Appendices

Appendix A Consultation Material

Landrie Lake Water Utility Proposed Upgrade and Environmental Assessment

July 2024

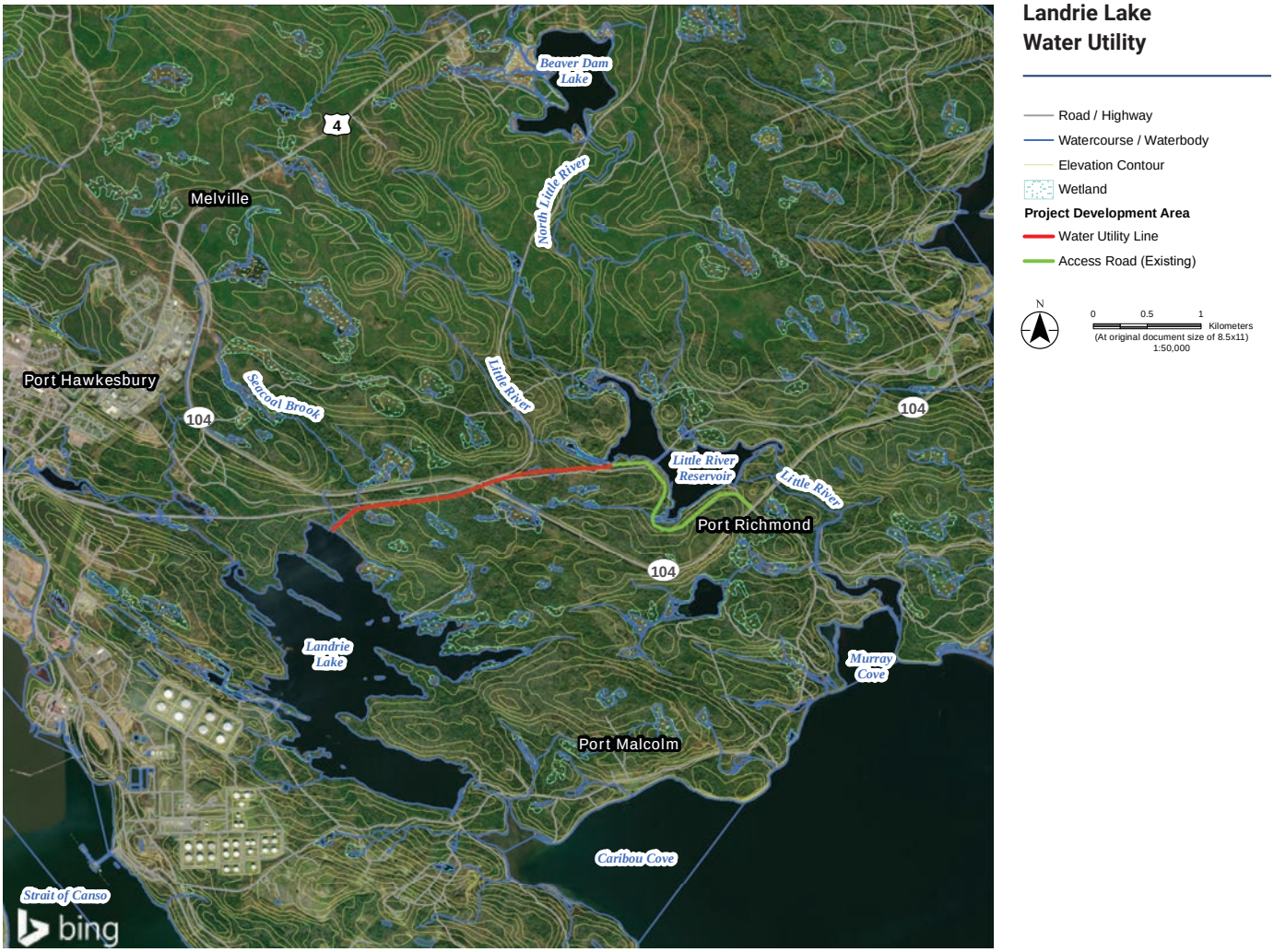
The Landrie Lake Water Utility (LLWU) is jointly owned by the Municipality of the County of Richmond and the Town of Port Hawkesbury. Landrie Lake has been identified by green hydrogen and ammonia production developers as the source water for what is the essential process component. The LLWU was originally constructed around 1969 and not structured to serve this level of industrial development. Serving the needs of this new industry will result in increasing the existing water demand and re-establishing the transfer of water from the adjacent watershed as per the original water system design.

The proposed upgrade is to reinstate the Little River Reservoir Transfer Pumping Station (LRTP) to enhance yield at Landrie Lake. The project will include reinstatement of 2 kms of road abandoned in 1992, replacement of the existing building superstructure and associated equipment, electrical power supply and emergency backup, and reinstatement of 2.6 kms of pipeline and right-of-way from Little River Reservoir to Landrie Lake. At the pipe outlet, a reinforced concrete energy dissipation structure (approximately 230 m long along an existing mapped watercourse) is being considered to transition flow to stream flow for entry into Landrie Lake, subject to final design.

Environmental Assessment Registration (EARD) Process and Schedule

Improvements to the LLWU will require a registration as a Class I Undertaking under the Nova Scotia Environment Act in accordance with the Environmental Assessment Regulations because the proposed project involves transferring water between watersheds, and the drainage area containing the water to be diverted is larger than 1 km².

Aerial view of existing pipeline corridor between pump house and Hwy 104 (West)



Stantec Consulting Ltd. is preparing the EARD. Field work in support of the assessment is underway and includes the following:

- Archaeological Resources Assessment
- Wetland Assessment
- Vegetation Survey
- Breeding Bird Survey
- Fish and Fish Habitat Survey

Membertou Geomatics Solutions is preparing a Mi'kmaq Ecological Knowledge Study.

Aberdeen Engagement Solutions is engaging with the public and stakeholders to provide project information and respond to questions. Information provided by the public and stakeholders is taken into consideration in the preparation of the EARD.

It is anticipated that the EARD will be submitted to Nova Scotia Environment and Climate Change (NSECC) in November 2024.

The public will have an opportunity to review the EARD and submit comments. When the EARD is released by NSECC, members of the public will be able to review the information at the following locations:

- Environmental Assessment Branch website
- Two public locations – location to be determined
- Department of Environment and Climate Change, local office

Public comments are reviewed by the Minister of Environment and Climate Change and considered when making a decision regarding the project.

Comments or Questions

If you would like to learn more about the proposed project or have questions, please contact:

Rebekah Cluett-Chan at 902-476-9146 or aberdeenengagementsolutions@gmail.com

Stantec

PORT HAWKESBURY

- Road / Highway
- Watercourse / Waterbody
- Elevation Contour
- Wetland

Project Development Area

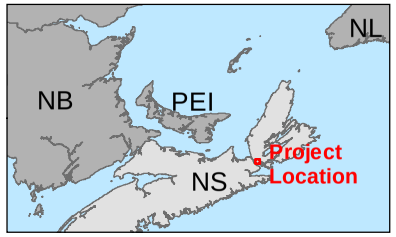
- Water Utility Line
- Access Road (Existing)

N

0 0.5 1 Kilometers
(At original document size of 8.5x11)
1:50,000

Notes

1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
2. Data Sources: GNS and Town of Port Hawkesbury
3. Background: © 2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus DS



Project Location Prepared by MPR on 2024-05-22

Richmond County,
Nova Scotia

Client/Project 121418143-0001 REVA

Town of Port Hawkesbury
Landrie Lake Water Utility ARIA

Figure No.
1

Title
Project Development Area

\\ca0181-ppfss01\workgroup\12214\active\121418143\1_environmental\2_drawings\6_gis_admin\mpr\Figure1-121418143_arch_permit_app.mxd Revised: 2024-05-22 By: mrooney

Aberdeen Engagement Solutions Ltd.

Environment . Stakeholder Engagement . Community Relations

June #, 2024

Chief X
X First Nation
ADDRESS

Dear Chief X,

Re: Landrie Lake Water Utility – Proposed Upgrade and Environmental Assessment Class I Undertaking

I am contacting you regarding a proposed upgrade to the Landrie Lake Water Utility, located in Richmond County NS, and associated Environmental Assessment Class I Undertaking. The Landrie Lake Water Utility has contracted Stantec Consulting Ltd (Stantec) to prepare the Environmental Assessment Registration Document (EARD). As part of the environmental assessment, a Mi'kmaq Ecological Knowledge Study (MEKS) will be prepared by Membertou Geomatics Solutions.

This letter provides information on the proposed project and will be sent to each of the Unama'ki Nations. Additionally, I have reached out to Potlotek and Paqtnkek Mi'kmaw Nations and representatives of the Kwilmu'kw Maw-klusuaqn to discuss the proposed project. Insight and advice gathered from the MEKS, community discussions and questions raised will be carefully considered and incorporated into the EARD.

Project Proponent and Description:

The Landrie Lake Water Utility is jointly owned by the Municipality of the County of Richmond (MOCR) and the Town of Port Hawkesbury (TOPH). Day-to-day operations and administration functions are generally coordinated by Port Hawkesbury staff and there is a governing board of directors with elected and senior staff representatives of both municipal units.

Landrie Lake has been identified by green hydrogen and ammonia production developers (such as Bear Head Energy and EverWind) as the source water for what is the essential process component. The availability, quantity and quality of this resource are factors that makes the sites near the lake in Point Tupper, Richmond County attractive for the emerging green energy industry. Green hydrogen will be produced for export to Europe and other jurisdictions over the next several years, leading to increased economic growth in the green energy sector in Nova Scotia.

The Landry Lake Water Utility (LLWU), jointly owned and operated by the TOPH and the MOCR, was transferred from the Province on April 1, 2019. The new LLWU was not originally structured to serve this level of significant industrial development. Serving the needs of this new industry will result in increasing

the existing water demand and re-establishing the transfer of water from the adjacent watershed as per the original water system design. These improvements necessitate hydrological studies, mechanical and civil engineering design of the piping and pumping requirements, structural design, and environmental assessment.

The original Landrie Lake Industrial Water Utility was constructed around 1969 to support industrial development in the Point Tupper area of Richmond County. The original 1969 project involved the construction of the Landrie Lake reservoir and the Little River reservoir, with both water bodies created with building a series of dams and spillways. The facility was operated by the Nova Scotia Department of Environment up to 2001 when it was transferred to the Nova Scotia Department of Transportation and Public Works. The Landrie Lake watershed was designated as a Protected Water Area on May 3, 1971. The watershed has an area of 3,558 acres. The designation defines an area that encompasses Landrie Lake and extends north to include the watersheds of Little River Reservoir, Beaver Dam Lake and MacIntyre Lake.

The 2019 ownership asset transfer included only the Landrie Lake Watershed. In 1992, the Department of Environment decommissioned and dismantled the pumping station and pipeline between Little River and Landrie Lake reservoirs because of reduced demand. The Little River watershed assets are currently managed by Nova Scotia Department of Public Works; ownership of the majority of the property is by the Province of Nova Scotia under the control of the Department of Environment and Climate Change. The physical layout of the watershed is provided in the attached figure.

The proposed upgrade is to reinstate the Little River Reservoir Transfer Pumping Station (LRTP) to enhance yield at Landrie Lake. The project will include reinstatement of the access road to the former LRTP, replacement of the existing building superstructure and associated equipment, electrical power supply and emergency backup, and reinstatement of pipeline and right-of-way from Little River Reservoir to Landrie Lake.

Access to the LRTP will require reinstating 2 kilometers of road abandoned in 1992. The project reinstates pipeline of 2.6 kilometers, complete with valves and hydro-pneumatic tank for pressure surges. At the pipe outlet, a reinforced concrete energy dissipation structure (approximately 230 m long along an existing mapped watercourse) is being considered to transition flow to stream flow for entry into Landrie Lake, subject to final design. The project requires registration as a Class I Undertaking under the *Nova Scotia Environment Act* in accordance with the Environmental Assessment Regulations because the project involves transferring water between watersheds, and the drainage area containing the water to be diverted is larger than 1 km^2.

Environmental Field Work and Schedule:

Stantec started the field work in support the environmental assessment in June; this work will continue through July. It is anticipated that the EARD will be submitted to Nova Scotia Environment and Climate Change in November 2024.

June #, 2024

Thank you for reviewing this information. If you have questions regarding the proposed project or would like to discuss further, please contact me at PHONE or EMAIL.

Wela'lin/Thank you

Aberdeen Engagement Solutions

Attachment – Landrie Lake Water Utility Map

Aberdeen Engagement Solutions Ltd.

Environment . Stakeholder Engagement . Community Relations

July 17, 2024

Vice President Health, Safety and Environment
Nova Scotia Power
1223 Lower Water St. Halifax, NS
B3J 3S8

Dear ,

Re: Landrie Lake Water Utility – Proposed Upgrade and Environmental Assessment Class I Undertaking

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July 17, 2024

Thank you for reviewing this information. If you have questions regarding the proposed project or would like to discuss further, please contact me at ###-###-#### or EMAIL.

Thank you

Aberdeen Engagement Solutions

Attachments – Landrie Lake Water Utility Map
July 2024 Landrie Lake Water Utility Proposed Upgrade and Environmental Assessment Newsletter

Aberdeen Engagement Solutions Ltd.

Environment . Stakeholder Engagement . Community Relations

July 25, 2024

Manager, Public
Affairs Everwind Fuels

1969 Upper Water St, Halifax
NS B3J 3R7

Dear ,

Re: Landrie Lake Water Utility – Proposed Upgrade and Environmental Assessment Class I Undertaking

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July 25, 2024

Thank you for reviewing this information. If you have questions regarding the proposed project or would like to discuss further, please contact me at 902-###-#### or EMAIL.

Thank you

R. MacLean.

Aberdeen Engagement Solutions

Attachments – Landrie Lake Water Utility Map
July 2024 Landrie Lake Water Utility Proposed Upgrade and Environmental Assessment Newsletter

From: Strait Area Chamber of Commerce <membership@straitareachamber.ca>
Sent: Thursday, August 29, 2024 4:28 PM
To:
Subject: EXTERNAL Strait Area Chamber Membership Newsletter

- Celtic Oktoberfest Tickets on Sale
- New Federal Funding Opportunities Available from Employment and Social Development Canada
- Innovation Rebate Program
- Canada Digital Adoption Program
- Gender-Based Violence Prevention Program
- Lunch & Learn: Work Permit Options for Nova Scotia Employers
- Expert Community on Housing Webinars
- Nourish your success at the SPICE Conference
- Training Opportunities with Invest Nova Scotia
- The Future of Electricity - A Conversation with Atlantic Canada's CEOs
- Nova Scotia Offshore Wind R&D Conference
- WCB to cover gradual onset psychological injury beginning September 1.
- Landrie Lake Water Utility Proposed Upgrade and Environmental Assessment
- 2SLGBTQI+ Chamber of Commerce’s (CGLCC) Business Leadership Awards
- Register for Cape Breton Partnership's Impact Awards
- Cape Breton Partnership's Investor's Summit Fireside Chat with Arlene Dickinson

- Cape Breton University World Tourism Institute Launching Their New Dashboard
- Applications Open for Co-op Housing Development Program
- Nova SAFE - Safety Information Made Simple
- Micro-Loan Program - Supporting Women+ Entrepreneurs
- Cape Breton Capital Group Rebranding & Second Fund Launch

CHAMBER NEWS & EVENTS

STRAIT AREA
CHAMBER OF COMMERCE

FALL GOLF CLASSIC

September 19th
Dundee Resort & Golf Club

Fall Golf Classic - Few Spots Remaining!

Join us for the most anticipated event of the year at Dundee Resort & Golf Club! Our Annual Chamber Golf Tournament is not just a day of golf—it's a premier networking opportunity for our members and the greater business community. This event is designed to foster meaningful business connections while enjoying a memorable day on the beautiful Dundee Golf Course.

Few spots remaining. Register now below!

Learn More & Register Here

New Member Welcome: Crowe MacKay Consulting Inc.

Crowe MacKay Consulting Inc. is a full-service technology and advisory consulting company. We are a subsidiary of Crowe MacKay LLP which is an independent Northern and Western Canadian accounting firm. We have 9 office locations and just over 500 staff total across the entire organization. Our technology consulting division under the Crowe MacKay Consulting Inc name is currently a smaller group of three Directors and five support staff. My name is Michael Hubber, and I am the Director, Transformation Services at Crowe MacKay Consulting. I decided to move my family to Cape Breton from the Okanagan in BC, as we wanted a change of pace, a better lifestyle for our kids, and a smaller close-knit community. Thankfully with technology I can work anywhere and have carried on servicing my clients from my home office here in Arichat, NS. We are actively expanding our technology consulting operations to Nova Scotia and will be looking to hire staff and setup a physical office premise in Cape Breton once we have expanded our client base sufficiently.

We offer a full line of services including, but not limited to:

Digital Transformation – Helping clients leverage technology to improve business operations, create a technology driven business advantage, or modernize infrastructure into the cloud.
Managed IT Services – Providing technical support for end users, managing our client's physical IT systems and Cloud infrastructure, and monitoring for issues before they become a major problem.
Cybersecurity Assessments and Management – We help clients reduce their business' vulnerabilities to malicious cyber-attacks and provide confidence that your operations are safeguarded from exploitation
Custom Application Development – We build custom web/SaaS applications to the specifications and needs of our clients.
Risk and Governance Consulting – We have over 17 years of experience in risk management and governance structure for organizations of all size and can assist organizations with assessing, implementing, or mitigating.

IT Project Management – Overseeing and managing an IT project for our clients from initial requirements gathering all the way through to go-live and operations, or any portion thereof.

A consultation for any of our service lines can be booked online here
Or you can reach out to me directly at (902) 334 7040

New Member Welcome:
Ryan Ehler, Realtor® with CRT Marquis at Keller Williams Select

Ryan began his real estate career in 2022 and joined the CRT Marquis team with Keller Williams Select Realty. He is born and raised in Cape Breton, Nova Scotia and enjoys sharing with his clients all that the island and Eastern Nova Scotia has to offer. Ryan is committed to helping people every step of the way, whether it is to relocate to the area, buy their first house, or upsize or downsize. He is both easy-going and diligent, making him an excellent Realtor® to work with. When he is not busy, Ryan can be found travelling, hiking, golfing, exploring Cape Breton beaches, playing hockey or catching a ceilidh at a local restaurant or festival.

Contact Ryan at ryanehler@kw.com or **902-615-6587**

BUSINESS COURSES

- No Cost
- Provincially Certified
- Online / 40 Hours

Book YOUR Seat
Limited Seats Available

*** Students must be currently employed or operate a business in Nova Scotia**

Strait Area Chamber of Commerce

Nova Scotia – Labour, Skills, and Immigration

101.5 The Hawk

Sage Accounting
Mondays 8:30am-12:00pm
Starting Sept. 9th

Quickbooks Level 1
Tuesdays 8:30am-12:00pm
Starting Sept. 17th

Professional Sales Level 2
Fridays 6:00pm-9:30pm
Starting Sept. 20th (11 weeks)

Content Marketing Using AI
Wednesdays 6:00pm-9:30pm
Starting Sept. 18th (11 weeks)

Content Marketing with YouTube & SEO for Business
Tuesdays 9:00am-1:00pm
Starting Sept. 17th (11 weeks)

Content Marketing for Bricks & Mortar
Thursdays 6:00pm-9:30pm
Starting Sept. 19th (11 weeks)

Financial Fundamentals Level 1
Thursdays 5:30pm-9:00pm
Starting Sept. 19th

Human Resources
Tuesdays 1:00pm-4:30pm
Starting Sept. 17th

Microsoft Office / Google Workspace
Thursdays 1:00pm-4:30pm
Starting Sept. 19th

Business Skills
Fridays 10:00am-1:30pm
Starting Sept. 13th (11 weeks)

Upgrade Your Business Skills with Our Workplace Education Courses!

Are you or one of your employees interested in updating your business skills? Need a refresher in QuickBooks? Want to understand Content Marketing with AI? These courses and many more are now available.

Eligibility:

- Students must be currently employed or self-employed
- Must be residents of Nova Scotia
- Courses are conducted online

Benefits:

- Earn credits for the Atlantic Trade Business Seal!
- Courses are provincially certified and cover a range of topics
- Designed to increase productivity and growth in the business community
- Earn Credits for the **Atlantic Trade Business Seal**
- Best of all, the courses are **free!**

The Strait Area Chamber is committed to providing the business community across the region with opportunities to upgrade their skills. Programs are offered in groups three times a year at convenient times, with courses selected based on the needs of our members. If demand allows, we also offer programming in communities across the region.

