* Visual simulation of the Project

ENVIRONMENTAL ASSESSMENT REGISTRATION DOCUMENT

Harbour Hills Wind Project

Prepared for: EverWind NS Holdings Ltd.
& Membertou Development Corporation

strum
CONSULTING

June 2026

Guysborough Wind

EverWind NS Holdings Ltd.
2102, 1969 Upper Water St.
Halifax, NS B3J 3R7

June 17, 2026

Meghan Rafferty
Nova Scotia Environment & Climate Change
Environmental Assessment Branch
#2085 - 1903 Barrington Street
PO Box 442
Halifax, NS B3J 2P8

Dear Ms. Rafferty,

Re: Environmental Assessment Registration Document
Harbour Hills Wind Project

Please find enclosed the Environmental Assessment Registration Document for the Harbour Hills Wind Project.

The undersigned approves and accepts the contents, as submitted to Nova Scotia Environment & Climate Change, Environmental Assessment Branch.

Sincerely,

Trent Vichie
Founder and CEO
EverWind

EXECUTIVE SUMMARY

EverWind NS Holdings Ltd. (EverWind) and Membertou Development Corporation (together as the “Proponent”) are proposing to construct and operate the Harbour Hills Wind Project (the "Project"), formerly referred to as the Wind Farm 3 Wind Project. The Project is an onshore wind farm with up to 107 proposed wind turbines capable of generating up to 856 MW of renewable energy. The Project is part of the Proponent’s Phase 2 renewable energy projects (Guysborough Wind Projects), being developed to support the production of Certified Green hydrogen and ammonia and other industrial uses in Nova Scotia. The Project will be constructed in the Municipality of the District of Guysborough (MODG) and the Municipality of the District of St. Mary’s (MODSM), near the communities of Port Bickerton, Country Harbour Mines, Melrose, and Indian Harbour Lake. The Project is predominantly sited on Crown land.

EverWind entered into a Memorandum of Understanding (MOU) with the Province in 2022 respecting Crown lands identified for potential wind generation development. The proposed Project is located within the lands identified under the MOU. The Project layout was refined through multiple design iterations to reduce environmental effects, meet applicable setbacks and separation distances, and prioritize placement of infrastructure within previously disturbed areas and along existing access roads (approximately 33% of access roads follow existing routes). In response to engagement with local communities and organizations, infrastructure siting was further refined to avoid locating Project infrastructure within the lands north of the Melrose Country Harbour Road.

The Project is considered a Class I Undertaking under Schedule A of the Nova Scotia Environmental Assessment Regulations, N.S. Reg. 26/95, and therefore, requires the registration of an Environmental Assessment (EA) Registration Document. The EA Registration Document has been completed in accordance with the requirements outlined in A Proponent’s Guide to Environmental Assessment (NSECC, 2025a), the Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025e), and the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).

The following valued components were identified and evaluated as part of this EA based on provincial guidance, desktop analysis, and subsequent field studies:

- Atmosphere and air quality
- Climate change
- Sound
- Shadow Flicker
- Geophysical environment
- Surface water and fish & fish habitat
- Wetlands
- Terrestrial vegetation communities and flora
- Terrestrial fauna
- Bats
- Avifauna

- Economy
- Land use
- Archaeological resources

The results of the assessment indicated that the Project, with the implementation of mitigation and monitoring measures, will not result in significant adverse residual effects. The Project is being developed to support the production of Certified Green hydrogen and ammonia, as well as other industrial applications in Nova Scotia, contributing to a reduction of greenhouse gas emissions through renewable energy production while promoting local economic prosperity.

The Proponent has engaged and collaborated with local communities, the Mi'kmaq of Nova Scotia, and government representatives to identify and consider potential concerns associated with the Project, and to inform Project planning and mitigation measures, and will continue to do so as the Project progresses.

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LIST OF ACRONYMS

%	Percent
°	Degree
°C	Degrees Celsius
µg/m^3	Micrograms per cubic meter
µm	Micrometres
µS/cm	Microsiemens per centimeter
AAQMS	Ambient air quality monitoring stations
ACCDC	Atlantic Canada Conservation Data Centre
AMO	Abandoned mine opening
AQHI	Air Quality Health Index
ARD	Acid rock drainage
ARIA	Archaeological Resource Impact Assessment
ARS	Avian radar system
ARU	Autonomous recording units

ATC	All-terrain vehicle
BMPs	Best management practices
BT	Biological targets
BT/km^3	Biological targets per cubic kilometre
CB	Coastal Boreal
CBA	Community Benefits Agreement
CBF	Community Benefit Fund
CCME	Canadian Council of Ministers of the Environment
CEA	Cumulative Effects Assessment
CEPA	*Canadian Environmental Protection Act*, 1999
CH_4	Methane
CLC	Community Liaison Committee
cm	Centimetres
CNWI	Canadian Wetland Inventory
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRM Group	Cultural Resource Management Group Ltd
CWS	Canadian Wildlife Service
dBA	A-weighted decibels
DBH	Diameter at breast height
DEM	Digital elevation model
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DWC	Diurnal watch count
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EMI	Electromagnetic interference
EPFU	Big brown bat
ERT	Emergency Response Team
ESA	*Endangered Species Act*, S.N.S. 1998, c. 11
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FEC	Forest Ecosystem Classification
FTE	Full-time equivalent
FWAL	Freshwater aquatic life
gCO_2e/kWh	Grams of CO_2 equivalent per kilowatt-hour of energy produced

GENMA	Guidelines for Environmental Noise Measurement and Assessment
GDP	Gross domestic product
GHG	Greenhouse gas
GIS	Geographic information system
GPS	Global positioning system
GW	Gigawatts
H_2S	Hydrogen sulfide
ha	Hectare
HADD	Harmful alteration, disruption, and destruction
HSI	Habitat suitability index
Hz	Hertz
IBA	Important bird areas
ID	Identification
IH	Intolerant hardwood
IPCC	Intergovernmental Panel on Climate Change
kg	kilograms
kHz	Kilohertz
km	Kilometre
km/h	Kilometres per hour
km^2	Square kilometre
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
kWh/year	Kilowatt-hours per year
LAA	Local Assessment Area
LABO	Eastern red bat
LACI	Hoary bat
LANO	Silver-haired bat
LCA	Lifecycle assessment
LFN	Low frequency noise
LiDAR	Light Detection and Ranging
m	Metre
M&NP	Maritimes & Northeast Pipeline
m/s	Metres per second
m^2	Square metres
m^3	Cubic metres
masl	Metres above sea level
MBA	Mi'kmaq Benefits Agreement
MBBA	Maritimes Bird Breeding Atlas
MBCA	*Migratory Bird Conservation Act, 1994*
MBS	Migratory Bird Sanctuaries

MD	Municipal district
MEKS	Mi'kmaq Ecological Knowledge Study
MET	Meteorological
MHz	Megahertz
MLA	Member of the Legislative Assembly
mm	Millimetre
MODG	Municipality of the District of Guysborough
MODSM	Municipality of the District of St. Mary's
MOU	Memorandum of Understanding
MP	Member of Parliament
MPRR	Minimum Planning Requirements Regulations
MTRI	Mersey Tobeatic Research Institute
MW	Megawatts
MW	Mixedwood
MWh/yr	Megawatt hours per year
MYOT	Myotis species
N_2O	Nitrous oxide
N/A	Not Applicable
nBTs	Number of biological targets
NI	No indicator
NL	Not listed
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxide
NS AAQS	Nova Scotia Ambient Air Quality Standards
NS Power	Nova Scotia Power Incorporated
NSAQR	Nova Scotia Air Quality Regulations
NSCCTH	NS Communities, Culture, Tourism and Heritage
NSECC	Nova Scotia Environment and Climate Change
NSF	Nova Sustainable Fuels
NSNC	Nova Scotia Native Council
NSNR	Nova Scotia Natural Resources
NSPW	Nova Scotia Public Works
O&M	Operations and maintenance
O_3	Ozone
OBL	Obligate
OHV	Off-highway vehicle
OLA	Office of L'nu Affairs
OGPI	Old Growth Potential Index

OT	Optional turbines
OW	Open woodland
PC	Point count
PESU	Tri-colored bat
pH	Potential of hydrogen
PID	Property identification
PM	Particulate matter
PM_{10}	Particulate matter 10 micrometres or less in diameter
$PM_{2.5}$	Particulate matter 2.5 micrometres or less in diameter
ppb	Parts per billion
PPE	Personal protective equipment
PWC	Predicted watercourses
PWL	Predicted wetlands
Q&A	Question and answer
RAA	Regional Assessment Area
RABC	Radio Advisor Board of Canada
ROW	Right of way
SAF	Sustainable aviation fluid
SANS	Snowmobilers Association of Nova Scotia
SAR	Species at risk
SARA	*Species at Risk Act*
SCADA	Supervisory control and data acquisition
SGI	Sipekne'katik Governance Initiative
SH	Spruce hemlock
SMP	Special management practices
SO_2	Sulphur dioxide
SOCI	Species of conservation interest
SP	Spruce pine
S-Rank	Subnational rank
TC	Transport Canada
tCO_2	Tonnes of carbon dioxide
tCO_2e	Tonnes of carbon dioxide equivalent
tCO_2e/kg	Tonnes of carbon dioxide equivalent per kilogram
tCO_2e/km	Tonnes of carbon dioxide equivalent per kilometer
$tCO_2e/tonne$	Tonnes of carbon dioxide equivalent per tonnes
$tCO_2e/tonne \cdot km$	Tonnes of carbon dioxide equivalent per tonnes by kilometer
$tCO_2e/year$	Tonnes of carbon dioxide equivalent per year
TH	Tolerant hardwood
TRS	Total reduced sulphur

TSP	Total suspended particulate
UNHI	Unknown high
UNKW	Unknown
UNLO	Unknown low
UPL	Upland
UTM	Universal Transverse Mercator
VCs	Valued Components
WAM	Wet area mapping
WC	Wet coniferous
WD	Wet deciduous
WM	Wet Mixedwood
WESP-AC	Wetland Ecosystem Services Protocol – Atlantic Canada
WSS	Wetland of special significance

LIST OF DRAWINGS

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1.0 PROPONENT DESCRIPTION

EverWind NS Holdings Ltd. (EverWind) and Membertou Development Corporation (together as the "Proponent") are proposing to construct and operate the Harbour Hills Wind Project (the "Project"), formerly referred to as the Wind Farm 3 Wind Project. The Project is an onshore wind farm with up to 107 wind turbines capable of generating up to 856 megawatts (MW) of renewable energy. The Project is part of the Proponent's Phase 2 (Guysborough Wind Projects) renewable energy buildout in Guysborough County, being developed to support the production of Certified Green hydrogen and ammonia and other industrial uses in Nova Scotia.

EverWind is a Nova Scotia-based energy and infrastructure company advancing green hydrogen and ammonia production and other industrial uses while operating established marine terminal, storage, and transportation assets.

The EverWind team includes experienced Canadian wind farm developers, constructors, and operators who have designed, financed, constructed, and operated wind and solar energy projects in Nova Scotia, Atlantic Canada, Western Canada, and across North America over the past 20 years. Together with deep expertise in marine operations and industrial infrastructure, this experience supports the safe development and operation of large-scale energy and industrial projects.

Membertou is a Mi'kmaw community located in Unama'ki-Cape Breton Island. Just 3 km from downtown Sydney, Membertou's urban location, in addition to its prioritization of community development, has enabled it to grow into one of Canada's most economically flourishing Indigenous communities.

With nearly 1,800 total members, Membertou's approach to business and community starts with its people. Chief Terry Paul, who is the elected Chief in Membertou for the last 41 years, often remarks that, "at the forefront of everything we do, is who we do it for; the people of Membertou."

Membertou Development Corporation was established in 1989 and over the last three decades has grown into a thriving organization that focuses on real estate, fisheries, gaming, trade and convention, retail development, and renewable energy. Through strategic acquisitions, Membertou has become not only a business leader, but an example of economic reconciliation. Membertou is a Canada's Best Managed Company and has ownership in companies such as Clearwater Seafoods and NewDock-St. John's Dockyard. Membertou holds strong partnerships in projects with Novaporte, EverWind Fuels, and others.

With a goal to provide opportunities, employment, and prosperity for the community, Membertou's Chief and Council are keen to see continued growth, while always using the lens of environmental and cultural stewardship.

The Proponent retained Strum Consulting to undertake the required technical studies and undertake regulatory consultations to support the preparation of the Project's Environmental Assessment (EA) Registration Document. Strum is an independent multi-disciplinary team of consultants with extensive experience undertaking EAs throughout Atlantic Canada.

Contact information for the Proponent and their consultant is included in Table 1.1.

Table 1.1: Proponent and Consultant Contact Information

Proponent Information	
Project Name	Harbour Hills Wind Project
Proponent Name	EverWind NS Holdings Ltd. and Membertou Development Corporation
Chief Executive Officer(s) / Principal(s)	Trent Vichie – Chief Executive Officer and Founder EverWind Fuels
Proponent Contact Information for the EA Registration	Jeff Bonazza –Director Environment and Permitting EverWind Fuels 902-292-7010 jeff.bonazza@everwindfuels.com
Mailing and Street Address	1969 Upper Water Street – Suite 2101 Purdy's Wharf II Halifax, NS B3J 2V1
Consultant Information	
Name of Consultant	Strum Consulting
Mailing and Street Address	211 Horseshoe Lake Road, Unit #210 Halifax, NS B3S 0B9
EA Contact	Angus Doane – Project Manager Environmental Assessments and Approvals Strum Consulting 902-835-5560 adoane@strum.com

2.0 PROJECT INFORMATION

2.1 Project Introduction

The Proponent's overall vision is to develop an Atlantic Canada energy hub in Point Tupper, Nova Scotia. The Project aims to utilize renewable energy sources, such as wind energy, to produce green hydrogen and ammonia (for both local use and export) and other industrial uses. The portfolio of projects is divided into two phases in Nova Scotia:

- Phase 1 includes the construction of the Point Tupper Energy Hub (the "Facility"). EA Approvals have been received for the Point Tupper Green Hydrogen and Ammonia Plant and four wind projects (Bear Lake, Kmtnuk, Windy Ridge, and Upper Afton Wind Projects). Phase 1 wind power projects use the existing Nova Scotia Power Inc. (NS Power) grid to transmit renewable energy to Point Tupper for the Facility.

- Phase 2 (Guysborough Wind Projects) includes the development of approximately 2 gigawatts (GW) of clean energy from up to three additional onshore wind projects, the associated high-voltage transmission line, and the portion of the high-voltage transmission line that crosses the Strait of Canso to provide a connection directly to the Facility. The Guysborough Wind Projects will transmit renewable energy to the Facility via EverWind constructed, owned, and operated transmission lines. The Strait Crossing Transmission Line and the Setapuktuk Wind Project (formerly Wind Farm 1), the first two components of Phase 2, both received EA approval in 2025. The Ocean Lake Wind Project (formerly Wind Farm 2) was registered for EA review on May 13, 2026, and is awaiting a decision on or before July 2, 2026.

This Project is the third of the onshore Guysborough Wind Projects, with up to 107 wind turbines, capable of generating up to 856 MW of renewable energy near the communities of Port Bickerton, Country Harbour Mines, Melrose, and Indian Harbour Lake (Drawing 2.1). The approximate center of the Project is 45.201139°N, 61.851846°W.

The Goldwind GWH182-8.0 wind turbine generator was selected for the visual simulations, noise, and shadow flicker modelling, as well as the electromagnetic interference (EMI) study conducted for this EA. The planned Project infrastructure also includes access roads (new and existing), temporary laydown areas, medium-voltage collector lines, one or more substations, worker accommodations, a concrete batch plant, meteorological towers (MET towers), borrow pits, and an Operations and Maintenance (O&M) building.

Upon approval of the EA, site preparation and construction activities are proposed to begin in 2030 (lasting approximately four years) and once constructed, the Project is expected to be operational for a minimum of 35 years.

2.2 Purpose & Need for the Undertaking

As part of the Clean Power Plan released in fall 2023, the Government of Nova Scotia set targets for producing 80% renewable energy by 2030 and cutting greenhouse gas (GHG) emissions produced from electricity by 90%. The development of wind energy is expected to be a significant part of supporting these goals. The Project has been proposed in support of this renewable energy target. Dependence on fossil fuels increases the vulnerability of Nova Scotians to rising international energy prices, weakens energy security, and takes valuable revenue out of the province, further leading Nova Scotia towards a preference for renewable energy (Nova Scotia, 2015). Negative impacts on human health (particularly in developing countries) and the environment, mainly in the form of climate change, are among the widely cited challenges associated with fossil fuel consumption around the world.

In its assessment report, Climate Change 2022 - Impacts, Adaptation and Vulnerability, the United Nations Intergovernmental Panel on Climate Change (IPCC) provides a detailed synopsis of the impacts associated with climate change on both global and regional scales. Evidence from all continents indicates that many biological systems and habitats are currently being affected by regional climate change. Ecological changes include those to the thermal

dynamics and quality of aquatic habitats, shifts in migratory timing and ranges of fauna and flora, changes in fish abundance, and increased risk of extinction and loss of forest habitat (IPCC, 2022). In North America specifically, the increase in ground, water, and atmospheric temperatures has resulted in direct mortality and redistribution of flora and fauna species. In addition, coastal flooding along with an increase in the frequency and intensity of extreme weather events will continue to impact the socioeconomic environment through displacement and/or damage to communities and economies (IPCC, 2022). Impacts of climate change are, and will increasingly be felt across environmental, social, human health, and economic sectors (IPCC, 2022).

Canadian climate experts acknowledge that the debate has largely evolved from questions about the reality and causes of climate change, to what actions can be taken to adapt to the realities of a changing climate. As the second most important and fastest growing source of electricity in Canada (along with solar) (NRCan, 2024), wind energy is a critical component of Canada's renewable energy strategy. Wind energy is emission-free; with every MW of wind energy generated, GHG emissions are reduced in comparison to previous levels associated with coal-related production (NSNR, n.d.-b). Numerous benefits can be expected from the transition to renewable energy, including:

- Long-term stability in energy prices.
- Long-term security in locally-sourced energy supply and decreased dependence on international markets.
- Creation of jobs and economic opportunities throughout the province.
- Community investment and economic return.
- Protection of human health and the environment.
- Educational opportunities for youth and the broader community about renewable energy technology, its benefits, and the role it will play in Nova Scotia's energy future.

The Proponent is committed to sharing economic opportunities with local communities and municipalities throughout the development and lifespan of the Project via the use of local skills and labour where practicable, municipal tax revenue, and ongoing energy literacy/education. The Project will also have broader regional economic benefits and will help support Nova Scotia's decarbonization and sustainability goals. Engagement with local groups has been ongoing to support both community and Project development.

2.3 Regulatory Framework

2.3.1 Federal

A federal impact assessment is not required for the Project as it is not located on federal lands or listed as a physical activity that constitutes a designated project as listed in the Physical Activities Regulations (Canada, 2019a), under the *Impact Assessment Act* (Canada, 2019b).

Federal approval, permit, notification, and compliance requirements for the Project are provided in Table 2.1. EMI and radio communication stakeholders have been contacted. The EMI consultation process and status is described further in Section 6.

Table 2.1: Federal Regulatory Requirements

Requirement	Regulatory Body	Status/Comments
Fisheries Act	Fisheries and Oceans Canada (DFO)	Compliance legislation - there is currently no expectation that an authorization under the *Fisheries Act* will be required. DFO will review watercourse alteration applications to determine potential to cause harmful alteration, disruption, or destruction of fish habitat or accidental death of fish. All fish surveys were conducted under DFO Scientific Licence #360444.
Species at Risk Act (SARA)	Environment and Climate Change Canada (ECCC), and DFO	No SARA permits were acquired for studies within the Study Area and none are expected based on Project design. Should the need to obtain a permit under SARA be identified, the Proponent will engage with ECCC and/or DFO, as appropriate.
Migratory Bird Convention Act, 1994 (MBCA)	ECCC	Compliance legislation – the requirement to obtain a MBCA permit is not anticipated.

2.3.2 Provincial

The Project is subject to a Class I EA as defined by the Environmental Assessment Regulations (Nova Scotia, 1995c) under the *Environment Act* (Nova Scotia, 1995b). As such, this submission has been prepared in accordance with:

- A Proponent's Guide to Environmental Assessment (NSECC, 2025a)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025e)
- Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d)

Other potentially applicable regulatory requirements including provincial approvals, permits, notification, and compliance for the Project along with their status are provided in Table 2.2.

Table 2.2: Provincial Regulatory Requirements

Requirement	Regulatory Body	Status/Comments
Watercourse Alteration Permit Wetland Alteration Permit	Nova Scotia Environment and Climate Change (NSECC)	Alteration applications will be submitted to NSECC in accordance with the Activities Designation Regulations following EA Approval. Locations requiring alteration are described in Section 9.
Endangered Species Act (ESA) (Nova Scotia, 1998)	Nova Scotia Natural Resources (NSNR)	Compliance legislation – should the need to obtain a permit under the ESA be identified, the Proponent will engage with NSNR.

Requirement	Regulatory Body	Status/Comments
Use of Crown lands	NSNR	In 2022, EverWind received a Memorandum of Understanding for use of Crown Lands for the purpose of developing a wind energy generating facility – the Project falls within the awarded Crown lands. Crown Land leases and easements will be applied for following EA approval and further project development work.
Notification of blasting (if required)	NSECC, Nova Scotia Health and Safety	To be confirmed following the geotechnical investigations.
Overweight/Special move permit Access permit Work within highway right-of-way (ROW)	Nova Scotia Public Works (NSPW)	Permits to be applied for before mobilizing oversize vehicles on public roads or commencing within a highway ROW.
Elevator lift license	Nova Scotia Labour Skills and Immigration	Application to be filed prior to erection of the wind turbines.
Archaeology Field Research Permit	Nova Scotia Communities, Culture, Tourism and Heritage (NSCCTH)	NSCCTH Permit A2026NS045 was obtained to complete the archaeology assessment (Section 9).
Nova Scotia Temporary Workplace Traffic Control Manual	NSPW	Compliance for the use of provincial roads during the construction, operation, and decommissioning phases of the Project.

2.3.3 Municipal

Municipal approval, permit, notification, and compliance requirements for the Project are provided in Table 2.3.

Table 2.3: Municipal Requirements

Requirement	Regulatory Body	Status/Comments
Building and Development Permits and Agreements	Municipality of the District of Guysborough (MODG), Municipality of the District of St. Mary's (MODSM)	Proponent will obtain all required municipal building and development permits prior to construction.
Noise Control By-Law	MODG	Compliance with schedule restrictions for construction activities. By-law includes provisions to permit construction activities during specific hours if a Building Permit has been issued.

2.4 Funding

The Proponent is arranging equity and debt project financing for the Project. Leading investment banks are engaged to lead the financing of the Project. Commercial banks have been approached to participate in the Project as a lender, and various financing support letters have been received for the funding.

3.0 DESCRIPTION OF THE UNDERTAKING

3.1 Geographical Location

The Project is located within Guysborough County, near the communities of Port Bickerton, Country Harbour Mines, Melrose, and Indian Harbour Lake, Nova Scotia (Drawing 2.1). The Project is situated primarily on Crown-owned, managed forestry land. The Project is centered at 45.201139°N, 61.851846°W.

3.2 Areas of Study

EverWind entered into a Memorandum of Understanding (MOU) with the Province in 2022 respecting Crown lands identified for potential wind generation development. The Project is located within the area covered by that MOU. Through ongoing engagement with local communities and organizations, including the St. Mary's River Association (SMRA), Project infrastructure was refined to avoid the northern portion of the MOU lands, north of the Melrose Country Harbour Road (Drawing 3.1).

Several areas of study were established for the purpose of field data collection and to describe the area containing Project infrastructure.

- Study Area: A Study Area was established based primarily on land parcels (i.e., PIDs) that encompass the development area (Drawing 2.1). The intent of the Study Area was to assess a large area at a high-level to allow flexibility in the design to move infrastructure and minimize effects to valued components (VCs; described further in Section 4.1). Based on the resulting Study Area analyses, an Assessment Area was established for more detailed field investigations. Note that not all PIDs included in the Study Area contain or are expected to contain Project infrastructure, as detailed in Appendix A.

- Assessment Area: An Assessment Area (Drawing 3.2A to 3.2N) was established for more detailed field assessment planning. The Assessment Area represents the area within which direct physical disturbance is expected to occur (i.e., the Project Footprint) plus a buffer to allow design flexibility and assess indirect effects beyond the direct Project Footprint. The Assessment Area buffer generally includes a 150 m radial area around each turbine and a 35 m buffer on either side of the centerline for roads and collector lines. The Assessment Area also includes temporary laydown areas.

  As field studies progressed, further Project design changes were made to avoid sensitive features and reduce potential adverse effects on VCs, which in some instances changed the noted assessment buffers.

- Clearing Footprint: A Clearing Footprint (Drawing 3.2A to 3.2N) was established, which includes the areas where vegetation clearing may be required to facilitate construction activities, including temporary laydown areas, collector line corridors, and access roads. Many of these areas will be allowed to revegetate during operations. The Clearing Footprint includes the full width of the Assessment Area along roads and collector lines, temporary laydown areas, as well as a 100 m by 100 m area surrounding turbine locations.

  The Clearing Footprint is a conservative estimate of the footprint where vegetation clearing will take place during construction and includes existing roads and previously cleared areas. The final area requiring vegetation clearing is expected to be less than the Clearing Footprint presented in this document.

- Project Footprint: The Project Footprint (Drawing 3.2A to 3.2N) includes the physical footprint where direct disturbance is expected to occur. The Project Footprint includes a conservative estimate of 30 m wide corridors for road construction and upgrades, collector line installation, and a 100 m by 100 m area surrounding turbine locations.

The areas for the areas of study are provided in Table 3.1.

Table 3.1: Area of Study

Area of Study	Area (ha)
Study Area	20,734
Assessment Area	1,906
Clearing Footprint[(1)]	1,380
Project Footprint[(2)]	564

[(1)] Area is a conservative estimate of the footprint where vegetation clearing will take place during construction.
[(2)] Area is a conservative estimate of the permanent footprint of the Project. Temporary Footprint components are shown on Drawing 3.2A to 3.2N but not included in this calculation. Following detailed design, the area will be refined.

The location for O&M buildings, the temporary worker accommodations, one or more substations, and borrow pits, have not yet been determined and are not shown on Drawing 3.2A to 3.2N or included in the Table 3.1 calculations. For the purposes of this EA, the Project has been assessed using conservative spatial envelopes and buffers intended to capture the potential area of direct and indirect effects associated with these components. Final locations will be selected considering environmental constraints, permitting requirements, and engineering considerations. No construction will occur in any area requiring additional field verification until those assessments have been completed and applicable approvals have been obtained.

3.3 Siting Considerations

Project siting was completed using a multi-phased approach, including a detailed constraints analysis primarily consisting of a geographic information system (GIS) exercise after considering land ownership, setbacks, and wind speed. Preliminary siting considerations included:

- Siting turbines at locations for efficient capture of wind energy.
- Utilizing existing disturbed areas and existing roads to the greatest extent practical.
- Complying with regulated setbacks and separation distances (Table 3.2).
- Minimizing potential interference with telecommunication and radar systems.
- Avoiding known protected areas (e.g., wildlife sites, provincial parks, or reserves).

Table 3.2: Summary of Minimum Setbacks and Separation Distances

Setback Category	Distance	Relevant Regulators / Stakeholders
Old Growth Forests	100 m limited development buffer where practicable on Crown land	NSNR
Protected Areas	To be determined in consultation with NSECC, as appropriate	NSECC, NSNR
Rare Plants and Lichens	Species-specific (Section 10.1)	NSNR
Residential Dwellings (non-participating)	4.0 x Turbine Height	Nova Scotia Municipal Affairs
Camps (non-participating)	350 m	Proponent Commitment
External Property Boundaries (non-participating)	1.0 x Turbine Height	MODG
Public Roads	As per municipal requirements (minimum 1.0 x turbine height)	Proponent Commitment
Powerlines	1.0 x Turbine Height from non-Project-related powerlines	Proponent Commitment
Shadow Flicker	As necessary to meet shadow flicker guidelines based on shadow flicker modelling	NSECC
Sound/Noise	As necessary to meet noise guidance based on sound modelling	NSECC

The Archibald Lake Wilderness Area, Big Plains Wilderness Area, and the Guysborough Headlands Wilderness Area are directly adjacent to the Study Area and near the Assessment Area, (Drawing 3.2A to 3.2N). The nearest turbines (OT57, T79, and T95) are approximately 78 m, 301 m, and 394 m from these protected areas, respectively. The Proponent respects the integrity and importance of protected areas and has engaged with the Nova Scotia Environment and Climate Change (NSECC) Protected Areas and Ecosystems Branch regarding appropriate precautions for protected areas (Section 6).

The Project Footprint has been developed to minimize potential effects to surrounding land uses, local residents, and environmental features. Project development considerations included the following:

- Use of Crown land which has been subject to previous and ongoing disturbance from forestry activities.
- Use of existing roads and cleared areas to the extent practicable, to minimize habitat fragmentation and impacts to wetlands, watercourses, and their riparian buffers from new road construction and clearing of mature vegetation stands.

- Avoidance of known species at risk (SAR) locations, and associated buffers where practicable.

Project siting constraints were updated with the results of Project-specific technical studies which included: field investigations, environmental resource/potential effects modeling, as well as information collected through engagement with the Mi'kmaq of Nova Scotia, government agencies, stakeholders, and local communities. Through this process, several iterations of the Project layout were considered for development before a Project Footprint was finalized for the purposes of this EA (Drawing 3.3).

Specific adjustments included relocation of Project infrastructure, and an overall reduction in turbine numbers from "up to 160" to "up to 107", to:

- Remove infrastructure from the Archibald Lake Wilderness Area, after its designation (August 2023).
- Remove infrastructure from the portion of the MOU lands north of the Melrose Country Harbour Road, due to the ecological importance of this area and feedback from community organizations (Drawing 3.1).
- Remove turbines from the Cochrane Hill Mine project area.
- Avoid and minimize interactions with old growth forests, SAR, wetlands, and watercourses.
- Maintain setbacks from nature reserves.
- Maintain setbacks from potential receptors.

The Project has been carefully designed to minimize environmental and land use impacts as far as reasonably practicable, with design modifications made in response to multiple years of environmental field studies and community engagement. Due to the size, scale, and complexity of the Project, additional refinements will likely be required as development advances. This refinement process constitutes an optimization exercise, reflecting the reality that projects of this magnitude cannot fully avoid or minimize all potential impacts individually; enhancing performance in one area may necessarily result in trade-offs that affect other VCs. Final siting decisions will continue to balance environmental constraints, engineering requirements, safety, and land use considerations. The Proponent will work with government departments throughout the detailed design and permitting process to manage potential impacts resulting from site optimization.

3.4 Project Proximity to Other Areas

3.4.1 Towns or Cities

The Project is situated approximately 12 km east of the community of Sherbrooke, and 35 km southwest of the community of Guysborough (Drawing 3.4). Antigonish is the nearest town, located 48 km north of the Project.

3.4.2 Mi'kmaq Communities

The nearest Mi'kmaq communities are Paqtnkek-Niktuek Indian Reserve No. 23 (Paq'tnkek) which is 43 km north of the Project (Drawing 3.4), and Chapel Island Indian Reserve No. 5 (Potlotek) which is 100 km northeast of the Project. Refer to Section 5 for additional details on the Mi'kmaq of Nova Scotia.

3.4.3 Other Known Wind Developments

Other wind developments within proximity to the Project include the following developments:

- Ocean Lake Wind Project 25 km east of the Study Area centre (proposed)
- Goose Harbour Lake Wind Farm Project 41 km northeast (currently under development)
- Upper Afton Wind Project, 42 km northeast (proposed)
- Setapuktuk Wind Project, 52 km northeast (proposed)
- Mulgrave Community Wind Power Project 57 km northeast (operational)
- Auld's Cove Wind Project 60 km northeast (proposed)
- Sable Wind Project, 69 km east (operational)

EverWind and Membertou Development Corporation is also the proponent of the Ocean Lake, Setapuktuk, and Upper Afton Wind Projects.

3.4.4 Protected Watersheds and Water Areas

The James River Watershed Protected Water Area is the nearest protected water area to the Project. It is located 50 km north of the Project, west of the town of Antigonish (Drawing 3.4).

3.4.5 Nearest Parks and Protected Areas

Archibald Lake Wilderness Area, Big Plains Wilderness Area, and Guysborough Headlands Wilderness Area are adjacent to the Study Area, with the nearest Project turbines located 78 m, 301 m and 394 m away, respectively (Drawing 3.2A to 3.2N). The nearest nature reserve to the Study Area is Loon Lake Nature Reserve, approximately 12 km east of the Study Area. The nearest turbine is approximately 12 km southwest of this nature reserve. Port Bickerton Provincial Park is 2 km southeast of the Study Area, with the nearest turbine 3 km away (Drawing 3.4). Cape Breton Highlands National Park, the nearest national park to the Project, is 168 km to the north.

3.4.6 Important Bird Areas

The closest Important Bird Area (IBA) is the Country Island Complex (NS028), a series of islands off the coast between the communities of Tor Bay and Drum Head. The closest island is approximately 2 km southwest of the Study Area, while the furthest is approximately 37 km west of the Study Area (Drawing 3.4).

3.5 Physical Components

3.5.1 Turbines

The Proponent is proposing the construction of up to 107 turbines, with a total nameplate capacity of up to 856 MW. Optional turbine locations (OTs) have been evaluated throughout the EA, with the exception of sound and shadow flicker modelling, which will be updated at a later date to ensure compliance, should these turbines be proposed for construction (Section 7.3 and 7.4).

The turbine model for the Project has not been finalized. However, for the purposes of the EA, the Proponent has selected the Goldwind GWH182-8.0 wind turbine generator as it is representative of the operating specifications of models being considered for the Project. Each turbine location, when constructed, will be comprised of a foundation, steel tower, rotor and blades, nacelle (including the rotor shaft and brake and gearbox system), and a cleared pad surrounding the turbine for construction and maintenance purposes. Table 3.3 shows the turbine characteristics of the Goldwind GWH182-8.0.

Table 3.3: Turbine Technical Specifications

Turbine Component	Turbine Specifications for Goldwind GWH182-8.0
Rated capacity	8.0 MW
Rotor diameter	183.4 m
Blade length	91.7 m
Hub height	130 m
Total turbine (tip) height	221.7 m
Cut-out wind speed	24.0 metres per second (m/s)
Number of blades	Three
Swept area	26,417 square metres (m^2)

Steel towers are the baseline consideration for the Project; however, the Proponent is considering concrete towers, manufactured on-site or nearby, to maximize local content and in response to international steel tariffs and other supply chain constraints. If a concrete tower configuration is selected, a greater hub height may be required, up to 150 m in height, to accommodate turbine design, structural engineering, and blade-to-tower clearance requirements associated with the selected tower and turbine configuration. Should this option be advanced, an updated Project Description will be submitted to NSECC, including updated noise and shadow flicker modelling and demonstration of setback compliance in accordance with the revised turbine height. It is expected that footprint-related effects of the Project would remain unchanged.

3.5.2 Road Layout

A road network currently exists in the Study Area and is associated with ongoing forestry activities. The proposed access roads consist of 110 km (67%) of new and 53 km (33%) of

existing roads (Drawing 3.2A to 3.2N). All roads will be constructed or upgraded, as required to safely transport turbine components, provide appropriate turning radii, and support construction activities in compliance with local and provincial guidelines/requirements. During the civil design process, consideration will be made to minimize impacts to sensitive habitats, such as wetlands and watercourses, as well as rare species, as practicable. In some cases, the construction of new roads will be required to access proposed turbine locations; however, the Proponent is planning to leverage the network of existing roads to the greatest extent feasible.

The Indian River Road near Melrose is the main arterial road that grants access to most of the Project Footprint. The NE Brook Road, West Side Road, and several existing but unnamed roads from Highway 211 (Marine Drive) also allow access to the site. Additional access points may also be established as determined during detailed design. A network of smaller spur roads and trails suited for all-terrain vehicles (ATVs) and/or snowmobile use are present throughout much of the Study Area and may require upgrades to facilitate the transportation of turbine components.

3.5.3 Substation, Power Collection Systems, and Transmission

The Project will include new medium-voltage electrical cabling from each turbine, and one or more substations to gather the produced energy. The medium-voltage electrical cabling will be overhead, with the exception of the first ~100 m from each turbine which will run underground, and predominantly parallel to Project roads. Substation location(s) and high voltage transmission tie-ins will be determined during detailed design. Energy produced by the Project will be transmitted to Point Tupper via an EverWind-owned high-voltage transmission line, currently undergoing development alongside the Guysborough Wind Projects, and subject to separate permitting, consultation and approval requirements, as applicable, once routing is sufficiently advanced.

3.5.4 Operations and Maintenance Building

The Project will require an O&M building, which will mainly consist of an electrical room, workshop, supervisory control and data acquisition (SCADA) room, parts room, conference room, and office spaces. The location and area that the O&M building will occupy have not yet been determined.

3.5.5 Worker Accommodation

The Project may require worker accommodation to house the large workforce required during the construction phase of the Project. The on-site location is yet to be determined. Alternatively, the Project may use worker accommodations proposed to be established at the Ocean Lake Wind Project.

3.5.6 Meteorological Towers

One MET tower, operational since 2025, has been installed within the Study Area to monitor atmospheric conditions relevant to the Project (wind speed and direction, atmospheric pressure, relative humidity, and temperature). Additional MET towers and/or light detection and

ranging (LiDAR) wind measurement systems may be required during the Project development. Several MET towers will be required during the Project operational period at locations yet to be determined.

3.5.7 Concrete Batch Plant

One or more concrete batch plants are likely to be used during construction. Concrete batch plants allow for high output and quality concrete to be produced at site and reduce trucking costs and impacts to local communities.

3.5.8 Temporary Laydown Yards

A total of 19 temporary laydown yards, between 8 ha and 17 ha in size, are under consideration for the Project. These areas will be used to temporarily store equipment, assemble Project infrastructure, locate concrete batch plants, and other Project construction activities. One or more laydown area may be repurposed for substation or O&M building placement.

3.5.9 Borrow Pits

During construction, aggregate material for road construction may be produced from borrow pits located within the Study Area. All borrow pits are expected to be under 4 ha and not require an EA. Should any borrow pit be over 2 ha, an Industrial Approval will be obtained, as required. On-site borrow pits allow for aggregate to be sourced at the site and reduce trucking costs and impacts to local communities. If borrow pits are not utilized, aggregate will be sourced from local quarries.

3.6 Project Phases

The Project will include three phases:

- Site preparation and construction (approximately four years, tentatively starting in 2030).
- Operations (approximately 35 years, tentatively starting in 2034).
- Decommissioning (18 to 36 months, at Project end of life).

Activities and requirements associated with each phase are discussed in the following sections.

3.6.1 Site Preparation and Construction

Geotechnical investigations and land surveys for placement of roads, turbines, and associated infrastructure will be performed prior to site preparation and construction.

Site preparation activities include:

- Demarcating boundaries of environmentally sensitive features and applying appropriate buffers.
- Installing erosion and sedimentation control measures.
- Clearing of trees, grubbing, excavating, grading, and compacting local and potentially imported materials for construction.

General construction activities include:

- Access road construction.
- Laydown area and turbine pad construction.
    - Completion of foundation excavation and construction, including blasting, if required.
    - Preparation of materials and storage (e.g., aggregate crusher and storage areas).
- Transportation of turbine components, equipment, and materials.
    - Establishment of site traffic control measures.
- On-site manufacturing of turbine towers (if concrete towers are used).
- Turbine assembly.
- Management of site waste and dust.
- Construction and connection of collection system, substation, and transmission lines.
- Removal of temporary works and site restoration.
- Commissioning.

Clearing activities are expected to be primarily performed outside of the nesting season for birds (April 15 to August 31) and general construction is anticipated to occur year-round. Nest sweeps will be conducted by a qualified professional prior to clearing activities, should vegetation removal be required within the nesting season.

Access Road Construction

Approximately 53 km of the existing road network will be re-used as part of the Project. Existing roads will require upgrades (widening, ditching, capping etc.). Approximately 110 km of new road construction is required to provide direct access to the turbines and connect areas within the Project. Access roads will have a 6 m to 12 m wide road surface and including ditching and grading will be 17 m to 20 m wide.

During construction, roads will be maintained with additional gravel or periodic grading. Aggregate material for road construction will be produced from borrow pits on the site or transported from local off-site quarries and stored temporarily until used. Any material removed for road construction will be stored or disposed of in accordance with regulations and best practices for road construction. Any material stored on the site will be managed with appropriate erosion and sedimentation control measures or re-used.

The following equipment is typically used during road upgrading and construction:

- Excavators
- Dump trucks
- Bull dozers
- Rollers
- Graders
- Crusher
- Light trucks

Turbine Pad Construction and Temporary Laydown Areas

Laydown areas and turbine pad construction may include:

- Installation of erosion and sedimentation control measures.
- Removal of vegetation and site grading.
- Removal of overburden and soils.
- Blasting/chipping of bedrock (to be determined, based on geotechnical conditions and foundation design).
- Pouring and curing of concrete pads (complete with reinforcing steel).
- Placement of competent soils to bring area to grade.
- Compaction of soils.
- Excavation for electrical conduits and fibre optic communication trenches.

The turbine tower foundations will be up to 30 m in diameter and extend to a depth of up to approximately 7 m below grade. Foundations will be backfilled (underground) with the exception of the concrete pedestal which will extend up to 1 m above ground to support the wind turbine tower structure.

Each turbine pad area is expected to be approximately 100 m by 100 m. The exact arrangement of each turbine pad and crane pad will be designed to suit the specific requirements of the turbine and the surrounding topography during the detailed design process.

Temporary laydown yards may be up 17 ha, which includes clearing limits and any overburden. There are currently 19 temporary laydown areas under consideration.

Construction of a typical turbine pad (from clearing to final preparation for erecting of the turbine) can take between one to four months, depending on weather, soil, and construction vehicle availability/access. The following equipment may be used for the laydown areas and turbine pad construction:

- Excavators
- Dump trucks
- Bull dozers
- Rollers
- Graders
- Crusher (not required if a local quarry can supply gravel sizes)
- Concrete trucks and pumper trucks
- Light cranes
- Light trucks

Transportation of Turbine Components, Equipment, and Materials

The center of the Project is approximately 6 km south of Highway 316 and adjacent to Highways 7 and 211. The network of roads and trails throughout the Study Area provides optionality for detailed design.

Throughout the Study Area, the roads are accessible by truck/sport utility vehicles as well as other vehicles designed for rough dirt roads and tracks. The Study Area is frequented by both commercial users, primarily related to forestry activities, as well as recreational users year-round, including snowmobiling and ATV use, and hunting during the fall.

The transportation route to deliver turbine components to the Project is subject to the final turbine technology provider, who will undertake a comprehensive logistics study to determine the transportation route from the receiving and unloading port. New roads within and beyond the Study Area may need to be established to accommodate turbine component transport.

Primary access routes during construction and operations are expected to be Indian River Road, NE Brook Road, and West Side Road, and the existing network of smaller access roads.

The following permits and considerations are anticipated to be required for the transportation of tower components:

- Traffic Management Plan – Nova Scotia Public Works (NSPW)
    - Required to provide NSPW with a comprehensive overview of oversized and overweight component movements, including transport routes from port(s) to the Project and assessment of bridges and other load bearing structures on the transport routes, as required.
- Work Within Highway Right of Way Permit (NSPW).
    - Required if installing access to sites from the roadway, erecting structures within 100 m of the highway or removing access signs and guard rails.
- Over-Weight Moves Special Move Permit (Service Nova Scotia and Internal Services).
    - Required to transport oversized and overweight components. In some cases, due to the size and weight of the components, some may only be transported on Sundays.
- Provincial road weight restrictions will also need to be considered, especially spring weight restrictions, for heavier equipment and materials that will be transported to the Project.
- Access points will be designed with proper height and width to accommodate large trucks and will adhere to commercial stopping sight distances.

Different volumes and types of traffic will be generated throughout the Project's lifecycle. During the construction phase, trucks and other vehicles will be frequently visiting the area resulting in increased vehicular sound and air emissions (see Sections 7.1 and 7.3 for assessment and mitigation related to air quality and sound). During construction, most days will have 100 trucks per day, with a few days potentially requiring up to 200 trucks. Outside of the construction phase, the Project will only require technicians to access the site to perform regular maintenance/equipment checks. Provincial road weight restrictions will be considered, especially spring weight restrictions, for heavier equipment, and materials that will be transported to the Project. Decommissioning will require a similar amount of traffic to the tower component delivery and construction.

The public road portion of the transportation route is expected to require road modifications to provide access to the Study Area. This is expected to be limited to modifications and upgrades to existing paved and unpaved roads that exit the Melrose Country Harbour Road, West Side Road, Highway 7, and Highway 211 to allow larger truck traffic to turn off the main road and to travel on the Project's gravel access roads.

The transportation route is expected to require road modifications, including the removal of signage and guardrails. Upgrades will also be made to roads and overhead wires, branches, and signs if conflicts arise. Bridges may be upgraded to increase allowable weight limits or temporary bridges built over existing bridges. Notices will be installed in public areas to inform residents of signage removal or road infrastructure alterations, as well as notify relevant municipal government staff of construction scheduling and safety measures.

The Proponent has committed to not restricting public access to roads and trails in the area with the exception of fencing surrounding the substation and temporary restrictions at active construction sites where restrictions are necessary due to safety considerations. In such circumstances, signs will be posted and physical barriers such as cones, candle sticks, t-posts and rope will be erected. In addition, transportation will avoid travel through urban areas, to the extent practicable, during high traffic times.

Turbine Assembly

The wind turbine assembly includes tower sections, the nacelle, the hub, and three-blade rotors. The tower sections will be erected in sequence on the turbine foundation, followed by the nacelle, hub, and blades. All sections will be delivered by specialized transportation equipment, and the pieces will require a crane for removal from the vehicle at each of the prepared turbine pads or staging areas as required. Turbine erection will depend on weather, specifically wind and lighting conditions. Typical assembly duration per turbine is expected to be between two and five days, and turbine components will be delivered as turbines are being assembled and erected. The following equipment is expected to be used for turbine assembly:

- Main crane unit
- Assembly cranes
- Manufacturer's support vehicles

Construction and Connection of Power Collector System and Substation, and Transmission Lines

The Project turbines will generate power that will flow via its medium voltage collection circuit (that primarily follows the proposed roads) to one or more Project substations. Transmission line tie-ins will be constructed to connect the Project substation(s) to the high-voltage transmission line to be constructed, owned, and operated by EverWind (not included as a Project component within this document).

The following equipment is expected to be used:

- Excavators and/or back hoes
- Concrete trucks and pumper trucks
- Assembly cranes
- Bucket trucks
- Light cranes
- Light trucks

Removal of Temporary Works and Site Restoration

Once construction has been completed, all temporary works will be removed, and the site will be appropriately graded. The following equipment is expected to be used in this process:

- Excavator and/or backhoe
- Grader
- Hydroseeder
- Light trucks

Commissioning

The turbines will undergo a series of tests for mechanical, electrical, and operational controls prior to unit start-up sequence. Once the start-up sequence has been initiated, another series of performance checks for safety systems will be completed. When the turbines have cleared all tests, the commissioning of the units can begin.

Commissioning includes performance testing. These performance tests will be completed by qualified wind turbine technicians. Additional testing may also be required for transformers, power lines, and substation components; all of which will be performed by qualified engineers and technical personnel.

3.6.2 Operations

The lifespan of the Project is estimated to be a minimum of 35 years. During this time, roads will be used to access the turbines by staff and maintenance personnel. The roads will be maintained with additional gravel and grading, as required. During the winter months, roads may be plowed, sanded, and/or salted to the extent necessary to allow for safe access to project facilities for operations and maintenance.

Timing of vegetation management will depend on site specific conditions and requirements by the Proponent and/or their operations and maintenance contractors. In addition to mechanical clearing (mowing, brush cutting, and trimming), selective and localized application of approved herbicides may be required to manage vegetation. If herbicide use is required, it will be selectively used and minimized to the extent possible.

Due to the potential for public access to the wind farm, signage will be affixed and maintained on all access roads to provide essential safety information such as emergency contacts and

telephone numbers, speed limits, and the hazards associated with being in close proximity to the turbines (i.e., ice throw). These signs will be maintained during the life of the Project. No gates to restrict access are proposed; however, fencing may be required around the substation and temporary restrictions during active construction may be required, for the safety of the public.

Maintenance will conform to manufacturer equipment specifications, industry best management practices (BMPs), and standard operating procedures. Scheduled maintenance work will be carried out on a periodic basis. Maintenance work may require the use of a variety of cranes for brief periods of time for replacement of blades or other turbine repairs. The most common vehicle during maintenance work will be light/medium pickup trucks.

3.6.3 Decommissioning

Prior to decommissioning, NSECC, MODG, and MODSM will be provided with decommissioning plans for review and compliance with the Project's EA conditions. Opportunities for repowering with modern turbine components will be considered prior to entering the decommissioning phase.

Generally, the decommissioning phase will follow the same steps as the construction phase:

- Dismantling and removal of the turbines.
- Decommissioning the turbine foundations as per the conditions of the land lease agreement (to approximately 1 m below surface grade).
- Removal, recycling (where practicable), and disposal of power collection system, conductor, and poles.
- Removal of all other equipment and reinstatement and stabilization of land.
- Access roads will either be removed or remain in place as per lease and easement agreements with the Crown and/or landowners.

According to the Canadian Renewable Energy Association (CanREA, n.d.), up to 90% of wind turbine blades can be recycled. Additional components, such as steel from the towers, copper cables, and electrical equipment, can also be recycled or reused. Materials that cannot be recycled can sometimes be reused in other applications, such as filler in construction materials. Recent innovations in fibreglass recycling have used various chemical and mechanical means to prepare the material for reuse in other applications (Power Technology, 2024). At the time of decommissioning, it is anticipated that newer technologies will allow for a greater amount of recycling or reuse of the end-of-life turbine materials. Any material that cannot be recycled or reused will be sent for final disposal at an approval disposal facility.

Decommissioning is anticipated to take 18 to 36 months to complete.

Procedures for Dismantling

If the Project is to be decommissioned and the turbines are to be removed at the end of their service life or during construction, the procedures will be similar to the construction phase, but in reverse sequence. The general dismantling procedure will proceed as follows:

- The Project will first be de-energized and isolated from all external electrical lines.

- Temporary staging areas will be created to provide sufficient area for laydown of the disassembled wind turbine components and loading onto trucks. An area of approximately 1 ha around each wind turbine must be cleared, levelled and made accessible. After completion of the decommissioning, temporary staging areas and any associated temporary decommissioning facilities or components used throughout the decommissioning phase will be removed. The temporary staging areas will be located within the Assessment Area and used during the construction phase of the Project.

- Crane pads will be installed (estimated 30 m x 70 m) within the temporary staging area around each wind turbine. The topsoil at the crane pad will be removed and approximately 600 mm of compacted crushed gravel will be added. Once the turbine disassembly has been completed, the gravel area around each turbine will be removed and the area will be restored to prior use using stockpiled topsoil.

- Wind turbines (blades, hub, nacelle, and tower segments) will be removed using cranes. The components and associated equipment will be hauled off using trucks and heavy-loaders, and components will be recycled, where practicable, or disposed of off-site at an approved and appropriate facility.

- The top of the concrete foundations will be removed to approximately 1 m below the surface at that time. Excavated foundation areas will be backfilled with clean fill and stockpiled topsoil to match the original elevations. These areas will also be graded, contoured, and restored to a land use similar to what was present prior to foundation installation to allow for prior activities to resume.

- Overhead electrical lines are expected to be removed at the end of the Project's life. Poles will be cut to a depth of approximately 1 m below original grade or may be completely removed from the ground, where feasible.

- The substation(s) and associated infrastructure will be dismantled and removed in accordance with the legal requirements at the time. Any concrete foundations associated with these facilities will be removed to at least 1 m below the original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation to allow for prior activities to resume. All materials will be recycled, where practicable, or disposed of off-site at an approved and appropriate facility.

- Removal of access roads will depend on the requirements and agreements in accordance with the Crown and/or landowner.

- The MET towers will be removed unless otherwise requested by the municipality or stakeholders (and agreed to by the Proponent and the Crown/landowner) to remain in

place. Any concrete foundation would be removed to at least 1 m below original grade or to the depth originally installed if less than 1 m below original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation to allow for prior activities to resume.

Restoration of Land

After the decommissioning process has been completed, the land will be left to naturally revegetate.

Waste Generated

Waste and debris generated during the decommissioning activities will be collected and disposed of at an approved facility. All reasonable efforts will be made to minimize waste generated throughout the decommissioning phase. Materials used and generated throughout decommissioning will be recycled, as practicable.

Industry best practices for spill prevention will be employed. In the event of a spill, it will be cleaned up immediately and any impacted soils will be removed from the site and disposed of at an appropriate facility in accordance with the applicable regulations.

After decommissioning, vehicles and construction equipment will be removed from the site.

3.7 Project Schedule

Table 3.4 presents the Project schedule from EA registration to Project decommissioning.

Table 3.4: Project Schedule

Project Activity	Timeline
EA Registration	June 2026
Post-EA Environmental Monitoring Programs	Prior to appropriate Project phase
Geotechnical Assessment	2027 to 2029
Detailed Engineering Design	2027 to 2029
Municipal Decision on Development Agreement	2029
Clearing	2029 to 2030
Construction	2030 to 2034
Commissioning	2034
Operation	+35 years
Decommissioning	1.5 to 3 years post-operation

4.0 ENVIRONMENTAL ASSESSMENT METHODOLOGY

As a Class 1 EA, this Registration Document and supporting studies have been developed to meet all requirements under Section 9(1A) of the Environmental Assessment Regulations, N.S. Reg. 93/2025. As such, this submission has been prepared in accordance with:

- A Proponent's Guide to Environmental Assessment (NSECC, 2025a)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025e)
- Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009)

Over the past several years, Project Team members have engaged with the following regulatory bodies to provide input and advice into the EA scope and planning for the proposed Project, as well as for several other similar proposed wind project developments in Nova Scotia:

- Environment and Climate Change Canada – Canadian Wildlife Service (ECCC-CWS)
- NSCCTH
- NSECC
- NSNR
- Nova Scotia Office of L'nu Affairs (OLA)

4.1 Assessment Scope & Approach

EA is a planning tool used to predict the environmental effects of a proposed project, identify measures to mitigate adverse environmental effects, and predict the significance of any effects after the application of mitigation measures.

The EA focuses on VCs. VCs are specific components of the biophysical and human environments that, if altered by the Project, may be of concern to the Mi'kmaq of Nova Scotia, regulators, stakeholders, and/or the public. The scope of the EA for this Project includes:

- Identify VCs that the Project may interact with (by activity and phase) within established spatial and temporal boundaries.
- Establish the existing conditions for VCs.
- Identify potential interactions between the Project and the VCs.
- Assess the potential effects that could occur from the interaction.
- Identify mitigation measures to reduce or eliminate those effects.
- Evaluate the significance of the environmental effects after the implementation of mitigation measures using VC-specific criteria.
- Identify monitoring or follow-up programs to verify predictions and/or evaluate the need to implement adaptive management.

4.1.1 Identification of Valued Components

The following VCs were identified based on the experience of the Project Team and through engagement with the Mi'kmaq of Nova Scotia, regulators, stakeholders and the public:

- Atmospheric environment
  - Weather, climate, air quality
  - GHGs
  - Sound
  - Shadow flicker
- Geophysical environment
  - Geology, hydrogeology/groundwater
- Aquatic environment
  - Surface water, fish and fish habitat
  - Wetlands
- Terrestrial environment
  - Terrestrial vegetation communities and flora
  - Fauna (including mainland moose)
  - Bats
  - Avifauna
- Socioeconomic environment
  - Economy
  - Land use
- Archaeological resources

4.1.2 Spatial & Temporal Boundaries

4.1.2.1 Spatial Boundaries

Spatial boundaries are considered separately for each VC and are typically based on natural system boundaries or administrative/political boundaries, as appropriate. The following spatial boundaries have been established for the effects assessment:

- Local Assessment Area (LAA): The area which represents the maximum extent of predicted or measurable direct and/or indirect effects of the Project. The LAA is VC-specific and defined in each VC chapter.

- Regional Assessment Area (RAA): The area that encompasses all Project-related effects including diffuse or long-range effects. The RAA provides a broader context for assessing Project-specific effects. This area may be used to support the assessment of cumulative effects, accidents and malfunctions, and elsewhere as appropriate. The RAA varies between VCs and will be defined (where necessary) in each VC chapter.

Additional boundaries were also identified for the purpose of field data collection and to describe the area containing Project infrastructure, as provided in Section 3.2.

4.1.2.2 Temporal Boundaries

The temporal boundaries in Table 4.1 apply to all VCs unless otherwise stated in the individual chapters.

Table 4.1: Temporal Boundaries

Project Phase	Temporal Boundary
Site Preparation and Construction	4 years
Operation and Maintenance	35 years
Decommissioning	+35 years (18 to 36 months in duration)

4.1.3 Species at Risk

In evaluating the potential effects of the Project on wild species, special consideration is given to SAR, which include those species listed under the *Species at Risk Act* (SARA) (Canada, 2002) and/or the *Endangered Species Act* (ESA) (Nova Scotia, 1998). Consideration is also given to species of conservation interest (SOCI), which, for the EA Registration Document, includes species that are:

- Assessed as Endangered, Threatened, or Special Concern by the Committee on the Status of Endangered Wildlife in Canda (COSEWIC) that are not listed under SARA.
- Have a subnational rank (S-Rank) of S3, S2, or S1 (or a combination thereof) from the Atlantic Canada Conservation Data Centre (ACCDC).

SAR and SOCI species and their supporting habitat are identified in individual VC chapters, as appropriate.

4.1.4 Biophysical Assessment Components and Timing

The biophysical field components of the EA were initiated in Winter 2023 and continued until March 2026. The field components, survey timing, and surveyors that completed the assessments are outlined in Table 4.2.

Table 4.2: Biophysical Assessment Components, Timing, and Surveyors

Survey		Date	Surveyor(s)
Vegetation Community and Classification (i.e., habitat)		Throughout vascular plant, lichen, winter moose, pellet group and old growth surveys	Strum botanists and biologists
Vascular Plant Surveys	Rare Plant Surveys	May to September 2025	Strum botanists
Lichen Survey		July to December 2025	Strum lichenologist
Wildlife Surveys	Incidental Observations	Opportunistically throughout all biophysical surveys	All surveyors
	Wood Turtles	May 2023 and May 2025	Strum biologists
	Bat Acoustic Monitoring	August to December 2023 May to August 2025	Strum

Survey		Date	Surveyor(s)
	Winter Tracking Surveys	February and March 2026	Strum biologists
	Trail Camera Assessment	February to October 2023	Strum
	Spring Pellet Group Inventory Surveys	May 2025	Strum biologists
Avian Surveys	Spring Migration (3)	April 1 to May 29, 2023	Chris Pepper (sub-contractor)
	Breeding Bird (2)	June 8 to July 3, 2023	
	Nightjar (2)	June 16 to Jule 1, 2023	
	Fall Migration (3)	August 24 to November 7, 2023	
	Acoustic & Radar Monitoring	May to November 2023	Strum
Wetland and Watercourse Surveys		October 2023, May to December 2025.	Strum biologists
Fish and Fish Habitat Surveys		September 2025	
SAR	Incidental Observations	All seasons	All surveyors

As the Project has continuously undergone design changes and refining, some portions of the Assessment Area have not yet been field-assessed. Areas to be assessed during future surveys are primarily related to shifts in turbine and road placement to avoid sensitive features identified through field assessments (Drawing 4.1). Table 4.3 provides a breakdown of the area remaining to be assessed.

Table 4.3: Assessed Areas

Area of Study	Area (ha)
Assessment Area (total)	1,906
Assessed as part of this EA	1,619
Remaining to be assessed	287

The Proponent commits to the completion of assessments in the remaining areas prior to the commencement of construction activities in those areas.

4.1.5 Approach to Receptors

Turbine setbacks have been applied to all residential dwellings as defined in the Minimum Planning Requirements Regulations, N.S. Reg. 51/2025 (MPRR), which was created to harmonize turbine setback requirements across Nova Scotia and promote wind development.

The MPRR limits municipal planning setbacks between residential dwellings and wind turbines to a **maximum** of:

a) Four times the wind turbine height.
b) The distance required to ensure that:
    i. Sound levels from the wind turbine do not exceed 40 A-weighted decibels (dBA) at the exterior of a residential dwelling.
    ii. A residential dwelling receives less than 30 minutes per day or 30 hours per year of shadow flicker.

and whereas “residential dwelling” means a permanent structure used for human habitation and includes a house, condominium, apartment building, cottage, mobile home, or trailer.

The Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d) requires:

a) Modelling to show that operational noise at permanent and seasonal receptors (within 2 km) will not exceed 40 dBA.
b) Modelling to show that shadow flicker will not exceed 30 minutes per day or 30 hours per year at any permanent or seasonal receptor within 2 km of the project.

To avoid conflict between the MPRR and the Environmental Assessment Supplemental Checklist: Wind Energy Projects, the Proponent has equated “permanent receptors” to “house, condominium, apartment buildings, mobile home, or trailer” and “seasonal receptors” to “cottage”. The Proponent has specifically excluded “camps” as “seasonal receptors” as this would conflict with the MPRR.

As required by the NSECC, all potential receptors within a 2 km radius of any wind turbine are included in the sound and shadow flicker studies. Consistent with the MRPP, compliance with sound and shadow thresholds are only considered a requirement for confirmed residential dwellings. Potential receptors were identified through a desktop review of Nova Scotia’s public “building” GIS layer, civic address database, and additional visual inspection of aerial imagery.

4.2 Potential Project-Valued Component Interactions

The potential interactions between the Project and the VCs, by phase, are presented in the individual VC chapters (Sections 7 to 12), following a description of existing conditions. Where an adverse effect on a VC is identified, strategies for avoidance, mitigation, or compensation are proposed. Where practicable, mitigation measures are incorporated into Project design to eliminate or reduce potential adverse effects.

4.3 Effects Assessment Criteria

The significance of the effects after mitigation is determined using defined criteria. Most criteria will be the same for all VCs (Table 4.4); however, the magnitude criteria are VC-specific and are provided in the individual chapters.

Table 4.4: Effects Assessment Criteria

Rating Criteria	Rating
Magnitude The amount of change in measurable parameters or the VC relative to existing conditions	**VC-specific as outlined in individual chapters.**
Geographic Extent[(1)] The geographic area in which an effect occurs	**LAA:** The area where direct and/or indirect Project-related effects can be predicted or measured for assessment unless impacts are widespread. **RAA:** The area providing broader context for assessing Project-specific effects (if/where applicable).
Frequency Identifies how often the residual effect occurs and how often in a specific phase	**Single event:** Occurs once. **Intermittent:** Occurs occasionally or intermittently during one or more phase of the Project. **Continuous:** occurs continuously.
Duration The time required until the measurable parameter or VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short Term:** Residual effect restricted to no more than the duration of the construction phase and/or decommissioning phase. **Medium Term:** Residual effect extends through the operation, maintenance, and ends before, during, or shortly after the decommissioning phase. **Long Term:** Residual effect extends throughout the Project's lifecycle and beyond the decommissioning phase.
Reversibility Describes whether a measurable parameter or the VC can return to its existing condition after the activity ceases	**Reversible:** Residual effect is likely to be reversed after the activity is completed. **Irreversible:** Residual effect is unlikely to be reversed. **Partially Reversible:** Residual effect is likely to be partially reversible after the activity is completed.

(1) Criteria used for describing context of the effect; however, do not factor directly into the significance definition.

If, based on the criteria in Table 4.4, a residual effect is identified, its significance is then evaluated based on the criteria in Table 4.5.

Table 4.5: Definition of Significant Residual Environmental Effect

Magnitude	Duration	Frequency	Reversibility	Significance
Negligible	All	All	All	Not significant
Low	All	All	All	Not significant
Moderate	Short term Medium term	Single event Intermittent	Reversible Partially reversible	Not Significant
	Long Term	**Continuous**	**Irreversible**	**Significant**
High	Short term Medium term	Single event Intermittent	Reversible Partially Reversible	Not significant
	Medium term Long term	**All**	**Irreversible**	**Significant**

4.4 Monitoring & Follow-Up

Follow-up programs and monitoring, in some cases developed in conjunction with regulators, may be recommended to verify predictions and/or assess effectiveness of mitigation measures and the need to implement adaptive management. Follow-up programs and monitoring are presented, as necessary, in individual VC chapters.

5.0 MI'KMAQ OF NOVA SCOTIA

The Mi'kmaq are the founding people of Nova Scotia and currently live throughout the province, including 13 Mi'kmaq communities (OLA, 2015). The Project is located within the Mi'kmaq territory called Eskikewa'kik, which means "skindresser's territory" (MDCC, 2025b).

The Mi'kmaq in the provinces of Nova Scotia, New Brunswick, and Prince Edward Island, the Gaspé Peninsula in Quebec, and the island of Newfoundland, are founded on land historically occupied by the ancestors of the Mi'kmaq. The earliest evidence of the Mi'kmaq of Nova Scotia in the Maritimes Region indicates that the ancestors of the Mi'kmaq have existed on the land for more than 11,000 years (MDCC, 2025a).

The Mi'kmaq of Nova Scotia have established Aboriginal and Treaty rights, including the right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties, and Aboriginal rights to hunt, fish, and gather for food, social, and ceremonial purposes, more broadly referred to as "traditional" purposes. Mi'kmaq rights are communal rights and therefore shared amongst all members of the Mi'kmaq Nation in Nova Scotia.

The Crown has a duty to consult with the Mi'kmaq of Nova Scotia, which is achieved in accordance with the Mi'kmaq-Canada-Nova Scotia Consultation Terms of Reference. As per Supreme Court of Canada instruction and subsequent guidance from governments, [such as the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (INAC, 2011) and the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (OLA, 2012)], the Crown may delegate procedural aspects of consultation to proponents. However, the duty to consult, and ultimate decision-making authority, remains with the Crown. The results of the Proponent's Mi'kmaq of Nova Scotia engagement program and EA development is expected to be considered by the provincial government in the EA decision-making process.

For the purposes of consultation, 10 of the 13 Nova Scotia Mi'kmaq communities are represented by the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), which reports to the Assembly of Nova Scotia Mi'kmaq Chiefs. At this time, Membertou First Nation, Millbrook First Nation and Sipekne'katik First Nation represent their own communities in consultation through their elected Chiefs and Councils.

Additionally, the Nova Scotia Native Council (NSNC) is the self-governing authority that represents Mi'kmaq and Aboriginal people living off reserve in Nova Scotia throughout traditional Mi'kmaq territory.

The nearest Mi'kmaq community to the Project is the Paq'tnkek Mi'kmaw Nation community on the Paqtnkek-Niktuek Reserve (No. 23) with a population of 614 individuals (2023, Paq'tnkek). Paq'tnkek is approximately 43 km north of the Project. Other, further communities include Potlotek First Nation on the Chapel Island (No. 5) Reserve (population 405; 100 km northeast), and the We'koqma'q First Nation on the Whycocomagh Reserve (No. 2) (population 877; 100 km north).

The nearest known Mi'kmaq placenames to the Project are L'nui-sipu which means "place of bark", Mimnoqnek which means "at the witch hazel place", and Anakwe'katik which means "at the flounder place" (T'an Weji-sqalia'tiek, n.d.). These placenames correspond to the areas of Indian River, Indian Harbour, and Country Harbour.

5.1 Engagement

As an integral component of any project development activity in Nova Scotia, the Proponent has prioritized engagement with Nova Scotia Mi'kmaq communities and organizations.

The Proponent initiated engagement with OLA in May 2024 and followed up with additional Project information in October 2024 and March 2026.

The Proponent notified the Mi'kmaq of Nova Scotia of the Project, extended an offer to meet, provided Project information, met with the KMKNO, initiated a Mi'kmaq Ecological Knowledge Study (MEKS) with Membertou Geomatics, and documented the engagement process (Table 5.1) per steps one through six of the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (OLA, 2012).

On June 6, 2024, Project introduction letters, which included an offer to meet, were sent to the 13 Mi'kmaq of Nova Scotia communities. Additionally, on March 24, 2026, Project overview letters, which included an offer to meet were provided via email to Potlotek First Nation, Paq'tnkek First Nation, Pictou Landing First Nation, Sipekne'katik First Nation, and Millbrook First Nation. This letter was also provided to the KMKNO.

The Proponet met with the Sipekne'katik Governance Initiative (SGI) on February 19, 2026, to discuss the Upper Afton Wind Project. An overview of Guysborough Wind Projects, including the Harbour Hills Wind Project, as they relate to the SGI process, was also provided.

Table 5.1: Engagement with the Mi'kmaq of Nova Scotia

First Nation / Organization	Representative(s)	Communication Details
First Nations		
Eskasoni First Nation	Chief Leroy Denny Michael Denny Steve Parsons	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet.

First Nation / Organization	Representative(s)	Communication Details
		July 3, 2025 – Email sent providing Project description, map, and offer to meet.
L'sitkuk First Nation	Chief Carol Dee Potter	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet.
Membertou First Nation	Chief Terrance Paul	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet. July 3, 2025 – Email sent providing Project description, map, and offer to meet. Since 2022, EverWind has regularly engaged with Membertou First Nation in their role as an equity partner in development of Phase 1 and 2 wind projects.
Millbrook First Nation	Chief Robert Gloade Claire Marshall Gerald Gloade	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet. Ms. Marshall responded with a question regarding capacity funding for consultation. EverWind requested a meeting to discuss the portfolio of projects. July 3, 2025 – Email sent providing Project description, map, and offer to meet. March 24, 2026 – Issued a Project overview letter for the Guysborough Wind Projects, described ongoing MEKS and ARIA work, and invited further discussion about community engagement.
Paq'tnkek First Nation	Chief Cory Julian	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet. July 3, 2025 – Email sent providing Project description, map, and offer to meet.

First Nation / Organization	Representative(s)	Communication Details
		January 20, 2026 – Community information session held at the Paq'tnkek Community Centre to discuss the Upper Afton Project as well as other Projects. Community members attended. January 26, 2026 – Email sent to Chief offering a detailed Project update. February 18, 2026 – Representative visited band office to leave contact information regarding Project. March 24, 2026 – Issued a Project overview letter for the Guysborough Wind Projects, described ongoing MEKS and ARIA work, and invited further discussion about community engagement.
Pictou Landing First Nation	Chief Tamara Young	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet. July 3, 2025 – Email sent providing Project description, map, and offer to meet. March 24, 2026 – Issued a Project overview letter for the Guysborough Wind Projects, described ongoing MEKS and ARIA work, and invited further discussion about community engagement.
Potlotek First Nation	Chief Wilbert Marshall	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet. May 8, 2025 – EverWind attended Potlotek Career Fair. July 3, 2025 – Email sent providing Project description, map, and offer to meet. March 24, 2026 – Issued a Project overview letter for the Guysborough Wind Projects, described ongoing MEKS and ARIA work, and invited further discussion about community engagement.

First Nation / Organization	Representative(s)	Communication Details
Sipekne'katik First Nation and Sipekne'katik Governance Initiative	Chief Michelle Glasgow Council Dr. Rodger Lewis Marine Courtois Maya Chouinard	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet. February 27, 2025 – Meeting held with SGI to discuss the portfolio of EverWind projects (focus on Strait Crossing Transmission Line). Project update to Chief and Council was scheduled for June 19, 2025, and July 3, 2025; however, both updates were cancelled by Council due to unforeseen circumstances. Meeting to be rescheduled. November 4, 2025 – Attended Sipekne'katik First Nation Council meeting and directed by Chief to follow SGI process, noting that this meeting was not consultation. Met with SGI team to understand history, process and next steps. February 19, 2026 – Follow up meeting held with SGI to discuss Phase 2 consultation with Sipekne'katik through the SGI process. Updated SGI on progress of the Project and upcoming EA.
Wagmatcook First Nation	Chief Norman Bernard Donald Hanson	June 6, 2024 – Email sent providing Project description, map, and offer to meet. January 23, 2025 – Email sent providing Project description, map, and offer to meet.
We'koqma'q First Nation	Chief John Leonard Bernard	January 23, 2025 – Email sent providing Project description, map, and offer to meet. July 3, 2025 – Email sent providing Project description, map, and offer to meet.
Annapolis Valley First Nation	Gerald B. Toney	June 6, 2024 – Email sent providing Project description, map, and offer to meet.
Acadia First Nation	Deborah Robinson	June 6, 2024 – Email sent providing Project description, map, and offer to meet.
Glooscap First Nation	Chief Sidney Peters	June 6, 2024 – Email sent providing Project description, map, and offer to meet.
Organizations		
KMKNO	Patrick Butler Twila Gaudet	KMKNO was copied by EverWind on all emails to respective Mi'kmaq of Nova Scotia communities (see above).

First Nation / Organization	Representative(s)	Communication Details
		Virtual meeting held on February 4, 2024 – Presentation provided to KMKNO (Project overview). September 10, 2025 – Email sent offering the opportunity to meet for Project update. March 24, 2026 – Issued a Project overview letter for the Guysborough Wind Projects, described ongoing MEKS and ARIA work, and invited further discussion about community engagement. April 16, 2026 – EverWind requested a meeting via email to discuss the Guysborough Wind Projects. May 29, 2026 – EverWind contacted KMKNO via phone to arrange a meeting.
Maritime Aboriginal Peoples Council	Christina Davis Vanessa Mitchell	April 16, 2026 – Email providing Project update sent and offer to meet extended. April 30, 2026 – EverWind provided an overview of the Project and discussed feedback from the Upper Afton Wind Project. EverWind also responded to questions regarding Project scale, potential effects on bats and birds, SAR setbacks, and mainland moose.
The Native Council of Nova Scotia	Chief Lorraine Augustine	March 21, 2025 – Email providing Project update sent and offer to meet extended.
Nova Scotia Mi'kmaq Summer Games	Chief Norman Bernard Samantha Young	July 3, 2025 – Email providing Project information sent. August 22 and 23, 2025 – Information booth at the Nova Scotia Mi'kmaq Summer Games in Wagmatcook with staff on-site discussing the Project.
Mukk Nqa'ltultik Community Connections Symposium	Tracy Menge Noelle MacLean	May 22, 2025 – The Proponent presented at a conference in Truro to discuss the Project and potential career and procurement opportunities.
Mi'kmaq Advisor	Proponent Contractor	The Proponent has engaged a Mi'kmaq advisor for ongoing engagement throughout 2025 and up to the time of EA registration, including multiple site tours. Discussion focused on potential considerations for Project development on Crown land, including land stewardship, Indigenous participation, and long-term monitoring. Additional topics included community wellbeing considerations related to workforce presence and accommodation, as well as potential effects on water resources, traditional land use, traditional medicines, and food security. Environmental considerations such as SAR, old growth forest, and ecological stewardship were also discussed.

5.1.1 Review of Concerns

Issues and concerns raised by the Mi'kmaq of Nova Scotia have been grouped into broader categories and reference to the relevant section of the EA in which the concern is addressed is noted (Table 5.2).

Table 5.2: Concerns from the Mi'kmaq of Nova Scotia

Key Issues	Proponent Response	Section of EA
Socioeconomic Impacts		
What are the employment opportunities for the Mi'kmaq of Nova Scotia?	The Proponent is committed to providing opportunities for Mi'kmaq participation in the Project, including employment, training, and contracting opportunities, where feasible. Engagement with Mi'kmaq communities will continue to identify areas of interest and capacity throughout Project planning and development. The Proponent continues to advance a Mi'kmaw Benefits Agreement with the Assembly of Mi'kmaq Chiefs that build upon the MOU signed in 2023 and the Memorandum of Agreement in 2025.	Sections 5.1.2 5.3 5.4
Environmental Impacts		
How will the Project impact Crown land?	The Project is primarily sited on Crown land and is being advanced in accordance with applicable provincial policies and approvals. The Proponent has entered into a MOU with NSNR for the use of Crown lands. The Proponent recognizes the importance of Crown lands to the Mi'kmaq of Nova Scotia and is committed to ongoing engagement to understand and consider interests related to land use, access, and stewardship. Project design has sought to minimize disturbance to the extent practicable while maintaining compatibility with existing uses. No permanent restrictions to public access are proposed, with the exception of fencing around substations and temporary access limitations during construction to ensure public safety.	Sections 3.3 11.2

Key Issues	Proponent Response	Section of EA
Will there be impacts on old growth?	Project design has prioritized the avoidance of sensitive environmental features, including old growth forest, where identified. The Proponent is committed to minimizing the extent of new disturbance in areas that bisect or are adjacent to protected old-growth stands, including adjustments to the locations of laydown areas. Field validation of potential old-growth stands and confirmation of Project impacts will be finalized through engagement with NSNR during the Crown lands permitting process. Where avoidance is not feasible, potential effects are expected to be localized and will be minimized through standard mitigation measures and further refined during detailed design and permitting.	Section 10.1
How will this Project impact birds and bats?	A full desktop review and extensive field surveys, including radar and acoustic monitoring, have been completed to identify the presence, abundance, and movement patterns of birds and bats as well as their habitat across the Study Area. The results of these assessments are used to inform Project design, including turbine siting and layout, to avoid or minimize potential impacts where possible. In addition, mitigation measures will be implemented. Post-construction monitoring will also be carried out to assess actual effects on birds and bats. If monitoring identifies higher-than-expected impacts, adaptive management measures will be implemented in consultation with NSECC, NSNR, and ECCC. The Proponent has also committed to the development and implementation of a Terrestrial Habitat and Wildlife Management Plan.	Sections 10.3 10.4
What are the impacts on Species at Risk?	Potential effects on SAR have been assessed based on available data and field studies. Mitigation measures, including avoidance, timing restrictions, and habitat protection, will be implemented to reduce potential impacts. The Proponent will also develop and implement a Terrestrial Habitat and Wildlife Management Plan. Additional requirements, if any, will be addressed through applicable permitting and follow-up programs.	Sections 9.1 10.1 10.2 10.3 10.4

Key Issues	Proponent Response	Section of EA
Will the project result in Impacts to water quality?	Where Project infrastructure intersects with watercourses, all crossings will be designed and constructed in accordance with applicable regulatory requirements and will be subject to the necessary authorizations from relevant authorities, including NSECC and DFO, where applicable. Construction activities near watercourses will be carefully managed to reduce potential effects on fish habitat. This includes timing work to avoid sensitive fish spawning and migration periods (known as in-water work timing windows) and implementing best management practices to prevent sediment release. A Surface Water Management Plan and an Erosion and Sediment Control Plan will be developed and implemented for the Project. If blasting is required for construction, groundwater wells within 800 m will undergo an assessment in accordance with NSECC's Procedures for Conducting a Pre-blast Survey (NSECC, 1993). If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply, of equal or better quantity/quality than that impacted will be provided to the landowner.	Sections 8.0 9.1
General		
What is the plan for workers accommodations?	Workforce accommodation needs will be managed in a manner that considers local community capacity and minimizes potential disruptions. The Proponent is exploring options for shared or dedicated accommodations in coordination with other industrial users in the region, where feasible, to manage pressure on local housing. Measures such as managed transportation to and from worksites, workforce codes of conduct, and worker onboarding that includes awareness of community context will be implemented to support respectful interactions. The Proponent is committed to ongoing engagement with relevant organizations and communities, including specific measures for the safety of Mi'kmaq women, to inform a responsible approach to workforce accommodation and management.	Section 3.5.5

Key Issues	Proponent Response	Section of EA
How is the Project considering impacts on women?	The Project will be developed with consideration of community wellbeing, including potential impacts on women and vulnerable populations. Measures such as workforce codes of conduct, employee screening and background checks, awareness of local context, and alignment with relevant guidance and best practices will be incorporated into Project planning and implementation. The Proponent is committed to engaging with relevant organizations and communities.	N/A

5.1.2 Ongoing Engagement

The Proponent is committed to on-going, meaningful engagement and economic reconciliation with the Mi'kmaq of Nova Scotia and will continue to provide regular updates and seek feedback throughout the life of the Project. Additionally, the Proponent is developing a Mi'kmaq Benefits Agreement (MBA) with the Assembly of First Nations and KMKNO. A MOU was signed with the Assembly in 2022, and a binding Memorandum of Agreement was signed in 2025. A draft Umbrella Agreement encompassing all Projects is currently being developed and a Mi'kmaw Benefits Working Group has been stood up in March 2026. The Proponent will continue to engage with KMKNO and SGI specifically.

The Proponent is also committed to minimizing footprint disturbance and impacts to the Mi'kmaq of Nova Scotia while generating positive economic and environmental benefits. The Proponent will develop a Mi'kmaq Communication Plan that outlines an ongoing two-way communication process throughout the life of the Project.

5.2 MEKS

A MEKS presents a thorough and accurate understanding of the Mi'kmaq of Nova Scotia's use of the land and resources within an area. It is a report of gathered, identified, and documented ecological knowledge which is held by individual Mi'kmaq people. In addition, the MEKS report provides information on proposed Project activities that may impact the traditional land and resources of the Mi'kmaq.

MEKS considers the land and water areas in which the proposed Project is located to identify what Mi'kmaq traditional use activities have occurred or are currently occurring within the "Study Area"; and what Mi'kmaq ecological knowledge presently exists with respect to the area. This process is done in accordance with the Mi'kmaq Ecological Knowledge Protocol, 2nd Edition ("Protocol"), which was established by the Assembly of Nova Scotia Mi'kmaq Chiefs and speaks to the process, procedures, and results that are expected of a MEKS. Per the Protocol, a copy of the MEKS will be provided to KMKNO for review. All MEKS' must be reviewed by KMKNO on behalf of the Assembly to ensure consistency with the Protocol. KMKNO will review the MEKS and advise if the requirements have been met, or if the MEKS must be amended.

The MEKS consists of two major components:

- Mi'kmaq Traditional Land and Resource Use Activities
  - Considers both past and present uses of the area.
  - Uses interviews as the key source of information regarding Mi'kmaq use.

- A Mi'kmaq Significance Species Analysis
  - Identifies species in the area and considers resources that are important to Mi'kmaq use (food/sustenance resources, medicinal/ceremonial plant resources, and art/tools resources).
  - Considers resource availability/abundance in the area (along with adjacent areas or in other areas outside), their use, and their importance, with regards to the Mi'kmaq.

The MEKS for this Project is in development by Membertou Geomatics Solutions and was geographically scoped to include an evaluation of the Project Site (the "Study Area" as defined throughout the rest of this document) along with a 5 km buffer surrounding the Project Site (referred to as the "Study Area" in the MEKS report). Interviews will be undertaken by the MEKS Team with Mi'kmaq knowledge holders from the communities nearest the Project and beyond. Once the MEKS report is complete and reviewed by KMKNO, a copy will be provided directly to the required reviewers under separate cover.

5.3 Mi'kmaq Partnerships

Membertou Development Corporation is leading a Mi'kmaq Nations consortium with equity ownership in both Phase 1 and 2 wind projects, including the Harbour Hills Wind Project. The Proponent is committed to partnering with Mi'kmaq communities for all projects.

5.4 Commitments to the Mi'kmaq of Nova Scotia

The Proponent is committed to the following mitigation measures to reduce the Project's impact on traditional practices and Mi'kmaq archaeological features (if identified), as follows:

- Provide the Mi'kmaq of Nova Scotia an opportunity to walk the site prior to clearing to document sensitive sites and harvest traditional plants.
- Halt work during construction if archaeological deposits or human remains are encountered. The Proponent will immediately contact NSCCTH, the KMKNO Archaeological Division, and SGI.
- Provide a tour of the Project to the Mi'kmaq of Nova Scotia, once constructed.
- Develop a Mi'kmaq Communication Plan.
- Develop a Complaint Resolution Plan.
- Continue to work with the Assembly of First Nations to develop a MBA that will enable the Mi'kmaq of Nova Scotia to actively participate in the Project through education, training, mentorship, employment, and procurement opportunities. Include the Project as a component of the MBA for the Mi'kmaq of Nova Scotia.
- Continue to engage with the Mi'kmaq of Nova Scotia for the life of the Project.

6.0 ENGAGEMENT

The Proponent is committed to meaningful engagement with government, the public, stakeholders, and the Mi'kmaq of Nova Scotia. To date, the Project Team has participated in meetings, delivered presentations, and hosted several open house sessions.

Associated presentations, posters, and meeting agendas/minutes are provided in Appendix B.

Engagement related to EMI is described in Section 6.3.

6.1 Engagement with Government Departments, Agencies and Regulators

6.1.1 Regulatory Engagement

The Project Team has met with government entities and officials representing federal, provincial, and municipal jurisdictions (Table 6.1) to open lines of communication about the Project and ensure all regulatory requirements are met.

Table 6.1: Government Meetings and Events

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Federal Government		
Transport Canada (TC)	Jason Flanagan Carl Ripley Allison Baker	November 19, 2024 – Presentation to TC providing an overview of EverWind's portfolio of Projects, including the Harbour Hills Wind Project (main focus of discussion was the Strait Crossing Transmission Line).
	Jason Flanagan Cindy Poirier Gabby Aseneault Melanie Leblanc	July 2, 2025 – Presentation to TC providing an overview of EverWind's portfolio of Projects, including the Harbour Hills Wind Project (main focus of discussion was Strait Crossing Transmission Line permitting).
Minister, Member of Parliament (MP), and Federal Atlantic Canada Opportunities Agency staff	Gudie Hutchings Mike Kelloway Neil MacIssac Kevin Lemkay Connor Poirier Chuck Maillet Joe Cashin	February 11, 2025 – Site tour of the Facility and briefing on the Project.
Member of Parliament (MP)	Jaime Battiste	June 25, 2025 – MP delivered opening remarks for EverWind-organized intergovernmental planning session held at Friends United. January 12, 2026 – MP invited via email to open houses and offered Project update meeting.
Natural Resources Canada (NRCAN) and Sustainable Jobs Partnership Council	Adam Hedayat (Council) Kaella-Marie Earle (Council) Lionel Railton (Council) Caroline Brouillette (Council) Paran Meysami (Council) Cori Anderson (NRCAN) Roan Corbett (NRCAN)	March 26, 2026 – Conducted a site tour of the Facility with a detailed Project update.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Provincial Government		
NSECC – EA Branch	EA Branch Staff	May 12, 2023 – Provided an update on the Project status, studies in progress, and timing of submission. June 8, 2023 – Reviewed methodology for baseline wetland data collection. October 11, 2023 – Provided an update on the Project status, studies in progress/completed, and timing of submission. January 25, 2024 – Provided an update on the Project status, studies in progress/completed, and timing of submission. July 7, 2024 – Meeting to provide Project updates, overview, and proposed EA registration timing. June 11, 2024 – Meeting held with the EA Branch to discuss wind project development and refinement throughout and after the EA process. November 18, 2025 – Provided an update on EA registration timing. March 20, 2026 – Project update memo provided that included a Project overview, map, schedule (including registration timing), future planned engagement activities, and the proposed approach to archaeology assessments.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		April 9, 2026 – Update on EA registration timing provided. April 16, 2026 – Notified the approach to OT and noise/shadow flicker monitoring within the EA. April 29, 2026 – Presented additional details to EA Branch staff for the Project and Ocean Lake Wind Project. Discussed submission details for the EA and answered questions. May 21, 2026 – Notified the EA Branch of the official Project name and registration timing.
NSECC – Protected Areas and Ecosystems Branch	Kermit deGooyer Craig Smith Oliver Maass Lynda Weatherby	July 18, 2024 – EverWind representatives met with NSECC to provide a broad Project update and discuss specific conservation measures being proposed for EverWind's Windy Ridge Wind Project. August 16, 2024 – The Proponent met with NSECC to provide a Project update. June 30, 2025 – Meeting requested for the Proponent to provide overview of layout updates and setback distances from the Upper Afton and Guysborough Wind Projects. July 16, 2025 – Presentation provided to NSECC in advance of the meeting.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		July 17, 2025 – Presentation provided on the EverWind Guysborough Projects. Discussed interactions with protected areas and Project infrastructure placement. March 20, 2026 – Project update memo and information related to distance to nearest protected area provided. April 29, 2026 – Presented Project details to Protected Areas staff and discussed design considerations for the Project. May 21, 2026 – Notified the Protected Areas and Ecosystems Branch of the official Project name and EA registration timing.
NSECC	Wetland Specialist	June 8, 2023 – Reviewed methodology for baseline wetland data collection. This included the proposed use of drone surveys in currently inaccessible areas to supplement wetland delineation ground surveys. April 29, 2026 – Presented Project details to the Wetland Specialist and discussed permitting pathways and the use of drones for wetland assessments for the Project.
NSECC	Surface Water Quality Specialist	July 13, 2023 – Reviewed methodology for baseline watercourse data collection. This included the proposed use of drone surveys in currently inaccessible areas to supplement watercourse assessments.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
NSECC	Senior Hydrogeologist Stormwater Engineer	April 29, 2026 – Presented Project details to NSECC staff and discussed EA methodology for the Project.
NSNR	Donna Hurlburt	June 4, 2025 – Provided an update on the Project via email including details on the biophysical surveys conducted from 2023 to 2025, and timing of EA registration.
	Sarah Spencer	May 12, 2026 – NSNR provided information regarding location sensitive species records (Mainland moose, wood turtle, black ash, bat occurrence/ hibernacula, peregrine falcon) within and near the Study Area. Correspondence specific to each location sensitive species is detailed in the applicable VC chapters.
	Mark McGarrigle	March 20, 2026 – Project update memo provided that included a Project overview, map, schedule (including registration timing), a summary of VCs being assessed, and guides used to develop field studies. May 21, 2026 – Notified NSNR of the official Project name and EA registration timing.
	Mark McPhail	April 29, 2026 – Presented Project and EA details to NSNR for the Project.
Office of L'nu Affairs	Senior Consultation Advisor	May 17, 2024 – Provided an update on the Project and the status of the archaeology assessment and engagement with the Mi'kmaq of Nova Scotia. June 4, 2025 – Provided an update via email on EA registration timing and a summary of

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		engagement with the Mi'kmaq of Nova Scotia completed to date. March 20, 2026 – Project update memo provided that included a Project overview, map, schedule (including registration timing), future planned engagement activities, and the proposed approach to archaeology assessments. April 29, 2026 – Presented Project details to OLA staff and discussed MEKS implementation for the Project. May 21, 2026 – Notified OLA of the official Project name and EA registration timing.
Nova Scotia Communities, Culture, Tourism, and Heritage (NSCCTH)	John Cormier	July 8, 2025 – CRM Group, on behalf of the Proponent, engaged with the Special Places Protection Program (Special Places) of NSCCTH and given the Projects overall scale and because the overall design of the Project is expected to continue to evolve, Special Places agreed that only the desktop component of an archeological resource impact assessment (ARIA) is required to be conducted at this time. Special Places further directed that, following finalization of the Projects layout and prior to construction, a qualified archaeologist must conduct a visual inspection and field reconnaissance.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Member of the Legislative Assembly (MLA) – Guysborough Tracadie Minister of Agriculture	Greg Morrow	May 17, 2024 – Invitation to attend upcoming open houses. October 10, 2024 – Project update and note to address resident concern. December 9, 2024 – Email follow-up regarding the Project and specifically a case study highlighting a reduction of GHG emissions when compared to use of fossil fuels. June 10, 2025 – Email invitation to join our community presentation on June 19, 2025. The Minister joined the event in person on June 19, 2025. March 24, 2026 – Community sessions poster placed at MLA office. April 15, 2026 – Verbal update provided on Project, open houses and next steps.
NSPW	Darcey MacBain Devon Pinks	November 19, 2025 – Discussed requirements for turbine deliveries and work within public road right of ways. Tentative turbine component delivery routes should be provided to the NSPW in advance of the full Traffic Management Plan for NSPW to identify bridges or other structures requiring engineering assessment.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
NS Department of Emergency Management	Jeffrey Moffat	March 30, 2026 – Meeting held to discuss the microwave link telecommunications systems in the area of the Project, potential interference, and possible mitigations.
Municipal Government		
MODG Staff	Gordon MacDonald Sean O'Connor Deborah Torrey Jason Thorpe	October 17, 2023 – Meeting held with Director of Economic Development to update on Project and community engagement. Regular meetings held with planning staff from 2023 to 2026.
MODG Council	MODG Council	January 24, 2024 – Project introduction presentation to MODG Council and staff. May 17, 2024 – Invitation to join the May and June community open houses. June 10, 2025 – Invitation for councilors and staff to join a community presentation for the Setapuktuk Wind Project (including an overview of the Guysborough Wind Projects) on June 19, 2025, in Guysborough at the Chedabucto Lifestyle Complex. October 15, 2025 – Update to Council on the Upper Afton Wind Project, Strait Crossing Transmission Line Project, and Guysborough Wind Projects. March 24, 2026 – Briefed Warden and district councillors on upcoming community sessions.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		April 1, 2026 – Invitation email for upcoming public information sessions sent to councillors. Open house posters displayed in the municipal office. May 6/7, 2026 – District 7 councillor attended public information session in Country Harbour.
MODSM Staff	Doug Patterson Lesley McFarlane	February 8, 2024 – Introductory meeting held with the Chief Administrative Officer (and Warden to introduce the Project, benefits, impacts and schedule. April 21, 2026 – Meeting held CAO to update on Project and community engagement.
MODSM Council	MODSM Council	April 3, 2024 – Introductory presentation to Council on Project and benefits. May 6, 2026 – Update to Council on the Project layout, upcoming milestones, municipal revenues and community benefits. May 6, 2026 – District 1, 3, and 5 councillors attended public information sessions.

6.1.2 Review of Government Concerns

Discussions with federal regulators focused on Project infrastructure location and engagement related to EMI (Section 6.3.3).

Discussions with provincial regulators focused on environmental impacts, survey approach, Mi'kmaq of Nova Scotia and public engagement, Project timelines, as well as infrastructure siting and design. All regulators highlighted the importance of sharing Project information early and in as much detail as possible.

The Project Team has had engagements with the MODG's Chief Administrative Officer, planner, economic development staff, councillors, and Warden throughout the development of the Project. No concerns were brought forward to date from planning staff. Municipal councillors voiced community concerns related to land use, general environmental impact, health concerns related to noise, and accommodations for people through the construction phase.

The Proponent has negotiated and executed a Community Benefits Agreement (CBA) with MODG. The Proponent is committed to continuing to engage with municipal staff, councillors, and community members on an ongoing basis.

The Project Team has engaged with the MOSDM's Chief Administrative Officers, councillors, and Wardens throughout the development of the Project. Municipal councillors voiced community concerns related to land use, general environmental impact, municipal revenue, employment opportunities, and community benefits.

The Proponent has started the process of creating a CBA with MODSM. The Proponent is committed to continuing to engage with municipal staff, councillors, and community members on an ongoing basis

Engagement with government officials will continue through development, construction, and operational phases of the Project.

6.2 Public and Stakeholder Engagement

The Project Team has been involved in formal engagement activities with the public and stakeholders to ensure the community was made aware of the Project and given ample opportunity to receive information, ask questions, and share local knowledge.

Engagement with the public and stakeholders will continue through development, construction, and operational phases of the Project. Table 6.2 summarizes engagement with stakeholders.

Table 6.2: Stakeholder Meetings and Events

Community/Stakeholder Organization	Engagement
St. Mary's Education Centre/Academy	May 23, 2025 – Attended the Career Connect event at St. Mary's Education Centre/Academy. The event was attended by 15 other companies and around 50 students from grades 7 to 12.
Strait Regional School Board	October 18, 2023 – School event to discuss potential career opportunities.
Nova Scotia Community Services	October 20, 2023 – Meeting with Nova Scotia Community Services Guysborough District Office and met with staff regarding employment opportunities and Project update for the Phase 2 developments in MODG.
Antigonish Chamber of Commerce Speaker Series	March 19, 2024 – This event brought together business leaders, entrepreneurs, and community members for a discussion on EverWind and the Project. Attendees had the opportunity to gain insights and engage in conversations surrounding the future of green hydrogen and ammonia production in Nova Scotia and wind development in Guysborough.
Strait Area Chamber of Commerce	April 11, 2024 – VISION 2024 Business Update and Trade Fair Director of Public Affairs presented on the panel with a focus on transformative industry. August 13 and 14, 2024 – Hosted two Summer Networking Socials, which included Project updates and a discussion of green hydrogen and ammonia production.
Chedabucto Snowmobilers Club within the Snowmobilers Association of Nova Scotia	May 27, 2024 – Email invitation to May and June 2024 open houses with opportunity to meet regarding the Project.
SMRA	May 27, 2024 – Email invitation to May and June 2024 open houses with opportunity to meet regarding the Project. July 12, 2024 – Presentation delivered to the SMRA board with an opportunity for questions and initial Project feedback. August 13, 2024 – Follow up correspondence with SMRA regarding Project overview and feedback. May 7, 2026 – Updated Project layout presentation delivered to SMRA board. Layout amended based on previous feedback. Opportunity for questions, discussion and feedback.

Community/Stakeholder Organization	Engagement
St. Mary's Trail Association	May 27, 2024 – Email invitation to May and June 2024 open houses with opportunity to meet regarding the Project.
Strait Area Education Recreation Centre	October 18, 2024 – Site tour and presentation to the Point Tupper Terminal for 32 high school students studying chemistry and physics to discuss the Project, green energy transition, and future opportunities.
Guysborough Academy	November 7, 2024 – Proponent contacted Vice Principal and Guidance Councillor regarding a site tours and extended an invitation to teachers/students to join the CLC and to discuss future employment opportunities. May 7 and 8, 2025 – Presented to all grade 9 to 11 students regarding the Project, renewable energy and future opportunities. Opportunity for questions and discussion at the end. May 23, 2025 – Site tour at the Point Tupper Terminal for 45 students and staff from Guysborough Academy to discuss the Project, existing infrastructure, transition to green fuels and tour the Facility.
Antigonish East Education Centre	October 18, 2024 – Site tour and presentation to the Point Tupper Terminal for 30 high school students studying to discuss the Project, green energy transition, and future opportunities.
Strait Area of Commerce	December 4, 2024 – Proponent hosted a site tour at Point Tupper Terminal, which included a 50-minute presentation, and a 20-minute question and answer discussion period for Strait Area Chamber of Commerce and Chamber Past Presidents to discuss the Project, current operations and upcoming plans.
Dr. John Hugh Gillis Regional High School Community Career Connect Event	May 2, 2025 – Proponent presented on the Project to highlight potential career opportunities.
St. Francis Xavier University Site Tour	May 16, 2025 – Proponent presented and conducted a guided site tour in Point Tupper for chemistry and engineering students and faculty.
Dalhousie Roundtable Community Meeting	May 27, 2025 – EverWind hosted in the Guysborough Project Office a delegation from Dalhousie University including the Dean of Science, Vice President of Strategic Engagement and Government Relations, Chair of Department of Chemistry, Director of the Clean Technologies Research Institute, Associate Dean Research, Department Of Industrial Engineering as well as representatives from local municipalities, community organizations and business groups to discuss the Project and industry in the Strait Area.

Community/Stakeholder Organization	Engagement
Residents of New Harbour and Ocean Lake Riders ATV Club	November 24, 2025 – Met with seven community members to discuss the Project and gather feedback.
The Ocean Lake Riders ATV Club	December 19, 2025 – Project overview provided and review of trail maps. Provided a list of attendees and discussed future community involvement. Request to follow up with organization regarding trail maps for design consideration. April 7, 2026 – Members of the Ocean Lake Riders ATV Club attended the New Harbour open house (Open House 21) for the Ocean Lake Wind Project and brought trail maps to discuss overlap with the Project.
Nova Scotia Works Career Connections	February 12, 2026 – Nova Scotia Works Career Connections invites recipients to the annual Spring Antigonish Guysborough Job Fair on March 25, 2026, at the East Coast Credit Union Social Enterprise Centre. The event offers exhibitor registration and a complimentary lunch sponsored by Mentor Ability.
Nova Scotia Youth Climate Council	February 25, 2026 – Discussed the planning and coordination for a presentation from EverWind to the Nova Scotia Youth Climate Council on February 24, 2026. The presentation focused on the impact of clean energy on Nova Scotia's job market, particularly in wind energy and green hydrogen.
Snowmobilers Association of Nova Scotia (SANS)	February 26, 2026 – Discussed Project updates and collaboration between EverWind and the SANS.
Sea Shore Volunteer Fire Department	April 4, 2026 – Provided a public open house poster to share with members and post at the fire station for the April sessions.
Three Top Fire Department	April 6, 2026 – Provided a Project update letter, shared public open house dates, and offered a dedicated information session to discuss Project details and emergency response consideration.
St. Mary's ATV Club	May 13, 2026 – Presentation to the board and members of the public regarding Project overview and reviewed trails for overlap. Discussed benefits, impacts and committed to continued engagement.
The Broadhorns ATV Club	May 14, 2026 – Presentation to the board and members of the public regarding Project overview and reviewed trails for overlap. Discussed benefits, impacts and committed to continued engagement.

6.2.1 Project Naming

Harbour Hills Wind Project was selected by community members surrounding the Project through a vote on options displayed on a poster board during the May 6 and 7, 2026, public open house events in Sherbrooke, Country Harbour, and Point Bickerton. The name Harbour Hills Wind Project is inspired by the region's rolling hills and nearby coastal harbours that shape the local landscape.

6.2.2 Digital Communications

The Proponent has maintained a website since July 4, 2024 (https://guysboroughwind.ca/home transitioned to https://everwindfuels.com/projects/guysborough-wind-projects/ on December 12, 2025). It includes information about the Project and Proponent. This publicly accessible website continues to be updated regularly.

