NEWFOUNDLAND ORPHAN BASIN EXPLORATION DRILLING PROGRAM EA UPDATE

BP CANADA ENERGY GROUP ULC

VERSION 2

PROJECT NO.: ME2382602.3000
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1. Introduction

bp Canada Energy Group ULC (bp Canada Energy Group ULC and/or any of its affiliates, hereafter generally referred to as "bp") plans to conduct exploration drilling activities in the Orphan Basin on Exploration Licences (ELs) 1168 (formerly 1145 and 1146) and 1148. These licences are approximately 343 and 496 kilometres (km) northeast of St. John's, Newfoundland and Labrador, in the Northwest Atlantic Ocean. The Newfoundland Orphan Basin Exploration Drilling Program (the Project) may involve drilling up to 20 exploration wells. On March 5, 2018, the Impact Assessment Agency of Canada (IAAC, hereafter referred to as the Agency; formerly the Canadian Environmental Assessment Agency (CEAA)) determined that a federal environmental assessment (EA) was required for the Newfoundland Orphan Basin Exploration Drilling Program pursuant to CEAA 2012. An Environmental Impact Statement (EIS) document was prepared to satisfy project-specific EIS Guidelines and was also intended to fulfil EA requirements of the C-NLOPB pursuant to the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (bp 2018). A decision statement was released by the Agency on February 12, 2020, and determined "that the Designated Project is not likely to cause significant adverse environmental effects referred to in subsection 5(1) of the *Canadian Environmental Assessment Act, 2012*", and established conditions with which bp must comply.

This document serves as an EA update for the Newfoundland Orphan Basin Exploration Drilling Program and reflects details to confirm that planned activities are within the scope of the previously assessed program (bp 2018). EA updates to the Project detailed in this document include:

- A summary of 2023 Project activities
- A description of the revised geographic scope with the consolidation of ELs 1145 and 1146 into EL 1168
- A summary of environmental modelling updates for drill cuttings dispersion and oil spill trajectory and fate
- Environmental setting updates including information on Species at Risk, special areas, and commercial fisheries
- Stakeholder engagement details.

2. Project Description

The Newfoundland Orphan Basin Exploration Drilling Program includes exploration drilling activities within existing ELs in the Orphan Basin between 2017-2026 (bp 2018). The program includes the drilling, testing, and eventual decommissioning of exploratory wells within various operator-held ELs in the region. Exploration drilling and associated supporting activities may include:

- Potential delineation drilling in the case of a hydrocarbon discovery
- Geohazard / wellsite surveys
- Vertical seismic profiling
- Formation flow testing with flaring
- Geotechnical surveys

- Environmental surveys and monitoring
- Potential wellhead decommissioning / removal and
- Helicopter and vessel activities for supply and servicing.

bp conducted pre-drilling seabed surveys to provide baseline data on coral and sponge distributions at the proposed wellsite location in June 2022 under the Ephesus Prospect ROV Survey EA 2019-2024 (bp 2019) and Ephesus Prospect ROV Survey EA Update (bp 2022a). The bp Ephesus Pre-drilling Benthic Fauna (Coral and Sponge) Seabed Survey Report (bp 2022b) and bp Ephesus Pre-drilling Benthic Fauna (Coral and Sponge) Seabed Survey Video Re-Analysis for Sea Pen Abundance and Density Report (bp 2023) were submitted to C-NLOPB and DFO for review and acceptance.

2.1. Project Location

The 2023 exploration drilling activities planned at the Ephesus well site are located within EL1168. In 2016, bp was awarded exploration rights to ELs 1145, 1146, and 1148, with its co-venturers Hess Canada Oil and Gas ULC and Chevron Canada Limited (formerly Noble Energy Canada ULC), and EL1149 with co-venturer Chevron Canada Limited. EL 1149 was later relinquished. In January 2023, EL1145 and EL1146 were consolidated into EL1168. See Figure 2-1.

While the new EL has a new geographic boundary associated with the scope of this updated EA, all project activities remain within the assessed spatial boundaries; EL1168 is entirely contained within the original boundaries of EL1145 and EL1146. See Table 2-1.

Table 2-1 Updated Coordinates for Project Area Exploration Licences.

WGS 84		NAD 83 UTM Zone 22N	
Latitude	**Longitude**	**Easting**	**Northing**
EL 1168			
-48.84890775	50.78324718	651636.3469	5627927.42
-48.84891142	50.64991212	652067.088	5613102.838
-48.87391176	50.64991527	650299.8865	5613052.157
-48.87391228	50.63324883	650353.0387	5611199.149
-48.89891266	50.63324666	648585.2198	5611148.468
-48.89891322	50.61658022	648637.7308	5609295.458
-48.94891403	50.61655988	645100.8696	5609194.096
-48.94891468	50.59989348	645152.1109	5607341.083
-48.9739151	50.5998753	643383.0686	5607290.403
-48.97391579	50.5832089	643433.6693	5605437.389
-48.99891623	50.5831854	641664.0097	5605386.708
-48.99891696	50.56651899	641713.9701	5603533.692
-49.04891769	50.56656314	638173.1239	5603444.246
-49.04891835	50.54989659	638221.8272	5601591.208
-49.07391871	50.54991056	636450.7976	5601546.475
-49.07391934	50.53324391	636498.8667	5599693.425
-49.09891969	50.53325247	634727.2252	5599648.682
-49.09892028	50.51658571	634774.6606	5597795.621
-49.14892092	50.51658662	631230.164	5597706.113
-49.14892233	50.44991985	631414.8639	5590293.908
-49.37392559	50.44992725	615441.8939	5589920.893
-49.37392912	50.31659377	615765.8255	5575096.388
-49.5239326	50.31655523	605087.0801	5574869.57
-49.52393314	50.28322202	605160.5182	5571163.462
-49.69893528	50.28324383	592693.0867	5570933.426

WGS 84		**NAD 83 UTM Zone 22N**	
Latitude	**Longitude**	**Easting**	**Northing**
-49.69893491	50.31657733	592628.3497	5574639.615
-49.72393522	50.31655898	590848.5609	5574606.765
-49.72393505	50.33322568	590816.8024	5576459.865
-49.74893534	50.33320198	589037.6425	5576427.021
-49.74893477	50.36653625	588975.3624	5580133.34
-49.77393521	50.36656112	587197.3444	5580106.5
-49.77393463	50.39989517	587136.2805	5583812.821
-49.79893509	50.39991464	585359.5155	5583785.985
-49.79893452	50.43324846	585299.669	5587492.308
-49.823935	50.43326253	583524.1576	5587465.475
-49.82393442	50.46659614	583465.5297	5591171.801
-49.84893491	50.46660481	581691.2721	5591144.971
-49.84893463	50.48327153	581662.5715	5592998.136
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-49.87393484	50.49994148	579860.8607	5594824.474
-49.92393583	50.49993193	576314.8724	5594770.823
-49.92392938	50.64992921	576073.3391	5611449.306
-49.82392815	50.6499278	583142.7916	5611556.604
-49.82392674	50.68326053	583084.039	5615262.966
-49.79892646	50.68324679	584850.1657	5615289.787
-49.79892567	50.69991324	584820.1587	5617142.981
-49.77392539	50.69989413	586585.667	5617169.797
-49.77392459	50.71656052	586555.0276	5619022.987
-49.74892433	50.71653604	588319.9173	5619049.799
-49.74892351	50.73320237	588288.6453	5620902.984
-49.69892304	50.7332446	591816.9853	5620968.53
-49.69892222	50.74991088	591784.4534	5622821.708
-49.67392196	50.74992395	593548.0076	5622854.477
-49.67392113	50.76659019	593514.8415	5624707.65
-49.12391321	50.76659031	632298.9446	5625547.366
-49.12391283	50.78325713	632251.9487	5627400.51
EL 1148			
-48.498923	50.2831813	678179.521	5573109.158
-48.498936	49.9998553	679234.6286	5541612.216
-48.748938	49.9998587	661320.3472	5541043.17
-48.748944	49.8331947	661877.11	5522515.39
-49.54895	49.8332499	604349.878	5521100.772
-49.548942	50.0165782	603955.4018	5541482.691
-49.24894	50.0165317	625446.9283	5541937.799
-49.248938	50.0665305	625316.8365	5547496.486
-49.198937	50.0665729	628894.8472	5547586.279
-49.198936	50.0999052	628805.5849	5551292.053
-49.148936	50.0999261	632381.1544	5551381.833
-49.148933	50.1499243	632243.4547	5556940.468
-49.123933	50.1499267	634029.3926	5556985.347
-49.123931	50.183259	633936.2938	5560691.143
-49.048931	50.183234	639290.4435	5560825.758
-49.048929	50.2165666	639193.5694	5564531.572
-49.023929	50.2165475	640977.0644	5564576.435
-49.023928	50.2332137	640927.988	5566429.336
-48.998928	50.2331892	642710.8723	5566474.194
-48.998926	50.2831876	642561.7054	5572032.878
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WGS 84		NAD 83 UTM Zone 22N	
Latitude	**Longitude**	**Easting**	**Northing**
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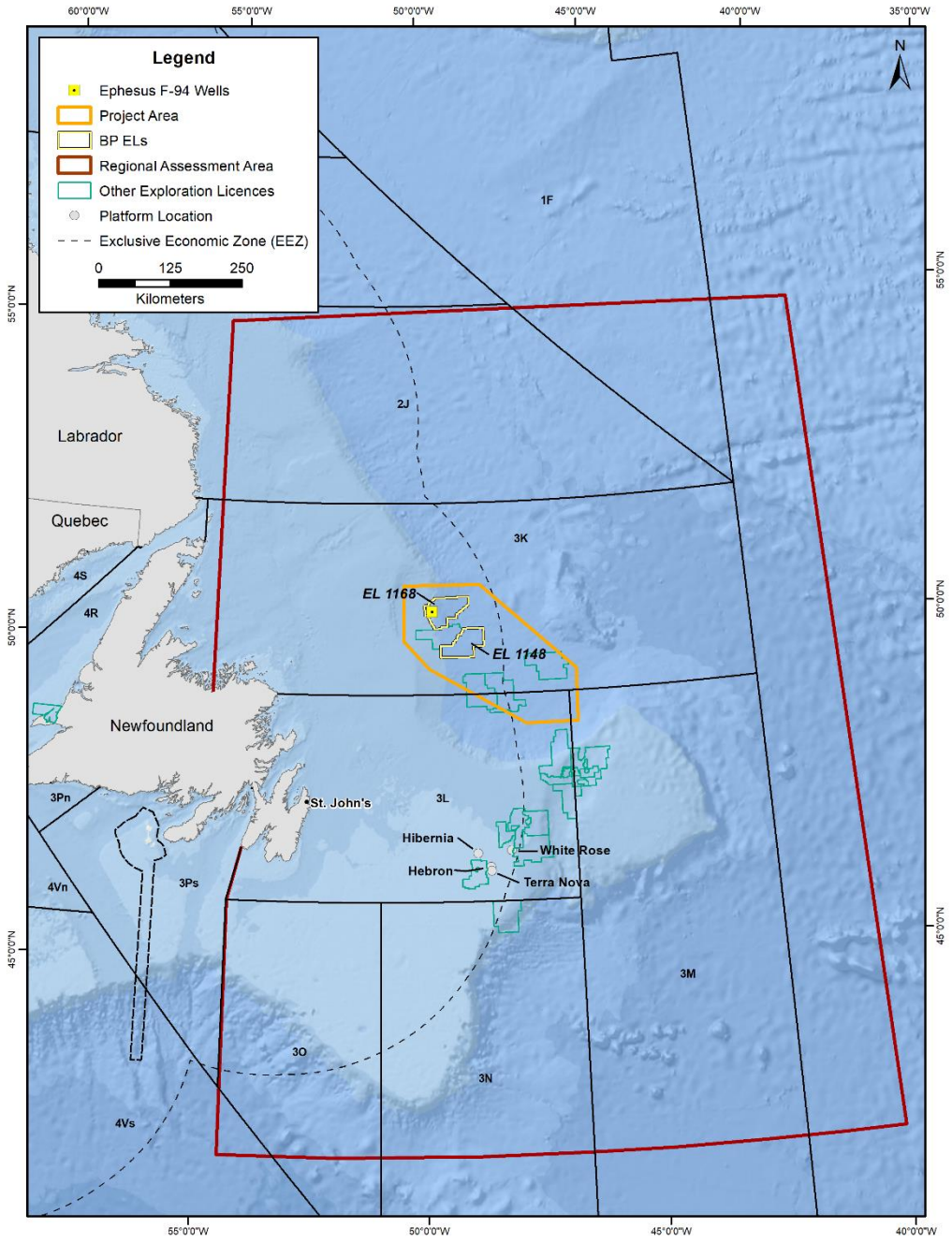

Figure 2-1 Project Location.

