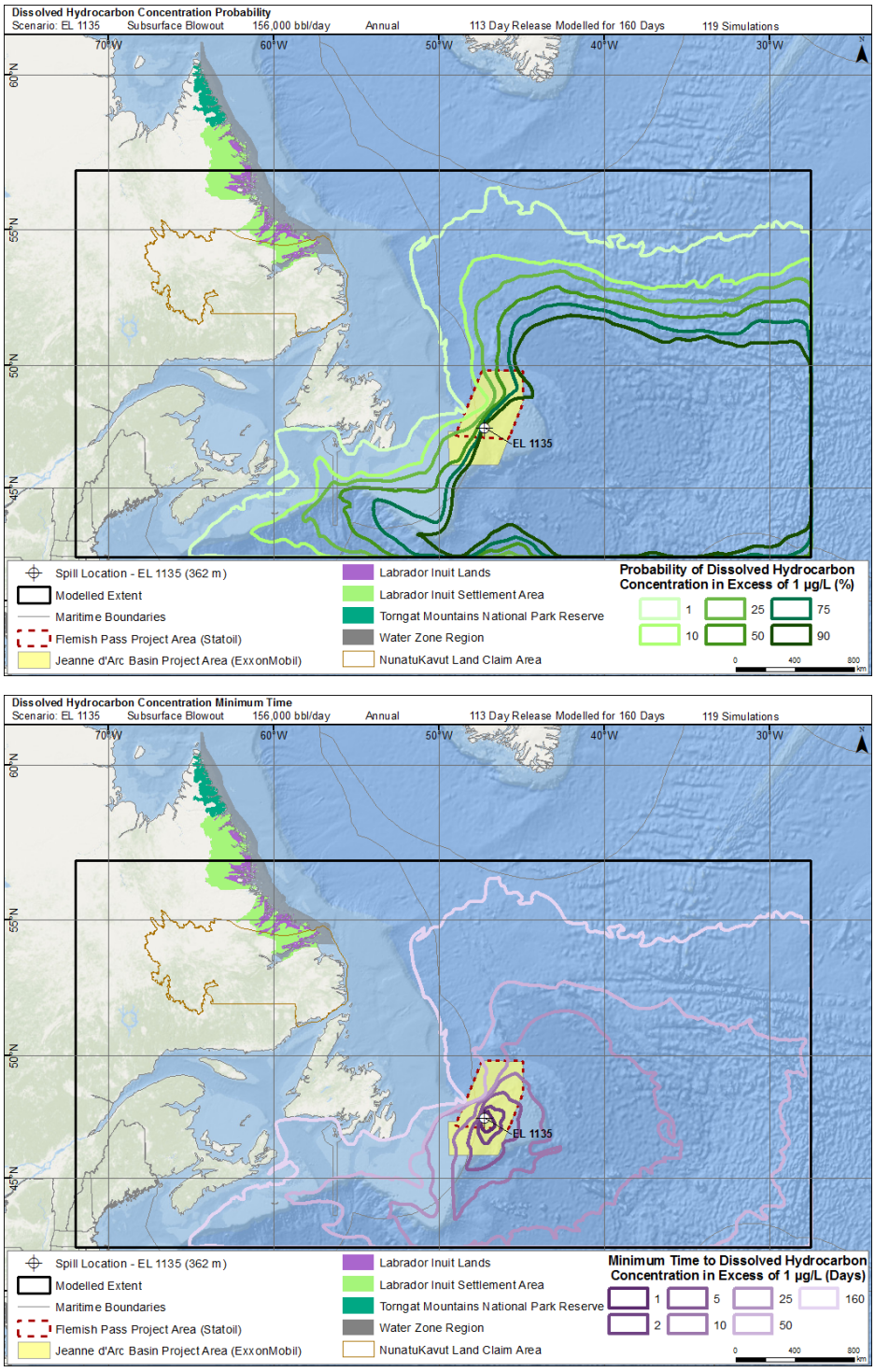


Figure 15-3 Annual probability of dissolved hydrocarbon concentrations >1 µg/L at some depth in the water column (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1135 (shallow-water) site

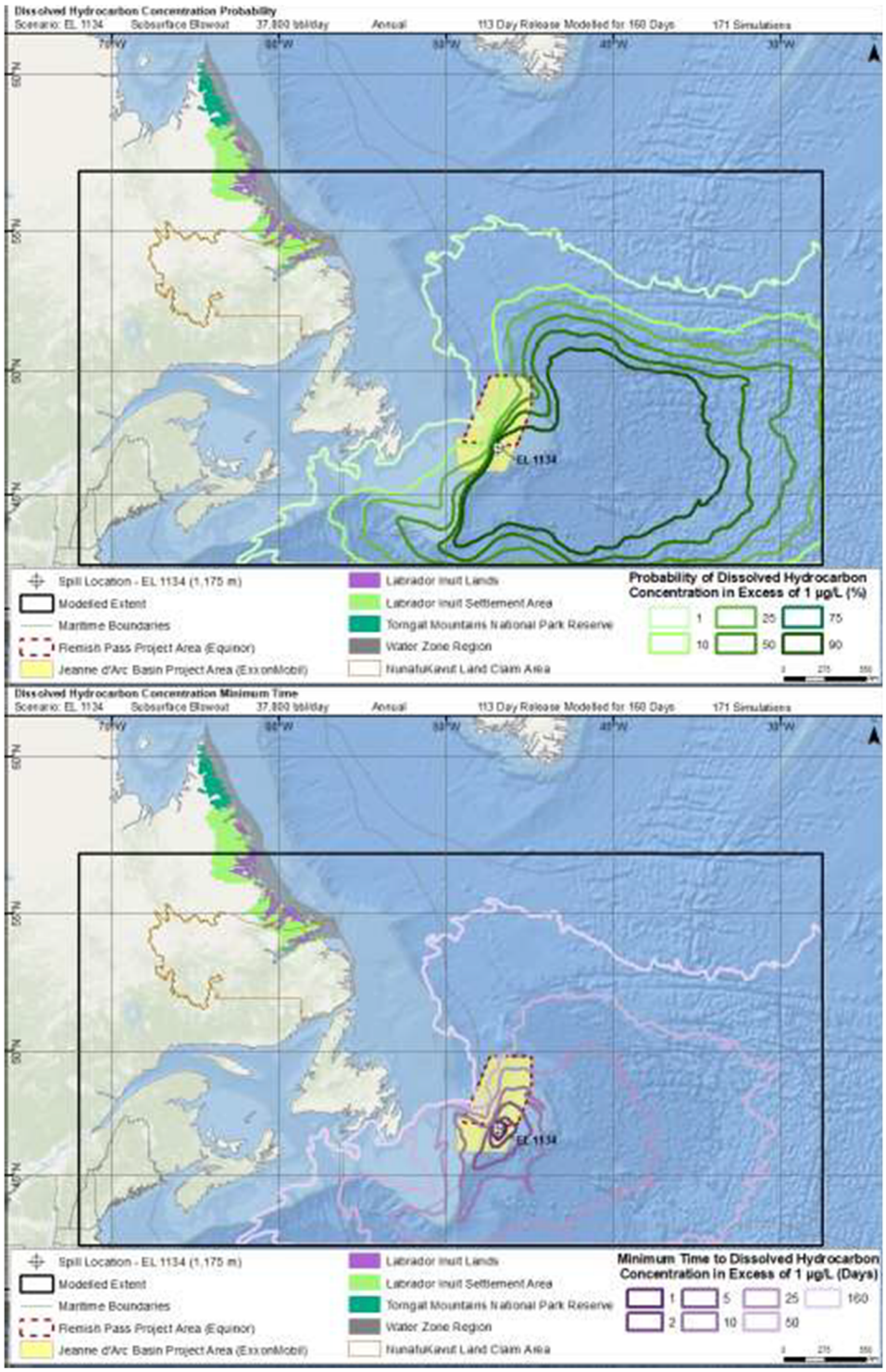


Figure 15-4 Annual probability of dissolved hydrocarbon concentrations >1 µg/L at some depth in the water column (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1134 (deep-water) site

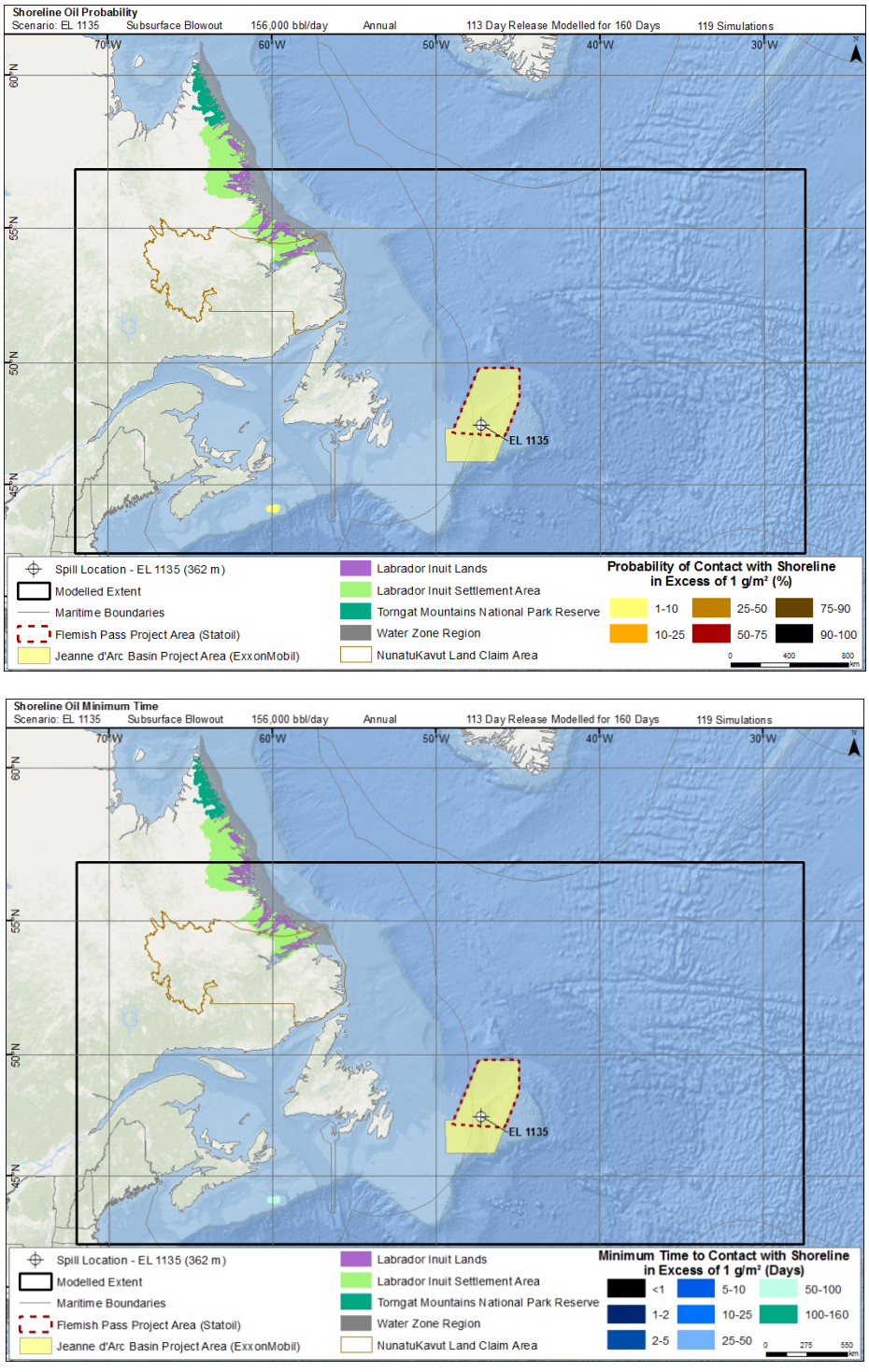


Figure 15-5 Annual probability of shoreline contact >1 g/m² (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1135 (shallow-water) site

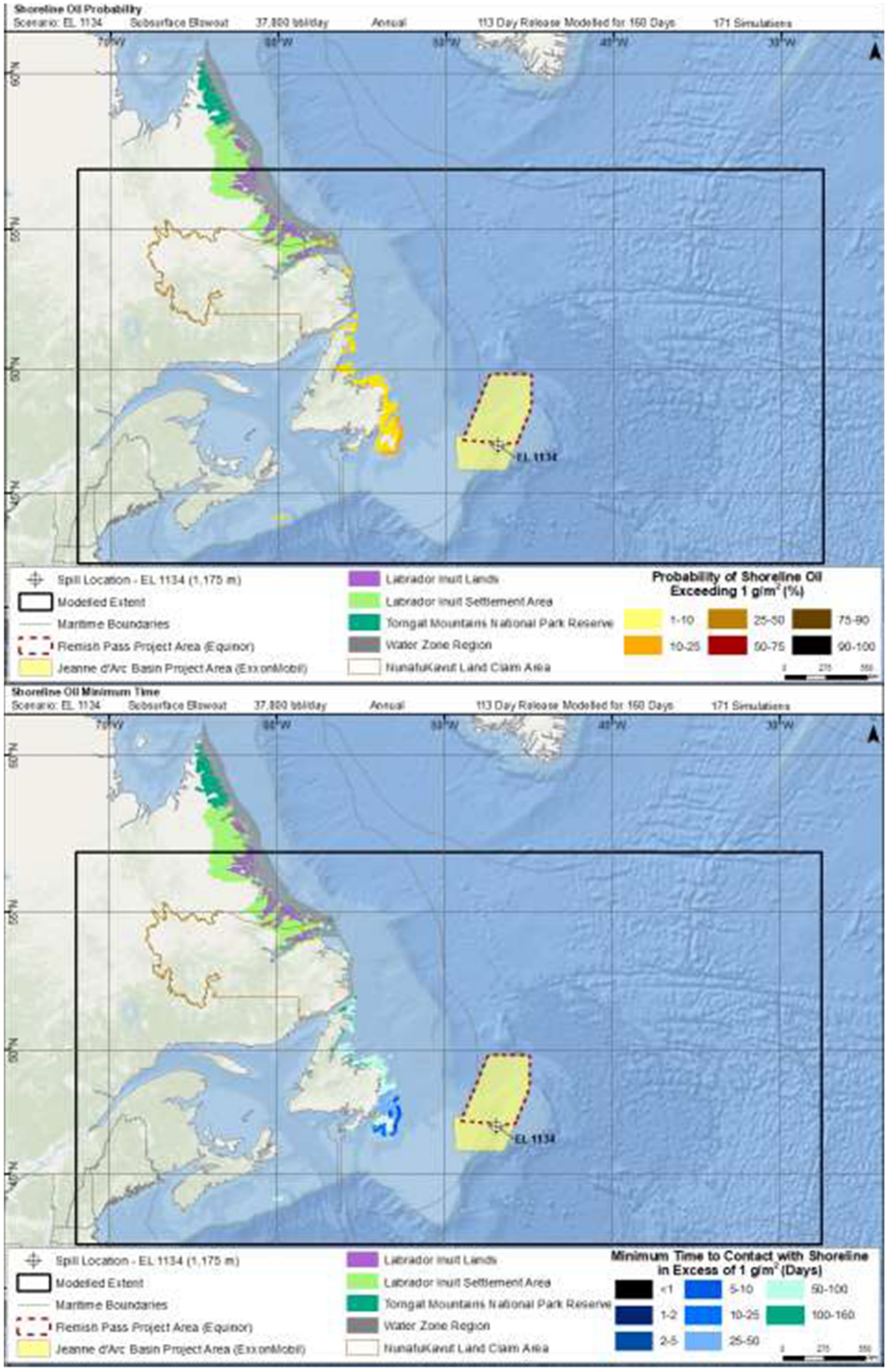


Figure 15-6 Annual probability of shoreline contact >1 g/m² (top) and minimum time to threshold exceedance (bottom) resulting from a 113-day subsurface blowout at the EL 1134 (deep-water) site

Table 15.7 Summary of Predicted Areas of Threshold Exceedance (km²) for Surface and Water Column, and Lengths (km) of Shoreline Oil Predicted to have the Potential to be Affected

Stochastic Scenario Parameters			Areas Exceeding Threshold (km		
Component and Threshold	**Release Site**	**Probability Contour**	**Annual**	**Winter (ice cover)**	**Summer (ice-free)**
Subsurface Oil >0.04 µm, on average	EL 1135 (156,000 bpd)	1%	1,309,000	1,406,000	1,341,000
		10%	587,400	623,300	560,400
		90%	19,160	23,730	18,370
	EL 1134 (37,800 bpd)	1%	3,422,000	3,528,000	3,402,000
		10%	2,723,000	2,885,00	2,488,000
		90%	1,314,000	1,286,000	1,394,000
Water Column Dissolved Hydrocarbons >1 µg/L at some depth within the water column	EL 1135 (156,000 bpd)	1%	146,800	157,000	153,700
		10%	82,160	88,200	73,170
		90%	3,452	5,686	3,123
	EL 1134 (37,800 bpd)	1%	2,524,000	2,678,000	2,475,000
		10%	1,941,000	2,047,000	1,835,000
		90%	727,400	714,200	752,400
			Lengths Exceeding Threshold (km)		
Shoreline Oil >1 g/m², on average	EL 1135 (156,000 bpd)	1%-5%	34	175	205
		5%-15%	--	--	--
		15%-25%	--	--	--
	EL 1134 (37,800 bpd)	1%-5%	1,877	1,859	847
		5%15%	1,068	1,678	761
		15%-25%	37	107	--

Note:
bpd = barrels per day
Areas are displayed by season (annual, winter, summer) and by the size of the regions within the modelled domain that had >1%, 10%, or 90% likelihood of exposure to oil.

Table 15.8 Shoreline Contamination Predicted Probabilities and Minimum Time for Oil Exposure Exceeding 1 g/m²

Release Site	Scenario Timeframe	Average Probability of Shoreline oil Contamination (%)	Maximum Probability of Shoreline Oil Concentration (%)	Minimum Time to Shore (Days)	Maximum Time to Shore (days)
EL 1135 (156,000 bpd)	Annual	2	2	31	36
	Winter	2	2	30	45
	Summer	2	2	31	45
EL 1134 (37,800 bopd)	Annual	5	16	8	151
	Winter	6	25	8	160
	Summer	4	14	27	160
Note: bpd = barrels per day					

Stochastic figures do not imply that the entire contoured area would be covered with oil in the event of a single release, nor do they provide any information on the quantity of oil in each area. The large threshold exceedance footprints in annual results are not the expected exposure from any single release of oil, but rather areas where there is >1% probability that exposure above the threshold could occur.

Various pieces of geographic and habitat data were also incorporated into the model (e.g., shoreline habitat, ice cover, wind, currents, water temperature, water salinity). These spill scenarios are considered representative of credible worst-case spill scenarios with no mitigations that could result from an accidental event. The probability of shoreline oil exposure is very low as less than 1% of the annual scenarios reach the shoreline.

15.4.3 Deterministic Results

Individual trajectories of interest were identified and selected from the stochastic ensemble of results for the deterministic analysis. The deterministic trajectory and fate simulations provided an estimate of the oil's transport through the environment as well as its physical and chemical behavior for a specific set of environmental conditions. While the stochastic analysis provides insight into the probable behavior of oil releases given historic wind and current data for the Project Area, the deterministic analysis provides individual trajectory, oil weathering information, expected concentrations or thicknesses of oil contamination, mass balance, or other information related to a single release at a given location and time.

Representative deterministic scenarios (i.e., single trajectory) were identified from each set of stochastic subsurface blowout results. Individual scenarios were selected based upon the size of the surface oil footprint, the mass of oil on shorelines, and the concentration of dissolved hydrocarbons in the water column, based upon a set of highly conservative socio-economic thresholds:

- Surface oil average thickness >0.04 µm
- Shore oil average concentration >1.0 g/m²
- Subsurface (within the water column) dissolved hydrocarbon concentrations >1.0 µg/L

The selected scenarios included the identified 95th percentile runs for surface oil footprint, shoreline oil length, and water column contamination identified for each release location. In addition to these six deterministic scenarios, four surface releases of marine diesel were modelled as batch spills, including two release volumes (100 litres and 1,000 litres) at both release locations.

Oils spilled at sea eventually are altered in their chemical compositions and physical-chemical properties through a variety of weathering processes including evaporation, dissolution, dispersion, emulsification, biodegradation, photo-oxidation, sedimentation, and shoreline interactions. These changes usually take place at different time scales and result in amendment of the distribution of oil components in the environmental compartments, such as water column, surface layer, atmosphere, or sediments. The long-term weathering and degradability of an oil (including microbial degradation, photo-oxidation, and other process that may break down compounds or components of oil) may increase the tendency of an oil to sink. This is an area of active research and results are dependent upon the type of oil released and the environmental conditions of the receiving environment.

In all cases, nearly all the surface oil was predicted to either entrain, evaporate, or degrade by the end of the simulation. The 95th percentile case represents what can be expected from a ‘worst case scenario’ blowout, where the environmental conditions happen to be just right for maximizing potential exposure.

For all representative deterministic scenarios, the amount of oil remaining in surface waters or on sediments at the end of the simulation was less than 5% for the BdN crude oil spills at EL 1135. For most representative deterministic scenarios, the amount of oil remaining in surface waters at the end of the simulation was 10% of the Ben Nevis crude oil at EL 1134. This is due to the highly volatile and soluble content of the crude oil and diesel product leading to large percentages predicted to evaporate (36% to 39% for EL 1135 and 30% at EL 1134) and dissolve and degrade (25% to 35% at EL 1135 and 39% at EL 1134). Entrainment into the water column ranged between 8% to 47% at EL 1135 and 3% EL 1134. Shoreline contact was minimal for these simulations, where even the 95th percentile shoreline contact case, was predicted to have less than 0.5% of released oil reaching shore from EL 1135 and less than 0.2% of released oil reaching shorelines from EL 1134.

Mass balance figures from the deterministic modelling of the same three scenarios are depicted in Figures 15-7 to 15-14. Summaries of the mass balance information for all representative scenarios for EL 1135 and 1134 are provided in Tables 15.9 and 15.10, respectively.

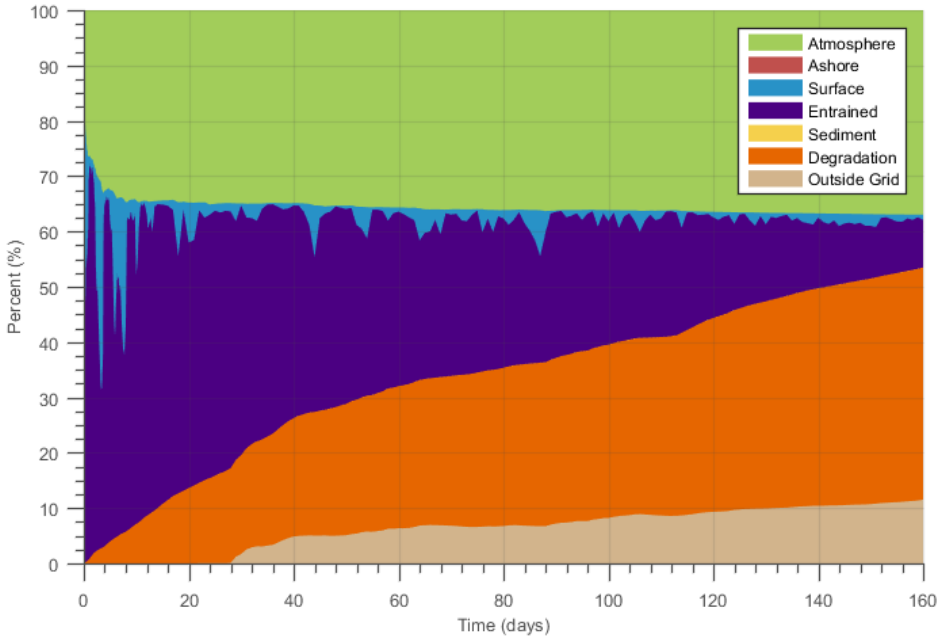


Figure 15-7 Mass balance plots of the 95th percentile surface oil thickness cases resulting from a 113-day blowout at EL 1135

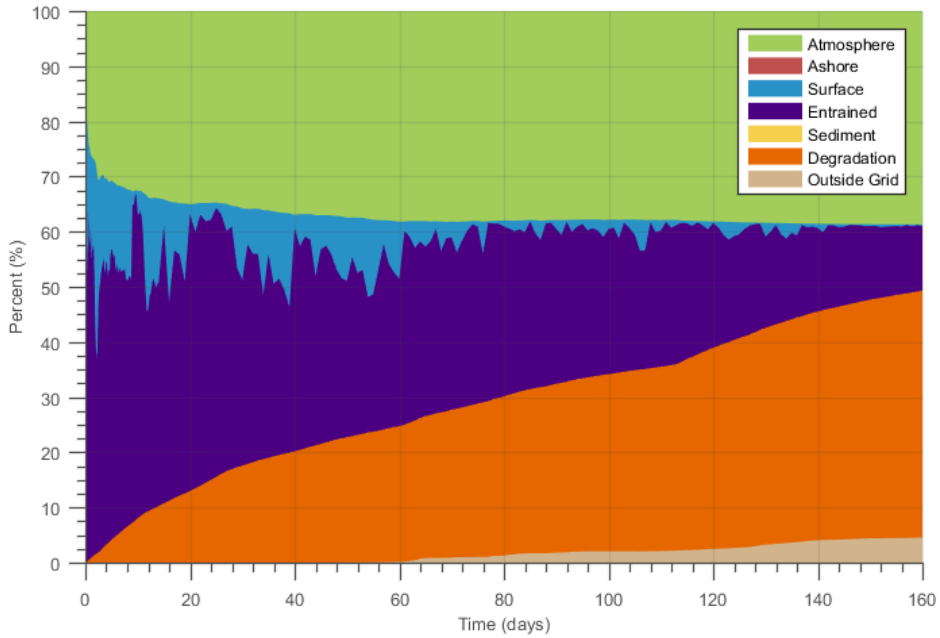


Figure 15-8 Mass balance plots of the 95th percentile water column contamination cases resulting from a 113-day blowout at EL 1135

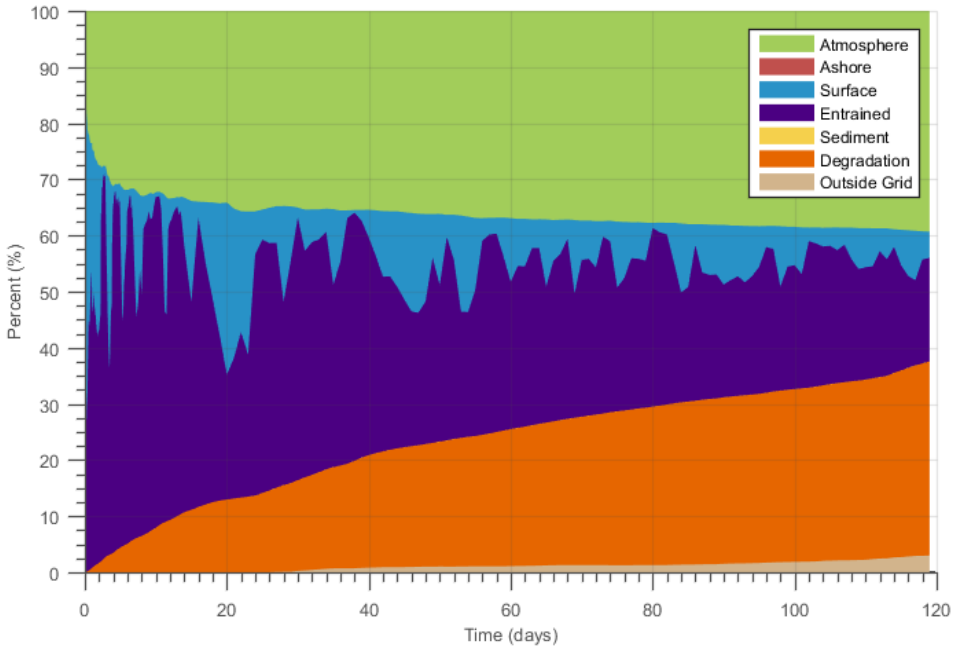


Figure 15-9 Mass balance plots of the 95th percentile shoreline contact cases resulting from a 113-day blowout at EL 1135

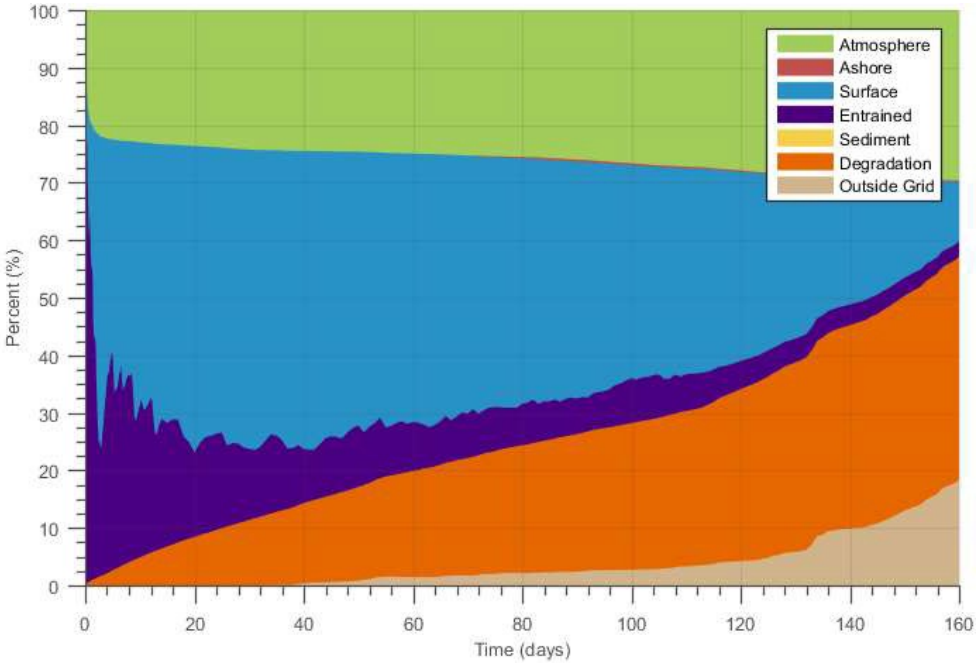


Figure 15-10 Mass balance plots of the 95th percentile shoreline contact cases resulting from a 113-day blowout at EL 1134

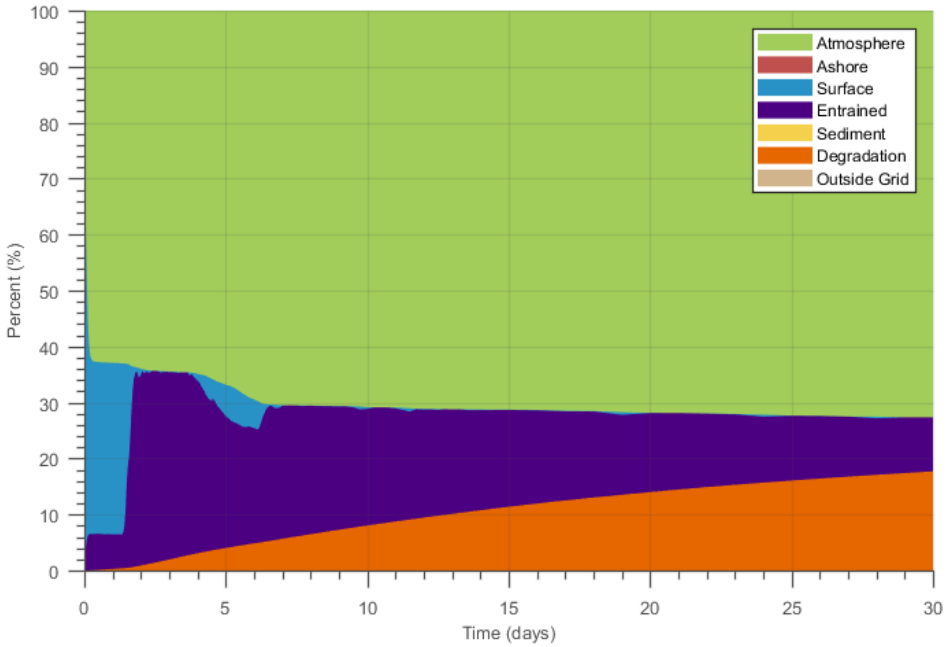


Figure 15-11 Mass balance plots of the EL 1135 release site marine diesel batch spills of 1,000 L

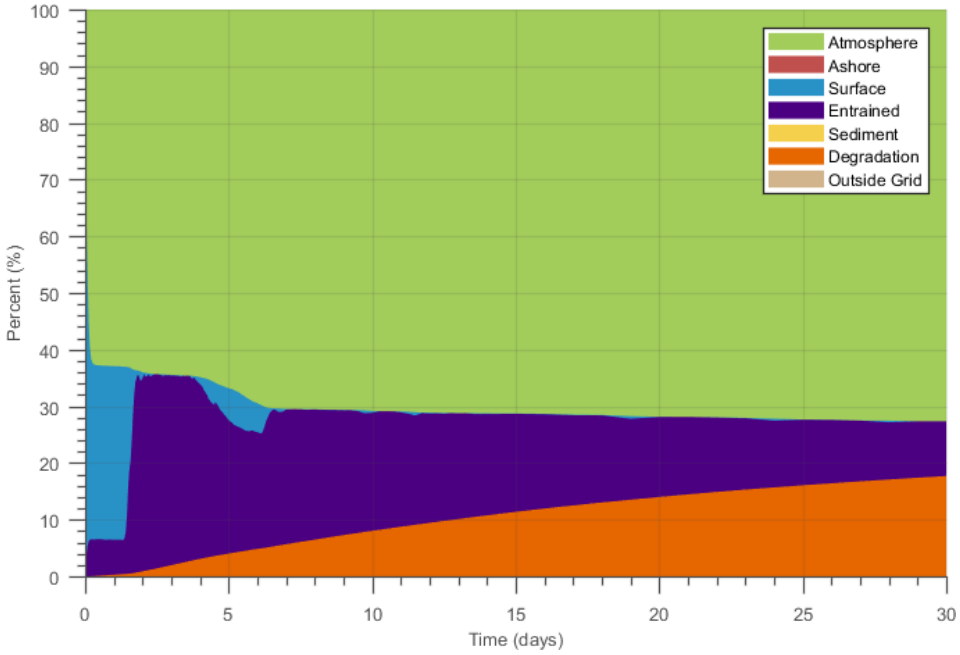


Figure 15-12 Mass balance plots of the EL 1134 release site marine diesel batch spills of 1,000 L

Table 15.9 Summary of the Mass Balance Information for All Representative Scenarios at EL 1135 (shallow-water)

Scenario Information		Surface (%)	Evaporated (%)	Water Column (%)	Sediment (%)	Ashore (%)	Degraded (%)	Outside Grid (%)
Scenario	**Product**							
113-day 95th percentile surface oil exposure case	BdN	0.93	36.96	8.60	0.01	0.00	41.96	11.54
113-day 95th percentile water column case		0.30	38.69	11.69	0.01	0.00	44.75	4.55
113-day 95th percentile shoreline contact case		4.68	39.31	18.42	0.01	<0.01	34.58	3.00
1,000 L Batch Spill	Marine Diesel	0.01	72.64	9.64	<0.01	0.00	17.70	0.00
All values represent a percentage of the total amount of released oil								

Table 15.10 Summary of the Mass Balance Information for All Representative Scenarios at EL 1134 (deep-water)

Scenario Information	Product	Surface (%)	Evaporated (%)	Water Column (%)	Sediment (%)	Ashore (%)	Degraded (%)	Outside Grid (%)
Scenario								
113-day 95th percentile shoreline contact case	Ben Nevis	10.43	29.61	2.66	<0.01	0.19	38.78	18.33
1,000 L Batch Spill	Marine Diesel	0.01	59.51	11.99	<0.01	0.00	28.45	0.00
All values represent a percentage of the total amount of released oil								

15.5 Environmental Effects Assessment

An accidental event during exploration drilling activities could potentially result in changes to the environment, including air and noise emissions, that would occur in federal lands as defined by the Accord Acts. Routine project activities could potentially result in changes to the environment (i.e., as described above and including air and noise emissions) that would occur on federal land as defined by the Accord Acts.