Register Now!

Celtic Oktoberfest
Saturday, October 19th

Our Celtic Oktoberfest sell-out sensation is back, and this year's music is sure to please! For the past 5 years, we've blown the roof off the Port Hawkesbury Civic Centre and this year is sure to be the same with Pretty Archie as our headliner! Join the hype and be part of something truly special!

Besides the Music - Why Should you attend:

- 10 Craft Beer Vendors (Wine & Cider)!
- Amazing Food Sampling throughout the evening!

- The BEST crowd you'll ever be part of!

Save the Date: October 19th, 2024
Location: Port Hawkesbury Civic Centre

Learn More & Get Tickets Here

Chamber Member Benefits

E-blasts & Social Media Exposure

Our e-blasts are sent to over 380 members and partners and shared with our large following on social media platforms such as Facebook, X & Instagram.

For just $25, this is a fantastic way to let the other local businesses and your local community know who you are and what you have to offer.

Chambers of Commerce Group Insurance Plan

The Chambers of Commerce Group Insurance Plan has been protecting Canadian firms for over 40 years. More than 30,000 small to midsize businesses choose the Chambers Plan to protect their employees with **comprehensive group benefits**, including **Health** and **Dental** insurance,


Canada's #1 Plan
for Employee Benefits
Chambers Plan
Employee Benefits
making it Canada's #1 employee benefits plan for small business.
The Chambers Plan is the simple, stable, smart choice for business, combining accessibility, flexibility and the stability of pooled benefits. Firms choose the Chambers Plan year after year because it offers unsurpassed value and customer service. The Chambers Plan – it's for your benefit.
Learn more by contacting Susan at 902-625-1588 or
emailing membership@straitareachamber.ca
STEP UP
for local.
Shop | Eat | Give | Celebrate Local
STRAIT AREA
CHAMBER OF COMMERCE
@StraitAreaCoC
#StepUpForLocal

...

Appendix B Mapbook

Figure No.

Appendix B

Title

Little River Pipeline Route

Client/Project

121418143_005

Landrie Lake Water Utility
Little River Pumping Station and Transmission Project

Project Location
Port Hawkesbury
Richmond County, NS

Prepared by NW on 2025-08-06
TR by GJ on 2025-08-06

N

0 25 50 m

(At original document size of 11x17)
1:2,000

Legend

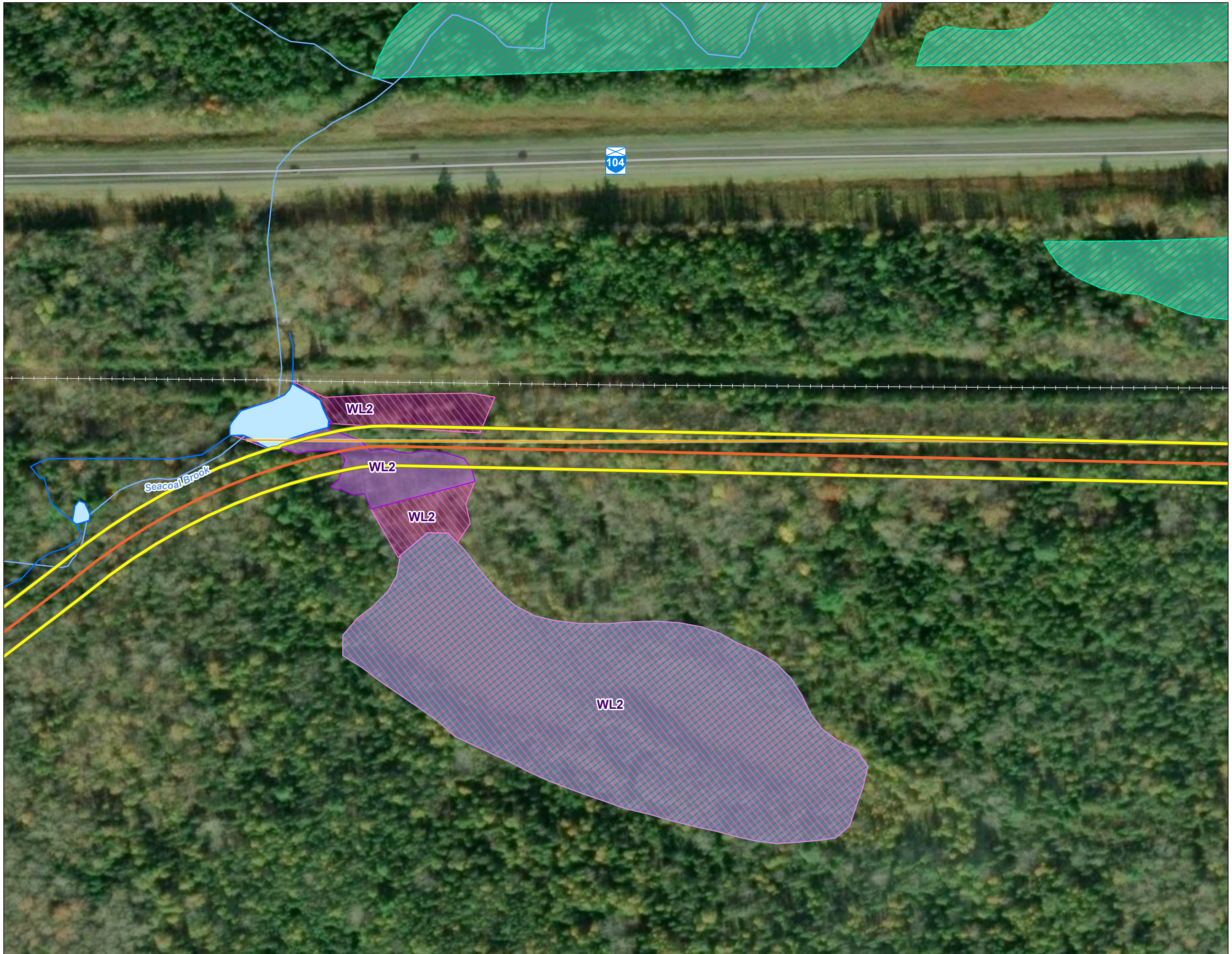
Project Features
- Pipeline Route (Approximate)
- Project Development Area (20 m RoW)

Built Infrastructure
- Highway
- Rail Road
- Pipeline

Wetlands and Habitat
- Watercourse (NSTDB)
- Watercourse (Stantec, 2024)
- Waterbody (Stantec, 2024)
- Wetland (Stantec, Field-delineated, 2024)
- Wetland (Stantec, Desktop-delineated, 2024)
- Wetlands (NS ECC)
- Wetland of Special Significance
- Waterbody (NSTDB)
- Significant Habitat (NS ECC)

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
2. Data Sources: Town of Port Hawkesbury; Stantec; Nova Scotia Natural Resources and Renewables; Nova Scotia Environment and Climate Change
3. Background: Service Nova Scotia NSTDB; ESRI

Stantec



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Client/Project 121418143_005

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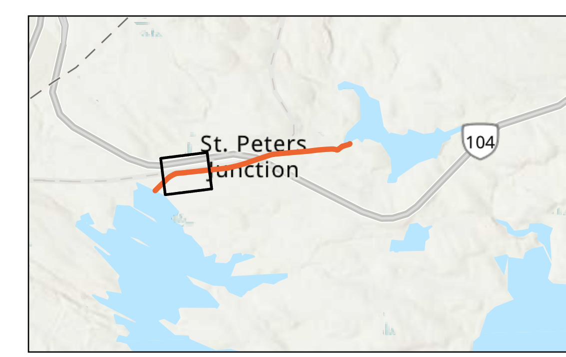

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Stantec

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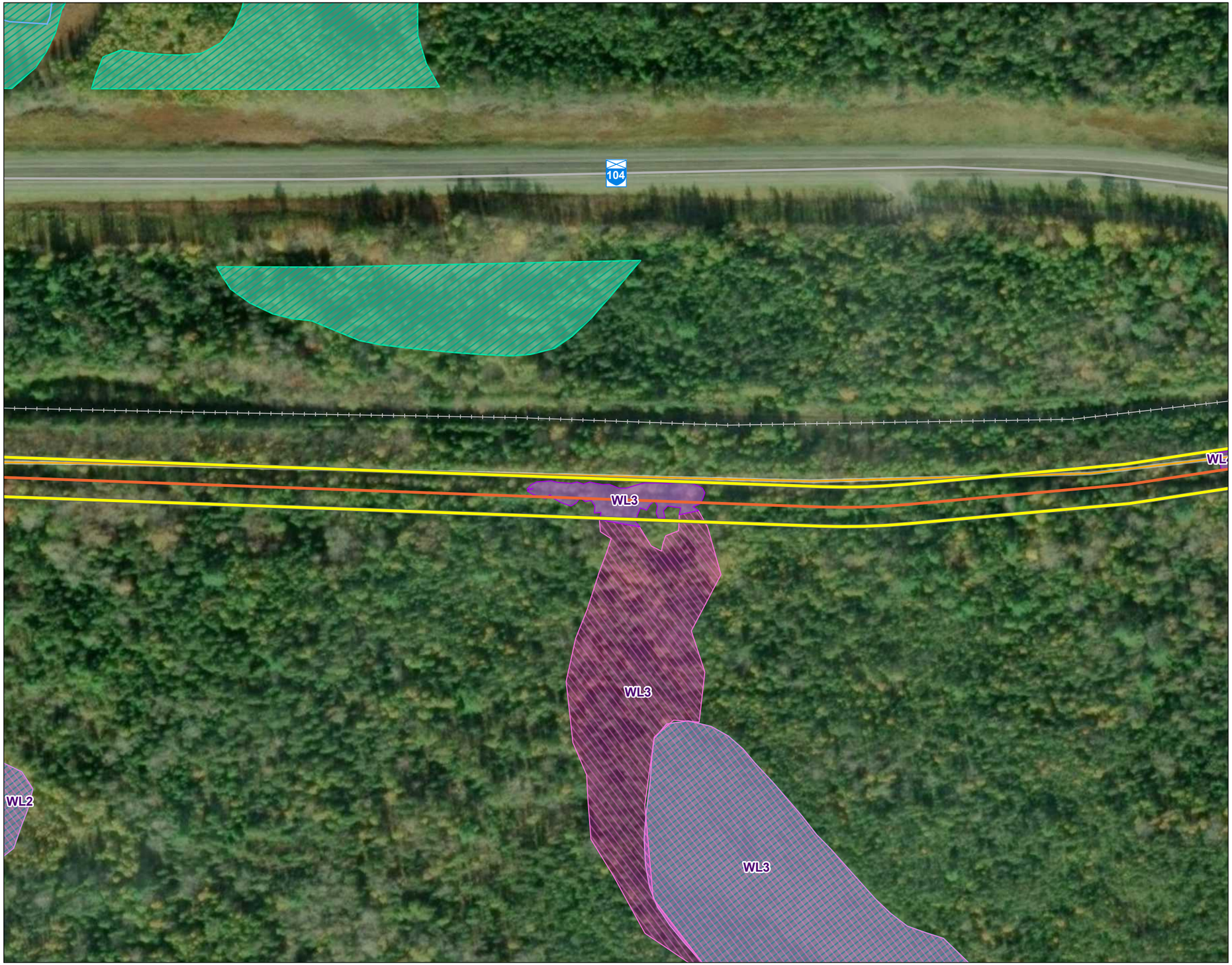

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Client/Project 121418143_005

Landrie Lake Water Utility
Little River Pumping Station and Transmission Project

Project Location
Port Hawkesbury
Richmond County, NS

Prepared by NW on 2025-08-06
TR by GJ on 2025-08-06

N

0 25 50 m

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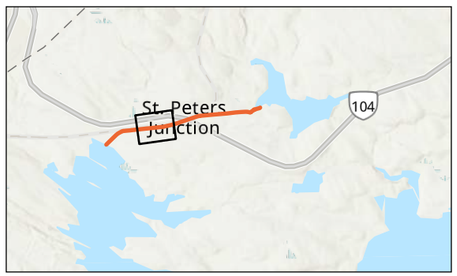
1:2,000

Legend

Project Features
- Pipeline Route (Approximate)
- Project Development Area (20 m RoW)

Built Infrastructure
- Highway
- Rail Road
- Pipeline

Wetlands and Habitat
- Watercourse (NSTDB)
- Wetland (Stantec, Field-delineated, 2024)
- Wetland (Stantec, Desktop-delineated, 2024)
- Wetlands (NS ECC)
- Wetland of Special Significance



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
2. Data Sources: Town of Port Hawkesbury; Stantec; Nova Scotia Natural Resources and Renewables; Nova Scotia Environment and Climate Change
3. Background: Service Nova Scotia NSTDB; ESRI

Stantec

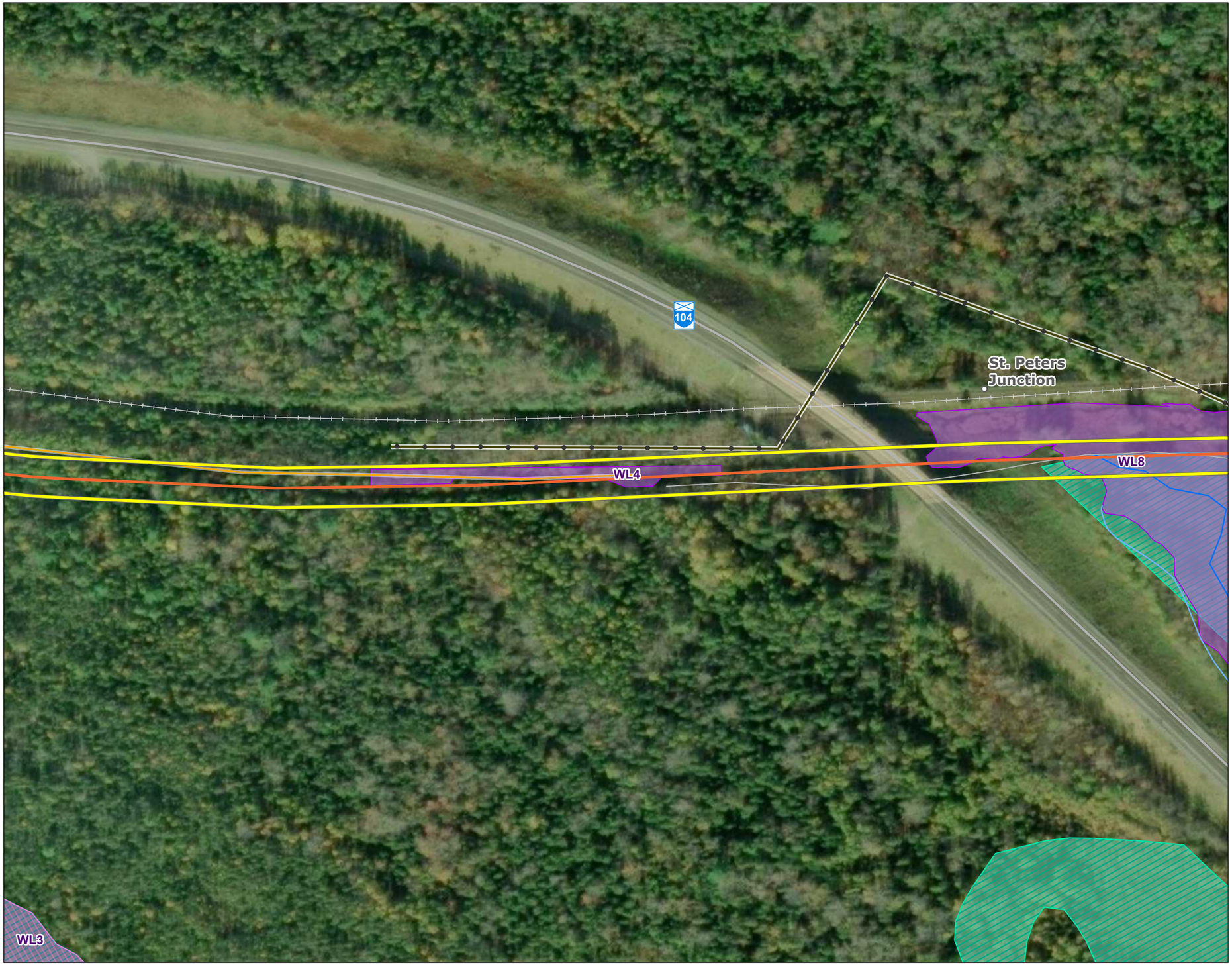


Figure No.

Appendix B

Title

Little River Pipeline Route

Client/Project 121418143_005

Landrie Lake Water Utility
Little River Pumping Station and Transmission Project

Project Location
Port Hawkesbury
Richmond County, NS

Prepared by NW on 2025-08-06
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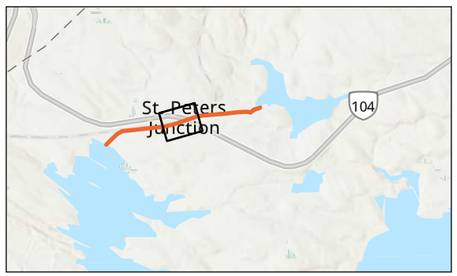
Legend

Project Features
- Pipeline Route (Approximate)
- Project Development Area (20 m RoW)

Built Infrastructure
- Highway
- Road
- Rail Road
- Transmission Line
- Pipeline

Wetlands and Habitat
- Watercourse (NSTDB)
- Watercourse (Stantec, 2024)
- Wetland (Stantec, Field-delineated, 2024)
- Wetland (Stantec, Desktop-delineated, 2024)
- Wetlands (NS ECC)
- Wetland of Special Significance



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3. Background: Service Nova Scotia NSTDB; ESRI

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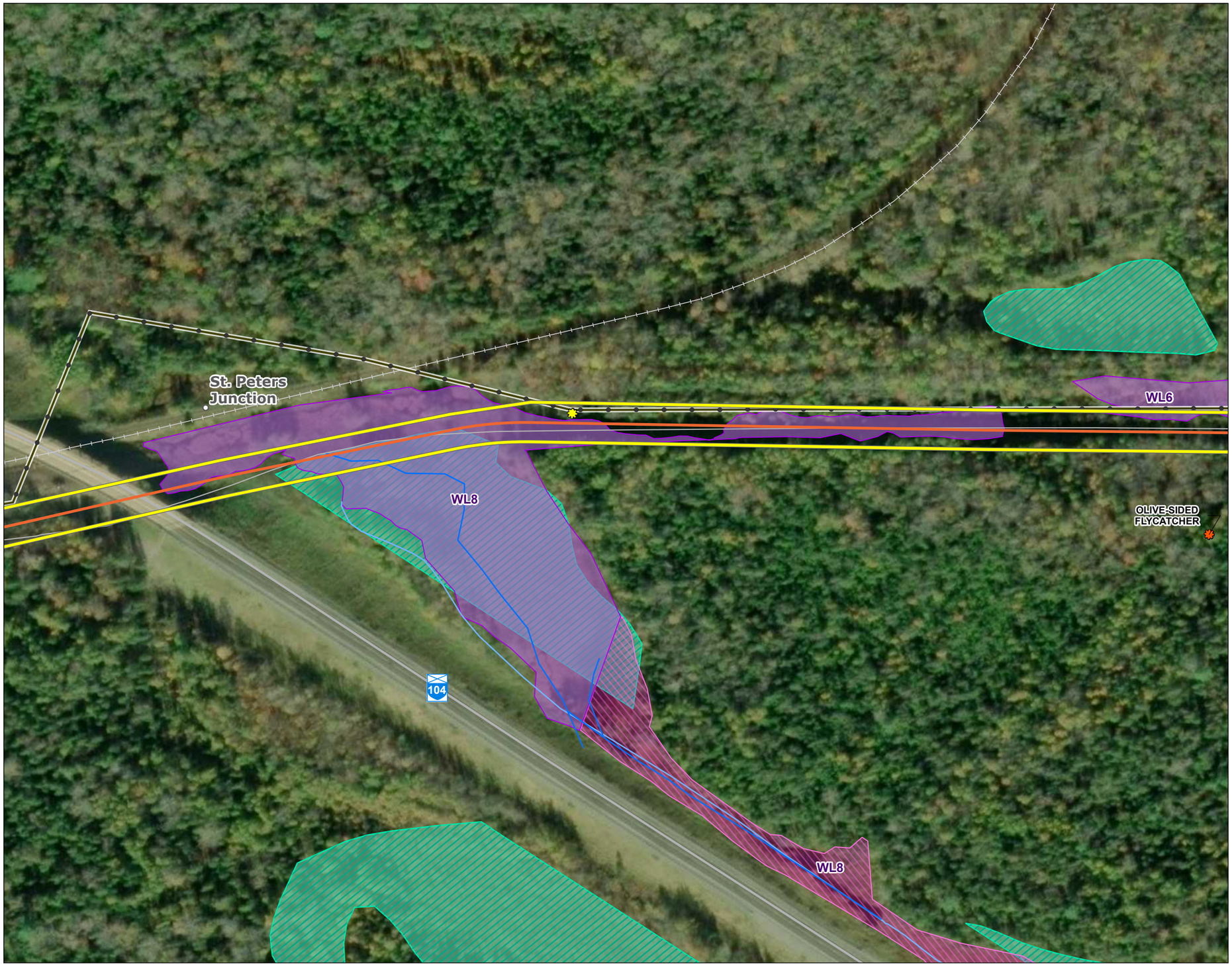

Figure No.