2.2. Planned Project Activities (2023)

The planned Project activities for 2023 are as described in the original EA and include mobile offshore drilling unit (MODU) mobilization and exploration drilling, vertical seismic

profiling, well evaluation and testing, well abandonment and decommissioning, supply and servicing as well follow-up monitoring, all occurring within EL1168. Further details specific to 2023 activities are presented in the following sections.

2.2.1. MODU Mobilization and Drilling (Construction, Operations, Decommissioning)

bp's 2023 plans include the drilling of one well, the Ephesus F-94 well, in EL 1168 in the Orphan Basin. The wellsite is in approximately 1,340 m water depth and located in a sea pen Significant Benthic Area (SiBA) and in the Northeast Newfoundland Slope Other Effective Area-Based Conservation Measure (OECM) (DFO 2019). The program will include mobilization of the Stena IceMax drillship to the site, drilling, construction and operation activities (inspection, maintenance, repairs, construction, modification), decommissioning activities, and drilling and appraisal associated support activities. The Stena IceMax will maintain position at the wellsite using dynamic positioning (DP) considering the site depth.

It is estimated the well will require approximately 60-150 days for drilling, evaluation, plug and abandon or suspension, and completion of follow up programs.

2.2.2. Vertical Seismic Profiling

A vertical seismic profiling (VSP) survey will be conducted following drilling completion to correlate well data to seismic data. This will be conducted by bp's approved geophysical contractors utilizing certified equipment installed on the Stena Icemax. All requisite safety procedures will be followed, and contractors will meet bp health, safety and environment (HSE) pre-qualifications. The activity will be conducted in accordance with the Geophysical, Geological, Environmental and Geotechnical Program Guidelines as well as conditions described in the Project Decision Statement.

2.2.3. Well Evaluation and Testing

If the exploration drilling results indicate that hydrocarbons are present in the target formations, the well will be evaluated (but not tested) to provide further information about the stratigraphic column, with special emphasis on reservoir characteristics. Well evaluation is an important component of exploration drilling as it helps to determine the viability of a prospect and commercial potential of the reservoirs.

2.2.4. Well Abandonment and Decommissioning

Once the well has been drilled to total depth and well evaluation programs completed (if applicable), the well will be plugged and abandoned in line with applicable bp practices and C-NLOPB requirements. Cement plugs will be placed above and between any hydrocarbon bearing intervals at appropriate depths in the well, as well as at the surface. For the Ephesus F-94 well, the wellhead with be cut and removed and not abandoned in-situ.

2.2.5. Supply and Servicing

Four offshore supply vessels (OSVs) will be used to support Project activities for the duration of the exploration drilling campaign at any given time. The existing supply base facility in the Port of St. John's will be used to support offshore operations. Common shipping routes will be used as practicable to reduce incremental marine disturbance and where these do not exist, supply vessels will follow a straight-line approach to and from the Project Area. Depending on operational requirements, arrivals and departures from Bay Bulls may also occur.

Helicopters will be used for crew changes on a routine basis and to support medical evacuation from the MODU and search and rescue activities in the area, if required. It is

anticipated that one to two helicopter trips per day from St. John's, NL would be required to transfer crew and any supplies not carried by the OSV to the Stena IceMax.

2.2.6. Follow-up Monitoring

bp has developed and will be implementing follow-up monitoring for exploration drilling activities as outlined in the Project specific Decision Statement (IAAC 2020). Follow-up monitoring activities will be used to verify the accuracy of the effects assessment and will include underwater sound monitoring, benthic habitat monitoring, drill cuttings monitoring, seabird monitoring, and marine mammal and sea turtle monitoring during VSP.

2.3. Schedule

The exploration drilling activities may occur year-round between 2020 and 2026 as detailed in the original EA (bp 2018). It is anticipated the 2023 exploration drilling activities will occur between May and October.

3. Engagement

bp has continued to provide updates on planned activities through email notifications and newsletters issued to Indigenous and fishing industry groups. A Monthly Operational Update was sent to Indigenous and Commercial Fisheries Groups on March 13, 2023. As of March 24, 2023, bp has not received any comments or concerns. Prior to the departure of the Stena IceMax in May 2023, Indigenous and commercial fishing industry groups will be contacted, and a Project update provided.

bp has regularly engaged with regulatory agencies (Fisheries and Oceans Canada (DFO), Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) to develop the follow up programs required as part of this drilling campaign.

Both DFO and the Department of National Defence (DND) will also be notified directly and a general notice to mariners will be issued.

Table 3-1 Engagement Activities for the 2022-2023 Exploration Program Activities.

Stakeholder/Indigenous Group	Description of Engagement
Commercial Fisheries Groups *Groups identified in the original EA*	• May 2022 – Provided the Orphan Basin Exploration Drilling Project newsletter. • September 2022 – Provided a draft of the Fisheries Communication Plan for review and feedback. • October 2022 – Meeting with One Ocean's Executive Director to introduce bp representatives and provide Project update. • November 2022 – Provided the Orphan Basin Exploration Drilling Project newsletter. • November 2022 – Provided the draft Oil Spill Response Plan for review and feedback. • November 2023 – Provided final version of the Fisheries Communication Plan and notification that the Fisheries Compensation Plan was available on the Project website. • February 2023 – Meeting with Fish, Food and Allied Workers Union (FFAW) to provide Project update and discuss fisheries guide vessel. • March 2023 – Provided the Monthly Operational Update including notification of commencement of drilling in May 2023.
Indigenous Groups *Groups identified in the original EA*	• May 2022 – Provided the Orphan Basin Exploration Drilling Project newsletter. • September 2022 – Provided a draft of the Indigenous Fisheries Communication Plan for review and feedback. • November 2022 – Provided the Orphan Basin Exploration Drilling Project newsletter. • November 2022 – Provided the draft Oil Spill Response Plan for review and feedback. • November 2023 – Provided final version of the Indigenous Fisheries Communication Plan and notification that the Fisheries Compensation Plan was available on the Project website. • December 2022 – Provided notification of consolidation of ELs 1145 and 1146. • February 2023 – Provided update on Atlantic Salmon research. • March 2023 – Provided the Monthly Operational Update including notification of commencement of drilling in May 2023.
C-NLOPB	• Monthly project meeting.
Fisheries and Oceans Canada	• Meetings as required. This has included a total of 7 meetings in 2022, and 3 in 2023 as of March.

4. Environmental Modelling

4.1. Drill Cuttings Modelling

Drill cuttings modelling was completed as part of the original EA to provide estimates on the potential environmental impact of drilling mud and cuttings dispersion during exploration drilling. The modelling was conducted using the SINTEF Marine Environmental Modelling Workbench software, which includes the numeric Dose-related Risk and Effects Assessment Model (DREAM) for chemical releases and Particle Tracking model for drilling discharges (ParTrack).

The original 2018 model included hypothetical representative exploration well sites for the West Orphan Basin (WOB) and East Orphan Basin (EOB) since the precise location of well sites for the drilling program were not known at the time. In 2022, updated modelling (bp

2022d) was completed to better align cuttings dispersion predictions with the regulatory expectations described in regional guidance (DFO 2022a), in particular the prediction of areal extent of cuttings accumulations of 1.5-6.5 mm and >6.5mm.

The Ephesus F-94 well site is within 5 km of the WOB well location (bp 2018) at a similar water depth with similar amounts of cuttings expected to be released. (Table 4-1). The 2022 modelling results include estimates of cuttings dispersion thickness at the >1.5 to 6.5 mm (i.e., the predicted no effect threshold (PNET)) and >6.5 mm levels specific to the Ephesus well (Figure 4-1, Table 4-2). The predicted areal coverage for cuttings thicknesses at the >1.5 – 6.5 mm PNET were 4.3 and 4.2 hectares (Ha) for the lowest and highest ambient upper water column current velocity scenarios with the 1.5 mm thickness contour extending up to 519 m and 452 m away from the wellsite respectively. Using the lowest and highest benthic current velocity scenarios the areal coverages for cuttings at the>1.5 mm PNET were 4.4 and 5.9 Ha respectively with the 1.5 mm thickness contour extending up to 558 m and 495 m away from the wellsite. For the proposed spud date period in May the maximum extent of the >1.5 mm PNET is within approximately 600 m of the Ephesus drill centre, irrespective of the hydrodynamic conditions. This is very similar to the results modelled in the original 2018 model results for the WOB well location.

Table 4-1 Comparison of Well Model Scenarios Input Parameters for Ephesus and WOB (bp 2022d)

Model Scenario / Input Parameters	Ephesus Well	West Orphan Basin Well
Well Location	50° 33’17.863’ N 49° 44’31.742’ W	50° 31’11.7820’ N 49° 41’24.7808’ W
Water depth (m)	1,339	1,360
Metres drilled with water-based mud (WBM)	786	890
Metres drilled with synthetic-based mud (SBM)	3,050	2,750
Total metres drilled (m)	3,836	3,640
Well design: No of hole intervals	5	4
Number of separate drilling and batch releases	7	6
Total Cuttings discharged to sea while drilling (tonnes)	2,183	1,938
Total WBM discharged to sea while drilling (tonnes)	1,233	1,397
Total Batch discharge of WBM to sea (tonnes)	2,662	2,613
Total SBM discharged to sea while drilling (tonnes)	252	195
Total Mud and Cuttings discharged to sea while drilling (tonnes)	6,330	6,143
Time period over which drilling discharges occur	56 days	19 days

