Appendix R

Species at Risk Impacts Monitoring and Mitigation Plan

Appendix R

Environmental Effects follow up and Monitoring Programs (EEMPs): Species at Risk Impacts Mitigation and Monitoring Plan (SAR IMMP)

Argentia Renewables Project

Issued by: Argentia Renewables Wind LP
Project Facility: All Locations
Affected Facility: All Locations

Effective Date: July 31, 2024

Document Maintenance and Control

Argentia Renewables Wind LP (Argentia Renewables), an affiliate of Pattern Energy Group LP (Pattern), is responsible for the distribution, maintenance and updating of this Environmental Effects follow up and Monitoring Programs (EEMPs): Species at Risk Impacts Mitigation and Monitoring Plan (SAR IMMP) for the Argentia Renewables Project (the "Project"). This SAR IMMP will be updated when needed for reasons including but not limited to reflecting changes in site-specific implementation, updating contact information, changes to scientific methods and survey best practices, and adding results of post-construction monitoring.

Document Version

Version #	Section(s) Revised	Prepared By	Approved By	Date Issued

Index of Major Changes/Modifications in Latest Version

Item #	Description of Change	Relevant Section

Table of Contents

List of Figures

List of Tables

Abbreviations Appearing in this Report.

ARU	Autonomous recording units
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dB	Decibels
DBH	Diameter at breast height
ECCC	Environment and Climate Change Canada
ECCC-CWS	Environment and Climate Change Canada – Canadian Wildlife Service
EPP	Environmental Protection Plan
ha	Hectares
IMMP	Impacts Mitigation and Monitoring Plan
IUCN	International Union for Conservation of Nature
km	Kilometre
km^2	Square kilometre
kV	Kilovolt
LAA	Local Assessment Area
m	Metre
m/s	Metres per second
MBCA	**Migratory Birds Convention Act**
MBR	**Migratory Birds Regulations**
MW	Megawatt
NL ECC	Newfoundland and Labrador Department of Environmental and Climate Change
NL DFFA	Newfoundland and Labrador Department of Fisheries, Forestry, and Agriculture
NL EAD	Newfoundland and Labrador Environmental Assessment Division
NL ESA	**Newfoundland and Labrador Endangered Species Act**
NL WD	Newfoundland and Labrador Wildlife Division
PCMP	Post Construction Monitoring Plan
RAA	Regional Assessment Area
RCP	Rehabilitation and Closure Plan
RPAS	Remotely Piloted Aircraft System
SAR	Species at Risk
SARA	**Species at Risk Act**
SEEF	Searcher Efficiency
TAT	Tree to above tree height (<60 m altitude)
TEK	Traditional Ecological Knowledge
WAT	Well above tree height (60-140 m altitude)
WNS	White-nose Syndrome

1.0 Introduction

The Species at Risk Impacts Mitigation and Monitoring Plan (SAR IMMP) has been prepared by Argentia Renewables Wind LP (Argentia Renewables), an affiliate of Pattern Energy Group LP (Pattern) for the Argentia Renewables Project (the Project), which involves the planning, construction, operation and maintenance, and eventual decommissioning and rehabilitation of an onshore wind energy generation facility (Argentia Wind Facility) and a green hydrogen and ammonia production, storage, and export facility (Argentia Green Fuels Facility). The Project is located on Port of Argentia (POA) property located within the Town of Placentia, Newfoundland and Labrador (NL). This plan is intended to address the scope of work noted in Section 4.5 of the "Guidance for Registration of Onshore Wind Energy Generation and Green Hydrogen Production Projects" (Doc-2022-1022 issued by Department of Environment and Climate Change, GNL April 2023).

1.1 Legal

This document has been developed in compliance with the requirements of the Government of Newfoundland and Labrador. As a component of a Project Registration under the **Environmental Protection Act** (**Environmental Assessment Regulations**), the document is considered to reflect a commitment by Argentia Renewables to carry out the actions described and to report on results achieved.

1.2 Purpose and Scope

This SAR IMMP includes mitigation, monitoring, and adaptive management frameworks for the SAR and species of concern outlined below in Table R-1.2-1, as it relates to the Argentia Renewables Project.

The purpose of this SAR IMMP is to meet the requirements for the issuance of a Section 19 permit under the **Newfoundland and Labrador Endangered Species Act** (NL ESA) by the Newfoundland and Labrador Department of Environment and Climate Change - Wildlife Division (Wildlife Division). SAR IMMP is inclusive of 11 NL ESA listed species: two Schedule A-listed species (i.e., Endangered), the little brown myotis and northern myotis; four Schedule B-listed species (i.e., Threatened), the Red Crossbill, Short-eared Owl, Gray-cheeked Thrush, and Olive-sided Flycatcher; and five Schedule C-listed species (i.e., Vulnerable), the American eel, Rusty Blackbird, boreal felt lichen, blue felt lichen, and water pygmy-weed. These species were designated for inclusion in this SAR IMMP due to either historical records in the area, or from results of field surveys in 2022-2024.

The species above, in addition to Evening Grosbeak, have federal designations under SARA and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In addition, the hoary bat and silver-haired bat are recently listed as endangered under COSEWIC.

All species are listed under the International Union for Conservation of Nature (IUCN) Red List. Founded in 1964, the IUCN Red List is an inventory of the global conservation status and extinction risk of biological species. The species are listed from low to high risk using the following designation criteria: not evaluated; data deficient; least concern; near threatened; vulnerable; endangered; critically endangered; extinct in the wild; and extinct. The species in this study area include five IUCN "least concern", two "near threatened", three "vulnerable", two "endangered", and one "critically endangered". Two species are not listed under the IUCN Red List.

Table R-1.2-1 List of Wildlife Species Incorporated into this SAR IMMP.

Common Name	Scientific Name	COSEWIC Status	Schedule 1 of SARA Status	NL ESA Status	IUCN Red List
Short-eared Owl	*Asio flammeus*	Threatened	Special Concern	Threatened	Least Concern
Red Crossbill	*Loxia curvirostra percna*	Threatened	Threatened	Threatened	Least Concern
Gray-cheeked Thrush	*Catharus minimus minimus*	Assessment in progress	Not Listed	Threatened	Least Concern
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Special Concern	Vulnerable	Vulnerable
Olive-sided Flycatcher	*Contopus cooperi*	Special Concern	Special Concern	Threatened	Near Threatened
Evening Grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern	Not listed	Vulnerable
Northern Myotis	*Myotis septentrionalis*	Endangered	Endangered	Endangered	Near Threatened
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Endangered	Endangered
Hoary Bat	*Lasiurus cinereus*	Endangered	Not listed	Not listed	Least Concern
Silver-haired Bat	*Lasionycteris noctivagans*	Endangered	Not listed	Not listed	Least Concern
Yellow-banded Bumblebee	*Bombus terricola*	Special Concern	Special Concern	Not Listed	Vulnerable
Blue Felt Lichen	*Degelia plumbea*	Special Concern	Special Concern	Vulnerable	Not listed
Boreal Felt Lichen	*Erioderma pedicellatum*	Special Concern	Special Concern	Vulnerable	Critically Endangered
Water Pygmy-weed	*Tillaea aquatic syn. Crassula aquatica*	Endangered	Endangered	Vulnerable	Not listed
American Eel	*Anguilla rostrata*	Special Concern	Not Listed	Vulnerable	Endangered

Other SAR and Species of Special Concern were considered for inclusion in this SAR IMMP based on the proximity of home ranges to the Project Area but were not included due to a lack of suitable habitat in the Project Area. Those considered include rock polypody (*Polypodium virginianum*), vole ears lichen (*Erioderma mollissimum*), Eastern Red Bat (*Lasiurus borealis*), Newfoundland marten (*Martes americana atrata*), and Harlequin Duck (*Histrionicus histrionicus*). A data query to the Atlantic Canada Conservation Data Centre (AC CDC) produced one record of Harlequin Duck from 1947, and it is likely this species occasionally uses Placentia Bay in the winter, but it would be unlikely to interact with the Project. If new information dictates otherwise, the aforementioned SAR will be reconsidered for inclusion into this SAR IMMP.

1.3 Company Information

Argentia Renewables is an affiliate of Pattern Energy Group LP (Pattern Energy) and is responsible for activities associated with the Project, including implementation and management of this IMMP. Contact information is provided below.

Argentia Renewables LP

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1.4 Project Description

The Project will produce up to approximately 100,000 metric tonnes of green hydrogen, equivalent to approximately 1.17 mega tonnes of ammonia annually, via electrolysis. The Project will have an installed electrolyser capacity of approximately 300 megawatts. The hydrogen produced by the Project will be converted into ammonia (i.e., a hydrogen-ammonia facility) and exported to international markets by ship from an existing marine terminal in the Port of Argentia. The Project electricity generation will be provided by a network of approximately 46 wind turbines located on the Argentia Peninsula and adjacent Port of Argentia lands commonly referred to as the Argentia Backlands. Associated infrastructure includes, but is not necessarily limited to, an access road network and electricity collection and distribution lines. The Project will help development of the green hydrogen and ammonia industry in Newfoundland and Labrador, providing opportunities for workers and businesses within a sector that will support efforts to decarbonize energy production. The Project is expected to have an operational life of no less than 30 years.

1.5 Site Description

The Project Area is defined as: “the immediate area within which Project activities and features will occur, and within which direct physical disturbance associated with the Project will occur.” The Project Area comprises the wind turbine pads, hydrogen-ammonia facility, electrical substation, access roads, Collector Lines, Gen-Tie Line, Project Interconnect Line, and turbine staging areas. Two higher-level assessment areas were included in the Argentia Renewables Environmental Assessment Registration: the Local Assessment Area (LAA) defined as the Project Area plus a 1-km buffer and a 0.25-km buffer

around the Project Interconnect Line, and the Regional Assessment Area (RAA) defined as the Census Division No. 1 (i.e., Avalon) subdivision B as the basis for the outer boundary in addition to the Placentia and Fox Harbour municipalities (Figure R-1.4-1). While the RAA is based on the census subdivision, this area boundary aligns with regional drainage basins. The Project Area and LAA were used to assess the potential for direct and indirect effects on target species and SAR; the RAA was used to assess the potential for regional and cumulative effects on target species and SAR.

For this SAR IMMP, the Project Area and LAA were used to assess the potential for direct and indirect effects on the targeted species and Species at Risk (Table R-1.1-1), and the RAA was used to assess the potential for regional and cumulative effects on the identified species and Species at Risk (Figure R-1.4-1).

Pattern | Argentia Renewables	FIGURE NUMBER: R - 1.5 - 1	COORDINATE SYSTEM: NAD 1983 CSRS UTM Zone 22N	PREPARED BY: C. Burke	DATE: 24/07/25
	FIGURE TITLE: Study Area Boundaries Associated with the Project	NOTES:	REVIEWED BY:	
	PROJECT TITLE: Argentia Renewables		APPROVED BY:	sem

SEM MAP ID: 238-005-GIS-158-Rev0

2.0 Existing Conditions

Several studies have been conducted in the LAA throughout the Environmental Assessment process to determine the presence of SAR. Baseline surveys conducted to date include spring and fall migratory bird, breeding bird, and overwintering bird surveys, vegetation and rare flora surveys, ecological land classification, and bats surveys. Incidental observations of mammals and arthropods were recorded while conducting terrestrial surveys. Species existing conditions based on these surveys as well as desktop reviews are provided below.