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Landrie Lake Water Utility
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Project Location
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N

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Legend

Project Features
- Pipeline Route (Approximate)
- Project Development Area (20 m RoW)

Biophysical Survey Observations (Stantec, 2024)
- Bird SAR - Incidental Observation (Stantec, 2024)
- Osprey Nest

Built Infrastructure
- Highway
- Road
- Rail Road
- Transmission Line

Wetlands and Habitat
- Watercourse (NSTDB)
- Watercourse (Stantec, 2024)
- Wetland (Stantec, Field-delineated, 2024)
- Wetland (Stantec, Desktop-delineated, 2024)
- Wetlands (NS ECC)
- Wetland of Special Significance

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
2. Data Sources: Town of Port Hawkesbury; Stantec; Nova Scotia Natural Resources and Renewables; Nova Scotia Environment and Climate Change
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Stantec

Figure No.

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Little River Pipeline Route

Client/Project 121418143_005

Landrie Lake Water Utility
Little River Pumping Station and Transmission Project

Project Location
Port Hawkesbury
Richmond County, NS

Prepared by NW on 2025-08-06
TR by GJ on 2025-08-06

N

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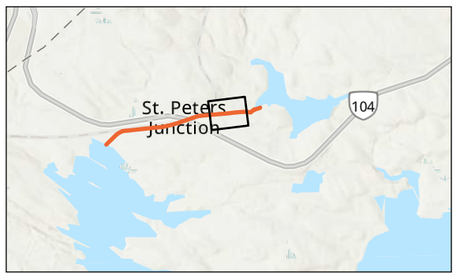
Legend

Project Features
- Pipeline Route (Approximate)
- Project Development Area (20 m RoW)

Biophysical Survey Observations (Stantec, 2024)
- Bird SAR - Incidental Observation (Stantec, 2024)

Built Infrastructure
- Road
- Rail Road
- Transmission Line

Wetlands and Habitat
- Watercourse (NSTDB)
- Watercourse (Stantec, 2024)
- Wetland (Stantec, Field-delineated, 2024)
- Wetland (Stantec, Desktop-delineated, 2024)
- Wetland Not Observed (Stantec, Field Observation, 2024)
- Wetlands (NS ECC)
- Wetland of Special Significance



Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
2. Data Sources: Town of Port Hawkesbury; Stantec; Nova Scotia Natural Resources and Renewables; Nova Scotia Environment and Climate Change
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Stantec

Figure No.

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Little River Pipeline Route

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Richmond County, NS

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TR by GJ on 2025-08-06

N

0 25 50 m

(At original document size of 11x17)
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Legend

Project Features
- Pipeline Route (Approximate)
- Access Road (Existing)
- Project Development Area (20 m RoW)
- Laydown Area (Proposed)

Built Infrastructure
- Road
- Transmission Line

Wetlands and Habitat
- Watercourse (NSTDB)
- Wetland (Stantec, Field-delineated, 2024)
- Wetlands (NS ECC)
- Wetland of Special Significance
- Waterbody (NSTDB)

Notes
1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
2. Data Sources: Town of Port Hawkesbury; Stantec; Nova Scotia Natural Resources and Renewables; Nova Scotia Environment and Climate Change
3. Background: Service Nova Scotia NSTDB; ESRI

Stantec

Appendix C Meco 2025

TECHNICAL MEMORANDUM REPORT

Project: Landrie Lake Sustainable Yield Study

Subject Little River Reinstatement Impacts on Yield

Author: Hamid Goharnejad, P.Eng.
H.Goharnejad

Reviewer Perry Mitchelmore, P.Eng., PMP

16 Oct 2025

Date: October 16, 2025

1.0 INTRODUCTION

The Landrie Lake Water Utility (LLWU) system is comprised of three reservoirs for a combined drainage area of approximately 53.9 km^2. As illustrated in Figure 2.1, the watershed is controlled by three dams with sub-basin catchments at Landrie Lake, 14.4 km^2; Little River, 33.1 km^2; and MacIntyre Lake, 6.4 km^2. The LLWU currently withdraws water from Landrie lake as a standalone station. MacIntyre Lake discharges into Little River that then discharges out of the LLWU system unless pumped to Landrie Lake. A pipeline that once connected Little River and Landrie Lake was removed in the 1980's, but the LLWU is considering re-activating a transfer station to supplement yield in response to potential demand.

In late 2022 Meco provided an opinion on a sustainable yield for the Landrie Lake watershed as it currently operates and for the Landrie Lake watershed supplemented with variable transfers from the Little River watershed. Meco estimated a sustainable yield for the Landrie Lake Watershed at 350 L/s, or 30.2 MLD (Million Litres per day) as a standalone system without Little River transfers. The sustainable yield varied by a wide margin depending on the rate of transfer from the Little River watershed.

In the interim since the 2022 estimate of sustainable yield, the LLWU completed bathymetric surveys of the Landrie Lake, Little River and Macintyre Lake reservoirs. In March 2025, Meco updated the stage-storage equations in previous hydrological and hydraulic models to incorporate the new bathymetric survey data for Landrie Lake, Little River and McIntyre Lake. We further updated the rainfall dataset with the most recent two years of data from Environment Canada. With the updated data, Meco revised the opinion on sustainable yield for the Landrie Lake watershed to 395 L/s, or 34.0 MLD as a standalone system without Little River transfers.

The LLWU is considering re-activating a transfer station at Little River to supplement yield at Landrie Lake in response to potential future demand. The LLWU has a separate process for the application but has requested Meco provide an update on sustainable yield based on the following operating guidelines for supplemental transfers from Little River to Landrie Lake.

1. During transfers, the low operating water level at Little River will be no more than one (1) meter below spillway sill elevation.
2. The low operating water level for Landrie Lake will remain 6.1 metres below spillway sill elevation.
3. An ecological maintenance flow (EMF) is required at Little River, but not at Landrie Lake.

2.0 WATER BALANCE AND YIELD ANALYSIS

Water balance and yield analysis involve quantifying the inflows, outflows, and storage changes within the watershed. A reservoir sustainable yield is understood to be the reliable withdrawal rate of water with acceptable quality that can be provided by reservoir storage through the critical drought period. The mean annual water balance of Landrie Lake can be expressed as follows:

$$I + P - E - O = \frac{ds}{dt} \pm G \pm error \qquad (1)$$

where:

I: the collective riverine inflow to the lake (m^3/s),

P: the precipitation on the lake surface (m^3/s),

E: the evaporation from the lake surface (m^3/s),

O: the riverine outflow (m^3/s) including discharge from spillway and pumping station,

G: the unknown groundwater inflow/outflow from the lake bottom, and

S: the lake storage change over time (m^3/s).

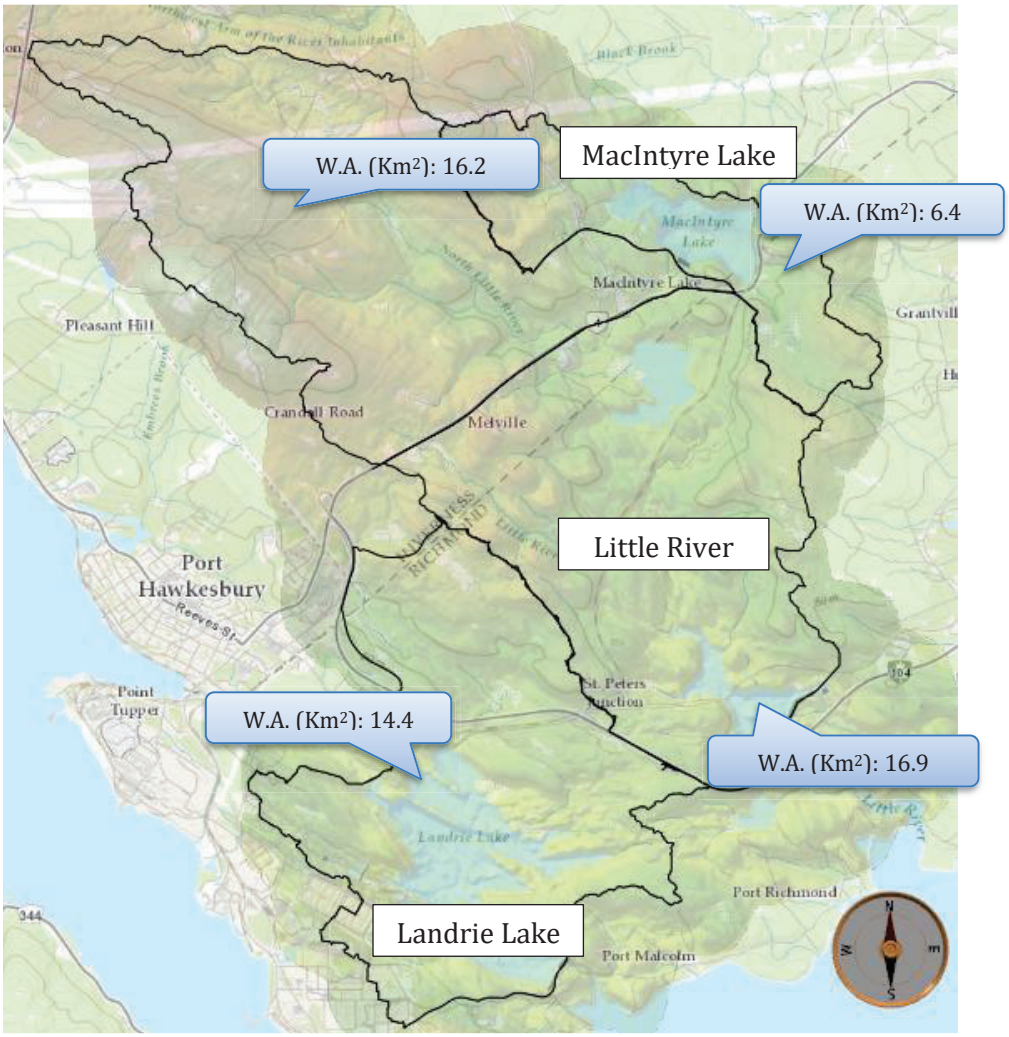

Figure 2.1 Landrie Lake Water Utility Watershed Area

2.1 AVAILABLE DATA

The LLWU does not collect meteorological data at the watershed. To estimate yield a daily inflow sequence is developed using rainfall measured by Environment Canada at Sydney Airport. The transposed data was modelled in HEC-HMS and HEC-ResSim software to estimate sustainable yield. Key background data included, but were not limited to:

- Historical daily climate and hydrometric records from Meteorological Service of Canada (MSC) and Environment Canada (EC), as listed in Table 2.1.
- Precipitation data from Sydney Airport Station.
- Evaporation data from Halifax Airport Station.
- DEM layer of the study area (https://nsgi.novascotia.ca/datalocator/elevation)

Table 2.1 Climatic Station Specifications

Station				Data	
Name	**ID**	**Longitude**	**Latitude**	**From**	**To**
Sydney Airport	8205700&01	-60.05	46.16	1940	Current

The base digital elevation model (DEM) was developed using publicly available contour data and record drawings, originally referenced to the 1928 vertical datum (CGVD28). To ensure consistency and minimize the risk of misinterpretation, all analyses in this report are presented in metric units and referenced to the CGVD2013 vertical datum. Current updated stage-storage relationships for each reservoir in Figure 2.2, Figure 2.3, and Figure 2.4 are based on the most recent bathymetric data.

Long-term annual Potential Evapotranspiration (PET) data published by Environment Canada for the Sydney Airport station is estimated to be 521 mm at Landrie Lake, distributed monthly as presented in Table 2.2. The PET values are applied directly to Landrie Lake's water surface. At the watershed terrain, actual evapotranspiration (AET) is generally 60–80% of PET depending on physiographic features of the watershed. There is insufficient data to accurately determine AET for Landrie Lake and a middle value of 70% is assumed.

Table 2.2 Estimated Long-Term Potential Evapotranspiration at Sydney Airport

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
mm	0	0	0	16	54	89	119	109	75	42	17	0	521
% Total	0	0	0	3	10	17	23	21	14	8	3	0	100

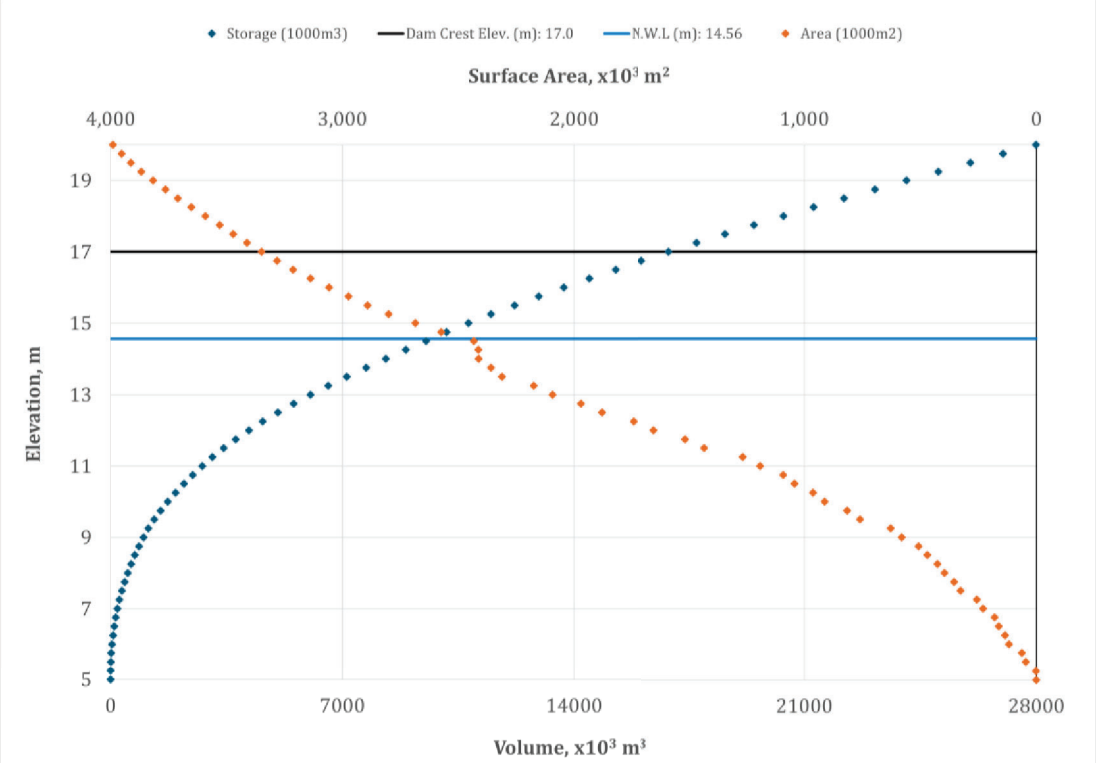

Figure 2.2 Stage-Storage Relationship for Landrie Lake

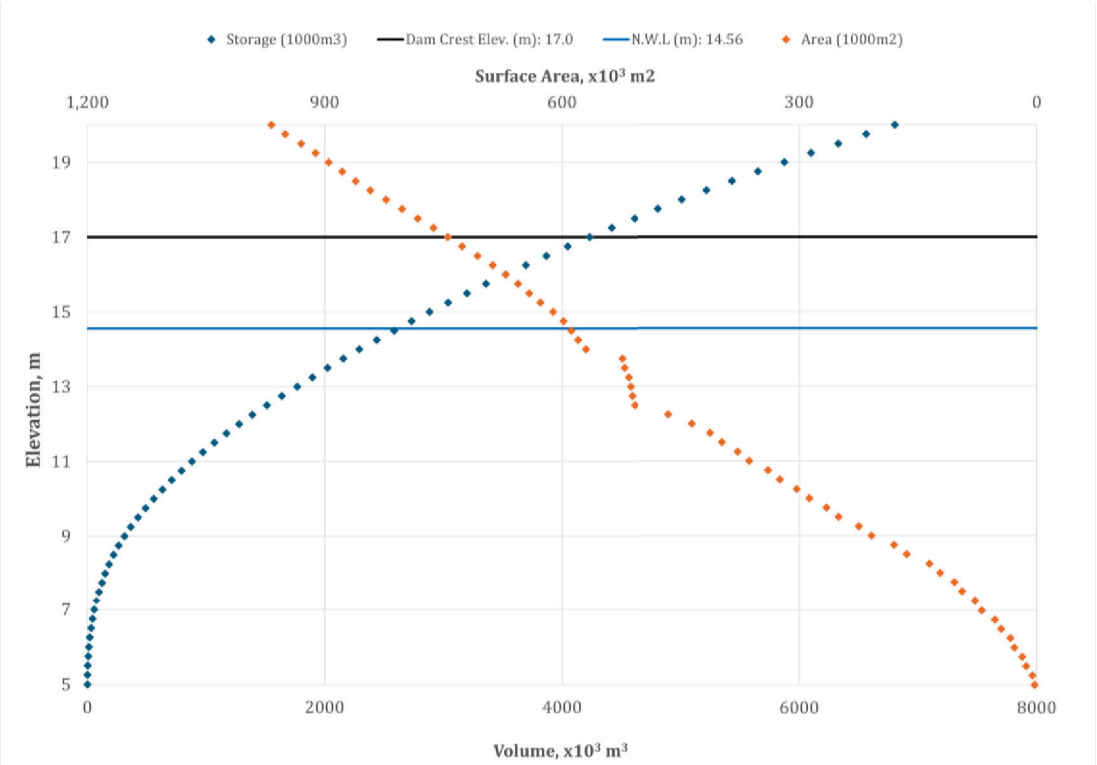

Figure 2.3 Stage-Storage Relationship for Little River Reservoir

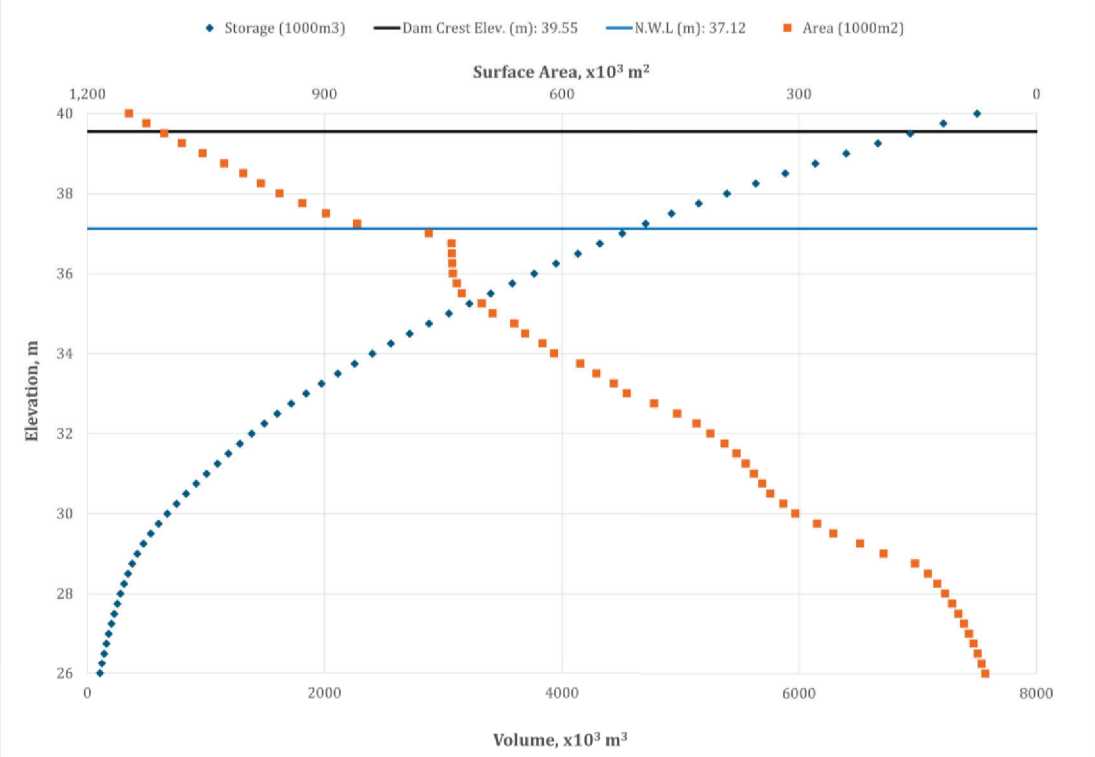

Figure 2.4 Stage-Storage Relationship for MacIntyre Lake

2.2 PRECIPITATION AND INFLOW ANALYSIS

The meteorological data from Sydney Airport is transposed and modelled to estimate inflows for the Landrie Lake and Little River watersheds. Table 2.3 summarizes average and expected values for monthly and annual inflow for the two watersheds. Table 2.4 presents extreme values, highlighting inflow variability during the wettest and driest recorded years.