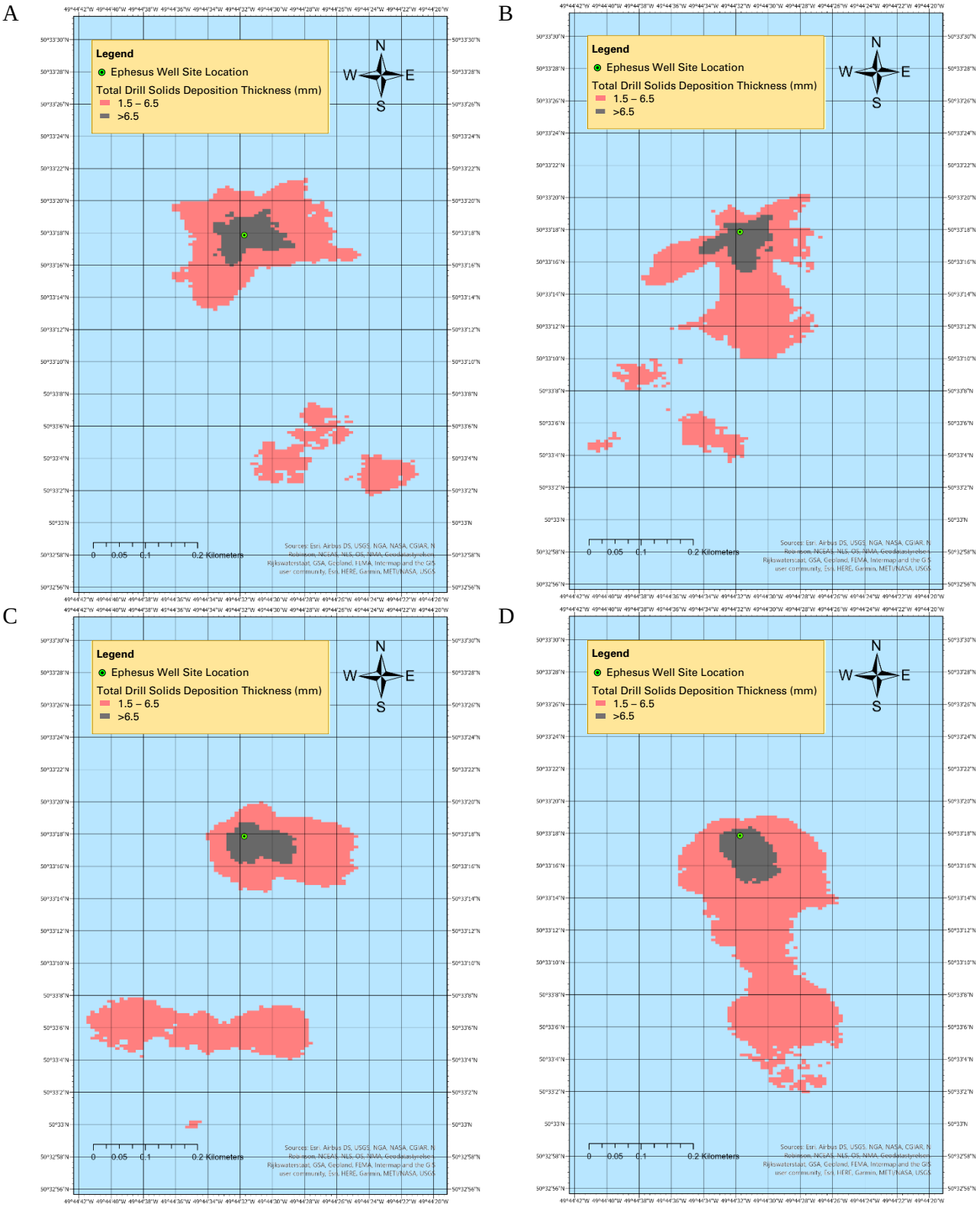

Figure 4-1 Predicted Drill Solids Deposition at the Ephesus well location after 75 days. A) Lowest Ambient Surface Current, B) Highest Ambient Surface Current, C) Lowest Ambient Benthic Current, and D) Highest Ambient Benthic Current (bp 2022d).

Table 4-2 Comparison of Ephesus and WOB Well Areal and Maximum Extent from Point of Release for >1.5 mm and >6.5 mm Deposition Thickness (bp 2022d)

Drill Solids Thickness (mm)	Parameter	Lowest Upper Water Column Current Velocity (0 – 100 m BSL)		Highest Upper Water Column Current Velocity (0-100 BSL)	
		Ephesus Well Scenario	West Orphan Basin Well Scenario	Ephesus Well Scenario	West Orphan Basin Well Scenario
1.5	Cumulative Areal Extent (Ha)	4.3	4.1	4.2	3.1
	Maximum Extent from Discharge Point (m)	519	541	452	477
6.5	Cumulative Areal Extent (Ha)	0.59	0.69	0.54	0.85
	Maximum Extent from Discharge Point (m)	61	128	73	85

4.2. Oil Spill Modelling

In the original EA (bp 2018), oil spill modelling was provided for a hypothetical drilling location in the WOB. In 2022, bp updated the spill modelling to reflect new information associated with the chosen well site, Ephesus F-94. A comparison of the original and updated model results is described in bp 2022e.

The addendum to the 2018 oil spill modelling is specific to the Ephesus well drilling program and uses a worst-credible case discharge model for a subsea blowout during the summer months (May to October) as the well is scheduled to be drilled in that time period (bp 2022e). The results reported in the original EA are similar to those presented in this addendum, as the WOB location is only 4 km from the Ephesus well, therefore similar inputs were used for both sites. See Table 4-3. Oil spill trajectory and fate modelling was conducted using the SINTEF Oil Spill Contingency and Response model (see bp 2022e for details). Wind, surface current, sea ice extent, and impact thresholds match those used in the earlier modelling.

For the relief well mitigation modelling (120 days) the Ephesus well is predicted to have a higher cumulative amount of oil produced following a subsea blowout event compared to the original WOB modelling, about 81% more after 120 days. While both site models have the same general footprint shape, due to the higher discharge rate the Ephesus model has a larger areal extent, including the area of water column exposure and total concentration (Table 4-3, Figure 4-2). Similarly, the Ephesus model has a greater exposure time in the vicinity of the well, a more prevalent metallic sheen, and heavier oiling during shoreline impact (Figure 4-3). The shortest time of arrival onshore for the Ephesus model is shorter than that for the WOB but is still greater than 3 months.

Changes to the results from the original EA for the capping stack (30 days) mitigation are very similar to those outlined above for the relief well mitigation, in that results are similar but with a larger areal extent (Table 4-3). As in the original model, no contact with shorelines is predicted.

The updated modelling results for the Ephesus well does not result in material changes to the conclusions presented in the original EA. The effect pathways and residual effects remain the same as previously predicted. No new interactions or new receptors have been identified as a result of the updated modelling for the Ephesus well and no new mitigation

or response planning is required beyond what was previously identified in the EIS. No changes to residual effects predictions are proposed for the assessment of effects of a subsea blowout at the Ephesus well.

Table 4-3 Comparison of Spill Location and Scenario Inputs (source: bp 2022e)

Model Scenario	Ephesus	West Orphan Basin
Well Location	50°33”17.856 N; 49°44”31.742 W	50°33”11.783’N; 49°41”21.7808 W
Water depth (m)	1,339	1,360
“Pipe” ID Diameter (blowout preventor or casing or tubing) at the Seabed Release Point for WCCD (m / in.)	0.314 / 12.375	0.337 / 13.275
Temperature of Release as it Leaves the Wellbore (°C)	94.3	94.3
Salinity of Release as it Leaves the Wellbore (ppt)	30.0	60.0
Release Duration – Capping Stack (P90 time; days)	30	30
Release Duration – Relief Well (P90 time; days)	120	120
Initial Oil Volume Release Rate (m^3 / d / bpd)	33,228 / 209,000	20,395 / 128,282
Initial Water Volume Release Rate (m^3 / d / bpd)	0 / 0	18,782 / 118,134
Gas-Oil Ratio (sm^3/m^3 / sfc / bbl)	125 / 700	321 / 1,800
Gas-Liquid Ratio (sm^3/m^3 / sfc / bbl)	125 / 700	167 / 937
Gas Density (kg/sm^3)	1.100	0.900
Calculated Gas Volume Release Rate ($MMsm^3/d$ / MMsfc/d)	4.14 / 146.30	6.54 / 230.91
Calculated Mass Flow Rate of Gas Released (kg/s)	52.75	68.12

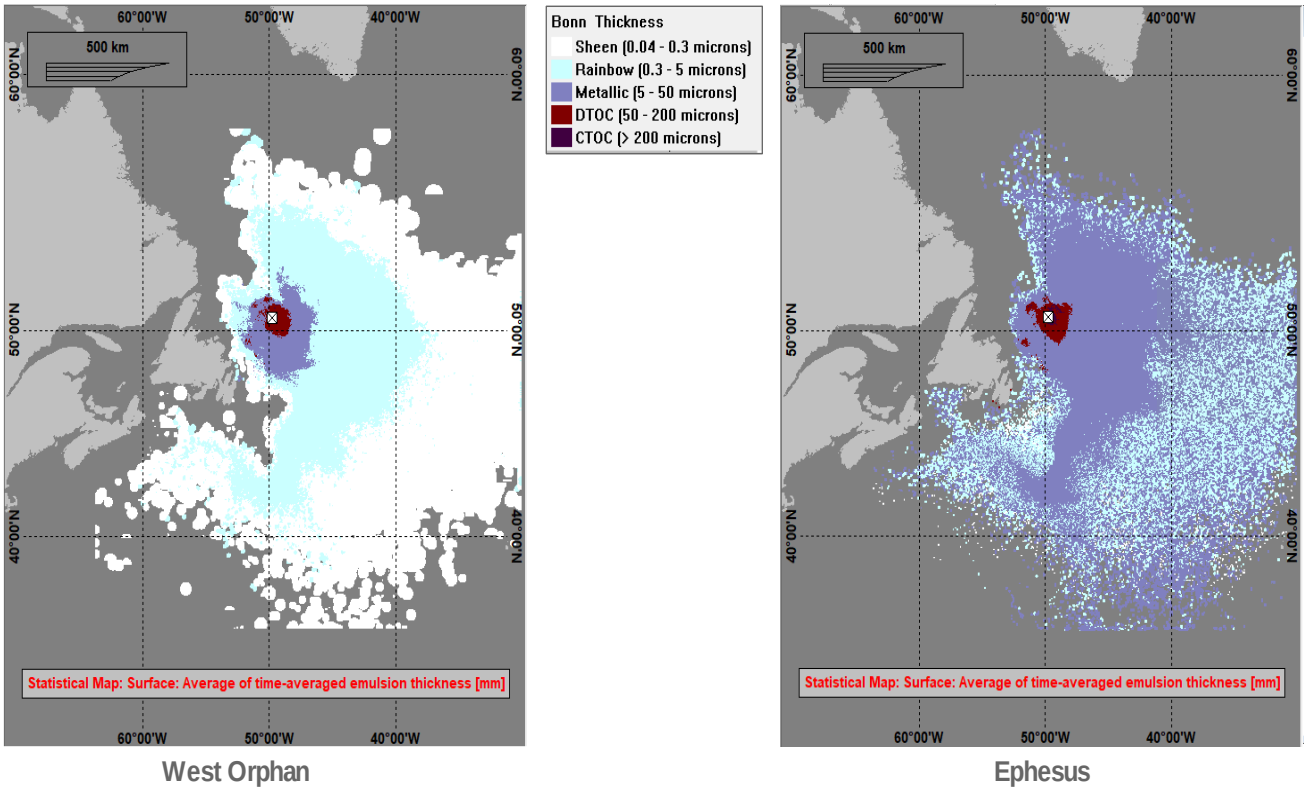

Figure 4-2 Average of Time-Averaged Emulsion Thickness (mm) in Summer Season (May to October) Compared Between the WOB Model and Ephesus Model (Source: bp 2022e).