2.1 Avifauna

The Project Area is in the nesting zone D3-4. Nesting zones correspond to federal bird conservation areas and are broad, general areas that allow for the characterization of typical bird nesting periods for each region. Spring migration for most bird species (including the known SAR) in this region occurs between early-May to late June and according to the Environment Canada nesting calendars for the area (Figure R-2.1-1), most birds nest between May 1 to August 3. The fall migration period for the region typically lasts from mid-August to late October, varying by species.

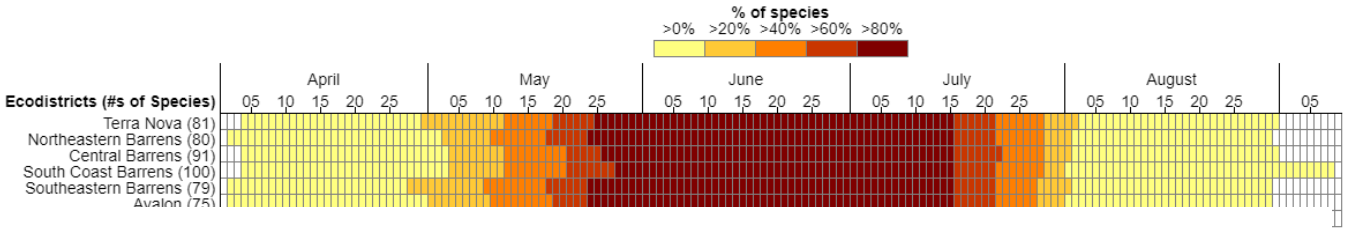

Figure R-2.1-1 Nesting Calendars by Ecodistrict in the RAA.

Surveys conducted throughout the LAA in 2022 and 2023 resulted in a comprehensive inventory of bird species using the area during the spring migration period, the breeding season, and fall migration. These surveys included efforts to identify any SAR using the area. Surveys were stratified across the three major habitat types found in the Project Area, including barrens, sparse conifer, and wetlands. Further information regarding the habitat uses and preferences of Short-eared Owl, Red Crossbill, Gray-cheeked Trush, Rusty Blackbird, and Olive-sided Flycatcher as well as evidence of their presence within the LAA and RAA, are provided in the following sections.

2.1.1 Short-eared Owl

Short-eared Owl (*Asio flammeus*) is a medium-sized owl, approximately 34-42 cm in length (COSEWIC, 2021). The plumage is mottled brown above and is buff with heavy streaking below. Unlike most owls, the Short-eared Owl is diurnal and hunts for small mammals mostly around dusk and dawn. Short-eared Owl is listed as Vulnerable under the NL ESA and was recently assessed as Threatened by COSEWIC. Short-eared Owl is listed as Special Concern under the Schedule 1 of SARA. The species is also

protected by the *NL Wildlife Act* and *Wildlife Regulations*. It is listed globally as "least concern" under the IUCN red list. The AC CDC identified four recorded observations of Short-eared Owl in the LAA including most recent observations in 2019 and 2021.

Short-eared Owls generally favour open habitats throughout the year, including grasslands, tundra, and wetlands (COSEWIC, 2021). In NL, the species has been observed in several habitat types, including tundra, coastal barrens, sand dunes, fields, and bog habitats (Wildlife Division, 2010). Breeding typically occurs in open landscapes of 50 to 100 ha in size. Nests are located on the ground in shallow scrapes near taller vegetation for concealment (COSEWIC, 2021). In winter, Short-eared Owl roost in conifers adjacent to open areas used for hunting or on the ground in the shelter of tall grasses or forbs (COSEWIC, 2021). Declines in the extent and quality of open grassland and wetland habitats have likely reduced the distribution and abundance of Short-eared Owl in southern Canada (COSEWIC, 2021).

Within the D3-4 nesting zone of insular Newfoundland (Figure R-2.1.1-1), Short-eared Owl usually nests between mid-April to mid-July.

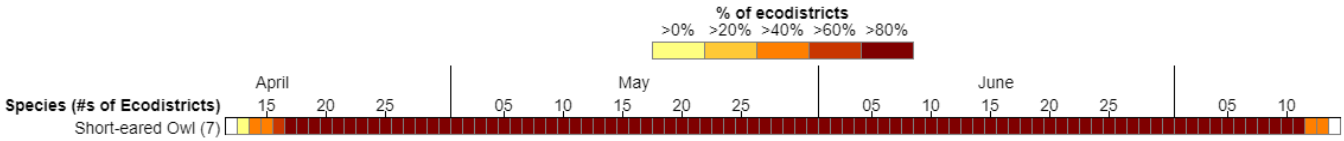

Figure R-2.1.1-1 Nesting Calendar for Short-eared Owl in D3-4.

According to COSEWIC (2021), habitat alteration, climate change and severe weather are the most important threats to Short-eared Owl. Short-eared Owl is also known to perch along roads and fly relatively close to the ground, sometimes colliding with vehicles (COSEWIC, 2021). Fragmentation of breeding habitat by roads and other anthropogenic developments may increase predation risk (COSEWIC, 2021). Collisions with wind turbines and power lines have also been identified as a possible threat (Environment and Climate Change Canada, 2018).

Baseline surveys have confirmed the presence of Short-eared Owl in the Project Area. More detailed surveys will be conducted in 2024 to determine how this species uses the Project Area.

2.1.2 Passerines

2.1.2.1 Red Crossbill

The Red Crossbill (*Loxia curvirostra percna*) is a medium-sized finch ranging from dull red to greyish-olive, most notably recognized by their specialized curved and crossed mandibles for seed eating (COSEWIC, 2016). The *percna* subspecies is differentiated from other Red Crossbills by their relatively stout and deep (tall) bill, larger body size, and darker, duskier plumage (COSEWIC, 2016). The *percna* is unique in being restricted to insular Newfoundland, although they are weakly genetically different from

other Red Crossbill groups sharing the same geographic range, it is theorized that vocalizations may promote reproductive isolation between the groups (COSEWIC, 2016). The subspecies has been listed as endangered by SARA and NL ESA since 2004; it is protected under the federal Migratory Birds *Convention Act* and has been ranked by NatureServe as nationally imperilled (N2) (COSEWIC, 2016). Red Crossbill in general has been ranked as S2S3 (Vulnerable at risk of being imperiled) for Newfoundland, however no ranking has been made provincially for the subspecies (COSEWIC, 2016). Globally, the species is listed as “least concern” under the IUCN Red List.

Red Crossbill *percna* are dependent on conifer forests for their food resources in the form of conifer seeds and cones (COSEWIC, 2016). Historically, the red and white pines of Newfoundland once provided critical habitat, however, since their increased rarity on the island, mature black spruce and to a lesser extent balsam fir and white spruce currently provide important habitat for *percna* (COSEWIC, 2016). The species is dependent on cone availability for survival and breeding and are known to be irruptive in their movements throughout their range in pursuit of food, however *percna* may be more sedentary (COSEWIC, 2016). They are also monogamous and often are faithful to their breeding areas. They nest in loose aggregations but tend to forage in flocks.

Within the D3-4 nesting zone of insular Newfoundland, Red Crossbill will nest any time of year, following the food resource availability.

According to COSEWIC (2021), threats to the species are not clearly understood due to the general lack of information. In Newfoundland competition for food resources, nest predation by introduced red squirrels, and habitat loss of native and non-native pine trees to fungal infections present the most likely threats. More broadly, habitat degradation due to development and forest harvesting reduces their general food availability, threatening starvation if there is a low crop yield across wide geographic areas (COSEWIC, 2021).

Baseline surveys have confirmed the presence of this species in the Project Area.

2.1.2.2 Gray-cheeked Thrush

The Gray-cheeked Thrush (*Catharus minimus minimus*) is larger then other *Catharus* thrushes and exhibits a grayish brown face and upperparts with stippling on the otherwise cream washed throat and breast. This species in general is known to be shy and difficult to identify visually given their preference for thick brushy habitat (SSAC, 2010). They are most often identified by their distinct vocalizations. The Newfoundland Gray-cheeked Thrush is listed as Threatened by the NL ESA and under consideration for listing by COSEWIC. They are also protected by the federal **Migratory Birds Convention Act** (MBCA). The AC CDC has one recorded observation of the species within the LAA from 1991 and this is supplemented by SEM observations in the 2023 breeding bird surveys.

The species prefers dense, low, coniferous and deciduous thickets for nesting. In Newfoundland this habitat primarily includes willow and alder thickets, dense young regenerating coniferous forests and scrub, and coastal elfin forests (SSAC, 2010). When migrating, they will use a variety of woodland and shrub habitats, however, they remain consistent in preferring dense canopy and understory forests (SSAC, 2010). The Newfoundland subspecies is thought to migrate east of the Appalachian Mountains and are one of the latest spring migrant thrushes, typically arriving to the breeding grounds between mid May and early June. The southward migration occurs from mid-August to October.

Within the D3-4 nesting zone of insular Newfoundland (Figure R-2.1.2-1), Gray-cheeked Thrush usually nests between late May to mid-July.

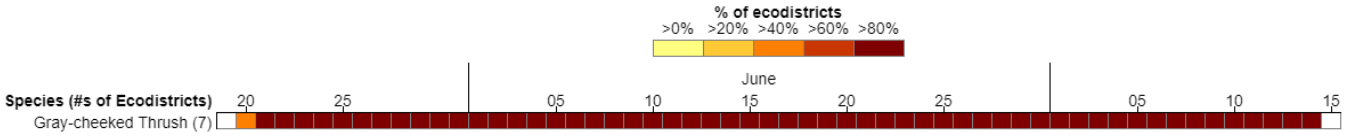

Figure R-2.1.2-1 Nesting Calendar for Gray-cheeked Thrush in D3-4.

Habitat loss due to industrial forestry, in addition to the increase in the introduced red squirrel population, might be contributing to the decrease in Gray-cheeked Thrush population in Western Newfoundland (SSAC, 2010). However, their decline from coastal habitats may not be a result of threats in their breeding grounds, rather by events or conditions experienced on their wintering grounds (SSAC, 2010). Overall, there are still large knowledge gaps preventing a more definitive explanation for their population decline.

Baseline surveys have confirmed the presence of this species in the Project Area.