A dedicated email inbox was set up on July 14, 2023 (guysboroughwind@everwind.ca transitioned to info@guysboroughwind.com on October 28, 2025, for consistency across all Projects. Note, the guysboroughwind@everwind.ca email remains active) to address all aspects of the EverWind Portfolio of Projects in Guysborough County. The email inbox is actively monitored by the Proponent. The Proponent has invited the public to reach out and engage with the lead contact through the Project social media channels, including LinkedIn and Facebook. The public was specifically invited to provide feedback and questions.

6.2.3 Public Open House Events

In total, 26 open houses were held from May 2023 to May 2026 (Table 6.3). Some open houses featured the Setapuktuk Wind Project (formerly Wind Farm 1), the Ocean Lake Wind Project (formerly Wind Farm 2), or the Strait Crossing Transmission Line, but are shown as they included EverWind's broader Phase 2 plans.

Table 6.3: Summary of Open Houses

Open House Number	Open House Date	Location	Number of Public Attendees[1]	Exit Surveys Completed
1	May 15, 2023	Lincolnville Community Hall	19	9
2	May 15, 2023	Boylston Community Centre	12	6
3	May 16, 2023	St. Francis Harbour Hall	11	5
4	May 17, 2023	Chedabucto Lifestyle Complex, Guysborough	29	13
5	May 28, 2024	Boylston Community Centre	10	5
6	May 28, 2024	Lincolnville Community Hall	11	5
7	May 29, 2024	Chedabucto Lifestyle Complex, Guysborough	29	11
8	May 30, 2024	St. Francis Harbour Hall	27	14
9	June 4, 2024	Erinville Fire Hall	6	4

Open House Number	Open House Date	Location	Number of Public Attendees[1]	Exit Surveys Completed
10	June 4, 2024	Larrys River Communities Along the Bay multi use Facility	7	5
11	June 5, 2024	Harbourview Community Centre, New Harbour	6	7
12	June 5, 2024	Goldboro Interpretive Centre	14	11
13	June 10, 2024	District of St. Mary's Lions Club, Sherbrooke	35	19
14	June 11, 2024	Country Harbour Community Centre	9	8
15	June 11, 2024	Port Bickerton Fire Department and Community Centre	13	12
16	February 5, 2025	Mulgrave Fire Hall	33	3
17	February 6, 2025	Port Hawkesbury Civic Centre	22	2
18	February 6, 2025	Acadiaville Community Center, West Arichat	8	0
19	June 19, 2025	Chedabucto Lifestyle Complex, Guysborough	32	0
20	April 7, 2026	Larrys River Communities Along the Bay multi use Facility	7	0
21	April 7, 2026	Harbourview Community Centre, New Harbour	24	0
22	April 8, 2026	Goldboro Interpretive Centre	17	0
23	April 8, 2026	Erinville Fire Hall	26	0
24	May 6, 2026	Sherbrooke Village	29	1
25	May 7, 2026	Country Harbour Community Centre	10	1
26	May 7, 2026	Sea Shore Volunteer Fire Department (Bickerton West)	8	1
		Total	**454**	**142**

[1] Only those attendees who sign in when entering the venue are counted; most open houses had more attendees who were not counted.

6.2.3.1 May 2023 Open Houses

Four public open houses (open houses 1 to 4) took place in May 2023, focused on the Setapuktuk Project. The objective of these engagement sessions was to update the community

about fieldwork findings, present Crown land allocation, and gather community feedback to inform the Project design. The Project Team presented 10 posters, answered questions, and took feedback from the local community and various stakeholders.

Sign-in sheets were available for participants to provide their contact information and enable follow-up. Exit surveys were also available for participants to provide anonymous feedback.

Open houses 1 to 4 were advertised in the Upper Big Tracadie Seniors Action Club Newsletter (May 2023 edition) and the Guysborough Journal (May 10, 2023, edition), 5 to 7 days prior to the events.

Figure 6.1: Open House 1 (Lincolnville) and 2 (Boylston)

Figure 6.2: Open House 3 (St. Francis Harbour) and 4 (Guysborough)

6.2.3.2 May/June 2024 Open Houses

There were 11 public open houses that took place throughout Guysborough County from St. Francis Harbour to Sherbrooke in May and June 2024 (open houses 5 to 15). The objective of these early engagement sessions was to introduce the community to the Guysborough Wind

Projects, present the general Project location, and gather community feedback to inform the Projects' design. The Project Team presented 38 posters detailing the full scope of the EverWind Portfolio of Projects, answered questions, and took feedback from the local community and various stakeholders in each of the different communities where open houses were held. The open houses were publicized in the local paper, on local radio and delivered to all residents via a Canada Post mail drop.

Sign-in sheets were available for participants to provide their contact information and enable follow up. Exit surveys were also available for participants to provide anonymous feedback.

Open Houses 5 to 15 were advertised in the Guysborough Journal (May 15, 2024, and May 29, 2024, editions) and via Canada Post neighbourhood mail.

Figure 6.3: Open House 5 (Boylston) and 6 (Lincolnville)

Figure 6.4: Open House 7 (Guysborough) and 8 (St. Francis Harbour)

6.2.3.3 February 2025 Open Houses

Three additional open houses were held on February 5 and 6, 2025 in Mulgrave, Port Hawkesbury, and West Arichat (Open Houses 16 to 18). These three open houses were specific to the Strait Crossing Transmission Line, but all Guysborough Wind Projects were also discussed due to their connection to the Strait Crossing Transmission Line.

Sign-in sheets were available for participants to provide their contact information and enable follow-up. Exit surveys were also available for participants to provide anonymous feedback.

Notices for open houses 16 to 18 were published on January 22 and January 29, 2025, in the Guysborough Journal and the Port Hawkesbury Reporter. Two weeks in advance of the open houses, notices were posted at EverWind's Guysborough Project Office, the Guysborough Post Office, the Mulgrave Post Office, the Independent Grocer (Guysborough), the entrance of the MODG office (Guysborough), the Port Hawkesbury Civic Centre, the Arichat Post Office (Richmond County), and at the Acadiaville Community Centre (Richmond County). Additionally, EverWind representatives visited 17 residences in proximity to the Steep Creek side of the Strait Crossing Transmission Line Project and spoke with the homeowners to invite them to the open houses or left an invitation at the door if the homeowner was not present.

6.2.3.4 June 2025 Public Information Session

On June 19, 2025, EverWind provided a presentation focused on the Setapuktuk Wind Project to the public at the Chedabucto Lifestyle Complex (open house 19). Maps of the project layout, noise assessment, and shadow flicker assessment were also provided. This presentation was followed by 90-minute question and answer (Q&A) period. The presentations and Q&A structure of the event were selected based on direct results of feedback from the community and the request of a member of the community liaison committee (CLC).

Additional information regarding the Ocean Lake and Harbour Hills Wind Projects were provided, though they were not the primary focus of the session.

Sign-in sheets were available for participants to provide their contact information and enable follow up. Exit surveys were also available for participants to provide anonymous feedback.

Open house 19 was advertised via paid advertisements in the Guysborough Journal for two weeks leading up to the events and on the local radio station. Additional notices were circulated to the CLC members to post on community social media sites.

Figure 6.5: Open House 19 (Guysborough)

6.2.3.5 April 2026 Open Houses

On April 7, and 8, 2026, the Proponent hosted Open Houses 20 through 23 in communities surrounding the Ocean Lake Wind Project: Larrys River, New Harbour, Goldboro, and Erinville. The objective of these engagement sessions was to present the detailed project layout and gather community feedback to further inform refinement..

The open houses were publicized in the Guysborough Journal for two weeks leading up to the events, on local radio, and posted in a number of locations in the community. Additional notices were circulated to the Setapuktuk CLC members to post on community social media sites.

Sign-in sheets were available for participants to provide their contact infrastructure and enable follow-up. Exit surveys were also available for participants to provide anonymous feedback.

Figure 6.6: Open House 20 (Larrys River) and 21 (New Harbour)

Figure 6.7: Open House 22 (Goldboro) and 23 (Erinville)

6.2.3.6 May 2026 Open Houses

On May 6 and 7, 2026, the Proponent hosted open houses 24 through 26 in Sherbrooke, Country Harbour, and Bickerton West, respectively. The objective of these engagement sessions was to present the detailed Project layout and gather community feedback to further inform refinement. The Project Team presented 22 posters detailing EverWind's Portfolio of Projects, specifics about the Harbour Hills Wind Project layout, environmental studies performed since 2023, and next steps in Project progression. Maps of the Project layout, noise assessment, shadow flicker assessment, and visual simulations were displayed and digital copies made available on the website. Several members of the Project team were in attendance to answer questions posed by members of the public.

The open houses were publicized in the Guysborough Journal for two weeks leading up to the events, on local radio, and posted in a number of locations in the community.

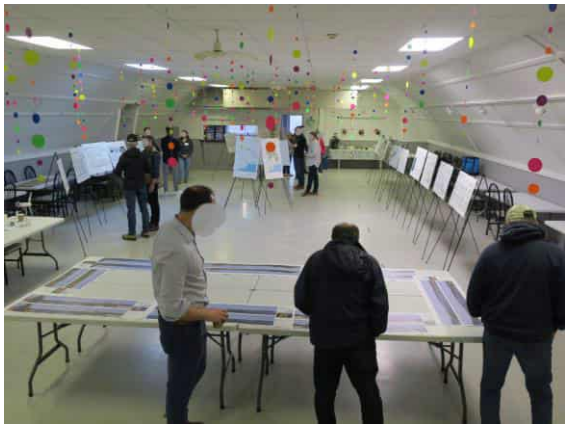

Figure 6.8: Open House 24 (Sherbrooke) and 25 (Country Harbour)

Figure 6.9: Open House 26 (Bickerton West)

6.2.4 Additional Engagement with Adjacent Businesses and Associations

The Proponent has engaged directly with adjacent businesses and community associations (Drawing 6.1).

Maritimes & Northeast Pipeline

Maritimes & Northeast Pipeline (M&NP) owns and operates a natural gas pipeline by the same name, which includes the main 30-inch line that runs east-west through the lands granted to EverWind as part of the 2023 MOU.

The Proponent has designed the Project to avoid placing infrastructure in the area of the MOU lands north of Melrose Country Harbour Road, which eliminates interaction within 1 km of the pipeline. Engagement with M&NP is ongoing on other Proponent-led project-pipeline interactions unrelated to the Project.

Atlantic Mining Nova Scotia (Cochrane Hill Gold Project)

Atlantic Mining Nova Scotia, a subsidiary of St Barbara Limited, is proposing to construct the Cochrane Hill Gold Project, an open-pit gold mine located in the northwestern extent of the

Study Area. The Proponent will continue to engage in dialog with Atlantic Mining Nova Scotia as the respective projects progress.

NexGold Mining Corp

NexGold is developing the Goldboro Gold Project, a gold mine near Goldbrook Lake.

The Proponent has engaged with NexGold to share information about the Guysborough Wind Projects and discuss potential Project interactions.

Nova Sustainable Fuels

Nove Sustainable Fuels (NSF) is developing a sustainable aviation fuel (SAF) production facility in Goldboro, Nova Scotia, with associated wind and solar energy production facility in the Caledonia area of Guysborough County, and a 65 km high voltage transmission line that is proposed to run through the Study Area.

The Proponent has engaged with NSF for the purpose of coordinating locations of planned infrastructure and shared use of temporary construction facilities. Discussions are ongoing at the time of EA submission.

St. Mary's River Association

The SMRA is a non-profit environmental organization that works with partners and local communities to support the long-term stewardship and ecological health of the St. Mary's River watershed and its native species, including Atlantic Salmon.

The Proponent attended two SMRA board meetings to provide information regarding the Project and ongoing environmental assessment activities. During the first meeting, held on July 12, 2024, the Proponent provided an overview of the Project, including the proposed location, construction activities, environmental field programs underway, and the environmental assessment process. During this meeting, SMRA identified the ecological significance of the northern portion of the lands identified under the MOU, including the area surrounding McKeen Brook.

During a subsequent meeting held on May 7, 2026, the Proponent presented an updated Project layout and discussed the anticipated EA registration schedule, Project benefits, proposed mitigation measures, and management and monitoring plans. Approximately 25 turbines remain within the St. Mary's River Secondary Watershed; however, the Proponent refined the Project layout to avoid locating Project infrastructure north of the Melrose Country Harbour Rd surrounding McKeen Brook.

SMRA expressed concerns regarding vegetation management practices, post-construction monitoring duration, decommissioning considerations, and regional wildlife connectivity, including mainland moose movement corridors.

The Proponent has continued engagement with SMRA following these meetings and remains committed to ongoing communication throughout Project development and the EA process.

St Mary's ATV Club

The Proponent has engaged directly with the St. Mary's ATV Club to understand their existing trail infrastructure, future plans, and how the trails interact with the proposed Project. The Proponent extended an invitation to the May 2026 public open houses and met directly with members of the club on May 13, 2026. The Proponent is committed to ongoing collaboration through the development, construction and operational phases of the Project.

Broadhorns ATV Club

The Proponent has engaged directly with the Broadhorns ATV Club to understand their existing trail infrastructure, future plans, and how the trails interact with the proposed Project. The Proponent extended an invitation to the May 2026 public open houses and met directly with members of the club on May 14, 2026. The Proponent is committed to ongoing collaboration through the development, construction and operational phases of the Project.

6.2.5 Office

A publicly accessible EverWind office is open in Guysborough. Office hours were advertised in the EverWind e-newsletter beginning in May 2024. Community members are encouraged to drop by the office to ask questions or discuss concerns with a Project representative.

Several office barbeques also took place in June and July 2024 to encourage community members to visit the office who may not otherwise do so. Over 40 people attended these events. Standard office hours of Tuesday and Wednesday from 10:00 am until 4:00 pm have been maintained since May 2024.

Several community members attended the office hours following the community information sessions as they were unable to attend the specific community events. The main questions and concerns raised are documented in Section 6.2.7.

6.2.6 Community Liaison Committee

The Proponent is committed to establishing a CLC for this Project in late 2026 or 2027 to support community engagement and dissemination of Project related information.

6.2.7 Review of Concerns

Issues and concerns raised by the public have been grouped into broader categories and reference to the relevant section of the EA in which the concern is addressed have been noted (Table 6.4).

Table 6.4: Comments Received from the Public

Key Issues	Proponent Response	Section of EA
Socioeconomic Impacts		
Will there be any land access restrictions?	No gates to restrict access are proposed; however, fencing may be required around the substation and temporary restrictions during active construction may be required, for the safety of the public.	Section 3.6.2

Key Issues	Proponent Response	Section of EA
Will there be a Community Liaison Committee for this Project?	Yes, the Proponent is committed to establishing a CLC for the Project.	Section 6.2.6
What kind of investments/ programs are planned for local communities?	The Proponent will create a Community Benefits Fund starting at the end of the first year of operations. The payments into the fund are based on $1,000 per MW of nameplate capacity and expected to be over $800,000 each year (pending final nameplate capacity of the Project). The CLC will advise how the funds are distributed. The Proponent has signed a CBA with MODG and is actively working to secure one with MODSM.	Section 11.1
Will jobs be created by the Project be given to local workers?	The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where practicable. The Proponent will maximize local content where appropriate. To this end, the Proponent will hold a job fair prior to the start of construction to engage with local community members and service providers and identify suitable candidates and/or businesses to support the construction phase employment and service providers.	Section 11.1
Is shadow flicker a health concern to people sensitive to fluorescent light?	No, shadow flicker is considered an annoyance but is not a health concern. The frequency of shadow flicker is much lower than fluorescent lights and the amount of time that a receptor is subject to shadow flicker is limited. Predictive modelling completed to support the EA indicates the Project complies with provincial standards. Compliance will continue to be maintained during operations.	Section 7.4
What is the complaint resolution process for noise?	NSECC requires sound levels of no more than 40 dBA outside of a residential receptor. For context, 40 dBA is equivalent to the sound of a quiet library. Sound modelling results of the Project indicate that all residential receptors will fall below the 40 dBA threshold.	Section 7.3

Key Issues	Proponent Response	Section of EA
	The Proponent will implement a Complaint Resolution Plan to investigate and mitigate (if required) noise related complaints.	
What are the health effects from turbine noise?	NSECC requires operational sound levels from wind turbines to not exceed 40 dBA at the exterior of residential receptors. Health Canada has reported that its research did not demonstrate a direct causal relationship between wind turbine noise and adverse health effects (Health Canada, 2012). For context, a sound level of 40 dBA is generally comparable to a quiet library or a quiet residential setting. Sound modelling completed for the Project indicates that all potential receptors are predicted to comply with the applicable 40 dBA criterion.	Section 7.3
Environmental Impacts		
How are spills responded to?	The Proponent will develop and implement a Contingency Plan that outlines measures to prevent spills, as well as procedures to respond effectively should a spill occur. In the event of a spill, the Plan will establish procedures for immediate containment, control, and clean-up, including the use of appropriate spill response equipment. It will also outline notification and reporting requirements in accordance with applicable regulations.	Section 15.3
Will the Project generate dust? How will dust and garbage be managed?	Construction activities have the potential to generate temporary dust emissions mainly associated with vehicle movement on unpaved roads. Standard mitigation measures will be implemented to minimize dust generation, including application of water or dust suppressants, as required. Dust generation is anticipated to be low during operations. Garbage and construction waste generated during the Project will be temporarily stored in designated areas and regularly removed from the site for appropriate recycling, reuse, or disposal at approved facilities.	Section 7.1
How will this Project impact birds and bats?	A full desktop review and extensive field surveys, including radar and acoustic monitoring, have been completed to identify the presence, abundance, and movement patterns	Sections 10.3 10.4

Key Issues	Proponent Response	Section of EA
	of birds and bats as well as their habitat across the Study Area. The results of these assessments are used to inform Project design, including turbine siting and layout, to avoid or minimize potential impacts where possible. In addition, mitigation measures will be implemented. Post-construction monitoring will also be carried out to assess actual effects on birds and bats. If monitoring identifies higher-than-expected impacts, adaptive management measures will be implemented in consultation with NSECC, NSNR, and ECCC. The Proponent has also committed to the development and implementation of a Terrestrial Habitat and Wildlife Management Plan.	
What are the impacts to wetlands and will compensation occur within the same watershed?	Wetland delineation and functional assessment work was completed to inform Project planning and design. Consistent with the mitigation hierarchy, the Proponent first sought to avoid wetland impacts and then minimize impacts where avoidance was not practicable. Wetland alterations will be required to support Project construction, and all required approvals will be obtained from NSECC prior to construction. As part of the approval process, wetland compensation (typically via restoration at a 2:1 ratio) will be completed in accordance with applicable provincial requirements and guidance. The Proponent is committed to working with wetland restoration professionals to identify opportunities for wetland restoration within the affected watershed(s), where practicable.	Section 9.2
What surveys were done for moose?	Baseline field surveys for moose included winter tracking surveys, pellet group inventory surveys, and trail camera monitoring. No mainland moose were identified during baseline field surveys. Monitoring for mainland moose is anticipated to be required during operations, pending EA Approval.	Section 10.2

Key Issues	Proponent Response	Section of EA
What additional permits are required after the EA?	Following completion of the EA process, the Project will be required to obtain additional permits and approvals prior to construction, as applicable. These will include Wetland Alteration Approvals and Watercourse Alteration Approvals from NSECC to support activities such as wetland alterations and culvert installation/replacement associated with access roads. The Project will also require Crown land leases and easements, for infrastructure located on Crown land. Additional permits, approvals, and authorizations may also be required.	Section 2.3
Do wind turbines scare away wildlife?	The potential for wind turbines to affect wildlife, including whether they may cause animals to avoid an area, is considered as part of the EA. Research indicates that some wildlife species may exhibit temporary avoidance behaviour during construction due to increased noise and human activity. However, many species return to the area once construction is complete and activity levels decrease. During operations, wind turbines are generally not associated with long-term displacement of most wildlife species.	Section 10.2
How will the Project affect fish?	Where Project infrastructure intersects with watercourses, all crossings will be designed and constructed in accordance with applicable regulatory requirements and will be subject to the necessary authorizations from relevant authorities, including NSECC and DFO, where applicable. Construction activities near watercourses will be carefully managed to reduce potential effects on fish habitat. This includes timing work to avoid sensitive fish spawning and migration periods (known as in-water work timing windows) and implementing best management practices to prevent sediment release. A Surface Water Management Plan and an Erosion and Sediment Control Plan will be developed and implemented for the Project.	Section 9.1

Key Issues	Proponent Response	Section of EA
Will the Project impact my well water?	If blasting is required for construction, groundwater wells within 800 m will undergo an assessment in accordance with NSECC's Procedures for Conducting a Pre-blast Survey (NSECC, 1993). If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply, of equal or better quantity/quality than that impacted will be provided to the landowner.	Section 8
General		
Questions about wind turbine layout	The Project layout is designed to incorporate public feedback and mitigate environmental impact as far as reasonably practicable (e.g., avoiding areas where protected species have been identified).	Section 3.3
Will there be enough housing capacity to support new and local workers?	The Proponent is committed to continued engagement with MODG and MODSM on current and future resourcing needs including housing. The Proponent is also considering a temporary worker accommodation in cooperation with other industrial projects in the area.	Section 3.5.5
Can residents continue to use Crown land?	Yes, the Proponent is not proposing to install gates or restrict access. For public safety, temporary restrictions may be required during active construction and the substation may be fenced.	Section 11.2
What fire prevention methods go into wind farm design?	Fire prevention and safety are key considerations in wind farm design and operation. Modern wind turbines are equipped with advanced monitoring and control systems that continuously track operating conditions such as temperature, vibration, and electrical performance. If abnormal conditions are detected that could indicate a risk of fire, the turbine is designed to automatically shut down to prevent escalation. Turbine fires are very rare. From a design perspective, vegetation management is an important mitigation measure. Typically, trees, brush, and other combustible material are cleared and maintained within a defined radius around each turbine. The Proponent will develop and implement a Contingency Plan and continue to engage with local fire authorities.	Section 15.2

Key Issues	Proponent Response	Section of EA
How do you move turbine components to site? There are a lot of sharp turns and wooden bridges in the area.	The Proponent is currently evaluating a range of transportation options to safely and efficiently deliver components to the site. A key focus is the potential use of marine transport to staging areas located close to the Project. This approach could significantly reduce the need to transport large components over long distances on local roads. Where overland transport is required, detailed route assessments will be completed to identify constraints such as tight turns, bridge capacities, and road widths. All transportation activities will be planned and carried out in coordination with relevant authorities to ensure public safety and to minimize disruption to local communities.	N/A
How will the Project be decommissioned? Are entire turbine foundations removed during decommissioning?	Prior to decommissioning, NSECC, MODG, and MODSM will be provided with decommissioning plans for review and compliance with the Project's EA conditions. Opportunities for repowering will be considered prior to entering the decommissioning phase. Decommissioning of turbine foundations will go to approximately 1 m below surface grade. Turbines sites and other laydown areas will have gravel removed and native soils typically respread to and graded similar to original conditions.	Section 3.6.3
How much concrete are in typical turbine foundations?	Each turbine foundation requires approximately 905 m³ of concrete (which equates to ~100 truckloads) and 81 tonnes of steel (rebar).	Section 7.2.4.3
Are the optional turbines included in the noise and shadow flicker models?	No, the 17 optional turbines have not been included in the noise and shadow flicker modelling completed as part of this EA. Should these turbines be constructed, updated noise and shadow flicker modelling will be completed and provided to NSECC to demonstrate compliance.	Sections 7.3 and 7.4
Are any turbines on private land?	Yes, four turbines are currently sited on private land.	N/A
Is Aircraft Detection Lighting System being considered for this Project to maintain dark skies at night?	Yes, the Proponent is considering light mitigation technologies including Aircraft Detection Lighting System, as allowable by relevant regulations.	N/A

Key Issues	Proponent Response	Section of EA
How does the power generated by the Project get to Point Tupper? Where is the transmission line located?	Renewable electricity generated by the Project will be transmitted to Point Tupper via a new transmission line to be constructed, owned, and operated by EverWind. This transmission line is not included within this EA. The transmission line routing is currently undergoing development and has not yet been finalized. The transmission line will connect this Project to Ocean Lake and Setapuktuk Wind Projects and connect to Point Tupper via the Strait of Canso Transmission Line Crossing.	Section 3.5.3
Is there potential for turbine height to increase?	Yes, the Proponent is considering concrete towers, manufactured on-site or nearby, to maximize local content and in response to international steel tariffs. This may require a tower height increase of up to 150 m. Noise and shadow flicker modelling will be updated and siting adjustments made to maintain compliance if the tower height or turbine model is changed.	Section 3.5.1

6.2.8 Ongoing Engagement

The Proponent is committed to continuing to work to address any concerns raised by stakeholders and members of the public over the duration of the Project's life. Additionally, once established, the CLC will meet at regular intervals throughout the lifespan of the Project, until such a time that it is deemed unnecessary.

6.3 Electromagnetic Interference Engagement

The rotating blades and support structures of wind turbines can interfere with various types of electromagnetic signals emitted from telecommunication and radar systems (RABC & CanWEA, 2020).

EMI created by a wind turbine can be classified into two categories: obstruction and reflection. Obstruction occurs when a wind turbine is placed between a receiver and a transmitter, creating an area where the signal is weakened and/or blocked. Reflection is caused by the distortion between a raw signal and a reflection of the signal from an object. Scatter is a sub-category of reflection caused by the rotor blade movement.

The EMI assessment identified point-to-point, broadcast systems, radar, navigation, and communications systems susceptible to the effects of windfarm interference. The specific characteristics of a wind turbine will influence the type and magnitude of the interference. Other factors that influence interference include blade dimension and design, tower height, diameter of the supporting tower, as well as the material used for blade and tower construction.

6.3.1 Assessment Guidelines

The Radio Advisory Board of Canada (RABC) and Canadian Renewable Energy Association developed guidelines for assessing the EMI potential from a wind turbine development: Technical Information and Coordination between Wind Turbines and Radiocommunication and Radar Systems; hereafter referred to as the RABC Guidelines (RABC & CanWEA, 2020). These guidelines outline a consultation-based assessment protocol that establishes areas, called "consultation zones", around transmission systems, based on the type and function of the system.

6.3.2 Assessment Methods

Consultation is generally the best method of notification, and this process typically begins with a letter distribution to those parties affected by the development. A summary of the RABC Guidelines for determining consultation zones is in Table 6.5.

Table 6.5: RABC Guidelines – Recommended Consultation Zones

Systems	Consultation Zone
Point-to-Point Systems above 890 megahertz (MHz)	**1 km**
Broadcast Transmitters (AM, FM, and TV stations)	AM station: **5 km** for omnidirectional (single tower) antenna system **15 km** for directional (multiple towers) antenna system FM station: **2 km** TV station: **2 km**
Over-the-Air Reception (TV off-air pickup, consumer TV receivers)	Analog TV Station (NTSC): **15 km** Digital TV (DTV) station (ATSC): **10 km**
Cellular Type Networks, Land Mobile Radio Networks, and Point-to-Point Systems below 890 MHz	**1 km**
Satellite Systems (Direct to Home, Satellite Ground Stations)	**500 m**
Air Defence Radars, Vessel Traffic Radars, Air Traffic Control Radars, and Weather Radars	Department of National Defence (DND) Air Defence Radar: **100 km** DND or NAV Canada Air Traffic Control Primary Surveillance Radar: **80 km** DND or NAV Canada Air Traffic Control Secondary Surveillance Radar: **10 km**

Systems	Consultation Zone
	DND Precision Approach Radar: **40 km** Canadian Coast Guard Vessel Traffic Radar System: **60 km** Military or Civilian airfield: **10 km** Environment Canada Weather Radar: **50 km**
Very High Frequency OmniRange	**15 km**

To conduct an EMI assessment, the following information regarding turbine design and placement is generally required to complete notifications:

- Turbine Universal Transverse Mercator (UTM) coordinates
- Number of turbines
- Ground elevation
- Tower/hub height of each turbine
- Nacelle height
- Rotor diameter
- Turbine blade sweep diameter (or length of blades)
- Turbine base diameter
- Substation/converter location coordinates and height(s) along with new transmission line(s) to connect to a grid.

Response time and feedback from the various organizations vary and can take several weeks. If turbine type, layout, or design changes, many organizations will need to be re-consulted prior to proceeding.

6.3.3 EMI Engagement Summary

Engagement with relevant government and community stakeholders was completed and results are provided in Appendix B. In addition to what is documented in the EMI Report (Appendix C), the Proponent has further consulted with Bell Canada and the Nova Scotia Department of Emergency Management and is continuing to work with both stakeholders.

7.0 ATMOSPHERIC ENVIRONMENT

7.1 Atmosphere and Air Quality

7.1.1 Overview

The assessment of the atmospheric environment included a review of weather, climate, and air quality data.

7.1.2 Regulatory Context

Relevant legislation includes:

- *Environment Act* (Nova Scotia, 1995b)
- Air Quality Regulations (Nova Scotia, 2020)

7.1.3 Assessment Methodology

The assessment was completed through a review of the following resources:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- ECCC Weather and Climate (ECCC, 2025d)
- NSECC Ambient Air Quality Data (NSECC, n.d.)

7.1.4 Assessment Results

Weather and Climate

Nova Scotia's climate is quite varied and is largely governed by coastal influences and elevation (Davis & Browne, 1996). The Study Area is located primarily within the Eastern Interior Ecodistrict (440), with the south sections within the Eastern Shore Ecodistrict (820), and a small northern section within the St. Mary's River Ecodistrict (370) (Drawing 7.1). These ecodistricts are typically cooler and more humid, with strong coastal winds (Neily et al., 2017).

To assess the local climate, weather data (1996 to 2025) were obtained from the Collegeville and Collegeville Auto meteorological stations (Climate ID 8201000 & 8201001) (Table 7.1), the climate station was not the closest climate station to the study area; however, it contained the most complete dataset relevant to the Project (approximately 34 km). While the meteorological station is near the Project, this data may not exactly represent the conditions observed within the Study Area.

Table 7.1: Climate Data from the Collegeville Meteorological Stations (1996 to 2025)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
Daily Average	-5.2	-5.8	-1.7	3.4	9.1	14.1	18.7	18.5	14.4	8.8	3.8	-1.6	6.4
Daily Maximum	-0.6	-0.9	3.2	8.3	15.2	20.3	24.8	24.6	20.6	14.3	8.1	2.4	11.7
Daily Minimum	-9.9	-10.7	-6.5	-1.6	2.9	7.9	12.5	12.4	8.1	3.3	-0.6	-5.6	1.0
Extreme Maximum	15.2	15.0	26.5	29.0	32.0	34.3	36.0	35.0	33.5	29.8	23.2	30.0	28.3
Extreme Minimum	-31.2	-29.9	-27.9	-22.3	-13.5	-4.4	1.0	1.0	-5.4	-8.9	-14.1	-24.0	-15.0
Precipitation (mm)													
Precipitation	94.2	85.0	86.9	81.4	76.5	97.4	86.9	97.5	102.9	131.4	137.8	113.3	1,191.1

Source: (ECCC, 2025d)

Between 1996 and 2025, the mean annual temperature was 6.4°C, with a mean daily maximum of 11.7°C and a mean minimum of 1.0°C. The coldest months were January and February, with mean daily averages of -5.2°C and -5.8°C, respectively. July and August were the warmest, averaging 18.7°C and 18.5°C, respectively. Over this period, the meteorological station did not consistently record mean annual snowfall or mean annual rainfall but recorded monthly average precipitation, with the highest occurring in October and November (131.4 mm and 137.8 mm, respectively) (ECCC, 2025d).

Wind speed and direction data were obtained from the Beaver Island meteorological station (Climate ID 8200558) (Table 7.2). This contains the most complete dataset of wind data near the Project.

Table 7.2: Wind Data from the Beaver Island Meteorological Stations (1996-2025)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (km/h)	135	120	111	107	115	109	95	95	160	117	133	145
Most Frequent Direction[(1)(2)]	NW	NW	SW	NW	SW	SW	SW	SW	SW	SW	NW	NW

Source: (ECCC, 2025d)
[(1)] NW = Northwest
[(2)] SW = Southwest

From 1996 to 2025, the maximum hourly wind speeds recorded at the Beaver Island meteorological station ranged from 95 kilometres per hour (km/h) in July and August to 145 km/h in December. The prevailing wind direction recorded is from the northwest. The direction during calm wind flows is not recorded at the meteorological station (ECCC, 2025d).

The windrose plot for the Beaver Island meteorological station (CWBV) illustrates the wind directions from 1996 to 2025 (Figure 7.1). Wind speeds above 12 metres per second (m/s)

(43.2 km/h) occurred most frequently from the northwest, with secondary contributions coming from the southwest (ISU, 2025).

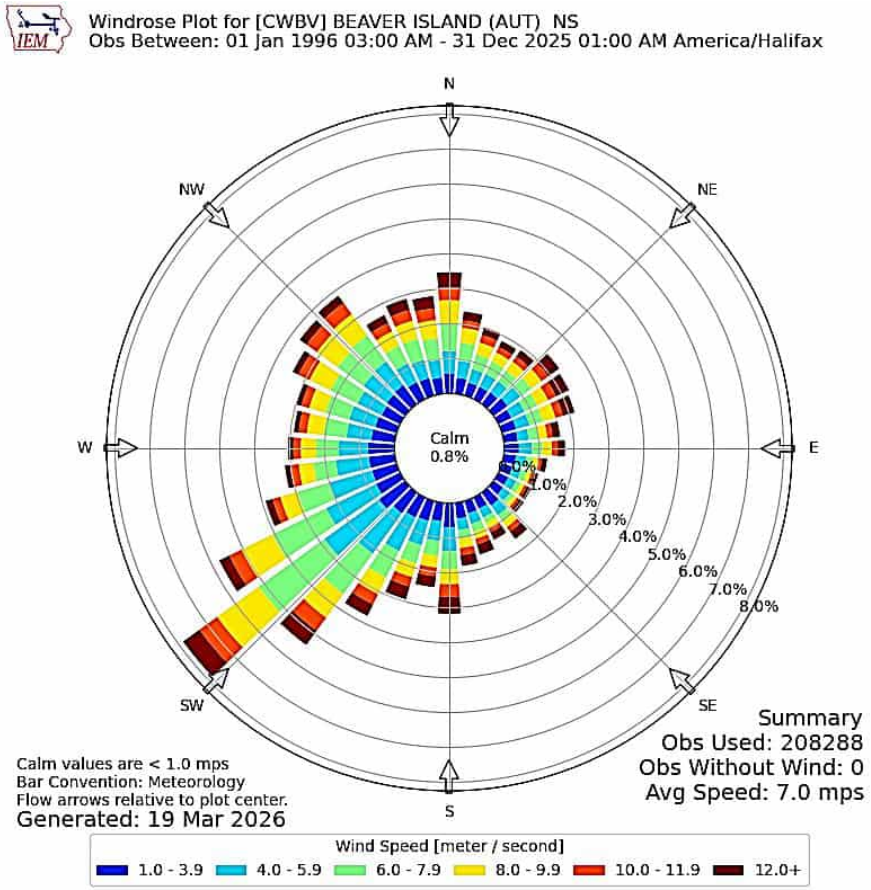

Figure 7.1: Windrose Plot for the Beaver Island Meteorological Station (CWBV) – January 1, 1996, Through December 31, 2025 (ISU, 2025)

Air Quality

The Government of Nova Scotia has legislated Air Quality Regulations (NSAQR) (Nova Scotia, 2020) under the *Environment Act* (Nova Scotia, 1995b). The ambient air quality standards (AAQS) published in the NSAQR set the maximum permissible ground-level concentration limits (Table 7.3).

Table 7.3: Summary of Regulations Pertaining to Ambient Air Quality in Nova Scotia

Contaminant	Averaging Period	Regulatory Threshold (µg/m³)
		Provincial [1]
Carbon Monoxide (CO)	1-hour	34,600
	8-hour	12,700
Nitrogen Dioxide (NO_2)	1-hour	400
	24-hour	-
	Annual	100

Contaminant	Averaging Period	Regulatory Threshold (µg/m³)
		Provincial [1]
Ozone (O_3)	1-hour	160
$PM_{2.5}$	24-hour	-
	Annual	-
PM_{10}	24-hour	-
	Annual	-
Sulphur Dioxide (SO_2)	1-hour	900
	24-hour	300
	Annual	60
Total Suspended Particulate (TSP)	24-hour	120
	Annual	70[2]

[1]Ambient Air Quality Standards (NS AAQS) (Air Quality Regulations, N.S. Reg. 8/2020)
[2]Geometric mean
µg/m³ = micrograms per cubic meter

Nova Scotia monitors air quality at eight ambient air quality monitoring stations (AAQMSs) located throughout the province (NSECC, n.d.). Measured parameters at these locations may include the following:

- Sulphur dioxide (SO_2)
- Carbon monoxide (CO)
- Nitrogen oxides (NO_x)
- Nitric oxide (NO)
- Fine particulate matter [particulate matter 2.5 micrometres (µm) or less in diameter; $PM_{2.5}$]
- Ground-level ozone (O_3)
- Total reduced sulphur (TRS)

The NO_2, O_3, and $PM_{2.5}$ values from seven of the eight AAQMSs are used to calculate a score on the Air Quality Health Index (AQHI) (ECCC, 2025a; NSECC, n.d.). The AQHI is a scale from 1 to 10+, in which scores represent the following health risk categories: Low (1 to 3), Moderate (4 to 6), High (7 to 10), and Very High (10+) (ECCC, 2025a).

The closest AAQMS with available data is the Port Hawkesbury station, approximately 60 km northeast of the center of the Study Area at 45.61416245° N, 61.36235428° W.

Table 7.4 summarizes the current (baseline) maximum ambient air quality conditions observed at the Port Hawkesbury AAQMS from 2021 to 2025. The monitored parameters are compared to the current NSAQR.

Table 7.4: Maximum Ambient Air Quality Conditions at Port Hawkesbury (2021 to 2025)

Parameter	Averaging Period	O_3 (ppb)	SO_2 (ppb)	NO_X (ppb)	NO (ppb)	NO_2 (ppb)	$PM_{2.5}$ ($\mu g/m^3$)	TSP ($\mu g/m^3$)	CO (ppb)	H_2S (ppb)
Port Hawkesbury AAQMS 2020 to 2025	1-hour	92.5	89.7	139.1	93.9	51.0	64.6	-	-	-
	24-hour	49.1	15.0	51.9	28.5	23.3	27.5	-	-	-
	Annual	29.4	0.7	4.5	1.8	2.6	5.4	-	-	-
NS AAQS Schedule A[(1)]	1-hour	82	340	-	-	210	-	-	30,000	30
	24-hours	-	110	-	-	-	-	120	-	6
	Annual	-	20	-	-	50	-	70[(2)]	-	-
Fraction of NS AAQS Schedule A	1-hour	113%	26%	-	-	24%	-	-	-	-
	24-hours	-	14%	-	-	-	-	-	-	-
	Annual	-	4%	-	-	5%	-	-	-	-

Source: (NSECC, n.d.)
[(1)]Current Ambient Air Quality Standards (NS AAQS) (Air Quality Regulations, N.S. Reg. 8/2020)
[(2)]Geometric mean
ppb = parts per billion
$\mu g/m^3$ = micrograms per cubic meter

Existing air quality conditions (i.e., baseline data; 2021 to 2025) indicate that the measured contaminants are well below their respective NS AAQS Schedule A limits in most instances. However, ozone exceeded the 1-hour averaging period limit under NS AAQS Schedule A (Table 7.4). This exceedance occurred in three separate instances between 2021 and 2025. The reported AQHI typically scores “low” for risk at all times of the year (ECCC, 2025a).

7.1.5 Effects Assessment

Project-Atmospheric Interactions

Project activities will interact with the atmospheric environment through fugitive dust and exhaust emissions from construction equipment (Table 7.5), primarily during the construction phase. There are no air emissions associated with the operation of the wind turbine. Furthermore, wind power generation will offset power production that would otherwise have come from fossil fuels.

Table 7.5: Potential Project-Atmospheric Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X

Project Phase	Potential for Interaction
Turbine Assembly	X
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for the atmospheric environment is a 200 m buffer surrounding the Assessment Area (Drawing 7.2). This boundary is selected as it represents the distance beyond which effects to air quality are considered sufficiently diffused to no longer represent a potential impact to humans. The RAA is the same as the LAA.

Assessment Criteria

The assessment criteria provided in Section 4.3 apply to the atmospheric environment. The VC-specific definition for magnitude is as follows:

- Low: Air quality is expected to remain less than or equal to the maximum permissible ground-level concentrations as defined by the NSAQR.
- High: Air quality is expected to exceed the maximum permissible ground-level concentrations as defined by the NSAQR.

Effects

Fugitive dust emissions consist of particulate matter (PM) and may be generated from open-air activities (e.g., moving earth/disturbing soil, wind erosion, increased traffic). Fugitive dust emissions are composed mainly of soil minerals, but can also contain salt, pollen, spores, and tire particles. PM is measured as total suspended particulate (TSP), defined as the mass of airborne particles with diameters less than 100 µm. There are two forms of PM that pose the greatest concern for human health: PM with a diameter of 10 µm or less (PM_{10}) and $PM_{2.5}$. Depending on its composition, concentration, and proximity to a human receptor, fugitive dust can affect lung and heart function when it enters the atmosphere. Particulate matter has been linked to premature death (people with lung and heart disease), non-fatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. People with underlying lung and heart disease, children, and the elderly are the most susceptible to particulate pollution exposure (US EPA, 2024b).

Fugitive dust may also affect the environment by impairing visibility and causing environmental damage. Fine particles are the leading cause of reduced visibility in many cities, national parks, and wilderness areas. In addition, fugitive dust particles can be carried over long distances (via wind), deposited in other locations, and within surface water features. Some of the potential effects of particulate deposition may include the following (US EPA, 2024b):

- Increasing lake and stream acidity.
- Altering the nutrient balance in coastal waters and large river basins.
- Depleting the nutrients in the soil.
- Damaging sensitive forests and farm crops.
- A variety of effects on flora (described further in Section 10.1)
- Affecting the diversity of ecosystems.
- Contributing to acid rain effects.

Anticipated sources of fugitive dust emissions from the Project will be primarily associated with the construction of the Project and may include the following activities:

- Soil disturbance during site preparation (i.e., clearing/grubbing, grading, blasting).
- Wind erosion from soil or rock stockpiles during grading.
- Increase in traffic on roadways from travel by Project personnel (to/from the site).
- Management of on-site materials transfers (i.e., loading/unloading).

To assess the potential effects of fugitive dust emissions, potential receptors were identified as described in Section 4.1.5 and the potential for interactions with these emissions was evaluated. The travel distance of fugitive dust is influenced by several factors, including the height at which the dust is released, wind conditions, and particle size. Under most standard conditions, fugitive dust above 30 µm settles out within 100 m of the emission source. Other finer particles have a slower settling velocity and may travel further (US EPA, 1995). The LAA is well vegetated, which will likely help to reduce the travel distance of fugitive dust emissions from the Assessment Area (US EPA, 2014).

In addition to fugitive dust, construction may increase combustion residuals and/or exhaust tailpipe emissions, primarily PM, NO_x, SO_2, and CO from vehicles (i.e., travel by Project personnel, transport/delivery activities) and heavy equipment. Exhaust emissions are primarily anticipated to be associated with road construction and upgrades within the Project Footprint. The United States Environmental Protection Agency (2014) determined that most roadway emissions are contained within the first 200 m from the emission source.

Three non-participating receptors are located within the LAA. These receptors are apparent camps (based on desktop aerial imagery) and are surrounded by a forested buffer. This buffer is anticipated to shield them from most impacts of fugitive/exhaust emissions; therefore, the effects of emissions are anticipated to be minimal and below the NSAQR.

Overall, dust and exhaust emissions are considered short-term, intermittent, and within the LAA.

Mitigation Measures

Measures to minimize and mitigate the creation and emission of pollutants, including fugitive dust and exhaust emissions, will be implemented for the Project (particularly for the construction phase). General mitigation measures for fugitive (dust) emissions include:

- Minimize the footprint of disturbance to the extent practicable.
- Conduct grading and site preparation in phases to minimize disturbed soil areas until nearing construction activities.
- Stabilize exposed soil surfaces by sloping.
- Compact and/or ridge disturbed soil to prevent dust formation.
- Wet aggregate and soil stockpiles to control dust, as required.
- Design storage areas and material stockpiles with prevailing wind directions in mind, as practicable.
- Wet roadways and heavy traffic areas with water or other approved dust suppressant technologies to minimize airborne emissions, as required.
- Post and maintain speed limits for on-site transportation and mobile equipment.
- Tie down, cover, and/or store loose site materials and/or products prior to inclement weather and wind events to prevent materials from becoming airborne.
- Wash down vehicles and equipment using hoses and water to remove accumulated mud/dirt on undercarriages, tracks, or wheel wells.
- Require that Project personnel adhere to all safety protocols and wear appropriate personal protective equipment (PPE) in the event of significant fugitive emissions events (i.e., windstorms, dust storms).
- Develop and implement an Erosion and Sedimentation Control Plan.

General mitigation measures for exhaust emissions include:

- Require that equipment meets all applicable provincial and air quality regulations and emissions standards.
- Maintain engines and exhaust systems according to the manufacturer's specifications and the recommended maintenance schedule.
- Remove from service malfunctioning equipment and/or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.
- Remove from service construction equipment with improperly functioning emissions control systems.
- Restrict the idling of equipment where feasible.

Monitoring

Given the low to negligible impacts, no monitoring is required.

Conclusion

The predicted residual effects of the Project on the atmosphere and ambient air quality (after mitigation) are characterized in Table 7.6.

Table 7.6: Atmosphere and Air Quality Residual Effects

Effect Detail	Fugitive and Exhaust Emissions
Magnitude of Effect	**Low:** Fugitive and exhaust emissions are expected to remain below the maximum permissible ground-level concentrations.
Geographic Extent of Effect	200 m buffer of the Assessment Area
Frequency of Effect	**Intermittent:** Effects may occur during the Project's construction, operation, and decommissioning phases, but only intermittently.
Duration of Effect	**Short Term:** Effects are mainly confined to the construction and decommissioning phases.
Reversibility of Effect	**Reversible**
Significance Level	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible	

7.2 Climate Change

The effects of the Project on climate change are addressed in terms of GHG emissions per NSECC's A Proponent's Guide to Environmental Assessment (2025a) and the Guide to Considering Climate Change in Project Development in Nova Scotia (2011d).

7.2.1 Overview

Climate change is a long-term alteration of weather patterns and conditions strongly impacted by changes in temperature and precipitation. Climate change typically involves changes in average conditions, as well as changes in variability. The main contributor to climate change is GHGs from anthropogenic sources. Since GHGs disrupt the natural heat transfer processes within the Earth's atmosphere, a build-up of these gases has enhanced the natural greenhouse effect. These human-induced enhancements are especially of concern since ongoing GHG emissions have the potential to warm the planet to levels that have yet to be experienced (ECCC, 2019c).

The effects of the Project on climate change are described in terms of GHG emissions from wind energy produced by the Project.

The impacts of climate change on the Project are assessed separately under Section 14.1.

7.2.2 Regulatory Context

The climate change assessment considered the following Acts and Regulations:

- *Environment Act* (Nova Scotia, 1995b)
- Greenhouse Gas Emissions Regulations (Nova Scotia, 2009)

- *Environmental Goals and Sustainable Prosperity Act* (Nova Scotia, 2012)
- *Canadian Environmental Protection Act* (Canada, 1999)
    - Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations (Canada, 2010)
    - Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations (Canada, 2013)
    - Ozone-depleting Substances and Halocarbon Alternatives Regulations (Canada, 2016)

7.2.3 Assessment Methodology

The objectives of this assessment include the following:

- Establish the sources of GHG contributions from the Project.
- Quantify baseline and Project-generated GHG emissions.
- Mitigate and minimize GHG generation from Project-related activities.

Sources of GHG emissions were identified through a review of Project phases, components, and equipment.

Project-generated GHGs were quantified in accordance with the specifications described in the International Standard ISO 14064 (2019), and using published values found in the literature (sources provided in applicable sections that follow) and emission factors published in the NSECC Standards for Quantification, Reporting, and Verification of Greenhouse Gas Emissions (2018).

The determination of climate change impacts was completed based on estimated construction impacts (e.g., shipments and materials) and the current Nova Scotia energy grid. Where detailed construction methodologies are not yet determined, reasonable estimates for construction materials, suppliers, and transportation distances were used. Furthermore, the Nova Scotia energy grid is expected to decarbonize to meet its net-zero emission targets. This will involve the development of additional renewable energy or low-carbon intensity electrical generation projects (NSECC, 2022b). These renewable energy targets were not included in the baseline GHG emission calculations. All emissions, unless otherwise stated, are reported in tonnes of carbon dioxide equivalent (tCO_2e).

7.2.4 Assessment Results

7.2.4.1 Sources of Greenhouse Gas Emissions

The main GHGs of concern include:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Halocarbons
- Water vapour

GHGs may be natural or anthropogenic in origin, except halocarbons, which are human-made (ECCC, 2019a). The following subsections describe the GHGs and their contributors (sources) as anticipated during each Project phase. However, during the operations phase, GHG emissions will be limited to maintenance activities (e.g., transportation and materials). Where these activities are intermittent and short-term, the GHG contributions from operations are negligible and are not considered further.

Carbon Dioxide

The primary source of atmospheric CO_2 is burning carbon-containing fossil fuels (i.e., coal, oil, and natural gas) and deforestation/land clearing activities.

Site preparation and construction for the Project will include several activities that are likely to produce CO_2; including, but not limited to:

- Use of heavy equipment (excavators, dozers, cranes, etc.).
- Use of light-duty vehicles and equipment (pick-up trucks, light plants, generators, etc.).
- Land clearing, including the decay of cut foliage (which releases CO_2 slowly).
- Cement production heats limestone, which releases CO_2 (ECCC, 2019a).

Methane

Primary sources of anthropogenic CH_4 include landfills, sewage, and the incomplete combustion of fossil fuels with insufficient oxygen (ECCC, 2019a). The Project's construction phase requires different heavy- and light-duty equipment, contributing to CH_4 emissions. Overall, methane emissions are anticipated to be minimal, in relation to other sources of GHGs.

Nitrous Oxide

The primary sources of N_2O are related to the use of nitrogen-based synthetic fertilizers and manure. These sources have added significant amounts of reactive nitrogen to Earth's ecosystems. Other contributors include the release of N_2O into the atmosphere during the combustion of fossil fuels and biomass (e.g., trees or wood-based fuels) and from some industrial sources (ECCC, 2019a).

The Project's construction phase requires heavy- and light-duty equipment, which can contribute to N_2O emissions. Land restoration activities (i.e., fertilizers) following construction will also contribute to N_2O emissions. Overall, the production of N_2O in association with this Project is anticipated to be minimal, in relation to other sources of GHGs.

Halocarbons

Halocarbons are a group of synthetic chemicals containing a halogen group (e.g., fluorine, chlorine, and bromine) and carbon (ECCC, 2019a). They are typically used in refrigerants, fire-extinguishing agents, and solvents (ECCC, 2013). There are various industrial sources, but the main contributor is aluminum production (US EPA, 2024a).

During the construction phase, the primary source of halocarbon emissions will be associated with coolants in air conditioning units found in vehicles, portable construction buildings (i.e., trailers), and equipment. Fire-extinguishing agents (containing halocarbons) may also be used in the event of an emergency which requires a fire-fighting response. Overall, halocarbon use is anticipated to be minimal and not considered further.

Water Vapour

Water vapour is the most important naturally occurring GHG. Human activities do not directly influence the amount of water vapour in the atmosphere, as it is a function of the atmosphere's temperature. The atmosphere can hold about 7% more water vapour for every additional degree Celsius in air temperature. When the air becomes saturated with water vapour, the water vapour condenses and falls as rain or snow, leading to climate change effects (i.e., variances in weather patterns).

As climate-warming gases (i.e., CO_2, CH_4, N_2O) increase in the atmosphere, the temperature rise increases water evaporation from the Earth's surface and increases the atmospheric water vapour concentrations. This increased water vapour, in turn, amplifies the warming from the initial GHGs, causing the cycle to repeat and temperatures to keep rising (ECCC, 2019a).

Project activities contributing to GHG emissions are not anticipated to impact water vapour concentrations in the atmosphere.

7.2.4.2 Quantification of the GHG Baseline Conditions

The GHG baseline is a reference of sources, sinks (removing), and reservoirs (storing) occurring in the absence of the Project and is used to compare pre- and post-Project conditions. That said, the baseline determines the quantity of carbon dioxide equivalent (CO_2e) emitted from current electricity production methods for the same electrical capacity of the Project.

The baseline sources are related to emissions generated from electricity currently produced in Nova Scotia from coal, oil, natural gas, and wind. There are no sinks and reservoirs attributed to the baseline scenario.

The Project consists of up to 107 turbines capable of generating up to 856 MW of renewable energy. Based on the wind turbine design capacity and an anticipated net capacity for the Project, the Project will be capable of producing approximately 2,624,496 megawatt-hours per year (MWh/year). The Project's lifespan is estimated at a minimum of 35 years.

Quantifying GHGs in terms of tCO2e requires using current electricity-generating practices. For the year 2025 (latest available data), electricity generated in Nova Scotia by NS Power (the leading producer) was produced from the following fuel sources (NSPI, 2026):

- Coal (38%)
- Natural Gas (12%)
- Wind (16%)

- Renewable Imports (19%)
- Hydro (6%)
- Non-Renewable Imports (3%)
- Biomass (3%)
- Oil (2%)
- Other Renewables (1%)

A large amount of electricity generated for use in Nova Scotia comes from coal, natural gas, and oil, cumulatively accounting for 52% of the energy mix. Renewable sources (biomass, wind, renewable imports, hydro) account for 45%, and the remaining 3% consists of non-renewable imports.

For the purpose of this assessment, the non-renewable energy imports are distributed amongst coal (+1%), natural gas (+1%), and oil (+1%). Therefore, the fractions used for this assessment were coal at 39%, natural gas at 13%, and oil at 3%. Renewable energy (locally sourced and imported) was lumped together, and for this assessment, renewables were considered as wind energy at 45%.

Table 7.7 summarizes the GHG emission factors for the different types of electricity generated in Nova Scotia.

Table 7.7: Electricity Fuel Source Emission Factors

Electricity Fuel Source	Emission Factor (tCO_2e/kWh)
Coal	0.00105
Natural Gas	0.00044
Oil	0.00111
Wind	0

Source: (EIA, 2023)

Given the current electricity generation methods and the fuel source emission factors (Table 7.7), Table 7.8 summarizes the baseline GHG emissions. Baseline emissions are defined here as the quantity of CO_2e emitted from the current electrical grid for the same electrical generating capacity as the Project.

Table 7.8: Baseline Quantification Summary

Electricity Fuel Source	Electricity Generation (kWh/year)	Emissions (tCO_2e/year)
Coal	1,023,553,440	1,074,926.61
Natural Gas	341,184,480	149,239.39
Oil	78,734,880	87,305.36
Wind	1,181,023,200	0
Total	**2,624,496,000**	**1,311,471.36**

The total calculated annual GHG emissions generated in Nova Scotia for the same electrical capacity as the Project (based on 2025 data) is **1,311,471.36 tCO_2e.**

Detailed CO_2e calculations are provided in Table 1 (Appendix D).

7.2.4.3 Quantification of GHG Emissions – Construction Phase

Access Roads

The construction of new roads and the upgrading of existing roads will require the removal of vegetation and overburden, which will create fugitive dust and GHG emissions. However, where fugitive dust and GHG contributions for these activities are temporary, short-term, and represent a small incremental addition compared to the overall Project emissions, they were not quantified.

Section 7.1 (Atmosphere and Air Quality) discusses fugitive dust and air emissions as they relate to the Project.

Temporary Laydown Areas and Turbine Pads

Temporary laydown areas are intended to store equipment temporarily. The turbine pad area will include the foundation, crane pad, and area to lay out turbine components prior to construction. These areas will be prepared by removing vegetation and overburden and placing competent soils. Construction activities and equipment associated with the laydown areas and turbine pads are anticipated to create fugitive dust and GHG emissions. However, where fugitive dust and GHG contributions for these activities are temporary, short-term, and represent a small incremental addition compared to the overall Project emissions, they were not quantified.

Turbine Foundation

A concrete tower foundation and pedestal will be required for each wind turbine. As such, the Project will require a large quantity of concrete to be produced and delivered to each wind turbine location.

The Proponent provided the anticipated materials to construct each tower foundation, which include 905 cubic metres (m^3) of concrete and 81 tonnes of steel (rebar), per turbine foundation. Note that these suppliers have not been procured at this stage of the Project; as such, for the purpose of this assessment, transportation distances are based on the nearest known concrete and steel suppliers, which are both approximately 53 km from the Study Area. The quantification of the GHG emissions requires the following inputs:

- The vehicle size and fuel type used to transport the concrete.
- The distance travelled to and from the concrete manufacturer to the wind turbine sites.
- The freight and weight associated with each trip (to and from each turbine location).
- The quantity of concrete and steel produced for the wind turbine bases.

Heavy-duty diesel concrete trucks and heavy-duty haulers will be required to transport concrete and steel to the Study Area. Given that the turbine locations are scattered across the Study Area, transportation distances range from approximately 57 km to 92 km.

It is assumed that each concrete truck will carry approximately 20 tonnes (9 m^3)[(1)] of concrete per delivery for a total of 2,036 tonnes of concrete per wind turbine. Similarly, it is assumed that each heavy hauler would carry no more than 38 tonnes of steel per truck, for a total of three trucks per turbine pad. With 101 truckloads of concrete and three truckloads of steel per wind turbine, the total one-way distance travelled is approximately 778,616 km for both the steel and concrete supplies. GHG quantification considered travel to and from the nearest concrete and steel suppliers to the wind turbine locations.

Table 7.9 summarizes the GHG emission factors for the different components used for concrete- and steel-related activities.

Table 7.9: Concrete Manufacturing and Transportation Emission Factors

Component	Emission Factor
Concrete Production	$3x10^{-4}$ tCO_2e/kg
Concrete Truck/Heavy Duty Truck (Diesel) with Freight	$1.35x10^{-4}$ $tCO_2e/tonne{\cdot}km$
Concrete Truck/Heavy Duty Truck (Diesel) without Freight	$1.106x10^{-3}$ tCO_2e/km
General Steel Production	1.5 $tCO_2e/tonne$

Source: (Hammond & Jones, 2011; Squared Consultants Inc, 2025)

Given the travelling distances, the quantity of concrete and steel required for the Project, and the emission factors (Table 7.9), the CO_2e emissions for constructing all the tower foundations and pedestals are expected to be approximately **81,498.05 tCO_2e**.

Detailed CO_2e calculations are provided in Table 2 (Appendix D).

Turbine Production

For the purposes of this EA, the Proponent has selected the Goldwind GWH182-8.0 MW turbine.

Goldwind completed a life cycle assessment (LCA) of the GWH182-8.0 MW. The LCA was based on a construction scenario in Miombo, Tanzania, and included construction, transportation, and the baseline energy utility mixture from Tanzania. As such, only the upstream module of the LCA was used for this assessment, which focused on the production of the turbines within the Goldwind assembly factory, including waste material transport, recycling, and disposal.

[1] $2{,}036 \frac{Tonnes\ of\ Concrete}{Turbine} \div 20.2 \frac{Tonnes\ of\ Concrete}{Truck} = 101 \frac{Trucks}{Turbine}$

The LCA determined that the production of the GWH182-8.0 MW turbines accounted for **2.35 grams of CO_2e per kilowatt-hour (gCO_2e/kWh)** (EPDItaly, 2025). Based on the anticipated net production capacity of the Project, the construction emissions for the turbines are anticipated to be **215,864.80 tCO_2e**[(2)] over the Project's life. Although there are some uncertainties regarding the assumptions used for the LCA and their applicability to this Project, it is expected that the larger size of the Project, compared to the LCA scenario, would lead to a conservative estimate of GHG emissions in this assessment.

To quantify GHG contributions from the transportation of these turbines from the Goldwind factory to the Project Footprint, the following items were assessed:

- The turbine transportation distances from the manufacturer to the intended wind turbine laydown.
- The vehicle size and fuel type used to transport the wind turbines.

For quantification purposes, the assessment assumed the following:

- Manufacturing Location: Goldwind, Dafeng District, Yancheng, Jiangsu Province, China
- Nearest Shipping Port: Dafeng Port, Dafeng District, Yancheng, Jiangsu Province, China
- Nearest Nova Scotia Shipping Port: Strait of Canso Superport, Mulgrave, Nova Scotia

The Goldwind GWH182-8.0 wind turbine consists of 13 principal components:

- Blades (3)
- Gearbox/generator and main shaft (2)
- Hub (1)
- Nacelle (1)
- Tower segments (6)

Project turbines are assumed to be manufactured at the Goldwind manufacturing facility in Dafeng District, Yancheng, Jiangsu Province, China. The turbines will travel to the Dafeng port in Dafeng District, Yancheng, Jiangsu Province, China, by heavy diesel hauler (transport), where they will be shipped via diesel cargo vessel to the Strait of Canso Superport, Mulgrave, Nova Scotia. Table 7.10 summarizes the transportation distances from the manufacturer to the Project.

[2] $2{,}624{,}496{,}000\ \text{kWh} * 2.35\ \frac{\text{gCO2e}}{\text{kWh}} * \frac{1.0\times10^{-6} tonnes}{g} * 35\ years = \ 215{,}864.80\ tCO_2e$

Table 7.10: Wind Turbine Transportation Distances

Originating Destination	Final Destination	Distance (km)
Manufacturing Facility Dafeng District, Yancheng, Jiangsu Province, China	Dafeng Port, Dafeng District, Yancheng, Jiangsu Province, China	63 (Land)
Dafeng Port, Dafeng District, Yancheng, Jiangsu Province, China	Strait of Canso Superport, Mulgrave, Nova Scotia	23,200 (Marine)
Strait of Canso Superport, Mulgrave, Nova Scotia	Harbour Hills Wind Project	Varied (Land)

To determine the travel distance for a wind turbine, the following assumptions were made:

- Each component will be individually transported via a single diesel heavy hauler.
    - 13 components per turbine to travel from the manufacturing facility in Dafeng District, Yancheng, Jiangsu Province, China, to the Dafeng Port in Dafeng.
    - 13 components per turbine to travel from the Strait of Canso Superport, Mulgrave Port, Nova Scotia, to the turbine location (distance will vary from one turbine location to another).
- Each wind turbine (in its entirety) will be transported via a single diesel cargo vessel (marine)

Based on the land distance from the manufacturer to the individual wind turbine location, the total land transportation distance (excluding marine transportation) is approximately **246,273 km**. The total marine transportation distance for transporting the wind turbines from China to the Strait of Canso Superport in Mulgrave, Nova Scotia, is approximately **2,482,400 km**. The distances travelled reflect travel only from the manufacturer to the Assessment Area; an equivalent return distance is not considered, as hauling companies have commitments to other clients, and those GHG emissions would not be attributable to the Project.

GHG emission factors for the different components of wind turbine transportation are provided in Table 7.11.

Table 7.11: Wind Turbine Transportation Emission Factors

Component	Emission Factor (tCO_2e/tonne·km)
Heavy Duty Truck (Diesel) with freight	$1.35x10^{-4}$
Marine Cargo and Container Vessel (Diesel) with Freight	$1.51x10^{-5}$

Source: (Squared Consultants Inc, 2025)

Given the land transportation distances required to deliver the wind turbines to the Project and the emission factors (Tables 7.10 and 7.11), the CO_2e emissions from land transportation are expected to be approximately **2,455.15 tCO_2e**. In addition, the marine transportation distances required to deliver the wind turbines from China to Canada will contribute **35,984.87 tCO_2e.**

Detailed CO_2e calculations are provided in Table 2 (Appendix D).

7.2.4.4 Operations Phase

Following the construction phase, the turbine will be operational, and the sinking of GHG emissions will begin. Based on the wind turbine design capacity, the Project will be capable of producing approximately 2,624,496,000 kWh/year. Therefore, the renewable energy produced will replace power production from fossil fuels and more intense generation methods described in the baseline conditions analysis.

According to Padey et al. (2012), maintenance activities are the only contributors of GHGs during the operations phase. The maintenance typically includes replacing approximately 15% of the nacelle components and one blade during the wind turbine's lifetime. According to a submission by Number Three Wind LLC (2018) to the New York State Department of Public Services, a wind turbine blade weighs 18,688 kg, while the nacelle weighs 76,204 kg. Assuming these components are fabricated of steel, the total emission from the replacement material for all the Project's wind turbines is **4,834.04 tCO_2e** (Appendix D).

7.2.5 Effects Assessment

Project-GHG Interactions

Project activities will emit GHGs during all phases of the Project (Table 7.12).

Table 7.12: Potential Project-GHG Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X (maintenance only)
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for GHG emissions is the province of Nova Scotia. The RAA for GHG emissions is the global environment.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply to Project-related GHG contributions. The VC-specific definition for magnitude is as follows:

- Positive: Project is expected to have a positive effect on GHG emissions.
- Negative: Project is expected to have a negative effect on GHG emissions.

Effects

The Project is intended to have a net positive effect on the GHG environment (Table 7.13).

Table 7.13: Project GHG Emission Summary

Component	Emissions (tCO_2e)
Baseline	
Electricity Generated from Coal	1,074,926.61/year
Electricity Generated from Natural Gas	149,239.39/year
Electricity Generated from Oil	87,305.36/year
Electricity Generated from Wind	0
Total	**1,311,471.36/year**
Construction Phase	
Foundation Production and Transportation	81,498.05
Wind Turbine Manufacturing	215,864.80
Wind Turbine Transportation	38,440.02
Total	**335,802.87**
Operations Phase	
Electricity Generated from Wind	0
Wind Turbine Maintenance	4,834.04[(1)]
Total	**4,834.04**

[(1)] Project lifespan emissions (single event)
The values in this table may differ from the values presented in Appendix D as a result of rounding errors; however, the rounding errors are negligible and do not change their representation.

As mentioned, the current GHG emissions for the quantity of electricity required by the Project using NS Power's conventional generation methods contribute to **1,311,471.36 tCO_2e** per year.

The Project's construction phase will generate the most GHGs from the manufacturing and transportation of the wind turbine, as well as the production and transport of concrete and steel for the tower foundation and pedestal. The total GHG emission contributions from the construction phase are **335,802.87 tCO_2e**.

The operations phase will generate GHGs from the wind turbines' maintenance (i.e., part replacements) as a one-time (Project lifespan) occurrence of **4,834.04 tCO_2e**.

Following the commissioning of the Project, the annual GHG emission reduction is expected to be **1,311,471.36 tCO_2e**. A one-time **4,834.04 tCO_2e** may be subtracted from any annual reduction; however, the annual reduction rate will be applied for the Project's lifespan (35+ years). The Project is anticipating a 0.26-year[3] payback period to offset the construction-related GHG emissions. Following this period, the Project will positively offset GHG emissions that would typically be emitted from conventional production methods employed by NS Power.

The GHG emission reduction over the Project's lifespan (35 years) could be **45,560,860.54 tCO_2e**. Annual Project emissions reduction defaults to the same value for each year the Project is in operation (0% change in baseline and Project emissions). Emissions reductions are anticipated to change in any given year due to externalities such as changes to energy fuel sources, grid emissions factors, or others which may affect reductions resulting from the Project. The emission projections described in this assessment (annual and Project lifespan) do not consider the provincial commitment to removing coal from the energy grid by 2030 and for the provincial GHG emissions (including the grid) to be net-zero by 2050 (NSECC, 2022b). As such, this lifespan emissions reduction is an estimate of a best-case GHG reduction scenario over the lifetime of the Project.

The assumptions considered in this assessment propose a conservative estimate of GHG emissions, which may be lower if turbine and concrete manufacturer locations are closer to the Project and manufacturing materials are less than assumed. The use of a concrete batch plant would also significantly reduce GHG emissions during construction. Where assumptions may change the values provided in this assessment, the results remain constant; the Project will offset GHG emissions.

Mitigation Measures

Mitigation measures to reduce the Project's contributions to GHG emissions, reducing the overall impact on climate change, include:

- Use of locally sourced materials, where practicable, to reduce CO_2, CH_4, and N_2O emissions associated with transport.
- Incorporate the shortest construction/transport routes where practicable to minimize the use of fossil fuels during construction.
- Recover and recycle construction and demolition waste, where practicable.
- Minimize clearing to the greatest extent practicable.
- Site infrastructure in previously disturbed areas and use existing access roads to the extent practicable.
- Require Project equipment to meet all applicable provincial and air quality regulations and emissions standards.

3 $\frac{Construction\ Emissions}{Offset\ Emissions} = \frac{\mathbf{335{,}802.87}\ tCO2e}{\mathbf{1{,}311{,}471.36}\ tCO2e/year} = 0.26\ years$

- Require that engine and exhaust systems are maintained according to the manufacturer's specifications and applicable maintenance schedule.
- Remove malfunctioning equipment or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.
- Require construction equipment with an improperly functioning emission control system to not be operated.
- Require regular equipment maintenance to be undertaken to maintain good operations and fuel efficiency.
- Require preventative maintenance and inspections (e.g., leak testing) of equipment containing coolant (i.e., air conditioning units).
- Dispose of halocarbon-containing substances at an approved hazardous waste facility per applicable regulations and in compliance with local requirements.
- Minimize idling to limit GHG emissions from vehicles and equipment and reduce the use of fossil fuels.

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on Climate Change (after mitigation) are characterized in Table 7.14.

Table 7.14: Climate Change Residual Effects

Effect Detail	Net Reduction of GHG Emissions
Magnitude of Effect	**Positive:** Net effect of the Project will be a reduction in GHG emissions.
Geographic Extent of Effect	Nova Scotia
Frequency of Effect	**Continuous:** Effects will occur continuously during operation.
Duration of Effect	**Medium Term:** Effects are expected throughout the operation phase.
Reversibility of Effect	**Irreversible**
Significance Level	Positive effect, significance not evaluated.
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High, Positive **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible	

7.3 Sound

7.3.1 Overview

The assessment of sound considered both construction and operational noise generated from the Project. During construction, heavy equipment, machinery, and light vehicles will emit sound to the surrounding environment from activities associated with the construction of wind

turbine pads, roads, and other infrastructure, along with the subsequent assembly and commissioning of wind turbines.

During the Project's operational phase, wind turbines will emit sound to the surrounding environment from mechanical equipment operation and the turbines' interaction with the surrounding air (aerodynamic sound). Detailed sound modelling was completed to quantify the potential impacts of turbine-generated noise on nearby receptors.

A noise assessment completed for the Project by WSP (Appendix E) includes a qualitative assessment of potential construction noise and evaluation of operational noise emissions. The Project is being assessed as a wind development of up to 107 turbines. The current modelled layout includes 90 turbine locations using the Goldwind GWH182 8.0 MW turbine model. A total of 17 optional turbine locations have been retained to preserve design flexibility during Project refinement, recognizing that final turbine selection may vary and improvements in turbine sound emissions are expected at the time of construction (denoted as OT on Drawing 2.1). If any optional turbine location is advanced, the Proponent will complete updated sound modelling and confirm compliance with applicable thresholds before that location is finalized for construction.

7.3.2 Regulatory Context

Sound level thresholds are regulated through a variety of municipal and provincial regulatory instruments (Table 7.15).

As described in Section 3 of Appendix E, the framework for assessing noise impacts of proposed wind projects includes provincial guidance provided in the Environmental Assessment Supplemental Checklist: Wind Energy Projects [EA Guide (NSECC, 2025d)] and the Guidelines for Environmental Noise Measurement and Assessment [GENMA (NSECC, 2023b)]. GENMA provides guidance on assessing low frequency noise (LFN) as further described in Section 3.2 of Appendix E.

Municipal by-laws are generally established to protect the peace and tranquility of communities. For those referenced in Table 7.15, provisions are in place to permit construction activities during specific hours in MODG if a Building Permit has been issued. There are currently no municipal by-laws in place in MODSM that relate to noise.

Table 7.15: Summary of Sound Level Regulations and Guidelines

Regulated By	Regulation/Guidance	Permissible Sound Levels (dBA)	Hours / Duration
For Residential Receptors			
Construction Period			
MODG	MODG Noise Control By-Law (MODG, 2011)	≤ 65	06:00 to 23:00
		≤ 55	23:00 to 06:00
MODSM	N/A	N/A	N/A
Operational Period			
NSECC	Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d)	≤ 40	During the operation of wind turbines at the exterior of a receptor
For Occupational Safety			
Workplace Health and Safety Regulations & Canadian Centre for Occupational Health and Safety	Noise – Occupational Exposure Limits in Canada (CCOHS, 2024)	85	8-hour maximum

7.3.3 Assessment Methodology

Construction Sound

The assessment of construction sound by WSP includes a discussion of expected noise sources and a qualitative assessment of potential effects to potential receptors (Section 6.3, Appendix E).

Operational Sound

The operational sound assessment conducted by WSP was completed through a combination of desktop studies and modelling per the NSECC Guidelines:

- The model's noise sources include:
  - 90 turbine locations using Goldwind GWH182 8.0 MW turbines with serrated trailing edge rotor blades and pad-mounted transformers. For clarity, 17 turbine locations [denoted as optional turbines (OT) in Drawing 2.1] have not been modelled for noise emissions.
- A Study Area for noise modelling was established as 2 km from all Project noise sources (Figure 1, Appendix E).
- Potential receptors within the 2 km buffer, as well as nearby receptors within 100 m of this buffer were identified and assessed for cumulative noise levels (i.e., baseline sound plus Project-related sound).
- Baseline noise levels of 35 dBA were assumed at receptors following Health Canada and NSECC Guidance (Health Canada, 2023; NSECC, 2025d).

- Cumulative noise levels were calculated using CadnaA® modelling software which uses the ISO 9613-2 standard for calculating outdoor sound propagation.
- Modelled cumulative noise levels at potential receptors were evaluated for compliance, excluding participating landowners.

Additional noise assessment methodology is described in Section 4.3 of Appendix E.

7.3.4 Sound Assessment Results

As described in Section 6.3 of the WSP report (Appendix E), construction noise varies by activity and is generated primarily from vehicles, heavy machinery [e.g., backhoes, cranes, blasting (if required)], smaller equipment like welding tools, and backup alarms. Noise levels at nearby receptors depend on the number, type, and proximity of sources, and decrease with greater distance from the construction activity.

A total of 337 potential receptors were identified within 2 km of the selected turbine locations. The additional 15 potential receptors identified within 100 m of this area were included in the modelling in consideration of potential minor changes in turbine locations. Results of the sound modelling are shown on Figure 2 of Appendix E and detailed results and a compliance assessment are provided in Table 5 and 6 of Appendix E. All potential receptors were determined to comply with the NSECC guideline of 40 dBA.

LFN modelling predicted no expected LFN issues following the GENMA methodology (NSECC, 2023b). Results of the LFN model are provided in Section 6.2 and Table 7 of Appendix E.

7.3.5 Effects Assessment

Project-Sound Interactions

Project activities will interact with the acoustic environment during all phases of the Project (Table 7.16). Sound related to the decommissioning phase is not addressed separately because sound levels are expected to be comparable to construction levels.

Table 7.16: Potential Project-Sound Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X

Project Phase	Potential for Interaction
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for sound includes a 2 km area around the selected turbine locations (Figure 1, Appendix E). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for sound. The VC-specific definition for magnitude is provided for construction and operational sound as follows:

Construction Sound

- Low: Project activities to be completed in accordance with relevant MODG bylaws and permitting.
- High: Continuous noise generated from Project activities is predicted to exceed relevant MODG bylaws and permitting.

Operational Sound

- Low: Measurable sound levels predicted at the exterior of a potential receptor are below the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects (i.e., ≤ 40 dBA).
- High: Sound levels predicted to exceed the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects at the exterior of a potential receptor (i.e., > 40 dBA).

Effects

During construction of the Project, decibel limits above 55 dBA at residential receptors can result in disruptions of sleep during nighttime hours, while sounds above 65 dBA may cause annoyance and disturbance during daytime hours. Sounds produced during construction can exceed these thresholds at some residential receptors located within close proximity to planned construction activities. However, construction will be kept within allowable hours, based on local noise by-laws, and is considered a temporary source of noise generated by the Project. Activities producing higher levels of sound, such as blasting (if required), or handheld air tools, will be less frequent and last for a very short duration.

Modelled sound levels (ambient and generated sound) from the normal operating conditions of the 90 modelled turbine locations do not exceed 40 dBA at all potential receptors. Therefore, all potential receptors comply with the NSECC guidance for operational sound.

Mitigation Measures

As noted in Appendix E, the Proponent will implement the following measures to mitigate potential noise effects during Project construction, where practical:

- Conduct construction activities within acceptable timeframes per municipal bylaws.
- Advise nearby residents of noisy activities (e.g., blasting, if required) and schedule these activities to reduce disruption.
- Install appropriate and well-maintained muffler systems on engine-driven equipment.
- Design work areas and travel paths to reduce the amount of time that equipment must operate in reverse and thereby reduce the use of back-up alarms.

The Project will develop and implement a Complaint Resolution Plan, which will consider complaints related to sound and outline a process to investigate complaints. Mitigation to resolve complaints, if determined to be necessary, will be completed on a case-by-case basis in consultation with the affected complainant. If necessary, noise monitoring will be included as part of this process to evaluate ambient and operational noise in areas of concern.

Modelling will be updated prior to construction if there are changes to the layout, turbine model or specifications to ensure compliance with the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on construction and operational noise (after mitigation) are characterized in Table 7.17.

Table 7.17: Sound Residual Effects

Effect Detail	Construction Noise	Operational Noise
Magnitude of Effect	**Low:** Construction activities are anticipated to comply with municipal by-laws and permitting.	**Low:** Operational sound is predicted to comply with the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects.
Geographic Extent of Effect	2 km buffer of noise sources	2 km buffer of noise sources
Frequency of Effect	**Intermittent:** Effects are anticipated during both the construction and decommissioning phases, and rarely during operation.	**Intermittent:** Effects may occur whenever the turbine rotors are spinning.

Effect Detail	Construction Noise	Operational Noise
Duration of Effect	**Short Term:** Effects are expected throughout construction and decommissioning, but generally not during operations or after decommissioning.	**Medium Term:** Effects are expected throughout the operational phase of the Project.
Reversibility of Effect	**Reversible**	**Reversible**
Significance Level	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible		

7.4 Shadow Flicker

7.4.1 Overview

Shadow flicker can occur when rotating blades cast flickering shadows during times of direct sunlight. The magnitude of shadow flicker is determined by the position and height of the sun, wind speed and direction, geographical location, time of year, cloud cover, turbine hub height and rotor diameter, and proximity to the turbine.

For shadow flicker to occur, the following criteria must be met:

- The sun must be shining and not be obscured by clouds/fog.
- The source turbine must be operating.
- The wind turbine must be situated between the sun and the shadow receptor.
- The wind turbine must be facing directly towards, or away from, the sun such that the rotational plane of the blades (i.e., rotor plane) is perpendicular to the azimuth of incident sun rays. For this to occur, the wind direction would have to be parallel to the azimuth of the incident sun rays throughout the day.
- The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, tall structures, etc., will prevent shadow flicker from occurring at the receptor.
- The receptor must be close enough to the turbine to be in the shadow.

An assessment of shadow flicker was completed by WSP that considers potential shadow flicker generated from the Project and effects on nearby receptors (as defined in Section 4.1.5). The Project is being assessed as a wind development of up to 107 turbines. The current modelled layout (Appendix F) includes 90 turbine locations using the Goldwind GWH182 8.0 MW turbine model. A total of 17 optional turbine locations have been retained to preserve design flexibility during Project refinement (denoted as OT in Drawing 2.1). If any optional turbine location is advanced, the Proponent will complete updated shadow flicker modelling

and confirm compliance with applicable thresholds before that location is finalized for construction.

7.4.2 Regulatory Context

The Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d) requires that a receptor will not exceed 30 hours of shadow flicker per year or 30 minutes of shadow flicker per day.

7.4.3 Assessment Methodology

The shadow flicker assessment was completed through modelling to achieve the following objectives:

- Identify potential receptors that may experience shadow flicker from the Project's operation (see Section 4.1.5 for approach and receptor classification).
- Quantify the expected duration and frequency of shadow flicker for all potential receptors over a calendar year and during the modelled worst day.
- Assess if applicable guidelines are expected to be met, excluding participating landowners.

A Study Area consisting of a 2 km buffer around turbine locations was established for the assessment of shadow flicker. Potential receptors located within this buffer, and the surrounding 100 m were identified to assess the potential effects of shadow flicker in the area (Figure 1, Appendix F).
As described in Section 3.4 of Appendix F, an analysis was conducted using the WindPRO v2.7 software package under "Worst-Case" modelling, which is the most conservative approach and assumes that all the criteria listed in Section 7.4.1 are always met. "Worst-Case" modelling assumes conditions that are unlikely to occur in practice but provides a starting point for assessing potential shadow flicker issues.

A second modelling scenario was developed to account for more realistic conditions. The "Adjusted-Case" used historical average monthly sunshine hours recorded at the closest weather station to the Study Area available in WindPRO, the Shearwater weather station (Table 3, Appendix F). In addition, the "Adjusted-Case" used historical wind direction data provided to WSP by EverWind to estimate the probability of different wind directions and therefore, turbine orientation (Table 4, Appendix F).

The "Adjusted Case" is still conservative as it assumes that turbines are always active (i.e., turbine rotors are always turning), receptors are sensitive to shadow flicker in every direction (i.e., greenhouse mode) and does not account for screening of shadow flicker by vegetation, outbuildings or other structures (Section 7.4.1). The "Adjusted-Case" cannot predict adjusted maximum daily shadow flicker amounts because it is based on monthly average sunshine data; therefore, the maximum daily shadow flicker amounts are based on "Worst-Case" modelling.

7.4.4 Assessment Results

A total of 337 potential receptors were identified within 2 km of the selected turbine locations. An additional 15 potential receptors within another 100 m of this area were included in the modelling in consideration of potential minor changes in turbine locations (Section 3.2, Appendix F).

Detailed results are provided in Section 4 of Appendix F. A total of 64 potential receptors are predicted to experience more than 30 hours of shadow flicker per year and 77 potential receptors are predicted to experience more than 30 minutes of shadow flicker per day under "Worst-Case" modelling (Tables 5 and 6, Appendix F).

Based on "Adjusted-Case" modelling (completed using weather data in Table 3 and 4, Appendix F), all potential receptors are predicted to comply with the guideline of 30 hours of shadow flicker per year (Table 6, Appendix F).

7.4.5 Effects Assessment

Project-Shadow Flicker Interactions

Project activities only interact with shadow flicker during wind turbine operations (Table 7.18).

Table 7.18: Potential Project-Shadow Flicker Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	-
Clearing and Grubbing	-
Access Road Upgrading and Construction	-
Laydown Area and Turbine Pad Construction	-
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	-
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	-
Decommissioning	
Infrastructure Removal	-
Site Reclamation	-

Assessment Boundaries

The LAA for shadow flicker includes a 2 km buffer of selected turbine locations (Figure 1, Appendix F). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for shadow flicker. The VC-specific definition for magnitude is as follows:

- Low: Measurable shadow flicker levels predicted at the exterior of receptors are below the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).
- High: Measurable shadow flicker levels at receptors predicted to exceed the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects.

Effects

The “Adjusted-Case” predicts that all potential receptors will experience less than 30 hours of shadow flicker per year. The “Adjusted-Case” cannot predict adjusted maximum daily shadow flicker amounts because it is based on monthly average sunshine data. A total of 77 potential receptors (all of which are in the LAA) were found to exceed 30 minutes of shadow flicker per day when modelled under “Worst-Case” conditions.

The “Adjusted-Case” is still considered a conservative assessment because it still assumes the following:

- Wind turbines are always in operation (i.e., rotors always spinning).
    - Wind turbines do not operate at all times, as rotor movement is dependent on suitable wind speeds and other operational factors.
- A clear line of sight, with no screening by trees, outbuildings, or other local structures.
- All receptors are sensitive to shadow flicker in every direction.

Mitigation Measures

The Proponent will develop a Complaint Resolution Plan, which will consider complaints related to shadow flicker and outline an investigation process. Mitigation to resolve complaints, if determined to be necessary, will be completed on a case-by-case basis in consultation with the affected complainant. This could include implementing an adaptive management schedule in Appendix F, as is determined to be necessary by the investigation and adapted to adjust for actual conditions experienced at the receptor.

Modelling will be updated if the turbine model or layout changes prior to construction to ensure compliance with the Environmental Assessment Supplemental Checklist: Wind Energy Projects (Nova Scotia, 2025; NSECC, 2025d).

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of Project-generated shadow flicker on non-participating receptors are characterized in Table 7.19.

Table 7.19: Shadow Flicker Residual Effects

Effect Detail	Shadow Flicker
Magnitude of Effect	**Low:** Measurable shadow flicker is expected but within regulatory compliance at non-participating receptors.
Geographic Extent of Effect	2 km buffer of turbine locations
Frequency of Effect	**Intermittent:** Effects may occur whenever the turbine rotors are spinning.
Duration of Effect	**Medium Term:** Effects are expected throughout the operational phase of the Project.
Reversibility of Effect	**Reversible**
Significance Level	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible	

8.0 GEOPHYSICAL ENVIRONMENT

8.1 Overview

The assessment of the geophysical environment included a review of topography, surficial geology, bedrock geology, and hydrogeology/groundwater.

8.2 Regulatory Context

Relevant legislation includes:

- *Environment Act* (Nova Scotia, 1995b)
- Sulphide Bearing Material Disposal Regulations (Nova Scotia, 1995d)

If blasting is required for construction, groundwater wells within 800 m must undergo an assessment in accordance with NSECC's Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

8.3 Assessment Methodology

The desktop assessment was completed through a review of the following resources:

- Aerial imagery and topography
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Geoscience Atlas (NSNR, 2021f)
- Mineral Resource Land-Use Atlas (NSNR, 2021b)

- Nova Scotia Groundwater Atlas (NSNR, 2024d)
- Karst Risk Map (NSNR, 2019)
- Manganese in Well Water Risk Map (Kennedy, 2021)
- Well Logs Database (NSECC & NSNR, 2022)
- Nova Scotia Pumping Test Database (NSNR, 2022b)
- Nova Scotia Groundwater Observation Well Network (NSECC, 2015a)
- Potential for Radon in Indoor Air (NSNR, 2009)

8.4 Assessment Results

Topography

The Study Area is located primarily within the Eastern Interior Ecodistrict (440), with the south and eastern sections within the Eastern Shore Ecodistrict (820), and a small northern section within the St. Mary's River Ecodistrict (370) (Drawing 7.1) (Neily et al., 2017).

The Eastern Interior Ecodistrict runs west from Pockwock Lake and extends east to Chedabucto Bay. This ecodistrict is the largest in the province. The ecodistrict consists of a rolling till plain with relatively gradual elevation changes, having a mean elevation of 95 m above sea level (masl). The Eastern Interior also has an upland terrain with concentrations of drumlins (Neily et al., 2017).

The Eastern Shore Ecodistrict extends from Chedabucto Bay to St. Margaret's Bay. The ecodistrict is narrow and topographically complex. Topography in this ecodistrict is rugged, with headlands and coastal peninsulas (Neily et al., 2017).

The St. Mary's River Ecodistrict is characterized by a narrow upland landscape with gently rolling to hummocky topography, with elevations averaging approximately 110 masl and reaching up to 220 masl. The terrain includes drumlins and scattered wetlands, resulting in moderate local relief across the Ecodistrict (Neily et al., 2017).

Within the Study Area specifically, elevations range from approximately 0.0 masl to 194.8 masl (Drawing 8.1).

Surficial Geology

Surficial geology of the Eastern Interior Ecodistrict consists predominantly of quartzite and slate tills of variable thickness. Drumlin formations are also common. Within the Eastern Shore Ecodistrict, surficial geology is dominated by stony glacial till deposits that are frequently shallow to bedrock and interspersed with drumlin formations. The St. Mary's River Ecodistrict is largely composed of glacial till derived from Horton Group sandstones and shales (Neily et al., 2017).

Within the Study Area specifically, surficial geology predominantly consists of a stony till plain of Quaternary age (Drawing 8.2). The plain consists of 2 m to 20 m of compact material derived from local sources, deposited at the base of melting ice sheets. These surficial features

have high erodibility, rapid drainage, high water tables, and are shallow/stony, which can pose limitations for construction (NSNR, 2021f). Other surficial features present within the Study Area include:

- Exposed bedrock
- Kame fields and esker systems
- Organic deposits
- Silty drumlin
- Silty till plain

Areas of exposed bedrock and/or bedrock overlain by a thin discontinuous layer of till were formed from glacial scouring, erosion, and/or non-deposition. These features are composed of various ages and types of bedrock and result in exposed ridges of hard rock (NSNR, 2021f).

Kame fields and esker systems are glaciofluvial deposits which consist primarily of sand and gravel with minor silt and occasional diamicton layers. The deposits generally have a thickness of approximately 4 to 6 m; however, individual landforms may be thicker, with kames ranging from about 4 to 20 m, kame terraces from 3 to 30 m, and eskers commonly around 5 m in thickness. These materials are deposited by meltwater streams associated with glacial ice. Sediments accumulate in ice-contact environments, including within openings or depressions in the ice, along the margins of glaciers between the ice and valley slopes, or within subglacial meltwater tunnels, where flowing water deposits sand and gravel that later remain as ridges after the surrounding ice melts (NSNR, 2021f).

Organic deposits (i.e., wetlands/peatlands) develop because of topographic depressions collecting and/or storing surface water along with the infilling of ponds/watercourses with vegetation. Within the Study Area, the organic deposits range in depth from 1 m to 5 m (NSNR, 2021f).

Silty drumlins comprise of silty till with a thickness of 4 m to 30 m that is derived from distance sources (including red clay). These features formed from material deposition at the base of melting ice sheets and provide moderate drainage due to stoniness. In addition, silty drumlins have calcareous bedrock components, which provide good acid rain buffering capacity (NSNR, 2021f).

Silty till plain date back to the Quaternary period. The plain is 3 m to 30 m of compact material derived from distant and local sources that was deposited at the base of melting ice sheets. Silty till plains provide moderate drainage due to stoniness and have calcareous bedrock components which provide good acid rain buffering capacity (NSNR, 2021f).

Bedrock Geology

Bedrock within the Study Area is dominated by the Goldenville Formation, with lesser occurrences of the Halifax Formation and Middle to Late Devonian muscovite–biotite monzogranite. A minor portion of the northern Study Area is underlain by the Horton Group (Drawing 8.3). The Goldenville formation includes rocks composed of metasandstone,

turbidites, and minor slate. The Halifax Formation is generally composed of slate, siltstone, and minor sandstone (NSNR, 2021f). The Horton Group, of Devonian to early Carboniferous age, is typically composed of sandstone, siltstone, conglomerate, and shale (NSNR, 2021f).

Fault lines exist in the vicinity of the Study Area. Eastern Canada, however, has a relatively low rate/risk of earthquake activity (NSNR, 2021f).

According to the Mineral Resource Land-Use Atlas, there are occurrences of sulphide-bearing slates in the Study Area (NSNR, 2021e). In addition, a review of the Nova Scotia Karst Risk Map (Drawing 8.4; based on provincial geology maps, sinkhole occurrence data, LiDAR data, and hydrogeological databases) indicated that the Study Area is predominantly within a “Low Risk” region with a small portion of the northern section within a "Medium Risk" region (NSNR, 2019).

A total of 17 abandoned mine openings (AMOs) were identified within the Study Area (NSNR, 2024d). These AMOs represent former shafts, declines, and open cuts used to extract gold. Many AMOs are protected by signage, fencing/gates, backfill and/or a concrete cap; others are not. Most of these AMOs (12) are identified as having a “Low” hazard rating, five display a “Medium” or “High” hazard rating. However, none are located within the Assessment Area (Drawing 8.3).

As there is no indoor air pathway for radon gas, it is not considered a risk for the Project and was therefore not evaluated.

Groundwater Quality and Quantity

The Study Area is underlain by plutonic and metamorphic bedrock (NSNR, 2021f). Wells located in plutonic and metamorphic bedrock typically have higher dissolved solids and lower well water yields, as groundwater can flow only along fractures. Naturally occurring trace metals such as iron, arsenic, and manganese can be found in all groundwater regions, but are often associated with plutonic and metamorphic groundwater regions (Kennedy & Drage, 2009). The Study Area’s northern section is underlain by a small section of sedimentary rock, sedimentary rock tends to have higher water yields as the groundwater can flow through the fractures and through the rock itself (Kennedy & Drage, 2009).

A review of the groundwater risk mapping indicated that the majority of Study Area is located in a “High Risk” zone for arsenic, with small sections of the Study Area categorized as “Medium Risk” (Drawing 8.5) (NSNR, 2021e). The Study Area is in a “High Risk” zone for manganese in well water, with small sections of “Medium Risk” in the northern and western sections of the Study Area (Drawing 8.6) (Kennedy, 2021). In addition, the Study Area is predominantly considered a “Low Risk” for uranium in the groundwater with small sections of “Medium Risk” in the northern and western sections of the Study Area (Drawing 8.7) (NSNR, 2021e).

Groundwater Wells

An assessment of nearby groundwater wells was conducted using the NSECC Well Logs Database (NSECC & NSNR, 2022). This database contains records of well locations and characteristics within the province, dating back until approximately 1920. The database was reviewed to identify groundwater wells that may exist within proximity of the Study Area; however, there are significant limitations associated with the spatial accuracy of this database. For the purposes of this assessment, any groundwater wells that had a spatial uncertainty of greater than 1,000 m were not considered/assessed.

A total of 128 water wells were identified within 2 km of the Study Area using the NSECC Well Logs Database (NSECC & NSNR, 2022) (Drawing 8.5 to 8.7; Appendix G). Most wells identified are located along Highway 316, from Isaacs Harbour to Cross Roads Country Harbour additional wells are located on Highway 211 from Jordanville to Fishermans Harbour and Highway 7 from Melrose to Stillwater. A summary of well statistics is provided in Table 8.1.

Table 8.1: Summary of Water Well Records within 2 km of the Study Area

	Drilled Date (year)	Well Depth (m)	Bedrock Depth (m)	Static (m)	Yield (litres per minute)	Elevation (masl)
Minimum	1953	3.35	1.22	-0.03[(1)]	0.00	0.00
Maximum	2017	107.18	39.58	60.90	908.00	115.00
Average	N/A	46.95	7.76	6.73	49.11	31.69

Source: (NSECC & NSNR, 2022)
[(1)] Negative values represent overflowing wells or static water level at ground level.

No groundwater wells were identified within the Assessment Area; however, three wells (drilled) are located within 800 m of the Assessment Area. These wells are east of the Assessment Area and are for domestic use. If blasting is required within 800 m of a well, the Proponent will conduct pre-blast surveys as per requirements under NSECC's Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

The NSNR Pumping Test Database provides long term yields for select wells throughout the province and includes details about the well construction and pumping test, and the interpreted hydrogeological properties. The nearest pumping test well (ID: 740813) is in Isaacs Harbour along Isaacs Harbour Road, approximately 15.37 km east of the Study Area and was completed in 1974 for the Nova Scotia Housing Commission. This well was drilled to a depth of 75.9 m below surface and had a static water level of 2.2 m and a safe long-term yield of 18.2 litres per minute (NSECC & NSNR, 2022).

NSECC maintains the Nova Scotia Groundwater Observation Well Network (NSECC, 2015a) to monitor groundwater level, water quality, evaluate impacts of human activities and evaluate long-term water trends. The nearest active provincial observation well to the Study Area is Stillwater (#055), approximately 10.38 km west of the Study Area, near Stillwater and within the metamorphic groundwater region, which also underlies the Project. This well was drilled in 1987 to a depth of 36 m through the Goldenville bedrock formation and is currently active. In

2022 (the most recent year with complete data), the average annual water level was 25.14 masl, and the annual water level fluctuation was approximately 1.42 m (NSECC, 2015a).

8.5 Effects Assessment

Project-Geophysical Interactions

Project activities will primarily interact with the geophysical environment during earth moving activities (Table 8.2).

Table 8.2: Potential Project-Geophysical Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	-
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for the geophysical environment is an 800 m buffer of the Project Footprint (Drawings 8.5 to 8.7). The RAA is the same as the LAA.

Assessment Criteria

The assessment criteria provided in Section 4.3 apply to the geophysical environment. The VC-specific definition for magnitude is as follows:

- Low: No geologic hazards are present within the Study Area; impacts to the quality/quantity of groundwater wells are not anticipated.
- Moderate: Risk mapping indicates a “Moderate” or “High Risk” of a geologic hazard(s) within the Study Area (or a known occurrence is identified) but the hazard(s) is

anticipated to be mitigated with routine measures; impacts to the quality/quantity of groundwater wells are possible if blasting is required (wells are located within the LAA).
- High: Risk mapping indicates a "Moderate" or "High Risk" of a geologic hazard(s) within the Study Area (or a known occurrence is identified) which cannot be mitigated with routine measures; impacts to the quality/quantity of groundwater wells are anticipated if blasting is required (wells are located within the Project Footprint).

Effects

The geophysical environment will be disturbed within the Assessment Area during the site preparation and construction phase, and again during infrastructure removal and site reinstatement. During these phases, potential impacts related to the geological environment are primarily due to the presence and subsequent disturbance of geologic hazards, including:

- Sulphide-bearing slates (i.e., acid-generating rock)
- Karst Topography
- AMOs
- Arsenic, manganese, and/or uranium-containing bedrock

In Nova Scotia, several bedrock formations are known to contain acid-generating rock (sulphide minerals such as pyrite and pyrrhotite) that, when disturbed, can result in acid rock drainage (ARD). ARD occurs when sulphide-bearing rocks are disrupted and exposed to air or water, producing sulphuric acid and metal oxides that are subsequently mobilized/leached through freshwater systems (NSNR, 2021a). Based on provincial risk mapping, some sulphide-bearing slates are recorded within the Study Area (NSNR, 2021b). However, the presence/absence of sulphide-bearing minerals and the likelihood of ARD will be confirmed following the results of the geotechnical evaluation.

Karst topography is characterized by naturally occurring sinkholes, underground drainage systems, and caves which are formed by the dissolution of soluble bedrock (e.g., limestone). The presence of karst terrain has the potential to cause extensive damage to infrastructure and the local landscape due to the risk of sudden collapse/subsidence. A review of the Karst Risk Map (Drawing 8.4) identified that the majority of the Study Area is primarily categorized as "Low Risk". However, sections of the Study Area in the north extended into "Medium Risk" zones (NSNR, 2019). While the entire Project Footprint is in "Low Risk" karst areas, as part of the geotechnical investigations completed for the Project, turbine pads (and other permanent infrastructure) will be assessed. If karst topography or other constructability limitations are encountered, infrastructure may be relocated or adjusted to avoid.

Unsecured or poorly characterized AMOs pose potential risks to personnel, equipment, and ground stability. During construction, this could result in safety hazards such as ground collapse, subsidence, or accidental entry into concealed openings. No AMOs are identified within the Assessment Area, but their presence is known within the Study Area. If encountered, unforeseen mitigation measures (e.g., delineation, stabilization, or closure of the AMO) might be necessary.

Construction activities, primarily blasting (if required), can affect the quality and quantity of the surrounding groundwater supply, depending on proximity to drinking water wells and the extent of disturbance. Disturbance of arsenic, manganese, and/or uranium-containing bedrock can mobilize these metals in groundwater and subsequently degrade nearby groundwater well quality. Risk mapping shows the Study Area is primarily situated in a region that has “High Risk” and “Medium Risk" of arsenic and manganese containing bedrock, with areas of “Medium Risk” and “Low Risk” for uranium in bedrock wells (Drawings 8.5 to 8.7) (Kennedy, 2021; Kennedy & Drage, 2020, 2017).

Potential impacts to nearby groundwater well quality because of arsenic, manganese, and uranium are not anticipated based on:

- Construction activities will primarily consist of clearing, grubbing, and grading within the surficial layer. Contact with/disturbance of groundwater is not anticipated from these activities.
- If blasting is required, potential impacts are anticipated to be localized, blasting monitoring and mitigation plans will be developed, and regulatory guidelines will be adhered to.

Potential indirect effects on connected surface waters and associated fish habitat are anticipated to be minimal due to the localized nature of groundwater disturbance and implementation of mitigation measures.

Groundwater quantity may be affected if blasting activities (as required) alter local hydrogeological flow regimes, causing groundwater to drain from or flow towards existing wells. As a result of potential impacts to groundwater quality and quantity, wells located within 800 m of blasting activities require monitoring per NSECC’s Procedure for Conducting a Pre-Blast Survey (NSECC, 1993). Based on the results of the desktop review, three wells are within 800 m of the Assessment Area. Detailed characteristics of water wells identified within 2 km of the Study Area and wells located within 800 m of the Project Footprint are provided in Appendix G. The requirements for blasting and pre-blast surveys will be confirmed and further assessed during geotechnical investigations and detailed engineering design. Potential impacts on groundwater quantity, should they occur, are anticipated to be localized.

Mitigation Measures

The following mitigation measures are recommended to minimize impacts to the geological environment:

- Limit the Project Footprint and disturbed areas to the extent practical.
- Use existing roads and site Project components in previously disturbed areas, where practicable.
- Assess the condition of AMOs if encountered, and delineation, stabilization, or close the AMO as necessary.
- Conduct blasting, if required, in accordance with provincial legislation and subject to the terms and conditions of applicable permits.

    - Conduct pre-blast surveys for wells within 800 m of blasting activities, which may include ground-truthing for nearby well locations.
        - If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply of equal or better quantity/quality than that impacted will be provided to the landowner.
    - Require that all blasts are conducted and monitored by certified professionals.
    - Notify landowners in advance of any blasting activities within 800 m.
- Assess for elevated sulphide potential in bedrock during pre-construction geotechnical surveys. If identified, develop a site-specific mitigation plan for sulphide-bearing materials in accordance with the Sulphide Bearing Material Disposal Regulations (Nova Scotia, 1995d) and in consultation with relevant regulatory departments.
- Store any soil needed for backfilling, after foundations have been poured, temporarily adjacent to the excavations until needed. Any remaining excavated material will be used on-site or removed.
- Install, monitor, and maintain erosion and sedimentation control measures as detailed in the Project Erosion and Sediment Control Plan.

