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CNOOC Petroleum North America ULC Eastern Newfoundland Offshore Geophysical, Geochemical, Environmental and Geotechnical Program (2018 – 2023)

Environmental Assessment Update

FINAL REPORT

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1 INTRODUCTION

CNOOC Petroleum North America ULC (CNOOC; formerly known as Nexen Energy ULC) is proposing to undertake an offshore petroleum exploration program in the Canada - Newfoundland and Labrador Offshore Area, which includes planned geophysical, geochemical, environmental and geotechnical survey activities in this region between 2018 and 2023 (hereinafter referred to as the Project). This document is an update of the Environmental Assessment (EA) report (Nexen Energy ULC (Nexen) 2017) and subsequent EA addendum (Nexen 2018) that provides information to confirm that the proposed program activities for 2019 fall within the scope of the previously assessed program.

As part of the required regulatory review and approval processes for the Project, CNOOC filed an EA Report (Nexen Energy ULC (Nexen) 2017) in relation to a proposed offshore petroleum exploration program in June 2017. The EA Report was planned, prepared and submitted in compliance with the associated EA requirements and processes of the Canada-Newfoundland Offshore Petroleum Board (C-NLOPB), including the C-NLOPB's Project-specific EA Scoping Document issued on March 13, 2017. In response to review comments on the EA Report, a series of EA Addenda were submitted with the final cumulative revised EA Addendum report submitted in October 2018. As part of the release of the Project from EA process (December 19, 2018) (C-NLOPB 2018), the C-NLOPB stated that:

> *"At the time of application for subsequent program authorizations in the Project Area, Nexen will be required to provide information to the C-NLOPB. This information should outline the proposed activities, confirm that the proposed program activities fall within the scope of the previously assessed program, and indicate if, with this information, the EA predictions remain valid. In addition, Nexen shall provide information regarding the adaptive management of requirements of the Species at Risk Act (SARA) into program activities (e.g., introduction of new species or critical habitat to Schedule 1; additional mitigations; implementation of recovery strategies and/or monitoring plans)."*

This EA Update is provided as an overview of the planned Project activities for the upcoming year, to update applicable information associated with species at risk, and to evaluate and confirm that the nature and scope of the planned activities are within the scope of the approved EA Report (Nexen 2017).

2 PROJECT DESCRIPTION

The EA Report included planned offshore exploration activities over the Project Area (Figure 2.1) over the 2018-2023 period. This includes data acquisition using a towed or remotely operated vehicle (ROV) mounted seabed camera video system (Section 2.4 of the EA Report).

CNOOC plans on conducting underwater video seabed investigations in 2019 within the Project Area (Figure 2.1). The planned seabed investigations with a ROV will be used to assess the potential presence of sensitive benthic organisms at proposed well site locations within the Exploration Licence (EL) areas (EL1144 and EL1150) (Figure 2.1) between 1100 and 1200 m depths. Tentative locations of the surveys are noted below (Figure 2.2). The ROV transects will also consider modelled drill cuttings area for proposed wellsite locations. A representative seabed characterization to investigate the potential presence of sensitive benthic organisms such as corals and sponges is also part of planned mitigations to reduce potential effects on the environment (Section 5.3.2 of the EA Report).

It is estimated that underwater survey activities will be localized to 1 kilometre (km) radius of each target survey site. It is anticipated that the survey activities will occur between July and September 2019. Further, it is expected that survey operations will be conducted from a single vessel and survey durations are short term (days) depending on final scoping and weather considerations. The M/V Horizon Star has been contracted for the Project has , and is a fully equipped, modern vessel suited to the operating environment and task. The vessel will use shore based facilities in or near St. John’s, NL. Existing port infrastructure will be used for all support aspects, and fuel and supplies will be sourced from existing, local suppliers.

A meeting was held with the C-NLOPB and DFO to gain concurrence to the visual seabed survey plan prior to execution of the field program. At the request of DFO and the CNLOPB, the plan was amended to incorporate two additional transect lines on the east and west side of the drill cuttings plume.