2.1.2.3 Rusty Blackbird

Rusty Blackbird (*Euphagus carolinus*) is a medium-sized songbird with yellow eyes and a black, slightly curved bill (COSEWIC, 2017). During the breeding season, the male is uniformly black, with a greenish iridescence of the body feathers and a violet iridescence of the head and neck (COSEWIC, 2017). The female is a dull brownish grey (COSEWIC, 2017). On the breeding grounds (i.e., sites in Canada), Rusty Blackbird feeds primarily on invertebrates, but also on salamanders, small fish, and crustaceans (COSEWIC, 2017). Rusty Blackbird is listed as Vulnerable under the NL ESA and was assessed as Special Concern by COSEWIC and under Schedule 1 of SARA. Globally, the species is listed as vulnerable under the IUCN Red List. The Canadian breeding population, which includes approximately 87% of the global population, is estimated at 4.4 million birds, but they have suffered one of the greatest population declines of birds in Canada, which seemingly began in the 1920s (COSEWIC, 2017). Short-term trends indicate that the population has, however, been relatively stable between 2004 and 2014 (COSEWIC, 2017). There are an estimated 40,000 individuals in Atlantic Canada, and they are known to breed in Newfoundland and Labrador (Wildlife Division, 2010).

Rusty Blackbird breeding habitat is characterized by coniferous-dominated forests near wetlands, such as treed swamps, bogs, and beaver ponds (COSEWIC, 2017). Rusty Blackbird nests are constructed in shrubs or small trees over or near water (COSEWIC, 2017). Within the D3-4 nesting zone of insular Newfoundland (Figure R-2.1.2-2), the species usually nests between early May to mid-July.

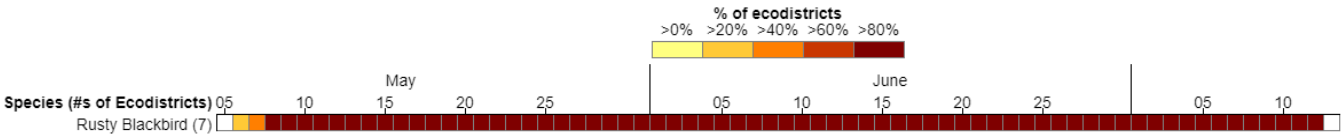

Figure R-2.1.2-2 Nesting Calendar for Rusty Blackbird in D3-4.

Suitable habitat for Rusty Blackbird appears to be decreasing on both the breeding and wintering grounds, due to the degradation and loss of wetlands by human activities, the contamination and/or acidification of wetlands, and habitat degradation due to climate change (COSEWIC, 2017). According to the recent management plan for Rusty Blackbird in the province, potential threats have not been adequately studied but habitat loss/degradation, disease transmission, increased competition with other species, and climate change effects have been identified as candidates (Wildlife Division, 2020).

Baseline surveys did not confirm the presence of this species in the Project Area. However, suitable habitat is present. They will continue to be monitored as part of the Projects Post Construction Monitoring Plan(PCMP)

2.1.2.4 Olive-sided Flycatcher

The Olive-sided Flycatcher (*Contopus cooperi*) is a deep brownish-olive medium sized insectivore (18-20 cm in length), with a whitish coloring extending along the center throat to underside of tail (COSEWIC, 2018). They tend to perch atop tall trees or snags of mature coniferous or mixed wood forests while foraging in adjacent open areas (COSWIC, 2018). They arrive in Canadian breeding grounds April and June but primarily mid-May and are socially monogamous with large territories of 10-20 ha (COSEWIC, 2018). Within the D3-4 nesting zone of insular Newfoundland (Figure R-2.1.2-3), Olive-sided Flycatcher usually nests between early May to mid-July, typically in coniferous trees.

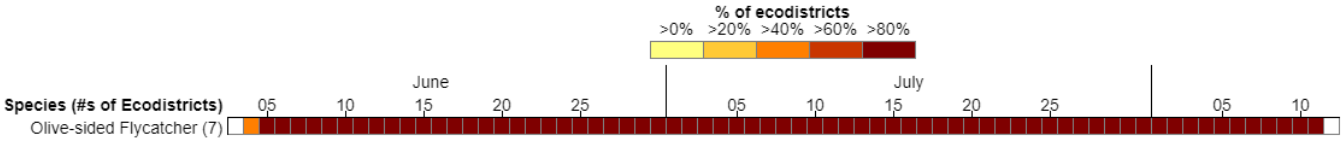

Figure R-2.1.2-3 Nesting Calendar for Olive-sided Flycatcher in D3-4.

The Olive-sided Flycatcher is listed as threatened by NL ESA and a species of special concern by COSEWIC and SARA. The species was listed in response to declining numbers across the country over

the past 30 years, likely because of habitat degradation (COSEWIC, 2018). Globally, the species is listed as near threatened under the IUCN Red List.

Baseline surveys have confirmed the presence of this species in the Project Area.

2.1.2.5 Evening Grosbeak

The Evening Grosbeak is a stocky bird of the Finch family (Fringillidae) felt. The species breeds in mature to old conifer and mixed wood forests across the boreal forest and western montane areas in North America (ECCC, 2022). The ideal forests are composed of high composition of fir (*Abies spp.*), spruce (*Picea spp.*), larch (*Larix spp.*), pine (*Pinus spp.*) and aspen (*Populus spp.*) (COSEWIC, 2016). The species occurs year-round in its Atlantic Canada Range, are nomadic when overwintering, and can range widely in search of food (ECCC, 2022). The species is listed as special concern by both COSEWIC and Schedule 1 of SARA. It is also listed as vulnerable under the global IUCN Red List.

Within the D3-4 nesting zone of insular Newfoundland (Figure R-2.1.2-4), Evening Grosbeak usually nests between late May to late August.

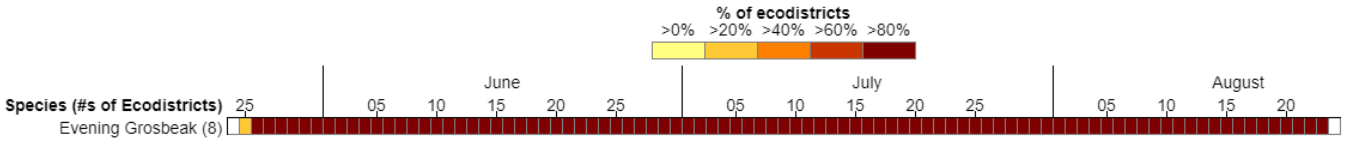

Figure R-2.1.2-4 Nesting Calendar for Evening Grosbeak in D3-4.

Threats to the species include reduced availability of mature and old-growth mixed wood and conifer forests (i.e., biological resource harvesting – forestry; spruce budworm control), collisions with windows, and mortality associated with feeding on grit and salt along roads in winter (ECCC, 2022).

Baseline surveys have confirmed the presence of this species in the Project Area.

2.2 Bats

Information regarding the habitat uses and preferences of Northern Myotis, Little Brown Myotis, Hoary Bat, and Silver-haired Bat is summarized in the following sections. There are no known hibernacula for any of the bat species within the Project Area.

2.2.1 Northern Myotis

Northern myotis (*Myotis septentrionalis*) is a small, insectivorous species with brown-pelage and an average mass and wingspan of 7.4 grams and 22-25 cm (COSEWIC, 2013). Foraging for their preferred diet of insects occurs along waterways, forest edges, and in gaps in the forest (COSEWIC, 2013). The species begins breeding after one year old and continue breeding for life (COSEWIC, 2013). Females

establish maternity colonies in the summer months in large-diameter trees and snags (COSEWIC, 2013). In 2013, Northern myotis was emergency-listed as Endangered under Schedule 1 of SARA. It was listed as Endangered on the NL ESA in 2021. Globally, the species is listed as near threatened under the IUCN Red List.

The species overwinters in hibernacula located in humid cold caves and mines and they are known to share the limited number of appropriate hibernacula with several other species (COSEWIC, 2013). Unfortunately, this increases the likelihood of transmission of the white nose syndrome fungal infection across species, which is the primary threat and source of their current designation.

Baseline surveys have confirmed the presence of this species in the Project Area.

2.2.2 Little Brown Myotis

Little brown myotis (*Myotis lucifugus*) is a small, insectivorous species with an average mass of 5.5-11 g, and a wingspan of 22-27 cm (COSEWIC, 2013). Their diet consists of a wide range of terrestrial and aquatic insects, and they often preferentially forage over water (COSEWIC, 2013). In NL, little brown myotis is a resident species typically found in forested habitats near waterbodies suitable for foraging in the spring, summer, and fall. In 2013, little brown myotis was emergency-listed as Endangered under Schedule 1 of SARA. It was listed as Endangered on the NL ESA in 2021. Globally, the species is listed as endangered under the IUCN Red List.

During the breeding season, females form large maternity roosts where they give birth to and raise their pups (COSEWIC, 2013). Maternity roosts may be at a natural site, such as a cavity in a tree, a snag, a rock crevice, a cave, or the underside of loose bark, or, more often at an anthropogenic site such as an attic in a building or within other structures like sheds or abandoned cabins (COSEWIC, 2013). Females are thought to select a quality maternity roost at the expense of travelling long distances to forage (Broders, Burns, & McCarthy, 2013). Typically, natural maternity roost sites are in tall, large-diameter trees (diameter at breast height (DBH) >30 cm), in forested landscapes (COSEWIC, 2013).

Little brown myotis spend their winters in hibernation in underground sites, such as caves and abandoned mines that stay above freezing and with sufficient humidity.

The little brown myotis has seen drastic population declines in North America caused by the fungal pathogen White-Nose Syndrome (WNS) (COSEWIC 2013). WNS was confirmed in insular Newfoundland in May 2018 (NL Department of Fisheries and Land Resources 2018). In areas affected by WNS, mortality rates are high significant. Populations in eastern Canada have declined by 94% since the arrival of WNS (COSEWIC 2013).

Baseline surveys have confirmed the presence of this species in the Project Area.

2.2.3 Hoary Bat

The hoary bat (*Lasiurus cinereus*) is the largest of the bats in Canada. They have distinct brown fur heavily frosted with white on their body, yellow fur around the face, weigh between 20-35 g, and have an average wingspan of 43 cm (Reid 2006). Hoary Bats are also insectivorous and feed primarily on large moths, but also flies, beetles, and grasshoppers. Hoary bat is widespread in eastern Canada but are relatively rare in the Atlantic Provinces. It is a long-distance migrant, that flies from northern breeding sites to overwintering sites as far south as Mexico. Hoary bats are typically solitary and roost in the foliage of mature deciduous or coniferous trees. Females often give birth to two pups in the spring, although litter size can range from one to four. The hoary bat is recently listed as endangered by COSEWIC; for this SAR IMMP, the hoary bat will be treated as likely to be listed on Schedule 1 of SARA and under the NL ESA. Globally, the species is listed as “least concern” under the IUCN Red List.

Hoary bats are particularly vulnerable to collisions with turbines during migration, and this species accounts for approximately half of all bat fatalities at wind turbine facilities in North America (Aivek Stantec Limited Partnership, 2021).

Baseline surveys have confirmed the presence of this species in the Project Area.