Monitoring

If blasting activities are required to construct the Project (to be confirmed during geotechnical investigations), groundwater wells within 800 m of blasting activities will be monitored as per the Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).
If geologic hazards (ARD, etc.) are identified within the Assessment Area (and/or Study Area) during geotechnical investigations, a site-specific mitigation plan will be developed.

No additional monitoring programs are proposed at this time in relation to the geophysical environment.

Conclusion

The predicted residual effects of the Project on the geophysical environment (after mitigation) are characterized in Table 8.3.

Table 8.3: Geophysical Environment Residual Effects

Effect Detail	Encountered Geologic Hazard	Change to Groundwater Quality or Quantity
Magnitude of Effect	**Moderate:** Risk mapping shows the potential for geologic hazards in the Study Area.	**Moderate:** Groundwater wells located within 800 m of the Assessment Area.
Geographic Extent of Effect	800 m buffer of the Project Footprint.	800 m buffer of the Project Footprint.
Frequency of Effect	**Continuous:** If present, effects may occur continuously.	**Intermittent:** Effects may occur during blasting (if required).
Duration of Effect	**Short Term:** If present, effects limited to construction and decommissioning.	**Short Term:** Effects are possible throughout construction (if blasting is required).

Effect Detail	Encountered Geologic Hazard	Change to Groundwater Quality or Quantity
Reversibility of Effect	**Partially Reversible**	**Partially Reversible**
Significance Level	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible		

9.0 AQUATIC ENVIRONMENT

9.1 Surface Water, Fish, and Fish Habitat

9.1.1 Overview

The objective of the aquatic assessment was to inform the Project's design and collect the information necessary to assess baseline biophysical data and potential impacts to surface water and fish and fish habitat, resulting from the Project. This was accomplished using the following approach:

- Identify surface water and fish and fish habitat within watercourses within the Study Area using desktop resources (Drawing 9.1 and 9.2).
- Identify representative habitats to survey for fish (Drawing 9.3A to 9.3P).
- Traverse the Assessment Area to ground truth and delineate surface water features and provide characterization of any identified features (Drawing 9.3A to 9.3P).
- Use the information collected to inform Project design (e.g., avoid/minimize impacts to surface water).
- Assess the quality of fish habitat within the Assessment Area via field surveys.
- Use the information collected to identify potential impacts and inform mitigation and management practices.

9.1.2 Regulatory Context

Under the *Environment Act* (Nova Scotia, 1995b), NSECC has the authority to promote the sustainable management of water resources in Nova Scotia. More specifically, as per Section 5A of the Activities Designation Regulations (Nova Scotia, 1995a), the alteration of a watercourse or the flow of water within a watercourse is an activity that requires an approval from NSECC, or a notification to NSECC if the work will be completed in accordance with the Nova Scotia Watercourse Alterations Standards (NSECC, 2015c).

The *Environment Act* (Nova Scotia, 1995b, Section 3be) defines a watercourse as:

(i) the bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and
(ii) all groundwater

Using this guidance, watercourses were identified and described throughout the Assessment Area to support the description of fish habitat, and effects to regulated watercourses which may require provincial approval. While groundwater is included in the regulatory definition of a watercourse under the *Environment Act* (Nova Scotia, 1995b), this section focuses on surface water features in the context of fish habitat. In addition to the above-mentioned definition, the watercourse parameters listed in the Guide to Altering Watercourses (NSECC, 2015b) were used to aid in determining the presence of a watercourse.

The *Fisheries Act* (Canada, 1985) is the primary federal legislation governing the conservation and protection of fish and fish habitat in Canada. The *Fisheries Act* prohibits any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction (HADD) of fish or fish habitat, as well as the deposit of deleterious substances into waters frequented by fish, unless such activities are authorized through appropriate regulatory approvals. Under Section 35(2) of the *Fisheries Act*, authorization may be granted for a proposed work, undertaking or activity that may, respectively, result in the death of fish or the harmful alteration, disruption, or destruction of fish habitat.

The *Fisheries Act* defines the following:

Fish:

> "(a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals"

Fish Habitat:

> "waters frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas"

If an alteration to a watercourse or waterbody is required, or impacts to fish and fish habitat are expected, a review under the DFO Request for Review process may be required. DFO review typically occurs through the provincial watercourse alteration application process.

Finally, species that are listed as Endangered or Threatened receive individual protection from harm and destruction under SARA and/or ESA.

9.1.3 Desktop Review

The objective of the desktop review was to identify potential fish communities, as well as watercourses and waterbodies located within the Study Area and within 5 km of its boundaries.

The desktop review included a query of the following resources and databases:

- CanVec Database – Hydrographic Features (NRCan, 2023)
- Significant Species and Habitats Database (NSNR, 2024f)
- Nova Scotia Topographic Database – Water Features (GeoNOVA, 2025)
- Wet Areas Mapping (WAM) (NSECC, 2022c)
- Nova Scotia 1:10,000 Primary Watersheds (NSECC, 2011a)
- 1:10,000 Secondary and Shore Direct Watershed of Nova Scotia (NSECC, 2011b)
- Aquatic Species at Risk Map (DFO, 2025a)
- Canadian Rivers Institute distribution (Gautreau & Curry, 2020)
- ACCDC Data Report (ACCDC, 2026a)

Surface Water

A review of the federal CanVec Database – Hydrographic Features (NRCan, 2023) identified 34 named and 104 unnamed waterbodies within the Study Area, along with 90 named and 115 unnamed waterbodies within 5 km. Bull Ridge Lake, the largest waterbody in the Study Area (59.3 ha), is located in the central portion of the Study Area. A complete list of named waterbodies within 5 km of the Study Area is provided in Table 9.1.

Table 9.1: Named Waterbodies Within 5 km of Study Area

Name of Waterbody[1]	Distance[2]
Waterbodies Within the Study Area[3]	
Archibald Lake	N/A
Cains Lake	N/A
Cargill Lake (2)	N/A
Cranberry Lake (3)	N/A
Deer Lake	N/A
Desert Lake	N/A
Devil Lake	N/A
Fishermans Harbour Lake	N/A
Georges Little Lake	N/A
Granite Lake	N/A
Head Lakes (4)	N/A
Hoop Pole Hill Lake	N/A
Island Lake (2)	N/A
Lake on the Mountain	N/A
Leonard Lake	N/A
Lily Lake	N/A
Loon Lake	N/A

Name of Waterbody[1]	Distance[2]
Mink Lake	N/A
Monument Lake	N/A
Quinces Long Lake (2)	N/A
Quinces Seven Island Lake	N/A
Rocky Lake (3)	N/A
Slatterys Pond	N/A
Square Lake	N/A
Stewart North Lake	N/A
Three Cornered Lake (2)	N/A
Twin Lakes (2)	N/A
Upper Indian Harbour Lakes (11)	N/A
Waterbodies Within 5 km of Study Area[3]	
A.I's Lake	2.75
Archibalds Big Lake	4.25
Bickerton Little Lake	2.24
Bill Neds Lake	2.69
Black Pond	3.36
Cameron Lakes	0.07
Cooper Lake	4.28
Country Harbour Lake	3.41
Cumminger Lake	1.05
Cutler Lake	3.21
Dickies Lake	1.85
Fifth Lake	1.67
Forks Lake	0.75
Fourth Lake	1.20
Frasers Lake	2.68
Frog Lake	2.48
Glenelg Lake (3)	1.92
Gouin Lake	2.67
Grassy Lake (2)	0.46
Hardings Lake	2.23
Hardings Pond	3.92
Hardwood Lake	0.64
Holmes Lake	1.25
Indian Harbour Lake	0.07
Jim Lake	2.67
Joes Lake (2)	2.75
Johns Lake	0.74
Johnsons Lake	2.36
Lewis Lake	2.70

Name of Waterbody[1]	Distance[2]
Lithgow Lake	1.93
Little Lake (3)	0.08
Long Lake	3.36
Lucas Beach Pond	0.17
Mallow Lake	3.15
McDonald Lake	0.13
McKeen Lake	3.39
McMullin Lake	0.05
Mills Lake	2.54
Mitchell Lake	2.46
Mud Lake (4)	0.41
Muskrat Lake	0.01
Neds Lake	2.51
New Found Out Lake	2.14
Owl Lake	1.74
Palmer Lake	3.35
Picketts Lake	0.04
Reids Pond	3.59
Robinson Lake	0.45
Round Lake	3.68
Second Lake	2.37
Sherbrooke Lake	2.44
Stewart Lake (2)	2.70
Stewart South Lake	0.14
T Lake	4.10
Tates Lake	1.48
The Lagoon	3.82
The Millpond	1.62
Third Lake	2.00
Stewart South Lake	0.14
Timber Lake (2)	3.98
Tom Mann Lake	4.08
Weeks Pond	2.97
Weirs Pond	1.45

[1] The number in parentheses indicates the number of waterbodies with that name
[2] If multiple waterbodies, the closest distance is noted
[3] Measurement from the nearest point of the Study Area.

A review of the Nova Scotia Topographic Database – Water Features (GeoNOVA, 2025) identified 453 watercourse feature segments within the Study Area and an additional 954 feature segments within 5 km of the Study Area. Of the 453 watercourse features within the Study Area, 13 are named (Drawing 9.1):

- Archibald Brook
- Armstrong Creek Brook
- Branch Brook
- Carding Mill Brook
- Cross Brook
- Fentons Brook
- Northeast Arm Brook
- Quinces Brook
- Roaring Brook
- Rocky Brook
- Shingle Brook
- Southwest Brook
- West Branch Indian River

The majority of watercourses in the Study Area drain to the Country Harbour River primary watershed (1EP), which is comprised of 20 secondary watersheds, 10 of which intersect the Study Area. Out of these 10 secondary watersheds, eight are Shore Direct and two are named [Indian River (1EP-3) and Country Harbour River (1EP-2) secondary watershed].

The other primary watershed that intersects the Study Area is the St. Mary's primary watershed (1EO), which is comprised of nine secondary watersheds, only two intersects the Study Area [St. Mary's River (1EO-1) and Shore Direct (1EO-SD1) secondary watershed]. The Study Area overlaps 6,233 ha (4.5%) of the combined total area of these secondary watersheds. Approximately 4,065 ha of land was removed from the St. Mary's River (1EO-1) secondary watershed through the removal of MOU lands north of Melrose Country Harbour Road from the Project.

Throughout the Study Area, WAM data indicates that groundwater ranges from 0 to 79.4 m (Drawing 9.2). WAM results generally aligned with the locations of watercourses identified using topographic mapping and highlighted the potential for additional watercourses throughout the Assessment Area (NSECC, 2022c).

Fish

The NSNR Significant Species and Habitat Database available on the Provincial Landscape Viewer (NSNR, 2024f) does not contain any polygons within the Study Area pertaining to aquatic freshwater and marine species.

The Aquatic Species at Risk Map (DFO, 2025a) is a federal database showing the distribution of SAR and their associated critical habitat within Canadian waters. Within the Study Area, the database identified no records of critical habitat; however, it did identify brook floater (*Alasmidonta varicose*, S3) within a section of the Salmon River that is north of the Study Area within a 1 km buffer. It also identified six SAR/SOCI marine species within a 1 km buffer. The species found include fin whale (*Balaenoptera physalus*, S2S3), blue whale (*Balaenoptera musculus*, S1N), North Atlantic right whale (*Eubalaena glacialis*, S1), leatherback sea turtle

(*Dermochelys coriacea*, S1,S2N), white shark (*Carcharodon carcharias*, SNRM), and northern wolffish (*Anarhichas lupus*, SNR). As these are marine species, , they would not interact with the Project and are not discussed further.

ACCDC Records

The ACCDC database identified one SAR [brook floater (*Alasmidonta varicosa*)] and five fish and aquatic invertebrate SOCI within 5 km of the Study Area (Drawing 9.1; Table 9.2). Additional aquatic species within 100 km of the Study Area are presented in the ACCDC report (Appendix H).

Table 9.2: Fish and Aquatic Invertebrate SAR and SOCI within a 5 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Fish					
Alewife	*Alosa pseudoharengus*	-	-	-	S3B
American Eel	*Anguilla rostrata*	Threatened	-	-	S3N
Atlantic Salmon - Nova Scotia Southern Upland Population	*Salmo salar* pop. 6	Endangered	-	-	S1
Brook Trout	*Salvelinus fontinalis*	-	-	-	S3
Aquatic Invertebrates[(1)]					
Brook Floater	*Alasmidonta varicosa*	Special Concern	Special Concern	Threatened	S3
Eastern Pearlshell	*Margaritifera margaritifera*	-	-	-	S2

Source: (ACCDC, 2026a)
[(1)] Invertebrates with at least one aquatic life stage brought forward (i.e., larvae, etc.)

9.1.4 Field Assessment

9.1.4.1 Field Assessment Methodology

The results of the desktop review were used to inform Project design (e.g., avoid/minimize impacts to waterbodies and watercourses). Given that the Project will avoid all waterbodies, field assessment efforts were focused on potential Project-watercourse interactions (i.e., intersections of access roads and watercourses where existing crossing structures may need replacement or new structures installed).

Watercourse Assessment

Watercourse delineations were completed in conjunction with wetland delineation during the summer of 2025.

Desktop-identified watercourses, along with WAM data and predicted flow data, were provided to field staff to guide the identification and assessment of watercourses within the Assessment Area. Confirmed watercourses were delineated to their termination point or to the boundary of the Assessment Area. The watercourses were characterized using Strum's baseline delineation form, which records the following general survey details:

- Date and time
- Flow regime (perennial, intermittent, ephemeral)
- Habitat types (riffle, pool, run, etc.)
- Flow characteristics (direction, velocity, etc.)
- Physical characteristics (width, length, depth, entrenchment)
- Substrate composition
- Cover types and compositions
- Bank stability
- Photographs and coordinates

This information was collected and georeferenced using Survey123, an Environmental Systems Research Institute application for creating, sharing, and analyzing data. Watercourses were classified into four main types (Table 9.3), consistent with the definitions provided by Buttle et al. (2012).

Table 9.3: Watercourse Types

Watercourse Type	Channel Width	Channel Definition	Bed and Banks	Flow Seasonality
Large perennial	Average width approximately > 5 m	Defined channel	Defined bed and banks	Year-round flow
Small perennial	Average width approximately 2 m to 5 m	Defined channel	Defined bed and banks	Year-round flow
Intermittent	Average width approximately < 2 m	Defined channel	Defined bed and banks	Seasonal water flow
Ephemeral	No defined channel		No defined bed and banks	Seasonal water flow

In accordance with current regulatory guidelines, fish habitat was identified as any aquatic feature contiguous with a fish-bearing system, whether it is located within a watercourse, wetland, or waterbody. Where habitat was present within a channelized watercourse flowing through a wetland, it was assessed in the context of the watercourse. If habitat was located outside a defined channel, it was assessed in the context of the wetland, based on fish accessibility, or the presence of open water features. No waterbodies were assessed as none are present within the Assessment Area.

Predicted Watercourse Mapping

Drone assisted watercourse delineation was employed to identify watercourses (PWC) within the Assessment Area between September and November 2025 to survey and characterize watercourses that were inaccessible by foot or presented safety challenges. Drones were employed to provide a safe and efficient means of data collection, offering high-resolution imagery and facilitating the analysis of otherwise challenging terrain. Strum met with NSECC's surface water quality specialist on June 13, 2023. The use of drone technologies for predictive watercourse mapping was further discussed with NSECC's wetland specialist on April 29, 2026, to present this approach.

Prior to conducting field surveys, a comprehensive flight plan was created using drone navigation software. This included defining the survey area, establishing optimal flight paths, and specifying the altitude for data acquisition to ensure full coverage of the watercourse and minimize the risk of missing critical data points. Once the data was collected, orthomosaic maps were created with photogrammetry techniques, with an emphasis on correcting distortions and enhancing the overall quality of the dataset for subsequent analysis. Several indices were derived to assist with the analysis in addition to a canopy height model. The analysis with the drone data focuses on vegetation change, canopy height, inundated ground, and surface water detection to help identify watercourse features in the landscape.

Drone-derived data was then combined with other geospatial derivatives from hydrology workflows in GIS, including the integration of airborne LiDAR and terrain analysis, high resolution satellite imagery and ground-based measurements, to enhance overall understanding of the watercourse dynamics, ensuring a comprehensive characterization of the survey area. Once all the data was integrated, high-level characterizations and boundaries were inferred, providing a nuanced perspective on the features and connectivity of otherwise inaccessible wet areas.

Across various projects, Strum has observed drone surveys carried out using the methodology above to be a conservative assessment approach, typically yielding a slightly larger delineated area than what would be ground-truthed.

Electrofishing Survey

Electrofishing is a standard fish capture technique used to collect juvenile and adult fish from watercourses and waterbodies. The method involves submerging an anode and cathode in the water and passing an electrical current through the water to attract and immobilize fish for capture.
Electrofishing surveys were conducted in summer 2025 to assess fish species' presence and relative abundance. All surveys were conducted under DFO Scientific License #360444.

DFO's Interim Policy for the Use of Backpack Electrofishing Units (DFO, 2003) was reviewed and followed by all members of the electrofishing crew. This policy outlines requirements for standard equipment, safety, training, and emergency procedures. Each crew consisted of two individuals, including a qualified crew lead as defined by the Policy. The crew lead is responsible for operating the backpack electrofisher according to their training and the Policy, and for communicating safety policies and electrofishing procedures to the crew member.

Fish sampling was conducted using a Halltech Battery Backpack Electrofisher (HT-2000) with un-pulsed direct current. A crew member walked alongside the electrofisher operator to net any stunned fish using a D-frame landing net (1/8" mesh). Captured fish were held in a live well containing ambient stream water, shaded from the sun, and regularly monitored for signs of stress. At the conclusion of each pass, fish in the live well were identified (species confirmation), photographed, and measured for length. After recuperating, all fish were released back into the watercourse. As part of the assessment, field staff made note of any fish

observed but not caught, along with any points of concern such as obstructions to fish passage (e.g., elevated culverts, waterfalls, etc.).

Electrofishing was conducted concurrently with fish habitat assessments using a presence-absence approach. Surveys were completed along 100 m reaches of ten selected watercourses within and outside the Study Area. Target watercourses were identified based on field observations made in summer 2025, during watercourse delineation results, and through a desktop assessment. The desktop assessment was conducted on predicted Project intersections with watercourses on existing roads. This approach aligns with methods described in The Salmonid Field Protocols Handbook (Johnson et al., 2007), which cites multiple studies supporting the effectiveness of single-pass electrofishing for assessing species richness (Simonson & Lyons, 1995) and relative abundance (Kruse et al., 1998). Species abundance was estimated using catch per unit effort (CPUE) indices, standardized to 300 seconds of effort (Scruton & Gibson RJ, 1995). Prior to sampling, water temperature (< 22°C), potential of hydrogen (pH), and conductivity were measured using a water quality pen to confirm suitable conditions and minimize stress on captured fish.

Watercourses identified during desktop review for electrofishing surveys are as follows (Drawing 9.3A to 9.3P):

- Site 1: Unnamed watercourse flowing out of the Twin Lakes and into the Cameron Lakes [St. Mary's secondary watershed (1EO-1)]
- Site 2: Archibald Brook [St. Mary's secondary watershed (1EO-1)]
- Site 3: Unnamed watercourse flowing into Indian Harbour Lake [Shore Direct secondary watershed (1EO-SD1)]
- Site 4: Unnamed watercourse flowing into a river connecting Third Lake and Fourth Lake [Shore Direct secondary watershed (1EO-SD1)]
- Site 5: Shingle Brook [Country Harbour River secondary watershed (1EP-2)]
- Site 6: East Branch Indian River [Indian River secondary watershed (1EP-3)]
- Site 7: Unnamed watercourse between Stewart South Lake and Stewart North Lake [Shore Direct secondary watershed (1EO-SD11)]
- Site 8: Quinces Brook [Shore Direct secondary watershed (1EO-SD1)]
- Site 9: Unnamed watercourse flowing out of Fisherman Harbour Lake [Shore Direct secondary watershed (1EO-SD13)]
- Site 10: Fenton Brook [Shore Direct secondary watershed (1EO-SD7)]

These 10 locations were selected based on suitability of the habitat to conduct electrofishing surveys (i.e., deep enough to submerge the anode), location within secondary watersheds that intersect the Study Area, fish habitat potential, and access considerations. Fish species caught within these watercourses are assumed to be present upstream to the first or second order watercourses within the Study Area.

In-Situ Water Quality

Water quality parameters were measured in-situ during watercourse assessments and fish collection surveys by Strum personnel using a Hannah Combo pH/Conductivity/TDS Probe at the time of the sampling event/survey. Parameters recorded include water temperature (°C), pH, and conductivity [microsiemens per centimeter (µS/cm)]. Results were analyzed using the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Freshwater Aquatic Life (FWALs).

9.1.4.2 Field Assessment Results

There were 111 watercourses identified within the Assessment Area during field assessments (Drawing 9.3A to 9.3P): perennial (53), intermittent (49), and ephemeral (9) features ranging in channel width from 0.2 m to 12.0 m. Characteristics presented are limited to the extent of the watercourse contained within or overlapping the Assessment Area (Table 9.4). Representative photographs are provided in Appendix I.

Table 9.4: Watercourse Characteristics within the Assessment Area

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC1	Intermittent	< 0.05	186	1.15-3.2	0.0-0.06	Dominant: Gravel Sub-dominant: Cobble	Run, Riffle, Pool	Moderate
WC2	Ephemeral	< 0.05	95	1.83-2.0	0.0	Dominant: Rubble, Cobble Sub-dominant: Boulder	Riffle, Run	Moderate
WC3	Ephemeral	< 0.05	31	0.9-1.6	0.0	Dominant: Rubble Sub-dominant: Cobble, Gravel	Riffle-run	High
WC4	Intermittent	< 0.05	90	0.5-1.39	0.01-0.04	Dominant Muck/Detritus: Sub-dominant: Cobble, Gravel	Riffle-run, undefined channel	Moderate
WC5	Small Perennial	< 0.05	130	2.05-4.5	0.05-0.35	Dominant: Cobble Sub-dominant: Rubble, Gravel	Riffle-run, pool, flat	High
WC6	Ephemeral	< 0.05	167	1.2-2.2	0.0	Dominant: Cobble, Gravel Sub-dominant: Muck/Detritus:	Riffle-run, pool	Moderate
WC7	Ephemeral	< 0.05	34	0.2-1.18	0.0-0.14	Dominant: Muck/Detritus	Run	Low
WC8	Intermittent	< 0.05	99	2.75-5.5	0.0-0.1	Dominant: Muck/Detritus Sub-dominant: Rubble	Riffle, Run	Low
WC9	Intermittent	< 0.05	383	0.69-1.29	0.05-0.18	Dominant: Muck/Detritus Sub-dominant: Boulder	Run, Riffle, Flat	Moderate
WC10	Small Perennial	< 0.05	75	3.14-5.5	0.11-0.51	Dominant: Rubble, Cobble Sub-dominant: Bedrock	Riffle	High
WC11	Intermittent	< 0.05	111	0.78-1.02	0.02-0.14	Dominant: Cobble Sub-dominant: Boulder, Rubble, Muck/Detritus	Run, Flat	Moderate
WC12	Small Perennial	< 0.05	62	0.7-1.3	0.04-0.07	Dominant: Boulder Sub-dominant: Rubble, Muck/Detritus	Riffle, Run, Pool, Step pool	Moderate
WC13	Small Perennial	< 0.05	87	1.18-2.4	0.08-0.14	Dominant: Muck/Detritus Sub-dominant: Rubble	Run	High

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC14	Large Perennial	0.33-0.5	92	6.0-8.5	0.0-0.38	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Riffle, Run	High
WC15	Intermittent	< 0.05	88	1.3-1.84	0.07-0.15	Dominant: Muck/Detritus Sub-dominant: Gravel, Cobble	Flat	High
WC16	Intermittent	< 0.05	39	0.5-0.9	0.03-0.3	Dominant: Muck/Detritus Sub-dominant: Cobble	Flat	Low
WC17	Small Perennial	0.05-0.22	165	2.91-3.64	0.11-0.22	Dominant: Cobble Sub-dominant: Gravel	Run	Low
WC18	Small Perennial	105	0.05-0.25	3.0-4.0	0.08-0.16	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Riffle, Run, Pool	Moderate
WC19	Large Perennial	< 0.05	82	8.0-12.0	0.07-1.0	Dominant: Rubble Sub-dominant: Muck/Detritus	Flat	Moderate
WC21	Small Perennial	0.08-0.41	85	1.05-2.1	0.11-0.21	Dominant: Cobble Sub-dominant: Rubble, Muck/Detritus	Riffle, Run	High
WC22	Intermittent	< 0.05	77	0.53-0.95	0.0-0.07	Dominant: Cobble Sub-dominant: Boulder, Gravel	Flat	Moderate
WC23	Small Perennial	< 0.05	394	0.7-1.2	0.05-0.12	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Flat, Riffle, Run	Moderate
WC24	Intermittent	< 0.05	165	0.87-1.54	0.0-0.13	Dominant: Muck/Detritus Sub-dominant: Rubble	Flat, Riffle	Moderate
WC25	Small Perennial	< 0.05	84	0.63-5.0	0.07-0.84	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Run, Pool	Moderate
WC26	Small Perennial	< 0.05	83	1.0-2.1	0.05-0.31	Dominant: Clay/Mud, Muck/Detritus Sub-dominant:	Flat, No defined channel	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC27	Intermittent	< 0.05	110	0.62-2.65	0.07-0.14	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Flat, Riffle	Medium
WC28	Intermittent	< 0.05	84	0.78-1.13	0.01-0.05	Dominant: Sand Sub-dominant: Gravel	Flat	Moderate
WC29	Small Perennial	< 0.05	80	0.87-1.16	0.01-0.1	Dominant: Boulder Sub-dominant: Cobble, Rubble	Riffle	High
WC30	Small Perennial	< 0.05	85	0.52-1.44	0.0-0.11	Dominant: Muck/Detritus Sub-dominant: Cobble	Flat	Moderate
WC31	Small Perennial	< 0.05	99	0.8-1.2	0.19-0.25	Dominant: Muck/Detritus Sub-dominant: Cobble, Gravel	Riffle, Run	Moderate
WC32	Small Perennial	< 0.05	79	0.74-1.48	0.02-0.06	Dominant: Rubble, Cobble Sub-dominant: Gravel	Flat	High
WC33	Small Perennial	< 0.05	134	1.1-1.7	0.04-0.21	Dominant: Gravel Sub-dominant: Sand	Riffle, Run	Moderate
WC34	Ephemeral	< 0.05	20	0.9-1.34	0.07-0.09	Dominant: Muck/Detritus Sub-dominant: Bedrock, Rubble	Riffle	Low
WC35	Intermittent	< 0.05	148	0.63-0.91	0.0	Dominant: Muck/Detritus Sub-dominant: Gravel, Silt	Run	Moderate
WC36	Small Perennial	0.07-0.18	95	2.1-4.5	0.05-0.09	Dominant: Muck/Detritus, Cobble Sub-dominant: Rubble	Run, Riffle	Moderate
WC37	Small Perennial	< 0.05	223	0.6-1.3	0.08-0.13	Dominant: Boulder Sub-dominant: Boulder, Rubble, Muck/Detritus	Flat, Run, Riffle	Moderate
WC38	Intermittent	< 0.05	331	0.5-1.0	0.05-0.2	Dominant: Muck/Detritus	Flat, Pool, No defined channel	Low

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC39	Intermittent	< 0.05	81	0.46-1.4	0.0	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Run, Flat	Moderate
WC40	Intermittent	< 0.05	87	0.54-1.26	0.0-0.11	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat, Run	Moderate
WC41	Small Perennial	< 0.05	95	2.0-8.0	0.0-0.1	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Run, Pool, No defined channel	Moderate
WC42	Intermittent	< 0.05	73	0.59-0.9	0.0-0.03	Dominant: Muck/Detritus Sub-dominant: Cobble	Flat, Run	Moderate
WC43	Small Perennial	< 0.05	199	1.16-3.34	0.03-0.12	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble, Cobble	Pool, Riffle, Run	Moderate
WC44	Intermittent	< 0.05	79	0.5-1.5	0.15-0.25	Dominant: Muck/Detritus	Pool, No defined channel	Moderate
WC45	Small Perennial	< 0.05	103	2.5-4.25	0.17-0.44	Dominant: Muck/Detritus	Pool	Low
WC46	Small Perennial	0.07-0.1	383	2.0-6.5	0.1-0.3	Dominant: Cobble Sub-dominant: Rubble, Gravel	Run, Riffle, Flat	High
WC47	Intermittent	< 0.05-0.1	55	3.0-6.0	0.1-0.49	Dominant: Cobble Sub-dominant: Rubble	Run	Low
WC48	Ephemeral	< 0.05	26	0.45-0.85	0.01-0.2	Dominant: Muck/Detritus Sub-dominant: Gravel, Silt	Pool, No defined channel	Low
WC49	Intermittent	< 0.05	101	0.5-1.0	0.1-0.2	Dominant: Muck/Detritus Sub-dominant: Clay/Mud	Run, Pool, No defined channel	Low

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC50	Intermittent	< 0.05	99	0.59-1.2	0.0-0.17	Dominant: Gravel Sub-dominant: Ruibble, Cobble	Flat	Low
WC51	Intermittent	< 0.05	88	0.79-0.85	0.0-0.08	Dominant: Boulder Sub-dominant: Rubble	Riffle, Run	High
WC52	Intermittent	< 0.05	76	0.9-1.62	0.03-0.18	Dominant: Boulder, Muck/Detritus Sub-dominant: Rubble	Flat	Low
WC53	Small Perennial	< 0.05	80	0.37-2.85	0.04-1.11	Dominant: Gravel Sub-dominant: Cobble, Muck/Detritus	Run	Moderate
WC54	Intermittent	< 0.05	86	1.93-3.44	0.0-0.12	Dominant: Boulder Sub-dominant: Rubble	Flat	High
WC55	Small Perennial	0.1	85	1.42-4.5	0.25-0.35	Dominant: Boulder Sub-dominant: Gravel	Riffle, Run, Pool	Moderate
WC56	Intermittent	< 0.05	92	0.8-1.7	0.01-0.06	Dominant: Cobble Sub-dominant: Rubble, Muck/Detritus	Run	Moderate
WC57	Small Perennial	< 0.05	158	3.0-5.0	0.11-0.38	Dominant: Bedrock Sub-dominant: Rubble	Riffle, Run, Pool	High
WC58	Intermittent	0.0	94	1.21-6.0	0.0	Dominant: Boulder Sub-dominant: Muck/Detritus	No defined channel	High
WC59	Large Perennial	0.05	83	3.4-7.3	0.02-0.06	Dominant: Cobble, Sub-dominant: Rubble, Gravel	Riffle, Run, Flat	Moderate
WC60	Small Perennial	< 0.05	81	2.3-3.0	0.0-0.07	Dominant: Cobble Sub-dominant: Boulder, Rubble, Gravel	Flat, Riffle	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC62	Intermittent	< 0.05	336	1.0-1.8	0.0-0.08	Dominant: Muck/Detritus Sub-dominant: Rubble	Riffle, Run, Pool, No defined channel	Moderate
WC63	Intermittent	< 0.05	66	0.4-2.3	0.0-0.35	Dominant: Cobble, Gravel Sub-dominant: Rubble	Run	High
WC64	Intermittent	< 0.05	207	0.62-1.24	0.0-0.1	Dominant: Muck/Detritus Sub-dominant: Cobble	Flat	Moderate
WC65	Intermittent	< 0.05	38	0.5-0.7	0.0-0.0	Dominant: Gravel Sub-dominant: Cobble	Run	High
WC66	Intermittent	< 0.05	684	0.69-0.78	0.0-0.01	Dominant: Rubble Sub-dominant: Boulder	Flat	High
WC67	Small Perennial	< 0.05	154	2.1-6.5	0.18-0.9	Dominant: Cobble Sub-dominant: Muck/Detritus	Riffle	High
WC68	Intermittent	< 0.05	175	0.8-1.6	0.0-0.1	Dominant: Muck/Detritus Sub-dominant: Cobble	Flat	Moderate
WC69	Large Perennial	< 0.05	90	4.9-6.37	0.17-0.5	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat	High
WC70	Large Perennial	< 0.05	100	4.7-10.0	0.2-0.4	Dominant: Rubble Sub-dominant: Boulder, Cobble	Riffle, Run, Flat	High
WC72	Intermittent	< 0.05	94	0.35-1.07	0.0-0.16	Dominant: Muck/Detritus	Flat	Moderate
WC73	Intermittent	< 0.05	85	1.05-1.7	0.0-0.1	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Flat	Moderate
WC74	Intermittent	< 0.05	205	0.4-1.4	0.0-0.06	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Flat, Riffle, Run	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC75	Intermittent	< 0.05	79	0.8-1.35	0.09-0.28	Dominant: Muck/Detritus Sub-dominant: Gravel, Sand	Riffle, Run	Moderate
WC76	Intermittent	< 0.05	75	0.55-1.1	0.0-0.02	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Run, Flat	Moderate
WC77	Intermittent	< 0.05	104	0.37-1.05	0.0-0.05	Dominant: Muck/Detritus Sub-dominant: Rubble	Flat, Run	Moderate
WC78	Small Perennial	< 0.05	93	0.59-1.23	0.14-0.38	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Flat	Moderate
WC79	Small Perennial	< 0.05	183	0.54-0.77	0.0-0.33	Dominant: Muck/Detritus	Flat	Low
WC80	Small Perennial	< 0.05	85	0.73-1.52	0.14-0.2	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Flat	Moderate
WC81	Intermittent	< 0.05	75	0.41-1.49	0.0-0.0	Dominant: Muck/Detritus Sub-dominant: Cobble	Step pool	Moderate
WC82	Intermittent	< 0.05	84	0.96-1.71	0.02-0.08	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Riffle	High
WC83	Small Perennial	< 0.05	201	1.34-2.23	0.07-0.14	Dominant: Rubble Sub-dominant: Boulder, Cobble	Run	Moderate
WC84	Intermittent	< 0.05	82	0.65-1.07	0.0	Dominant: Muck/Detritus Sub-dominant: Gravel	Flat	Low
WC85	Intermittent	< 0.05	87	0.69-0.78	0.0	Dominant: Muck/Detritus Sub-dominant: Gravel	Flat	Moderate
WC86	Small Perennial	< 0.05	77	0.82-1.38	0.17-0.28	Dominant: Muck/Detritus	Flat	High
WC87	Intermittent	< 0.05	80	0.49-1.54	0.0-0.12	Dominant: Muck/Detritus Sub-dominant: Cobble, Gravel	Flat	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC88	Small Perennial	< 0.05	121	1.25-1.64	0.08-0.19	Dominant: Clay/Mud Sub-dominant: Muck/Detritus	Run	Moderate
WC89	Intermittent	< 0.05	245	0.6-0.7	0.06-0.11	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Riffle, Run, Pool	Low
WC90	Small Perennial	< 0.05	95	0.96-2.31	0.13-0.39	Dominant: Bedrock Sub-dominant: Boulder	Run	Moderate
WC91	Small Perennial	< 0.05	353	0.83-1.42	0.0-0.07	Dominant: Clay/Mud, Muck/Detritus Sub-dominant: Cobble	Riffle, Run	High
WC92	Intermittent	< 0.05	78	0.3-0.82	0.06-0.12	Dominant: Muck/Detritus Sub-dominant: Silt, Clay/Mud	Riffle, Run, Flat	High
WC93	Large Perennial	< 0.05	416	4.0-7.0	0.1-0.19	Dominant: Rubble Sub-dominant: Cobble	Pool, Riffle, Run	Low
WC94	Small Perennial	< 0.05	99	3.0-5.5	0.04-0.08	Dominant: Boulder Sub-dominant: Muck/Detritus	Flat, Riffle, Run	High
WC95	Small Perennial	< 0.05	169	1.15-1.6	0.1-0.17	Dominant: Clay/Mud Sub-dominant: Muck/Detritus	Pool	Low
WC96	Ephemeral	< 0.05	96	0.55-0.71	0.0-0.08	Dominant: Muck/Detritus Sub-dominant: Rubble	Flat, Riffle, Run	Moderate
WC97	Small Perennial	0.08-0.147	430	0.65-1.16	0.11-0.55	Dominant: Muck/Detritus: Sub-dominant: Rubble, Cobble	Riffle-run, flat	Moderate
WC98	Small Perennial	< 0.05	85	1.0-1.17	0.07-0.19	Dominant: Boulder Sub-dominant: Muck/Detritus	Flat	Moderate
WC99	Intermittent	< 0.05	75	0.4-0.87	0.0-0.08	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat, Riffle	Moderate
WC100	Small Perennial	< 0.05	145	0.58-1.09	0.14-0.96	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Flat	Low
WC101	Small Perennial	< 0.05	107	0.53-1.28	0.0-0.1	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Flat	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC102	Small Perennial	< 0.05	78	1.0-1.1	0.16-0.49	Dominant: Boulder, Muck/Detritus Sub-dominant: Rubble	Run	Moderate
WC103	Ephemeral	< 0.05	82	0.78-1.8	0.14-0.2	Dominant: Muck/Detritus Sub-dominant: Clay/Mud	Pool	Moderate
WC104	Intermittent	< 0.05	245	0.41-0.73	0.03-0.05	Dominant: Muck/Detritus	Flat, Riffle, Run	Moderate
WC105	Ephemeral	< 0.05	16	0.35-0.92	0.09-0.16	Dominant: Muck/Detritus	Pool, No defined channel	Moderate
WC106	Small Perennial	< 0.05	82	2.0-3.64	0.03-0.14	Dominant: Muck/Detritus Sub-dominant: Clay/Mud	Flat	Low
WC107	Small Perennial	0.2-0.26	78	1.75-2.25	0.02-0.21	Dominant: Cobble Sub-dominant: Muck/Detritus:	Riffle-run, Step pool	Moderate
WC108	Small Perennial	< 0.05	100	2.0-2.6	0.13-0.19	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble, Silt	Flat, Run	Moderate
WC109	Small Perennial	0.08-0.16	80	2.02-3.23	0.09-0.19	Dominant: Gravel Sub-dominant: Rubble	Riffle-run	Moderate
WC110	Intermittent	0.05-0.28	82	1.23-1.75	0.02-0.07	Dominant: Muck/Detritus Sub-dominant: Rubble, Clay/Mud	Run, Step pool, No defined channel	Moderate
WC111	Intermittent	0.02-0.2	35	0.85-0.98	0.03-0.08	Dominant: Muck/Detritus Sub-dominant: Rubble	Flat, Run, No defined channel	Moderate

(1) WC20, WC61 and WC71 were delineated via aerial imagery.

Perennial or permanent features see flow for the majority, if not the entirety of the year. Their continuous flow is often attributed to their direct connection to stable sources of water, including lakes and groundwater springs (US EPA, 2013). Small permanent features include streams, brooks, and creeks. These features are often first- and second-order streams fed by springs, groundwater, and run-off, and often act as tributaries to larger features, creating larger permanent features at their confluence. Large permanent features often exhibit lower flow path gradients, larger channel dimensions, and an increased flow (US EPA, 2013). A total of 53 watercourses were categorized as perennial.

Flow in intermittent watercourse features can vary throughout the year, either due to changes in their water source in other abiotic factors such as temperature or geological properties (Buttle et al., 2012). Intermittent watercourses are often first- and second-order streams fed by lakes, wetlands, springs, groundwater, and run-off. They are often episodic and flow more prominently following rainfall events and snowmelt conditions. Intermittent flow can occur underground as well as above the water table, along the surface. These features also differ in that they can observe partial channelization but will often enter below the surface (Buttle et al., 2012). A total of 49 watercourses were categorized as intermittent.

Ephemeral features are often surface water flows and only present following snowmelt periods or rainfall events. These conditions are the sole sources of stream flow present in many of these features and as a result, their flow is always observed above the water table near the surface. In Nova Scotia, and within the Study Area, ephemeral conditions can also be observed between and within wetlands, which are sometimes referred to as wetland corridors. Nine watercourses were categorized as ephemeral.

Several of the identified watercourses within the Assessment Area showed evidence of alteration resulting from anthropogenic development activities throughout the last century. For example, some watercourses have been disrupted through the installation of culverts to facilitate forestry activities and other land uses within the Study Area. Forestry activities have also indirectly impacted watercourses through a decrease in evapotranspiration, a decrease in shaded areas, and an increased displacement of organic material and sediment through surface erosion and overland flow.

Predicted Watercourse Mapping

Drone-assisted watercourse mapping identified 15 PWCs either partially or fully within the Assessment Area (Drawing 9.3A to 9.3P) including, intermittent (8), small permanent (4), and large permanent (3) watercourses. Any PWCs determined to be impacted by the Project will be ground-truthed for boundaries, characteristics, and functionality prior to any alterations.

Electrofishing Surveys

Qualitative electrofishing was conducted on 10 watercourses during summer 2025 by qualified Strum field staff (Table 9.5; Drawing 9.3A to 9.3P).

Table 9.5: Electrofishing Survey Results

Site	Secondary Watershed	Survey Date	Coordinates (UTM)		Fish Species Collected						Electrofishing Effort (Seconds)	Catch Per Species	Total Catch
			Easting	Northing	Common Name	Scientific Name	SARA	COSEWIC	ESA	S-Rank			
Site 1 Twin Lake River	St. Mary's Secondary Watershed (1EO-1)	September 3, 2025	580783	5011369	Brook Trout	*Salvelinus fontinalis*	-	-	-	S3	1853	21	21
Site 2 – Archibald Brook		September 5, 2025	580559	5003053	American Eel	*Anguilla rostrata*	-	Threatened	-	S3N	3571	12	35
					Atlantic Salmon	*Salmo salar* pop. 6.	-	Endangered	-	S1		20	
					Brook Trout	*Salvelinus fontinalis*	-	-	-	S3		1	
					White Sucker	*Catostomus commersonii*	-	-	-	S5		2	
Site 3 Indian Harbour Lake River	Shore Direct Secondary Watershed (1EO-SD1)	September 2, 2025	587971	4998796	American Eel	*Anguilla rostrata*	-	Threatened	-	S3N	3466	22	23
					Brook Trout	*Salvelinus fontinalis*	-	-	-	S3		1	
Site 4 Fourth Lake River		September 5, 2025	583721	5002479	American Eel	*Anguilla rostrata*	-	Threatened	-	S3N	693	1	1
Site 5 – Shingle Brook	Country Harbour River Secondary Watershed (1EP-2)	September 3, 2025	586945	5013185	American Eel	*Anguilla rostrata*	-	Threatened	-	S3N	1929	7	58
					Atlantic Salmon	*Salmo salar*	-	Endangered	-	S1		19	
					Brook Trout	*Salvelinus fontinalis*	-	-	-	S3		13	
					Creek Chub	*Semotilus atromaculatus*	-	-	-	S5		17	
					White Sucker	*Catostomus commersonii*	-	-	-	S5		2	
Site 6 – East Branch Indian River	Indian River Secondary Watershed (1EP-3)	September 4, 2025	591311	5002421	American Eel	*Anguilla rostrata*	-	Threatened	-	S3N	3172	13	13
Site 7 – Stewart Lake River	Shore Direct Secondary Watershed (1EO-SD11)	September 2, 2025	601751	5001334	N/A	N/A	-	-	-	-	902	0	0
Site 8 – Quinces Brook	Shore Direct Secondary Watershed (1EO-SD12)	September 3, 2025	601191	4999628	American Eel	*Anguilla rostrata*	-	Threatened	-	S3N	3168	19	22
					Ninespine Stickleback	*Pungitius pungitius*	-	-	-	S5		3	
Site 9 – Fisherman Harbour Lake River	Shore Direct Secondary Watershed (1EO-SD13)	September 2, 2025	600639	4996451	Alewife	*Alosa pseudoharengus*	-	-	-	S3B	1778	1	5
					American Eel	*Anguilla rostrata*	-	Threatened	-	S3N		4	
Site 10 – Fenton Brook	Shore Direct Secondary Watershed (1EO-SD7)	September 4, 2025	594387	5010478	Brook Trout	*Salvelinus fontinalis*	-	-	-	S3	1562	2	2

The electrofishing surveys resulted in 180 fish being caught representing seven species (alewife, Atlantic salmon, American eel, brook trout, creek chub, ninespine stickleback, and white sucker) across the 10 assessed watercourses (Drawing 9.3A to 9.3P). American eel was observed in seven of the 10 surveys locations, while brook trout were present in five of the 10. All other species were only observed in one to four different locations.

Representative photographs of fish species captured within and adjacent to the Study Area are provided in Appendix I.

Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) was used to identify priority species and habitat associated with the Project. Mobile aquatic SAR and SOCI within 100 km of the Study Area were identified from desktop resources and their respective habitat associations were compared to the habitat present within the Study Area. Priority species captured during electrofishing and trapping surveys were also included. Only those aquatic SAR or SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR or SOCI and/or their associated habitat. Priority species include:

- Alewife
- American eel
- Atlantic salmon [Nova Scotia Southern Upland East population (formerly known as Nova Scotia SU population)]
- Brook floater
- Brook trout
- Eastern pearlshell

Alewife

Alewives are not listed under federal (SARA) or provincial (ESA) legislation as SAR; however, are ranked as ‘S3B’ by ACCDC (ACCDC, 2026). They are a small, herring-like fish, usually less than 30 cm long and 400 g in weight (Jessop, 1986). They are an anadromous species that spawns in freshwater but travels between freshwater and marine environments. In the Atlantic provinces, they are more commonly found in larger rivers (DFO, 2016). Adult alewives typically live in coastal marine waters 56 to 110 m deep (NSSA, 2005). As they are anadromous, they can adjust to a wide range of salinities and may prefer cooler water than other anadromous fish. Optimal spawning, egg, and larval habitat includes substrates with 75% silt or other soft material containing vegetation and detritus (ASMFC, n.d.).

Alewife were captured in one of the 10 sampled locations (Site 9) during the 2025 electrofishing surveys (Drawing 9.3A to 9.3P).

American Eel

The American eel is assessed as Threatened under COSEWIC and ranked S3N by ACCDC (ACCDC, 2026). American eel are not listed under SARA. American eel are a migratory species with life stages in freshwater, estuary, and marine environments (COSEWIC, 2012). Though much is still unknown about the American eel, several studies have shown a temperature preference of around 16.7°C (Blakeslee et al., 2018). American eel spawning occurs in the marine environment at the Sargasso Sea and only once during their lifespan. American eel larvae, known as leptocephali, drift westward towards the coast, where they grow into glass eels and begin to migrate inland to freshwater habitats for maturation (COSEWIC, 2012). Within freshwater habitats, this species of eel is typically found in rivers and lakes, and will readily burrow into mud, sand, fine gravel, cobble, and woody debris. Within marine environments, American eels are commonly associated with protected shallow waters containing submerged vegetation (e.g., eelgrass) and woody debris (COSEWIC, 2012).

American eel were captured in seven of the 10 locations sampled during the 2025 electrofishing surveys (Drawing 9.3A to 9.3P).

Atlantic Salmon

The Atlantic salmon – Nova Scotia Southern Upland population is assessed as Endangered by COSEWIC and ranked S1 by ACCDC (ACCDC, 2026). This population in December 2025 was split into two distinct populations: Nova Scotia Southern Upland West and Nova Scotia Southern Upland East populations. The Nova Scotia Southern Upland East population is not currently listed under SARA. This population of Atlantic salmon occupy rivers in the Eastern Shore that drain into the Atlantic, east of the Musquodoboit River (DFO, 2013).

In general, the freshwater habitat preference of Atlantic salmon includes clear, well-oxygenated waters in streams with bottoms of gravel, cobble, and boulder. Atlantic salmon prefer cool waters, with spawning typically observed in the 4.4 to 10°C range, and growth typically observed in the 5 to 19°C range (US Fish and Wildlife Service, 2021a). As temperatures rise above 23°C, habitat potential decreases, and Atlantic salmon will search for deeper and cooler waters. Riffles, rapids, and pools are also necessary components for various life stages, with the preferred depth being in the 10 to 40 cm range (US FWS, n.d.). Furthermore, Atlantic salmon prefer a circumneutral pH ranging from 6.5 to 7.5 (MDEP, 2022).

Atlantic salmon species undertake long feeding migrations to the ocean as older juveniles and adults and return to freshwater streams to reproduce. Marine habitat features for both SU Atlantic salmon and the Gulf of St Lawrnce populations have not been identified due to the vast spatial and temporal variations (DFO, 2013). SU Atlantic salmon smolts migrate seaward from rivers during May-July and adults return to the rivers in the late fall to spawn (COSEWIC, 2011). Smolts from the Gulf of St Larwence population head to marine waters in spring and early summer (DFO, 2025b).

Atlantic salmon were captured in two of the 10 locations sampled during the 2025 electrofishing surveys (Drawing 9.3A to 9.3P).

Brook Floater

The brook floater is listed as Special Concern under SARA and COSEWIC, Threatened under ESA, and ranked S3 by ACCDC (ACCDC, 2026). Brook floaters are medium sized freshwater mussels that are confined to only 15 watersheds in Nova Scotia and New Brunswick (COSEWIC, 2009). The closest known river that supports brook floater populations is the Salmon River which is less than a kilometer away from the most northern portion of the Study Area. This species of mussel is typically found in shallow rivers or streams with moderate to high water flow, and substrate consisting of a rocky bottom with cobble and sand or fine gravel (DFO, 2016). Furthermore, brook floaters prefer environments with dissolved oxygen levels above 6 milligrams per litre, and a pH greater than 5.4 (DFO, 2016).

Brook floaters are considered long-term brooders, known to hold onto their larvae (called glochidia) for almost a year (COSEWIC, 2009). From there, larvae are released into the water column when temperatures rise above 14°C, where they attach to the body, gills or fins of fish, remaining there through fall and winter until being released in the following spring (COSEWIC, 2009). After development on the host fish, juveniles burrow into the substrate of rivers where they grow into adults. As sessile organisms, brook floaters require areas of flow refuge with stable substrate (COSEWIC, 2009) and in this life stage, like other mussels, brook floaters feed on algae, bacteria, and other particles filtered from the water column (COSEWIC, 2009).

The closest ACCDC observation of brook floater is 18.6 ± 0.2 km from the center of the Study Area (ACCDC, 2026a). No brook floater were identified on site during aquatic surveys or incidentally.

Brook Trout

Brook trout are not listed under federal (SARA) or provincial (ESA) legislation as a SAR; however, they are ranked S3 by ACCDC (ACCDC, 2026). This species of trout is typically found in cold, clear, and well oxygenated rivers and lakes with plenty of shade and gravel substrate (US FWS, 2009). They prefer water temperatures that do not exceed 20°C, though adult fish can tolerate temperatures of up to 25°C for short periods of time. Furthermore, despite being able to reproduce in waters with a pH as low as 4.5, they do best in a pH range of 5.0 to 7.5 (MDNR, 2012).

Brook trout are a migratory species that migrate further inland to rivers and lakes during the fall months to spawn. Sea-run Brook trout may spend April to June in marine environments, but migration to marine habitat does not always occur year to year, with some Brook trout never entering marine environments (DFO, 1988). In Nova Scotia, Brook trout are considered the number one sportfish, with approximately 2 million trout stocked within the province on an annual basis (NSFA, 2005).

Brook trout were in five of the 10 locations sampled during the 2025 electrofishing surveys (Drawing 9.3A to 9.3P).

Eastern Pearlshell

Eastern pearlshell are not listed under federal (SARA) or provincial (ESA) legislation as a SAR; however, they are listed as 'S2' by ACCDC (ACCDC, 2026a). The eastern pearlshell is a large, long-lived freshwater mussel with a thick, enlarged, oval to slightly kidney-shaped shell that typically reaches up to 15 cm in length (Massachusetts Government, 2026). Its exterior is dark brown to black and relatively smooth, often worn in older individuals, while the interior is lined with bright silvery to white nacre. Absence and/or reduced hinge teeth helps distinguish it from many other Nova Scotian freshwater mussels. The species has a large muscular foot for burrowing and usually sits partially buried in sand or gravel. It is notable for its exceptional longevity, living up to 100 years or more. It has a parasitic larval stage that depends on salmonid fishes such as Atlantic salmon and brook trout (Massachusetts Government, 2026).

The closest ACCDC observation of eastern pearlshell is 12.4 ± 0.1 km from the center of the Study Area (ACCDC, 2026a). No eastern pearlshell were identified during aquatic surveys or incidentally during the field program.

In-Situ Water Quality

Water quality results are reported and discussed as it relates to the chemical characteristics required for suitable fish habitat. Where applicable, water quality sampling results are measured against the CCME and FWAL guidelines. Summaries of water quality measurements are presented in Table 9.6. Water quality measurement locations coincide with fish collection locations, shown on Drawing 9.3A to 9.3P. The results generally provide a snapshot of in-situ water quality from select aquatic features in September 2025.

Table 9.6: Results of the In-situ Water Chemistry Analysis Complete for Fish Collection within the Study Area

Site	Sampling Dates	Water Temperature (ºC)	pH	Conductivity (µS/cm)
Site 1	September 3, 2025	14.5	5.62	57.6
Site 2	September 5, 2025	14.1	6.21	26.3
Site 3	September 2, 2025	17.3	5.62	57.6
Site 4	September 5, 2025	13.8	5.90	49.4
Site 5	September 3, 2025	16.7	6.01	56.5
Site 6	September 4, 2025	18.9	5.50	34.9
Site 7	September 2, 2025	15.5	4.02	108.4
Site 8	September 3, 2025	18.3	4.96	33.2
Site 9	September 2, 2025	16.7	5.49	87.7
Site 10	September 2, 2025	12.3	5.50	34.9

Water temperature affects the metabolic rates and biological activity of aquatic organisms, thus influencing the use of habitat by aquatic biota. There are no CCME guidelines related to temperature and aquatic biota. Temperature preferences of fish vary between species, as well

as with size, age, and season. All temperatures recorded are considered within the suitable temperature range for cold-water fish species (< 20 ºC).

The CCME FWAL guidelines suggest a range of pH from 6.5 to 9.0 is suitable within freshwater habitat to support aquatic health. Kalff (2002) indicates that the loss of fish populations is gradual and depends on fish species, but decline is evident when pH is < 6.5. Kalff (2002) further states that a 10 to 20% species loss is apparent when pH < 5.5. Nova Scotia typically has more acidic freshwater systems with pH ranging from 5 to 9. Surface water features within and adjacent to the Study Area were found to be slightly acidic with pH ranging from 4.02 to 6.21, with an average pH of 5.48. Only three of the sampled sites exhibited pH so low to expect species loss (< 5.5).

Conductivity is often used as the baseline for detecting potential sources of pollution and changes in water quality. Significant changes in these parameters could indicate that a discharge or some other source of pollution has entered the aquatic resource. Conductivity levels measured within the Study Area are considered typical for Nova Scotia (NSSA, 2014).

9.1.5 Effects Assessment

Project-Surface Water and Fish and Fish Habitat Interactions

Project activities, primarily those that involve earth moving, vegetation removal, and road construction have the potential to impact watercourses, and fish and fish habitat (Table 9.7). These potential impacts could include habitat loss, changes to hydrology, and/or displacement of sediment.

Table 9.7: Potential Project-Surface Water, Fish and Fish Habitat Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	X

Project Phase	Potential for Interaction
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for watercourses includes the Assessment Area. The RAA includes the secondary watersheds that intersect the Study Area (Drawing 9.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 also apply to watercourses. The VC-specific definition for magnitude is as follows:

- Negligible: No loss of fish or fish habitat. No expectation for changes to water quantity or quality.
- Low: Small loss of fish or fish habitat, with minimal potential for changes to water quantity or quality or resulting impacts to fish.
- Moderate: Moderate loss of fish or fish habitat. Changes to water quantity or quality expected but can be managed with routine measures. Impacts to fish will only be experienced by individuals rather than entire populations and can be managed with routine measures.
- High: High loss of fish and fish habitat. Changes to water quantity or quality expected that would be challenging to manage with routine measures. Impacts to fish will be experienced by entire populations and cannot be managed with routine measures; the population's life history is permanently altered.

Effects

Habitat Loss

The Project design has been optimized to minimize interactions between the Project and watercourses and wetlands that may support fish and fish habitat. However, in areas where interactions are unavoidable, there is a potential for habitat loss.

Watercourse alterations (e.g., culvert installations) required for the Project have the potential to impact aquatic habitat. The removal of overhanging vegetation from stream banks decreases shade/cover for fish resulting in increased vulnerability to predators. Likewise, the removal of instream cover, such as coarse woody debris or edge habitat (e.g., undercut banks) can have a negative effect on both fish and aquatic invertebrate habitat (MTO, 2009). Furthermore, alterations to channel morphology including altered substrate composition and interference with sediment transport can also result in aquatic habitat degradation.

A total of 126 watercourses were identified within the Assessment Area through field assessments or drone-assisted watercourse mapping. To be conservative, all watercourses

identified are presumed to be accessible to fish, even though there may be seasonal restrictions to the intermittent watercourses or permanent barriers downstream preventing fish passage.

The Project may interact with up to 106 watercourses through either an upgrade to an existing watercourse crossing or construction of a new crossing. An estimated 49 of these watercourses contain pre-existing crossings that have structurally declined. Therefore, some watercourses are expected to see improved hydrology and fish passage with upgraded crossings. There are an additional 25 watercourses within turbine pad buffers or laydown areas that will be avoided following micrositing efforts during the detailed design phase.

A summary of the watercourses identified to be directly affected by the Project (i.e., new road crossing or upgrading in existing crossing) is provided in Table 9.8.

Table 9.8: Direct Effect Summary

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC2	Ephemeral	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC4	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC5	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC6	Ephemeral	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC8	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC9	Intermittent	None observed	Structure to be installed for road crossing
WC10	Small Perennial	None observed	Structure to be installed for road crossing
WC11	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC12	Small Perennial	None observed	Structure to be installed for road crossing
WC13	Small Perennial	None observed	Structure to be installed for road crossing
WC14	Large Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC15	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC17	Small Perennial	None observed	Structure to be installed for road crossing

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC18	Small Perennial	None observed	Structure to be installed for road crossing
WC19	Large perennial	None observed	Structure to be installed for road crossing
		None observed	Structure to be installed for road crossing
WC20	Large Perennial	None observed	Structure to be installed for road crossing
WC21	Small Perennial	None observed	Structure to be installed for road crossing
WC22	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC23	Small Perennial	None observed	Structure to be installed for road crossing
WC24	Intermittent	None observed	Structure to be installed for road crossing
WC25	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC26	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC27	Intermittent	None observed	Structure to be installed for road crossing
WC28	Intermittent	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC29	Small Perennial	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC30	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC31	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC32	Small Perennial	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC33	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC35	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC36	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC37	Small Perennial	Yes, bridge at road crossing	Structure to be assessed and potentially replaced during road upgrades

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC38	Intermittent	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC39	Intermittent	None observed	Structure to be installed for road crossing
WC40	Intermittent	None observed	Structure to be installed for road crossing
WC41	Small Perennial	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC42	Intermittent	None observed	Structure to be installed for road crossing
WC43	Small Perennial	None observed	Structure to be installed for road crossing
WC44	Intermittent	None observed	Structure to be installed for road crossing
WC45	Small Perennial	None observed	Structure to be installed for road crossing
WC46	Small Perennial	Yes, bridge at road crossing	Structure to be assessed and potentially replaced during road upgrades
WC47	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC49	Intermittent	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC50	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC51	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC52	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC53	Small Perennial	None observed	Structure to be installed for road crossing
WC54	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC55	Small Perennial	None observed	Structure to be installed for road crossing
WC56	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC57	Small Perennial	None observed	Structure to be installed for road crossing
WC59	Large Perennial	None observed	Structure to be installed for road crossing

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC60	Small Perennial	None observed	Structure to be installed for road crossing
WC61	Intermittent	None observed	Structure to be installed for road crossing
WC62	Intermittent	None observed	Structure to be installed for road crossing
WC63	Intermittent	None observed	Structure to be installed for road crossing
WC64	Intermittent	None observed	Structure to be installed for road crossing
WC65	Intermittent	None observed	Structure to be installed for road crossing
WC66	Intermittent	None observed	Structure to be installed for road crossing
WC67	Small Perennial	None observed	Structure to be installed for road crossing
WC68	Intermittent	None observed	Structure to be installed for road crossing
WC69	Large Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC70	Large Perennial	None observed	Structure to be installed for road crossing
WC72	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC73	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC75	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC76	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC77	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC78	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC80	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC81	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC82	Intermittent	None observed	Structure to be installed for road crossing

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC83	Small Perennial	None observed	Structure to be installed for road crossing
WC84	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC85	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC86	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC87	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC88	Small Perennial	None observed	Structure to be installed for road crossing
WC89	Intermittent	None observed	Structure to be installed for road crossing
WC91	Small Perennial	None observed	Structure to be installed for road crossing
WC92	Intermittent	None observed	Structure to be installed for road crossing
WC93	Large Perennial	None observed	Structure to be installed for road crossing
WC96	Ephemeral	None observed	Structure to be installed for road crossing
WC98	Small Perennial	None observed	Structure to be installed for road crossing
WC101	Small Perennial	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC102	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC103	Ephemeral	Yes, plastic culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC104	Intermittent	None observed	Structure to be installed for road crossing
WC106	Small Perennial	None observed	Structure to be installed for road crossing
WC107	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC108	Small Perennial	None observed	Structure to be installed for road crossing
WC109	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC110	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC106	Small Perennial	None observed	Structure to be installed for road crossing
WC107	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC108	Small Perennial	None observed	Structure to be installed for road crossing
WC109	Small Perennial	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
WC110	Intermittent	Yes, metal culvert at road crossing	Culvert to be assessed and potentially replaced during road upgrades
PWC1	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC2	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC3	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC4	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC6	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC10	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC11	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
PWC15	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.

If required, the 107 forecasted alterations could involve potentially upgrading 52 of the existing watercourse crossings to facilitate upgrading the existing road and the installation of up to 55 new crossings associated with new roads. The Proponent will obtain approval under the NSECC watercourse alteration process, as required (NSECC, 2015a). DFO will review the application to determine whether the crossing will result in a HADD of fish habitat. Based on Strum's experience with culvert design, crossing construction, monitoring, and mitigation implementation, it is anticipated that standard design and construction practices can be applied to avoid a HADD determination. No additional direct impacts to watercourses, waterbodies, or wetlands supporting fish habitat are expected.

Fish Injury or Mortality

If required, blasting may result in sensory disturbance to fish, impacting fish behaviour, spawning grounds, and migration patterns. The detonation of explosives near watercourses can produce post-detonation shock waves which involves a rise to a high peak pressure and then a subsequent fall to below ambient hydrostatic pressure. This pressure deficit can cause impacts in fish (Wright & Hopky, 1998). An overpressure in excess of 100 kilopascals can result in effects on fish including damage to the swim bladder in finfish, and potential rupture and hemorrhage to the kidney, liver, spleen and sinus venous. It is also possible that fish eggs and larvae can be damaged (Wright & Hopky, 1998). The degree of damage is related to the type of explosive, size, and pattern of the charges and the distance to the watercourse, depth of water within the watercourse, and species, size and life stage of the fish.

Sublethal effects have also been observed including changes in fish behaviour as a result of noise produced during blasting (Wright & Hopky, 1998). Should blasting be required, guidance outlined by Wright and Hopky (1998) will be used to develop a Blasting Management Plan. The Blasting Management Plan will be designed to ensure that appropriate setback distances are maintained, or mitigations are implemented to protect fish and fish habitat from the potential impacts of blasting.

Changes in Surface Water Quantity and Quality

Changes to the amount of flow can alter channel morphology, increase flood potential, cause erosion, and disrupt habitat characteristics that support vulnerable species (MTO, 2009) .

These impacts could result from:

- Alteration of bank or channel grades for road development.
- New or upgraded watercourse crossings.

- Compaction of soil from the heavy machinery required for turbine assembly.
- Alteration of channel beds to facilitate the removal and replacement of preexisting infrastructure (e.g., collapsed culverts).

Changes in surface water quality can arise from alterations to the surrounding environment and can include an increase in water temperature from decreased shade, an increase in pollutants from machinery and infrastructure, and the mobilization of sediments (MTO, 2009). Given the dynamic nature of channeling water, effects on water quality can quickly spread throughout different reaches of the respective watershed.

Sediment mobilization within aquatic environments can cause shifts in ecological integrity, including changes to plant species composition, the distribution of primary and secondary producers, and the habitat suitability for vulnerable species (Tilman et al., 1997). Erosion and sedimentation can occur throughout the lifecycle of the Project, including during construction efforts, routine road maintenance, and daily traffic. However, the highest potential for these effects is related to the construction and upgrading of access roads, and the installation or upgrading of crossing structures. The alteration or removal of riparian vegetation can also result in bank instability and erosion, further exasperating these effects (MTO, 2009).

Surface water quantity and quality can also be affected by changes to groundwater. Blasting may be required for site grading or foundation work, which can influence surface water through both chemical and physical groundwater pathways. Changes to surface water quality or quantity as a result of blasting are not expected to be measurable and limited to the immediate area around the blasting zone. If blasting is required, appropriate monitoring and mitigation plans will be developed, and all regulatory guidelines will be adhered to.

Mitigation Measures

In addition to the removal of infrastructure from the MOU lands north of the Melrose Country Harbour Road from the Project, the following mitigative measures will be implemented to avoid and mitigate any potential effects on watercourses. In addition, the Proponent will develop and implement a Surface Water Management Plan, Erosion and Sediment Control Plan, Blasting Management Plan, and a site-specific Contingency Plan.

As required, all work completed under the provincial watercourse alteration notification process will be done in accordance with the Nova Scotia Watercourse Alterations Standards and will be executed by a certified Watercourse Alteration Installer/Sizer. For work requiring a watercourse alteration approval, specific and detailed mitigation will be developed and submitted to NSECC as part of the application process.

The following mitigation measures will be implemented:

Habitat Loss

- Educate Project personnel on the sensitivity of aquatic habitat.
- Flag watercourses and avoid impacts to the watercourse and adjacent riparian habitat to the extent practicable.

- Obtain watercourse alteration approval from NSECC and adhere to the terms and conditions of the approval, as required.
- Require that the crossing is installed by a certified Watercourse Alteration Installer/Sizer, and designed to avoid any permanent diversion, restriction or blockage of natural flow, such that the hydrologic function of the watercourse is maintained.
    - Follow best management practices during culvert installation (e.g., installation in the dry and following appropriate timing windows, where practicable).
- Require that fueling or lubrication of equipment not occur within 30 m of a watercourse, with the exception of refueling of pumping equipment that is being used to control water at a work site during construction, if required.
- Allow for natural vegetation along the watercourse edge and above the ordinary high-water mark to facilitate the stabilization of the area, and restoration of fish habitat.
- Conduct any work within the bed of a watercourse between June 1 and September 30 to avoid sensitive periods in the life cycles of fish, to better control water flow, and to allow for a faster vegetation period (NSECC, 2015b).
    - Consult with NSECC and DFO if work is required outside of appropriate timing windows.
- Complete a fish rescue, as required, during instream work requiring isolation of flow.

Fish Injury or Mortality

- Develop a Blasting Management Plan, if blasting is required, that is informed by the guidance provided in Wright and Hopky (1998).

Changes in Surface Water Quantity and Quality

- Develop and implement a Surface Water Management Plan.
    - Integrate water management systems including diversion and collection ditches, roadside drainage channels, vegetated swales, and stormwater retention ponds, as directed by the Surface Water Management Plan.
- Design any necessary alterations in a way that maintains the natural grade of the watercourse, to ensure the hydroperiod remains as it was pre-alteration.
- Fit any watercourse crossings with appropriately sized infrastructure, as prescribed by a certified Watercourse Alteration Installer/Sizer.
- Develop a site-specific Erosion and Sediment Control Plan during the detailed design phase.
    - The plan will target the disturbance to banks (as required) and adjacent land, and will address the type of control structures, proper installation techniques, grading, maintenance and inspection, timing of installation, and vegetation.
- Maintain 30 m vegetated buffers around watercourses, to the extent practicable.
- Integrate outlet protection features to dissipate flow velocities and decrease erosion at the outflow.
- Require that if concrete is to be used, it is pre-cast and cured for at least one week prior to use at a crossing site (NSECC, 2015b).

- Use untreated, rot-resistant timber (e.g., hemlock, tamarack, juniper, or cedar) below the ordinary highwater mark to avoid the leaching of toxic preservatives into waterways (NSECC, 2015b).
- Use rock material that is clean, coarse granular, non-ore-bearing, non-watercourse-derived, and non-toxic to aquatic life (NSECC, 2015b).
- Plan any construction activities that may impact stream banks and substrate to align with low-flow periods.

Monitoring

For crossings subject to provincial notification requirements, visual monitoring will be completed during the installation process to ensure the work is conducted in accordance with the Nova Scotia Watercourse Alteration Activity Standards (NSECC, 2015c). If the crossing requires an approval, monitoring will be determined as part of the permitting process.

A watercourse monitoring plan, if required as part of the permitting phase, may include hydrological, sediment, and stability assessments upstream, downstream, and at the crossing of the watercourse.

Conclusion

The predicted residual effects of the Project (after mitigation) are characterized in Table 9.9.

Table 9.9: Surface Water and Fish and Fish Habitat Residual Effects

Effect Detail	Habitat loss	Fish Injury or Mortality	Changes to Water Quality and Quantity
Magnitude of Effect	**Low:** A small loss of fish habitat.	**Negligible:** No loss of fish expected.	**Low:** Minimal potential for altered hydrology or impact to fish.
Geographic Extent of Effect	Assessment Area	**N/A**	Assessment Area
Frequency of Effect	**Single Event:** Effects may occur during initial construction.	**N/A**	**Intermittent:** Effects may occur during initial construction and during operations.
Duration of Effect	**Medium Term:** Effects may occur during all phases but will not extend beyond decommissioning.	**N/A**	**Medium Term:** Effects may occur during all phases but will not extend beyond decommissioning.
Reversibility of Effect	**Partially Reversible**	**N/A**	**Partially Reversible**
Significance Level	Not Significant	Not Significant	Not Significant

Effects Assessment Ratings (Refer to Table 4.4 for definitions)

Magnitude: Negligible, Low, Moderate, High
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

9.2 Wetlands

9.2.1 Overview

Wetland assessments were conducted to identify and delineate wetland habitat so that impacts to wetland area and function could be avoided and minimized, to the extent practicable. This was achieved by using the following approach:

- Identify wetland habitat in the Study Area using desktop resources.
- Ground-truth and delineate wetland habitat within the Assessment Area.
- Complete functional assessments for delineated wetlands within the Assessment Area.
- Identify the potential for and confirm the presence of Wetlands of Special Significance (WSS) within the Assessment Area.
- Use the results to refine the Project design to avoid/minimize impacts to wetlands, to the extent practicable.

9.2.2 Regulatory Context

The Nova Scotia Wetland Conservation Policy (NSECC, 2019b) outlines a policy goal of no loss of WSS and no net loss in area and function for other wetlands. Wetlands are considered WSS based on the wetland having significant species or species assemblages, high levels of biodiversity, significant hydrological value, or high social or cultural importance. Under this policy, the following wetlands are considered WSS:

- All salt marshes.
- Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (Crown and Provincial lands only), Provincial Park, Nature Reserve, Wilderness Area or lands owned or legally protected by non-government charitable conservation land trusts.
- Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through the Nova Scotia Eastern Habitat Joint Venture program.
- Wetlands known to support at-risk species as designated under SARA or ESA.
    - This applies only to the portion of the wetland directly supporting species designated as ‘Threatened’ and/or ‘Endangered’ (M. Gorman, 2023)
- Wetlands in designated protected water areas as described within Section 106 of the *Environment Act,* S.N.S. 1994-95, c. 1.

Additionally, a wetland can be determined to be a WSS based on its functional assessment score (discussed further in Section 9.2.4).

Per Section 5 of the *Environment Act,* S.N.S. 1994-95, c. 1, approval from NSECC is required to alter a wetland. Nova Scotia considers a wetland alteration to be any activity that may affect wetland function and habitat. Such activities include, but are not limited to, excavating, flooding, infilling, or draining (Nova Scotia, 1995b).

9.2.3 Desktop Review

A desktop review for the location and extent of potential wetlands across the Study Area was completed using the following information sources:

- Wetlands Inventory (ECCC, 2024)
- WSS Database (NSECC, 2020b)
- Nova Scotia Hydrographic Network (ODNS, 2024)
- WAM Database (NSECC, 2022c)
- Nova Scotia Digital Elevation Model (DEM) (GeoNOVA, 2024b)
- Satellite and aerial imagery

The Wetlands Inventory (ECCC, 2024) identified 738 provincially mapped wetlands overlapping with the Study Area, which are classified as: swamp (417), fen (28), bog or fen (155), unknown (125), marsh (12), and water (1). The wetlands range in size from 0.05 ha to 346 ha (Drawing 9.5).

According to the NSNR WSS database (2020b), there are 42 potential WSS overlapping with the Study Area. These wetlands were predicted to be potential WSS based on the following flagging criteria found in the Nova Scotia Wetland Conservation Policy (NSECC, 2019b): 31 wetlands partially within a designated area (Big Plains Wilderness Area), and 11 wetlands overlapping with reported observations of SAR. Five of these potential WSS overlap with the Assessment Area, including two wetlands partially within designated areas, and three wetlands containing reported SAR observations. At the time of the WSS database being published, Big Plains Wilderness Area was pending designation; however, this Wilderness Area was designated in 2023 (Nova Scotia, 2023).

The Nova Scotia Hydrographic Network (ODNS, 2024) was used in conjunction with the WAM database (NSECC, 2022c) and DEM layer to further assess the distribution of confirmed and potential wetland habitat within the Study Area. These sources identified potential wet areas and predicted flow based on the assumed depth-to-water generated from digital elevation data (Drawing 9.2).

Wet Area Modelling

Wet area modelling was conducted prior to field surveys to identify target areas with a high likelihood of containing wetlands and guide field surveys. To create the model, an artificial intelligence method known as Deep Learning was used in tandem with GIS to create an improved wet area map of the Study Area.

To train the model, sample wetland data sourced from NSNR was used to create image chips of the predictor variables. These image chips were also able to incorporate the results of the field assessments, thus allowing for further fine tuning of the model. During this process, training loss, validation loss, accuracy, and dice were calculated, all crucial to strengthening the accuracy and validity of the Deep Learning process. That is, once the model was created, it

was assessed to ensure reasonable predictions were computed, and field assessment results were utilized to cross check for validation.

The predictor variables used were multiband imagery from a high-resolution satellite, and elevation-based data products derived from the provincial LiDAR. Additionally, terrain preprocessing and elevation surface analysis were completed and conditioned to enhance the output.

The elevation derived data products comprise three groups: hydrology, geomorphometry, and visualization products. These datasets offer unique inputs to the model, incorporating topography and vegetation into the classification while focusing on principal components. Furthermore, these data products inform the model and the quality assurance/quality control process.

The results of the desktop review assisted in scoping field studies and were ultimately used to conduct a constraints analysis thus refining turbine/road siting locations to avoid known wetland features to the extent practicable.

9.2.4 Field Assessment

9.2.4.1 Field Assessment Methodology

General

Wetland field assessments were completed within the Assessment Area in October 2023, and between May and December 2025. Surveys included high-level assessments for hydrology, complemented by in-depth wetland delineations and functional assessments. Wetland surveys were done in conjunction with watercourse assessment surveys (Section 9.1).

To accompany wetland field surveys, a list of SAR and SOCI known to occur within the region of the Project was compiled to help with incidental identification. Details of any incidental SAR or SOCI observations are captured under their respective reporting sections, as applicable to the species observed.

Field Delineations

Strum ecologists surveyed the Assessment Area, delineating and characterizing each wetland identified in accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). Wetland boundaries were determined by confirming the following:

- Presence of hydrophytic (water loving) vegetation.
- Presence of hydrologic conditions which result in periods of flooding, ponding, or saturation during the growing season.
- Presence of hydric soils.

A positive indicator must typically be present for all three parameters to definitively identify any given site as a wetland (Environmental Laboratory, 1987). Field staff walked meandering transects throughout the landscape to look for wet areas. When wetlands were identified, the boundary was flagged, and the spatial boundaries were recorded on iPads using the Environmental Systems Research Institute software Survey 123.

Identification of Hydrophytic Vegetation

Hydrophytic vegetation is defined as the sum of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produces permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (Environmental Laboratory, 1987). Hydrophytic vegetation should be the dominant plant type observed in wetland habitat (Environmental Laboratory, 1987).

Dominant plant species observed in each wetland were classified according to indicator status (probability of occurrence in wetlands), in accordance with the U.S. Fish and Wildlife Service National List of Vascular Plant Species that Occur in Wetlands: NE Region (Region 1) (US FWS, 1988) (Table 9.10). These indicators are used as this region most closely resembles the flora and climate regime of Nova Scotia.

Table 9.10: Classification of Wetland-Associated Plant Species

Plant Species Classification	Abbreviation[(1)]	Probability of Occurring in Wetland
Obligate	OBL	> 99%
Facultative Wetland	FACW	66% to 99%
Facultative	FAC	33% to 66%
Facultative Upland	FACU	1% to 33%
Upland	UPL	< 1%
No indicator status	NI	Insufficient information to determine status
Plants That Are Not Listed (assumed upland species)	NL	Does not occur in wetlands in any region

Source: (US FWS, 1988)
[(1)] A '+' or '-' symbol can be added to the classification to indicate greater or lesser probability, respectively, of occurrence in a wetland.

If the majority (greater than 50%) of the dominant vegetation at a data point is classified as obligate (OBL), facultative wetland (FACW), or facultative (FAC), then the location of the data point is considered to be dominated by hydrophytic vegetation.

Identification of Hydric Soils

A hydric soil is formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper layer (USDA NRCS, 2003). Indicators of the presence of hydric soils include soil colour (gleyed soils and soils with bright mottles and/or low matrix chroma), aquic or preaquic moisture regimes, reducing soil conditions, sulfidic material (odour), soils listed on the hydric soils list, iron and manganese concretions, organic soils (histosols), histic epipedons, high organic content in the surface layer of sandy soils, and organic streaking in sandy soils.

During field surveys, soil pits were excavated to a minimum depth of 40 cm or until (auger) refusal. The soil in each pit was then examined for hydric soil indicators. The matrix colour and mottle colour (if present) of the soil were determined using Munsell Soil Colour Charts.

Determination of Wetland Hydrology

Wetland habitat, by definition, either periodically or permanently has a water table at, near, or above the land surface. To be classified as a wetland, a site should have at least one primary indicator or two secondary indicators of wetland hydrology (Table 9.11). Wetland habitat is assessed for signs of hydrology via visual observations across the area and through the assessment of soil pits.

Table 9.11: Indicators of Wetland Hydrology

Examples of Primary Indicators	Examples of Secondary Indicators
Surface Water	Oxidized Root Channels in the Upper 30 cm
Saturation	Local Soil Survey Data
Sediment Deposition	Dry Season Water Table
Drainage Patterns	Stunted or Stressed Plants
Water-stained Leaves	Drainage Patterns
Sparsely Vegetated Concave Surfaces	Surface Soil Cracks
Hydrogen Sulfide Odor	Moss Trim Lines

Source: As identified in the Nova Scotia Wetland Delineation Data Form (NSECC, 2011c) which has been adapted from the U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (Environmental Laboratory, 1987)

Predicted Wetland Mapping

Drone-assisted wet area modelling was employed to identify predicted wetlands (PWL) within the Assessment Area between September and November 2025 to collect data in areas of the Study Area that were inaccessible by foot or presented safety challenges. Drones were employed to provide an efficient means of data collection, offering high-resolution imagery and facilitating the analysis of otherwise challenging terrain. Strum met with NSECC's wetland specialists on June 8, 2023 and April 29, 2026, to present this approach.

Prior to conducting field surveys, a comprehensive flight plan was created using drone navigation software. This included defining the survey area, establishing optimal flight paths, and specifying the altitude for data acquisition to ensure full coverage of the wetland and minimize the risk of missing critical data points. Once the data were collected, orthomosaic maps were created by stitching together individual images, with an emphasis on correcting for distortions and enhancing the overall quality of the dataset for subsequent analysis.

Drone-derived data were then combined with other geospatial information, including satellite imagery and ground-based measurements, to enhance the overall understanding of the wetland dynamics, ensuring a comprehensive characterization of the surveyed area. Once all the data was integrated, high-level characterizations and boundaries were inferred, providing a nuanced perspective on the features and connectivity of otherwise inaccessible wetlands.

Across various projects, Strum has observed drone surveys carried out using the methodology above to be a conservative assessment approach, typically yielding a slightly larger delineated area than what would be ground-truthed.

Functional Assessments

Wetland functional assessments were completed for all field-delineated wetlands identified within the Assessment Area. Functional assessments were completed using the Wetland Ecosystems Services Protocol – Atlantic Canada (WESP-AC) evaluation technique Version 2 in 2023, and Version 3.4 in 2025 (Adamus, 2021, 2025). The WESP-AC process involves the completion of three forms: a desktop review portion (Office Form) that examines the landscape level aerial conditions to which the wetland is situated, and two field forms identifying biophysical characteristics of the wetland (Field Form) and stressors to the wetland (Stressors Form), if any. The process serves as a rapid method for assessing individual wetland functions and values. WESP-AC addresses multiple specific functions that wetlands may provide, presented in Table 9.12 (WESP-AC Version 2.0) and Table 9.13 (WESP-AC Version 3.4).

Table 9.12: WESP-AC Version 2 Function Parameters

Grouped Wetland Function	Specific Wetland Functions
Hydrologic Function	Surface Water Storage
Aquatic Support	Aquatic Invertebrate Habitat
	Stream Flow Support
	Organic Nutrient Export
	Water Cooling
Water Quality Support	Sediment Retention & Stabilization
	Phosphorus Retention
	Nitrate Removal & Retention
	Carbon Sequestration
Aquatic Habitat	Anadromous Fish Habitat
	Resident Fish Habitat
	Waterbird Feeding Habitat
	Waterbird Nesting Habitat
	Amphibian and Turtle Habitat
Transition Habitat	Songbird, Raptor, & Mammal Habitat
	Pollinator Habitat
	Native Plant Habitat

Source: (Adamus, 2021)

Table 9.13: WESP-AC Version 3.4 Function Parameters

Grouped Wetland Function	Specific Wetland Functions
Hydrologic Function	Surface Water Storage
Water and Climate Protection	Sediment and Toxicant Retention and Stabilization
	Phosphorus Retention
	Nitrate Removal and Retention
	Carbon Stock Preservation
Aquatic Support	Stream Flow and Temperature Support
	Organic Nutrient Export
	Aquatic Primary Productivity
Aquatic Habitat	Anadromous Fish Habitat
	Resident and Other Fish Habitat
	Waterbird Feeding Habitat
	Waterbird Nesting Habitat
	Amphibian Habitat
Transition Habitat	Raptor and Wetland Songbird Habitat
	Pollinator Habitat
	Native Plant Habitat

Source: (Adamus, 2025)

The specific wetland functions are individually allocated into grouped wetland functions and measured for “functional” and “benefit” scores. Wetland function relates the wetland’s natural ability (i.e., water storage), whereas wetland benefits are benefits of these functions, whether it is ecological, social, or economic. The highest functioning wetlands are those that have both high ‘function’ and ‘benefit’ scores for a given function. WESP-AC enables a comparison to be made between individual wetlands within a province to gain a sense of the importance each has in providing ecosystem services.

In addition to the grouped wetland functions above, WESP-AC Version 2 also measures the following specific wetland functions, however, these are only evaluated by their benefit scores:

- Wetland Condition
- Wetland Risk (i.e., sensitivity to potential impacts)

For each wetland evaluated, the WESP-AC process calculates the overall score for the grouped wetland functions and the specific wetland functions listed in Table 9.12 and 9.13. One score each is provided for function and benefit. Scores are ranked as “Lower”, ”Moderate”, or “Higher” allowing for analysis of the wetland as compared to calibrated baseline wetland scores in Nova Scotia to date. A ”Higher” WESP-AC score means that wetland has a greater capacity to support those processes as compared to other wetlands in the province. A ”Higher” WESP-AC score in both the function and benefits category means the wetland supports the natural ecosystem functions and provides services with potentially societal importance.

Additionally, the WESP-AC process assesses the wetland for a determination of WSS based on the functional results. The grouped functions outlined in Table 9.12 and Table 9.13 are

further combined into “supergroups” for habitat (Aquatic Habitat and Transition Habitat) and support [Hydrologic, Water Quality Support (Version 2)/Water & Climate Protection (Version 3.4) and Aquatic Support] functions. WSS designation is dependent on a certain combination of ‘moderate’ and ‘high’ scores within these groups.

The WESP-AC functional evaluation technique recognizes that, in many cases, delineation of entire wetlands where they extend beyond a Study Area is not always feasible (e.g., property ownership) or required to complete an appropriate assessment using this tool (NBDELG, 2021). Instead, WESP-AC permits the delimitation of an assessed area, defined as the wetland or portion of wetland physically assessed in the field, while the Office Form considers the broader landscape characteristics and functions that extend beyond the assessed area and/or study area boundary.

9.2.4.2 Field Assessment Results

General

Field surveys completed during 2023 and 2025 identified 388 field-delineated wetlands, either partially or fully within the final iteration of the Assessment Area (Drawing 9.3A to 9.3P). For coherence, wetlands were given a numerical ID based on the order of their occurrence from north to south. If a wetland was segmented, but segments remained hydrologically connected, the wetland was given the same numeric ID. Detailed results and a photograph log of each wetland are found in Appendix J. Due to the inaccessible nature of some of the Assessment Area and recent design iterations, several areas were not ground-truthed during wetland field surveys. These areas will be assessed in support of wetland permitting as needed.

Of the 388 identified wetlands, the most prominent wetland type was swamp (304). The Canadian Wetland Classification System (NWWG, 1997) defines a swamp as a wetland characterized by the dominance of woody vegetation in which the water table is typically at or near the surface or inundates the soil for a significant portion of the growing season. Swamps are often associated with poorly drained or saturated soils, and they provide important habitat for various plant and animal species adapted to wet conditions. Swamps can be further sub-divided into treed swamps or shrub swamps, depending on their physiological makeup.

Of the identified swamps, 231 were classified as treed swamps. Treed swamps are characterized by the presence of trees as the dominant vegetation [> 7.5 cm diameter at breast height (DBH)] and an environment that is not as waterlogged as other wetland types, such as shrub swamps or marshes. These wetlands typically experience their highest hydroperiod during spring and fall precipitation events (NSNR, 2018b). As a result, treed swamps provide deciduous trees [e.g., red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*)] and coniferous trees [e.g., black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*)] the opportunity to establish themselves and adapt to the inconsistent inundation periods (NSNR, 2018b). Typical species composition of the identified treed swamps consisted of cinnamon fern (*Osmundastrum cinnamomeum*), New York fern (*Amauropelta noveboracensis*), three-seeded sedge (*Carex trisperma*), northern starflower (*Lysimachia borealis*), bunchberry (*Cornus*

canadensis), black spruce, red maple, and balsam fir. Surface water was observed in approximately 23% of the treed swamps, while saturation was almost always present as identified through the excavation of small soil pits.

An additional 67 identified swamps were classified as shrub swamps. Shrub swamps are dominated by shrubs and smaller woody plants (< 7.5 cm DBH, > 1 m tall) with a denser understory and tend to form in permanently or seasonally flooded areas where the surface is moist from ground saturation. As drought conditions were persistent during the survey period and the temporal extent of the surficial hydroperiod is expected to be seasonal, surface water was only marginally more prevalent in shrub swamps than within treed swamps (approximately 27%). Trees may be present but are less dominant than in treed swamps. In many cases, shrub swamps eventually transition into treed swamps via succession (NSNR, 2018b). The typical species composition of shrub swamps identified within the Assessment Area included bunchberry, cinnamon fern, mountain holly (*Ilex mucronata*), northern wild raisin (*Viburnum cassinoides*), sheep laurel (*Kalmia angustifolia*), tamarack (*Larix laricina*), red maple, and balsam fir.

The shrub swamps observed throughout the Assessment Area were of both natural origin and the product of extensive forestry activity in the area. In areas of previous harvest, the impacts of reduced interception and evapotranspiration were visible in the form of an increased water yield, including increased soil moisture and increased instances of overland flow and/or water pooling. In such situations, vegetation was often dominated by the dense regeneration of tree species in the early- to mid-successional stage.

The remaining six swamps were classified as treed/shrub swamp complexes, in which areas containing treed swamp and areas containing shrub swamp were present in one contiguous wetland.

There were 56 bogs observed within the Assessment Area. These wetlands are characterized by their poor drainage, accumulation of peat, and dense coverage of either *Sphagnum* moss or graminoids (NSNR, 2018b). Bogs typically have a high water table and receive most of their water from precipitation, resulting in nutrient-poor, acidic environments (NWWG, 1997). This acidity is further compounded due to the release of organic acids that result from the decomposition of *Sphagnum spp.* Typical species composition observed included cinnamon fern, tawny cottongrass (*Eriophorum virginicum*), northern pitcher plant (*Sarracenia purpurea*), three-seeded sedge, creeping snowberry (*Gaultheria hispidula),* common Labrador tea (*Rhododendron groenlandicum)*, sheep laurel, tamarack, and black spruce. Trees, when present, were often stunted and scattered throughout.

There were three fens identified within the Assessment Area. Fens typically exhibit more open water than bogs, often with a connection to a watercourse or abutting a lakeshore. They may also receive hydrology from neighbouring uplands. Ultimately, this inundation of water from outside sources facilitates a transfer of nutrients that allow fens to support a wider variety of flora and fauna than bogs (NSNR, 2018b). Typical species assemblages included common Labrador tea, northern wild raisin, tamarack, and black spruce.

One marsh was observed within the Assessment Area. Marshes often display more persistent surface water areas that tend to shrink as the growing season progresses. Hydrology can be influenced by various external sources, including precipitation, surface runoff, surface water connections, and groundwater. This diversity of hydrological sources typically fosters a nutrient-rich environment which, when paired with the lack of canopy cover, often facilitates the vigorous growth of herbaceous vegetation (NSNR, 2018b). In many cases, this vigorous growth can lead to the full engulfment of any open water areas, resulting in meadow-like marshes that may be partially or fully inundated. Vegetation composition within the delineated marsh included common woolly bulrush (*Scirpus cyperinus*), Canada manna grass (*Glyceria canadensis*), and Canada goldenrod (*Solidago canadensis).*

The remaining 24 wetlands identified within the Assessment Area were wetland complexes, including bog-swamp and fen-swamp complexes. These wetlands contained defined areas of each wetland type in one, contiguous wetland.

Predicted Wetland Mapping

Drone-assisted wet area modelling identified 70 PWLs either partially or fully within the Assessment Area (Drawing 9.3A to 9.3P). These PWLs were classified based on aerial imagery and hydrology data as: treed swamp (36), shrub swamp (2), treed and shrub swamp (2), fen (1), bog (23), bog and swamp (4), and fen and swamp (2). Detailed characterization and functional assessment results were not collected for the PWLs. However, any PWLs determined to be impacted by the Project will be ground-truthed for boundaries, characteristics, and functionality as required to support wetland permitting.

Functional Assessments – Version 2

Functional assessments using WESP-AC Version 2.0 were completed in 2023 by Strum wetland specialists for four wetlands located within the Assessment Area. A summary is provided in Table 9.14.

Table 9.14: Summary of WESP-AC Assessments Using Version 2.0 for Wetlands within the Assessment Area

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL28	3.25	10.00	3.45	4.08	7.97	6.18	4.31	3.96	8.37	4.24	N/A	8.26	N/A	5.91	**No**
WL33	7.97	10.00	9.20	4.67	3.52	3.09	6.02	7.64	6.69	7.41	N/A	6.52	N/A	7.50	**No**
WL39	7.03	10.00	9.28	4.87	5.70	2.57	4.23	3.92	7.46	4.07	N/A	6.52	N/A	5.83	**No**
WL43	2.62	10.00	3.19	3.14	8.04	6.25	5.60	4.26	9.17	4.47	N/A	8.26	N/A	7.04	**No**
Grouped Function Scores by Rating (%)															
Lower	50.00	0.00	0.00	25.00	0.00	50.00	0.00	0.00	0.00	75.00		0.00		0.00	
Moderate	25.00	0.00	50.00	75.00	25.00	50.00	100.00	75.00	25.00	25.00		0.00		50.00	
Higher	25.00	100.00	50.00	0.00	75.00	0.00	0.00	25.00	75.00	0.00		100.00		50.00	

[1] Wetlands of Special Significance determination as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator.
Ratings are represented by colours, where red corresponds to a 'lower' rating, yellow corresponds to a 'moderate' rating, and green corresponds to a 'higher' rating.

Hydrological Group

The hydrologic group evaluates the effectiveness of a wetland to store or delay the downslope movement of surface water. However, the model does not account for wetland size, and in turn, the ability of larger wetlands to store more water than smaller wetlands. Wetlands that have the highest benefit scores within this group tend to be located within developed areas, where water storage is more valuable to reduce flood risks.

Wetlands had a mix of lower (50%), moderate (25%), and high (25%) hydrologic function score, and all wetlands had a high hydrologic benefit score.

Water Quality Group

The water quality group is compiled from four different functions: sediment retention and stabilization; phosphorus retention; nitrate removal; carbon sequestration. The main function of this group is to evaluate the wetland's potential to intercept, retain, and filter sediments, particulates, and organic matter. Similar to the hydrologic group, the wetlands that have the higher benefit score in this regard include those that do not have a surface water outlet and instead are isolated from flowing surface water. This model also does not account for wetland size and as such, larger wetlands do not necessarily score higher than small wetlands, although size may factor into this function.

All wetlands had either a moderate (50%) or high (50%) functional water quality score, and the majority of wetlands had a moderate (75%) water quality benefit score.

Aquatic Support Group

The aquatic support group comprises four individual functions: stream flow support; aquatic invertebrate habitat; organic nutrient export; and water cooling. The main function of this group is to determine the wetland's ability to support ecological stream functions that promote habitat health. Wetlands lying adjacent to or containing flowing water score higher than those that do not (e.g., isolated wetlands). Additionally, headwater wetlands are crucial for supporting stream flow during the dry season by contributing to water flow via groundwater input and storage capacity. Headwater wetlands provide stream flow and cooling functions due to their typically limited exposed surface water, insulating properties and groundwater water storage and retention time. Treed swamps can also provide aquatic support through groundwater discharge (e.g., seeps) and vegetation shading.

The majority of wetlands had a high (75%) score for the aquatic support functional group, and all wetlands had either a lower (50%) or moderate (50%) aquatic support group benefit score.

Aquatic Habitat Group

The aquatic habitat group is compiled from five different functions: anadromous fish habitat, resident fish habitat, amphibian and turtle habitat, waterbird feeding habitat, and waterbird nesting habitat. Wetlands that have the higher functions within this group include those that are adjacent to or contain water features with potential habitat characteristics (e.g., in-stream cover, aquatic vegetation, etc.).

All wetlands received moderate aquatic habitat functional scores, and aquatic habitat group benefit scores were either moderate (75%) or high (25%).

Transition Habitat Group

The transition habitat group comprises three different functions: songbird, raptor, and mammal habitat, native plant habitat and pollinator habitat. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants.

The Study Area has a mix of remote habitat and fragmented or disturbed habitat. The majority of wetlands (77%) scored high on transition habitat function, while (75%) scored low on transition habitat group benefit.

Wetland Condition

Wetland condition refers to the integrity or health of a wetland as defined by its vegetative composition and richness of native species. Scores are derived from the similarity between the wetland being evaluated and reference wetlands of the same type and landscape setting (Adamus, 2021).

All wetlands in the Assessment Area had higher wetland condition scores. Wetlands with higher ranks contain a relatively good level of ecological integrity and species diversity.

Wetland Risk

Wetland risk takes sensitivity and stressors into account by averaging the two. Sensitivity is the lack of intrinsic resistance and resilience of the wetland to human or naturally caused stress (Niemi et al., 1990). Stress relates to the degree to which the wetland is or has recently been anthropogenically altered in a way that degrades natural condition and/or function. The functional assessment tool uses five metrics to measure sensitivity: abiotic resistance, biotic resistance, site fertility, availability of colonizers, and growth rate. The model applies four stress groups: hydrologic stress, water quality stress, fragmentation stress, and general disturbance stress. Wetlands that are highly resilient may have lower risk scores despite their exposure to multiple stressors. Additionally, wetlands exposed to fewer threats, but with low resilience may have higher risk scores. Wetland resilience is tied to multiple factors, such as size, proximity to natural land cover, and presence of invasive species.

All wetlands in the Assessment Area scored either moderate (50% of wetlands) or high (50% of wetlands) for wetland risk, meaning they have a reasonable resilience and are not highly susceptible to change.

Functional Assessments – Version 3.4

Functional assessments using WESP-AC Version 3.4 were completed in 2025 by Strum wetland specialists for 383 wetlands located within the Assessment Area. A summary is provided in Table 9.15.