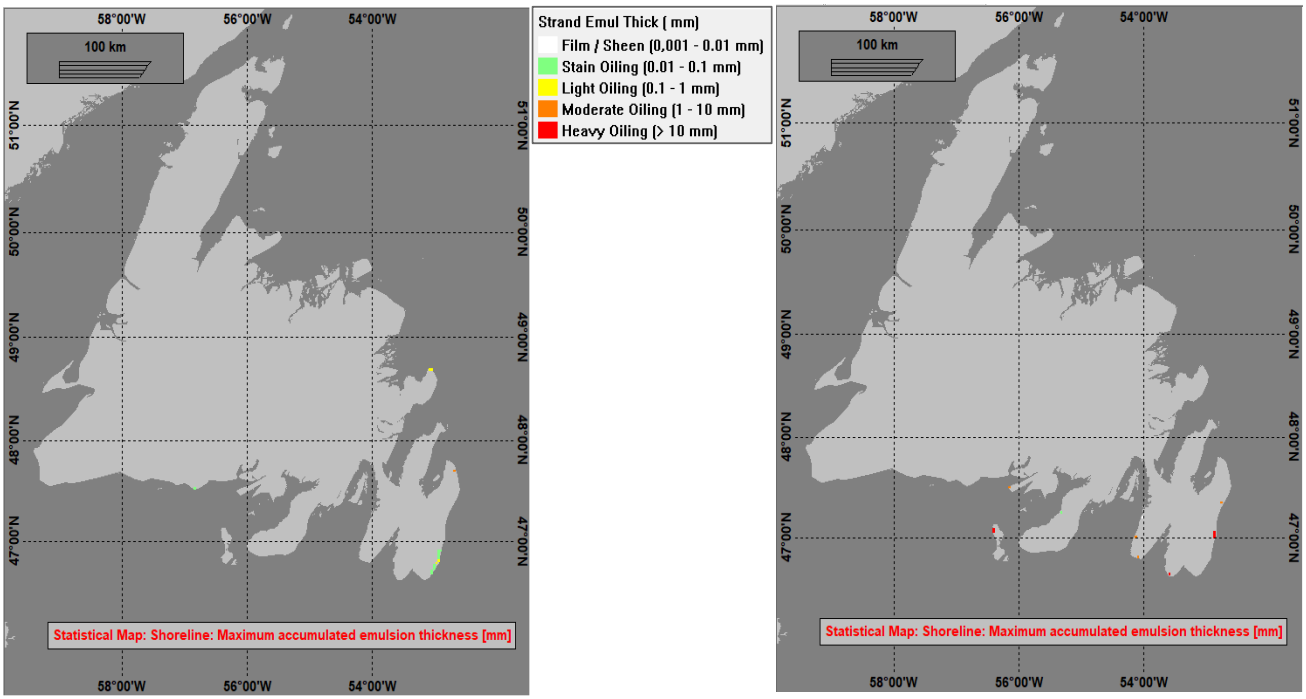

Figure 4-3 Shoreline Maximum Accumulated Emulsion Thickness (mm) in Summer Season (May to October) Compared Between the WOB Model and Ephesus Model (Source: bp 2022e).

5. Environmental Setting and Effects Assessment

5.1. Species at Risk

Table 5-1 outlines Species at Risk (SAR) as designated by the Species at Risk Act (SARA) and/or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) with the potential to occur in the Orphan Basin area. Changes that have occurred since the original EA are noted in grey in Table 5-1 and summarized below:

- Roughhead grenadier was downgraded from Special Concern to Not at Risk in 2018 (COSEWIC 2018)
- Shortfin mako was elevated from Special Concern to Endangered in 2019 (COSEWIC 2019a)
- Spiny dogfish was listed under COSEWIC as Special Concern in 2010 (COSEWIC 2010)
- White hake was listed under COSEWIC as Threatened in 2014 (COSEWIC 2014)
- Red Knot *rufa* subspecies was divided into three populations based on wintering locations, with the Tierra del Fuego / Patagonia wintering population retaining the SARA and COSEWIC listing of Endangered from the original EA. The new populations gained the COSEWIC statuses of Special Concern (Northeastern South America wintering population) and Endangered (Southeastern USA / Gulf of Mexico / Caribbean wintering population), though neither is currently listed by SARA (COSEWIC 2020a)
- Red-necked phalarope was listed under SARA Schedule 1 in 2019 as Special Concern (Government of Canada 2019)

- Ross's gull was elevated from Threatened to Endangered in 2021 by COSEWIC (COSEWIC 2021)
- Peregrine falcon was removed from Schedule 1, and downgraded from Special Concern to Not at Risk by COSEWIC in 2017 (COSEWIC 2017)
- Leach's storm petrel was listed as Threatened by COSEWIC in 2020 (COSEWIC 2020b)
- Beluga whale (Eastern Hudson Bay population) was downgraded from Endangered to Threatened by COSEWIC in 2020 (COSEWIC 2020c)
- Sei whale was listed as Endangered by COSEWIC in 2019 (COSEWIC 2019b), and
- Ringed seal was listed as Special Concern by COSEWIC in 2019 (COSEWIC 2019c).

Several of these species are under consideration for inclusion under SARA Schedule 1, with consultations ongoing.

Several new Species-at-Risk have been added since the original EA: spiny dogfish, white hake, Leach's storm petrel, sei whales, ringed seals, and beluga whales. Leach's storm petrel, sei whale, and red knot (*rufa* subspecies) were described in the original EA as likely to be present in the area and have since been listed by COSEWIC. As these species were described previously (Sections 6.2.2.6, 6.3.3.3, and 6.2.4, respectively, in bp 2018), only changes since the original EA will be described here. New descriptions have been added below for the Leach's Storm Petrel, spiny dogfish, white hake, beluga whale, and ringed seal.

In the original EA, Leach's storm petrel is well described as they commonly occur offshore and often fly hundreds of kilometres from colonies to forage and are known to strand on offshore vessels and installations at night due to light attraction (COSEWIC 2020b). They have since been listed as Threatened by COSEWIC due to declines in individuals in nesting areas and the loss of several colonies in Quebec (COSEWIC 2020b). Threats include displacement of breeding colonies by Atlantic puffins, predation by gulls, changes to the food web, and light attraction to vessels and platforms causing collisions and strandings.

In the original EA, red knot (*rufa* subspecies) is described as a Species-at-Risk with a single population. In 2022, the *rufa* subspecies was broken into three populations based on their wintering grounds: northeastern South America, southeastern USA/Gulf of Mexico/Caribbean, and Tierra del Fuego/Patagonia. All three populations of red knot *rufa* subspecies may migrate through the Project Area or Regional Assessment Area and the subspecies was described in the original EA, including their threats in Canada which now apply to all three subspecies.

The sei whale (Atlantic Population) was considered data deficient by COSEWIC in the original EA but was described as a species likely to be in the area. Their status was re-examined in 2019 and were listed as Endangered by COSEWIC (COSEWIC 2019b). Current threats to sei whales include the noise from seismic surveys, shipping and military exercises, vessel strikes, and entanglement in fishing gear (COSEWIC 2019b).

Spiny dogfish (Atlantic population) is the world's most abundant shark species and is a small-sized shark. Disparity in size and sex among this species has been documented and this has been attributed to habitat preferences. They are widely distributed in temperate regions of the world's ocean and can tolerate a wide range of temperatures (5-15°C), salinities, including estuarine waters, even though there is a seasonal shift in distribution driven by temperature preference (Compagno 1984, COSEWIC 2010). The Atlantic

population is distributed from Labrador to Cape Hatteras while the species is most abundant in Canadian waters in southwest Nova Scotia. The species typically occur at depths ranging from surface waters to depths of 730 m (Compagno 1984, COSEWIC 2010). They are long lived (23 years for the Atlantic population), have long gestation periods (18-24 months), slow growth rates with females bigger than the males, a late age of maturity (50% females considered mature at 16 years in the Atlantic), low fecundity (average of six pups born every two years), and high natural mortality (COSEWIC 2010). Historic and current threats to this species include overfishing, due to its high socio-economic value (body oils for industrial lubrications, lighting and vitamins, flesh for fertilizer, meat, and fishmeal, and their fins are high value in the international shark fin trade). This population is designated as Special Concern as of 2010 and is under consideration for inclusion in SARA Schedule 1 (COSEWIC 2010).

White hake (Atlantic and Northern Gulf of St. Lawrence population) are widely distributed from the Grand Banks to North Carolina. The species is short lived (9 years) and has high fecundity. In Canada, 50% are mature from 40-54 cm for females and 37-44 cm for males, with an extended juvenile stage based on water temperature (settles in the upper water layer for two to three months duration) prior to settlement (COSEWIC 2014). It occurs primarily in Canada (Bay of Fundy, the Scotian Shelf, the Gulf of St. Lawrence, the slopes of St. Pierre Bank, and on the Southern Grand Banks); coastal Newfoundland areas (Holyrood Pond and Conception Bay), and in the Saint John River system of New Brunswick in Kennebecasis Bay. Canada recognizes two distinct populations of White hake: Southern Gulf of St. Lawrence population, and the Atlantic and Northern Gulf of St. Lawrence population which occurs on the Scotian Shelf, Northern Gulf of St. Lawrence, and Southern Newfoundland. This species is commonly found near the bottom with larger hakes occupying deeper waters while juveniles occupy shallow areas close to the shore. Threats to the Atlantic and Northern Gulf of St. Lawrence population are the declining adult abundance, estimated to be a 70% decline over the past three generations. This decline stabilized after the mid-1990s which could be attributed to restrictions on fisheries during that period. This population is designated as Threatened as of 2013 and is under consideration for inclusion in SARA Schedule 1 (COSEWIC 2014).

Beluga whales, also known as white whales, are a medium sized toothed whale. They are long lived (45-60 years), slow to mature (6 to 14 years for females) and have long gestation periods (13-15 months). Their populations are below historical levels, and as such were originally designated Special Concern in 2004 and were split into many populations with varying statuses in 2020. Threats to this species historically included hunting, and today include sea ice reduction from climate change, and ocean noise and other disturbances from increased human activity in the Arctic. They are distributed throughout the Arctic and sub-Arctic, and Canada recognizes eight populations. These populations are distributed throughout the Arctic, from the Beaufort Sea to Ungava Bay, with an additional population living in the mouth of the St. Lawrence River (COSEWIC 2020c). The Arctic populations frequently have overlapping ranges and may share common wintering areas. They are highly migratory and use a wide range of different habitats throughout the year. The original EA had a single record within the Project Area of a beluga whale, and eight records within the RAA. These records are from May to July, and these individuals are most likely members of the Eastern Hudson Bay population based on occupied areas by this population. This population is designated as Threatened as of 2020 and is under consideration for inclusion in SARA Schedule 1 (COSEWIC 2020c).

The ringed seal is a phocid seal, and once of the smallest species of pinnipeds. They are relatively long lived (up to 45 years), with a long gestation period (10-11 months), and are generally mature around 6 years though males enter the breeding population later

(COSEWIC 2019c). They rely on sea ice as habitat, and as such as distributed widely throughout the Arctic and sub-Arctic. They rely on stable ice for breeding grounds, and during open-water season can utilize a wide range of habitats and depths where prey is present. They consume pelagic fish such as sand lance, capelin, and Arctic cod, and a wide variety of crustaceans. Migrations during open-water months can be extensive in search of prey, including Labrador and northern Newfoundland, with their presence in the original EA listed as uncommon. The ringed seal was listed as Special Concern in 2019, with their main threats the loss of sea ice habitat from climate change and increased human activity in the Arctic (COSEWIC 2019c). They are an important prey item for many species such as polar bears and killer whales and are important economically and culturally to humans.

Table 5-1 Species at Risk listed under SARA and/or COSEWIC with the Potential to Occur within the Study Area.