2.2.4 Silver-haired Bat

The silver-haired Bat (*Lasionycteris noctivagans*) has black fur with white tips, giving a silver appearance and weighing 8-11 g with an average wingspan of 29.5 cm (Aivek Stantec Limited Partnership, 2021). Silver-haired Bats are insectivorous with a diet comprised primarily of moths, flies, and beetles. The species roosts in mature coniferous and mixed-wood forest (Aivek Stantec Limited Partnership, 2021). In the spring, females form maternity colonies in cavities of trees or snags, where they typically give birth to two pups (Aivek Stantec Limited Partnership, 2021). During this time, males are typically solitary. In the fall, silver-haired bats migrate to more southern locations with milder temperatures, where they hibernate in roosts found in tree hollows, under loose bark, in wood piles, or on cliff faces (Aivek Stantec Limited Partnership, 2021).

A COSEWIC status report for silver-haired bat has been recently issued, listing the species as endangered. The species has been considered as though it is a SAR for the purposes of this report. Globally the species is listed as “least concern” under the IUCN Red List.

Baseline surveys have confirmed the presence of this species in the Project Area.

2.3 Insects

2.3.1 Yellow-banded Bumblebee

The Yellow Banded Bumblebee (*Bombus terricola*) is a medium sized bee, however, quite large compared to other Bombus species found in the Project Area. The species is a generalist and can be observed in many different natural habitats and anthropogenic areas (COSEWIC, 2015). This bee can be observed in most areas with abundant flowering plants. The species is considered extremely important for the pollination of native and commercial plant species (COSEWIC, 2015). Young queen bees are the only members of the colony to overwinter. These queens emerge in the spring to form new colonies. Yellow-banded Bumblebees have colonies of around 100 workers (COSEWIC, 2015).

Baseline surveys have confirmed the presence of this species in the Project Area. More detailed surveys will be conducted in 2024 to determine how this species uses the Project Area.

2.4 Plants and Lichens

2.4.1 Blue Felt Lichen

Blue felt lichen (*Degelia plumbea*) typically grow on branches and trunks of broadleaved trees but may also occur on some coniferous trees, forest floor substrates such as non-vascular vegetation (i.e., mosses) and rock (COSEWIC, 2010). This species prefers hardwood hosts such as the yellow birch (*Betula alleghaniensis*), a species that is less common in the forests of the coastal zones of the southeast Avalon Peninsula than in the more central regions. Red maples (*Acer rubrum*) are the main phorophyte of many of these lichen in Sir Robert Bond Park in Whitbourne but have been known to occur on white spruce (*Picea glauca*) in other portions of the Avalon (COSEWIC, 2010).

Blue felt lichen is listed as “vulnerable” under the NL ESA, and “special concern” under SARA.

The species, like other rare lichens is highly affected by changing atmospheric conditions and is especially affected by air pollution. Preferring a humid environment, this species is also affected by the reduction in humidity caused by the opening or spacing of the forest due to windfallen trees, cutting/clearing, or browsing of young trees associated with their typical habitat (i.e., balsam fir) (COSEWIC, 2010).

Baseline surveys have confirmed the presence of this species in the Project Area.

2.4.2 Boreal Felt Lichen

Boreal felt lichen (*Erioderma pedicellatum*) is an epiphytic lichen species which typically grows on the trunks and branches of trees in cool humid areas (Environment Canada, 2007). This lichen is primarily found on Balsam Fir (*Abies balsamea*) alongside wetlands which promote the required humidity. Boreal felt lichen has a slow generation time of approximately 30 years, boosting the importance of protecting mature individuals (Environment Canada, 2007).

This species is listed as “vulnerable” under the NL ESA, listed as “special concern” under COSEWIC and Schedule 1 of SARA, while the IUCN Red List of threatened species rates it as “critically endangered”.

The Project Area contains suitable habitat for boreal felt lichen. Baseline surveys have confirmed the presence of this species in the Project Area.

2.4.3 Water Pygmy-weed

Water pygmy-weed (*Tillaea aquatic syn. Crassula aquatica*) Is a coastal loving succulent found on sandy, gravelly, or muddy shores alongside oceans and brackish waterways (Wildlife Division, 2021). This species can range from green to red in colour depending on conditions and season (Wildlife Division, 2021). Water pygmy-weed is adapted to transition between aquatic and immersed forms, suiting its coastal lifestyle (Wildlife Division, 2021). As an annual, this plant is reliant on yearly seed production for survival (Wildlife Division, 2021). Water pygmy-weed has been observed on the airstrip of the Argentia Peninsula in 2020.

Water pygmy-weed is listed as “vulnerable” under the NL ESA and is listed as “endangered” under COSEWIC and Schedule 1 of SARA.

A survey has been conducted for water pygmy-weed on July 16 2024 and has resulted in the observation of four water pygmy-weed plants on the Argentia Peninsula. Further information will be provided once additional 2024 rare plant surveys are complete. Mitigation measures for water pygmy-weed will be established in consultation with NL WD.

2.5 Fish

2.5.1 American Eel

American eel (*Anguilla rostrata*), a catadromous species, is an important component of freshwater and marine ecosystems, filling a multi dimensional niche as a scavenger feeding on carrion, also a top-level predator (e.g., fish, insects, frogs), and is prey for numerous species, including terrestrial (e.g., Osprey,

Cormorants, other raptors), aquatic (e.g., salmonids, bass, River otters) and marine pelagic species. The species inhabits a broad diversity of habitats throughout their life, including oceanic migrations, tributaries, rivers, streams, and ponds. The only restriction to habitat is that the freshwater environment must be connected to the ocean for migration.

The population of American eel in NL (a part of one large global population not concretely designated as a local population) was designated as “vulnerable” under the NL ESA in 2022. Under a status of “threatened” by the COSEWIC in 2012, the species is being considered for listing on Schedule 1 of SARA.

Baseline surveys have confirmed the presence of this species in the Project Area through incidental observations.

3.0 Direct and Indirect Impacts of the Project on SAR

Information regarding the potential direct and indirect effects of Project activities on SAR is provided below. These effects are assessed prior to the identification of mitigation measures (see section 4.2 Monitoring and Mitigation). Below is an overview of the anticipated SAR interactions at each Project phase (Table R-3.0-1). American eel was excluded from further analysis given its minimal occurrence in one stream where a road is already existing and crosses the stream. The stream crossing where the species was identified is in the Argentia Brownfield site (site SC2, Appendix B1), and is the site of an existing road crossing. The stream leads to Argentia Pond which will not be affected by the Project. Based on the preliminary layout, the closest turbine pad construction to the mouth of Argentia Pond are located more than 500 m away. The Project will therefore have negligible interactions with American eel.

Table R-3.0-1 Potential Project-Environment Interactions Matrix.

	Species at Risk				
Project Component and Activity Description	**Short-eared Owl**	**Passerine**	**Bats**	**Insects**	**Plants and Lichens**
Construction Phase					
Site Preparation	X	X	X	X	X
Roads	X	X	X		X
Staging and Laydown					X
Material Transport	X				
Wind Turbine Foundations	X	X	X	X	X
Electrical Infrastructure	X	X	X	X	
Wind Turbine Installation	X	X	X	X	
Electrolyzer Plant				X	
Ammonia Plant				X	
Ammonia Storage/Transfer				X	

Species at Risk					
Project Component and Activity Description	**Short-eared Owl**	**Passerine**	**Bats**	**Insects**	**Plants and Lichens**
Flares					
Admin Buildings				X	
Operation and Maintenance Phase					
Wind Turbine Generation	X	X	X		X
Wind Turbine Maintenance					
Electrical Infrastructure	X	X	X	X	
Venting and Flaring		X	X		
Road Maintenance	X	X		X	
Plant Operations					
Ammonia Handling					
Decommissioning and Rehabilitation Phase					
Electrical Infrastructure	X	X	X	X	X
Wind Turbine Removal	X	X	X	X	X
Building Removal				X	
Plant Removal				X	
Terrain Reclamation	X	X	X	X	X
✓ Potential interactions that might cause an effect. Interactions between the Project and the VC are not expected.					

3.1 Site Preparation and Construction

Site preparation and construction activities, which have the potential to interact with SAR include:

- Site clearing, grading/excavation, widening of gravel road, and new access road construction;
- Preparation of turbine construction areas, crane pads, and laydown areas;
- Tree cutting and vegetation clearing of ground-laid/underground collection network construction;
- Site clearing and preparation for the electrical substation;
- Site clearing and preparation for the hydrogen and ammonia plants;
- Installation of a temporary mobile lunchroom, office, or wash car trailer and on-site generator that will be moved between turbine sites as construction progresses, and
- Use of lighting when working at night.

An overview of the direct and indirect effects of site preparation and construction activities is provided in Table R-3.1-1. A discussion of the potential effects is provided in more detail in the following sections. A discussion of mitigation measures during this Project phase is provided in Section 4.2.

Table R-3.1-1 Summary of Direct and Indirect Effects of the Site Preparation and Construction Phase of the Project on SAR.

Potential Effect
Habitat Quality • Reduced habitat availability for foraging • Reduced habitat availability for nesting/roosting • Increased sensitivity due to habitat alterations (i.e., pollution, noise, desiccation)
Edge Effects • Desiccation • Fragmentation of continuous habitat
Sensory Disturbance • Noise and/or light pollution • Intensified dust emissions
Incidental Mortality • Destruction of nests or roost sites during site clearing activities • Desiccation due to altered habitat • Clearing of sensitive habitat

3.1.1 Habitat Quality

Vegetation will be cleared at each of the turbine pads, for access roads and other associated infrastructure. The clearing and infilling will be wide enough to allow the transport of large equipment during construction. While the turbine pads and roads will remain clear throughout the lifespan of the Project and will be constructed with gravel/crushed stone fill, they will be reduced in size and the surrounding land recovered during the Operation and Maintenance Phase. Based on preliminary design, the quantity of habitat that will be altered for turbine pad/laydown area and road construction is outlined in Table R-3.1.1-1. This calculation excluded collector lines, the Project Gen-Tie, and the Interconnect Line, as such the ELC habitat data excluded the Project Interconnect Line right-of-way.

Table R-3.1.1-1 Habitat Altered in Argentia Backlands and Argentia Peninsula by Preliminary Project Layout (roads and turbine pads).

ELC Ecotype	Habitat Area in Argentia Backlands and Argentia Peninsula (ha)	Habitat Altered by Preliminary Project Layout (ha)	Percent Altered per Ecotype (%)
Coastline	14.34	0.2	1.39
Rocky Barren	40.03	2.42	6.05
Wetland	244.64	4.32	1.77
Meadow	173.76	7.6	4.37
Regenerating Coniferous Forest	425.27	7.92	1.86
Coniferous Scrub	415.48	16.37	3.94
Mature coniferous	1332.36	39.89	2.99
Mixedwood Forest	368.5	6.66	1.81
Open Water	245.76	0	0.00
Anthropogenic	276.91	14.34	5.18

This amounts to an estimated 99.72 ha altered ecotype or less than 3% in the Project Area (preliminary roads and turbine alterations only). At the time of this calculation, Project infrastructure is estimated to alter 4.32 ha of wetland, however, the Project maintains the goal to minimize their effects on wetlands. This is calculated currently by the use of a preliminary Project layout and ELC mapping (Appendix D3) for this modelling. The Project layout will still undergo micro-siting adjustments prior to construction to avoid and minimize effects on wetlands in the Project Area where practicable.