The potential for an oil spill to contact the shoreline is very low. Spill prevention techniques and response strategies will be incorporated into the design and operations for Project activities as part of contingency planning, which will reduce the likelihood of such effects occurring. If a worst-case oil spill were to occur, modelling has indicated that surface oil would take at least 29 days to reach the eastern shoreline of Newfoundland, at which point it will be highly weathered and discontinuous. Given this and the application of mitigation and response measures, it is unlikely that the overall abundance, distribution, or health of affected coastal areas would be significantly affected.

With respect to effects from the use of dispersants, Equinor Canada is required to develop SIMAs as part of their Oil Spill Response Plans (OSRPs) during the OA approval process. Both documents are submitted to the C-NLOPB prior to drilling activities commencing. The SIMA compares the various spill response measures to determine response strategies that will result in the lowest overall effect on the environment. The SIMA will include a risk assessment section that takes into consideration the response options, which may include surface dispersant application and subsea dispersant injection (SSDI), spill scenarios, and resources of concern (e.g., birds, fish, marine mammals, sea turtles, corals and sponges, commercial fisheries, responder safety). The risk assessment uses a single comparative matrix that provides a qualitative prediction of how each response option might mitigate the overall impacts to the resources of concern (Coelho et al. 2017). Equinor Canada will develop SIMAs and complete risk assessments on each response option, which may include surface dispersant application and SSDI, and the potential effects of resources of concern (e.g., birds, fish, marine mammals, sea turtles, corals and sponges, commercial fisheries, responder safety) will be further determined in the SIMAs. Further to the submission of the SIMA, Equinor Canada is required to obtain approval from the C-NLOPB's Chief Conservation Officer prior to application of dispersants. Equinor Canada developed a SIMA for the 2017 exploration drilling program, which will be reviewed and updated for this Project. The SIMA is currently being updated for the 2020 drilling program on EL 1156.

15.5.1 Marine Fish and Fish Habitat (including Species at Risk)

Potential accidental events may interact with and potentially affect fish and fish habitat in terms of habitat availability and quality, fish mortality, injury and health, and fish presence and abundance. Potential accidental effects that are considered involve varying degrees of hydrocarbon interaction and exposure with fish and fish habitat and include SBM spills, batch spills, and surface blowouts.

Modelling of batch spills predicts that no area will exceed the ecological threshold of 100 µg/L THC; therefore, the potential for exposure and the likelihood of adverse effects on Marine Fish and Fish Habitat from a batch release are low. Only fish in the immediate vicinity near the surface at the time of the spill may be exposed, and at the concentrations predicted. A change in habitat availability and quality

will likewise be of low magnitude. While batch spills would affect water quality around the spill site, this would be short-term until the slick naturally disperses through surface wave action in the offshore environment.

A subsurface blowout has a larger potential to have long-term environmental effects. The results of a hypothetical subsurface blowout modelled at two sites in the Project Area – Northern Section indicate the oil would not accumulate in the sediments, but flocculating and sinking of hydrocarbon material through plankton and microbial pathways may result in interactions with benthic environments. Adult demersal and pelagic fish could potentially avoid the spill areas, but the juvenile and the early life stages of fish and benthic invertebrates in the immediate areas of the spill would likely result in sublethal and lethal effects. Fish presence and abundance would also be affected by this unmitigated scenario as mobile fish species would temporarily avoid the spill footprint within the model results. Local reductions in plankton due to injury or mortality from hydrocarbon exposure may also reduce foraging opportunities for fish.

In the unlikely event of an offshore oil release, some degree of residual adverse effects to individual marine fish and to fish habitat in the area at the time of the accident or malfunction are expected. The degree of exposure and type of effects would depend on the type and size of spill, time of year, and location and species of fish within the affected area. The effects of hydrocarbons on corals are typically assessed in situ using visual indicators of stress (White et al. 2012). Visual indicators of coral stress related to the Deep Water Horizon (DWH) spill included partial tissue loss, excessive mucus production, retracted polyps, partial coverage of brown flocculant sourced to the spill, and death (Ragnarsson et al. 2017). Follow-up studies on the DWH spills have shown a patchy distribution of the effects of the spill which are highly site specific.

Effects are not expected to alter the long-term viability of local or regional fish populations in the RSA. Spill prevention techniques and response strategies (e.g., capping stacks, spill clean-up processes) will be incorporated into the design and operations for Project activities as part of contingency planning, resulting in predicted adverse residual effects of low to medium magnitude, occurring within the RSA, of short to long term duration, not likely to occur or occurring sporadically, and reversible with a moderate level of confidence in the effects prediction.

Dispersant use after a spill has the potential to increase the exposure of oil within the water column (e.g., plankton, pelagic fish) and eventually benthos (e.g., demersal fish, benthic invertebrates). Certain concentrations and ratios of oil to dispersants have been shown to reduce the effectiveness of certain degradation pathways related to the formation of microbial “marine snow” (organic matter that falls continuously from the surface in the deep ocean) (Passow 2016; Seidel et al. 2016). Chemically dispersed oil can affect early life stages of fish and invertebrates (e.g., eggs and larvae) (Cordes et al. 2016; DeLeo et al. 2016), and are more toxic to coral than untreated oil solutions (DeLeo et al. 2016). However, marine oil snow that is deposited on the seabed after effective dispersant use would likely be highly degraded, which aligns with observations from the assessments complete following the DWH incident (Stout and Payne 2016). Equinor Canada will prepare SIMAs that will evaluate benefits and drawbacks of different spill response tactics, including the use of dispersants.

15.5.2 Marine and Migratory Birds (including Species at Risk)

Accidental events such as oil spills can have important, adverse consequences for marine-associated birds, leading to potential changes in the presence, abundance, distribution and/or health of marine birds (individuals and populations). Exposure to accidental oil spills from a drilling installation or vessels may affect individuals (through physical exposure, ingestion), important habitats and food sources. Marine birds are amongst the biota most at risk from oil spills, as they spend much of their time upon the surface of the ocean (LGL Limited 2005; Barron 2012; Boertmann and Mosbech 2012). In the event of a spill, and depending upon project and area specific factors, coastal birds may also be at risk on beaches and in intertidal zones.

Batch spills, if any, resulting from the Project would cause a temporary (likely less than 24 hours) decrease in water quality (and thus habitat quality) around the spill site. This would be short-term in nature, lasting until the slick disperses in the offshore environment. Based on modelling results, the potential for exposure and the likelihood of adverse effects on marine birds from a batch release are low. Only those birds occupying the immediate footprint of the spill for this time period would be affected.

A subsurface blowout represents the accidental event with the greatest potential to affect marine birds, given the potentially large volume of discharged oil, and the possibility for such a spill to have a large geographic extent. Shoreline contact was not predicted to be likely from releases at either the Eastern Flemish Pass or Northern Flemish Pass sites, with maximum probabilities of shoreline contact of approximately 1% to 2% from the Eastern Flemish Pass site only. Based on vulnerability indices (French-McCay 2009) the mortality rate would range from 35% to 95% for birds that come in contact with the slick in the 0.01-0.1 mm thickness range. Murres and dovekies, which spend most of their time sitting on the water's surface, are most vulnerable (estimated 95% mortality), while species that dive or feed at the water's surface for their prey but otherwise spend little time on the water, including Leach's storm-petrels, great shearwaters, and great skuas, are predicted to have a lower mortality rate of 35%. Black-legged kittiwakes and northern gannets, which do often sit on the water but spend more time in the air than alcids (murres and dovekies), would be expected to have an intermediate mortality rate. As described in French-McCay (2009), a species' behaviour affects its likelihood of being oiled; for example, the amount of time spent on water, exhibiting diving behaviour, and having extended flightless periods (e.g., moulting) or roosting on the water can result in increased oiling if a slick is present. Oiled birds are generally assumed to have a very low survival rate (approximately 0 to 5%). Dispersant use has a net environmental benefit for marine and migratory birds that could encounter surface oil; however, it is acknowledged that dispersants may reduce surface tension at the feather-water interface which can reduce the capacity of insulation provided by feathers. The magnitude of these effects depends on the proximity of wildlife during dispersant application, as well as the effectiveness of the dispersant on the surface oil (National Research Council 2005). Equinor Canada will prepare SIMAs that will evaluate benefits and drawbacks of different spill response tactics, including the use of dispersants.

In the unlikely event of an offshore oil release, some degree of residual adverse effects to individual marine and migratory birds in the area at the time of the accident or malfunction are expected. The degree of exposure and type of effects would depend on the type and size of spill, time of year, and

location and species of Marine and Migratory Birds within the affected area. Spill prevention techniques and response strategies (e.g., capping stacks, spill clean-up processes detailed in Section 15.1 of the EIS) will be incorporated into the design and operations for Project activities as part of contingency planning, resulting in predicted adverse residual effects of low to high magnitude, occurring within the RSA, of short to long term duration, not likely to occur or occurring sporadically, and reversible with a moderate level of confidence in the effects prediction.

15.5.3 Marine Mammals and Sea Turtles (including Species at Risk)

Various species of marine mammals and sea turtles, including several SAR/SOCC, are known to occur in the RSA seasonally or year-round, and could therefore be present at the time of an accidental event. The potential for interaction of different species of marine mammals or sea turtles with an accidental event such as a hydrocarbon release will vary based on the timing, location, duration, and extent of the spill. Marine mammals and sea turtles may experience a change in mortality or injury (acute or immediate effects) if directly exposed to accidentally-released hydrocarbons or associated volatiles and aerosols. They may experience a change in health (sub-lethal effects) from direct contact with hydrocarbons (including volatiles and aerosols) or consumption of contaminated prey. There may be a change in habitat (marine water or shoreline / haulout) quality due to oiling and associated response measures.

Results of the modelling of batch spills (100 or 1,000 L at Northern Flemish Pass site and Eastern Flemish Pass site) suggest that both the potential for exposure and the likelihood of adverse effects on marine mammals and sea turtles from a batch release (e.g., fouling, inhalation of vapours) are low. Only animals in the immediate vicinity at the time of the spill may be exposed, and at the concentrations predicted, change in mortality or injury is considered unlikely and changes in health are predicted to be of low magnitude (e.g., temporary inflammation of mucous membranes). Changes in habitat quality or use will likewise be of low magnitude. Batch spills from either the Eastern Flemish Pass site or Northern Flemish Pass site are not expected to affect haulout areas on distant shorelines. While there will be a decrease in water quality around the spill site, this would be short-term until the slick disperses (aided by surface wave action in the offshore environment).

Based on modelling of a subsea release at Northern Flemish Pass site and the Eastern Flemish Pass site, subsurface-released oil is extremely unlikely to reach shorelines, and terrestrial areas affected may or may not be used by marine mammals for haulouts. In the extremely unlikely event of shoreline oiling, fur-bearing marine mammals that haul out in the affected area may experience a change in mortality or injury and a change in health upon exposure to hydrocarbons, although it is probable that only a small proportion of local populations would be affected. Potential for change in habitat quality or use of oceanic habitats (i.e., water quality and air quality at the air-sea interface) will be greater near the location of the sub-surface release. The degree of change in mortality or injury and change in health will depend in large part on the occurrence and distribution of marine mammals and sea turtles at the time of the blowout, as well as the duration and extent of oil release (i.e., potential severity of effects will be dependent on the potential for exposure). Depending on the exact nature, extent, and duration of a spill, marine mammals and sea turtles in the spill area are likely to experience a combination of exposures from contaminated air, water, and sediment and via a combination of pathways (inhalation, ingestion,

aspiration, and adsorption). Oceanic animals that are closer to the site of the blowout are more likely to be exposed to a more constant flow and higher concentrations of fresher oil, as compared to nearshore species.

In the unlikely event of an offshore oil release, some degree of residual adverse effects to individual marine mammals or sea turtles in the area at the time of the accident or malfunction are expected. The degree of exposure and type of effects would depend on the type and size of spill, time of year, and location and species of animals within the affected area. However, effects are not expected to alter the long-term viability of local or regional marine mammal and sea turtle populations in the RSA and it is considered unlikely that the size, health, ecological function, and/or sustainability of a population of marine mammals or sea turtles would be measurably affected. Spill prevention techniques and response strategies will be incorporated into the design and operations for Project activities as part of contingency planning, resulting in predicted adverse residual effects of low to medium magnitude, within the RSA, short to long term in duration, not likely to occur or occurring sporadically, and reversible with a moderate to high degree of confidence in the effects prediction.

15.5.4 Special Areas

There are a number of Special Areas offshore Eastern Newfoundland that overlap in whole or in part with the Project Area - Northern or Southern Sections including various EBSAs, VMEs and NAFO FCAs. Key potential effects in the unlikely event of an accidental event includes potential changes in environmental features and/or processes, and changes in human use and/or societal value.

Modelling results for batch spills (100 or 1,000 L at each hypothetical well site location) for both sites indicate that such spills would not reach the threshold for ecological effects from surface slicks or in water concentrations, but do potentially reach the socioeconomic effects threshold of 0.04 µm in some areas (ranging from 17-22 km² surface area) for a 1,000 L spill only. The special areas that would partially overlap with the affected area exceeding the socioeconomic threshold of 0.04 µm (for the 1,000 L EPA site scenario) are the Northern Flemish Cap (7), Northern Flemish Cap (9), Northwest Flemish Cap (10), Northwest Flemish Cap (11) and Flemish Pass \ Eastern Canyon (2) NAFO FCAs, as well as the Northern Flemish Cap, Southern Flemish Pass to Eastern Canyons and Beothuk Knoll VMEs. No special areas overlap with the area exceeding the socioeconomic threshold of 0.04 µm for the 1,000 L NPA site scenario. This concentration of spilled materials will be short in duration with less than 0.1% of the released volume predicted to remain floating on the water surface at the end of the 30-day simulation.

A subsurface blowout represents the accidental event with the greatest potential to affect adjacent Special Areas, given the potentially large amount of discharged oil that could conceivably be associated with such a blowout event, and the possibility for such a spill to extend to adjacent areas and resources. Based on model results for the Northern Flemish Pass site, the worst-case modelling results (i.e., winter scenario) indicates that the likely areas to be affected by such a spill include the Sackville Spur and Northern Flemish Cap VMEs, and the Sackville Spur (6) and Northern Flemish Cap (8) FCAs. Based on model results for the Eastern Flemish Pass site, the likely areas to be affected by such a spill include the Sackville Spur and Northern Flemish Cap VMEs, and the Sackville Spur (6), Northern Flemish Cap

(7), Northern Flemish Cap (8), Northern Flemish Cap (9), Northwest Flemish Cap (10), and Northwest Flemish Cap (12) FCAs.

In consideration of the present knowledge of special areas within the RSA (some of which have been identified based on the presence of important habitats including seabird overwintering areas), the known effects of oil spills, the result of spill modelling exercises, and planned mitigation, the predicted residual environmental effects from an accidental subsurface blowout event scenario on special areas is considered to be significant depending on the specific occurrence and nature and degree of the event, recognizing that such events are extremely unlikely to occur.

Special Areas within or near the predicted shoreline contact areas include the coastal portions of the Placentia Bay / Grand Banks LOMA, Placentia Bay Extension EBSA, Mistaken Point Provincial Ecological Reserve, Gooseberry Cove Provincial Park, Mistaken Point IBA and Placentia Bay IBA. Due to the time predicted for the oil to reach shore and the fact it is occurring in the winter season, the oil is expected to be highly weathered, patchy and discontinuous. In the event of a spill, there will be adequate time to plan and implement shoreline response measures before any weathered oil contacts the shoreline.

Spill prevention techniques and response strategies will be incorporated into the design and operations for Project activities as part of contingency planning, resulting in predicted adverse residual effects of low to medium in magnitude, within the RSA, of short to long-term duration, not likely to occur or occurring sporadically, and reversible with a moderate level of confidence in the effects prediction. In the extremely unlikely event of a subsurface blowout occurring within a Special Area, significant effects may result, depending on the nature of the Special Area, and the extent and duration of the spill event.

15.5.5 Indigenous Communities and Activities

Although the environmental effects assessment for the Project's planned components and activities has predicted no potential interactions with or adverse effects upon Indigenous communities and their activities, there is potential for an accidental event, such as a large oil spill to eventually reach and affect Indigenous communities and their activities elsewhere in Eastern Canada.

A potential batch spill from a Project-related drilling installation or supply vessel will be limited in terms of its overall magnitude, extent and duration, and thus, its potential environmental consequences. The geographic extent of such Project-related discharges and their effects, if they did occur, will be localized to the Project Area, far away from Indigenous communities and therefore unlikely to extend to or affect the physical or social health and well-being of Indigenous persons or communities. Moreover, given the distances involved, they will not interact with nor adversely affect the physical and cultural heritage of any Indigenous community. The Project Area is also not known to contain resources of historical, archaeological, paleontological, or architectural significance, and given its location far offshore Eastern Newfoundland, is not likely to contain such resources or materials that are relevant to and valued by any Indigenous group. The potential effects of the Project on commercial fishing activities by Indigenous groups are addressed as part of the Commercial Fisheries and Other Ocean Users VC (Section 15.5.6).

Although extremely unlikely to occur, a large subsurface blowout is the scenario with greatest potential to interact with Indigenous Communities and Activities in Newfoundland and Labrador, and elsewhere in eastern Canada. a subsurface blowout could potentially discharge a large volume of oil, which could extend beyond the LSA. Notwithstanding the much larger size and magnitude of such a blowout as compared to a smaller batch spill during routine operations, most of the potential issues, key considerations and general principles associated with the potential effects of a batch spill on this VC, as described above, are also generally relevant to a blowout. While it is obviously not possible to determine with absolute certainty whether any individual of a species (e.g., Atlantic salmon) (in any life history stage) used for traditional purposes by any group may be present in the affected area before moving to an area that is the subject of traditional harvesting activity, there is limited potential for any degree of connection. As also described for the various preceding biophysical VCs accidental events are not likely to occur and therefore significant adverse environmental effects upon marine fish and marine mammals are not likely.

It is acknowledged that the perception of contamination and associated potential effects that may be experienced (e.g., anxiety) are difficult to quantify. In the rare event of a subsea blowout, and with specific reference to Indigenous groups, a loss or perceived loss would likely not be limited to direct economic impact and food value and, in turn, potential psychological effects such as anxiety and depression, but can also extend to ceremonial and spiritual aspects associated with traditional foods. However, in addition to the considerable distances of the Project Area to Indigenous communities in NL, NS, NB, PEI, and QC, the results of the spill trajectory modelling conducted in the vicinity of ELs 1159 and 1160 also indicated a low probability of shoreline oiling in the event of an unmitigated subsea blowout.

In the extremely unlikely event that a blowout occurs, the (conservative, without mitigation) oil spill modelling predicts a very low probability (less than 2%) of oil making contact with the shoreline areas of eastern / southern Newfoundland, southeast Labrador, and Sable Island (depending on the time of the spill) and thus, potentially coming into direct contact with Indigenous communities or activities. There will be little or no potential for such biophysical effects on marine-associated resources to translate into any decrease in the overall nature, intensity, distribution, quality or cultural value of these traditional activities by Indigenous communities. For transient species that may encounter spilled materials offshore, the low likelihood of a spill coupled with the probability that a transient species would intersect spilled materials and then travel to an onshore, or nearshore location makes any direct contact or impact unlikely. Therefore, an assessment of potential adverse effects on the health of Indigenous peoples from consumption of contaminated species is not required as there is no credible pathway for an interaction. Spill prevention techniques and response strategies will be incorporated into the design and operations for Project activities as part of contingency planning, resulting in predicted adverse residual effects of neutral to low magnitude, within the RSA, of medium to long-term duration, not likely to occur, and reversible with a moderate to high level of confidence in the effects prediction.

15.5.6 Commercial Fisheries and Other Ocean Users

Accidental events that have the potential to interact with Commercial Fisheries and Other Ocean Users are primarily related to the release of hydrocarbons from a surface batch spill or subsurface blowout. These releases could interact with Commercial Fisheries and Other Ocean Users by potentially impeding the ability of fishers to harvest fish, fouling gear, affecting the biological health of commercial fish species, reducing the marketability of commercial fish products, and interfering with marine research activities or offshore military exercises.

In the event of a batch spill, there is potential for temporary closure of commercial fishing activity in the immediate area. Likewise, a subsurface blowout from the Northern or Eastern Flemish Pass site has the potential to result in the closure of fishing areas and fouling of gear and vessels. In both cases, the potential effects on commercial fishing and other ocean users will depend on the volume of oil released, the time of year, and the timely implementation of mitigation and response measures. The geographic and temporal extent of a spill would be reduced through the implementation of mitigation and response measures.

Although a temporary closure of one or more areas to fishing activities and other ocean users, such as researchers and military training, may result, the geographic and temporal extent will be reduced through the implementation of mitigation and response measures. The issuance of a Notice to Shippers will provide timely notice of closure areas, giving fishers opportunity to make alternate plans, thereby reducing effects to commercial harvesting activity and notifying fishers to avoid the area, and reducing potential gear/vessel fouling. In the event of gear fouling, the compensation program for damages will be activated, mitigating the cost of damaged or lost fishing gear. Likewise, other commercial damages or losses associated with the spill will be addressed through the existing compensation program and best practices procedures currently under development by One Ocean (joint fishing and petroleum industry initiative). Spill prevention techniques and response strategies will be incorporated into the design and operations for Project activities as part of contingency planning, resulting in predicted adverse residual effects of low to moderate magnitude, within the RSA, short to long term, not likely to occur or occurring sporadically, and reversible with a moderate level of confidence in the effects prediction.

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16.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

This chapter considers environmental factors, including climatological and meteorological conditions (wind, precipitation, fog, and visibility), oceanographic conditions (waves, currents), seasonal presence of sea ice and icebergs, geology and seismicity, and other environmental features and conditions. It also describes how these issues will be considered and addressed as part of ongoing and future planning, design, and eventual implementation. This includes discussing how relevant engineering and environmental design criteria, industry standards, guidelines, and regulatory conditions will be applied and will be relevant to the mitigation of such Effects of the Environment on the Project.

16.1 Key Environmental Considerations

The planning and conduct of offshore oil and gas exploration and other marine activities offshore eastern Newfoundland are often influenced by environmental factors, including climatological and meteorological conditions (wind, precipitation, fog, and visibility), oceanographic conditions (waves, currents), the seasonal presence of sea ice and icebergs, geology and seismicity, and other environmental features and conditions.

An appropriate understanding and consideration of these environmental characteristics and phenomena are therefore required so that offshore activities can be designed and implemented appropriately, and in a manner where the safety and protection of workers, equipment and infrastructure, and the environment are protected. This includes the consideration of these environmental characteristics in the design, review, and conduct of the planned and routine components and activities of offshore exploration. It also includes taking appropriate measures to avoid or reduce the potential for incidents and accidents (and resulting environmental effects) that may occur as a result of unplanned interactions between exploration activity and the physical environment.

As per Section 19(1)(h) of CEAA, 2012 (any change to the designated project that may be caused by the environment), this chapter considers how existing environmental conditions in and around the Project Area and potential natural hazards could adversely affect the Project, and in turn, potentially result in adverse effects on the environment.

Key components of the environment that could potentially affect the Project include:

- Weather conditions
- Oceanographic conditions
- Sea ice, icebergs, and superstructure icing
- Geological stability and seismicity

Severe weather (e.g., fog, heavy rain, snow) and oceanographic conditions (e.g., high winds and waves) can delay movement of supply and/or personnel to and from the drilling installation and increase stress conditions on vessels and equipment, thereby increasing risk of accidental spills, suspension or delay of Project activities, evacuation of the drilling installation, and in extreme cases, fatalities. Sea ice and icebergs are navigational hazards that may hinder offshore supply vessel transportation and the operation of the drilling installation. Although the Project Area has been classified as having a low

seismic hazard, a seismic event could contribute to sediment and seafloor instability and/or a tsunami conditions and increase the risk of potential accidental events (e.g., spills to the environment).

These issues will be considered and addressed as part of ongoing and future Project planning, design, and eventual implementation. This includes discussing how relevant engineering and environmental design criteria, industry standards, guidelines. and regulatory conditions will be applied and will be relevant to the mitigation of such effects of the environment on the Project.

16.2 Assessing and Mitigation Potential Effects of the Environment on the Project

Existing environmental conditions (both typical and extreme conditions or events) influence key aspects of the design and conduct of offshore oil and gas activities. The selection of the drilling installation is based on a consideration of existing and anticipated conditions at site, including water depth, met-ocean conditions, and presence of sea ice and icebergs. Some types of oil and gas activities in the marine environment, such as the deployment and use of geophysical or geotechnical gear, also have specific operational parameters and restrictions which require that they only be commenced and completed during environmental conditions. The potential for, and occurrence of, extreme meteorological and oceanographic conditions may also affect other project components, activities, and schedules, including the timing of associated vessel movements and drilling activity.

The primary measures for mitigating risks associated with effects from the environment on the Project are engineering design that incorporates environmental criteria so that the physical conditions of the Project Area can be tolerated, and sound planning that includes adherence to regulatory design and fitness standards. Engineering design of drilling installations used offshore Newfoundland adhere to national and international standards, which inform and guide Project design that is suitable for the requirements for site-specific normal and extreme physical environmental conditions. These national and international standards consider physical environmental criteria (e.g., temperature, wind, snow, waves, ice loading, drainage), as well as the life of the expected life of the design (i.e., choosing materials with sufficient durability and corrosion resistance).

An OA is required from the C-NLOPB to conduct an exploration drilling program. That Authorization, and the *Newfoundland Offshore Certificate of Fitness Regulations*, require an Operator obtain a Certificate of Fitness from an independent, third-party Certifying Authority for a drilling installation prior to onset of drilling. The third-party Certifying Authority will review the installation to confirm it meets the requirements of the Regulations, is fit for purpose, can function as intended, and remains in compliance with the regulations without compromising safety and polluting the environment. In addition, modifications/repairs to the installation that affects its strength, stability, integrity, operability, safety, or regulatory compliance need to be reviewed and accepted by the Certifying Authority to ensure the continued validity of the certificate. The Regulations require that offshore installations must be designed, constructed, transported, and installed in accordance with Parts I to III of the *Newfoundland Offshore Petroleum Installations Regulations*.

Other mitigation includes:

- Selection criteria for drilling installations where the installation is capable of operating at required water depths and in environmental conditions prevalent in the Northwest Atlantic Ocean
- Third party certification – a certificate of fitness – of the drilling installation and other facilities as required to obtain an OA issued by the C-NLOPB
- Physical environment data observations, weather forecasting, and reporting conducted in accordance with the Offshore Physical Environmental Guidelines
- Implementation of an Ice Management Plan. Options to be investigated for ice management include: ice detecting radar on drilling installations, use of satellite data to monitor for presence of ice
- Ability to quick disconnect riser in event of emergency

16.3 Residual Effects Summary

A significant adverse residual effect of the environment on the Project is defined as one that results in one or more of the following if:

- Project infrastructure is damaged, causing harm to Project workers or the public
- A substantial impact to the Project schedule delaying ongoing Project activities by one season or resulting in a shutdown of drilling operations for three months or more
- Project infrastructure is damaged, resulting in repairs that are not technically or economically feasible

The key environmental factors that may affect the Project include severe and/or extreme weather conditions, sea ice, icebergs and superstructure icing, oceanographic conditions, and geological stability and seismicity (unlikely due to low probability of occurrence). Engineering design, operational procedures, and mitigation measures discussed in Section 16.2 will reduce the potential adverse effects to the Project.

The short-term duration of offshore activities between 2018 and 2027 (i.e., 35 to 65 days drilling per well (up to 30 wells), the absence of fixed offshore infrastructure, the harsh-weather design criteria for the drilling installation, the requirements of the C-NLOPB's OA for drilling an exploration well, the requirements of the *Newfoundland Offshore Certificate of Fitness Regulations* and the Offshore Physical Environmental Guidelines also reduce the potential for, and possible magnitude of, effects of the environment on the Project. Meteorological and oceanographic conditions are constantly monitored and stop-work procedures have been developed should unsafe conditions arise.

Based on the significance criteria defined above, and with the application of the engineering and environmental design standards, operational procedures, regulations (e.g., *Newfoundland Offshore Certificate of Fitness Regulations*, *Newfoundland Offshore Petroleum Installations Regulations*), and adherence to the Offshore Physical Environmental Guidelines, it is predicted that there will be no significant adverse residual effects of the environment on the Project.

There is potential for effects of the environment on the Project to result in the Project having an accidental event or experiencing a malfunction. Potential environmental effects of Project-related accidents and malfunctions are assessed in Chapter 14.

17.0 ENVIRONMENTAL ASSESSMENT SUMMARY AND CONCLUSIONS

The proposed exploration drilling activities associated with ELs 1159 and 1160 have been reviewed, specifically:

- ELs 1159 and 1160 are within the defined Project Area assessed for the Flemish Pass and Eastern Newfoundland EISs
- The well count assessed in the Flemish Pass EIS (i.e., 30) remains the same
- Engagement with government departments and agencies, Indigenous groups and stakeholders completed for the Flemish Pass EIS is also applicable to ELs 1159 and 1160
- Updated information regarding the existing biological and human environments has been compiled and reviewed; however, it does not change the environmental effects assessments
- The Flemish Pass and Eastern Newfoundland EISs completed drill cuttings modelling in five locations with varying locations and water depths, four of which are applicable and valid for ELs 1159 and 1160 and therefore EL specific modelling is not being carried out
- The Flemish Pass and Eastern Newfoundland EISs completed spill trajectory modelling of eight unmitigated subsurface blowouts with varying locations, water depths, spill rates and durations, seven of which are applicable and valid for ELs 1159 and 1160 and therefore EL specific modelling is not being carried out
- The Flemish Pass and Eastern Newfoundland EISs completed spill trajectory modelling of 10 unmitigated batch spills with varying locations, water depths and volumes, eight of which are applicable and valid for ELs 1159 and 1160 and therefore EL specific modelling is not being carried out
- The nature of SAR in the Project Area have been validated and no new species have been added to Schedule 1 of SARA, and therefore re-assessment is not anticipated
- Conditions outlined in the Decision Statement (CEA Agency 2019) associated with the Flemish Pass EIS will be implemented for exploration drilling activities on ELs 1159 and 1160

17.1 Summary of Potential Effects

As a first step in assessing the potential effects of the Project on the selected VCs, interactions between Project activities included in the scope of the EIS and each VC are identified. A summary of the potential interactions between the VCs and planned Project activities, which formed the basis for the effects analysis, are presented in Table 17.1.

17.2 Summary of Mitigation and Commitments

Mitigation is proposed to reduce or eliminate adverse environmental effects. Design features and mitigation measures have been incorporated into the Project to prevent or reduce potential environmental effects. These design-feature mitigation measures, in combination with VC-specific mitigation measures will reduce environmental effects to acceptable levels. A summary of mitigation and commitments set out in the EIS is provided in Table 17.2. In addition, Equinor Canada will apply conditions outlined in the Decision Statement (CEA Agency 2019) for the Flemish Pass EIS on ELs 1159 and 1160.