Common Name (Population)	Scientific Name	SARA Schedule 1	COSEWIC
Marine Fish			
Acadian redfish (Atlantic population)	*Sebastes fasciatus*	-	Threatened
American eel	*Anguilla rostrata*	-	Threatened
American plaice (NL population)	*Hippoglossoides platessoides*	-	Threatened
Atlantic bluefin tuna	*Thunnus thynnus*	-	Endangered
Atlantic cod (NL population)	*Gadus morhua*	-	Endangered
Atlantic salmon (South Newfoundland population)	*Salmo salar*	-	Threatened
Atlantic salmon (Gaspe-Southern Gulf of St. Lawrence)		-	Special Concern
Atlantic salmon (Outer Bay of Fundy)		-	Endangered
Atlantic salmon (Eastern Cape Breton)		-	Endangered
Atlantic salmon (Nova Scotia Southern Upland)		-	Endangered
Atlantic salmon (Quebec Eastern North Shore population)		-	Special Concern
Atlantic salmon (Quebec Western North Shore population)		-	Special Concern
Atlantic salmon (Anticosti Island population)		-	Endangered
Atlantic wolffish	*Anarhichas lupus*	Special Concern	Special Concern
Basking shark (Atlantic population)	*Cetorhinus maximus*	-	Special Concern
Lumpfish	*Cyclopterus lumpus*	-	Threatened
Cusk	*Brosme brosme*	-	Endangered
Deepwater redfish (Northern population)	*Sebastes mentella*	-	Threatened
Northern wolffish	*Anarhichas denticulatus*	Threatened	Threatened
Porbeagle	*Lamna nasus*	-	Endangered
Roughhead grenadier	*Macrourus berglax*	-	Not at Risk [1]
Roundnose grenadier	*Coryphaenoides rupestris*	-	Endangered

Common Name (Population)	Scientific Name	SARA Schedule 1	COSEWIC
Shortfin mako (Atlantic population)	*Isurus oxyrinchus*	-	Endangered[2]
Smooth skate (Funk Island Deep Population)	*Malacoraja senta*	-	Endangered
Spiny dogfish (Atlantic population)[3]	*Squalus acanthias*	-	Special Concern
Spotted wolffish	*Anarhichas minor*	Threatened	Threatened
Thorny skate	*Amblyraja radiata*	-	Special Concern
White hake (Atlantic and Northern Gulf of St. Lawrence population)[4]	*Urophycis tenuis*	-	Threatened
White shark (Atlantic population)	*Carcharodon carcharias*	Endangered	Endangered
Winter skate (Eastern Scotian Shelf – Newfoundland population)	*Leucoraja oscellata*	-	Endangered
Marine Birds			
Harlequin duck (Eastern population)	*Histrionicus histrionicus*	Special Concern	Special Concern
Barrow's goldeneye (Eastern population)	*Bucephala islandica*	Special Concern	Special Concern
Piping plover (*melodus* subspecies)	*Charadrius melodus melodus*	Endangered	Endangered
Red knot *rufa* spp. (Tierra del Fuego / Patagonia wintering population	*Calidris canutus rufa*	Endangered	Endangered[5]
Red knot *rufa* spp. (Northeastern South America wintering population		-	Special Concern[5]
Red knot *rufa* spp. (Southeastern USA / Gulf of Mexico / Caribbean wintering population)		-	Endangered[5]
Buff-breasted sandpiper	*Tryngites subruficollis*	Special Concern	Special Concern
Red-necked phalarope	*Phalaropus lobatus*	Special Concern[6]	Special Concern
Ivory gull	*Pagophila eburnea*	Endangered	Endangered
Ross's gull	*Rhodostethia rosea*	Threatened	Endangered[7]
Peregrine falcon (*anatum/tundrius*)	*Falco peregrinus anatum/tundrius*	-[8]	Not at Risk[8]
Leach's Storm-petrel (Atlantic population)[9]	*Oceanodroma leucorhoa*	-	Threatened
Marine Mammals			
North Atlantic right whale	*Eubalaena glacialis*	Endangered	Endangered
Fin whale (Atlantic population)	*Balaenoptera physalus*	Special Concern	Special Concern
Blue whale (Atlantic population)	*Balaenoptera musculus*	Endangered	Endangered
Northern bottlenose whale (Scotian Shelf population)	*Hyperoodon ampullatus*	Endangered	Endangered
Northern bottlenose whale (Davis Strait-Baffin Bay-Labrador Sea population)		-	Special Concern
Sowerby's beaked whale	*Mesoplodon bidens*	Special Concern	Special Concern

Common Name (Population)	Scientific Name	SARA Schedule 1	COSEWIC
Sei whale (Atlantic Population) [10]	*Balaenoptera borealis*	-	Endangered
Killer whale (Northwest Atlantic / Eastern Arctic population)	*Orcinus orca*	-	Special Concern
Harbour porpoise (Northwest Atlantic population)	*Phocoena phocoena*	-	Special Concern
Ringed seal [11]	*Pusa hispida*	-	Special Concern
Beluga whale (Eastern Hudson Bay population) [12]	*Delphinapterus leucas*	-	Threatened
Sea Turtles			
Leatherback sea turtle (Atlantic population)	*Dermochelys coriacea*	Endangered	Endangered
Loggerhead sea turtle	*Caretta caretta*	Endangered	Endangered

[1] COSEWIC 2018
[2] COSEWIC 2019a
[3] COSEWIC 2010
[4] COSEWIC 2014
[5] COSEWIC 2020a
[6] Government of Canada 2019
[7] COSEWIC 2021
[8] COSEWIC 2017
[9] COSEWIC 2020b
[10] COSEWIC 2019b
[11] COSEWIC 2019c
[12] COSEWIC 2020c

5.1.1. Recovery Strategies and Plans

Since the release of the original EA, several action plans and recovery strategies have been released. There have also been some studies in identifying important habitats that may inform future critical habitat decisions.

5.1.1.1. Marine Mammal and Sea Turtles

Important areas have been recognized for blue whales and leatherback sea turtles that may inform future critical habitat decisions. As well, the action plan for North Atlantic Right Whale was finalized in 2021.

Important areas for blue whales include parts of the Gulf of St. Lawrence, along southern Newfoundland, the slopes of the Scotian Shelf, and the southern slopes of the Grand Banks (DFO 2018, 2020a). The blue whale important habitat intersects the Regional Assessment Area (RAA) along the southern slopes of the Grand Banks. This area is well below the Project Area, and as noted in the original EA, interactions with blue whales in the Project Area are unlikely, with no recorded sightings. No new mitigations are required beyond those described in the original EA.

Important feeding areas for leatherback sea turtles have been identified near the Gulf of St. Lawrence, and from southern Newfoundland down to eastern Cape Breton (DFO 2020b). As neither of these areas is within the Project Area or RAA, no new mitigation measures are required for this species beyond those already identified in the original EA.

The action plan for the North Atlantic Right Whale is designed to implement the recovery strategy finalized in 2014 (DFO 2014, 2021). Critical habitat for the North Atlantic Right

Whale includes the Roseway Basin and Grand Manan Basin, which are off the western coast of Nova Scotia. The original EA describes the proposed action plan for this species, and as these areas are well outside the Project Area and RAA, no additional mitigations are required for this species.

5.1.1.2. Marine and Migratory Birds

Since the original EA, a management plan has been proposed for Red-necked Phalarope (ECCC 2022). A review of the plan determined that no new or modified mitigation measures are required beyond those already identified in the original EA (bp 2018).

5.1.1.3. Marine Fish and Fish Habitat

Both the spotted and northern wolffish are listed under COSEWIC and SARA schedule 1 as Threatened. Under the Species at Risk Act, recovery strategies and management plans were created that identified critical habitat along the northern Grand Banks and Northeast Newfoundland Shelf (DFO 2020c). In the original EA, both species were described and proposed critical habitat was discussed. These areas have since been finalized based on known water depths and habitat preferences and overlap with the majority of their catches in Canadian RV trawls. These areas are known to contain features that should allow for their recovery and survival based on current knowledge. Both areas are to the south and west of the Project Area, with a small overlap for both (Figure 5-1). Northern wolffish critical habitat overlaps with a portion of the Project Area in the west, representing ~676 Ha or 0.6% of their critical habitat (Figure 5-1). Spotted wolffish critical habitat overlaps with a small sliver of the Project Area, representing ~0.1 Ha. Northern Wolfish were observed during the June 2022 benthic fauna survey. The Project will have limited interaction with wolfish, no additional mitigations are required for this species.

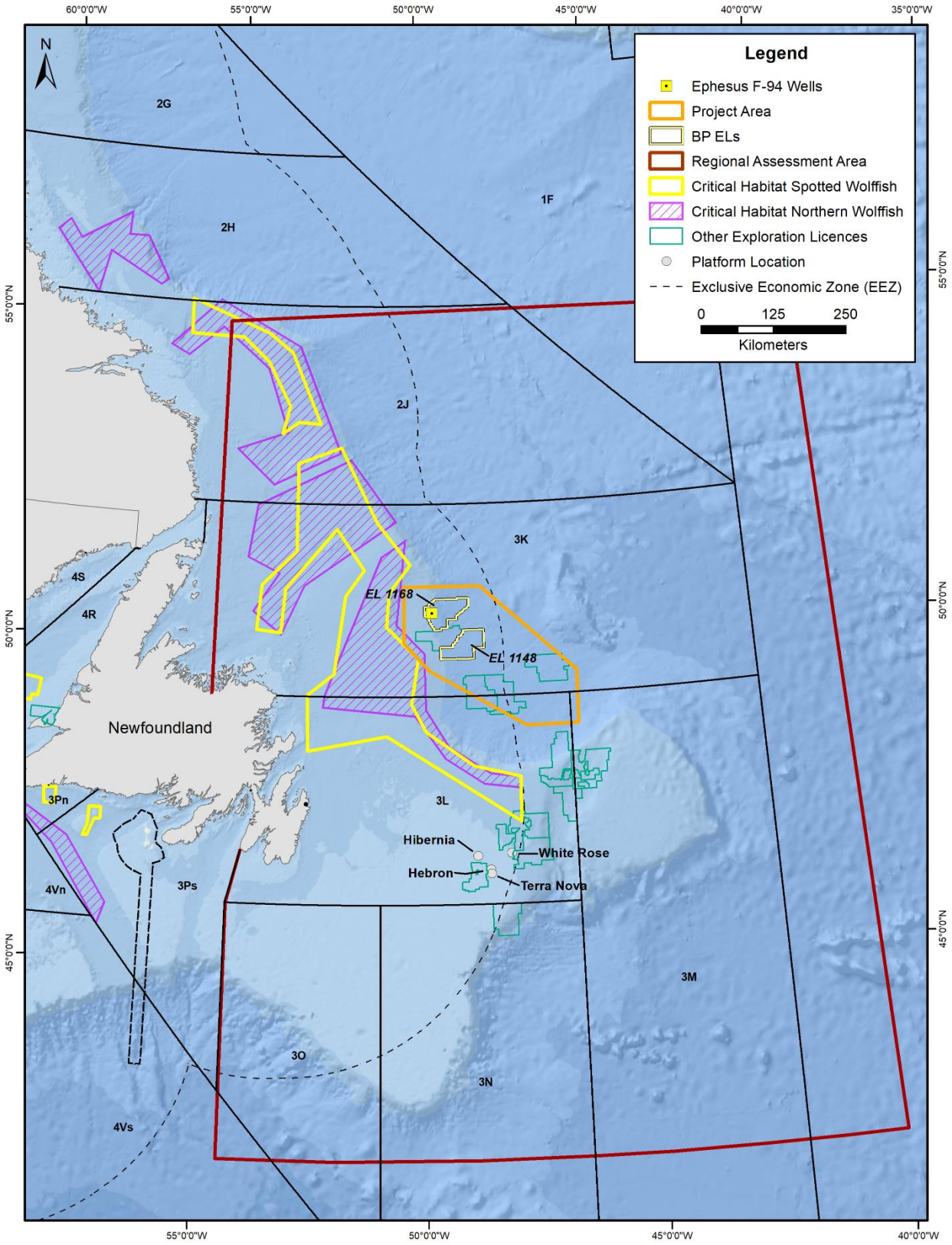

Figure 5-1 Identified Critical Habitat for Spotted and Northern Wolffish.

5.2. Special Areas

Since the original EA, some special area boundaries have been modified and new special areas have been identified. A list of special areas intersecting the RAA and their descriptions can be found in Table 5-2, and an updated map of special areas near or within the RAA can be found in Figure 5-2. Special areas described in Section 5.1.1 above are not included here.

Table 5-2 Special Areas that Overlap with the Regional Area.