How each SAR interacts with habitats contained within the Project Area is discussed below.

3.1.1.1 Short-eared Owl

Short-eared Owl prefers open grassland habitats for hunting, and they construct their nests in shallow scrapes on the ground. They fly relatively close to the ground and are most active during dawn, dusk and at night. Low shrub and barren habitats may be used by Short-eared Owl within the Project Area during the nesting season. Minimal habitat loss will occur due to site preparation; however, the effects will be small as there is limited grasslands habitat in the LAA and RAA and those that do exist are contained within wetlands, a habitat that will see minimal disturbance.

3.1.1.2 Passerine

Red Crossbill prefers to forage on the seeds of conifer forests (pine trees and black spruce) and are reliant in these habitats for roosting and nesting. They are most active during the day, exhibiting irruptive behaviour in search of abundant food resources. Habitat loss and habitat fragmentation from tree clearing may occur for Red Crossbill due to site preparation and construction in the Argentia Backlands; however, the effect will be reduced due to the nomadic lifestyle of the Red Crossbill and their ability to adapt. Since the species nests throughout the year, nest monitoring and avoidance will be required during vegetation clearing in the Project Area (see section 4.2).

Gray-cheeked Thrush prefers to ground forage and nest in dense low thickets characteristic of Newfoundland coastal habitat such as occurs throughout the LAA and RAA. Clearing along pre-existing forest edges and coastal habitat will affect their nesting and foraging during site preparation; however, there is abundant alternate habitat available within the LAA and RAA.

Rusty Blackbird prefers to forage in shallow waters of wetlands surrounded by coniferous-dominant forests, and their nests are usually established in shrubs or small trees near/over water. A small amount of habitat loss may occur for Rusty Blackbird due to site preparation and construction (possibly due to habitat alteration by disturbance), but the potential effect will be reduced due to the quantity of suitable available habitat that exists in the LAA and RAA.

Olive-sided Flycatcher prefer to forage in open areas including mature forests near wet areas, including rivers and bogs, semi-open mature forests, barrens, and clearcuts. A small quantity of habitat loss may occur in the removal of mature forest stands; however, the open habitat created might be beneficial to this species.

Evening Grosbeak prefers to forage on invertebrates in the summer months and fruit and conifer seeds in the winter. Their preferred habitat for mating and foraging is in mature mixedwood forests that are predominantly coniferous. A small quantity of habitat loss may occur for Rusty Blackbird due to site preparation and construction (possibly due to habitat alteration by disturbance), but the potential effect will be minimal due to the amount of available habitat that exists in the LAA and RAA and their nomadic lifestyle.

3.1.1.3 Bats

Northern myotis and little brown myotis prefer forested areas or open water for foraging, and establish maternity roosts occur in trees, snags, or human structures. The preliminary Project infrastructure layout will affect marginal habitat for Little Brown Myotis, hence the effect of loss of habitat for this SAR from site preparation and clearing will be minimal.

The range of the migratory silver-haired bat likely does not extend to the Project Area (aside from the rare outlier vagrant individual). The species occupies a similar niche to the Little Brown Myotis, foraging over waterbodies and roosting in forested habitat. The potential for the Project Area, LAA, or RAA to contain habitat for this species is minimal.

Hoary Bat has a higher wing loading and aspect ratio than the other three bat species, restricting it to less cluttered areas for foraging. Little is known about this species' foraging behaviour and diet in eastern Canada, but other studies have shown that their migratory diet resembles that while on summer grounds (Reimer et. al., 2010). Some evidence suggests that this species may seek out larger waterbodies (Reimer *et al*. 2010) and it seems unlikely that the Project Area (or the LAA or RAA) would provide quality foraging habitat. More local information would be beneficial for this species, and the Environmental Effects follow up and Monitoring Programs (EEMPs): Bat and Avian Post-construction Monitoring Plan (PCMP) (Appendix S) may contribute to this gap.

3.1.1.4 Insects

Yellow-banded Bumblebee is generalist and can be observed in many different natural habitats and anthropogenic areas (COSWIC, 2015). This bee can be observed in any area with abundant flowering plants. As such, existing transmission line right-of-way, open meadows, and unoccupied land on the Argentia Peninsula have the potential to support this species. Therefore, site preparation of turbine sites, transmission lines, and plant facilities all interact with potential suitable habitat.

3.1.1.5 Plants and Lichens

Blue felt lichen in Newfoundland grow predominately on native yellow birch in coastal areas, but occasionally on white spruce where spillover effects allow (COSEWIC, 2010), an estimated 30% of the known thalli exist on non-native red maple (COSEWIC, 2010). In the Project Area, lichen were found to be present in yellow birch mixedwood forests in the Northeast portion of the Argentia Backlands, surrounding Big Shalloway Pond.

Small mixedwood forests in the Project Area were observed to include white birch, yellow birch, and balsam fir. Blue felt lichen thalli were most commonly observed in mixedwood forests that contain mature yellow birch at more than 40 cm in diameter at breast height (DBH). Sampling of this forest type has resulted in the observation of numerous thalli of blue felt lichen. The yellow birch forests present in the Big Shalloway Pond area occupy the same areas of sloped terrain where humid air travels from the ocean through the valley. It is highly probable, based on observations to date, that all the yellow birch ("mixedwood forests") as shown on the rare lichen habitat suitability maps contain blue felt lichen thalli. Observations of blue felt lichen were obtained in both closed, coniferous dominated mixedwoods but were most abundantly present in large, open yellow birch and white spruce canopy dominated areas where low-growing regenerating balsam fir is present in the shrub layer. These areas have been highly grazed by moose. Alterations to surrounding forested areas may produce changes in atmospheric conditions surrounding these thalli and cause desiccation and mortalities. Consequently, protective measures apply not only to trees associated with thallus growth but include provision for buffers around the habitat type possessing the thalli as a means for the mixedwood patches to persist.

The species sensitivity to atmospheric changes and air quality makes it highly susceptible to changes in nearby forest stands.

Boreal felt lichen grows in coniferous stands dominated by Balsam Fir adjacent to wetlands. Habitat suitability studies indicate a high likelihood of the species presence. Small areas of habitat may be lost through the removal of mature balsam fir forest stands during Project construction.

Water pygmy-weed is located on the Argentia Peninsula along its northwestern coast. Should this area be used during the Construction Phase of the Project as a laydown area for Project components, there could be interactions with water pygmy-weed, however, habitat alterations are unlikely to occur, and can be prevented by surveys and flexibility in placement of laydown areas.

3.1.2 Edge Effects

In areas where vegetation is cleared for Project infrastructure, new transitional areas will be created, leading to a type of habitat alteration described as edge effects. These changes may include changes in species composition, increases in predation, changes in vegetation structure, and microclimates.

Species that rely on intact, contiguous tracts of forest may be more affected than the generalist species that often benefit from edges. Given the relatively forested habitat in which the turbines will be constructed, the SAR linked to this IMMP could be subject to edge effects. However, none of the avifauna SAR are reliant on continuous forest landscapes, and some species may even benefit from the dense edges that are created and/or the open shrub habitat created adjacent to remaining forest edges.

Boreal felt lichen and blue felt lichen grow in coniferous stands dominated by Balsam Fir adjacent to wetlands and yellow birch stands, respectively. Small sections of habitat loss will occur through the removal of mature balsam fir and yellow birch forest stands. These areas have been highly grazed by moose. Alterations to surrounding forested areas may produce changes in atmospheric conditions surrounding these thalli and cause desiccation and mortalities. Consequently, protective measures apply not only to trees associated with thallus growth but include provision for buffers around the habitat type possessing the thalli as a means for the mixedwood patches to persist.

3.1.3 Sensory Disturbance

Construction activities can sometimes result in sensory interactions between a project and SAR, namely through increased noise or light levels, or intensified dust emissions.

Some species will react to heightened sensory disturbances by avoiding the areas of disturbance, rendering those areas unutilized habitat for certain SAR, or by increasing stress to individuals. Noise limits the ability of individual SAR species to communicate with each other, thus limiting the transfer of important information, e.g., regarding the presence of predators. Noise may also limit the ability of bat SAR to echolocate when hunting for prey. Bats are particularly vulnerable to disturbance during hibernation since increased frequency or length of awakenings can result in a loss of critical fat stores (Sheffield *et al*. 1992). Vibrations and noise resulting from blasting activities could result in disturbance to hibernating bats and partial collapses of hibernation sites, but there are no known hibernacula in this area. The breeding season is also a time of vulnerability to disturbance; abandonment of pups may occur if the degree of disturbance surpasses tolerance thresholds (Sheffield *et al*. 1992). It is anticipated that bats will be minimally affected by sensory disturbance from the Project given the relatively low populations (based on acoustic monitoring results) and habitat types present in the Project Area (which are of poor quality for the subject bat species).

Excessive additive light in SAR habitat can alter the daily activity schedule of individuals. Singing (for birds), foraging, breeding, and migration may all be temporally or spatially modified by the presence of light; singing may start earlier in the morning, foraging for insects may continue later into the evening, and migration routes may be altered to favour areas of enhanced lighting, which also often coincides with heightened risk (of collisions with light sources). Given the Project Area landscape context (i.e.,

brownfield adjacent to an industrial port) it is anticipated that the site preparation and construction activities will result in minimal additive sensory disturbance for these SAR.

3.1.4 Incidental Mortality

Incidental mortality of SAR can occur in several ways through interactions with the Project. The destruction of nests (birds) or roost sites (bats) during site-clearing has the potential to affect parents and immobile offspring. The Project is committed to avoidance and minimization strategies to prevent incidental mortalities (see Section 4.2 - e.g., nest surveys, bat hibernacula surveys, vehicle speed limits).

3.1.4.1 Short-eared Owl

Short-eared Owl likely has an elevated potential for collisions with vehicles due to their tendency to fly low when hunting in open areas (including clearings and along roadsides). In addition, as a ground-nester, there is potential for the destruction of Short-eared Owl nests should site clearing be conducted during the breeding season.

3.1.4.2 Passerine

Red Crossbill has a high likelihood of interacting with the Project during site preparation and construction because they nest throughout the year in habitat types that will be disturbed during site clearing.

Gray-cheeked Thrush may interact with the Project Construction Phase during corridor widening and site clearing. Nesting and foraging for this species occur in dense thickets typical of the type present in the Project Area. Site clearing during the nesting season presents the risk of destruction of nests/eggs/nestlings.

Rusty Blackbird is likely to interact with the Project during site preparation and construction since it is known from field surveys to be present in the area. Any site clearing in or near wetland habitat during nesting season has the potential to destroy nests/eggs/nestlings.

Olive-sided Flycatcher is likely to interact with the Project given their habitat preference for edge habitat such as existing and new clearings. Their territory range during nesting is 10-20 ha in predominantly coniferous trees. Therefore, site clearing activities during nesting periods may result in interactions.

Evening Grosbeak were not identified as present in the conducted surveys. However, their nomadic lifestyle allows for the possibility of occasional occurrences, including nesting. In such cases, site clearing activities may affect such individuals.