Table 17.1 Potential Project-VC Interactions Summary

Potential Environmental Effects	Project Component / Activity						
	Presence and Operation of Drilling Installation (Including lights, noise, air emissions, anchoring)	**Drilling and Associated Marine Discharges (including fluids and cuttings)**	**Formation Flow Testing with Flaring**	**Wellhead Decommissioning**	**Geophysical, Geohazard, Wellsite, Seabed, and VSP Surveys**	**Geological, Geotechnical and Environmental Surveys**	**Supply and Servicing**
Fish and Fish Habitat							
Change in Habitat Availability and Quantity	•	•			•		
Change in Fish Mortality / Injury Risk and Fish Health	•	•			•		•
Change in Fish Presence and Abundance (Behavioral Effects)	•	•	•	•	•		•
Marine and Migratory Birds							
Change in Mortality / Injury Levels and Bird Health (Individuals or Populations)	•	•	•		•	•	•
Change in Avifauna Presence and Abundance (Behavioral Effects)	•				•	•	•
Change in Habitat Availability and Quality	•				•		

Table 17.1 Potential Project-VC Interactions Summary

Potential Environmental Effects	Project Component / Activity						
	Presence and Operation of Drilling Installation (Including lights, noise, air emissions, anchoring)	Drilling and Associated Marine Discharges (including fluids and cuttings)	Formation Flow Testing with Flaring	Wellhead Decommissioning	Geophysical, Geohazard, Wellsite, Seabed, and VSP Surveys	Geological, Geotechnical and Environmental Surveys	Supply and Servicing
Change in Habitat Availability and Quality	•				•		
Change in Food Availability or Quality	•	•					
Marine Mammals and Sea Turtles							
Change in Mortality or Injury (Underwater Noise)	•				•		
Change in Habitat Quality or Use (Behavioural Effects)	•	•	•	•	•	•	•
Change in Mortality or Injury (Vessel Strikes)	•	•	•	•	•	•	•
Change in Food Availability or Quality	•	•	•	•	•	•	•
Change in Health (Contaminants)		•	•				
Special Areas							
Change in Environmental Features and/or Processes	•	•	•	•	•	•	•

Table 17.1 Potential Project-VC Interactions Summary

Potential Environmental Effects	Potential Environmental Effects						
	Presence and Operation of Drilling Installation (Including lights, noise, air emissions, anchoring)	**Drilling and Associated Marine Discharges (including fluids and cuttings)**	**Formation Flow Testing with Flaring**	**Wellhead Decommissioning**	**Geophysical, Geohazard, Wellsite, Seabed, and VSP Surveys**	**Geological, Geotechnical and Environmental Surveys**	**Supply and Servicing**
Change in Human Use and/or Societal Value	•	•			•	•	•
Indigenous Communities and Activities							
Change in Health and Socio-Economic Conditions	•	•					•
Change in the Current Use of Lands and Resources for Traditional Purposes	•	•	•	•	•	•	•
Change in Physical and Cultural Heritage and Change in any Structure, Site, or Thing that is of Historical, Archaeological, Paleontological or Architectural Significance	•	•			•	•	•

Table 17.1 Potential Project-VC Interactions Summary

Potential Environmental Effects	Potential Environmental Effects						
	Presence and Operation of Drilling Installation (Including lights, noise, air emissions, anchoring)	**Drilling and Associated Marine Discharges (including fluids and cuttings)**	**Formation Flow Testing with Flaring**	**Wellhead Decommissioning**	**Geophysical, Geohazard, Wellsite, Seabed, and VSP Surveys**	**Geological, Geotechnical and Environmental Surveys**	**Supply and Servicing**
Commercial Fisheries and Other Ocean Users							
Direct Interference, Resulting in a Change in the Distribution, Intensity and/or Function (Effectiveness /Efficiency) of Commercial Fishing and Other Ocean Uses	•			•	•	•	•
Damage to Fishing Gear, Vessels, and Other Equipment and Components		•		•	•	•	•
Change in the Abundance, Distribution, and Quality of Marine Resources, Resulting in a Change in Distribution, Intensity and/or Function (Effectiveness / Efficiency) of Commercial Fishing and Other Ocean Uses	•	•		•	•	•	•

Table 17.2 Summary of Mitigation and Commitments

No.	Commitment Source	Operator Commitment
General*		
1	EIS	Adherence to C-NLOPB guidelines (environmental and drilling/production) and compliance with regulations, as applicable.
2	EIS	Operator will provide an update of planned activities to fishers and fish processors that will include timing of exploration activities and locations of planned wells. In addition, Equinor Canada will provide an EA update to the C-NLOPB each year that offshore operations are planned. The EA update will provide an overview of planned activities as defined by the scope of the project, update on recent and on-going engagement activities and their outcomes, and an overview of any new information regarding commercial fishing activities and updates to SAR, if applicable, as well as outlining the proposed work for the coming year and evaluating the continued applicability and validity of the EIS predictions and mitigation measures.
3	EIS	A copy of the EA update will be sent to all Indigenous groups and stakeholders identified in Chapter 3 of the EIS. Equinor Canada will follow up with Indigenous groups and stakeholders on any questions arising from the EA update.
4	EIS	Use of existing and common travel routes for vessels and helicopters will be used where possible and practicable.
5	EIS	Low-level aircraft operations will be avoided where it is not required per Transport Canada protocols.
6	EIS	Operational discharges will be treated prior to release in accordance with the OWTG and other applicable regulations and standards.
7	EIS	The selection and screening of chemicals to be discharged, including drilling fluids, will be in accordance with the OCSG for Drilling and Production Activities on Frontier Lands.
8	EIS	During formation flow testing with flaring, produced hydrocarbons and produced water will be flared. If there is a large amount of produced water encountered, it will be treated in accordance with the relevant regulatory requirements prior to ocean discharge or shipped to shore for appropriate disposal.
9	EIS	Appropriate handling, storage, transportation and on-shore disposal of solid and hazardous waste.
10	EIS	Spill prevention plans and procedures as required by the C-NLOPB, will be developed and submitted for approval to the C-NLOPB as a requirement of the OA and will include, at a minimum, the following: Training of project personnel in spill prevention and response Spill Response equipment for containment (e.g., booms) and/or removal Implementation of measures to deter birds from contacting spilled oil (e.g., bird scaring devices) Shoreline response measures, if oil is predicted to contact shoreline Shoreline clean-up measures, if in the event oil contacts shoreline Measure to be implemented for the rehabilitation and recovery of oiled seabirds Overview of monitoring that could be conducted in relation to various spill events
11	Flemish Pass IR-01, IR-04	Submit a Notification to Suspend/Abandon to the C-NLOPB for approval.

Table 17.2 Summary of Mitigation and Commitments

No.	Commitment Source	Operator Commitment
12	Flemish Pass IR-07	Submit monthly compliance reports, including volumes of liquid wastes discharged to the marine environment (e.g., ballast water, bilge water, deck drainage, blowout preventer (BOP) testing fluids, produced water, well treatment fluids) to the C-NLOPB.
13	Flemish Pass IR-07	Submit annual environmental reports, including volumes of liquid wastes, to the C-NLOPB.
14	Flemish Pass IR-07	Equinor Canada will keep records of chemicals screened (i.e., chemicals that are, or have to the potential to be, discharged to the marine environment), and will make them available to the C-NLOPB upon request.
15	Flemish Pass IR-78, IR-78-2	The type and concentration of biocides to be used and discharged to the marine environment will be outlined, if applicable, in Equinor Canada's EPPs.
Air Emissions		
16	EIS	Sulphur content in diesel fuel will meet the *Sulphur in Diesel Fuel Regulations* and will comply with the sulfur limits in fuels for large marine diesel engines, per the *Vessel Pollution and Dangerous Chemicals Regulations* under the *Canada Shipping Act*.
17	EIS	Adherence with the *Canadian Environmental Protection Act*, the Newfoundland *Air Pollution Control Regulations* for specified CACs in exhaust emissions, relevant regulations under MARPOL, and use of the National Ambient Air Quality Objectives as the benchmark for assessing air quality
Marine Fish and Fish Habitat		
18	EIS	Prior to the start of a drilling campaign, a pre-drill coral survey will be undertaken (see Section 2.5.2). A report summarizing the coral mapping, risk assessment and planned mitigation measures (if corals are identified) will be prepared and submitted to C-NLOPB/DFO for review and acceptance.
19	EIS	Relocation of well and/or redirection of WBM cuttings discharge location in the event that the pre-drill coral survey and risk assessment identifies mitigations required to protect sensitive benthic habitat (i.e., corals and sponges)
20	EIS	SBM-related drill cuttings will be returned to the drilling installation and treated in accordance with the OWTG before being discharged to the marine environment. WBM-related drill cuttings will be discharged without treatment.
21	EIS	Use of explosives will not be employed for removal of wellheads.
22	EIS	At the time of decommissioning a well, the well will be inspected in accordance with applicable regulatory requirements.
23	Flemish Pass IR-16/16a-2	Generate a short list of potential research activities with Indigenous organizations (e.g., Unama'ki Institute of Natural Resources [UINR], Mi'kmaw Conservation Group [MCG)] to address Indigenous concerns regarding knowledge/data gaps for salmon.
24	Flemish Pass IR-16/16a-2	Purchase 18 additional tags for the Atlantic Salmon Federation (ASF) salmon tagging program of kelt in Greenland in fall 2018.
25	Flemish Pass IR-16/16a-2	Consider deploying acoustic receivers in the Project Area to provide higher resolution data (i.e., location) within the Project Area.

Table 17.2 Summary of Mitigation and Commitments

No.	Commitment Source	Operator Commitment
26	Flemish Pass IR-16/16a-2	Present the data gap associated with the migratory route of salmon in the far offshore (Project Area) to the Environmental Studies Research Fun (ESRF) Secretariat in the fall management meeting as a potential new priority.
27	Flemish Pass IR-23	If DP is used instead of anchors, then the transponder areas would also be subjected to a pre-drill coral and sponge survey.
28	Flemish Pass IR-23-2	Provide copies of resumes associated with the selected Marine Biologists/Scientists, if requested by the C-NLOPB and/or DFO.
29	Flemish Pass IR-23-2	Provide video footage to C-NLOPB, DFO, stakeholders and/or Indigenous groups, if requested.
Marine and Migratory Birds		
30	EIS	Equinor Canada will avoid, where possible, established bird colonies. Helicopters will avoid known coastal seabird colonies per requirements of the NL *Seabird Ecological Reserve Regulations, 2015*
31	EIS	During drilling operations, routine observations of seabirds, following the CWS protocols will be undertaken from the drilling installation.
32	EIS	Routine searches for stranded birds will be conducted on the platform and supply vessels, and appropriate programs and protocols for the collection and release of marine and migratory birds will be implemented for any birds that become stranded (i.e., Routine searches for stranded birds will be conducted on the platform and supply vessels, and appropriate programs and protocols for the collection and release of marine and migratory birds will be implemented for birds that become stranded (i.e., ECCC-CWS's "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada" [ECCC 2017] and Williams and Chardine "The Leach's storm-petrel - General Information and Handling Instructions" [no date; adapted in Appendix I of EC 2016]).
33	EIS	Equinor Canada will obtain a Seabird Handling permit from ECCC-CWS.
34	EIS	Maceration of sewage and kitchen waste, in accordance with the OWTG to 6 mm particle size.
35	EIS	Operators are required to notify the C-NLOPB for plans to flare associated with formation flow testing for exploration drilling. The C-NLOPB then consults with ECCC-CWS to determine a safe timeline to proceed to minimize effects on migrating birds
36	Flemish Pass IR-30	Requirements associated with seabird observation program will be outlined in the EPP and will take into consideration the latest information from ECCC.
37	Flemish Pass IR-30-2	Develop a seabird observation protocol in consultation with ECCC-CWS prior to commencing the first exploration drilling program. Information outlined in the seabird observation protocol will be determined in consultation with ECCC-CWS, and aspects such as frequency of searches, reporting procedures and training requirements will be included.
38	Flemish Pass IR-45	Requirements associated with oiled seabirds will be described in Oil Spill Response Plans (OSRPs).

Table 17.2 Summary of Mitigation and Commitments

No.	Commitment Source	Operator Commitment
Marine Mammals and Sea Turtles		
39	EIS	Project associated vessel traffic will be approximately eight to ten trips per month for one drilling installation. Use of existing and common travel routes will be used where possible and practical. Vessels will maintain a steady course and safe vessel speed whenever possible.
40	EIS	Use of explosives will not be employed for removal of wellheads.
41	Flemish Pass Decision Statement	Passive acoustic monitoring will be implemented as per the condition in the Flemish Pass Decision statement
42	Flemish Pass IR-26	If a vessel strikes a marine mammal or sea turtle and assistance is required, then DFO will be contacted (1-888-895-3003) and details of the incident (e.g., species involved, speed of the vessel at the time of impact, state of the animal) will be recorded and reported.
43	EIS	As required in the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2018), mitigation measures applied during the project's geophysical surveys will be consistent with those outlined in the SOCP (DFO 2007). The following is a partial list of those mitigation measures. Trained Marine Mammals Observers (MMOs) will be used to monitor and report on marine mammal and sea turtle sightings during VSP and geophysical surveys where seismic source arrays are used. A ramp-up of the source array (i.e., gradually increasing seismic source elements over a period of at least 20 minutes until the operating level is achieved) starting from a single source element. MMOs will implement a pre-ramp up watch of 30 minutes prior to the start of the air source. Ramp-up will be delayed if any marine mammal or sea turtle is sighted within the safety zone. Shut down of the seismic source array if a marine mammal or sea turtle listed as endangered or threatened on SARA Schedule 1.
Indigenous Communities and Activities		
44	EIS	The mitigation measures outlined elsewhere in this EIS will serve to avoid or reduce environmental emissions, disturbances and resulting environmental changes by minimizing reducing the nature, degree, extent and duration of these changes, and therefore, reducing the potential for these to interact with and adversely affect the various components and activities that comprise this VC. A copy of the EA update will be sent to all Indigenous groups and stakeholders identified in chapter 3 of the EIS. Equinor Canada will follow up with Indigenous groups and stakeholders on any questions arising from the EA update. Equinor Canada will continue to communicate with relevant Indigenous communities and representative organizations, through established and/or informal engagement processes, as required and requested. The specific nature, frequency, subject matter and format of such future engagement will be determined in discussion with the Indigenous organizations and outlined in an Indigenous Communities Fisheries Communication Plan.

Table 17.2 Summary of Mitigation and Commitments

No.	Commitment Source	Operator Commitment
45	Flemish Pass IR-16/16a-2	Provide Indigenous groups with result of research studies associated with salmon migration.
46	Flemish Pass IR-84-2	Equinor Canada will share its plans for monitoring and follow-up programs with Indigenous groups during upcoming and ongoing engagement. Throughout all phases of the project, Equinor Canada will continue to engage with interested Indigenous groups and provide updates regarding the implementation of monitoring and follow-up programs and will share the results of these programs.
47	Flemish Pass IR-87-2	Share results and learnings from spill response exercise with Indigenous groups, if requested.
48	Flemish Pass IR-87-2	Provide Indigenous groups with a copy of the final OSRP.
Refer to Marine Fish and Fish Habitat and Commercial Fisheries and Other Ocean Users for additional commitments from IR/CLs responses that are also applicable to Indigenous Communities and Activities.		
Commercial Fisheries and Other Ocean Users		
49	EIS	Establishment of a safety zone around drilling installations in accordance with the *Newfoundland Offshore Petroleum Drilling and Production Regulations*.
50	EIS	Issuance of Notices to Shipping, Notices to Mariners (where appropriate) regarding planned project activities.
51	EIS	Ongoing communications with commercial fishers through One Ocean, FFAW-Unifor and seafood producers regarding planned project activities, including timely communication of drilling locations, safety zone and decommissioned wellsites. This information will also be communicated to Indigenous commercial fishers in accordance with the Indigenous Communities Fisheries Communication Plan.
52	EIS	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 decommissioned wellsites.
53	EIS	In accordance with the One Ocean “Risk Management Matrix Guidelines,” the need for a FLO and/or fisheries guide vessels during drilling installation movement from port to its offshore location will be determined in consideration of the guidelines. Use of a FLO during geophysical programs will also be determined in consideration of these guidelines.
54	EIS	A SPOC will be established during project activities to facilitate communications between fishers and Equinor Canada regarding gear loss//damage and other compensation matters.

Table 17.2 Summary of Mitigation and Commitments

No.	Commitment Source	Operator Commitment
55	EIS	Develop and implement a compensation program for damages resulting from Project activities. This compensation program will be developed in consideration of C-NLOPB guidelines, including the Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity (C-NLOPB and CNSOPB 2017a) and as revised. This program will outline compensation procedures for actual loss or damages to commercial fishers, including Commercial-communal fishers, attributable to Equinor Canada resulting from a spill or debris, or expenses incurred in taking remedial action. Actual loss or damage includes loss of income or future income; loss of hunting, fishing, or gathering opportunities; and costs and expenses incurred for action taken to remedy a situation involving a spill, including measure to control or clean a spill.
56	Flemish Pass IR-41-2	Develop the compensation program in consultation with Indigenous groups with communal-commercial licenses that overlap with the Project Area prior to commencing the first exploration drilling program.
57	EIS	The communication of suspended and/or abandoned wellsite locations to the appropriate authorities for inclusion on nautical charts for use by commercial fishers and other mariners.
58	EIS	Contact DFO regarding timing and locations of planned DFO research surveys
59	EIS	Contact DND regarding timing of planned offshore military exercises
Effects of the Environment on the Project		
60	EIS	Selection criteria for drilling installations where the installation is capable of operating at required water depths and in environmental conditions prevalent in the Northwest Atlantic Ocean.
61	EIS	Third party certification – a Certificate of Fitness – of the drilling installation and other facilities, as required to obtain an OA issued by the C-NLOPB.
62	EIS	Physical environment data observations, weather forecasting, and reporting will be conducted in accordance with the Offshore Physical Environmental Guidelines.
63	EIS	Implementation of an Ice Management Plan. Options to be investigated for ice management include: ice detecting radar on drilling installations, use of satellite data to monitor for presence of ice
64	EIS	Ability to quick disconnect riser in event of emergency.
*General mitigation measures are applicable to the assessment of potential environmental effects on all identified VCs.		

17.3 Residual Environmental Effects

A summary of the residual adverse effects for each VC from interactions, accidental events, and cumulative effects is provided in Table 17.3.

Table 17.3 Summary of Residual Environmental Effects for Routine Operations, Accidental Events, and Cumulative Effects

VC	Routine Operations	Accidental Events		Cumulative Effects
	Significance of Residual Environmental Effect	Significance of Residual Environmental Effect	Likelihood of Significant Effect	Significance of Residual Environmental Effect
Marine Fish and Fish Habitat	N	N	N/A	N
Marine and Migratory Birds	N	S	L	N
Marine Mammals and Sea Turtles	N	N	N/A	N
Special Areas	N	N	N/A	N
Indigenous Communities and Activities	N	N	N/A	N
Commercial Fisheries and Other Ocean Users	N	N	N/A	N

Key:
N = Not significant residual environmental effect (adverse)
S = Significant residual environmental effect (adverse)
L = Low likelihood
N/A = Not Applicable

17.4 Environmental Monitoring and Observations

The purpose of the follow-up monitoring program would be to determine the effectiveness of mitigation measures in protecting the sensitive benthic habitat. The monitoring program may include parameters such as:

- Sediment traps and/or seabed core samples to measure drill cuttings deposition
- Current and turbidity measurements
- Visual assessments using high-definition images / video

Detailed design of a follow-up monitoring program would be based on the pre-drill coral survey, potential ZOI as estimated in the drill cuttings dispersions modelling, location of the well in proximity to the sensitive benthic habitat, other site-specific information collected during planning, and industry experience in conducting similar monitoring programs (e.g., Norwegian Continental Shelf experience). If exploration wells are planned to be drilled under the circumstances identified above, a follow-up monitoring program plan will be developed and submitted for C-NLOPB / DFO review and acceptance at least 60 days prior to drilling.

The effects of exploration drilling activities are well understood, and mitigation measures are effective, allowing for a high level of confidence in the environmental effects predictions. Therefore, follow-up monitoring is not proposed for other VCs, including SAR.

Results of indigenous and stakeholder engagement to date have not identified concerns that could be addressed by follow-up monitoring.

As indicated in the relevant sections of the EIS, Equinor Canada undertakes visual observation programs regarding presence of marine and migratory birds, and marine mammals and sea turtles. In particular, during a geophysical survey, involving an air source array, visual monitoring for marine mammals will be undertaken based on the protocols outlined in the SOCP and the ESRF marine mammal monitoring protocol. Data from these observation programs will be provided to the C-NLOPB no later than six months after termination of the fieldwork.

In the case of marine and migratory birds, routine seabird observations will be undertaken from the drilling installation, following CWS seabird observation protocols from fixed platforms. In addition, regular inspections of the decks of the drilling installation will be undertaken to look for stranded and/or oiled seabirds. As stated previously, if stranded wildlife are encountered they will be handled and released in accordance with ECCC-CWS protocols (see Section 9.3.2). All observation and stranded seabird data will be submitted to ECCC-CWS within 12 months of completion of the drilling campaign.

Environmental compliance monitoring programs refers to activities used to ensure compliance with regulatory requirements. Compliance monitoring is to assure the regulator and the public that environmental regulations and requirements are being followed. Requirements for compliance monitoring are outlined in the OWTG and the EPP Guidelines (NEB et al. 2011). Equinor Canada's EPCMP details the environmental compliance monitoring plans, procedures, and reporting requirements that Equinor Canada will follow. Some of these monitoring requirements are outlined in Section 2.11. The EPCMP must be reviewed and accepted by the C-NLOPB in order to obtain an OA. OA applications for drilling programs are normally submitted at least 4 months in advance of drilling programs but this time frame can vary depending on the Drilling Installation and specific circumstances.

In addition to reporting requirements outlined in Equinor Canada's own plans and procedures, Equinor Canada will be responsible for reporting to the C-NLOPB in accordance with the *Drilling and Production Regulations* and Data Acquisition and Reporting Guidelines. The Drilling and Production Guidelines (C-NLOPB and CNSOPB 2017b) and Data Acquisition and Reporting Guidelines (C-NLOPB 2011) describe the operational testing, measurement, monitoring, and reporting requirements to be conducted during an exploratory well drilling program. These are primarily related to engineering and technical aspects of the operations. Incidents will be reported in accordance with the Incident Reporting and Investigation Guidelines (C-NLOPB and CNSOPB 2017c).

In the event of a spill, an EEM program may be required, depending on the magnitude of the spill. This monitoring program will be developed in consultation with the C-NLOPB and other relevant regulatory authorities.

A summary of follow-up and compliance monitoring and observational programs is provided in Table 17.4.

Table 17.4 Summary of Monitoring Programs for Routine Project Activities

Proposed Monitoring Program	Program Overview	Applicable VC(s)	Proposed Intervention / Adaptive Management	Schedule	Reporting
Benthic Sedimentation Monitoring in VMEs / FCAs and / or Other Sensitive Benthic Habitat	Site specific monitoring program to be developed based on results of coral mapping and risk assessment. Monitoring program to be reviewed and accepted by C-NLOPB / DFO. May include: • sediment traps and/or seabed core samples to measure drill cuttings deposition • current and turbidity measurements • visual assessments using high-definition images / video	Marine Fish and Fish Habitat	Survey is for data gathering purposes. Coral mapping, risk assessment, and mitigation processes may be improved based on the results and learnings.	Drilling and Post-Drilling	A monitoring report will be provided to the C-NLOPB / DFO within 12 months of completing the monitoring program
Migratory Bird Observations	Operational program including: • A trained Environmental Observer will be onboard to record marine bird (and marine mammals) sightings during Project operations, which will be undertaken in accordance with CWS's monitoring protocol from fixed platforms • Regular searches of vessel decks will be undertaken and accepted protocols for the collection / handling of bird mortalities and release of birds that become stranded	Migratory and Marine Birds	Survey is for data gathering purposes.	Mobilization to well decommissioning	If a SAR is found alive (stranded) or dead on the drilling installation or survey vessel, a report will be sent to CWS for identification. Seabird observations report will be submitted to the C-NLOPB within 90 days of well suspension and/or decommissioning An annual report summarizing stranded and/or seabird handling will be submitted to the CWS in accordance with the Seabird Handling permit requirements.

Table 17.4 Summary of Monitoring Programs for Routine Project Activities

Proposed Monitoring Program	Program Overview	Applicable VC(s)	Proposed Intervention / Adaptive Management	Schedule	Reporting
Marine Mammal and Sea Turtle Observations	Operational program for marine mammals during geophysical surveys where sound source is used, including VSP • A trained MMO will be onboard to record marine mammal and sea turtle sightings during Project operations • A marine mammal and sea turtle monitoring plan will be submitted to the applicable regulators for review at least 30 days prior to the commencement of the first geophysical survey • Visual monitoring for the presence of marine mammals and sea turtles within a pre-determined exclusion zone will take place during geophysical operations where an air source array is used • Observational / shutdown procedures will follow the SOCP	Marine Mammals and Sea Turtles	Survey is for data gathering purposes and reducing potential interactions	Geophysical surveys with use of sound source, VSP Surveys; as required	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. Vessel strikes involving marine mammals or sea turtles will be reported to DFO within 24 hours.

Table 17.4 Summary of Monitoring Programs for Routine Project Activities

Proposed Monitoring Program	Program Overview	Applicable VC(s)	Proposed Intervention / Adaptive Management	Schedule	Reporting
Environmental Compliance Monitoring	Environmental compliance monitoring is a requirement of the *Drilling and Production Regulations*. Monitoring of volumes and hydrocarbon concentration for the following treated effluents is completed in accordance with regulatory requirements: • Bilge and ballast water • Deck drainage • Drill cuttings	All			Monthly compliance monitoring report submitted to C-NLOPB during drilling operations. Final compliance monitoring report submitted to C-NLOPB within 90 days of completion of drilling activities.

17.5 Conclusion

The proposed exploration drilling activities on ELs 1159 and 1160 are not expected to result in significant adverse residual environmental effects on the environment (see Table 17.3) and will not cumulatively interact with other industries in the Canada-NL Offshore Area, including other oil and gas operations, in a way that would cause significant environmental effects. Exploration drilling on ELs 1159 and 1160 has the potential to provide economic benefits to Newfoundland and Labrador, and Canada, while posing a low risk of environmental effects.

17.6 References

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APPENDIX A

Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Central Ridge Exploration Drilling Project Equinor Canada Ltd.

Canadian Environmental Assessment Agency
Agence canadienne d'évaluation environnementale

GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

pursuant to the

Canadian Environmental Assessment Act, 2012

For the

Central Ridge Exploration Drilling Project

Equinor Canada Ltd.

July 5, 2019

Canada

TABLE OF CONTENTS

GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT I

DISCLAIMER v

ABBREVIATIONS AND SHORT FORMS 1

PART 1 - KEY CONSIDERATIONS 2

1. INTRODUCTION 2

2. GUIDING PRINCIPLES 2

2.1. Environmental assessment as a planning and decision making tool 2

2.2. Public participation 2

2.3. Engagement with Indigenous groups 3

2.4. Application of the precautionary approach 3

3. SCOPE OF THE ENVIRONMENTAL ASSESSMENT 3

3.1. Designated project 3

3. Regulatory, Indigenous and Stakeholder Engagement 5

4, Environmental Assessment Scope, Approach and Methods 5

5. Existing Physical Environment 5

3.2. Factors to be considered 6

3.2.1. Changes to the environment 7

3.2.2. Valued components to be examined 7

3.2.3. Spatial and temporal boundaries 8

4. PREPARATION AND PRESENTATION OF THE ENVIRONMENTAL IMPACT STATEMENT 9

4.1. Guidance 9

4.2. Use of information 9

4.2.1. Government expert advice 9

4.2.2. Community knowledge and Aboriginal traditional knowledge 9

4.2.3. Existing information 10

4.2.4. Confidential information 10

4.3. Study strategy and methodology 10

4.4. Presentation and organization of the environmental impact statement 12

4.5. Summary of the environmental impact statement 13

PART 2 – CONTENT OF THE ENVIRONMENTAL IMPACT STATEMENT 15

1. INTRODUCTION AND OVERVIEW 15

1.1. The proponent 15

1.2. Project overview 15

1.3. Project location 15

1.4. Regulatory framework and the role of government 16

2. PROJECT JUSTIFICATION AND ALTERNATIVES CONSIDERED 16

2.1. Purpose of the project 16

2.2. Alternative means of carrying out the project 16

3. PROJECT DESCRIPTION 18

3.1. Project components 18

3.2. Project activities 19
3.2.1. Drilling and testing activities 19
3.2.2. Supply and servicing 20
3.2.3. Decommissioning, suspension or abandonment of wells 20
4. PUBLIC PARTICIPATION AND CONCERNS 20
5. ENGAGEMENT WITH INDIGENOUS GROUPS AND CONCERNS RAISED 20
6. IMPACTS TO POTENTIAL OR ESTABLISHED ABORIGINAL OR TREATY RIGHTS 23
7. EFFECTS ASSESSMENT 25
7.1. Project setting and baseline conditions 25
7.1.1. Atmospheric environment 25
7.1.2. Marine environment 26
7.1.3. Fish and fish habitat 26
7.1.4. Migratory birds and their habitat 27
7.1.5. Species at Risk 28
7.1.6. Marine mammals 28
7.1.7. Marine turtles 29
7.1.8. Indigenous peoples 29
7.1.9. Other changes to the environment arising as a result of a federal decision or due to changes on federal lands, in another province or outside Canada 31
7.1.9.1. Special areas 31
7.1.9.2. Human environment 31
7.2. Predicted changes to the physical environment 32
7.3. Predicted effects on valued components 32
7.3.1. Fish and fish habitat 33
7.3.2. Marine plants 33
7.3.3. Marine mammals 33
7.3.4. Marine turtles 34
7.3.5. Migratory birds 34
7.3.6. Species at risk 35
7.3.7. Indigenous peoples 35
7.3.8. Other valued components that may be affected as a result of a federal decision or due to effects on federal lands, another province or outside Canada 37
7.3.8.1. Air quality and greenhouse gas emissions 37
7.3.8.2. Commercial Fisheries 38

7.3.8.3. Special areas 38
7.3.8.4. Human environment 38
7.4. Mitigation measures 39
7.5. Significance of residual effects 40
7.6. Other effects to consider 41
7.6.1. Effects of potential accidents or malfunctions 41
7.6.2. Effects of the environment on the project 43
7.6.3. Cumulative effects assessment 43
8. SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT 44
9. FOLLOW-UP AND MONITORING PROGRAMS 45
9.1. Follow-up program 45
9.2. Monitoring 46

DISCLAIMER

This document is not a legal authority, nor does it provide legal advice or direction; it provides information only, and must not be used as a substitute for the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) or its regulations. In the event of a discrepancy, CEAA 2012 and its regulations prevail. Portions of CEAA 2012 have been paraphrased in this document, but will not be relied upon for legal purposes.

Abbreviations and Short Forms

CEAA 2012	*Canadian Environmental Assessment Act*, *2012*
Agency	Canadian Environmental Assessment Agency
EA	environmental assessment
EIS	environmental impact statement
VC	valued component

Part 1 - Key Considerations

1. INTRODUCTION

The purpose of this document is to identify for the proponent the minimum information requirements for the preparation of an Environmental Impact Statement (EIS) for a designated project[1] to be assessed pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). This document specifies the nature, scope and extent of the information required. Part 1 of this document defines the scope of the environmental assessment (EA) and provides guidance and general instruction that must be taken into account in preparing the EIS. Part 2 outlines the information that must be included in the EIS.

Section 5 of CEAA 2012 describes the environmental effects that must be considered in an EA, including changes to the environment and effects of changes to the environment. The factors that are to be considered in an EA are described under section 19 of CEAA 2012. The Canadian Environmental Assessment Agency (the Agency) will use the proponent's EIS and other information received during the EA process to prepare a report that will inform the issuance of a decision statement by the Minister of Environment and Climate Change. Therefore the EIS must include a full description of the changes the project will cause to the environment that may result in adverse effects on areas of federal jurisdiction (i.e. section 5 of CEAA 2012) including changes that are directly linked or necessarily incidental to any federal decisions that would permit the project to be carried out. The EIS must also include a list of the mitigation measures that the proponent proposes to undertake in order to avoid or minimize any adverse environmental effects of the project. It is the responsibility of the proponent to provide sufficient data and analysis on potential changes to the environment to ensure a thorough evaluation of the environmental effects of the project by the Agency.

2. GUIDING PRINCIPLES

2.1. Environmental assessment as a planning and decision making tool

EA is a process to predict environmental effects of proposed projects before they are carried out. An EA:

- identifies potential adverse environmental effects;
- proposes measures to mitigate adverse environmental effects;
- predicts whether there will be significant adverse environmental effects, after mitigation measures are implemented; and
- includes a follow-up program to verify the accuracy of the EA and the effectiveness of the mitigation measures.

2.2. Public participation

One of the purposes identified in CEAA 2012 is to ensure that opportunities are provided for meaningful public participation during an EA. CEAA 2012 requires that the Agency provide the public

1 In this document, "project" has the same meaning as "designated project" as defined in CEAA 2012.

with an opportunity to participate in the EA. For EAs led by the Agency the public has an opportunity to comment on the draft EA report. Additional opportunities for participation may also be provided.

Meaningful public participation is best achieved when all parties have a clear understanding of the proposed project as early as possible in the review process. The proponent is required to provide current information about the project to the public and especially to the communities likely to be most affected by the project.

2.3. Engagement with Indigenous groups

The proponent is expected to engage with potentially affected Indigenous groups starting as early as possible in the project planning process in order to:

- Fulfil the statutory obligations of CEAA, 2012 to assess environmental effects of the proposed Project on Aboriginal peoples; and
- Assist the Agency fulfilling the Crown's constitutional obligations to consult with potentially impacted Indigenous groups on potential impacts to potential or established Aboriginal or Treaty rights.

The proponent is expected to work with potentially affected Indigenous groups to establish an engagement approach. The proponent will make reasonable efforts to integrate Indigenous knowledge into the assessment of environmental effects. For more information on requirements for the effects assessment, see Part 2, Section 7.1.8 and Section 7.3.7 of these guidelines. For more information on incorporating Indigenous knowledge, refer to Part 1, Section 4.2.2 of these guidelines.

2.4. Application of the precautionary approach

In documenting the analyses included in the EIS, the proponent will demonstrate that all aspects of the project have been examined and planned in a careful and precautionary manner in order to avoid significant adverse environmental effects.

3. SCOPE OF THE ENVIRONMENTAL ASSESSMENT

3.1. Designated project

On May 9. 2019, Equinor Canada Ltd., the proponent of the Central Ridge Exploration Drilling Project provided a project description to the Agency. Based on this project description, the Agency has determined that an EA is required under CEAA 2012 and will include the following project components and activities:

- the mobilization, operation and demobilization of Mobile Offshore Drilling Unit(s) designed for year-round operations for the drilling, testing and abandonment of up to 24 wells (including those proposed for the Flemish Pass Exploration Drilling Project) in Exploration Licences 1159 and 1160 operated by Equinor Canada Ltd., including consideration of any proposed safety exclusion zones. Drilling may occur in various water depths under consideration, using Mobile Offshore Drilling Unit(s), and with multiple drilling units operating simultaneously, if applicable;
- vertical seismic profiling or any other in-water works (e.g. wellsite surveys) to support the specific exploration wells under consideration, but excluding surveys potentially required to

support the conduct of the EA (e.g. environmental baseline surveys) and surveys related to the broader delineation of resources;

- well evaluation and testing; and
- the loading, refuelling and operation of marine support vessels (i.e. for re-supply and transfer of materials, fuel, and equipment; on-site safety during drilling operations; and transport between the supply base and the drilling unit(s) and helicopter support (i.e. for crew transport and delivery of light supplies and equipment) including transportation to the drilling unit(s).

Note: If the proponent acquires and becomes the operator of new or additional exploration licences issued by the Canada-Newfoundland and Labrador Offshore Petroleum Board and submits corresponding information to the Agency prior to the submission of the EIS, the Agency will consider whether activities on these additional licences may be incorporated into the scope of this EA.

Equinor Canada acquired ELs 1159 and 1160 in the November 2018 Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) call for bids. The proponent indicated that ELs 1159 and 1160 are within the project area described in the Flemish Pass Exploration Drilling Project EIS and Eastern Newfoundland Offshore Exploration Drilling Project EIS submitted to the Agency on December 17, 2019 and for which Environmental Assessment Decision Statements were issued by the Agency on April 17, 2019. The proponent suggested that the overall level of activity (i.e. project components and number of wells) would remain unchanged from the Flemish Pass Exploration Drilling Project with the inclusion of ELs 1159 and 1160 and that the baseline environmental conditions and environmental effects of exploration drilling and associated incidental activities in the ELs are already understood.

All information requirements set out in these EIS Guidelines apply to exploration drilling and associated incidental activities within ELs 1159 and 1160. Information requirements issued by the Agency during the technical review of the EIS for the Flemish Pass Exploration Drilling Project also apply.

In the event that Equinor Canada believes the required information is already included in the existing Flemish Pass Exploration Drilling Project EIS and associated information requirement responses, an abridged EIS may be submitted that provides a complete effects assessment of the Project as it pertains to ELs 1159 and 1160, but does not replicate detailed analysis contained in the Flemish Pass Exploration Drilling Project EIS and associated information requirements. The abridged EIS should provide detailed analysis of effects that are specific to the Project and provide a rationale for the applicability of the analysis and conclusions of the Flemish Pass EIS. The abridged EIS should include any new information available for ELs 1159 and 1160, such as seabed survey results.