Table 9.15: Summary of WESP-AC Assessments Using Version 3.4 for Wetlands within the Assessment Area

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL1	7.44	4.42	9.23	3.12	0.77	2.74	2.87	0.39	8.20	8.48	**No**
WL2	7.44	4.33	9.26	3.76	0.68	2.47	1.53	0.75	7.70	2.84	**No**
WL3	5.34	6.77	9.69	0.76	1.82	5.00	5.11	4.27	9.03	1.63	**No**
WL4	8.22	2.31	6.25	0.70	6.60	4.28	2.86	0.67	7.98	2.82	**No**
WL5	9.41	5.50	9.60	1.63	2.15	4.12	1.63	1.02	8.43	2.86	**No**
WL6	7.28	10.83	5.26	1.85	5.56	6.56	2.91	0.80	7.72	2.80	**No**
WL7	7.08	2.82	8.46	1.31	1.33	2.90	3.06	0.57	8.06	1.51	**No**
WL8	6.81	2.59	9.94	1.32	3.56	3.23	4.47	6.38	9.09	3.92	**No**
WL9	7.44	12.75	9.09	3.34	1.47	2.98	3.33	0.56	8.22	2.75	**No**
WL10	5.70	2.54	9.16	2.01	1.72	2.52	2.31	0.72	8.47	2.79	**No**
WL11	6.65	2.54	9.27	1.96	1.75	2.51	2.31	0.70	8.32	2.78	**No**
WL12	7.28	2.71	9.09	0.88	1.70	2.71	2.52	0.81	7.95	2.85	**No**
WL13	6.09	4.46	9.22	0.60	0.88	4.58	2.25	0.63	7.16	1.91	**No**
WL14	6.86	4.74	9.91	3.34	3.71	4.20	6.24	7.21	7.85	9.02	**No**
WL15	6.38	5.96	9.65	2.75	1.99	6.08	5.94	4.13	8.69	2.69	**No**
WL16	3.68	8.93	5.08	2.64	5.80	6.62	5.12	8.42	8.53	2.95	**No**
WL17	7.44	10.02	9.56	2.90	0.11	2.71	3.17	0.54	8.29	2.75	**No**
WL18	6.65	4.06	5.15	3.22	6.10	4.57	1.69	1.02	7.68	2.87	**No**
WL19	6.46	5.59	9.82	1.66	4.07	6.25	7.06	4.62	8.96	2.81	**No**
WL20	3.58	4.29	5.10	1.39	6.99	6.35	4.08	0.71	9.53	2.74	**No**
WL21	2.70	4.34	3.67	2.02	5.63	6.81	6.26	2.95	9.35	2.74	**No**
WL22	8.22	5.59	9.35	1.63	0.39	4.20	1.88	0.59	7.77	2.76	**No**
WL23	7.44	5.77	9.43	3.05	2.32	4.54	2.44	0.51	7.75	2.77	**No**
WL24	1.55	5.68	4.49	1.96	7.15	7.87	5.91	5.33	8.56	1.63	**No**
WL25	7.44	4.74	9.16	1.23	1.40	4.95	2.88	0.53	8.01	2.78	**No**
WL26	4.43	5.77	4.65	2.25	4.51	6.67	5.16	8.46	8.31	2.95	**No**
WL27	7.44	5.64	9.13	2.07	0.95	4.25	1.88	0.68	7.50	2.79	**No**
WL29	7.44	4.60	9.17	2.45	1.70	2.87	2.28	0.61	7.19	2.84	**No**
WL30	8.22	5.77	9.33	1.62	0.95	4.49	2.40	0.52	7.32	2.79	**No**
WL31	6.49	6.09	8.74	1.77	0.66	4.86	1.49	0.78	7.45	1.57	**No**
WL32	7.44	5.91	9.26	2.10	0.33	4.58	1.21	2.14	7.60	6.22	**No**
WL34	8.62	4.34	9.17	1.30	1.39	4.44	2.08	1.37	8.00	3.62	**No**
WL35	9.21	4.79	9.14	1.26	1.78	4.93	2.05	0.94	7.81	1.70	**No**
WL36	9.21	4.91	9.36	1.22	2.25	4.93	0.95	1.00	7.45	2.29	**No**
WL37	9.21	8.52	9.45	2.16	0.46	4.48	3.10	2.51	8.14	8.98	**No**
WL38	8.22	10.21	9.54	2.20	0.53	3.38	4.31	0.28	8.24	1.46	**No**
WL40	8.82	10.24	9.55	3.00	2.00	4.40	1.93	0.71	7.21	2.83	**No**
WL41	8.82	4.62	9.13	0.60	0.84	4.69	1.49	2.80	8.13	9.05	**No**
WL42	7.44	4.42	9.14	2.45	1.55	2.49	0.88	0.72	7.10	1.45	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL44	6.65	4.46	9.21	1.88	0.40	4.60	2.35	0.49	8.45	2.73	**No**
WL45	7.44	4.78	9.17	2.11	1.70	3.07	1.73	0.67	7.26	2.82	**No**
WL46	8.22	5.87	9.32	1.67	2.02	4.61	1.88	0.84	7.75	1.55	**No**
WL47	8.62	2.31	9.23	1.33	1.38	2.30	2.76	0.70	8.14	2.78	**No**
WL48	9.01	9.02	6.71	1.40	6.63	6.33	2.44	0.72	8.47	2.76	**No**
WL49	4.24	4.51	8.80	2.12	0.99	2.65	1.40	0.64	7.13	2.82	**No**
WL50	6.65	4.78	8.97	2.55	1.41	3.13	2.39	0.52	7.35	2.79	**No**
WL51	4.86	4.29	5.32	1.18	5.54	6.55	6.00	6.83	9.37	8.94	**No**
WL52	8.79	2.03	9.41	1.24	3.53	2.47	3.10	-0.07	7.85	2.68	**No**
WL53	8.62	2.31	9.12	1.33	1.00	2.31	2.76	0.72	8.63	2.79	**No**
WL54	7.44	5.68	9.37	2.07	2.63	4.38	2.23	0.74	7.20	2.83	**No**
WL55	-0.44	4.23	3.22	1.39	7.89	8.42	7.50	5.45	9.08	1.65	**No**
WL56	8.62	6.59	9.58	3.12	2.04	2.56	2.30	0.68	8.07	2.78	**No**
WL57	10.00	4.34	9.61	0.61	1.94	4.63	3.84	0.41	8.48	2.75	**No**
WL58	7.28	2.88	8.99	0.67	1.14	2.74	1.36	1.01	7.17	2.91	**No**
WL59	6.65	9.53	8.98	3.04	0.61	2.39	2.11	0.63	7.99	2.77	**No**
WL60	7.44	2.82	9.17	1.31	1.46	2.73	1.96	0.60	7.59	2.79	**No**
WL61	6.65	6.88	9.00	2.85	0.94	4.08	1.84	1.93	7.68	6.19	**No**
WL62	8.22	4.29	9.52	1.69	2.26	2.54	2.80	0.52	8.12	2.74	**No**
WL63	6.13	6.37	9.93	1.28	2.35	4.69	5.65	7.51	9.05	1.71	**No**
WL64	7.44	10.02	9.34	2.89	1.99	2.70	3.13	0.53	8.04	2.74	**No**
WL65	7.44	2.59	9.17	1.32	1.46	2.50	1.96	0.62	7.73	2.80	**No**
WL66	7.44	9.25	9.12	2.42	1.56	2.23	3.17	0.57	8.22	2.74	**No**
WL67	7.44	2.14	9.46	1.34	1.46	2.17	3.20	0.57	8.27	2.74	**No**
WL68	8.22	2.14	9.40	0.70	1.73	2.16	3.04	0.57	8.43	2.75	**No**
WL69	7.44	9.47	9.33	2.41	1.68	2.50	3.45	0.57	8.43	2.75	**No**
WL70	7.44	4.65	9.17	2.11	0.99	2.89	1.73	0.58	7.64	2.79	**No**
WL71	7.44	3.27	9.29	1.29	1.92	3.38	3.17	0.52	7.98	2.77	**No**
WL72	1.02	3.05	4.96	1.52	8.74	6.78	8.25	8.07	8.47	2.18	**No**
WL73	8.62	3.27	6.43	1.29	6.95	5.02	3.16	0.35	8.86	2.70	**No**
WL74	7.44	2.43	9.37	1.33	2.11	2.47	3.21	0.63	7.47	2.80	**No**
WL75	8.62	3.05	9.21	1.30	1.69	2.98	1.51	1.19	7.96	2.96	**No**
WL76	10.20	11.35	9.70	2.39	0.43	2.91	2.80	0.32	8.41	2.69	**No**
WL77	7.44	3.05	9.14	1.30	1.15	3.02	2.23	0.49	7.87	1.46	**No**
WL78	8.62	2.99	9.21	1.30	1.34	3.07	2.67	0.57	8.95	2.74	**No**
WL79	8.22	8.30	9.64	3.02	0.16	4.73	0.80	0.88	7.40	1.73	**No**
WL80	5.70	5.81	5.88	2.90	6.20	4.20	3.08	0.74	8.57	2.79	**No**
WL81	9.41	3.10	9.60	0.70	0.81	3.20	2.89	0.53	8.70	2.68	**No**
WL82	7.44	6.09	6.22	1.71	5.16	6.15	3.31	0.53	7.77	2.75	**No**
WL83	7.08	6.41	4.71	2.03	4.17	6.47	2.98	0.55	8.48	2.76	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL84	6.49	6.32	9.21	2.04	1.89	5.36	3.18	0.56	7.97	1.50	**No**
WL85	7.44	6.14	6.34	1.71	5.25	6.16	2.66	0.69	8.00	2.73	**No**
WL86	8.22	4.57	9.53	1.11	1.54	4.67	1.76	0.85	8.16	1.59	**No**
WL87	7.08	5.08	6.13	1.21	5.10	6.25	1.79	0.88	8.51	1.63	**No**
WL88	7.44	4.74	9.17	2.11	1.02	3.00	1.74	0.67	7.25	2.82	**No**
WL89	7.44	5.13	9.39	1.21	1.69	5.25	1.50	0.21	7.68	1.40	**No**
WL90	8.62	3.55	9.37	1.28	0.63	3.60	2.08	1.01	8.21	2.80	**No**
WL91	8.62	5.30	9.37	1.20	1.75	5.49	1.85	1.12	7.92	2.92	**No**
WL92	7.28	5.53	9.39	0.56	0.64	5.72	1.67	1.03	8.41	2.85	**No**
WL93	3.75	3.27	3.70	5.48	5.93	5.61	5.43	7.56	9.09	2.89	**No**
WL94	6.49	3.72	8.90	1.27	1.04	3.71	1.50	0.83	7.95	1.57	**No**
WL95	6.88	10.72	9.45	0.32	1.37	5.67	2.87	0.51	8.27	1.46	**No**
WL96	8.62	5.30	9.42	1.20	1.77	5.48	1.77	1.02	8.40	2.85	**No**
WL97	1.08	4.96	3.91	1.80	7.26	6.56	5.03	3.27	8.35	2.87	**No**
WL98	10.20	11.43	9.79	2.39	0.89	2.94	2.44	0.68	8.22	2.78	**No**
WL99	7.44	5.08	9.25	1.21	1.18	5.27	2.24	0.77	7.53	2.81	**No**
WL100	5.64	4.78	9.64	2.69	1.70	3.55	3.53	2.32	8.77	2.80	**No**
WL101	6.65	4.74	8.96	2.55	0.39	3.06	2.11	0.61	7.80	2.76	**No**
WL102	8.62	6.68	9.26	1.69	2.02	5.79	2.57	0.68	8.06	2.82	**No**
WL103	7.44	9.56	9.36	4.89	1.26	3.58	2.89	0.50	7.63	2.73	**No**
WL104	0.76	3.83	4.70	1.41	8.30	7.28	6.10	4.29	9.07	1.64	**No**
WL105	3.59	2.76	4.50	1.46	5.37	4.34	5.13	3.14	9.27	2.74	**No**
WL106	2.34	7.08	5.26	3.94	6.37	5.08	3.80	6.52	7.96	2.93	**No**
WL107	0.51	6.86	2.95	3.85	7.47	6.85	5.86	8.42	8.62	2.88	**No**
WL108	6.65	9.70	9.16	3.03	0.44	2.68	3.00	0.51	8.12	2.74	**No**
WL109	7.44	2.99	9.23	1.30	1.65	3.01	2.68	0.60	7.55	2.80	**No**
WL110	8.62	5.36	9.39	1.20	1.06	5.64	2.77	0.71	8.36	2.78	**No**
WL111	3.45	4.96	5.49	3.98	7.20	5.59	4.19	2.70	8.63	2.95	**No**
WL112	6.28	10.29	9.91	3.08	1.66	3.80	4.84	6.61	8.72	2.82	**No**
WL113	9.21	2.93	9.28	1.37	0.48	2.98	2.89	0.67	8.23	2.78	**No**
WL114	5.14	2.53	4.36	1.44	5.76	5.84	6.43	4.48	8.33	2.77	**No**
WL115	9.21	5.36	9.23	1.20	1.33	5.64	2.64	0.54	8.84	2.74	**No**
WL116	8.62	6.32	9.22	2.30	1.54	3.51	1.93	0.99	8.01	2.85	**No**
WL117	4.24	2.65	9.09	1.32	0.86	2.71	3.12	0.56	8.19	2.74	**No**
WL118	0.98	10.74	3.49	2.71	7.74	6.55	4.84	7.93	8.68	2.95	**No**
WL119	1.50	3.25	4.99	2.63	8.76	7.06	5.17	4.46	8.97	9.00	**No**
WL120	8.22	2.59	9.28	0.68	2.11	2.68	3.33	0.58	8.27	2.74	**No**
WL121	8.22	5.13	9.43	0.57	0.56	5.17	1.14	0.34	6.16	1.34	**No**
WL122	7.44	9.59	9.33	2.40	-0.11	2.63	3.60	0.54	8.22	2.69	**No**
WL123	8.22	2.88	9.33	0.67	1.44	2.87	2.63	0.57	7.58	2.80	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL124	6.65	4.15	5.25	2.25	7.97	6.89	2.29	0.73	8.49	2.79	**No**
WL125	8.62	5.08	9.39	1.21	1.63	5.35	2.94	0.72	8.25	2.77	**No**
WL126	9.21	5.41	6.07	1.20	6.11	6.68	2.64	0.56	9.01	2.74	**No**
WL127	3.09	2.99	3.44	2.05	6.15	5.94	6.36	4.43	9.33	2.79	**No**
WL128	5.70	4.33	9.05	3.21	0.11	2.60	2.85	0.51	8.41	2.75	**No**
WL129	5.02	8.06	9.92	2.99	1.22	6.73	5.53	5.30	8.96	6.21	**No**
WL130	7.44	5.02	9.33	1.22	1.43	5.40	4.01	0.23	8.41	2.64	**No**
WL131	9.21	5.08	9.46	1.21	2.69	5.35	2.78	0.51	8.75	1.53	**No**
WL132	5.22	4.60	9.66	2.31	1.16	4.05	5.31	5.20	8.26	2.84	**No**
WL133	7.83	4.62	9.27	1.87	1.19	4.84	2.89	1.91	8.10	6.16	**No**
WL134	5.14	4.46	9.88	1.38	1.10	5.75	5.52	2.72	8.96	1.42	**No**
WL135	8.62	3.61	9.20	1.34	1.79	3.69	2.59	0.78	7.65	2.81	**No**
WL136	3.47	5.58	5.40	2.41	7.49	5.48	5.94	6.11	9.26	1.67	**No**
WL137	6.27	4.51	9.67	2.26	2.84	3.51	4.13	3.52	8.80	1.60	**No**
WL138	6.49	4.74	9.20	1.23	2.40	5.05	3.43	0.41	8.84	2.70	**No**
WL139	1.59	4.29	3.03	2.80	7.34	5.89	4.88	3.22	8.21	7.59	**No**
WL140	8.22	9.43	9.34	2.65	0.87	3.54	4.16	2.87	7.23	7.40	**No**
WL141	-0.45	4.57	4.67	1.38	8.87	7.94	5.46	0.60	9.52	1.60	**No**
WL142	8.22	2.82	9.33	0.77	1.61	2.75	1.96	0.73	7.48	2.83	**No**
WL143	6.55	2.48	9.96	1.01	3.12	2.95	3.77	1.02	9.05	2.82	**No**
WL144	3.65	5.13	8.96	1.21	2.38	5.46	3.36	0.34	8.95	1.46	**No**
WL145	6.02	4.34	9.21	1.25	2.62	4.58	3.25	0.34	8.90	1.46	**No**
WL146	6.49	4.23	9.20	1.25	2.87	4.49	3.45	0.36	8.58	1.44	**No**
WL147	4.70	11.28	9.85	4.58	1.43	3.92	5.12	5.52	7.96	2.79	**No**
WL148	8.62	6.95	9.45	2.77	2.47	2.99	1.53	1.00	8.22	2.85	**No**
WL149	4.24	9.53	8.83	2.40	1.95	2.48	2.54	0.72	8.18	2.78	**No**
WL150	5.31	4.24	8.92	2.47	1.78	2.35	1.87	2.41	7.77	8.96	**No**
WL151	7.44	5.13	9.11	1.21	3.11	5.43	2.94	0.52	8.42	1.46	**No**
WL152	7.44	4.29	9.35	1.25	2.13	4.54	3.48	0.32	8.19	1.37	**No**
WL153	7.44	9.42	9.31	2.59	0.48	2.32	2.60	0.28	8.15	2.68	**No**
WL154	1.83	4.34	2.72	2.29	7.92	7.97	7.57	4.39	9.14	2.69	**No**
WL155	7.44	3.72	9.50	1.27	0.67	3.72	1.54	0.99	8.00	2.84	**No**
WL156	8.22	5.64	9.37	1.75	1.68	-0.03	4.12	2.90	7.71	7.38	**No**
WL157	7.44	2.76	9.23	1.31	1.73	2.78	2.54	0.72	8.17	2.78	**No**
WL158	2.86	2.93	5.62	2.14	6.03	4.41	5.91	3.68	8.73	2.78	**No**
WL159	7.44	4.06	9.18	1.26	0.07	4.00	0.97	1.01	7.44	2.90	**No**
WL160	6.65	4.47	8.97	2.56	1.45	2.66	1.87	0.59	7.77	2.76	**No**
WL161	7.44	2.37	9.23	1.33	1.73	2.35	2.54	0.72	8.17	2.78	**No**
WL162	8.22	2.82	9.35	1.23	0.71	2.75	2.11	0.61	7.82	2.76	**No**
WL163	7.44	2.71	9.44	1.32	1.17	2.71	2.49	0.70	8.09	2.78	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL164	7.44	5.24	9.17	1.21	0.83	5.52	3.29	0.53	7.53	2.81	**No**
WL165	1.07	3.63	5.06	3.09	9.56	7.29	5.47	2.98	9.67	2.81	**No**
WL166	8.22	2.43	9.42	0.69	1.91	2.48	3.36	0.40	7.92	1.46	**No**
WL167	7.44	2.99	9.15	1.30	0.68	2.83	0.97	1.01	7.15	2.89	**No**
WL168	7.44	4.00	9.36	1.31	0.88	4.09	2.28	0.94	7.52	1.66	**No**
WL169	3.54	5.68	4.24	2.27	5.75	6.41	5.26	4.27	8.81	1.72	**No**
WL170	7.44	2.12	9.21	1.90	1.27	2.67	2.94	1.08	7.65	3.62	**No**
WL171	5.31	4.23	9.08	1.25	1.27	4.32	1.98	0.95	7.95	1.69	**No**
WL172	8.22	3.67	9.27	0.64	0.89	3.67	1.63	1.01	8.21	2.85	**No**
WL173	6.65	4.29	9.11	1.88	2.01	4.38	2.36	0.77	6.73	2.91	**No**
WL174	7.44	3.50	9.21	1.28	0.22	3.58	2.54	0.71	8.16	2.78	**No**
WL175	8.22	4.42	9.25	1.68	0.99	2.60	1.96	0.69	7.31	2.83	**No**
WL176	8.62	4.92	9.02	2.81	1.96	3.40	2.75	0.67	8.21	2.78	**No**
WL177	7.44	5.68	9.15	2.13	1.84	4.45	2.99	0.24	7.91	1.39	**No**
WL178	9.21	2.71	8.77	1.55	0.18	3.36	1.91	0.70	7.89	1.45	**No**
WL179	9.41	5.98	9.36	11.73	2.20	3.31	3.43	0.58	8.35	2.75	**No**
WL180	7.58	4.72	9.21	2.06	4.22	4.44	2.59	-0.03	7.26	1.39	**No**
WL181	3.61	6.95	4.65	2.92	7.35	6.06	6.32	6.04	8.95	2.78	**No**
WL182	7.44	4.57	9.31	1.24	2.06	4.62	1.46	0.91	7.31	1.64	**No**
WL183	8.62	2.93	9.50	1.31	0.25	2.88	1.70	0.86	8.07	1.58	**No**
WL184	8.62	5.87	9.25	2.26	0.25	3.01	1.70	0.76	8.33	1.51	**No**
WL185	7.83	3.16	9.08	1.93	2.31	3.31	3.40	0.59	8.49	2.75	**No**
WL186	8.22	2.71	9.40	0.68	1.63	2.69	2.34	0.78	7.60	2.84	**No**
WL187	8.22	5.36	9.30	0.56	0.98	5.64	2.71	0.72	8.21	2.78	**No**
WL188	5.70	5.02	8.98	1.85	2.43	5.31	3.06	0.55	8.75	2.74	**No**
WL189	6.08	4.96	9.95	2.00	2.44	6.35	5.85	7.64	8.84	3.97	**No**
WL191	3.94	8.39	4.49	3.96	5.84	7.95	6.48	5.52	8.99	2.73	**No**
WL192	-0.73	4.29	4.43	3.58	8.73	4.87	4.98	3.86	8.79	2.69	**No**
WL193	6.65	4.74	5.33	1.87	2.49	4.95	3.03	0.60	7.60	2.76	**No**
WL194	0.48	6.41	1.98	2.79	2.17	2.85	4.28	6.18	8.61	3.66	**No**
WL195	8.62	5.50	9.23	2.13	1.24	4.21	2.93	0.26	7.91	1.34	**No**
WL196	7.44	2.82	9.14	1.31	0.87	2.89	3.24	0.62	7.52	2.80	**No**
WL197	7.44	4.51	9.16	1.24	0.69	4.68	2.89	0.23	8.03	1.35	**No**
WL198	2.69	2.37	3.70	1.61	5.68	4.90	4.98	5.24	8.03	1.10	**No**
WL199	9.21	2.14	8.86	1.90	1.36	2.23	2.78	0.87	7.76	1.73	**No**
WL200	6.49	2.59	9.05	1.32	1.69	2.49	1.61	0.83	8.26	1.59	**No**
WL201	7.87	2.43	9.10	0.74	2.47	2.39	2.74	0.44	7.29	1.88	**No**
WL202	6.50	4.69	9.69	3.94	2.88	3.92	4.68	5.33	8.95	1.59	**No**
WL203	6.84	3.05	9.31	1.30	1.02	3.17	3.24	0.39	9.02	2.70	**No**
WL204	7.44	4.42	8.89	1.79	2.47	2.66	2.19	0.65	8.36	2.78	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL205	7.44	8.80	9.17	2.66	0.51	2.50	2.66	0.27	8.14	2.68	**No**
WL206	7.44	3.05	9.38	1.30	1.04	3.10	2.89	0.26	8.17	1.36	**No**
WL207	9.41	2.59	9.50	1.52	0.26	2.72	3.87	0.42	8.38	1.53	**No**
WL208	6.65	3.05	9.00	1.94	0.77	3.09	2.78	0.31	8.37	2.68	**No**
WL209	7.44	5.41	9.40	2.28	1.52	2.66	2.98	0.62	8.58	1.58	**No**
WL210	5.86	4.00	9.55	0.65	1.29	4.25	3.62	0.54	8.07	1.60	**No**
WL211	10.20	7.11	9.83	0.44	1.94	3.68	2.81	0.73	8.27	2.78	**No**
WL212	7.44	3.44	9.41	1.28	2.36	3.56	2.76	0.76	8.66	2.79	**No**
WL213	7.44	3.16	9.13	1.30	1.21	3.12	1.97	0.63	7.80	2.80	**No**
WL214	9.41	2.76	9.59	0.72	1.07	2.83	3.02	0.53	8.54	2.73	**No**
WL215	6.49	5.75	8.95	2.26	0.48	3.14	4.18	0.30	8.44	1.47	**No**
WL216	7.83	3.21	9.33	1.93	2.01	3.19	1.71	1.00	8.13	2.85	**No**
WL217	6.49	3.05	8.94	1.30	2.65	3.01	1.74	1.02	8.31	2.85	**No**
WL218	7.83	2.76	9.26	1.95	0.92	2.90	3.67	0.38	8.62	2.69	**No**
WL219	7.44	3.05	9.18	1.30	-0.03	3.09	2.88	0.25	8.21	1.36	**No**
WL220	8.22	3.05	9.34	0.66	-0.03	3.09	2.88	0.26	8.25	1.36	**No**
WL221	9.41	2.65	9.58	0.68	0.43	2.71	3.18	0.34	8.55	8.46	**No**
WL222	3.59	5.30	4.93	2.42	6.04	5.26	5.78	6.04	8.85	1.53	**No**
WL223	8.62	2.65	9.09	1.32	0.82	2.77	3.74	0.31	8.56	1.43	**No**
WL224	7.44	4.12	9.09	1.25	0.67	4.30	3.00	0.35	8.44	2.69	**No**
WL225	8.03	2.93	9.47	1.31	1.16	3.01	2.97	0.57	7.90	1.49	**No**
WL226	8.62	3.16	9.51	1.34	1.03	3.20	2.79	0.49	7.65	2.71	**No**
WL227	9.21	2.93	9.60	1.35	0.60	3.03	3.32	0.54	8.09	2.73	**No**
WL228	7.44	3.27	9.47	1.29	0.98	3.38	2.97	0.57	7.95	1.45	**No**
WL229	3.29	7.67	8.82	2.51	0.88	2.51	2.72	0.27	8.32	2.68	**No**
WL230	7.44	6.37	9.17	2.23	0.67	3.57	2.10	0.45	8.29	2.72	**No**
WL231	9.21	2.76	9.44	1.31	0.89	2.83	3.26	0.51	7.38	2.77	**No**
WL232	7.44	3.50	9.13	1.28	1.05	3.42	1.22	0.80	7.83	1.54	**No**
WL233	6.25	3.10	9.05	1.30	2.67	3.17	2.63	0.53	8.29	2.73	**No**
WL234	9.41	2.76	9.30	0.68	1.10	2.85	3.44	0.39	8.12	1.46	**No**
WL235	7.44	3.50	9.17	1.28	0.67	3.52	2.22	0.50	7.91	1.47	**No**
WL236	7.83	2.99	8.97	1.94	2.16	3.03	2.66	0.49	8.43	2.72	**No**
WL237	6.25	9.20	9.44	3.83	0.86	3.09	2.84	0.30	8.48	2.73	**No**
WL238	7.83	6.36	9.11	3.57	0.45	2.33	3.23	0.31	8.61	2.69	**No**
WL239	8.62	2.37	9.41	1.33	1.72	2.43	3.37	0.56	8.13	2.78	**No**
WL240	9.41	4.60	9.49	2.34	0.49	3.01	2.96	0.32	8.85	1.46	**No**
WL241	6.46	3.21	9.70	0.94	1.56	4.84	6.49	7.67	9.44	1.77	**No**
WL242	8.62	2.99	9.41	1.30	2.62	3.08	2.93	0.55	8.58	2.73	**No**
WL243	7.44	3.27	9.10	1.29	2.26	3.43	3.55	0.42	7.86	1.44	**No**
WL244	6.49	8.23	4.46	3.23	6.06	3.88	4.02	0.42	8.28	2.70	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL245	7.44	3.05	9.41	1.30	2.22	3.18	3.37	0.39	8.64	2.70	**No**
WL246	4.65	2.31	5.60	1.48	6.68	4.90	6.15	7.88	9.27	1.63	**No**
WL247	6.02	2.20	9.94	5.61	2.18	3.91	6.81	3.00	9.08	2.71	**No**
WL248	8.62	2.48	9.36	1.33	-0.13	2.54	3.30	0.55	8.25	2.78	**No**
WL249	1.13	5.13	4.28	6.03	7.90	5.90	8.22	4.55	9.58	1.52	**No**
WL250	1.27	5.98	4.94	1.76	8.58	6.46	6.90	1.13	8.57	2.06	**No**
WL251	8.62	2.59	9.37	1.32	0.41	2.61	2.88	0.68	7.92	7.59	**No**
WL252	8.62	2.54	9.35	1.32	0.59	2.62	3.56	0.54	7.83	2.77	**No**
WL253	8.62	2.88	9.49	1.31	0.29	3.01	3.53	0.44	8.44	1.50	**No**
WL254	8.42	2.54	9.07	0.14	1.26	2.62	3.35	0.58	8.46	2.79	**No**
WL255	8.62	2.37	9.41	1.33	1.79	2.47	3.77	0.33	8.25	1.33	**No**
WL256	9.21	5.06	9.26	1.37	-0.02	2.45	4.89	2.32	8.43	1.45	**No**
WL257	8.62	2.37	9.45	1.33	0.09	2.34	2.60	0.67	7.83	2.80	**No**
WL258	7.44	2.37	9.54	1.33	0.66	2.38	3.06	0.53	7.72	2.72	**No**
WL259	3.90	2.88	3.76	5.16	5.58	6.01	6.05	6.34	9.18	1.62	**No**
WL260	9.41	3.10	9.50	0.66	1.33	3.18	3.00	0.53	8.26	2.74	**No**
WL261	7.44	2.88	9.01	1.31	1.27	2.92	2.76	0.57	8.02	1.51	**No**
WL262	8.62	9.75	9.26	2.97	1.47	2.27	2.65	0.66	7.64	2.77	**No**
WL263	5.02	2.59	9.76	0.87	2.33	3.91	5.82	2.79	8.84	2.78	**No**
WL264	8.22	6.63	5.66	3.05	5.58	3.89	4.22	0.18	8.23	2.65	**No**
WL265	9.41	4.96	9.60	1.66	2.37	3.53	3.21	0.37	8.61	2.70	**No**
WL266	7.44	3.95	9.39	1.26	0.86	4.16	3.42	0.42	7.94	1.45	**No**
WL267	9.41	4.83	9.56	1.67	0.34	3.26	2.54	0.67	8.08	2.78	**No**
WL268	9.41	6.03	9.59	1.61	1.07	3.29	2.66	0.72	8.43	2.79	**No**
WL269	2.77	6.09	4.95	2.19	6.96	5.71	5.88	3.53	9.18	2.73	**No**
WL270	9.41	3.61	9.50	0.69	0.38	3.74	3.00	0.64	8.39	8.52	**No**
WL271	7.44	5.87	9.34	2.26	0.94	3.10	2.66	0.72	8.31	2.78	**No**
WL272	4.52	2.88	9.07	1.95	1.16	2.95	3.17	0.33	8.11	2.68	**No**
WL273	7.83	6.41	9.31	3.62	0.12	2.27	2.14	0.42	7.94	2.72	**No**
WL274	6.49	2.65	9.22	1.32	0.23	2.75	3.71	0.36	7.69	2.73	**No**
WL275	4.08	3.16	9.05	0.70	1.20	3.23	2.73	0.52	8.52	2.73	**No**
WL276	5.31	3.10	9.20	1.30	1.55	3.28	3.80	0.22	8.45	2.65	**No**
WL277	6.65	3.16	9.34	1.93	0.91	3.21	2.52	0.47	8.42	1.46	**No**
WL278	8.22	5.19	9.58	0.57	2.46	5.53	3.49	0.54	7.47	1.89	**No**
WL279	6.77	2.42	9.14	1.86	4.53	3.35	3.83	0.25	9.05	2.75	**No**
WL280	3.76	5.87	4.97	6.65	6.69	5.50	6.03	8.45	7.51	1.62	**No**
WL281	8.03	4.74	8.83	2.81	0.07	2.99	1.19	0.80	7.49	1.51	**No**
WL282	7.44	6.50	9.38	2.07	0.72	5.47	2.29	0.44	7.43	2.76	**No**
WL283	7.28	3.61	9.53	0.64	2.04	3.69	2.36	0.58	8.39	1.56	**No**
WL284	0.00	5.30	3.83	0.73	8.07	8.08	5.55	3.99	8.81	1.58	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL285	8.42	3.44	8.70	1.92	0.64	3.56	3.15	0.32	8.52	2.69	**No**
WL286	9.21	3.67	9.49	1.27	1.16	3.85	3.42	0.43	8.37	1.51	**No**
WL287	7.44	3.44	9.41	1.28	1.03	3.56	3.13	0.38	7.83	1.44	**No**
WL288	7.44	4.96	9.07	1.26	0.85	5.21	2.90	0.44	7.88	1.38	**No**
WL289	5.31	3.27	3.67	1.29	5.83	4.43	2.87	0.34	7.08	0.90	**No**
WL290	7.44	3.44	9.45	1.28	1.45	3.62	3.54	0.42	7.97	1.45	**No**
WL291	10.00	3.67	9.32	0.64	-0.11	3.85	3.66	0.57	8.08	2.83	**No**
WL292	10.00	3.78	9.65	0.63	0.27	3.91	2.83	0.56	8.43	1.55	**No**
WL293	9.41	3.72	9.31	0.63	0.79	3.98	4.13	0.21	8.72	2.66	**No**
WL294	7.83	3.72	9.26	1.91	0.63	3.94	3.81	0.39	8.10	2.70	**No**
WL295	8.62	3.16	9.51	1.30	0.62	3.24	3.04	0.38	8.06	1.46	**No**
WL296	8.42	11.90	9.29	2.94	1.33	5.17	3.66	0.57	8.49	2.70	**No**
WL297	7.44	3.44	9.35	1.28	0.94	3.65	4.08	0.59	7.34	2.81	**No**
WL298	9.41	4.78	9.57	1.67	1.23	3.22	2.89	0.66	7.84	2.82	**No**
WL299	3.34	7.67	3.83	5.83	6.36	7.75	5.75	3.92	9.08	1.70	**No**
WL300	5.31	4.57	9.11	1.29	1.56	4.82	3.41	0.39	7.82	1.45	**No**
WL301	7.44	3.50	9.34	1.28	2.07	3.63	2.99	0.52	8.27	2.72	**No**
WL302	8.03	11.05	9.34	3.24	1.73	5.78	4.35	0.80	8.12	3.49	**No**
WL303	8.62	4.20	9.10	1.80	1.54	2.43	3.20	0.57	7.81	2.81	**No**
WL304	8.22	9.19	9.47	2.30	0.68	2.21	3.82	0.52	7.77	2.73	**No**
WL305	4.83	2.76	9.96	1.97	2.88	3.65	4.58	3.74	8.62	2.78	**No**
WL306	2.32	3.78	4.04	5.42	6.99	7.13	8.36	5.30	9.26	2.74	**No**
WL307	8.62	2.43	9.45	1.33	1.38	2.47	3.05	2.20	8.67	8.90	**No**
WL308	9.21	7.44	9.26	2.19	1.08	4.94	3.72	0.39	8.95	2.66	**No**
WL309	7.44	4.00	9.22	1.26	-0.22	4.07	2.05	0.43	8.40	1.44	**No**
WL310	9.21	5.08	9.36	1.21	0.98	5.31	2.52	0.47	8.10	0.90	**No**
WL311	8.22	4.40	9.16	0.61	0.66	4.65	3.19	0.36	8.91	1.47	**No**
WL312	7.44	4.29	8.99	1.25	0.82	4.46	3.03	0.20	6.90	1.51	**No**
WL313	4.52	4.40	8.79	1.88	1.80	4.90	5.69	2.20	8.74	1.46	**No**
WL314	0.49	6.03	3.59	1.85	8.63	5.78	5.73	3.45	9.72	1.66	**No**
WL315	1.10	6.60	3.57	1.64	7.97	7.59	6.89	4.22	7.74	1.62	**No**
WL316	10.00	4.12	9.52	0.62	0.74	4.27	2.69	0.70	7.91	2.73	**No**
WL317	7.08	3.05	5.44	1.30	7.35	4.37	3.67	0.57	7.62	2.82	**No**
WL318	8.62	3.78	9.44	1.27	1.56	3.74	1.40	1.23	6.99	2.99	**No**
WL319	10.79	7.78	9.80	0.19	2.37	4.20	4.23	0.22	9.05	1.45	**No**
WL320	10.00	1.97	9.64	0.71	0.85	1.84	1.86	0.68	8.39	2.78	**No**
WL321	9.21	3.83	9.45	1.27	1.10	3.93	2.52	0.60	7.83	2.81	**No**
WL322	7.44	2.31	9.34	1.33	1.25	2.37	3.48	0.31	8.15	1.35	**No**
WL323	1.35	1.00	3.17	5.61	7.63	5.04	5.57	1.35	9.42	3.71	**No**
WL324	7.87	66.66	9.43	21.62	1.24	4.92	3.50	0.45	8.76	1.56	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL325	9.80	3.21	9.56	1.29	2.20	3.29	2.86	0.28	8.20	1.37	**No**
WL326	5.01	5.87	5.87	3.14	7.16	5.84	7.25	2.71	9.36	1.55	**No**
WL327	9.41	3.38	9.36	0.65	2.51	3.45	2.41	0.53	8.58	2.73	**No**
WL328	9.41	2.99	9.56	0.67	2.79	3.02	2.41	0.53	8.57	2.73	**No**
WL329	9.01	6.54	9.64	0.58	0.89	3.33	2.78	0.30	8.18	2.68	**No**
WL330	7.44	1.30	9.39	1.38	1.73	1.27	3.43	0.33	8.37	1.39	**No**
WL331	3.09	1.24	5.11	5.58	8.62	6.52	8.21	2.64	8.95	2.67	**No**
WL332	8.62	2.54	9.60	1.32	2.55	2.57	3.02	0.54	7.78	2.77	**No**
WL333	7.44	1.86	9.55	1.35	0.50	1.86	3.32	0.34	8.15	2.68	**No**
WL334	7.44	1.64	9.51	1.36	0.77	1.59	2.99	0.36	8.46	2.69	**No**
WL335	8.62	2.71	9.71	1.32	1.28	2.87	3.84	0.42	8.85	2.70	**No**
WL336	8.62	1.18	9.44	1.38	1.97	1.20	3.82	0.40	8.44	2.64	**No**
WL337	7.44	1.58	9.55	1.36	0.76	1.52	3.10	0.32	8.10	2.68	**No**
WL338	6.65	3.38	9.23	3.26	1.96	1.35	3.24	0.33	7.79	2.68	**No**
WL339	6.49	2.76	9.19	1.31	2.43	2.89	3.45	0.35	8.67	1.44	**No**
WL340	5.42	4.57	9.07	1.24	2.41	4.85	3.43	0.35	7.94	1.43	**No**
WL341	7.44	0.00	9.30	1.43	-0.32	-0.06	3.20	0.42	7.96	1.47	**No**
WL342	5.42	5.02	9.05	1.22	2.74	5.35	3.34	0.41	8.83	2.70	**No**
WL343	3.65	3.47	4.69	4.94	6.31	4.92	4.26	3.74	9.01	1.63	**No**
WL344	7.44	2.37	9.28	1.33	2.16	2.39	3.01	0.35	8.04	2.68	**No**
WL345	6.09	5.36	5.96	0.60	7.50	6.72	3.73	0.44	8.88	2.71	**No**
WL346	7.44	4.96	9.02	1.77	2.21	3.47	2.94	0.27	8.27	1.37	**No**
WL347	4.24	5.64	5.22	1.19	7.08	7.09	3.72	0.37	8.54	1.42	**No**
WL348	4.24	5.64	5.68	1.19	7.16	6.81	2.05	0.48	7.96	1.42	**No**
WL349	7.44	1.47	9.34	1.37	2.43	1.35	2.45	0.68	7.96	2.81	**No**
WL350	7.44	5.96	8.94	1.72	2.21	4.86	3.17	0.29	8.31	1.38	**No**
WL351	4.30	13.65	5.66	4.55	7.68	5.07	6.71	4.54	8.94	2.72	**No**
WL352	4.82	7.53	5.56	7.10	7.67	6.17	7.92	6.29	8.62	1.72	**No**
WL353	10.00	1.69	9.83	1.08	2.70	1.63	2.79	0.55	8.32	2.78	**No**
WL354	1.05	4.47	4.49	2.27	8.96	6.41	6.37	5.06	8.91	2.82	**No**
WL355	3.57	3.47	5.16	2.17	7.52	4.41	6.15	5.14	8.23	2.88	**No**
WL356	3.77	4.36	4.68	1.57	6.32	7.70	4.97	4.20	8.72	1.50	**No**
WL357	7.44	5.77	8.92	1.73	2.58	4.62	3.17	0.30	8.31	1.38	**No**
WL358	8.62	1.64	9.61	1.36	2.29	1.57	3.02	0.60	7.53	2.80	**No**
WL359	3.63	1.41	5.05	1.41	7.68	3.50	4.43	4.29	8.73	2.89	**No**
WL360	7.44	3.43	9.21	4.81	0.16	1.40	3.27	0.90	7.82	3.54	**No**
WL361	3.06	3.78	4.47	1.77	6.30	7.13	6.98	3.14	8.94	2.81	**No**
WL362	4.22	2.59	5.21	2.46	7.84	4.54	4.80	0.89	9.51	2.79	**No**
WL363	7.87	4.34	9.12	0.71	2.40	4.55	2.94	0.48	8.33	1.44	**No**
WL364	6.88	5.75	5.85	0.89	7.29	4.23	3.22	0.60	8.71	2.76	**No**

WL ID	Hydrologic Group		Water & Climate Protection Group		Aquatic Support Group		Aquatic Habitat Group		Transition Habitat Group		WSS [1]
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	
WL365	7.87	13.40	9.17	2.78	0.55	5.77	2.82	0.56	8.75	2.76	**No**
WL366	5.31	2.82	5.73	1.31	6.62	3.90	3.10	0.39	8.02	1.47	**No**
WL367	5.31	4.51	5.68	1.24	7.40	6.25	3.49	0.59	8.29	2.75	**No**
WL368	6.49	7.73	9.11	2.48	1.40	0.53	2.80	0.72	8.48	2.79	**No**
WL369	8.62	2.82	9.45	1.31	1.55	2.85	2.55	0.48	8.55	1.41	**No**
WL370	6.49	3.74	9.21	2.87	2.76	1.81	2.94	0.36	8.03	1.47	**No**
WL371	9.21	4.51	9.44	1.24	2.58	4.81	3.63	0.39	8.71	2.70	**No**
WL372	8.62	4.46	9.41	1.29	1.29	4.73	3.73	0.65	7.71	2.72	**No**
WL373	6.49	4.65	5.86	2.12	5.89	4.36	2.77	0.60	8.50	1.56	**No**
WL374	7.44	1.52	9.34	1.37	2.56	1.36	2.03	0.77	7.67	2.83	**No**
WL375	5.31	3.43	5.47	2.81	7.64	4.51	2.58	0.53	7.93	1.51	**No**
WL376	5.66	1.69	9.94	1.30	9.56	7.28	5.42	3.76	8.94	2.74	**No**
WL377	5.31	5.64	9.02	2.27	1.90	2.88	2.98	0.34	8.32	2.69	**No**
WL378	6.49	3.72	9.14	1.27	2.68	3.93	3.34	0.60	8.70	2.76	**No**
WL379	8.62	3.67	9.44	2.39	1.62	0.66	2.31	0.70	8.36	2.74	**No**
WL380	5.70	7.31	9.98	4.41	5.29	1.91	4.78	5.04	9.49	2.82	**No**
WL381	3.75	2.82	5.09	1.62	7.71	5.27	4.98	1.14	9.44	2.83	**No**
WL382	6.16	5.23	9.69	3.64	4.06	1.66	5.09	6.75	8.52	3.55	**No**
WL383	9.41	1.24	9.32	0.74	2.33	1.22	3.40	0.60	8.50	1.54	**No**
WL384	4.52	2.31	9.02	1.97	2.35	2.33	3.19	0.53	7.82	2.73	**No**
WL385	4.32	2.93	5.14	2.20	8.08	4.87	6.32	6.50	8.18	1.54	**No**
WL386	9.21	1.35	9.45	1.37	2.67	1.02	0.92	0.43	6.46	1.45	**No**
WL387	9.41	1.02	9.70	0.88	1.07	0.93	3.19	0.66	8.30	2.79	**No**
WL388	4.28	3.29	5.95	2.82	6.79	3.29	4.74	5.98	8.71	2.81	**No**
Grouped Function Scores By Rating (%)											
Lower	11.49	32.11	1.57	80.42	68.67	28.46	14.10	77.81	0.00	33.16	
Moderate	28.98	50.91	18.54	18.02	16.19	52.74	70.50	9.14	29.24	0.26	
Higher	59.53	16.97	79.90	1.57	15.14	18.80	15.40	13.05	70.76	66.58	

[1] WSS determination as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator.
Ratings are represented by colours, where red corresponds to a "lower" rating, yellow corresponds to a "moderate" rating, and green corresponds to a "higher" rating.

Hydrological Group

The hydrologic group evaluates the effectiveness of a wetland to store or delay the downslope movement of surface water. However, the model does not account for wetland size, and in turn, the ability of larger wetlands to store more water than smaller wetlands. Wetlands that have the highest benefit scores within this group tend to be located within developed areas, where water storage is more valuable to reduce flood risks.

The hydrological function score for wetlands was predominantly rated as moderate (29%) and higher (60%), while the benefit scores were a mix of lower (32%), moderate (51%), and higher (17%).

Water and Climate Protection Group

The water quality group is compiled from four different functions: sediment and toxicant retention and stabilization; phosphorus retention; nitrogen removal and retention; and carbon stock preservation. The main function of this group is to evaluate the wetland's potential to intercept, retain, and filter sediments, particulates, and organic matter. Similar to the hydrologic group, the wetlands that have the higher benefit score in this regard include those that do not have a surface water outlet and instead are isolated from flowing surface water. This model also does not account for wetland size and as such, larger wetlands do not necessarily score higher than small wetlands, although size may factor into this function.

A majority of wetlands had a high (80%) functional water quality score, and a lower (80%) water quality benefit score.

Aquatic Support Group

The aquatic support group comprises four individual functions: stream flow and temperature support; aquatic primary productivity; and organic nutrient export. The main function of this group is to determine the wetland's ability to support ecological stream functions that promote habitat health. Wetlands lying adjacent to or containing flowing water score higher than those that do not (e.g., isolated wetlands). Additionally, headwater wetlands are crucial for supporting stream flow during the dry season by contributing to water flow via groundwater input and storage capacity. Headwater wetlands provide stream flow and cooling functions due to their typically limited exposed surface water, insulating properties and groundwater water storage and retention time. Treed swamps can also provide aquatic support through groundwater discharge (e.g., seeps) and vegetation shading.

The aquatic support function score for wetlands was predominantly rated as lower (69%), and the majority of wetlands had a moderate rating (53%) for the aquatic support group benefit score.

Aquatic Habitat Group

The aquatic habitat group is compiled from five different functions: anadromous fish habitat, resident fish habitat, amphibian and turtle habitat, waterbird feeding habitat, and waterbird nesting habitat. Wetlands that have the higher functions within this group include those that are

adjacent to or contain water features with potential habitat characteristics (e.g., in-stream cover, aquatic vegetation, etc.).

The majority of wetlands (71%) received moderate aquatic habitat functional scores, while aquatic habitat group benefit scores were predominantly lower (78%).

Transition Habitat Group

The transition habitat group comprises three different functions: songbird, raptor, and mammal habitat, native plant habitat and pollinator habitat. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants.

The Study Area has a mix of remote habitat and fragmented or disturbed habitat. The majority of wetlands scored high on both the transition habitat function (71%) and group benefit (67%).

Wetlands of Special Significance

None of the field-delineated wetlands met the criteria for WSS, as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator. The results of the wetland field assessments were also cross-referenced with breeding bird, vegetation, and lichen survey results, specifically for SAR (listed as endangered or threatened) with habitat requirements tied to wetlands. As a result, 16 wetlands were determined to be potential WSS (Table 9.16). Official WSS designation will be made by NSECC.

Table 9.16: Summary of Field-Identified Potential WSS, as Determined by the Presence of SAR

Wetland ID	Wetland Type(s)	Rationale for Potential WSS Designation
WL12	Treed Swamp	Canada warbler (*Cardellina canadensis*) heard singing in wetland.
WL22	Treed Swamp	Canada warbler and olive-sided flycatcher (*Contopus cooperi*) heard singing in wetland.
WL30	Bog; Treed Swamp	Canada warbler heard singing in wetland.
WL48	Treed Swamp	Probable breeding pair of rusty blackbird (*Euphagus carolinus*) observed, two male Canada warbler heard singing, and one olive-sided flycatcher observed in wetland.
WL78	Treed Swamp	Olive-sided flycatcher heard singing/calling in wetland.
WL101	Treed Swamp	Multiple Canada warbler heard singing in wetland.
WL111	Treed Swamp	Canada warbler heard singing and observed displaying agitated behaviour in wetland.
WL150	Treed Swamp	Canada warbler males heard counter-singing in wetland.
WL204	Shrub Swamp	Canada warbler pair observed and heard singing in wetland.
WL221	Treed Swamp	Wetland meets criteria identified in Section 9.2.2
WL229	Treed Swamp	Canada warbler observed and heard in wetland.
WL247	Treed Swamp	Olive-sided flycatcher heard singing/calling in wetland.
WL249	Fen; Treed Swamp	Olive-sided flycatcher heard singing/calling in wetland.
WL343	Treed Swamp	Canada warbler heard singing in wetland.
WL381	Treed Swamp	Presumed olive-sided flycatcher family unit observed in wetland.
WL385	Treed Swamp	Canada warbler heard singing in wetland.

9.2.5 Effects Assessment

Project-Wetland Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact wetlands through habitat removal, disruptions to hydrology, and/or displacement of sediment (Table 9.17).

Table 9.17: Potential Project-Wetland Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	X
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for wetlands is the Assessment Area. The RAA is the boundary of secondary watersheds that intersect with the Assessment Area (Drawing 9.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for wetlands. The VC-specific definition for magnitude is as follows:

- Negligible: No direct loss of wetland habitat or alteration to wetland functions expected.
- Low: Direct loss of wetland habitat, but overall wetland functions remain intact.
- Moderate: Direct loss of wetland habitat and impact to wetland functions, but wetland area loss will not impact the hydrology of the watershed. Where WSS are impacted, adequate general SAR habitat is prevalent elsewhere within the RAA.

- High: Direct loss of wetland habitat and impact to wetland functions; and wetland area loss will affect the hydrology of the watershed and the impacted wetland areas are part of a WSS that provides unique SAR habitat within the RAA.

Effects

Effects to wetlands include both habitat loss and changes in wetland functionality and can occur throughout the life of the Project. Effects might be direct (e.g., habitat loss through infilling) or indirect (e.g., changes to functionality due to hydrologic shifts). Effect-specific active management, mitigation, and long-term monitoring are required to eliminate, mitigate, or otherwise manage the magnitude of these direct effects.

Habitat Loss

Habitat loss can occur both directly (i.e., excavation or infilling) and indirectly (i.e., altered hydrology or canopy cover) from the Project (Trombulak & Frissell, 2000). Loss of habitat can fragment wildlife corridors, potentially isolating species and lowering species richness. Habitat loss can also disrupt vital habitat characteristics that support vulnerable species. Further, the removal or infilling of wetland habitat can impact the hydroperiod of neighbouring wet areas, resulting in farther reaching impacts on habitat quality (Mitsch & Gosselink, 2000).

A GIS suitability analysis was conducted to design a Project Footprint that would optimize the placement of Project infrastructure to avoid and minimize loss of wetland area and function, where practicable. A summary of field-delineated and drone-delineated wetlands identified within the Assessment Area (Drawing 9.3A to 9.3P) that are expected to overlap with the Project Footprint are provided in Table 9.18 and 9.19, respectively.

Table 9.18: Habitat Alteration Potential for Field-Delineated Wetlands

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL4	Treed Swamp	Partial	17,844	597	Road and turbine pad construction
WL5	Treed Swamp	Partial	1,141	561	Road construction
WL6	Bog	Partial	4,738	540	Turbine pad construction
WL9	Treed Swamp	Full	660	308	Road upgrades
WL10	Treed Swamp	Partial	1,017	54	Road construction
WL11	Treed Swamp	Partial	1,247	1,039	Road construction
WL12	Treed Swamp	Partial	9,698	4,888	Road construction and upgrades
WL13	Bog	Partial	20,679	2,896	Road construction
WL14	Treed Swamp	Partial	777	268	Road upgrades
WL16	Bog	Partial	804	259	Road upgrades
WL18	Treed Swamp	Partial	667	101	Road upgrades
WL19	Treed Swamp; Shrub Swamp	Partial	12,142	2,994	Road and turbine pad construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL20	Treed Swamp; Fen	Partial	1,272	940	Road construction
WL21	Shrub Swamp	Partial	2,648	560	Road construction
WL22	Treed Swamp	Partial	6,717	2,247	Road upgrades
WL25	Treed Swamp	Partial	889	413	Road construction
WL26	Treed Swamp	Partial	1,409	447	Road upgrades
WL27	Treed Swamp	Partial	7,515	2,697	Road upgrades
WL28	Treed Swamp	Partial	442	10	Road upgrades
WL29	Treed Swamp	Partial	646	73	Road upgrades
WL30	Bog; Treed Swamp	Partial	38,363	1,121	Road upgrades
WL31	Shrub Swamp	Partial	1,138	255	Road construction
WL33	Marsh	Partial	1,406	500	Road upgrades
WL34	Treed Swamp	Partial	1,946	485	Road upgrades
WL35	Bog	Partial	4,000	2,409	Road construction
WL36	Shrub Swamp	Partial	570	42	Road construction
WL37	Bog	Partial	1,129	256	Road upgrades
WL38	Treed Swamp	Partial	14,872	5,856	Road construction and upgrades
WL40	Treed Swamp	Partial	2,369	442	Road upgrades
WL42	Treed Swamp	Partial	2,092	1,249	Road upgrades
WL44	Treed Swamp	Partial	343	178	Road construction
WL45	Treed Swamp	Partial	1,709	625	Road upgrades
WL46	Treed Swamp	Partial	9,332	625	Road upgrades
WL48	Treed Swamp	Partial	10,102	3,761	Road construction and upgrades
WL49	Treed Swamp	Partial	1,313	413	Road construction
WL50	Treed Swamp	Full	486	208	Road upgrades
WL51	Treed Swamp	Partial	27,742	3,722	Road and turbine pad construction
WL52	Treed Swamp; Shrub Swamp	Partial	6,323	1,875	Road construction
WL55	Treed Swamp	Partial	3,779	1,627	Road construction
WL56	Treed Swamp	Partial	7,826	3,100	Road upgrades
WL57	Bog	Partial	30,072	12,745	Road and turbine pad construction
WL59	Bog	Partial	4,820	1,504	Road construction
WL60	Treed Swamp	Partial	3,068	1,494	Road upgrades
WL61	Treed Swamp	Partial	2,724	1,116	Road construction
WL64	Treed Swamp	Partial	1,224	485	Road upgrades
WL65	Shrub Swamp	Partial	7,453	3,473	Road construction
WL66	Treed Swamp	Partial	4,117	2,282	Road construction
WL68	Treed Swamp	Full	8,606	2,241	Road construction
WL69	Treed Swamp	Partial	1,290	187	Road upgrades
WL71	Treed Swamp	Partial	923	215	Turbine pad construction
WL72	Fen; Treed Swamp	Partial	64,401	20,773	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL73	Bog; Treed Swamp	Partial	26,711	455	Road and turbine pad construction
WL76	Treed Swamp	Partial	8,227	1,646	Road upgrades
WL77	Bog	Partial	1,670	991	Road construction
WL78	Treed Swamp	Partial	5,724	2,739	Road construction
WL81	Treed Swamp; Shrub Swamp	Partial	25,470	3,311	Road and turbine pad construction
WL82	Shrub Swamp	Partial	549	144	Road upgrades
WL83	Treed Swamp	Partial	4,755	1,876	Road upgrades
WL84	Shrub Swamp	Full	1,497	1,120	Road construction
WL85	Treed Swamp	Partial	2,627	704	Road upgrades
WL86	Bog	Partial	2,522	1,059	Road construction
WL88	Treed Swamp	Partial	6,013	1,051	Road upgrades
WL90	Shrub Swamp	Full	1,786	193	Road construction
WL91	Shrub Swamp	Partial	1,554	190	Road construction
WL93	Treed Swamp	Partial	1,311	850	Road construction
WL95	Shrub Swamp	Partial	43,363	13,859	Road construction
WL96	Shrub Swamp	Partial	602	311	Road construction
WL97	Treed Swamp; Bog	Partial	12,500	5,078	Road upgrades
WL98	Treed Swamp	Partial	1,931	139	Road upgrades
WL100	Treed Swamp	Partial	2,386	752	Road upgrades
WL101	Treed Swamp	Partial	1,466	368	Road upgrades
WL103	Treed Swamp	Partial	2,534	1,205	Road upgrades
WL104	Treed Swamp	Partial	1,174	494	Road construction
WL105	Treed Swamp	Partial	1,093	247	Road construction
WL106	Treed Swamp	Partial	2,604	830	Road upgrades
WL107	Treed Swamp	Partial	4,853	3,035	Road upgrades
WL108	Shrub Swamp	Partial	646	317	Road construction
WL110	Bog	Partial	3,393	1,619	Road construction
WL111	Treed Swamp	Partial	865	26	Road upgrades
WL112	Bog	Partial	1,832	706	Road upgrades
WL114	Treed Swamp	Partial	47,928	2,986	Road construction
WL116	Shrub Swamp	Partial	1,785	552	Road construction
WL117	Treed Swamp	Partial	3,759	1,793	Road construction
WL118	Treed Swamp	Partial	17,776	7,993	Road construction and upgrades
WL120	Treed Swamp	Partial	6,495	124	Road construction
WL121	Shrub Swamp	Full	4,124	1,520	Road construction
WL122	Shrub Swamp	Full	1,711	270	Road construction
WL123	Treed Swamp	Partial	6,139	2,452	Road construction
WL125	Shrub Swamp	Partial	1,195	438	Road construction
WL130	Bog	Partial	3,289	1,836	Road construction
WL131	Treed Swamp	Partial	1,980	1,365	Road construction
WL132	Bog	Partial	2,044	751	Road upgrades

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL135	Treed Swamp	Partial	5,875	3,048	Road upgrades
WL136	Treed Swamp	Partial	7,355	3,114	Road construction
WL137	Treed Swamp	Partial	7,304	2,271	Road upgrades
WL138	Treed Swamp	Full	448	342	Road construction
WL139	Treed Swamp	Partial	1,559	276	Road construction
WL141	Fen; Treed Swamp	Partial	3,914	1,040	Road construction
WL142	Bog	Partial	13,115	5,044	Road construction
WL143	Treed Swamp	Partial	9,670	3,997	Road construction
WL144	Treed Swamp	Partial	1,723	1,010	Road construction
WL145	Treed Swamp	Partial	1,368	901	Road construction
WL146	Treed Swamp	Full	612	349	Road construction
WL147	Shrub Swamp	Full	1,483	932	Road upgrades
WL149	Treed Swamp	Partial	9,123	3,925	Road construction
WL150	Treed Swamp	Partial	18,127	8,623	Road construction and upgrades
WL151	Treed Swamp	Partial	2,525	1,932	Road construction
WL152	Treed Swamp	Partial	815	18	Road construction
WL153	Treed Swamp	Partial	992	149	Road upgrades
WL154	Treed Swamp	Partial	4,832	2,442	Road construction
WL155	Treed Swamp	Full	2,131	1,113	Road and turbine pad construction
WL157	Treed Swamp	Partial	2,074	1,109	Road construction
WL160	Treed Swamp	Partial	2,084	831	Road upgrades
WL161	Treed Swamp	Partial	1,884	797	Road construction
WL162	Treed Swamp	Partial	9,282	3,964	Road upgrades
WL163	Treed Swamp	Full	2,260	572	Road construction
WL164	Treed Swamp	Full	539	532	Road construction
WL165	Treed Swamp	Partial	1,225	303	Road upgrades
WL166	Treed Swamp	Partial	3,406	678	Road construction
WL168	Treed Swamp	Full	1,208	833	Road construction
WL169	Shrub Swamp	Partial	2,413	654	Road upgrades
WL171	Bog	Partial	591	13	Road construction
WL173	Bog	Full	739	602	Road construction
WL175	Treed Swamp	Partial	5,561	2,545	Road upgrades
WL176	Shrub Swamp	Full	2,268	1,859	Road upgrades
WL177	Treed Swamp	Partial	1,031	18	Road upgrades
WL178	Treed Swamp	Partial	4,611	2,137	Road construction
WL180	Treed Swamp	Partial	1,148	3	Road upgrades
WL181	Treed Swamp	Partial	9,951	4,541	Road upgrades
WL182	Bog	Full	317	12	Road construction
WL188	Shrub Swamp	Full	438	100	Road construction
WL191	Treed Swamp	Partial	1,578	710	Road upgrades
WL192	Bog	Partial	5,485	2,623	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL195	Shrub Swamp	Partial	190	6	Road upgrades
WL197	Treed Swamp	Full	791	482	Road upgrades
WL198	Shrub Swamp	Partial	4,261	2,392	Road upgrades
WL199	Treed Swamp	Partial	1,399	500	Road construction and upgrades
WL201	Shrub Swamp	Partial	4,716	2,490	Road upgrades
WL202	Shrub Swamp	Full	1,296	750	Road upgrades
WL204	Shrub Swamp	Partial	2,990	1,357	Road upgrades
WL205	Treed Swamp	Partial	3,627	1,265	Road upgrades
WL207	Treed Swamp	Partial	5,585	1,933	Road upgrades
WL208	Shrub Swamp	Partial	4,355	966	Road construction
WL209	Shrub Swamp	Partial	10,250	4,204	Road construction and upgrades
WL211	Bog; Treed Swamp	Partial	32,041	14,584	Road construction
WL212	Shrub Swamp	Partial	1,584	1,400	Road and turbine pad construction
WL216	Shrub Swamp	Partial	37,135	15,509	Road construction
WL219	Treed Swamp	Partial	1,313	293	Road construction
WL222	Treed Swamp	Full	4,621	1,018	Road construction
WL224	Treed Swamp	Partial	15,846	8,045	Road construction
WL225	Treed Swamp	Partial	1,008	544	Road construction
WL226	Bog	Partial	810	288	Road construction
WL227	Bog	Partial	846	209	Road construction
WL228	Shrub Swamp	Full	1,186	610	Road construction
WL229	Treed Swamp	Partial	3,011	636	Road upgrades
WL231	Bog	Partial	4,342	2,485	Road construction
WL235	Treed Swamp	Partial	8,818	6,425	Road construction
WL237	Treed Swamp	Partial	3,250	868	Road construction
WL238	Bog	Full	1,096	1,029	Road construction
WL239	Treed Swamp	Partial	1,091	370	Road construction
WL241	Treed Swamp	Partial	5,128	1,902	Road construction
WL242	Treed Swamp	Partial	10,836	1,332	Road construction
WL244	Treed Swamp	Partial	1,009	487	Road construction
WL245	Treed Swamp; Shrub Swamp	Partial	1,646	1,228	Road construction
WL246	Bog	Partial	5,002	6	Road construction
WL248	Treed Swamp	Full	1,097	666	Turbine pad construction
WL249	Fen; Treed Swamp	Partial	11,790	4,766	Road construction
WL250	Treed Swamp; Shrub Swamp; Fen	Partial	44,673	14,492	Road construction
WL251	Bog	Partial	811	203	Road construction
WL252	Treed Swamp	Full	1,085	1,085	Turbine pad construction
WL253	Treed Swamp	Full	1,615	1,121	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL256	Bog	Partial	2,407	1,160	Road construction
WL259	Fen	Partial	16,126	5,847	Road construction
WL260	Bog	Partial	30,115	3,250	Road and turbine pad construction
WL261	Treed Swamp	Partial	3,066	1,143	Road construction
WL262	Treed Swamp	Partial	2,298	795	Road construction and upgrades
WL263	Treed Swamp	Partial	17,309	39	Road construction
WL264	Treed Swamp; Bog	Partial	2,391	999	Road construction and upgrades
WL265	Bog	Partial	8,353	3,685	Road construction and upgrades
WL267	Treed Swamp	Partial	2,076	137	Road upgrades
WL269	Treed Swamp	Partial	1,195	360	Road upgrades
WL273	Treed Swamp	Partial	4,871	2,388	Road upgrades
WL274	Treed Swamp	Full	473	273	Road construction
WL277	Treed Swamp	Full	148	3	Road upgrades
WL278	Treed Swamp	Partial	22,459	5,884	Road and turbine pad construction
WL280	Treed Swamp	Partial	5,834	2,372	Road upgrades
WL283	Treed Swamp	Partial	28,173	1,673	Road construction
WL285	Treed Swamp; Shrub Swamp	Partial	24,406	10,513	Road construction
WL287	Treed Swamp	Full	287	272	Road construction
WL291	Shrub Swamp	Partial	11,208	166	Road construction
WL293	Treed Swamp	Partial	996	373	Road construction
WL294	Bog	Full	576	257	Road construction
WL296	Shrub Swamp	Partial	812	427	Road construction
WL298	Bog	Partial	40,047	4,319	Road upgrades
WL299	Fen; Treed Swamp	Partial	9,489	4,128	Road construction
WL300	Bog	Partial	1,281	53	Road upgrades
WL301	Bog; Treed Swamp	Partial	15,947	6,675	Road construction
WL302	Shrub Swamp	Full	1,451	872	Road upgrades
WL303	Treed Swamp	Partial	1,253	525	Road upgrades
WL304	Treed Swamp	Full	898	431	Road upgrades
WL305	Shrub Swamp	Partial	1,684	94	Road upgrades
WL306	Bog; Treed Swamp	Partial	13,972	5,836	Road construction
WL309	Treed Swamp	Partial	4,156	2,060	Road construction
WL310	Shrub Swamp	Partial	4,851	44	Road construction
WL311	Treed Swamp	Partial	9,545	3,724	Road construction
WL314	Treed Swamp	Partial	7,759	2,912	Road construction
WL316	Bog	Full	5,808	2,213	Road and turbine pad construction
WL317	Treed Swamp	Partial	2,215	1,094	Road construction
WL318	Treed Swamp	Partial	652	23	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL319	Treed Swamp	Partial	80,187	24,466	Road and turbine pad construction
WL324	Bog; Treed Swamp; Shrub Swamp	Partial	197,487	61,385	Road and turbine pad construction
WL326	Bog; Shrub Swamp	Partial	82,164	20,256	Road and turbine pad construction
WL327	Treed Swamp	Full	264	78	Road construction
WL329	Bog; Treed Swamp	Partial	37,351	16,584	Road construction
WL330	Treed Swamp	Partial	705	328	Road construction
WL332	Bog; Treed Swamp	Partial	1,613	728	Road construction
WL333	Treed Swamp	Partial	405	144	Road construction
WL334	Treed Swamp	Full	228	225	Road construction
WL335	Bog; Treed Swamp	Partial	1,912	79	Road construction
WL338	Treed Swamp	Partial	188	17	Road upgrades
WL341	Shrub Swamp	Full	598	194	Road construction
WL342	Treed Swamp	Partial	1,597	795	Turbine pad construction
WL343	Treed Swamp	Partial	3,497	1,463	Road upgrades
WL345	Treed Swamp; Bog	Partial	18,614	6,204	Road and turbine pad construction
WL347	Treed Swamp	Partial	479	6	Road construction
WL348	Treed Swamp	Partial	3,255	2,160	Road construction
WL349	Shrub Swamp	Full	457	266	Road construction
WL350	Shrub Swamp	Full	1,391	883	Road construction
WL351	Shrub Swamp	Full	302	108	Road upgrades
WL352	Fen	Partial	2,129	775	Road upgrades
WL354	Treed Swamp	Partial	3,902	1,027	Road upgrades
WL355	Shrub Swamp	Full	495	86	Road upgrades
WL356	Bog	Partial	4,848	2,307	Road construction
WL357	Shrub Swamp	Full	1,004	915	Road construction
WL360	Shrub Swamp	Partial	1,106	25	Road upgrades
WL361	Shrub Swamp	Partial	1,962	439	Road construction
WL362	Shrub Swamp	Partial	2,632	988	Road construction
WL363	Shrub Swamp	Partial	5,019	2,959	Road construction
WL364	Shrub Swamp	Partial	20,577	4,684	Road construction
WL365	Treed Swamp	Partial	10,874	4,898	Road construction
WL368	Shrub Swamp	Full	1,690	616	Road construction
WL370	Treed Swamp	Partial	1,440	104	Road upgrades
WL372	Treed Swamp	Partial	9,172	4,283	Road construction
WL373	Shrub Swamp	Partial	2,292	727	Road construction
WL374	Shrub Swamp	Partial	1,150	380	Road construction
WL376	Treed Swamp	Partial	15,869	7,024	Road construction
WL377	Treed Swamp	Full	384	346	Road construction
WL378	Treed Swamp	Partial	1,458	712	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Estimated Area of Potential Impact (m^2)	Activity
WL380	Treed Swamp	Full	216	142	Road upgrades
WL381	Treed Swamp	Partial	24,077	7,033	Road and turbine pad construction
WL385	Treed Swamp	Partial	1,572	208	Road upgrades
WL386	Bog	Partial	298	4	Road upgrades
Total Estimated Area with Potential Impact				**582,529 m^2**	

Table 9.19: Habitat Alteration Potential for Predicted Wetlands within the Assessment Area

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Area of Potential Impact (m^2)	Activity
PWL2	Treed Swamp	Partial	8,370	2,466	Road and turbine pad construction
PWL4	Bog; Treed Swamp	Partial	12,598	5,237	Road construction
PWL5	Bog	Full	1,574	259	Road construction
PWL8	Treed Swamp	Partial	540	88	Road construction
PWL9	Treed Swamp	Partial	3,451	1,349	Road construction
PWL10	Bog	Partial	1,197	350	Road construction
PWL11	Bog	Partial	383	12	Road construction
PWL14	Bog	Partial	687	160	Road construction
PWL15	Treed Swamp	Partial	502	53	Road construction
PWL16	Treed Swamp	Partial	18,367	1,762	Road construction
PWL18	Treed Swamp	Partial	2,427	1,013	Road construction
PWL19	Shrub Swamp	Partial	1,755	832	Road construction
PWL20	Treed Swamp; Fen	Full	8,305	2,304	Road and turbine pad construction
PWL23	Bog	Partial	723	67	Road construction
PWL24	Treed Swamp; Shrub Swamp	Partial	3,214	1,223	Road construction
PWL25	Treed Swamp	Partial	1,331	499	Road construction
PWL26	Treed Swamp	Partial	1,382	71	Road construction
PWL28	Bog	Full	1,155	950	Road construction
PWL32	Bog	Partial	3,861	1,951	Road construction
PWL33	Bog	Partial	4,618	1,839	Road construction
PWL34	Treed Swamp	Partial	783	293	Road construction
PWL35	Bog	Partial	1,044	533	Road construction
PWL36	Treed Swamp; Fen	Partial	42,987	8,682	Road and turbine pad construction
PWL37	Treed Swamp	Partial	1,092	615	Road construction
PWL38	Bog	Partial	5,457	14	Turbine pad construction
PWL39	Treed Swamp	Partial	905	284	Road construction
PWL40	Treed Swamp	Full	231	228	Road construction
PWL41	Treed Swamp	Full	513	496	Road construction
PWL42	Treed Swamp	Partial	5,380	1,099	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m^2)	Area of Potential Impact (m^2)	Activity
PWL43	Bog	Partial	2,839	37	Road construction
PWL44	Treed Swamp	Full	2,587	1,438	Road construction
PWL45	Bog	Partial	1,003	119	Road construction
PWL47	Bog	Partial	6,612	2	Turbine pad construction
PWL49	Treed Swamp	Partial	600	205	Road construction
PWL50	Treed Swamp; Shrub Swamp	Partial	4,781	1,749	Road construction
PWL51	Treed Swamp	Full	212	116	Road construction
PWL52	Treed Swamp	Partial	1,186	176	Road construction
PWL53	Treed Swamp	Full	865	221	Road construction
PWL57	Bog; Shrub Swamp	Partial	3,142	1,391	Road construction
PWL59	Bog	Partial	1,898	135	Road construction
PWL68	Treed Swamp	Full	2,513	1,323	Road construction
Total Estimated Area with Potential Impact				**41,643 m²**	

The results of the field assessments indicate that there is potential for 252 field-delineated Project-wetland interactions and 41 PWL Project-wetland interactions comprising partial (292) or complete (1) alterations to facilitate Project development. The Proponent prioritized the use of existing disturbed areas, with approximately 110 km of new road being constructed and approximately 53 km of previously existing road being utilized. As such, 82 of the potential alterations would be associated with upgrades to existing roads only (if determined to be required during the detailed design phase) and 175 of the potential alterations are associated with the construction of new roads. An additional 10 potential alterations are associated with both upgrades to existing roads and construction of new roads. While many wetlands within the Assessment Area around turbines are expected to be completely avoided through the detailed design of turbines, there are currently seven potential alterations stemming from turbine pad construction only. The remaining 19 potential alterations are associated with a combination of road construction and/or upgrades and turbine construction.

Alteration approval is needed from NSECC for wetland alterations. In areas where wetland alteration is unavoidable, the detailed design phase, where practicable, will refine the layout so that wetland crossings will occur along wetland edges or narrow portions of the wetland and will configure infrastructure in a way to impact as little of the wetland as possible. Furthermore, any necessary wetland crossings will be designed to avoid any permanent diversion, restriction or blockage of natural flow, such that the hydrologic function of the wetland is maintained. Specific details of the crossings will be finalized during the detailed design phase and will be included in the application for wetland alteration.

Provincial wetland data obtained from the Canadian Wetland Inventory (CNWI) (ECCC, 2024) was used to estimate the total amount of wetland habitat within the 173,622 ha RAA. An estimated 15,471 ha of wetland habitat was identified, which equates to approximately 8.9% of the RAA. Field and predicted wetland data were used to estimate the total amount of wetland habitat within the assessed portion of the LAA (i.e., excluding areas identified in Drawing 4.1).

An estimated 257 ha of wetland habitat was identified, which equates to approximately 15.9% of the assessed portion of the LAA. Field and predicted wetland habitat that may be directly impacted by the Project comprises approximately 62 ha, or 0.04% of the total area within the RAA, which is approximately 0.4% of the potential wetland habitat within the RAA and approximately 24.1% of the field and predicted wetland habitat within the assessed portion of the LAA. Mitigations for loss of wetlands will ensure that the provincial wetland policy of no net loss of wetland habitat and function will be upheld.

There were 16 wetlands identified as potential WSS. No alterations are expected to be required for WL221 and WL247. The remaining 14 potential WSS may, however, require alteration. Alterations may be required for these potential WSS as a result of the following proposed activities: construction of new roads (WL78, WL249); both the construction of new roads and upgrades to existing roads (WL12, WL48, and WL150); upgrades to existing roads (WL22, WL30, WL101, WL111, WL204, WL229, WL343, and WL385); and construction of both new roads and turbine pads (WL381). Olive-sided flycatcher, rusty blackbird and Canada warbler were each observed in at least one of these 14 wetlands, and each species was observed in suitable breeding habitat during their respective breeding seasons. No alterations are expected to be required for the potential WSS in designated areas identified in the desktop review.

Suitable habitat for Canada warbler, olive-sided flycatcher, and rusty blackbird is common throughout the Study Area based on avian SAR habitat modelling (Section 10.4.5). Within a 5 km buffer of the Study Area, approximately 6,226 ha, 14,542 ha, and 4,016 ha of suitable habitat were modelled for Canada warbler, olive-sided flycatcher, and rusty blackbird, respectively. Wetlands identified as potential WSS based on observations of these species extend beyond the Assessment Area and remain broadly represented within the surrounding region. Anticipated Project interactions with these wetlands range from complete avoidance to partial overlap, with most wetlands experiencing limited partial interaction. Habitat modelling indicates that suitable habitat for these avian SAR is widely distributed regionally, and habitat availability is anticipated to remain within and adjacent to the Study Area following Project construction. Potential effects on avian SAR and associated habitat are discussed further in Section 10.4.

Where practical, potential WSS will be avoided through the detailed design process. If the detailed design process requires unavoidable impacts to WSS, the proposed impacts will be minimized and consider, where practical, avoiding portions of the wetlands that provided suitable habitat for the respective SAR species.

Indirect Loss

Indirect losses to wetlands generally occur as a result of construction but the effects become noticeable during the operation of the Project. Indirect loss of wetland habitat occurs through disruption of the hydrology of a wetland through the redirection of surface and subsurface water to a wetland. The hydrology of a wetland is one of the most important aspects of its overall structure and function. Project infrastructure located within or near a wetland can result

in changes in the quantity and timing of water flow, potentially affecting species composition, water treatment capacity, and nutrient export (Mitsch & Gosselink, 2000). Additionally, disruptions to hydrology in one area may reduce the hydrological connectivity to other areas, causing impacts that may extend into neighbouring wetlands.

Indirect loss may be mitigated through surface water management to ensure that pre-existing hydrologic sources are continuing to feed into a wetland. As hydrologic impacts are not immediately identified, long-term monitoring is required to evaluate wetland changes post-alteration and are included within the wetland alteration approval process. Often shifts in hydrology on a project site do not result in direct loss, but rather a change in the wetland type and function. Surface water management for the Project will consider the location of wetlands not directly impacted by the Project, and hydrology will be maintained in partially altered wetlands.

Changes to Wetland Functionality

Changes to wetland functionality may be caused through habitat loss, as discussed above, or through other Project activities that may release dust, sediment or invasive species into the wetland, thus shifting its ecological, chemical, and hydrological profiles.

Erosion and Sedimentation

Erosion and sedimentation can occur throughout the lifecycle of the Project, including during construction efforts, daily traffic, routine road and transmission line right of way (ROW) maintenance. The accumulation of sediment within wetland environments can cause shifts in ecological integrity, including the plant species composition and subsequent nutrient retention potential, hydrological storage capabilities, and habitat suitability for vulnerable species (Tilman et al., 1997). Additionally, the use of road salt for winter maintenance may result in indirect adverse effects on microbial and vegetative wetland communities, including detrimental salinity levels and increased soil erosion due to salt-damaged vegetation (Jones et al., 2017).

Dust

The potential for dust deposition will likely be highest during the construction phase, though the risk will be present throughout the Project's lifecycle. Dust primarily impacts vegetative health, with particle size influencing the scale of the impact (Farmer, 1993). Smaller particulate can result in clogged pores, hindering vital biochemical processes including photosynthesis, respiration, and transpiration; and larger particulate can result in lacerations in plant tissues, thus jeopardizing the health of the plant (Farmer, 1993).

Invasive Species

The colonization of invasive species can result in detrimental impacts on wetland environments, including alterations to evapotranspiration rates, infilling from reduced decomposition rates, and ultimately a reduction in the complexity of the wetland and its subsequent species richness (Zedler & Kercher, 2004). The creation of roadways can act as a vector for invasive species, with the potential for seed dispersal increasing with both vehicular and animal traffic. Further, because many invasive species thrive in disturbed soils, routine

maintenance of roadways can provide ideal conditions for their establishment (Trombulak & Frissell, 2000).

Compaction

Compaction can hinder both the vegetative and hydrological structure of a wetland, with a loss of pore space restricting root growth and groundwater infiltration (Duiker, 2004). This impacts the absorption of moisture and nutrients, thus impacting the ecological integrity of the wetland and the ecosystem services it provides. Further, compaction can decrease percolation rates, resulting in prolonged periods of saturation, and increasing the potential for flooding (Duiker, 2004).

The temporal and spatial extent of indirect effects such as erosion and sedimentation, dust, invasive species, and compaction can be far reaching, but are often foreseeable, and research based, standardized BMPs can be implemented to mitigate the resulting outcomes. Changes to wetland functionality can be assessed through long-term wetland monitoring to identify biological, hydrologic, and physical shifts within a wetland.

Mitigation Measures

In addition to the removal of infrastructure from the MOU lands north of the Melrose Country Harbour Road from the Project, the following specific mitigative measures will be implemented to avoid and mitigate any potential effects on wetlands.

Habitat Loss

- Mark wetlands clearly to avoid interference with wetland habitat to the extent practicable.
- Complete wetland delineation and functional assessments to support permitting, if required, in areas not previously assessed.
- Avoid and minimize impacts to wetlands to the extent practicable.
    - Where wetland impacts are unavoidable, wetland alterations will be completed in accordance with the NSECC Wetland Conservation Policy (2019b). The wetland alteration process will occur during the permitting stage, which includes a requirement to compensate for lost wetland habitat and functions.
        - Adhere to the terms and conditions of the wetland alteration approval.
    - For wetlands along collector lines, orient placement of structures in dry areas adjacent to wetlands thus allowing cables to span wetlands, to the extent practicable.
    - If temporary access roads are required within wetlands, appropriate mitigations, including the use of swamp mats, will be implemented to prevent disturbance.
    - Design wetland crossings to occur at the narrow portion of the wetland or the wetland's edges, to the extent practicable.
    - Swamp mats will be used to limit impacts outside of the alteration area.

Indirect Habitat Loss

- Design wetland crossings to avoid permanent diversion, restriction or blockage of natural flow, such that hydrologic function of wetlands will be maintained.

Erosion and Sedimentation

- Develop a site-specific Erosion and Sediment Control Plan during the detailed design phase.
    - The plan will address the type of control structures, proper installation techniques, grading, maintenance and inspection, timing of installation, and revegetation.
- Limit the area of exposed soil and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover).
- Use the existing roads and access routes to the extent feasible.
- Minimize travel through wetlands.
    - If travel through wetlands is required, use swamp mats and if practicable, time work to occur during frozen ground conditions and/or travel through the drier portions of the wetland, where practicable. This mitigation also applies to minimizing compaction.
- Direct run-off from construction activities away from wetlands.
- Maintain existing vegetation cover, where practicable.

Dust Deposition

- Use water or an approved dust suppressant to control dust on roads as required.
- Establish site speed limits to minimize dust generation.

Invasive Species

- Clean and inspect work vehicles prior to use to prevent the introduction of invasive/non-native species.

Compaction

- Require that wetland delineation tape is in place and visible to avoid unnecessary compaction within wetlands.
- Hold pre-construction site meetings to educate staff on the sensitivity of wetlands.

Monitoring

A site-specific post-construction wetland monitoring plan will be developed to facilitate adaptive management and contribute to the safeguarding of ecological integrity and environmental stability. The plan will be provided to NSECC as part of the permitting process and will likely consist of detailed monitoring and general spot checks. Detailed monitoring typically includes vegetative, hydrological, and soil assessments within the wetland habitat adjacent to the infill site. Spot checks typically involve a general overview of vegetative, hydrological, and soil conditions, focusing on evidence of significant hydrologic alterations and sedimentation.

Conclusion

The predicted residual effects of the Project on wetlands (after mitigation) are characterized in Table 9.20.

Table 9.20: Wetland Resources Residual Effects

Effect Detail	Habitat Loss	Changes in Wetland Function
Magnitude of Effect	**Moderate:** Direct loss of habitat, including that of potential WSS, but wetland area loss will not impact the hydrology of the watershed. Where WSS are impacted, adequate general SAR habitat is prevalent elsewhere within the RAA.	**Low:** Project activities have low potential for changes to wetland function with the implementation of mitigation measures.
Geographic Extent of Effect	Assessment Area	Assessment Area
Frequency of Effect	**Single Event:** Effects will occur once, during initial ground disturbance or vegetation clearing for the Project.	**Single Event:** Direct effects resulting from construction activities will occur once, and indirect effects to wetland function will be mitigated through the use of controls.
Duration of Effect	**Medium Term:** Residual effects will extend until wetlands are compensated for following construction.	**Medium Term:** Residual effects may extend through the operation and maintenance phase of the Project.
Reversibility of Effect	**Partially Reversible**	**Partially Reversible**
Significance Level	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible		

10.0 TERRESTRIAL ENVIRONMENT

10.1 Terrestrial Vegetation Communities and Flora

10.1.1 Overview

The vegetation community and flora assessment was completed using a combination of desktop and field studies to achieve the following objectives:

- Develop a preliminary understanding of the landscape features, vegetation communities, and flora species within and near the Study Area using desktop resources.

- Undertake field surveys to document the range of vegetation communities and flora present within the Assessment Area, with a focus on sensitive and/or uncommon communities and flora SAR and SOCI (and their supporting habitat).
- Use the information collected during field studies to iteratively update the Project design to avoid or minimize interactions between vegetation communities, flora SAR and SOCI, and Project components.
- Apply mitigation techniques including construction, and operational management practices to minimize the Project's effects on vegetation communities and flora SAR and SOCI (including supporting habitat).

10.1.2 Regulatory Context

Several laws and regulations provide protection for vegetation communities and rare flora in Nova Scotia.

- *Species At Risk Act* (Canada, 2002)
- *Endangered Species Act* (Nova Scotia, 1998)
- *Biodiversity Act* (Nova Scotia, 2021)
- *Environment Act* (Nova Scotia, 1995b)

Species that are listed as Endangered or Threatened receive individual protection from harm and destruction under SARA and/or ESA, including protection of habitually occupied spaces.

For certain rare and sensitive lichen species, special management practices (SMPs) have been established to limit disturbance to individuals and their supporting habitat on Crown land, as outlined in the At-Risk Lichens–Special Management Practices (NSNR, 2018a). For example, limitations to the type and extent of land development are prescribed within protected and/or restricted zones around the occurrence of certain rare lichens. Additional regulations aim to protect important landscape features such as wetlands (described in Section 9.2) that support many plant and lichen SAR and SOCI in Nova Scotia.

The Silvicultural Guide for the Ecological Matrix (McGrath et al., 2021) and An Old-Growth Forest Policy for Nova Scotia (NSNR, 2022a) make recommendations on and regulate forestry and forest management practices on provincial Crown land and offer BMPs for forests on private land. The publications provide direction for maintaining forest ecological integrity and identifying and preserving old-growth forests. Old-growth forest stands are defined in Nova Scotia as "area(s) where 20% or more of the basal area is in trees greater than or equal to the reference age for that forest (ecosystem classification vegetation) type" (NSNR, 2022a). The Old-Growth Forest Policy requires no net loss of old-growth forests on Crown land and stipulates development limitations within 100 m of confirmed old-growth stands.

Finally, the *Environment Act* (Nova Scotia, 1995b) supports and promotes the protection, enhancement, and use of the provincial environment while maintaining ecosystem integrity and sustainable development. The *Biodiversity Act* (Nova Scotia, 2021) provides for the stewardship, conservation, sustainable use, and governance of biodiversity of Nova Scotia.

10.1.3 Desktop Review

Several databases were referenced as part of the desktop review to provide an initial understanding of the landscape characteristics, vegetation communities, and flora species present within and near the Assessment Area. The following references were included in the desktop review:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Provincial Landscape Viewer (NSNR, 2024e)
- Nova Scotia Forest Inventory (NSNR, 2021g)
- WAM Database (NSECC, 2022c)
- Nova Scotia Wetland Inventory (NSNR, 2021l)
- Nova Scotia Topographic Features Database (GeoNOVA, 2024c)
- Canopy Height Model (GeoNOVA, 2024a)
- Provincial Crown Land Harvest Plan Archive (NSNR, 2025a)
- Old-Growth Policy Layer (NSNR, 2026)
- Old-Growth Potential Index (NSNR, 2023a)
- ACCDC Data Report (ACCDC, 2026a)
- Boreal Felt Lichen Habitat Layer (NSNR, 2012a)
- MTRI Vole Ears (*Erioderma mollissimum*) and Extant Boreal Felt Lichen (*Erioderma pedicellatum*) GIS Databases (MTRI, 2019a, 2019b)
- Critical Habitat for SAR National Dataset (ECCC, 2025c)
- SARA and ESA Recovery Strategies

During the desktop review, emphasis was placed on information recorded within 5 km of the Study Area, as this distance captures observational records and mapped habitat that are of high relevance to the Project.

Landscape Characteristics

The Study Area falls within Nova Scotia's Eastern, Atlantic Coastal, and Nova Scotia Uplands Ecoregions (Drawing 7.1). The Eastern Ecoregion, which includes roughly three-quarters of the Study Area (17,021 ha), covers 12% of the province and is characterized by rolling plains of glacial till, granite uplands, large chains of lakes, and streams susceptible to acidification (Neily et al., 2017). Acadian softwood forests in the ecoregion are influenced by stand-level disturbances such as hurricanes and fires. The Atlantic Coastal Ecoregion, which includes most of the remainder of the Study Area, is a thin stretch of land along the eastern coast of Nova Scotia that covers 9% of the province. It is highly influenced by its proximity to the cold Atlantic Ocean which leads to a moderate climate, abundant brackish lakes and ponds, and Maritime Boreal ecosites dominated by balsam fir (*Abies balsamea*), black spruce (*Picea mariana*), and white spruce (*Picea glauca*) (Neily et al., 2017). A small portion of the Study Area (282 ha) also extends into the Nova Scotia Uplands Ecoregion, though no infrastructure is planned for this area.

Within the Eastern Ecoregion, the Study Area lies within the Eastern Interior Ecodistrict (440) (Drawing 7.1). This ecodistrict is the largest in Nova Scotia and has an average elevation of

only 95 masl with gradually rolling topography throughout. Forested areas within this ecodistrict are influenced by the depth of underlying soils (Neily et al., 2017). Soil profiles include impoverished shallow soils, deep well-drained soils, and imperfectly to poorly drained soils. The Spruce Pine (SP) forest group is widely dispersed along nutrient-poor soils; the potential development of old-growth characteristics within this forest group is limited by the natural disturbance regime (e.g., hurricanes, insects, fire). Even-aged black spruce forests with an understory dominated by ericaceous shrubs are common on imperfectly drained soils with hummocky to level terrain, whereas wet open woodlands with limited stocking of trees may occur on poorly drained soils. Non-forested uplands are largely composed of low heathlands with lambkill (*Kalmia angustifolia),* rhodora (*Rhododendron canadense*), huckleberries (*Gaylussacia* spp.), and blueberries (*Vaccinium* spp.) most dominant (Neily et al., 2017).

The southern portion of the Study Area is in the Eastern Shore Ecodistrict (820) (Drawing 7.1), which flanks the eastern shore of Nova Scotia from Chedabucto Bay to St. Margaret's Bay. This narrow ecological landscape is highly exposed along the eastern shore and experiences strong winds, extended periods of fog, and a cold climate. Exposed headlands may support conditions associated with Maritime Boreal ecosites as the oceanic influence extends inland until topographical features restrict further penetration. About one fifth of the land area includes sparsely vegetated exposed bedrock occupied by lichens and/or mosses (Neily et al., 2017). Hydric soil is common due to hummocky terrain, shallow soil profiles, and abundant moisture. Even-aged forests are common along the eastern shore, where strong winds and disturbance from insects and disease create opportunities for advanced tree regeneration and limit the potential for old forest development. Natural senescence further promotes the development of even-aged forests, with both softwood and hardwood stands restricted to ages of 100 to 125 years. Maritime Boreal coastal forests dominate this ecodistrict, which are typified by balsam fir, black spruce, and white spruce trees and a shrub layer dominated by regenerating balsam fir, lambkill, wild raisin (*Viburnum cassinoides*), and American mountain ash (*Sorbus americana*) (Neily et al., 2017).

The NSNR Wetlands Inventory (NSNR, 2021l) indicates that wetland habitat, which is known to support a variety of vegetation communities and flora species, is present throughout the Study Area and most concentrated in the southeastern extent. Detailed characterizations of wetlands within the Assessment Area are provided in Section 9.2.

Vegetation Communities

The desktop assessment of vegetation communities included the use of geospatial data to understand the abundance and distribution of major land cover types (vegetation communities and disturbed areas) within various Project boundaries. The land cover model was developed using data from the Nova Scotia Forest Inventory (NSNR, 2021g), WAM Database (NSECC, 2022c), Provincial Crown Land Harvest Plan Archive (NSNR, 2025a), and Canopy Height Model (GeoNOVA, 2024a), which were reclassified, combined, and reviewed for accuracy against high-resolution aerial imagery (dated July 2022) (Drawing 10.1A to 10.1O).

In the resulting model, cutover areas include harvested forest stands identified in the Forest Inventory (NSNR, 2021g), as well as stands in the Provincial Crown Land Harvest Plan Archive (NSNR, 2025a). It is possible that some stands in the Provincial Crown Land Harvest Plan Archive (NSNR, 2025a) have not been harvested as the layer represents proposed harvest plans; however, comparisons to recent aerial imagery confirmed that the vast majority of the stands identified in this layer do correspond to cutovers. Finally, an unknown additional amount of cutover and disturbed area not captured by either the Nova Scotia Forest Inventory (NSNR, 2021g) or the Provincial Crown Land Harvest Plan Archive (NSNR, 2025a) generally falls into the "open areas" class due to having a low canopy height.

The extent of each land cover type within the Clearing Footprint (the area to be cleared for construction and the placement of Project infrastructure), the Study Area, and the Study Area plus a 5 km buffer is provided in Table 10.1.

Table 10.1: Land Cover Types within and Surrounding the Study Area

Land Cover Type	Clearing Footprint		Study Area		5 km of the Study Area[3]	
	ha	%	ha	%	ha	%
Hardwood Forest	74.3	5.4	1,217.1	5.9	5289.3	8.2
Hardwood Wet Forest	2.3	0.2	26.1	0.1	154.0	0.2
Mixedwood Forest	201.5	14.6	2,584.9	12.5	8569.0	13.2
Mixedwood Wet Forest	6.6	0.5	131.8	0.6	482.6	0.7
Softwood Forest	381.8	27.7	5,359.4	25.8	18165.9	28.0
Softwood Wet Forest	65.6	4.8	1,135.4	5.5	3228.3	5.0
Shrub/Alders	95.9	6.9	723.1	3.5	1579.3	2.4
Open Wetland	35.3	2.6	3,208.4	15.5	7520.7	11.6
Cutover[1] Upland	195.5	14.2	2,466.0	11.9	7517.6	11.6
Cutover[1] Wetland	7.4	0.5	115.5	0.6	416.5	0.6
Urban/Developed	3.8	0.3	49.9	0.2	1,466.8	2.3
Open Areas[2]	310.1	22.5	3,205.2	15.5	7,538.0	11.6
Water	0.1	0.0	510.9	2.5	2,908.8	4.5
Total	**1,380.3**	**100.0**	**20,733.5**	**100.0**	**64,836.9**	**100.0**

[1]Cutover class represents harvested and/or windthrow/dead forest areas as identified in the Forest Inventory and Crown Land Harvest Plant Archive.
[2]Open areas include landscapes with low/no canopy height, such as barrens and agricultural fields, as well as harvested areas not captured by the cutover class.
[3]This area represents the RAA for terrestrial vegetation communities and flora, as described in Section 10.1.6
Source: Land cover types derived from provincial WAM Database (NSECC, 2022c), Provincial Crown Land Harvest Plan Archive (NSNR, 2025a), Canopy Height (GeoNOVA, 2024a), and Forest Inventory Data (NSNR, 2021g).

The land cover classification indicates that the Study Area is dominated by softwood forests (25.8%), open wetlands (15.5%), and other open areas (15.5%), with cutover uplands being the most abundant "disturbed" cover type (13.4%). On a proportional basis, the percentage of open wetlands in the Clearing Footprint is 2.6%, lower than both the Study Area (15.5%) and surrounding 5 km (11.6%) due to efforts to minimize placement of Project infrastructure in

wetland habitat where practicable (described further in Section 9.2). Similarly, the percentages of cutover upland, shrub/alder cover, and open areas are concentrated in the Clearing Footprint relative to the surroundings due to the preferred use of disturbed and open areas in determining the layout of the Project (15.0% of the Clearing Footprint consists of previously disturbed areas).

Old-growth forest stands, which may be composed of a variety of vegetation communities, hold high ecological and cultural value and are known to support high levels of biodiversity (NSNR, 2022a). To identify areas with elevated potential for encountering old-growth forests within the Study Area, the Old-Growth Policy layer (NSNR, 2026) and an Old-Growth Potential Index (OGPI) layer provided by NSNR (2025b) were reviewed. The Old-Growth Forest Policy layer is a database of stands protected under the Old-Growth Forest Policy (NSNR, 2022a), whereas the OGPI is a desktop tool intended to guide forest management and land use decisions. The OGPI ranks forest stands from 0 to 11 based on their height in comparison to stands with the same tree cover and ecological site conditions. Stands ranking seven or higher are included in the resulting layer due to their elevated potential to be old growth.

There are 23 stands protected under the Old-Growth Forest Policy within the Study Area, seven of which coincide with the Assessment Area (including one stand identified as a restoration opportunity area; Drawing 10.2). An additional confirmed old-growth stand identified during field assessments associated with the placement of a Project MET tower is also present in the Study Area (Drawing 9.3J). Based on a comparison of polygons in the OGPI layer (NSNR, 2025b) to stand boundaries in the Nova Scotia Forest Inventory (NSNR, 2021g), 164 stands ranked seven or higher coincide with the Assessment Area (251.8 ha of overlapping area).

Flora Species

The ACCDC data report (ACCDC, 2026a) prepared for the Project contains 321 records associated with 62 flora species (25 vascular plants, three bryophytes, one fungi, and 33 lichens) within 5 km of the Study Area (Drawing 10.2). Of these, five are SAR:

- Black ash (*Fraxinus nigra*): ESA Threatened, S-Rank S2 (records not available due to location sensitivity)
- Blue felt lichen (*Pectenia plumbea*): SARA Special Concern, ESA Vulnerable, S-Rank S3 (37 unique records)
- Boreal felt lichen (*Erioderma pedicellatum*, Atlantic population): SARA and ESA Endangered, S-Rank S1 (11 unique records)
- Eastern waterfan (*Peltigera hydrothyria*): SARA and ESA Threatened, S-Rank S1 (21 unique records)
- Frosted glass-whiskers (*Sclerophora peronella*, Atlantic population): SARA Special Concern, S-Rank S3S4 (six unique records)

Black ash is a location sensitive species in Nova Scotia, and confirmation that an area of core habitat and multiple species occurrences are present within 5 km of the Study Area was

provided by NSNR (SAR Biologist S. Spencer, May 12, 2026). No ACCDC records or identified core habitat is present in the Study Area.

The 11 unique records of boreal felt lichen identified in the ACCDC report are located between 11 m and 4.8 km from the Study Area boundary, with no occurrences in the Study Area. Five of the 11 occurrences are described as historical records (ACCDC, 2026a).

ACCDC records of blue felt lichen, eastern waterfan, and frosted glass-whiskers are present in the Study Area, along with records of five vascular plant and 18 lichen SOCI. Two occurrences of blue felt lichen and records associated with three flora SOCI are also in the Assessment Area.

A summary of the ACCDC flora SAR and SOCI occurrence records within the Study Area is presented in Table 10.2. The complete ACCDC data report for the Project, which includes species records within 100 km of the Study Area, is provided in Appendix H.

Table 10.2: ACCDC Flora SAR and SOCI Records within the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Vascular Plants					
American Beech	*Fagus grandifolia*	-	-	-	S3S4
Michaux's Dwarf Birch	*Betula michauxii*	-	-	-	S3
Northern Blueberry(1)	*Vaccinium boreale*	-	-	-	S3S4
Northern Comandra	*Geocaulon lividum*	-	-	-	S3S4
Southern Twayblade	*Neottia bifolia*	-	-	-	S3
Lichens					
Acadian Jellyskin Lichen	*Leptogium acadiense*	-	-	-	S3S4
Black-footed Reindeer Lichen	*Cladonia stygia*	-	-	-	S3?
Blistered Jellyskin Lichen	*Leptogium corticola*	-	-	-	S3S4
Blue Felt Lichen(1)	*Pectenia plumbea*	Special Concern	Special Concern	Vulnerable	S3
Blue-gray Moss Shingle Lichen	*Moelleropsis nebulosa*	-	-	-	S2S3
Eastern Waterfan	*Peltigera hydrothyria*	Threatened	Threatened	Threatened	S1
Fertile Shield Lichen	*Parmelia fertilis*	-	-	-	S3S4
Finger Ring Lichen	*Arctoparmelia incurva*	-	-	-	S3S4
Fringe Lichen(1)	*Heterodermia neglecta*	-	-	-	S3S4
Frosted Glass-whiskers (Atlantic population)	*Sclerophora peronella (Atlantic pop.)*	Special Concern	Special Concern	-	S3S4
Ghost Antler Lichen	*Pseudevernia cladonia*	Not at Risk	-	-	S2S3

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Granulating Loop Lichen	*Hypotrachyna revoluta*	-	-	-	S2S3
Naked Kidney Lichen	*Nephroma bellum*	-	-	-	S3
Poor-man's Shingles Lichen	*Parmeliella parvula*	-	-	-	S1S2
Powdered Fringe Lichen	*Heterodermia speciosa*	-	-	-	S3S4
Roughened Shingle Lichen	*Fuscopannaria ahlneri*	-	-	-	S3
Salted Shell Lichen	*Coccocarpia palmicola*	-	-	-	S3S4
Scaly Fringe Lichen	*Heterodermia squamulosa*	Threatened	-	-	S3
Shaggy Fringed Lichen[(1)]	*Anaptychia palmulata*	-	-	-	S3S4
Tree Pelt Lichen	*Peltigera collina*	-	-	-	S3
White-rimmed Shingle Lichen	*Fuscopannaria leucosticta*	Threatened	-	-	S3

Source: (ACCDC, 2026a)
[(1)]Species recorded within the Assessment Area

In addition to the ACCDC report (2026a), several geospatial resources were reviewed to further assess the potential for encountering rare lichens within and near the Assessment Area. Following the direction of the At-risk Lichens - Special Management Practices (NSNR, 2018a), a boreal felt lichen habitat layer provided by NSNR (2012a) was reviewed for areas within 100 m of the Assessment Area identified as having high potential for boreal felt lichen occurrence. The habitat model is based on the known distribution of boreal felt lichen, which is most often observed on the trunks and branches of balsam fir trees growing in/near peatlands in close proximity (< 30 km) to the Atlantic Ocean (NSNR, 2012a). A total of 253 potential habitat features encompassing 444 ha of land are present within 100 m of the Assessment Area. Boreal felt lichen potential habitat features identified through this review were used to inform the selection of search areas for rare lichen surveys.

The rare lichen database maintained by the Mersey Tobeatic Research Institute (MTRI, 2019a) includes seven records of boreal felt lichen within 5 km of the Study Area (none of which are in the Study Area). These records correspond to occurrences reported by the ACCDC (2026a), as described above. No records of vole ears lichen (*Erioderma mollissimum*, SARA and ESA Endangered, S-Rank S1) were identified within 5 km of the Study Area in the rare lichen database (MTRI, 2019b).

Critical habitat for boreal felt lichen is described in the Amended Recovery Strategy for the Boreal Felt Lichen (*Erioderma pedicellatum*), Atlantic Population, in Canada as the substrates (trees) the lichens occur upon, a critical function zone (a 500 m area around the occurrences), and their associated wetland, buffered by 50 m (ECCC, 2020a). The federal amended recovery

strategy for boreal felt lichen was adopted by Nova Scotia in 2020; these critical habitat areas are therefore also considered to be core habitat (NSNR, 2020a) (but are not currently designated under ESA). The ECCC Critical Habitat Database (2025b) includes two areas of critical habitat relating to boreal felt lichen approximately 4 km north and northeast of the Study Area (Drawing 10.2). No other critical habitat areas for flora species were identified within 5 km of the Study Area (ECCC, 2025b).

10.1.4 Field Assessment

10.1.4.1 Field Assessment Methodology

Vegetation Community Assessments

An inventory of vegetation communities was completed during various biophysical field surveys in 2025 and 2026 (e.g., flora surveys, winter tracking, and pellet group surveys) to understand the types and extent of communities present in the Study Area. The vegetation community inventory is also used to support the assessment of habitat for terrestrial fauna, avifauna, and bats. During surveys, forested areas were classified according to the Forest Ecosystem Classification (FEC) for Nova Scotia (Neily et al., 2023), and barren communities were classified following the reference guide for Barrens Ecosystems in Nova Scotia (Porter et al., 2020). Observations of the following were also recorded if encountered:

- Landscape features such as watercourses, wetlands, and caves/mine shafts
- Forest stands noted as having old-growth potential
- Vegetation communities known to serve as habitat for rare flora or that provide important lifecycle functions for moose, birds, bats, and insects

Flora Surveys

Vascular flora and lichen surveys were completed in the Study Area in 2025 as follows:

- Vascular flora surveys: Late-May to late-September 2025 (22 survey days)
- Lichen surveys: July to December 2025 (27 survey days)

The field assessment strategy for vascular flora and lichens was informed by a review of land cover data and aerial imagery to prioritize survey areas. Meandering transects were completed within and near the Assessment Area in all major land cover types, including wetlands, upland forests, open areas, and forestry trails. More time was spent surveying in priority areas more likely to support SAR and SOCI, including mature forests, wetlands, and riparian areas. During all surveys a list of all vascular flora encountered was maintained and opportunistic observations of non-vascular flora and lichens were also recorded.

In addition to surveys for vascular flora, targeted surveys for rare lichens were completed in areas of suitable habitat up to 100 m outside of the Assessment Area in 2025. Prior to completing surveys, boreal felt lichen potential habitat polygons were reviewed against aerial imagery and recent forest harvest data (NSNR, 2025c) to confirm current conditions. In-tact

potential habitat polygons up to 100 m outside of the Assessment Area were prioritized for field assessments. Lichen surveys included a visual inspection of potential host trees, focusing on tree trunks, branches, and twigs.

Upon encountering flora SAR or SOCI, specimens were georeferenced, counted (when possible), photographed, and a description of their habitat was recorded. When unknown species were encountered, surveyors took photos and samples (when appropriate) to verify identification with guidebooks and/or experts as required. In addition to the prior knowledge of the surveyors, identification keys and descriptions from various print and electronic resources were used. Non-vascular flora (primarily mosses) were recorded incidentally during vascular flora and lichen surveys. Incidental observations of flora SAR and SOCI were also recorded during other biophysical surveys (e.g., wetland determinations, fauna surveys) within the Assessment Area, if observed.