The average annual precipitation at Sydney is approximately 1,456 mm, resulting in estimated mean annual inflows of 0.40 m^3/s for Landrie Lake and 1.62 m^3/s for Little River. During the wettest years—such as 1983 and 2022—precipitation exceeded 1,970 mm, with inflows peaking at over 2.0 m^3/s for Landrie Lake and 6.2 m^3/s for Little River. In contrast, during drier years like 1950 and 1940, precipitation dropped to near 1,020 mm, significantly reducing inflows to below 0.24 m^3/s and 1.05 m^3/s for Landrie Lake and Little River, respectively.

Table 2.3 Estimated Response at Landrie Lake and Little River

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Median Values													
Q LL (m^3/s)	0.493	0.467	0.404	0.278	0.087	0.004	0.003	0.003	0.006	0.145	0.417	0.542	
Q LR (m^3/s)	1.205	1.202	1.007	0.991	0.541	0.314	0.194	0.224	0.44	0.725	1.311	1.402	
Average Values													
Q LL (m^3/s)	0.666	0.643	0.585	0.465	0.253	0.145	0.159	0.180	0.241	0.380	0.634	0.735	0.400
Q LR (m^3/s)	2.149	2.077	1.895	1.685	1.262	1.076	0.751	0.911	1.234	1.765	2.268	2.381	1.618

LL – Landrie Lake
LR – Little River

Table 2.4 Range of Values at Landrie Lake and Little River

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Maximum													
Precip. (mm)	356	223	255	267	262	277	218	252	334	376	346	443	1,974
Year	2022	1988	1999	1988	2017	1940	1983	2008	1996	2000	2021	2010	1983
Q LL (m^3/s)	1.619	1.176	1.262	1.125	0.922	0.902	0.567	0.518	1.146	1.194	1.589	2.018	0.589
Year	2022	1973	1999	2021	2017	1940	1998	2008	1996	2016	2000	2010	1983
Q LR (m^3/s)	5.093	3.639	3.894	3.769	3.499	3.511	2.665	3.212	4.568	4.380	5.060	6.272	2.283
Year	2022	1973	1999	2021	2017	1940	1998	2008	1996	2016	2000	2010	1983
Minimum													
Precip. (mm)	36	29	31	15	23	24	19	18	35	35	40	55	1,023
Year	1940	2007	2006	2023	1960	1967	1959	1961	1956	2017	1946	1943	1950
Q LL (m^3/s)	0.016	0.146	0.141	0.078	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.309	0.235
Year	1940	2007	2006	2023	1960	1946	1941	1941	1941	1950	1950	1989	1950
Q LR (m^3/s)	0.095	0.490	0.495	0.330	0.061	0.054	0.000	0.000	0.088	0.323	0.561	1.080	1.041
Year	1940	2007	2006	2023	1960	1957	1957	1961	1956	1956	1946	1989	1950

LL – Landrie Lake
LR – Little River

To determine whether it is appropriate to use the 1950 drought period as the critical drought, instead of more recent data, a comparison of the observed mean annual inflow in 1950 to the inflow values associated with various annual return periods derived from historical records. The estimated mean annual inflow for the 2-year, 5-year, 10-year, 20-year, 25-year, and 50-year return periods are 0.398, 0.330, 0.299, 0.273, 0.267, and 0.251 m^3/s, respectively. The mean annual inflow in 1950 was 0.235 m^3/s, an inflow less than the 1-in-50-year inflow of 0.251 CMS.

3.0 SUSTAINABLE YIELD

The LLWU was originally developed in response to potential industrial demand that included a pumping station to transfer water from Little River to Landrie Lake. Though the need was never realized, the LLWU may again be required to increase withdraw rates based on potential industrial developments in the region. In the current regulatory environment, reinstating the original transfer station at Little River to the watershed operating model may include conditions that may limit the transfers. To quantify the potential risk that conditions may have on yield for the system, the following operating environments and their impact on yield were considered.

1. Continue to operate Landrie Lake as currently configured. Do not impose any operating range limitation or allowance for an ecological maintenance flow.
2. Develop a transfer station at Little River and modify the current dam. Include a provision for an EMF and limit the operating range at Little River to a minimum one (1) metre below the current spillway.
3. Estimate the yield at Landrie Lake for transfers of 14 and 22 MLD to Landrie Lake.

The method adopted to estimate sustainable yield was to simulate operations within the rules defined above and establish a constant withdraw rate that can be achieved 95% of the time. All models use a simulation period of 31,132 days, or approximately 85 years, and include drought periods in the record.

3.1 LANDRIE LAKE WITHOUT EXTERNAL TRANSFERS

A simulation model of constant withdraws from Landrie Lake without any supplemental transfers from Little River was developed and executed. A simulated reservoir eater levels for a constant withdraw rate of 34 MLD (394 L/s) from 1940 to present are illustrated in Figure 3.1. a suite of different constant withdraw rates are used with 34 MLD as the recommended sustainable yield with 99 percent annual reliability and 95% reliability in the critical September and October months.

In the simulation, the level in Landrie Lake is operated to a low supply level of 8.5 m for a six meter operating range. Below 8.5 metres the system is considered unable to meet the required withdrawal rate. The selection of 8.5 m is based on its correspondence to a storage volume of approximately 732,000 m^3, a buffer that includes an allowance for the 7-day emergency supply requirement to Point Tupper. Moreover, maintaining this level ensures that the pumping system has sufficient head to operate efficiently.

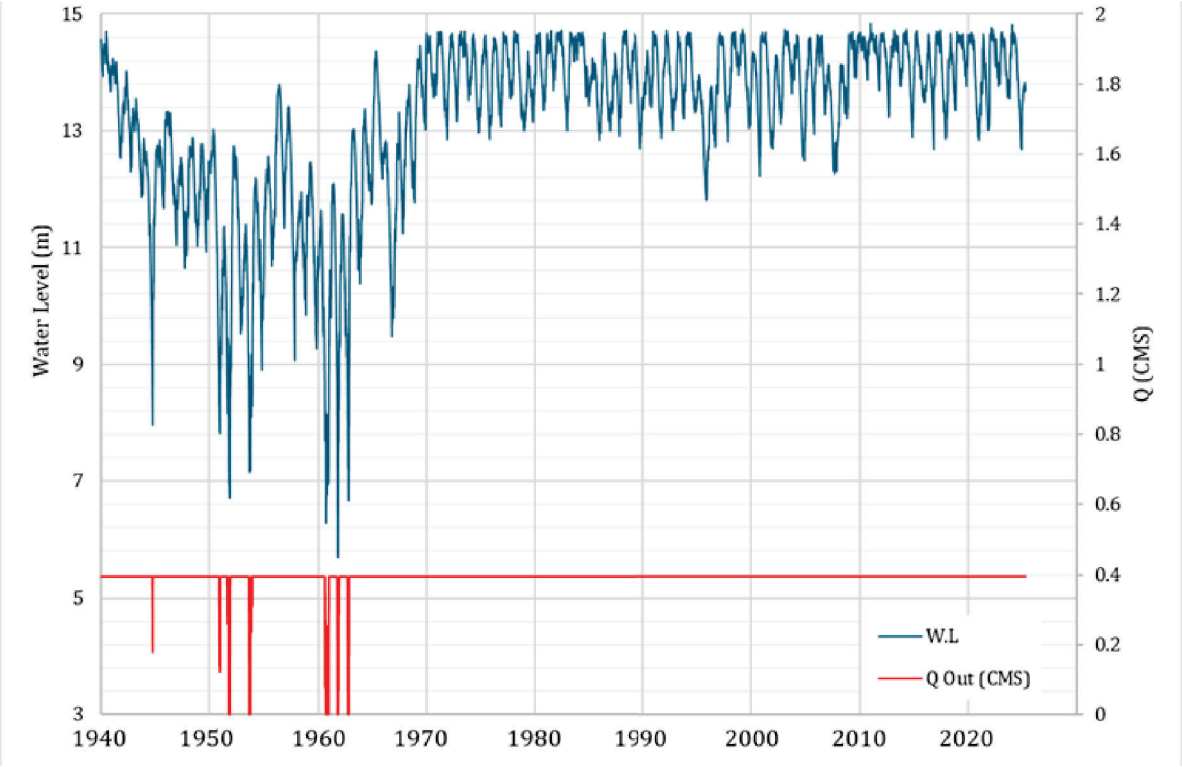

Figure 3.1 Simulated Water Level for Landrie Lake at 34 MLD (394 L/s) Withdrawal Rate

Table 3.1 summarizes the number of days Landrie Lake is unable to sustain a yield of 34 MLD. The total number of days are distributed over seven drought periods prior to 1970 that govern yield at Landrie Lake. The critical period for sustainable yield is in the early 1960's with critical drought occurring in September and October. It is noteworthy that Landrie Lake reservoir does not spill between 1940 and 1970. Since 1970, there are one to two year periods where the reservoir does not recover, but nothing similar in scale to the 30 year period from 1940 to 1960. There data since 1970 is nor consistent and will provide for a slight increase if sustainable yield to 24 MLD if the extended drought from 1940 to 1970 is removed from the data set.

Table 3.1 Performance for Landrie Lake and Percentage of Withdrawal Reliability ($Q \geq 34MLD$)

	No. Days Yield <34 MLD	Withdrawal Reliability (%)
Total	418	99
Jan	0	100
Feb	0	100
Mar	0	100
Apr	0	100
May	0	100
Jun	0	100
Jul	10	100
Aug	54	98
Sep	135	95
Oct	162	95
Nov	34	97
Dec	23	99

3.2 LANDRIE LAKE WITH TRANSFERS FROM LITTLE RIVER

As noted, the original design operating model included transfers from Little River but did not include provisions for an EMF or limits on drawdown. However, under the current regulatory framework, the re-development of a transfer station may require maintaining an EMF and may also impose limits on reservoir drawdown. To address this operational risk, Meco was instructed to simulate Little River with a minimum operational water level at 13.56 m (1 m below the normal level), while simultaneously providing downstream EMF while transferring a continuous transfer of 14 and 22 MLD.

3.2.1 LITTLE RIVER ECOLOGICAL MAINTENANCE FLOW

Guidance for selecting an EMF are contained in the *Guide to Surface Water Withdrawal Approvals in Nova Scotia*. An EMF is understood to be the minimum flow required to sustain the ecological functions of an environment, particularly related to fisheries. The EMF is initially estimated as 75% of the seasonal median flow, with seasons defined as:

Winter	January–March	851 L/s
Spring	April–June	461 L/s
Summer	July–September	215 L/s
Fall	October–December	856 L/s

A reservoir simulation model is developed for Little River and executed for the above seasonal EMF over the 85 years of daily inflow data, without any transfer to Landrie Lake. During the simulation, the lake level varies from 9.41 m to 15.09 m with critical years in the 1950's and 1960's. The predicted response at Little River in Figure 3.2 indicate 1957 is a critical year. Table 3.2 summarizes the frequency with which the level in Little River levels was more than one (1) metre below the crest.

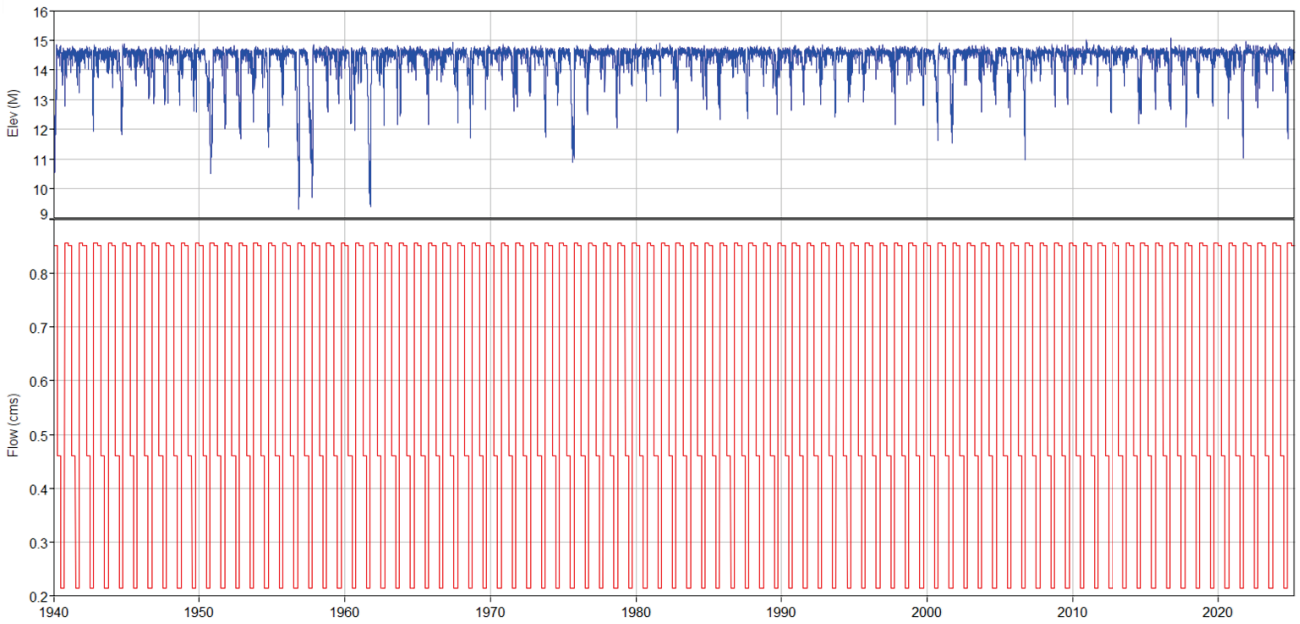

Figure 3.2 Simulated Water Level for Little River with EMF withdrawal and without transfer

The simulation indicates the reservoir water level will be less than 13.56 m approximately 7.5% of the time with just the EMF discharge. Monthly statistics show that the most frequent and severe deficits occur in late summer and early fall (August–October), which aligns with typical drought conditions. For example, in 1957 the water level remained below 13.56 m for a maximum of 127 consecutive days, while other notable drought-related shortages were observed in 1940, 1950, and 1960. The results indicate a seasonal EMF based on median flow rates is not sustainable for the system.

Table 3.2 Performance for Little River Reservoir with EMF

	Q_{EMF} (L/s)	Percentage of Time (W. L<13.56)	Max No of Consecutive Days (W.L <13.56)	Year
Annual	596	7.5%	127	1957
Jan	851	0.8%	20	1940
Feb	851	1.2%	29	1940
Mar	851	0.3%	8	1940
Apr	461	0.0%	0	1940
May	461	1.3%	28	1960
Jun	461	1.1%	12	1960
Jul	215	6.4%	31	1957
Aug	215	24.6%	31	1957
Sep	215	28.9%	30	1957
Oct	856	18.3%	31	1950
Nov	856	6.4%	30	1950
Dec	856	0.5%	5	1950

3.2.2 LITTLE RIVER WITH EMF AND TRANSFER TO LANDRIE LAKE

The reservoir simulation model was modified to include transfers from Little River to Landrie Lake in addition to the seasonal EMF. The simulation rule was to discharge the seasonal EMF and transfer to Landrie Lake until the level of Little River was reduced to one (1) metre below the spillway sill, i.e., elevation 13.56 metres.

Table 3.3 provides a summary of frequency the Little River system meets required transfer volumes and the anticipated EMF for a transfer rate of 14 MLD and 22 MLD. These transfer rates were identified by the LLWU as the rate required to meet potential future demand. For a transfer rate of 14 MLD, the system can provide the transfer 96% of the time, but cannot provide the seasonal EMF 31% of the time, up from the 7.5% without the transfers. If transferring 22 MLD, the system reliability drops to 94% and monthly and the seasonal EMF can not be provided 36% of the time. The seasonal EMF values based on a percentage of median flow govern the sustainable yield using transfers.

From an operating perspective, the LLWU will require an operational plan to provide a susitable EMF from Little River at levels below El.. This may incoude a low-level outlet, floating decant or other measures, including modifying the EMF based on wetted perimeter analysis of the downstream environment.

Table 3.3 Little River Supply EMF and Transfer (Threshold: WL > 13.56 m)

	14 MLD Transfer	EMF Supplied	22 MLD Transfer	EMF Supplied
Annual	96%	69%	94%	64%
Jan	100%	73%	100%	69%
Feb	100%	68%	100%	65%
Mar	100%	64%	100%	60%
Apr	100%	68%	100%	63%
May	99%	51%	97%	45%
Jun	96%	38%	91%	34%
Jul	86%	86%	79%	79%
Aug	85%	85%	79%	79%
Sep	94%	94%	89%	89%
Oct	98%	49%	97%	46%
Nov	100%	68%	99%	65%
Dec	100%	79%	100%	75%

Table 3.4 presents the percentage of time Landrie Lake is able to meet different withdrawal rates. When transferring 14 MLD when avaialble, the sustainable yield at Landrie lake increases proportionally from 34 MLD to 48 MLD. When transferring 22 MLD the sustainable yield increases to 54 MLD, a slight loss of efficiency. The simulation model indicates that transfers from Little River will increase the yield at Landrie lake proportionally. The rate of transfer can be variable to supplement Landrie Lake only to the point of spill, without exceeding the normal operating level.

Table 3.4 Landrie Lake Withdrawal Reliability (%) Under Combined Inflows from Little River Transfers (14 MLD and 22 MLD Scenarios)

Withdrawal Rate Scenario		Landrie Lake Inflow +14MLD Transfer				Landrie Lake Inflow +22MLD Transfer			
$Q_{Withdraw}$	MLD	43	48	52	56	48	52	56	61
	Lit/s	500	550	600	650	550	600	650	700
Annual		100	98	95	88	100	100	97	92
Jan		100	100	100	100	100	100	100	100
Feb		100	100	100	100	100	100	100	100
Mar		100	100	100	99	100	100	100	100
Apr		100	100	99	98	100	100	100	98
May		100	100	97	95	100	100	99	96
Jun		100	99	97	91	100	100	98	95
Jul		100	99	91	73	100	100	95	86
Aug		100	95	83	61	100	100	90	76
Sep		100	94	84	64	100	98	91	74
Oct		100	95	88	81	100	97	94	83
Nov		100	99	96	94	100	99	98	95
Dec		100	100	99	99	100	100	100	99

4.0 DISCUSSION AND RECOMMENDATIONS

In 2022, Meco provided an opinion on the Landrie Lake watershed without Little River transfers that estimated a sustainable yield at 350 L/s, or 30.2 MLD. Since these values were reported, LLWU has completed a bathymetric survey of the Landrie Lake that increased the sustainable yield to 395 L/s, or 34.0 MLD. The governing period for yield is in the 1950's and 1960's. If more recent data is used for the simulation model sustainable yield increases slightly to 36 MLD.

The LLWU is considering re-instating a pumping station to transfer water from Little River to Landrie Lake to increase sustainable yield. The 2022 report increased the yield to 550 L/s, or 47.5 MLD if transfers from the Little River watershed are performed to ensure that Landrie Lake is at normal levels at the end of May. In an extreme case where all available water is transferred from Little River to Landrie lake, the yield increased to 1,220 L/s, or 105.4 MLD. These values do not include provision for ecological maintenance flow or restrictions on the reservoir operating range.