The abridged EIS shall include discussion of the following:

Chapter of the Abridged EIS	**Information Required in Abridged EIS**
1. Introduction	Provide the background/context for activities on ELs 1159 and 1160 in the EA.
2. Project Description	Provide information, including mapping, of the ELs. Describe the Project, including components, activities, and schedule. Specify

	any potential differences from the description of the Flemish Pass Exploration Drilling Project in the EIS.
3. Regulatory, Indigenous and Stakeholder Engagement	Provide a summary of how Indigenous groups and interested parties (e.g. commercial fish harvesters) have been notified of the Project, and of any views expressed in relation to ELs 1159 and 1160.
4, Environmental Assessment Scope, Approach and Methods	Provide Project-specific information and figures for ELs 1159 and 1160 on scope of the Project, environmental assessment study areas and zones of influence for anticipated environmental effects. As applicable, describe any changes in approach to selection of valued components, significance criteria, and environmental assessment methodology.
5. Existing Physical Environment 6. Existing Biological Environment 7. Existing Human Environment	Provide baseline information for ELs 1159 and 1160, as applicable, ensuring discussion of species at risk, special areas and any other environmental features, habitats and valued component species that may be unique to ELs 1159 and 1160. Where baseline information was presented in the Flemish Pass Exploration Drilling Project EIS specific to each EL (including but not limited to Table 6.10, Section 6.1.6, Section 7.1.4, Section 7.1.6), provide similar baseline information specific to ELs 1159 and 1160.
<u>Environmental Effects</u> 8. Marine Fish and Fish Habitat 9. Marine and Migratory Birds 10. Marine Mammals and Sea Turtles 11. Special Areas 12. Indigenous Communities and Activities 13. Commercial Fisheries and Other Ocean Users 14. Cumulative Effects	For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results

	applicable to ELs 1159 and 1160, and an updated effects analysis, as required.
15. Accidental Events	Update the effects assessment for potential accidents and malfunctions, including the results of oil spill trajectory modelling for a worst-case scenario within ELs 1159 and 1160 or a rationale for the use of existing models showing comparability of previously used event inputs and environmental conditions. Ensure a robust rationale for selection of the worst-case scenario is provided.
16. Effects of the Environment on the Project	Provide information on environmental considerations for ELs 1159 and 1160 and the potential effects of the environment on the Project.
17. Environmental Assessment and Summary and Conclusions	Update as appropriate based on the above.

3.2. Factors to be considered

Scoping establishes the parameters of the EA and focuses the assessment on relevant issues and concerns. Part 2 of this document specifies the factors to be considered in the EA, including the factors listed in subsection 19(1) of CEAA 2012:

- environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other physical activities that have been or will be carried out;
- the significance of the effects referred to above;
- comments from the public;
- mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
- the requirements of the follow-up program in respect of the project;
- the purpose of the project;
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
- any change to the project that may be caused by the environment; and
- the results of any relevant regional study pursuant to CEAA 2012.

3.2.1. Changes to the environment

Environmental effects occur as interactions between actions (the carrying out of the project or decisions made by the federal government in relation to the project) and receptors in the environment, and subsequently between components of the environment (e.g. change in water quality that may affect fish).

Under CEAA 2012, an examination of environmental effects that result from changes to the environment as a result of the project being carried out or as a result of the federal government exercising any power duty or function that would allow the project to be carried out must be considered in the EIS.

In scoping the potential changes to the environment that may occur, the proponent should consider any potential changes in the physical environment such as changes to air quality, water quality and quantity, and physical disturbance of land that could reasonably be expected to occur.

3.2.2. Valued components to be examined

Valued components (VCs) refer to environmental biophysical or human features that may be impacted by a project. The value of a component not only relates to its role in the ecosystem, but also to the value people place on it. For example, it may have been identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

The proponent must conduct and focus its analysis on VCs as they relate to **section 5 of CEAA 2012,** including the ones identified in Section 7.3 (Part 2) of these guidelines that may be affected by changes in the environment, as well as species at risk and their critical habitat as per the requirement outlined in section 79 of the *Species at Risk Act*. Section 5 of CEAA 2012 defines environmental effects as:

- a change that may be caused to fish and fish habitat, marine plants and migratory birds;
- a change that may be caused to the environment on federal lands, in another province or outside Canada;
- with respect to aboriginal peoples, an effect of any change that may be caused to the environment on:
  - ✓ health and socio-economic conditions;
  - ✓ physical and cultural heritage;
  - ✓ the current use of lands and resources for traditional purposes; or
  - ✓ any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.
- for projects requiring a federal authority to exercise a power or perform a duty or function under another Act of Parliament:
  - ✓ a change, other than the ones mentioned above, that may be caused to the environment and that is directly linked or necessarily incidental to the exercise of the federal power or the performance of a duty or function; and
  - ✓ the effect of that change, other than the effects mentioned above, on:
    - health and socio-economic conditions,
    - physical and cultural heritage, or

- any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The list of VCs presented in the EIS will be completed according to the evolution and design of the project and reflect the knowledge acquired through public consultation and engagement with Indigenous groups. The EIS will describe what methods were used to predict and assess the adverse environmental effects of the project on these VCs.

The VCs will be described in sufficient detail to allow the reviewer to understand their importance and to assess the potential for environmental effects arising from the project activities. The EIS will provide a rationale for selecting specific VCs and for excluding any VCs or information specified in these guidelines. Challenges may arise regarding particular exclusions, so it is important to document the information and the criteria used to justify the exclusion of a particular VC or piece of information. Justification may be based on, for example, primary data collection, computer modelling, literature references, public participation or engagement with Indigenous groups, or expert input or professional judgement. The EIS will identify those VCs, processes, and interactions that either were identified to be of concern during any workshops or meetings held by the proponent or that the proponent considers likely to be affected by the project. In doing so, the EIS will indicate to whom these concerns are important (i.e. the public or Indigenous groups) and the reasons why, including environmental, cultural, historical, social, economic, recreational, and aesthetic considerations, and traditional knowledge. If comments are received on a component that has not been included as a VC, these comments will be summarized and the rationale for excluding the component will address the comments.

3.2.3. Spatial and temporal boundaries

The spatial and temporal boundaries used in the EA may vary depending on the VC and will be considered separately for each VC, including for VCs related to the current use of lands and resources for traditional purposes by Aboriginal peoples, or other environmental effects referred to under paragraph 5(1)(*c*) of CEAA 2012. The proponent is encouraged to consult with the Agency, federal and provincial government departments and agencies, local government and Indigenous groups, and take into account public comments when defining the spatial and temporal boundaries used in the EIS.

The EIS will describe the spatial boundaries, including local and regional study areas, of each VC to be used in assessing the potential adverse environmental effects of the project and provide a rationale for each boundary. Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential environmental effects, community knowledge and Aboriginal traditional knowledge, current or traditional land and resource use by Indigenous groups, ecological, technical, social and cultural considerations.

The temporal boundaries of the EA will span all phases of the project determined to be within the scope of this EA as specified under section 3.1 above. If effects are predicted after project decommissioning, this should be taken into consideration in defining boundaries. Community knowledge and Aboriginal traditional knowledge should factor into decisions around defining temporal boundaries.

If the temporal boundaries do not span all phases of the project, the EIS will identify the boundaries used and provide a rationale.

4. PREPARATION AND PRESENTATION OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1. Guidance

The proponent should consult the Agency policy and guidance on topics to be addressed in the EIS, which is available on the Agency's website, and liaise with the Agency during the planning and development of the EIS. The proponent should also consult relevant guidance from other federal departments and ensure that the most up to date version is being used.

The proponent is encouraged to engage with Indigenous groups on the planning and development of relevant sections of the EIS, including effects from changes to the environment and impacts to potential or established Aboriginal or Treaty rights as well as assessment of environmental effects as outlined in paragraph 5(1)(c) of CEAA 2012.

Submission of regulatory and technical information necessary for federal authorities to make their regulatory decisions during the conduct of the EA is at the discretion of the proponent. Although that information is not necessary for the EA decision, the proponent is encouraged to submit it concurrent with the EIS. While the EIS must outline applicable federal authorizations required for the project to proceed, the proponent must provide information relevant to the regulatory role of the federal government. It should be noted that the issuance of these other applicable federal legislative, regulatory and constitutional requirements are within the purview of the relevant federal authorities, and are subject to separate processes post EA decision.

4.2. Use of information

4.2.1. Government expert advice

Section 20 of CEAA 2012 requires that every federal authority with specialist or expert information or knowledge with respect to a project subject to an EA must make that information or knowledge available to the Agency. The Agency will advise the proponent of the availability of pertinent information or knowledge or expert and specialist knowledge received from other federal authorities or other levels of government so that it can be incorporated into the EIS.

4.2.2. Community knowledge and Aboriginal traditional knowledge

Sub-section 19(3) of CEAA 2012 states that "the environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge". For the purposes of these guidelines, community knowledge and Aboriginal traditional knowledge refers to knowledge acquired and accumulated by a local community or an Indigenous group.

The proponent will incorporate into the EIS the community knowledge and Aboriginal traditional knowledge to which it has access or that is acquired through public participation and engagement with Indigenous groups, in keeping with appropriate ethical standards and obligations of confidentiality. The proponent will engage in a respectful dialogue with Indigenous groups about the collection and use of Indigenous knowledge and enter into agreements where necessary regarding the use of information during and after the EA. The proponent should collaborate with Indigenous groups to ensure, where possible, that the Indigenous knowledge is incorporated into the EIS in a way that appropriate for the Indigenous group. The proponent will integrate Aboriginal traditional knowledge into all aspects of its assessment including both methodology (e.g. establishing spatial and temporal

boundaries, defining significance criteria) and analysis (e.g. baseline characterization, effects prediction, development of mitigation measures). Agreement should be obtained from Indigenous groups regarding the use, management and protection of their existing traditional knowledge information during and after the EA. For more information on how Aboriginal traditional knowledge can be obtained and incorporated in the preparation of the EIS, please refer to the Agency's reference guide on the topic. Should there be a lack of Indigenous knowledge, the proponent is still expected to seek information from other sources to complete the assessment of effects of changes to the environment on Aboriginal peoples or the assessment of impacts to rights. For more information on requirements for the effects assessment, see Part 2, Section 7.1.8 and 7.3.7 of these guidelines.

4.2.3. Existing information

In preparing the EIS, the proponent is encouraged to make use of existing information relevant to the project. When relying on existing information to meet requirements of the EIS Guidelines, the proponent will either include the information directly in the EIS or clearly direct the reader to where it may obtain the information (i.e. through cross-referencing). When relying on existing information, the proponent will also comment on how the data were applied to the project, separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from the existing information.

4.2.4. Confidential information

In implementing CEAA 2012, the Agency is committed to promoting public participation in the EA of projects and providing access to the information on which EAs are based. All documents prepared or submitted by the proponent or any other stakeholder in relation to the EA are included in the Canadian Environmental Assessment Registry and made available to the public on request. For this reason, the EIS will not contain information that:

- is sensitive or confidential (i.e. financial, commercial, scientific, technical, personal, cultural or other nature), that is treated consistently as confidential, and the person affected has not consented to the disclosure; or
- may cause substantial harm to a person or specific harm to the environment through its disclosure.

The proponent will consult with the Agency regarding whether specific information requested by these guidelines should be treated as confidential.

4.3. Study strategy and methodology

The proponent is expected to respect the intent of these guidelines and to consider the environmental effects that are likely to arise from the project (including situations not explicitly identified in these guidelines), the technically and economically feasible mitigation measures that will be applied, and the significance of any residual effects. Except where specified by the Agency, the proponent has the discretion to select the most appropriate methods to compile and present data, information and analysis in the EIS as long as they are justifiable and replicable.

It is possible these guidelines may include matters which, in the judgement of the proponent, are not relevant or significant to the project. If such matters are omitted from the EIS, the proponent will clearly indicate it, and provide a justification so the Agency, federal authorities, Indigenous groups, the

public and any other interested party have an opportunity to comment on this decision. Where the Agency disagrees with the proponent's decision, it will require the proponent to provide the specified information.

The assessment will include the following general steps:

- ✓ identifying the activities and components of the project;
- ✓ predicting potential changes to the environment;
- ✓ predicting and evaluating the likely effects on identified VCs;
- ✓ identifying technically and economically feasible mitigation measures for any significant adverse environmental effects;
- ✓ determining any residual environmental effects;
- ✓ considering cumulative effects of the project in combination with other physical activities that have been or will be carried out; and
- ✓ determining the potential significance of any residual environmental effect following the implementation of mitigation measures.

For each VC, the EIS will describe the methodology used to assess project-related effects. The EIS could include an analysis of the pathway of the effects of environmental changes on each VC. The EIS will document where and how scientific, engineering, community knowledge and Aboriginal traditional knowledge were used to reach conclusions. Assumptions will be clearly identified and justified. All data, models and studies will be documented such that the analyses are transparent and reproducible. All data collection methods will be specified. The uncertainty, reliability, sensitivity and conservativeness of models used to reach conclusions must be indicated.

The EIS will identify all significant gaps in knowledge and understanding related to key conclusions, and the steps to be taken by the proponent to address these gaps. Where the conclusions drawn from scientific, engineering and technical knowledge are inconsistent with the conclusions drawn from Aboriginal traditional knowledge, the EIS will present each perspective on the issue and a statement of the proponent's conclusions.

The EIS will include a description of the environment (both biophysical and human), including the components of the existing environment and environmental processes, their interrelations as well as the variability in these components, processes and interactions over time scales appropriate to the likely effects of the project. The description will be sufficiently detailed to characterize the environment before any disturbance to the environment due to the project and to identify, assess and determine the significance of the potential adverse environmental effects of the project. These data should include results from studies done prior to any physical disruption of the environment due to initial project related activities. The information describing the existing environment may be provided in a stand-alone chapter of the EIS or may be integrated into clearly defined sections within the effects assessment of each VC. This analysis will include environmental conditions resulting from historical and present activities in the local and regional study areas.

If the baseline data have been extrapolated or otherwise manipulated to depict environmental conditions in the study areas, modelling methods and equations will be described and will include calculations of margins of error and other relevant statistical information, such as confidence intervals and possible sources of error. The proponent will provide the references used in creating their approach to baseline data gathering, including identifying where appropriate, the relevant federal or

provincial standards. The proponent is encouraged to discuss the timeframe and considerations for its proposed baseline data with the Agency prior to submitting its EIS.

In describing and assessing effects to the physical and biological environment, the proponent will take an ecosystem approach that considers both scientific and community knowledge and Indigenous knowledge and perspectives regarding ecosystem health and integrity. The proponent will consider the resilience of relevant species populations, communities and their habitats. The assessment of environmental effects on Aboriginal peoples, pursuant to paragraph 5(1)(*c*) of CEAA 2012, will undergo the same rigour and type of assessment as any other VC (including setting of spatial and temporal boundaries, identification and analysis of effects, identification of mitigation measures, determination of residual effects, identification and a clear explanation of the methodology used for assessing the significance of residual effects and assessment of cumulative effects).

The proponent will consider the use of both primary and secondary sources of information regarding baseline information, changes to the environment and the corresponding effect on health, socio-economics, physical and cultural heritage and the current use of lands and resources for traditional purposes. Primary sources of information include traditional land use studies, socio-economic studies, heritage surveys or other relevant studies conducted specifically for the project and its EIS. Often these studies and other types of relevant information are obtained directly from Indigenous groups. Secondary sources of information include previously documented information on the area, not collected specifically for the purposes of the project, or desk-top or literature-based information. The proponent will provide Indigenous groups the opportunity to review and provide comments on the information used for describing and assessing effects on Aboriginal peoples (further information on engaging with Indigenous groups is provided in Part 2, Section 5 of this document). The proponent will respond to the comments of Indigenous groups prior to submitting the EIS to ensure that the comments are adequately addressed. Where there are discrepancies in the views of the proponent and Indigenous groups on the information to be used in the EIS, the EIS will document these discrepancies and the rationale for the proponent's selection of information.

The assessment of the effects of each of the project components and physical activities, in all phases, will be based on a comparison of the biophysical and human environments between the predicted future conditions with the project and the predicted future conditions without the project. In undertaking the environmental effects assessment, the proponent will use best available information and methods. All conclusions will be substantiated. Predictions will be based on clearly stated assumptions. The proponent will describe how each assumption has been tested. With respect to quantitative models and predictions, the EIS will document the assumptions that underlie the model, the quality of the data and the degree of certainty of the predictions obtained. Where there are discrepancies in the views of the proponent and Indigenous groups with respect to the outcomes of assessment(s), the EIS will document and provide a rationale for these discrepancies.

4.4. Presentation and organization of the environmental impact statement

To facilitate the identification of the documents submitted and their placement in the Canadian Environmental Assessment Registry, the title page of the EIS and its related documents will contain the following information:

- project name and location;
- title of the document, including the term "environmental impact statement";

- subtitle of the document;
- name of the proponent; and
- date of submission of the EIS.

The EIS will be written in clear, precise language. A glossary defining technical words, acronyms and abbreviations will be included. The EIS will include charts, diagrams, tables, maps and photographs, where appropriate, to clarify the text. Perspective drawings that clearly convey the various components of the project will also be provided. Wherever possible, maps will be presented in common scales and datum to allow for comparison and overlay of mapped features.

For purposes of brevity and to avoid repetition, cross-referencing is preferred. The EIS may make reference to the information that has already been presented in other sections of the document, rather than repeating it. Detailed studies (including all relevant and supporting data and methodologies) will be provided in separate appendices and will be referenced by appendix, section and page in the text of the main document. The EIS will explain how information is organized in the document. This will include a table of content with a list of all tables, figures, and photographs referenced in the text. A complete list of supporting literature and references will also be provided. A table of concordance, which cross references the information presented in the EIS with the information requirements identified in the EIS Guidelines, will be provided. The proponent will provide copies of the EIS and its summary for distribution, including paper and electronic version in an unlocked, searchable PDF format, as directed by the Agency.

4.5. Summary of the environmental impact statement

The proponent will prepare a summary of the EIS in both of Canada's official languages (French and English) to be provided to the Agency at the same time as the EIS that will include the followings:

- a concise description of all key components of the project and related activities;
- a summary of the engagement with Indigenous groups, and the participation of the public and government agencies, including a summary of the issues raised and the proponent's responses;
- an overview of expected changes to the environment;
- an overview of the key environmental effects of the project, as described under section 5 of CEAA 2012, and proposed technically and economically feasible mitigation measures;
- an overview of how factors under paragraph 19(1) of CEAA 2012 were considered;
- the proponent's conclusions on the residual environmental effects of the project, and the significance of those effects, after taking into account the mitigation measures.

The summary is to be provided as a separate document and should be structured as follows:

1. Introduction and EA context
2. Project overview
3. Alternative means of carrying out the project
4. Public participation
5. Engagement with Indigenous Groups
6. Summary of environmental effects assessment for each VC, including:

a. description of the baseline
b. anticipated changes to the environment
c. anticipated effects
d. mitigation measures
e. significance of residual effects

7. Follow-up and monitoring programs proposed

The summary will have sufficient details for the reader to understand the project, any potential environmental effects, proposed mitigation measures, and the significance of the residual effects. The summary will include key maps illustrating the project location and key project components.

Part 2 – Content of the Environmental Impact Statement

1. INTRODUCTION AND OVERVIEW

1.1. The proponent

In the EIS, the proponent will:

- provide contact information (e.g. name, address, phone, fax, email);
- identify itself and the name of the legal entity(ies) that would develop, manage and operate the project;
- describe corporate and management structures;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project; and
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the EIS.

1.2. Project overview

The EIS will describe the project, key project components and associated activities, scheduling details, the timing of each phase of the project and other key features. If the project is part of a larger sequence of projects, the EIS will outline the larger context.

The overview is to identify the key components of the project, rather than providing a detailed description, which will follow in Section 3 below.

1.3. Project location

The EIS will contain a description of the geographical setting in which the project will take place. This description will focus on those aspects of the project and its settings that are important in order to understand the potential environmental effects of the project. The following information will be included:

- the Universal Transverse Mercator (UTM) projection coordinates of the main project site;
- current land use in the area;
- distance of the project facilities and components to any federal lands;
- the environmental significance and value of the geographical setting in which the project will take place and the surrounding area;
- environmentally sensitive areas, such as national, provincial and regional parks, ecological reserves, ecologically and biologically sensitive areas, fishery closure areas, vulnerable marine ecosystems, marine refuge areas, and habitats of federally or provincially listed species at risk and other sensitive areas;
- description of local communities and Indigenous communities; and
- traditional territories and/or consultation areas, treaty lands, Indian Reserve lands.

1.4. Regulatory framework and the role of government

The EIS will identify:

- any federal power, duty or function that may be exercised that would permit the carrying out (in whole or in part) of the project or associated activities;
- legislation and other regulatory approvals that are applicable to the project at the federal, provincial, regional and municipal levels;
- government policies, resource management plans, planning or study initiatives pertinent to the project and/or EA and their implications;
- any treaty, self-government or other agreements between federal or provincial governments and Indigenous groups that are pertinent to the project and/or EA;
- any relevant land use plans, land zoning, or community plans; and
- regional, provincial and/or national objectives, standards or guidelines that have been used by the proponent to assist in the evaluation of any predicted environmental effects.

2. PROJECT JUSTIFICATION AND ALTERNATIVES CONSIDERED

2.1. Purpose of the project

The EIS will describe the purpose of the project by providing the rationale for the project, explaining the background, the problems or opportunities that the project is intended to satisfy and the stated objectives from the perspective of the proponent. If the objectives of the project are related to broader private or public sector policies, plans or programs, this information will also be included.

The EIS will also describe the predicted environmental, economic and social benefits of the project. This information will be considered in assessing the justifiability[2] of any significant adverse residual environmental effects as defined in section 5 of CEAA 2012, if such effects are identified.

2.2. Alternative means of carrying out the project

The EIS will identify and consider the environmental effects of alternative means of carrying out the project that are technically and economically feasible. The proponent will complete the assessment of alternative means in accordance with the Agency's Operational Policy Statement on this topic.

In its alternative means analysis, the proponent will address, at a minimum, the following project components:

- choice of drilling fluid (i.e. water-based drilling mud or synthetic-based drilling mud);
- choice of drilling unit (i.e. drillship or semi-submersible);
- management of drilling wastes (i.e. disposal on seabed or into water column, recover and ship to shore, re-inject);
- water management and location of the final effluent discharge points;

[2] See subsection 52(2) of CEAA 2012.

- alternative ways to light the platform at night (or flare at night when testing the well), to reduce attraction and associated mortality of birds, such as installing flare shields.

The *Offshore Waste Treatment Guidelines*[3] include minimum performance targets for concentrations and volumes of waste material in discharges resulting from offshore exploration and development. Offshore operators are expected to take all reasonable measures to minimize the volumes of waste materials generated by their operations, and to minimize the quantity of substances of potential environmental concern contained within these waste materials. The EIS should include a discussion on how wastes and potential associated toxic substances would be minimized. The proponent should also discuss any alternatives that would enable it to achieve these objectives and adopt best practices in waste management and treatment.

The *Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands*[4] provide a framework for the selection of chemicals in support of offshore operations. The guidelines outline minimum expectations on the selection of lower toxicity chemicals; recognizing that variations to the selection process described in the guidelines may be required in areas where increased risk to the environment has been identified. With the objective of minimizing potential environmental impacts of discharges to the marine environment, the proponent should identify the quantity and type of chemicals (or constituents) that may be used in support of the proposed project that are:

- included on the Canadian Environmental Protection Act's List of Toxic Substances;
- not included on the OSPAR[1] Pose Little or No Risk to the Environment (PLONOR) list of chemicals and have a PARCOM[2] Offshore Chemical Notification Scheme Hazard Rating of A, B or purple, orange, blue, or white; or
- not included on the PLONOR list of chemicals and have not been assigned a PARCOM Offshore Chemical Notification Scheme Hazard Rating.

Alternatives to the use of the above-listed chemicals (e.g. through alternative means of operating or use of less-toxic alternatives) should be discussed in the EIS.

For further information regarding the "purpose of" and "alternative means", please consult the Agency's Operational Policy Statement entitled "*Addressing "Purpose of" and "Alternative Means" under the Canadian Environmental Assessment Act, 2012".*

The Agency recognizes that projects may be in the early planning stages when the EIS is being prepared. Where the proponent has not made final decisions concerning the placement of project infrastructure, the technologies to be used, or that several options may exist for various project components, the proponent shall conduct an environmental effects analysis at the same level of detail for each of the various options available (alternative means) within the EIS.

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[3] National Energy Board, Canada-Nova Scotia Offshore Petroleum Board and Canada-Newfoundland and Labrador Offshore Petroleum Board. *Offshore Waste Treatment Guidelines*. December 2010. Available from: www.cnlopb.ca

[4] National Energy Board, Canada-Nova Scotia Offshore Petroleum Board and Canada-Newfoundland Offshore Petroleum Board. *Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands*. April 2009. Available from: www.cnlopb.ca

[1] Oslo and Paris Commissions

[2] Paris Commission

3. PROJECT DESCRIPTION

3.1. Project components

The EIS will describe the project, by presenting the project components, associated and ancillary works, and other characteristics that will assist in understanding the environmental effects. This will include:

- maps, at an appropriate scale, of the project location;
- project components;
- boundaries of exploration licences 1159 and 1160 with UTM coordinates;
- the major existing infrastructure;
- adjacent land and resource uses; and
- any important environmental features.

If the project is part of a larger sequence of projects, the proponent will outline the larger context and present the relevant references, if available.

In its EIS, the proponent will describe:

- the Mobile Offshore Drilling Unit(s) and their operations (drilling, testing, suspension or abandonment) in locations and water depths under consideration;
- navigation activities (number and frequency of trips), size and types of vessels, anticipated vessel routes and anchorages, predicted percentage of increase in vessel traffic of similar size vessels resulting from the project, icebreaking activities (time of year, frequency, duration, expected start and end dates), and ballast water management
- helicopters, including routes, number and frequency of trips;
- vertical seismic profiling or any other in-water works (e.g. wellsite surveys) to support the specific exploration wells under consideration, but excluding surveys potentially required to support the conduct of the EA (e.g. environmental baseline surveys) and surveys related to the broader delineation of resources;
- well evaluation and testing;
- reagent requirements and uses (e.g. volumes, storage, types);
- petroleum products (e.g. source, volume, storage, types);
- the nature, composition and fate (e.g. areal extent) of drilling wastes (e.g. muds, cuttings) at various water depths and at various stages of drilling, including during riserless drilling and drilling with the marine riser in place, using dispersion modelling;
- the management or disposal of wastes (e.g. type and constituents of waste, quantity, treatment and method of disposal) including:
  - ✓ drilling muds, drill solids;
  - ✓ deck drainage;
  - ✓ cooling water;
  - ✓ bilge and ballast water;
  - ✓ fire control system test water;

- ✓ operational discharges from subsea systems and the installation of subsea systems;
- ✓ sewage and food wastes;
- ✓ well treatment or testing fluids; and
- ✓ other operational discharges.

- contributions to atmospheric emissions, including emissions profile (i.e. type, rate and source) for activities including routine or upset flaring (including the contribution from any produced fluids that may be added to any flares), routine drilling, testing, shipping etc.;
- sources and extent of light, heat and noise;
- transfers of bulk materials (e.g. mud) and fuel;
- number of employees and transportation of employees;
- drinking and industrial water requirements (source, quantity required, need for water treatment);
- energy supply (source, quantity); and
- waste disposal (types of waste, methods of disposal, quantity).

3.2. Project activities

The EIS will include descriptions of the drilling, testing and decommissioning, suspension or abandonment of wells associated with the proposed project.

This will include descriptions of the activities to be carried out during each phase, the location of each activity, expected outputs and an indication of the activity's magnitude and scale. Water depths for potential drill sites will be specified.

Although a complete list of project activities should be provided, the emphasis will be on activities with the greatest potential to have environmental effects. Sufficient information will be included to predict environmental effects and address concerns identified by the public and Indigenous groups. Highlight activities that involve periods of increased environmental disturbance or the release of materials into the environment.

The EIS will include a summary of the changes that have been made to the project since originally proposed, including the benefits of these changes to the environment, Indigenous groups, and the public.

The EIS will include a schedule including time of year, frequency, and duration for all project activities.

The information will include a description of:

3.2.1. Drilling and testing activities

- operation of the Mobile Offshore Drilling Unit(s), including:
  - ✓ drilling at various water depths and in locations under consideration
  - ✓ well flow testing
  - ✓ waste management
  - ✓ water management
- vertical seismic profile surveys;

- flaring, including:
  - ✓ specifics on flare tip used, including type, manufacturer and/or model;
  - ✓ all flaring activities and estimation of flared volumes;
  - ✓ estimation of total greenhouse gas and criteria air contaminants emissions;
  - ✓ an estimate of the contribution of the flaring emissions at the local, provincial and federal scale;
  - ✓ justification for all estimated emissions and emission factors used; and
  - ✓ the estimation or derivation method, and a description of all assumptions and emission factors used;
- well evaluation and testing;
- equipment requirements (type, quantity); and
- storage and management of hazardous materials, fuels and residues.

3.2.2. Supply and servicing

- vessel support, including loading, refuelling and operation of marine support vessels (i.e. for transfer, re-supply and on-site safety during drilling activities); and
- helicopter support (i.e. crew transport and delivery of supplies and equipment).

3.2.3. Decommissioning, suspension or abandonment of wells

- the preliminary outline of a well decommissioning, suspension and abandonment plan for wells at varying water depths.

4. PUBLIC PARTICIPATION AND CONCERNS

The EIS will describe the ongoing and proposed public participation activities that the proponent will undertake or that it has already conducted on the project. It will provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process. The EIS will indicate the methods used, where the consultation was held, the persons and organizations consulted, the concerns voiced and the extent to which this information was incorporated in the design of the project as well as in the EIS. The EIS will provide a summary of key issues raised related to the project and its potential effects to the environment as well as describe any outstanding issues and ways to address them.

5. ENGAGEMENT WITH INDIGENOUS GROUPS AND CONCERNS RAISED

As noted in Part 1, Section 2.3 of these guidelines, the proponent is expected to engage with potentially affected Indigenous groups. For the purposes of developing the EIS, the proponent will engage with Indigenous groups that may be affected by the project, to obtain their views on:

- the project;
- effects of changes to the environment on Aboriginal peoples (health and socio-economic conditions; physical and cultural heritage, including any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and current use of lands and resources for traditional purposes) pursuant to paragraph 5(1)(c) of CEAA 2012, and

- potential adverse impacts of the project on potential or established Aboriginal or Treaty rights, in respect of the Crown's duty to consult, and where appropriate, accommodate Aboriginal peoples.

Aboriginal rights are defined as: practices, traditions and customs integral to the distinctive culture of the Aboriginal group claiming the right that existed prior to contact with the Europeans. In the context of Métis groups, Aboriginal rights means practices, traditions, and customs integral to the distinctive culture of the Métis group that existed prior to effective European control, that is, prior to the time when Europeans effectively established political and legal control in the claimed area. Generally, these rights are fact and site specific. Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) Canada also define Aboriginal title as an Aboriginal right.

In order to allow the Indigenous groups to engage and provide views on the above, the proponent will provide the Indigenous groups with the following timely and relevant:

- opportunities to learn about the project including providing information about the proposed project (including but not limited to project design, location, potential effects, mitigation measures and follow-up and monitoring programs); and
- opportunities to provide input on the overall project; effects of changes to the environment on Aboriginal peoples pursuant to paragraph 5 (1)(c) of CEAA, 2012 and potential adverse impacts of the project on potential or established Aboriginal or Treaty rights.

The proponent will structure its engagement activities to provide adequate time for groups to review and comment on the relevant information. Engagement activities are to be appropriate to the groups' needs, arranged through discussions with the groups and in keeping with established consultation protocols, where available. The EIS will describe all efforts, successful or not, taken to solicit the information required from groups to support the preparation of the EIS. With respect to engagement activities, the EIS will document:

- the engagement activities undertaken with each group prior to the submission of the EIS, including the date and means of engagement (e.g. meeting, mail, telephone);
- document the main issues and comments raised during the engagement activities by each group and the proponent's responses (effort should be made to collating like issues together along VCs identified in the EIS);
- any future planned engagement activities;
- where and how Indigenous groups' perspectives were integrated into and/or contributed to decisions regarding the project, design, operation, decommissioning, suspension abandonment, follow-up and monitoring and associated potential effects (paragraph 5(1)(c)) and the associated mitigation utilized to manage those effects. The effects and mitigation measures should be clearly linked to VCs in the EIS as well as to specific project components or activities; and
- how engagement activities by the proponent allowed groups to understand the project and evaluate its impacts on their communities, activities, potential or established Aboriginal or Treaty rights,. Where impacts are identified, provide a discussion of how those would be managed or mitigated (and provide this information for each Indigenous group separately).

To assist with the provision of records as requested above, the Agency recommends the proponent create a tracking table of key issues raised by each Indigenous group and responses provided by the

Proponent. Information provided related to potential adverse impacts on potential or established Aboriginal or Treaty rights rights will be considered by the Crown in meeting its common law duty to consult obligations.

For the groups listed below, the proponent will ensure they are notified about key steps in the EIS development process and of opportunities to provide comments on key EA documents and/or information to be provided regarding their community. The proponent will ensure these groups are reflected in the baseline information and assessment of potential environmental effects as described under paragraph 5(1)(c) of CEAA 2012 and/or impacts to potential or established section 35 rights, including title and related interest in the EIS. These groups include:

Newfoundland and Labrador

- the Labrador Inuit (Nunatsiavut Government)
- the Labrador Innu (Innu Nation)
- the NunatuKavut Community Council

Nova Scotia

- 11 Mi'kmaq First Nation groups represented by Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO):
  - ✓ Acadia First Nation
  - ✓ Annapolis Valley First Nation
  - ✓ Bear River First Nation
  - ✓ Eskasoni First Nation
  - ✓ Glooscap First Nation
  - ✓ Membertou First Nation
  - ✓ Paqtnkek Mi'kmaw Nation
  - ✓ Pictou Landing First Nation
  - ✓ Potlotek First Nation
  - ✓ Wagmatcook First Nation
  - ✓ Waycobah First Nation
- Millbrook First Nation
- Sipekne'katik First Nation

New Brunswick

- eight Mi'gmaq First Nations groups represented by Mi'gmawe'l Tplu'taqnn Inc. (MTI)
  - ✓ Fort Folly First Nation
  - ✓ Eel Ground First Nation
  - ✓ Pabineau First Nation
  - ✓ Esgenoôpetitj First Nation
  - ✓ Buctouche First Nation
  - ✓ Indian Island First Nation
  - ✓ Eel River Bar First Nation
  - ✓ Metepnagiag Mi'kmaq First Nation
- Elsipogtog First Nation

- six Wolastoqey (Maliseet) First Nation groups represented by Wolastoqey Nation in New Brunswick (WNNB)
  - ✓ Kingsclear First Nation
  - ✓ Madawaska Maliseet First Nation
  - ✓ Oromocto First Nation
  - ✓ Saint Mary's First Nation
  - ✓ Tobique First Nation
  - ✓ Woodstock First Nation
- Peskotomuhkati Nation at Skutik (Passamaquoddy)

Prince Edward Island

- Abegweit First Nation
- Lennox Island First Nation

Quebec

- three Mi'gmaq First Nation groups represented by Mi'gmawei Mawiomi Secretariat (MMS)
  - ✓ Micmas of Gesgapegiag
  - ✓ La Nation Micmac de Gespeg
  - ✓ Listuguj Mi'gmaq Government
- Les Innus de Ekuanitshit
- Innu First Nation of Nutashkuan

The groups referenced above may change as more is understood about the environmental effects of the project and/or if the project or its components change during the EA. The Agency reserves the right to alter the list of groups that the proponent will engage as additional information is gathered during the EA.