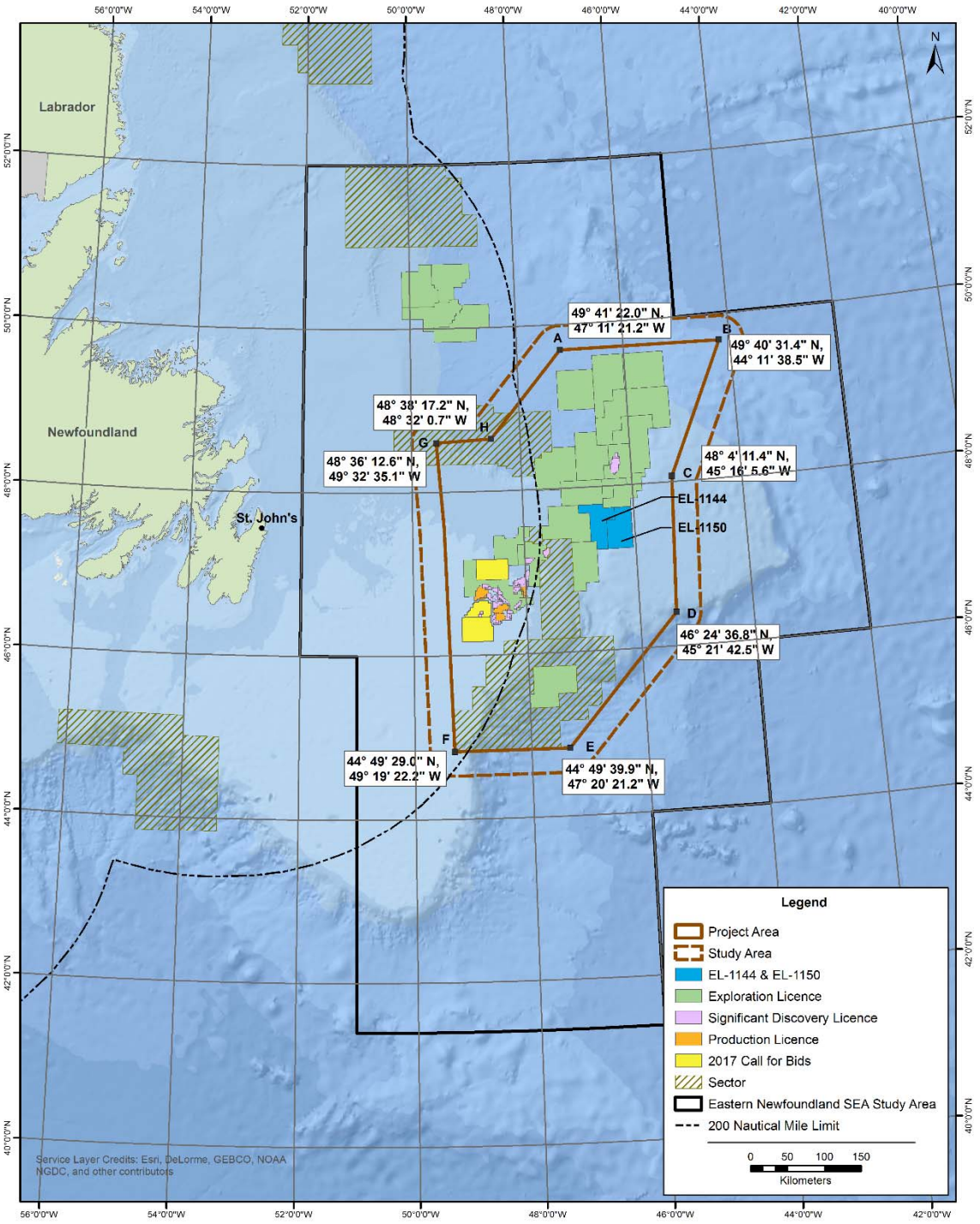

Figure 2.1: Eastern Newfoundland Offshore Geophysical, Geochemical, Environmental and Geotechnical Program Project Area.