While much of the Assessment Area has been surveyed for vascular flora and lichens, portions of the north and southeast were not surveyed due to poor site access, and additional areas will be surveyed, as required, prior to construction (described in Section 4.1 and Drawing 4.1).

10.1.4.2 Field Assessment Results

Vegetation Communities

Each of the land cover types identified through desktop review (Table 10.1) were observed in the Study Area during field assessments. Vegetation composition varied, with open wetlands, shrub cover, and softwood forests being abundant in the eastern half of the Study Area, and hardwood-dominant forests being more common in the north and west. Historical and ongoing forestry operations have modified forest conditions in the Study Area, particularly in the west, which is bisected by numerous unpaved roads and forestry trails. Less evidence of human disturbance was observed in the eastern portion of the Study Area where existing access is poor.

Seven upland forest groups were identified during surveys, comprised of 17 different vegetation types/communities (Table 10.3). Two wetland forest groups were identified, comprised of five vegetation types, and three barren communities were also described. Disturbed vegetated areas were largely composed of cutovers and planted forests. Representative points for these vegetation communities are shown in Drawing 9.3A to 9.3P.

Table 10.3: Vegetation Types/Communities Identified During Biophysical Surveys

Community Type	Group/Association	Vegetation Type/Community
Upland Forest Community[(1)]	Coastal Boreal (CB)	CB2 (White spruce – Balsam fir / Foxberry / Twinflower)
	Intolerant Hardwood (IH)	IH6 (White birch – Red maple / Sarsaparilla – Bracken)
		IH7 (Red maple / Hay-scented fern – Wood-sorrel)
	Mixedwood (MW)	MW1 (Red spruce – Yellow birch / Evergreen wood fern)
		MW2 (Red spruce – Red maple – White birch / Goldthread
		MW7 (Balsam fir – Red maple / Wood-sorrel – Goldthread)

Community Type	Group/Association	Vegetation Type/Community
	Spruce Hemlock (SH)	SH5 (Red spruce – Balsam fir / Schreber's moss – Stair-step moss)
		SH5b (Red spruce - Balsam fir / Schreber's moss - Stair-step moss - Balsam fir variant)
	Spruce Pine (SP)	SP6 (Black spruce – Balsam fir / Blueberry)
		SP7 (Black spruce / Lambkill – Wild raisin – Mountain holly)
		SP9 (Tamarack / Wild raisin / Scheber's moss)
	Tolerant Hardwood (TH)	TH1 (Sugar maple / Wood fern – Hay-scented fern)
		TH1a (Sugar maple / Wood fern – Hay-scented fern – Yellow birch variant)
		TH2 (Sugar maple / New York fern – Northern beech fern)
		TH2a (Sugar maple / New York fern – Northern beech fern – Yellow birch variant)
		TH8 (Red maple – Yellow birch / Striped maple)
	Open Woodland (OW)	OW2 (Black spruce / Lambkill / Reindeer lichen)
Wetland Forest Community[(1)]	Wet Coniferous (WC)	WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum)
		WC5 (Red spruce – Balsam fir / Cinnamon fern / Sphagnum)
		WC6 (Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum)
	Wet Mixedwood (WM)	WM1 Red maple – Balsam fir / Wood aster / Sphagnum)
		WM3 (Red maple / Black spruce / Lambkill / Cinnamon fern / Sphagnum)
Barren[(2)]	Shrubland	S1 (Black huckleberry heath)
		S3 (Mixed tall shrubland)
		S5 (Sheep laurel inland heath)
Anthropogenic	-	Cutover
		Regenerating cutover
		Planted forest
		Treated forest
		Utility corridor

Source: [(1)](Neily et al., 2023); [(2)](Porter et al., 2020)

The forest groups and vegetation types/communities identified within and near the Assessment Area are described in detail within the following subsections.

Coastal Boreal Forest Group

Black and white spruce and balsam fir are the primary species in this partial/closed canopy forest group. Coastal winds have a role in shaping forests through disturbance and the formation of krummholz vegetation. Coastal forests provide habitat for many species of birds, particularly during migration (Neily et al., 2023).

Intolerant Hardwood Forest Group

The IH forest group is typically comprised of early to mid-successional communities with a range of soil and site conditions. Moisture and nutrient regimes range from dry to moist and poor to rich. This forest group is dominated by hardwoods such as red maple (*Acer rubrum*), white birch (*Betula papyrifera*), grey birch (*Betula populifolia*), trembling aspen (*Populus tremuloides*), and large-toothed aspen (*Populus grandidentata*).

Mixedwood Forest Group

The MW forest group consists of early to late successional vegetation types, and these can be difficult to characterize due to variation in tree species composition. This group is dominated by a mixture of hardwood and softwood species and occurs in upland settings. Early successional stages often consist of red maple, white birch, and balsam fir, and late successional stages are comprised of yellow birch (*Betula alleghaniensis*), red spruce (*Picea rubens*), and/or eastern hemlock (*Tsuga canadensis*) (Neily et al., 2023). Herb and bryophyte diversity are often high and extensive.

Open Woodland Forest Group

Forests in the OW forest group are characterized by open canopies (20 to 60%) either due to limiting site conditions (e.g., low soil fertility, depth, or moisture, exposed bedrock) or frequent disturbances (windthrow and fire) (Neily et al., 2023). Stunted tree growth (due to climatic exposure and poor site conditions) and well-developed shrub layer (e.g., huckleberry, lambkill, rhodora) are common. Reindeer lichen (*Cladonia* spp.) is common in OW forests. The habitat value of OW forests is variable, with some communities known to support uncommon mammal, snail, and flora species (Neily et al., 2023). OW forests can express a variety of successional stages, including edaphic climax communities, but rarely support old-growth conditions that are characteristic of other forest types.

Spruce Hemlock Forest Group

The SH forest group is widespread throughout Nova Scotia and consists of mid to late successional vegetation types. The canopies of this group are dominated by shade tolerant softwoods such as balsam fir, red spruce, and eastern hemlock. The shrub layer often consists of regenerating softwoods and soils are frequently derived from glacial till. The SH group provides habitat for a diverse community of birds and mammals (Neily et al., 2023).

Spruce Pine Forest Group

Vegetation types within the SP forest group are dominated by black spruce and pine (*Pinus* spp.) species with understories often composed of ericaceous shrubs (Neily et al., 2023). This group frequently occurs in areas of shallow, nutrient-poor soils. Soils are often very to excessively stony, especially when associated with granitic glacial till deposits. Herbaceous cover is low and dependent on light availability.

Tolerant Hardwood Forest Group

The TH forest group is characterized by mid- to late-successional hardwood stands generally composed of a closed canopy dominated by sugar maple (*Acer saccharum*), beech, yellow

birch, and red maple, with balsam fir as a significant understory species. The shrub layer in TH vegetation types can be extensive and will show a high diversity and abundance of ferns. Most TH sites contain soils ranging from fresh to moist. Due to the fertile soils of TH forests, rare plants are often associated with this group (Neily et al., 2023).

Wet Coniferous Forest Group

This forest group has partial to closed canopies dominated by softwood tree species, and well-developed understories composed of ericaceous shrubs [e.g., mountain holly (*Ilex mucronata*), winterberry (Ilex verticillata)]. Sphagnum moss is generally abundant, and herbaceous species include cinnamon fern (*Osmundastrum cinnamomeum*), creeping snowberry (*Gaultheria hispidula*), and sedges. In addition to serving important landscape functions (e.g., carbon and water storage, nutrient cycling), forests in the wet coniferous group provide habitat for many flora and fauna species, including rare lichens, moose (*Alces Alces*), and birds (Neily et al., 2023).

Wet Mixedwood Forest Group

The WM forest group occurs in areas where water is present at or near the ground surface during most of the growing season. Canopies are partly open to closed, and are dominated by red maple, spruce, and balsam fir, with the prevalence of white ash (*Fraxinus americana*) correlated with nutrient availability. The shrub layer generally contains regenerating tree species, winterberry, mountain holly, and speckled alder (*Alnus incana*) (Neily et al., 2023). Several uncommon flora and bird species, as well as a variety of amphibians find suitable habitat conditions within this forest group.

Shrubland Barren

Shrubland barrens are non-forested, shrub-dominant associations that occur in areas with harsh climatic and/or edaphic conditions. Factors such as soil moisture, wind exposure, and disturbance play an important role in shaping the plant communities that occur in barrens (Porter et al., 2020). The three shrubland barren types identified in the Study Area (S1, S3, and S5) are associated with, or frequently originate after fire events (Porter et al., 2020).

Anthropogenic

Several areas characterized by recent or ongoing anthropogenic disturbance were observed during field assessments, including cutovers in various states of regeneration, planted and treated forest stands, and other disturbed areas such as utility corridors. Disturbed areas were most frequently observed in the north and west of the Study Area which has a more extensive disturbance history than the eastern portion of the Study Area.

Summary of Vegetation Types

The Study Area is comprised of several vegetation types within the CB, IH, MW, SH, SP, TH, OW, WC, and WM forest groups (Drawing 9.3A to 9.3P). Of the forested vegetation types identified, CB2, MW1, TH1, TH2, TH8, WC6, and WM1 are known to support rare flora due to fertile soils and/or later successional stages. For instance, the high levels of humidity that are characteristic of edaphic climax CB2 forests are known to support boreal felt lichen and other

rare cyanolichens. The wetland vegetation type WC6 can also occur as an edaphic climax forest with conditions that support rare lichens. Although an early-successional forest type, the OW2 forest type is considered to have a limited distribution in Nova Scotia. OW2 forests can support unique habitat characteristics, though the species associations with are poorly documented (Neily et al., 2023).

Evidence of past forestry activity was observed during field assessments, and vegetation community points captured areas that have undergone silvicultural treatments (e.g., pre-commercial thinning) as well as early-successional forests that clearly followed human disturbance. Several of the vegetation types identified during field surveys (IH6, MW2, MW7, WM3) are considered early- to-mid successional forests that follow disturbances such as windthrow or harvesting. These early- to mid-successional forests, often with predominantly single layered canopy structures, are considered less complex than mature or late-successional forests where the flora and fauna species diversity and tree vertical complexity are generally higher. Regardless, early- to mid-successional forest communities provide a variety of ecological services to generalist species, particularly those that rely on dense understory cover and abundant browse, such as snowshoe hare (*Lepus americanus*), white-tailed deer (*Odocoileus virginianus*), and shrub-nesting birds including the chestnut-sided warbler (*Setophaga pensylvanica*) and common yellowthroat (*Geothlypis trichas).*

In addition to forest vegetation types, three shrubland barren associations were identified in the Study Area. Barren ecosystems can support heterogenous habitat conditions for flora species, though the barren types observed during field surveys are not described as having elevated potential to serve as habitat rare flora (based on descriptions in Porter et al., 2020). None of the barren types are considered to be uncommon or have a limited range in Nova Scotia (Porter et al., 2020). The Project is relatively sheltered from coastal exposure, indicating that barrens in the Study Area, including those that may be present in unsurveyed areas, are unlikely to support rare flora species associated with coastal barrens in Nova Scotia.

Flora Surveys

A total of 240 vascular plant species, plus 15 bryophyte and 35 lichen species were identified during field surveys in 2025 (Appendix K). Of these, four are SAR: black ash (*Fraxinus nigra*; ESA Threatened, S-Rank S2), blue felt lichen (SARA Special Concern, ESA Vulnerable, S-Rank S3), eastern waterfan (SARA and ESA Threatened, S-Rank S2S3) and frosted glass-whiskers (SARA Special Concern, S-Rank S3S4); and 16 are SOCI (Table 10.4; Drawing 9.3A to 9.3P). The majority of flora SAR and SOCI occurrences were recorded in the western portion of the Study Area with fewer observations recorded in the east (Drawing 9.3A to 9.3P), although additional surveys are required to fully describe the range of species present in this area (areas requiring further survey are shown on Drawing 4.1). No evidence of boreal felt lichen (SARA and ESA Endangered, S-Rank S1) was observed during flora surveys, including targeted surveys of potential habitat polygons.

Table 10.4: Flora SAR and SOCI Observed in the Study Area and Assessment Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	No. of Occurrences[1] in Assessment Area / Study Area
Vascular Plants						
American Beech	*Fagus grandifolia*	-	-	-	S3S4	5 / 6[2]
Black Ash	*Fraxinus nigra*	Threatened	-	Threatened	S2	1 / 1
Northern Comandra	*Geocaulon lividum*	-	-	-	S3S4	0 / 3
Southern Twaybalde	*Neottia bifolia*	-	-	-	S3	1 / 1
Wild Celery	*Vallisneria americana*	-	-	-	S2S3	0 / 1
Lichens						
A Lichen	*Fuscopannaria sorediata*	-	-	-	S2S3	0 / 2
A Stubble Lichen	*Chaenotheca brachypoda*	-	-	-	S3S4	0 / 1
Appressed Jellyskin Lichen	*Scytinium subtile*	-	-	-	S3S4	2 / 2
Black-footed Reindeer Lichen	*Cladonia stygia*	-	-	-	S2S3	1 / 2
Blistered Jellyskin Lichen	*Leptogium corticola*	-	-	-	S3?	1 / 1
Blue Felt Lichen	*Pectenia plumbea*	Special Concern	Special Concern	Vulnerable	S3	4 / 14
Eastern Waterfan	*Peltigera hydrothyria*	Threatened	Threatened	Threatened	S2S3	0 / 1
Finger Ring Lichen	*Arctoparmelia incurve*	-	-	-	S3S4	0 / 1
Fringe Lichen	*Heterodermia neglecta*	-	-	-	S3S4	5 / 7
Frosted Glass-whiskers (Atlantic population)	*Sclerophora peronella* (Atlantic population)	Special Concern	Special Concern	-	S3S4	4 / 8
Naked Kidney Lichen	*Nephroma bellum*	-	-	-	S3S4	1 / 2

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	No. of Occurrences[1] in Assessment Area / Study Area
Powdered Fringe Lichen	*Heterodermia speciosa*	-	-	-	S2S3	2 / 2
Roughened Shingle Lichen	*Fuscopannaria ahlneri*	-	-	-	S3S4	7 / 9
Shaggy Fringed Lichen	*Anaptychia palmulata*	-	-	-	S3	16 / 26
Tree Pelt Lichen	*Peltigera collina*	-	-	-	S3	2 / 5

Source: Species status from ACCDC (2026b)
[1]Occurrences represent locations where one or more individuals of a species were observed during field surveys
[2]As the species is relatively widespread throughout the Study Area, not all occurrences were recorded.

Descriptions of Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) was used to identify any priority species and habitat associated with this Project. All terrestrial flora SAR and SOCI and their respective habitat associations identified within the Study Area through desktop review and field inventory were initially considered. Only those terrestrial flora SAR and SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR or SOCI and/or their associated habitat.

These priority species include the following SAR identified within the Assessment Area:

- Black ash
- Blue felt lichen
- Boreal felt lichen (though not observed during field assessments, boreal felt lichen is considered a priority species due to its protection status, combined with prior observation of the species near the Study Area, and presence of suitable habitat within the Assessment Area)
- Eastern waterfan (though not observed in the Assessment Area, an SMP buffer for this species intersects with the Assessment Area)
- Frosted glass-whiskers

As well as the following SOCI identified within the Assessment Area:

- American beech
- Southern twayblade
- Appressed jellyskin lichen
- Black-footed reindeer lichen
- Blistered jellyskin lichen
- Fringe lichen

- Naked kidney lichen
- Roughened shingle lichen
- Shaggy fringed lichen
- Tree pelt lichen

Black Ash

Black ash (ESA Threatened, S-Rank S1S2) is a slow-growing, broadleaf deciduous tree found primarily in moist habitats, including riparian areas adjacent to watercourses and within wetlands that have poorly drained peat or muck soils. The species is tolerant of short-term seasonal or annual hydrological fluctuations, and its habitat represents a specific, narrow niche where individuals will not be out-competed by either more flood-tolerant [e.g., alders (*Alnus* spp.)] or upland species (e.g., red maple) (COSEWIC, 2018a; Tardif & Bergeron, 1992, 1999). Habitat requirements for black ash are thus defined by a stable hydrological regime averaged over years that provides adequate soil moisture and conditions where competition is limited. A key threat to this species is habitat loss and hydrological changes to wet areas (NSNR, 2015). Research and data show that the decline in black ash in Nova Scotia can also be attributed to disease and changing environmental conditions (COSEWIC, 2018a; NSNR, 2015; Zinck, 1998). The arrival of the invasive emerald ash borer beetle in Nova Scotia poses a significant threat to the species (CFIA, 2025; NSNR, 2015).

Black ash was designated as Threatened under ESA in 2013 (Nova Scotia, 2017). The species was also assessed as Threatened by COSEWIC in 2017 (COSEWIC, 2018a). The criteria to identify core habitat for the species in Nova Scotia has been described and has been mapped for known occurrences of black ash (NSNR, 2021c). No areas of core habitat have been designated (granted legal protection) through legislation within the Study Area. One black ash occurrence was observed in a wetland, within a laydown area, during field surveys in the Assessment Area. The occurrence consists of a single tree with one dead and one living stem.

Blue Felt Lichen

Blue felt lichen is listed as Special Concern under SARA and Vulnerable under ESA (S-Rank S3) and was declared Nova Scotia's provincial lichen in 2022 (Nova Scotia, 2022). The species occurs in eastern North America, Europe, and Africa (NSDNR, 2025). In North America, blue felt lichen is restricted to Maine in the United States and the Atlantic provinces in Canada, where the vast majority of known occurrences are in Nova Scotia (ECCC, 2022). Blue felt lichen requires mature hardwood or mixedwood forests with high humidity, where several successional stages are present. Activities that result in the loss of host trees and creation of edge habitat, including forestry, resource extraction, renewable energy developments, and industrial activities, pose a major threat to the species (NSNR, 2025). The At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend that lands within 100 m of blue felt lichen occurrences be managed for minimal disturbance.

A total of 14 blue felt lichen occurrences were identified in the Study Area growing primarily on red maple trees (> 130 individual thalli; Drawing 9.3A to 9.3P). Of these, four occurrences are in the Assessment Area and two are within 100 m of the Assessment Area.

Boreal Felt Lichen

Boreal felt lichen is a foliose lichen that is greenish (when wet) or grey (when dry) in colour, with a felt-like upper surface and white underside (COSEWIC, 2014a). Mature thalli range from about 2 to 5 cm in size, with thalli less frequently growing up to 12 cm. Its reddish-brown fruiting bodies and lack of vegetative propagules distinguish boreal felt lichen from other *Erioderma* species in Nova Scotia (COSEWIC, 2014a). The species requires cool and humid conditions and is most frequently found in coastal forests dominated by balsam fir. The trunks and branches of balsam fir trees are the most common substrate for boreal felt lichen thalli. The At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend a 200 m protected zone around occurrences of boreal felt lichen that are managed for minimal disturbance, as well as a restricted zone extending from 200 m to 500 m in which development limitations may be imposed.

Though no signs of boreal felt lichen were observed during field surveys, 11 previously recorded occurrences of the species and two areas of associated core and critical habitat were identified within 5 km of the Study Area in the desktop review (occurrences between 11 m and 4.8 km from the Study Area, and critical/core habitat approximately 4 km from the Study Area; Drawing 10.2). Therefore, there is potential for this species to occur within the Study Area, although no occurrences of boreal felt lichen were identified during field assessments.

Eastern Waterfan

Eastern waterfan (SARA and ESA Threatened, S-Rank S1) is one of the only foliose lichens in the northeast that always grows submerged in fresh water. It is a medium-sized (2 to 8 cm broad) species with fan-shaped lobes and a brownish to bluish-black upper surface that can range from smooth to warty (NSNR, 2021j). It often prefers small streams with a steady flow and a rocky bed, and it tends to persist in calm pools adjacent the main flow of a watercourse. Land development, including the construction of transportation corridors, has the potential to directly and indirectly impact eastern waterfan through alterations to natural hydrological regimes and changes in water quality (e.g., water flow, temperature, pH, sediment, and nutrients) (NSNR, 2021j). As a result, the At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend that lands within 200 m of eastern waterfan be managed for minimal disturbance.

One occurrence of the species (three clusters of individuals) was observed approximately 60 m from the Assessment Area in a watercourse that is downstream of the confluence of WC3, WC4, and WC5, near an existing road (Drawing 9.3A). The criteria to determine critical and core habitat for eastern waterfan has been described, though no areas of identified critical or core habitat are present within 5 km of the Study Area (ECCC, 2021a; NSNR, 2021j).

Frosted Glass-whiskers

Frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) is a minute lichen that occurs on the heartwood of hardwood trees in mature forest stands (ECCC, 2011). The species belongs to a group known as calicioids or “stubble” lichen, due to their tiny, stalked structures, which are imbedded in substrates. Nova Scotia has the most substantial population of this

species which is very rare across its range (COSEWIC, 2014b). The At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend that lands within 100 m of occurrences of frosted glass-whiskers be managed for minimal disturbance.

Eight trees with occurrences of frosted glass-whiskers were observed in the Study Area during field surveys, primarily in tolerant hardwood forests, four of which are in the Assessment Area, and two of which are within 100 m of the Assessment Area (Drawing 9.3A to 9.3P).

American Beech

Although historically a common tree species in the province, the status of American beech trees (S-Rank S3S4) has been significantly affected by beech bark disease in Nova Scotia. Beech bark disease has reduced the potential for the species to mature into an overstory tree, and its ecological role has thus shifted to that of an understory or intermediate species (NSNR, 2021d). American beech were documented at six locations in the northern portion of the Study Area, five of which are in the Assessment Area (Drawing 9.3A to 9.3P). Note that not all occurrences of the species were recorded during field assessments due to the relative commonality of this species in the region.

Southern Twayblade

Southern twayblade (S-Rank S3) occurs throughout eastern Canada and the eastern United States, ranging from eastern Texas to Florida in the south, and Ontario to Nova Scotia in the north (NatureServe, 2024). The most secure populations of the species are found in the eastern to south-eastern United States, though Nova Scotia has the most apparently secure population in Canada. The species is part of the Atlantic Coastal Plains Flora, a unique group of approximately 90 flora species that occur along the Atlantic Coast from Flora to Nova Scotia.

Southern twayblade often occurs in undisturbed swamps and may serve as an indicator species for ecosystem integrity (Hill et al., 2018). Southern twayblade was observed in one location in the Assessment Area, with one individual observed in a treed swamp (Drawing 9.3E).

Lichen SOCI

In addition to the above lichen SAR, nine lichen SOCI were observed within the Assessment Area (37 total occurrences; Drawing 9.3A to 9.3N). These species are not described further due to the lack of specific habitat requirements associated with each.

Non-Native Flora

There were 10 non-native vascular plant species encountered during field surveys within and near the Assessment Area (Table 10.5). None of these species are considered invasive in Nova Scotia (MTRI, 2022).

Table 10.5: Non-Native Flora Encountered During Field Surveys

Common Name[1]	Scientific Name	Exotic Status[2]
Field Bindweed	*Convolvulus arvensis*	N/A
Meadow Hawkweed	*Pilosella caespitosa*	N/A
Mouse-ear Hawkweed	*Pilosella officinarum*	N/A
Norway Spruce	*Picea abies*	Uncommon
Pale St John's-Wort	*Hypericum ellipticum*	N/A
Queen Anne's Lace	*Daucus carota*	N/A
Rabbit's-foot Clover	*Trifolium arvense*	N/A
Spotted Hawkweed	*Hieracium maculatum*	N/A
White Sweet-Clover	*Melilotus albus*	Widespread
Yellow Clover	*Trifolium aureum*	N/A

[1]Species with an ACCDC (2026b) S-Rank of SNA (Exotic)
[2]As described in the WESP-AC guide, supplementary information (Adamus, 2018)

10.1.5 Spatial Analysis

Following the completion of the desktop review and field assessments for the Project, several spatial analyses were completed to understand the potential impacts of the Project on terrestrial vegetation communities and flora that are not easily captured through in-person surveys. The analyses are intended to support the effects assessments for terrestrial VCs and complement the approach to the biophysical field program.

Potential Sensitive Flora Habitat Model

A potential sensitive flora habitat model was developed by Strum to identify areas within and surrounding the Study Area with elevated potential to serve as habitat for rare flora species, particularly vascular plants. The model was developed by considering the range of SAR and SOCI plant species and their associated habitat preferences that may be present in the Study Area (e.g., species identified in the desktop review and field assessments).

Plant species vary greatly in their distribution and are rarely bound to a quantifiable set of criteria. For example, some species are generalists and thrive in a wide range of environments, making it difficult to predict where they might occur. Despite this, some notable landscape characteristics are strongly associated with certain rare flora in Nova Scotia. Alluvial floodplains are a subset of wetlands that have rich, moist soils suitable for several rare plant species (NSNR, 2018c), including black ash (NSNR, 2015), Canada lily (*Lilium canadense*; S-Rank S2), white elm (*Ulmus americana*; S-Rank S3S4), and wood anemone (*Anemone quinquefolia*; S-Rank S3). Calcareous surficial geology, commonly characterized by limestone and/or barrens, creates more alkaline soil conditions preferred by rare flora such as orchids (NSNR, 2020b). Thus, these habitats, along with the preferred south-facing slopes, were the primary targets of the modelling exercise.

Several spatial layers were created using LiDAR (GeoNOVA, 2024b) and surficial geology data (NSNR, 2006) to represent habitat characteristics preferred by several rare species. LiDAR

was used to identify areas of intact forest, surface water (floodplains), and directional exposure, while surficial geology was referenced to identify the presence of moderate drainage and transported calcareous bedrock components. The final model layer depicts areas greater than 100 m^2 (0.01 ha) where one or more of these conditions exist (Drawing 10.3).

A total of 357.6 ha of modelled potential sensitive flora habitat is present in the Study Area (Drawing 10.3).

Edge Effects Analysis

The construction of linear features such as roads is known to impact flora and fauna through habitat fragmentation and associated edge effects (e.g., Degtjarenko, 2016; Dickie et al., 2020). A spatial analysis was therefore completed to estimate the amount of new edge habitat that will be created by the construction of the Project. As it relates to human land disturbance, edge effects occur when the impacts of land disturbance extend beyond a disturbed footprint into the surrounding landscape (ABMI, 2024). Estimating the extent of edge habitat created by the Project included identification of the following:

- The locations of existing intact forest stands.
- Areas that currently experience edge effects due to recent human land disturbance (existing edge effect).
- Areas of new edge habitat associated with the Clearing Footprint (new edge effect).

For the purposes of the analysis, areas of “intact forest” are considered the land cover type that, when cleared for the Project, will create edge effects on the surrounding environment. Areas of intact forest were identified by first categorizing data from the provincial canopy height model (GeoNOVA, 2024a) into 2 m interval bins. The mean bin value was then determined across a 100 m^2 hexagonal grid (approximately 10 m wide) to capture neighbourhood-scale canopy patterns. Zones with a mean value of “8” or higher were retained, providing a generalized, upper-bound approximation of areas whose true mean canopy height exceeds approximately 6 m. Through a review of different height thresholds, 6 m was identified as providing a suitable representation of cohesive canopy closure.

Next, data from the Provincial Crown Land Harvest Plan Archive (NSNR, 2025a) were used to remove harvested forest polygons (2016-2025) that may not be reflected in the provincial canopy height model (which has coverage from 2016 to 2018). No other sources of forest harvest data were used as the canopy height model provides a more current depiction of canopy conditions (e.g., the forest inventory dataset is dated to 2007 to 2008). If a stand protected under the Old-Growth Forest Policy (NSNR, 2022a, 2026) overlapped an area identified in the Provincial Crown Land Harvest Plan Archive (NSNR, 2025a), the boundary of the old-growth stand took precedence and was not assumed to be harvested. Finally, small or isolated forest patches were removed by filtering out polygons composed of one or two hexagons (totaling less than 205 m^2), as these represent individual trees or very small clusters not relevant to the identification of continuous canopy coverage indicative of intact forest.

Prior to identifying new areas of edge habitat associated with the Project, areas of existing edge habitat were identified by buffering polygons in the Provincial Crown Land Harvest Plan Archive by 100 m to identify edge habitat that has been created in the past 10 years. The 100 m buffer distance was selected to capture the depth of influence that vegetation clearing can be expected have on its surroundings based on the typical range of values reported in the literature (Gauslaa et al., 2019; Rheult et al., 2002). Any intact forest overlapping this buffered area was classified as experiencing existing edge habitat and the remaining area is considered to approximate areas of intact "interior" forest habitat [interior forests are considered forests located 100 m from a forest edge (NSNR, 2022a)].

Finally, to identify new areas of potential edge habitat associated with the Project, the intact interior forest layer was overlaid with a 100 m buffer of the Clearing Footprint. Areas of overlap between intact interior forest and this edge effect buffer (i.e., areas not already under existing edge effect and excluding areas in the Clearing Footprint itself) were classified as having potential to experience edge effects due to the Project.

The edge effects analysis identified 355.7 ha of existing edge habitat within the Study Area (i.e., due to recent land disturbance) (Drawing 10.4A to 10.4D). A total of 142.6 ha of intact interior forest coincides with the Clearing Footprint (direct loss), with an additional 363.8 ha of edge habitat expected to be created. In the Study Area, there is 2,618.9 ha of unimpacted intact interior forest, with 14,529.5 ha of unimpacted within 5 km of the Study Area.

10.1.6 Effects Assessment

Project-Terrestrial Vegetation Community and Flora Species Interactions

Project activities, primarily those that involve earth-moving and/or vegetation removal, have the potential to impact terrestrial vegetation communities and flora (Table 10.6).

Table 10.6: Potential Project Interactions with Terrestrial Vegetation Communities and Flora Species

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-

Project Phase	Potential for Interaction
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	X
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for terrestrial vegetation communities and flora is a 100 m buffer of the Clearing Footprint (Drawing 10.5). This area was selected to assess the direct and indirect impacts of the Project on vegetation communities and flora. The RAA is the Study Area plus a 5 km buffer including only the contiguous mainland. This area was selected for the RAA to contextualize the impacts to terrestrial vegetation communities and flora within the broader landscape (Drawing 10.5).

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for terrestrial habitat. The VC-specific definition for magnitude is as follows:

- Negligible: No loss or alteration of sensitive vegetation communities; no loss of flora SAR or SOCI individuals; no loss of, or effect on habitat supporting flora SAR or SOCI.
- Low: Small loss or alteration of sensitive vegetation communities; no flora SAR or SOCI individuals lost; small loss of, or effect on habitat supporting flora SAR or SOCI.
- Moderate: Moderate loss or alteration of sensitive vegetation communities; small loss of flora SAR or SOCI individuals that do not have legislated protection status, but their populations remain largely intact; moderate loss of, or effects on habitat supporting flora SAR or SOCI.
- High: High loss or alteration of sensitive vegetation communities; loss of flora SAR that does have legislative protection status and/or loss of an entire population of terrestrial flora SAR or SOCI; high loss of, or effect on habitat supporting flora SAR or SOCI.

Effects

Project activities have the potential to impact vegetation communities and flora through:

- Loss of sensitive vegetation communities
- Loss of flora SAR or SOCI and impacts on supporting habitat
- Indirect effects on vegetation communities and flora

Loss of Sensitive Vegetation Communities

Direct impacts to vegetation communities will occur in the Clearing Footprint (1,380 ha) during the initial site preparation and construction phase. Within the Clearing Footprint, losses of vegetation cover will be permanent in some areas (e.g., roads, turbine pads), whereas

vegetation in areas such as roadsides and construction laydowns will be allowed to regrow during the operations phase. Although all vegetation communities have inherent ecological value, the broader impacts of land development are driven not only by the overall area affected, but also by the sensitivity of the communities that are impacted. For example, a vegetation community may have high sensitivity to disturbance due to being regionally uncommon (e.g., a community with highly specialized habitat requirements or that has been significantly reduced by historical land disturbance) or because it supports an abundance of rare or diverse species. These vegetation communities and the ecological services they provide are difficult to restore once they are lost, and small impacts to sensitive vegetation communities can disproportionately affect species and habitat diversity at a landscape scale. The assessment of Project impacts on vegetation communities therefore focuses on sensitive vegetation communities in addition to considering the overall impacts on land cover types.

The land cover model developed in the desktop review offers a general means to quantify the expected loss of vegetated areas and identify which cover types will be most impacted by the Project. Based on Table 10.7, softwood (381.8 ha), mixedwood forests (201.5 ha), open areas (310.1 ha), and cutover uplands (195.5 ha) are the dominant cover types in the Clearing Footprint, accounting for 78.9% (1,088.9 ha) of the total area (1,380.3 ha). Approximately 15% of the Clearing Footprint is represented by land cover types with previous disturbance (i.e., cutover wetland, cutover upland, and urban/developed).

When contextualized within the land cover present in the LAA, the Clearing Footprint is expected to have concentrated impacts on urban/developed land (43.5% of the amount available in the LAA) and shrub/alder cover (36.4%) and uses a disproportionately low amount of open wetland (10.8%). At the scale of the RAA, shrub/alder cover, open areas, and cutover uplands will experience the highest proportional impacts due to the Clearing Footprint, highlighting the prioritization of disturbed, open, and low-growing areas in determining the Project layout. In general, impacts to forest cover types are proportional to the amounts available in the LAA and RAA.

Table 10.7: Direct Impacts to Land Cover Relative to the LAA and RAA

Land Cover Class	Hectares Cleared for the Project	LAA		RAA	
		Hectares Available	% Cleared	Hectares Available	% Cleared
Hardwood Forest	74.3	272.9	27.2	5,289.3	1.4
Hardwood Wet Forest	2.3	6.7	35.0	154.0	1.5
Mixedwood Forest	201.5	597.6	33.7	8,569.0	2.4
Mixedwood Wet Forest	6.6	28.2	23.4	482.6	1.4
Softwood Forest	381.8	1,268.1	30.1	18,165.9	2.1
Softwood Wet Forest	65.6	257.5	25.5	3,228.3	2.0
Shrub/Alders	95.9	263.8	36.4	1,579.3	6.1
Open Wetland	35.3	325.8	10.8	7,520.7	0.5

Land Cover Class	Hectares Cleared for the Project	LAA		RAA	
		Hectares Available	% Cleared	Hectares Available	% Cleared
Cutover Upland	195.5	649.4	30.1	7,517.6	2.6
Cutover Wetland	7.4	29.4	25.1	416.5	1.8
Urban/Developed	3.8	8.6	43.5	1,466.8	0.3
Open Areas	310.1	883.6	35.1	7,538.0	4.1
Water	0.1	18.5	0.7	2,908.8	0.0
Total	**1,380.3**	**4,609.9**	**29.9**[(1)]	**64,836.9**	**2.1**[(1)]

[(1)]Percentage of land cleared for the Project relative to the total size of the LAA and RAA. Percentages in the "% Cleared" columns that are higher/lower than these values represent disproportionately high/low impacts.
Source: Landcover types predictions derived from provincial WAM Database (NSECC, 2022c), Provincial Crown Harvest Plan Archive (NSNR, 2025a), Canopy Height (GeoNOVA, 2024a), and Forest Inventory Data (NSNR, 2021g).

More detailed information about the interactions of the Project with sensitive vegetation communities can be inferred from the vegetation community assessments completed during field surveys, although the extent to which these communities are present in the Clearing Footprint is not precisely known. One forest vegetation type known to have a limited distribution in Nova Scotia, OW2, was observed within and near the Clearing Footprint and some loss of this vegetation community is expected to occur. However, OW2 forests are considered common in the Eastern Ecoregion (Neily et al., 2023) where it was observed during field surveys, indicating that it is not a sensitive vegetation community in the regional context. Other forest vegetation types observed during field surveys that are associated with fertile soils and/or later successional stages (e.g., CB2, MW1, TH1, TH2, TH8, WC6, and WM1) may have a higher potential to support rare or diverse flora species but are likewise not considered regionally uncommon.

Evidence of forest harvesting was observed in the Study Area during vegetation community assessments and other surveys, particularly in the north and west, including an abundance of early- to mid-successional and planted forests. These forest types often follow stand-level disturbances such as forest harvesting, and though they provide habitat for a variety of generalist flora and fauna species (Neily et al., 2023), early- to mid-successional and planted forests generally support fewer rare species and are less diverse than late successional forests. In the northern and western portion of the Study Area, the Project has prioritized the placement of infrastructure in disturbed areas such as recent harvests and young regenerating forest stands, which has limited the impacts of the Project on sensitive vegetation communities.

Old-Growth Forests

Though many of the vegetation communities that make up old-growth forest stands are not particularly uncommon in Nova Scotia, old-growth forests themselves generally have a limited distribution in the province due to the impacts of historical and on-going land development, and the long time period required for old-growth characteristics to develop (NSNR, 2022a). These characteristics, as well as the high levels of diversity they support (NSNR, 2022a), make old-growth forest stands highly sensitive to land disturbance. The locations of the 23 stands

protected under the Old Growth Forest Policy (NSNR, 2022a) and the field-confirmed old-growth stand present in the Study Area (described in Section 10.1.3) have been incorporated to various degrees into the layout of the Clearing Footprint with the goal of minimizing interactions with the Project.

Six stands protected under the Old Growth Forest Policy (NSNR, 2022a) overlap the Clearing Footprint (five confirmed old growth stands and one restoration opportunity area) in the western half of the Study Area, with an additional protected stand within 100 m of the Clearing Footprint (the recommended setback buffer outlined in the Old Growth Forest Policy). Of the six overlapping stands, four intersect the Clearing Footprint in areas where upgrades to existing roads are planned, and two stands coincide with laydown areas. The field-confirmed old-growth stand identified in the Study Area during Project-related assessment has been incorporated into the infrastructure layout and no impacts to this stand are expected.

The Proponent is committed to minimizing the extent of new disturbance associated with upgrades to existing roads that bisect or are adjacent to protected old-growth stands, and the locations of laydown areas will be adjusted during the detailed design and engineering stage to avoid direct impacts to protected old-growth stands. In addition to existing protected stands, it is expected that a portion of the potential old-growth stands identified in the desktop review of the OGPI layer (NSNR, 2025b) will also be confirmed as having old-growth status. Field validation of potential old-growth stands and confirmation of Project impacts will be finalized through engagement with NSNR during the Crown lands permitting process.

Summary - Loss of Sensitive Vegetation Communities

The direct impacts of the Project on sensitive vegetation communities are expected to be of low to moderate magnitude due to prioritizing the placement of the Clearing Footprint in previously disturbed areas (e.g., cutovers and existing roads) and avoidance of sensitive features such as protected old-growth forest stands where practicable. None of the vegetated land cover types or vegetation communities identified during the desktop review or field assessments are considered unique or rare in the local or regional context. One vegetation community identified in the Clearing Footprint (OW2) is considered uncommon in Nova Scotia but is common within the ecoregion where it was observed. Allowing vegetation regrowth in areas temporarily cleared for construction and further restoration of the Clearing Footprint during decommissioning will reduce the duration and area of overall vegetation loss. However, the composition of newly established communities will likely differ from pre-clearing conditions, such that impacts are expected to be only partially reversible.

Loss of Flora SAR or SOCI and Impacts on Supporting Habitat

Activities requiring ground disturbance and vegetation clearing during the site preparation and construction phase have the potential to impact flora SAR and SOCI individuals. Throughout the planning phase of the Project, information from the desktop review and the results of subsequent field surveys were used to iteratively update the layout of Project components to maximize avoidance of field-observed SAR and SOCI and their associated habitat. The anticipated effects of the Project on flora SAR and SOCI are described in the following sections.

Black Ash

One occurrence of black ash (ESA Threatened, S-Rank S1S2; one tree) was identified during field surveys in a wetland that coincides with the Clearing Footprint. The portion of the Clearing Footprint where black ash was identified is associated with a temporary laydown area rather than permanent Project infrastructure. The Proponent will further refine the layout during detailed design and engineering to avoid the identified occurrence. If additional black ash are identified on site and if avoidance cannot be achieved, the Proponent will consult with NSNR to determine appropriate mitigation and management measures. The location of the black ash tree and the associated wetland will be provided directly to NSNR as a location sensitive species.

Alterations to wetland habitat have been identified as a threat to black ash in Nova Scotia (NSNR, 2021j), as vegetation clearing and infilling has the potential to alter hydrological regimes (Erdmann et al., 1987). During detailed design and engineering, the Clearing Footprint will be further refined to avoid the wetland with the black ash occurrence and minimize indirect effects to the extent practicable, including maintaining an undisturbed vegetated buffer around the host wetland where feasible. Surface water flows contributing to the existing hydrological regime of the wetland are not anticipated to be altered by the Project.

Blue Felt Lichen

Within the Study Area, a total of 14 blue felt lichen (SARA Special Concern, ESA Vulnerable, S-Rank S3) occurrences were recorded during field surveys, and an additional 28 occurrences were identified in the ACCDC data report (ACCDC, 2026a). The locations of these occurrences have been incorporated into the Project layout, and no direct impacts to the species are expected (all known occurrences are > 45 m from the Clearing Footprint). If avoidance is determined not to be possible, the Proponent will consult with NSNR to determine appropriate mitigation measures.

Indirect impacts through alteration of supporting habitat (e.g., habitat fragmentation and edge effects) are expected for the four occurrences (> 60 thalli) observed during field surveys and the five occurrences reported by the ACCDC (2026a) that are within 100 m of the Clearing Footprint in areas associated with new road development [e.g., the buffer recommended in the At-Risk Lichens – Special Management Practices (NSNR, 2018a); approximately 87 thalli]. The remaining 33 occurrences identified in the Study Area (during field surveys or by the ACCDC) are not expected to interact with the Project.

Boreal Felt Lichen

A total of 11 previously recorded occurrences of boreal felt lichen (SARA and ESA Endangered, S-Rank S1) were identified in the RAA during the desktop review, along with two areas of identified critical and core habitat, none of which overlap the Study Area (Drawing 10.2). Though areas of suitable habitat for boreal felt lichen were identified, no occurrences of this species were observed during field assessments.

Based on a lack of field observations and the separation of the Project from previously recorded boreal felt lichen occurrences, no direct impacts to this species are expected.

Eastern Waterfan

One occurrence of eastern waterfan (SARA and ESA Threatened, S-Rank S2S3; three groups of individuals) was observed within 60 m of the Assessment Area and Clearing Footprint in a watercourse that is downstream of the confluence of WC3, WC4, and WC5, near an existing road (Drawing 9.3A). Based on the separation of the occurrence from Project infrastructure, no direct impacts to eastern waterfan are expected; however, if road upgrades are determined to be required (including potential replacement of the existing culverts within WC4 and WC5), the buffer recommended for minimal disturbance in the At-Risk Lichens – Special Management Practices will not be maintained. Proposed mitigations, including the development of a Surface Water Management Plan and Erosion and Sediment Control Plan will help to reduce the potential for erosion and sedimentation to impact the occurrence and its associated watercourse.

Frosted Glass-whiskers

Four occurrences of frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) were recorded in the Assessment Area during field surveys, two of which are in an area planned for turbine construction and two of which are in a laydown area. Direct impacts to individuals in turbine locations have been avoided through adjustments to the Clearing Footprint. Efforts will be made during the detailed design and engineering stage to avoid direct impacts to the two remaining occurrences. Should avoidance not be possible, the Proponent will consult with NSNR to determine appropriate mitigation and management measures. Indirect impacts to three occurrences are possible through alterations to supporting habitat where the 100 m buffer recommended in the At-Risk Lichens – Special Management Practices (NSNR, 2018a) cannot be maintained.

American Beech

American beech (S-Rank S3S4) was observed in the northern portion of the Study Area during field surveys, including four occurrences in the Clearing Footprint. Based on proximity to planned infrastructure, it is expected that some or all of these occurrences will be lost due to vegetation clearing. In addition to the American beech observed during field surveys, 15 occurrence records were also identified in the ACCDC data report (ACCDC, 2026a) in the northern portion of the RAA that will be avoided by the Project. The presence of American beech at multiple locations indicates that the species is not habitat limited in this area and will continue to persist in the RAA following the construction of the Project.

Southern Twayblade

One occurrence of Southern twayblade (S-Rank S3) was observed in a wetland (WL246) in the Assessment Area. The occurrence is outside of the Clearing Footprint; therefore, no direct impacts to this species are expected.

Lichen SOCI

A total of 18 occurrences of lichen SOCI are in the Clearing Footprint in areas planned for road development and laydowns. Direct impacts to the following species are expected:

- Appressed jellyskin lichen (S-Rank S3S4; one occurrence)
- Black-footed reindeer lichen (S-Rank S2S3; one occurrence)
- Blistered jellyskin lichen (S-Rank S3?; one occurrence)
- Fringe lichen (S-Rank S3S4; three occurrences)
- Roughened shingle lichen (S-Rank S3S4; three occurrences)
- Shaggy fringed lichen (S-Rank S3; seven occurrences)
- Tree pelt lichen (S-Rank S3; two occurrences)

Apart from blistered jellyskin lichen, all species were also observed in other parts of the Study Area that will not be impacted by the Project.

Sensitive Flora Habitat

The impacts of the Project on potential habitat for rare flora, including areas not directly captured through field assessments, was qualitatively assessed through a review of the sensitive flora habitat model (described in Section 10.1.5). Based on Drawing 10.3, the sensitive flora habitat in the Clearing Footprint is mainly associated with areas of intact forest (associated with calcareous substrate or south-facing slopes), whereas the RAA also contains an abundance of floodplain forests and calcareous surficial deposits (Drawing 10.3). This indicates that habitat within the RAA offers a higher diversity of habitat types for sensitive flora species than the Clearing Footprint. A relatively low amount of modelled potential habitat coincides with the Clearing Footprint. This includes areas that have yet to be surveyed, which are concentrated in the southeast of the Clearing Footprint, indicating a lower potential for these areas to serve as habitat for diverse and/or rare vascular flora.

Summary - Loss of Flora SAR or SOCI and Impacts on Supporting Habitat

Based on the current configuration of the Clearing Footprint, the Project is expected to have a moderate impact on flora SAR and SOCI within the LAA due to avoidance of flora SAR individuals and a small expected loss of flora SOCI. Interactions with rare flora have been reduced by incorporating the locations of flora SAR and SOCI into the layout of the Clearing Footprint where practicable and additional avoidance is anticipated during detailed design and engineering. Modelling suggests that a low amount of potential habitat for sensitive vascular flora species will be impacted by the Project, and abundant, more diverse habitat will remain available in the RAA following construction. While any direct loss of individuals will be irreversible, impacts to supporting habitat may be partially reversed following decommissioning.

Indirect Effects

In addition to the direct impacts to vegetation communities and flora described above, vegetation clearing and land disturbance also have the potential for indirect impacts that extend beyond the Clearing Footprint. Indirect impacts to vegetation communities and flora

may occur through habitat fragmentation and edge effects, dust deposition, and the introduction and spread of invasive species.

Habitat Fragmentation

On a per kilometre basis, wind energy projects tend to impact relatively low amounts of undisturbed habitat, but often cause high levels of habitat fragmentation due to the large road networks typically required to access turbines (Diffendorfer et al., 2019). Habitat fragmentation, defined as the conversion of continuous habitat into small and isolated patches (Meffe & Carroll, 1994) can have a variety of impacts on vegetation communities and flora, including changes in species composition, genetic diversity, and reproductive output (Aguilar et al., 2009; Brisson et al., 2010; Hulting et al., 2025).

The Project road network makes the largest overall contribution to the area of the Clearing Footprint and is expected to increase the baseline road density of the Study Area, with a total of 110 km of new roads planned (55% of the Clearing Footprint). The sensitivity of different groups of flora to habitat fragmentation is likely to vary based on factors such as seed dispersal ability, pollination requirements, and the population size of individual species. Large-seeded plants and species with animal-mediated dispersal may be more vulnerable to the impacts of habitat fragmentation than species with small, or wind-dispersed seeds that can move more effectively between patches of remnant habitat (Cramer et al., 2007).

As described by Diffendorfer et al. (2019), new roads play a key role in determining the levels of habitat fragmentation created by wind energy projects. The greatest increases in road density, and therefore potential for fragmentation, will occur in the southeastern portion of the Study Area where few existing roads are present (Drawing 3.2A to 3.2N). Land cover modelling indicates this area is dominated by shrub-cover and open wetlands, and sensitive flora habitat modelling suggests a reduced potential for this area to support sensitive flora, which will be confirmed through additional field surveys prior to construction. In determining the infrastructure layout, the Project has prioritized the use of existing roads, such that 32% of the total road network (53 km) consists of roads that have been developed for other uses (primarily forest harvesting) and that will be upgraded and reused for the Project. While fragmentation of terrestrial habitats is certain to occur, these factors have helped to reduce the overall impact on vegetation communities and flora.

Edge Effects

In addition to the division and isolation of suitable habitat, fragmentation can also have a variety of edge effects on flora by creating abrupt transition zones between disturbed and intact areas. As outlined in Section 10.1.5, the Project will create new areas of edge habitat when intact forest is cleared during the site preparation and construction phase. The creation of edge habitat is known to cause changes in environmental conditions that extend beyond a disturbance footprint, including increased temperature and light availability and reductions in moisture and humidity (Braithwaite & Mallik, 2012; Hamberg et al., 2009). These abrupt environmental changes can impact the growth and survival of flora individuals adapted to interior forest conditions (Boudreault et al., 2008; Esseen & Renhorn, 1998) and can cause

long-term changes in the composition and diversity of vegetation communities (Willmer et al., 2022).

An estimated 363.8 ha of new edge habitat will be created in the LAA, with an additional 142.6 ha of interior forest directly impacted by the Clearing Footprint (Drawing 10.4A to 10.4D). Due to the linear nature of road infrastructure, most areas of new edge habitat will be associated with road development and upgrades to existing roads. Overall, an estimated 7.9% of the LAA is expected to be indirectly impacted by edge effects, with areas of intact interior forest remaining abundant within the RAA following construction (14,529.5 ha of intact interior forest identified). Similar to habitat fragmentation, the degree to which vegetation communities and flora are impacted by edge effects varies depending on the species and specific site conditions.

Many types of lichens (e.g., cyanolichens, and fruticose and foliose lichens) require high humidity environments to support the growth of thalli, as lichens lack true roots and absorb water directly from the air/dew. Lichens are therefore known to be sensitive to edge effects that alter the microclimate of their supporting habitat (Boudreault et al., 2008; Nash, 2008). For example, Cameron et al. (2013) suggest that forest harvesting near occurrences of boreal felt lichen can impact the survival of individuals through increased solar radiation, wind, and temperature. Although field surveys primarily focused on direct interactions with the Project such that areas outside the Clearing Footprint were not consistently captured, one occurrence of frosted glass-whiskers [a lichen SAR associated with mature forest habitat (ECCC, 2011)], two occurrences of blue felt lichen, and 24 occurrences of lichen SOCI coincide with areas of new edge habitat created by the Project (note that edge habitat differs from interactions with lichen SMP buffers previously described).

The composition and diversity of plant communities also have potential to be impacted by the creation of edge habitat. For instance, following vegetation clearing, trees growing along new forest edges are often more vulnerable to natural disturbances such as windthrow (e.g., Esseen, 1994) due to be being exposed to higher wind speeds that they are accustomed to. As described by Willmer et al. (2022), abrupt edges in temperate forests can also experience an increase in the number of plant species due to edge effects. However, increases in diversity may be temporary as species adapted to interior forest conditions may be poor competitors with light-demanding species that frequently colonize forest edges (Gonzalez et al., 2010). Shade-adapted trees and herbaceous flowering plants observed during field surveys that may be impacted by edge effects include American beech, large false solomon's seal (*Maianthemum racemosum*), and cucumber root (*Medeola virginiana*). Although edge dynamics are frequently complex and difficult to predict, it is likely that the composition of plant communities containing these and other shade tolerant species would change following vegetation clearing for the Project.

The edge effects analysis indicates that a low amount of edge habitat will be created by the Project relative to the size of the Clearing Footprint and LAA. Literature suggests that flora species, particularly lichens and shade-adapted plants, that occur within new areas of edge

habitat will experience changes in microclimate conditions that may alter the status of individuals and influence the long-term composition of vegetation communities. In the context of the RAA, a low amount of intact forest is expected to be directly/indirectly impacted relative to the amount available, and areas of intact interior forest will remain abundant in the RAA following construction. Though there is no threshold for identifying the duration of edge effects, the impacts can generally be expected to diminish over time (Alberta Environment and Parks, 2022) as infilling at forest edges reduces the depth of edge influence. Allowing for natural revegetation of areas that are temporarily cleared for construction and revegetation of the site during decommissioning will help to mitigate the impacts of edge effects.

Dust

Dust deposition may impact flora within or near the Clearing Footprint when fugitive dust is generated by road traffic on unpaved areas, crushing material, and blasting (if required for the Project). Vascular plants may be impacted by dust through reductions in photosynthesis and leaf diffusion (Thompson et al., 1984) as dust deposited on leaf surfaces can block stomata and reduce light absorption. Lichens can also be impacted by dust deposition due to their sensitivity to air quality. Dust from unpaved areas has been found to change the pH of lichen substrates (i.e., the tree bark they are attached to) and impact individual health and species richness (Degtjarenko, 2016).

The impacts of dust on flora species are influenced by duration of exposure and distance from the source of dust production. For instance, one study found that lichens along a gravel road were unaffected within two years, but significant changes to the communities were observed after 10 years (Farmer, 1993). The spread of fugitive dust is influenced by several factors, including the height at which the dust is released, wind conditions, and particle size. Under standard conditions, fugitive dust particles above 30 µm settle out within 100 m of the emission source. Other finer particles have a slower settling velocity and may travel further (US EPA, 1995).

It is expected that impacts to vegetation communities and flora relating to dust deposition will be greatest during the site preparation and construction phase (short-term duration) and will be limited to the LAA. Site traffic will be greatly reduced during the operations and maintenance phase of the Project. Measures to mitigate the effects of dust in relation to air quality, which will also benefit flora species, are described in detail in Section 7.1.

Invasive Species

The development of wind energy projects has been identified as a pathway for the introduction and spread of non-native species due to the vegetation clearing and ground disturbance required to support the construction of road networks, turbines, and other project infrastructure, (Urziceanu et al., 2024). Non-native species, often introduced to a landscape accidentally by humans, can become invasive when they cause harm to the environment, economy, or human health through rapid reproduction and out-competing of native species (Rutledge et al., 2024). Invasive species are often adapted to soil disturbance and high light levels, such that they often proliferate along disturbed edges and other open areas (Harper et al., 2005). Several

plant SAR that occur in Nova Scotia are known to be threatened by invasive species (NSNR, n.d.-a). Industrial projects can contribute to the spread of invasive species in several ways:

- Reduced resistance to invasion through soil disturbance and removal of native vegetation
- Increased access to remote areas with equipment carrying seeds, spores, or other reproductive materials from non-native species.
- Revegetation of cleared land with non-native seed mixes.

A total of 10 non-native plant species were observed during field surveys. Given that non-native species are already known to be present, mitigations to limit the introduction and spread of non-native and invasive species within the LAA are provided.

Mitigation Measures

In addition to the removal of infrastructure from the MOU lands north of the Melrose Country Harbour Road from the Project, the following mitigation measures will be implemented to minimize the effects of the Project on terrestrial vegetation communities and flora:

Loss of Sensitive Vegetation Communities

- Minimize overall area to be altered by maximizing the use of previously disturbed areas (i.e., clearcuts and use of existing roads), where practicable.
- Allow for natural revegetation wherever practicable to promote continued growth of terrestrial vegetation communities and flora.
- Avoid disturbance to sensitive features identified during desktop and field assessment (e.g., wetlands and old-growth forests) by micro-siting, where practicable, including any new observations encountered while surveying the areas to be assessed later (Drawing 4.1). Should avoidance not be possible, engage with NSECC and/or NSNR, as appropriate during the permitting process.

Loss of Flora SAR or SOCI and Impacts on Supporting Habitat

- Continue to avoid flora SAR and minimize interactions with supporting habitat during the detailed design phase, including any new observations encountered while surveying the areas to be assessed later (Drawing 4.1). Should avoidance not be possible, engage with NSNR, as appropriate during the permitting process.
- Ensure that Project personnel are aware of the confirmed location of the black ash and ensure it is adequately identified in the field (i.e., flagged) to avoid accidental losses during vegetation clearing.
- Consult with NSNR and NSECC if unexpected flora SAR are encountered during construction activities.
- Develop and implement a Surface Water Management Plan and Erosion and Sediment Control Plan.

Indirect Effects

- Minimize the development of new linear features through compact design of the Project layout.
- Implement speed limits to reduce dust emissions.
- Use dust suppressants (e.g., water trucks) when required.
- Ensure equipment is cleaned periodically to prevent the introduction and/or spread of non-native species.

Monitoring

No monitoring programs specific to terrestrial vegetation communities and flora are proposed.

Conclusion

The predicted residual effects of the Project on terrestrial vegetation communities and flora (after mitigation) are characterized in Table 10.8.

Table 10.8: Terrestrial Vegetation Communities and Flora Residual Effects

Effect Detail	Loss of Sensitive Vegetation Communities	Loss of Flora SAR or SOCI and Impacts on Supporting Habitat	Indirect Effects on Vegetation Communities and Flora
Magnitude of Effect	**Low to Moderate:** Small loss of sensitive vegetation communities	**Moderate:** small loss of flora SOCI individuals, but their populations remain largely intact; moderate loss of, or effects on habitat supporting flora SAR or SOCI.	**Low:** Low impacts to sensitive vegetation communities and flora SAR and SOCI due to indirect effects
Geographic Extent of Effect	100 m buffer of the Clearing Footprint	100 m buffer of the Clearing Footprint	100 m buffer of the Clearing Footprint
Frequency of Effect	**Single Event:** Effects may occur during initial site preparation and construction	**Single Event:** Effects may occur during initial site preparation and construction	**Intermittent:** Effects may occur throughout all Project phases
Duration of Effects	**Medium Term:** Effects will end following decommissioning	**Medium Term:** Effects will end following decommissioning	**Medium Term:** Effects will end following decommissioning
Reversibility of Effect	**Partially Reversible**	**Partially Reversible**	**Partially Reversible**
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible			

10.2 Terrestrial Fauna

10.2.1 Overview

The terrestrial fauna assessment was completed using a combination of desktop and field assessments to achieve the following objectives:

- Identify significant species and habitat supporting SAR and SOCI within/near the Study Area using desktop resources.
- Determine the likelihood of SAR and SOCI occurring in the Study Area.
- Use data from targeted surveys as well as incidental observations for different groups of terrestrial fauna to document the presence of species within the Study Area, particularly SAR and SOCI.
- Use the information collected through field studies to update the Project design, as necessary, to avoid or minimize interactions between Project infrastructure and confirmed locations of terrestrial fauna SAR and SOCI or the habitats that are known to support terrestrial fauna SAR or SOCI.
- Apply mitigation, construction, and operational management practices to minimize effects to terrestrial fauna.

10.2.2 Regulatory Context

Several laws and regulations provide protection for terrestrial fauna (i.e., mammals, herpetofauna, and invertebrates) and their habitats in Nova Scotia:

- *Species At Risk Act* (Canada, 2002)
- *Canadian Environmental Protection Act* [CEPA, (Canada, 1999)]
- *Canada Wildlife Act* (Canada, 2000)
- *Endangered Species Act* (Nova Scotia, 1998)
- *Wildlife Act* (Nova Scotia, 1989)
- *Biodiversity Act* (Nova Scotia, 2021)
- *Environment Act* (Nova Scotia, 1995b)

ESA and SARA prohibit harm to SAR listed as Endangered or Threatened along with their habitually occupied spaces and core/critical habitat. The *Canada Wildlife Act* (Canada, 2000) provides a framework for the creation of protected wildlife areas, and the *Wildlife Act* (Nova Scotia, 1989) provides policies and programs for wildlife to maintain diversity of species at levels of abundance to meet specific management objectives. The *Wildlife Act* (Nova Scotia, 1989) includes a clause for the protection of den/habitation of a furbearer [48(3)] and prohibits harm to the nest of a (bird or) turtle [51(a)]. The *Biodiversity Act* (Nova Scotia, 2021) provides a framework for the creation of Biodiversity Management Zones used for conservation and sustainable biodiversity values. Lastly, CEPA and the *Environment Act* (Nova Scotia, 1995b) both provide measures for the protection of the environment and pollution prevention.

10.2.3 Desktop Review

Prior to undertaking the terrestrial field assessment, a detailed desktop review of known fauna observations and potential habitat for terrestrial fauna was completed to support the survey design. The following databases were reviewed:

- ACCDC Report (ACCDC, 2025)
- NSNR Significant Species and Habitat Database
- Provincial Forest Inventory Database (NSNR, 2021k)
- Provincial Roads and Railroads Database (GeoNOVA, 2024c)
- Provincial Secondary Watershed Boundaries (NSECC, 2011b)
- Provincial WAM Database (NSECC, 2022c)
- SARA and ESA Recovery Strategies
- Special Management Practice (SMP) Layers

During the desktop review, emphasis was placed on information recorded within 5 km of the Study Area, as this distance captures observational records and mapped habitat that are of high relevance to the Project.

Mammals

The ACCDC data report (2026a) indicates that two terrestrial mammal SAR, American marten (*Martes americana*; ESA Endangered, S-Rank S2S3) and mainland moose (ESA Endangered, S-Rank S1), have been recorded within 5 km of the Study Area (excluding aquatic mammals, bats, and birds; see Sections 9.1, 10.3, and 10.4, respectively; Table 10.9).

Though listed as Endangered by ACCDC, the protected status of the mainland population of American marten is currently pending due to data deficiency, with the Cape Breton population listed under ESA in 2001 (Nova Scotia, 2017; NSNR, 2023b). The occurrence of American marten was recorded approximately 3.4 km south of the Study Area near the St. Mary's River. Core habitat for this species has been identified though none is present within 5 km of the Study Area (NSNR, 2023b).

Records of mainland moose, a location sensitive SAR in Nova Scotia, were also identified in the ACCDC data report. Confirmation that the Study Area is located within core habitat was provided by NSNR (SAR Biologist, S. Spencer, May 12, 2026).

No records associated with other mammal SAR or SOCI were identified within 5 km of the Study Area. The complete ACCDC data report for the Project, which includes records of terrestrial fauna within 100 km of the Study Area, is provided in Appendix H.

Table 10.9: ACCDC Mammal Records within 5 km of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
American Marten	*Martes americana*	-	-	Endangered(1)	S2S3
Mainland Moose	*Alces alces americana*	-	-	Endangered	S1

Source: (ACCDC, 2026a)
(1)ESA Status refers to the Cape Breton population of American marten, as reported by ACCDC

The NSNR Significant Species and Habitat Database available on the Provincial Landscape Viewer (NSNR, 2024f) indicates that one wintering area for white-tailed deer coincides with the Study Area, and that six additional wintering areas are within 5 km of the Study Area boundary (Drawing 10.2).

Mainland Moose Habitat Suitability Modelling

Mainland moose habitat suitability modelling was conducted by Strum based on methodology established in the Mainland Moose Recovery Plan (NSNR, 2021k). Modelling was completed using the following data sources:

- Provincial Forest Inventory Database (NSNR, 2021k)
- Provincial Roads and Railroads Database (GeoNOVA, 2024c)
- Provincial WAM Database (NSECC, 2022c)

The data contained within the forest inventory database was reclassified for the purposes of this analysis based on land cover types (e.g., forest types, management history, and wet areas) to determine suitability for the different habitat needs of mainland moose. Wetland environments were a required component in the creation of this model as mainland moose use wetlands for thermal refuge in summer, and aquatic plants such as pondweed (*Potamogeton* spp.) and yellow pond lily (*Nuphar lutea*) provide important nutritional foraging options. Wetlands, particularly isolated areas surrounded by water, are also important calving areas as they provide protection and nutrients for calves and cows. For the purposes of the model, wetlands were determined from the wet areas database which was used to find areas where the depth to water of 50 cm or less, indicating a high probability of wet conditions favourable to mainland moose.

Land was classified based on its suitability for the various requirements of mainland moose to establish favourable attributes for habitat suitability. Habitat types assessed through land cover and landscape features which are counted in a positive criteria layer include:

- Summer forage
- Summer cover
- Winter forage
- Winter cover
- Calving areas

For more information on the criteria and characteristics of the above habitat types, refer to the Recovery Plan for the Moose in Mainland Nova Scotia (NSNR, 2021k), Section 8.2 Attributes of Core Habitat. From the above datasets, features that detract from suitability of mainland moose habitat are incorporated into a negative criteria layer to include:

- Urban areas
- Landfill
- Quarry

- Road density
- Harvested areas

Using the Raster Calculator in ArcGIS Pro, the values of the negative criteria rasters were subtracted from positive criteria raster values to determine the overall suitability of habitat for mainland moose. To allow for some generalization of habitat areas, zonal statistics were calculated based on 5 ha hexagons. A grid of hexagons was generated as a Habitat Suitability Score which ranges from -3 to 5 (the lowest and highest possible scores), in which -3 is highly unsuitable, and 5 is ideal mainland moose habitat. For descriptive purposes, this range is divided into discrete bins that describe habitat suitability on a scale from poor to best (Table 10.10; Drawing 10.6).

Based on habitat suitability score, any area classified as at least "fair" provides at least one habitat type requirement for the mainland moose. Habitat designated as "best" is providing multiple habitat types for the species while being minimally impacted by negative factors such as roads or conflicting land-uses. Note that scores greater than 4.01, while mathematically possible, are ecologically infeasible due to the unique characteristics of different mainland moose habitat types.

Table 10.10: Mainland Moose Habitat Suitability Model Weighting Scheme

Habitat Suitability Score Range	Habitat Suitability Category	Clearing Footprint		Study Area		5 km of the Study Area[(1)]	
		ha	%	ha	%	ha	%
< 0	Poor	311.9	22.6	4,189.3	20.2	21,434.6	33.1
0	Neutral	498.0	36.1	7,125.2	34.4	13,846.3	21.4
0 to 1.35	Fair	480.0	34.8	7,665.0	37.0	23,556.8	36.3
1.36 to 2.68	Better	85.5	6.2	1,599.7	7.7	5,586.0	8.6
2.69 to 4.01	Best	4.9	0.4	154.2	0.7	413.2	0.6
Total		**1,380.3**	**100.0**	**20,733.5**	**100.0**	**64,836.9[(1)]**	**100.0**

[(1)]This area includes only mainland Nova Scotia (ocean and offshore islands excluded), and also represents the LAA for terrestrial fauna, as described in Section 10.2.5.

The habitat suitability map indicates that the Study Area primarily consists of "neutral" (36.1%) and "fair" (34.8%) habitat for mainland moose (Drawing 10.6). On a proportional basis, the distribution of suitable habitat is comparable between in the Clearing Footprint, Study Area, and surrounding 5 km. Across all three spatial boundaries, there is a low amount of habitat in the "better" and "best" categories (4.9 ha). During the modelling exercise, the low overall suitability of habitat within the Study Area was observed to be driven by existing disturbance to forest stands in the north and west, and the presence of existing roads along coastal areas, with areas of suitable habitat primarily associated with areas of intact forest and wetlands. The amount of suitable habitat ("better" and "best" categories) within the Clearing Footprint represents 0.5% of the amount modelled in the Study Area, and 1.5% of the amount modelled within 5 km of the Study Area.

Herpetofauna

Data from the ACCDC report (2026a) indicates that two herpetofauna SAR, snapping turtle (*Chelhydra serpentina*, SARA Special Concern, ESA Vulnerable, S-Rank S3) and wood turtle (*Glyptemys insculpta*, SARA and ESA Threatened, S-Rank S2), have been recorded within 5 km of the Study Area (Table 10.11; Drawing 10.2). The 13 records of snapping turtle are all outside of the Study Area. Wood turtles are a location sensitive herpetofauna SAR, and confirmation that core habitat and multiple occurrence records of this species are within 5 km of the Study Area was provided by NSNR (SAR Biologist S. Spencer, May 12, 2026). None of these records are in the Study Area, and no other records of herpetofauna SAR or SOCI were identified in the ACCDC report (2026a).

Table 10.11: ACCDC Herpetofauna Records within 5 km of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Snapping Turtle	*Chelhydra serpentina*	Special Concern	Special Concern	Vulnerable	S3
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened	S2

Source: (ACCDC, 2026a)

A wood turtle SMP layer provided to Strum by NSNR (NSNR, 2012b) indicates that watercourses known to support wood turtles, along with their associated secondary watersheds (NSECC, 2011b) are present within and near the Study Area. The Significant Species and Habitat Databased (NSNR, 2024f) also contains several features associated with wood turtles within 5 km of the Study Area.

Invertebrates

The ACCDC data report (2026a) contains 66 records of 13 terrestrial invertebrates within 5 km of the Study Area (Table 10.12; Drawing 10.2). Of these, one record of yellow-banded bumble bee (*Bombus terricola*; SARA Special Concern, ESA Vulnerable, S-Rank S3), a SAR, and one record of black meadowhawk (*Sympetrum danae;* S-Rank S3B), a SOCI, is in the Study Area. A total of 19 occurrences of monarch (*Danaus plexippus*; SARA and ESA Endangered, S-Rank S2?B,S3M; 19 records), an invertebrate SAR, have also been recorded south of the Study Area near Port Bickerton.

Table 10.12: ACCDC Terrestrial Invertebrate Records within 5 km of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Balsam Fir Sawyer	*Monochamus marmorator*	-	-	-	S3
Black Meadowhawk	*Sympetrum danae*	-	-	-	S3S4
Broad-tailed Shadowdragon	*Neurocordulia michaeli*	-	-	-	S2
Comparison Weevil	*Tachyerges ephippiatus*	-	-	-	S3
Digging Rove Beetle	*Platydracus fossator*	-	-	-	S3
Dogbane Beetle	*Chrysochus auratus*	-	-	-	S3

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Monarch	*Danaus plexippus*	Endangered	Endangered	Endangered	S2?B,S3M
Ocellated Darner	*Boyeria gradiana*	-	-	-	S3S4
Pepper and Salt Skipper	*Amblyscirtes hegon*	-	-	-	S3S4
Question Mark	*Polygonia interrogationis*	-	-	-	S3B
Rusty Snaketail	*Ophiogomphus rupinsulensis*	-	-	-	S3
Seaside Lady Beetle	*Naemia seriata*	-	-	-	S3
Two-spotted Skipper	*Euphyes bimacula*	-	-	-	S3
Yellow-banded Bumble Bee	*Bombus terricola*	Special Concern	Special Concern	Vulnerable	S3

Source: (ACCDC, 2026a)

There are no Significant Species and Habitat Database Polygons on the Provincial Landscape Viewer (NSNR, 2024e) relevant to invertebrates within 5 km of the Study Area.

10.2.4 Field Assessment

10.2.4.1 Field Assessment Methodology

Mammals

Winter tracking and pellet surveys were conducted in 2025 and 2026 to assess the presence and distribution of mainland moose and other mammals across the Study Area. Trail cameras (five) were also deployed from February to October 2023 to capture the presence of wildlife without interference from humans (Table 10.13; Drawing 10.7). The goal of the surveys was to provide a broad perspective of terrestrial mammal activity in the Study Area by covering all relevant habitat types, including roadways, wetlands, forested habitats, riparian areas along watercourses and waterbodies, and previously disturbed areas (e.g., clearcuts). Incidental observations of terrestrial mammals made during other survey types were also recorded.

Table 10.13: Mammal Assessment Survey Information

Survey Type	Transect/Trail Camera ID	Dates Completed/Deployed	Transect Length (km)
Winter Tracking	WT-T1	Round 1: February 18, 2026 Round 2: February 27, 2026	1.6
	WT-T2	Round 1: February 9, 2026 Round 2: March 6, 2026	0.7
	WT-T3	Round 1: February 4, 2026 Round 2: February 27, 2026	2.1
	WT-T4	Round 1: February 6, 2026 Round 2: March 1, 2026	1.6
	WT-T5	Round 1: February 10, 2026 Round 2: March 1, 2026	0.9
	WT-T6	Round 1: February 10, 2026 Round 2: March 5, 2026	1.9

Survey Type	Transect/Trail Camera ID	Dates Completed/Deployed	Transect Length (km)
	WT-T7	Round 1: February 10, 2026 Round 2: March 5, 2026	1.3
	WT-T8	Round 1: February 25, 2026 Round 2: March 5, 2026	1.2
	WT-T9	Round 1: February 10, 2026 Round 2: March 4, 2026	1.4
	WT-T10	Round 1: February 18, 2026 Round 2: February 27, 2026	1.3
	WT-T11	Round 1: February 5, 2026 Round 2: February 27, 2026	1.3
	WT-T12	Round 1: February 4, 2026 Round 2: February 24, 2026	1.6
	WT-T13	Round 1: February 5, 2026 Round 2: February 26, 2026	1.4
	WT-T14	Round 1: February 19, 2026 Round 2: February 28, 2026	1.1
	WT-T15	Round 1: February 17, 2026 Round 2: February 28, 2026	1.4
	WT-T16	Round 1: February 17, 2026 Round 2: February 28, 2026	1.1
	WT-T17	Round 1: February 19, 2026 Round 2: February 28, 2026	1.1
	WT-T18	Round 1: February 11, 2026 Round 2: February 28, 2026	1.4
	WT-T19	Round 1: February 20, 2026 Round 2: February 28, 2026	1.3
	WT-T20	Round 1: February 1, 2026 Round 2: February 28, 2026	1.2
	WT-T21	Round 1: February 11, 2026 Round 2: February 28, 2026	0.6
Pellet Surveys	PGI-T1	May 8, 2025	1.8
	PGI-T2	May 7, 2025	1.2
	PGI-T3	May 7, 2025	1.2
	PGI-T4	May 7, 2025	1.6
	PGI-T5	May 7, 2025	1.9
	PGI-T6	May 7, 2025	1.2
	PGI-T7	May 9, 2025	0.9
	PGI-T8	May 9, 2025	1.2
	PGI-T9	May 9, 2025	1.2
	PGI-T10	May 9, 2025	1.0
	PGI-T11	May 7, 2025	1.2
	PGI-T12	May 7, 2025	1.5

Survey Type	Transect/Trail Camera ID	Dates Completed/Deployed	Transect Length (km)
	PGI-T13	May 9, 2025	1.0
	PGI-T14	May 9, 2025	1.1
	PGI-T15	May 8, 2025	1.0
	PGI-T16	May 8, 2025	1.0
	PGI-T17	May 9, 2025	1.4
	PGI-T18	May 8, 2025	1.1
	PGI-T19	May 8, 2025	0.8
	PGI-T20	May 8, 2025	1.1
Trail Cameras	TC-55	February 14 to October 4, 2023	NA
	TC-56	February 14 to October 3, 2023	NA
	TC-71	February 16 to October 3, 2023	NA
	TC-74[(1)]	February 14 to July 19, 2023	NA
	TC-79	February 16 to October 3, 2023	NA

[(1)]Camera stolen; not shown on Drawing 10.7 due to missing location data

The methods used for winter tracking and pellet surveys were adapted from recommendations provided by NSNR Wildlife Division (NSNR, 2022c). Winter wildlife tracking surveys were completed over two rounds from February to March 2026. As recent, intact, tracks in fresh snow allow for the most accurate track identification, winter tracking surveys were completed within five days of snowfall of 10 cm or more. This timeline allowed sufficient time for animals to leave their tracks, and limited opportunities for tracks to deteriorate or disappear because of excessive snowfall, melting, wind, or rain. Care was also taken to ensure surveys were not completed during rain or snow events. One round of pellet surveys was completed in early May 2025 after snow had melted completely, revealing animal droppings that had been preserved in the snow over the winter.

Winter tracking and pellet surveys were conducted along pre-determined transects (21 in winter, 20 in spring) covering a range of representative habitats within the Study Area (Drawing 10.7) and ranging from 0.6 km to 2.1 km in length. Transect lengths and locations varied between winter tracking and pellet surveys to account for information gained during pellet surveys to ensure suitable habitat for mainland moose was prioritized, and to maximize coverage across the Study Area. Areas of winter forage and winter cover identified through habitat suitability modelling were also prioritized when selecting locations for winter tracking in 2026. Additional sections of trails and roads were surveyed opportunistically during surveys, and any observations of interest were recorded. All survey tracks were recorded using ArcGIS Field Maps, and any changes to transects were made such that the new course was similar in length to the planned transect and covered similar or improved habitat types.

Transects were travelled by foot during both survey types. While slowly travelling along a transect, an approximately 4 m area centered on the transect line was scanned for any sign of

animal activity, including tracks, pellets/scat, browse, dens, or animal sightings. When suspected activity from white-tailed deer and any terrestrial mammal SAR or SOCI, including mainland moose, was observed, detailed notes and photos relating to habitat and animal sign were recorded. Additional observations of interest, such as evidence of predator and prey interactions, were also recorded. Any other activity from non-SAR or SOCI mammals was recorded only if the observation was found to be particularly unusual or interesting. Observations were recorded and georeferenced in the field using an ArcGIS Survey123 form. Upon completion of each transect, a general description of the transect including overall tracking conditions, different habitats encountered, and abundance of each species was recorded. Abundance of each species includes all SAR and SOCI and non-SAR and SOCI mammals. If observations of terrestrial mammal SAR or SOCI activity were made during other survey types (i.e., wetland assessments), these observations were also recorded.

In addition to wildlife surveys, five trail cameras were deployed across the Study Area from February to October 2023 (Drawing 10.7). Locations were selected to include various habitat types expected to be frequented by terrestrial mammals. Large mammals commonly use old roads, trails, or natural corridors such as riparian zones to travel throughout a landscape, and thus cameras were placed in these areas to capture their movements. Trail cameras were visited regularly to replace storage cards and batteries, and occasionally the trail camera itself was removed from one location and relocated to increase site coverage. All photos were then assessed for signs of wildlife.

Herpetofauna

A desktop review of the Study Area was undertaken before conducting field surveys to identify areas of potential wood turtle habitat. According to their Recovery Strategy, wood turtles require water with sufficient flow and depth to provide them with ice-free, well-oxygenated water throughout the winter (ECCC, 2020c). Wood turtles tend to hibernate wherever instream structures such as boulders or root-wads provide some cover and rarely hibernate outside of the main channel of a watercourse, as they require well oxygenated water throughout the winter (pers. comm., M. Pulsifer, January 2021).

Wood turtles nest in well-drained gravelly soil on the banks of inhabited watercourses. While some may be attracted to gravelly roadsides for nesting, this habitat is considered unsuitable due to the danger presented to emerging hatchlings. To support egg incubation, soils need to be well-drained, with a southern aspect, and free of vegetation. This habitat is typically present as sand or gravel bars in depositional areas of dynamic, natural watercourses (ECCC, 2020c).

An initial round of targeted wood turtle surveys was completed in May 2023 along 13 pre-determined watercourse transects ranging from 378 m to 1,427 m in length (Drawing 10.7). Additional surveys were completed in May 2025 (typically two rounds), consisting of 15 transects, including two located in watercourses that were also surveyed in 2023 (949 m to 1,944 m in length). The locations of surveys were determined through a desktop review to identify areas of potential wood turtle habitat, including referencing the locations of wood turtle SMP watercourses and their associated secondary watersheds in relation to the Study Area.

Generally, transects were established to target clear, meandering watercourses with a moderate flow, sandy or sand-gravel areas, and artificial nesting sites which may include gravel pits, road shoulders, and residential sites. The suitability of habitat surrounding watercourses (including riparian or forested areas, or open areas such as flood plains, meadows, river oxbows, and beaver ponds) was also considered when selecting transect locations. Note that while the results of all surveys are reported, 12 of the transect locations are outside of the Study Area due to changes in the layout of the Project that have occurred since the surveys took place (described further in Section 4.1).

During all surveys, transects were simultaneously assessed by two field biologists walking on each side of the watercourse while scanning the ground, the banks, and the water. Search efforts focused on bank areas with high sun exposure or other adequate basking areas such as instream rocks or logs. Wood turtles may occur under or near deadfall, grasses, leaf litter, or woody shrubs (particularly alder trees) where they are more inconspicuous, and these areas were therefore searched with greater intensity. All survey tracks were recorded using handheld global positioning system (GPS) units, and any changes to transects were made such that the new course was similar in length to the planned transect and covered similar or improved habitat types. One survey round was completed.

Any observations of turtles, snakes, or salamanders were recorded and georeferenced in the field using an ArcGIS Survey123 form. Upon completion of each transect, a general description of the transect, including the presence of any notable habitat features, was recorded. Any additional observations of herpetofauna made during other survey types such as wetland or watercourse surveys, as well as observations of suitable wood turtle habitat, were also recorded.

Invertebrates

Targeted surveys for invertebrate species were not completed; however, any incidental observations of invertebrate SAR or SOCI during other field surveys were documented, if observed. Obligate habitats for invertebrate SAR were recorded if observed incidentally or through botany surveys – specifically referring to observations of milkweed (*Asclepias* spp.) as an obligatory food source and breeding habitat for the monarch butterfly.

10.2.4.2 Field Assessment Results

Mammals

Signs or observations of 10 mammal species (as well as signs of unidentified rodents) were identified in the Study Area during targeted surveys and/or incidental observations (Table 10.14; photograph log included in Appendix L). No signs or observations of mainland moose were recorded. During pellet inventory surveys, signs of white-tailed deer were common, with scat observed along all transects except PGI-T3 and PGI-T4. Several incidental encounters with American black bears occurred, and two suspected signs of fisher (*Pekania pennanti*; S-Rank S3), a SOCI, were observed during various biophysical surveys.

Table 10.14: Results Summary of the Mammal Field Assessments

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
American Black Bear	*Ursus americanus*	-	-	-	S5
North American Porcupine	*Erethizon dorsatum*	-	-	-	S5
Bobcat	*Lynx rufus*	-	-	-	S5
Eastern Coyote	*Canis latrans*	-	-	-	S5
Fisher	*Pekania pennanti*	-	-	-	S3
North American beaver	*Castor canadensis*	-	-	-	S5
Red Fox	*Vulpes vulpes*	-	-	-	S5
Red Squirrel	*Tamiasciurus hudsonicus*	-	-	-	S5
Snowshoe Hare	*Lepus americanus*	-	-	-	S5
Unidentified Rodent	N/A	N/A	N/A	N/A	N/A
White-tailed Deer	*Odocoileus virginianus*	-	-	-	S5

Source: (ACCDC, 2026b)

Five mammal species, American black bear, bobcat, eastern coyote, white-tailed deer, and North American porcupines were recorded by trail cameras (Table 10.15, photograph log provided in Appendix L). The highest level of white-tailed deer activity was recorded at TC-74, where 23 observations of the species were recorded. Note that this trail camera went missing sometime after July 2023, limiting the amount of available data. Eastern coyotes were observed to be highly abundant at the location of TC-71 with 26 individuals observed along an established road.

Table 10.15: Summary of Trail Camera Results

Trail Camera	Mammals Observed	Number of Observations[(1)]
TC-55	Bobcat	2
	Eastern Coyote	3
	White-tailed Deer	11
TC-56	-	-
TC-71	American Black Bear	2
	Bobcat	3
	Eastern Coyote	26
	White-tailed Deer	8
TC-74	Eastern Coyote	6
	North American Porcupine	1
	White-tailed Deer	23
TC-79	-	-

[(1)]Number of observations adjusted based on likelihood of photos belonging to the same animal; a general rule of one hour between photos was applied to consider photos of the same species to be separate observations.

Herpetofauna

No direct observations or signs of wood turtles (e.g., nests, eggs, shell fragments) were recorded during targeted wood turtle surveys. Transects in several of the surveyed watercourses had suitable habitat characteristics for wood turtles, such as moving water with deep pools, scalable banks, basking areas, and/or gravel areas. Potential nesting habitat was observed in WCT-1, WCT-3, WCT-15, WCT-17, WCT-21, and potential overwintering habitat at WCT-17, and WCT-18 (Table 10.16; Drawing 10.7). The remaining transects were determined to have low suitability for wood turtles due to shorelines being dominated by dense tree or shrub cover or having boulder/muck substrate.

Table 10.16: Habitat Descriptions of Wood Turtle Survey Transects

Dates	Transect	Description of Habitat	Substrate	Potential Wood Turtle Habitat		
				Nesting	Overwintering	General
May 29, 2023 May 14, 2025 May 16, 2025	WCT-1[(1)]	Shrub fen, slow flat watercourse changes to riffle run, cobble gravel substrate.	Gravel, cobble	Y	N	N
May 30, 2023 May 14, 2025 May 16, 2025	WCT-2[(1)]	Shrub wetland with open water, softwood dominant forest. Slow/flat.	Muck, gravel, cobble	N	N	N
May 30, 2023	WCT-3[(1)]	Mixedwood forest, perennial watercourse, slow flow, sandy undercut banks.	Cobble, gravel, sand	Y	N	Y
May 30, 2023	WCT-4[(1)]	Fen, grassy and mossy undefined banks. Slow flow.	Muck	N	N	N
May 26, 2023	WCT-5	Mixedwood forest, intermittent watercourse, fast flow.	Bedrock, boulder, cobble	N	N	N
May 25, 2023	WCT-6	Treed swamp, fringe wetland along watercourse.	Muck, boulder, cobble	N	N	N
May 26, 2023	WCT-7	Softwood forest, fringe wetland along watercourse.	Muck, cobble, boulder	N	N	N
May 25, 2023	WCT-8	Black spruce fen. Perennial watercourse, large deep pools (> 0.5 m).	Boulder, cobble	N	N	N
May 25, 2023	WCT-9	Treed swamp, dense shrub cover. Intermittent, slow flow.	Boulder	N	N	N
May 26, 2023	WCT-10	Treed fen, perennial watercourse, undefined banks. Softwood forest.	Boulder	N	N	N
May 26, 2023	WCT-11	Softwood forest, narrow stream with boulders. Fringe wetland along watercourse edge.	Boulder	N	N	N

Dates	Transect	Description of Habitat	Substrate	Potential Wood Turtle Habitat		
				Nesting	Overwintering	General
May 29, 2023	WCT-12[(1)]	Softwood forest, large intermittent watercourse, slow flow.	Boulder, cobble	N	N	N
May 26, 2023	WCT-13	Tree swamp, intermittent watercourse, fast flow. Undefined banks.	Boulder, cobble	N	N	N
May 14, 2025 May 16, 2025	WCT-14[(1)]	Mixedwood forest, alterations due to beaver.	Cobble, gravel, muck	N	N	N
May 14, 2025 May 27, 2025	WCT-15[(1)]	Alder swamp with sandy banks, mixedwood forest, flat, riffle run.	Sand, gravel, cobble,	Y	N	Y
May 14, 2025 May 20, 2025	WCT-16[(1)]	Softwood forest, alder swamp narrow and shallow intermittent watercourse	Muck, gravel, cobble	N	N	N
May 14, 2025 May 27, 2025	WCT-17[(1)]	Shrub swamp, tree swamp, shrub fen. Exposed gravel/sand banks. Undercut banks with deep pools.	Gravel, cobble, sand	Y	Y	Y
May 14, 2025 May 16, 2025	WCT-18[(1)]	Softwood forest, treed swamp, shrub fen, watercourse wide, fast sections > 1 m deep.	Rubble, cobble	N	Y	Y
May 15, 2025	WCT-19[(1)]	Open graminoid fen, alder swamp, immature mixedwood forest with abundant windthrow.	Gravel, cobble	N	N	Y
May 15, 2025 May 16, 2025	WCT-20[(1)]	Mixedwood forest, shrub fen.	Rubble, gravel	N	N	N
May 10, 2025	WCT-21	Mixedwood forest, large perennial watercourse, riffle run.	Cobble, gravel, sand	Y	N	Y
May 15, 2025 May 16, 2025	WCT-22	Mixedwood forest, shrub swamp, perennial watercourse, slow flow.	Gravel, cobble, muck	N	N	N
May 16, 2025	WCT-23	Graminoid fen, immature softwood forest, slow flow.	Gravel, cobble, muck	N	N	N

Dates	Transect	Description of Habitat	Substrate	Potential Wood Turtle Habitat		
				Nesting	Overwintering	General
May 14, 2025	WCT-24	Shrub fen, mixedwood forest. Slow flow with deep pools.	Boulder, muck	N	N	N
May 14, 2025 May 16, 2025	WCT-25	Mixedwood forest, alder swamp, perennial watercourse, slow flow.	Boulder, cobble, muck	N	N	N
May 14, 2025	WCT-26	Open bog complex, acidic watercourse, slow flow.	Muck	N	N	N

(1)Transect outside of the Study Area

Two incidental observations of snapping turtles were recorded during field surveys in 2025 (Drawing 9.3A to 9.3P). Both observations were on roadsides near ponded watercourses, one of which was in the Study Area and one immediately adjacent to the Study Area (Appendix L). During one encounter, a snapping turtle showed signs of nesting behaviour (digging along a gravel roadside). No other incidental observations of herpetofauna were recorded.

Invertebrates

There were no observations of invertebrate SAR or SOCI recorded during field assessments. No observations of milkweed species, which support the monarch butterfly (SARA and ESA Endangered, S-Rank S2?B,S3M) were recorded during flora surveys.

Priority Species

Based on the desktop review and field survey results, terrestrial species that have been recorded or are likely to occur within the Study Area were screened against the criteria outlined in the Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) to develop a list of priority species, as detailed in the sections that follow.

American Marten

American marten are a small mammal species with long slender bodies and short limbs. The mainland population has an S-Rank of S2S3 and is currently pending listing under ESA (Nova Scotia, 2017; NSNR, 2023b). The main areas occupied by the species in Nova Scotia are on Cape Breton Island and in southwestern mainland (NSNR, 2023b). The habitat preferences of American marten include mature forests with tall canopies (> 8 m canopy) and abundant woody debris that provide protection from predators and abundant prey (NSNR, 2023b). The species is vulnerable to population decline due to their large space requirements and low reproductive rates. The main threats to the species include habitat fragmentation due to forest clearing and changes in forest/snow cover resulting from climate change (NSNR, 2023b).

No signs or observations of American marten were recorded during biophysical surveys, and there is no identified core habitat within 5 km of the Study Area. However, an ACCDC occurrence record for this species was identified near the Study Area indicating that American marten may use areas of suitable habitat within the Study Area.

Fisher

Fishers, a SOCI with an S-Rank of S3, prefer dense, mature to old-growth forests with continuous overhead cover with abundant mammalian prey (snowshoe hare, red squirrel, porcupine) (Allen, 1983). Generally considered an interior-forest species (OMNR, 2000), fishers require large tracts of well-connected habitat (Meyer, 2007) and prefer areas of topographic and ecological diversity (Potter, 2002). Fishers are distributed throughout mainland Nova Scotia, and trapping data suggest the population is concentrated in Cumberland, Colchester, and Pictou counties (NSNR, 2024a). Mature and old-growth forest stands nearby the Project may provide suitable canopy closure and coarse woody debris of sufficient diameter for fishers on the site. Suspected fisher tracks were incidentally observed along existing roads during biophysical surveys in winter 2023.

Mainland Moose

Mainland moose are a SAR listed as Endangered under ESA with an S-Rank of S1 (highest priority). They are not listed under SARA. Threats to mainland moose include habitat loss and fragmentation, particularly resulting from industrial activities; and loss of habitat connectivity due to the increased placement and density of roads (NSNR, 2021k). Portions of the Study Area have previously been and continue to be subject to the abovementioned threats as a result of historical and current land-uses, including forestry activities and recreation. Renewable energy projects are described in the Mainland Moose Recovery Plan (2021k) as a medium level threat to the species, as the nature of wind projects usually requires the construction or expansion of road networks and loss of forested habitat.

No evidence of mainland moose was observed during winter tracking or pellet inventory surveys, or captured by trails cameras, and no incidental observations were recorded. However, mainland moose are considered a priority species based on the overlap of the Project with areas of suitable core habitat.

Wood Turtle

Wood turtles are a SAR listed as Threatened under SARA and ESA with an S-Rank of S2. Wood turtles are habitat generalists but are associated with perennially flowing watercourses within forested habitat and require specific conditions for nesting (gravel beaches or bars) and overwintering (pools). The most significant threats to the species include road development and land use practices (NSNR, 2020c). Core and critical habitat has been identified for wood turtles in Nova Scotia (NSNR, 2020c), and SMPs have been established that include recommendations for activity and development limitations in the area (up to 200 m) surrounding watercourses where wood turtles are known to occur (NSNR, 2020c).

No occurrences or signs of wood turtles were recorded during target or non-target field surveys within or near the Study Area. Areas of suitable nesting, overwintering, and general habitat were identified during wood turtle surveys, and SMP watercourses and associated secondary watersheds intersect with the Study Area. The St. Mary's River watershed, which overlaps and is immediately adjacent to the Study Area, is believed to support the province's largest population of wood turtles (Pulsifer et al., n.d.)

Snapping Turtle

Snapping turtles are a SAR listed as Special Concern under SARA and Vulnerable under ESA (S-Rank S3). Snapping turtles are considered to be fairly common throughout mainland Nova Scotia, particularly in the southwest of the province (NSNR, n.d.-a). The species uses a variety of habitats; however, snapping turtles prefer slow-moving water with a soft mud bottom and dense aquatic vegetation. Overwintering sites are aquatic environments (e.g., lentic, lotic, and mud) where water will not freeze to the bottom, the substrate is a thick layer of mud, and other cover (e.g., large woody debris) is present. Typical nesting habitat includes sand or gravel banks in proximity to water with sparse vegetative cover (ECCC, 2020b). The primary threats to snapping turtles are habitat conversion and road mortality (ECCC, 2020b). Due to their delayed reproductive age, populations of snapping turtles are highly sensitive to the survival rates of adults.

Numerous occurrence records of snapping turtle have been recorded in the vicinity of the Project (ACCDC, 2026a), and two incidental observations of adult snapping turtle were recorded in 2025. The observations were both recorded along gravel roads near ponded watercourses (Drawing 9.A to 9.3P).

Monarch

The monarch (SARA and ESA Endangered, S-Rank S2?B,S3M) is a distinctive butterfly species that is native to North, Central, and South America. The eastern population, which occurs in Nova Scotia, has a large breeding range that extends from the Gulf of Mexico in the United States to southern Canada (including Nova Scotia) (ECCC, 2016a). During winter, the species migrates south to overwintering sites before breeding and northward migration begins again in the spring. The species faces a variety of threats across its geographic range that have led to population-level declines, the most severe of which include degradation and loss of overwintering habitat in Mexico and the southern United States, and the extensive use of herbicides throughout the breeding range (ECCC, 2016a). Monarchs almost exclusively lay their eggs on milkweed plants, which are also an obligatory food source for larvae, and declines in the distribution and abundance of milkweed also pose a threat to the species. In Nova Scotia, conservation measures are primarily focused on maintaining the province's population of swamp milkweed to ensure sufficient habitat is available to support breeding populations (NSNR, 2021h).

No direct observations of monarch butterflies were recording during field assessments, and no occurrences of milkweed species were recorded during field surveys. However, based on the proximity of previously recorded occurrences (ACCDC, 2026a) it is possible that the Study Area may serve as habitat for the species.

Yellow-banded Bumble Bee

The yellow-banded bumble bee is a medium-sized bumble bee and an invertebrate SAR designated Special Concern under SARA and Vulnerable under ESA (S-Rank S3). The species was once the most abundant bumble bee species in eastern and boreal Canada but substantial population declines have occurred since the 1990s largely due to the effects of invasive and problematic native species [e.g., pathogens and other bee species (ECCC, 2023b; NSNR, 2024b)]. The species is considered a generalist pollen forager and habitat generalist, but requires a consistent supply of pollen and nectar to maintain colonies (NSNR, 2024b).

No incidental observations of yellow-banded bumble bee were recorded during biophysical surveys; however, an occurrence of this species has been previously recorded in the Study Area (ACCDC, 2026a).

10.2.5 Effects Assessment

Project-Terrestrial Fauna Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact terrestrial fauna (Table 10.17).

Table 10.17: Potential Project-Terrestrial Fauna Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for terrestrial fauna includes a 5 km buffer of the Study Area, including only the contiguous mainland (Drawing 10.5). This distance was selected based on the home ranges and short distance migrations of species between habitat types. The boundaries of ecoregions that intersect the Study Area, bounded the Moser River, and the Pictou Antigonish Highlands and Governor Lake ecodistricts. This area was selected to support the assessment of cumulative effects (Section 16.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for terrestrial fauna. The VC-specific definition for magnitude is as follows:

- Negligible: No loss of fauna habitat or impact to fauna through sensory disturbance or injury/mortality.
- Low: Small loss of habitat supporting fauna and low impacts to fauna through sensory disturbance or injury/mortality.

- Moderate: Moderate loss of fauna habitat and/or moderate impacts to fauna through sensory disturbance or injury/mortality, but these impacts will only be experienced by individuals rather than entire populations.
- High: High loss of fauna habitat or high impact to fauna through sensory disturbance or injury/mortality that would impact fauna on a population scale.

Effects

Project activities have the potential to impact terrestrial fauna through:

- Habitat loss and fragmentation
- Sensory disturbance
- Injury or mortality

Habitat Loss and Fragmentation

The Study Area and LAA are variable landscapes dominated by softwood and mixedwood forests, open areas, and cutover uplands, with areas of intact mature forest and an abundance of wetland habitat (described further in Section 10.1). These and other less common cover types are known to support a variety of fauna species, indicating that vegetation clearing and ground disturbance associated with the construction of the Project will result in a degree of habitat loss and/or fragmentation for terrestrial fauna. Incorporating important habitat features into the layout of wind energy projects is considered an important strategy for mitigating impacts on terrestrial fauna (Katzner et al., 2025). As described in Section 10.1, many forested areas in the LAA have already been disturbed and fragmented by harvesting and associated access roads and trail (e.g., cutover uplands make up 11.6% of the LAA and 14.2% of the Clearing Footprint). To the extent possible, the Project has prioritized the re-use of recently disturbed areas and minimized impacts to sensitive habitats such as mature forests, wetlands, and watercourses (i.e., areas regularly frequented by terrestrial fauna) which will help to reduce the overall impacts of the Project on the quality and abundance of fauna habitat.

A total of 142.6 ha of intact interior forest, which is an important habitat type for many fauna species (OMNR, 2000), is expected to be directly impacted by the Project, with an additional 363.8 ha of new edge habitat expected to be created. Species of terrestrial fauna that are known to use the Study Area and surroundings will respond differently to the impacts of habitat loss and fragmentation. For example, generalist species such as American black bear, eastern coyote, red fox, and white-tailed deer, tend to be more adaptable to altered conditions and the creation of edge habitats or open corridors (e.g., due to abundant prey, foraging opportunities, and ease of movement) than species with more specific habitat requirements. In contrast, the effects of habitat fragmentation may be particularly impactful for small mammals and herpetofauna that have difficulty relocating to alternative areas of suitable habitat (Colino-Rabanal & Lizana, 2012; OMNR, 2000) or that prefer interior forest conditions for shelter and prey (such as American marten and fisher). As a large ungulate that requires a variety of habitat types to support different life history stages, mainland moose are also known to be highly sensitive to disruptions in landscape connectivity (NSNR, 2021k).

The potential effects of the Project on the habitat of priority fauna species are described in the following sections.

Mammals

American Marten and Fisher

The preferred habitat of both American marten and fisher includes large areas of intact, mature forest which provides protection from predators and supports abundant prey (Meyer, 2007; NSNR, 2023b). Though no direct observations or signs of American marten (S2S3) were recorded during field surveys, an occurrence record in the ACCDC data report (2026a) is located near the Study Area, indicating there is potential for American marten to be impacted by the loss of intact interior forest through changes in habitat selection and availability of prey. Similarly, signs of fisher in the Study Area were limited to two occurrences of suspected tracks. In the absence of direct observations or local population estimates, it is not possible to determine the extent to which habitat loss and fragmentation will impact these species; however, no significant population-level impacts are expected. The Study Area is located well outside of the main species concentration areas for American marten (southwestern mainland and Cape Breton Island) and fisher (Cumberland, Colchester, and Pictou counties) in Nova Scotia.

Mainland Moose

The Study Area is located within core habitat identified in the Mainland Moose Recovery Plan for the Pictou/Antigonish/Guysborough subgroup of mainland moose (NSNR, 2021k) (though not legislatively protected under Section 16 or 18 of ESA). Within core habitat, areas are ranked as having high or low suitability based on a combined HSI and road density score. Scores of 4 to 9 meet the suitability requirements (with higher scores reflecting higher suitability), and scores of three or below do not. The northwest portion of the Study Area coincides core habitat areas with HSI/roads criteria values of 4 to 6 and 7 to 9, as shown in Figure 5 of the Mainland Moose Recovery Plan (NSNR, 2021k). Infrastructure planned for this area includes turbines, new and existing roads, and laydown areas. The remainder and majority of the Study Area does not have an associated HSI/road density score, indicating low suitability in comparison to the northwest.

Habitat loss and reduced habitat quality may result in behavioural changes in mainland moose, including from reduced opportunities for thermoregulation, loss of overwintering areas, loss of adequate sources of food, reduced space for mating, and reduced protection for calves. The habitat suitability model for mainland moose developed as part of the desktop review (described in Section 10.2.3) provides a spatially explicit reference for quantifying the impacts of the Project on suitable moose habitat. In line with mapping in the Mainland Moose Recovery Plan (NSNR, 2021k), the habitat suitability model suggests that the Clearing Footprint primarily consists of areas with “neutral” or lower suitability for mainland moose, with 90.4 ha (6.5%) of suitable habitat (the “better” or “best” suitability categories) expected to be cleared for the Project. Of this, 4.9 ha is habitat in the “best” suitability category. The amount of suitable habitat within the Clearing Footprint represents 1.5% of the 5,999.3-ha modelled within the LAA, suggesting that the amount suitable habitat to be cleared for the Project is low.

Importantly, infrastructure has avoided several areas of suitable habitat within the LAA, including within MOU lands north of the Melrose Country Harbour Road and several patches of high suitability habitat in the north and west of the Study Area (Drawing 10.6).