3.1.4.3 Bats

Bat incidental mortality is unlikely to occur during the site preparation and Construction Phase. There are no known hibernacula in the RAA. There is, however, the potential for natural maternity roost habitats in snags, large roost trees, and/or cliff sides within the Project Area. Further monitoring surveys for presence of natural maternity roosts (in addition to outbuildings and abandoned bunkers) will be completed prior to site clearing and/or blasting. In addition, mitigation measures will be developed in consultation with Wildlife Division.

3.1.4.4 Insects

Yellow-banded bumblebee mortalities are possible when clearing of land occurs during the colony's active season (May – August). During the fall and winter months, site preparation activities pose the risk of disturbing overwintering queens in shallow loose soil burrows or rotting logs.

3.1.4.5 Plants and Lichen

Lichen mortality is possible, either directly because of site clearing in yellow birch and balsam fir stands of high suitability, or indirectly when nearby forest stands are eliminated causing alteration in local atmospheric conditions.

Water pygmy-weed is present in areas proximate to Project laydown sites to be used during construction. While possible, accidental disruption to plants and habitat can be avoided through awareness and avoidance.

3.1.4.6 Summary

The risk is moderate that effects on SAR will occur because of Project site preparation and clearing, given the habitat types present and the documented occurrences of SAR species. The risk will be greatly reduced through implementation of mitigation measures as noted above and described further in Section 4.2.

3.2 Operation and Maintenance

Operation and Maintenance activities that have the potential to interact with SAR include:

- Presence and operation of the wind turbines (moving blades);
- Presence of electricity transmission and distribution network, including towers, conductors, and terminals;
- Airborne emissions from the hydrogen and ammonia plants;

- Flaring associated with the production facility;
- Maintenance of linear features - access roads and electrical infrastructure; and
- Servicing of wind turbines (drone inspections, parts servicing, and replacement) handling and storage of lubricant, and associated vehicle traffic.

Mitigation measures to avoid or reduce effects are provided in Section 4.2.

3.2.1 Habitat Quality

The effects on habitat quality from sensory disturbance will continue throughout the Operation and Maintenance Phase of the Project; noise will remain amplified over baseline conditions because of the rotating turbines, road traffic for maintenance and regular operation activities (and the associated noise of those activities). Lighting will be present in the Project Area to meet Transport Canada lighting requirements, for the safety of site personnel, for the maintenance of the facilities and equipment, and travel along the access roads. Lights and flaring stacks can alter habitat, often by attracting insects which may be foraged by insectivorous bats. If densities of insects increase in the LAA due to additional lighting, they could act as a sink for bats. Argentia Renewables is committed to avoidance and minimization strategies as well as mitigation measures to address such potential decreases in habitat quality (see Section 4.2).

Wind turbine operations may result in sensory disturbance for bats beyond the footprint of the turbines (the Project Area) and result in changes to localized bat behaviour (e.g., within the LAA). Research has shown that anthropogenic noise affects bat foraging effort and success; bats have been found to spend less time foraging in noisy areas (Luo *et al*. 2015, Siemers and Schaub 2011, Schaub *et al*. 2008). Another study (Barré *et al*. 2018) indicated that, in addition to a decrease in activity for several bat species near turbines, sensory disturbance for bats can also extend as far as 1 km from wind turbines.

The removal of trees in forest habitats adjacent to rare lichens such as blue felt lichen can alter the atmospheric conditions within the nearby host habitats. Rare lichens such as boreal and blue felt lichen require humid conditions with low air pollution. In a mature forest habitat, large balsam fir or yellow birch (i.e., dominant phorophytes for both species) are naturally spaced apart. Development of roads or other infrastructure located close to such mature trees can alter the habitat quality of the rare lichens they host. Desiccation or total loss of the lichens can result. This effect could be amplified by the microclimate effects of air movement from wind turbine operation. Vertical mixing, turbulence, and wakes created by wind turbine blades can result in changes to local temperature, moisture, and CO_2 levels (D.T. Kaffine, 2019). The same altered conditions also affect climate sensitive species including the Water pygmy-weed and Yellow-banded Bumble Bee within a zone around each wind turbine site.

3.2.2 Collisions

Birds are vulnerable to wind generation projects through collisions with turbine blades or other infrastructure (e.g., meteorological towers, transmission lines, vehicles). Although bats have been found incidentally in bird mortality searches along transmission and distribution powerline corridors, little is known about such interactions as bat-wire collisions (Manville, 2016).

3.2.2.1 Turbine and Tower Collisions

Collision mortality with turbines appear unlikely for many of the SAR associated with this Project. Short-eared Owl often flies relatively low (2-30 m) to the ground occupying the tree to above tree height (TAT) airspace (0-60 m), representing a low probability of collision. Similarly, Red Crossbill, Gray-cheeked Thrush, Rusty Blackbird and Olive-sided Flycatcher occupy the TAT zone, and are mostly wetland or woodland specialists, rendering the probability of collision with turbines as low. The migratory Hoary and Silver-haired Bats detected during the acoustic monitoring program are known to be susceptible to collisions with wind turbines. Historically, migratory bats account for the highest portion of wind farm fatalities. Little Brown Bat are typically a lower-flying species (compared to the migratory bat species) but may also be susceptible to turbine collisions, ranking fourth among bat species in Canada for collisions with turbines (Zimmerling and Francis 2016).

In general, the collision potential for a SAR is directly related to flying ability. Fast, strong flyers (high wing loading; favourable ratio of body weight to wing area) are typically most susceptible.

The proposed IMMP and PCMP Appendix S will serve to determine the relative importance of the Project Area to SAR species through bat acoustic surveys, fatality searches, searcher efficiency trials, and carcass persistence trials.

Avifauna (Short-eared Owl and Passerines)

Raptors are considered the most highly affected avian group through interactions with wind turbines. The site choice for turbines favours locations with elevated and sustained winds. These same locations may often be used by raptors seeking updrafts to soar along corridors and conserve energy. The typical landscapes for wind turbine farms also can serve as hunting, foraging, and in some cases nesting sites for birds of prey. The hunting habits of many of these raptors involve scanning the landscape for prey items at a height that is beyond the view of prey species, but close enough to the ground to site prey. This preferred elevation is often at the height of the wind turbine rotors (May *et al*. 2020).

Nocturnal neotropical and temperate migrant birds (e.g., Passerines) can, under some conditions interact with wind projects. In most cases these birds fly at altitudes well above turbines. However, during severe weather events, birds can occupy relatively lower altitudes. Under such conditions, there is a potential for collisions with turbines.

The effects on birds from lighting associated with wind projects are poorly understood (Marques *et al*. 2014). Turbines with lights can attract birds, increasing the risk of collision, especially in conditions of poor visibility where visual cues are lacking, and birds depend on magnetic compass navigation (Poot *et al*. 2008). This possibility also applies to the flaring stack at the production and storage facility. Bird collisions with lit structures are likely to be more pronounced at sea than on land, and particularly during nighttime storms and associated with heavy migration traffic (Hüppop *et al*., 2006). While the Project is on land, its adjacency to the coast may result in interaction with SAR.

Birds generally can also be affected by passive collisions with transmission lines (Bevanger, 1994) and associated towers. Most Project electricity distribution lines will be overhead and the Project Interconnect Line running from the Project to interconnect with the NLH grid will generally run parallel to existing linear facilities. As a result, the potential for collisions by a SAR is low.

Collisions often occur when birds are preoccupied with hunting, landing, or fighting (Willard 1978). However, a range of biological and external factors will affect the potential risks to a specific SAR. Among the most important considerations are a species' vision and its flying abilities. This can help explain why some raptors with highly binocular vision (eyes in front of the head) often are susceptible to collisions (Bevanger 1994, Tucker 2001). While their straight-ahead view is excellent, large blind zones to the sides increase vulnerability (Tucker 2001). This characteristic also applies to the Short-eared Owl. The crepuscular nature of the Short-eared Owl may also increase susceptibility due to the poor light associated with dawn and dusk (Bevanger 1994).

Bats

The effects of wind energy projects can vary substantially across the ranges of bat species (Environment and Climate Change Canada 2018). Bat mortalities are most commonly caused by collisions with rotors. Bats account for most vertebrate fatalities at wind turbines, making wind energy production the leading cause of multiple mortality events in bats (Voigt C. *et. al*., 2024). However, it is also acknowledged that regions characterized by high wind speeds, like Newfoundland and the Argentia area, exhibit a reduced potential for turbine collisions due to relative lower habitat use by bats.

Given the steep declines of bat populations in eastern Canada due to WNS, any effects on individual bats of the SARA-listed species have the potential to be significant. Mortality of any remaining individuals, particularly breeding adults, can negatively affect the survival of local populations, slow the rate of recovery, and possibly delay the development of resistance to the fungus that causes WNS (Environment and Climate Change Canada, 2018).

3.2.2.2 Vehicles

SAR collisions with light vehicles will be possible during the Operation and Maintenance Phase when routine inspections and maintenance are carried out. While Project speed limits will be in place and serve to reduce effects, bird collisions with vehicles are still possible, as documented in literature. As discussed for Construction, Short-eared Owl would be vulnerable to collisions with vehicles, as they typically fly slowly and hover close to the ground while hunting. Rusty Blackbird seldom leaves the wetland habitats in which it breeds, so interaction with vehicles is unlikely. Similarly, Red Crossbill, Gray-cheeked Thrush, and Olive-sided Flycatcher are unlikely to interact with vehicles outside of their migration periods in the spring and fall, preferring localized foraging near their nest and rearing habitat in clearings adjacent to mature forests.

Bats can be vulnerable to vehicle collisions (Fensome and Mathews 2016). Low-flying species are more prone to collisions than high-flying species, and juveniles are more vulnerable than adults (Fensome and Mathews 2016). Given that most light vehicle traffic associated with routine inspections and maintenance of the Project infrastructure will be during the day, and traffic volumes will be low (single vehicles), the potential for bat SAR interactions with light vehicles (and especially remotely piloted aircraft system (RPAS)) is low.

Behavioural responses of avifauna species to RPAS flown at varying altitudes have been observed across the world (Rebolo-Ifrán, Graña Grilli, & Lambertucci, 2019), and, closer to home, during RPAS fieldwork conducted along transmission lines in Labrador (E. Aylward, personal communication, November 2, 2022) passerines, raptors, and waterbirds were observed to fly aggressively toward the RPAS or exhibit flushing behaviours from the nest (Rebolo-Ifrán, Graña Grilli, & Lambertucci, 2019). RPAS will be employed minimally for the Project, and usage will be restricted should monitoring results demonstrate a seasonal pattern to SAR usage of the Project Area. Interactions between SAR species and RPAS inspections and/or surveys will thereby be avoided.

3.3 Decommissioning and Rehabilitation Phase

Several Decommissioning and Rehabilitation Phase activities have the potential to interact with SAR avifauna and bats, including:

- Removal and appropriate disposal of all salvageable and non-salvageable equipment, materials, and supplies;
- Demolition of all above-grade buildings, foundations, and other infrastructure and removal of non-hazardous demolition debris; and
- Earthworks including re-contouring, and overburden and topsoil replacement.