Special Area	Name	Map #	Description
Crab Exclusion Zones	5A	1	Conservation exclusion zones identified for snow crab.
	6A	2	
	6B	3	
	6C	4	
	8A	5	
	9A	6	
	Nearshore	7	
North Atlantic Fisheries Organization (NAFO) Sponge, Coral, and Sea pen Closure	Tail of the Bank 1 (NAFO)	8	The tail of the Grand Bank has important concentrations of large-sized sponges, sea squirts, erect bryozoans, sea pens, and small and large gorgonian coral.
	Northwest Flemish Cap 10 (NAFO)	9	Along the edge of the Flemish Cap are large aggregations of sea pens, as well as black corals.
	Northwest Flemish Cap 11 (NAFO)	10	
	Northwest Flemish Cap 12 (NAFO)	11	
	Beothuk Knoll 13 (NAFO)	12	The Beothuk Knoll is closed to bottom contact fishing due to large gorgonians and large-sized sponges present.
	3O Coral Closure (NAFO)	13	Contains canyons likely to contain VMEs and overlaps with closures for sea pens and small gorgonians.
	Northern Flemish Cap 7a (NAFO)	14	Along the edge of the Flemish Cap are large aggregations of sea pens, as well as black corals.
	Northwest Flemish Cap 11a (NAFO)	15	
	Eastern Flemish Cap 14a (NAFO)	16	
	Eastern Flemish Cap 14b (NAFO)	17	
	Flemish Pass/Eastern Canyon 2 (NAFO)	18	Contains large aggregations of large-sized sponges, large gorgonian coral, sea pens, and black coral.
	Beothuk Knoll 3 (NAFO)	19	The Beothuk Knoll is closed to bottom contact fishing due to large gorgonians and large-sized sponges present.
	Eastern Flemish Cap 4 (NAFO)	20	Contains large gorgonian corals and several structure-forming sponges, as well as stalked crinoids.
	Northeast Flemish Cap 5 (NAFO)	21	Encompasses a gradient of benthic communities ranging from coral to sponge dominated grounds.
	Sackville Spur 6 (NAFO)	22	Has large concentrations of sponges. Closed to bottom contact fishing.
	Northern Flemish Cap 7 (NAFO)	23	Along the edge of the Flemish Cap are large aggregations of sea pens, as well as black corals.

Special Area	Name	Map #	Description
	Northern Flemish Cap 8 (NAFO)	24	
	Northern Flemish Cap 9 (NAFO)	25	
EBSA (Ecologically and Biologically Significant Area)	Labrador Marginal Trough	26	Important area for several species, including shrimp, American plaice, capelin, and marine mammals.
	Labrador Slope	27	High diversity area for corals, sponges, fish functional groups, and several rare or endangered species.
	Grey Islands	28	Important area for seabirds and waterfowl.
	Fogo Shelf	29	Spawning area for capelin, Atlantic salmon migration corridor, and important seabird colonies.
	Notre Dame Channel	30	Important area for cetacean feeding and migration, and high densities of skates and other fish species.
	Orphan Spur	31	High diversity of corals, fish, marine mammals, and seabirds, including rare or endangered species.
	Bonavista Bay	32	Important due to the presence of seabird colonies, eelgrass, Atlantic salmon, and capelin spawning areas.
	Northeast Slope	33	High diversity of corals, fish, marine mammals, and seabirds, including rare or endangered species.
	Smith Sound	34	Extensive seagrass beds, spawning grounds for capelin, and seabird foraging area.
	Baccalieu Island	35	Highly productive waters support the world's largest nesting colony of Leach's storm petrels, as well as other seabirds.
	Eastern Avalon	36	Eelgrass habitat, capelin spawning, seabird colonies, and marine mammal presence.
	Virgin Rocks	37	Hard structure supports a high diversity of fish species, and important forage fish species for seabirds and marine mammals.
	St. Mary's Bay	38	Important area for several seabirds and waterfowl, as well as capelin spawning beaches and eelgrass beds.
	Placentia Bay	39	Important area for Atlantic salmon, leatherback sea turtles, capelin spawning, eelgrass, and seabird colonies.
	Haddock Channel Sponges	40	Important sponge benthic area, as well as for capelin and American plaice.
	Lilly Canyon-Carson Canyon	41	Slopes and canyons support many important fish species, seabirds, marine mammals, and corals and sponges.
	Southeast Shoal	42	Important area for yellowtail flounder, as well as many other fish species including species at risk.
	Southwest Slope	43	Important area for many fish species, as well as coral species and seabirds.
NAFO Seamount Closures	1F West	44	Closed as a seamount VME element.
	2J East 1	45	
	2J East 2	46	
	3K North	47	
	Fogo Seamount Chain	48	
	Newfoundland Seamounts	49	
	Orphan Knoll	50	Appears to have a distinctive fauna from the adjacent continental slopes, including corals and sponges.

Special Area	Name	Map #	Description
Marine Refuge	Division 3O Closure	51	High concentrations of structure forming corals and sponges.
	Gander Bay Lobster closure	52	Important lobster spawning habitat.
	Gooseberry Island Lobster closure	53	
	Funk Island Deep Closure	54	Important benthic habitat for Atlantic cod and overlaps with EBSAs with high densities of benthic fish.
	Hawke Channel Closure	55	
	Northeast Newfoundland Slope Closure	56	An area designated to protect corals and sponges and contribute to the long-term conservation of biodiversity.
SiBA (Significant Benthic Area)	Sponge Significant Benthic Areas from KDE Analyses	57	Areas identified using kernel density analysis containing significant concentrations of a given functional/morphological group.
	Sea Pen Significant Benthic Areas from KDE Analyses	58	
	Large Gorgonian Coral Significant Benthic Areas from KDE Analyses	59	
	Small Gorgonian Coral Significant Benthic Areas from KDE Analyses	60	
Convention on Biological Diversity Identified EBSA	Seabird Foraging Zone in the Southern Labrador Sea	61	Important foraging area for seabirds, including black-legged kittiwakes, thick-billed murres, and Leach's storm-petrels.
	Orphan Knoll	62	Appears to have a distinctive fauna from the adjacent continental slopes, including corals and sponges.
	Slopes of the Flemish Cap and Grand Bank	63	Has a high biodiversity of marine taxa, and habitat for a number of threatened species.
	Southeast Shoal and Adjacent Areas on the Tail of the Grand Bank	64	A highly productive ecosystem, with spawning areas for capelin, American plaice, Atlantic cod, and Atlantic wolffish, as well as nursery grounds for yellowtail flounder. Important feeding area for whales and seabirds.

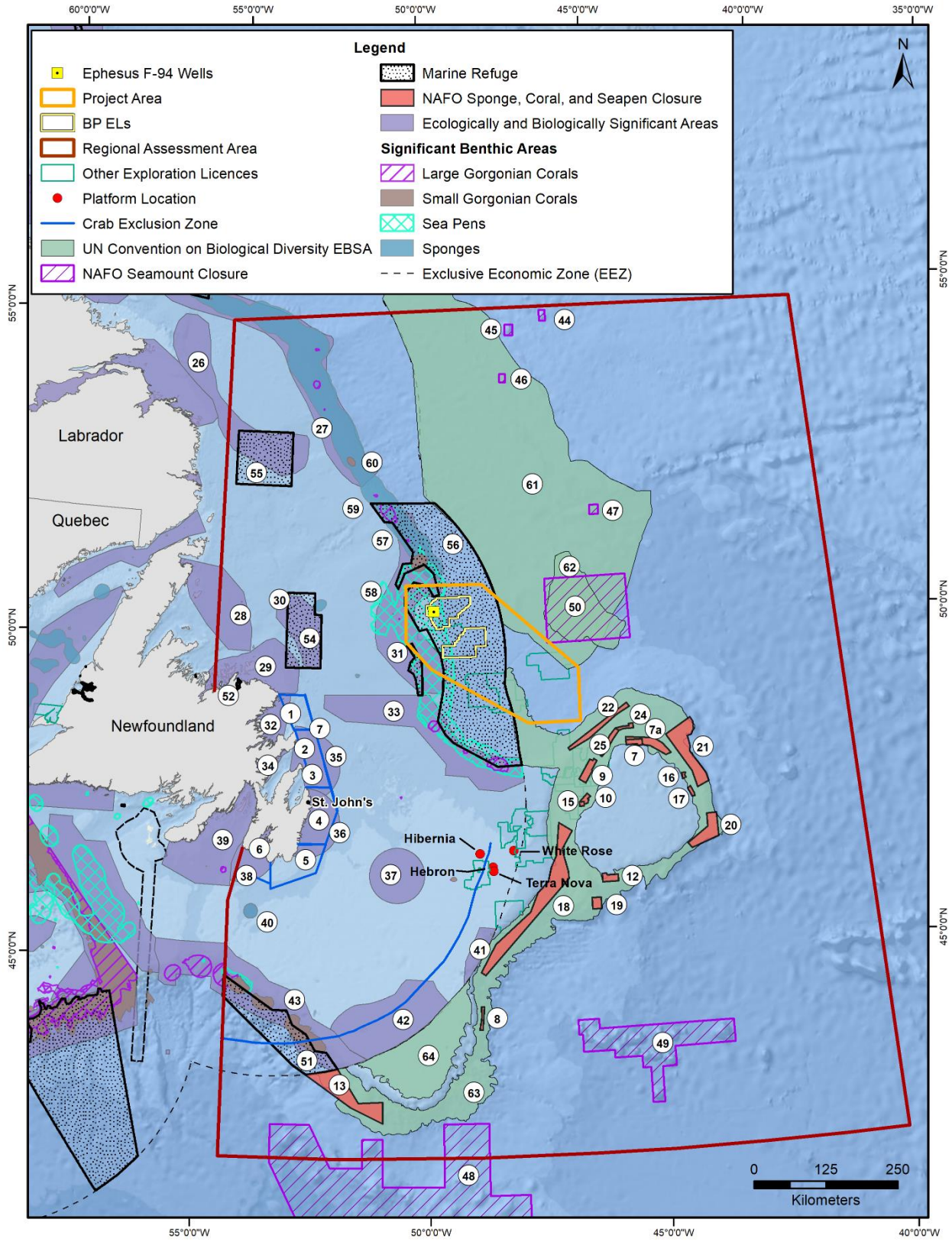

Figure 5-2 Special areas within and adjacent to the regional assessment area.

5.3. Existing Socio-Economic Environment

The 2023 exploration drilling temporal scope from March to October coincides with peak fishing season for many commercially important fisheries in the Newfoundland Offshore Area. Project activities have the potential for interactions with fisheries and other ocean users, including Indigenous organizations. Maintaining engagement with Indigenous groups and harvesters is a top priority throughout the duration of this project (see Section 3). The Project Area is located within the Northwest Atlantic Fisheries Organization (NAFO) unit areas 3K, L and M, specifically 3Kg, 3Kk, 3Le, and 3Ma. The larger Regional Assessment Area includes nearly all NAFO area 3 (K, L, M, N, O), as well as portions of 1F, 2J, and 4Vs, and a portion outside of Canada's Exclusive Economic Zone (EEZ). DFO manages fisheries within the EEZ (as well as sedentary species across Canada's continental shelf), and NAFO holds jurisdiction over several commercial fisheries outside the EEZ. The original EA presented DFO catch data within the Project Area from 2012 to 2016. This document provides an update to these results, with DFO data from 2017 and 2021. It should be noted that the Ephesus well is in a marine refuge for which a there is a prohibition on bottom contact fisheries activities.

DFO catch data within the Project Area from 2017 and 2021 (Table 5-3) is similar to results reported in the original EA (bp 2018). Targeted fishing areas nearby are largely the slopes and shelf of the Northeast Newfoundland Shelf (Figure 5-3, Figure 5-4, Figure 5-5). Greenland halibut is the largest catch by weight, representing 96% of the reported catch. Redfish, queen/snow crab, and roughhead grenadier make up the remaining reported catch in the Project Area. Northern shrimp was a large portion of the reported catch from 2012 to 2016, but numbers for 2017 and 2021 have been withheld for confidentiality purposes.

Similarly, DFO catch data within the RAA from 2017 and 2021 (Table 5-4) is similar to that from the original EA. The largest fishery by weight in most years is snow/queen crab, followed by northern shrimp, capelin, and Atlantic cod. Values are similar to those reported in the original EA, though many smaller fisheries are now making up larger portions of the total catch. Landings of northern shrimp decreased from 2012 to 2016 and continued to decrease in 2017 and 2021. Many NAFO fishing areas have a moratorium on northern shrimp, and quotas have decreased in Canada.