On a broad scale, habitat fragmentation is a major concern for the longevity of mainland moose, as the species is already highly localized to three areas of the province (NSNR, 2021k). Road placement and density are the main drivers of reduced habitat connectivity, and road construction has been identified as one of the main activities likely to result in destruction of important moose habitat (NSNR, 2021k). Road density values above 0.6 km/km^2 have been shown to impact habitat selection by moose due to relationships between road density and habitat loss and fragmentation, and associated impacts of human activity (Beazley et al., 2004). The highest density of existing roads is in the north and west portions of the Study Area where access roads, forestry trails, as well as more heavily trafficked roads are present, indicating these areas may already be subject to road density impacts on terrestrial fauna habitat. The southeastern portion of the Study Area has the greatest potential for impacts due to increases in road density as few existing roads are present in this area. However, as visible in Drawing 10.1A to 10.1O, this area is dominated by shrub cover and open wetlands, and the results of habitat suitability modelling indicate that this area offers predominantly neutral or fair habitat for mainland moose (Drawing 10.6). Based on pre-existing levels of fragmentation and disturbance in the Study Area and LAA, and the low overall suitability of the Clearing Footprint for mainland moose, the impacts of the Project due to habitat loss and fragmentation are expected to be low.

Herpetofauna

Terrestrial habitat used by herpetofauna, including snapping turtles and wood turtles, includes riparian areas along wetlands and watercourses, forested areas near watercourses, and rocky or gravelly areas such as roadsides. These habitats support different biological needs of species and relate directly to life history strategies. Conversion of these habitats to roads and other land uses may therefore prevent natural patterns of movement across the landscape. The greatest potential for interactions with snapping turtle and wood turtle habitat is in the northwestern portion of the Study Area, where incidental occurrences of snapping turtles were observed during field assessments, and which overlaps a secondary watershed known to support wood turtles. This part of the Study Area will see the highest reuse of existing roads and disturbed areas, which has helped to minimize the amount of new disturbance to wetlands, riparian areas, and intact forest (described further in Sections 9.1, 9.2, and 10.3, respectively). Though loss and fragmentation of snapping turtle and wood turtle habitat may occur, no significant impacts on these or other herpetofauna SAR or SOCI resulting from habitat loss are expected within the Study Area or LAA.

Invertebrates

Nova Scotia is in the range of the eastern population of monarchs and provides both breeding and staging habitat ahead of fall migration (MTRI, n.d.; NSNR, 2021h). Though the loss of breeding habitat is considered the primary threat to monarchs in Nova Scotia, the abundance of monarchs in the province is influenced more by the number of migrating individuals rather

than the availability of habitat, and the species is not considered habitat limited in Nova Scotia (NSNR, 2021h). Similarly, habitat availability is not considered to pose a major threat to yellow-banded bumble bees, which are more directly impacted by the effects of invasive and introduced bee species (NSNR, 2024b). Habitat loss due to renewable energy projects, including wind developments, is considered to pose a negligible threat to the status of yellow-banded bumble bees in Nova Scotia (NSNR, 2024b). The effects of the Project on habitat for monarchs and yellow-banded bumble bee are therefore expected to be negligible.

Sensory Disturbance

The Project may induce sensory disturbance in terrestrial fauna during all Project phases through the production of noise, the use of anthropogenic lighting, and the elevated presence of human activity in the LAA. Many species have sensitive windows for breeding and birthing, and small disruptions during these periods may reduce reproductive success in a population. Lovich and Ennen (2013) stress the importance of turbine siting relative to the needs of wildlife to minimize effects. The iterative Project design process has prioritized avoidance and interactions with important wildlife habitat such as wetlands and mature forest, which will help to reduce sensory disturbance in these areas.

Elevated sound levels have the potential to alter patterns of activity (including avoidance behaviour), stress levels, immune response, reproductive success, risk of predation, communication with conspecifics and antipredator predator behaviours, and hearing damage in fauna species (Lovich & Ennen, 2013; Rabin et al., 2006). Although the auditory capabilities of fauna species vary (Shannon, McKenna, et al., 2016), a literature review conducted by Shannon et al. (2016) found that an increase in stress and decrease in reproductive success in terrestrial mammals has the potential to occur at sound levels ranging from 52 to 68 dBA.

The sound levels produced by the Project will be highest during the site preparation and construction phase and will vary by activity. Construction noise will primarily be generated by vehicles, heavy machinery [e.g., backhoes, cranes, blasting (if required)], smaller equipment like welding tools, and backup alarms. Although construction noise is likely to exceed the sound level reported by Shannon et al. (2016) and may cause some fauna species to temporarily avoid the area, sound levels will decrease with distance from the source and be of short-term duration. Due to the scale of the Project, construction will be localized to one area of the Clearing Footprint at a time, with sensory disturbance expected to be low in the remaining areas. Sound levels will be reduced during the operations phase of the Project when noise will primarily be generated by turbines and occasional vehicle traffic.

Terrestrial fauna may also experience sensory disturbance due to the use artificial lighting, which has the potential to cause disorientation or alter levels attraction/avoidance to an area (Longcore & Rich, 2004). During the construction phase, lighting will be restricted to the amount required to ensure the safety of Project personnel, and construction activities will be limited to daytime hours when feasible. Lighting during the operations phase will be minimal and turbine lighting at night will be restricted to navigation hazard lights mounted on turbines.

Mammals

American Marten and Fisher

As with other species of terrestrial fauna, American marten and fisher may experience sensory disturbance related to noise, lighting, and human activity generated by the Project. These species often occupy intact, forested areas that have fewer opportunities for human interactions, indicating there is potential for American marten and fisher to be sensitive to human activities. Sensory disturbance could result in temporary displacement or avoidance behaviour, though no population-level impacts are expected.

Mainland Moose

The general effects of sensory disturbance described above would pose a particular concern for mainland moose where they coincide spatially and temporally with sensitive life history events due to the low population size of the species. Mainland moose breeding season takes place between September and October, with calving generally occurring in late May to early June, where one to two calves are born. Cows may require specific habitat types for calving, such as secluded islands, peninsulas, and shorelines. Seclusion is an important factor for protecting calves from predators. The cow and calf or calves remain together for one year until the calf or calves become mature enough for independence (NSNR, 2021k).

With limited desktop and field data about the age or sex diversity of individuals, it is not possible to confirm the extent to which the area is used for breeding or calving. No signs of mainland moose were observed during field surveys, though parts of the Study Area is expected to serve as habitat for the species based on prior observations (ACCDC, 2026a) and the suitability of core habitat identified in the northwest of the Study Area. Mitigation measures will be implemented to minimize the impacts of sensory disturbance on mainland moose and other fauna species; however, the extent of pre-existing roads and forest disturbance observed in areas of higher quality habitat, and the continued availability of suitable habitat within the Study Area and LAA following construction indicate that the magnitude of Project-related impacts to mainland moose life history will be low.

Herpetofauna

Sensitive windows for herpetofauna, including snapping turtles and wood turtles, may relate to migration and nesting periods. Interference with animals during these windows, either temporally or spatially, may disrupt their natural life history. Project related activities occurring during sensitive windows may impact migratory or breeding behaviours, and habitat removal or fragmentation may create a physical barrier to herpetofauna species from reaching important habitat. A snapping turtle was observed exhibiting signs of nesting behaviour during Project surveys, and areas of suitable wood turtle nesting and overwintering habitat have also been documented in the Study Area. Impacts to the life history of snapping turtles and wood turtles due to sensory disturbance are expected to be low due to efforts to limit Project interactions with habitat features such as wetlands and watercourses, and mitigation measures will be employed within the Terrestrial Habitat and Wildlife Management Plan to further minimize disturbance if snapping turtle or wood turtle are observed during the nesting season (late May to early July).

Invertebrates

Wind turbines have the potential to alter the movement of insects through changes in environmental conditions (e.g., local increases in temperature around turbine locations, changes in pollinator habitat) and sensory cues (attraction behaviour, disorientation due to light and noise), though there are many uncertainties regarding how these factors impact population dynamics and habitat use (Weschler & Tronstad, 2024). Monarchs have been shown to be sensitive to artificial nighttime lighting, which disrupts their diurnal movements and ability to navigate (Parlin et al., 2022). Pollinator activity of Hymenoptera (which includes bumble bees) has also been shown to be sensitive to artificial nighttime lighting (Giavi et al., 2021). With limited species-specific information available about the use of the Study Area by these species, it is difficult to assess the extent to which sensory disturbance may impact these invertebrate SAR. The use of nighttime lighting for the Project will be limited to the amount required to ensure safe operations, which will help to broadly reduce potential impacts on invertebrates, and no significant effects to invertebrate SAR are expected.

Injury and Mortality

The potential for Project-related injury and mortality to terrestrial fauna is primarily related to the development and use of roadways. Many roads in the Study Area are currently used for forestry activities and recreation by ATV, snowmobile, and dirt bike users; however, the Project involves the development of new roads and will increase traffic volumes within the Study Area and LAA. The potential effects of increased road traffic on terrestrial fauna will be greatest during the site preparation and construction phase when the greatest number of Project personnel will be travelling to and from the site. During the operations phase, the Project will only require a small number of technicians to access the site to perform regular maintenance and equipment checks.

A variety of small and large terrestrial mammals are known to use the roadways within the Study Area as evidenced by first-hand accounts by field staff, winter tracking/pellet surveys, and trail camera results (described in Section 10.2.4). Implementing speed limits on Project roads will help to reduce the risk of collisions with medium and large mammals such as porcupine, eastern coyotes, white-tailed deer, and mainland moose. Some herpetofauna, such as salamanders and snakes, may face elevated road collision risk due to daily movements for foraging or seasonal migrations and being difficult to see (Wills, 2021). For species that are primarily active at night, such as salamanders, the risks of traffic-related injury and mortality due to the Project may be reduced as nighttime traffic volumes are expected to low.

Non-vehicle related injury or mortality may also occur due to the use or accidental release of substances that are harmful to fauna species. For instance, some herpetofauna may be indirectly impacted by road use through the application of road salt during winter driving conditions, as road salt is readily absorbed through their skin (Canadian Herpetological Society, 2025). Large mammals such as deer and moose are also known to be attracted to the salt that accumulates along roads which poses a health concern and increases their vulnerability to vehicle collisions (Seburn, 2017). The use of road salt for the Project will be limited to periods where it is required to ensure safe access is maintained.

Uniquely, swarming and migrating insects are susceptible to mortality from collisions with wind turbines. There are a number of hypotheses as to whether, or why, these insects are attracted to wind turbines (Jansson et al., 2020; Long et al., 2010; Rydell et al., 2010). Questions remain in the literature concerning how this tendency affects mortality rates; whether insect fatalities at wind turbines contribute to population-level declines; and how fatalities impact ecological functions (e.g., pollination, predator-prey dynamics) (Voigt, 2021). No significant effects to invertebrate SAR are expected as a result of this Project based on current insect population and ecology research.

Mammals

American Marten and Fisher

Road development, particularly in the southeastern portion of the Study Area where few existing roads are present, is expected to increase access for humans and predators. These factors have potential to increase the exposure of American marten and fisher to the risks of accidental catch (e.g., from trapping) and predation (NSNR, 2023b). Predators of both species such as eastern coyotes and bobcats are known to use roadways in the Study Area and can be expected to use newly constructed roads as well. However, as these species have pre-existing access and were observed to be widespread throughout the Study Area, added effects due to increased road access are expected to be low.

Mainland Moose

Disease

Problematic native species have been identified as a pervasive threat to mainland moose due to their potential to spread debilitating disease. Specifically, white-tailed deer are hosts for brainworm (*Parelaphostrongylus tenuis*) and winter tick (*Dermacentor albipictus*), both of which cause mortality in moose and are thought to be regulators of population abundance and distribution (NSNR, 2021k). A possible concern associated with developments is their potential to cause indirect effects on mainland moose by increasing access to the site by white-tailed deer and therefore, increasing the chances of disease spreading to mainland moose.

There are several deer over-wintering areas in the vicinity of the Project (Drawing 10.2), and signs of white-tailed deer were observed throughout the Study Area during field assessments and directly observed by trail cameras. It is possible that new and upgraded roads will increase access for white-tailed deer in some parts of the Study Area, particularly the southeast where existing road density is low. However, as deer have pre-existing access, effects to mainland moose from disease are expected to be negligible.

Poaching

Poaching, which is a threat to all terrestrial mammal species, but especially those with unstable populations, has been identified as a potential threat facing mainland moose in the Mainland Moose Recovery Plan (NSNR, 2021k). Increased human access to a given area (e.g., through land clearing and road development) has the potential to increase the risk of poaching for rare,

sought-after animals. Much of the Study Area, particularly the north and west, is already accessible to the public, including local hunters and recreational users. The southeastern portion of the Study Area has the lowest amount of pre-existing roads and will experience a higher increase in public access due to the Project; however, habitat modelling suggests that this area may not be heavily used by moose as habitat suitability is low.

Due to the pre-existing access throughout much of the Study Area, overall effects to mainland moose from poaching due to the Project are expected to be low. Furthermore, the increased presence of staff within the Project may act as a deterrent to poaching.

Herpetofauna

Road traffic and the development of gravel roads pose unique risks for snapping turtles and wood turtles as both species are known to be attracted to exposed gravel areas for nesting. This recognized ecological trap increases the risk of traffic-related mortality (ECCC, 2020c). Wood turtles are known to occur near the Study Area in the St. Mary's River, where the impacts of vehicle-related injury and mortality have been well documented (Pulsifer et al., n.d.). Two incidental observations of snapping turtles on gravel roads were recorded during field surveys, indicating that this species also uses roadways within and near the Study Area. Mitigation measures to reduce risks to snapping turtles and wood turtles will be outlined in the Terrestrial Habitat and Wildlife Management Plan if occurrences of these species are observed during sensitive windows (e.g., nesting, overwintering).

Invertebrates

Mortality due to vehicle collisions have been shown to influence population sizes of monarchs and species of bumble bees (Dániel-Ferreira et al., 2022; MTRI, n.d.). Due to the low traffic volumes associated with the Project, this pathway is not expected to pose a significant threat to these or other invertebrate species.

Mitigation Measures

In addition to the removal of infrastructure from the MOU lands north of the Melrose Country Harbour Road from the Project, the Proponent will develop and implement a Terrestrial Habitat and Wildlife Management Plan to address the abovementioned effects to terrestrial fauna. The following mitigation measures will also be implemented:

Habitat Loss and Fragmentation

- Minimize overall area to be cleared by using previously altered areas (i.e., clearcuts) and optimizing the Project layout.
- Minimize habitat fragmentation and isolation by using pre-existing roads and previously altered areas where practicable during the design phase.
- Support landscape connectivity by maintaining vegetated buffers around wetlands and watercourses, where practicable.
- Design road construction and upgrades to maintain surface water flow and avoid any permanent diversion, restriction, or blockage of natural flow, which may impact connectivity for species of herpetofauna.

- Allow for natural revegetation in the Clearing Footprint, as possible, to limit the effects of habitat loss and fragmentation.

Sensory Disturbance

- Maintain all equipment and machinery on site so that a level of good working condition is kept, reducing noise and vibration emissions.
- Use noise controls (e.g., mufflers) on machinery, equipment, etc. during the construction and operation phase.
- Limit use of lights to the amount necessary to ensure safe operation.
- Install motion activated lights on-site infrastructure, if practicable, to reduce insect attraction.

Injury and Mortality

- Design the Project Footprint to minimize total road length and use pre-existing roads where practicable.
- Install traffic signs to alert road users of speed limits and the presence of wildlife in the area.
    - Inform all Project-related staff working on the site of dangers to wildlife and create awareness around wildlife hotspots.
- Minimize Project-related traffic to reduce chances of wildlife collisions and traffic-related stress to wildlife.
- Prohibit harassment and feeding of wildlife by Project personnel.

Monitoring

Project-specific monitoring activities for terrestrial fauna are not being proposed.

Conclusion

After mitigations, residual effects to terrestrial fauna are characterized as shown in Table 10.18.

Table 10.18: Terrestrial Fauna Residual Effects

Effect Detail	Habitat Loss and Fragmentation	Sensory Disturbance	Injury or Mortality
Magnitude of Effect	**Low:** Small loss and fragmentation of habitat supporting fauna SAR	**Low:** Low impacts to fauna through sensory disturbance	**Low:** Low impacts to fauna through injury and mortality
Geographic Extent of Effect	5 km buffer of the Study Area	5 km buffer of the Study Area	5 km buffer of the Study Area
Frequency of Effect	**Single Event:** Effects expected to occur during construction phase	**Intermittent:** Effects occur occasionally or intermittently during one or more phase of the Project.	**Intermittent:** Effects occur occasionally or intermittently during one or more phase of the Project.
Duration of Effect	**Medium Term:** Effects will end following decommissioning	**Medium Term:** Effects will end once decommissioning is complete	**Medium Term:** Effects will end once decommissioning is complete

Effect Detail	Habitat Loss and Fragmentation	Sensory Disturbance	Injury or Mortality
Reversibility of Effect	**Partially Reversible**	**Reversible**	**Partially Reversible**
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible			

10.3 Bats

10.3.1 Overview

A desktop review and field studies were undertaken to gather information on bat species and associated habitat. Objectives were as follows:

- Assess observations, species diversity, and habitat utilization of bats within the Study Area during the active bat period (spring to fall).
- Use the information collected to inform and refine the Project design (i.e., avoid impacts to SAR/SOCI and their habitats).
- Use the information collected to inform mitigation and management practices.

10.3.2 Regulatory Context

There are seven species of bats documented in Nova Scotia, of which four are year-round resident species and three are migratory species that overwinter in the southern United States. Resident species include the little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), tri-colored bat (*Perimyotis subflavus*), and big brown bat (*Eptesicus fuscus*). Big brown bats are rare in Nova Scotia, as New Brunswick is typically considered the northeastern limit of its range (McAlpine et al., 2024). Migratory species include the eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*).

Three of the resident species (the little brown myotis, northern myotis, and tri-colored bat) are protected federally and provincially under SARA and ESA. These three species were listed as Endangered under ESA on July 11, 2013, and were designated Endangered under Schedule 1 of SARA on November 26, 2014. The designation of these species under SARA and ESA was driven by the emergence of white-nose syndrome (a disease caused by the fungus *Geomyces destructans*), which was first detected in Canada in 2010 and led to a 90% population decline in Nova Scotia by 2013 (COSEWIC, 2013). All three migratory bat species were assessed by COSEWIC as Endangered in May 2023 (COSEWIC, 2023), but are not currently listed under SARA or ESA. The big brown bat is also not listed under SARA or ESA.

10.3.3 Desktop Review

Databases and online resources referenced as part of this desktop review include:

- Terrestrial Habitat Mapping
- Locations of Known Bat Hibernacula in Nova Scotia (Moseley, 2007)
- Nova Scotia Geoscience Atlas – Abandoned Mine Openings (NSNR, 2024c)
- Nova Scotia Significant Species and Habitats Database (NSNR, 2024f)
- Critical Habitat for SAR National Dataset (ECCC, 2025c)
- ACCDC Data Report (ACCDC, 2026a)

Terrestrial Habitat Mapping

Terrestrial habitat modelling was conducted within a 5 km buffer around the Study Area to provide an estimate of potential maternity roosting habitat for SAR bats within and near the Study Area (Drawing 10.8). This modelling used the following publicly available data sources:

- Nova Scotia Canopy Height Model (GeoNOVA, 2024a)
- Crown Lands Harvest Plans Archive (NSNR, 2025a)

A literature review was conducted to determine features of suitable maternity roosting habitat for SAR bats in Nova Scotia. Northern myotis may roost in living trees or snags of a variety of softwood and hardwood species, preferring larger than average trees with a higher than average density of trees (CWHC, 2025; Morningstar, 2018). Little brown myotis has extremely similar roosting preferences to that of the northern myotis in terms of tree roost selection, but is also likely to roost in anthropogenic structures or rock crevices (COSEWIC, 2013; CWHC, 2025; Morningstar, 2018). In Nova Scotia, the tri-colored bat is known to roost primarily in beard lichens, which may grow on softwood or hardwood trees (COSEWIC, 2013; CWHC, 2025; Poissant et al., 2010). All three of these species also prefer to roost near wetlands or open fresh water habitats (Balzer et al., 2023; CWHC, 2025; Morningstar, 2018).

Although some species may roost in anthropogenic structures or rock crevices, these features were not included in modelling as they are more difficult to map given a lack of publicly available data that can be used to predict habitat. Modelling was therefore limited to tree roosting habitat. Proximity to fresh water and wetland habitats were also not incorporated into habitat modelling; as wetlands and water bodies are abundant in this region, proximity to these habitats was not considered to be a limiting factor. Potential maternity roosting habitat was identified based primarily on density of large trees.

The Nova Scotia canopy height model (GeoNOVA, 2024a) was first used to filter out unforested areas. The canopy height model was reclassified into 2 m interval bins using the upper bound of each class (i.e., 0 to 2 m is labelled 2 m, 2 to 4 m is labelled 4 m, etc.), The mean bin value was then calculated using a 100 m² (approximately 10 m wide) hexagonal grid to capture local canopy patterns. Zones with a mean value of ≥ 8 m were retained, providing an estimation of areas with a mean canopy height exceeding approximately 6 m. Although 5 m is commonly referred to as the minimum forest definition (Convention on Biological Diversity,

2006; U.S. Department of Agriculture, 2025), this slightly higher threshold provides a better representation of cohesive canopy closure within the Study Area while limiting overestimation of intact forest.

The Crown lands harvest plans archive (NSNR, 2025a) was then used to remove more recent historic forestry polygons not captured by the canopy height model, as the harvest archive includes data up to 2025 while the canopy height model only includes data up to 2018. Small or isolated patches of forest were subsequently removed by filtering out contiguous zones composed of only one or two hexagons (totaling less than 205 m²), as these represent individual trees or very small clusters not relevant to the identification of continuous canopy coverage indicative of intact forest.

The canopy height model was then used to identify areas containing large diameter trees preferable for maternity roosting. Canopy height was reclassified to include any heights above 15 m, indicating a diameter at breast height of ≥ 30 cm (Rijal et al., 2012). This data was converted to 10 m by 10 m cells to remove isolated occurrences and increase processing efficiency, and these cells were then converted to points. Only points located within the intact forest layer were retained, reflecting contiguous mature forest which is preferential for roosting (CWHC, 2025; Morningstar, 2018). Point density was then calculated to determine the density of potential habitat (i.e., potential roost trees) and the range of values within the 5 km buffer.

A threshold was applied to exclude low-density areas based on a visual interpretation of spatial patterns. The mean density was then calculated (excluding unforested areas) to determine which areas represent higher habitat potential than the mean. This process resulted in the identification of two categories of maternity roosting habitat based on the assumption that bats prefer to roost in habitat containing more large, tall trees than the regional average (CWHC, 2025; Morningstar, 2018):

- Suitable maternity roosting habitat: Forested areas with a higher mean density of large diameter trees (≥ 30 cm) than the mean
- Marginal maternity roosting habitat: Forested areas with a lower mean density of large diameter trees (≥ 30 cm) than the mean

Based on the results of the terrestrial habitat modelling, suitable maternity roosting habitat availability within 5 km of the Study Area, the Study Area, and the Clearing Footprint was evaluated (Table 10.19).

Table 10.19: Suitable Maternity Roosting Habitat

Range	Total Area	Area of Habitat		Percent of Total Area Consisting of Habitat	
		Suitable	Marginal	Suitable	Marginal
5 km Buffer of the Study Area[1]	64,950.7	3,652.5	7,595.4	5.6	11.7
Study Area	20,733.8	788.4	1,456.6	3.8	7.0
Clearing Footprint	1,380.3	11.2	57.6	0.8	4.2

[1]LAA for bats. Does not include marine areas.

Locations of Known Bat Hibernacula

Moseley (2007) provides an overview of known and recorded bat hibernacula within Nova Scotia. This research indicates four known hibernacula within a 100 km radius of the Study Area (Table 10.20).

Table 10.20: Known Bat Hibernacula within 100 km of the Study Area

Hibernaculum	Approximate Distance to Study Area (km)[1]	Direction
Hirschfield Galena Prospect	5.2	West
McLellans Brook Cave	54.0	Northwest
New Lairg Adit #1 and #2	65.9	Northwest
Lake Charlotte Gold Mine	90.0	Southwest

Source: (Moseley, 2007)
[1] Distance measured to the nearest point of the Study Area.

The nearest recorded hibernaculum to the Study Area is Hirschfield Galena Prospect, 5.2 km to the west near Glenelg, Nova Scotia. This hibernaculum is an abandoned mine adit with a surveyed length of 215 m suspected to support approximately 200 to 300 bats. The next nearest hibernacula is McLellans Brook Cave, 54 km to the northwest near McLellans Brook, Nova Scotia. This is an 85 m long dissolutional stream cave with associated observations of *Myotis* species around the cave but no records of underground bat activity (Moseley, 2007). New Lairg Adit #1 and #2 are small AMOs located 65.9 km to the northwest of the Study Area. Bats have been observed around the entrances, but no observations have been recorded underground. The only other hibernaculum within 100 km of the Study Area is Lake Charlotte Gold Mine, a major, gated hibernaculum which has been known to support approximately 3,000 *Myotis* individuals. This hibernacula is about 90 km to the southwest of the Study Area. These hibernacula were assessed prior to the onset of white-nose syndrome in Nova Scotia, therefore, populations of bats using these habitats may vary from original estimates.

Abandoned Mine Openings

According to the British Columbia Ministry of Environment and Climate Change Strategy, Ecosystems Branch (2019), AMOs may serve as overwintering bat habitat if they have a depth greater than 30 m. Mine openings must also be of a suitable type (i.e., shafts, slopes, declines, or adits) and remain accessible to bats (i.e., not flooded, filled, capped, or plugged) to provide suitable habitat.

AMOs within 25 km of the Study Area were reviewed, as per the recommended buffer provided in the NSECC Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia (NSECC, 2021). A total of 1,195 AMOs are documented within this area (NSNR, 2024c), of which 12 are open/dry mine shafts, slopes, or adits with an original depth that could potentially support overwintering habitat for resident bat species (Table 10.21; Drawing 10.8). An additional 41 AMOs could not be properly assessed due to data deficiencies (e.g., missing measurements). The remainder are not considered potential bat overwintering habitat as they were characterized as pits or trenches, shallow in depth, infilled, capped, plugged, or flooded. None of the 17 AMOs within the Study Area are considered to be potential bat habitat.

Table 10.21: AMOs with Potential to Support Overwintering

Name	Location	Commodity	Opening Type	Original Depth (m)	Approximate Distance to Study Area (km)[(1)]
MacGillivary Tunnel	Polsuns Brook	Iron	Adit	30	20.2
N/A	Goldboro	Gold	Shaft	33	5.2
Griffin Gold Mining Company Hattie Belt Shaft	Goldboro	Gold	Shaft	33	5.2
N/A	Goldboro	Gold	Shaft	33	5.2
N/A	Goldboro	Gold	Shaft	41	5.1
N/A	Goldenville	Gold	Shaft	75	6.8
Nova Scotia Mineral Reduction Company Level	Stillwater	Gold	Adit	80	1.4
Wellington Mining Company Dewar Lead #4 East Shaft	Goldenville	Gold	Shaft	90	6.8
Wellington Mining Company Dewar Lead #5 East Shaft	Goldenville	Gold	Shaft	90	6.8
Wellington Mining Company Dewar Lead #3 East Shaft	Goldenville	Gold	Shaft	100	6.8
Maritime Minerals Limited A.C. Blair (Hayne) Tunnel	Country Harbour Mines	Gold	Adit	127	0.9
Zwickl & McClure Tunnel	Glenelg	Lead	Adit	220	7.0

Source: (NSNR, 2024c)
[(1)] Distance measured to the nearest point of the Study Area

Significant Species and Habitat Records

The Significant Species and Habitats Database (NSNR, 2024f) contains 32 unique species/habitat records pertaining to bats and associated habitat within the LAA. All of these

are “Species at Risk” records relating to *Myotis* species (22), hoary bat (5), unclassified bat species (4), and little brown myotis (1). None of these 32 records are within the Study Area.

Critical Habitat for Species at Risk

A critical habitat area associated with bat species was identified southwest of the Study Area in the Critical Habitat for SAR National Dataset (ECCC, 2025c) (shown as a 10 km by 10 km buffer on Drawing 10.8 due to location sensitivity). Confirmation that a critical habitat area is also present approximately 4 km north of the Study Area was provided by NSNR (SAR biologist S. Spencer, May 12, 2026).

ACCDC Records

The ACCDC Data Report (ACCDC, 2026a) indicates one bat genera of concern recorded within 5 km of the Study Area (Table 10.22). According the ACCDC Report, a “bat hibernaculum or bat species occurrence” is known to exist within the Study Area. A representative of NSNR confirmed that this record is related to a species observation and there are no known bat hibernacula within the Study Area (SAR biologist S. Spencer, May 12, 2026).

Table 10.22: Bat Species Recorded within a 5 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Bat species not big brown bat	*Vespertilionidae* sp. not *Eptesicus*	-	-	-	S1S2

Source: (ACCDC, 2026a)

10.3.4 Field Assessment Methodology

Monitoring conducted within the Study Area consisted of passive acoustic monitoring during the 2023 and 2025 active bat seasons. Monitoring locations targeted a combination of turbine locations and ideal bat habitat features such as wetlands, mature forest, riparian river valleys, and forest edges using habitat mapping and accumulated knowledge from field studies. Monitoring locations were also adjusted between 2023 and 2025 to provide additional coverage within the Study Area (Drawing 10.9).

Acoustic monitoring was conducted using Song Meter SM4BAT FS and Song Meter Mini Bat detectors from Wildlife Acoustics. The detectors were programed to monitor from 30 minutes before sunset to 30 minutes after sunrise to correspond with peak bat activity. GPS points and supplementary information (i.e., habitat descriptions and photographs) for each monitoring location and detector set up were recorded using QuickCapture and Survey123 (Esri, 2024).

Passive acoustic monitoring in 2023 included 14 detectors deployed for 116 consecutive days within the Study Area between August 21 and December 15, encompassing the late summer and fall active bat seasons (Table 10.23; Drawing 10.9). Not all detectors were deployed and retrieved on the same day, resulting in varied numbers of monitoring nights at different detectors. Detectors also experienced some data loss due to depleted batteries or technological malfunctions. Detectors BAT01-23 and BAT12-23 were moved during monitoring to avoid the continued use of roads which became impassable. These detectors’ first locations

are labeled as “A”, and their second locations are labeled “B”. Detector BAT10-23 was deployed in an area that was later excluded from the current iteration of the Study Area.

Table 10.23: Monitoring Periods for Detectors (2023)

Detector ID	Detector Location	Within 500 m of Turbine[1]	Habitat Description	Monitoring Duration (2023)[2]	Number of Monitoring Nights[3]
BAT01-23A	45.255254, -62.012039	No	Small clearing at the end of a dirt road surrounded by young hardwood forest.	August 22 to October 18	57
BAT01-23B	45.255781, -61.980115	No	Edge of an open wetland surrounded by mature mixedwood forest.	October 18 to November 24	37
BAT02-23	45.204751, -61.912172	No	Harvested open wetland near a clearing at the end of a dirt road.	August 22 to November 28	98
BAT03-23	45.231175, -61.967333	Yes	Clearing at the end of a dirt road surrounded by young hardwood forest.	August 22 to November 27	97
BAT04-23	45.257198, -61.951392	Yes	Harvested wetland surrounded by young softwood forest.	August 22 to December 15	115
BAT05-23	45.192647, -61.868401	Yes	Edge of a harvest containing a small number of tall red maple and white pine along a dirt road.	August 22 to November 27	97
BAT06-23	45.129434, -61.732706	Yes	Clearing at the end of a dirt road surrounded by harvested wetland.	August 22 to November 28	98
BAT07-23	45.154084, -61.848328	No	Edge of clearcut along a dirt road.	August 22 to November 16	86
BAT08-23	45.179286, -61.946399	Yes	Small watercourse surrounded by harvested wetland containing small clumps of young mixedwood forest.	August 22 to November 24	94
BAT09-23	45.157370, -61.903751	No	Small clearing at the end of a dirt road near graminoid wetland and mid-age mixedwood forest.	August 22 to November 26	96
BAT10-23	45.124101, -61.795679	No	Flowing watercourse surrounded by mixed age softwood forest and dense shrubs.	August 21 to November 19	90
BAT11-23	45.221926, -61.820412	No	Small clearing at the end of a dirt road surrounded by young spruce forest regenerating after harvesting.	August 23 to December 7	106

Detector ID	Detector Location	Within 500 m of Turbine[1]	Habitat Description	Monitoring Duration (2023)[2]	Number of Monitoring Nights[3]
BAT12-23A	45.222230, -61.784483	No	Small clearing along a dirt road surrounded by mid-age spruce forest.	August 22 to October 18	57
BAT12-23B	45.236375, -61.785063	No	Small treed swamp wetland surrounded by uneven age softwood forest.	October 18 to December 1	44
BAT13-23	45.224411, -61.905014	Yes	Small clearing at the end of a dirt road surrounded by mature hardwood forest with open understory.	August 22 to November 3	73
BAT14-23	45.139795, -61.715997	No	Lake edge surrounded by mid-age softwood forest.	August 22 to December 7	107
				Survey Total	**1,352**

[1] Distance is measured from the nearest turbine point location.
[2] As most detectors experienced battery depletion prior to retrieval, the end date of monitoring reflects the final recording date rather than the date detectors were retrieved.
[3] The number of monitoring nights takes into account nights lost due to depleted batteries and/or technological malfunction. Of the 16 detector locations, 11 experienced between one and 55 nights of data loss, with an average of 10 nights lost across all detector locations.

Passive acoustic monitoring in 2025 included 23 detectors deployed for 113 consecutive days within the Study Area between May 5 and August 26, encompassing the spring and early summer active bat seasons (Table 10.24; Drawing 10.9). Not all detectors were deployed and retrieved on the same day, resulting in varied numbers of monitoring nights at different detectors. Detectors also experienced some data loss due to depleted batteries or technological malfunctions. Detectors BAT01-25, BAT08-25, BAT11-25, BAT14-25, and BAT16-25 were deployed in areas that were later excluded from the current iteration of the Study Area.

Table 10.24: Monitoring Periods for Detectors (2025)

Detector ID	Detector Location	Within 500 m of Turbine[1]	Habitat Description	Monitoring Duration (2025)[2]	Number of Monitoring Nights[3]
BAT01-25	45.322236, -61.965276	No	Edge of a small clearing at the end of a dirt road adjacent to mature balsam fir forest and an open wetland.	May 7 to August 17	102
BAT02-25	45.192622, -61.868442	Yes	Edge of a harvest containing a small number of tall red maple and white pine along a dirt road.	May 6 to August 26	112

Detector ID	Detector Location	Within 500 m of Turbine[1]	Habitat Description	Monitoring Duration (2025)[2]	Number of Monitoring Nights[3]
BAT03-25	45.243438, -61.867646	Yes	Black spruce wetland along a watercourse surrounded by dense shrubs.	May 5 to July 26	82
BAT04-25	45.189718, -61.903444	Yes	Young softwood forest along a harvest trail adjacent to an open harvest.	May 6 to August 16	102
BAT05-25	45.179039, -61.946600	Yes	Small watercourse surrounded by harvested wetland containing small clumps of young mixedwood forest.	May 6 to August 15	101
BAT06-25	45.231322, -61.967473	Yes	Edge of a clearing at the end of a dirt road surrounded by young hardwood forest.	May 6 to June 20	45
BAT07-25	45.154153, -61.848660	No	Edge of clearcut along a dirt road.	May 6 to August 15	101
BAT08-25	45.328978, -62.011540	No	Mature hardwood forest with open understory.	May 7 to August 16	101
BAT09-25	45.139714, -61.716107	Yes	Lake edge surrounded by mid-age softwood forest.	May 7 to August 7	92
BAT10-25	45.142051, -61.763592	No	Edge of open bog surrounded by softwood forest.	May 7 to August 5	72
BAT11-25	45.287722, -61.949279	No	Young, open regenerating hardwood forest along harvester trail.	May 5 to August 16	103
BAT12-25	45.255572, -61.980033	No	Edge of an open wetland surrounded by mature mixedwood forest.	May 6 to August 14	100
BAT13-25	45.255136, -61.902803	No	Small clearing along a dirt road adjacent to shrub swamp.	May 6 to June 22	15
BAT14-25	45.294683, -62.009359	No	Open harvest containing scattered large trees.	May 7 to August 11	85

Detector ID	Detector Location	Within 500 m of Turbine[1]	Habitat Description	Monitoring Duration (2025)[2]	Number of Monitoring Nights[3]
BAT15-25	45.157382, -61.903537	Yes	Small clearing at the end of a dirt road near graminoid wetland and mid-age mixedwood forest.	May 6 to August 16	102
BAT16-25	45.118921, -61.778489	No	Edge of young softwood forest along a large black spruce wetland.	May 7 to August 9	94
BAT17-25	45.235071, -61.784280	Yes	Small treed swamp surrounded by uneven age softwood forest.	May 5 to August 18	105
BAT18-25	45.204772, -61.912273	No	Harvested open wetland near a clearing at the end of a dirt road.	May 6 to August 15	101
BAT19-25	45.129603, -61.732700	Yes	Clearing at the end of a dirt road surrounded by harvested wetland.	May 7 to August 12	97
BAT20-25	45.221826, -61.820459	No	Small clearing at the end of a dirt road surrounded by young spruce forest regenerating after harvesting.	May 5 to August 9	96
BAT21-25	45.224470, -61.904882	Yes	Small clearing at the end of a dirt road surrounded by mature hardwood forest with open understory.	May 6 to August 13	99
BAT22-25	45.255262, -62.012254	No	Small clearing at the end of a dirt road surrounded by young hardwood forest.	May 7 to August 1	86
BAT23-25	45.257181, -61.951382	Yes	Harvested wetland surrounded by young softwood forest.	May 6 to August 16	102
				Survey Total	**2,095**

[1] Distance is measured from the nearest turbine point location.
[2] As most detectors experienced battery depletion prior to retrieval, the end date of monitoring reflects the final recording date rather than the date detectors were retrieved.
[3] The number of monitoring nights takes into account nights lost due to depleted batteries and/or technological malfunction. Of the 23 detector locations, three experienced between 13 and 32 nights of data loss, with an average of three nights lost across all detector locations.

Passive acoustic monitoring was not conducted throughout most of the eastern portion of the Study Area in both 2023 and 2025 due to the inaccessible nature of this area (Drawing 10.9). The lack of roads and trails in this area made it unfeasible to deploy equipment which requires

frequent maintenance visits and resulted in a spatial gap in monitoring. Field surveys identified large swaths of barrens habitat in this area and modelling suggests a lack of maternity roosting habitat throughout most of the eastern portion of the Study Area (Drawing 10.8). Bats may access wetlands, watercourses, and lake edges in this region as a foraging resource; however, due to the scarcity of mature forest environments, the unsurveyed area is unlikely to support suitable maternity roosting habitat.

Acoustic monitoring data (i.e., spectrograms) were processed using Kaleidoscope Pro software from Wildlife Acoustics, complementary to the detectors used. Spectrograms were analyzed for potential bat generated ultrasonic vocalizations and speciated when possible, first by the automatic identification feature of Kaleidoscope Pro and then manually by a trained biologist.

Due to their similarity, the calls of Nova Scotia's two resident *Myotis* species (little brown myotis and northern myotis) can be difficult to reliably distinguish from one another (O'Farrell & Gannon, 1999), so these calls were not identified to the species level. In addition, bat generated calls were identified as Unknown (UNKW) if the recording was within the correct frequency range for bats but was unable to be speciated based on the quality or length of the recording. Unknown calls between 20 kilohertz (kHz) and 35 kHz were labelled as unknown low frequency bats (UNLO) and unknown calls between 35 kHz and 120 kHz were labelled as unknown high frequency bats (UNHI).

Incidental Observations

In addition to passive acoustic monitoring, incidental observations of bats and bat habitat (e.g., roost trees) were also recorded via Survey123 (Esri, 2024) throughout the administration of other field surveys within the Study Area.

10.3.5 Field Assessment Results

Throughout the monitoring period, 42,428 files were recorded by acoustic detectors, of which 2,710 were determined to be bat generated ultrasound (Table 10.25). The remaining files were determined to be caused by extraneous noise from sources such as vegetation, wind, or precipitation. Note that since it is impossible to distinguish whether recordings represent different individuals or the same bats passing by detectors multiple times, it should not be assumed that this represents an accurate measure of the local population. The following species were recorded during the acoustic survey:

- *Myotis* species (MYOT)
- Eastern red bat (LABO)
- Hoary bat (LACI)
- Silver-haired bat (LANO)
- Tri-colored bat (PESU)
- Big brown bat (EPFU)
- Unknown high-frequency bat (UNHI)
- Unknown low-frequency bat (UNLO)
- Unknown bat (UNKW)

Table 10.25: Results of the Passive Acoustic Bat Survey

Detector ID	MYOT	LABO	LACI	LANO	PESU	EPFU	UNHI	UNLO	UNKW	Bat Passes per Detector
2023 (August to December)										
BAT01-23A	9	3	140	1	0	0	0	0	3	156
BAT01-23B	0	0	1	0	0	0	0	0	0	1
BAT02-23	6	1	1	2	0	0	0	0	0	10
BAT03-23	31	4	21	0	0	0	9	2	1	68
BAT04-23	14	3	10	4	0	0	1	0	14	46
BAT05-23	1	0	4	14	0	0	0	0	2	21
BAT06-23	0	1	0	14	1	0	1	5	0	22
BAT07-23	3	0	0	8	0	0	0	0	2	13
BAT08-23	4	0	2	3	0	0	0	0	2	11
BAT09-23	13	2	66	5	0	0	0	2	20	108
BAT10-23	2	0	6	14	0	0	1	0	17	40
BAT11-23	1	1	0	1	0	1	0	0	1	5
BAT12-23A	10	1	12	4	0	0	0	0	205	232
BAT12-23B	0	0	413	0	0	0	0	0	2	415
BAT13-23	6	3	1	0	0	0	0	0	0	10
BAT14-23	5	29	3	2	0	2	1	1	7	50
2023 Total	**105**	**48**	**680**	**72**	**1**	**3**	**13**	**10**	**276**	**1,208**
2025 (May to August)										
BAT01-25	207	0	0	0	0	0	135	1	1	344
BAT02-25	16	0	0	5	0	0	8	1	0	30
BAT03-25	20	0	0	1	0	0	8	1	0	30
BAT04-25	8	0	1	0	0	0	6	0	0	15

Detector ID	MYOT	LABO	LACI	LANO	PESU	EPFU	UNHI	UNLO	UNKW	Bat Passes per Detector
BAT05-25	20	0	3	0	0	0	13	0	0	36
BAT06-25	25	0	0	0	0	0	8	2	0	35
BAT07-25	6	0	0	3	0	0	5	0	0	14
BAT08-25	106	0	28	2	0	0	111	0	0	247
BAT09-25	5	0	3	2	0	0	1	1	0	12
BAT10-25	7	0	0	3	0	0	0	0	0	10
BAT11-25	43	0	7	3	0	0	19	0	0	72
BAT12-25	58	0	0	0	0	0	26	0	0	84
BAT13-23	9	0	0	0	0	0	0	0	0	9
BAT14-23	38	0	1	0	0	0	56	0	0	95
BAT15-25	21	0	3	0	0	0	6	0	0	30
BAT16-25	4	1	3	0	0	0	5	2	0	15
BAT17-25	7	0	89	2	0	0	7	1	0	106
BAT18-25	23	0	0	0	0	0	8	1	0	32
BAT19-25	2	0	3	1	0	0	2	1	0	9
BAT20-25	3	0	2	0	0	0	2	0	0	7
BAT21-25	65	1	3	0	0	0	92	1	0	162
BAT22-25	49	0	3	0	0	0	18	2	0	72
BAT23-25	25	0	1	0	0	0	10	0	0	36
2025 Total	**767**	**2**	**150**	**22**	**0**	**0**	**546**	**14**	**1**	**1,502**

In 2023, migratory species accounted for about 66% of recorded bat passes while resident species accounted for approximately 9% of bat passes. Most resident species were identified as *Myotis* species and migratory species consisted mostly of hoary bats. The remaining 25% of bat passes consisted of unknown bats.

Detector BAT12-23B recorded the most bat passes during the 2023 monitoring period with 415 detections. Three other detectors recorded more than 100 bat passes during 2023 monitoring (BAT01-23A, BAT09-23, and BAT12-23A). These detectors were deployed in a variety of habitat types (i.e., utility corridors, wetlands, hardwood forest, mixedwood forest, and softwood forest) and were spread throughout the Study Area. Detectors BAT12-23B and BAT01-23A were both deployed in modelled maternity roosting habitat.

In 2025, resident species accounted for approximately 51% of recorded bat passes while migratory species accounted for about 12% of bat passes. All confirmed resident species recorded were *Myotis* species, while the most commonly detected migratory species was the hoary bat. The remaining 37% of bat passes consisted of unknown bats.

Detector BAT01-25 recorded the most bat passes during the 2024 monitoring period at 344 detections. This detector was deployed along a clearing near an open wetland and mature balsam fir forest north of the Study Area. Three other detectors recorded more than 100 bat passes during 2025 monitoring (BAT08-25, BAT17-25, and BAT21-25). These detectors were all deployed in the northern portion of the Study Area or north of the Study Area and were located in mature hardwood forest or along wetland edges. Mature hardwood forest may provide roosting habitat while wetland edges may provide foraging habitat (COSEWIC, 2023; ECCC, 2015). Detectors BAT17-25 and BAT21-25 were both deployed in modelled maternity roosting habitat, while detectors BAT01-25 and BAT08-25 were deployed outside of the range of modelling (more than 5 km from the edge of the Study Area).

Throughout the entirety of passive acoustic monitoring (a cumulative 3,447 monitoring nights), 2,710 bat passes were detected, resulting in an average of 0.79 bat passes per monitoring night across the Study Area (Table 10.26). Detector BAT12-23B had the highest number of bat passes per night for migratory species and overall, while BAT01-25 had the highest number of resident bat passes per night.

Table 10.26: Bat Passes Per Detector Night

Detector ID	Number of Bat Passes	Number of Monitoring Nights	Bat Passes Per Monitoring Night		
			Resident	Migratory	Total[(1)]
BAT01-23A	156	57	0.16	2.53	2.74
BAT01-23B	1	37	0.00	0.03	0.03
BAT02-23	10	98	0.06	0.04	0.10
BAT03-23	68	97	0.32	0.26	0.70
BAT04-23	46	115	0.12	0.15	0.40
BAT05-23	21	97	0.01	0.19	0.22
BAT06-23	22	98	0.01	0.15	0.22
BAT07-23	13	86	0.03	0.09	0.15
BAT08-23	11	94	0.04	0.05	0.12
BAT09-23	108	96	0.14	0.76	1.13
BAT10-23	40	90	0.02	0.22	0.44

Detector ID	Number of Bat Passes	Number of Monitoring Nights	Bat Passes Per Monitoring Night		
			Resident	Migratory	Total[(1)]
BAT11-23	5	106	0.02	0.02	0.05
BAT12-23A	232	57	0.18	0.30	4.07
BAT12-23B	415	44	0.00	9.39	9.43
BAT13-23	10	73	0.08	0.05	0.14
BAT14-23	50	107	0.07	0.32	0.47
BAT01-25	344	102	2.03	0.00	3.37
BAT02-25	30	112	0.14	0.04	0.27
BAT03-25	30	82	0.24	0.01	0.37
BAT04-25	15	102	0.08	0.01	0.15
BAT05-25	36	101	0.20	0.03	0.36
BAT06-25	35	45	0.56	0.00	0.78
BAT07-25	14	101	0.06	0.03	0.14
BAT08-25	247	101	1.05	0.30	2.45
BAT09-25	12	92	0.05	0.05	0.13
BAT10-25	10	72	0.10	0.04	0.14
BAT11-25	72	103	0.42	0.10	0.70
BAT12-25	84	100	0.58	0.00	0.84
BAT13-25	9	15	0.60	0.00	0.60
BAT14-25	95	85	0.45	0.01	1.12
BAT15-25	30	102	0.21	0.03	0.29
BAT16-25	15	94	0.04	0.04	0.16
BAT17-25	106	105	0.07	0.87	1.01
BAT18-25	32	101	0.23	0.00	0.32
BAT19-25	9	97	0.02	0.04	0.09
BAT20-25	7	96	0.03	0.02	0.07
BAT21-25	162	99	0.66	0.04	1.64
BAT22-25	72	86	0.57	0.03	0.84
BAT23-25	36	102	0.25	0.01	0.35
Total	**2,710**	**3,447**	**0.25**	**0.28**	**0.79**

[(1)]The number of total bat passes per detector night may not equal the sum of resident and migratory bat passes per detector night as the total also includes unknown species.

All detectors recorded some level of bat activity, with varying numbers of bat passes and different species compositions being recorded at each location. Detector BAT12-23B recorded the most nightly activity, with 9.43 bat passes per night and 415 total bat passes. This detector was deployed from August to December in 2023 along the northeastern edge of the Study Area near Country Harbour Mines. This detector recorded almost exclusively hoary bat passes consistently between late October and late November. Detectors BAT01-23A, BAT12-23A, BAT01-25, and BAT08-25 each also recorded more than two nightly bat passes. Detector BAT01-23A recorded mostly hoary bats, concentrated throughout September and October of

2023, while detectors BAT01-25 and BAT08-25 recorded mainly *Myotis* species spread throughout the 2025 monitoring period. Most bat passes recorded at detector BAT12-23A were unknown. These detectors were deployed in a variety of habitats including mature hardwood forests, open areas, and wetlands in the northern portion of the Study Area and near the edges of the Study Area or north of the Study Area.

Of the 39 total detector locations, two detectors (BAT01-25, and BAT08-25) recorded more than one resident bat pass per night. Detector BAT01-25 was deployed in along a dirt road in close proximity to softwood forest and an open wetland, which may provide foraging habitat (COSEWIC, 2023; ECCC, 2015). Detector BAT08-25 was deployed within mature hardwood forest, which may act as roosting habitat for the resident *Myotis* species which were recorded at this location (ECCC, 2015). These detectors were both deployed north of Melrose Country Harbour Road, outside the Study Area and more than 7 km from the nearest proposed turbine location.

Additionally, two detectors (BAT01-23A and BAT12-23B) recorded more than one migratory bat passes per night. Detector BAT01-23A was located at the edge of a small clearing within young hardwood forest along the western edge of the Study Area and detector BAT12-23B was located within a small, open wetland along the eastern edge of the Study Area. Both detectors were in the northern portion of the Study Area, at the western and eastern edges, respectively. Neither of these detectors were deployed within 500 m of a proposed turbine location.

The total number of recorded bat passes was higher in 2025 than in 2023. However, more detectors were deployed in 2025, resulting in more monitoring nights in 2025 than in 2023. The number of recorded bat passes per monitoring night decreased by 0.2 bat passes per night between 2023 and 2025 (Table 10.27). More migratory bat passes were identified in 2023 while more resident bat passes were identified in 2025. There are multiple factors which may contribute to this difference. One factor is that detectors were deployed in different locations in 2023 and 2025, so variations may be related to different activity levels in different habitat types or different geographic locations within the Study Area. Monitoring was also conducted at different times of year, with 2023 monitoring targeting the fall and 2024 monitoring capturing the spring. The difference in the level of recorded activity between the two monitoring periods may be attributed to inter-year or seasonal variability in local population, habitat use patterns, or behaviours.

Table 10.27: Comparison of 2023 and 2024 Monitoring Results

Monitoring Year	Number of Resident Bat Passes	Number of Migratory Bat Passes	Total Number of Bat Passes[(1)]	Number of Monitoring Nights	Number of Bat Passes Per Night
2023	109	800	1,208	1,352	0.9
2025	767	174	1,502	2,095	0.7

[(1)]The number of total bat passes may not equal the sum of resident and migratory bat passes as the total also includes unknown species.

Bat activity was analyzed monthly for the 2023 and 2025 monitoring periods (Figure 10.1). The relatively low recorded activity levels in August 2023 and August 2025 likely reflect a reduced monitoring effort during these months rather than a lack of bat activity, as detectors were not deployed until August 21, 2023, and detectors stopped recording by August 26, 2025.

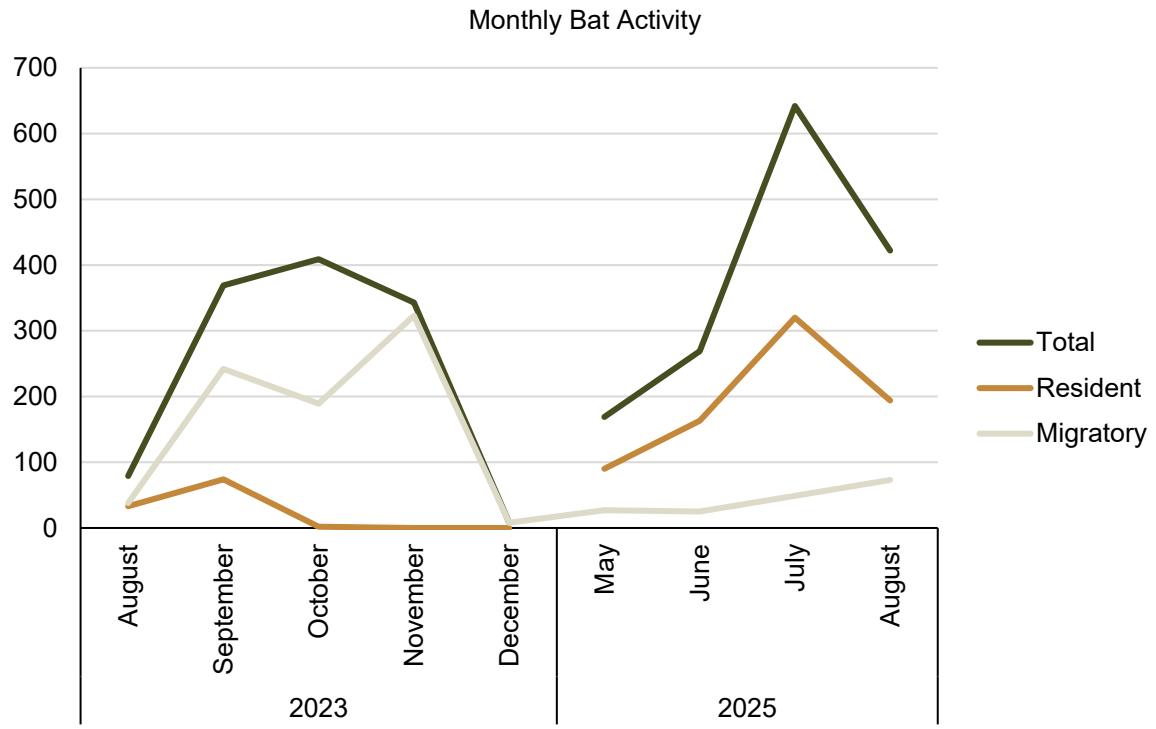

Figure 10.1: Bat Activity per Month by Species during the 2023 and 2025 Monitoring Period

Migratory bat activity was higher in 2023 than in 2025, with peaks in activity occurring in September and November of 2023. Resident bat activity was low during 2023 monitoring with activity ceasing in October, likely indicating a return to hibernacula around this time. The highest level of recorded bat activity throughout the monitoring period occurred in July 2025, coinciding with a peak in resident bat activity. Recorded resident bat activity was higher than migratory bat activity throughout 2025 monitoring, with migratory bat pass detections increasing slightly from May to August 2025. Migratory bat activity was higher than resident bat activity during the fall migration season, which may indicate that some southern migration occurs through the Study Area. Resident bat activity was higher during the summer maternity season (June and July), which may indicate that resident bats are feeding, roosting, and potentially raising pups (i.e., maternity roosting) in the area throughout the summer.

Bat calls were also analyzed hourly throughout the night for both monitoring periods (Figure 10.2).

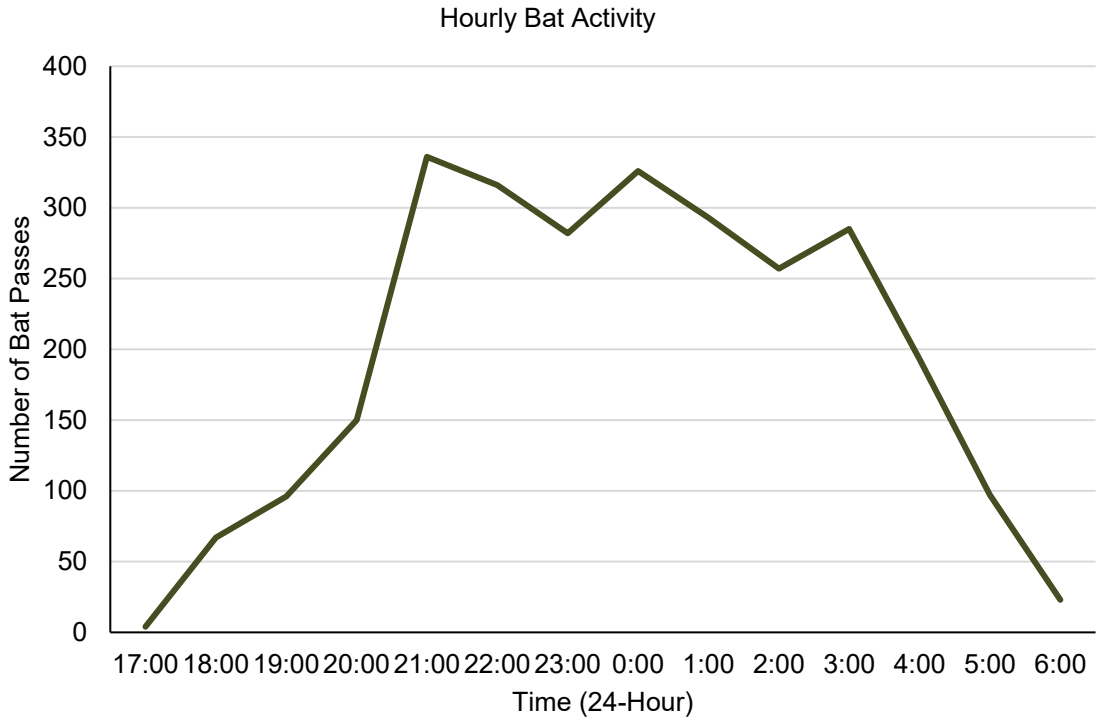

Figure 10.2: Bat Activity per Hour during the 2023 and 2025 Monitoring Period

Hourly bat activity was observed to begin after 17:00, increasing steadily to a peak occurring around 21:00, then decreasing gradually to the end of activity before 7:00. Factors that may influence the distribution of nightly bat activity include species presence and abundance, environmental conditions, foraging location, time of year, competition and resource partitioning, and/or diet (Fern et al., 2018; K. M. Gorman et al., 2021). There is limited literature available for species specific levels of bat activity throughout the night; however, the pattern of activity identified during monitoring is consistent with previously observed patterns exhibited by resident *Myotis* species described by Broders et al. (2003).

Incidental Observations

One potential bat roost was observed incidentally on November 7, 2025, during other biophysical surveys within the Study Area. The potential roost tree is a large diameter yellow birch found within a stand of TH8 forest (Neily et al., 2023). It was identified by the presence of guano at the base of its hollow trunk. The roost is located west of Leonard Lake and Red Hill Road approximately 1.2 km from the nearest detector, BAT09-23, which recorded 108 bat passes during 2023 monitoring. This roost is located within the Clearing Footprint. As no individuals were observed (possibly due to the time of year), it could not be confirmed whether the roost tree was active or by which species the roost had been used.

Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) was utilized to identify any priority species and habitat associated with this Project. All bat SAR and SOCI, and their respective habitat associations identified within the Study Area through desktop review and field assessments were considered. Only those bat SAR and SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR and/or SOCI and/or their associated habitat. These priority species include:

- Little brown myotis
- Northern myotis
- Tri-colored bat
- Hoary bat
- Eastern red bat
- Silver-haired bat

Little Brown Myotis

The little brown myotis is the most common species in Nova Scotia and is likely ubiquitous in the province (Broders et al., 2003). During the day, the little brown myotis will roost in buildings, trees, wood piles, caves, or under rocks, often congregating in tight spaces (Fenton & Barclay, 1980). Maternity colonies may consist of hundreds of females and can occur in buildings, under bridges, or within tree cavities, among other habitat features (COSEWIC, 2013; ECCC, 2015). As a non-migratory species, the little brown myotis hibernates from September to early or mid-May in abandoned mines or caves (Fenton & Barclay, 1980; Moseley, 2007). *Myotis* species were recorded during the monitoring program; however, little brown myotis calls were not distinguished from the northern myotis. Little brown myotis is assumed to be present within the Study Area.

Northern Myotis

The northern myotis, once considered uncommon throughout Nova Scotia (Moseley, 2007), is likely prevalent in forested regions of the province (Broders et al., 2003). This species is widely distributed in the eastern United States and Canada and is commonly encountered during swarming and hibernation (Caceres & Barclay, 2000). During the day, northern myotis shows a preference for roosting in trees; however, the habitat preferences of females may vary according to their reproductive status (Garroway & Broders, 2008). Females appear to prefer shade tolerant deciduous trees over coniferous trees, whereas males tend to roost alone in coniferous or mixed-stands in mid-decay stages (Broders & Forbes, 2004). The northern myotis is also non-migratory and typically associated with the little brown myotis during hibernation, being found in caves or abandoned mines alongside this species (Moseley, 2007). Hibernation of the northern myotis is thought to begin as early as September and can last until May (Caceres & Barclay, 2000). *Myotis* species were recorded during the monitoring program; however, northern myotis calls were not distinguished from the little brown myotis. Northern myotis is assumed to be present within the Study Area.

Tri-colored Bat

Approximately 10% of the tri-colored bat's range is in Canada and the species is considered rare in Nova Scotia (COSEWIC, 2013). Documented observations of the tri-colored bat predominantly occur in the southwestern region of the province, especially during summer months (Broders et al., 2003). The tri-colored bat can be found in a variety of habitats but typically forages in covered riparian areas and around open bodies of water. Tri-colored bats in Nova Scotia typically roost in beard lichens growing on spruce or pine trees (CWHC, 2024). Hibernation begins in September and extends to early or mid-May, occurring in abandoned mines or caves with high humidity and above freezing temperatures (COSEWIC, 2013). Tri-colored bat was recorded within the Study Area during monitoring.

Hoary Bat

Hoary bats have the widest range among all native terrestrial mammals within the Western Hemisphere and are found across Canada and the United States (COSEWIC, 2023). Hoary bats travel long distances (i.e., across the continent) during migratory periods, residing in coastal regions of Mexico and the United States during winter and migrating north in the spring. Hoary bats can be found roosting in the foliage of trees or shrubs in coniferous or deciduous forests of any age, but they prefer mature stands with abundant canopy cover and an open understory. During lactation, females prefer to roost within the sheltered side of coniferous trees in mature forests (Klug et al., 2012). Foraging habitat for hoary bats is associated with open areas containing patches of trees such as fields, grasslands, or wetlands, though they tend to avoid heavily disturbed habitats such as transportation corridors, urban developments, and mines. Migration is thought to occur across coastal and/or open areas (COSEWIC, 2023). Hoary bat was recorded during the monitoring program within the Study Area.

Eastern Red Bat

Eastern red bats are typically found east of the Rocky Mountains in Canada and the United States and in northeastern Mexico (COSEWIC, 2023). This species can travel thousands of kilometres during spring and fall migrations. Eastern red bats roost in similar habitat to hoary bats (described above), often roosting alone or with pups. Maternity roosts for this species are typically found in large diameter trees that reach or exceed the height of the surrounding canopy. Foraging habitat for eastern red bats includes both open and forested habitats as well as forest edges. Heavily disturbed habitats such as transportation corridors, urban developments, or mines are typically avoided by this species. Migration is thought to occur across coastal and/or open areas (COSEWIC, 2023). Eastern red bat was recorded during the monitoring program within the Study Area.

Silver-haired Bat

The silver-haired bat is widely distributed across Canada and the United States, extending from southern portions of the Northwest Territories and British Columbia east to Nova Scotia (COSEWIC, 2023). The silver-haired bat undertakes long distance migrations, residing in coastal regions of British Columbia and throughout the United States and Mexico during the winter and travelling north in the spring. Silver-haired bats typically roost in cavities or under the bark of large, decaying trees. Maternity roosts are usually small and found in decaying

deciduous trees or in buildings. Foraging habitat is not well characterized, but is usually associated with forests, including forest edges and openings. Little is known about migration requirements for this species (COSEWIC, 2023). Silver-haired bat was recorded during the monitoring program within the Study Area.

10.3.6 Effects Assessment

Project-Bat Interactions

Project activities, primarily those involving vegetation clearing and turbine operation, have the potential to impact bats and bat habitat (Table 10.28). These activities could result in habitat loss and accidental injury or mortality. Other Project activities during construction and operation may impact bat behaviors such as increased noise and lighting.

Table 10.28: Potential Project-Bat Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	-
Clearing and Grubbing	x
Access Road Upgrading and Construction	x
Laydown Area and Turbine Pad Construction	x
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	-
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	x
Vegetation Management	x
Decommissioning	
Infrastructure Removal	-
Site Reclamation	x

Assessment Boundaries

The LAA for bats includes a 5 km buffer of the Study Area (Drawing 10.10). As most bats forage within 5 km of their roosting sites (Balzer et al., 2023; ECCC, 2015), this area should capture the roosting habitat of most bats foraging within the Study Area. The RAA is the boundaries of ecoregions that intersect the Study Area, bounded by the Moser River, and the Pictou Antigonish Highlands and Governor Lake ecodistricts. This area was selected to support the assessment of cumulative effects (Section 16.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 applies to bats. The VC-specific definition for magnitude is as follows:

- Negligible: No measurable loss of habitat supporting bats and loss of individuals is not expected.
- Low: Low loss of habitat supporting bats and loss of individuals is not expected.
- Moderate: Moderate loss of habitat supporting bats and/or minimal loss of individuals is expected.
- High: High loss of habitat supporting bats and/or loss of individuals at a level which may cause population level impacts is expected.

Effects

Potential impacts to bat species from the Project's construction and operation include:

- Habitat fragmentation and/or removal.
- Direct and/or indirect mortality.
- Sensory disturbance (i.e., lighting, noise, human activity, etc.).

Habitat Fragmentation and/or Removal

Vegetation clearing required for construction can result in the removal of bat habitat or disrupt corridors between important habitat features, such as foraging and roosting habitat (Reusch et al., 2022; Segers & Broders, 2014). This may impede movement, foraging, flight activity, and habitat use (ECCC, 2015). Harvesting and the creation of cleared areas can also reduce landscape-level habitat quality as well as result in increased predation risk as bats travel across open areas (Slough et al., 2023).

One study by Segers & Broders (2014) found that different species of bats respond differently to landscape alteration for wind farm development. Some bat species prefer edge habitat over both open clearcuts and intact interior forest as it can provide good foraging habitat (Hein et al., 2008). Little brown myotis has been shown to benefit from edge habitat created during harvesting and road construction, preferring to forage in cut blocks and road rights-of-way over intact forest (Segers & Broders, 2014; Slough et al., 2023). Harvesting can also create foraging habitat suitable for hoary bats and eastern red bats (COSEWIC, 2023). Alternatively, suitable habitat for northern myotis may decrease following construction due to this species' preference to forage in forested areas and around canopy covered streams (Segers & Broders, 2014). Silver-haired bats (a cavity-roosting species) can also experience a reduction in roosting habitat due to some forestry practices (COSEWIC, 2023). Pregnant and lactating female bats have been shown to be particularly sensitive to habitat degradation as their foraging ranges are more constricted due to decreased energy and caring for young (Henry et al., 2002; Segers & Broders, 2014).

The results of passive acoustic monitoring showed a relatively even mix of resident and migratory species, with resident bat passes representing approximately 32% of recorded

activity and migratory species accounting for about 36%. Hoary bats accounted for about 85% of migratory detections while *Myotis* species accounted for more than 99% of resident detections. According to a study by Perry & Thill, (2007), hoary bats prefer to roost in unmanaged mixedwood stands with an overstory age of more than 50 years. Females tend to establish maternity roosts in large coniferous trees of old growth forests (Klug et al., 2012). Additionally, according to the Recovery Strategy for the Little Brown Myotis, Northern Myotis, and Tri-colored Bat (ECCC, 2015), *Myotis* species prefer to roost in anthropogenic structures or in forests containing large diameter trees.

As discussed in Section 10.1.3, the Study Area is comprised of a range of forest types, shrublands, wetlands, and areas of anthropogenic disturbance. Historic and ongoing forestry operations in the Study Area have resulted in modification of natural habitat conditions. Based on terrestrial habitat assessments (Table 10.1), proportionally, the largest overall direct impacts from the Project are expected to occur in softwood forest (27.7%), open areas (22.5%), mixedwood forest (14.6%), and cutover upland (14.2%). The percentage of softwood forest and mixedwood forest are comparable in the LAA and in the Clearing Footprint (less than 1.5% difference), whereas the percentage of cutover upland and open areas are higher in the Clearing Footprint than in the LAA (2.6% and 10.9%, respectively). This demonstrates that the Project design and layout has prioritized the use of previously disturbed and unforested areas in the region to minimize new impacts to forested habitat.

Habitat mapping was conducted within the LAA for bats (described in Section 10.3.3). Modelling found that the LAA consists of 17.3% maternity roosting habitat (5.6% suitable and 11.7% marginal), the Study Area consists of 10.8% maternity roosting habitat (3.8% suitable and 7.0% marginal), and the Clearing Footprint consists of 5.0% maternity roosting habitat [0.8% suitable and 4.2% marginal (Table 10.19)]. This indicates that the Study Area is situated away from most maternity roosting habitat in the LAA, and that the Clearing Footprint avoids most habitat in the Study Area. Since the percentage of overlap with marginal habitat is consistently greater than the percentage of overlap with suitable habitat, modelling also indicates that higher quality habitat has been avoided in the Project design to a greater extent than lower quality habitat. Note also that the two detectors which recorded the most resident bat passes per night during monitoring were deployed more than 7 km from the nearest proposed turbine, indicating that bat habitat is available in the LAA outside of the Study Area.

Only 11 ha (approximately 1.4%) of suitable maternity roosting habitat within the Study Area will be directly impacted by construction, leaving 777 ha of suitable maternity roosting habitat available (Table 10.29). Additionally, 58 ha (approximately 4.0%) of marginal maternity roosting habitat in the Study Area will be directly impacted, leaving 1,399 ha remaining in the Study Area. Within the LAA for bats, construction will result in a loss of 0.3% of suitable habitat and 0.8% of marginal habitat.

Table 10.29: Availability of Suitable Habitat in the Study Area Pre- and Post-Construction

Range	Area of Habitat Pre-Construction (ha)		Area of Habitat Post-Construction (ha)		Percent Change (%)	
	Suitable	Marginal	Suitable	Marginal	Suitable	Marginal
5 km Buffer of the Study Area[(1)]	3,653	7,595	3,641	7,538	-0.3	-0.8
Study Area	788	1,457	777	1,399	-1.4	-4.0

[(1)]LAA for bats. Excludes marine areas.

While the Project has prioritized the use of existing roads in its design, habitat fragmentation will occur with the construction of 110 km of new roads. Some bats, especially migratory species, may avoid high-traffic roads due to an increase in noise pollution (COSEWIC, 2023). A study by Fensome & Mathews (2016) found that 79% of bats crossed a two-lane rural road through forested habitat when vehicles were absent, but this decreased to 59% when vehicles were present. Crossings decreased to 14% without traffic and 3.5% with traffic in areas that lacked a tree line (Fensome & Mathews, 2016). Road density is expected to increase in the Study Area following construction; however, traffic is expected to be low within the Study Area at night (when bats are active), which should reduce the barrier effect of roads within the Study Area.

Impacts to bats from habitat fragmentation and removal are anticipated to be minimal based on the existing disturbance and habitat fragmentation within the Study Area, the Project's maximized use of existing roadways and cleared areas.

Injury/Mortality

Wind project related bat injuries/mortalities are increasingly becoming a concern, as some researchers have highlighted that turbines could have a greater impact on bats than birds (Barclay et al., 2007). Bats have a slower life cycle than birds, resulting in impacts to population dynamics when mortalities occur (Wellig et al., 2018). This is especially prominent where populations are already small, either naturally or due to the impacts of white-nose syndrome (ECCC, 2018).

Bat injuries/mortalities can result either from direct collision with turbine blades or from barotrauma, which is caused by the sudden decrease in air pressure following rotating blades (ECCC, 2015). Bats tend to collide with spinning turbine blades, and do not typically collide with stationary blades or towers (Arnett et al., 2008). Bats may collide with blades due to their inability to detect or avoid blades moving at high speeds, which can be up to 300 km/h at the tip of the blade (Wellig et al., 2018).

Research suggests that bats are attracted to wind turbines because wind turbines attract insects due to their light colour and because they are often built in high places that coincide with insect hilltopping behaviours (Guest et al., 2022). Swarms of insects that occur alongside wind turbines provide an excellent foraging opportunity for bats, especially migratory species that rely on stopover sites to feed during migration (Arnett et al., 2008; Guest et al., 2022).

Wind turbines may also attract bats because they can be perceived as potential mating sites or roost trees, or because of their movement and the sounds they create (Guest et al., 2022; Wellig et al., 2018). One study found that bats actively forage near turbines during operation (Horn et al., 2008). During this study, researchers observed bats approaching non-rotating and rotating blades, repeatedly investigating turbine elements, following or becoming trapped by blade-tip vortices, and colliding with turbine blades (Horn et al., 2008). Some research suggests that bats may exhibit attraction to or avoidance of wind turbines depending on inter-individual and interspecific variation (Reusch et al., 2022).

Bat activity and use of habitat within the Study Area was assessed through passive acoustic monitoring. Bat species identified during monitoring include *Myotis* species (i.e., little brown myotis and/or northern myotis), tri-colored bat, hoary bat, silver-haired bat, eastern red bat, and big brown bat. Migratory species accounted for approximately 36% of recorded bat passes within the Study Area. Long distance migrating bats, including the eastern red bat, hoary bat, and silver-haired bat, comprise most of the reported mortalities from wind turbines due to their higher flight elevations and long migration distances (Arnett et al., 2008; ECCC, 2015; Parisé & Walker, 2017). In the COSEWIC Assessment and Status Report on the Hoary Bat, Eastern Red Bat, and Silver-haired Bat (2023), wind energy development was determined to have a high to very high impact, with these three species comprising approximately 75% to 80% of bat fatalities associated with wind turbines. A review of mortality studies at wind farms between 1996 and 2006 found that mortality consistently peaked during fall migration, between mid-summer and autumn (Arnett et al., 2008).

Myotis species have relatively low fatality rates compared to other species due to their lower flight elevations and short migration distances (ECCC, 2015); nevertheless, in the Recovery Strategy for Little Brown Myotis, Northern Myotis, and Tri-colored Bat (ECCC, 2015), collisions and barotrauma from wind turbines were listed as a high level of concern in areas impacted by white-nose syndrome (like Nova Scotia), with localized seasonal impacts in the spring, summer, and fall. *Myotis* species accounted for approximately 32% of recorded bat passes during the 2023 and 2025 monitoring period.

To reduce the potential for bat mortality with wind turbines, scientific literature recommends that wind turbines be strategically sited away from bat habitats such as mature forests, wetlands, and waterbodies (Reusch et al., 2022; Roeleke et al., 2016). Turbine locations have been selected to maximize the use of previously disturbed habitat and avoid features such as lakes, wetlands, watercourses, and intact forest to the extent possible. The Study Area also excludes areas north of Melrose Country Harbour Road where higher activity levels were detected during 2025 monitoring. Additional opportunities to increase avoidance and minimization of interactions with these features will be reviewed during the detailed design phase.

Potential exists for bats to be harmed during vegetation clearing if they are roosting in vegetation as it is being cleared. One potential roost tree was identified within the Study Area, located within the Clearing Footprint for a turbine pad. It is unclear whether the roost tree is

active based on the condition of guano present at the base of the tree. Additional investigation is required and may result in Project layout changes if the location is confirmed to be active.

Injury and/or mortality is possible if a hibernaculum is heavily disturbed while occupied. Construction activities, such as blasting or the use of heavy machinery, could potentially cause a hibernaculum to collapse (ECCC, 2015). However, studies conducted by Summers et al. (2023) and Armstrong (2010) indicate that blasting and drilling near a bat hibernaculum or roost does not significantly disturb bats. According to Moseley (2007), the nearest known hibernaculum is located about 5.2 km from the Study Area, 7.9 km from the nearest edge of the Assessment Area, and 8.8 km from the nearest proposed turbine point. Personal communications with NSNR (Sarah Spencer, May 12, 2026) indicate that the nearest critical habitat for bats is located approximately 4 km from the Study Area. The study by Armstrong (2010) concluded that short term drilling up to within 25 m of a mine entrance was not found to disturb bats roosting within. Based on these findings, Project construction is not anticipated to disturb this habitat.

Increased traffic associated with the construction of new roads and the upgrading of existing roads within the Study Area also poses a risk to bats. Low-flying species, such as *Myotis* species, account for the majority of recorded vehicle-related mortality events, with juveniles being particularly vulnerable due to their reduced maneuverability and preference to forage in open, low-clutter habitats (Fensome & Mathews, 2016; Lesiński, 2007). Mortality is also likely to be higher in areas where roads intersect good quality habitat, such as watercourses or forest edges (Fensome & Mathews, 2016; Lesiński, 2007; Medinas et al., 2013). As traffic volumes on most roads within the Study Area are not expected to be high at night, the risk of mortality associated with traffic is anticipated to be low.

Sensory Disturbance

Noise and light will be generated during all phases of the Project. During the site preparation and construction and decommissioning phases, noise and lighting will be generated by heavy equipment. During the operations and maintenance phase, noise and light will be generated by wind turbines. During site preparation and construction and decommissioning, noise will typically occur during daylight hours; therefore, sensory disturbance should be limited to roosting bats during these Project phases.

Construction noise (e.g., heavy equipment, blasting, and pile-driving) may disrupt or deter bats, particularly species that roost nearby, potentially causing roost abandonment; however, bats are well adapted morphologically, physiologically, and behaviourally to avoid acoustic trauma (CDT, 2016). Since bats are often exposed to the exceptionally loud sounds of their own echolocation signals (approximately 110 dB), they have evolved protective mechanisms to prevent sensory overload and damage to the auditory system (CDT, 2016). These mechanisms include behavioural avoidance, changing the shape and orientation of the pinnae, closing the cartilaginous fold in the outer ear canal, the tympanic reflex, and resonance absorption (Wever & Vernon, 1961). While these mechanisms are very effective in achieving protection from constant noise exposure (i.e., in the case of wind turbines), it is speculated that

they also can prevent overexposure from sudden, unexpected anthropogenic noise shocks (e.g., blasting). Additionally, bat echolocation calls are in the ultrasonic range beyond the upper frequency limits of construction noise (CDT, 2016) meaning there is effectively no echolocation masking effect from construction noise. The typical lack of construction activity during the nightly active bat period (30 minutes before sunset to 30 minutes after sunrise) further limits any potential masking effects in the ultrasonic ranges.

Sensory disturbance associated with lighting during all Project phases may also impact bat behaviour. During site preparation and construction and decommissioning, lighting will be a temporary source of sensory disturbance. A study by Seewagen et al. (2023) found that, while white floodlights had no significant impact on migratory species (including the eastern red bat and hoary bat), little brown myotis was impacted within at least a 75 m radius and experienced a loss of foraging habitat. This risk can be mitigated by utilizing motion activated lights whenever possible. During the operations and maintenance phase, turbine lighting will be restricted to the minimum required by Transport Canada for safety.

The impacts of necessary noise and light associated with the Project on bat behaviour and movements are anticipated to be low based on the morphological adaptations and behavioural patterns of bats, as well as the timing of activities that have potential to cause sensory disturbances outside of active bat periods (i.e., when bats are roosting or hibernating). Impacts will be limited to the Study Area, as only those bats roosting or foraging within areas undergoing construction will be exposed to sensory disturbance caused by the Project.

Mitigation Measures

To address the abovementioned effects to bat and bat habitat, the following mitigation measures will be implemented:

- Minimize the overall area to be cleared by utilizing pre-existing roads and previously altered areas (i.e., clearcuts) where practicable.
- Maintain 30 m vegetated buffers around wetlands and watercourses, where practicable, to support connectivity and foraging habitat for bats.
- Plan clearing activities outside of April 15 to August 31 (encompasses the active bat window and bird breeding/nesting window) where practicable.
- Avoid known active roost habitats to the extent practicable during detailed design.
- Give preference to motion activated lights on infrastructure to reduce insect attraction and subsequent attraction of bats. Motion activated lighting is only applicable to ground-based infrastructure (i.e., at doorways and substations) as turbine lighting at the top of individual turbines is regulated by Transport Canada.
- Allow for natural revegetation of roadsides and other temporary works after construction to the greatest extent practicable.
- Employ noise controls (e.g., mufflers) on machinery, equipment, etc. during the site preparation and construction phase.
- Develop and implement a Surface Water Management Plan to support appropriate drainage around turbines and limit standing water, which will limit insect breeding near

turbines and thus reduce potential for the attraction of bats to areas surrounding turbines.
- Develop and implement a Terrestrial Habitat and Wildlife Management Plan.

Monitoring

The Proponent is committed to completing a second year of the baseline bat monitoring program, prior to operations, as per requirements under the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).

A detailed Post-Construction Bat Monitoring Plan will be developed and submitted to NSECC and NSNR for review. Monitoring activities may include:

- Post-construction bat mortality monitoring.
- Adaptive management if post-construction monitoring identifies significant bat mortality, developed in consultation with NSNR.

Conclusion

After mitigations, residual effects to bats have been assessed, including habitat fragmentation and/or loss, injury or mortality, and sensory disturbance. Based on this assessment, residual effects to bats are characterized as shown in Table 10.30.

Table 10.30: Bats and Bat Habitat Residual Effects

Effect Detail	Habitat Fragmentation and/or Loss	Injury or Mortality	Sensory Disturbance
Magnitude of Effect	**Low:** Low loss of suitable bat habitat is expected (about 0.6% of modelled maternity roosting habitat available within the LAA).	**Moderate:** Minimal loss of individuals is expected.	**Low:** Low impacts to habitat usage (i.e., effective habitat loss) due to sensory disturbance is expected.
Geographic Extent of Effect	5 km buffer of the Study Area	5 km buffer of the Study Area	Study Area
Frequency of Effect	**Single Event:** Effects may only be associated with clearing during construction.	**Intermittent:** Effects may occur seasonally between dusk and dawn during operations and temporarily during construction.	**Continuous:** Effects may occur sporadically during construction and decommissioning but may be constant (though spatially limited) during operations.
Duration of Effect	**Medium Term:** Effects will end following decommissioning	**Medium Term:** Effects will end following decommissioning.	**Medium Term:** Effects will end following decommissioning.
Reversibility of Effect	**Partially Reversible**	**Irreversible**	**Reversible**
Significance Level	Not Significant	Not Significant	Not Significant

Effect Detail	Habitat Fragmentation and/or Loss	Injury or Mortality	Sensory Disturbance
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible			

10.4 Avifauna

10.4.1 Overview

A desktop review, field program, and habitat modelling exercise were undertaken to gather information on avian species and associated habitat in the Study Area. Objectives were as follows:

- Assess observations, trends, species diversity, and habitat utilization of avian species within the Study Area during all seasons.
- Use the information collected to inform and refine the Project design (i.e., avoid and minimize impacts to avifauna species and their habitats, with a focus on SAR and SOCI.
- Assess migratory bird activity and assess the risk that the Project poses to migratory birds.
- Use the information collected to inform mitigation and management practices.

10.4.2 Regulatory Context

The Project has potential to interact with avifauna species that may be protected under several federal and provincial legislations. Applicable laws and regulations include:

- *Species at Risk Act* (Canada, 2002)
- *Migratory Bird Convention Act* (MBCA) (Canada, 1994)
- Migratory Birds Regulations (Canada, 2022)
- W*ildlife Act* (Nova Scotia, 1989)
- *Endangered Species Act* (Nova Scotia, 1998)

The MBCA protects all migratory birds while they are present in Canadian jurisdiction, including on land, in the air, and on the water. The Migratory Birds Regulations (Canada, 2022) protect the nests of species listed under Schedule 1 of MBCA for a set period, depending on the species. Nests of species listed under Schedule 1 can be registered under the Abandoned Nest Registry to begin a waiting period, after which the nest can legally be removed. Under the provincial *Wildlife Act*, it is illegal to destroy or disturb bird nests or eggs without a permit. ESA and SARA prohibit harm to listed SAR along with their habitually occupied spaces and designated core and/or critical habitat, as defined by each of these Acts.

The Project is also guided by policies, guidelines, and standards that provide guidance on the development of the Project and related survey design.

- ECCC-CWS (Atlantic Region) – Wind Energy & Birds EA Guidance Update (ECCC-CWS, 2022)
- Wind Turbines and Birds - Updated Guidance for EA and Monitoring (ECCC, 2018)
- Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)
- Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (ECCC-CWS, 2007a)
- Nova Scotia Wetland Conservation Policy (NSECC, 2019b)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009)
- Various NSNR SMPs and ECCC SAR Management Plans

10.4.3 Desktop Review

Desktop information was used to gain insight into protected avifauna habitats, species utilization of the area, and to identify SAR or SOCI potentially occurring within or near the Study Area, using the following sources:

- IBAs (2025)
- ACCDC (2026a)
- Maritimes Breeding Bird Atlas (MBBA) (2025)
- Canadian Wildlife Service Waterbird Colony Database (Atlantic Region) (Wilhelm & Mahoney, 2017)
- Canadian Wildlife Service Migratory Bird Sanctuaries (MBS) (ECCC, 2021b)
- NSNR Significant Species and Habitats Database (2024f)
- eBird (2025)
- Nova Scotia Parks and Protected Areas (NSECC, 2020a)
- Critical Habitat for SAR National Dataset (ECCC-CWS, 2025)

Important Bird Area: Country Island Complex (NS028)

The closest IBA is the Country Island Complex (NS028), a series of islands off the coast between the communities of Tor Bay and Drum Head. The closest island is approximately 2.2 km southeast of the Study Area, while the furthest is approximately 37.4 km east of the Study Area (Drawing 10.11).

Habitats featured on the islands include native grasses, inlets, and other coastal features (IBA Canada, n.d.). The Country Island Complex is known to provide nesting habitat for roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), Leach's storm-petrel (*Hydrobates leucorhous*), herring gull (*Larus argentatus*), and great black-backed gull (*Larus marinus*). There are also several summertime records of Manx shearwater (*Puffinus puffinus*) within the IBA, although their breeding status in Nova Scotia is considered unknown by ACCDC (2026b)

The federally and provincially Endangered roseate tern has been recorded nesting within the Country Island Complex since the late 1980s, with one island within the complex (Country Island) considered critical habitat for the species (ECCC-CWS, 2025). Country Island is approximately 13 km southeast of the Study Area.

ACCDC Report

S-Ranks from ACCDC were used to determine whether a species is a SOCI, based on the time of year in which the species was observed. Species ranks may differ depending on whether a species is observed in the breeding season (B), the non-breeding season (N), or during migration (M). Tennessee warbler (*Leiothlypis peregrina*), for example, is ranked S3B,S5M, indicating that this species is considered a SOCI in Nova Scotia during its breeding season but not during its migratory seasons.

The ACCDC report for the Project (ACCDC, 2026a) contained records of 16 avian SAR (Table 10.31) and 63 avian SOCI (Appendix H) within 5 km of the Study Area.

Table 10.31: Avian SAR Recorded within a 5 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	Recorded Within the Study Area?
Bank Swallow	*Riparia riparia*	Threatened	Threatened	Endangered	S3B	Yes
Barn Wwallow	*Hirundo rustica*	Special Concern	Threatened	Endangered	S3B	Yes
Bobolink	*Dolichonyx oryzivorus*	Special Concern	Threatened	Vulnerable	S2S3B	No
Canada Warbler	*Cardellina canadensis*	Special Concern	Threatened	Endangered	S2S3B	Yes
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened	Endangered	S2S3B,S2S3M	No
Common Nighthawk	*Chordeiles minor*	Special Concern	Special Concern	Threatened	S3S4B	Yes
Eastern Wood-Pewee	*Contopus virens*	Special Concern	Special Concern	Vulnerable	S3S4B	Yes
Evening Grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern	Vulnerable	S3B,S3N	Yes
Harlequin Duck – Eastern Population	*Histrionicus histrionicus*	Special Concern	Special Concern	Endangered	S3N	No
Horned Grebe – Western Population	*Podiceps auritus* pop. 2	Not Listed	Special Concern	Not Listed	S3N	No
Ipswich Sparrow	*Passerculus sandwichensis princeps*	Special Concern	Special Concern	Not Listed	S1B	No

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	Recorded Within the Study Area?
Olive-sided Flycatcher	*Contopus cooperi*	Special Concern	Special Concern	Threatened	S3B	Yes
Red-necked Phalarope	*Phalaropus lobatus*	Special Concern	Special Concern	Not Listed	S2S3M	No
Roseate Tern	*Sterna dougallii*	Endangered	Endangered	Endangered	S1B	No
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Special Concern	Endangered	S2S3B	Yes
Short-eared Owl	*Asio flammeus*	Threatened	Special Concern	Not Listed	S1B	No

Source: (ACCDC, 2026b)

The Study Area contains records of Canada warbler (*Cardellina canadensis)*, eastern wood-pewee (*Contopus virens*), olive-sided flycatcher (*Contopus cooperi*), and rusty blackbird (*Euphagus carolinus*), all of which are wetland-associated species that could nest within the Study Area. Common nighthawk (*Chordeiles minor)*, which utilizes open habitats, was also recorded within the Study Area. The Study Area contains harvested areas, barrens, and bogs, which could provide suitable nesting habitat for this species. Evening grosbeak (*Coccothraustes vespertinus*), which breeds in mature coniferous and/or mixedwood forest, has also been recorded within the Study Area. While there are records of bank swallow (*Riparia riparia*) and barn swallow (*Hirundo rustica)* within the Study Area, suitable breeding habitat for these species (sandy banks and human-made structures) appears to be absent.

Bobolink (*Dolichonyx oryzivorus*), chimney swift (*Chaetura pelagica*), harlequin duck (*Histrionicus histrionicus*), horned grebe (*Podiceps auritus)*, Ipswich sparrow (*Passerculus sandwichensis princeps)*, red-necked phalarope (*Phalaropus lobatus)*, roseate tern, and short-eared owl (*Asio flammeus*) have been recorded within 5 km of the Study Area, but not within the Study Area itself. Of these species, only chimney swift may potentially nest within the Study Area. This species nests in hollow structures, including large hollow trees. The remaining species either do not breed on mainland Nova Scotia (harlequin duck, horned grebe, Ipswich sparrow, and red-necked phalarope) or are habitat specialists that require habitat features absent from the Study Area (e.g., grasslands and/or agricultural fields for bobolink and short-eared owl and coastal islands for roseate tern). While none of these species are anticipated to nest within the Study Area, they may pass through the Study Area while foraging or during migration.

The ACCDC report also contains one record of a “location sensitive” SAR:

- Peregrine falcon (*Falco peregrinus* pop. 1): Listed as Vulnerable by ESA and ranked S1B, SUM by ACCDC. Peregrine falcon is likely present in the area due to the expanse of coastline and large lakes for foraging, as well as intense topography that may be suitable for nesting outside of the Study Area (i.e., coastal areas with exposed rock).

Avian SAR and SOCI records within 100 km of the Study Area are provided in Appendix H.

Maritimes Breeding Bird Atlas

The Study Area is primarily located within MBBA squares 20NR80, 20NR81, 20NR90, and 20NQ99.

Records from the first (1986 to 1990) and second (2006 to 2010) editions of the MBBA within these squares are as follows:

- For map square 20NR80, the first atlas contained records of 34 possible, three probable, and 37 confirmed breeders. The second atlas contained records of 18 possible, 24 probable, and 36 confirmed breeders.
- For map square 20NR81, the first atlas contained records of 30 possible, one probable, and 14 confirmed breeders. The second atlas contained records of 31 possible, 40 probable, and three confirmed breeders.
- For map square 20NR90, the first atlas contained records of 35 possible, one probable, and 30 confirmed breeders. The second atlas contained records of 45 possible, 16 probable, and nine confirmed breeders.
- For map square 20NQ99, the first atlas contained records of 28 possible, 17 probable, and 44 confirmed breeders. The second atlas contained records of 29 possible, 11 probable, and 34 confirmed breeders.

Between the four squares, 129 species were recorded, including 11 SAR (Table 10.32).

Table 10.32: Avian SAR Recorded within MBBA Squares 20NR80, 20NR81, 20NR90, and 20NQ99

Species	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Barn Swallow	*Hirundo rustica*	Special Concern	Threatened	Endangered	S3B
Bank Swallow	*Riparia riparia*	Threatened	Threatened	Endangered	S2B
Bobolink	*Dolichonyx oryzivorus*	Special Concern	Threatened	Vulnerable	S2S3B
Canada Warbler	*Cardellina canadensis*	Special Concern	Threatened	Endangered	S2S3B
Common Nighthawk	*Chordeiles minor*	Special Concern	Special Concern	Threatened	S3S4B
Eastern Meadowlark	*Sturnella magna*	Threatened	Threatened	Not Listed	SHB
Eastern Wood-pewee	*Contopus virens*	Special Concern	Special Concern	Vulnerable	S3S4B
Evening Grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern	Vulnerable	S3B,S3N

Species	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Ipswich Sparrow	*Passerculus sandwichensis princeps*	Special Concern	Special Concern	Not Listed	S1B
Olive-sided Flycatcher	*Contopus cooperi*	Special Concern	Special Concern	Threatened	S3B
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Special Concern	Endangered	S2S3B

Source: (ACCDC, 2026b; Birds Canada, 2025)

CWS Waterbird Colony Database

The CWS Waterbird Colony Database (Atlantic Region) (Wilhelm & Mahoney, 2017) contained records of eight waterbird colonies within 5 km of the Study Area. The colonies are primarily located on offshore islands, and range between 2.9 km and 4.9 km from the Study Area (Drawing 10.11). These include:

- A common eider (*Somateria mollissima*) colony near Isaacs Harbour.
- A great black-backed gull colony near Fishermans Harbour.
- Colonies of common tern, arctic tern, and roseate tern near Fishermans Harbour.
- A common eider colony near Port Bickerton.
- Colonies of American herring gull, great black-backed gull, great blue heron (*Ardea Herodias*), common tern, and unspecified cormorant species on Bickerton Island.
- An arctic tern colony near Port Bickerton.
- Colonies of American herring gull and great black-backed gull near Holland Harbour.
- Colonies of American herring gull and great black-backed gull on Reids Island.

Migratory Bird Sanctuaries

There are no Migratory Bird Sanctuaries within 5 km of the Project.

NSNR Significant Species and Habitats Database

The NSNR Significant Species and Habitats Database (NSNR, 2024f) contained 30 records relating to avifauna within 5 km of the Study Area (Drawing 10.11), as follows:

- 12 records relating to habitat for waterfowl, including American black duck (*Anas rubripes),* Canada goose (*Branta canadensis*), common eider, common loon (*Gavia immer*), common merganser (*Mergus merganser*), and wood duck (*Aix sponsa*).
- Four records relating to habitat for raptors, including bald eagle (*Haliaeetus leucocephalus*), northern harrier (*Circus hudsonius)*, and osprey (*Pandion haliaetus).*
- Four records relating to habitat for terns, including roseate tern and unspecified tern species.
- 10 records relating to habitat for SAR (Canada warbler, olive-sided flycatcher, and barn swallow).

eBird

The citizen science database eBird (2025) showed a notable birding location (i.e., hotspot) at the Port Bickerton Lighthouse, approximately 3 km south of the Study Area. The hotspot contained records of 173 species, including a variety of passerine, seabird, shorebird, and waterfowl species.

Notable observations include several large flocks of migrating shorebirds and seabirds:

- Semipalmated sandpiper (*Calidris pusilla*; 550)
- Semipalmated plover (*Charadrius semipalmatus;* 400)
- Sanderling (*Calidris alba*; 300)
- Northern gannet (*Morus bassanus*; 400)
- Purple sandpiper (*Calidris maritima*; 100)

Several SAR have been observed at this location, including:

- Barn swallow
- Evening grosbeak
- Harlequin duck
- Olive-sided flycatcher
- Peregrine falcon
- Roseate tern

Protected and Conserved Areas

Five wilderness areas, two provincial parks, and 31 properties designated as conservation lands were identified within 5 km of the Study Area (Drawing 10.11). Many of these areas contain mature forested habitats which are of importance for cavity-nesting birds such as owls, woodpeckers, and various waterfowl species (Neily & Parsons, 2017), wetlands, which can provide habitat for several avian SAR, and coastal features, which can provide valuable nesting, feeding, and overwintering habitat for a variety of seabird, shorebird, and waterfowl species.

Big Plains Wilderness Area, located directly adjacent to the Study Area, features mature hardwood and mixedwood forest, lakes, rivers, barrens, and various wetland types (NSECC, 2026c).

Guysborough Headlands Wilderness Area, located along the southeastern boundary of the Study Area, features a variety of coastal habitats, including barrier beaches, ponds, low cliffs, rock and cobble shoreline, and tidal flats (NSECC, 2026c). The interior portion of the wilderness area consists primarily of coastal barrens, bogs, and stunted spruce-fir forest. Archibald Lake Wilderness Area, located directly adjacent to the Study Area, features a variety of forested habitats, wetlands, and several large lakes. Over half of the wilderness area consists of old growth forest (NSECC, 2026c). This wilderness area is also known to support avian SAR, including Canada warbler and olive-sided flycatcher (CPAWS NS, n.d.).

Nine Mile Wood Wilderness Area, located just over 500 m north of the Study Area, features rolling drumlins dominated by tolerant hardwood species. The wilderness area also features several small lakes and stillwaters (NSECC, 2026c).

The Big Bog Wilderness Area, located 4.5 km west of the Study Area, is primarily comprised of open bog habitat, with patches of softwood, mixedwood, and hardwood forest scattered throughout (NSECC, 2026c). The wilderness area also features barrens, lakes, and riparian habitats.

St. Mary's River Provincial Park is composed of a series of properties which run along the St. Mary's River. The park features a variety of habitats, including floodplains and old growth forest (Province of Nova Scotia, n.d.).

Port Bickerton Provincial Park, located 1.6 km southeast of the Study Area, features several kilometres of undisturbed coastline, and prominent coastal headlands (NSECC, 2026c). The interior portion of the park features intact softwood forest, barrens, and wetlands.

Several properties within 5 km of the Study Area have been designated as Conservation Lands, most of which are owned and managed by Nova Scotia Nature Trust. These properties, which are concentrated around the St. Mary's River, feature habitats such as Acadian floodplain forest and old growth hemlock, and provide habitat for Canada warbler and other avian SAR (Nova Scotia Nature Trust, n.d.).

Critical Habitat for Species at Risk

The Critical Habitat for Species at Risk National Dataset (ECCC-CWS, 2025) did not contain any records relating to avifauna within 5 km of the Study Area.

10.4.4 Field Assessment

10.4.4.1 Field Assessment Methodology

Several survey methodologies were employed to assess avian abundance and species diversity within and near the Study Area throughout the year. Prior to conducting field surveys, a preliminary desktop survey design [using provincial aerial imagery (e.g., Google Earth, NSECC, and NSNR), forestry, wetland, watercourse, depth-to-water, and topographic databases or GIS layers] was developed to target suitable habitat for avifauna species or groups of interest (e.g., migratory birds, breeding birds, shorebirds, waterfowl, and nightjars).

Since species have different habitat requirements for breeding and migratory purposes, a wide range of habitats were targeted, with a goal of achieving representative coverage of all major habitat types in the Study Area. Habitat types surveyed included wetlands, lakes, watercourses and riparian areas, harvested areas in varying stages of regeneration, softwood, hardwood, and mixedwood forest, and coastal mudflats.

The following survey types were completed.

- Winter point count (PC) surveys
- Spring and fall migration point count surveys
- Spring and fall migration diurnal watch count (DWC) surveys
- Breeding bird point count surveys
- Nightjar surveys

Survey dates were selected to provide representative coverage across appropriate seasons and to ensure migratory bird abundance and species diversity was fully captured (e.g., early and late season migrants). A breakdown of survey type, dates, and rationale is described in Table 10.33. Habitat descriptions for the point count locations are found in Table 1, Appendix M.

Table 10.33: 2023 Avifauna Field Survey Overview

Survey Type	Survey Locations	Dates	Rationale	Reference for Survey Dates and Methods
Winter birds	81 PC	February 1 to 12, 2023 February 21 to March 11, 2023 March 16 to 29, 2023	Winter bird surveys help capture resident species and migratory species that may overwinter within the Study Area.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)
Spring migration	81 PC and 6 DWC	April 1 to 16, 2023 April 27 to May 14, 2023 May 16 to 29, 2023	Most migratory birds return to Canada to breed between late March and mid-May. Surveys were completed throughout April and May to capture both early and late season migrants, as well as early breeding activity.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)
Breeding bird	81 PC	June 8 to 20, 2023 June 27 to July 3, 2023	June is peak breeding season in Nova Scotia. Surveys were completed in June and July to capture early and late season breeders.	Maritimes Breeding Bird Atlas (Birds Canada, 2025)
Nightjar	11	June 16 to 20, 2023	The goal of these surveys was to understand the use of the land within the Study Area by nightjars.	Canadian Nightjar Survey Protocol (Knight et al., 2019)

Survey Type	Survey Locations	Dates	Rationale	Reference for Survey Dates and Methods
		July 1, 2023	Suitable habitat for one nightjar species, common nighthawk, is thought to be present within the Study Area based on historical records.	
Fall migration	81 PC and 6 DWC	August 24 to September 7, 2023 September 22 to October 2, 2023 October 25 to November 7, 2023	Most migratory birds begin to migrate south between August and September. Surveys were completed between August and November to capture both early and late season migrants.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)

Due to the remoteness of the Study Area, the mobility of avian species, and dynamic nature of designing a large Project, a focus on habitat diversity was prioritized, as well as Assessment Area coverage where possible, during field surveys. Access to the eastern portion of the Study Area was particularly limited, as there are little to no roads or trails present. This area primarily features open bogs, barrens, and softwood forest; habitat types which were surveyed in other parts of the Study Area. Access constraints and changing environmental conditions also prevented some locations from being accessed during certain seasons. When necessary, alternate survey locations were selected.