In addition, for the purposes of good governance, the proponent should also provide information to and discuss potential environmental effects from the Project, as described under section 5(1)(c) of CEAA 2012, with the Qalipu Mi'kmaq First Nation Band and the Miawpukek First Nation.

Upon receipt of knowledge or information of potential effects or adverse impacts to any Indigenous group, even those not listed above, the proponent shall provide that information to the Agency at the earliest opportunity.

With respect to the effects of changes to the environment on Aboriginal peoples, the assessment requirements are outlined in Part 2, Sections 7.1.8 and Part 2, 7.3.7 of these guidelines. With respect to the assessment requirements are outlined in Part 2, Section 6 of these guidelines.

6. IMPACTS TO POTENTIAL OR ESTABLISHED ABORIGINAL OR TREATY RIGHTS

With respect to potential adverse impacts of the project on potential or established Aboriginal or Treaty rights, the EIS will document for each group identified in Part 2, Section 5 of these guidelines (or in subsequent correspondence from the Agency):

- potential or established Aboriginal or Treaty rights[5], when this information is directly provided by a group to the proponent, the Agency or is available through public records, including but not limited to:
  - ✓ location of the right being practiced or exercised
  - ✓ context in which the right is practiced or exercised (including information about which groups of an Indigenous group practice the right (women, elders, youth), how the right was practiced historically),
  - ✓ how the Indigenous group's cultural traditions, laws and governance systems inform the manner in which they exercise their rights (the who, what, when, how, where and why)
  - ✓ the Indigenous group's perspectives on the importance of the land on which the Project is located and how it intersects with any land management uses and/or plans they may have,
  - ✓ how often the right is practiced or exercised and timing or seasonality of the practice or exercise of the right; and,
  - ✓ maps and data sets (e.g., fish catch numbers);
- potential adverse impacts of each of the project components and physical activities, in all phases, on potential or established Aboriginal or Treaty rights, including those raised by Indigenous groups.
- measures identified to accommodate potential adverse impacts of the project on the potential or established Aboriginal or Treaty rights. These measures will clearly describe how the proponent intends to implement them, and may go beyond mitigation measures that are developed to address potential adverse environmental effects. Include perspectives and specific suggestions raised of potentially impacted Indigenous groups; as well as any views of Indigenous groups on the effectiveness of mitigation measures.
- potential adverse impacts on potential or established Aboriginal or Treaty rights that have not been fully mitigated or accommodated as part of the EA and associated engagement with Indigenous groups. Include perspective of potentially impacted Indigenous groups; and
- potential adverse impacts that may result from the residual and cumulative environmental effects. Include the perspectives of potentially impacted Indigenous groups.

This information and assessment will be informed from engagement with Indigenous groups described in Part 2, Section 5 of these guidelines. The information sources, methodology and findings of the assessment of paragraph 5(1)(c) effects under CEAA 2012 may be used to inform the assessment of potential adverse impacts of the project on potential or established Aboriginal or Treaty rights. However, there may be distinctions between the adverse impacts on potential or established Aboriginal or Treaty rights and paragraph 5(1)(c) effects under CEAA 2012. The proponent will carefully consider the potential distinction between these two aspects and, where there are differences; will include the relevant information in its assessment.

[5] Refer to Crown-Indigenous Relations and Northern Affairs Canada or Indigenous Services Canada for more information.

7. EFFECTS ASSESSMENT

7.1. Project setting and baseline conditions

Based on the scope of the project described in Section 3 (Part 1), the EIS will present baseline information in sufficient detail to enable the identification of how the project could affect the VCs and an analysis of those effects. Should other VCs be identified during the conduct of the EA, the baseline condition for these components will also be described in the EIS. To determine the appropriate spatial boundaries to describe the baseline information, refer to Section 3.2.3 (Part 1) of these guidelines. As a minimum, the EIS will include a description of the following environmental components.

7.1.1. Atmospheric environment

The EIS will describe the atmospheric environment and climate at the project site and within areas that could be affected by routine project operations or accidents and malfunctions, such as:

- ambient air quality in the project area and in the airshed likely to be affected by the project, including consideration of the following contaminants: total suspended particulates (TSP), fine particulates smaller than 2.5 microns ($PM_{2.5}$), respirable particulates of less than 10 microns (PM_{10}), carbon monoxide (CO), sulphur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs), hydrogen sulfide (H2S) and any other potentially toxic air pollutants;
- identify and quantify existing greenhouse gas emissions[6] by individual pollutant measured as kilotonnes of CO_2 equivalent per year in the project study areas;
- direct (e.g. emissions related to vessel traffic) and indirect sources of air emissions;
- current provincial/territorial/federal limits for greenhouse gas emission targets;
- current ambient noise levels in the project area. Information on typical sound sources, geographic extent and temporal variations will be included;
- existing ambient night-time light levels in the project area and at any other areas where project activities could have an effect on light levels. The EIS will describe night-time illumination levels during different weather conditions and seasons; and
- historical records of relevant meteorological information (e.g. total precipitation (rain and snow); mean, maximum and minimum temperatures; and typical wind speed and direction (freezing spray; lighting; and visibility).

Particular attention should also be given to the analysis of extreme meteorological events that have the potential to result in adverse effects on the project (e.g. high wind events).

Relevant marine climate data sources should be consulted, including but not limited to data from Environment and Climate Change Canada moored weather buoys and any offshore platforms operating in the Eastern Newfoundland Strategic Environmental Assessment (SEA) area. Data from the International Comprehensive Atmosphere Ocean Dataset (ICOADS), the United States of America National Oceanographic and Atmospheric Administration (NOAA) database of tropical

[6] Greenhouse gas emissions include: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3).

cyclone activity in the North Atlantic, NOAA's Climate Forecast System Reanalysis (CFSR), and the Canadian Lightning Detection Network.

7.1.2. Marine environment

- marine water quality (e.g. water temperature, turbidity, salinity and pH);
- marine geology and geomorphology (i.e. bottom sediments, including quality, thickness, grain size, and mobility);
- physical oceanography including surface and subsurface current patterns, current velocities, waves, storm surges, long shore drift processes, tidal patterns, and tide gauges levels for the site, in proximity to the site, and along the marine transportation routes with consideration of predicted climate change effects;
- available bathymetric information (e.g. maximum and mean water depths) for the site and along marine transportation routes if applicable;
- ice climate in the regional study area, including ice formation and thickness, ridging, breakup and movement;
- ice conditions along the marine transportation routes with consideration of predicted climate change and its possible effect on the timing of ice formation in the future;
- fast-ice characteristics, including its surface area and seasonal stability and along the marine transportation routes;
- marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton;
- acoustic environment (ambient noise levels from natural sources, shipping, seismic surveys, and other sources), including information on geographic extent and temporal variations and how the acoustic environment may be affected by the project.

When describing the baseline marine environment, relevant data sources such as DFO Research Vessel Surveys/Science Reports and other primary and secondary scientific literature should be consulted. In addition to data sources discussed under Atmospheric Environment and Climate (some of which contain marine data), the proponent should consult MSC50 Wind and Wave Hindcast Data, and long term gridded hourly wind and wave measurements for the North Atlantic.

7.1.3. Fish and fish habitat

The EIS will describe fish and fish habitat within areas that could be affected by routine project operations or by accidents and malfunctions, including:

- a characterization of fish populations on the basis of species and life stage, including information on the surveys carried out (e.g. location of sampling stations, catch methods, date of catches, species, catch per-unit effort) and the source of data available (e.g. government and historical databases, commercial fishing data);
- a description of primary and secondary productivity in affected water bodies with a characterization of season variability; and

- benthic flora and fauna and their associated habitat, including sensitive features such as corals and sponges (Note: a benthic habitat survey (ROV / camera), including transects of seafloor in the area of the well locations, may be required).

Emphasis will be placed on the waters and benthic environments likely to be affected by the project. Hence, for all areas in which effects are anticipated, the EIS will describe the biophysical water and sediment characteristics, including:

- a description of the physical and biological characteristics of the fish and fish habitat likely to be directly or indirectly affected by the project;
- maps, at a suitable scale, indicating the surface area of potential or confirmed fish habitats and a description of these habitats as determined by water depths, type of substrate (sediments), aquatic vegetation, and potential use (i.e. spawning, rearing, nursery, feeding, overwintering, migration routes, etc.). Where appropriate, this information should be linked to water depths (bathymetry) to identify the extent of a water body's littoral / photic zone;
- quality, thickness, grain size and mobility of bottom sediments; and
- a discussion of sea bottom stability at the project site.

Any sampling survey methods used by the proponent will be described in order to allow experts to ensure the quality of the information provided. If previous studies on the habitat in the study area were conducted, they are to be submitted with the EIS.

7.1.4. Migratory birds and their habitat[7]

The EIS will describe migratory and non-migratory birds and their habitat at the project site and within areas that could be affected by routine project operations or accidents and malfunctions.

Migratory birds are protected under the *Migratory Bird Protection Act* (MBCA) and associated regulations. Preliminary data from existing sources will be gathered, including information such as:

- birds and their habitats that are found or are likely to be found in the study area. This description may be based on existing sources, but supporting evidence is required to demonstrate that the data used are representative of the avifauna and habitats found in the study area. The existing data must be supplemented by surveys, if required.
- abundance, distribution, and life stages of migratory and non-migratory birds likely to be affected in the project area based on existing information, or surveys, as appropriate, to provide current field data;
- year-round migratory bird use of the area (e.g. winter, spring migration, breeding season, fall migration), based on preliminary data from existing sources and surveys to provide current field data if appropriate; and
- areas of concentration of migratory birds, such as for breeding, feeding or resting.

[7] Surveys should be designed in light of the available references and recommendations in Environment and Climate Change Canada's document entitled "*Guidance for the Preparation of an Environmental Impact Statement and Useful References*" (2016) (available from the Department of Environment and Climate Change Canada), and in the Canadian Wildlife Service's Technical Report No. 508, *A Framework for the Scientific Assessment of Potential Project Impacts on Birds* (Hanson et al. 2009). Appendix 3 of the Framework provides examples of project types and recommended techniques for assessing impacts on migratory birds.

Other relevant datasets should be consulted, such as those available from the Canadian Wildlife Service (e.g. Eastern Canadian Seabirds at Sea (ECSAS), Programme intégré de recherches sur les oiseaux pélagiques (PIROP)), the Atlantic Canada Conservation Data Centre (ACCDC), recovery strategies, management plans, Newfoundland and Labrador Department of Fisheries and Land Resources Wildlife Division, previous petroleum operations in the area and university or other research programs, if available.

7.1.5. Species at Risk

The EIS will describe federal species at risk and their habitat, including critical habitat, at the project site and within areas that could be affected by routine project operations or accidents and malfunctions, such as:

- a list of all potential or known federally listed species at risk that may be affected by the project, using existing data and literature as well as surveys to provide current field data;
- a list of all federal species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing on Schedule 1 of the Species at Risk Act. This will include those species in the risk categories of extirpated, endangered, threatened and of special concern[8];
- any published studies that describe the regional importance, abundance and distribution of species at risk including recovery management plans, recovery strategies and action plans. The existing data must be supplemented by surveys, if required;
- residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified critical habitat and/or recovery habitat (where applicable) and general life history of species at risk that may occur in the project area, or be affected by the project; and
- identification of any potentially affected critical habitat as defined in the Species at Risk Act.

The following information sources on species at risk and species of conservation concern should be among those consulted:

- Species at Risk Act Registry (www.sararegistry.gc.ca);
- COSEWIC;
- Relevant government agencies;
- Local naturalist and interest groups; and
- Indigenous groups and First Nations.

7.1.6. Marine mammals

- *marine mammal species that may be present, the times of year they are present, the ranges of the species and their migration patterns; and*

[8] Proponents are encouraged to consult COSEWIC's latest annual report for a listing of the designated wildlife species posted on their website

- *important areas in the vicinity of the drilling sites or supply routes (e.g. for mating, breeding, feeding and nursing of young) or that could be impacted by the project (e.g. acoustics, spills, etc.)*

Relevant datasets should be consulted, such as DFO marine mammal sightings database, DFO Research Vessel Surveys, Scientific Reports, and other primary and secondary scientific literature.

7.1.7. Marine turtles

- *marine turtle species that may be present, the times of year they are present, the ranges of the species and their migration patterns; and*
- *important areas in the vicinity of the drilling sites or supply routes (e.g. for mating, breeding, and feeding) or that could be impacted by the project (e.g. routine discharges, spills, etc.)*

7.1.8. Indigenous peoples

The proponent shall gather and document baseline information in the EIS for each Indigenous group identified in Part 2, Section 5 of these guidelines (and any groups identified after these guidelines are finalized). The baseline information will:

- Describe and characterize the elements in paragraph 5(1)(c) of CEAA 2012 based on the spatial and temporal scope selected for the EA according to the factors outlined in Part 1, Section 3.2.3 of this document.
- Characterize the regional context of each of the elements of paragraph 5(1)(c) of CEAA 2012 to support the assessment of project related effects, including consideration of the differences of experiences by sub-populations within an Indigenous group, as appropriate (for example, women, youth, elders, families) and cumulative effects.
- Be sufficient to provide a comprehensive understanding of the current state of each VC related to effects of changes to the environment on Aboriginal peoples. Each of the VCs for effects of changes to the environment on Aboriginal peoples is interrelated and therefore baseline information will often overlap.

The proponent should engage with Indigenous groups to understand where baseline information and the respective assessment fit appropriately. Note: VCs identified for biophysical assessment (such as fish and fish habitat) may contribute to assessment and conclusion of VCs related to effects of changes to the environment on Aboriginal peoples.

Health and Socio-Economic Conditions

Baseline information is required for health[9] and socio-economic conditions. For health this includes the state of physical, mental and social well-being. For socio-economic conditions, as well as the economic and social activities of an individual Indigenous group, the baseline will include contextual information regarding their practices. Specific aspects that will be considered include:

- general information about Indigenous populations and sub-populations;

[9] The proponent should refer to Health Canada's guidance documents in order to include the appropriate baseline information relevant to human health.

- consumption of country foods (also known as traditional foods) including food that is trapped, fished, or hunted for subsistence or medicinal purposes, outside of the commercial food chain;
- which country foods are consumed by which groups, how frequently, and where these country foods are harvested;
- commercial activities (e.g. fishing, trapping, hunting, outfitting);
- any project components and a description of any activities (e.g. exclusion zones) that may affect commercial fisheries or other uses;
- human health, primarily with respect to potential contamination of food sources; and
- recreational uses.

Physical and Cultural Heritage

Baseline information for physical and cultural heritage (including any site, structure or thing of archaeological, paleontological, historical or architectural significance) will consider all elements of cultural and historical importance to Indigenous groups in the area and is not restricted to artifacts considered under provincial heritage legislative requirements.

Current Use of Lands and Resources for Traditional Purposes[10]

Baseline information for current use of lands and resources for traditional purposes will focus on the traditional activity (e.g. hunting, fishing) and include a characterization of all attributes of the activity that can be affected by environmental change. This includes understanding of the baseline conditions of the quality and quantity of resources (e.g. preferred species and perception of quality, cultural connections to species), access to resources (e.g. physical access, timing, seasonality, distance from community) and overall quality of the experience of the practice (e.g. noise, air quality, visual landscape and presence of others). Specific aspects that will be considered include, but are not limited to:

- location of traditional territory (including maps where available);
- location of reserves and communities;
- commercial and traditional fishing activity within the project's potential zone of influence, including licences and maps;
- fish, wildlife, birds, plants or other natural resources and their habitats of importance for traditional use;
- places where fish, wildlife, birds, plants or other natural resources are harvested, including places that are preferred;
- access and travel routes for conducting traditional practices;
- frequency, duration or timing of traditional practices;
- cultural values associated with the area affected by the project and the traditional uses identified;

[10] The proponent should refer to CEAA's guidance documents related to current use of lands and resources for traditional purposes in order to include the appropriate baseline information relevant to current use.

- other current uses identified by Indigenous groups.

Any other baseline information that supports the analysis of predicted effects on Indigenous peoples will be included as necessary.

The EIS will also indicate how input, including Indigenous knowledge, from groups was used in establishing the baseline conditions related to health and socio-economics, physical and cultural heritage and current use of lands and resources for traditional purposes. Information collected as part of Section 6 Aboriginal and Treaty rights can be used to inform the baseline information for the elements of 5(1)(c) listed above.

Should there be a lack of Indigenous knowledge; the proponent is still expected to seek information from other sources sufficient enough to allow for a complete the assessment of effects to be presented in the EIS. For more information on requirements for the effects assessment, see Part 2, Section 7.3.7 of these guidelines.

7.1.9. Other changes to the environment arising as a result of a federal decision or due to changes on federal lands, in another province or outside Canada

Should there be the potential for a change to the environment arising as a result of a federal decision(s), or on federal lands, lands in another province or lands outside Canada, the EIS will include baseline information on the environmental component likely to be affected (if this information is not already covered in other subsections of these guidelines).

7.1.9.1. Special areas

The EIS will describe special areas (e.g. marine refuges, species at risk critical habitat that has been designated and that has been proposed or that may be under consideration, Important Bird Areas, Migratory Bird Sanctuaries, ecological reserves, etc.) at the project site and within areas that could be affected by routine project operations or accidents and malfunctions, such as:

- Marine Protected Areas
- Ecologically and Biologically Significant Areas
- Fishery Closure Areas
- Vulnerable Marine Ecosystem
- Preliminary Representative Marine Areas

The EIS will describe the distances between the edge of the project area (i.e. drill sites and marine transportation routes) and special areas. It shall state the rationale for designating specific areas as “special” (i.e. the environmental features that define the special area).

7.1.9.2. Human environment

With respect to potential effects on the human environment, non-Indigenous people and the related VC baseline information will describe and characterize the following that could be affected by routine project operations or accidents and malfunctions. At a minimum, this should include:

- any federal lands, lands located outside the province or Canada that may be affected by the project operations or by accidents and malfunctions;

- the current and historical use of waters that may be affected by routine project operations or by accidents and malfunctions, including:
    - current commercial and recreational fishing activity, including licence holders and species fished;
    - other ocean uses (e.g. shipping, research, oil and gas, military, ocean infrastructure [e.g. subsea cable]);
- the location of and proximity of any permanent, seasonal or temporary residences or camps that could be affected by routine project operations or accidents and malfunctions;
- health[11] and socio-economic conditions that could be affected by routine project operations or accidents and malfunctions, including the functioning and health of the socio-economic environment, encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities;
- physical and cultural heritage, including structures, sites or things of historical, archaeological, paleontological or architectural significance that could be affected by routine project operations or accidents and malfunctions;
- the rural and urban settings that could be affected by routine project activities or accidents and malfunctions; and
- any project components and activities (e.g. exclusion zones) that may affect commercial or recreational fisheries or other uses.

The EIS should also discuss the potential to encounter unexploded ordnance (UXOs), based on consultation with the Department of National Defence.

7.2. Predicted changes to the physical environment

The EA will include a consideration of the predicted changes to the environment as a result of the project being carried out or as a result of any powers, duties or functions that are to be exercised by the federal government in relation to the project. These predicted changes to the environment are to be considered in relation to each phase of the project (e.g. drilling, testing, decommissioning, suspension, abandonment) and are to be described in terms of the magnitude, geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible. As changes to various parts of the physical environment may be inter-related as part of an ecosystem, the EIS will explain and describe the connections between the changes described.

7.3. Predicted effects on valued components

Based on the predicted changes to the environment identified in Section 6.2, the proponent is to assess the environmental effects of the project on the following VCs. All interconnections between VCs and between changes to multiple VCs will be described:

[11] The proponent should refer to Health Canada's guidance documents in order to include the appropriate baseline information relevant to human health

7.3.1. Fish and fish habitat

- the identification of any potential adverse effects to fish and fish habitat as defined in subsection 2(1) of the *Fisheries Act*, including the calculations of any potential habitat loss (temporary or permanent) in terms of surface areas (e.g. spawning grounds, fry-rearing areas, feeding). The assessment will include a consideration of:
  - ✓ effects on water quality including changes to chemical composition, temperature, oceanographic conditions, etc.;
  - ✓ the geomorphological changes and their effects on hydrodynamic conditions and fish habitats (e.g. modification of benthic habitat including corals and sensitive habitat, area affected by drilling waste, disturbance to water column);
  - ✓ the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, juvenile, rearing, and feeding, movements);
  - ✓ any potential imbalances in the food web in relation to baseline conditions;
  - ✓ underwater noise and vibration emissions from project activities (i.e. drilling, vertical seismic profiling, offshore supply vessel operation, well abandonment) and how it may affect fish health and behaviour; and
  - ✓ effects on the primary and secondary productivity of water bodies and how project-related effects may affect fish food sources.
- the effects of changes to the aquatic environment on fish and their habitat, including:
  - ✓ the anticipated changes in the composition and characteristics of the populations of various fish species, including shellfish and forage fish including mortality of fish, eggs and larvae;
  - ✓ any modifications in migration or local movements during and after project activities (e.g. vertical seismic profiling, drilling); and
  - ✓ any modifications and use of habitats by federally or provincially listed fish species at risk.
- a discussion of the effects of drilling waste disposal on fish health, marine benthos (fish habitat) and other components of the aquatic environment, recognizing that the disposal of these wastes is expected to be a primary cause of effect on benthos;
- a discussion of the length of time it would take for the benthic environment to return to baseline conditions in water depths within which the Project would occur;
- a discussion of how project timing correlates to key fisheries windows and any potential effects resulting from overlapping periods; and
- a discussion of how data examining the deposition of drilling-related wastes (e.g. fluid, mud residues, cuttings) and acoustic monitoring data could be collected during and after drilling operations and how this would be used to verify effects predictions.

7.3.2. Marine plants

- effects on marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton.

7.3.3. Marine mammals

- *effects on marine mammals, including but not limited to*:

- ✓ mortality and other effects from vessel collisions or disturbance;
- ✓ direct and indirect effects caused by increased disturbance (e.g. noise, light, vibrations) including mortality, physical injury and behavioural changes (e.g. habitat avoidance, disruption to feeding behaviour, deviation in migration routes, communication masking, and behavioural disturbance);
- ✓ exposure to spilled contaminants (e.g. fuel, oils) and operational discharges (e.g. deck drainage, gray water, black water); and
- ✓ change in marine habitat quality from drill muds and cuttings and sedimentation.

7.3.4. Marine turtles

- *effects on marine turtles, including but not limited to*:
  - ✓ mortality and other effects from vessel collisions or disturbance;
  - ✓ direct and indirect effects caused by increased disturbance (e.g. noise, light, vibrations) including mortality, physical injury and behavioural changes (e.g. habitat avoidance, disruption to feeding behaviour, deviation in migration routes, communication masking, and behavioural disturbance);
  - ✓ exposure to spilled contaminants (e.g. fuel, oils) and operational discharges (e.g. deck drainage, grey water, black water); and
  - ✓ change in marine habitat quality from drill muds and cuttings and sedimentation.

7.3.5. Migratory birds

- direct and indirect adverse effects on migratory birds, including population level effects that could be caused by project activities, including, but not limited to:
  - ✓ noise disturbance from seismic equipment including both direct effects (physiological), or indirect effects (foraging behaviour of prey species);
  - ✓ physical displacement as a result of vessel presence (e.g. disruption of foraging activities);
  - ✓ night-time illumination levels from lights and flares during different weather conditions and seasons and during different project activities (e.g. drilling, well testing) and associated nocturnal disturbance (e.g. increased opportunities for predators, attraction to the drilling unit and vessels and subsequent collision or exposure to vessel-based activities, incineration in flares, disruption of normal activities);
  - ✓ exposure to spilled contaminants (e.g. fuel, oils) and operational discharges (e.g. deck drainage, grey water, black water);
  - ✓ attraction of, and increase in, predator species as a result of waste disposal practices (i.e. sanitary and food waste) and the presence of incapacitated/dead prey near the Mobile Offshore Drilling Unit(s) or support vessels;
  - ✓ physical harm or mortality from flaring on the drilling unit or other vessel-based activities;
  - ✓ collision risk with the drilling unit and other project infrastructure;
  - ✓ the effects of oil spills in the nearshore or that reach land, on landbird species;
  - ✓ change in marine habitat quality from drill muds and cuttings and sedimentation; and
  - ✓ indirect effects caused by increased disturbance (e.g. noise, light, presence of workers), relative abundance movements and changes in migratory bird habitat.

7.3.6. Species at risk

- the potential adverse effects of the project on federally-listed species at risk and those species listed by the Committee on the Status of Endangered Wildlife in Canada classified as extirpated, endangered, threatened or of special concern (flora and fauna) and their critical habitat, including:
  - ✓ alteration of habitat (including critical habitat) features;
  - ✓ direct and indirect effects from noise, vibrations and increased exposure to contaminants of concern;
  - ✓ a discussion of migration patterns of federal species at risk and related effects (e.g. displacement, increased risk of collision); and
  - ✓ direct and indirect effects on the survival or recovery of federally listed species (list species).

7.3.7. Indigenous peoples

With respect to Indigenous peoples, a description and analysis, for each Indigenous group, of how changes to the environment caused by the project will affect the health and socio-economic conditions, physical and cultural heritage including any structure, site or thing of historical, archaeological or paleontological importance, and current use of lands and resources for traditional purposes.

Health and Socio-Economic Conditions

Baseline information gathered as part of the assessment of effects described in 5(1)(c) of CEAA 2012, as well as general information about Indigenous populations and sub-populations could inform the assessment of human health.

- The assessment of impacts to human health will be based on effects of changes to the environment on Aboriginal peoples' human health, focusing on effects on health outcomes or risks in consideration of, but not limited to, potential changes in noise exposure, current and future availability of country foods (e.g. marine species), and water quality (recreational and cultural uses).
- When risks to human health due to changes in one or more of these components are predicted, the proponent is expected to complete a Human Health Risk Assessment (HHRA) examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health.
- The proponent must provide a justification if it determines that an assessment of the potential for contamination of country foods is not required or if some contaminants are excluded from the assessment.
- Consider effects to mental and social well-being of Indigenous peoples. Where adverse health effects are predicted, any incidental effects such as effects on current use of lands and resources for traditional purposes should also be assessed.
- Consider and document how effects of changes to the environment could be different for particular sub-populations within an Indigenous group (for example, women, youth, elders, specific families);

- This assessment of impacts to human health will assess effects of changes to the environment on Indigenous peoples' socio-economic conditions, including, but not limited to:
  - ✓ the use of navigable waters (including any water used for Indigenous transport)
  - ✓ commercial fishing, hunting, and trapping activities
  - ✓ commercial outfitters
  - ✓ recreational use
  - ✓ food security[12]
  - ✓ income inequity
  - ✓ changes at the community level that affect socio-economic conditions for Indigenous peoples as result of increased population, economic activity, cost of living, among other factors
  - ✓ non-commercial / trade economy

Physical and Cultural Heritage

- This assessment will assess effects of changes to the environment on Aboriginal peoples' physical and cultural heritage, and structures, sites or things of historical, archaeological, paleontological or architectural significance to groups, including, but not limited to:
  - ✓ the loss or destruction of physical and cultural heritage
  - ✓ changes to access to physical and cultural heritage
  - ✓ changes to the cultural value or importance associated with physical and cultural heritage
  - ✓ changes to sacred, ceremonial or culturally important places, objects, or things

Current Use of Lands and Resources for Traditional Purposes

- This assessment will characterize the effects (including cumulative effects) on the use or activity (e.g. hunting, fishing, trapping, and cultural practices) as a result of the underlying changes to the environment (i.e. how will the activity change if the project proceeds), using the approach described in the Agency's guide entitled Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA 2012. This assessment should consider changes caused by the Project through changes to the environment, can cause effects to the practice of a current use or activity through the following interactions with:
  - ✓ Resources used, such as changes to the quantity, quality, and availability of resources and habitat, as well as to the sufficiency of resources required to conduct an activity or practice, including perception of effects, avoidance, and consideration of the seasonal round;
  - ✓ any changes or alterations to access into the areas used for traditional purposes and commercial fishing, including implementation of exclusion zones;
  - ✓ effects on food, social, ceremonial, and commercial fishing;
  - ✓ a discussion of how drilling activities correlates to key fisheries windows, and any potential impacts resulting from overlapping periods; and

[12] According to Health Canada and the Food and Agricultural Organisation "food security" is "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".

- ✓ Experience by Indigenous peoples, including changes that affect the spiritual and cultural experiences of the activity or practice, as well as sense of place and wellbeing, and the applicability and transmission of Indigenous knowledge, laws, customs and traditions.

- Using the interactions listed in the above bullet, the proponent should also consider the following in their assessments:
  - ✓ the cultural value or importance associated with traditional uses or areas affected by the project (e.g. values or attributes of the area that make it important as a place for inter-generational teaching of language or traditional practices, communal gatherings, integrity of preferred traditional practice areas);
  - ✓ how timing of project activities (e.g. drilling, flaring) have the potential to interact with the timing of traditional practices, and any potential effects resulting from overlapping periods;
  - ✓ any changes to environmental quality (e.g. air, water), the sensory environment (e.g. noise, light, visual landscape), or perceived disturbance of the environment (e.g. fear of contamination of water or country foods) that could detract from use of the area or lead to avoidance of the area; and
  - ✓ an assessment of the potential to return affected areas to pre-project conditions to support traditional practices.

- Other effects of changes to the environment on groups should be reflected as necessary.

The proponent is expected to provide mitigation measures for effects of changes to the environment on Aboriginal peoples pursuant to section 5 (1)(c) of CEAA, 2012 (see Part 2, Section 7.4. of these guidelines).

7.3.8. Other valued components that may be affected as a result of a federal decision or due to effects on federal lands, another province or outside Canada

If there is the potential for a change to the environment arising as a result of a federal decision(s), for example an authorization under section 138(1) of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* or section 35 of the *Fisheries Act*, the EIS should include a description of the specific project components for which a federal authorization/decision is required, and an assessment of any other VCs (not already covered in other subsections of these guidelines) that may be affected by the changes to the environment caused by these specific project components. If there is the potential for the project to result in environmental changes on federal lands (or waters), another province, or another country, then VCs of importance not already identified should be included. For example, if the project will result in the generation of greenhouse gas emissions, the EIS should include a description of the project's greenhouse gas emissions in a regional, provincial, national or international context if applicable. Suggested VCs are noted below for this project.

7.3.8.1. Air quality and greenhouse gas emissions

- comparison of anticipated air quality concentration against the Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter or other relevant federal and/or provincial criteria for other contaminants of potential concern;
- description of all methods and practices (e.g. control equipment) that will be implemented to minimize and control atmospheric emissions throughout the project life cycle. If the best

available technologies are not included in the project design, the proponent will need to provide a rationale for the technologies selected;

- an estimate of the direct greenhouse gas emissions associated with all phases of the project (i.e. including drilling, well testing and vessel and helicopter transportation) as well as any mitigation measures proposed to minimize greenhouse gas emissions. This information is to be presented by individual pollutant and should also be summarized in CO_2 equivalent per year. The proponent is responsible for the following:
  - ✓ provide an estimate of the contribution of the project emissions at the local, provincial and federal scale, and indicate the category into which the project falls in terms of the relative magnitude of its contribution to greenhouse gas emissions (project with low, medium or high emission rates);
  - ✓ provide the estimation or derivation method, and disclose, describe, and justify assumptions and emission intensity factors used;
  - ✓ compare and assess the level of estimated emissions to the regional, provincial and federal emission targets; and
  - ✓ provide information related to the project's electrical demand and sources of electrical power for equipment, i.e. the project's main source and any other additional sources (generators, etc.), as appropriate.
- changes in ambient noise levels; and
- changes in night-time light levels.

7.3.8.2. Commercial Fisheries

- effects of changes to the environment on commercial fishing activities (e.g. effects on fished species affecting fisheries success, displacement from fishing areas (e.g. exclusion zones), gear loss or damage);
- a discussion of how drilling activities correlates to key commercial fisheries windows, and any potential impacts resulting from overlapping periods;
- effects from subsea infrastructure that could be left in place (e.g. wellheads) following abandonment; and
- changes to habitat of commercial fish species (e.g. noise, water and sediment quality).

7.3.8.3. Special areas

- effects on special areas, including, but not limited to:
  - ✓ use of dispersants;
  - ✓ change to habitat quality (e.g. noise, light, water, sediment quality); and
  - ✓ change to the environmental features that define the special area (e.g. physical features, species assemblages, species abundance).

7.3.8.4. Human environment

- effects of changes to the environment on health and socio-economic conditions, physical and cultural heritage and any structure, site or thing that is of historical, archaeological, paleontological, or architectural value, including, but not limited to the following, as applicable:

- ✓ recreational activities;
- ✓ other ocean uses;
- ✓ socio-economic conditions;
- ✓ human health;
- ✓ physical and cultural heritage (e.g. shipwrecks); and
- ✓ rural and urban settings that could be affected by routine activities and/or accidents and malfunctions.

7.4. Mitigation measures

Every EA conducted under CEAA 2012 will consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project. Under CEAA 2012, mitigation measures includes measures to eliminate, reduce or control the adverse environmental effects of a designated project, as well as restitution for damage to the environment through replacement, restoration, compensation or other means. Measures will be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. Mitigation measures may be considered for inclusion as conditions in the EA decision statement and/or in other compliance and enforcement mechanisms provided by other authorities' permitting or licensing processes.

As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the project or relocation of project components.

The EIS will describe the standard mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location. The EIS will then describe the project's environmental protection plan and its environmental management system, through which the proponent will deliver this plan. The plan will provide an overall perspective on how potentially adverse effects would be minimized and managed over time. The EIS will further discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The EIS will then describe mitigation measures that are specific to each environmental effect identified. Mitigation measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation measure is designed to address. The EIS will identify and describe mitigation measures to avoid, or lessen potential adverse effects on species and/or critical habitat listed under the *Species at Risk Act*. These measures will be consistent with any applicable recovery strategy and action plans. The EIS will also identify and describe mitigation measures to avoid or lessen adverse effects on listed COSEWIC species.