In the current regulatory environment, there is a likelihood that watercourse alterations at Little River would contain conditions for an ecological maintenance flow or a restriction on operating range. As an initial screening evaluation, a simulation model for Litte River evaluated a seasonal EMF equal to 75% of median seasonal inflow while only allowing the reservoir level to fluctuate to one metre below the current normal operating level.

- The model indicates that the seasonal EMF is not sustainable for a one metre operating range in the reservoir. The model predicts water levels will exceed one metre drawdown 7.5% of the time annually, and will be acute during the late summer.
- If a transfer rate of 14 MLD is adopted for Little River, the model predicts the water levels will exceed one metre drawdown 31% of the time annually, and will have an impact for all seasons.
- If a transfer rate of 22 MLD is adopted for Little River, the model predicts the water levels will exceed one metre drawdown 36% of the time annually, and will have an impact for all seasons.

The transfers from Little River result in proportional gains in yield at Landrie Lake for 14 and 22 MLD transfers. The LLWU will need to consider options for achieving the EMF when Little River is one metre or more below normal operating levels. Options include demand side management of reducing the frequency of drawdown, provision for a low level outlet to facilitate discharges below the one metre drawdown, or ancillary discharge methods for decanting the reservoir.

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Appendix D Vascular Plant List

D.1 Observed Vegetation in the LLWU PDA

Table D.1 Vascular Plant Species Observed within the Landrie Lake Water Utility Project Development Area

Species Name	Common Name	S Rank
Abies balsamea	Balsam Fir	S5
Acer pensylvanicum	Striped Maple	S5
Acer rubrum	Red Maple	S5
Acer saccharum	Sugar Maple	S4S5
Agrostis stolonifera	Creeping Bent Grass	S5
Alisma triviale	Northern Water Plantain	S5
Alnus alnobetula	Green Alder	S5
Alnus incana	Speckled Alder	S5
Amauropelta noveboracensis	New York Fern	S5
Amelanchier sp.	a Serviceberry	NA
Angelica sylvestris	Woodland Angelica	SNA
Anthoxanthum odoratum	Large Sweet Vernal Grass	SNA
Aralia nudicaulis	Wild Sarsaparilla	S5
Aronia melanocarpa	Black Chokeberry	S5
Athyrium filix-femina	Common Lady Fern	S5
Betula alleghaniensis	Yellow Birch	S5
Betula papyrifera	Paper Birch	S5
Bidens frondosa	Devil's Beggarticks	S5
Brachyelytrum aristosum	Northern Shorthusk	S5
Calamagrostis canadensis	Bluejoint Reed Grass	S5
Callitriche sp.	a Water-Starwort	NA
Carex brunnescens	Brownish Sedge	S5
Carex canescens	Silvery Sedge	S5
Carex echinata	Star Sedge	S5
Carex flava	Yellow Sedge	S5
Carex folliculata	Northern Long Sedge	S5
Carex gracillima	Graceful Sedge	S5
Carex gynandra	Nodding Sedge	S5
Carex intumescens	Bladder Sedge	S5
Carex lasiocarpa	Slender Sedge	S5
Carex michauxiana	Michaux's Sedge	S4
Carex novae-angliae	New England Sedge	S5
Carex pallescens	Pale Sedge	S5
Carex projecta	Necklace Sedge	S5
Carex scoparia	Broom Sedge	S5
Carex stipata	Awl-fruited Sedge	S5
Carex stricta	Tussock Sedge	S5
Centaurea benedicta	Blessed Thistle	SNA
Centaurea nigra	Black Knapweed	SNA

Species Name	Common Name	S Rank
Chelone glabra	White Turtlehead	S5
Circaea alpina	Small Enchanter's Nightshade	S5
Claytosmunda claytoniana	Interrupted Fern	S5
Clintonia borealis	Yellow Bluebead Lily	S5
Coptis trifolia	Goldthread	S5
Cornus canadensis	Bunchberry	S5
Corylus cornuta	Beaked Hazel	S5
Cypripedium acaule	Pink Lady's-Slipper	S5
Dennstaedtia punctilobula	Eastern Hay-Scented Fern	S5
Deschampsia cespitosa	Tufted Hair Grass	S4
Diervilla lonicera	Northern Bush Honeysuckle	S5
Diphasiastrum complanatum	Northern Ground-cedar	S3S4
Doellingeria umbellata	Hairy Flat-top White Aster	S5
Dryopteris campyloptera	Mountain Wood Fern	S5
Dryopteris carthusiana	Spinulose Wood Fern	S5
Dryopteris cristata	Crested Wood Fern	S5
Dryopteris intermedia	Evergreen Wood Fern	S5
Elaeagnus angustifolia	Russian Olive	SNA
Eleocharis acicularis	Needle Spikerush	S5
Eleocharis palustris	Common Spikerush	S5
Eleocharis tenuis	Slender Spikerush	S5
Epigaea repens	Trailing Arbutus	S5
Epilobium ciliatum	Northern Willowherb	S5
Equisetum arvense	Field Horsetail	S5
Equisetum sylvaticum	Woodland Horsetail	S5
Euthamia graminifolia	Grass-leaved Goldenrod	S5
Eutrochium maculatum	Spotted Joe Pye Weed	S5
Fagus grandifolia	American Beech	S3S4
Fragaria virginiana	Wild Strawberry	S5
Fraxinus americana	White Ash	S4
Galium palustre	Common Marsh Bedstraw	S5
Gaultheria hispidula	Creeping Snowberry	S5
Gaultheria procumbens	Eastern Teaberry	S5
Glyceria canadensis	Canada Manna Grass	S5
Glyceria grandis	Common Tall Manna Grass	S5
Glyceria striata	Fowl Manna Grass	S5
Hieracium maculatum	Spotted Hawkweed	SNA
Hypericum fraseri	Fraser's St. John's-wort	S5
Ilex mucronata	Mountain Holly	S5
Ilex verticillata	Common Winterberry	S5
Impatiens capensis	Spotted Jewelweed	S5
Iris versicolor	Harlequin Blue Flag	S5
Juncus brevicaudatus	Narrow-Panicled Rush	S5
Juncus conglomeratus	Compact Rush	SNA

Species Name	Common Name	S Rank
Juncus sp.	a Rush	NA
Kalmia angustifolia	Sheep Laurel	S5
Lactuca sp.	a Lettuce	NA
Larix laricina	Tamarack	S5
Lemna minor	Lesser Duckweed	SNA
Leucanthemum vulgare	Oxeye Daisy	SNA
Linnaea borealis	Twinflower	S5
Lonicera canadensis	Canada Fly Honeysuckle	S5
Lycopus americanus	American Water Horehound	S5
Lycopus uniflorus	Northern Water Horehound	S5
Lysimachia borealis	Northern Starflower	S5
Lysimachia terrestris	Swamp Yellow Loosestrife	S5
Maianthemum canadense	Wild Lily-of-The-Valley	S5
Mitchella repens	Partridgeberry	S5
Moehringia lateriflora	Blunt-leaved Sandwort	S5
Morella pensylvanica	Northern Bayberry	S5
Myosotis laxa	Small Forget-Me-Not	S5
Nabalus trifoliolatus	Three-leaved Rattlesnakeroot	S5
Nuphar variegata	Variegated Pond-lily	S5
Oclemena acuminata	Whorled Wood Aster	S5
Oenothera parviflora	Small-flowered Evening Primrose	S4S5
Oenothera perennis	Perennial Evening Primrose	S5
Onoclea sensibilis	Sensitive Fern	S5
Osmundastrum cinnamomeum	Cinnamon Fern	S5
Oxalis montana	Common Wood Sorrel	S5
Packera schweinitziana	Schweinitz's Groundsel	S4
Persicaria sagittata	Arrow-leaved Smartweed	S5
Picea glauca	White Spruce	S5
Picea mariana	Black Spruce	S5
Pilosella caespitosa	Meadow Hawkweed	SNA
Pinus strobus	Eastern White Pine	S5
Plantago lanceolata	English Plantain	SNA
Plantago major	Common Plantain	SNA
Poa alsodes	Grove Blue Grass	S4
Poa compressa	Canada Blue Grass	SNA
Poa palustris	Fowl Blue Grass	S5
Polystichum acrostichoides	Christmas Fern	S5
Populus grandidentata	Large-toothed Aspen	S5
Populus tremuloides	Trembling Aspen	S5
Potamogeton crispus	Curly Pondweed	SNA
Potamogeton sp.	a Pondweed	NA
Potentilla simplex	Old Field Cinquefoil	S5
Prunella vulgaris	Common Self-heal	S5
Prunus virginiana	Chokecherry	S5

Species Name	Common Name	S Rank
Pteridium aquilinum	Bracken Fern	S5
Ranunculus acris	Common Buttercup	SNA
Ranunculus repens	Creeping Buttercup	SNA
Rosa nitida	Shining Rose	S4S5
Rosa virginiana	Virginia Rose	S5
Rubus canadensis	Smooth Blackberry	S5
Rubus hispidus	Bristly Dewberry	S5
Rubus idaeus	Red Raspberry	S5
Rubus pubescens	Dwarf Red Raspberry	S5
Rudbeckia hirta	Black-Eyed Susan	SNA
Salix bebbiana	Bebb's Willow	S5
Salix discolor	Pussy Willow	S5
Scirpus atrocinctus	Black-girdled Bulrush	S5
Scirpus cyperinus	Common Woolly Bulrush	S5
Scirpus hattorianus	Mosquito Bulrush	S5
Scirpus microcarpus	Small-fruited Bulrush	S5
Scutellaria galericulata	Marsh Skullcap	S5
Scutellaria lateriflora	Mad-dog Skullcap	S5
Solanum dulcamara	Bittersweet Nightshade	SNA
Solidago canadensis	Canada Goldenrod	S4S5
Solidago rugosa	Rough-stemmed Goldenrod	S5
Sorbus americana	American Mountain Ash	S5
Sparganium americanum	American Burreed	S5
Spiraea alba	White Meadowsweet	S5
Streptopus amplexifolius	Clasping-leaved Twisted-stalk	S4S5
Streptopus lanceolatus	Rose Twisted-stalk	S5
Symphyotrichum lateriflorum	Calico Aster	S5
Symphyotrichum puniceum	Purple-stemmed Aster	S5
Taraxacum officinale	Common Dandelion	SNA
Thalictrum pubescens	Tall Meadow-Rue	S5
Trifolium hybridum	Alsike Clover	SNA
Trillidium undulatum	Painted Trillium	S5
Tsuga canadensis	Eastern Hemlock	S4
Tussilago farfara	Coltsfoot	SNA
Typha latifolia	Broad-leaved Cattail	S5
Vaccinium angustifolium	Late Lowbush Blueberry	S5
Vaccinium myrtilloides	Velvet-leaved Blueberry	S5
Veronica officinalis	Common Speedwell	SNA
Veronica sp.	a Speedwell	NA
Viburnum cassinoides	Northern Wild Raisin	S5
Viola cucullata	Marsh Blue Violet	S5

Notes:
S-Ranks available from AC CDC (2025). NA = Not available, where species identified to genus only.

Appendix E WESP-AC Summaries

WL1 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.22	Lower	1.48	Lower	3.60	0.66
Stream Flow Support (SFS)	3.14	Moderate	3.22	Moderate	2.53	2.14
Water Cooling (WC)	6.79	Higher	0.88	Lower	4.53	0.48
Sediment Retention & Stabilisation (SR)	1.44	Lower	1.59	Moderate	3.32	0.78
Phosphorus Retention (PR)	1.20	Lower	1.29	Moderate	4.50	1.00
Nitrate Removal & Retention (NR)	1.81	Lower	10.00	Higher	4.08	10.00
Carbon Sequestration (CS)	4.57	Moderate			7.36	
Organic Nutrient Export (OE)	9.41	Higher			6.15	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	3.65	Moderate	5.37	Moderate	4.98	4.14
Amphibian & Turtle Habitat (AM)	5.63	Moderate	3.22	Moderate	6.07	4.41
Waterbird Feeding Habitat (WBF)	7.21	Higher	0.83	Lower	5.49	0.83
Waterbird Nesting Habitat (WBN)	7.61	Higher	0.00	Lower	5.52	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	8.89	Higher	0.00	Lower	7.74	0.00
Pollinator Habitat (POL)	7.41	Moderate	0.00	Lower	6.14	0.00
Native Plant Habitat (PH)	4.62	Moderate	4.63	Lower	5.74	4.63
Public Use & Recognition (PU)			2.31	Moderate		1.88
Wetland Sensitivity (Sens)			4.55	Lower		3.47
Wetland Ecological Condition (EC)			3.04	Lower		6.67
Wetland Stressors (STR) (higher score means more stress)			4.48	Moderate		2.34
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.22	Lower	1.48	Lower	3.60	0.66
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.41	Moderate	7.15	Higher	6.09	6.96
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.58	Higher	4.26	Moderate	5.35	3.19
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.85	Moderate	2.01	Moderate	4.75	2.73
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.93	Higher	3.09	Lower	7.14	3.09
WETLAND CONDITION (EC)			3.04	Lower		6.67
WETLAND RISK (average of Sensitivity & Stressors)			4.52	Moderate		2.90

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	3.276458894	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	24.37797794	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	32.32199497	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	11.77067762	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	24.47964357	Low

WL2 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	3.20	Lower	2.43	Lower	4.33	1.08
Stream Flow Support (SFS)	1.69	Moderate	4.68	Moderate	1.36	3.11
Water Cooling (WC)	4.83	Moderate	0.57	Lower	3.22	0.31
Sediment Retention & Stabilisation (SR)	3.25	Lower	0.83	Lower	4.73	0.41
Phosphorus Retention (PR)	0.75	Lower	0.43	Lower	4.21	0.33
Nitrate Removal & Retention (NR)	3.70	Moderate	10.00	Higher	5.45	10.00
Carbon Sequestration (CS)	3.76	Moderate			6.98	
Organic Nutrient Export (OE)	6.38	Moderate			4.17	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.62	Higher	5.47	Moderate	5.79	4.19
Amphibian & Turtle Habitat (AM)	8.48	Higher	4.13	Moderate	7.56	5.16
Waterbird Feeding Habitat (WBF)	7.58	Higher	3.33	Moderate	5.77	3.33
Waterbird Nesting Habitat (WBN)	7.45	Higher	3.33	Moderate	5.40	3.33
Songbird, Raptor, & Mammal Habitat (SBM)	7.34	Moderate	3.33	Moderate	6.39	3.33
Pollinator Habitat (POL)	8.09	Higher	3.33	Moderate	6.71	3.33
Native Plant Habitat (PH)	5.05	Moderate	5.48	Moderate	5.92	5.48
Public Use & Recognition (PU)			2.31	Moderate		1.88
Wetland Sensitivity (Sens)			6.30	Moderate		3.97
Wetland Ecological Condition (EC)			5.36	Moderate		7.78
Wetland Stressors (STR) (higher score means more stress)			4.70	Moderate		2.45
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	3.20	Lower	2.43	Lower	4.33	1.08
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.32	Moderate	6.88	Higher	6.16	6.79
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.51	Moderate	4.52	Moderate	4.71	3.36
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.59	Higher	3.15	Moderate	5.66	3.77
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.46	Higher	4.76	Lower	6.52	4.76
WETLAND CONDITION (EC)			5.36	Moderate		7.78
WETLAND RISK (average of Sensitivity & Stressors)			5.50	Moderate		3.21

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	7.753295163	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	22.80037821	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	24.88750072	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	20.72160359	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	35.54563252	Low

WL3 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.64	Lower	2.99	Lower	3.17	1.33
Stream Flow Support (SFS)	4.76	Higher	5.16	Moderate	3.83	3.43
Water Cooling (WC)	5.29	Higher	3.97	Moderate	3.53	2.15
Sediment Retention & Stabilisation (SR)	2.28	Lower	0.83	Lower	3.98	0.41
Phosphorus Retention (PR)	0.00	Lower	0.43	Lower	3.67	0.33
Nitrate Removal & Retention (NR)	3.51	Moderate	10.00	Higher	5.31	10.00
Carbon Sequestration (CS)	2.82	Lower			6.53	
Organic Nutrient Export (OE)	7.85	Higher			5.13	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	2.93	Lower	4.06	Moderate	4.69	3.43
Amphibian & Turtle Habitat (AM)	6.53	Moderate	4.01	Moderate	6.54	5.07
Waterbird Feeding Habitat (WBF)	5.77	Moderate	5.00	Moderate	4.40	5.00
Waterbird Nesting Habitat (WBN)	5.30	Moderate	5.00	Higher	3.84	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.67	Moderate	5.00	Moderate	5.81	5.00
Pollinator Habitat (POL)	7.80	Moderate	0.00	Lower	6.46	0.00
Native Plant Habitat (PH)	1.94	Lower	4.09	Lower	4.68	4.09
Public Use & Recognition (PU)			2.31	Moderate		1.88
Wetland Sensitivity (Sens)			3.99	Lower		3.31
Wetland Ecological Condition (EC)			1.88	Lower		6.11
Wetland Stressors (STR) (higher score means more stress)			5.36	Moderate		2.76
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	1.64	Lower	2.99	Lower	3.17	1.33
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.83	Moderate	6.88	Higher	5.70	6.79
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.53	Higher	4.78	Moderate	4.71	3.22
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.02	Moderate	3.90	Moderate	4.75	4.04
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.63	Moderate	4.01	Lower	6.05	4.01
WETLAND CONDITION (EC)			1.88	Lower		6.11
WETLAND RISK (average of Sensitivity & Stressors)			4.67	Moderate		3.03

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	4.910952971	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	19.45895003	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	31.19438555	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	19.59967075	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	26.62881833	Low

WL4 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.93	Lower	6.03	Moderate	3.38	2.68
Stream Flow Support (SFS)	4.07	Moderate	5.56	Moderate	3.28	3.70
Water Cooling (WC)	5.67	Higher	1.76	Lower	3.78	0.95
Sediment Retention & Stabilisation (SR)	2.63	Lower	1.40	Moderate	4.25	0.69
Phosphorus Retention (PR)	0.00	Lower	1.07	Moderate	3.71	0.83
Nitrate Removal & Retention (NR)	2.52	Lower	10.00	Higher	4.60	10.00
Carbon Sequestration (CS)	1.50	Lower			5.90	
Organic Nutrient Export (OE)	8.85	Higher			5.79	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	3.92	Moderate	3.69	Moderate	5.09	3.23
Amphibian & Turtle Habitat (AM)	6.22	Moderate	3.09	Moderate	6.38	4.31
Waterbird Feeding Habitat (WBF)	5.67	Moderate	2.50	Lower	4.32	2.50
Waterbird Nesting Habitat (WBN)	3.54	Moderate	2.50	Moderate	2.57	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	7.03	Moderate	2.50	Lower	6.12	2.50
Pollinator Habitat (POL)	7.39	Moderate	0.00	Lower	6.13	0.00
Native Plant Habitat (PH)	3.22	Lower	4.08	Lower	5.19	4.08
Public Use & Recognition (PU)			2.39	Moderate		1.94
Wetland Sensitivity (Sens)			5.23	Moderate		3.66
Wetland Ecological Condition (EC)			1.88	Lower		6.11
Wetland Stressors (STR) (higher score means more stress)			8.62	Higher		4.32
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	1.93	Lower	6.03	Moderate	3.38	2.68
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.15	Lower	7.08	Higher	5.26	6.92
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.24	Higher	4.61	Moderate	5.13	3.16
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.65	Moderate	2.36	Moderate	4.52	3.09
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.64	Moderate	3.14	Lower	5.97	3.14
WETLAND CONDITION (EC)			1.88	Lower		6.11
WETLAND RISK (average of Sensitivity & Stressors)			6.93	Higher		3.99

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	11.62850402	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	15.21363748	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	33.39966535	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	10.95996324	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	20.82838021	Low