Avian specialist and subcontractor Chris Pepper selected survey locations during preliminary site reconnaissance and using aerial imagery sources for support. The Project underwent several additional layout iterations (within the Study Area) over the next two field seasons as part of site optimization and to minimize interactions with other environmental features identified during footprint surveys. While the field survey locations do not completely overlap with the final Assessment Area, they do represent the diversity of habitat and species within the Study Area, and when combined with detailed habitat modelling and other habitat survey results, support a robust analysis. Survey locations are presented in Drawing 10.12 and Drawing 10.13.

Point Counts – Spring/Fall Migration, Winter Birds, and Breeding Bird Surveys

Point count surveys were used as the primary means of identifying species in the Study Area through all seasons. A total of 81 point count locations were distributed throughout a variety of habitat types within or near the Study Area, including forests, lakes, wetlands, and harvested areas. Point counts were 10 minutes in duration and were completed at predetermined locations. All visual and auditory observations of birds were recorded at each point count location, along with relevant behavioural information such as breeding evidence. The estimated

distance to target, direction, and number of species is recorded, while the observer remains still and silent for the duration of the survey interval. Surveys were completed 30 minutes before, through four hours after dawn in any given season to observe the most active time of day for passerine species. Survey opportunities were maximized for clear weather and minimal wind within the appropriate timeframe. Target species of point counts are primarily passerines, identified audibly.

During the point count surveys, all signs of breeding behaviour (e.g., agitation, carrying food, nest building, the presence of a pair of birds in suitable nesting habitat) were documented. Breeding evidence codes from the MBBA (MBBA, 2006) were used to determine breeding status based on field observations. Breeding evidence was described using the following four categories:

- Observed: The species was observed in its breeding season, but no breeding evidence was observed.
- Possible: Breeding is possible based on species' presence in suitable nesting habitat during its breeding season or based on the presence of a male singing in suitable nesting habitat in its breeding season.
- Probable: Breeding is probable based on strong indicators of breeding behaviour (e.g., nest building, agitated behaviour, the presence of a pair in suitable nesting habitat during the breeding season).
- Confirmed: Breeding is confirmed based on the observation of behaviour which indicates the presence of an active nest (e.g., recently fledged young, a nest containing eggs or young, nest building behaviour, an adult carrying food, distraction display).

Nightjar Surveys

Nightjar counts were six minutes in duration and completed at 11 predetermined locations throughout the Study Area, following the Canadian Nightjar Survey Protocol (Knight et al., 2019). Survey locations were situated in open habitats (e.g., clearcuts and wetlands) where nightjars were most likely to be observed foraging. As the target species, all nightjars (nighthawks, etc.) were recorded with information on direction, behaviour (if applicable), and distance from the observer. Other diurnal or nocturnal species (e.g., owls) were also recorded. Surveys were conducted from dusk until two hours after dusk on clear nights with minimal wind and no precipitation. Survey locations were limited to roads or trails due to safety concerns with evening surveys.

Diurnal Watch Count Surveys – Spring/Fall Migration Surveys

Diurnal watch count surveys, also known as hawk watch surveys, were completed to assess the movement of birds within and flying over the Study Area during the day (e.g., potential migratory behaviour). These surveys help capture the movements of raptors and other birds that migrate during the day and would therefore not be captured by radar or acoustic monitoring programs, which target nocturnal migrants. These surveys were completed for up to 150 minutes, usually starting in the late morning, after morning point count surveys are completed. Observations on the movement of birds were recorded, including bearing from the

observer, distance to the target, the direction that the target was moving, its passing height, and any other behaviour notes. Six locations with open, unobstructed views of the sky were surveyed within the Study Area. Four locations were situated in harvested areas, one location was situated in an open bog, and one location was situated on a forested hill.

The absence of observable migration patterns or notable events during field surveys does not rule out such activity in the area. Radar and acoustic monitoring programs have a higher likelihood of detecting large migration events since they record data for longer periods of time, including at night. Many species migrate nocturnally and may therefore be missed or under-represented by field surveys conducted in the morning. The radar and acoustic monitoring programs are intended to help fill this gap.

10.4.4.2 Field Assessment Results

2023 Winter Bird Surveys

Three rounds of winter bird surveys were completed between early February and late March 2023. A total of 395 birds were observed, representing 23 different species (Tables 2 and 3, Appendix M). Passerine species (particularly chickadees, kinglets, and corvids) were most abundant, accounting for approximately 82% of the birds observed. Woodpeckers, followed by landfowl (i.e., grouse), gulls, waterfowl, and raptors made up the remaining 18%.

The most abundant species observed:

- Golden-crowned kinglet (*Regulus satrapa*)
- Black-capped chickadee (*Poecile atricapillus*)
- Common raven (*Corvus corax*)
- Boreal chickadee (*Poecile hudsonicus*)
- American crow (*Corvus brachyrhynchos)*

Avian SOCI observed:

- American goshawk (*Astur atricapillus*; 1)
- Boreal chickadee (51)
- Canada jay (*Perisoreus canadensis*; 6)
- Fox sparrow (*Passerella iliaca*; 1)

No avian SAR were observed. Species diversity was relatively low, which is typical of winter surveys, and did not vary widely between survey locations.

2023 Spring Migration Surveys

Three rounds of spring migration surveys, comprising of point count and diurnal watch count surveys, were completed between early April and late May 2023.

Spring Migration Point Count Surveys

During spring migration point count surveys, 2,054 birds were observed, representing 72 different species (Tables 4 and 5, Appendix M). Passerine species (particularly warblers and sparrows) were most abundant, accounting for approximately 88% of the birds observed. Woodpeckers, followed by landfowl (i.e., grouse), gulls, waterfowl, and raptors made up the remaining 12%.

The most abundant species observed:

- White-throated sparrow (*Zonotrichia albicollis*)
- Palm warbler (*Setophaga palmarum*)
- Dark-eyed junco (*Junco hyemalis)*
- Yellow-rumped warbler (*Setophaga coronata*)
- Magnolia warbler (*Setophaga magnolia*)

Avian SOCI observed:

- Boreal chickadee (27)
- Black-backed woodpecker (*Picoides arcticus*; 1)
- Canada jay (9)

Avian SAR observed:

- Canada warbler (5)
- Evening grosbeak (3)
- Olive-sided flycatcher (1)

Canada warbler and olive-sided flycatcher observations were primarily made in late May in wetlands or riparian habitats and could either represent migrants or individuals that had recently arrived on their breeding grounds. One Canada warbler observation consisted of a pair displaying agitated behaviour, which indicates probable breeding evidence. The evening grosbeak observations consisted of individuals flying overhead in mid to late May, in open areas or in mixedwood forest habitats.

Spring Migration Diurnal Watch Count Surveys

A total of 70 birds were observed during spring migration diurnal watch count surveys, representing 16 different species (Table 6 and 7, Appendix M). Gull species were most abundant, accounting for approximately 46% of the birds observed. The remaining individuals consisted primarily of passerines (23%) and raptors (21%).

The most abundant species observed:

- Unknown gull species
- Red-tailed hawk (*Buteo jamaicensis)*

- Common raven
- American kestrel (*Falco sparverius)*
- American crow

Avian SOCI observed:

- Boreal chickadee (2)
- Rough-legged hawk (*Buteo lagopus*; 1)

No avian SAR were observed.

Most birds observed in flight were flying at heights of 50 m or less (32%) or between 100 m and 250 m (56%), with several individuals (accounting for 5%) flying at heights greater than 250 m. Most of the birds observed flying at heights between 100 m and 250 m were gulls, while passerines typically flew at lower heights (50 m or less). Common raven was the only species observed flying at heights greater than 250 m. Further analysis of flight heights observed using remote sensing technologies is provided in Section 10.4.6 and Appendix N.

2023 Spring Migration Surveys - Probable and Confirmed Breeding Evidence

Breeding evidence can be observed before the core breeding season begins, particularly for bird groups like waterfowl and raptors whose courtship often takes place throughout winter and early spring. Observations of probable and confirmed breeding evidence, based on the MBBA (MBBA, 2006) include:

- Probable breeding evidence (agitated behaviour): Barred owl (*Strix varia*), Canada warbler, and dark-eyed junco.
- Probable breeding evidence (courtship or display): Northern flicker (*Colaptes auratus*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Canachites canadensis*), and Wilson's snipe (*Gallinago delicata*).
- Probable breeding evidence (pair in suitable breeding habitat): Black-and-white warbler (*Mniotilta varia*), boreal chickadee, hairy woodpecker (*Dryobates villosus*), northern parula (*Setophaga americana*), ruby-crowned kinglet (*Corthylio calendula*), white-throated sparrow, and yellow-rumped warbler.

2023 Breeding Bird Surveys

Two rounds of breeding bird surveys, comprising of point count surveys, were completed in June and July 2023. A total of 2,265 birds were observed, representing 74 different species (Tables 8 and 9, Appendix M). Passerine species (particularly warblers, sparrows, and flycatchers) were most abundant, accounting for approximately 95% of the birds observed. Woodpeckers, raptors, waterfowl, and shorebirds made up the remaining 5%.

The most abundant species observed:

- Magnolia warbler
- White-throated sparrow
- Common yellowthroat (*Geothlypis trichas*)
- Hermit thrush (*Catharus guttatus*)
- Yellow-bellied flycatcher (*Empidonax flaviventris*)

Avian SOCI observed:

- American kestrel (1)
- Black-backed woodpecker (2)
- Boreal chickadee (14)
- Canada jay (17)
- Cape May warbler (*Setophaga tigrine*; 1)
- Common tern (3)
- Fox sparrow (3)
- Greater yellowlegs (*Tringa melanoleuca*; 11)
- Wilson's snipe (1)

Avian SAR observed:

- Barn swallow (2)
- Canada warbler (37)
- Common nighthawk (1)
- Olive-sided flycatcher (7)
- Rusty blackbird (3)

The barn swallow observation consisted of a pair observed outside of the Study Area in mid-June, near several residential properties that could provide suitable nesting habitat.

Canada warbler was observed at 24 locations within or near the Study Area between early June and early July. The observations were primarily associated with treed wetlands and riparian areas, which represent suitable breeding habitat. Just over half of the Canada warbler observations (21 individuals) were made in wetlands within the Assessment Area.

Common nighthawk was observed once in early June, in an area with suitable nesting and foraging habitat. The individual was observed performing a territorial display, which is an indicator of probable breeding evidence.

Olive-sided flycatcher was observed in seven locations within the Study Area throughout June. These observations were generally associated with wetland habitats, which represent suitable breeding habitat. Two individuals were observed in wetlands within the Assessment Area.

Rusty blackbird was observed in one location within the Study Area in early June. A pair was observed in a roadside treed swamp, which represents suitable breeding habitat for this species, and one of these individuals was re-sighted the following day in the same location. Canada warbler and olive-sided flycatcher were also observed in the same wetland, during the same survey.

2023 Breeding Bird Surveys - Probable and Confirmed Breeding Evidence

Notes on breeding evidence were recording during all breeding bird surveys (MBBA, 2006). For species with multiple indications of probable or confirmed breeding evidence, the highest level of breeding evidence is provided.

- Confirmed breeding evidence (young observed): Canada jay, common raven, and ruffed grouse.
- Confirmed breeding evidence (carrying food): Hermit thrush.
- Confirmed breeding evidence (nest building): Dark-eyed junco.
- Probable breeding evidence (courtship or display): Common nighthawk and ruffed grouse.
- Probable breeding evidence (pair in suitable habitat): White-throated sparrow.
- Probable breeding evidence (agitated behaviour): American robin (*Turdus migratorius*), black-and-white warbler, Canada warbler, common yellowthroat, greater yellowlegs, Lincoln's sparrow (*Melospiza lincolnii*), mourning warbler (*Geothlypis philadelphia*), and savannah sparrow (*Passerculus sandwichensis*).
- Probable breeding evidence (presumed territory - observed in the same location twice during the breeding season): Alder flycatcher (*Empidonax alnorum*), American crow, American goldfinch (*Spinus tristis*), American redstart (*Setophaga ruticilla*), bay-breasted warbler (*Setophaga castanea*), blackburnian warbler (*Setophaga fusca*), black-capped chickadee, black-throated blue warbler (*Setophaga caerulescens*), black-throated green warbler, blue jay, blue-headed vireo (*Vireo solitarius*), boreal chickadee, fox sparrow, golden-crowned kinglet, hairy woodpecker, least flycatcher (*Empidonax minimus),* magnolia warbler, Nashville warbler (*Leiothlypis ruficapilla*), northern flicker, northern waterthrush (*Parkesia noveboracensis*), ovenbird (*Seiurus aurocapilla*), palm warbler, pileated woodpecker (*Dryocopus pileatus*), purple finch (*Haemorhous purpureus),* red-eyed vireo (*Vireo olivaceus*), ruby-crowned kinglet, Swainson's thrush (*Catharus ustulatus*), swamp sparrow (*Melospiza georgiana*), winter wren (*Troglodytes hiemalis*), yellow warbler (*Setophaga petechia),* yellow-bellied flycatcher, and yellow-bellied sapsucker (*Sphyrapicus varius*).

2023 Nightjar Surveys

Two rounds of nightjar surveys were completed between mid-June and early July 2023. A total of 13 individuals were observed, representing two different species (Table 10, Appendix M). There were 10 common nighthawk observations made, six of which occurred during the first round of surveys and four of which occurred during the second round. Territorial displays were observed on six occasions, indicating probable breeding evidence.

CONI11 was the survey location with the most nightjar detections (6). This location features harvested lands that could provide suitable nesting habitat, and nearby wetland complexes that could provide foraging habitat.

Three incidental barred owl observations were also made during the surveys.

2023 Fall Migration Surveys

Three rounds of fall migration surveys, consisting of point count and diurnal watch count surveys, were completed between late August and early November 2023.

Fall Migration Point Count Surveys

During fall migration point count surveys, 1,837 birds were observed, representing 65 different species (Tables 11 and 12, Appendix M). Passerine species (particularly finches, thrushes, and warblers) were most abundant, accounting for approximately 95% of the birds observed. Woodpeckers, raptors, waterfowl, landfowl (i.e., grouse), and shorebirds made up the remaining 5%.

The most abundant species observed:

- Pine siskin (*Spinus pinus*)
- White-winged crossbill (*Loxia leucoptera*)
- American robin
- Golden-crowned kinglet
- Purple finch

Avian SOCI observed:

- Black-backed woodpecker (1)
- Boreal chickadee (21)
- Canada jay (32)
- Northern shrike (*Lanius borealis*; 1)
- Orange-crowned warbler (*Leiothlypis celata*; 1)
- Whimbrel (*Numenius phaeopus*; 1)

Avian SAR observed:

- Canada warbler (1)
- Eastern wood-pewee (1)

Both the Canada warbler and eastern wood-pewee observations were made in late August in riparian habitats. These observations could represent fall migrants, or locally breeding individuals that had yet to depart their breeding grounds.

Fall Migration Diurnal Watch Count Surveys

A total of 84 birds were observed during fall migration diurnal watch count surveys, representing 13 different species (Tables 13 and 14, Appendix M).

The most abundant species observed:

- White-winged crossbill
- Pine siskin
- Bald eagle
- Unknown passerine species
- American crow

No avian SAR or SOCI were observed.

Most birds observed in flight were flying at heights of 50 m or less (76%) or between 100 m and 250 m (15%). Small numbers of individuals were observed flying at heights between 50 m and 100 m (4%) and 250 m and 500 m (5%). All birds observed flying at heights between 100 m and 250 m and at heights above 250 m were raptors, while passerines primarily flew at lower heights (50 m or less). Further analysis of flight heights observed using remote sensing technologies is provided in Section 10.4.6 and Appendix N.

2023 Fall Migration Surveys - Probable and Confirmed Breeding Evidence

Breeding evidence can be observed after the core breeding season ends, particularly for birds that arrive later to their breeding grounds or those who lay more than one clutch of eggs. Observations of probable and confirmed breeding evidence, based on the MBBA (MBBA, 2006), are provided below.

- Confirmed breeding evidence (adults feeding young): Black-throated green warbler.
- Confirmed breeding evidence (young observed): Red crossbill (*Loxia curvirostra*).

Avian Incidental Results

Incidental observations were collected by birders when notable species were encountered while travelling between designated survey locations, and by staff conducting various other field programs between 2023 and 2026. A total of 81 individuals were observed incidentally, representing eight different species (Tables 15 and 16, Appendix M).

The most frequently recorded species:

- Evening grosbeak
- Redpoll (*Acanthis flammea*)
- Canada jay
- Pine grosbeak (*Pinicola enucleator*)
- Olive-sided flycatcher

Avian SOCI observed:

- Boreal chickadee (1)
- Canada jay (13)

Avian SAR observed:

- Evening grosbeak (29)
- Olive-sided flycatcher (11)

The evening grosbeak observations were made in December 2025 and consisted of flocks or pairs of overwintering birds, flying overhead at low altitudes (50 m or less).

The olive-sided flycatcher observations were made between June and August in 2023 and 2025, in softwood dominant wetland habitats. One observation made within the Assessment Area in August 2023 consisted of a family unit with five individuals.

10.4.4.3 Species at Risk Detected within or Near the Study Area

A total of 7,578 individual birds were detected during field surveys and acoustic monitoring efforts, including incidental observations made during other field programs between 2023 and 2025. A total of 124 species were recorded, eight of which are SAR (Table 10.34). Field observed SAR locations are shown in Drawing 10.14.

Table 10.34: Avian SAR Detected Within or Near the Study Area

Common Name	Species Code[1]	Status	Year and Season	Total Observed
Barn Swallow	BARS	SARA: Threatened ESA: Endangered S-Rank: S3B	Summer 2023	2
Bobolink	BOBO	SARA: Threatened ESA: Vulnerable S-Rank: S2S3B	Spring 2023	2
Canada Warbler	CAWA	SARA: Threatened ESA: Endangered S-Rank: S3B	Spring 2023 Summer 2023 and 2025 Fall 2023	82
Common Nighthawk	CONI	SARA: Special Concern ESA: Threatened S-Rank: S3S4B	Summer 2023	11
Eastern Wood-pewee	EAWP	SARA: Special Concern ESA: Vulnerable S-Rank: S3S4B	Fall 2023	1

Common Name	Species Code[1]	Status	Year and Season	Total Observed
Evening Grosbeak	EVGR	SARA: Special Concern ESA: Vulnerable S-Rank: S3B,S3N	Spring 2023 Winter 2025	32
Olive-sided Flycatcher	OSFL	SARA: Special Concern ESA: Threatened S-Rank: S3B	Spring 2023 Summer 2023 and 2025	18
Rusty Blackbird	RUBL	SARA: Special Concern ESA: Endangered S-Rank: S2S3B	Summer 2023	3

[1] As shown on Drawing 10.14

Canada warbler was the most common avian SAR within the Study Area, with 44 field observations and 38 acoustic detections. Canada warbler, olive-sided flycatcher, and rusty blackbird are wetland dependent species and were generally observed within or near wetland habitats. Canada warbler and olive-sided flycatcher were primarily observed during the breeding season, although several individuals were also observed during spring or fall migration surveys. Rusty blackbird was observed exclusively during the breeding season. Common nighthawk is also presumed to breed within the Study Area based on the results of the targeted nightjar surveys.

Evening grosbeak was observed during winter and spring surveys. Of the avian SAR identified, evening grosbeak is the only species which overwinters in Nova Scotia. This species is likely to overwinter within the Study Area based on field observations and its preference for coniferous and mixedwood forest.

Eastern wood-pewee was observed once, during fall migration surveys. This species could breed within the Study Area based on its known preference for mature forest and riparian areas; however, it was not observed during the breeding season.

Bobolink was detected exclusively during the acoustic assessment using an autonomous recording unit (ARU) as a nocturnal migrant during spring migration. While this species may migrate through the area, the Study Area does not contain suitable breeding habitat (i.e., agricultural fields and grasslands). Barn swallow, which was observed during breeding bird surveys, likely breeds in rural areas outside of the Study Area and may forage within the Study Area. No suitable nesting structures for barn swallow were observed within the Study Area.

10.4.5 Avian Species at Risk Habitat Modelling

10.4.5.1 *Avian Species at Risk Habitat Modelling Methods*

Habitat modelling was completed to provide an evaluation of habitat availability and habitat loss for avian SAR that were observed during field surveys or that are likely to occur near the

Project. Habitat preferences for each species were used to create models in ArcGIS Pro, which were then used to estimate the abundance of suitable habitat. The model criteria for each species are as follows:

Barn Swallow

This species forages over a wide range of open and semi-open habitats, including natural and anthropogenic environments, and often nests on anthropogenic structures. Buildings (e.g., houses, camps, sheds, garages, barns) and bridges were identified and buffered 600 m to allow for their respective foraging range.

Canada Warbler

To account for moist forests with a dense, deciduous shrub layer, complex understory, and available perch trees, the NSECC WAM GIS layer (NSECC, 2022c) was filtered to include values up to 0.5 m depth to water and overlaid with forestry data. The NSNR forestry GIS inventory data (NSNR, 2021g) was queried to include the FORNON code 39, which are areas where alders (*Alnus* spp.) comprise 75% or more of the total canopy. Records where the leading species (SP1) was indicated as tamarack (*Larix laricina*), red maple, balsam fir, and black spruce were included in the model. Stands including larch as the second or third most abundant species were also included. These methods are consistent with habitat requirements outlined in the document ECCC Recovery Strategy for the Canada Warbler (*Cardellina canadensis*) in Canada (2016b).

Common Nighthawk

Open ground and/or clearings for nesting (e.g., sandy areas, open forests, grasslands, wetlands, barrens, and other rocky areas) were considered from the land cover classification. A 10 m buffer was included on the road network, including unpaved forestry roads [Government of Nova Scotia's Topographic Database (GeoNOVA, 2024c)], to account for push up topography features from past road construction. The CNWI was filtered to include only open wetland types (e.g., bog, bog or fen, fen, marsh). The land cover types of "Urban, Landfill, Quarry, Transport Corridor", "Utility Corridor", or "Blueberries or Barren" were queried. These methods are consistent with habitat requirements outlined in the document ECCC Recovery Strategy for the Common Nighthawk (*Chordeiles minor*) in Canada (2016c).

Evening Grosbeak

The NSNR forestry GIS inventory data (NSNR, 2021g) was used to select stands with a suitable species composition. Since nesting often occurs in large, mature mixedwood stands with a high percentage of fir, spruce, tamarack, pine, and aspen, these were filtered from SP1 to include all pine, fir, and spruce species in addition to tamarack that composed greater than 50%, but less than 70% of a given stand.

Olive-sided Flycatcher

The forest inventory data was filtered to select for stands where the leading species attribute included any of the following species:

- Black spruce
- Red spruce
- White spruce
- Scots pine
- Red pine
- Jack pine
- Eastern hemlock (*Tsuga canadensis*)

The archived Crown harvest plans and harvest land cover class received a 20 m internal buffer to include only edge habitat. All wetlands were included from the CNWI data. Burn data was also included as habitat in the analysis. A large burn area from 2020 intersects the Study Area.

Further filtering the leading species attribute field to a height greater than 12 m was not completed due to the resulting significant habitat loss. These methods are consistent with habitat requirements outlined in the document ECCC Recovery Strategy for the Olive-sided Flycatcher (*Contopus cooperi*) in Canada (2016b).

Rusty Blackbird

Forest inventory data was filtered based on potential wet softwood forests (e.g., fir and all spruce near water bodies or wetlands). To capture wet areas containing the softwood species specified and potential softwood dominated treed swamps, the forestry data was intersected with wet areas mapping of 50 cm or less and the Canadian Nation Wetland Inventory database. Forest stands flagged with breeding evidence were included.

10.4.5.2 Avian SAR Habitat Modelling Results

The habitat models were used to calculate the amount of predictive habitat for each species within the Clearing Footprint, Study Area, and a 5 km buffer of the Study Area (Table 10.35).

Table 10.35: Potential Avian SAR Habitat within Various Spatial Boundaries

Species	Clearing Footprint		Study Area		5 km of the Study Area	
	ha	%	ha	%	ha	%
Barn Swallow	35	3	1,642	8	16,905	26
Canada Warbler	148	11	2,296	11	6,226	10
Common Nighthawk	313	23	3,051	15	9,502	15
Evening Grosbeak	72	5	1,131	5	3,788	6
Olive-sided Flycatcher	256	19	6,424	31	14,542	22
Rusty Blackbird	82	6	1,518	7	4,016	6

(1)Calculations based on a Clearing Footprint of 1,380.3 ha, Study Area of 20,733.8 ha, and 5 km buffer of 64,914 ha.

Drawings 10.15A to 10.15F show the results of the habitat modelling for each species.

Barn swallow nests primarily on human-made structures, and no negative Project-related impacts to their nesting habitat are anticipated. Some loss of foraging habitat (e.g., open areas, wetlands, etc.) may occur. Of the 16,905 ha of predictive barn swallow habitat within a 5 km buffer of the Study Area, 35 ha (0.21%) overlaps with the Clearing Footprint. This amount consists of foraging habitat, as no suitable structures for nesting are present within the Clearing Footprint. While this species had the most predicted habitat within 5 km, the proportion anticipated to be impacted by the Project was the smallest of the five species modelled.

Canada warbler nests in a variety of shrubby and treed wetlands. This species is often associated with wet, mixedwood forest with a well-developed deciduous shrub layer (COSEWIC, 2020). Of the 9,502 ha of predictive Canada warbler habitat within a 5 km buffer of the Study Area, 148 ha (2.4%) overlaps with the Clearing Footprint. This species had the third highest amount of predicted habitat within 5 km; however, the proportion anticipated to be impacted by the Project is relatively low.

Common nighthawk nests primarily in open habitats with bare ground (e.g., clearcuts, fields, rock outcrops, barrens, open wetlands, etc.) (COSEWIC, 2018b; NSNR, 2021i). Forestry activity within the Study Area has created open habitat that may be suitable for common nighthawk. Open bogs and barrens are also present and may offer suitable nesting habitat. Of the 9,502 ha of predictive common nighthawk habitat with a 5 km buffer of the Study Area, 313 ha (3.3%) overlaps with the Clearing Footprint. Common nighthawk was the species with the highest proportion of predicted habitat to be altered by the Project; however, it is possible that clearing associated with the Project could increase the amount of suitable breeding habitat for this species.

Evening grosbeak nests primarily in mature softwood and mixedwood forested habitats, where spruce or fir are dominant (COSEWIC, 2016a). Of the modelled SAR, evening grosbeak is the only species that overwinters in Nova Scotia. This species was recorded within the Study Area in December, suggesting the Study Area likely provides suitable overwintering habitat. Since evening grosbeak's breeding habitat and overwintering habitat are similar, this model can be used to estimate both. Of the 3,788 ha of predictive evening grosbeak habitat within a 5 km buffer of the Study Area, 72 ha (1.9%) overlaps with the Clearing Footprint.

Olive-sided flycatcher typically nests in open habitats such as open wetlands (i.e., bogs, fens, riparian areas), and near forest edges with coniferous trees and tall trees and/or snags for perching (COSEWIC, 2018c). Of the 14,542 ha of predictive olive-sided flycatcher habitat within a 5 km buffer of the Study Area, 256 ha (1.76%) overlaps with the Clearing Footprint. This species had the second highest amount of predicted habitat within 5 km; however, the proportion anticipated to be impacted by the Project is relatively low.

Rusty blackbird nests in wetlands and riparian areas that typically feature open water and are surrounded by coniferous or mixedwood forest (COSEWIC, 2006). Of the 4,016 ha of predictive rusty blackbird habitat within a 5 km buffer of the Study Area, 82 ha (2.0%) overlaps with the Clearing Footprint. Rusty blackbird was among the species with the least predicted habitat within 5 km, and the proportion anticipated to be altered by the Project is relatively low.

The results of the habitat modelling show that local habitat loss for avian SAR should be low, and that the amount of suitable habitat within the Clearing Footprint is low relative to the amount of suitable habitat present within a 5 km buffer of the Study Area. The species with the highest potential for habitat loss based on the results of this analysis is common nighthawk. The habitat types favoured by this species have often been heavily disturbed (open areas, clearcuts etc.), and the Project has prioritized the use of these areas to minimize impacts to more intact and/or ecologically significant habitats. It is possible that clearing for the Project could result in the creation of new common nighthawk habitat.

10.4.6 Remote Sensing

10.4.6.1 Remote Sensing Methodology

Avian Radar System

Avian radar assessments were undertaken during the spring and fall 2023 migratory periods. The objective of the avian radar assessment was to assess migratory bird activity in the airspace above the Study Area. Two Simrad Halo 20 pulse compression marine surveillance radars were deployed within the Study Area and angled diagonally at 45° above the horizon. These avian radar systems (ARS) each consisted of two x-band pulse compression surveillance radars oriented specifically to scan the airspace approximately 50 m to 3,000 m above the Project. The diagonal orientation allowed for a 150° scan of the airspace above each ARS, while the 210° below the radar is blanked. The diagonal orientation also allows for the calculation of the height of any potential avian target.

One ARS unit (Fishermans Harbor ARS) was placed in the southeastern portion of the Study Area near the Country Harbor Ferry from April 16 to November 27, 2023, and operated for 182 days. The second ARS unit (Indian River Road ARS) was placed in the northwestern portion of the Study Area near the community of Melrose from April 11 to November 27, 2023, and operated for 203 days (Drawing 10.16). These locations provided good sightlines into the airspace above the Project, southern exposure for solar charging, sufficient cellular and satellite coverage for remote communications, and accessibility for spot checks.

The ARS units were mounted off the ground to minimize ground noise interference and lessen the impact of local microtopography on data collection and quality. The systems were designed to charge and store energy using solar panels and a battery bank, while also powering the radar and associated equipment for data collection and remote communications. Since most birds migrate nocturnally, the ARS was programmed to collect data between sunset and sunrise.

Avian radar scans were processed using the radR platform – an open-source platform designed for the processing of radar data for biological applications – and outputs were analyzed using Microsoft Excel (P. Taylor et al., 2010). Standard settings for the identification of biological targets (BT), such as birds, and bats were used. Targets reflected by the radar generate blips in the image of the radar scan. radR helps filter sequential images of radar

scans to identify blips that occur in the same area over at least four out of five scans. Should these constraints be met, a target is generated. BTs are most likely generated by birds, but could also be bats and insects, or even drones and planes. Weather occurrences, such as fogs, rain, and low cloud cover, may cause interference with the radar (similarly to weather radar), which lowers the effectiveness of the system and reduces the reliability of the system's ability to detect birds. As such, data was excluded from the analysis when the minimum hourly rainfall exceeds 0.5 mm. Rainfall data was obtained from ECCC's Collegeville Weather Station (ECCC, 2025d).

Data analysis of radar results focused on assessing the number of targets moving through the Study Area and at what heights flyovers occurred, especially during the migration seasons. Assessment of migratory cues were also conducted to visualize potential weather and climatic conditions (i.e., wind speed, wind direction, temperature, lunar cycle) that may influence migratory patterns. Data analysis also assessed migratory bird density at various height bins comparable with altitudinal heights to demonstrate potential target interactions with turbines.

Detailed methods are provided in Appendix N.

Acoustic Assessment

Two ARUs were deployed within the Study Area between May 25 and November 27, 2023, to assess the activity of birds migrating nocturnally over the Project. The ARUs, labelled FHBird1 and IRRBird1 were deployed in the western and southwestern portions of the Study Area alongside the ARS' (Drawing 10.16). The ARUs were placed in clearings or along roads for ease of access, to reduce noise interference from overhanging vegetation, and to provide open access of the microphone to the sky.

Audio recordings from the ARUs were run through Nighthawk, a machine learning model that specializes in the detection and classification of avian nocturnal flight calls. The output files were then manually verified by Strum environmental scientists, to assess the accuracy of the model.

Manual verification was completed using Raven Pro, a computer program specializing in the visualization and analysis of sounds. The scientists listened to approximately 30 vocalizations (or all vocalizations if fewer than 30 were detected) for each species identified by Nighthawk. The vocalizations were annotated 'Y' if the species-level identification made by the model was correct, or 'N' if the identification was incorrect.

Detailed methods are provided in Appendix N.

10.4.6.2 Remote Sensing Results

Radar Results

Data collected by the ARS units during the 2023 monitoring period was analyzed to provide the number of biological target (nBTs) by date, time, height and by migratory cue. Data was also

analyzed to determine target density within height bins and the percentage of potential targets within the rotor swept area (i.e., risk zones of turbine interaction). A snapshot of radar results is provided below and detailed results can be found in Appendix N.

During the 2023 monitoring period, the Fishermans Harbour ARS detected 9,074 BTs and the Indian River Road ARS detected 6,102 BTs (Figure 10.3).

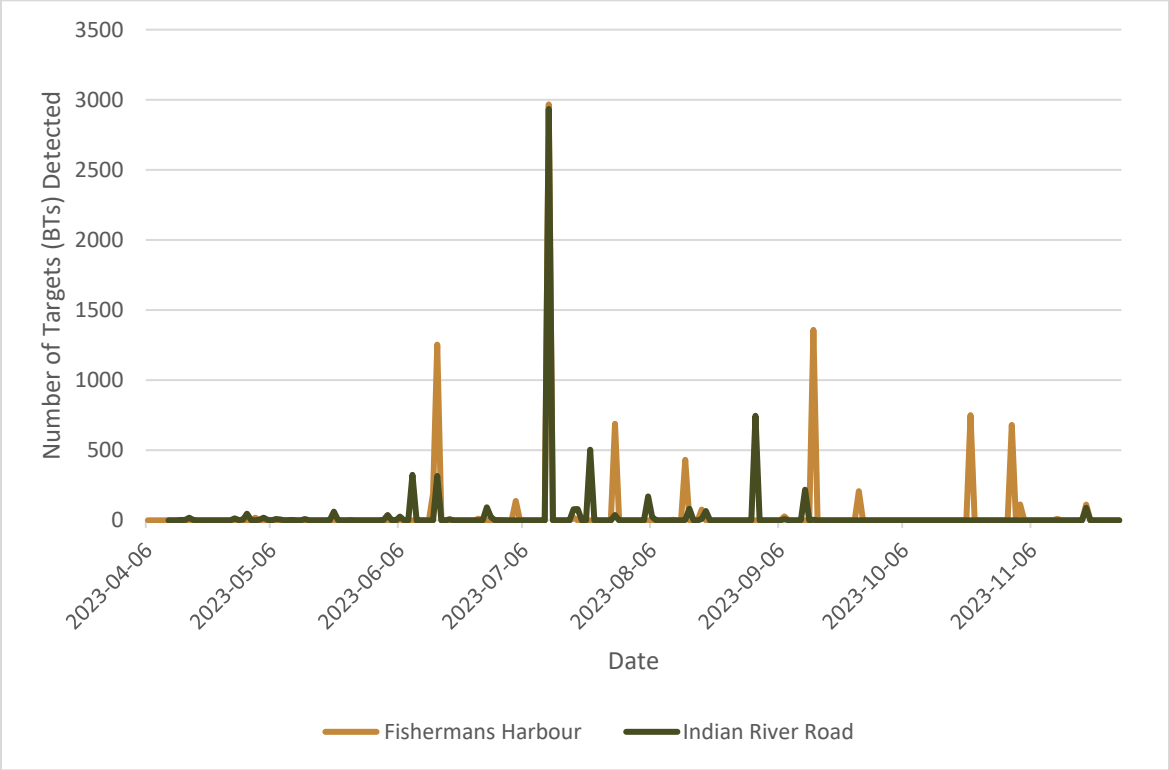

Figure 10.3: Number of BTs detected throughout the 2023 Monitoring Period

During spring 2023, the Fishermans Harbour ARS detected 19 BTS, with all detections occurring on May 2. All BTs were detected at heights between 250 m and 2,000 m, with the highest proportion (74%) occurring between 500 m and 1,500 m. The Indian River Road ARS detected 282 BTs during spring, with detections peaking on April 30 (nBTs = 47), May 21 (nBTs = 62), and June 3 (nBTs = 38). Most BTs (53%) were detected at heights between 50 m and 100 m.

During summer 2023, the Fishermans Harbour ARS detected 4,572 BTs, with detections peaking on June 14 (nBTs = 191), June 15 (nBTs = 1,254), July 4 (nBTs = 139) and July 12, 2023 (nBTs = 2,967). Most BTs (90%) were detected at heights between 250 m and 1,500 m. The Indian River Road ARS detected 3,699 BTs during the summer, with detections peaking on June 9 (nBTs = 325), June 15 (nBTs = 316), and July 12 (nBTs = 2,934). Most BTs (90%) were detected at heights between 250 m and 1,500 m.

During fall 2023, the Fishermans Harbour ARS detected 4,483 BTs, with detections peaking on July 28 (nBTs = 689), September 14 (nBTs = 1,359), October 22 (nBTs = 750) and November 1 (nBTs = 680). Most BTs (92%) were detected at heights between 250 m and 1,500 m. The Indian River Road ARS detected 2,121 BTs during the fall, with detections peaking on July 22 (nBTs = 504), August 5 (nBTs = 170), August 31 (nBTs = 746), and September 12 (nBTs = 218). Most BTs (93%) were detected at heights between 250 m and 1,500 m.

Table 10.36 summarizes the number of detections made per season, and their respective height bins.

Table 10.36: Number of BTs Detected per ARS Height Bin During the 2023 Monitoring Period

Height Bin (m)	Number of Targets Detected (Spring)		Number of Targets Detected (Summer)		Number of Targets Detected (Fall)	
	Fishermans Harbour	Indian River Road	Fishermans Harbour	Indian River Road	Fishermans Harbour	Indian River Road
0-25	0	0	0	0	0	0
25-50	0	0	0	0	0	0
50-100	0	150	7	14	9	2
100-150	0	1	57	39	44	14
150-200	0	1	81	47	42	13
200-250	0	1	86	51	44	8
250-500	3	20	907	513	741	227
500-1,000	7	84	2,319	1,847	2,345	1,176
1,000-1,500	7	22	886	956	1,024	562
1,500-2,000	2	3	229	232	234	119
2,000-3,000	0	0	0	0	0	0
Total	19	282	4,572	3,699	4,483	2,121

Timing of Migratory Movement

The ARS was active between sunset and sunrise throughout the 2023 monitoring period. During spring, all BTs detected by the Fishermans Harbour ARS occurred between 01:00 and 02:00. The Indian River Road ARS detected most BTs (46%) between 18:00 and 22:00.

During summer, the Fishermans Harbour ARS detected most BTs (58%) between 03:00 and 04:00. The Indian River Road ARS detected most BTs (80%) between 01:00 and 03:00.

During fall, the Fishermans Harbour ARS detected most BTs (47%) between 20:00 and 22:00. The Indian River Road ARS detected most BTs (47%) between 18:00 and 21:00.

Across all seasons, BT detections were highest between 01:00 and 03:00. Figure 10.4 summarizes the timing of detections made throughout the 2023 monitoring period.

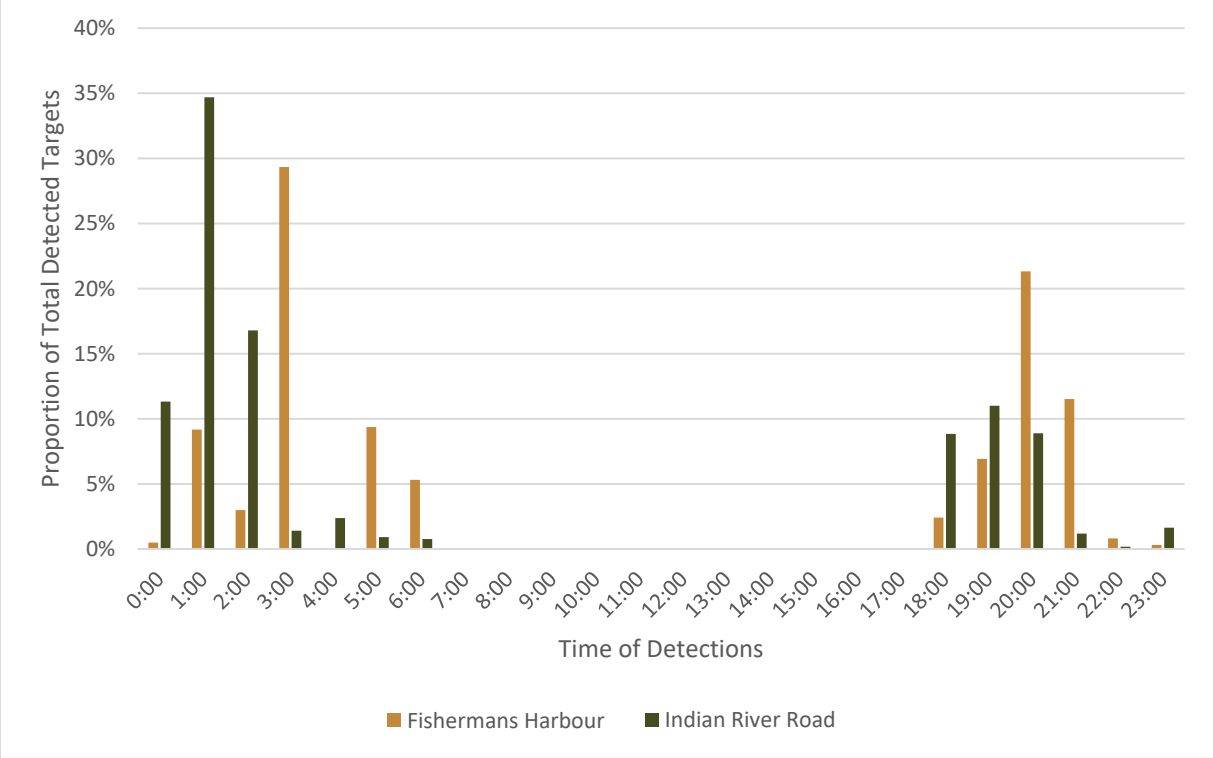

Figure 10.4: Timing of BT Detections Throughout the 2023 Monitoring Period

Target Density

ARS target density was calculated using the number of targets detected during the 2023 monitoring period and the volume of airspace scanned within each height bin.

Across all seasons, target density was relatively consistent with target count, with no unexpected variation observed. Target density for both ARU units was higher during summer and fall, and relatively low during spring.

During spring, target density detected by the Fishermans Harbour ARS increased above 200 m and peaked in the 500 m to 1,000 m range bin. Spring target density detected by the Indian River Road ARS peaked in the 150 m to 200 m range bin. Spring was the only season during which target density and target count were higher at the Indian River Road ARS than the Fishermans Harbour ARS.

During summer, target density detected by both the Fishermans Harbour ARS and the Indian River Road ARS increased above 100 m and peaked in the 500 m to 1,000 m range bin.

During fall, target density detected by the Fishermans Harbour ARS increased above 100 m and peaked in the 500 m to 1,000 m range bin. Fall target density detected by the Indian River Road ARS increased above 200 m and peaked in the 500 m to 1,000 m range bin.

Table 10.37 provides a summary of target density calculations for the 2023 monitoring period.

Table 10.37: Target Density – All Seasons

Range Bin (m)	Target Density (BT/km³) - Spring		Target Density (BT/km³) - Summer		Target Density (BT/km³) - Fall	
	Fishermans Harbour	Indian River Road	Fishermans Harbour	Indian River Road	Fishermans Harbour	Indian River Road
0-25	0.00	0.00	0.00	0.00	0.00	0.00
25-50	0.00	0.00	0.00	0.00	0.00	0.00
50-100	0.00	736.74	34.38	68.76	44.20	9.82
100-150	0.00	4.89	279.00	190.90	215.37	68.53
150-200	0.00	4.87	394.74	229.04	204.68	63.35
200-250	0.00	4.85	416.87	247.21	213.28	38.78
250-500	2.85	19.01	862.17	487.64	704.37	215.78
500-1,000	3.14	37.74	1,041.78	829.74	1,053.46	528.30
1,000-1,500	3.00	9.41	379.12	409.07	438.17	240.48
1,500-2,000	0.82	1.24	94.39	95.63	96.46	49.05
2,000-3,000	0.00	0.00	0.00	0.00	0.00	0.00

Avian Interactions with the Project

Based on the height and rotor diameter of the proposed turbine model, birds flying at heights between 38 m and 221 m would be at potential risk of interacting with Project infrastructure; this range is also referred to as the rotor swept area. The number of BTs detected within or above the rotor swept area during the 2023 monitoring period is shown in Figure 10.5.

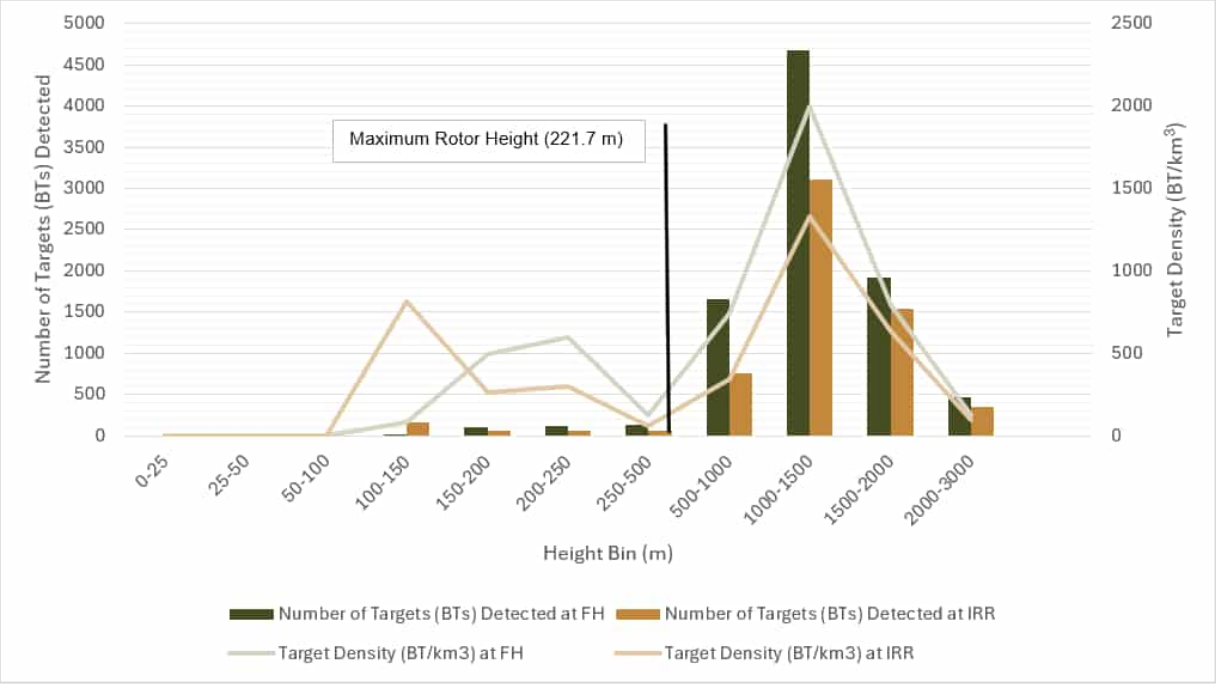

Figure 10.5: Number of Detections Within or Above the Rotor Swept Zone During the 2023 Fishermans Harbour (FH) and Indian River Road (IRR) ARS Monitoring Period

During the 2023 monitoring period, 98% of the BTs detected by the Fishermans Harbour ARS were detected above the rotor swept area. The number of targets within the rotor swept area peaked on June 15 (nBTs = 32), July 12 (nBTs = 109) and September 14 (nBTs = 43). In total, 247 BTs were detected within the rotor swept area of potential turbines, which accounts for 3% of the BTs detected by this ARS (Figure 10.5)

During the 2023 monitoring period, 95% of the BTs detected by the Indian River Road ARS were detected above the rotor swept area. The number of targets within the rotor swept area peaked on April 16 (nBTs = 19), April 30 (nBTs = 47) and July 12 (nBTs = 63). In total, 281 BTs were detected within the rotor swept area of potential turbines, which accounts for 5% of the BTs detected by this ARS (Figure 10.5)

Acoustic Monitoring Results

Data collected by the two ARUs during the 2023 monitoring period was analyzed to provide peak detection periods and presence of species within the Study Area. A snapshot of the acoustic monitoring results is provided below, and detailed results can be found in Appendix N.

FHLBird1

The Nighthawk model made 41,796 detections from the FHLBird1 data during the 2023 monitoring period. Approximately 35% of the detections occurred during spring, 39% occurred during summer, and 26% occurred during fall. Most of the detections occurred in the hours around sunrise and sunset.

A subset of 907 detections was manually verified by Strum environmental scientists, and of those, 285 (31%) were correctly identified by Nighthawk. Nighthawk was most successful at detecting the following species, all of which had a success rate of 100% when a sample of detections was manually verified:

- American robin
- Canada warbler
- Dark-eyed junco
- Grey-cheeked thrush (*Catharus minimus*)
- Dickcissel (*Spiza americana*)
- Northern parula
- Mourning warbler
- Palm warbler
- Wood thrush (*Hylocichla mustelina)*

IRRBird1

The Nighthawk model made a total of 66,227 detections from the IRRBird1 data during the 2023 monitoring period. Approximately 10% of the detections occurred during spring, 19% occurred during summer, and 71% occurred during fall. Most of the detections occurred in the hours around sunrise and sunset.

A subset of 1,114 detections was manually verified by Strum environmental scientists, and of those, 494 (44%) were correctly identified by Nighthawk. Nighthawk was most successful at detecting the following species, all of which had a success rate of 95% or higher when a sample of detections was manually verified:

- American robin
- Common yellowthroat
- Dark-eyed junco
- Mourning warbler
- Palm warbler

Table 10.38 provides a summary of species correctly identified between the two ARUs during the 2023 monitoring period.

Table 10.38: Summary of Species Correctly Identified by Nighthawk during the 2023 Acoustic Monitoring Period

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
American Pipit	*Anthus rubescens*	-	-	-	S4M
American Redstart	*Setophaga ruticilla*	-	-	-	S5B
American Robin	*Turdus migratorius*	-	-	-	S5B,S5N
American Tree Sparrow	*Spizelloides arborea*	-	-	-	S4N
Black-and-white Warbler	*Mniotilta varia*	-	-	-	S5B
Black-billed Cuckoo	*Coccyzus erythropthalmus*	-	-	-	S3B
Black-throated Blue Warbler	*Setophaga caerulescens*	-	-	-	S4B
Bobolink	*Dolichonyx oryzivorus*	Special Concern	Threatened	Vulnerable	S2S3B
Canada Warbler	*Cardellina canadensis*	Special Concern	Threatened	Endangered	S2S3B
Cape May Warbler	*Setophaga tigrina*	-	-	-	S3S4B,S4M
Chestnut-sided Warbler	*Setophaga pensylvanica*	-	-	-	S5B
Chipping Sparrow	*Spizella passerina*	-	-	-	S4B
Common Yellowthroat	*Geothlypis trichas*	-	-	-	S5B
Dark-eyed Junco	*Junco hyemalis*	-	-	-	S5
Dickcissel	*Spiza americana*	-	-	-	SNA
Greater Yellowlegs	*Tringa melanoleuca*	-	-	-	S3B,S4M
Grey-cheeked Thrush	*Catharus minimus*	-	-	-	SUB

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Hermit Thrush	*Catharus guttatus*	-	-	-	S5B
Indigo Bunting	*Passerina cyanea*	-	-	-	S1B,SUM
Least Sandpiper	*Calidris minutilla*	-	-	-	S1S2B,S2S4M
Lincoln's Sparrow	*Melospiza lincolnii*	-	-	-	S4B
Mourning Warbler	*Geothlypis philadelphia*	-	-	-	S4B
Nashville Warbler	*Leiothlypis ruficapilla*	-	-	-	S4B,S5M
Northern Parula	*Setophaga americana*	-	-	-	S5B
Northern Waterthrush	*Parkesia noveboracensis*	-	-	-	S5B
Ovenbird	*Seiurus aurocapilla*	-	-	-	S5B
Palm Warbler	*Setophaga palmarum*	-	-	-	S5B
Red-breasted Nuthatch	*Sitta canadensis*	-	-	-	S5
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	-	-	-	S3S4B
Savannah Sparrow	*Passerculus sandwichensis*	-	-	-	S4B,S5M
Semipalmated Plover	*Charadrius semipalmatus*	-	-	-	S1B,S3S4M
Short-billed Dowitcher	*Limnodromus griseus*	-	-	-	S3M
Solitary Sandpiper	*Tringa solitaria*	-	-	-	SUB,S3S4M
Spotted Sandpiper	*Actitis macularius*	-	-	-	S4B
Swainson's Thrush	*Catharus ustulatus*	-	-	-	S4B,S5M
Veery	*Catharus fuscescens*	-	-	-	S4S5B
White-throated Sparrow	*Zonotrichia albicollis*	-	-	-	S4S5B,S5M
Wilson's Warbler	*Cardellina pusilla*	-	-	-	S3B,S4M
Wood Thrush	*Hylocichla mustelina*	Threatened	Threatened	-	SUB

Source: (ACCDC, 2026b)

Avian SOCI detected:

- Black-billed cuckoo (*Coccyzus erythropthalmus;* 3)
- Cape May warbler (6)
- Greater yellowlegs (38)

- Indigo bunting (*Passerina cyanea;* 1)
- Least sandpiper (*Calidris minutilla;* 5)
- Rose-breasted grosbeak (*Pheucticus ludovicianus;* 4)
- Semipalmated plover (1)
- Short-billed dowitcher (*Limnodromus griseus;* 14)
- Solitary sandpiper (*Tringa solitaria;* 6)
- Wilson's warbler (*Cardellina pusilla;* 7)

Avian SAR detected:

- Bobolink (2)
- Canada warbler (38)

Both bobolink detections occurred during spring migration. The Canada warbler detections were primarily made during spring and fall migration; however, two detections were also made in the summer (June). These detections could either represent late spring migrants, or locally breeding individuals moving around their breeding ground.

10.4.7 Effects Assessment

Project-Avifauna Interactions

Project activities, primarily those that involve earth moving or vegetation removal, or turbine interactions with avifauna in the airspace have the potential to impact avifauna (Table 10.39). These activities could result in habitat removal, edge effects, reductions in food availability, and avifauna-turbine interactions (i.e., sensory disturbance, injury, or mortality). Other Project related activities, including during construction and operation, may impact avifauna behaviours, such as increased traffic and noise.

Table 10.39: Potential Project-Avifauna Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X

Project Phase	Potential for Interaction
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

For the purposes of this assessment, the LAA for avifauna includes a 5 km buffer of the Study Area (Drawing 10.10) as well as the airspace that is directly surrounding the turbines to account for the rotor swept area (i.e., risk zone). The RAA is the boundaries of ecoregions that intersect the Study Area, bounded by the Moser River, and the Pictou Antigonish Highlands, and Governor Lake ecodistricts. This area was selected to support the assessment of cumulative effects (Section 16.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 also apply for avifauna. The VC-specific definition for magnitude is as follows:

- Negligible: No loss of avifauna habitat, no sensory disturbance impacts, and injuries or mortalities to avifauna are not expected.
- Low: Small loss of habitat supporting SAR and habitat sensitive avifauna, low sensory disturbances, and low risk of injuries and mortalities.
- Moderate: Moderate loss of habitat supporting SAR and habitat sensitive avifauna, moderate sensory disturbances, and moderate risk of injuries and mortalities on individual level rather than entire populations.
- High: High loss of habitat supporting SAR and habitat sensitive avifauna, high sensory disturbances, and high risk of injuries and mortalities that would be sufficient to impact species on a population scale.

Effects

Project Activities may have the following impacts on avifauna:

- Habitat loss, fragmentation, and edge effects
- Sensory disturbance (i.e., lighting and noise)
- Injury and mortality

Habitat Loss

Habitat loss is considered one of the biggest threats to bird populations and a key driver behind population declines observed across Canada in recent decades (Birds Canada & ECCC, 2024). This assessment uses an estimate of 1,380.3 ha of clearing (the Clearing Footprint) to evaluate habitat impacts; however, much of the area cleared represents a temporary impact that will be allowed to revegetate following construction. The Project will include up to 107 turbines, with each turbine pad measuring approximately 100 m x 100 m. The Project also includes 163 km of roads, 110 km (67%) of which will be newly constructed and 53 km (33%)

of which are existing. The Project Footprint has maximized the use of existing roads, which will decrease the amount of habitat loss associated with road construction.

The most abundant habitat types within the Study Area are softwood forest (26%), open areas (16%), and open wetlands (16%). The greatest impacts from clearing will be to softwood forest, open areas, and mixedwood forest, which together comprise approximately 65% of the Clearing Footprint. Harvested lands and disturbed areas were prioritized for the siting of Project infrastructure, where possible, to minimize habitat loss. For instance, 207 ha (15%) of the Clearing Footprint consists of disturbed habitat types including cutovers and urban/developed lands.

Impacts to wetlands, which can provide valuable habitat for avifauna (including several avian SAR), are expected to be low. Approximately 62 ha of field delineated and predicted wetland within the Assessment Area, predominantly treed and/or shrub swamp, may require alteration permitting. This represents approximately 0.5% of the wetland habitat available within the LAA based on land cover modelling. A portion of the wetland vegetation impacts within the Clearing Footprint will be temporary, as many of these areas will be allowed to revegetate following construction. On a proportional basis, impacts to wetlands (e.g., open wetlands) are lower in the Clearing Footprint than the Study Area and LAA due to efforts to minimize impacts to wetlands (described further in Section 10.1).

A total of 15 wetlands within the Assessment Area were found to support avian SAR: nine containing Canada warbler, four containing olive-sided flycatcher, one containing both Canada warbler and olive-sided flycatcher, and one containing Canada warbler, olive-sided flycatcher, and rusty blackbird. Of these, 14 are expected to require partial alterations that would affect between 3% and 50% of their total area.

For SAR identified, the construction of turbine pads and new roads may either create or reduce suitable habitat within the Clearing Footprint. Suitable breeding habitat is anticipated to decrease for species such as Canada warbler and rusty blackbird, which prefer intact habitats. Suitable breeding habitat is anticipated to increase for common nighthawk due to their affinity for open, disturbed habitats. Similarly, foraging habitat for olive-sided flycatcher may increase as this species utilizes edge habitat and clear-cuts for foraging, though these habitats may be less suitable for nesting. Robertson & Hutto (2007) found that nesting success in olive-sided flycatcher was twice as high when the birds nested in naturally occurring habitats (e.g., open wetlands) compared to human-influenced habitats (e.g., clearcut edges).

Other potential impacts from habitat loss can include increased competition for territory, nesting areas, and foraging areas, and in some cases changes in migratory patterns if stopover areas are reduced or food availability decreases (Chen & Wang, 2024).

Avian Species at Risk Habitat Modelling

Avian SAR habitat modelling was completed to identify potential habitat for barn swallow, Canada warbler, common nighthawk, evening grosbeak, olive-sided flycatcher, and rusty blackbird (Drawings 10.15A to 10.15F).

Predicted habitat within the LAA with potential to be impacted by the Project was low, ranging from 0.2% to 3.3%. Common nighthawk, which prefers open, disturbed habitats, was the species with the highest proportion of predicted habitat anticipated to be impacted by the Project. This result was expected, as the Project prioritized the use of disturbed areas (e.g., clearcuts) to minimize impacts to more intact, ecologically significant habitats. It should also be noted that new habitat for this species may be created as a result of clearing for the Project.

Predicted habitat loss was lowest for barn swallow, with potential impacts to 0.2% of the predicted available habitat within the LAA. Clearing for the Project would primarily impact foraging habitat, with no impacts to potential nesting structures (buildings, bridges, etc.) anticipated.

While Canada warbler, olive-sided flycatcher, and rusty blackbird are all wetland dependent species, their modelling results varied due to differences in specific habitat preferences (e.g., wetland type and dominant vegetation type), and the relative abundance of each habitat type. Of these three species, Canada warbler, which prefers treed swamps and shrub swamps, had the highest amount of predicted habitat within the LAA with potential to be impacted by the Project (2.4%). Canada warbler was also the most abundant avian SAR encountered during avian field surveys (and incidentally during other field programs), with 82 observations made between 2023 and 2025.

The avian SAR habitat modelling results suggest that habitat for each of these species is not unique to the Clearing Footprint and is abundant within the Study Area and LAA.

Based on the avian SAR habitat modelling results, the Project's prioritization of existing road infrastructure, and the prioritization of open or disturbed habitats, overall impacts to avifauna from habitat loss are anticipated to be low.

Habitat Fragmentation

Wind energy projects have been associated with habitat fragmentation due to large road networks typically required to access turbines (Diffendorfer et al., 2019). Habitat fragmentation, defined as the conversion of continuous habitat into small and isolated patches (Meffe & Carroll, 1994) can have a variety of impacts on avifauna, including changes in species composition, nesting success, competition, and predation (Andrén, 1994; Chen & Wang, 2024; Schmiegelow & Mönkkönen, 2002).

Habitat fragmentation can influence habitat suitability for avifauna species, leading to changes in species composition within a given area. Habitat fragmentation has been shown to increase the number of habitat generalist species while also decreasing the number of habitat specialists. Habitat generalists have a higher likelihood of surviving in smaller habitat patches in a mosaic landscape (e.g., a road network associated with a wind project) due to their ability to utilize various habitat patch types (Andrén, 1994). Some bird species (i.e., forest interior birds) occupy large territories and require large, contiguous tracts of habitat. Forest interior species such as American goshawk, black-backed woodpecker, and bay-breasted warbler,

which were detected during field studies for the Project, tend to prefer larger, intact habitats and may be more sensitive to changes in habitat continuity. Studies suggest that forest interior or “area-sensitive” bird species occur less frequently in smaller, more isolated habitat patches, and have lower nesting success when they do occur in these habitats (Austen et al., 2001).

Forest interior species such as American goshawk, which occupy particularly large territories, are likely more susceptible to impacts from habitat fragmentation than species which occupy smaller territories. A study conducted in Nova Scotia (Whynot, 1999) found that American goshawks nested in forest stands with an average size of 11.6 ha. When species that require a large territory are displaced by fragmentation, they may have a harder time finding new territories that are large enough and also meet their other habitat requirements. Smaller interior forest birds such as bay-breasted warbler, which are believed to have smaller territory requirements (1.6 to 3.6 ha) (Maine Audubon, 2017), would likely have a higher abundance of suitable alternate habitat patches to move to if displaced by habitat fragmentation.

For many forest interior species, habitat patch size is thought to be the variable that has the greatest influence on reproductive success, (Austen et al., 2001; Burke & Nol, 2000). Burke & Nol (2000) found that nesting success for interior forest birds in Ontario increased significantly as habitat patch size increased. Local forest cover was not found to have a significant impact on nesting success, suggesting that for area-sensitive species, habitat continuity may play a more important role in their success than overall habitat abundance.

Based on the configuration of Project road network (53 km of road upgrades and 110 km of new road development), an increase in road density will occur across the LAA, with the greatest increases concentrated in the southeastern portion of the Study Area where few existing roads are present (Drawing 3.2A to 3.2N). Since the southeastern portion of the Study Area is largely comprised of open habitat (i.e., shrubs and open wetlands), impacts to forest birds in that area would be minimal. Contiguous forest is most abundant along the northern edges of the Study Area, where proposed infrastructure is minimal.

Edge Effects

In addition to the division and isolation of suitable habitat, fragmentation can also cause edge effects, which impact avifauna by altering factors such as environmental conditions, predator behaviour, and food availability. “Edge effects” refer to changes that occur at the transition zone between habitat types (e.g., forest edges), which impact the species and habitats found there. The Project will create new areas of edge habitat when intact forest is cleared during the site preparation and construction phase. Similar to habitat fragmentation, the degree to which avifauna are impacted by edge effects varies depending on the species and specific site conditions.

Edge habitat may alter physical conditions like light, temperature (e.g., higher wind and sun exposure), and wind, which in turn influences vegetation structure and food availability, potentially impacting bird communities (Andrén, 1994). Bird species with different characteristics, such as habitat specialization, reproductive rates, and trophic guilds, may

respond differently to edge effects. For example, species that prefer low-light habitats (e.g., larger eyed birds like owls and thrushes) may be more sensitive to edge effects, while other bird species such as insectivores (e.g., flycatchers, swallows, and nightjars) and understory foragers may thrive in fragmentated habitats (Andrén, 1994; Tittler et al., 2001). Examples of species that rely on interior-forest habitat, especially with regards to nesting, include certain thrush (e.g., Swainson's thrush and wood thrush) and warbler species (e.g., bay-breasted warbler and ovenbird).

While the creation of edge habitat may negatively impact some species, it can also benefit others. For example, the creation of edge habitat and open areas has the potential to attract aerial insectivores. Some bird species benefit from forest edge habitat and have been shown to return in subsequent years after an area is cleared due to the availability of foraging opportunities and other niche habitats (Tittler et al., 2001). Additionally, some species (e.g., blackbirds) can also tolerate forestry activities as long as their habitat of coniferous dominant trees of varied heights near waterbodies is maintained (C. Stacier, avian biologist and professor at Dalhousie University, personal communication 2018). Consequently, cleared areas create open spaces and edges within the forested environment, which may benefit certain bird species that favour edge or transitional habitats. These changes could potentially create favorable microhabitats within the Clearing Footprint, particularly for generalist bird species or those that readily adapt to disturbed environments.

A total of 142.6 ha of intact interior forest is expected to be directly impacted by the Project, with 363.8 ha of new edge habitat created (Drawing 10.4A to 10.4D). Due to the linear nature of road infrastructure, most areas of new edge habitat will be associated with the development of new roads and upgrades to existing roads. Impacts on avifauna from increased edge effects are anticipated to be low, with indirect impacts estimated to affect 2.5% of the intact interior forest within the LAA. The Project's prioritization of existing road infrastructure has reduced the amount of new edge area that will be created. Furthermore, approximately 14,529.5 ha of intact interior forest habitat was identified within the LAA, which could provide alternative habitat for interior forest birds displaced by the increase in edge habitat created by the Project.

Summary

Within the Clearing Footprint, habitat loss, fragmentation and increased edge areas may have the following effects:

- Increase in the number of habitat generalist species
- Decrease in the number of habitat specialist species
- Increase in aerial insectivores/foraging habitat
- Increase in transitional and microhabitats
- Increase in suitable habitat for common nighthawk and olive-sided flycatcher (SAR)
- Decrease in suitable habitat for Canada warbler, evening grosbeak, and rusty blackbird (SAR)
- Increased avian predation

Overall, while habitat loss, fragmentation, and edge effects have the potential to negatively impact avifauna, the Project's prioritization of open and disturbed habitats, and the use of existing road infrastructure where possible, will reduce these impacts. The largest increase in road density will occur in open and disturbed habitats, which tend to support more habitat generalists and fewer habitat specialists (including SAR). Some species may also benefit from new habitats created by clearing activities, and overall habitat functionality across the LAA is expected to remain intact.

Sensory Disturbance – Light and Noise

Construction and operation activities for the Project including increased traffic, noise, and lighting have the potential to disturb bird species within the LAA.

Sensory disturbance may occur during all Project phases, though it will be more prevalent during construction (limited to daylight hours, when possible, during construction), with limited disturbance through operations (i.e., consistent and sporadic noise and lighting generated by traffic and facility operations). The noise and light will be concentrated in the Study Area but could also extend beyond it into the portions of the LAA that are near the Project Footprint. Increased movement of vehicles could lead to short-term displacement of birds, particularly ground-nesting or low-flying species within proximity to access routes. Traffic disturbance can be particularly stressful for species with established territories within the area, potentially prompting them to abandon nests or avoid otherwise suitable habitat. Overall, while these construction-related disturbances are temporary, they may cause localized changes in bird distribution and behaviour during the active phases of the Project.

Noise from heavy machinery and equipment can disrupt normal behaviours such as foraging, breeding, and resting, especially for sensitive species documented during breeding bird surveys. The sounds associated with construction, while temporary, may lead some birds to avoid areas near active construction zones, possibly altering their habitat use patterns during critical breeding or migration periods (Blickley & Patricelli, 2010; Marler et al., 1973; Shannon, Crooks, et al., 2016).

Birds can exhibit greater susceptibility to noise impacts as many species rely on vocal communication (Blickley & Patricelli, 2010). Avifauna may be displaced from areas adjacent to the Project due to construction related noise. Impacts can also differ between acute and chronic noise sources. Chronic exposure may degrade auditory cues, feedback, and vocal development over time, which are important for predator/prey detection, communication, breeding, and orientation (Blickley & Patricelli, 2010; Marler et al., 1973; Shannon, Crooks, et al., 2016). A direct physiological impact causing a temporary decrease in auditory sensitivity can occur at acute noise levels above 93 dBA, while permanent damage to avian auditory systems is not recorded until 125 dBA to 140 dBA (Blickley & Patricelli, 2010). In one study, chicks exposed to 111 dBA for 48 hours were found to completely recover from hearing damage within 10 days (Saunders & Tilney, 1982). Ryals et al. (1999) found that birds lose hearing from hair cell loss and that these hairs can recover via regeneration allowing birds to regain hearing.

Certain bird species may not be impacted by sensory disturbances. A study of the impact of logging truck traffic on birds reported no observed effects on nesting at noise levels of 53 dBA (Grubb et al., 1998). It was also found that noise-tolerant species had increased nesting success and decreased nest predation through higher awareness and less flushing (Francis et al., 2009). The median sound level produced by construction equipment at 15 m from point source is comparable to sound produced from an ATV or pick-up truck (96 dBA), which is already a common source of sound within the Study Area, as are logging trucks and harvesting equipment. Therefore, impacts to auditory sensitivity may occur from acute noise on a short term and intermittent frequency during the construction phase. The decibel limits of individual construction equipment required for the Project are not expected to be greater than 115 dBA, indicating permanent damage to avian auditory systems is not likely to occur. Blasting noise (if blasting is deemed necessary) may exceed this range but this activity will be sporadic in nature, only occurring during the construction phase of the Project. A Blasting Management Plan and mitigation measures will be developed to lessen impacts during blasting if it is required.

A literature review conducted by Shannon et al. (2016) found that noise levels greater than 45 dBA have the potential to exhibit changes in avian song characteristics, reproduction, abundance, stress levels, and species richness. Sensory disturbance from noise levels associated with construction activities during the avian breeding season could result in abandonment of nests. If adjacent suitable habitat is not available, birds that have been displaced are not likely to nest until habitat becomes available which may result in a higher non-breeding population. Based on the avian SAR habitat modelling results, any SAR individuals displaced by noise would likely move to other suitable habitats within the Study Area or LAA.

Based on the noise model developed for the Project (Appendix E), predicted operational sound levels above 40 dBA are expected to be localized around turbines, depending on the proximity and layout of each turbine with respect to others. Predicted sound levels above 40 dBA are only expected outside of the Study Area in a few cases, leading to a very low or negligible sensory disturbance impact within the LAA (i.e., only in portions within and potentially along the Study Area edge).

Lighting used during construction, particularly if activities extend into early morning or late evening hours, could also impact birds within the vicinity. Artificial lighting may disorient nocturnally active birds, increasing the likelihood of attracting them closer to construction areas. For light-sensitive birds, especially migratory and nocturnal species, this could temporarily alter natural behaviours or increase the risk of collisions with equipment or structures. Given the frequency of foggy conditions in portions of the Study Area that encroach on the coastline, light intensity may be amplified, further enhancing the potential for disturbance. Light sensory disturbance that can impact birds includes behavioural effects such as disorientation, avoidance, or attraction (Longcore & Rich, 2004). The nearest distance between the Project Footprint and the coastline is approximately 503 m, suggesting that foggy conditions are likely to occur, particularly along the southern portion of the Study Area which is

closest to the coast. Light attraction is a particular concern during nights with low visibility (e.g., low cloud cover or fog) and high winds. Lighting used during construction, particularly if activities extend into early morning or late evening hours, could also impact birds in the vicinity. Artificial lighting may disorient nocturnally active birds, increasing the likelihood of attraction to construction areas. For light-sensitive birds, especially migratory and nocturnal species, this could temporarily alter natural behaviours or increase the risk of collisions with equipment or structures (Longcore & Rich, 2004). Research has demonstrated that birds attracted to or congregating around lights often become disorientated and lose their sense of direction, ultimately disrupting migration (Adams et al., 2021).

Disoriented migratory birds are prone to circling light sources, which increases the potential for death by exhaustion or predation when forced to land in high-risk areas. In turn, these behavioural changes can affect the success of foraging, reproduction, and communication and can disrupt habitat connectivity through anthropogenic development (Bliss-Ketchum et al., 2016; Longcore & Rich, 2004). It has been known that exterior structures such as buildings and other floodlit structures can attract birds during the night and lead to mortality events. In addition, migratory birds during fall and spring are especially attracted to lighting on tall structures. Modifications and timing of use for lighting can be managed to limit impacts on birds (Bliss-Ketchum et al., 2016; Longcore & Rich, 2004).

At night, and especially during cloudy nights with low ceiling, artificial lighting can attract birds during migration. Lights that are known to increase disorientation include consistent white or red lights (Poot et al., 2008). Strobe lights or intermittent/flashing lights have been shown to decrease avian mortality as it interrupts the zone of influence that lighting on birds can have (Longcore et al., 2008). While continuous lighting can attract or disorient birds, especially nocturnal migrants, brief and low-frequency lights reduce the risk of such interactions.

For nocturnally active species that may be more sensitive to artificial lighting, the risk of attraction or disorientation remains low due to the limited light exposure. In the event of foggy or low-visibility conditions (e.g., heavy rain), the short, infrequent flashes will also reduce the overall light presence, limiting the potential for enhanced attraction effects.

Lighting associated with the Project will be minimal and turbine lighting at night will be restricted to Transport Canada required navigation hazard lights mounted on the turbine nacelles. As such, lighting is not expected to impact bird migration.

Upon completion of construction and throughout the lifespan of the Project, the lighting on-site will be minimized, and mitigation measures will be applied to limit the effects of lighting on birds [e.g., motion-activated lighting, shielding, light emitting diodes (LEDs), etc.].

Injury and Mortality Risk

The radar and acoustic monitoring program provided quantifiable insights into the volume, movement patterns, and flight heights of birds moving within the Study Area, enabling a more precise understanding of collision risk relative to the Project's infrastructure.

Bird strikes are a primary concern when considering the interactions of avifauna with the Project, as turbine blades spin at high speeds through the airspace frequented by a variety of species at all different altitudes within the rotor swept area (i.e., 38.3 m to 221.7 m). Bird strikes include instances when birds are struck by the rotating turbine blades, or birds collide with the turbine tower or nacelle structures, which can cause injury or mortality to birds. Collisions with transmission lines are also a concern for avian injury and mortality risk. Factors including species abundance, frequency of passage, species-specific flight behaviour, avoidance behaviours, differential use of areas within the Study Area, weather, and topography may all influence collision risk (De Lucas et al., 2008). Estimated bird mortality as a result of wind turbine collisions varies across Canada, with Zimmerling et al. (2013) estimating mortalities at 8.2 per turbine per year. Bird Studies Canada (2016) conducted a study to review mortality across Atlantic Canada and Ontario, showing mortality estimates in Atlantic Canada to be lower, at approximately 1.17 birds per turbine per year. Strum has conducted avian mortality monitoring across a variety of wind projects in Nova Scotia and New Brunswick, with approximately one observable mortality per turbine per year.

Most radar detections were at heights above 250 m and were therefore outside of the interaction risk zone (i.e., the total height of the turbine to the tip of blade; 221.7 m). Between both ARS units, approximately 3.5% of detections were within the interaction space (rotor swept area), suggesting little interaction between avian movement and turbines. Detections within the rotor swept area were similar between the Fishermans Harbour ARS and the Indian River Road ARS (247 BTs and 281 BTs respectively), despite the Fishermans Harbour ARS having a greater number of total detections (9,074 BTs compared to 6,102 BTs).

Based on the radar results showing a few peak detection nights, potential mortality events would likely be limited to a few events during the spring and fall migration periods. Both migration activity and flight heights influence the likelihood of potential collisions; however, other variables such as weather conditions, photoperiod, and lunar cycle may play a role. Comparison of radar data with several of these variables showed that wind speed had a notable influence on migration activity, with no BTs detected when wind speeds were greater than 19 km/hr.

Avian field surveys conducted in 2023 showed that diurnal movement typically occurred at heights of 50 m or less in the fall. During spring, diurnal movement occurred primarily at heights between 100 m and 250 m and at heights of 50 m or less. Most of the bird observed flying at heights between 100 m and 250 m (which falls within the rotor swept area) were gulls and raptors, suggesting that these groups may be at higher risk of interacting with turbines. Raptors are considered particularly vulnerable to collisions with wind turbines as they are long-lived species with low rates of reproduction and they typically soar at high altitudes (Estellés-Domingo & López-López, 2025). These impacts are more pronounced in mountainous areas, where raptors often gather in large groups called kettles to take advantage of thermal updrafts (Estellés-Domingo & López-López, 2025; Katzner et al., 2012). While moderate raptor activity was observed within the Study Area, no instances of kettling behaviour were observed and raptors were typically observed individually or in pairs. Neither Leach’s storm-petrel nor roseate

tern, both identified as users of the nearby Country Island IBA, were observed during surveys within the Study Area and are therefore also considered to be at low risk of impact from the Project.

An increase in road traffic during construction and wind turbine maintenance will increase the chances of mortality to avifauna species that use roadways, especially grouse species and similar species, as they are known to use roadways for travel and nesting (Madden & Perkins, 2017; Whitaker et al., 2010). Construction and increased road traffic particularly pose a risk to nests and unfledged nestlings. Outside of the construction phase, the Project will only require technicians to access the site to perform regular maintenance/equipment checks and occasional larger-scale repairs. Considering the pre-existing traffic load (i.e., forestry and off-roading vehicles) and the minimal traffic that will be associated with Project operation, along with road traffic mitigations (e.g., speed limits), road traffic is expected to have a negligible or low effect on avifauna in the LAA.

Mitigation measures will reduce the risk of avifauna interactions with Project equipment and infrastructure, as well as management and monitoring plans (e.g., further radar and acoustic monitoring, which may result in adaptive management measures being taken if applicable).

Migration Disruption

Birds moving through the Study Area during migration seasons may encounter turbines as a new structural barrier. This could potentially lead to natural flight path alterations, which could in turn result in additional energy expenditure to avoid these obstacles. This is particularly relevant for species traveling at altitudes within the infrastructure height range, as they may need to navigate around or above the structures to avoid collisions.

The modified airspace could lead to temporary disorientation for birds unfamiliar with the infrastructure, especially during low visibility conditions such as fog or heavy rain, which are common in the region. Radar results showed peaks in migration activity during fall, and to a lesser degree during spring, with detections within the rotor swept area peaking on a few nights per season. The majority of detections (approximately 97%) occurred above the rotor swept area, suggesting that overall disruption to migratory routes is likely minimal; however, specific conditions or migration events may increase the likelihood of navigational adjustments as birds travel through an unfamiliar environment.

Mitigation Measures

The primary mitigation for avifauna is avoidance in the siting of infrastructure, including:

- Minimizing impacts to sensitive bird habitats, such as wetlands, waterbodies, mature forest stands, etc. This includes siting Project infrastructure within areas with existing disturbances, such as existing roads and historically cleared areas, to the greatest extent possible.
- Avoidance of turbine placement within topographic funnels, such as within lake or river valleys, to reduce the likelihood of interactions with concentrated bird movements.

Mitigations to reduce effects on avifauna include:

- Adhere to ECCC guidelines on clearing windows for nesting migratory birds where possible. If vegetation and tree clearing activities during the nesting/breeding season cannot be avoided, nest sweeps will be conducted by a qualified avian biologist.
- Allow natural revegetation of disturbed areas where vegetation suppression is not required during operations.
- Develop a site reclamation plan in accordance with engineering standards and in consultation with NSECC and NSNR, to be submitted 2 years prior to the end of operations.
- Establish speed limits for construction vehicles to avoid vehicle-avifauna collisions. Traffic signs will be installed to alert road users of speed limits and the presence of wildlife in the area.
- Service construction equipment and vehicles regularly and, where practical, muffle loud machinery to reduce noise disturbance.
- Maintain good housekeeping practices (i.e., designated garbage and recycling cans and pack out all waste) during construction and operation to avoid indirectly feeding birds and potentially attracting nuisance wildlife.
- Develop and implement a Terrestrial Habitat and Wildlife Management Plan.
- Develop a spill response plan (within the Contingency Plan), equip site machinery with spill kits, and instruct site personnel on their use.
- Minimize lighting, to the extent possible, while ensuring employee safety.

Monitoring

A site-specific Terrestrial Habitat and Wildlife Management Plan will be developed in consultation with government regulators and all other relevant parties.

A second year of bird surveys will be completed, prior to operations, as per requirements under the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).

A detailed Post Construction Avian Monitoring Plan will be developed and submitted to NSECC and NSNR for review. Monitoring activities may include:

- Post-construction avian mortality monitoring.
- Adaptive management if post-construction monitoring identifies significant avian mortality, developed in consultation with NSNR.

Conclusion

The predicted residual effects of the Project on avifauna (after proposed mitigation and monitoring activities) are characterized in Table 10.40.

Table 10.40: Project-Avifauna Residual Effects

Effect Detail	Habitat Loss, Alteration/ Fragmentation, and Edge Effect	Sensory Disturbance – Light and Noise	Injury and Mortality
Magnitude of Effect	**Low to Moderate:** Low to moderate loss of habitat supporting avian SAR and habitat-sensitive avifauna, depending on the species.	**Low:** Low sensory disturbances are expected.	**Moderate:** Avian use of the Study Area indicates a likelihood of interactions but recorded flight altitudes indicate effect is likely at the individual and not population scale.
Geographic Extent of Effect	5 km buffer of the Study Area	5 km buffer of the Study Area	5 km buffer of the Study Area
Frequency of Effect	**Single Event:** Loss of habitat occurs once during the construction phase (i.e., clearing and ground disturbance).	**Intermittent:** Intermittent during the construction, decommissioning, and operations phases.	**Intermittent:** May vary by Project phase, as well as seasonal differences (e.g., breeding, migration, and winter seasons).
Duration of Effects	**Medium Term:** Effects will end following decommissioning.	**Medium Term:** Effects will end following decommissioning.	**Medium Term:** Effects will end following decommissioning.
Reversibility of Effect	**Partially Reversible**	**Reversible**	**Irreversible**
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Negligible, Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible			

11.0 SOCIO-ECONOMIC ENVIRONMENT

11.1 Economy

11.1.1 Overview and Assessment Methodology

The assessment of the economy included consideration of local demographics, income, and businesses, as well as the economic contributions of the Project to the local economy through a review of the following resources:

- Census of Population – Statistics Canada (2023)
- Public mapping resources
- Economic Impact Assessment – Deloitte LLP (2024)
- Economic data from the Proponent
- Taxation legislation

11.1.2 Existing Environment

The Project is in both the MODG and the MODSM, near the communities of (Drawing 11.1):

- Country Harbour Mines (measured from the Project's center to the approximate town center, approximately 7 km north)
- Middle Country Harbour (7 km northeast)
- Jordanville (8 km southwest)
- Indian Harbour Lake (8 km south)
- Cross Roads Country Harbour (9 km north)
- Stormont (9 km northeast)
- Sherbrooke (12 km east)
- Stillwater (12 km southwest)
- Port Bickerton (14 km southeast)
- Melrose (16 km west)

The Guysborough Municipal District (MD) census subdivision corresponds with the MODG, and the St. Mary's MD census subdivision corresponds with the MODSM, as each will be referred to here. Population statistics for the province, MODG, and MODSM were summarized using the 2016 and 2021 Census of Population (Table 11.1). The populations of the largely rural MODG and MODSM have declined between 2016 and 2021, contrary to the provincial trend. MODG and MODSM have much lower population densities than the province.

Table 11.1: Population Characteristics in 2016 and 2021 for Nova Scotia, MODG, and MODSM

Population Statistics	Nova Scotia	MODG	MODSM
Population in 2021	969,383	4,585	2,161
Population in 2016	923,598	4,670	2,233
Population change from 2016 to 2021	+5.0%	-1.8%	- 3.2%
Total Private Dwellings in 2021	476,007	3,043	1,538
Land Area (km^2)	52,824.7	2,115.2	1,904.08
Population Density (per km^2)	18.4	2.2	1.1

Source: (Statistics Canada, 2023)

The age distribution in MODG and MODSM reveals median ages of 58.4 and 57.6 years, respectively, both over 10 years higher than the provincial median age of 45.6 (Statistics Canada, 2023). Further statistics on age distribution in 2021 were compared for the province, MODG, and MODSM (Table 11.2), revealing that both MODG and MODSM have proportionally fewer people in both 0 to 14 and 15 to 64 years age groups, indicating there are fewer people of working age or who will join the workforce from the local population within the next one to two decades.

Table 11.2: Age Distribution in 2021 in Nova Scotia, MODG, and MODSM

Age Statistics	Nova Scotia	MODG	MODSM
0 to 14 years	136,710 (14.1%)	515 (11.2%)	230 (10.6%)
15 to 64 years	617,345 (63.7%)	2,455 (53.5%)	1,210 (56.0%)
65+ years	215,325 (22.2%)	1,615 (35.2%)	720 (33.3%)
Total Population	**969,380**	**4,585**	**2,160**

Source: (Statistics Canada, 2023)
Due to rounding, total percentage may be ±100%.

Median housing costs and median household total incomes in 2020 for MODG and MODSM were compared to the provincial and national values (Table 11.3). This comparison shows that the median dwelling value in MODG is less than half of the provincial figure, which itself is less than half the national median. While the median dwelling value in MODSM is higher than the MODG, it remains much lower than the provincial and national medians.

Examining the relative value of median total income and median dwelling value across these jurisdictions demonstrates that housing is more affordable for those on a median income in MODG and MODSM than in Nova Scotia or Canada as a whole. This is corroborated by the percentages of owner and tenant households spending over 30% of their income on shelter costs, although these figures may be skewed by legacy homeowners or renters who either own their property outright or have longstanding leases lower than regional averages.

Table 11.3: Housing Costs (2021) and Median Individual Income (2020) for Canada, Nova Scotia, and MODG

Housing and Income Statistics	Canada	Nova Scotia	MODG	MODSM
Median total income	$41,200	$38,000	$31,200	$32,800
Median dwelling value	$618,500	$250,000	$120,000	$150,000
Median total income as a % of median dwelling value	6.7%	15.2%	26.0%	22.0%
Median monthly shelter costs for owned dwellings	$1,498	$870	$400	$416
Percent of owner households spending 30% or more of their income on shelter costs	14.8%	9.7%	7.0%	6.3%
Median monthly shelter costs for rented dwellings	$1,209	$1,000	$552	$568
Percent of tenant households spending 30% or more of their income on shelter costs	33.2%	34.7%	22.0%	25.0%

Source: (Statistics Canada, 2023)

Most residents in MODG (98.6%) and MODSM (98.6%) use English as their first official spoken language (Statistics Canada, 2023). Because of this, all public outreach and communication for the Project have been and will continue to be in English. There is some knowledge of other languages, though no communication has been requested in other languages.

The nearest fire station to the Study Area is the Sea Shore Volunteer Fire Department, approximately 14 km southeast of the Study Area on Highway 211. There is also the

Harbourview Volunteer Fire Department, approximately 16 km east of the Study Area on Marine Drive (Drawing 11.1).

Health and emergency services also exist in the area and are accessible to Project workers if the need should arise. The closest location is the St. Mary's Memorial Hospital, approximately 12 km southwest of the Study Area on Hospital Road in Sherbrooke. There is also the Guysborough Memorial Hospital, approximately 35 km northeast of the Study Area on Highway 16 (Drawing 11.1).

The unemployment rates in 2021 for MODG and MODSM were 18% and 19.4%, respectively, both of which are higher than both the provincial and national unemployment rates (Table 11.4). The employment rate for MODG was 38% and 40% for MODSM, both of which are lower than the provincial employment rate of 52% (Statistics Canada, 2023).

Table 11.4: Employment Statistics for Canada, Nova Scotia, and MODG

Employment Statistics	Canada	Nova Scotia	MODG	MODSM
Employment Rate	57.1%	51.9%	38.0%	40.3%
Unemployment Rate	10.3%	12.7%	18.1%	19.4%

Source: (Statistics Canada, 2023)

The top industries in MODG and MODSM in 2017 were compared with the province (Table 11.5), as categorized under the North American Industry Classification System (Statistics Canada, 2023). The highest proportion of workers in MODG fall into the "agriculture, forestry, fishing, and hunting" and "health care and social assistance" categories (21.6% and 12.5%, respectively). Similar to those of the MODG, the highest proportion of workers in MODSM fall into the "agriculture, forestry, fishing and hunting" and "health care and social assistance" categories (19.5% and 13.4%, respectively). There are some distinctions between MODG and MODSM, with "manufacturing" having the third highest proportion of workers in MODG and "educational services" having the third highest proportion of workers in MODSM.

Table 11.5: Top Industries for the Employed Labour Force in 2017 in MODG Compared to the Province of Nova Scotia, Including Number Employed, Rank in Jurisdiction, and % of Total Workforce

Industry	MODG	MODSM	Nova Scotia
Accommodation and Food Services	50 (8, 3%)	50 (7, 5.4%)	30,010 (7, 6.2%)
Agriculture, Forestry, Fishing, and Hunting	405 (1, 21.6%)	185 (1, 19.5%)	17,880 (9, 3.7%)
Construction	145 (5, 7.7%)	85 (4, 9.1%)	35,720 (5, 7.3%)
Educational Services	145 (5, 7.7%)	95 (3, 10.2%)	38,425 (4, 7.9%)
Health Care and Social Assistance	235 (2, 12.5%)	125 (2, 13.4%)	70,595 (1, 14.5%)
Manufacturing	165 (3, 8.8%)	25 (8, 3%)	31,210 (6, 6.4%)
Public Administration	140 (6, 7%)	70 (6, 7.5%)	42,070 (3, 8.6%)

Industry	MODG	MODSM	Nova Scotia
Retail Trade	150 (4, 8.0%)	75 (5, 8.1%)	58,985 (2, 12.1%)
Transportation and Warehousing	90 (7, 4.8%)	15 (9, 2%)	19,930 (8, 4.1%)
Others	350	220	142,435
Total Employed Labour Force 15 Years +	**1,875**	**930**	**487,260**

Source: (Statistics Canada, 2023)

The community of Sherbrooke is the closest economic center to the Project, approximately 12 km southwest of the Project with a range of businesses offering many services. In combination with the numerous smaller communities, there are several nearby businesses that may potentially supply or otherwise benefit (either directly or indirectly) from the Project. A list of businesses was generated by searches on Google Maps using the keywords “restaurant”, “industrial supplier”, “accommodations”, “grocery”, “fuel station”, and “hardware store”, presenting a representative selection of both the businesses that may serve the Project and its staff (Table 11.6). This list is not exhaustive, and there are numerous other businesses in the area that will likely benefit directly or indirectly from the Project through the patronage of the business and its employees, and the increased economic activity in the area.

Table 11.6: Local Businesses and Their Approximate Distance

Business[1]	Nearest Community	Approximate Distance and Direction to the Project[2]
Country Harbour Gun Club	Country Harbour Mines	7 km north
HWY 316 Mobile Welding & Repair	Country Harbour Mines	7 km north
Smokey Hollow General	Cross Roads Country	8 km north
Funky Munkys Bath & Body	Middle Country Harbour	8 km northeast
U-Haul Neighborhood Dealer	Stillwater	10 km west
Forgotten Shore Farm	Port Hilford	11 km south
Knickle's Studio and By the Tides Kitchen	Port Hilford	11 km south
Bigger Dreams Farms	Port Hilford	11 km south
The Soap Company of Nova Scotia Ltd.	Sherbrooke	12 km southwest
Underwood Bows	Aspen	13 km west
Chrysalis Creative Consulting	Bickerton West	14 km southeast
Whitney's Corner Store	Bickerton West	14 km southeast
Beanie’s Bistro	Sherbrooke	12 km east
Sherbrooke Clover Farms Supermarket	Sherbrooke	12 km east
Highland Building Supplies	Sherbrooke	13 km east
Sherbrooke Village Inn	Sherbrooke	13 km east
Sherbrooke Village	Sherbrooke	12 km east

[1] Businesses were included based on Google Maps presence.
[2] All distances were measured from the centre of the Study Area by a straight line and rounded to the nearest km.

Aside from the immediate area and associated businesses, smaller communities are generally dependent on services in Sherbrooke and larger towns, such as Guysborough (approximately 35 km northeast) or Antigonish (approximately 48 km north), which offer many shops and services, including indoor recreation and big-box stories. Many residents of the communities surrounding the Study Area commute daily to areas within the MODG, MODSM, or to Antigonish and Guysborough for employment purposes.

11.1.3 Effects Assessment

Project-Economy Interactions

Project activities have the potential to interact with the economy during all phases of the Project (Table 11.7).

Table 11.7: Potential Project-Economy Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	X
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for economy is the MODG and the MODSM (Drawing 11.1). The RAA for economy includes the entire province.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for the economy as well. The VC-specific definition for magnitude is as follows:

- Positive: Project is expected to have a positive effect on the economy.
- Negative: Project is expected to have a negative effect on the economy.

Effects

The Guysborough Wind Projects, of which this Project is a key component, will provide significant economic benefit and employment within the MODG and the MODSM.

An economic analysis was conducted by Deloitte (2024) to estimate the economic contribution of the Phase 1 and 2 EverWind projects. The capital investments made by EverWind in Phase 2 are expected to contribute $7.1 billion in gross domestic product (GDP) and support 35,270 full-time-equivalent positions (FTEs) for Canada, and $3.9 billion in GDP and 16,880 FTEs for Nova Scotia. Further, Phase 2 is anticipated to annually contribute approximately $1.1 million in GDP, $151 million in labour income, $92 million in government revenue to Nova Scotia, and sustain 2,400 FTEs (Deloitte LLP, 2024).

The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where practicable, municipal tax revenue, and on-going energy literacy/education (such as site tours to EverWind's Point Tupper Terminal, presentations about renewable energy at local schools, community meetings or for municipal councils, windfarm tours and visits, etc.). The Proponent has delivered site tours to the EverWind Point Tupper Terminal for over 600 students from the Strait Regional Centre for Education and will continue to engage the community, schools, local businesses, and municipal staff and leaders to help identify Project-related opportunities and benefits for the local community.

As outlined in the *Wind Turbine Facilities Municipal Taxation Act* (Nova Scotia, 2006), MODG will receive tax revenues based on nameplate capacity (per MW) on an annual basis and the royalty is tied to increases in the Consumer Price Index. The Project is expected to enhance the community's economic development by providing tax revenues of approximately $7.4 million annually to MODG and MODSM, increasing each year of operation for a total of approximately $308 million over the 35-year life of the Project (these figures are based on the 856 MW proposed nameplate capacity and are subject to change based on final nameplate capacity of the installed turbines). Municipal tax revenue will be distributed based on the municipality in which each turbine is located. The MODG and MODSM operating budgets for the 2025-2026 fiscal year is approximately $17 million and $4.7 million respectively, resulting in a significant revenue increase should the Project advance into operation with a similarly high nameplate capacity.

The Proponent understands the importance of supporting local communities and the Project Team is committed to using as many local skills as practicable. In alignment with these commitments, the Proponent has entered into a CBA with the MODG and intends to execute a CBA with the MODSM to formalize long-term social and economic benefits for the communities. Under the MODG CBA, the Proponent will voluntarily establish a Community Benefits Fund (CBF) based on operating wind capacity ($1,000/MW annually) starting at the

end of the first year of operations, supporting local initiatives such as low-income housing, healthcare, education, sports and recreation, and bursaries for students pursuing renewable energy-related post-secondary studies. The payments for the Guysborough Wind Projects are expected to be $2 million each year or $70 million over the life of the projects. For this Project, it is anticipated that the funds will exceed $800,000 annually for the CBF (pending the final nameplate capacity of the installed turbines). The CBA outlines a structured approach to workforce development, including commitments to publicize employment opportunities locally, collaborate on training programs, and reduce barriers to employment for local residents. Contractors and suppliers engaged in Project construction and operation will be encouraged to source locally and adhere to equitable employment practices.

As part of the CBA, the Proponent will make available a Bursary Fund prior to commercial operations for community members who want to train in the renewables industry. This will support the additional use of local labour and skills both during the construction phase and operations phase of the Project.

Potential work associated with different stages of the Project includes environmental studies, geotechnical investigation, engineering, land and snow clearing, surveying, worksite security, road construction and maintenance, turbine component transportation, turbine foundation construction, turbine installation, collector system construction, and substation construction. Specifically, elements of job creation throughout the lifespan of the Project may include:

- Project Development: During the development phase of the Project, Nova Scotian professionals have and will continue to deliver services in a variety of areas, including civil and electrical engineering, geotechnical engineering, legal, environmental and biological surveys, archaeological, land and community relations, and many others. Dozens of professionals within Nova Scotia have already rendered their services as part of the development of the Project, and many more will as development matures.

- Construction: The construction phase is approximately four years and will require a large workforce that will fluctuate throughout the construction period. Much of the construction employment will come through contracting and subcontracting of Canadian, and where practicable, Nova Scotian construction firms and specialized service providers related to the balance of plant and installation and commissioning of the wind turbines. It is estimated that the Project will require approximately 350 to 450 jobs for varying scope and duration throughout the construction period. The largest construction scopes of work are anticipated to be:
    - Civil installation, that is, land clearing, grubbing, road construction, and foundation installation, which includes:
        - Excavating
        - Rebar supply and installation
        - Anchor bolt supply and installation
        - Forming
        - Concrete supply and pouring
        - Grouting

  - Electrical installation, that is, transmission line, collector line and substation infrastructure installation, and interconnection, which includes:
    - Overhead installation
    - Cable terminations
    - Electrical testing
    - Instrument installation and testing
  - Turbine installation, that is, the offloading of turbine components, turbine erection, and commissioning, which includes:
    - Crane supply
    - Turbine offload and erection
    - Mechanical works inside turbines
    - Electrical work inside turbines

  The Proponent will look to maximize local contractors and personnel where appropriate. To this end, the Proponent will hold a job fair prior to the start of construction to engage with local community members and service providers and identify suitable candidates and/or businesses to support the construction phase employment and service providers.

- Operations and Maintenance: Operational wind projects require long-term operations and maintenance professionals to be located either on-site or within short driving distance of the Project. Up to 30 to 40 full- and part-time jobs will be required for this Project during operations and maintenance. The employment associated with operations and maintenance is long-term, local, stable, and well-paying, requiring skillsets such as experience managing facilities, working on wind farms, or working with high-voltage systems. These jobs include:
  - Medium-voltage or high-voltage technicians/electricians
  - Wind turbine technicians
  - Road maintenance workers
  - Vegetation management service providers

- In addition to wind turbine operation and maintenance, a variety of wind farm activities will require on-going services such as environmental monitoring, snow removal and road surface maintenance, administrative support, inventory/materials management, shipping, scheduling, and coordination of maintenance inspections to accommodate the facility's operation (i.e., power collection system, electrical substation inspections, etc.).

In addition to the direct investments that the Project would bring to Nova Scotia's economy, the Project will result in indirect and induced economic benefits that will be realized by governments, local businesses, communities, and residents. Workers that are directly involved with the development, construction, and operations would contribute to the local economy by redistributing wealth to a variety of goods and services such as hotels, restaurants, and grocery stores (NREL, 2016).

Mitigation Measures
The economic impact to the LAA and RAA is positive; therefore, no mitigation is proposed.

Monitoring
A specific monitoring program for the economy is not proposed.

Conclusion
The impacts to the economy are expected to be positive.

11.2 Land Use

11.2.1 Overview and Assessment Methodology

Baseline conditions must consider a wide range of land uses within, adjacent to, and near the Study Area. This may include uses by the public or Mi'kmaq for residential (both urban and rural), industrial or commercial activities, agriculture, forestry, protected and resource areas, recreation, and tourism.

The assessment was completed through a review of desktop resources and in consideration of feedback from public engagement to evaluate how the Project may interact with this VC. The following resources were reviewed:

- Nova Scotia property records
- Public mapping resources
- Review of the local tourism and recreation websites
    - Guysborough County (TGS, 2024)
    - Municipality of the District of Guysborough (MODG, n.d.)
    - Sherbrooke Village (CCTH, n.d.)
    - Municipality of the District of St. Mary's (MODSM, 2026)
- Visual renderings of the Project prepared by WSP (Appendix O)
- Literature review of property values and wind farms
- Literature review of wind farm impacts on tourism and recreation

11.2.2 Existing Land Use

The Study Area consists primarily of Crown land (19,236.8 ha, or 92.8%). Land use around the Study Area is primarily forestry and recreational use; however, there is a mix of residential and agricultural land uses in the surrounding area (recreational land use is discussed in Section 11.2.2.3).