The EIS will specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the project's various phases to eliminate or reduce the significance of adverse effects. The EIS will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The reasons for determining if the mitigation measure reduces the significance of an adverse effect will be made explicit. The proponent is also encouraged to identify mitigation measures for effects that are adverse although not significant.

The EIS will indicate what other technically and economically feasible mitigation measures were considered, and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation measures will be justified. The EIS will identify who is responsible for the implementation of these measures and the system of accountability.

Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective will be clearly and concisely described. In addition, the EIS will identify the extent to which technological innovations will help mitigate environmental effects. Where possible, it will provide detailed information on the nature of these measures, their implementation, management and the requirements of the follow-up program.

The EIS will document specific suggestions raise by each Indigenous group for mitigating the effects of changes to the environment on Aboriginal peoples (section 5(1)(c) of CEAA 2012*).* For those mitigation measures intended to address effects of changes to the environment on Aboriginal peoples, the proponent must discuss the residual effects with the Indigenous groups identified in Part 2, Section 5 of these guidelines prior to submitting the EIS.

Adaptive management is not considered as a mitigation measure, but if the follow-up program (refer to Section 8 below) indicates that corrective action is required, the proposed approach for managing the action should be identified.

7.5. Significance of residual effects

After having established the technically and economically feasible mitigation measures, the EIS will present any residual environmental effects of the project on the VCs identified in Section 7.3 above. For those VCs related to effects of changes to the environment on Aboriginal peoples, the proponent must discuss the residual effects with the Indigenous groups identified in Part 2, Section 7 of these guidelines prior to submitting the EIS. The residual effects, even if very small or deemed insignificant, will be described.

The EIS will then provide a detailed analysis of the significance of the residual environmental effects that are considered adverse following the implementation of mitigation measures, using the Agency's guidance on determining whether a project is likely to cause significant adverse environmental effects.

The EIS will identify the criteria used to assign significance ratings to any predicted adverse effects. It will contain clear and sufficient information to enable the Agency, technical and regulatory agencies, Indigenous groups, and the public to review the proponent's analysis of the significance of effects. For those predicted adverse effects that relate to effects of the changes to the environment on Aboriginal peoples, the proponent will consider the views of the Indigenous groups in the determination of the definitions of the significance criteria. The EIS will document the terms used to describe the level of significance.

The following criteria should be used in determining the significance of residual effects:

- magnitude
- geographic extent
- timing
- duration

- frequency
- reversibility
- ecological and social context[13]
- existence of environmental standards, guidelines or objectives for assessing the effect

In assessing significance against these criteria the proponent will, where possible, use relevant existing regulatory documents, environmental standards, guidelines, or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous agents into the environment. The EIS will contain a section which explains the assumptions, definitions and limits to the criteria mentioned above in order to maintain consistency between the effects on each VC.

Where significant adverse effects are identified, the EIS will set out the probability (likelihood) that they will occur, and describe the degree of scientific uncertainty related to the data and methods used within the framework of this environmental analysis.

7.6. Other effects to consider

7.6.1. Effects of potential accidents or malfunctions

The failure of certain works caused by equipment malfunctions, human error or exceptional natural events (e.g. earthquake, hurricane, submarine landslide) could cause adverse environmental effects. The proponent will therefore conduct an analysis of the risks of accidents and malfunctions, determine their effects, and present preliminary emergency response measures.

Taking into account the lifespan of different project components, the proponent will identify the probability of potential accidents and malfunctions related to the project, including an explanation of how those events were identified, potential consequences (including the environmental effects as defined in section 5 of CEAA 2012), the plausible worst case scenarios and the effects of these scenarios.

This assessment will include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events and would potentially result in an adverse environmental effect as defined in section 5 of CEAA 2012.

The EIS will describe the safeguards that have been established to protect against such occurrences and the contingency and emergency response procedures that would be put in place if such events do occur.

Of particular concern with exploration drilling in the marine environment is the potential for accidental spills. This includes both low-probability, large-scale events (e.g. blowouts, either surface, sub-sea or underground) and relatively smaller-volume spills that may occur more frequently. These incidents may affect, among other things, the health and survival of plankton, fish eggs and larvae, juvenile and adult fish, marine mammals, marine birds, marine turtles, and marine invertebrates in the affected area, which may include special areas and areas of high ecological significance. Fishing activity,

[13] The ecological and social context within which potential environmental effects may occur should be taken into account when considering the key criteria above in relation to a particular VC, as the context may help better characterize whether adverse effects are significant.

including fishing by Indigenous peoples, and the commercial marketability of seafood products harvested in the Newfoundland and Labrador offshore may also be adversely affected by a spill or blowout. The effects of accidental spills and blowouts will therefore require assessment in the EIS, including fate and behaviour modelling, and hydrologic trajectory modelling for worst-case large-scale spill scenarios that may occur, including any assumptions, limitations, and formulated hypotheses, accompanied by supporting documentation of methodologies and the cumulative results of the modelling. Results should be reported in a manner that illustrates the effects of varying weather and oceanographic conditions that may occur throughout the year, and should include a projection for spills originating at the site and followed until the slick volume is reduced to a negligible amount or until a shoreline is reached. Spill scenarios should also consider potential worst–cases, including when species at risk and high concentrations of marine birds or fish are present or for areas important for reproduction. A discussion on water depth and its effect on blow-out rate and spill trajectory modelling assumptions must be provided. Where well locations have not yet been identified, points of origin selected for spill trajectory models should be conservative (e.g. selecting a potential location within the proposed drilling area that is closest to a sensitive feature or that could result in greatest effects).

Based on the results of the spill modelling and analysis in the EIS, an emergency response plan (e.g. oil spill contingency plan) for spills (small and large) and blowouts will be required. At a minimum, an outline of the emergency response plan along with key commitments is required in the EIS. Depending on the outcomes of the effects analysis, specific detail on key components of the plan will be required in the EIS. The proponent should commit to finalizing the plan in consultation with regulators prior to the application of permits. The EIS shall include a discussion on the use, availability (including nearest location), timing (testing and mobilizing) and feasibility of a capping stack to stop a blowout and resultant spills. If dispersants are to be used, the proponent shall consider associated environmental effects in the EIS (e.g. effects on marine life) and provide a plan for their use. The environmental effects of other measures outlined in the emergency response plan should also be considered (e.g. effects from in-situ burning). The EIS shall include the means by which design and/or operational procedures, including follow-up measures, will be implemented to mitigate significant adverse effects from malfunctions and/or accidental events.

The potential to encounter shallow gas pockets, and associated implications, should also be discussed.

The EIS should also consider effects of accidents in the near-shore environment (e.g. spills and ship groundings, as applicable) and of spills reaching shore; including effects on species at risk and their critical habitat, colonial nesters and concentrations of birds, and their habitat. The proponent will also demonstrate what long-term actions it would be prepared to undertake to remediate spill-affected lands and waters.

The EIS should include a summarization of the nature, extent and magnitude of spills, and accidental releases related to existing production installations and past exploration drilling programs in Atlantic Canada.

Comparisons with similar settings would also be meaningful for deep water drilling where there is very low probability but very high consequences associated with landslides.

7.6.2. Effects of the environment on the project

The EIS will take into account how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events (e.g. icebergs, seismic events and submarine landslide potential), could adversely affect the project and how this in turn could result in effects to the environment (e.g. extreme environmental conditions result in malfunctions and accidental events). These events will be considered in different probability patterns (e.g. 5-year flood vs. 100-year flood).

The EIS will provide details of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the project.

7.6.3. Cumulative effects assessment

The proponent will identify and assess the project's cumulative effects using the approach described in the Agency's guidance documents related to cumulative environmental effects.

Cumulative effects are defined as changes to the environment due to the project combined with the existence of other past, present and reasonably foreseeable physical activities. Cumulative effects may result if:

- the implementation of the project may cause direct residual adverse effects on the VC, taking into account the application of technically and economically feasible mitigation measures; and,
- the same VC may be affected by other past, present and future physical activities[14].

VCs that would not be affected by the project or would be affected positively by the project can, therefore, be omitted from the cumulative effects assessment. A cumulative effect on an environmental component may, however, be important even if the assessment of the project's effects on this component reveals that the effects of the project are minor.

In its EIS, the proponent will:

- identify and provide a rationale for the VCs that will constitute the focus of the cumulative effects assessment, focussing the cumulative effects assessment on the VCs most likely to be affected by the project and other project and activities. To this end, the proponent must consider, without limiting itself thereto, the following components likely to be affected by the project:
  - ✓ fish and fish habitat,
  - ✓ migratory birds,
  - ✓ marine mammals and marine turtles,
  - ✓ species at risk,
  - ✓ marine plants,
  - ✓ special areas,
  - ✓ commercial fisheries,

[14] Definitions of these terms can be found in the Agency's technical guidance on cumulative environmental effects.

- ✓ Indigenous peoples,
- ✓ air quality and greenhouse gases, and
- ✓ human environment

- identify and justify the spatial and temporal boundaries for the cumulative effects assessment for each VC selected. The boundaries for the cumulative effects assessments will generally be different for each VC considered. These cumulative effects boundaries will also generally be larger than the boundaries for the corresponding project effects;
- identify the sources of potential cumulative effects. Specify other projects or activities that have been or that are likely to be carried out that could cause effects on each selected VC within the boundaries defined, and whose effects would act in combination with the residual effects of the project. This assessment may consider the results of any relevant study conducted by a committee established under section 73 or 74 of CEAA 2012.
- assess the cumulative effects on each VC selected by comparing the future scenario with the project and without the project. Effects of past activities (activities that have been carried out) will be used to contextualize the current state of the VC. In assessing the cumulative effects on current use of lands and resources for traditional purposes, the assessment will focus on the cumulative effects on the relevant activity (e.g. hunting, fishing, trapping).
- describe the mitigation measures that are technically and economically feasible. The proponent shall assess the effectiveness of the measures applied to mitigate the cumulative effects. In cases where measures exist that are beyond the scope of the proponent's responsibility that could be effectively applied to mitigate these effects, the proponent will identify these effects and the parties that have the authority to act. In such cases, the EIS will summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term.
- determine the significance of the cumulative effects; and
- develop a follow-up program to verify the accuracy of the assessment or to dispel the uncertainty concerning the effectiveness of mitigation measures for certain cumulative effects.

The proponent is encouraged to consult with key stakeholders and Indigenous groups prior to finalizing the choice of VCs and the appropriate boundaries to assess cumulative effects.

8. SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT

The EIS will contain a table summarizing the following key information:

- potential environmental effects on VCs;
- proposed mitigation measures to address the effects identified above; and
- potential residual effects and the significance of the residual environmental effects.

The summary table will be used in the EA Report prepared by the Agency. An example of a format for the key summary table is provided in Appendix 1 of this document.

In a second table, the EIS will summarize all key mitigation measures and commitments made by the proponent which will more specifically mitigate any significant adverse effects of the project on VCs

(i.e. those measures that are essential to ensure that the project will not result in significant adverse environmental effects).

9. FOLLOW-UP AND MONITORING PROGRAMS

A follow-up program is designed to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the project. Considerations for developing a follow-up program include:

- whether the project will impact environmentally sensitive areas/VCs or protected areas or areas under consideration for protection;
- the nature of Indigenous and public concerns raised about the project;
- suggestions from Indigenous groups regarding the design of and involvement in follow-up and monitoring programs;
- incorporation of Indigenous knowledge, where available;
- the accuracy of predictions;
- whether there is a question about the effectiveness of mitigation measures or the proponent proposes to use new or unproven techniques and technology;
- the nature of cumulative environmental effects;
- the nature, scale and complexity of the program; and
- whether there was limited scientific knowledge about the effects in the EA.

The goal of a monitoring program is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project development, and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety.

9.1. Follow-up program

The duration of the follow-up program shall be as long as required to evaluate the effectiveness of the mitigation measures.

The EIS shall present a preliminary follow-up program and shall include:

- objectives of the follow-up program and the VCs targeted by the program;
- list of elements requiring follow-up;
- number of follow-up studies planned as well as their main characteristics (list of parameters to be measured, planned implementation timetable, etc.);
- intervention mechanism used in the event that an unexpected deterioration of the environment is observed;
- mechanism to disseminate follow-up results among the concerned populations;
- accessibility and sharing of data for the general population;
- opportunity for the proponent to include the participation of Indigenous groups and stakeholders on the affected territory, during the development and implementation of the program; and

- involvement of local and regional organizations in the design, implementation and evaluation of the follow-up results as well as any updates, including a communication mechanism between these organizations and the proponent.

The discussion / description of follow-up and monitoring programs relative to the currently proposed drilling program should include a short summary of the design and results/outcomes of monitoring programs that have been undertaken for previously assessed and/or completed offshore drilling programs in similar environments and how these will be factored into the verification of impact predictions and design of the follow-up and monitoring for the current exploration drilling program.

9.2. Monitoring

The proponent will prepare an environmental monitoring program for all phases of the project.

Specifically, the environmental impact statement shall present an outline of the preliminary environmental monitoring program, including the:

- identification of the interventions that pose risks to one or more of the environmental and/or VCs and the measures and means planned to protect the environment;
- identification of regulatory instruments that include a monitoring program requirement for the VCs;
- description of the characteristics of the monitoring program where foreseeable (e.g. location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, human and financial resources required);
- description of the proponent's intervention mechanisms in the event of the observation of non-compliance with the legal and environmental requirements or with the obligations imposed on contractors by the environmental provisions of their contracts;
- guidelines for preparing monitoring reports (number, content, frequency, format) that will be sent to the authorities concerned; and
- plans to engage Indigenous groups in monitoring, where appropriate.

Appendix 1 Example - Summary Table of Environmental Assessment

						Key Criteria for Determining Significance[15]							
Valued Component affected	Area of federal jurisdiction[16] (√)	Project Activity	Potential effects	Proposed mitigation	Residual effect	*Magnitude*	*Geographical Extent*	*Timing*	*Duration*	*Frequency*	*Reversibility*	Significance of residual adverse effect	Likelihood of significance of residual adverse effect
Fish and fish habitat													
Migratory birds													
Species at risk													
Current use of land and resource for traditional purpose	√ 5(1)(c)(iii)												
Any other VCs identified													

[15] Other key criteria can be used to determine significance, as appropriate. The ecological and social context within which potential environmental effects may occur should be taken into account when considering the key criteria in relation to a particular VC, as the context may help better characterize whether adverse effects are significant.

[16] Indicate by a check mark which valued components can be considered "environmental effects" as defined in section 5 of CEAA 2012, and specify which subsection of section 5 is relevant. For example, for the VC "current use of lands and resources for traditional purposes", the appropriate cell would indicate, section 5(1)(c)(iii) of CEAA 2012.

equinor

APPENDIX B

Table of Concordance with EIS Guidelines

Table B.1 Concordance with Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* for the Central Ridge Exploration Drilling Project, Equinor Canada Ltd.

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
1. INTRODUCTION	
The EIS must include a full description of the changes the project will cause to the environment that may result in adverse effects on areas of federal jurisdiction (i.e., section 5 of CEAA 2012) including changes that are directly linked or necessarily incidental to any federal decisions that would permit the project to be carried out.	4.2; Chapters 8-14
The EIS must also include a list of key mitigation measures that the proponent proposes to undertake in order to avoid or minimize any adverse environmental effects of the project. It is the responsibility of the proponent to provide sufficient data and analysis on potential changes to the environment to ensure a thorough evaluation of the environmental effects of the project by the Agency.	2.11.2; Chapters 8-14; 17.2
2. GUIDING PRINCIPLES	
2.1. Environmental assessment as a planning and decision making tool	1.3; 4.3
2.2. Public participation	
The proponent is required to provide current information about the project to the public and especially to the communities likely to be most affected by the project	4.1; 4.3; Chapter 3
2.3. Engagement with Indigenous groups	
The proponent is expected to engage with potentially affected Indigenous groups starting as early as possible in the project planning process in order to: • Fulfil the statutory obligations of CEAA, 2012 to assess environmental effects of the proposed Project on Aboriginal peoples; and • Assist the Agency fulfilling the Crown's constitutional obligations to consult with potentially impacted Indigenous groups on potential impacts to potential or established Aboriginal or Treaty rights.	4.1; 4.3; Chapter 3
The proponent is expected to work with potentially affected Indigenous groups to establish an engagement approach.	4.1; 4.3; Chapter 3
The proponent will make reasonable efforts to integrate Indigenous knowledge into the assessment of environmental effects.	4.1; 4.3; Chapter 3
2.4. Application of the precautionary approach	
The proponent will demonstrate that all aspects of the project have been examined and planned in a careful and precautionary manner in order to avoid significant adverse environmental effects.	2.11.2; 4.3
3. SCOPE OF THE ENVIRONMENTAL ASSESSMENT	
3.1. Designated project	
On May 9. 2019, Equinor Canada Ltd., the proponent of the Central Ridge Exploration Drilling Project provided a project description to the Agency. Based on this project description, the Agency has determined that an EA is required under CEAA 2012 and will include the following project components and activities:	

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The mobilization, operation and demobilization of Mobile Offshore Drilling Unit(s) designed for year-round operations for the drilling, testing and abandonment of up to 24 wells (including those proposed for the Flemish Pass Exploration Drilling Project) in Exploration Licences 1159 and 1160 operated by Equinor Canada Ltd., including consideration of any proposed safety exclusion zones. Drilling may occur in various water depths under consideration, using Mobile Offshore Drilling Unit(s), and with multiple drilling units operating simultaneously, if applicable.	1.2; 2.5
Vertical seismic profiling or any other in-water works (e.g. wellsite surveys) to support the specific exploration wells under consideration, but excluding surveys potentially required to support the conduct of the EA (e.g. environmental baseline surveys) and surveys related to the broader delineation of resources.	1.2; 2.5.2
Well evaluation and testing.	1.2.2; 2.5.3
The loading, refuelling and operation of marine support vessels (i.e. for re-supply and transfer of materials, fuel, and equipment; on-site safety during drilling operations; and transport between the supply base and the drilling unit(s) and helicopter support (i.e. for crew transport and delivery of light supplies and equipment) including transportation to the drilling unit(s)	1.2; 2.5.5
Note: If the proponent acquires and becomes the operator of new or additional exploration licences issued by the Canada-Newfoundland and Labrador Offshore Petroleum Board and submits corresponding information to the Agency prior to the submission of the EIS, the Agency will consider whether activities on these additional licences may be incorporated into the scope of this EA. Equinor Canada acquired ELs 1159 and 1160 in the November 2018 Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) call for bids. The proponent indicated that ELs 1159 and 1160 are within the project area described in the Flemish Pass Exploration Drilling Project EIS and Eastern Newfoundland Offshore Exploration Drilling Project EIS submitted to the Agency on December 17, 2019 and for which Environmental Assessment Decision Statements were issued by the Agency on April 17, 2019. The proponent suggested that the overall level of activity (i.e. project components and number of wells) would remain unchanged from the Flemish Pass Exploration Drilling Project with the inclusion of ELs 1159 and 1160 and that the baseline environmental conditions and environmental effects of exploration drilling and associated incidental activities in the ELs are already understood. All information requirements set out in these EIS Guidelines apply to exploration drilling and associated incidental activities within ELs 1159 and 1160. Information requirements issued by the Agency during the technical review of the EIS for the Flemish Pass Exploration Drilling Project also apply. In the event that Equinor Canada believes the required information is already included in the existing Flemish Pass Exploration Drilling Project EIS and associated information requirement responses, an abridged EIS may be submitted that provides a complete effects assessment of the Project as it pertains to ELs 1159 and 1160, but does not replicate detailed analysis contained in the Flemish Pass Exploration Drilling Project EIS and associated information requirements. The abridged EIS should provide detailed analysis of effects that are specific to the Project and provide a rationale for the applicability of the analysis and conclusions of the Flemish Pass EIS. The abridged EIS should include any new information available for ELs 1159 and 1160, such as seabed survey results.	1.2; 2.1, 4.1
The abridged EIS shall include discussion of the following:	
Chapter 1 Introduction: Provide the background/context for activities on ELs 1159 and 1160 in the EA.	Chapter 1
Chapter 2 Project Description: Provide information, including mapping, of the ELs. Describe the Project, including components, activities, and schedule. Specify any potential differences from the description of the Flemish Pass Exploration Drilling Project in the EIS.	Chapter 2

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
Chapter 3 Regulatory, Indigenous and Stakeholder Engagement: Provide a summary of how Indigenous groups and interested parties (e.g. commercial fish harvesters) have been notified of the Project, and of any views expressed in relation to ELs 1159 and 1160.	Chapter 3
Chapter 4 Environmental Assessment Scope, Approach and Methods: Provide Project-specific information and figures for ELs 1159 and 1160 on scope of the Project, environmental assessment study areas and zones of influence for anticipated environmental effects. As applicable, describe any changes in approach to selection of valued components, significance criteria, and environmental assessment methodology.	Chapter 4
Chapter 5 Existing Physical Environment: Provide baseline information for ELs 1159 and 1160, as applicable, ensuring discussion of species at risk, special areas and any other environmental features, habitats and valued component species that may be unique to ELs 1159 and 1160. Where baseline information was presented in the Flemish Pass Exploration Drilling Project EIS specific to each EL (including but not limited to Table 6.10, Section 6.1.6, Section 7.1.4, Section 7.1.6), provide similar baseline information specific to ELs 1159 and 1160.	Chapter 5
Chapter 6 Existing Biological Environment: Provide baseline information for ELs 1159 and 1160, as applicable, ensuring discussion of species at risk, special areas and any other environmental features, habitats and valued component species that may be unique to ELs 1159 and 1160. Where baseline information was presented in the Flemish Pass Exploration Drilling Project EIS specific to each EL (including but not limited to Table 6.10, Section 6.1.6, Section 7.1.4, Section 7.1.6), provide similar baseline information specific to ELs 1159 and 1160.	Chapter 6
Chapter 7 Existing Human Environment: Provide baseline information for ELs 1159 and 1160, as applicable, ensuring discussion of species at risk, special areas and any other environmental features, habitats and valued component species that may be unique to ELs 1159 and 1160. Where baseline information was presented in the Flemish Pass Exploration Drilling Project EIS specific to each EL (including but not limited to Table 6.10, Section 6.1.6, Section 7.1.4, Section 7.1.6), provide similar baseline information specific to ELs 1159 and 1160.	Chapter 7
Chapter 8 Marine Fish and Fish Habitat: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 8
Chapter 9 Marine and Migratory Birds: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 9

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
Chapter 10 Marine Mammals and Sea Turtles: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 10
Chapter 11 Special Areas: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 11
Chapter 12 Indigenous Communities and Activities: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 12
Chapter 13 Commercial Fisheries and Other Ocean Users: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 13
Chapter 14 Cumulative Effects: For all VCs, update the effects assessment to account for the addition of activities on ELs 1159 and 1160. Update information on potential effects, mitigation measures, residual effects, significance conclusions, follow-up and monitoring, as applicable. Where there are no changes to the residual effects predicted in the Flemish Pass Exploration Drilling Project EIS, provide a rationale as to why the analysis remains unchanged, and indicate where in the Flemish Pass Exploration Drilling Project EIS the required information can be found. Include a fulsome discussion of drill cuttings dispersion modelling and seabed survey results applicable to ELs 1159 and 1160, and an updated effects analysis, as required.	Chapter 14
Chapter 15 Accidental Events: Update the effects assessment for potential accidents and malfunctions, including the results of oil spill trajectory modelling for a worst-case scenario within ELs 1159 and 1160 or a rationale for the use of existing models showing comparability of previously used event inputs and environmental conditions. Ensure a robust rationale for selection of the worst-case scenario is provided.	Chapter 15
16. Effects of the Environment on the Project: Provide information on environmental considerations for ELs 1159 and 1160 and the potential effects of the environment on the Project.	Chapter 16
17. Environmental Assessment and Summary and Conclusions: Update as appropriate based on the above.	Chapter 17

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
3.2. Factors to be considered	
Environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other physical activities that have been or will be carried out.	4.1; Chapters 8-14; 15.5
The significance of the effects referred to above.	4.1; Chapters 8-14; 15.5
Comments from the public.	Chapter 3; Chapters 8-14
Mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project.	2.11; Chapters 8-14; 17.2
The requirements of the follow-up program in respect of the project.	Chapters 8-14; 17.3
The purpose of the project.	2.2; 4.1
Alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means.	2.10; 4.1
Any change to the project that may be caused by the environment	4.1; Chapter 16
The results of any relevant regional study pursuant to CEAA 2012.	A Regional Assessment of the NL Offshore is currently underway; Chapters 8-14 incorporates information from the Eastern NL SEA
Changes to the environment	
Under CEAA 2012, an examination of environmental effects that result from changes to the environment as a result of the project being carried out or as a result of the federal government exercising any power duty or function that would allow the project to be carried out must be considered in the EIS	4.3; Chapters 8-14
In scoping the potential changes to the environment that may occur, the proponent should consider any potential changes in the physical environment such as changes to air quality, water quality and quantity, and physical disturbance of land that could reasonably be expected to occur.	4.3; Chapters 8-14
Valued components to be examined	
The proponent must conduct and focus its analysis on VCs as they relate to section 5 of CEAA 2012, including the ones identified in Section 7.3 (Part 2) of these guidelines that may be affected by changes in the environment, as well as species at risk and their critical habitat as per the requirement outlined in section 79 of the Species at Risk Act.	4.2; Chapters 8-14
The list of VCs presented in the EIS will be completed according to the evolution and design of the project and reflect the knowledge acquired through public consultation and engagement with Indigenous groups.	4.2; Chapter 3; Chapters 8-14
The EIS will describe what methods were used to predict and assess the adverse environmental effects of the project on these VCs.	4.3; Chapters 8-14

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The VCs will be described in sufficient detail to allow the reviewer to understand their importance and to assess the potential for environmental effects arising from the project activities.	4.2; 4.3; Chapters 8-14
The EIS will provide a rationale for selecting specific VCs and for excluding any VCs or information specified in these guidelines. Challenges may arise regarding particular exclusions, so it is important to document the information and the criteria used to justify the exclusion of a particular VC or piece of information. Justification may be based on, for example, primary data collection, computer modelling, literature references, public participation or engagement with Indigenous groups, or expert input or professional judgement	4.2; Chapters 8-14
The EIS will identify those VCs, processes, and interactions that either were identified to be of concern during any workshops or meetings held by the proponent or that the proponent considers likely to be affected by the project. In doing so, the EIS will indicate to whom these concerns are important (i.e. the public or Indigenous groups) and the reasons why, including environmental, cultural, historical, social, economic, recreational, and aesthetic considerations, and traditional knowledge. If comments are received on a component that has not been included as a VC, these comments will be summarized and the rationale for excluding the component will address the comments.	4.2; Chapter 3; Chapters 8-14
Spatial and temporal boundaries	
The spatial and temporal boundaries used in the EA may vary depending on the VC and will be considered separately for each VC, including for VCs related to the current use of lands and resources for traditional purposes by Aboriginal peoples, or other environmental effects referred to under paragraph 5(1)(c) of CEAA 2012. The proponent is encouraged to consult with the Agency, federal and provincial government departments and agencies, local government and Indigenous groups, and take into account public comments when defining the spatial and temporal boundaries used in the EIS.	1.2; 2.3; 4.2; Chapters 8-14
The EIS will describe the spatial boundaries, including local and regional study areas, of each VC to be used in assessing the potential adverse environmental effects of the project and provide a rationale for each boundary. Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential environmental effects, community knowledge and Aboriginal traditional knowledge, current or traditional land and resource use by Indigenous groups, ecological, technical, social and cultural considerations.	1.2; 2.2; 4.3.1; Chapters 8-14
The temporal boundaries of the EA will span all phases of the project determined to be within the scope of this EA as specified under section 3.1 above. If effects are predicted after project decommissioning, this should be taken into consideration in defining boundaries. Community knowledge and Aboriginal traditional knowledge should factor into decisions around defining temporal boundaries.	1.2.2; 2.2; 4.2; Chapters 8-14
If the temporal boundaries do not span all phases of the project, the EIS will identify the boundaries used and provide a rationale.	1.2; 2.2; 4.1; 4.3.1; Chapters 8-14
PREPARATION AND PRESENTATION OF THE ENVIRONMENTAL IMPACT STATEMENT	
4.1. Guidance	
The proponent should consult the Agency policy and guidance on topics to be addressed in the EIS, which is available on the Agency's website, and liaise with the Agency during the planning and development of the EIS. The proponent should also consult relevant guidance from other federal departments and ensure that the most up to date version is being used.	1.5

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The proponent is encouraged to engage with Indigenous groups on the planning and development of relevant sections of the EIS, including effects from changes to the environment and impacts to potential or established Aboriginal or Treaty rights as well as assessment of environmental effects as outlined in paragraph 5(1)(c) of CEAA 2012.	Chapter 3; 4.2; 7.3; Chapter 12
Submission of regulatory and technical information necessary for federal authorities to make their regulatory decisions during the conduct of the EA is at the discretion of the proponent. Although that information is not necessary for the EA decision, the proponent is encouraged to submit it concurrent with the EIS. While the EIS must outline applicable federal authorizations required for the project to proceed, the proponent must provide information relevant to the regulatory role of the federal government. It should be noted that the issuance of these other applicable federal legislative, regulatory and constitutional requirements are within the purview of the relevant federal authorities, and are subject to separate processes post EA decision.	1.5
4.2. Use of information	
Government expert advice	
The Agency will advise the proponent of the availability of pertinent information or knowledge or expert and specialist knowledge received from other federal authorities or other levels of government so that it can be incorporated into the EIS.	Noted
4.2.2. Community knowledge and Aboriginal traditional knowledge	
The proponent will incorporate into the EIS the community knowledge and Aboriginal traditional knowledge to which it has access or that is acquired through public participation and engagement with Indigenous groups, in keeping with appropriate ethical standards and obligations of confidentiality.	4.2; 4.3; Chapter 3; Chapters 8-14
The proponent will engage in a respectful dialogue with Indigenous groups about the collection and use of Indigenous knowledge and enter into agreements where necessary regarding the use of information during and after the EA.	4.2; 4.3; Chapter 3; Chapters 8-14
The proponent should collaborate with Indigenous groups to ensure, where possible, that the Indigenous knowledge is incorporated into the EIS in a way that appropriate for the Indigenous group.	4.2; 4.3; Chapter 3; Chapters 8-14
The proponent will integrate Aboriginal traditional knowledge into all aspects of its assessment including both methodology (e.g. establishing spatial and temporal boundaries, defining significance criteria) and analysis (e.g. baseline characterization, effects prediction, development of mitigation measures).	4.2; 4.3; Chapter 3; Chapters 8-14
Agreement should be obtained from Indigenous groups regarding the use, management and protection of their existing traditional knowledge information during and after the EA.	4.2; 4.3; Chapter 3; Chapters 8-14
4.2.3. Existing information	
In preparing the EIS, the proponent is encouraged to make use of existing information relevant to the project. When relying on existing information to meet requirements of the EIS Guidelines, the proponent will either include the information directly in the EIS or clearly direct the reader to where it may obtain the information (i.e. through cross-referencing).	4.3; Chapters 5-7; Chapters 8-14
When relying on existing information, the proponent will also comment on how the data were applied to the project, separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from the existing information.	4.3; Chapters 5-7; Chapters 8-14

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
Confidential information	
In implementing CEAA 2012, the Agency is committed to promoting public participation in the EA of projects and providing access to the information on which EAs are based. All documents prepared or submitted by the proponent or any other stakeholder in relation to the EA are included in the Canadian Environmental Assessment Registry and made available to the public on request. For this reason, the EIS will not contain information that: • is sensitive or confidential (i.e. financial, commercial, scientific, technical, personal, cultural or other nature), that is treated consistently as confidential, and the person affected has not consented to the disclosure; or • may cause substantial harm to a person or specific harm to the environment through its disclosure.	Confidential information is not included in the EIS.
The proponent will consult with the Agency regarding whether specific information requested by these guidelines should be treated as confidential.	Confidential information is not included in the EIS.
4.3. Study strategy and methodology	
It is possible these guidelines may include matters which, in the judgement of the proponent, are not relevant or significant to the project. If such matters are omitted from the EIS, the proponent will clearly indicate it, and provide a justification so the Agency, federal authorities, Indigenous groups, the public and any other interested party have an opportunity to comment on this decision. Where the Agency disagrees with the proponent's decision, it will require the proponent to provide the specified information.	4.2
The assessment will include the following general steps:	
Identifying the activities and components of the project.	2.5; 4.2; Chapters 8-14
Predicting potential changes to the environment.	4.2; 4.3; Chapters 8-14
Predicting and evaluating the likely effects on identified VCs.	4.2; 4.3; Chapters 8-14
Identifying technically and economically feasible mitigation measures for any significant adverse environmental effects.	4.2; 4.3.3; Chapters 8-14
Determining any residual environmental effects.	4.2; 4.3; Chapters 8-14
Considering cumulative effects of the project in combination with other physical activities that have been or will be carried out.	4.2; 4.3.4; Chapter 14
Determining the potential significance of any residual environmental effect following the implementation of mitigation measures.	4.2; 4.3; Chapters 8-14
For each VC, the EIS will describe the methodology used to assess project-related effects.	4.2; 4.3; Chapters 8-14
The EIS could include an analysis of the pathway of the effects of environmental changes on each VC.	4.2; 4.3.4; Chapters 8-14
The EIS will document where and how scientific, engineering, community knowledge and Aboriginal traditional knowledge were used to reach conclusions.	Chapter 3; 4.2; 4.3; Chapters 8-14
Assumptions will be clearly identified and justified.	4.2; 4.3; Chapters 8-14
All data, models and studies will be documented such that the analyses are transparent and reproducible.	4.5; Chapters 8-14
All data collection methods will be specified. The uncertainty, reliability, sensitivity, and conservativeness of models used to reach conclusions must be indicated.	4.5; Chapters 8-14; 15.4