WL5 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	3.29	Lower	2.65	Lower	4.40	1.18
Stream Flow Support (SFS)	0.55	Lower	0.00	Lower	0.44	0.00
Water Cooling (WC)	4.92	Moderate	0.77	Lower	3.28	0.42
Sediment Retention & Stabilisation (SR)	2.71	Lower	1.21	Moderate	4.31	0.59
Phosphorus Retention (PR)	0.71	Lower	0.86	Lower	4.19	0.67
Nitrate Removal & Retention (NR)	3.73	Moderate	10.00	Higher	5.47	10.00
Carbon Sequestration (CS)	2.49	Lower			6.37	
Organic Nutrient Export (OE)	7.47	Higher			4.88	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	9.51	Higher	6.38	Higher	7.38	4.68
Amphibian & Turtle Habitat (AM)	9.31	Higher	4.49	Moderate	8.00	5.46
Waterbird Feeding Habitat (WBF)	8.74	Higher	3.33	Moderate	6.65	3.33
Waterbird Nesting Habitat (WBN)	9.71	Higher	3.33	Moderate	7.04	3.33
Songbird, Raptor, & Mammal Habitat (SBM)	7.34	Moderate	3.33	Moderate	6.39	3.33
Pollinator Habitat (POL)	8.37	Higher	3.33	Moderate	6.93	3.33
Native Plant Habitat (PH)	4.18	Moderate	5.55	Moderate	5.57	5.55
Public Use & Recognition (PU)			2.17	Moderate		1.79
Wetland Sensitivity (Sens)			5.55	Moderate		3.75
Wetland Ecological Condition (EC)			5.36	Moderate		7.78
Wetland Stressors (STR) (higher score means more stress)			5.29	Moderate		2.73
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	3.29	Lower	2.65	Lower	4.40	1.18
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.07	Moderate	7.01	Higher	5.73	6.88
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.56	Higher	4.38	Moderate	5.69	3.19
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	7.63	Higher	3.36	Moderate	6.17	3.94
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.50	Higher	4.81	Lower	6.61	4.81
WETLAND CONDITION (EC)			5.36	Moderate		7.78
WETLAND RISK (average of Sensitivity & Stressors)			5.42	Moderate		3.24

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	8.724072597	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	21.53651874	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	33.13133912	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	25.62020636	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	36.07155717	Low

WL6 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.97	Lower	2.82	Lower	3.41	1.25
Stream Flow Support (SFS)	5.45	Higher	5.12	Moderate	4.39	3.40
Water Cooling (WC)	5.04	Moderate	2.75	Moderate	3.36	1.49
Sediment Retention & Stabilisation (SR)	3.39	Lower	0.83	Lower	4.85	0.41
Phosphorus Retention (PR)	0.91	Lower	0.43	Lower	4.31	0.33
Nitrate Removal & Retention (NR)	3.64	Moderate	10.00	Higher	5.40	10.00
Carbon Sequestration (CS)	3.59	Moderate			6.89	
Organic Nutrient Export (OE)	9.36	Higher			6.12	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.75	Moderate	4.32	Moderate	5.43	3.57
Amphibian & Turtle Habitat (AM)	6.37	Moderate	3.27	Moderate	6.46	4.46
Waterbird Feeding Habitat (WBF)	5.96	Moderate	3.33	Moderate	4.54	3.33
Waterbird Nesting Habitat (WBN)	5.65	Moderate	2.50	Moderate	4.10	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	7.27	Moderate	2.50	Lower	6.33	2.50
Pollinator Habitat (POL)	7.71	Moderate	0.00	Lower	6.39	0.00
Native Plant Habitat (PH)	4.60	Moderate	4.24	Lower	5.74	4.24
Public Use & Recognition (PU)			2.86	Moderate		2.26
Wetland Sensitivity (Sens)			6.52	Moderate		4.03
Wetland Ecological Condition (EC)			6.52	Higher		8.33
Wetland Stressors (STR) (higher score means more stress)			8.88	Higher		4.45
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	1.97	Lower	2.82	Lower	3.41	1.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.26	Moderate	6.88	Higher	6.13	6.79
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.75	Higher	4.59	Moderate	5.47	3.20
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.98	Moderate	2.58	Moderate	4.74	3.26
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.12	Higher	3.24	Lower	6.27	3.24
WETLAND CONDITION (EC)			6.52	Higher		8.33
WETLAND RISK (average of Sensitivity & Stressors)			7.70	Higher		4.24

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	5.546367163	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	22.41364189	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	35.59356318	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	12.84442859	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	23.0784341	Low

WL7 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	3.06	Lower	1.92	Lower	4.23	0.85
Stream Flow Support (SFS)	2.72	Moderate	4.25	Moderate	2.19	2.83
Water Cooling (WC)	5.54	Higher	0.76	Lower	3.69	0.41
Sediment Retention & Stabilisation (SR)	3.62	Moderate	7.64	Higher	5.02	3.74
Phosphorus Retention (PR)	2.76	Lower	6.86	Higher	5.47	5.33
Nitrate Removal & Retention (NR)	4.06	Moderate	10.00	Higher	5.71	10.00
Carbon Sequestration (CS)	4.53	Moderate			7.34	
Organic Nutrient Export (OE)	8.22	Higher			5.37	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	8.06	Higher	5.67	Moderate	6.78	4.30
Amphibian & Turtle Habitat (AM)	6.17	Moderate	4.38	Moderate	6.36	5.37
Waterbird Feeding Habitat (WBF)	7.49	Higher	2.50	Lower	5.71	2.50
Waterbird Nesting Habitat (WBN)	8.06	Higher	2.50	Moderate	5.84	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.07	Higher	2.50	Lower	7.89	2.50
Pollinator Habitat (POL)	9.11	Higher	0.00	Lower	7.55	0.00
Native Plant Habitat (PH)	5.63	Moderate	5.15	Lower	6.15	5.15
Public Use & Recognition (PU)			2.17	Moderate		1.79
Wetland Sensitivity (Sens)			9.29	Higher		4.82
Wetland Ecological Condition (EC)			8.26	Higher		9.17
Wetland Stressors (STR) (higher score means more stress)			7.11	Higher		3.60
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	3.06	Lower	1.92	Lower	4.23	0.85
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	4.14	Moderate	9.08	Higher	6.61	8.18
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.18	Higher	4.62	Moderate	5.65	3.41
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.20	Moderate	3.13	Moderate	4.97	3.72
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.53	Higher	3.85	Lower	7.55	3.85
WETLAND CONDITION (EC)			8.26	Higher		9.17
WETLAND RISK (average of Sensitivity & Stressors)			8.20	Higher		4.21

Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	5.876562297	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	37.59616481	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	33.14324344	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	19.3835299	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	32.81917168	Low

WL8 WESP-AC Scores

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.41	Lower	1.86	Lower	3.75	0.83
Stream Flow Support (SFS)	1.34	Lower	4.39	Moderate	1.08	2.92
Water Cooling (WC)	5.33	Higher	0.94	Lower	3.56	0.51
Sediment Retention & Stabilisation (SR)	3.67	Moderate	0.83	Lower	5.06	0.41
Phosphorus Retention (PR)	2.40	Lower	0.43	Lower	5.25	0.33
Nitrate Removal & Retention (NR)	3.93	Moderate	10.00	Higher	5.62	10.00
Carbon Sequestration (CS)	4.24	Moderate			7.20	
Organic Nutrient Export (OE)	8.58	Higher			5.60	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	10.00	Higher	6.23	Higher	7.61	4.60
Amphibian & Turtle Habitat (AM)	8.98	Higher	4.45	Moderate	7.83	5.42
Waterbird Feeding Habitat (WBF)	8.65	Higher	4.17	Moderate	6.58	4.17
Waterbird Nesting Habitat (WBN)	9.40	Higher	3.33	Moderate	6.81	3.33
Songbird, Raptor, & Mammal Habitat (SBM)	7.30	Moderate	3.33	Moderate	6.36	3.33
Pollinator Habitat (POL)	8.11	Higher	3.33	Moderate	6.72	3.33
Native Plant Habitat (PH)	4.69	Moderate	5.47	Moderate	5.77	5.47
Public Use & Recognition (PU)			1.61	Moderate		1.40
Wetland Sensitivity (Sens)			7.35	Higher		4.27
Wetland Ecological Condition (EC)			6.52	Higher		8.33
Wetland Stressors (STR) (higher score means more stress)			8.93	Higher		4.47
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.41	Lower	1.86	Lower	3.75	0.83
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.90	Moderate	6.88	Higher	6.49	6.79
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.16	Higher	5.04	Moderate	6.04	3.64
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	7.40	Higher	3.42	Moderate	6.04	4.00
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.40	Higher	4.76	Lower	6.50	4.76
WETLAND CONDITION (EC)			6.52	Higher		8.33
WETLAND RISK (average of Sensitivity & Stressors)			8.14	Higher		4.37

Functional WSS Interpretation Results

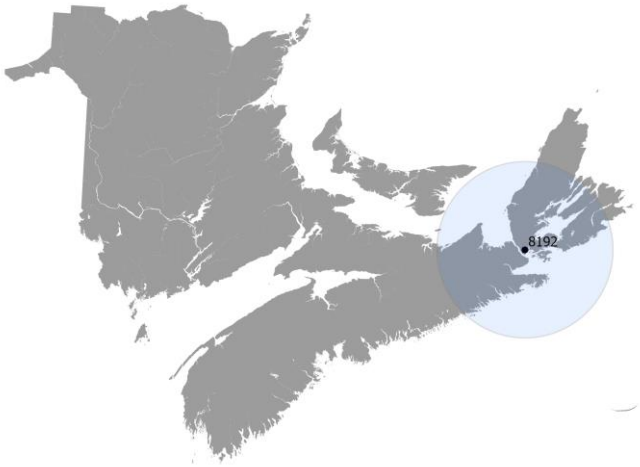
Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	4.492104613	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	26.83006836	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	41.10131098	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	25.29286997	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	35.22786909	Low

Appendix F AC CDC Data Report

DATA REPORT 8192: Landrie Lake, NS

Prepared 22 August 2024
by P. Greyson, Conservation Data Analyst

CONTENTS OF REPORT



Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; www.accdc.com) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The AC CDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the AC CDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees.

Upon request and for a fee, the AC CDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the AC CDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
LandrieLkNS_8192ob.xls	Rare or legally-protected Flora and Fauna in your study area
LandrieLkNS_8192ob100km.xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
LandrieLkNS_8192msa.xls	Managed and Biologically Significant Areas in your study area
LandrieLkNS_8192ff_py.xls	Rare Freshwater Fish in your study area (DFO database)
LandrieLkNS_8192bp.xls	Rare and common Pelagic Birds in your study area (CWS database)

1.2 RESTRICTIONS

The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The AC CDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) AC CDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) AC CDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an AC CDC data response.

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

Please direct any additional questions about AC CDC data to the following individuals:

Plants, Lichens, Ranking Methods, All other Inquiries
Sean Blaney
Senior Scientist / Executive Director
(506) 364-2658
sean.blaney@accdc.ca

Animals (Fauna)
John Klymko
Zoologist
(506) 364-2660
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Data Management, GIS
Charity Robicheau
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Billing
Jean Breau
Financial Manager / Executive Assistant
(506) 364-2657
jean.breau@accdc.ca

Questions on the biology of Federal Species at Risk can be directed to AC CDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Donna Hurlburt, NS DLF: (902) 679-6886. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NS DLF Regional Biologist:

Western: Emma Vost
(902) 670-8187
Emma.Vost@novascotia.ca

Western: Sarah Spencer
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Eastern: Harrison Moore
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Eastern: Maureen Cameron-MacMillan
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Maureen.Cameron-MacMillan@novascotia.ca

Eastern: Elizabeth Walsh
(902) 563-3370
Elizabeth.Walsh@novascotia.ca

For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

2.0 RARE AND ENDANGERED SPECIES

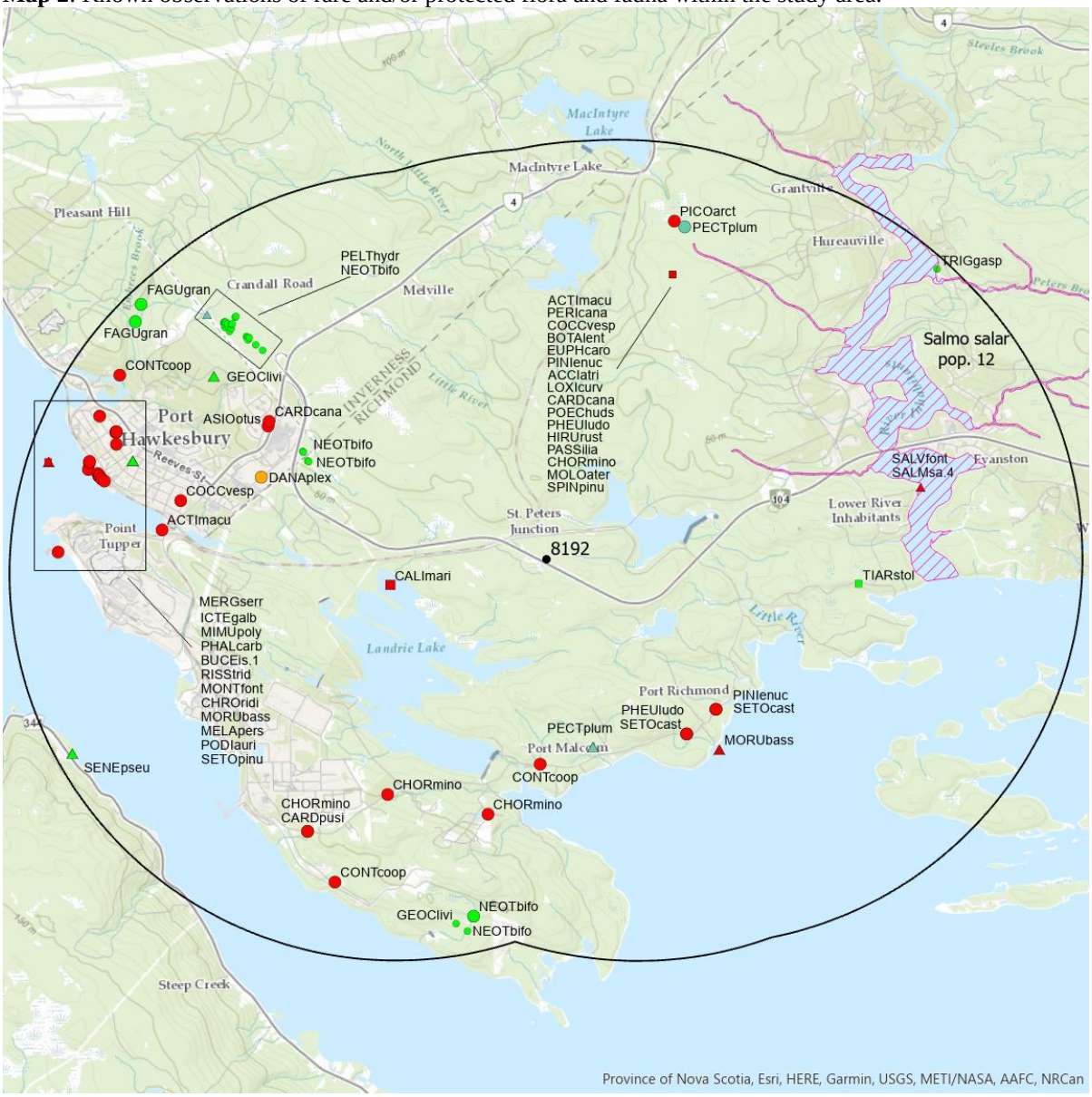
2.1 FLORA

The study area contains 35 records of 7 vascular and 3 records of 2 nonvascular flora (Map 2 and attached: *ob.xls), excluding 'location-sensitive' species.

2.2 FAUNA

The study area contains 60 records of 35 vertebrate and 1 record of 1 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List), excluding 'location-sensitive species'. Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within the study area.



Resolution

- 1.0 = Within 10s of metres
- 1.7 = Within 50s of metres
- 2.0 = Within 100s of metres
- 2.7 = Within 500s of metres
- 3.0 = Within kilometres
- 3.7 = Within 5s of kilometres
- 4.0 = Within 10s of kilometres
- 4.7 = Within 50s of kilometres

Higher taxon

- Vertebrate fauna
- Invertebrate fauna
- Vascular flora
- Nonvascular flora

3.0 SPECIAL AREAS

3.1 MANAGED AREAS

The GIS scan identified 2 managed areas in the vicinity of the study area (Map 3 and attached file: *msa.xls).

3.2 SIGNIFICANT AREAS

The GIS scan identified no biologically significant sites in the vicinity of the study area (Map 3).

Map 3: Boundaries and/or locations of known Managed and Significant Areas within the study area.

4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding "location-sensitive" species, section 4.3) within the study area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
N	*Peltigera hydrothyria*	Eastern Waterfan	Threatened	Threatened	Threatened	S1	1	5.4 ± 0.5
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	2	2.5 ± 3.0
P	*Montia fontana*	Water Blinks				S1	2	5.5 ± 1.0
P	*Tiarella stolonifera*	Stoloniferous Foamflower				S2S3	1	4.1 ± 3.81
P	*Senecio pseudoarnica*	Seabeach Ragwort				S3	1	6.6 ± 1.0
P	*Neottia bifolia*	Southern Twayblade				S3	26	3.3 ± 0.01
P	*Fagus grandifolia*	American Beech				S3S4	2	6.1 ± 0.2
P	*Geocaulon lividum*	Northern Comandra				S3S4	2	4.9 ± 0.01
P	*Triglochin gaspensis*	Gaspé Arrowgrass				S3S4	1	6.3 ± 0.01

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Salmo salar pop. 4*	Atlantic Salmon - Eastern Cape Breton population	Endangered			S1	1	4.9 ± 0.5
A	*Bucephala islandica pop. 1*	Barrow's Goldeneye - Eastern Population	Special Concern	Special Concern		S1N,SUM	1	5.9 ± 0.2
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	1	4.0 ± 7.07
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened	Endangered	S3B	1	4.0 ± 7.07
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Endangered	S3B	2	4.0 ± 0.15
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Special Concern	Threatened	S3B	4	3.4 ± 0.15
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Special Concern	Threatened	S3B	4	2.7 ± 0.15
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3B,S3N,S3M	3	4.0 ± 7.07
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern		S3N,SUM	1	5.9 ± 0.2
A	*Accipiter atricapillus*	American Goshawk	Not At Risk			S3S4	1	4.0 ± 7.07
A	*Mimus polyglottos*	Northern Mockingbird				S1B	1	5.8 ± 0.15
A	*Molothrus ater*	Brown-headed Cowbird				S2B	1	4.0 ± 7.07
A	*Melanitta perspicillata*	Surf Scoter				S2N,S4M	3	5.8 ± 0.2
A	*Asio otus*	Long-eared Owl				S2S3	1	4.0 ± 0.15
A	*Rissa tridactyla*	Black-legged Kittiwake				S2S3B	1	6.6 ± 5.86
A	*Phalacrocorax carbo*	Great Cormorant				S2S3B,S2S3N	2	6.6 ± 3.03
A	*Setophaga pinus*	Pine Warbler				S2S3B,S4S5M	3	5.8 ± 0.2
A	*Icterus galbula*	Baltimore Oriole				S2S3B,SUM	1	5.8 ± 0.2
A	*Perisoreus canadensis*	Canada Jay				S3	2	4.0 ± 7.07
A	*Poecile hudsonicus*	Boreal Chickadee				S3	2	4.0 ± 7.07
A	*Spinus pinus*	Pine Siskin				S3	3	4.0 ± 7.07
A	*Salvelinus fontinalis*	Brook Trout				S3	1	4.9 ± 0.5
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3B	2	2.9 ± 0.15
A	*Mergus serrator*	Red-breasted Merganser				S3B,S4S5N,S5M	1	6.3 ± 0.2
A	*Cardellina pusilla*	Wilson's Warbler				S3B,S5M	1	4.7 ± 0.15
A	*Pinicola enucleator*	Pine Grosbeak				S3B,S5N,S5M	2	2.9 ± 0.15
A	*Chroicocephalus ridibundus*	Black-headed Gull				S3N	2	5.9 ± 0.2
A	*Picoides arcticus*	Black-backed Woodpecker				S3S4	1	4.7 ± 0.2
A	*Loxia curvirostra*	Red Crossbill				S3S4	1	4.0 ± 7.07
A	*Botaurus lentiginosus*	American Bittern				S3S4B,S4S5M	1	4.0 ± 7.07
A	*Setophaga castanea*	Bay-breasted Warbler				S3S4B,S4S5M	2	2.9 ± 0.15
A	*Actitis macularius*	Spotted Sandpiper				S3S4B,S5M	3	4.0 ± 7.07

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Passerella iliaca*	Fox Sparrow				S3S4B,S5M	1	4.0 ± 7.07
A	*Calidris maritima*	Purple Sandpiper				S3S4N	1	2.0 ± 10.0
A	*Morus bassanus*	Northern Gannet				SHB	2	3.3 ± 1.14
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Endangered	S2?B,S3M	1	3.8 ± 0.2

4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below with "YES".