11.2.2.1 Industrial and Commercial Land Use

Proposed developments within 10 km of the Study Area include (Drawing 6.1):

- Cochrane Hill Gold Mine
- Goldboro Gold Project
- NSF Renewable Energy Park

The Cochrane Hill Gold Project is a proposed open-pit gold mine in the Melrose area that has not yet registered for EA The Goldboro Gold Project is a surface gold mine that received EA approval in 2022 (NSECC, 2022a) and as of 2026, the mine is moving toward construction, having received Industrial Approval from NSECC (#2023-3392341-00). The NSF Renewable Energy Park, which received an EA approval in 2025 (NSECC, 2025f), is a proposed development for a SAF production facility using biomass from Nova Scotia's forestry industry, along with proposed renewable energy generation in the nearby MODSM.

The Proponent is committed to continuing to engage with all parties.

11.2.2.2 Protected and Resource Areas

There are 20 public protected lands and parks located within 10 km of the Study Area (Drawing 3.4) (all distances measured from the closest boundary of the Study Area, as indicated):

- Salsman Provincial Park (0.3 km northeast)
- Big Plains Wilderness Area (occupy the gap between the Study Area)
- Guysborough Headlands Wilderness Area (six separate areas in total, with one area bordering the southeastern boundary of the Study Area, one approximately 8 km south, and four outside of the 10 km buffer of the Study Area)
- Archibald Lake Wilderness Area (borders the western boundary of the Study Area)
- Nine Mill Woods Wilderness Area (0.8 km north)
- C.W. Anderson Conservation Lands (2 km southwest)
- The Big Bog Wilderness Area (7 km west)
- Mitchell Pool Conservation Lands (1 km west)
- St. Mary's River Conservation Lands (multiple areas along the St. Mary's River from Stillwater to Crows Nest, approximately 1 km west and northwest of the Study Area)
- Welsh Road Conservation Lands (6 km north)
- A.M. Sandy Cameron Conservation Lands (2 km west)
- St. Mary's River Crows Nest Conservation Lands (1 km southwest)
- West River Conservation Lands (3 km west)
- Stillwater Conservation Lands (2 km west)
- Hemlock Hill Conservation Lands (6 km west)
- St. Mary's River Provincial Park (multiple areas along the St. Mary's River from Stillwater to Crows Nest, approximately 1 km west and northwest of the Study Area)
- St. Mary's River East Conservation Lands (3 km northwest)
- St. Mary's River Harrisons Pool Conservation Lands (3 km northwest)
- St. Mary's River Hardwood Hill Conservation Lands (6 km northwest)
- Oxbow Conservation Lands (8 km northwest)

There are also three parks and protected areas currently under interim policy that are within 10 km of the Study Area (Drawing 3.4):

- Port Bickerton Provincial Park (2 km southeast)
- Sherbrooke Provincial Park (3 km southwest)
- Isaacs Harbour Wilderness Area (7 km northeast)

Based on a review of the NSNR Mineral Resource Land Use Atlas (2021e), there are several mineral exploration licenses overlapping the Study Area.

There are no Mi'kmaq reserve lands within 10 km of the Study Area. Further consideration of Mi'kmaq resources and the results of the MEKS are included in Section 5.

11.2.2.3 Recreation and Tourism

Baseline conditions for recreation and tourism are considered jointly. While some recreational opportunities may attract locals more often than tourists, and vice versa, the region's natural and cultural offerings are an asset to both groups. Recreational opportunities, therefore, should be understood to apply to both locals and people travelling intra-provincially, interprovincially, or internationally for leisure.

Recreation

The communities of Cross Roads Country Harbour, Country Harbour Mines, Stillwater, and others near the Study Area, are home to a variety of primarily outdoor recreational activities, including use of the area's trails by ATV riders in the summer and snowmobilers in the winter, beaches, and other unstructured recreation. There are nearby indoor community or recreation centers, some with accompanying outdoor infrastructures, such as the Goldboro Interpretive Center, Indian Harbour Lake – Jordanville Recreation Center, and St. Mary's Recplex. Salsman Provincial Park is approximately 0.3 km northeast of the Study Area and is popular for camping, picnics, hiking, fishing, and kayaking. Sherbrooke Provincial Park, a public park situated next to the St. Mary's River, is located approximately 3 km southwest of the Study Area and is frequented in the summer for picnics and swimming. Additionally, the St. Mary's River is an ecologically, culturally, and recreationally important river in the region, supporting activities such as fishing, paddling, camping, and other outdoor recreation opportunities valued by local communities and visitors.

The region is also known for hiking, camping, and biking. Evidence of ATV or other off-highway vehicle use was observed within the Study Area during biophysical assessments indicating opportunities for motorsport recreationalists. Both the St. Mary's ATV Club and the Broadhorns ATV Club oversee trails in the Study Area through the All Terrain Vehicle Association Nova Scotia. There are several notable hikes in the region, including some featured in Michael Hayne's popular Hiking Trails of Nova Scotia (2002), including trails at Black Duck Cove, Chapel Gully, the Guysborough Nature Trail, Tor Bay, and more, however, none are found within the Study Area. Furthermore, a search through the public trails repository AllTrails.com (n.d.), a popular and well-used source for information about hikes globally recommended by Hike Nova Scotia as the source for information about trails in Nova Scotia, found some trails near the Study Area. A significant regional trail is the Guysborough Natural Trail, which runs from the Town of Guysborough to St. Mary's before turning into the St. Mary's Nature Trail. A

portion of the Guysborough Nature Trail directly borders Melrose Country Harbour Road that is part of the northwestern boundary of the Study Area. This portion of the trail travels through the portion of the MOU lands north of the Melrose Country Harbour Road that have been avoided for the placement of Project infrastructure due to ongoing engagement with the community. There is also the Stonewall Park Loop, approximately 3 km southwest of the Study Area in Sherbrooke.

Most game and furbearer hunting seasons in Nova Scotia start in the fall and have varying end dates by species. Deer hunting starts in September and October depending on the method of hunting and age of hunter (NSNR, 2024g). Additional approved hunting or trapping may occur on site per NSNR guidelines. Several fish species were confirmed in watercourses within the Study Area (see Section 9), and several waterfowl were also observed (see Section 10). There are numerous trails that lead to the edges of the lakes that could be used for fishing or waterfowl hunting in this area. Signs of hunting and human activity were also recorded incidentally during field seasons, which further support various uses of the natural environment within and adjacent to the Study Area.

Cultural Attractions

Guysborough County has a rich history, dating back over 400 years, and offers museums and historical and cultural attractions including the Old Courthouse Museum in Guysborough. Music and theatre are popular in the area, with Mulgrave Road Theatre, a professional theatre company focused on the Atlantic Canadian experience located in Guysborough, as well as the Chedabucto Place Performance Centre for live performances of all types, also located in Guysborough (MODG, n.d.).

The MODSM, considered to be the heart of Nova Scotia Eastern Shore, has a history dating back before the municipality was incorporated in 1879 (MODSM, 2026). Known for the St. Mary's River and the historic Sherbrooke Village, the region thrived on forestry, fishing, and resource extraction. Today, Sherbrooke Village is an historical landmark that showcases historic buildings and arts and crafts made by the local artisans demonstrating heritage crafting skills (NSCCTH, n.d.).

There are several accommodations options available both in MODSM and MODG. Accommodation such as the Sherbrooke Village Inn and Daysago Bed & Breakfast offer options for visitors to both Sherbrooke Village and the MODSM. There is also the Authentic Seacoast Company, located in the town of Guysborough and offering three unique accommodations that are themed on the region's history and attractions (Authentic Seacoast, n.d.). Other accommodations may also be available through websites such as Airbnb (n.d.), but all are found outside of the Study Area.

Recreation and Tourism Trend

Tourism Nova Scotia's 2019 visitor exit survey collected information on the reason for people's visits and activities that visitors undertook while in Nova Scotia (TNS, 2021). The top five main reasons for visiting Nova Scotia in 2019 among pleasure visitors were:

- For the scenery/natural landscape (22%)
- To visit a specific area or location in Nova Scotia (18%)
- For the seacoast and ocean (14%)
- To do a specific activity (8%)
- To experience Nova Scotia's culture (8%)

Of those who participated in outdoor activities, the most common were coastal sightseeing, visiting a beach, and hiking (TNS, 2021). No spatial data is available from this or other research products of Tourism Nova Scotia regarding the places visited within province, limiting the understanding of the impact that tourism has on the communities that surround the Project. Additionally, no data was found on intra-provincial travel or local use of these resources.

Visitors to the area will likely rely on popular paved road networks to traverse through both the MODG and MODSM, with Highway 316 and Highway 211 assumed to be the most popular route taken. Highway 316 and Highway 211 are scenic routes that showcase the Eastern Shore and are part of Nova Scotia's Marine Drive scenic travelway (TNS, 2025). It is likely that visitors using this route will be traveling to some of the previously mentioned parks and trails, north towards Guysborough and Aulds Cove, west towards Antigonish, or south towards Halifax.

11.2.3 Effects Assessment

Project-Land Interactions

Project activities have the potential to interact with land use during all phases of the Project (Table 11.8).

Table 11.8: Potential Project-Land Use Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	X
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X

Project Phase	Potential for Interaction
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for land use includes MODG and MODSM (Drawing 11.1). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for land use as well. The VC-specific definition for magnitude is as follows:

- Negligible: No change in land use expected and surrounding land use can largely continue.
- Low: Small reduction in land use expected and/or minor limitations to surrounding land use.
- Moderate: Moderate reduction in land use and/or moderate limitations to surrounding land use.
- High: High reduction in land use and/or widespread limitation to surrounding land use.

Effects

Due to the nature of turbines being tall structures with small footprints, they are highly compatible with other land uses like agriculture, forestry, and ground-based recreation. Any forestry activities that are ongoing in the area will have minimal disruption during the construction phase, and no anticipated disruption during operations. Upgraded roads and infrastructure will improve access, limit weather-related access disruptions, and improve the access road conditions, which will reduce wear on vehicles and other industrial equipment. None of the existing and permitted users of the Crown land are expected to be impacted by the Project.

A 2017 study mentions that contrary to the traditional energy industry's direct and indirect impacts on conservation, wind energy can be seen as a complementary land use to conservation and protected areas broadly, as wind energy is not a carbon emitter (Wind Europe, 2017). Given the context of Nova Scotia where the traditional energy source has primarily been coal, land use for wind energy can be seen as a positive step.

Visual Aesthetics

People living and working in the vicinity of wind projects express a wide range of perspectives on the visual aesthetics and social acceptability of large turbines (Kirchhoff et al., 2022). While regulations in Nova Scotia do not require assessment of aesthetic impacts, visual simulation modelling was completed by WSP to demonstrate expected Project visibility from eight viewpoints surrounding the Project (Appendix O). These visual simulations were shared at

public information sessions (Section 6.2.4) to show members of surrounding communities what the Project will look like from several different viewpoints, once constructed.

Property Value

Potential effects on property value are often a concern of neighbouring residents due largely to anecdotal reports of drastic declines in property values following the nearby installation of a wind energy facility (Gulden, 2011). Despite these concerns, many rigorous and statistically defensible studies have concluded that wind energy developments have had no significant effect on surrounding property values.

Prior to 2013, the most comprehensive study on the impact of wind farms on property values was completed by Hoen et al. (2009) This research analyzed data on nearly 7,500 sales of single-family homes situated within 16 km of 24 existing wind farms in the United States. Eight different hedonic pricing models failed to generate statistically significant evidence that property values for houses located within 16 km of wind farms are influenced by the developments. Subsequent research by the same researchers but employing additional analyses confirmed these results (Hoen et al., 2010).

A study by Hinman (2010) tracked property transactions in communities located close to a 240-turbine wind farm for an eight-year period that spanned pre-development and operation stages. Hinman found that before project approval, property values in the area decreased. This was attributed to a fear of the unknown effects that the development would have; an effect known as anticipation stigma. However, once the development became operational, property values recovered. This recovery was attributed to a greater understanding of the operational effects of the development. Anticipation stigma, however, was not detected in a similar study in Colorado (Laposa & Mueller, 2010), in which it was concluded that the announcement of a large wind energy development did not significantly reduce the selling prices of homes surrounding the proposed development.

The primary limitation of previous research on the effects of wind energy facilities on surrounding home values has long been the relatively small sample sizes (data sets) of relevant home-sale data. The inability to account for the complexity of the various factors that affect property values has also been cited as a limitation of previous studies. Data had been limited for homes located within approximately 800 m of turbines, where impacts would be expected to be the largest: Hinman (2010) (sample size of 11); Carter (2011) (sample size of 41). This is in part because setback requirements generally result in wind facilities being sited in areas with relatively few dwellings, limiting the number of sales transactions available to be analyzed (Hoen et al., 2013). Although these smaller data sets are adequate to examine large impacts (e.g., over 10%), they are less likely to reveal small effects with any reasonable degree of statistical significance.

A study published in August 2013 by Berkeley National Laboratory was conducted to address these gaps in data and included the largest home-sale dataset to date (Hoen et al., 2013). Researchers collected data from 51,276 home sales spanning 27 counties in nine states,

related to 67 different wind facilities. These homes were within 16 km of 67 different wind facilities, and 1,198 of the sales analyzed were within 1.6 km of a turbine, giving a much larger dataset than previous studies had collected. The data span the periods well before announcement of the wind facilities to well after their construction (Hoen et al., 2013).

Two types of models were employed during Hoen et al.'s (2013) study to estimate property-value impacts: (1) an ordinary least squares model, which is standard for this type of study, and (2) a spatial-process model, which accounts for spatial variability. These models allowed the researchers to control for home values before the announcement of a wind facility (as well as the post-announcement, pre-construction period), the spatial dependence of unobserved factors affecting home values, and value changes over time. A series of robust models was also employed to add an additional level of confidence to the study results (Hoen et al., 2013).

Regardless of model specification, the results of Hoen et al.'s (2013) study revealed no statistical evidence that home values near turbines were affected in the post-construction or post-announcement/pre-construction periods. Therefore, the authors concluded that if effects do exist, the average impacts are relatively small (within the margin of error in the models) and/or sporadic (Hoen et al., 2013).

A study analyzing more than 7,000 home and farm sales from 2002 to 2010 in the Melancthon Township and 10 surrounding counties found that Ontario's first and largest wind farm (133 turbines) had "no statistically significant effect" on property values. Further, the study found a lack of significant effect is similar across both rural residential properties and agricultural properties (Vyn & McCullough, 2014).

A more recent review based on housing and property values within specific radii of wind farms and other energy infrastructure by Brinkley and Leach (2019) finds that while most energy infrastructure has an impact on nearby land values, renewable energy projects (including wind farms) do not have statistically significant impacts. These findings are based on seven individual studies of varying scales that all consider the value of property relative to the proximity to wind power, whether a single turbine or more (Brinkley & Leach, 2019).

In 2019, researchers at the University of California, Davis conducted an analysis of property values research in the energy sector. Their analysis found that studies on wind turbines and property values overwhelmingly find that wind turbines do not negatively impact property values at any point during their installment (ACPA, 2023). Similarly, a study of onshore wind energy projects in New England found that negative effects on property value were concentrated within 1 km of the project, were not significant beyond this threshold, and dissipated with time (Dong et al., 2023).

Research has consistently demonstrated that, in a variety of spatial settings and across a wide temporal scale, sale prices for homes near wind energy facilities are not significantly different from those attained for homes sited away from wind energy facilities.

Recreation and Tourism

It is difficult to determine with certainty how tourists will react to wind-power development. Wind farms are objects of fascination for many who might see them as an attraction or at worst neutral in their tourism decisions. Others may find them intrusive in otherwise natural or rural spaces and choose other, less developed areas for tourism and recreational opportunities. While it is not possible to predetermine recreationalists' response to the presence of or the aesthetic qualities of the Project, including potential impacts to viewscapes (Appendix O), the Project's direct impacts on recreational opportunities and the experiences sought after by locals and tourists alike can be examined.

Construction of the Project will likely cause overlap with recreational activities practiced in the Study Area, primarily the use of existing trails and natural environment. Although the Project is not proposing to implement permanent access restrictions (e.g., gates), trails noted to be used by ATVs, snowmobiles, or that provide access to fishing and hunting may be temporarily inaccessible for safety reasons if in proximity to active construction sites. Such closures will be temporary and limited to construction, with similar temporary closures during decommissioning.

A variety of research has attempted to understand the connection between wind energy development and tourism outcomes, both in terms of tourism demand and tourist experience. Most research finds that the effect of wind turbines on both demand and experience is neutral to slightly negative. Work in Portugal found a generally net neutral outcome of onshore wind farms, in which some tourists and residents expressed slightly negative to positive outlooks (de Sousa & Kastenholz, 2015). The researchers examined the potential for wind farms to become areas of tourism interest, which they concluded requires more investigation though may be practical. Alternatively, in Iceland, tourists especially expressed negative views towards turbines from one project in particular (Sæþórsdóttir & Ólafsdóttir, 2020). The authors of this study found that further development in the region would put 'nature-based tourism' and wind energy in competition for land use, highlighting that the conflict between tourism and wind development is dependent on the prevailing type of tourism practiced in an area. In Germany, researchers found a negative relationship between turbines and tourism demand, and highlighted a strong difference between the effect of onshore inland and onshore coastal, turbines (Broekel & Alfken, 2015). These authors, however, point to the need for greater study to determine if these relationships hold when examined at a greater scale. Finally, research in the Czech Republic finds a generally neutral attitude towards wind farms among regional visitors (Frantál & Kunc, 2011). The authors noted that interestingly, tourists had higher acceptance of turbines than residents.

Based on literature review, the potential effects of the Project on tourism demand and experience need to be understood in the context of the Project's features and the tourism demand in the area. There are little structured recreational opportunities (i.e., established recreation providers) within or adjacent to the Study Area. Given the high prevalence of minimally structured and uncommercialized activities (e.g. hiking and beach exploration), the low prevalence of tourism providers near the Study Area would not necessarily be a deterrent to tourists using the area. However, it is more likely that visitors to the MODG and MODSM

seeking natural experience will visit established destinations such as the nearby Salsman Provincial Park, the Port Bickerton Lighthouse, Port Hilford beach or the St. Mary's River, although some reduction in visual aesthetics may be anticipated given the proximity of the Project to the latter. Less-structured recreational activities, such as trail users, may be more affected by the Project through the limitations of trail usage within the Study Area during the construction phase. Nonetheless, some recreationalists, especially off-highway vehicle (OHV) riders, may benefit from the Project due to the increased road network allowing for greater access to trails.

The Project Team is committed to continuing to work with local recreational groups to ensure continued access to the area and associated trails, within the bounds of all safety considerations, particularly during construction. Following construction, the Proponent is not proposing to gate access roads or restrict movement through the Study Area. For Project and public safety, substation areas may be fenced throughout operations, but this will only limit access to a small area within the Study Area and not restrict movement. As discussed above, the presence of turbines is highly compatible with most land-based recreation activities and is not expected to limit recreation opportunities, whether by locals or tourists.

Mitigation Measures
The following mitigation measures are recommended:

- Limit trail, road, and area closures to temporary periods within the construction and decommissioning phases for the safety of the public.
- Continue working with local recreation groups to ensure continued access to areas within the Study Area for recreation, including ATV/OHV use, hunting, and trapping.
- Continue engaging with nearby landowners and community members.
- Develop a Blasting Management Plan in consideration of nearby industrial land users, if blasting is required.

Monitoring
No monitoring is proposed.

Conclusion
The impact on land use is expected to be negligible, as no change in land value is expected and surrounding land use can largely continue and is therefore considered not significant.

12.0 ARCHAEOLOGICAL RESOURCES

12.1 Overview
The purpose of the Archaeological Resource Impact Assessment (ARIA) was to identify areas of high archaeological potential within the Assessment Area. Cultural Resource Management (CRM) Group Ltd. was retained to conduct the ARIA in 2026.

12.2 Regulatory Context

The *Special Places Protection Act,* R.S.N.S. 1989, c. 438 provides the province of Nova Scotia with a mandate to protect important archaeological, historical, and paleontological sites and remains, including those underwater. A permit is required for any archaeological or paleontological exploration or excavation in Nova Scotia. The permit system ensures that work is completed based on established standards by qualified applicants.

This ARIA was conducted in accordance with the terms of Heritage Research Permits A2026NS045 issued by the NSCCTH – Special Places Program (Appendix P).

As archaeological work can often result in findings or information that is confidential or sensitive, a summary of the results of the ARIA is provided in the EA, with the ARIA reports provided directly to NSCCTH for review. It is understood that the findings and recommendations of the ARIA are considered “draft” until the reports are accepted by NSCCTH. The report completed for the Project has been submitted to NSCCTH and is currently under review.

12.3 Assessment Methodology

The objectives of the ARIA were to provide an overview of the distribution of areas of elevated archaeological resources within the Study Area. Based on engagement with NSCCTH by CRM Group and given the focused intent, the size of the Project, as well as the absence of any existing Project-related plans for development or other ground impacts, it was determined that an ARIA consisting of a desktop study and not involving any archaeological fieldwork was most appropriate for this EA. CRM Group designed a desktop assessment strategy that included three main elements:

- Mi’kmaw engagement
- A background study
- Predictive modelling of archaeological resource potential

Recognizing Mi’kmaw ties to lands and waters in the vicinity of the Study Area, CRM Group engaged with Kwilmu’kw Maw-klusuaqn - Archaeology Research Division to request information relating to traditional or historical Mi’kmaw use of the Study Area. The information provided helped to expand the results of the background study and improved the understanding of the cultural and archeological context of the Study Area.

The background study examined how people have used and occupied the Study Area and surrounding landscape through a review of past archaeological assessments, historic documents (e.g., land grant records, legal surveys, historic maps), and local and regional histories. Satellite and LiDAR digital elevation models (DEMs) were also used to infer evidence of past human settlement and resource use, including remains of historic infrastructure, transportation routes, and navigable waterbodies. The proximity to existing registered archaeological sites, heritage properties, cemeteries, Mi’kma’ki First Nation Lands, Crown land

parcels, and protected areas was determined using GIS data to further understand the archaeological context of the Study Area.

Finally, information gathered during Mi'kmaw engagement and the background study was used to develop an archaeological potential model. The locations of cultural and archaeological features such as burial and archeological sites, areas of historic activity, and important travel corridors (e.g., lakes, coastlines, and watercourses) were used to identify zones of elevated archaeological potential within the Study Area. Though acknowledged to be a simplification of the distribution of archaeological resources, the model output provides a useful depiction of areas requiring additional attention.

12.4 Assessment Results

The ARIA led by CRM Group (A2026NS045) resulted in the identification of several modelled areas of elevated archaeological potential throughout the Study Area. CRM Group recommends that field assessments, including ground-truthing the archaeological potential model, be completed prior to the development of the Project. The goal of the field assessments would be to determine any requirements for sub-surface archaeological testing and/or mitigative measures.

12.5 Effects Assessment

Project-Archaeological Resources Interactions

Project activities could interact with archaeological resources during earth moving activities in the construction phase (Table 12.1).

Table 12.1: Potential Project-Archaeological Resources Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	-
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	-

Project Phase	Potential for Interaction
Decommissioning	
Infrastructure Removal	-
Site Reclamation	-

Assessment Boundaries

The LAA for archaeological resources is the Clearing Footprint (Drawing 3.2A to 3.2N). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply to archaeological resources. The VC-specific definition for magnitude is as follows:

- Low: Activities have a low potential for encountering archaeological resources during ground disturbance.
- Moderate: Activities have an elevated potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.
- High: Activities have an elevated potential for encountering archaeological resources during ground disturbance, and ARIA indicates a high potential for accidental and irrevocable loss of archaeological resources regardless of mitigative measures.

Effects

Impacts on archaeological resources could occur during activities requiring ground disturbance or vegetation clearing. New ground disturbance and vegetation clearing for the Project will be limited to the Clearing Footprint and will occur during the site preparation and construction phase. Ground disturbance will also occur during decommissioning but will be limited to areas previously disturbed during construction.

The results of the archaeological potential model suggest that most of the Clearing Footprint has a low potential for encountering archaeological resources. The potential for interactions with archaeological resources will be further examined through field assessments focused in areas of elevated archaeological potential (prior to construction).

Mitigation Measures

The following mitigation measures are recommended:

- Complete a site-specific archaeological assessment, including ground-truthing of the areas of elevated archaeological potential identified by the model.
    - Avoid any identified areas of high potential for archaeological resources, where practicable, in detailed design.
    - Conduct additional studies, as required by NSCCTH, in areas with high potential for archaeological resources that cannot be avoided.

- Include a chance find procedure related to the potential unexpected discovery of archaeological items or sites, or human remains, during construction, within the Contingency Plan. This would include halting any work immediately upon discovery of suspected resources and contacting NSCCTH. If the resources are suspected to be of Mi'kmaq origin, the Executive Director of KMKNO and SGI would also be contacted.

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on archaeological resources (after mitigation) are characterized in Table 12.2. This is considered a preliminary conclusion, pending the outcome of the site-specific archaeological assessment.

Table 12.2: Archaeological Resources Residual Effects

Effect Detail	Loss of Archaeological Resources
Magnitude of Effect	**Moderate:** Activities have an elevated potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.
Geographic Extent of Effect	Clearing Footprint, should unlikely impacts to archeological resources occur.
Frequency of Effect	**Single Event:** Should unlikely impacts to archeological resources occur, effects would occur once, during initial ground disturbance or vegetation clearing for the Project.
Duration of Effect	**Short Term:** Should unlikely impacts to archeological resources occur, they would be limited to the site preparation and construction phase when new ground disturbance and vegetation clearing will occur.
Reversibility of Effect	**Irreversible:** Should unlikely impacts to archeological resources occur, the effects would not be reversible.
Significance Level	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) **Magnitude:** Low, Moderate, High **Frequency:** Single Event, Intermittent, Continuous **Duration:** Short Term, Medium Term, Long Term **Reversibility:** Reversible, Irreversible, Partially Reversible	

13.0 EFFECTS OF THE UNDERTAKING ON THE ENVIRONMENT

13.1 Summary of Effects of the Undertaking on the Environment

Table 13.1 summarizes the results of the effects assessment for each VC.

Table 13.1: Effects of the Undertaking on the Environment Summary

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Atmosphere and Air Quality	Fugitive and Exhaust Emissions	**Low:** Fugitive and exhaust emissions are expected to remain below the maximum permissible ground-level concentrations.	200 m buffer of the Assessment Area	**Intermittent:** Effects may occur during the Project's construction, operation, and decommissioning phases, but only intermittently.	**Short Term:** Effects are mainly confined to the construction and decommissioning phases.	**Reversible**	**Not Significant**
Climate Change	Net Reduction of GHG Emissions	**Positive:** Net effect of the Project will be a reduction in GHG emissions.	Nova Scotia	**Continuous:** Effects will occur continuously during operation.	**Medium Term:** Effects are expected throughout the operation phase.	**Irreversible**	Positive effect, significance not evaluated.
Sound	Construction Noise	**Low:** Construction activities are anticipated to comply with municipal by-laws and permitting.	2.1 km buffer of noise sources	**Intermittent:** Effects are anticipated during both the construction and decommissioning phases, and rarely during operation.	**Short Term:** Effects are expected throughout construction and decommissioning, but generally not during operations or after decommissioning.	**Reversible**	**Not Significant**
	Operational Noise	**Low:** Operational sound is predicted to comply with the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects.	2 km buffer of selected turbine locations	**Intermittent:** Effects may occur whenever the turbine rotors are spinning.	**Medium Term:** Effects are expected throughout the operational phase of the Project.	**Reversible**	**Not Significant**

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Shadow Flicker	Shadow Flicker	**Low:** Measurable shadow flicker is expected but within regulatory compliance at non-participating receptors.	2 km buffer of selected turbine locations	**Intermittent:** Effects may occur whenever the turbine rotors are spinning.	**Medium Term:** Effects are expected throughout the operational phase of the Project.	**Reversible**	**Not Significant**
Geophysical Environment	Encountered Geologic Hazard	**Moderate:** Risk mapping shows the potential for geologic hazards in the Study Area.	800 m buffer of the Project Footprint	**Continuous:** If present, effects may occur continuously.	**Short Term:** If present, effects limited to construction and decommissioning.	**Partially Reversible**	**Not Significant**
	Change to Groundwater Quality or Quantity	**Moderate:** Groundwater wells located within 800 m of the Project Footprint.	800 m buffer of the Project Footprint	**Intermittent:** Effects may occur during blasting (if required).	**Short Term:** Effects are possible throughout construction (if blasting is required).	**Partially Reversible**	**Not Significant**
Surface Water, Fish, and Fish Habitat	Habitat loss	**Low:** A small loss of fish habitat.	Assessment Area	**Single Event:** Effects may occur during initial construction.	**Medium Term:** Effects may occur during all phases but will not extend beyond decommissioning.	**Partially Reversible**	**Not Significant**
	Fish Injury or Mortality	**Negligible:** No loss of fish expected.	**N/A**	**N/A**	**N/A**	**N/A**	**Not Significant**
	Changes to Water Quality and Quantity	**Low:** Minimal potential for altered hydrology or impact to fish.	Assessment Area	**Intermittent:** Effects may occur during initial construction and during operations.	**Medium Term:** Effects may occur during all phases but will not extend beyond decommissioning.	**Partially Reversible**	**Not Significant**

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Wetlands	Habitat Loss	**Moderate:** Direct loss of habitat, including that of potential WSS, but wetland area loss will not impact the hydrology of the watershed. Where WSS are impacted, adequate general SAR habitat is prevalent elsewhere within the RAA.	Assessment Area	**Single Event:** Effects will occur once, during initial ground disturbance or vegetation clearing for the Project.	**Medium Term:** Residual effects will extend until wetlands are compensated for following construction.	**Partially Reversible**	**Not Significant**
	Changes in Wetland Function	**Low:** Project activities have low potential for changes to wetland function with the implementation of mitigation measures.	Assessment Area	**Single Event:** Direct effects resulting from construction activities will occur once, and indirect effects to wetland function will be mitigated through the use of controls.	**Medium Term:** Residual effects may extend through the operation and maintenance phase of the Project.	**Partially Reversible**	**Not Significant**
Terrestrial Vegetation Communities and Flora	Loss or Alteration of sensitive vegetation communities	**Low to Moderate:** Small loss of sensitive vegetation communities	100 m buffer of the Clearing Footprint	**Single Event:** Effects may occur during initial site preparation and construction.	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**
	Loss of flora SAR or SOCI and Impacts on supporting habitat	**Moderate:** small loss of flora SOCI individuals, but their populations remain largely intact; moderate loss of, or effects on habitat supporting flora SAR or SOCI.	100 m buffer of the Clearing Footprint	**Single Event:** Effects may occur during initial site preparation and construction.	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
	Indirect effects on vegetation communities and flora	**Low:** Low impacts to sensitive vegetation communities and flora SAR and SOCI due to indirect effects.	100 m buffer of the Clearing Footprint	**Intermittent:** Effects may occur throughout all Project phases.	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**
Terrestrial Fauna	Habitat Loss and Fragmentation	**Low:** Small loss of habitat supporting fauna SAR.	5 km buffer of the Study Area	**Single Event:** Effects expected to occur during construction phase.	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**
	Sensory Disturbance	**Low:** Low impacts to fauna through sensory disturbance.	5 km buffer of the Study Area	**Intermittent:** Effects occur occasionally or intermittently during one or more phase of the Project.	**Medium Term:** Effects will end following decommissioning.	**Reversible**	**Not Significant**
	Injury or Mortality	**Low:** Low impacts to fauna through injury and mortality.	5 km buffer of the Study Area	**Intermittent:** Effects occur occasionally or intermittently during one or more phase of the Project.	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**
Bats	Habitat Fragmentation and/or Loss	**Low:** Low loss of suitable bat habitat is expected (about 0.6% of modelled maternity roosting habitat available within the LAA).	5 km buffer of the Study Area	**Single Event:** Effects may only be associated with clearing during construction.	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**
	Injury or Mortality	**Moderate:** Minimal loss of individuals is expected.	5 km buffer of the Study Area	**Intermittent:** Effects may occur seasonally between dusk and dawn during operations and temporarily during construction.	**Medium Term:** Effects will end following decommissioning.	**Irreversible**	**Not Significant**

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
	Sensory Disturbance	**Low:** Low impacts to habitat usage (i.e., effective habitat loss) due to sensory disturbance is expected.	5 km buffer of the Study Area	**Continuous:** Effects may occur sporadically during construction and decommissioning but may be constant (though spatially limited) during operations.	**Medium Term:** Effects will end following decommissioning.	**Reversible**	**Not Significant**
Avifauna	Habitat Loss, Alteration/ Fragmentation, and Edge Effect	**Low to Moderate:** Low to moderate loss of habitat supporting avian SAR and habitat-sensitive avifauna, depending on the species.	5 km buffer of the Study Area	**Single Event:** Loss of habitat occurs once during the construction phase (i.e., clearing and ground disturbance).	**Medium Term:** Effects will end following decommissioning.	**Partially Reversible**	**Not Significant**
	Sensory Disturbance – Light and Noise	**Low:** Low sensory disturbances are expected.	5 km buffer of the Study Area	**Intermittent:** Intermittent during the construction, decommissioning, and operations phases.	**Medium Term:** Effects will end following decommissioning.	**Reversible**	**Not Significant**
	Injury and Mortality	**Moderate:** Avian use of the Study Area indicates a likelihood of interactions but recorded flight altitudes indicate effect is likely at the individual and not population scale.	5 km buffer of the Study Area	**Intermittent:** May vary by Project phase, as well as seasonal differences (e.g., breeding, migration, and winter seasons).	**Medium Term:** Effects will end following decommissioning.	**Irreversible**	**Not Significant**
Economy	Economic Impact	The economic impact is expected to be positive throughout the lifespan of the Project. As a positive effect, significance is not evaluated.					

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Land Use	Land Use or Value Change	The impact to land use is expected to be negligible, as no change in land value is expected and surrounding land use can largely continue and is therefore considered not significant.					
Archaeological Resources	Loss of Archaeological Resources	**Moderate:** Activities have an elevated potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.	Clearing Footprint, Should unlikely impacts to archeological resources occur	**Single Event:** Should unlikely impacts to archeological resources occur, effects would occur once, during initial ground disturbance or vegetation clearing for the Project.	**Short Term:** Should unlikely impacts to archeological resources occur, they would be limited to the construction phase when new ground disturbance and vegetation clearing will occur.	**Irreversible:** Should unlikely impacts to archeological resources occur, the effects would not be reversible.	**Not Significant**

Effects Assessment Ratings (Refer to Table 4.4 for definitions)

Magnitude: Negligible, Low, Moderate, High, Positive
Frequency: Single Event, Intermittent, Continuous
Duration: Short Term, Medium Term, Long Term
Reversibility: Reversible, Irreversible, Partially Reversible

14.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

The following section discusses potential effects of the natural environment, including climate change, natural hazards, and weather events, on the infrastructure and operation of the Project. Potential sources of effects from the environment are described below, including mitigation and design strategies for reducing the significance of residual effects.

The primary mitigative measure employed during the construction and operation of the Project is to educate and train site personnel. Environmental and safety orientations will be conducted prior to the start of construction and all staff will be informed of the potential effects of the environment on the Project. Staff responsible for the operation and maintenance of the Project will be trained on the design and operation of the turbines, including applicable operating procedures, safety protocols, and evacuation plans. To further mitigate damages that cannot be controlled by education and training alone, turbines will be equipped with safety mechanisms to limit damage resulting from extreme weather events.

14.1 Climate Change

Climate change refers to a long-term, persistent change in average and extreme weather conditions. Contemporary climate change (i.e., since the beginning of the industrial period) is being caused by increases in GHG emissions associated with human activities. Warming temperatures, altered precipitation regimes, and sea level rise are three notable aspects of climate change with potential to impact Project operations.

14.1.1 Increased Air Temperature

A key aspect of climate change is global warming, which refers to the long-term rise in the Earth's average surface temperature, measured over 30 years, in comparison to preindustrial levels (IPCC, 2018). Air temperatures are an important driver of many environmental processes, including the intensity of severe weather events such as hurricanes (Gilford et al., 2024). Based on a range of emissions scenarios (Coupled Model Intercomparison Project Phase 6), average annual temperatures in the Study Area are expected to be 2.4°C to 3.7°C warmer during the period 2041 to 2070 relative to the 1971 to 2000 baseline, while the number of days with a humidex above 30°C are expected to increase by 24 to 39 days per year (ClimateData.ca, 2025).

Temperature increases associated with global warming may impact all phases of the Project as well as the comfort of on-site personnel. For example, higher and more frequent temperature extremes may impact the integrity and lifespan of Project infrastructure, including unpaved roads. At the same time, Guysborough County (which includes the entirety of the Study Area) is expected to experience fewer freeze-thaw cycles in the coming years which may reduce damage to infrastructure (NSECC, 2025g), highlighting the complexity of project planning in the context of climate change. In their Climate Change Action Plan, the MDOSM recognizes temperature fluctuations and impacts to health and wellness under climate change as having medium and low concern levels, respectively (MDOSM, 2022).

To maintain the comfort and safety of on-site personnel, it is likely that the demand for cooling in construction vehicles will increase alongside warming temperatures and personnel may be required to take regular breaks to cool down and rehydrate. Warmer temperatures also have the potential to enhance the spread and abundance of disease vectors such as ticks (Bouchard et al., 2019), with associated increases in health risks. Longer and more intense heat waves under climate change may also increase the risk of forest fires (ECCC, 2019b), which impact site personnel as well as Project operations (described further in Section 14.2.3).

The direct risks of increased temperatures to Project personnel will be managed by ensuring staff are trained to understand the importance of regular breaks, proper hydration, and unsafe working conditions. Regular inspection and maintenance will help to manage risks to Project infrastructure.

14.1.2 Changes in Precipitation

Heavy rainfall events are a common, highly probable natural hazard in Nova Scotia that may be exacerbated by climate change. Although it is difficult to accurately forecast decadal-scale changes in rainfall events, future climate scenarios suggest that conditions will become “wetter” over the Project’s lifespan. For example, total annual precipitation in the Study Area is expected to be 98 mm/y to 146 mm/yr higher over the period 2041 to 2070 relative to the 1971 to 2000 baseline (ClimateData.ca, 2025). Heavy rainfall events have the potential to impact construction and operations by increasing the risk of overland flooding which may temporarily restrict site access, overwhelm ditches and culverts, and require operational strategies to be implemented (e.g., sedimentation and erosion controls).

While the climate of the Study Area is expected to become wetter overall, prolonged dry periods will continue to occur. Periods of dry conditions may impact Project operations (e.g., by limiting construction activities) if forest access is restricted due to increased wildfire risk (e.g., woods access restrictions). Droughts may also limit fire-fighting abilities if water levels are low in nearby lakes and rivers and may cause an increase in fugitive dust emissions during construction that require management via mitigations.

The Project will mitigate the risks of flooding and drought by:

- Developing and implementing a Surface Water Management Plan.
- Minimizing alterations to wetlands.
- Sizing culverts appropriately for anticipated increased precipitation events.
- Designing roadside ditches and water off-take infrastructure next to all roads to encourage rainwater drainage.
- Maintaining regular upkeep of surface water infrastructure.
- Allowing for natural revegetation of roadsides to absorb excess water.

14.1.3 Sea Level Rise

On a global scale, sea levels are currently rising because of warming air and ocean temperatures (via thermal expansion of ocean water and increased inputs of melting of sea

ice/glaciers). Sections of the Atlantic coastline have been highlighted as some of Canada's most severely threatened areas from sea level rise and resulting impacts, with rising sea levels expected to amplify coastal flooding, erosion, and storm surge across the Atlantic region (ECCC, 2023a). According to the National Oceanic and Atmospheric Administration (NOAA, n.d.), the relative sea level trends across Nova Scotia ranges from approximately 3.19 mm/y to 3.99 mm/y (based on data from 1895 to 2021).

The majority of new Project infrastructure will be at an elevation (up to 195 masl) and distance from the coast such that direct impacts of coastal flooding are unlikely. However, access routes located along the Atlantic Coast, including highways and shipping routes, have potential to be impacted by rising water levels, erosion, and coastal flooding, with possible disruptions to Project operations. For instance, based on predicted sea level rise to the year 2100, severe coastal flooding events could impact public roads and bridges near the Project, including Highway 211 (MDOSM, 2022; NSECC, 2025c). As several alternate access routes to the Study Area are available (described in Section 3), however, the risk of coastal flooding restricting site access for Project personnel is low.

14.2 Natural Hazards

Nova Scotia regularly experiences natural hazards, including severe weather events (e.g., blizzards, hurricanes) and wildfires. These events can lead to adverse outcomes such as power outages, health-related emergencies, infrastructure damage, and road damage, thereby posing direct risks to infrastructure (Public Safety Canada, 2024). In addition to severe weather events and wildfires, a natural hazard that is unique to wind energy projects is the possibility of turbine icing.

14.2.1 Severe Weather Events

Hurricanes, blizzards, and other severe weather events are natural hazards that have the potential to impact the Project through direct effects to infrastructure and personnel, and through disruptions to site access. During severe weather events, safety risks may be elevated due to hazardous driving conditions, poor visibility, cold temperatures, and falling debris. Throughout the life of the Project, the safety of Project personnel will be managed by developing and implementing safe work procedures, and ensuring staff are trained in the use of PPE and understand unsafe work conditions.

High winds and lightning, which may be associated with heavy rainfall or hurricane conditions, may increase the risk of mechanical issues or electrical fires. To mitigate this risk, turbines will be monitored remotely and equipped with an automatic shutdown that will engage when wind thresholds are reached (i.e., cut-out speed). Turbines will also be designed with a built-in grounding system for lightning strikes.

14.2.2 Wildfire

Wildfire poses a potential risk to the Project during all Project phases. A substantial portion of the Project Footprint is surrounded by forest cover and there is potential for naturally occurring and/or human-caused forest fires to damage Project infrastructure and elevate safety risks for Project personnel.

Fire is one of the sources of natural disturbance in Nova Scotia, with moderate to high severity fires impacting an estimated 0.2% to 0.4% of forested land per year (A. R. Taylor et al., 2020). In the Eastern Interior Ecodistrict, which encompasses the majority of the Study Area, forest conditions have historically been conducive to frequent stand-level disturbances by wildfire (Neily et al., 2017). Although it is challenging to precisely predict changes to fire regimes, modelling suggests wildfire risk in the Acadian forest region (which includes the Study Area) will increase moderately under climate change as a result of warmer and drier conditions (Whitman et al., 2015). In recent years, several large wildfires have occurred in Nova Scotia, which were exacerbated by prolonged dry periods (e.g., Upper Tantallon/Hammonds Plains fire in 2023, Long Lake fire in 2025).

The following operational and technological measures will be implemented:

- Develop and implement a Project-specific Contingency Plan that includes a fire safety plan. Circulate the plan to local fire departments for input and awareness.
- Engage with first responders on site access and availability of water resources for fire suppression.
- Ensure fire response equipment is available at the O&M building and that site personnel are trained in its use.
- Equip each turbine with integrated condition-monitoring and control systems with automated shutdown function and alerts to operations personnel.

14.2.3 Turbine Icing

Turbine icing occurs when ice accumulates on the surface of turbine blades, a condition created by specific temperatures and levels of humidity or the presence of freezing rain. Icing may occur more frequently when turbine blades reach 150 m above ground where lower clouds may contain supercooled rain during the cold season (Seifert et al., 2003). Turbine icing may lead to ice throw or ice fall, and the distance and direction in which the ice is thrown/falls is dependent on factors such as wind speed, rotor speed, rotor azimuth, the position of the ice on the blade, and the characteristics of the ice itself.

The maximum throwing distance of ice from a turbine, as determined using the following equation (CREA, 2020) is:

$$d_t = 1.5 * (D + H)$$

Where:
d_t = Maximum throwing distance (m)
D = Rotor diameter (m)
H = Hub height (m)

Based on the above equation and turbine model specifications (183.4 m rotor diameter and 130.0 m hub height), the maximum theoretical throwing distance associated with the Project's turbines is 470.1 m. Note that the equation above is a simple ballistics model that

overestimates actual ice throw and does not account for particle size or the distribution of ice throw within the maximum theoretical distance.

A Swedish research study published in 2017 that involved a comprehensive determination of ice throw area found that 75% of located ice fragments thrown from turbine blades were within one rotor diameter distance from the turbine tower (Lunden, 2017). In the case of the turbine model being considered for the Project, this represents a distance of 183.4 m. The ice throw study also noted that a very low percentage of identified ice fragments were located beyond 1.5 times the length of the rotor diameter (Lunden, 2017). Regardless, all potential receptors are located beyond the distance identified using the ballistics model, with the nearest potential receptor located 541.3 m from a turbine. Ice throw presents a risk to those who will work in close proximity to turbines during operations and personnel will follow best management practices..

To reduce the risk of injury from ice throw or falling ice, mitigation measures to protect recreation users and site workers from ice throw or shedding will include:

- Equip turbines with blade anti-icing or de-icing systems.
- Equip turbines with automatic shutdown systems that can activate in instances of ice shedding.
- Continue engagement and education with local recreational users regarding the safe continued use of lands within the Study Area.
- Install signage illustrating and warning of potential hazards associated with ice throw and shedding around wind turbines.
- Equip staff and workers accessing turbines for maintenance or other purposes with necessary PPE and associated safety protocols and procedures to mitigate risk of injury and/or fatality, especially during potential icing conditions.

14.3 Summary of Effects

Environmental effects associated with climate change and natural hazards have the potential to affect the Project. Project location siting and design measures will minimize many of the risks associated with these environmental hazards, and the mitigation measures described above will allow for both proactive and adaptive management of any remaining risks, thus limiting the likelihood of impacts on all phases of the Project.

15.0 ACCIDENTS AND MALFUNCTIONS

Without proper mitigation, accidents and malfunctions can interact with many VCs and potentially result in adverse effects. However, implementing preventative measures limits the probability of occurrence, and having appropriate response procedures in place reduces the magnitude of residual effects.

Accidents, malfunctions, and unplanned events considered for this Project include:

- Erosion and sediment control failure
- Fire
- General hazardous material spill
- Structural damage
- Transportation-related incidents
- Ice throw (addressed in Section 14.2.3)

The safety of on-site personnel is a vital Project component; however, it is not specifically considered in the EA as workplace occupational health and safety is regulated by the policies, procedures, plans, and codes of practice set in the *Occupational Health and Safety Act* (Nova Scotia, 1996). A site-specific Contingency Plan will be developed to address accidents, spills and malfunctions.

The Proponent uses the principles of Safety in Design, a proactive engineering approach that considers all potential hazards and designs systems to eliminate or minimize the likelihood of accidents or injuries. The Project will be designed and constructed in strict compliance with the principles of Safety in Design. EverWind has a long history of safely operating the Point Tupper Terminal, located approximately 55 km northeast of the Project in Point Tupper, and recognizes the importance of ensuring the safety of workers, the public, and the environment. At the Point Tupper Terminal, EverWind has created a world class Emergency Response Team (ERT). The EverWind ERT is comprised of 40 members that are NFPA 1081 Advanced Industrial Firefighter certified, NFPA 470/472 Haz Mat certified, NFPA 1006 Technical Rescue (High Angle Rescue and Confined Space Rescue), and St. John Ambulance Advance First Aid certified. In addition, one of EverWind's ERT members is a certified Paramedic with 12 years' experience with Wood Buffalo Fire & Emergency Services.

EverWind also operates an NSECC approved fire training facility at its Point Tupper Terminal and hosts bi-annual live fire training exercises for regional volunteer fire departments and other local industrial ERTs.

15.1 Erosion and Sediment Control Failures

Failure of erosion and sedimentation controls may result in potential adverse effects on VCs (primarily during construction), most notably to watercourses, wetlands, and fish and fish habitat. Erosion and sedimentation controls may fail due to extreme weather conditions (e.g., flooding), improper installation, improper maintenance, and unforeseen accidents (e.g., collisions). Failure of these control measures may release sediment into the environment, impacting water quality and aquatic and terrestrial habitats.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Provide workers with training to properly install and repair erosion and sediment controls.

- Develop and implement an Erosion and Sedimentation Control Plan for all phases of the Project.
- Conduct regular monitoring of all erosion and sediment controls, and repair or replace as necessary.
- Develop and implement a Project-specific Contingency Plan that includes information on sediment and erosion control.

15.2 Fires

An accidental fire could potentially adversely affect the atmospheric environment (emissions), the terrestrial environment (vegetation and wildlife), and the socio-economic environment (land use) during all Project phases.

Fires in wind farms are most often caused by lightning strikes, mechanical and hydraulic faults, and electrical installation failure (You et al., 2023). Publicly available data cannot provide exact statistics, but the rate of fire is estimated to be between 1-in-2,000 and 1-in-15,000, or between a 0.05% and 0.007% chance of fire (Krcmar, 2021), though this will be affected by the installation of fire mitigation technologies such as lightning protection systems.

Various standards and guidelines have been implemented to minimize the chances of fires occurring in turbines and associated infrastructure. The turbines planned for use in this Project are compliant with the International Electrotechnical Commission's IEC 61400 international standard to avoid damage from hazards during their operational lifespan. This includes lightning and surge protection measures. The turbines are equipped with early detection and control systems, including breakers, temperature and pressor sensors (e.g., PT sensors), that continuously monitor key components such as the gearbox, generator, and electrical systems. If electrical currents or temperatures exceed pre-set thresholds, the turbine will automatically enter a safe shutdown state to prevent potential damage or fire. These systems are monitored remotely via the turbine's SCADA system, allowing operators to respond quickly to abnormal conditions.

In addition to general safety protocols and training, fire safety procedures will be developed within the Project's Contingency Plan. The Proponent is also committed to working with local fire departments (Sea Shore Volunteer Fire Department and Harbourview Volunteer Fire Department) to provide site orientation, mapping, and a tour of the wind farm to familiarize them with the site, turbine locations, and the locations of other key infrastructure and safety features.

Wildfires are addressed in Section 14.2.2.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Equip each turbine with integrated condition-monitoring and control systems with automated shutdown functions and alerts to operations personnel.

- Prohibit the use of campfires or burning within the Study Area by staff and contractors.
- Dispose of all flammable waste regularly at an approved facility.
- Allow smoking in designated areas only.
- Equip heavy machinery with fire extinguishers.
- Require turbine technicians heading “up-tower” to carry a fire extinguisher.
- Ensure fire response equipment is available at the O&M building and that site personnel are trained.
- Develop a Contingency Plan including fire safety plan. Circulate the plan to local fire departments for input and awareness.
- Continue to engage with first responders on site access and access to water.

15.3 General Hazardous Material Spills

Hazardous spills resulting from fuel (i.e., storage, refueling, operation of combustion vehicles) and other on-site chemicals may occur during the Project's construction and operations activities. Hazardous spills can adversely impact air, soil, surface water, groundwater quality, human health, and safety. In addition, hazardous spills may risk the health of aquatic, avian, and terrestrial wildlife. The severity of the impacts will depend on the nature of the hazardous material and the quantity spilled.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include the following:

- Develop spill prevention and response procedures within the Contingency Plan.
- Store all fuels, lubricants, and chemicals in designated containers and areas.
- Provide secondary containment in storage areas (where possible).
- Inspect equipment for fluid leaks.
- Locate fuel storage areas, refueling, and/or equipment lubrication a minimum of 30 m from any surface and groundwater feature (i.e., watercourse, well).
- Ensure workers remain with equipment during refueling.
- Complete equipment servicing off-site, where practicable. If this is not possible, require that the work is completed in a designated area, greater than 30 m from a watercourse/waterbody/wetland.
- Store all dangerous goods in compliance with the Workplace Hazardous Material Information System.
- Equip mobile equipment with spill kits stocked with appropriate spill containment materials for the activities taking place, such as soaker pads, oil-absorbing materials, and containment booms.
- Locate stationary spill kits or spill drums at work areas using mobile equipment, hazardous fluids and/or in proximity to environmentally sensitive areas (e.g., wetlands or watercourses).
- Stock spill kits with the appropriate quantity and type of material for the anticipated product type(s) and volume(s) in use.
- Train site workers on site specific spill response requirements and equipment.

With the implementation of the above preventative measures, the likelihood of an accident or a malfunction is low. Appropriate response plans will be put in place to ensure any interactions with VCs from an accident or malfunction are limited and the effects can be quickly contained.

15.4 Transportation-related Incidents

Operator error or techno-mechanical malfunctions may occur during all stages of the Project's lifespan, although the type and intensity of vehicular traffic will vary depending on the Project phase. The construction and decommissioning phases will see the highest volume of traffic and largest vehicles both travelling to and on the site. On the site especially, where workers may be near light to heavy-duty traffic, there is a higher risk of incidents affecting human health (HSE, n.d.). During operation, vehicular access by technicians also presents risks that must be managed. While vehicular use has implicit risks that cannot be fully eliminated, an established Traffic Management Plan will ensure that these risks are mitigated to the highest degree practicable and that they are understood by anyone accessing the Study Area.

Additionally, mitigation measures to limit the probability of an incident and reduce the magnitude and extent of potential effects include:

- Develop a Traffic Management Plan outlining traffic management procedures.
- Assess site access routes, including structural integrity of bridges and culverts, baseline traffic levels and high-risk areas prior to construction.
- Install appropriate traffic signage and road markers to identify high-risk areas and communicate traffic rules and safety information.
- Conduct preventative vehicle inspections to ensure all mobile equipment is in good condition (breaks, light system, leaks absent).
- Develop and maintain roads according to the Erosion and Sedimentation Control Plan.
- Establish, post, and enforce speed limits on site.
- Require that public road speed limits are followed by Project vehicles.
- Require that drivers follow all laws and regulations pertaining to distracted (e.g., cell phone usage) or impaired driving on and off site.
- Require that only licensed individuals operate heavy equipment.
- Follow weather statements and alerts and adjust plans accordingly to avoid transportation in extreme weather conditions.
- Install signage where existing trails cross access roads to avoid potential interactions with trail users when heavy equipment is in use.
- Operate in appropriate weather and provide ample lighting and visibility aids (e.g., mirrors around tight turns).
- Require that visitors are familiar with the Project Footprint or are accompanied, whether in vehicles or on foot.

Detailed information regarding vehicle collision prevention and response procedures will be outlined in the Contingency Plan.

15.5 Structural Damage

Wind turbine damage up to and including failure may result from a variety of factors, both human and environmental, presenting risks to human health, infrastructure, and the environment. The most frequent causes of damage to turbines that may result in failure include damage from lightning, material fatigue over time, leading edge erosion, and damage from icing (Katsaprakakis et al., 2021). While damage by these mechanisms and others is unavoidable in many cases, preventing failure or harm to human or environmental health is critical. This typically involves detecting damage before it can result in a complete failure, including partial or full blade detachment. Wind turbine structural health monitoring, through use of advanced sensors, can detect anomalies in performance and abnormal vibrations that might indicate an imbalance requiring further investigation (Algolfat et al., 2023).

Regular monitoring and inspections are essential for ensuring the continued structural integrity of all components of turbines (Enlitia, 2024), and the Proponent will implement mitigative actions to limit the probability of an occurrence and reduce the magnitude and extent of potential effects, including:

- Maintain sufficient lubrication in bearings, and keep seals clean to prevent excess friction and overheating.
- Maintain and test the lighting protection system and verify grounding integrity.
- Prepare and enact severe weather plans to reduce the risk of physical damage from flying debris or hail and minimize the risk that thermo-electric damage by lightning results in blade failure.
- Inspect and properly maintain turbine pitch, yaw, overspeed, and mechanical brake function.
- Check and change lubrication regularly in the turbine gearboxes to prevent excess heat and minimize wear; conduct oil sampling/analysis at regular intervals.
- Test SCADA/condition-monitoring sensors regularly to ensure that anomalous conditions are detected early and managed before they result in damage to turbines, other infrastructure, or harm human health.
- Inspect blades (e.g., drone/rope access), maintain leading-edge protection, and repair surface defects to control blade erosion and fatigue.
- Implement ice detection/operating procedures and establish temporary exclusion zones during icing events.

The separation of turbines from people and public roads also mitigates the risk to human health and public infrastructure in the highly unlikely event of a failure.

16.0 CUMULATIVE EFFECTS

16.1 Overview

Cumulative effects are changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities and natural processes (Government of British Columbia, 2024). Concerns are often raised about long-term changes

that may occur not only as a result of a single action but of the combined effects of each successive action on the environment (Hegmann et al., 1999). While a single undertaking might not cause significant adverse effects, multiple undertakings may result in incremental impacts, referred to as cumulative effects. These cumulative effects may potentially result in an overall impact on a VC.

16.2 Cumulative Effects Assessment Methodology

The objective of the cumulative effects assessment (CEA) is to evaluate potential changes to a VC that may result from the combined influence of the proposed Project and other past, present, or reasonably foreseeable future projects or activities. The CEA is conducted using publicly available information, with uncertainties clearly identified, and in accordance with the Cumulative Effects Assessment Practitioners Guide (Hegmann et al., 1999). As outlined by Hegmann et al. (1999), the CEA scoping process involves the following steps:

- Selection of VCs to be included in the CEA.
- Determination of spatial and temporal boundaries for the CEA.
- Identification and description of other projects or activities within those boundaries.
- Confirmation of which VCs will proceed through the CEA analysis.

For those VCs selected for the CEA process, an analysis was conducted considering the residual effects of the Project on that VC, the effect of other activities or projects on that VC, and the potential for cumulative effects. Mitigation measures and proposed monitoring programs and follow-up are described, if cumulative effects are predicted. At this stage, the certainty in effects predictions was considered. It is not uncommon for data on effects of other projects or activities to be limited, increasing the uncertainty of the CEA predictions.

16.3 Selection of VCs for Evaluation in the CEA

The primary effects pathways of the Project include the loss and alteration of terrestrial habitats and wetlands (and therefore effects to species that rely on those habitats), as well as potential bird and bat mortality resulting from interactions with wind turbines. Depending on the proximity of nearby projects, pathways may also exist for the effects of sound and interactions with the geophysical environment to add to the effects of nearby activities. Based on the effects assessment for each VC evaluated, no significant adverse residual effects were identified for these or other VCs. Details of the effects assessment for each VC can be found in Sections 7 to 12 and are summarized in Section 13 (Table 13.1).

Table 16.1 summarizes the potential for the Project to interact with the effects of nearby projects based on the expected residual effects described in Sections 7 to 12.

Table 16.1: Potential for Cumulative Effects on Identified VCs

VC	Cumulative Effects Potential	Reasoning
Atmosphere and Air Quality	No	Project emissions are expected to remain below the maximum permissible ground-level concentrations.
Climate Change	No	Residual positive impacts regarding GHG emissions from the use of renewable energy resources will have a positive effect on climate change.
Sound	Yes	Construction and operational sound levels experienced by receptors are expected to comply with regulatory thresholds but could interact with nearby projects.
Shadow Ficker	No	The potential for shadow flicker from Project turbines to interact with other wind projects was considered during shadow flicker modelling (no interactions are expected due to the physical separation of projects).
Geophysical Environment	Yes	If blasting is determined to be required for the Project, interactions with the geophysical environment could interact with nearby projects.
Surface Water, Fish and Fish Habitat	No	The Project is maximizing the use of existing disturbed areas to minimize impacts to watercourses, and no surface water withdrawal will be required. In accordance with provincial permitting requirements, appropriate mitigations will be incorporated into the design of new watercourse crossings, such that there is no significant residual effect, and direct effects are limited to the Project Footprint.
Wetlands	Yes	The Project has been designed to minimize the overall disturbance footprint and maximizes the use of previously disturbed areas to reduce impacts to wetlands; however, impacts to wetlands, including potential WSS, are required for the Project. Residual effects on wetlands through permitted alterations during the development of the Project will be non-significant but may add to effects of nearby projects.
Terrestrial Vegetation Communities and Flora	Yes	Impacts to sensitive terrestrial vegetation communities and rare flora have been minimized through iterative Project design and the use of existing disturbed areas. However, habitat disturbance is expected through a large geographic area that may add to the effects of nearby projects.
Terrestrial Fauna	Yes	Habitat disturbance is expected through a large geographic area, and the effects of sensory disturbance may add to the effects from nearby projects.
Bats	Yes	The Project is predicted to have low and moderate non-significant impacts to bats through habitat loss and potential mortality, respectively. Effects may increase with effects from nearby projects.
Avifauna	Yes	The Project is predicted to have low to moderate and non-significant impacts on birds through habitat loss and potential mortality. Effects may increase with effects from nearby projects.

VC	Cumulative Effects Potential	Reasoning
Economy	No	Residual impacts are anticipated to be positive.
Land Use	No	Residual impacts are anticipated to be negligible.
Archeological Resources	No	Avoidance of archaeological, historical, or culturally significant areas.

Based on Table 16.1, the following VCs are being considered for assessment of cumulative effects:

- Sound
- Geophysical Environment
- Wetlands
- Terrestrial Vegetation Communities and Flora
- Terrestrial Fauna
- Bats
- Avifauna

If, on review of other undertakings, there is no potential spatial and temporal overlap of project effects for a specific VC, then the VC may not be carried through the full CEA process. Similarly, if the pathways of cumulative effects are similar between VCs, then they may be grouped together in the CEA.

16.4 Selection of Spatial and Temporal Boundaries

The temporal boundaries of the CEA are based on expected duration of the three Project phases: site preparation and construction (4 years), operations and maintenance (35 years), and decommissioning and reclamation (18 to 36 months). The spatial boundaries of the CEA are VC-specific and are based on the RAAs identified in Sections 7 to 12. The RAAs of the VCs selected for evaluation in the CEA are summarized in Table 16.2.

Table 16.2: Spatial Boundaries of VCs Considered for Cumulative Effects Assessment

Project VC	Section of EA (Effects Assessment)	VC-Specific RAA
Sound	Section 7.3.5	A 2 km buffer of selected turbine locations.
Geophysical Environment	Section 8.5	An 800 m buffer of the Project Footprint.
Wetlands	Section 9.1.5	The boundaries of secondary watersheds that intersect the Study Area.
Terrestrial Vegetation Communities and Flora	Section 9.2.5	A 5 km buffer of the Study Area, bounded by mainland Nova Scotia.
Terrestrial Fauna	Section 10.2.5	The boundaries of ecoregions that intersect the Study Area, bounded by the Moser River, and the Pictou Antigonish Highlands and Governor Lake Ecodistricts.

Project VC	Section of EA (Effects Assessment)	VC-Specific RAA
Bats	Section 10.3.5	The boundaries of ecoregions that intersect the Study Area, bounded by the Moser River, and the Pictou Antigonish Highlands and Governor Lake Ecodistricts.
Avifauna	Section 10.4.7	The boundaries of ecoregions that intersect the Study Area, bounded by the Moser River, and the Pictou Antigonish Highlands and Governor Lake Ecodistricts.

16.5 Other Undertaking in the Area

16.5.1 Identification of Undertakings

Nearby projects for initial consideration in the CEA were identified based on the maximum, combined extent of the VC-specific RAAs summarized in Table 16.2. This boundary, which represents a combination of the RAA for terrestrial fauna, bats, and avifauna, and the RAA for wetlands, was selected to allow for a comprehensive review of nearby developments with which the Project may have localized and/or widespread cumulative effects. The size of the selected boundary is consistent with current best practices (Hegmann et al., 1999; IAAC, 2023) and with typical spatial scales used in Nova Scotia EAs for similar project types, while remaining sufficiently constrained for data analysis and meaningful analytical relevance.

In the CEA, both past and reasonably foreseeable undertakings within the selected boundary were considered. Past projects are those registered, approved, or constructed within the last 10 years, selected from the Environmental Assessment Projects Dashboard (NSECC, 2026a). Reasonably foreseeable future projects are those which have been registered with an EA document through NSECC but have not been approved or constructed. Note that the CEA conservatively assumes that all projects registered for EA will be constructed, unless their cancellation has otherwise been communicated.

There are eight proposed, three active, and one project under development within the CEA boundary that were registered, approved, or constructed within the past 10 years (Drawing 16.1). In addition to these projects, there are several projects on the Environmental Assessment Projects Dashboard (NSECC, 2026a) within the boundary that have been proposed but are no longer considered for development, or that have been developed over 10 years ago. Included amongst those that have been constructed are the Sable Wind Project and Mulgrave Community Wind Power Project. Both projects are active wind developments and were therefore considered for CEA despite being constructed more than 10 years ago. The remaining projects were not considered in the CEA.

In addition to the Projects identified in the EA dashboard, the Cochrane Hill Gold Project is a proposed open-pit gold mine in the Melrose area being developed by Atlantic Mining Nova Scotia. This project is not considered within the CEA as the EA has not yet been registered but is noted here due to its proximity to the Project (shown on Drawing 3.4).

Existing and planned projects within the selected boundary are summarized in Table 16.3.

Table 16.3: Summary of Nearby Undertakings

Development Type	Project	Project Status	Activity Location	Distance from Study Area (km)
Energy	NSF Renewable Energy Park	Approved with Conditions	Goldboro	5.5
Mining	Goldboro Gold Project	Approved with Conditions	Goldboro	7.2
Other	Canso Spaceport Facility Project	Active	Canso	58.4
	Melford International Terminal	Approved with Conditions	Melford	48.8
Pit/Quarry	Black Point Quarry	Approved with Conditions	Black Point	48.1
	Chedabucto Aggregates Quarry Expansion Project	Active	Halfway Cove	34.0
	Loch Katrine Quarry Expansion Project	Active	Loch Katrine	15.1
Wind Development	Aulds Cove Wind Project	Approved with Conditions	Aulds Cove	49.6
	Goose Harbour Lake Wind Farm	Under Construction	Lincolnville	41.2
	Mulgrave Community Wind Power Project	Active	Mulgrave	50.3
	Ocean Lake Wind Project	Under EA Review	Municipality of the District of Guysborough	13.7
	Sable Wind Project	Active	Hazel Hill	57.7
	Setapuktuk Wind Project	Approved with Conditions	Middle Melford	44.4
	Sugar Maple Wind Energy Project	Approved with Conditions	Pictou County	25.3
	Upper Afton Wind Project	Approved with Conditions	Upper Afton	35.3
	Weavers Mountain Wind Energy Project	Under Construction	West of Beaver Meadow	33.2

Following initial identification, the projects in Table 16.3 were screened against VCs selected for consideration in the CEA to determine if there is potential for both spatial and temporal overlap with the Project. Spatial overlap was determined for each selected VC by comparing the VC-specific RAA identified in Table 16.2 to the extent of anticipated effects on equivalent VCs described in project EA Registration Documents. Temporal overlap was assessed by comparing the temporal boundaries of the Project to the proposed timelines of nearby projects. Additional project details and their potential for interactions with the Project are described in the following subsections (project locations shown on Drawings 16.1 and 6.1).

Nova Sustainable Fuels Renewable Energy Park

The NSF Renewable Energy Park is a SAF production facility and associated infrastructure (including a 15 km freshwater pipeline) that will produce SAF and low carbon co-products from biomass (Strum Consulting, 2025a). The project, which has an assessment area of approximately 247 ha, received EA approval in 2025 (NSECC, 2025f) but is not yet constructed. Based on the proximity of the Project Study Area, localized interactions with the NSF Renewable Energy Park are possible, though the physical separation of Project infrastructure (including coastal waters, and Isaacs and County Harbours) lessens the opportunities for many cumulative effects.

NSF has a proposed wind and solar energy production facility in the Caledonia area of Guysborough County, and a 65 km high voltage transmission line that is proposed to run through the Project Study Area, which is expected to be the subject of an EA registration in 2027 (NSF, 2026). These components are not considered within the CEA, as the EA has not yet been registered.

Goldboro Gold Project

The Goldboro Gold Project is planned to consist of an open pit mine with associated infrastructure including a 4,000 tonne per day processing facility, tailings management facility, waste rock storage areas, and till and organic material stockpiles (GHD, 2022). The project received EA approval in 2022 (NSECC, 2022d) and is reportedly preparing to begin work in 2026 (Canadian Mining Journal, 2025). The project area is approximately 410 ha. Like the NSF Renewable Energy Park, there is potential for localized interactions with the Goldboro Gold Project based on proximity, though opportunities for cumulative effects are limited by the physical separation of Project infrastructure.

Canso Spaceport Facility

The Canso Spaceport Facility is a commercial rocket launch site located approximately 2 km south of the community of Canso. The project site includes 20 ha of land on which a launch control centre and various integration and processing facilities, launch area, and access roads are planned (Strum Consulting, 2018). The project received EA approval in 2019 (NSECC, 2019a), and initial construction of the project began in 2022 with site and infrastructure development on-going (Maritime Launch, 2026). Given the compact nature of the project (20 ha), the different effects pathways, and the physical separation of the projects (58.4 km), there is limited potential for interactions with the Canso Spaceport Facility.

Melford International Terminal

The Melford International Terminal is a proposed Marine Terminal in Middle Melford, along the Strait of Canso. The project, which received EA approval in 2008 (NSECC, 2008), includes the development of a deepwater port, rail container logistic terminal, and 34 km rail line (including 24 km of new rail and the reactivation of 10 km of historical rail bed), and 20 km transmission line. The project site is planned to occupy 217 ha of land, though it has yet to be developed. There is limited potential for the Project to have localized cumulative effects with the proposed Melford International Terminal due to the physical separation of the projects (48.8 km). However, there is potential for landscape-scale interactions due to similarities in the pathways to terrestrial effects. For the purposes of this assessment, the Melford Terminal rail line is considered similar to a road, given its linear nature and relative scale.

Black Point Quarry

The Black Point Quarry is a proposed granite quarry and marine terminal that received EA approval in 2016 (NSECC, 2016a). The quarry site is planned to occupy approximately 180 ha of land with an additional 28 ha required for the processing plant, administration areas, and stockpiles (SLR Consulting, 2015). The project has yet to be developed but is in an active planning phase (Bruce, 2025). The scale of the Black Point Quarry indicates there may be potential for the Project to interact at a landscape-scale; however, given the generally compact (versus dispersed) nature of the infrastructure layout, the different pathways to effects, and separation of the projects (48.1 km) there is limited potential for widespread cumulative effects.

Chedabucto Aggregates Quarry Expansion Project

The Chedabucto Aggregates Quarry Expansion Project received EA approval in 2014 (NSECC, 2014a) for the consolidation and expansion of two existing quarry sites (Strum Consulting, 2014) and has been developed within the past 10 years. There is limited potential for the Project to interact with the Chedabucto Aggregate Quarry Expansion project given the relatively small size and compact nature of the project footprint (11 ha), the different pathways to effects, and the physical separation of the project (34.0 km).

Loch Katrine Quarry Expansion Project

The Loch Katrine Quarry Expansion Project is an expansion of an existing quarry operation in Antigonish County, northwest of the Project, that received EA approval in 2016 (NSECC, 2016b). The project includes a 42.5-ha study area with expanded quarry operations taking place within 27.3 ha; expansion of the quarry began around 2018 (H2O GEO Environmental Services, 2016). Based on the separation of the Project (15.1 km), the compact footprint, and different pathways to effects, there is limited potential for interactions with the Loch Katrine Quarry Expansion Project.

Aulds Cove Wind Project

The Aulds Cove Wind Project is an approved (NSECC, 2025b) wind project of up to 21 wind turbines. Located 32 km northeast of the Project, the Aulds Cove Wind Project encompasses a study area of approximately 1,417 ha, with a project footprint of roughly 64 ha. Planned infrastructure includes approximately 11.9 km of new road construction, widening and improvements to approximately 2.7 km of existing roads, substations and operations buildings,

electrical collection system, transmission line, temporary laydown and turbine pad yards (Strum Consulting, 2025d). Initial site clearing for the project is expected to begin in 2026. The similar pathways to effects between the Project and the Aulds Cove Wind Project indicate there is potential for landscape-scale interactions, though opportunities for localized cumulative effects are limited due to the physical separation of the projects (49.6 km).

Goose Harbour Lake Wind Project

The Goose Harbour Lake Wind Farm Project is a 130 MW wind project registered and approved in 2023 (NSECC, 2023a) and currently under construction. The EA was approved based on the proposed construction of 29 wind turbines requiring approximately 65 km of roads (12 km of new roads and 53 km of upgrades to existing roads) (Strum Consulting, 2023a). The project has a study area of approximately 9,428 ha, a project footprint of approximately 209 ha, and is directly south of the Aulds Cove Wind Project. Like the Aulds Cove Wind Project, the Project has similar pathways to effects and landscape-scale interactions are possible, but localized effects are unlikely to occur (the projects are 41.2 km apart).

Mulgrave Community Wind Power Project

The Mulgrave Community Wind Power Project is 2.35 MW single turbine development constructed near Mulgrave approved in 2014 (NSECC, 2014b) and constructed in 2015. The turbine is located at the end of an existing 1 km road on private land, with a laydown area of approximately 0.8 ha around the turbine location (McCallum Environmental Ltd., 2014). There is limited potential for cumulative effects with the Mulgrave Community Wind Power Project due to its small scale and separation from the Project (the projects are 50.3 km apart).

Ocean Lake Wind Project

The Ocean Lake Wind Project is an up to 158 turbine,1,264 MW (1.26 GW) wind farm registered for EA in 2026 and currently under review (NSECC, 2026b). The project includes a 22,056 ha study area and 785 ha infrastructure footprint, with the nearest turbine located 6.6 km from the Project Study Area. A 223 km road network is planned for Ocean Lake Wind Project, including 129 km of new roads and 94 km of roads that will require upgrades (Strum Consulting, 2026). The proximity of the Project and shared pathways to environmental effects indicate that interactions with the Ocean Lake Wind Project are possible.

Sable Wind Project

The Sable Wind Project is a 13.8 MW wind project consisting of six turbines and approximately 4 km of road registered in 2012 and approved in 2013 (NSECC, 2013). It is located in Hazel Hill, south of the community of Canso, and was commissioned in 2014 under shared ownership between MODG and NS Power. There is limited potential for cumulative effects with the Sable Wind Project due to its small scale and separation from the Project (the projects are 57.7 km apart).

Setapuktuk Wind Project

The Setapuktuk Wind Project is a wind project with 54 wind turbines that received EA approval in 2025 (NSECC, 2025h). The project's 8,880 ha study area is directly southwest of the Goose

Harbour Lake Wind Farm Project. The project footprint includes 273 ha of land within which 44 km of new road development and upgrades to 35 km of existing roads are planned (Strum Consulting, 2025c). Initial site clearing for the project is expected to being in 2027. Landscape-scale interactions with the Setapuktuk Wind Project are possible based on shared pathways to effects, though opportunities for localized interactions are limited (the projects are 44.4 km apart).

Sugar Maple Wind Energy Project

The Sugar Maple Wind Energy Project is an up to 112 MW wind project that was registered for and received EA approval in 2026 (CBCL Limited, 2026; NSECC, 2026d). A 219-ha project development area was identified for the project, within which 16 turbines, short transmission line tie-ins, and associated infrastructure (e.g., 11 km of new roads and upgrades to 17 km of existing roads) are planned to be developed. The Project has similar pathways to effects as the Sugar Maple Wind Energy Project, indicating there is potential for project effects to interact, though the potential for many localized cumulative effects is limited (the projects are 25.3 km apart).

Upper Afton Wind Project

The Upper Afton Wind Project is an up to 176 MW wind development consisting of up to 28 turbines that received EA approval in 2026 (NSECC, 2026e). The project includes a 4,961-ha study area and 219 ha project footprint. A total of 51 km of upgrades to existing access roads and construction of 15 km of new access roads are expected (Strum Consulting, 2025b). Initial site clearing for the project is expected to begin as soon as late 2026 (Strum Consulting, 2025b). The Project has similar pathways to effects as the Upper Afton Wind Project, indicating there is potential for project effects to interact, though the separation of the projects limits the potential for localized interactions (the projects are 35.3 km apart).

Weavers Mountain Wind Energy Project

The Weavers Mountain Wind Energy Project is an up to 16 turbine, up to 99.2 MW wind project that received EA approval in 2023 (NSECC, 2023c) is and located north of the Sugar Maple Wind Power Project. The project study area is approximately 3,322 ha, with a 12.3 ha project area also identified that represents the permanent footprint of project infrastructure (Strum Consulting, 2023b). Construction for the Weavers Mountain Wind Energy Project began in 2024, and the project is expected to be commercially operational in 2026 (SWEB Development LP, 2026). The separation of the Project will limit the potential for localized cumulative effects with the Weavers Mountain Wind Energy Project (the projects are 33.2 km apart), though widespread interactions are possible due to shared effects pathways.

16.5.2 Potential for Interactions

Table 16.4 summarizes potential for the Project to interact with the effects of nearby developments based on potential for spatial and temporal overlap, and pathways to residual effects on each selected VC.

Table 16.4: Potential for Interactions with Nearby Undertakings

Project	Sound	Geophysical Environment	Wetlands	Terrestrial Effects	Avian Mortality
NSF Renewable Energy Park	No	No	No	**Yes**	No
Goldboro Gold Project	No	No	No	**Yes**	No
Canso Spaceport Facility Project	No	No	No	No	No
Melford International Terminal	No	No	No	**Yes**	No
Black Point Quarry	No	No	No	No	No
Chedabucto Aggregates Quarry Expansion Project	No	No	No	No	No
Loch Katrine Quarry Expansion Project	No	No	No	No	No
Aulds Cove Wind Project	No	No	No	**Yes**	**Yes**
Goose Harbour Lake Wind Farm	No	No	No	**Yes**	**Yes**
Mulgrave Community Wind Power Project	No	No	No	No	No
Ocean Lake Wind Project	No	No	No	**Yes**	**Yes**
Sable Wind Project	No	No	No	No	No
Setapuktuk Wind Project	No	No	No	**Yes**	**Yes**
Sugar Maple Wind Energy Project	No	No	**Yes**	No	No
Upper Afton Wind Project	No	No	No	**Yes**	**Yes**
Weavers Mountain Wind Energy Project	No	No	**Yes**	No	No

Based on a review of project descriptions and pathways to environmental effects, there is limited potential for the Project to interact with the effects of the Canso Spaceport Facility Project (Strum Consulting, 2018), the Chedabucto Aggregates Quarry Expansion Project (Strum Consulting, 2014), the Black Point Quarry (SLR Consulting, 2015), and the Loch Katrine Quarry Expansion Project (H2O GEO Environmental Services, 2016). The types of activities associated with all four projects indicate that the main pathways to environmental effects include sound (and sensory disturbance), interactions with groundwater resources, and atmospheric emissions. The Project RAAs for these VCs are over 12 km from these projects, such that there is limited potential for the Project to have a cumulative effect. These projects are therefore not considered further.

Additionally, there is limited potential for the Project to act cumulatively with the Mulgrave Community Wind Power Project and the Sable Wind Project across all VCs due to the distance from these developments (over 50 km), their small scale (seven turbines in total), and shorter turbine heights (hub heights < 100 m). These projects are therefore not considered further.

The potential for cumulative effects related to sound and interactions with the geophysical environment were initially considered but were screened out of the CEA. The nearest projects, the Goldboro Gold Project, NSF Renewable Energy Park, and Ocean Lake Wind Project, are over 5 km away, and the Project RAAs for sound and the geophysical environment do not

overlap the equivalent assessment boundaries of these projects. Further, there is no pathway for any identified receptors to experience cumulative effects related to these VCs, as none of the receptors or groundwater wells identified in the assessment boundaries of these projects overlap the Project RAAs for sound or the geophysical environment. Cumulative effects relating to sound and the geophysical environment are therefore not considered further.

Finally, it is important to recognize that the projects identified in Table 16.4 are situated in a mosaic of land cover types and uses, including intact and disturbed forests, timber harvesting operations, intensive agricultural land, communities, and residential developments. While these activities all affect the landscape and usage of lands by humans and other species, general land use is not accounted for as “other undertakings” in the CEA as there is not a meaningful way to determine or quantify the effect of these activities on various VCs. Furthermore, the existing land use was considered in the determination of residual environmental effects for each VC within the Project’s EA Registration Document, so no additional conclusions can be made through the lens of a CEA.

16.6 Cumulative Effects Assessment

Cumulative effects for the Project were assessed by considering potential residual effects (as identified in VC sections) in relation to past, existing, and reasonably foreseeable future activities within the area surrounding the Project (i.e., projects currently under regulatory review, approval, or construction; identified in Table 16.4). Pathways to cumulative effects were found to be similar among terrestrial vegetation communities and flora, terrestrial fauna, and habitat for avifauna and bats. Likewise, pathways are similar between bird and bat mortality. These VCs are therefore grouped for the purposes of the CEA, such that impacts are collectively evaluated under “Terrestrial Effects” and “Avian Mortality”.

For the VCs carried forward through the CEA, the effects of assessed projects have been quantified when possible; however, differences in available data, study boundaries, and assessment methodologies among projects limit the extent to which quantitative comparisons can be made. As such, the potential cumulative effects of these projects are evaluated primarily through a qualitative assessment.

16.6.1 Wetlands

Wetland impacts are discussed in terms of pathways to cumulative effects with the following projects:

- Sugar Maple Wind Energy Project
- Weavers Mountain Wind Energy Project

The Project RAA for wetlands overlaps both projects, and there is temporal overlap based on reported development timelines. Other, closer projects (e.g., Ocean Lake Wind Project, NSF Renewable Energy Park, Goldboro Gold Project) are in different secondary watersheds, limiting the potential for cumulative effects. The potential effects of the Project on wetlands through habitat loss and changes in wetland function are outlined in Section 9.2. These effects

are predicted to be of moderate and low magnitude; no watershed-scale changes are anticipated, and the effect is evaluated as not significant.

The Project RAA for wetlands includes the St. Mary's River secondary watershed (1EO-1), in which wetlands are also expected to be directly and indirectly impacted by both the Sugar Maple Wind Energy Project, the Weavers Mountain Wind Energy Project (secondary watersheds shown on Drawing 9.4). Though the residual effects of each project on wetlands were determined to be not significant, they will each add to the total impacted area within the overlapping St. Mary's River watershed. Data about the extent of direct impacts to wetlands have been included in the EA Registration Documents of each project, and it is therefore possible to assess the potential for cumulative effects on wetlands by determining the combined loss of wetland habitat.

A total of 75 wetlands are expected to be directly impacted by the Sugar Maple Wind Energy Project, with an estimated maximum potential loss of wetland area totaling 20.8 ha (CBCL Limited, 2026). Of this, approximately 20.2 ha are in the St. Mary's River secondary watershed (Table 16.5). A total of 29 wetlands were delineated in the Study Area for the Weavers Mountain Wind Energy Project, with an additional 11 wetlands planned to be surveyed post-EA approval (Strum Consulting, 2023b). The total wetland alteration area for wetlands identified in the EA registration document for this project was 6.4 ha, 5.1 ha of which is in the St. Mary's River secondary watershed (Table 16.5). As described in Section 9.3, a total of 458 wetlands were delineated in the Project Assessment Area through field assessments (388) or using drone-assisted modelling (70), with approximately 286.5 ha of the Assessment Area remaining to be surveyed (including 17.7 ha within the St. Mary's River secondary watershed). Within the St. Mary's River secondary watershed, direct impacts to wetland habitat due to the Project are expected to amount to 16.2 ha, or 26.0% of the total impact area (62.4 ha).

Table 16.5: Estimated Extent of Direct Impacts to Wetlands in Shared Secondary Watersheds

Secondary Watershed	Estimated Direct Wetland Impacts (ha)			Total Wetland Impact (ha)	Percentage of Total Wetland Area Impacted[(2)]
	Project[(1)]	Sugar Maple Wind Energy Project[(1)]	Weavers Mountain Wind Energy Project[(1)]		
St. Mary's River (1EO-1)	16.2	20.2	5.1	41.5	0.4

[(1)]Additional direct impacts are expected outside of identified watersheds
[(2)]Total wetland area estimated from the NSNR Wetlands Inventory (NSNR, 2021l). Note that provincial wetland mapping is less detailed than field delineations, such that percentage-based impacts are conservative estimates.

Relative to the total amount of wetland habitat identified in the St. Mary's River secondary watershed [derived from the NSNR Wetlands Inventory (NSNR, 2021l)], the combined impacts of the three projects amount to 0.4%. Within the shared secondary watershed, the Project also overlaps different tertiary watersheds, with flow paths differing from the other projects. Considering the low combined impacts to wetland habitat relative to amount present at the secondary watershed scale, and the separation of the Project from the Sugar Maple and

Weaver Mountain Wind Energy Project, the potential for cumulative hydrologic effects is expected to be low.

The impacts of the three projects on wetland habitat will be managed through provincial permitting and approval processes in accordance with the *Environment Act* (Nova Scotia, 1995b) that are required for all wetland alterations in Nova Scotia. Nova Scotia's Wetland Conservation Policy (NSECC, 2019b) requires compensation for wetland alterations (for example, wetland restorations), that will ensure no net loss in wetland area and function.

16.6.2 Terrestrial Effects

Terrestrial effects are discussed in terms of pathways to cumulative effects with the following projects:

- Goldboro Gold Project
- NSF Renewable Energy Park
- Melford International Terminal
- Aulds Cove Wind Project
- Goose Harbour Lake Wind Farm Project
- Ocean Lake Wind Project
- Setapuktuk Wind Project
- Upper Afton Wind Project

The Project RAAs for terrestrial VCs have varying degrees of spatial overlap with these projects, and all projects have temporal overlap based their long operational timeframes. For instance, the Project RAA for terrestrial vegetation communities and flora overlaps the LAA of the equivalent VC identified for the Goldboro Gold Project and NSF Renewable Energy Park, and the RAA of the Ocean Lake Wind Project, indicating there may be potential for localized terrestrial effects. While the physical separation of the remaining projects suggests there are limited pathways for localized interactions (all are located over 20 km from the Project Study Area), there is spatial overlap with the Project RAA for terrestrial fauna, avifauna, and bats, and therefore potential for the Project to add to landscape-scale effects on these VCs. All projects overlap temporally based on reported development timelines.

The CEA for terrestrial effects considered the two main effects pathways: habitat loss and alteration, and sensory disturbance to terrestrial fauna, bats, and avifauna. Because the types of cumulative effects resulting from interactions with overlapping projects differ from those located further away, pathways to cumulative effects due to habitat loss and alteration are discussed in terms of localized as well as landscape-scale effects where applicable.

16.6.2.1 Habitat Loss and Alteration

The potential for Project to add to the effects of nearby projects on habitat loss and alteration is considered in terms of all eight projects identified for assessment of terrestrial effects. These projects have spatial overlap with the Project RAA for terrestrial vegetation communities and flora, or the Project RAA for terrestrial fauna, bats, and avifauna (Table 16.4), and overlap

temporally based reported development timelines. Most of the projects also have relatively large study areas and dispersed footprints, indicating there is potential for a cumulative effect related to habitat loss and fragmentation.

Each project is expected to impact a low proportion of terrestrial habitat within their respective assessment boundaries and has attempted to maximize the use of existing disturbed areas including roads and rail lines (i.e., the Melford International Terminal) to reduce the amount of new disturbance required for development. However, the combined development footprints of the eight projects total 5,491.2 ha (including the 1,380.3 ha Project Clearing Footprint), representing a potentially large loss of habitat for species that depend on these areas. Within this combined disturbance footprint, a total of 355 km of new road/rail is planned to be developed, with upgrades to an additional 299 km of existing infrastructure required. Of this, the road development for the Project represents 31% of new linear infrastructure, indicating that the Project will add to the effects of habitat fragmentation and road density related to other planned developments. Habitat loss and fragmentation across large spatial scales is known to impact the movement, behaviour, and population dynamics of many species (Beazley et al., 2004; Katzner et al., 2025), though different lifeforms and species are likely to vary in their degree of sensitivity to landscape-scale processes.

It is possible that flora species adapted to the attributes of interior habitats, such as shade-adapted plants and many species of rare lichens, will experience widespread impacts due to the development of linear features. The spread and propagation of flora species across the landscape, which occurs over extended timescales, may also be disrupted by changes in habitat connectivity and animal-mediated dispersal. Notably, due to similarities in the ecological characteristics of the various project sites, there is a degree of overlap in the flora species expected to be directly or indirectly impacted by the projects. Of the flora SAR with potential to interact with the Project, interactions with individuals or supporting habitat of black ash (ESA Threatened, S-Rank S2), blue felt lichen (SARA Special Concern, ESA Vulnerable, S-Rank S3), eastern waterfan (ESA and SARA Threatened, S-Rank S2S3), and/or frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) have also been reported for other projects.

Widespread impacts to terrestrial fauna are also possible through the effects of habitat loss and fragmentation, particularly for wide ranging species such as mainland moose. Mainland moose require a variety of terrestrial habitats to meet life stage requirements and are known to be highly sensitive to the impacts of habitat loss and fragmentation, including through road development (Beazley et al., 2004; NSNR, 2021k). Each of the projects identified for assessment of terrestrial effects is located within core habitat identified for the Pictou-Antigonish-Guysborough subpopulation of mainland moose and will contribute to habitat loss and fragmentation for this species. Importantly, the Project is separated from other developments by Isaacs Harbour and Country Harbour, the Milford Haven River, and nearby coastal waters such that individual moose are unlikely to experience the combined effects of habitat loss and linear development of multiple developments. Fencing for the Project will also be limited to the perimeter of substations, such that the Project will not add further physical restrictions to the movement of many fauna species (though roads may pose a physical barrier

to some species, as described in Section 10.2). The Project may be required, as a condition of EA approval, to complete monitoring for mainland moose, which would serve as a means to identify and manage impacts on this species.

In relation to avian species, the sites of the assessed wind projects are known to be used by a variety of bird and bat species for migration, breeding, and foraging purposes. The coastline of Nova Scotia is known as a fly-way during migration and it is evident that different groups of birds utilize habitats found in these and the surrounding areas for various needs (i.e., foraging, migratory stop-overs, etc.) (Smith et al., 2022; U.S. Fish & Wildlife Service, 2025). There is potential for the Project to add to habitat loss and fragmentation for avifauna as they may be reasonably expected to migrate across project boundaries, though impacts will differ by species and group. For instance, species such as Canada warbler may be impacted by combined impacts to wetland habitat, whereas species such as barn swallow may adapt to and make use of constructed features. In general, species that are adapted to or frequently use fragmented habitats, such as olive-sided fly catcher and common nighthawk, will be less sensitive to localized and widespread impacts of habitat fragmentation than species requiring intact forest cover. Habitat fragmentation across a large geographic area may also impact migrating birds searching for suitable stopover habitat. While it is likely that the Project, due to its overall scale, will contribute to these landscape scale impacts, it is not currently possible to determine the extent to which the Project adds to the impacts of nearby activities due to lack of population data and monitoring that extends well beyond the boundaries of the Project.

Based on the above, the scale of the combined developments indicates there is potential for a cumulative effect to occur due to widespread habitat loss and alteration. The Proponent has committed to developing a Terrestrial Habitat and Wildlife Management Plan and a Mainland Moose Monitoring Plan in consultation with NSNR, NSECC, and ECCC, which is also expected to be a condition of EA approval. As the Proponent of the Project is also the proponent of the Ocean Lake Wind Project, Setapuktuk Wind Project, and Upper Afton Wind Project, there will be opportunities to directly assess the results of post-construction wildlife monitoring within the context of the results of these nearby projects. These mechanisms and project-specific mitigations will help to address the potential for cumulative effects due to habitat loss and alteration.

16.6.2.2 Sensory Disturbance

Sensory disturbance is discussed in terms of pathways to cumulative effects with the following projects:

- Goldboro Gold Project
- NSF Renewable Energy Park to the Project
- Ocean Lake Wind Project

The primary pathways to sensory disturbance on terrestrial fauna, bats, and avifauna with these projects is through the production of noise and light. The indirect and/or direct effects of each of these projects related to sensory disturbance overlap the Project LAA and RAA for

terrestrial fauna, bats, and avifauna. The physical separation of the remaining projects is such that there is limited potential for interactions with sensory disturbance.

Sensory disturbance due to the Project, and thus the potential for cumulative effects, will be highest during the construction phase when noise levels and the presence of site personnel will be greatest. The Goldboro Gold Project, NSF Renewable Energy Park, and Ocean Lake Wind Project also expect sensory disturbance to result in some level of avoidance behaviour by wildlife species during periods of elevated activity (e.g., construction, drilling and blasting, hauling, processing, and operations; GHD, 2022; Strum Consulting, 2025c, 2026), and it is possible that wildlife avoiding nearby developments due to noise and elevated activity could also encounter and be impacted by sensory disturbance associated with the Project. However, construction will progress across the Project Footprint (as opposed to occurring in all areas at once) and will be of limited duration, which will reduce the potential for the Project to have a cumulative effect. During the operations phase, noise levels will be greatly reduced and are unlikely to have a significant cumulative effect with nearby projects.

All four projects will introduce new sources of artificial lighting that may cause sensory disturbance and/or disorientation for terrestrial fauna, bats, and avifauna. Safety lighting will be required during the construction of the Goldboro Gold Project and will be used throughout the project site during operations (GHD, 2022, p. 102). Lighting will also be used during the construction of the NSF Renewable Energy Park and required for operations, though no lighting will installed along the freshwater pipeline to Ocean and Meadow lakes (Strum Consulting, 2025a, p. 235). As described in Section 10.2.5, lighting during Project construction will be limited to the amount required for the safety of personnel and will be minimal during the operations phase, which will also be the case for the Ocean Lake Wind Project. Therefore, while the Project will add to the use of lighting, effects are expected to be localized, and no significant cumulative effects are expected.

The Proponent has committed to developing a Terrestrial Habitat and Wildlife Management Plan and a Mainland Moose Monitoring Plan in consultation with NSNR, NSECC, and ECCC, which is also expected to be a condition of EA approval. Such plans are also required for the Ocean Lake Wind Project (NSECC, 2026b), NSF Renewable Energy Park (NSECC, 2025f), and the Goldboro Gold Project (NSECC, 2022d), with the gold project also required to develop a lighting management plan and noise mitigations to reduce impacts on fauna. Considering the limited overlap with the direct effects of nearby projects and the temporary, localized, and intermittent nature of the Project's construction activities, no additional mitigation measures for sensory disturbance are expected to be necessary.

16.6.3 Avian Mortality

Effects on avian mortality are discussed in terms of pathways to cumulative effects with the following projects:

- Goose Harbour Lake Wind Farm Project
- Aulds Cove Wind Project
- Ocean Lake Wind Project
- Setapuktuk Wind Project
- Upper Afton Wind Project

The Project RAA for avifauna and bats overlaps each of these projects, and given the long operating life of wind projects, temporal overlap is also expected. Though additional undertakings are located closer to the Project (e.g., Goldboro Gold Project, NSF Renewable Energy Park), the shared pathways to avian mortality are limited due to the different types of planned developments. The potential for avian mortality associated with all selected projects is primarily associated with the possibility of bird and/or bat strikes with turbine blades. Other wind developments initially considered for the CEA include the Mulgrave Community Wind Power Project and the Sable Wind Project. These projects are not considered in the assessment of avian mortality due to the small scale of these projects and the shorter turbines used for these developments (< 100 m hub height). The Sugar Maple and Weavers Mountain Wind Energy Projects are also not included in the assessment of avian mortality. These projects are more likely to interact with groups of avifauna and bats migrating along or near the Northumberland coast (compared to the position of the Project near the Atlantic coastline) and are outside the Project RAA for avifauna and bats.

The Goose Harbour Lake Wind Farm Project, currently under construction, includes 29 wind turbines and ancillary infrastructure. While the EA Registration Document presented a summary of migratory bird interaction index (likely activity based on the fall 2022 migratory period which may correlate to increased mortality), no estimate of avian mortality was presented. Post-construction mortality monitoring will be required for the project but has not yet been completed as turbines are not yet in operation. Similarly, the 21-turbine Aulds Cove Wind Project and 54-turbine Setapuktuk Wind Project located adjacent to the Goose Harbour Lake Wind Farm Project, as well as the 28-turbine Upper Afton Wind Project and 158-turbine Ocean Lake Wind Project did not include avian mortality estimates in their assessments but will undertake post-construction mortality monitoring as required by their approvals.

Given the proximity of nearby wind projects and combined number of turbines (up to 290 planned turbines in addition to up to 107 Project turbines), additive effects to avian mortality are likely. With the lack of publicly available post-construction mortality data, it is not possible to determine whether or the degree to which any additive cumulative effects would result in a significant impact to avian mortality. Each project indicated that there is potential for avian mortality, though each deemed the effect to be not significant within the spatial boundaries of respective EA Registration Documents.

Wind projects requiring an EA in Nova Scotia are required to complete two years of post-construction mortality monitoring for birds and bats. In addition, it is expected that the Project will be required, as a condition of EA Approval, to develop an Adaptive Management Plan that includes a decision-making process to mitigate potential impacts to bird and bat species during operations. The plan and the monitoring results will be reviewed by NSECC, NSNR, and ECCC. NSECC would also receive the post-construction monitoring results from the Goose Harbour Lake Wind Farm Project, Aulds Cove Wind Project, Ocean Lake Wind Project, Setapuktuk Wind Project, and Upper Afton Wind Project. Further, recent wind EA Approval conditions note NSECC's ability to require additional mitigation as part of adaptive management. Therefore, the potential for cumulative effects will be managed through future requirements for monitoring and adaptive management, as required.

16.7 Cumulative Effects Assessment Summary

The CEA applied a structured approach consistent with established guidance documents (Government of British Columbia, 2024; Hegmann et al., 1999) to identify relevant VCs, define appropriate spatial and temporal boundaries, and assess the combined influence of the Project and other existing or foreseeable activities. This process also incorporated an acknowledgment of uncertainties associated with data gaps and the limited availability of publicly available information for other developments.

Given the relative separation of project many activities from nearby projects and receptors, no cumulative effects relating to sound or the geophysical environment are expected. The combined, direct impacts to wetlands associated with projects in shared secondary watersheds are expected to be low at the watershed scale, with limited potential for cumulative hydrologic effects based on the physical separation of planned impacts. Wetland alterations completed for all projects will require compensation under the Nova Scotia's Wetland Conservation Policy (NSECC, 2019b). The Project is expected to add to the effects of nearby projects on the terrestrial environment, including impacts to terrestrial habitats and through sensory disturbance. Siting considerations have helped to reduce the magnitude of localized and widespread terrestrial effects, which will be further managed through post-construction monitoring (e.g., for mainland moose). Although potential cumulative effects on avifauna remain uncertain due to limited regional mortality data, required post-construction monitoring will provide a mechanism to detect and respond to any emerging cumulative impacts. Overall, the CEA indicates that cumulative effects for the relevant VCs are expected to be low and not significant and can be effectively managed through project-related mitigation and ongoing monitoring. No additional mitigation measures or monitoring is recommended based on the cumulative effects assessment.

17.0 CONCLUSION

In accordance with A Proponent's Guide to Environmental Assessment (NSECC, 2025), the studies, regulatory assessments and VC evaluations described within this EA Registration Document have been considered both singularly and cumulatively, for all phases of the Project.

The results of this assessment indicate that in consideration of the Project's mitigative and protection measures, adverse residual effects are anticipated to be not significant.

18.0 CLOSURE

This EA Registration Document was completed by Strum Consulting, an independent, multi-disciplinary team of consultants with extensive experience with submission of EA Registration Documents for undertakings within Atlantic Canada. Curriculum vitae for report contributors and Strum Project Team members are provided in Appendix Q. A list of the Project Team and their associated roles is provided below.

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APPENDIX A
PROJECT PIDS

PID	Ownership	Within Project Footprint
35030360	Crown	Y
35030386	Private	Y
35030428	Private	Y
35030436	Private	Y
35030444	Crown	Y
35030493	Private	N
35030527	Private	Y
35030576	Private	Y
35030584	Private	Y
35033521	Private	Y
35090422	Crown	N
35090596	Crown	Y
35090612	Private	N
35090653	Private	Y
35090661	Private	N
35090737	Crown	N
35091636	Private	N
35125673	Private	Y
35144492	Road	Y
35144864	Water	N
35144872	Water	N
35144898	Water	N
35144906	Water	N
35144914	Water	N
35144922	Water	N
35144930	Water	N
35144948	Water	N
35144989	Water	N
35144997	Water	N
35145002	Water	N
35145010	Water	N
35145028	Water	N
35145036	Water	N
35145044	Water	N
35145051	Water	N
35145085	Water	N
35145093	Water	N
35145101	Water	N
35145119	Water	N
35145143	Water	N
35145150	Water	N
35145176	Water	N
35145184	Water	N
35145192	Water	N
35145200	Water	N
35145218	Water	N
35145226	Water	N
35145234	Water	N
35145242	Water	Y
35145259	Water	N
35145267	Water	N
35145275	Water	N

PID	Ownership	Within Project Footprint
35145283	Water	N
35145291	Water	N
35145309	Water	N
35145317	Water	N
35145325	Water	N
35145333	Water	N
35145341	Water	N
35145358	Water	N
35145366	Water	N
35145374	Water	N
35145382	Water	N
35145390	Water	N
35145408	Water	N
35145416	Water	N
35145424	Water	N
35145432	Water	N
35145440	Water	N
35145457	Water	N
35145465	Water	N
35145473	Water	N
35145481	Water	N
35145499	Water	N
35145507	Water	N
35145531	Water	N
35145556	Water	N
35145564	Water	N
35145721	Water	N
35145747	Water	N
35145754	Water	N
35145762	Water	N
35145770	Water	N
35145788	Water	N
35145796	Water	N
35145804	Water	N
35145812	Water	N
35146216	Water	N
35146273	Water	N
35146281	Water	N
35147628	Water	N
35148097	Water	N
35148105	Water	N
35148139	Water	N
35198175	Private	Y
35199199	Crown	Y
35220102	Crown	Y
35225747	Crown	N
37500048	Crown	Y
37500865	Water	N
37504743	Crown	N
37504750	Crown	N
37505344	Crown	N
37505732	Crown	N

PID	Ownership	Within Project Footprint
37505914	Private	N
37540911	Crown	N
37541547	Crown	N
37541786	Private	Y
37542339	Crown	N
37542800	Crown	N
37544749	Crown	N
37544913	Crown	Y
37544913	Crown	Y
37544913	Crown	Y
37544913	Crown	Y
37544913	Crown	Y
37544913	Crown	Y
37545670	Crown	Y