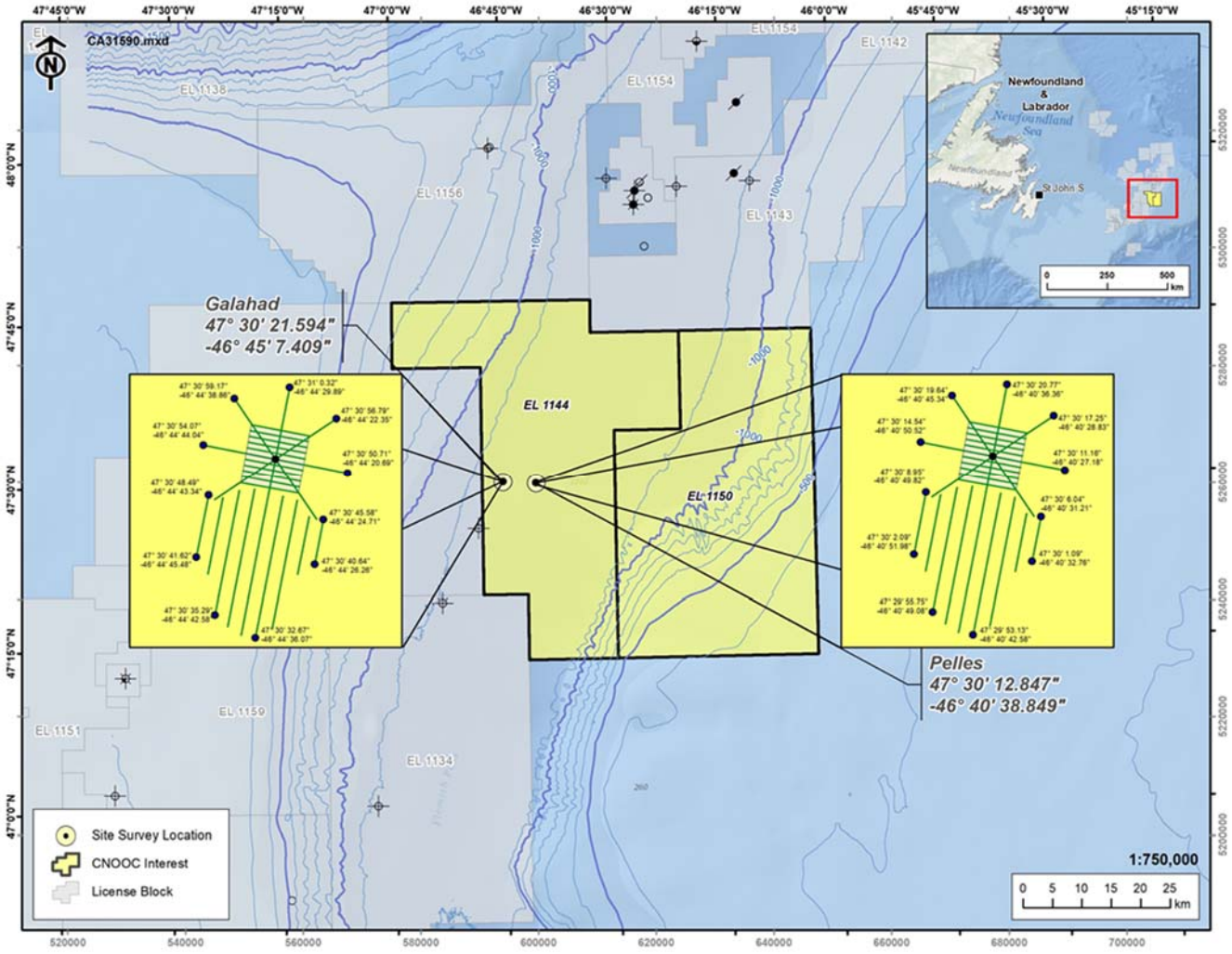

Figure 2.2: Tentative Well and Survey Locations

3 ENVIRONMENTAL SETTING

The original EA Report and EA Addenda provided an overview of species of conservation concern (SOCC) within and around the Project Area. The following sections provide updated information on SOCC and is to be considered with the information provided, and associated assessments of, the EA Report.