Nova Scotia

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within the Study Site?
Alces alces americana	Moose – Mainland population		Endangered	No
Fraxinus nigra	Black Ash		Threatened	No
Emydoidea blandingii	Blanding's Turtle - Nova Scotia pop.	Endangered	Endangered	No
Glyptemys insculpta	**Wood Turtle**	**Threatened**	**Threatened**	**YES**
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.		Vulnerable	No
Bat Hibernaculum or bat species occurrence		**[Endangered][1]**	**[Endangered][1]**	**YES**
Snake hibernaculum		[Threatened][2]	[Threatened][2]	No

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NS Endangered Species Act.
2 *Thamnophis sauritus* (Eastern Ribbonsnake) is Threatened under the Federal Species at Risk Act (SARA) and the Nova Scotia Endangered Species Act. Occurrences between October 15 – April 15 are considered location sensitive.

4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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1	Rousseau, J. 1938. Notes Floristiques sur l'est de la Nouvelle-Ecosse in Contributions de l'Institut Botanique de l'Universite de Montreal. Universite de Montreal, 32, 13-62. 11 recs.

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 29232 records of 158 vertebrate and 1157 records of 60 invertebrate fauna; 5978 records of 238 vascular and 4018 records of 134 nonvascular flora (attached: *ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs (including "location-sensitive" species). All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Myotis lucifugus*	Little Brown Myotis	Endangered	Endangered	Endangered	S1	67	15.6 ± 0.5	NS
A	*Salmo salar pop. 4*	Atlantic Salmon - Eastern Cape Breton population	Endangered			S1	38	12.9 ± 0.5	NS
A	*Salmo salar pop. 6*	Atlantic Salmon - Nova Scotia Southern Upland population	Endangered			S1	21	16.3 ± 1.0	NS
A	*Eubalaena glacialis*	North Atlantic Right Whale	Endangered	Endangered		S1	1	71.4 ± 1.62	NS
A	*Sterna dougallii*	Roseate Tern	Endangered	Endangered	Endangered	S1B	65	36.3 ± 7.07	NS
A	*Charadrius melodus melodus*	Piping Plover melodus subspecies	Endangered	Endangered		S1B	683	98.6 ± 7.07	PE
A	*Dermochelys coriacea pop. 2*	Leatherback Sea Turtle - Atlantic population	Endangered	Endangered		S1S2N	2	11.5 ± 0.2	NS
A	*Pagophila eburnea*	Ivory Gull	Endangered	Endangered		SNA	1	11.0 ± 0.2	NS
A	*Melanerpes erythrocephalus*	Red-headed Woodpecker	Endangered	Threatened		SNA	1	37.6 ± 0.2	NS
A	*Icteria virens*	Yellow-Breasted Chat	Endangered	Endangered		SNA	1	64.7 ± 0.2	NS
A	*Lasiurus cinereus*	Hoary Bat	Endangered			SUB,S1M	1	85.2 ± 0.2	NS
A	*Lamna nasus pop. 1*	Porbeagle - Northwest Atlantic population	Endangered				1	40.1 ± 1.52	NS
A	*Catharus minimus minimus*	Gray-cheeked Thrush minimus subspecies	Threatened			S1?B	5	45.7 ± 0.15	NS
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Threatened	Endangered	S1B	26	100.0 ± 0.01	NS
A	*Asio flammeus*	Short-eared Owl	Threatened	Special Concern		S1B	9	53.3 ± 0.15	NS
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2	7865	10.1 ± 0.1	NS
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened		S2S3B	675	98.6 ± 7.07	PE
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Endangered	S2S3B,S1M	130	26.4 ± 7.07	NS
A	*Limosa haemastica*	Hudsonian Godwit	Threatened			S2S3M	13	30.7 ± 0.2	NS
A	*Acipenser oxyrinchus*	Atlantic Sturgeon	Threatened			S2S3N	1	82.8 ± 0.5	NS
A	*Hydrobates leucorhous*	Leach's Storm-Petrel	Threatened			S3B	32	11.6 ± 0.2	NS
A	*Tringa flavipes*	Lesser Yellowlegs	Threatened			S3M	269	20.1 ± 0.3	NS
A	*Anguilla rostrata*	American Eel	Threatened			S3N	14	22.8 ± 0.2	NS
A	*Sturnella magna*	Eastern Meadowlark	Threatened	Threatened		SHB	2	36.3 ± 7.07	NS
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened		SUB	8	32.7 ± 7.07	NS
A	*Salmo salar pop. 12*	Atlantic Salmon - Gaspe - Southern Gulf of St. Lawrence population	Special Concern			S1	20	24.4 ± 1.0	NS
A	*Antrostomus vociferus*	Eastern Whip-Poor-Will	Special Concern	Threatened	Threatened	S1?B	3	50.3 ± 7.07	NS
A	*Passerculus sandwichensis princeps*	Ipswich Sparrow	Special Concern	Special Concern		S1B	13	38.3 ± 0.2	NS
A	*Bucephala islandica pop. 1*	Barrow's Goldeneye - Eastern Population	Special Concern	Special Concern		S1N,SUM	21	26.1 ± 0.2	NS
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	247	100.0 ± 4.43	NS
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Special Concern		S2B	1100	98.6 ± 7.07	PE
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened		S2B	832	98.6 ± 7.07	PE
A	*Dolichonyx oryzivorus*	Bobolink	Special Concern	Threatened		S2B	402	98.6 ± 7.07	PE
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern population	Special Concern	Special Concern	Endangered	S2N	38	25.3 ± 16.6	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Balaenoptera physalus pop. 1*	Fin Whale - Atlantic population	Special Concern	Special Concern		S2S3	2	60.6 ± 0.2	NS
A	*Phalaropus lobatus*	Red-necked Phalarope	Special Concern	Special Concern		S2S3M	1	65.0 ± 0.2	NS
A	*Morone saxatilis pop. 1*	Striped Bass - Southern Gulf of St. Lawrence population	Special Concern			S2S3N	1	49.3 ± 1.0	NS
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Vulnerable	S3	147	15.0 ± 0.01	NS
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Endangered	S3B	714	10.0 ± 0.01	NS
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Special Concern	Threatened	S3B	274	10.1 ± 0.15	NS
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern		S3B	505	98.6 ± 7.07	PE
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3B,S3N,S3M	868	13.8 ± 7.07	NS
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern		S3N,SUM	34	12.1 ± 0.2	NS
A	*Phocoena phocoena pop. 1*	Harbour Porpoise - Northwest Atlantic Population	Special Concern			S4	16	11.0 ± 0.2	NS
A	*Chrysemys picta picta*	Eastern Painted Turtle	Special Concern	Special Concern		S4	3	61.1 ± 1.0	NS
A	*Calidris subruficollis*	Buff-breasted Sandpiper	Special Concern	Special Concern		SNA	3	47.0 ± 0.5	NS
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1?B,SUN,SUM	7	28.1 ± 1.52	NS
A	*Fulica americana*	American Coot	Not At Risk			S1B	12	43.1 ± 0.2	NS
A	*Sterna hirundo*	Common Tern	Not At Risk			S1B	632	98.6 ± 7.07	PE
A	*Chlidonias niger*	Black Tern	Not At Risk			S1B	4	36.5 ± 0.05	NS
A	*Falco peregrinus pop. 1*	Peregrine Falcon - anatum/tundrius	Not At Risk		Vulnerable	S1B,SUM	13	12.9 ± 0.15	NS
A	*Sorex dispar gaspensis*	Gaspé Shrew	Not At Risk	Special Concern		S2	9	48.7 ± 0.5	NS
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S2?B,SUM	8	37.8 ± 0.15	NS
A	*Lynx canadensis*	Canada Lynx	Not At Risk		Endangered	S2S3	69	15.9 ± 1.0	NS
A	*Globicephala melas*	Long-finned Pilot Whale	Not At Risk			S2S3	4	67.7 ± 0.43	NS
A	*Hemidactylium scutatum*	Four-toed Salamander	Not At Risk			S3	20	10.2 ± 0.5	NS
A	*Megaptera novaeangliae*	Humpback Whale	Not At Risk			S3	12	11.1 ± 0.2	NS
A	*Sialia sialis*	Eastern Bluebird	Not At Risk			S3B	21	19.4 ± 7.07	NS
A	*Buteo lagopus*	Rough-legged Hawk	Not At Risk			S3N	9	12.4 ± 0.49	NS
A	*Accipiter atricapillus*	American Goshawk	Not At Risk			S3S4	176	14.2 ± 0.2	NS
A	*Lagenorhynchus acutus*	Atlantic White-sided Dolphin	Not At Risk			S3S4	2	11.0 ± 0.2	NS
A	*Ammospiza nelsoni*	Nelson's Sparrow	Not At Risk			S3S4B	120	16.0 ± 7.07	NS
A	*Calidris canutus rufa*	Red Knot rufa subspecies	E,SC	Endangered	Endangered	S2M	33	20.2 ± 0.5	NS
A	*Morone saxatilis*	Striped Bass	E,SC			S2S3B,S2S3N	13	39.0 ± 0.2	NS
A	*Salmo salar*	Atlantic Salmon	E,T,SC			S1B,S1N	13	69.9 ± 0.2	NS
A	*Alces alces americana*	Moose			Endangered	S1	79	15.2 ± 0.01	NS
A	*Alces alces*	Moose				S1	7	61.2 ± 0.2	NS
A	*Picoides dorsalis*	American Three-toed Woodpecker				S1?	7	44.2 ± 0.15	NS
A	*Uria aalge*	Common Murre				S1?B	4	33.2 ± 0.2	NS
A	*Passerina cyanea*	Indigo Bunting				S1?B,SUM	21	33.1 ± 0.6	NS
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1B	2	50.3 ± 7.07	NS
A	*Oxyura jamaicensis*	Ruddy Duck				S1B	7	53.8 ± 0.2	NS
A	*Bartramia longicauda*	Upland Sandpiper				S1B	1	65.1 ± 0.2	NS
A	*Myiarchus crinitus*	Great Crested Flycatcher				S1B	1	65.3 ± 3.42	NS
A	*Mimus polyglottos*	Northern Mockingbird				S1B	19	18.0 ± 7.07	NS
A	*Toxostoma rufum*	Brown Thrasher				S1B	7	35.3 ± 0.15	NS
A	*Charadrius semipalmatus*	Semipalmated Plover				S1B,S4M	360	16.6 ± 0.5	NS
A	*Calidris minutilla*	Least Sandpiper				S1B,S4M	193	13.9 ± 0.05	NS
A	*Larus delawarensis*	Ring-billed Gull				S1B,S5M	2	98.6 ± 7.07	PE
A	*Anas acuta*	Northern Pintail				S1B,SUM	15	39.8 ± 0.2	NS
A	*Vireo gilvus*	Warbling Vireo				S1B,SUM	7	13.8 ± 7.07	NS
A	*Vespertilionidae sp.*	bat species				S1S2	110	10.5 ± 0.1	NS
A	*Vireo philadelphicus*	Philadelphia Vireo				S1S2B,SUM	14	98.6 ± 7.07	PE
A	*Pooecetes gramineus*	Vesper Sparrow				S1S2B,SUM	9	13.8 ± 7.07	NS
A	*Microtus chrotorrhinus*	Rock Vole				S2	12	48.7 ± 0.5	NS
A	*Alca torda*	Razorbill				S2B	32	11.9 ± 0.2	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Cepphus grylle*	Black Guillemot				S2B	1	98.6 ± 7.07	PE
A	*Fratercula arctica*	Atlantic Puffin				S2B	16	59.1 ± 0.34	NS
A	*Empidonax traillii*	Willow Flycatcher				S2B	8	48.5 ± 7.07	NS
A	*Molothrus ater*	Brown-headed Cowbird				S2B	64	100.0 ± 4.43	NS
A	*Somateria mollissima*	Common Eider				S2B,S2N,S4M	501	10.9 ± 0.2	NS
A	*Charadrius vociferus*	Killdeer				S2B,S3M	194	98.6 ± 7.07	PE
A	*Larus argentatus*	Herring Gull				S2B,S5N	1	98.6 ± 7.07	PE
A	*Spatula clypeata*	Northern Shoveler				S2B,SUM	5	42.4 ± 0.5	NS
A	*Mareca strepera*	Gadwall				S2B,SUM	12	27.9 ± 0.2	NS
A	*Piranga olivacea*	Scarlet Tanager				S2B,SUM	9	40.0 ± 7.07	NS
A	*Calidris alba*	Sanderling				S2N,S3M	155	20.2 ± 0.5	NS
A	*Melanitta perspicillata*	Surf Scoter				S2N,S4M	96	12.1 ± 0.2	NS
A	*Melanitta deglandi*	White-winged Scoter				S2N,S4M	34	25.3 ± 16.6	NS
A	*Martes americana*	American Marten			Endangered	S2S3	22	47.9 ± 0.01	NS
A	*Asio otus*	Long-eared Owl				S2S3	26	29.1 ± 7.07	NS
A	*Rallus limicola*	Virginia Rail				S2S3B	9	29.1 ± 7.07	NS
A	*Rissa tridactyla*	Black-legged Kittiwake				S2S3B	38	11.0 ± 0.2	NS
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B	208	100.0 ± 4.43	NS
A	*Phalacrocorax carbo*	Great Cormorant				S2S3B,S2S3N	206	10.8 ± 0.2	NS
A	*Actitis macularius*	Spotted Sandpiper				S2S3B,S4M	840	98.6 ± 7.07	PE
A	*Cathartes aura*	Turkey Vulture				S2S3B,S4S5M	14	33.6 ± 0.5	NS
A	*Setophaga pinus*	Pine Warbler				S2S3B,S4S5M	22	37.9 ± 0.2	NS
A	*Larus marinus*	Great Black-backed Gull				S2S3B,S5N	1	98.6 ± 7.07	PE
A	*Icterus galbula*	Baltimore Oriole				S2S3B,SUM	43	37.5 ± 0.2	NS
A	*Pluvialis dominica*	American Golden-Plover				S2S3M	31	33.2 ± 1.5	NS
A	*Numenius phaeopus hudsonicus*	Whimbrel				S2S3M	82	24.1 ± 0.2	NS
A	*Phalaropus fulicarius*	Red Phalarope				S2S3M	2	65.2 ± 0.36	NS
A	*Perisoreus canadensis*	Canada Jay				S3	675	10.0 ± 0.01	NS
A	*Poecile hudsonicus*	Boreal Chickadee				S3	1351	10.1 ± 0.01	NS
A	*Spinus pinus*	Pine Siskin				S3	657	10.5 ± 7.07	NS
A	*Salvelinus fontinalis*	Brook Trout				S3	81	14.1 ± 0.2	NS
A	*Synaptomys cooperi*	Southern Bog Lemming				S3	4	48.7 ± 0.5	NS
A	*Pekania pennanti*	Fisher				S3	8	18.1 ± 0.01	NS
A	*Calcarius lapponicus*	Lapland Longspur				S3?N,SUM	7	40.2 ± 4.16	NS
A	*Spatula discors*	Blue-winged Teal				S3B	114	21.9 ± 7.07	NS
A	*Tringa semipalmata*	Willet				S3B	656	12.2 ± 7.07	NS
A	*Sterna paradisaea*	Arctic Tern				S3B	104	13.2 ± 7.07	NS
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B	46	24.0 ± 0.5	NS
A	*Tyrannus tyrannus*	Eastern Kingbird				S3B	108	10.7 ± 0.15	NS
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3B	356	13.8 ± 7.07	NS
A	*Alosa pseudoharengus*	Alewife				S3B	41	12.9 ± 0.5	NS
A	*Tringa melanoleuca*	Greater Yellowlegs				S3B,S4M	409	12.3 ± 0.2	NS
A	*Falco sparverius*	American Kestrel				S3B,S4S5M	328	10.5 ± 7.07	NS
A	*Mergus serrator*	Red-breasted Merganser				S3B,S4S5N,S5M	265	10.5 ± 7.07	NS
A	*Gallinago delicata*	Wilson's Snipe				S3B,S5M	658	10.5 ± 7.07	NS
A	*Corthylio calendula*	Ruby-crowned Kinglet				S3B,S5M	1	98.6 ± 7.07	PE
A	*Setophaga striata*	Blackpoll Warbler				S3B,S5M	194	13.2 ± 7.07	NS
A	*Cardellina pusilla*	Wilson's Warbler				S3B,S5M	155	13.2 ± 7.07	NS
A	*Pinicola enucleator*	Pine Grosbeak				S3B,S5N,S5M	201	10.5 ± 1.49	NS
A	*Setophaga tigrina*	Cape May Warbler				S3B,SUM	165	16.4 ± 7.07	NS
A	*Branta bernicla*	Brant				S3M	1	25.3 ± 16.6	NS
A	*Pluvialis squatarola*	Black-bellied Plover				S3M	264	17.6 ± 0.5	NS
A	*Arenaria interpres*	Ruddy Turnstone				S3M	135	12.6 ± 0.2	NS
A	*Calidris pusilla*	Semipalmated Sandpiper				S3M	257	26.5 ± 0.5	NS
A	*Calidris melanotos*	Pectoral Sandpiper				S3M	42	33.2 ± 1.5	NS
A	*Limnodromus griseus*	Short-billed Dowitcher				S3M	129	33.2 ± 22.5	NS
A	*Chroicocephalus ridibundus*	Black-headed Gull				S3N	105	39.2 ± 0.16	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Picoides arcticus*	Black-backed Woodpecker				S3S4	102	10.5 ± 7.07	NS
A	*Loxia curvirostra*	Red Crossbill				S3S4	125	15.3 ± 0.05	NS
A	*Tachycineta bicolor*	Tree Swallow				S3S4B	2	98.6 ± 7.07	PE
A	*Botaurus lentiginosus*	American Bittern				S3S4B,S4S5M	208	18.7 ± 7.07	NS
A	*Setophaga castanea*	Bay-breasted Warbler				S3S4B,S4S5M	393	10.5 ± 7.07	NS
A	*Leiothlypis peregrina*	Tennessee Warbler				S3S4B,S5M	415	10.7 ± 0.15	NS
A	*Passerella iliaca*	Fox Sparrow				S3S4B,S5M	187	18.3 ± 7.07	NS
A	*Bucephala albeola*	Bufflehead				S3S4N	94	12.4 ± 0.49	NS
A	*Calidris maritima*	Purple Sandpiper				S3S4N	32	19.1 ± 11.3	NS
A	*Lanius borealis*	Northern Shrike				S3S4N	20	33.3 ± 1.0	NS
A	*Morus bassanus*	Northern Gannet				SHB	208	10.9 ± 0.2	NS
A	*Aythya americana*	Redhead				SHB	12	53.8 ± 0.2	NS
A	*Leucophaeus atricilla*	Laughing Gull				SHB	6	40.9 ± 0.5	NS
A	*Progne subis*	Purple Martin				SHB	5	59.1 ± 0.34	NS
A	*Eremophila alpestris*	Horned Lark				SHB,S4S5N,S5M	5	61.4 ± 0.53	NS
I	*Bombus bohemicus*	Ashton Cuckoo Bumble Bee	Endangered	Endangered	Endangered	S1	18	44.4 ± 0.5	NS
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Endangered	S2?B,S3M	161	3.8 ± 0.2	NS
I	*Lampsilis cariosa*	Yellow Lampmussel	Special Concern	Special Concern	Threatened	S1	75	91.4 ± 0.1	NS
I	*Alasmidonta varicosa*	Brook Floater	Special Concern	Special Concern	Threatened	S3	9	32.0 ± 0.1	NS
I	*Bombus terricola*	Yellow-banded Bumble Bee	Special Concern	Special Concern	Vulnerable	S3	370	6.8 ± 0.2	NS
I	*Coccinella transversoguttata richardsoni*	Transverse Lady Beetle	Special Concern		Endangered	SH	1	52.3 ± 2.5	NS
I	*Papilio brevicauda*	Short-tailed Swallowtail				S1	1	99.4 ± 1.0	NS
I	*Papilio brevicauda bretonensis*	Short-tailed Swallowtail				S1	11	68.0 ± 2.5	NS
I	*Coenagrion interrogatum*	Subarctic Bluet				S1	1	90.3 ± 0.05	NS
I	*Atlanticoncha ochracea*	Tidewater Mucket				S1	28	88.4 ± 1.45	NS
I	*Polygonia satyrus*	Satyr Comma				S1?	1	67.9 ± 2.5	NS
I	*Euphyes bimacula*	Two-spotted Skipper				S1S2	2	57.2 ± 0.1	NS
I	*Boloria chariclea grandis*	Purple Lesser Fritillary				S1S2	2	71.8 ± 2.5	NS
I	*Haematopota rara*	Shy Cleg				S1S3	1	46.1 ± 0.05	NS
I	*Tharsalea dorcas*	Dorcas Copper				S2	36	32.1 ± 0.01	NS
I	*Tharsalea dospassosi*	Maritime Copper				S2	1	51.9 ± 0.05	NS
I	*Neurocordulia michaeli*	Broad-tailed Shadowdragon				S2	22	71.2 ± 0.05	NS
I	*Somatochlora septentrionalis*	Muskeg Emerald				S2	8	73.2 ± 0.05	NS
I	*Margaritifera margaritifera*	Eastern Pearlshell				S2	149	9.5 ± 0.5	NS
I	*Pantala hymenaea*	Spot-Winged Glider				S2?B	2	77.7 ± 1.0	NS
I	*Nymphalis l-album j-album*	Compton Tortoiseshell				S2S3	2	71.8 ± 2.5	NS
I	*Aglais milberti*	Milbert's Tortoiseshell				S2S3	2	69.4 ± 2.5	NS
I	*Lanthus vernalis*	Southern Pygmy Clubtail				S2S3	8	55.0 ± 0.2	NS
I	*Somatochlora williamsoni*	Williamson's Emerald				S2S3	8	74.9 ± 0.05	NS
I	*Alasmidonta undulata*	Triangle Floater				S2S3	5	23.4 ± 0.25	NS
I	*Sphaeroderus nitidicollis*	Polished Snail-eating Beetle				S3	1	47.6 ± 0.2	NS
I	*Astyleiopus variegatus*	Variegated Long-horned Beetle				S3	1	84.5 ± 0.2	NS
I	*Psephenus herricki*	Herrick's Water Penny Beetle				S3	1	58.5 ± 0.2	NS
I	*Platydracus fossator*	Digging Rove Beetle				S3	2	69.8 ± 0.2	NS
I	*Oxyporus lateralis*	Lateral Cross-toothed Rove Beetle				S3	1	90.7 ± 0.2	NS
I	*Chrysochus auratus*	Dogbane Leaf Beetle				S3	1	69.8 ± 0.2	NS
I	*Naemia seriata*	Seaside Lady Beetle				S3	3	55.2 ± 0.54	NS
I	*Tachyerges ephippiatus*	Caparison Weevil				S3	1	69.8 ± 0.2	NS
I	*Chilocorus stigma*	Twice-stabbed Lady Beetle				S3	1	29.2 ± 0.2	NS
I	*Myzia pullata*	Streaked Lady Beetle				S3	1	78.6 ± 0.2	NS
I	*Iphthiminus opacus*	Cloudy Darkling Beetle				S3	1	34.4 ± 0.01	NS
I	*Monochamus marmorator*	Balsam Fir Sawyer				S3	3	70.4 ± 0.2	NS
I	*Callophrys lanoraieensis*	Bog Elfin				S3	1	95.4 ± 0.2	NS