Since the original EA, there have not been significant changes to timing of harvests, gear used, international fisheries, or other ocean users. bp is not aware of food, social, or ceremonial (FSC) fishing or harvesting occurring within the Project Area but is aware of the potential presence of species in the Project Area that may be harvested by Indigenous peoples outside the Project Area, including Atlantic salmon, American eel, swordfish, and tuna. Birds and seals that could occur in the Project Area may also be harvested by Indigenous peoples for FSC purposes.

Table 5-3 Offshore Harvest by Species within NAFO Unit Areas 3Kg, 3Kk, 3Le, and 3Ma (Project Area) from 2017 to 2021 Reported as Annual Weight (metric tons (t)).

Species	2017[1]	2021[2]	Total	Percent of Total (%)
Greenland halibut	1781	752	2,533	96
Queen/Snow crab	X	21	21	0.8
Roughhead grenadier	X	5	5	0.2
Redfish	77	0.3	77.3	3
Atlantic halibut	X	X	-	-
Northern shrimp	X	X	-	-
Atlantic cod	X	X	-	-
Skate	X	X	-	-

Total	**2,636.3**	**100**

Source: (DFO 2022b)
'X' denotes species had been fished although due to confidentiality reasons, data has been suppressed.
[1] Only includes 3Kg and 3Le
[2] No data provided for 3Kk

Table 5-4 Offshore Harvest by Species within NAFO Unit Areas 1F, 2J, 3KLMNO, and 4Vs (Regional Area) from 2017 to 2021 Reported as Annual Weight (metric tonnes (t)).

Species	2017[1]	2021[2]	Total	Percent of Total (%)
Atlantic cod	12,114	10,700	22,814	13.3
Greenland halibut	2,841	3,690	6,531	3.8
Atlantic halibut	85	1,416	1,501	0.9
Snow/Queen crab	30,920	35,581	66,501	38.8
Skate	X	X	-	-
Redfish	78	3,648	3,726	2.2
Capelin	17,256	12,996	30,252	17.6
Witch flounder/greysole	X	X	-	-
White hake	X	26	26	<0.1
Haddock	X	1	1	<0.1
Northern shrimp	13,185	12,247	25,432	14.8
Cusk	X	4	4	<0.1
Roughhead grenadier	X	5	5	<0.1
Shortfin squid	231	10,100	10,331	6.0
Swordfish	147	236	383	0.2
Atlantic herring	2,285	X	2,285	1.3
Tunas	X	22	22	<0.1
Mackerel	598	X	598	0.3
Yellowtail flounder	X	X	-	-
Lobster	143	265	408	0.2
Monkfish	X	X	-	-
Sea cucumber	-	X	-	-
Sea scallop	-	5	5	<0.1
Lumpfish (roe)	X	17	17	<0.1
Spider/toad crab	342	X	342	0.2
Whelk	203	X	203	0.1
Winter flounder	48	0.1	48.1	<0.1
Pink shrimp (*Pandalus montagui*)	149	30	179	0.1
Total			**171,614.1**	**100**

Source: (DFO 2022b)
'X' denotes species had been fished although due to confidentiality reasons, data has been suppressed.
[1] Only includes 2J3KLNO
[2] Only includes 2J3KLMNO4Vs

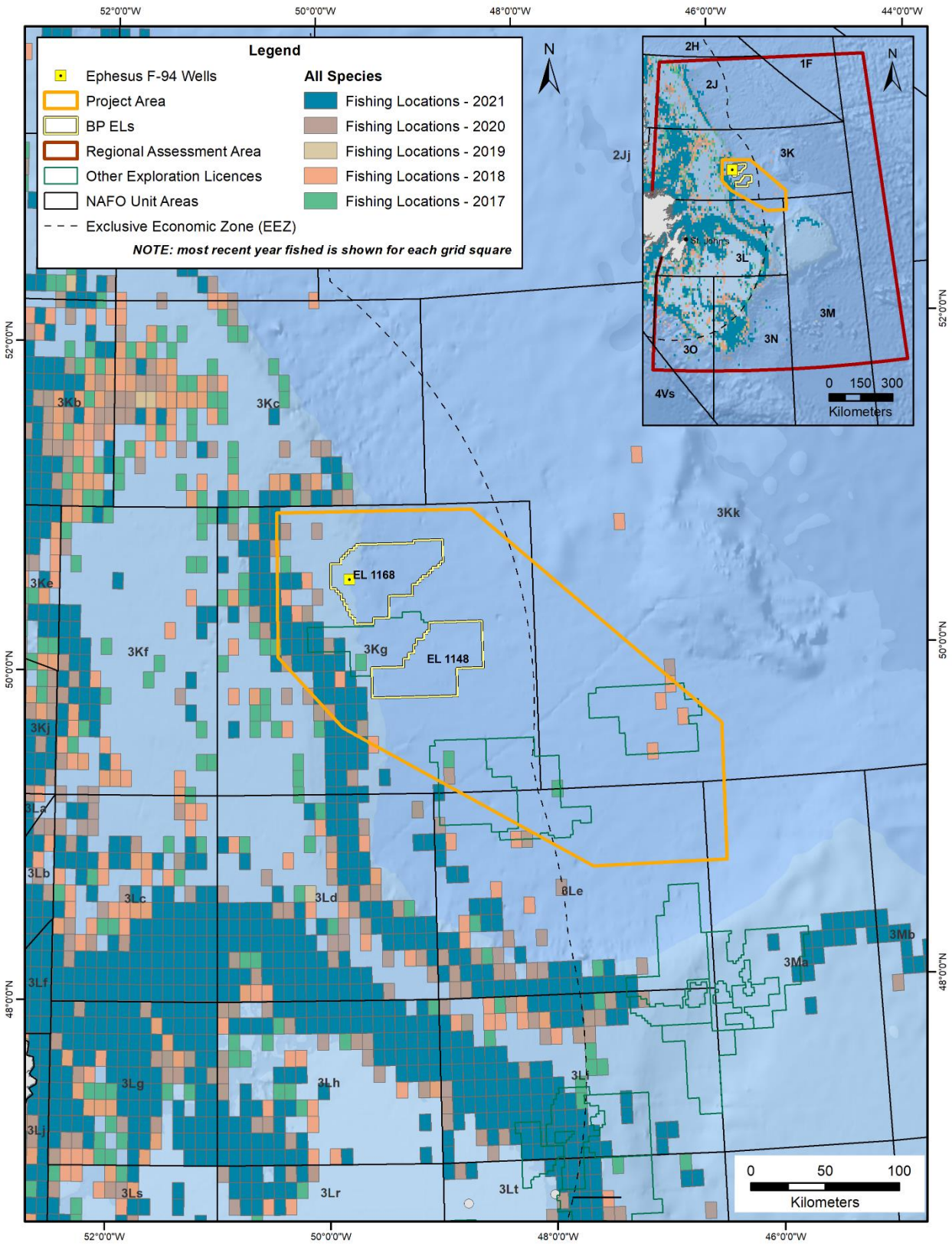

Figure 5-3 Harvesting Locations for All Species from 2017 to 2021.

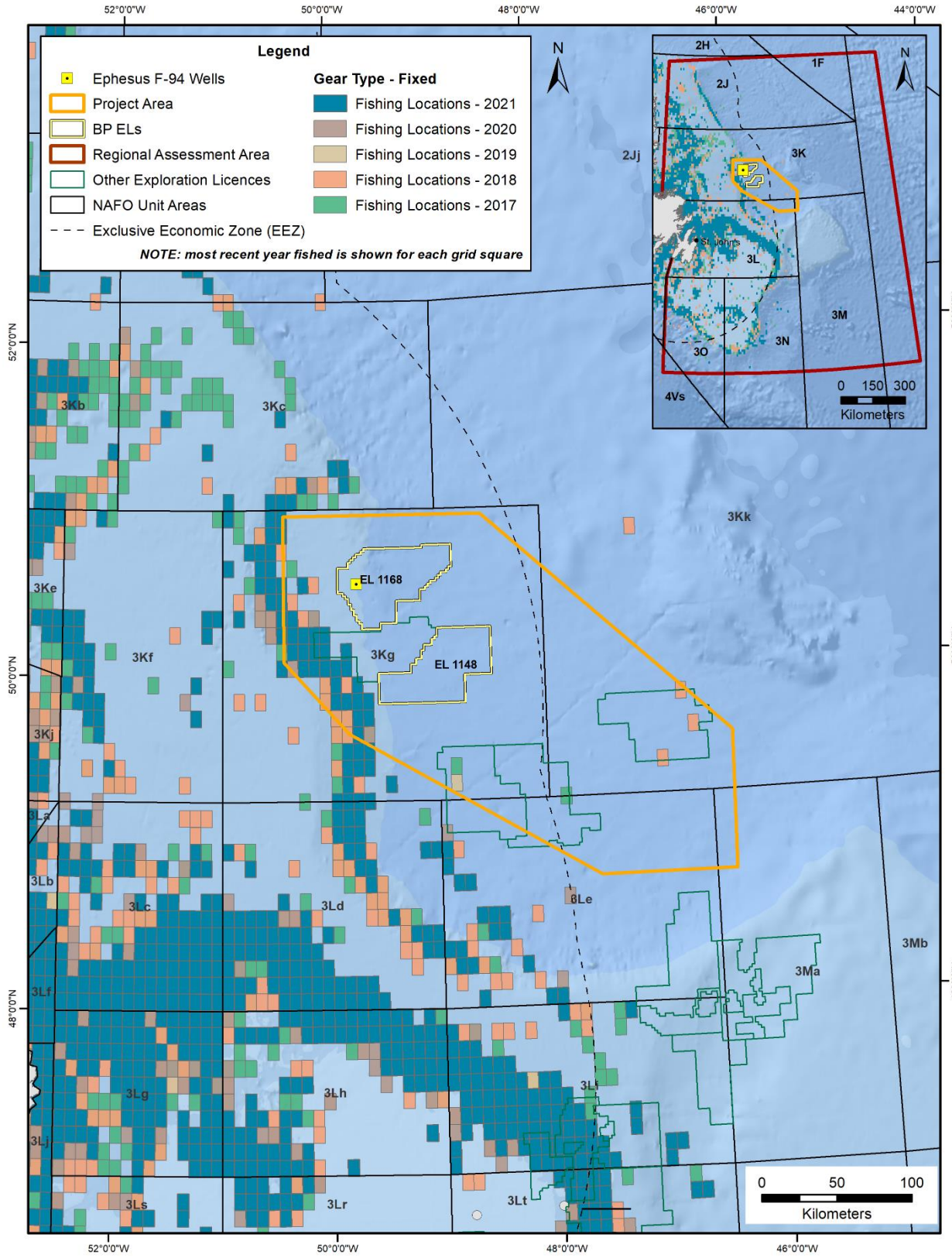

Figure 5-4 Harvesting Locations for Fixed Gear from 2017 to 2021.