During this Phase, all the Project infrastructure will be dismantled and taken from the site, and the footprint of the area will be restored to established standards. During this Phase, interactions will be similar, but somewhat less intensive as the Site Preparation and Construction Phase. Noise and lights will potentially interact with local SAR, and fatalities could occur through collisions with light vehicles or machinery. Any nests or roosting sites located on or in the Project infrastructure (e.g., eaves of buildings, transmission towers) would likely be lost during this Phase. However, as noted earlier, only Little Brown Myotis would have any potential for using Project structures, and nesting and roosting can be deterred during Project Operation and Maintenance thereby avoiding any incidental mortality (discussed further in the Mitigations section).

Site Rehabilitation will include recontouring, selected placement of topsoil and possible restoration of designated areas with vegetative cover using native species.

The LAA contains sufficient habitat to support any of the identified SAR, hence Decommissioning and Rehabilitation can be expected to result in negligible negative effects and, for many aspects of the work, will benefit any SAR using the area.

4.0 Impact Assessment

The environmental effects of the Project on SAR are primarily associated with the potential for collisions with wind turbines (primarily for the bat species, and to a lesser extent, Short-eared Owl, and migratory birds), possible displacement of individuals (for passerines), and habitat alteration (Insects, plants, and lichens). This assessment considers that baseline conditions reflect both historic and contemporary high levels of anthropogenic activity throughout the Project Area.

4.1 Impact Assessment Methods

The evaluation criteria employed in the environmental effects assessment of SAR are described below in Table R-4.1-1.

Table R-4.1-1 Effects Assessment Evaluation Criteria.

Evaluation Criteria	Rating	Descriptor
Magnitude	1	Negligible – not detectable.
	2	Low – within the range of natural variability and affecting less than 10% of individuals / receptors in an effected area.
	3	Moderate – affects 10 to 25% of individuals / receptors in an affected area.
	4	High – affects between 25 to 50% of individuals / receptors in an affected area.
	5	Very High – affects greater than 50% of individuals / receptors in an affected area.
Frequency	1	Fewer than 11 events per year.

Evaluation Criteria	Rating	Descriptor
	2	Between 11 to 50 events per year.
	3	Between 51 to 100 events per year.
	4	Between 101 to 200 events per year.
	5	Greater than 200 events per year.
Geographic Extent	1	Spatial extent of an interaction is isolated to brownfield sites inside the Project area.
	2	Spatial extent of an interaction is limited to the Project Area.
	3	Spatial extent of an interaction is limited to the LAA.
	4	Spatial extent of an interaction is within the RAA.
	5	Spatial extent of an interaction is beyond the RAA.
Duration	1	Interaction lasts one day or less.
	2	Interaction lasts one to seven days.
	3	Interaction lasts one to four weeks.
	4	Interaction lasts one to twelve months.
	5	Interaction lasts longer than one year.
Reversibility	1	Highly reversible.
	2	
	3	Partially reversible.
	4	
	5	Not reversible.
Context	1	Brownfield site.
	2	
	3	Evidence of utilization but with natural features.
	4	
	5	Relatively pristine area.
Confidence Rating	Low	Degree of certainty of knowledge
	Moderate	
	High	
Probability of Occurrence	Low	Likelihood of interaction with the Project
	Moderate	
	High	
Mitigation Potential	Low	Potential for interactions to be mitigated by the Project
	Moderate	
	High	
Impact Rating	Low	
	Moderate	
	High	

For this SAR IMMP, a high impact rating (Magnitude 4-5) from the Project was defined as “one which would cause a negative interaction with a SAR, resulting in a decline in that SAR in the LAA and RAA”.

4.1.1 Consideration of Avoidance and/or Reasonable Activity Alternatives

Argentia Renewables considered several alternatives in the process of developing the optimum Project — a Project that is financially viable, employs proven but innovative technology, has minimal negative environmental effects, and that addresses sustainability objectives in an environmentally responsible manner. See the discussion of alternative methods of carrying out the undertaking in Chapter 2, Section 2.4 (Registration Document). These were considered prior to conducting this SAR impact assessment.

4.2 Monitoring and Mitigation

The Environment and Climate Change Canada – Canadian Wildlife Service (ECCC-CWS) has advised that if impacts to SAR are unavoidable, the proponent should identify monitoring actions and measures to assess any residual adverse effects of Project activities on SAR, and any mitigations to minimize impacts, including all Phases (pre-construction, during construction and post-construction/operational periods). Based on the results of the IMMP and PCMP, an adaptive management framework may be employed to pivot mitigation measures in response to monitoring results. Specific monitoring and mitigation options for SAR are outlined below. The following sections also outline additional mitigations that may be used should monitoring dictate that modifications are necessary. Changes to the strategy will be established through consultations with Wildlife Division.

4.2.1 Site Preparation and Construction Monitoring

During the site preparation and Construction Phase, the Project will implement the following SAR monitoring surveys. These surveys are supplementary to the previously completed baseline surveys and will help to address any remaining data gaps and/or maintain data continuity prior to the Operation and Maintenance Phase.

An additional year of dedicated Short-eared Owl monitoring will occur in 2024. Surveys to confirm the presence and extent of yellow-banded bumblebee and water pygmy-weed will also take place in 2024.

Avifauna spring and fall migratory, breeding, winter surveys will continue throughout the pre-construction period. During spring construction activities, nest surveys will be conducted within 24 hours of site clearing to prevent incidental mortality of nesting birds.

The Project will continue acoustic monitoring of bat SAR to assess the presence, establish numbers, and habitat use, confirm EA predictions and inform the development of additional mitigation measures and adaptive management plans.

A Newfoundland marten hair snag survey will be undertaken as per discussions with Wildlife Division and in following with Wildlife Division's guidance document (Herdman, 2014). If Newfoundland marten are found to occupy the Project Area, mitigation measures will be developed in consultation with Wildlife Division.

4.2.2 Post-Construction Monitoring

A PCMP for avifauna and bats (Appendix S) has been produced which details various surveys (Table R-4.2.2-1) that aim to assess bird and bat fatalities. The following sections summarize each of the surveys associated with the PCMP, but which also pertain to the detection of SAR fatalities. These include standardized carcass searches, searcher efficiency (SEEF) trials, and carcass persistence surveys. The three surveys will be conducted from spring until fall (from April 1 to October 31) with intensive, short duration survey periods.

Table R-4.2.2-1 Planned Post-construction Activities for 2027, as Outlined in the PCMP.

Activity	Deliverable	Timing (approximate)
Avifauna Surveys	Field Surveys, Analyses, and Report	TBD
Bat Acoustic and/or Thermal Camera Surveys	Field Surveys, Analyses, and Report	May 1 - September 30
Standardized Fatality Searches	Field Surveys, Analyses, and Report	May 1 - September 30
Searcher Efficiency Trials	Field Surveys, Analyses, and Report	May 1 - September 30
Carcass Persistence Trials	Field Surveys, Analyses, and Report	May 1 - September 30

4.2.2.1 Avifauna Surveys

Extending the work of Dr. William Montevecchi, Memorial University of Newfoundland, traditional PCM will be supplemented by avifauna surveys. This will allow the Project to assist with local research initiatives whereby researchers are hoping to gain insight into how avifauna behaviour may change following Construction and Operation of the Project, and onshore wind energy facilities generally. Prior to commencement of Operations, the Project will have two years of avifauna surveys at the Argentia Wind Facility portion of the Project Area. The Project will conduct avifauna surveys in Year One, Year Three, and Year Six of operations. Post-construction avifauna surveys will comprise avian use point count surveys and will follow the study design and survey protocols of pre-construction Project avifauna surveys.

4.2.2.2 Bat Acoustic and/or Thermal Camera Surveys

Bat acoustic detectors and/or thermal cameras will be used to collect information on bat activity at select Project sites. Bat acoustic detectors and/or thermal cameras will be used to gather information about bat activity in proximity to Project wind turbines and may be used to inform smart curtailment protocols (see Section 7.3 below). Bat acoustic and/or thermal camera surveys will be conducted from approximately May 1 to September 30, which coincides with the anticipated summer active period for the three bat

species known to be present in the Project Area. The Project will utilize bat acoustic and/or thermal cameras in Year One of operation. This is further detailed in the PCMP (Appendix S).

4.2.2.3 Bird and Bat Fatality Monitoring

The detailed surveys associated with documentation of bird and bat fatalities in the Project Area are located in the PCMP (Appendix S), with a focus on the detection of SAR fatalities and in particular, bats. Survey types include standardized fatality searches and bias trials (collectively, the "PCM Surveys"). Bias trials include searcher efficiency (SEEF) trials and carcass persistence (CP) trials. PCM Surveys will be conducted in Year One of operation. PCM Surveys after Year One may be modified to evaluate smart curtailment protocols (*see* Appendix S Section 5.1.4). Additional PCM Surveys may be conducted if a large mortality event of a SAR occurs or to test the efficacy of material changes to smart curtailment protocol implementation, in consultation with Wildlife Division. Specific survey methods will be refined in consultation with Wildlife Division prior to commencement of operations; preliminary PCM Survey protocols are described below.

PCM Surveys will be conducted from spring until fall, approximately May 1 to September 30, as practicable (Table R-4.2.2-1).

4.2.3 Mitigation

The Project is committed to avoiding and/or minimizing direct and indirect impacts to wildlife, including SAR, which may occur during Project Construction Phase or Operation and Maintenance Phase.

4.2.3.1 Pre-construction and Construction Mitigation

Prior to and/or during Construction of the Project, the Project (or designate) will:

- Install bird flight diverters in areas of relatively high risk of collision with infrastructure.
- Engage a wildlife-friendly Project lighting plan:
    - Minimize pilot warning and obstruction lighting on all tall structures as feasible;
    - Utilize flashing warning lights that turn off completely between flashes;
    - Install the fewest number of site-illuminating lights feasible in the Project Area; and
    - Use only flashing lights at night at the lowest intensity and fewest number of flashes per minute as required by Transport Canada.
- The equipment used will be in good working order with no leaks or excessive noise.
- Before any clearing of suitable habitat types for rare lichen species (i.e., vole ears lichen, blue felt lichen, boreal felt lichen) or habitat adjacent to such suitable habitat types, surveys will be

conducted to identify any thalli existing within the habitats connected to the proposed infrastructure.

  - Where boreal felt lichen exist within the proposed construction sites of turbines, roads, etc., thalli will be translocated outside of the construction zone and associated buffers.
  - Other rare lichen species like the observed blue felt lichen, require a buffer as the crustose form of the species will not as easily survive transplanting. An appropriate buffer will be established for this species through consultation with Wildlife Division.
  - Buffer areas will be created where possible around any environmentally sensitive areas, such as areas identified by the baseline survey (i.e., yellow birch stands for blue felt lichen).
  - Mitigation measures for water pygmy-weed will be established in consultation with Wildlife Division.