3.1 Species at Risk

The Canadian *Species at Risk Act* (*SARA*) provides for the protection of SOCC at the national level to prevent extinction and extirpation, facilitate the recovery of endangered and threatened species, and to promote the management of other species to prevent them from becoming at risk in the future. At the provincial level, the *Newfoundland and Labrador Endangered Species Act* (*NL ESA*) provides protection for indigenous species, sub-species and populations considered to be endangered, threatened, or vulnerable within the province. Designations under the Acts follow the recommendations and advice provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the provincial Species Status Advisory Committee (SSAC).

Table 3-1 provides a listing of identified species at risk, as identified and considered in the EA Report under NL ESA, SARA and COSEWIC, indicating their current designations. Species at risk considered unlikely to occur in the Project Area as described in the EA Report are not listed below. This includes birds that have affinities with other habitats (i.e. red knot [*Calidris canutus*], harlequin duck [*Histrionicus histrionicus*]) that have been observed (rarely) by surveys in offshore Newfoundland. Cells shaded in grey are species that have been added since the previous EA Report.

Table 3-1: Species at Risk or of Special Conservation Concern (Current Designations - updated May 2019).

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	Scientific Name	NL ESA	SARA	COSEWIC	
Fish					
Acadian redfish	*Sebastes fasciatus*			T	Atlantic (COSEWIC)
American eel	*Anguilla rostrata*	V		T	
American plaice	*Hippoglossoides platessoides*			T	NL (COSEWIC)
Atlantic bluefin tuna	*Thunnus thynnus*			E	
Atlantic cod	*Gadus morhua*			E	NL (COSEWIC)
Atlantic halibut	*Hippoglossus hippoglossus*			NR	
Atlantic salmon	*Salmo salar*			T	South Newfoundland Population (COSEWIC)
				SC	Quebec Eastern North Shore (COSEWIC)

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	Scientific Name	NL ESA	SARA	COSEWIC	
				SC	Quebec Western North Shore (COSEWIC)
				E	Anticosti Island (COSEWIC)
				SC	Inner St. Lawrence (COSEWIC)
				SC	Gaspe-Southern Gulf of St. Lawrence (COSEWIC)
				E	Eastern Cape Breton (COSEWIC)
				E	Nova Scotia Southern Upland (COSEWIC)
				E	Outer Bay of Fundy Population (COSEWIC)
Atlantic wolffish	*Anarhichas lupus*		SC	SC	
Barndoor skate	*Dipturus laevis*			NR	
Basking shark	*Cetorhinus maximus*			SC	Atlantic (COSEWIC)
Blue shark	*Prionace glauca*			NR	Atlantic (COSEWIC)
Common lumpfish	*Cyclopterus lumpus*			T	Atlantic (COSEWIC)
Cusk	*Brosme brosme*			E	
Deepwater redfish	*Sebastes mentella*			T	Northern (COSEWIC)
Northern wolffish	*Anarhichas denticulatus*		T	T	
Porbeagle	*Lamna nasus*			E	
Roughhead grenadier	*Macrourus berglax*			SC	
Roundnose grenadier	*Coryphaenoides rupestris*			E	
Shortfin mako	*Isurus oxyrinchus*			SC	Atlantic (COSEWIC)
Smooth skate	*Malacoraja senta*			E	Funk Island Deep (COSEWIC)
Spiny dogfish	*Squalus acanthias*			SC	Atlantic (COSEWIC)
Spotted wolffish	*Anarhichas minor*		T	T	
Striped wolffish	*Anarhichas lupus*		SC	SC	
Thorny skate	*Amblyraja radiata*			SC	Canada
White hake	*Urophycis tenuis*			T	Atlantic and Northern Gulf of St. Lawrence (COSEWIC)
White shark	*Carcharodon carcharias*		E	E	Atlantic (COSEWIC/SARA)
Winter skate	*Leucoraja ocellata*			E	Eastern Scotian Shelf – Newfoundland (COSEWIC)