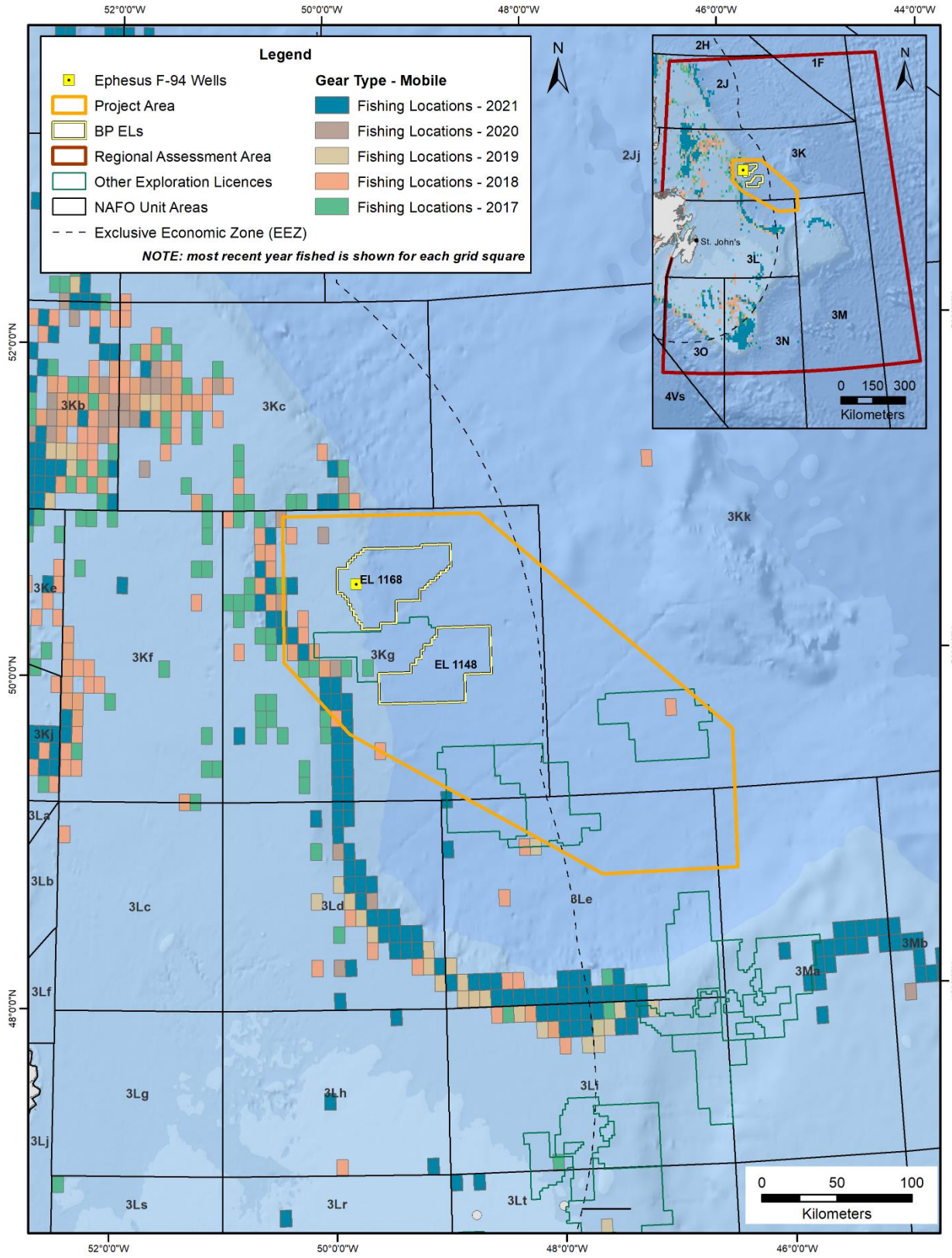

Figure 5-5 Harvesting Locations for Mobile Gear from 2017 to 2021.

5.4. Drill Cuttings Dispersion

Updated drill cuttings dispersion modelling was conducted for the Ephesus well (bp 2022d). The model scenario inputs for the WOB scenario for the original EA and the Ephesus well scenario were similar in water depth, drilling depths, and discharge totals.

The updated drill modelling results for the Ephesus well have not produced significant changes to the conclusions presented in the EIS. The impact pathways and residual effects have remained the same as previously anticipated, and no new receptors or interactions have been discovered as a result of the updated modelling for the Ephesus well. Mitigation measures will be implemented as planned including selection and screening of chemicals to be discharged under the Offshore Chemical Selection Guidelines (OSCG) and treatment of SBM drill cuttings in accordance with the Offshore Waste Treatment Guidelines (OWTG). The mitigations identified in the EIS remain sufficient, and no new measures are necessary. The areal extent and maximum extent from the discharge source was similar to previous predictions.

The residual effects characterization as summarized in Table 5-5 remains the same as predicted in the original EA. Similarly, the significance of residual environmental effects as summarized in Table 5-6 remains as not significant adverse residual effects. The modelling results between the WOB and Ephesus well are of similar extent and footprint, therefore, there are no changes to residual effects predictions in the assessment of drill cuttings dispersion from the Ephesus well. As part of follow-up monitoring, bp plans to conduct a visual survey of the seafloor using an ROV after drilling activities to assess the visual extent of sediment dispersion and validate the drill waste modelling predictions.

Table 5-5 Summary of Residual Project-Related Environmental Effects from Discharges.

Residual Effect	Residual Environmental Effects Characterization						
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Fish and Fish Habitat [Change in Risk of Mortality or Physical Injury and Habitat Quality and Use]	A	L	PA	MT-LT	IR	R	D
Migratory Birds [Change in Risk of Mortality or Physical Injury and Habitat Quality and Use]	A	L	PA	ST	IR	R	D
Marine Mammals and Sea Turtles [Change in Habitat Quality and Use]	A	N	PA	ST	UL	R	D
Special Areas [Change in Habitat Quality]	A	L-M	PA	ST-MT	IR	R	D
Indigenous People and Community Values [Change in Commercial Communal Fisheries and Change in Current Indigenous Use of Lands and Resources for Traditional Purposes]	A	L	PA	MT	IR	R	D

Table 5-5 Summary of Residual Project-Related Environmental Effects from Discharges.

Residual Effect	Residual Environmental Effects Characterization						
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Commercial Fisheries and Other Ocean Users [Change in Availability of Resources]	A	L	PA	ST	IR	R	D

KEY: N/A: Not Applicable **Direction:** P: Positive A: Adverse **Magnitude:** N: Negligible L: Low M: Moderate H: High	**Geographic Extent:** PA: residual environmental effects are restricted to the Project Area LAA: residual environmental effects extend into the Local Assessment Area RAA: residual environmental effects extend into the Regional Assessment Area; in certain scenarios, effects may extend beyond the RAA as indicated by an "*" **Duration:** ST: Short-term MT: Medium-term LT: Long-term	**Frequency:** UL: Unlikely S: Single event IR: Irregular event R: Regular event C: Continuous **Reversibility**: R: Reversible I: Irreversible **Ecological / Socio-Economic Context**: D: Disturbed U: Undisturbed

Table 5-6 Summary of Residual Environmental Effects from Discharges.

Valued Component	Significance of Residual Environmental Effect	Likelihood of Significant Effect
Marine Fish and Fish Habitat	N	N/A
Marine and Migratory Birds	N	N/A
Mammals and Sea Turtles	N	N/A
Special Areas	N	N/A
Indigenous People and Community Values	N	N/A
Commercial Fisheries and Other Ocean Users	N	N/A

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

5.5. Accidental Events

Updated oil spill modelling was conducted for the Ephesus well. The spill scenario inputs for the WOB scenario for the original EA and the Ephesus well scenario were similar in water depth, oil characteristics, and release rates.

As detailed in the Oil Spill Modelling Addendum (bp 2022e), the updated modelling results for the Ephesus well does not result in material changes to the conclusions presented in the EIS. The effect pathways and residual effects remain the same as previously predicted. No new interactions or new receptors have been identified as a result of the updated modelling for the Ephesus well and no new mitigation or response planning is required beyond what was previously identified in the EIS. The Ephesus model indicates that water column exposure and total concentration footprints from the Ephesus well would be the same basic shape, but with a larger areal extent (more eastward), while dissolved hydrocarbon concentrations would be the same basic shape as the WOB well. There would be greater exposure time in the vicinity of the well, and the metallic sheen (5 to 50 µm thickness) would be more prevalent within the trajectory footprint. There would still be no shoreline contact for a capping well scenario and a relief well scenario would have limited shoreline contact with the shortest time to shore still being more than three months.

Table 5-7 summarizes the characterization of residual effects as presented in the EIS, based on the worst-credible case discharge modelling for the WOB well. The significance of residual environmental effects remains the same as defined in the EIS, as summarized in Table 5-8. Given the conservative assumptions used in the original EA and the similarity of modelling results between the WOB and Ephesus wells, no changes to residual effects predictions are proposed for the assessment of effects of a subsea blowout of the Ephesus well (bp 2022e).

Table 5-7 Summary of Residual Project-Related Environmental Effects Due to a Subsea Blowout (bp 2022e).

Residual Effect	Residual Environmental Effects Characterization						
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Fish and Fish Habitat [Change in Risk of Mortality or Physical Injury and Habitat Quality and Use]	A	M-H	RAA*	ST-MT	S	R	D
Migratory Birds [Change in Risk of Mortality or Physical Injury and Habitat Quality and Use]	A	H	RAA*	ST-MT	S	R	D
Marine Mammals and Sea Turtles [Change in Risk of Mortality or Physical Injury and Habitat Quality and Use]	A	H	RAA*	ST-MT	S	R	D
Special Areas [Change in Habitat Quality]	A	H	RAA*	ST-MT	S	R	D
Indigenous People and Community Values [Change in Commercial	A	H	RAA	LT	S	R	D

Table 5-7 Summary of Residual Project-Related Environmental Effects Due to a Subsea Blowout (bp 2022e).

Residual Effect	Residual Environmental Effects Characterization						
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Communal Fisheries and Change in Current Indigenous Use of Lands and Resources for Traditional Purposes]							
Commercial Fisheries and Other Ocean Users [Change in Availability of Resources]	A	H	RAA*	LT	S	R	D

KEY: N/A: Not Applicable **Direction:** P: Positive A: Adverse **Magnitude:** N: Negligible L: Low M: Moderate H: High	**Geographic Extent:** PA: Project Area LAA: Local Assessment Area RAA: Regional Assessment Area; in certain scenarios, effects may extend beyond the RAA as indicated by an "*" **Duration:** ST: Short-term MT: Medium-term LT: Long-term	**Frequency:** UL: Unlikely S: Single event IR: Irregular event R: Regular event C: Continuous **Reversibility**: R: Reversible I: Irreversible **Ecological / Socio-Economic Context**: D: Disturbed U: Undisturbed

Table 5-8 Summary of Residual Environmental Effects for a Subsea Blowout (bp 2022e).

Valued Component	Significance of Residual Environmental Effect	Likelihood of Significant Effect
Marine Fish and Fish Habitat	N	N/A
Marine and Migratory Birds	S	U
Mammals and Sea Turtles	N	N/A
Special Areas	N	N/A
Indigenous People and Community Values	S	U
Commercial Fisheries and Other Ocean Users	S	U

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

6. Summary and Concluding Statement

bp plans to conduct exploration drilling on EL 1168 in the Orphan Basin offshore Newfoundland and Labrador in 2023. The proposed program has been assessed and deemed within the scope of the previously accepted EA.

Since the initial preparation of the exploration drilling EA (bp 2018), there have been updates to key environmental aspects including the conservation status of several species, special areas, and commercial fisheries. There have been additional SARA and COSEWIC listings and de-listings of species as well as publication of Action Plans and Recovery Strategies. Critical habitat for spotted and northern wolffish overlap with the Project Area but does not overlap with the EL where there are direct effects to the benthic environment. Therefore, interaction with the critical habitat is considered unlikely.

A review was conducted on the distribution and intensity of fishing activities in the region. The exploration drilling activities are planned during March to October, peak season for many commercially important fisheries near the Project. However, the nature and extent of fisheries activities remain unchanged from the previous assessment, meaning that the potential effects are expected to be similar.

Updated drill cuttings dispersion modelling and oil spill modelling was conducted for the Ephesus wellsite. The modelling results were similar to the model scenarios that informed the original EA effects assessment. The potential effects are predicted to be similar to the previously modelled scenarios and therefore the assessment remains unchanged.

The EA update does not affect the original environmental predictions, required mitigations, or determinations related to environmental effects significance. The activities planned in 2023 are within the scope of the original EA, hence the conclusions of the original EA remain valid. bp will continue to adhere to the original EA commitments and Decision Statement conditions, including mitigation measures and follow-up monitoring, with no additional measures planned based on the update.

Planning is underway for 2023 surveys and Indigenous groups, NL fishers, and other stakeholders have been and will continue to be consulted through existing communication channels. These consultations and communications will build upon the engagement efforts for the planned exploration drilling program and bp will continue to address potential questions and concerns as they arise.

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