- The work area will be kept clean and free from leftover foods which can attract birds and other wildlife to the Project Area.
- Standard and approved methodology will be applied to construction practices when culverts and bridges are being installed.
- The Project will refrain from using herbicides on the regrowth of the understory along the transmission lines or any other cleared area.
- During the bat roosting season, any trees proposed for removal and any suitable rock crevices or caves in areas proposed for blasting will be searched for signs of maternity roosts by a qualified Biologist. A buffer will be established around any active roosts found within the construction footprint site, in consultation with Wildlife Division.
- Minimize scheduling disturbance-causing activities, such as vegetation clearing during the regional avian nesting period of approximately April through August, to the extent practicable.
  - Conduct avian nest clearance surveys if vegetation clearing occurs during the regional avian nesting period to avoid and/or minimize incidental take of birds, nests, and eggs.
  - Take the following steps immediately if an active nest is discovered, defined by the presence of eggs or young dependent on the nest (Government of Canada 2019):
    - Halt all disruptive activities in the nesting area;
    - Move construction equipment and personnel away and avoid disturbing the surrounding vegetation or making a trail to and from the nest;
    - Establish a setback distance from the nest; and
    - Maintain mitigation measures and avoid the immediate area until the young have fledged the nest.

4.2.3.2 Post-construction Mitigation

During Operation and Maintenance Phase of the Project, the Project (or designate) will:

- Feather (i.e., curtail) turbine blades below a cut-in speed of 3.5 metres per second (m/s) during the autumnal bat migration period.
- Curtail turbines during Year One at wind speeds below 6 m/s, from dusk to dawn, when ambient air temperatures are above six degrees (º) Celsius (C), between July 1 and September 30.
- Implement the PCM activities described in Appendix S.
- Implement preventative mitigative measures to ensure bats do not occupy buildings (i.e., building maintenance, upkeep, and construction).
- Areas of undisturbed habitats will be avoided during maintenance.
- The Project will refrain from using herbicides on the regrowth of the understory along the transmission lines or any other cleared Project Area.

Section 5.0 of Appendix S describes post-construction mitigation measures for bats and avifauna in greater detail.

4.3 Results

The impact ratings assigned to each SAR were assessed in the context of the Project Phases discussed earlier in this document, the associated activities for each Phase, and how interactions could affect SAR health, distribution, or reproduction. This assessment (Table R-4.3-1) considers the direct and indirect interactions presented in Section 3, as well as the mitigation and monitoring measures and protocols to be implemented by the Project (Section 4.2).

Table 2 Impact Ratings of each Species at Risk associated with this IMMP.

Species at Risk											
Project Phase	**Key Indicator**	**M ag**	**Fr eq**	**E xt**	**D ur**	**R ev**	**C o**	**C o nf id en**	**Pr o ba bil ity**	**Mi ti ga ti o**	**Im pa ct**
Construction Phase	Short-eared Owl	2	2	3	3	1	3	Low	Moderate	High	Low
	Passerine	2	2	3	3	1	3	Moderate	High	High	Low
	Bats	2	1	3	3	1	3	High	High	Moderate	Low
	Insects	2	1	3	3	1	3	Moderate	Moderate	Low	Low
	Plants and Lichens	2	1	3	3	1	3	Moderate	Moderate	High	Low
Operation and Maintenance Phase	Short-eared Owl	2	1	2	1	1	3	Low	Moderate	Moderate	Low
	Passerine	2	1	2	3	1	3	Moderate	High	High	Low
	Bats	2	2	2	1	1	3	Moderate	High	Moderate	Low

	Insects	2	2	2	1	1	3	Moderate	Moderate	Low	Low
	Plants and Lichens	2	1	2	3	1	3	Moderate	Moderate	High	Low
Decommissioning and Rehabilitation Phase	Short-eared Owl	2	2	2	3	1	3	Low	Moderate	Low	Low
	Passerine	2	2	2	3	1	3	Moderate	High	High	Low
	Bats	2	1	2	3	1	3	High	High	Moderate	Low
	Insects	2	1	2	3	1	3	Moderate	Moderate	Low	Low
	Plants and Lichens	2	1	2	3	1	3	Moderate	Moderate	High	Low
*Note: Context can be assigned more than one value.											

4.3.1 Discussion

Considering the use and availability of resources/habitat in the RAA and the low magnitude of predicted interactions between the Project and the identified SAR, the predicted negative residual environmental effects are Low. Each SAR is discussed in detail below.

4.3.1.1 Short-eared Owl

Short-eared Owl, known from the RAA and the LAA from anecdotal observations, but not detected during bird surveys in 2022-24, was given an Impact Rating of Low. This species hunts low (in the TAT) and would potentially use open barren habitats periodically. However, given the scarcity of observations of this species during extensive avifauna surveys, it is unlikely to be a nesting area or significant hunting area for Short-eared Owl. If new information is obtained (e.g., during the PCMP activities) then dedicated surveys will be conducted to ensure the potential effects on Short-eared Owl can be assessed. Sensory disturbances may occur for any SAR in the area during all Phases because of noise, light, and dust, all of which could cause avoidance behaviours. Mitigation measures for noise, light and dust disturbance are detailed in Section 4.2 for this Project. In addition, measures will be taken during all Project phases, predominantly during construction where nest surveys will be completed prior to any clearing activities proposed to occur during the nesting season. Appropriate buffers will be implemented where practicable (*see* Section 4.2).

4.3.1.2 Passerine

Interactions of Passerine with the Project would primarily be periodic (as most of these species migrate and/or hibernate); only resident Red Crossbill would have interactions year-round. While marginal habitat loss and fragmentation will occur for most SAR within the LAA, none of these SAR will experience direct loss of critical habitat for their survival. Sensory disturbances may occur for any SAR in the area during all Phases through noise, light, and dust. These phenomena could also cause temporary avoidance behaviours. Mitigation measures for noise, light, and dust disturbance are included in Section 4.2. Mitigation measures will apply during all Project phases, predominantly during Construction when nest

surveys will be completed prior to any clearing activities planned for the nesting season and appropriate buffers will be implemented where practicable (see Section 4.2).

4.3.1.3 Bats

Since it is uncertain where little brown myotis and northern myotis move in the winter for hibernation, it is still unknown whether the RAA is a refuge from WNS. Based on the baseline surveys, the likelihood of little brown myotis and northern myotis having a reliance on this area for hibernation, roosting, or foraging is known to be low. Thus, incidental turbine collisions will be infrequent at most, especially since their typical airspace for foraging would be lower than the bottom of the rotors. Hoary bat and silver-haired bat, while known to be susceptible to collisions with wind turbines on migration, based on the low occurrence during 2022-24 baseline studies, were also rated Low in Impact Rating. A set of mitigation measures will be implemented throughout the life of the Project to further reduce or eliminate the potential for bat mortality (see Section 4.2).

4.3.1.4 Insects

The yellow-banded bumblebee habitat is primarily open areas that have wildflowers, e.g., anthropogenic meadows and wetlands. Site clearing for the Project may remove some habitat, however, site clearing is also anticipated to create potential new habitat for wildflowers to grow (i.e., along transmission lines and road corridors). Further, given the history of the Project Area (local settlements, followed by military and then industrial development), relatively large areas of anthropogenic meadows are present and likely provide ample resources for this SAR. While their presence was confirmed in the baseline surveys, additional monitoring in 2024 will allow for a better understanding of their preferred habitat use within the Project Area. Therefore, the Project's Impact Rating for Insects is Low.

4.3.1.5 Plants and Lichens

Blue felt lichen, boreal felt lichen, and water pygmy-weed have all been identified in the Project Area. Fifty thalli of blue felt lichen were identified on yellow birch in several small stands within the Project Area, all around Big Shalloway Pond. Boreal felt lichen was (somewhat surprisingly) only found at one site north of Hickey's Pond on the eastern side of the Project Area, despite several high-potential areas of likely occurrence. Only two thalli were observed on one balsam fir tree.

Water pygmy-weed is located on the Argentia Peninsula but is not anticipated to be close to Project activities.

Given the commitment to proven and appropriate avoidance and mitigation measures (see Section 4.2) and considering the low potential for interaction with the Project (limited evidence of presence from baseline surveys) the Impact Rating of the Project on Plants and Lichens is assessed to be Low. Ongoing monitoring will serve to identify any changes that could alter this rating.

5.0 Cumulative Effects

Cumulative effects are those expected to occur through interactions of the Project's residual effects and the residual effects of other projects in the region, either in the past, present or future. The cumulative effects identified in Chapter 6 of the Registration Document were used to assess the cumulative interactions on the SAR associated with this IMMP.

The Project will be situated in an area already moderately to heavily affected by noise, lights, dust, human presence, road network, and vehicular traffic. Given the locations of the other projects in the RAA, SAR may be affected from a cumulative effects perspective through the incremental alteration of habitat and the further amplification of industrial activities - noise, artificial light, and dust (during construction). However, such intensified sensory disturbance will be localized to the Project Area.

There is no heightened risk of SAR mortality attributable to cumulative effects. Given the other projects in the RAA, the primary risk of SAR fatalities remains attributable to collisions with turbines. There is some potential of cumulative effects for species like avifauna (passerines and Short-eared Owls) and bats, which may nest/roost within the Project Area. Excessive cumulative sensory disturbance from the Phases of the Project, combined with existing activities could cause interactions between the Project and avifauna and Bats, in the extreme case resulting in the mortality of nestlings, eggs, or young bats. However, this type of mortality would be extremely unlikely given that the additive sensory disturbance would be minimal compared to the disturbance that already exists in this area. Mortality risk will eventually return to pre-construction conditions after Decommissioning and Rehabilitation Phase.

Cumulative residual adverse effects are not predicted to affect the long-term persistence or viability of SAR within the RAA. A PCMP will be implemented, which will better characterize the Project Area SAR populations and serve to inform the necessity of mitigation measures, both for the Project as well as other undertakings in the Region. It is unlikely that Project effects, in combination with effects from other projects and activities, will result in a cumulative reduction in the amount or composition of habitats within the RAA that would threaten the persistence or viability of SAR. Since the cumulative effects of this Project will not extend outside of the influence of the LAA, and combined with the limited spatial scale of the Project activities, the Project is not predicted to have significant adverse cumulative environmental effects on avifauna and bats.

6.0 Reporting Requirements

For each year IMMP activities are conducted at the Project, an Annual IMMP Report will be generated. Annual IMMP Reports will document the methods and results of IMMP activities described in this IMMP and implemented at the Project and will be submitted to Wildlife Division. Annual reports will be made available to the Qalipu First Nation and Miawpukek First Nation, as needed.

Annual IMMP Reports will include data summaries and analyses, as appropriate, of all IMMP activities conducted at the Project, including avifauna surveys and bat acoustic and/or thermal camera surveys. Any SAR carcasses discovered during IMMP activities or incidentally at the Project will be reported to Wildlife Division and other government agencies, as appropriate, within 48 hours of discovery and confirmation. Annual IMMP Reports will also include recommendations for additional mitigation and/or adaptive management, as appropriate (see Section 4.2).

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