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	**Scientific Name**	**NL ESA**	**SARA**	**COSEWIC**	
Birds					
Ivory gull	*Pagophila eburnea*	E	E	E	
Ross's gull	*Rhodostethia rosea*		T	T	
Red-necked phalarope	*Phalaropus lobatus*			SC	
Marine Mammals					
Blue whale	*Balaenoptera musculus*		E	E	Atlantic (COSEWIC)
North Atlantic right whale	*Eubalaena glacialis*		E	E	
Bowhead whale	*Balaena mysticetus*			SC	Eastern Canada-West Greenland (COSEWIC)
Fin whale	*Balaenoptera physalus*		SC	SC	Atlantic (COSEWIC)
Northern bottlenose whale	*Hyperoodon ampullatus*		E	E, SC	Scotian Shelf, Davis Strait-Baffin Bay-Labrador Sea (COSEWIC)
Sowerby's beaked whale	*Mesoplodon bidens*		SC	SC	
Killer whale	*Orcinus orca*			SC	Northwest Atlantic-Eastern Arctic (COSEWIC)
Beluga whale	*Delphinapterus leucas*		E	E	St. Lawrence Estuary (COSEWIC)
Harbour porpoise	*Phocoena phocoena*		T	SC	Northwest Atlantic (COSEWIC)
Sea Turtles					
Leatherback sea turtle	*Dermochelys coriacea*		E	E	Atlantic (COSEWIC)
Loggerhead sea turtle	*Caretta caretta*		E	E	

[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

Grey-shaded cells indicated designation changes to this list since the 2017 EA Report.

3.2 SOCC Biological and Ecological Information and Environmental Assessment

There have been updated designations for SOCC common lumpfish (*Cyclopterus lumpus*), shortfin mako, Ross's gull (*Rhodostethia rosea*), bowhead whale (*Balaena mysticetus*), and beluga whale (*Delphinapterus leucas*). Beluga whales and shortfin mako were identified and considered in the EA Report. Common lumpfish, Ross's gull, and bowhead whale had not been identified by COSEWIC at the time of the EA Report and are the only species added to the SOCC listing (Table 3-1). Therefore, additional biological and ecological information is provided below for this species. All other species listed in the Table 3-1 were previously identified and considered within the existing EA Report for the potential effects of a geophysical, geochemical, environmental and geotechnical program.

Common lumpfish were assessed in November 2017 as "threatened" and no status or recovery documents have been finalized for this species. Common lumpfish are widely distributed in temperate waters from shallow coastal waters of less than 20 m to depths greater than 300 m (Simpson et al. 2016). In Newfoundland and Labrador waters, lumpfish are distributed from inshore bays to the Newfoundland and Labrador Shelf. This species may occur in the Project Area as it is distributed out to the Flemish Cap (Simpson et al. 2016).This semi-pelagic species primarily occupies pelagic areas, but adults become demersal during spawning in shallow coastal waters (Simpson et al. 2016). Canadian Research Vessel (RV) surveys indicate that this species prefers waters ≤4^{0}C (Simpson et al. 2016).

This species undergoes inshore spawning migrations in spring with spawning occurring from May-June in the subtidal zone (Simpson et al. 2016). Tagging studies indicate that this species returns to the same spawning areas each year and adults may make migrations of hundreds of kilometres (Simpson et al 2016). Common lumpfish are batch spawners where the eggs deposited in a nest are fertilized externally. The eggs are secured to hard substrate and guarded by the male. After hatching, larval lumpfish attach themselves to hard substrates, macroalgae and eel grass. Eelgrass beds may be important nursery habitat for lumpfish as with other fish species (Simpson et al. 2016, COSEWIC 2017, Gauthier et al. 2017). For the first year, juveniles also live in the upper 1 m of the water column and are often attached to floating macroalgae. Juvenile stages in surface waters primarily consume zooplankton (Simpson et al. 2016).

Primary potential threats to this species include changes in oceanographic processes, spawning habitat destruction, seal predation, coastal pollution, seismic activities, fishing, and bycatch mortalities (Simpson et al. 2016, COSEWIC 2017). However, there has not been any direct link between suggested potential threats and observed declines in abundance (Simpson et al. 2016, COSEWIC 2017). Currently, no critical habitat or recovery plan has been established for this species, however coastal spawning habitats are considered important for lumpfish recovery and survival (Simpson et al. 2016, COSEWIC 2017, Gauthier et al. 2017).