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The EIS will identify all significant gaps in knowledge and understanding related to key conclusions, and the steps to be taken by the proponent to address these gaps. Where the conclusions drawn from scientific, engineering and technical knowledge are inconsistent with the conclusions drawn from Aboriginal traditional knowledge, the EIS will present each perspective on the issue and a statement of the proponent's conclusions.	Chapter 4; Chapters 5-7; Chapters 8-14
The EIS will include a description of the environment (both biophysical and human), including the components of the existing environment and environmental processes, their interrelations as well as the variability in these components, processes and interactions over time scales appropriate to the likely effects of the project. The description will be sufficiently detailed to characterize the environment before any disturbance to the environment due to the project and to identify, assess and determine the significance of the potential adverse environmental effects of the project. These data should include results from studies done prior to any physical disruption of the environment due to initial project related activities. The information describing the existing environment may be provided in a stand-alone chapter of the EIS or may be integrated into clearly defined sections within the effects assessment of each VC. This analysis will include environmental conditions resulting from historical and present activities in the local and regional study areas.	4.2; 4.3; Chapters 5-7
If the baseline data have been extrapolated or otherwise manipulated to depict environmental conditions in the study areas, modelling methods and equations will be described and will include calculations of margins of error and other relevant statistical information, such as confidence intervals and possible sources of error. The proponent will provide the references used in creating their approach to baseline data gathering, including identifying where appropriate, the relevant federal or provincial standards. The proponent is encouraged to discuss the timeframe and considerations for its proposed baseline data with the Agency prior to submitting its EIS.	Chapter 4; Chapter 5-7; Chapters 8-14
In describing and assessing effects to the physical and biological environment, the proponent will take an ecosystem approach that considers both scientific and community knowledge and Indigenous knowledge and perspectives regarding ecosystem health and integrity. The proponent will consider the resilience of relevant species populations, communities and their habitats. The assessment of environmental effects on Aboriginal peoples, pursuant to paragraph 5(1)(c) of CEAA 2012, will undergo the same rigour and type of assessment as any other VC (including setting of spatial and temporal boundaries, identification and analysis of effects, identification of mitigation measures, determination of residual effects, identification and a clear explanation of the methodology used for assessing the significance of residual effects and assessment of cumulative effects).	Chapter 4; Chapters 8-14
The proponent will consider the use of both primary and secondary sources of information regarding baseline information, changes to the environment and the corresponding effect on health, socio- economics, physical and cultural heritage and the current use of lands and resources for traditional purposes.	4.2; 4.3; Chapters 8-14
The proponent will provide Indigenous groups the opportunity to review and provide comments on the information used for describing and assessing effects on Aboriginal peoples (further information on engaging with Indigenous groups is provided in Part 2, Section 5 of this document). The proponent will respond to the comments of Indigenous groups prior to submitting the EIS to ensure that the comments are adequately addressed. Where there are discrepancies in the views of the proponent and Indigenous groups on the information to be used in the EIS, the EIS will document these discrepancies and the rationale for the proponent’s selection of information.	Chapter 3; 4.2; Chapters 8-14

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The assessment of the effects of each of the project components and physical activities, in all phases, will be based on a comparison of the biophysical and human environments between the predicted future conditions with the project and the predicted future conditions without the project. In undertaking the environmental effects assessment, the proponent will use best available information and methods. All conclusions will be substantiated. Predictions will be based on clearly stated assumptions. The proponent will describe how each assumption has been tested. With respect to quantitative models and predictions, the EIS will document the assumptions that underlie the model, the quality of the data and the degree of certainty of the predictions obtained. Where there are discrepancies in the views of the proponent and Indigenous groups with respect to the outcomes of assessment(s), the EIS will document and provide a rationale for these discrepancies.	4.2; 4.3; 4.5; Chapters 8-14
4.4. Presentation and organization of the environmental impact statement	
To facilitate the identification of the documents submitted and their placement in the Canadian Environmental Assessment Registry, the title page of the EIS and its related documents will contain the following information: project name and location; title of the document, including the term “environmental impact statement”; subtitle of the document; name of the proponent; and date of submission of the EIS.	Title page
The EIS will be written in clear, precise language. A glossary defining technical words, acronyms and abbreviations will be included. The EIS will include charts, diagrams, tables, maps and photographs, where appropriate, to clarify the text. Perspective drawings that clearly convey the various components of the project will also be provided. Wherever possible, maps will be presented in common scales and datum to allow for comparison and overlay of mapped features.	Entire EIS
Detailed studies (including all relevant and supporting data and methodologies) will be provided in separate appendices and will be referenced by appendix, section and page in the text of the main document.	Throughout EIS
The EIS will explain how information is organized in the document. This will include a table of content with a list of all tables, figures, and photographs referenced in the text.	Table of Contents
A complete list of supporting literature and references will also be provided.	Throughout EIS
A table of concordance, which cross references the information presented in the EIS with the information requirements identified in the EIS Guidelines, will be provided.	Table of Concordance
The proponent will provide copies of the EIS and its summary for distribution, including paper and electronic version in an unlocked, searchable PDF format, as directed by the Agency.	noted
4.5. Summary of the environmental impact statement	
The proponent will prepare a summary of the EIS in both of Canada’s official languages (French and English) to be provided to the Agency at the same time as the EIS that will include the following: a concise description of all key components of the project and related activities; a summary of the engagement with Indigenous groups, and the participation of the public and government agencies, including a summary of the issues raised and the proponent’s responses; an overview of expected changes to the environment; an overview of the key environmental effects of the project, as described under section 5 of CEAA 2012, and proposed technically and economically feasible mitigation measures; an overview of how factors under paragraph 19(1) of CEAA 2012 were considered; the proponent’s conclusions on the residual environmental effects of the project, and the significance of those effects, after taking into account the mitigation measures.	EIS Summary

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The summary is to be provided as a separate document and should be structured as follows:	EIS Summary
Introduction and EA context	
Project overview	
Alternative means of carrying out the project	
Public participation	
Engagement with Indigenous Groups	
Summary of environmental effects assessment for each VC, including: description of the baseline; anticipated changes to the environment; anticipated effects; mitigation measures; and significance of residual effects.	
Follow-up and monitoring programs proposed	
The summary will have sufficient details for the reader to understand the project, any potential environmental effects, proposed mitigation measures, and the significance of the residual effects. The summary will include key maps illustrating the project location and key project components.	
Part 2 – Content of the Environmental Impact Statement	
1. INTRODUCTION AND OVERVIEW	
1.1 The proponent	1.1
In the EIS, the proponent will:	
Provide contact information (e.g. name, address, phone, fax, email); identify itself and the name of the legal entity(ies) that would develop, manage, and operate the project; describe corporate and management structures; specify the mechanism used to ensure that corporate policies will be implemented and respected for the project; and identify key personnel, contractors, and/or sub-contractors responsible for preparing the EIS.	1.1.2, 1.1.3
1.2 Project overview The EIS will describe the project, key project components and associated activities, scheduling details, the timing of each phase of the project and other key features. If the project is part of a larger sequence of projects, the EIS will outline the larger context.	1.2; Chapter 2
1.3 Project location	
The EIS will contain a description of the geographical setting in which the project will take place. This description will focus on those aspects of the project and its settings that are important in order to understand the potential environmental effects of the project. The following information will be included:	
The Universal Transverse Mercator (UTM) projection coordinates of the main project site;	2.3
Current land use in the area.	2.4, Chapter 7
Distance of the project facilities and components to any federal lands.	1.3.2; 2.3, 7.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The environmental significance and value of the geographical setting in which the project will take place and the surrounding area.	2.3
Environmentally sensitive areas, such as national, provincial and regional parks, ecological reserves, ecologically and biologically sensitive areas, fishery closure areas, vulnerable marine ecosystems, marine refuge areas, and habitats of federally or provincially listed species at risk and other sensitive areas.	2.3; 2.4; Chapter 6
Description of local communities and Indigenous communities.	7.3; 7.4
Traditional territories and/or consultation areas, treaty lands, and Indian Reserve lands.	7.3
1.4. Regulatory framework and the role of government	
The EIS will identify:	
Any federal power, duty or function that may be exercised that would permit the carrying out (in whole or in part) of the project or associated activities.	1.3
Legislation and other regulatory approvals that are applicable to the project at the federal, provincial, regional, and municipal levels.	1.3
Government policies, resource management plans, planning or study initiatives pertinent to the project and/or EA and their implications.	1.3
Any treaty, self-government, or other agreements between federal or provincial governments and Indigenous groups that are pertinent to the project and/or EA.	3.3, 7.3
Any relevant land use plans, land zoning, or community plans.	N/A
Regional, provincial, and/or national objectives, standards or guidelines that have been used by the proponent to assist in the evaluation of any predicted environmental effects.	1.3; 1.5
2. PROJECT JUSTIFICATION AND ALTERNATIVES CONSIDERED	
2.1. Purpose of the project	
The EIS will describe the purpose of the project by providing the rationale for the project, explaining the background, the problems or opportunities that the project is intended to satisfy and the stated objectives from the perspective of the proponent. If the objectives of the project are related to broader private or public sector policies, plans or programs, this information will also be included.	2.2
The EIS will also describe the predicted environmental, economic and social benefits of the project. This information will be considered in assessing the justifiability of any significant adverse residual environmental effects as defined in section 5 of CEAA 2012, if such effects are identified.	2.2
2.2. Alternative means of carrying out the project	
The EIS will identify and consider the environmental effects of alternative means of carrying out the project that are technically and economically feasible.	2.10
The proponent will complete the assessment of alternative means in accordance with the Agency's Operational Policy Statement on this topic.	2.10

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
In its alternative means analysis, the proponent will address, at a minimum, the following project components:	
Choice of drilling fluid (i.e. water-based drilling mud or synthetic-based drilling mud); choice of drilling unit (i.e. drillship or semi-submersible); management of drilling wastes (i.e. disposal on seabed or into water column, recover and ship to shore, re-inject); water management and location of the final effluent discharge points; and alternative ways to light the platform at night (or flare at night when testing the well), to reduce attraction and associated mortality of birds, such as by installing flare shields.	2.10
The EIS should include a discussion on how wastes and potential associated toxic substances would be minimized. The proponent should also discuss any alternatives that would enable it to achieve these objectives and adopt best practices in waste management and treatment.	2.9, 2.10
With the objective of minimizing potential environmental impacts of discharges to the marine environment, the proponent should identify the quantity and type of chemicals (or constituents) that may be used in support of the proposed project that are: included on the Canadian Environmental Protection Act's List of Toxic Substances; not included on the OSPAR[1] Pose Little or No Risk to the Environment (PLONOR) list of chemicals and have a PARCOM[2] Offshore Chemical Notification Scheme Hazard Rating of A, B or purple, orange, blue, or white; or not included on the PLONOR list of chemicals and have not been assigned a PARCOM Offshore Chemical Notification Scheme Hazard Rating.	2.9.3; 2.9.4
Alternatives to the use of the above-listed chemicals (e.g. through alternative means of operating or use of less-toxic alternatives) should be discussed in the EIS.	2.10
The Agency recognizes that projects may be in the early planning stages when the EIS is being prepared. Where the proponent has not made final decisions concerning the placement of project infrastructure, the technologies to be used, or that several options may exist for various project components, the proponent shall conduct an environmental effects analysis at the same level of detail for each of the various options available (alternative means) within the EIS.	2.10
3. PROJECT DESCRIPTION	
3.1. Project components	
The EIS will describe the project, by presenting the project components, associated and ancillary works, and other characteristics that will assist in understanding the environmental effects. This will include:	
Maps, at an appropriate scale, of the project location; project components; boundaries of exploration licences 1159 and 1160 with UTM coordinates; the major existing infrastructure; adjacent land and resource uses; and any important environmental features.	Chapter 2
If the project is part of a larger sequence of projects, the proponent will outline the larger context and present the relevant references, if available.	Chapter 2
In its EIS, the proponent will describe:	
• the Mobile Offshore Drilling Unit(s) and their operations (drilling, testing, suspension or abandonment) in locations and water depths under consideration;	2.5.1
• navigation activities (number and frequency of trips), size and types of vessels, anticipated vessel routes and anchorages, predicted percentage of increase in vessel traffic of similar size vessels resulting from the project, icebreaking activities (time of year, frequency, duration, expected start and end dates), and ballast water management.	2.5.1; 2.5.5; 2.9.4

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• helicopters, including routes, number, and frequency of trips;	2.5.5
• vertical seismic profiling or any other in-water works (e.g. wellsite surveys) to support the specific exploration wells under consideration, but excluding surveys potentially required to support the conduct of the EA (e.g. environmental baseline surveys) and surveys related to the broader delineation of resources;	2.5.2
• well evaluation and testing;	2.5.3
• reagent requirements and uses (e.g. volumes, storage, types);	2.9
• petroleum products (e.g. source, volume, storage);	2.9
• the nature, composition, and fate (e.g. areal extent) of drilling wastes (e.g. muds, cuttings) at various water depths and at various stages of drilling, including during riserless drilling and drilling with the marine riser in place, using dispersion modeling;	2.9.3
• the management or disposal of wastes (e.g. type and constituents of waste, quantity, treatment, and method of disposal) including: - drilling muds, drill solids; - deck drainage; - cooling water; - bilge and ballast water; - fire control system test water; - operational discharges from subsea systems and the installation of subsea systems; - sewage and food wastes; - well treatment or testing fluids; and - other operational discharges.	2.9
• contributions to atmospheric emissions, including emissions profile (i.e. type, rate and source) for activities including routine or upset flaring (including the contribution from any produced fluids that may be added to any flares), routine drilling, testing, shipping etc.;	2.9.1
• sources and extent of light, heat, and noise;	2.9.5
• transfers of bulk materials (e.g. mud) and fuel;	2.9
• number of employees and transportation of employees;	2.6
• drinking and industrial water requirements (source, quantity required, need for water treatment);	2.9.4
• energy supply (source, quantity); and	2.9.1
• waste disposal (types of waste, methods of disposal, quantity).	2.9

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
3.2. Project activities	
The EIS will include descriptions of the drilling, testing and decommissioning, suspension or abandonment of wells associated with the proposed project.	2.5.1; 2.5.3; 2.5.4
This will include descriptions of the activities to be carried out during each phase, the location of each activity, expected outputs and an indication of the activity's magnitude and scale. Water depths for potential drill sites will be specified.	2.5.1; 2.5.3; 2.5.4
Although a complete list of project activities should be provided, the emphasis will be on activities with the greatest potential to have environmental effects. Sufficient information will be included to predict environmental effects and address concerns identified by the public and Indigenous groups. Highlight activities that involve periods of increased environmental disturbance or the release of materials into the environment.	2.5
The EIS will include a summary of the changes that have been made to the project since originally proposed, including the benefits of these changes to the environment, Indigenous groups, and the public.	2.8
The EIS will include a schedule including time of year, frequency, and duration for all project activities. The information will include a description of:	2.7
Drilling and testing activities	
• operation of the Mobile Offshore Drilling Unit(s), including: - drilling at various water depths and in locations under consideration - well flow testing - waste management - water management	2.5.1; 2.5.3; 2.9.2; 2.9.3; 2.9.4
• vertical seismic profile surveys	2.5.2
• flaring, including: – specifics on flare tip used, including type, manufacturer and/or model; – all flaring activities and estimation of flared volumes; – estimation of total greenhouse gas and criteria air contaminants emissions; – an estimate of the contribution of the flaring emissions at the local, provincial and federal scale; – justification for all estimated emissions and emission factors used; and – the estimation or derivation method, and a description of all assumptions and emission factors used; • well evaluation and testing;	2.5.3
• equipment requirements (type, quantity); and	2.5.1; 2.5.2; 2.5.3
• storage and management of hazardous materials, fuels and residues.	2.9.2
Supply and servicing	
• vessel support, including loading, refuelling and operation of marine support vessels (i.e. for transfer, re-supply, and on-site safety during drilling activities); and	2.5.5

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• helicopter support (i.e. crew transport and delivery of supplies and equipment).	2.5.5
Decommissioning, suspension, or abandonment of wells	
• the preliminary outline of a well decommissioning, suspension and abandonment plan for wells at varying water depths	2.5.4
4. PUBLIC PARTICIPATION AND CONCERNS	
The EIS will describe the ongoing and proposed public participation activities that the proponent will undertake or that it has already conducted on the project. It will provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process.	Chapter 3
The EIS will indicate the methods used, where the consultation was held, the persons and organizations consulted, the concerns voiced and the extent to which this information was incorporated in the design of the project as well as in the EIS.	Chapter 3
The EIS will provide a summary of key issues raised related to the project and its potential effects to the environment as well as describe any outstanding issues and ways to address them.	Chapter 3 – summaries by group
5. ENGAGEMENT WITH INDIGENOUS GROUPS AND CONCERNS RAISED	
For the purposes of developing the EIS, the proponent will engage with Indigenous groups that may be affected by the project, to obtain their views on:	
• the project;	3.3
• effects of changes to the environment on Aboriginal peoples (health and socio-economic conditions; physical and cultural heritage, including any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and current use of lands and resources for traditional purposes) pursuant to paragraph 5(1)(c) of CEAA 2012; and	3.3
• potential adverse impacts of the project on potential or established Aboriginal or Treaty rights, in respect of the Crown's duty to consult, and where appropriate, accommodate Aboriginal peoples.	3.3
In order to allow the Indigenous groups to engage and provide views on the above, the proponent will provide the Indigenous groups with the following timely and relevant: – opportunities to learn about the project including providing information about the proposed project (including but not limited to project design, location, potential effects, mitigation measures and follow-up and monitoring programs); and – opportunities to provide input on the overall project; effects of changes to the environment on Aboriginal peoples pursuant to paragraph 5 (1)(c) of CEAA, 2012 and potential adverse impacts of the project on potential or established Aboriginal or Treaty rights.	3.3
The proponent will structure its engagement activities to provide adequate time for groups to review and comment on the relevant information. Engagement activities are to be appropriate to the groups' needs, arranged through discussions with the groups and in keeping with established consultation protocols, where available.	Chapter 3
The EIS will describe all efforts, successful or not, taken to solicit the information required from groups to support the preparation of the EIS.	Chapter 3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
With respect to engagement activities, the EIS will document:	
• the engagement activities undertaken with each group prior to the submission of the EIS, including the date and means of engagement (e.g. meeting, mail, telephone);	Chapter 3
• document the main issues and comments raised during the engagement activities by each group and the proponent's responses (effort should be made to collating like issues together along VCs identified in the EIS);	Chapter 3
• any future planned engagement activities;	Chapter 3
• where and how Indigenous groups' perspectives were integrated into and/or contributed to decisions regarding the project, design, operation, decommissioning, suspension abandonment, follow-up and monitoring and associated potential effects (paragraph 5(1)(c)) and the associated mitigation utilized to manage those effects. The effects and mitigation measures should be clearly linked to VCs in the EIS as well as to specific project components or activities; and any future planned engagement activities; and	Chapter 3; Chapter 7; Chapters 8-15
• how engagement activities by the proponent allowed groups to understand the project and evaluate its impacts on their communities, activities, potential or established Aboriginal or Treaty rights. Where impacts are identified, provide a discussion of how those would be managed or mitigated (and provide this information for each Indigenous group separately).	Chapter 3; Chapter 12
For the groups listed below, the proponent will ensure they are notified about key steps in the EIS development process and of opportunities to provide comments on key EA documents and/or information to be provided regarding their community. The proponent will ensure these groups are reflected in the baseline information and assessment of potential environmental effects as described under paragraph 5(1)(c) of CEAA 2012 and/or impacts to potential or established section 35 rights, including title and related interest in the EIS. These groups include:	
Newfoundland and Labrador – the Labrador Inuit (Nunatsiavut Government) – the Labrador Innu (Innu Nation) – the NunatuKavut Community Council Nova Scotia – 11 Mi'kmaq First Nation groups represented by Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO): • Acadia First Nation • Annapolis Valley First Nation • Bear River First Nation • Eskasoni First Nation • Glooscap First Nation • Membertou First Nation • Paqtnkek Mi'kmaw Nation	Chapter 3; Chapter 7; Chapter 12

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• Pictou Landing First Nation • Potlotek First Nation • Wagmatcook First Nation • Waycobah First Nation – Millbrook First Nation – Sipekne'katik First Nation New Brunswick – eight Mi'gmaq First Nations groups represented by Mi'gmawe'l Tplu'taqnn Inc. (MTI) • Fort Folly First Nation • Eel Ground First Nation • Pabineau First Nation • Esgenoôpetitj First Nation • Buctouche First Nation • Indian Island First Nation • Eel River Bar First Nation • Metepnagiag Mi'kmaq First Nation – Elsipogtog First Nation – Six Wolastoqey (Maliseet) First Nation groups represented by Wolastoqey Nation in New Brunswick (WNNB) • Kingsclear First Nation • Madawaska Maliseet First Nation • Oromocto First Nation • Saint Mary's First Nation • Tobique First Nation • Woodstock First Nation – Peskotomuhkati Nation at Skutik (Passamaquoddy) Prince Edward Island – Abegweit First Nation – Lennox Island First Nation	

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
Quebec – three Mi'gmaq First Nation groups represented by Mi'gmawei Mawiomi Secretariat (MMS) • Micmas of Gesgapegiag • La Nation Micmac de Gespeg • Listuguj Mi'gmaq Government – Les Innus de Ekuanitshit – Innu First Nation of Nutashkuan	
In addition, for the purposes of good governance, the proponent should also provide information to and discuss potential environmental effects from the Project, as described under section 5(1)(c) of CEAA 2012, with the Qalipu Mi'kmaq First Nation Band and the Miawpukek First Nation.	Chapter 3
Upon receipt of knowledge or information of potential effects or adverse impacts to any Indigenous group, even those not listed above, the proponent shall provide that information to the Agency at the earliest opportunity.	noted
6. IMPACTS TO POTENTIAL OR ESTABLISHED ABORIGINAL OR TREATY RIGHTS	
With respect to potential adverse impacts of the project on potential or established Aboriginal or Treaty rights, the EIS will document for each group identified in Part 2, Section 5 of these guidelines (or in subsequent correspondence from the Agency):	
• potential or established Aboriginal or Treaty rights, when this information is directly provided by a group to the proponent, the Agency or is available through public records, including but not limited to: - location of the right being practiced or exercised - context in which the right is practiced or exercised (including information about which groups of an Indigenous group practice the right (women, elders, youth), how the right was practiced historically), - how the Indigenous group's cultural traditions, laws and governance systems inform the manner in which they exercise their rights (the who, what, when, how, where and why) - the Indigenous group's perspectives on the importance of the land on which the Project is located and how it intersects with any land management uses and/or plans they may have, - how often the right is practiced or exercised and timing or seasonality of the practice or exercise of the right; and, - maps and data sets (e.g., fish catch numbers);	Chapter 12
• potential adverse impacts of each of the project components and physical activities, in all phases, on potential or established Aboriginal or Treaty rights, including those raised by Indigenous groups;	Chapter 12
• measures identified to accommodate potential adverse impacts of the project on the potential or established Aboriginal or Treaty rights. These measures will clearly describe how the proponent intends to implement them, and may go beyond mitigation measures that are developed to address potential adverse environmental effects. Include perspectives and specific suggestions raised of potentially impacted Indigenous groups; as well as any views of Indigenous groups on the effectiveness of mitigation measures;	Chapter 12

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• potential adverse impacts on potential or established Aboriginal or Treaty rights that have not been fully mitigated or accommodated as part of the EA and associated engagement with Indigenous groups. Include perspective of potentially impacted Indigenous groups; and	Chapter 12
• potential adverse impacts that may result from the residual and cumulative environmental effects. Include the perspectives of potentially impacted Indigenous groups.	Chapter 12; Section 14.6
The information sources, methodology and findings of the assessment of paragraph 5(1)(c) effects under CEAA 2012 may be used to inform the assessment of potential adverse impacts of the project on potential or established Aboriginal or Treaty rights. However, there may be distinctions between the adverse impacts on potential or established Aboriginal or Treaty rights and paragraph 5(1)(c) effects under CEAA 2012. The proponent will carefully consider the potential distinction between these two aspects and, where there are differences; will include the relevant information in its assessment.	Chapter 12
7. EFFECTS ASSESSMENT	
7.1. Project setting and baseline conditions	
Based on the scope of the project described in Section 3 (Part 1), the EIS will present baseline information in sufficient detail to enable the identification of how the project could affect the VCs and an analysis of those effects. Should other VCs be identified during the conduct of the EA, the baseline condition for these components will also be described in the EIS. To determine the appropriate spatial boundaries to describe the baseline information, refer to Section 3.2.3 (Part 1) of these guidelines. As a minimum, the EIS will include a description of the following environmental components.	Chapters 8-14
7.1.1. Atmospheric environment	
The EIS will describe the atmospheric environment and climate at the project site and within areas that could be affected by routine project operations or accidents and malfunctions, such as:	
• ambient air quality in the project area and in the airshed likely to be affected by the project, including consideration of the following contaminants: total suspended particulates (TSP), fine particulates smaller than 2.5 microns ($PM_{2.5}$), respirable particulates of less than 10 microns (PM_{10}), carbon monoxide (CO), sulphur oxides (SO_X), nitrogen oxides (NO_X), volatile organic compounds (VOCs), hydrogen sulfide (H_2S) and any other potentially toxic air pollutants;	5.4
• identify and quantify existing greenhouse gas emissions by individual pollutant measured as kilotonnes of CO_2 equivalent per year in the project study areas;	5.4
• direct (e.g. emissions related to vessel traffic) and indirect sources of air emissions;	5.4
• current provincial/territorial/federal limits for greenhouse gas emission targets;	2.9.1
• current ambient noise levels in the project area. Information on typical sound sources, geographic extent and temporal variations will be included;	5.6
• existing ambient night-time light levels in the project area and at any other areas where project activities could have an effect on light levels. The EIS will describe night-time illumination levels during different weather conditions and seasons; and	9.3.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• historical records of relevant meteorological information (e.g. total precipitation (rain and snow); mean, maximum and minimum temperatures; and typical wind speed and direction (freezing spray; lighting; and visibility).	5.3
Particular attention should also be given to the analysis of extreme meteorological events that have the potential to result in adverse effects on the project (e.g. high wind events).	5.3
Relevant marine climate data sources should be consulted, including but not limited to data from Environment and Climate Change Canada moored weather buoys and any offshore platforms operating in the Eastern Newfoundland Strategic Environmental Assessment (SEA) area. Data from the International Comprehensive Atmosphere Ocean Dataset (ICOADS), the United States of America National Oceanographic and Atmospheric Administration (NOAA) database of tropical cyclone activity in the North Atlantic, NOAA's Climate Forecast System Reanalysis (CFSR), and the Canadian Lightning Detection Network.	5.3; 5.8
7.1.2 Marine environment	
• marine water quality (e.g. water temperature, turbidity, salinity, and pH);	5.5
• marine geology and geomorphology (i.e. bottom sediments, including quality, thickness, grain size, and mobility);	5.1
• physical oceanography including surface and subsurface current patterns, current velocities, waves, storm surges, long shore drift processes, tidal patterns, and tide gauges levels for the site, in proximity to the site, and along the marine transportation routes with consideration of predicted climate change effects	5.5
• available bathymetric information (e.g. maximum and mean water depths) for the site and along marine transportation routes if applicable;	5.2
• ice climate in the regional study area, including ice formation and thickness, ridging, breakup and movement;	5.7
• ice conditions along the marine transportation routes with consideration of predicted climate change and its possible effect on the timing of ice formation in the future;	5.7
• fast-ice characteristics, including its surface area and seasonal stability and along the marine transportation routes;	5.7
• marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton;	6.1.1
• acoustic environment (ambient noise levels from natural sources, shipping, seismic surveys, and other sources), including information on geographic extent and temporal variations and how the acoustic environment may be affected by the project.	5.6
7.1.3 Fish and fish habitat	
The EIS will describe fish and fish habitat within areas that could be affected by routine project operations or by accidents and malfunctions, including:	
• a characterization of fish populations on the basis of species and life stage, including information on the surveys carried out (e.g. location of sampling stations, catch methods, date of catches, species, catch per-unit effort) and the source of data available (e.g. government and historical databases, commercial fishing data);	6.1

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• a description of primary and secondary productivity in affected water bodies with a characterization of season variability; and	6.1.1
• benthic flora and fauna and their associated habitat, including sensitive features such as corals and sponges (Note: a benthic habitat survey (ROV / camera), including transects of seafloor in the area of the well locations, may be required).	6.1.4
Emphasis will be placed on the waters and benthic environments likely to be affected by the project. Hence, for all areas in which effects are anticipated, the EIS will describe the biophysical water and sediment characteristics, including:	
• a description of the physical and biological characteristics of the fish and fish habitat likely to be directly or indirectly affected by the project;	6.1
• maps, at a suitable scale, indicating the surface area of potential or confirmed fish habitats and a description of these habitats as determined by water depths, type of substrate (sediments), aquatic vegetation, and potential use (i.e. spawning, rearing, nursery, feeding, overwintering, migration routes, etc.). Where appropriate, this information should be linked to water depths (bathymetry) to identify the extent of a water body's littoral / photic zone;	6.1
• quality, thickness, grain size and mobility of bottom sediments; and	5.1
• a discussion of sea bottom stability at the project site.	5.1
Any sampling survey methods used by the proponent will be described in order to allow experts to ensure the quality of the information provided. If previous studies on the habitat in the study area were conducted, they are to be submitted with the EIS.	6.1
7.1.4 Migratory birds and their habitat	
The EIS will describe migratory and non-migratory birds and their habitat at the project site and within areas that could be affected by routine project operations or accidents and malfunctions.	6.2
Migratory birds are protected under the Migratory Bird Protection Act (MBCA) and associated regulations. Preliminary data from existing sources will be gathered, including information such as:	
• birds and their habitats that are found or are likely to be found in the study area. This description may be based on existing sources, but supporting evidence is required to demonstrate that the data used are representative of the avifauna and habitats found in the study area. The existing data must be supplemented by surveys, if required.	6.2
• abundance, distribution, and life stages of migratory and non-migratory birds likely to be affected in the project area based on existing information, or surveys, as appropriate, to provide current field data;	6.2
• year-round migratory bird use of the area (e.g. winter, spring migration, breeding season, fall migration), based on preliminary data from existing sources and surveys to provide current field data if appropriate; and	6.2
• areas of concentration of migratory birds, such as for breeding, feeding or resting.	6.2
Other relevant datasets should be consulted, such as those available from the Canadian Wildlife Service (e.g. Eastern Canadian Seabirds at Sea (ECSAS), Programme intégré de recherches sur les oiseaux pélagiques (PIROP)), the Atlantic Canada Conservation Data Centre (ACCDC), recovery strategies, management plans, Newfoundland and Labrador Department of Fisheries and Land Resources Wildlife Division, previous petroleum operations in the area and university or other research programs, if available.	6.2

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.1.5. Species at Risk	
The EIS will describe federal species at risk and their habitat, including critical habitat, at the project site and within areas that could be affected by routine project operations or accidents and malfunctions, such as:	
• a list of all potential or known federally listed species at risk that may be affected by the project, using existing data and literature as well as surveys to provide current field data;	6.1.6; 6.2.2; 6.3.1
• a list of all federal species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing on Schedule 1 of the Species at Risk Act. This will include those species in the risk categories of extirpated, endangered, threatened and of special concern;	6.1.6; 6.2.2; 6.3.1
• any published studies that describe the regional importance, abundance and distribution of species at risk including recovery management plans, recovery strategies and action plans. The existing data must be supplemented by surveys, if required;	6.1.6; 6.2.2; 6.3.1
• residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified critical habitat and/or recovery habitat (where applicable) and general life history of species at risk that may occur in the project area, or be affected by the project; and	6.1.6; 6.2.2; 6.3.1
• identification of any potentially affected critical habitat as defined in the Species at Risk Act.	6.1.6; 6.2.2; 6.3.1
• The following information sources on species at risk and species of conservation concern should be among those consulted: - Species at Risk Act Registry (www.sararegistry.gc.ca); - COSEWIC; - Relevant government agencies; - Local naturalist and interest groups; and - Indigenous groups and First Nations.	6.1.6; 6.2.2; 6.3.1
7.1.6. Marine mammals	
• marine mammal species that may be present, the times of year they are present, the ranges of the species and their migration patterns, and	6.3
• important areas in the vicinity of the drilling sites or supply routes (e.g. for mating, breeding, feeding and nursing of young) or that could be impacted by the project (e.g. acoustics, spills, etc.).	6.3
6.1.7. Marine turtles	
• marine turtle species that may be present, the times of year they are present, the ranges of the species and their migration patterns; and	6.3
• important areas in the vicinity of the drilling sites or supply routes (e.g. for mating, breeding, and feeding) or that could be impacted by the project (e.g. routine discharges, spills, etc.).	6.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.1.8. Indigenous peoples	
The proponent shall gather and document baseline information in the EIS for each Indigenous group identified in Part 2, Section 5 of these guidelines (and any groups identified after these guidelines are finalized). The baseline information will: • Describe and characterize the elements in paragraph 5(1)(c) of CEAA 2012 based on the spatial and temporal scope selected for the EA according to the factors outlined in Part 1, Section 3.2.3 of this document.	7.3
• Characterize the regional context of each of the elements of paragraph 5(1)(c) of CEAA 2012 to support the assessment of project related effects, including consideration of the differences of experiences by sub-populations within an Indigenous group, as appropriate (for example, women, youth, elders, families) and cumulative effects.	7.3
• Be sufficient to provide a comprehensive understanding of the current state of each VC related to effects of changes to the environment on Aboriginal peoples. Each of the VCs for effects of changes to the environment on Aboriginal peoples is interrelated and therefore baseline information will often overlap.	7.3
The proponent should engage with Indigenous groups to understand where baseline information and the respective assessment fit appropriately. Note: VCs identified for biophysical assessment (such as fish and fish habitat) may contribute to assessment and conclusion of VCs related to effects of changes to the environment on Aboriginal peoples.	3.3; 7.3
Health and Socio-Economic Conditions	
Baseline information is required for health and socio-economic conditions. For health this includes the state of physical, mental and social well-being. For socio-economic conditions, as well as the economic and social activities of an individual Indigenous group, the baseline will include contextual information regarding their practices. Specific aspects that will be considered include:	
• general information about Indigenous populations and sub-populations;	7.3
• consumption of country foods (also known as traditional foods) including food that is trapped, fished, or hunted for subsistence or medicinal purposes, outside of the commercial food chain;	7.3
• which country foods are consumed by which groups, how frequently, and where these country foods are harvested;	7.3
• commercial activities (e.g. fishing, trapping, hunting, outfitting);	7.1; 7.3
• any project components and a description of any activities (e.g. exclusion zones) that may affect commercial fisheries or other uses;	2.3; 2.5; 7.3
• human health, primarily with respect to potential contamination of food sources; and	7.3
• recreational uses.	7.3
Physical and Cultural Heritage	
Baseline information for physical and cultural heritage (including any site, structure or thing of archaeological, paleontological, historical or architectural significance) will consider all elements of cultural and historical importance to Indigenous groups in the area and is not restricted to artifacts considered under provincial heritage legislative requirements.	7.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
Current Use of Lands and Resources for Traditional Purposes	
Baseline information for current use of lands and resources for traditional purposes will focus on the traditional activity (e.g. hunting, fishing) and include a characterization of all attributes of the activity that can be affected by environmental change. This includes understanding of the baseline conditions of the quality and quantity of resources (e.g. preferred species and perception of quality, cultural connections to species), access to resources (e.g. physical access, timing, seasonality, distance from community) and overall quality of the experience of the practice (e.g. noise, air quality, visual landscape and presence of others). Specific aspects that will be considered include, but are not limited to: • location of traditional territory (including maps where available);	7.3
• location of reserves and communities;	7.3
• commercial and traditional fishing activity within the project's potential zone of influence, including licences and maps;	7.1; 7.3
• places where fish, wildlife, birds, plants or other natural resources are harvested, including places that are preferred;	7.3
• access and travel routes for conducting traditional practices;	7.3
• frequency, duration or timing of traditional practices;	7.3
• cultural values associated with the area affected by the project and the traditional uses identified;	7.3
• other current uses identified by Indigenous groups.	7.3
Any other baseline information that supports the analysis of predicted effects on Indigenous peoples will be included as necessary.	7.3
The EIS will also indicate how input, including Indigenous knowledge, from groups was used in establishing the baseline conditions related to health and socio-economics, physical and cultural heritage and current use of lands and resources for traditional purposes. Information collected as part of Section 6 Aboriginal and Treaty rights can be used to inform the baseline information for the elements of 5(1)(c) listed above.	7.3
Should there be a lack of Indigenous knowledge; the proponent is still expected to seek information from other sources sufficient enough to allow for a complete the assessment of effects to be presented in the EIS.	7.3
7.1.9. Other changes to the environment arising as a result of a federal decision or due to changes on federal lands, in another province or outside Canada	
Should there be the potential for a change to the environment arising as a result of a federal decision(s), or on federal lands, lands in another province or lands outside Canada, the EIS will include baseline information on the environmental component likely to be affected (if this information is not already covered in other subsections of these guidelines).	Chapter 17