The common lumpfish life stages (egg, larvae, juveniles, and adults) may potentially interact with Project activities. Primary aggregations and spawning habitats for this species are known to occur outside the Project Area in coastal waters around southern Newfoundland. The potential environmental effects on this species are the same as for marine fish assessed in the EA Report. With the application of mitigation measures and adherence to published and/or industry standards and best management practices (e.g., Offshore Waste Treatment Guidelines (National Energy Board et al. 2010), Statement of Canadian Practice (DFO 2007), and C-NLOPB guidelines) (Section 3.4.2 and 5.3.2 of the EA Report), potential environmental effects on common lumpfish from the offshore geophysical, geochemical, environmental and geotechnical program are expected to be adverse, negligible to low magnitude, occur localized or within the 100 km^2, low duration (<1 month), low frequency (<11 events/year), reversible, and made

with a high degree of certainty. Based on the nature and characteristics of the Project, the existing environment for Marine Fish and Fish Habitat, and with the implementation of planned mitigation measures, the Project is not likely to result in significant adverse effects on common lumpfish.

Ross's Gull (COSEWIC) are known to nest in very small numbers at a few locations in Arctic Canada with most of the world population nesting in Arctic Russia (COSEWIC 2007). The total known breeding population in any single year may range from 0-10 pairs (COSEWIC 2007). Geolocators placed on Ross's gulls at a nesting site in the high Arctic of Nunavut showed that some of them spent October–May in the Labrador Sea as far south as 50°N near the northern boundary of the Study Area. One bird's track showed it within Orphan Basin and followed the shelf edge close to the Sackville Spur (Maftei et al. 2015) indicating that this species can occur at least occasionally in the northern part the Project Area. Due to the remote breeding sites in Canada from industrial activities, low population, primary Arctic distribution, and occasional occurrence in the Project Area, interactions with the Project are not predicted. The mitigation measures outlined in Section 3.4.2 and 5.3.2 of the EA Report will be implemented to avoid or reduce potential environmental effects of the Project on all marine and migratory birds, including the Ross's Gull. Therefore, the potential environmental effects on Ross's Gull from the offshore geophysical, geochemical, environmental and geotechnical program are expected to be adverse, negligible to low magnitude, occur localized or within the 10 km^2, short duration (<1 month), low frequency (<11 events/year), reversible, and made with a high degree of certainty.

Bowhead whales live primarily in arctic waters with a circumpolar distribution, but very rare sightings have been reported in Newfoundland. The Eastern Canada-West Greenland population is roughly estimated to be 10,000 individuals, with considerable variation between estimates (COSEWIC 2009). Historically, whaling was their greatest threat, though the killer whale may pose the greatest threat today. Other threats include anthropogenic noise, entanglement, vessel strikes, and pollution. This species is considered to be of Special Concern by COSEWIC and is currently under consideration by SARA for further protection (COSEWIC 2009).

The distribution of the Eastern Canada-West Greenland population covers 1 million square kilometers, with individuals summering in western Baffin Bay, high arctic regions, northwestern Hudson Bay, and off west Greenland. Winter migration takes 2-3 months, where they occupy areas with unconsolidated pack ice in the Hudson Strait, southern Baffin Bay, and off west Greenland (COSEWIC 2009). As the species does not typically reside in or migrate through the Project Area, interactions with the Project are not predicted. The mitigation measures outlined in Section 3.4.2 and 5.3.2 of the EA Report will be implemented to avoid or reduce potential environmental effects of the Project on all marine mammals and sea turtle species, including the bowhead whale. In consideration of the bowhead whale's primarily Arctic distribution, interactions with routine Project activities are considered highly unlikely. Therefore, the potential environmental effects on Bowhead whale from the offshore geophysical, geochemical, environmental and geotechnical program are expected to be adverse, negligible to low magnitude, occur localized or within the 10 km^2, short duration (<1 month), low frequency (<11 events/year), reversible, and made with a high degree of certainty.