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.1.9.1. Special areas	
The EIS will describe special areas (e.g. marine refuges, species at risk critical habitat that has been designated and that has been proposed or that may be under consideration, Important Bird Areas, Migratory Bird Sanctuaries, ecological reserves, etc.) at the project site and within areas that could be affected by routine project operations or accidents and malfunctions, such as: • Marine Protected Areas • Ecologically and Biologically Significant Areas • Fishery Closure Areas • Vulnerable Marine Ecosystem • Preliminary Representative Marine Areas	6.4
The EIS will describe the distances between the edge of the project area (i.e. drill sites and marine transportation routes) and special areas. It shall state the rationale for designating specific areas as “special” (i.e. the environmental features that define the special area).	6.4
7.1.9.2. Human environment	
With respect to potential effects on the human environment, non-Indigenous people and the related VC baseline information will describe and characterize the following that could be affected by routine project operations or accidents and malfunctions. At a minimum, this should include:	
• any federal lands, lands located outside the province or Canada that may be affected by the project operations or by accidents and malfunctions;	7.1; 7.2; 7.3
• the current and historical use of waters that may be affected by routine project operations or by accidents and malfunctions, including:	Chapter 7
- current commercial and recreational fishing activity, including licence holders and species fished;	7.1
- other ocean uses (e.g. shipping, research, oil, and gas, military, ocean infrastructure [e.g. subsea cable]);	7.2
• the location of and proximity of any permanent, seasonal, or temporary residences or camps that could be affected by routine project operations or accidents and malfunctions;	7.4
• health and socio-economic conditions that could be affected by routine project operations or accidents and malfunctions, including the functioning and health of the socio-economic environment, encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities	7.4
• physical and cultural heritage, including structures, sites or things of historical, archaeological, paleontological or architectural significance that could be affected by routine project operations or accidents and malfunctions;	7.4
• the rural and urban settings that could be affected by routine project activities or accidents and malfunctions; and	7.4
• any project components and activities (e.g. exclusion zones) that may affect commercial or recreational fisheries or other uses.	7.1; 7.2
The EIS should also discuss the potential to encounter unexploded ordnance (UXOs), based on consultation with the Department of National Defence.	7.4

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
6.2. Predicted changes to the physical environment	
The EA will include a consideration of the predicted changes to the environment as a result of the project being carried out or as a result of any powers, duties or functions that are to be exercised by the federal government in relation to the project. These predicted changes to the environment are to be considered in relation to each phase of the project (e.g. drilling, testing, decommissioning, suspension, abandonment) and are to be described in terms of the magnitude, geographic extent, timing, duration, frequency, ecological and social context, and whether the environmental changes are reversible or irreversible.	Chapters 8-14
The EIS will include stand-alone sections that summarize those changes that may be caused by the project on the components of the environment listed in paragraph 5(1)(a) of CEAA 2012, namely fish and fish habitat, aquatic species, and migratory birds.	Chapters 8-14
The EIS will include a stand-alone section that summarizes any change the project may cause to the environment that may occur on federal lands or lands outside the province in which the project is to be located (including outside of Canada).	Chapters 8-13
In situations where the project requires one or more federal decisions identified in section 5(2), the EIS will also include a stand-alone section that describes any change that may be caused by the project on the environment that is directly linked or necessarily incidental to these decisions (e.g. changes to commercial fishing).	Chapter 17
7.2. Predicted changes to the physical environment	
The EA will include a consideration of the predicted changes to the environment as a result of the project being carried out or as a result of any powers, duties or functions that are to be exercised by the federal government in relation to the project. These predicted changes to the environment are to be considered in relation to each phase of the project (e.g. drilling, testing, decommissioning, suspension, abandonment) and are to be described in terms of the magnitude, geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible. As changes to various parts of the physical environment may be inter-related as part of an ecosystem, the EIS will explain and describe the connections between the changes described.	Chapters 8 and 11
7.3. Predicted effects on valued components	
Based on the predicted changes to the environment identified in Section 6.2, the proponent is to assess the environmental effects of the project on the following VCs. All interconnections between VCs and between changes to multiple VCs will be described:	
7.3.1. Fish and fish habitat	
• the identification of any potential adverse effects to fish and fish habitat as defined in subsection 2(1) of the Fisheries Act, including the calculations of any potential habitat loss (temporary or permanent) in terms of surface areas (e.g. spawning grounds, fry-rearing areas, feeding). The assessment will include a consideration of:	
- effects on water quality including changes to chemical composition, temperature, oceanographic conditions, etc.;	8.2; 8.3
- the geomorphological changes and their effects on hydrodynamic conditions and fish habitats (e.g. modification of benthic habitat including corals and sensitive habitat, area affected by drilling waste, disturbance to water column);	8.2; 8.3
- the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, juvenile, rearing, and feeding, movements);	8.3
- any potential imbalances in the food web in relation to baseline conditions;	8.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
- underwater noise and vibration emissions from project activities (i.e. drilling, vertical seismic profiling, offshore supply vessel operation, well abandonment) and how it may affect fish health and behaviour;	8.3
- effects on the primary and secondary productivity of water bodies and how project-related effects may affect fish food sources;	8.3
• the effects of changes to the aquatic environment on fish and their habitat, including:	
- the anticipated changes in the composition and characteristics of the populations of various fish species, including shellfish and forage fish including mortality of fish, eggs and larvae;	8.3
- any modifications in migration or local movements during and after project activities (e.g. vertical seismic profiling, drilling); and	8.3
- any modifications and use of habitats by federally or provincially listed fish species at risk.	8.4
• a discussion of the effects of drilling waste disposal on fish health, marine benthos (fish habitat) and other components of the aquatic environment, recognizing that the disposal of these wastes is expected to be a primary cause of effect on benthos;	8.3.4
• a discussion of the length of time it would take for the benthic environment to return to baseline conditions in water depths within which the Project would occur;	8.3.4
• a discussion of how project timing correlates to key fisheries windows and any potential effects resulting from overlapping periods; and	13.3
• a discussion of how data examining the deposition of drilling-related wastes (e.g. fluid, mud residues, cuttings) and acoustic monitoring data could be collected during and after drilling operations and how this would be used to verify effects predictions.	8.3.3; 8.3.4
7.3.2. Marine plants	
• effects on marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae and phytoplankton.	8.3
7.3.3. Marine mammals	
• effects on marine mammals, including but not limited to:	
- mortality and other effects from vessel collisions or disturbance;	10.3
- direct and indirect effects caused by increased disturbance (e.g. noise, light, vibrations) including mortality, physical injury and behavioural changes (e.g. habitat avoidance, disruption to feeding behaviour, deviation in migration routes, communication masking, and behavioural disturbance).	10.3.3; 10.3.4; 10.3.6; 10.3.7
- exposure to spilled contaminants (e.g. fuel, oils) and operational discharges (e.g. deck drainage, gray water, black water); and	10.3.3; 10.3.4; 10.3.6; 10.3.7
- change in marine habitat quality from drill muds and cuttings and sedimentation.	10.3.4

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.3.4. Marine turtles	
• effects on marine turtles, including but not limited to:	
- mortality and other effects from vessel collisions or disturbance;	10.3
- direct and indirect effects caused by increased disturbance (e.g. noise, light, vibrations) including mortality, physical injury and behavioural changes (e.g. habitat avoidance, disruption to feeding behaviour, deviation in migration routes, communication masking, and behavioural disturbance).	10.3.3; 10.3.4; 10.3.6; 10.3.7
- exposure to spilled contaminants (e.g. fuel, oils) and operational discharges (e.g. deck drainage, gray water, black water); and	10.3.3; 10.3.4; 10.3.6; 10.3.7
- change in marine habitat quality from drill muds and cuttings and sedimentation.	10.3.4
7.3.5. Migratory birds	
• direct and indirect adverse effects on migratory birds, including population level effects that could be caused by all project activities, including but not limited to:	
- noise disturbance from seismic equipment including both direct effects (physiological), or indirect effects (foraging behaviour of prey species);	9.3
- physical displacement as a result of vessel presence (e.g. disruption of foraging activities);	9.3.3; 9.3.6; 9.3.7; 9.3.8
- night-time illumination levels from lights and flares during different weather conditions and seasons and during different project activities (e.g. drilling, well testing) and associated nocturnal disturbance (e.g. increased opportunities for predators, attraction to the drilling unit and vessels and subsequent collision or exposure to vessel-based activities, incineration in flares, disruption of normal activities);	9.3.3; 9.3.5; 9.3.6; 9.3.7; 9.3.8
- exposure to spilled contaminants (e.g. fuel, oils) and operational discharges (e.g. deck drainage, grey water, black water);	9.3.3; 9.3.4; 15.5.2
- attraction of, and increase in, predator species as a result of waste disposal practices (i.e. sanitary and food waste) and the presence of incapacitated/dead prey near the Mobile Offshore Drilling Unit(s) or support vessels;	9.3.3; 9.3.4
- physical harm or mortality from flaring on the drilling unit or other vessel-based activities;	9.3.3; 9.3.5; 9.3.6; 9.3.7; 9.3.8
- collision risk with the drilling unit and other project infrastructure;	9.3.3; 9.3.5; 9.3.6; 9.3.7; 9.3.8
- the effects of oil spills in the nearshore or that reach land on landbird species;	15.5.2
- change in marine habitat quality from drill muds and cuttings and sedimentation; and	9.3.4
- indirect effects caused by increased disturbance (e.g. noise, light, presence of workers), relative abundance movements and changes in migratory bird habitat.	9.3.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.3.6. Species at risk	
• the potential adverse effects of the project on federally-listed species at risk and those species listed by the Committee on the Status of Endangered Wildlife in Canada classified as extirpated, endangered, threatened or of special concern (flora and fauna) and their critical habitat, including:	
- alteration of habitat (including critical habitat) features;	8.4; 9.4; 10.4
- direct and indirect effects from noise, vibrations, and increased exposure to contaminants of concern;	8.4; 9.4; 10.4
- a discussion of migration patterns of federal species at risk and related effects (e.g. displacement, increased risk of collision); and	8.4; 9.4; 10.4
- direct and indirect effects on the survival or recovery of federally listed species (list species).	8.4; 9.4; 10.4
7.3.7. Indigenous peoples	
With respect to Indigenous peoples, a description and analysis, for each Indigenous group, of how changes to the environment caused by the project will affect the health and socio-economic conditions, physical and cultural heritage including any structure, site or thing of historical, archaeological or paleontological importance, and current use of lands and resources for traditional purposes.	Chapter 12
Health and Socio-Economic Conditions	
Baseline information gathered as part of the assessment of effects described in 5(1)(c) of CEAA 2012, as well as general information about Indigenous populations and sub-populations could inform the assessment of human health.	7.3
• The assessment of impacts to human health will be based on effects of changes to the environment on Aboriginal peoples' human health, focusing on effects on health outcomes or risks in consideration of, but not limited to, potential changes in noise exposure, current and future availability of country foods (e.g. marine species), and water quality (recreational and cultural uses).	12.1
• When risks to human health due to changes in one or more of these components are predicted, the proponent is expected to complete a Human Health Risk Assessment (HHRA) examining all exposure pathways for pollutants of concern to adequately characterize potential risks to human health.	12.1
• The proponent must provide a justification if it determines that an assessment of the potential for contamination of country foods is not required or if some contaminants are excluded from the assessment.	12.1
• Consider effects to mental and social well-being of Indigenous peoples. Where adverse health effects are predicted, any incidental effects such as effects on current use of lands and resources for traditional purposes should also be assessed.	12.1
• Consider and document how effects of changes to the environment could be different for particular sub-populations within an Indigenous group (for example, women, youth, elders, specific families);	12.2; 12.4

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• This assessment of impacts to human health will assess effects of changes to the environment on Indigenous peoples' socio-economic conditions, including, but not limited to: - the use of navigable waters (including any water used for Indigenous transport) - commercial fishing, hunting, and trapping activities - commercial outfitters - recreational use - food security - income inequity - changes at the community level that affect socio-economic conditions for Indigenous peoples as result of increased population, economic activity, cost of living, among other factors - non-commercial / trade economy	12.1; 12.3; 12.4
Physical and Cultural Heritage	
This assessment will assess effects of changes to the environment on Aboriginal peoples' physical and cultural heritage, and structures, sites or things of historical, archaeological, paleontological or architectural significance to groups, including, but not limited to:	12.1; 12.3; 12.4
• the loss or destruction of physical and cultural heritage	12.1; 12.3; 12.4
• changes to access to physical and cultural heritage	12.1; 12.3; 12.4
• changes to the cultural value or importance associated with physical and cultural heritage	12.1; 12.3; 12.4
• changes to sacred, ceremonial or culturally important places, objects, or things	12.1; 12.3; 12.4
• Current Use of Lands and Resources for Traditional Purposes	
This assessment will characterize the effects (including cumulative effects) on the use or activity (e.g. hunting, fishing, trapping, and cultural practices) as a result of the underlying changes to the environment (i.e. how will the activity change if the project proceeds), using the approach described in the Agency's guide entitled Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA 2012.	12.1; 12.3; 12.4; 14.6
• This assessment should consider changes caused by the Project through changes to the environment, can cause effects to the practice of a current use or activity through the following interactions with:	
– Resources used, such as changes to the quantity, quality, and availability of resources and habitat, as well as to the sufficiency of resources required to conduct an activity or practice, including perception of effects, avoidance, and consideration of the seasonal round;	12.1; 12.3; 12.4; 14.6
– any changes or alterations to access into the areas used for traditional purposes and commercial fishing, including implementation of exclusion zones;	12.1; 12.3; 12.4; 14.6
– effects on food, social, ceremonial, and commercial fishing;	12.1; 12.3; 12.4; 14.6

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
– a discussion of how drilling activities correlates to key fisheries windows, and any potential impacts resulting from overlapping periods; and	12.1; 12.3; 12.4; 14.6
– Experience by Indigenous peoples, including changes that affect the spiritual and cultural experiences of the activity or practice, as well as sense of place and wellbeing, and the applicability and transmission of Indigenous knowledge, laws, customs and traditions.	12.1; 12.3; 12.4; 14.6
• Using the interactions listed in the above bullet, the proponent should also consider the following in their assessments:	
– the cultural value or importance associated with traditional uses or areas affected by the project (e.g. values or attributes of the area that make it important as a place for inter- generational teaching of language or traditional practices, communal gatherings, integrity of preferred traditional practice areas);	12.1; 12.3; 12.4; 14.6
– how timing of project activities (e.g. drilling, flaring) have the potential to interact with the timing of traditional practices, and any potential effects resulting from overlapping periods;	12.1; 12.3; 12.4; 14.6
– any changes to environmental quality (e.g. air, water), the sensory environment (e.g. noise, light, visual landscape), or perceived disturbance of the environment (e.g. fear of contamination of water or country foods) that could detract from use of the area or lead to avoidance of the area; and	12.1; 12.3; 12.4; 14.6
– an assessment of the potential to return affected areas to pre-project conditions to support traditional practices.	12.1; 12.3; 12.4; 14.6
• other effects of changes to the environment on groups should be reflected as necessary.	12.1; 12.3; 12.4; 14.6
The proponent is expected to provide mitigation measures for effects of changes to the environment on Aboriginal peoples pursuant to section 5 (1)(c) of CEAA, 2012 (see Part 2, Section 7.4. of these guidelines).	12.3
7.3.8. Other valued components that may be affected as a result of a federal decision or due to effects on federal lands, another province or outside Canada	
If there is the potential for a change to the environment arising as a result of a federal decision(s), for example an authorization under section 138(1) of the Canada-Newfoundland and Labrador Atlantic Accord Implementation Act or section 35 of the Fisheries Act, the EIS should include a description of the specific project components for which a federal authorization/decision is required, and an assessment of any other VCs (not already covered in other subsections of these guidelines) that may be affected by the changes to the environment caused by these specific project components. If there is the potential for the project to result in environmental changes on federal lands (or waters), another province, or another country, then VCs of importance not already identified should be included. For example, if the project will result in the generation of greenhouse gas emissions, the EIS should include a description of the project's greenhouse gas emissions in a regional, provincial, national or international context if applicable.	Chapter 17
Suggested VCs are noted below for this project.	
7.3.8.1. Air quality and greenhouse gas emissions	
• comparison of anticipated air quality concentration against the Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter or other relevant federal and/or provincial criteria for other contaminants of potential concern;	2.9.1

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• description of all methods and practices (e.g. control equipment) that will be implemented to minimize and control atmospheric emissions throughout the project life cycle. If the best available technologies are not included in the project design, the proponent will need to provide a rationale for the technologies selected;	2.9
• an estimate of the direct greenhouse gas emissions associated with all phases of the project (i.e. including drilling, well testing and vessel and helicopter transportation) as well as any mitigation measures proposed to minimize greenhouse gas emissions. This information is to be presented by individual pollutant and should also be summarized in CO2 equivalent per year. The proponent is responsible for the following: – provide an estimate of the contribution of the project emissions at the local, provincial and federal scale, and indicate the category into which the project falls in terms of the relative magnitude of its contribution to greenhouse gas emissions (project with low, medium or high emission rates); – provide the estimation or derivation method, and disclose, describe, and justify assumptions and emission intensity factors used; – compare and assess the level of estimated emissions to the regional, provincial and federal emission targets; and – provide information related to the project's electrical demand and sources of electrical power for equipment, i.e. the project's main source and any other additional sources (generators, etc.), as appropriate.	2.9.1
• changes in ambient noise levels; and	2.9.5
• changes in night-time light levels.	2.9.5; 9.3.3
7.3.8.2. Commercial fisheries	
• effects of changes to the environment on commercial fishing activities (e.g. effects on fished species affecting fisheries success, displacement from fishing areas (e.g. exclusion zones), gear loss or damage);	13.3.3
• a discussion of how drilling activities correlates to key commercial fisheries windows, and any potential impacts resulting from overlapping periods;	13.3.3
• effects from subsea infrastructure that could be left in place (e.g. wellheads) following abandonment; and	13.3.3
• changes to habitat of commercial fish species (e.g. noise, water and sediment quality).	13.3.3; 8.3
7.3.8.3. Special areas	
effects on special areas, including, but not limited to:	
- use of dispersants;	15.5
- change to habitat quality (e.g. noise, light, water, sediment quality); and	11.4.3
- change to the environmental features that define the special area (e.g. physical features, species assemblages, species abundance).	11.4.3

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.3.8.4. Human environment	
effects of changes to the environment on health and socio-economic conditions, physical and cultural heritage and any structure, site or thing that is of historical, archaeological, paleontological, or architectural value, including, but not limited to the following, as applicable:	
• recreational activities;	13.3.3
• other ocean uses;	13.3.3
• socio-economic conditions;	13.3.3
• human health;	13.3.3; 12.3
• physical and cultural heritage (e.g. shipwrecks); and	13.3.3; 12.3
• rural and urban settings that could be affected by routine activities and/or accidents and malfunctions.	7.4
7.4 Mitigation measures	
Every EA conducted under CEAA 2012 will consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project. Under CEAA 2012, mitigation measures includes measures to eliminate, reduce or control the adverse environmental effects of a designated project, as well as restitution for damage to the environment through replacement, restoration, compensation or other means. Measures will be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. Mitigation measures may be considered for inclusion as conditions in the EA decision statement and/or in other compliance and enforcement mechanisms provided by other authorities' permitting or licensing processes. As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the project or relocation of project components.	8.3.2; 9.3.2; 10.3.2; 11.3; 12.3; 13.3.2
The EIS will describe the standard mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location. The EIS will then describe the project's environmental protection plan and its environmental management system, through which the proponent will deliver this plan. The plan will provide an overall perspective on how potentially adverse effects would be minimized and managed over time. The EIS will further discuss the mechanisms the proponent would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.	8.3.2; 9.3.2; 10.3.2; 11.3; 12.3; 13.3.2
The EIS will then describe mitigation measures that are specific to each environmental effect identified. Mitigation measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation measure is designed to address. The EIS will identify and describe mitigation measures to avoid, or lessen potential adverse effects on species and/or critical habitat listed under the Species at Risk Act. These measures will be consistent with any applicable recovery strategy and action plans. The EIS will also identify and describe mitigation measures to avoid or lessen adverse effects on listed COSEWIC species.	8.3.2; 9.3.2; 10.3.2; 11.3; 12.3; 13.3.2

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The EIS will specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the project's various phases to eliminate or reduce the significance of adverse effects. The EIS will also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The reasons for determining if the mitigation measure reduces the significance of an adverse effect will be made explicit. The proponent is also encouraged to identify mitigation measures for effects that are adverse although not significant.	8.3.2; 9.3.2; 10.3.2; 11.3; 12.3; 13.3.2
The EIS will indicate what other technically and economically feasible mitigation measures were considered, and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation measures will be justified. The EIS will identify who is responsible for the implementation of these measures and the system of accountability.	8.3.2; 9.3.2; 10.3.2; 11.3; 12.3; 13.3.2
Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective will be clearly and concisely described. In addition, the EIS will identify the extent to which technological innovations will help mitigate environmental effects. Where possible, it will provide detailed information on the nature of these measures, their implementation, management and the requirements of the follow-up program.	8.3.2; 9.3.2; 10.3.2; 11.3; 12.3; 13.3.2
The EIS will document specific suggestions raise by each Indigenous group for mitigating the effects of changes to the environment on Aboriginal peoples (section 5(1)(c) of CEAA 2012). For those mitigation measures intended to address effects of changes to the environment on Aboriginal peoples, the proponent must discuss the residual effects with the Indigenous groups identified in Part 2, Section 5 of these guidelines prior to submitting the EIS.	7.3
Adaptive management is not considered as a mitigation measure, but if the follow-up program (refer to Section 8 below) indicates that corrective action is required, the proposed approach for managing the action should be identified.	8.6; 9.6; 10.6; 11.6; 12.5; 13.5
7.5. Significance of residual effects	
After having established the technically and economically feasible mitigation measures, the EIS will present any residual environmental effects of the project on the VCs identified in Section 7.3 above. For those VCs related to effects of changes to the environment on Aboriginal peoples, the proponent must discuss the residual effects with the Indigenous groups identified in Part 2, Section 7 of these guidelines prior to submitting the EIS. The residual effects, even if very small or deemed insignificant, will be described.	8.5; 9.5; 10.5; 11.5; 12.4; 13.4
The EIS will then provide a detailed analysis of the significance of the residual environmental effects that are considered adverse following the implementation of mitigation measures, using the Agency's guidance on determining whether a project is likely to cause significant adverse environmental effects.	8.5; 9.5; 10.5; 11.5; 12.4; 13.4
The EIS will identify the criteria used to assign significance ratings to any predicted adverse effects. It will contain clear and sufficient information to enable the Agency, technical and regulatory agencies, Indigenous groups, and the public to review the proponent's analysis of the significance of effects. For those predicted adverse effects that relate to effects of the changes to the environment on Aboriginal peoples, the proponent will consider the views of the Indigenous groups in the determination of the definitions of the significance criteria. The EIS will document the terms used to describe the level of significance.	8.5; 9.5; 10.5; 11.5; 12.4; 13.4

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The following criteria should be used in determining the significance of residual effects: • magnitude • geographic extent • timing • duration • frequency • reversibility • ecological and social context • existence of environmental standards, guidelines, or objectives for assessing the effect	4.3.3; 8.1; 8.5; 9.1; 9.5; 10.1; 10.5; 11.1; 11.5; 12.1; 12.4; 13.1; 13.4
In assessing significance against these criteria the proponent will, where possible, use relevant existing regulatory documents, environmental standards, guidelines, or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous agents into the environment. The EIS will contain a section which explains the assumptions, definitions and limits to the criteria mentioned above in order to maintain consistency between the effects on each VC.	4.3.3
Where significant adverse effects are identified, the EIS will set out the probability (likelihood) that they will occur, and describe the degree of scientific uncertainty related to the data and methods used within the framework of this environmental analysis.	8.5; 9.5; 10.5; 11.5; 12.4; 13.4
7.6. Other effects to consider	
7.6.1. Effects of potential accidents or malfunctions	
The failure of certain works caused by equipment malfunctions, human error or exceptional natural events (e.g. earthquake, hurricane, submarine landslide) could cause adverse environmental effects. The proponent will therefore conduct an analysis of the risks of accidents and malfunctions, determine their effects, and present preliminary emergency response measures.	Chapter 15
Taking into account the lifespan of different project components, the proponent will identify the probability of potential accidents and malfunctions related to the project, including an explanation of how those events were identified, potential consequences (including the environmental effects as defined in section 5 of CEAA 2012), the plausible worst case scenarios and the effects of these scenarios.	Chapter 15
This assessment will include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events and would potentially result in an adverse environmental effect as defined in section 5 of CEAA 2012.	Chapter 15
The EIS will describe the safeguards that have been established to protect against such occurrences and the contingency and emergency response procedures that would be put in place if such events do occur.	Chapter 15
The effects of accidental spills and blowouts will therefore require assessment in the EIS, including fate and behaviour modelling, and hydrologic trajectory modelling for worst-case large-scale spill scenarios that may occur, including any assumptions, limitations, and formulated hypotheses, accompanied by supporting documentation of methodologies and the cumulative results of the modelling.	Chapter 15

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
Results should be reported in a manner that illustrates the effects of varying weather and oceanographic conditions that may occur throughout the year, and should include a projection for spills originating at the site and followed until the slick volume is reduced to a negligible amount or until a shoreline is reached. Spill scenarios should also consider potential worst–cases, including when species at risk and high concentrations of marine birds or fish are present or for areas important for reproduction. A discussion on water depth and its effect on blow-out rate and spill trajectory modelling assumptions must be provided. Where well locations have not yet been identified, points of origin selected for spill trajectory models should be conservative (e.g. selecting a potential location within the proposed drilling area that is closest to a sensitive feature or that could result in greatest effects).	Chapter 15
Based on the results of the spill modelling and analysis in the EIS, an emergency response plan (e.g. oil spill contingency plan) for spills (small and large) and blowouts will be required. At a minimum, an outline of the emergency response plan along with key commitments is required in the EIS. Depending on the outcomes of the effects analysis, specific detail on key components of the plan will be required in the EIS. The proponent should commit to finalizing the plan in consultation with regulators prior to the application of permits. The EIS shall include a discussion on the use, availability (including nearest location), timing (testing and mobilizing) and feasibility of a capping stack to stop a blowout and resultant spills. If dispersants are to be used, the proponent shall consider associated environmental effects in the EIS (e.g. effects on marine life) and provide a plan for their use. The environmental effects of other measures outlined in the emergency response plan should also be considered (e.g. effects from in-situ burning). The EIS shall include the means by which design and/or operational procedures, including follow-up measures, will be implemented to mitigate significant adverse effects from malfunctions and/or accidental events.	Chapter 15
The potential to encounter shallow gas pockets, and associated implications, should also be discussed.	Chapter 15
The EIS should also consider effects of accidents in the near-shore environment (e.g. spills and ship groundings, as applicable) and of spills reaching shore; including effects on species at risk and their critical habitat, colonial nesters and concentrations of birds, and their habitat. The proponent will also demonstrate what long-term actions it would be prepared to undertake to remediate spill-affected lands and waters.	Chapter 15
The EIS should include a summarization of the nature, extent and magnitude of spills, and accidental releases related to existing production installations and past exploration drilling programs in Atlantic Canada. Comparisons with similar settings would also be meaningful for deep water drilling where there is very low probability but very high consequences associated with landslides.	Chapter 15
7.6.2. Effects of the environment on the project	
The EIS will take into account how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events (e.g. icebergs, seismic events and submarine landslide potential), could adversely affect the project and how this in turn could result in effects to the environment (e.g. extreme environmental conditions result in malfunctions and accidental events). These events will be considered in different probability patterns (e.g. 5-year flood vs. 100-year flood).	Chapter 16
The EIS will provide details of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the project.	16.2

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
7.6.3. Cumulative effects assessment	
The proponent will identify and assess the project's cumulative effects using the approach described in the Agency's guidance documents related to cumulative environmental effects.	
In its EIS, the proponent will: • identify and provide a rationale for the VCs that will constitute the focus of the cumulative effects assessment, focussing the cumulative effects assessment on the VCs most likely to be affected by the project and other project and activities. To this end, the proponent must consider, without limiting itself thereto, the following components likely to be affected by the project:	Chapter 14
- fish and fish habitat, - migratory birds, - marine mammals and marine turtles, - species at risk, - marine plants, - special areas, - commercial fisheries, - Indigenous peoples, - air quality and greenhouse gases, and - human environment	
• identify and justify the spatial and temporal boundaries for the cumulative effects assessment for each VC selected. The boundaries for the cumulative effects assessments will generally be different for each VC considered. These cumulative effects boundaries will also generally be larger than the boundaries for the corresponding project effects;	Chapter 14
• identify the sources of potential cumulative effects. Specify other projects or activities that have been or that are likely to be carried out that could cause effects on each selected VC within the boundaries defined, and whose effects would act in combination with the residual effects of the project. This assessment may consider the results of any relevant study conducted by a committee established under section 73 or 74 of CEAA 2012.	Chapter 14
• assess the cumulative effects on each VC selected by comparing the future scenario with the project and without the project. Effects of past activities (activities that have been carried out) will be used to contextualize the current state of the VC. In assessing the cumulative effects on current use of lands and resources for traditional purposes, the assessment will focus on the cumulative effects on the relevant activity (e.g. hunting, fishing, trapping).	Chapter 14
• describe the mitigation measures that are technically and economically feasible. The proponent shall assess the effectiveness of the measures applied to mitigate the cumulative effects. In cases where measures exist that are beyond the scope of the proponent's responsibility that could be effectively applied to mitigate these effects, the proponent will identify these effects and the parties that have the authority to act. In such cases, the EIS will summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term.	1.1.2; 4.3.3; 8.3.2; 9.3.2; 10.3.2; 11.4.2; 13.3.2; 15.1; 16.2; 17.2
• determine the significance of the cumulative effects; and	14.2; 14.3; 14.4; 14.5; 14.6; 14.7

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• develop a follow-up program to verify the accuracy of the assessment or to dispel the uncertainty concerning the effectiveness of mitigation measures for certain cumulative effects.	14.8
The proponent is encouraged to consult with key stakeholders and Indigenous groups prior to finalizing the choice of VCs and the appropriate boundaries to assess cumulative effects.	Chapter 3
8. SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT	
The EIS will contain a table summarizing the following key information:	
• potential environmental effects on VCs;	17.1
• proposed mitigation measures to address the effects identified above; and	17.2
• potential residual effects and the significance of the residual environmental effects.	17.3
The summary table will be used in the EA Report prepared by the Agency. An example of a format for the key summary table is provided in Appendix 1 of this document.	17.3
In a second table, the EIS will summarize all key mitigation measures and commitments made by the proponent which will more specifically mitigate any significant adverse effects of the project on VCs (i.e. those measures that are essential to ensure that the project will not result in significant adverse environmental effects).	17.2
9. FOLLOW-UP AND MONITORING PROGRAMS	
A follow-up program is designed to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the project. Considerations for developing a follow-up program include: • whether the project will impact environmentally sensitive areas/VCs or protected areas or areas under consideration for protection; • the nature of Indigenous and public concerns raised about the project; • suggestions from Indigenous groups regarding the design of and involvement in follow-up and monitoring programs; • incorporation of Indigenous knowledge, where available; • the accuracy of predictions; • whether there is a question about the effectiveness of mitigation measures or the proponent proposes to use new or unproven techniques and technology; • the nature of cumulative environmental effects; • the nature, scale and complexity of the program; and • whether there was limited scientific knowledge about the effects in the EA.	8.6; 9.6; 10.6; 11.6; 12.5; 13.5

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
The goal of a monitoring program is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project development, and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety.	
9.1. Follow-up program	
The duration of the follow-up program shall be as long as required to evaluate the effectiveness of the mitigation measures. The EIS shall present a preliminary follow-up program and shall include: • objectives of the follow-up program and the VCs targeted by the program; • list of elements requiring follow-up; • number of follow-up studies planned as well as their main characteristics (list of parameters to be measured, planned implementation timetable, etc.); • intervention mechanism used in the event that an unexpected deterioration of the environment is observed; • mechanism to disseminate follow-up results among the concerned populations; • accessibility and sharing of data for the general population; • opportunity for the proponent to include the participation of Indigenous groups and stakeholders on the affected territory, during the development and implementation of the program; and • involvement of local and regional organizations in the design, implementation and evaluation of the follow-up results as well as any updates, including a communication mechanism between these organizations and the proponent.	8.6; 9.6; 10.6; 11.6; 12.5; 13.5; 17.3.1
The discussion / description of follow-up and monitoring programs relative to the currently proposed drilling program should include a short summary of the design and results/outcomes of monitoring programs that have been undertaken for previously assessed and/or completed offshore drilling programs in similar environments and how these will be factored into the verification of impact predictions and design of the follow-up and monitoring for the current exploration drilling program.	17.3.1
9.2. Monitoring	
The proponent will prepare an environmental monitoring program for all phases of the project.	Chapters 8-14; 17.3.1
Specifically, the environmental impact statement shall present an outline of the preliminary environmental monitoring program, including the: • identification of the interventions that pose risks to one or more of the environmental and/or VCs and the measures and means planned to protect the environment;	Chapters 8-14; 17.3.1
• identification of regulatory instruments that include a monitoring program requirement for the VCs;	Chapters 8-14; 17.3.1
• description of the characteristics of the monitoring program where foreseeable (e.g. location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, human and financial resources required);	Chapters 8-14; 17.3.1
• description of the proponent's intervention mechanisms in the event of the observation of non-compliance with the legal and environmental requirements or with the obligations imposed on contractors by the environmental provisions of their contracts;	Chapter 3; Chapters 8-14; 17.3.1

Equinor Central Ridge Abridged EIS Guidelines	EIS Reference
• guidelines for preparing monitoring reports (number, content, frequency, format) that will be sent to the authorities concerned; and	Chapters 8-14; 17.3.1
• plans to engage Indigenous groups in monitoring, where appropriate.	Chapters 8-14; 17.3.1