3.3 SARA Recovery Strategy Updates

Schedule 1 of SARA is the official federal list of species at risk in Canada. Once a species is listed, measures to protect and recover a listed species are established and implemented, including the development of a Recovery Strategy. Action Plans summarize the activities required to meet recovery strategy objectives and goals, and Management Plans set goals and objectives for maintaining

sustainable population levels of one or more species that are particularly sensitive to environmental factors.

New proposed critical habitat for spotted and northern wolffish was set out in the 2018 Recovery Strategy (DFO 2018) for these species, primarily along the northeast shelf and slopes of the Grand Banks (Figure 3.1). No critical habitat has been established for the Atlantic wolffish (DFO 2018). While there is overlap between the Project Area and spotted and northern wolffish critical habitat in the Project Area, seabed investigation activities will be limited to the EL areas that are outside the proposed critical habitat. These species were also considered and assessed in the EA Report (Section 4.2.1.8 of the EA Report) for potential environmental effects of the Project on this species. As environmental surveys such as seabed investigations are unlikely to have potential effects on Marine Fish and Fish Habitat and with the implementation of planned mitigation measures, the Project is not likely to result in significant adverse effects on northern and spotted wolffish.

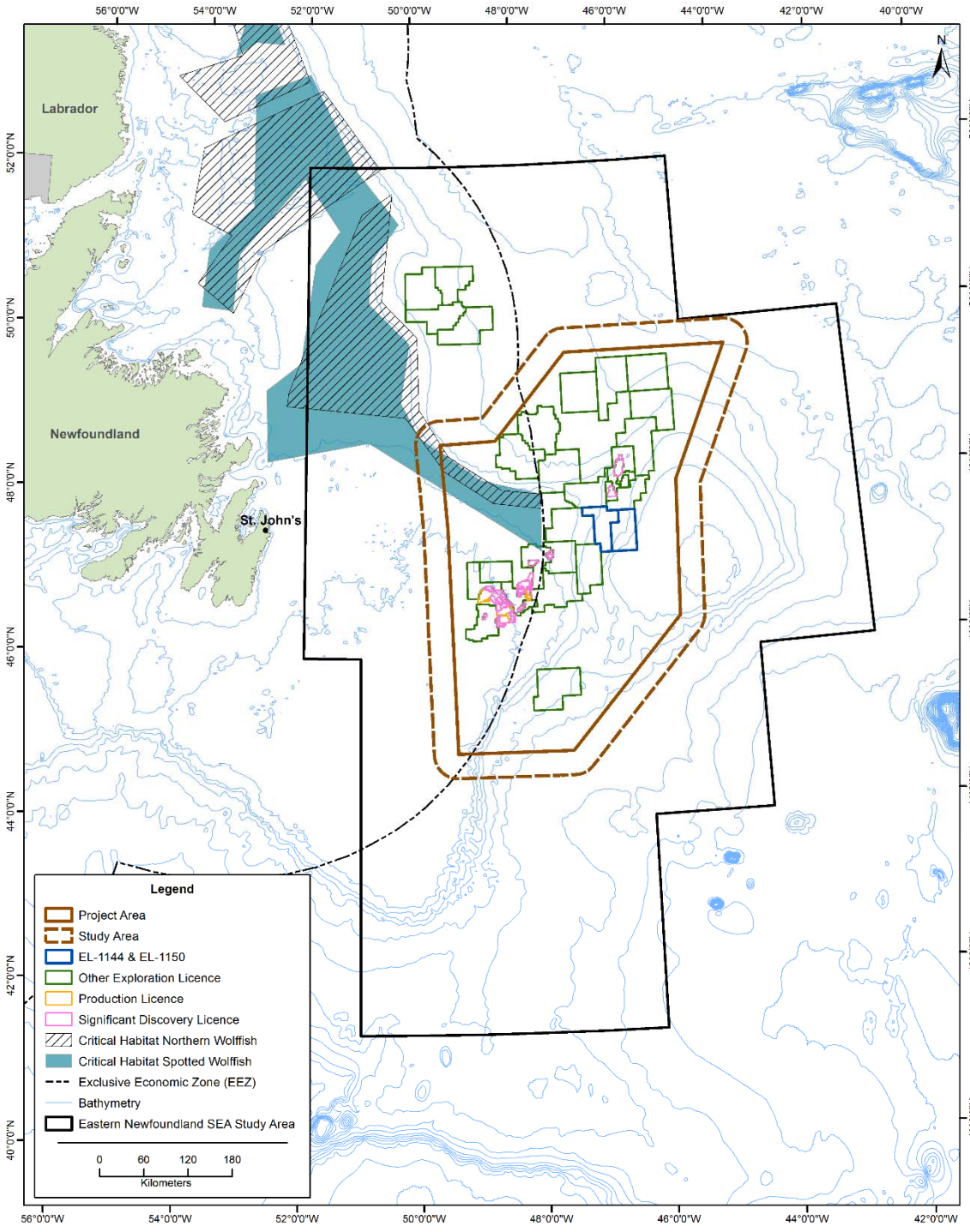

Figure 3.1: Proposed Critical Habitat for Northern and Spotted Wolffish (DFO 2018).

4 ENGAGEMENT

As part of current and planned operations offshore Newfoundland & Labrador, CNOOC regularly engages with other ocean users and other stakeholders. These engagement sessions include, but are not limited to, the details of the planned activities, potential for interaction with other ocean users and mitigations that may be applicable to each activity.

Details of the 2019 Visual Seabed Survey program described in this EA update were communicated to the Fish, Food and Allied Workers (FFAW-Unifor) and One Ocean during a meeting with CNOOC held on May 24, 2019. A meeting with fish harvesters was held on May 31, 2019 and was attended by the Atlantic Groundfish Council and CNOOC representatives. Ocean Choice International and Association of Seafood Producers were unable to attend the May 31st meeting but information presented at that meeting has been provided. Participants in both meetings advised that they don't anticipate any impacts to their members for the proposed 2019 activities. The two Exploration Licences (EL1144 and EL1150) overlap both the NAFO 3L and 3M zones.

A Notice to Mariners will be communicated in advance of the 2019 field activities to advise other ocean users of the planned location and duration of the activities.

CNOOC recognizes that communication and coordination between ocean users is key to avoiding and/or minimizing any potential conflicts. CNOOC will continue to engage with all relevant stakeholders throughout the life of the project.

5 ENVIRONMENTAL EFFECTS ASSESSMENT AND SUMMARY

The potential environmental effects of a visual seabed investigation survey and associated vessel traffic on SOCC and other species not of conservation concern were considered and assessed in the EA Report (Section 5.4, 5.5, 5.6 and 5.7 of the EA Report) and were associated with disturbance on various valued components (VCs). For SOCC and other species for Marine Fish and Fish Habitat, Marine and Migratory Birds, Marine Mammals and Sea Turtles, these activities are predicted to be adverse, low magnitude, occur localized or within the 100 km^2, short duration (days), low frequency (<11 events/year), and reversible. With the implementation of planned mitigation measures (Section 3.4.2 of the EA Report), the Project is not likely to result in significant adverse effects on SOCC and other species not of conservation concern. Further details on the VC assessment definitions are details in the EA Report. This assessment includes common lumpfish, Ross's gull, and bowhead whale that are currently identified as SOCC by COSEWIC and/or SARA and northern and spotted wolffish that have proposed critical habitat along northeast Newfoundland shelf and slopes.

As noted in the original EA Report, each of the potential environmental interactions and effects that may be associated with the Project can be avoided or otherwise mitigated through the use of good planning and proven operational practices and procedures, supported by standard mitigations that are well established and outlined in relevant regulatory procedures and guidelines, and which have been identified by CNOOC as part of the EA. Overall, the Project will entail a localized, short-term and

transient disturbance in the marine environment throughout the operational life of the exploration program.

The additional information and clarifications provided through this EA Update do not result in any changes in the original environmental effects predictions, required mitigation or associated determinations related to environmental effects significance for any component of the environment. The Project is not likely to result in significant adverse environmental effects.

6 REFERENCES

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