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I	*Strymon melinus*	Gray Hairstreak				S3	2	25.8 ± 0.1	NS
I	*Phanogomphus descriptus*	Harpoon Clubtail				S3	16	19.9 ± 0.05	NS
I	*Ophiogomphus aspersus*	Brook Snaketail				S3	5	19.9 ± 0.05	NS
I	*Ophiogomphus mainensis*	Maine Snaketail				S3	4	66.9 ± 0.1	NS
I	*Ophiogomphus rupinsulensis*	Rusty Snaketail				S3	36	71.2 ± 0.05	NS
I	*Somatochlora forcipata*	Forcipate Emerald				S3	7	62.6 ± 1.0	NS
I	*Enallagma vernale*	Vernal Bluet				S3	8	17.3 ± 0.05	NS
I	*Polygonia interrogationis*	Question Mark				S3B	19	25.1 ± 0.25	NS
I	*Cecropterus pylades*	Northern Cloudywing				S3S4	14	31.0 ± 0.1	NS
I	*Amblyscirtes hegon*	Pepper and Salt Skipper				S3S4	8	28.6 ± 1.0	NS
I	*Argynnis aphrodite winni*	Aphrodite Fritillary				S3S4	6	48.7 ± 2.5	NS
I	*Polygonia faunus*	Green Comma				S3S4	16	31.6 ± 0.05	NS
I	*Oeneis jutta ascerta*	Jutta Arctic				S3S4	6	29.3 ± 0.01	NS
I	*Aeshna clepsydra*	Mottled Darner				S3S4	3	11.2 ± 0.05	NS
I	*Aeshna constricta*	Lance-Tipped Darner				S3S4	1	78.7 ± 0.2	NS
I	*Boyeria grafiana*	Ocellated Darner				S3S4	10	54.8 ± 0.2	NS
I	*Gomphaeschna furcillata*	Harlequin Darner				S3S4	3	9.6 ± 0.05	NS
I	*Erythrodiplax berenice*	Seaside Dragonlet				S3S4	8	84.4 ± 0.2	NS
I	*Nannothemis bella*	Elfin Skimmer				S3S4	10	9.6 ± 0.05	NS
I	*Sympetrum danae*	Black Meadowhawk				S3S4	9	16.3 ± 0.05	NS
I	*Amphiagrion saucium*	Eastern Red Damsel				S3S4	23	33.6 ± 0.05	NS
I	*Polygonia gracilis*	Hoary Comma				SH	1	69.4 ± 2.5	NS
N	*Erioderma mollissimum*	Graceful Felt Lichen	Endangered	Endangered	Endangered	S1	9	91.2 ± 0.5	NS
N	*Erioderma pedicellatum (Atlantic pop.)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	S1	408	33.3 ± 0.5	NS
N	*Peltigera hydrothyria*	Eastern Waterfan	Threatened	Threatened	Threatened	S1	120	5.4 ± 0.5	NS
N	*Pannaria lurida*	Wrinkled Shingle Lichen	Threatened	Threatened	Threatened	S2S3	292	25.4 ± 0.01	NS
N	*Anzia colpodes*	Black-foam Lichen	Threatened	Threatened	Threatened	S3	5	83.9 ± 1.0	NS
N	*Fuscopannaria leucosticta*	White-rimmed Shingle Lichen	Threatened			S3	2	56.1 ± 0.01	NS
N	*Heterodermia squamulosa*	Scaly Fringe Lichen	Threatened			S3	6	93.8 ± 0.01	NS
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	974	2.5 ± 3.0	NS
N	*Sclerophora peronella (Atlantic pop.)*	Frosted Glass-whiskers (Atlantic population)	Special Concern	Special Concern		S3S4	17	15.5 ± 0.01	NS
N	*Pseudevernia cladonia*	Ghost Antler Lichen	Not At Risk			S2S3	6	39.8 ± 0.01	NS
N	*Fissidens exilis*	Pygmy Pocket Moss	Not At Risk			S3	9	43.3 ± 0.01	NS
N	*Cinclidium stygium*	Sooty Cupola Moss				S1	2	36.0 ± 0.01	NS
N	*Seligeria diversifolia*	a Moss				S1	1	93.4 ± 0.3	NS
N	*Cladonia brevis*	Short Peg Lichen				S1	1	46.9 ± 0.0	NS
N	*Lathagrium cristatum*	Fingered Jelly Lichen				S1	3	50.1 ± 4.0	NS
N	*Scytinium schraderi*	Wrinkled Jellyskin Lichen				S1	1	48.7 ± 1.0	NS
N	*Polychidium muscicola*	Eyed Mossthorns Woollybear Lichen				S1	4	9.0 ± 0.05	NS
N	*Sticta limbata*	Powdered Moon Lichen				S1	2	25.8 ± 2.0	NS
N	*Dermatocarpon miniatum*	Common Stippleback Lichen				S1	1	82.1 ± 0.01	NS
N	*Peltigera lepidophora*	Scaly Pelt Lichen				S1	3	50.3 ± 0.01	NS
N	*Hypogymnia hultenii*	Powdered Honeycomb Lichen				S1	20	30.8 ± 0.5	NS
N	*Jubula pennsylvanica*	a liverwort				S1?	3	29.2 ± 0.2	NS
N	*Eocalypogeia schusteriana*	Schuster's Pouchwort				S1?	2	74.6 ± 0.01	NS
N	*Brachythecium erythrorrhizon*	Taiga Ragged Moss				S1?	4	75.0 ± 0.01	NS
N	*Conardia compacta*	Coast Creeping Moss				S1?	2	52.1 ± 2.0	NS
N	*Oligotrichum hercynicum*	Hercynian Hair Moss				S1?	3	55.4 ± 0.01	NS
N	*Paludella squarrosa*	Tufted Fen Moss				S1?	1	71.1 ± 5.0	NS
N	*Lathagrium undulatum var. granulosum*	Granular Jelly Flakes Lichen				S1?	1	47.2 ± 1.0	NS
N	*Scytinium intermedium*	Forty-five Jellyskin Lichen				S1?	3	48.7 ± 1.0	NS

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N	*Peltigera malacea*	Veinless Pelt Lichen				S1?	1	21.7 ± 0.01	NS
N	*Buxbaumia minakatae*	Hump-Backed Elves				S1S2	1	75.4 ± 100.0	NS
N	*Platydictya confervoides*	a Moss				S1S2	1	96.3 ± 3.0	NS
N	*Hamatocaulis vernicosus*	a Moss				S1S2	1	40.1 ± 0.01	NS
N	*Enchylium bachmanianum*	Bachman's Jelly Lichen				S1S2	2	52.7 ± 1.0	NS
N	*Placidium squamulosum*	Limy Soil Stipplescale Lichen				S1S2	1	50.1 ± 4.0	NS
N	*Cladonia labradorica*	Labrador Lichen				S1S2	1	47.8 ± 0.05	NS
N	*Parmotrema reticulatum*	Netted Ruffle Lichen				S1S2	1	33.4 ± 0.5	NS
N	*Solorina spongiosa*	Fringed Chocolate Chip Lichen				S1S2	11	59.4 ± 0.2	NS
N	*Parmeliella parvula*	Poor-man's Shingles Lichen				S1S2	28	33.4 ± 0.5	NS
N	*Barbilophozia lycopodioides*	Greater Pawwort				S1S3	1	54.5 ± 0.01	NS
N	*Odontoschisma sphagni*	Bog-Moss Flapwort				S1S3	1	69.8 ± 0.01	NS
N	*Xylopsora friesii*	a Lichen				S1S3	1	76.9 ± 0.01	NS
N	*Peltigera neckeri*	Black-saddle Pelt Lichen				S1S3	5	28.2 ± 0.01	NS
N	*Stereocaulon grande*	Grand Foam Lichen				S1S3	1	96.3 ± 0.01	NS
N	*Anacamptodon splachnoides*	a Moss				S2	2	14.2 ± 0.2	NS
N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2	12	32.1 ± 0.01	NS
N	*Sphagnum platyphyllum*	Flat-leaved Peat Moss				S2	4	29.7 ± 0.01	NS
N	*Sphagnum subnitens*	Lustrous Peat Moss				S2	2	49.1 ± 0.01	NS
N	*Scorpidium cossonii*	CossonΓÇÖs Hook Moss				S2	6	30.0 ± 0.01	NS
N	*Scytinium imbricatum*	Scaly Jellyskin Lichen				S2	1	64.9 ± 0.05	NS
N	*Nephroma arcticum*	Arctic Kidney Lichen				S2	3	53.6 ± 0.5	NS
N	*Nephroma resupinatum*	a lichen				S2	2	31.1 ± 0.01	NS
N	*Anaptychia crinalis*	Hanging Fringed Lichen				S2	2	86.5 ± 0.5	NS
N	*Moerckia flotoviana*	Flotow's Ruffwort				S2?	2	74.6 ± 0.01	NS
N	*Riccardia multifida*	Delicate Germanderwort				S2?	2	29.9 ± 0.2	NS
N	*Anomodon viticulosus*	a Moss				S2?	2	52.4 ± 1.0	NS
N	*Atrichum angustatum*	Lesser Smoothcap Moss				S2?	2	55.4 ± 3.0	NS
N	*Drepanocladus polygamus*	Polygamous Hook Moss				S2?	2	46.8 ± 0.01	NS
N	*Pseudocampylium radicale*	Long-stalked Fine Wet Moss				S2?	1	32.1 ± 0.01	NS
N	*Fontinalis sullivantii*	Sullivant's Water Moss				S2?	1	75.4 ± 100.0	NS
N	*Grimmia anomala*	Mountain Forest Grimmia				S2?	1	96.1 ± 0.01	NS
N	*Philonotis marchica*	a Moss				S2?	1	74.1 ± 0.01	NS
N	*Platydictya jungermannioides*	False Willow Moss				S2?	5	43.1 ± 0.01	NS
N	*Tortella fragilis*	Fragile Twisted Moss				S2?	8	46.4 ± 0.01	NS
N	*Cyrtomnium hymenophylloides*	Short-pointed Lantern Moss				S2?	1	78.0 ± 0.01	NS
N	*Platylomella lescurii*	a Moss				S2?	1	60.5 ± 0.2	NS
N	*Scorpidium revolvens*	Limprichtia Moss				S2S3	8	29.3 ± 0.01	NS
N	*Moelleropsis nebulosa*	Blue-gray Moss Shingle Lichen				S2S3	24	47.8 ± 0.05	NS
N	*Moelleropsis nebulosa ssp. frullaniae*	Blue-gray Moss Shingle Lichen				S2S3	1	94.5 ± 0.5	NS
N	*Ramalina thrausta*	Angelhair Ramalina Lichen				S2S3	11	22.6 ± 0.5	NS
N	*Collema leptaleum*	Crumpled Bat's Wing Lichen				S2S3	262	25.5 ± 0.01	NS
N	*Usnea hirta*	Bristly Beard Lichen				S2S3	1	53.1 ± 0.2	NS
N	*Usnea rubicunda*	Red Beard Lichen				S2S3	3	46.0 ± 0.01	NS
N	*Ahtiana aurescens*	Eastern Candlewax Lichen				S2S3	1	90.9 ± 6.33	NS
N	*Cetraria muricata*	Spiny Heath Lichen				S2S3	2	49.0 ± 1.7	NS
N	*Cladonia incrassata*	Powder-foot British Soldiers Lichen				S2S3	1	93.4 ± 0.05	NS
N	*Scytinium tenuissimum*	Birdnest Jellyskin Lichen				S2S3	18	50.0 ± 0.01	NS
N	*Parmelia fertilis*	Fertile Shield Lichen				S2S3	20	25.5 ± 0.01	NS
N	*Parmeliopsis ambigua*	Green Starburst Lichen				S2S3	3	43.6 ± 0.5	NS
N	*Usnea mutabilis*	Bloody Beard Lichen				S2S3	1	32.4 ± 0.5	NS

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N	*Fuscopannaria sorediata*	a Lichen				S2S3	14	12.4 ± 0.03	NS
N	*Stereocaulon condensatum*	Granular Soil Foam Lichen				S2S3	15	27.8 ± 0.01	NS
N	*Cladonia coccifera*	Eastern Boreal Pixie-cup Lichen				S2S3	3	46.6 ± 0.01	NS
N	*Fissidens taxifolius*	Yew-leaved Pocket Moss				S3	3	52.4 ± 0.01	NS
N	*Sphagnum contortum*	Twisted Peat Moss				S3	7	29.7 ± 0.01	NS
N	*Tetraplodon angustatus*	Toothed-leaved Nitrogen Moss				S3	2	10.9 ± 0.01	NS
N	*Tetraplodon mnioides*	Entire-leaved Nitrogen Moss				S3	1	38.7 ± 0.01	NS
N	*Rostania occultata*	Crusted Tarpaper Lichen				S3	4	49.3 ± 5.0	NS
N	*Solorina saccata*	Woodland Owl Lichen				S3	13	9.8 ± 0.05	NS
N	*Fuscopannaria ahlneri*	Roughened Shingle Lichen				S3	108	11.8 ± 0.1	NS
N	*Scytinium lichenoides*	Tattered Jellyskin Lichen				S3	19	9.8 ± 0.2	NS
N	*Leptogium milligranum*	Stretched Jellyskin Lichen				S3	1	21.2 ± 0.01	NS
N	*Nephroma bellum*	Naked Kidney Lichen				S3	15	40.7 ± 1.5	NS
N	*Platismatia norvegica*	Oldgrowth Rag Lichen				S3	196	26.9 ± 0.01	NS
N	*Punctelia appalachensis*	Appalachian Speckleback Lichen				S3	1	26.3 ± 0.01	NS
N	*Viridothelium virens*	a lichen				S3	1	60.7 ± 5.0	NS
N	*Ephebe lanata*	Waterside Rockshag Lichen				S3	3	15.3 ± 0.01	NS
N	*Phaeophyscia pusilloides*	Pompom-tipped Shadow Lichen				S3	5	40.4 ± 0.01	NS
N	*Peltigera collina*	Tree Pelt Lichen				S3	211	10.0 ± 0.01	NS
N	*Cladonia pocillum*	Rosette Pixie-cup Lichen				S3	1	74.6 ± 0.01	NS
N	*Calliergon giganteum*	Giant Spear Moss				S3?	4	49.0 ± 0.01	NS
N	*Mnium stellare*	Star Leafy Moss				S3?	2	75.0 ± 0.01	NS
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S3?	4	39.0 ± 0.01	NS
N	*Sphagnum riparium*	Streamside Peat Moss				S3?	2	55.3 ± 0.01	NS
N	*Cladonia stygia*	Black-footed Reindeer Lichen				S3?	14	21.1 ± 0.2	NS
N	*Dicranum leioneuron*	a Dicranum Moss				S3S4	1	21.3 ± 0.01	NS
N	*Encalypta ciliata*	Fringed Extinguisher Moss				S3S4	1	22.6 ± 2.5	NS
N	*Encalypta procera*	Slender Extinguisher Moss				S3S4	14	47.2 ± 1.0	NS
N	*Splachnum ampullaceum*	Cruet Dung Moss				S3S4	1	45.3 ± 0.01	NS
N	*Thamnobryum alleghaniense*	a Moss				S3S4	26	70.2 ± 0.01	NS
N	*Schistidium agassizii*	Elf Bloom Moss				S3S4	1	73.7 ± 3.0	NS
N	*Hylocomiastrum pyrenaicum*	a Feather Moss				S3S4	1	65.1 ± 3.0	NS
N	*Enchylium tenax*	Soil Tarpaper Lichen				S3S4	14	46.4 ± 0.01	NS
N	*Sticta fuliginosa*	Peppered Moon Lichen				S3S4	20	15.2 ± 0.5	NS
N	*Arctoparmelia incurva*	Finger Ring Lichen				S3S4	17	40.0 ± 0.01	NS
N	*Scytinium teretiusculum*	Curly Jellyskin Lichen				S3S4	3	50.4 ± 0.01	NS
N	*Leptogium acadiense*	Acadian Jellyskin Lichen				S3S4	72	21.0 ± 0.01	NS
N	*Scytinium subtile*	Appressed Jellyskin Lichen				S3S4	17	26.1 ± 0.01	NS
N	*Chaenotheca brachypoda*	a stubble lichen				S3S4	2	72.6 ± 1.17	NS
N	*Cladonia floerkeana*	Gritty British Soldiers Lichen				S3S4	5	47.1 ± 0.01	NS
N	*Vahliella leucophaea*	Shelter Shingle Lichen				S3S4	33	20.1 ± 0.01	NS
N	*Heterodermia speciosa*	Powdered Fringe Lichen				S3S4	34	25.6 ± 0.01	NS
N	*Leptogium corticola*	Blistered Jellyskin Lichen				S3S4	15	32.9 ± 0.01	NS
N	*Melanohalea olivacea*	Spotted Camouflage Lichen				S3S4	3	75.5 ± 0.5	NS
N	*Parmeliopsis hyperopta*	Gray Starburst Lichen				S3S4	2	43.6 ± 0.5	NS
N	*Parmotrema perlatum*	Powdered Ruffle Lichen				S3S4	1	93.9 ± 0.01	NS
N	*Peltigera hymenina*	Cloudy Pelt Lichen				S3S4	2	14.7 ± 0.5	NS
N	*Sphaerophorus fragilis*	Fragile Coral Lichen				S3S4	1	41.0 ± 0.2	NS
N	*Sclerophora peronella*	Frosted Glass-whiskers Lichen				S3S4	3	15.6 ± 0.01	NS
N	*Coccocarpia palmicola*	Salted Shell Lichen				S3S4	498	31.1 ± 0.1	NS
N	*Physcia tenella*	Fringed Rosette Lichen				S3S4	1	95.7 ± 3.5	NS
N	*Anaptychia palmulata*	Shaggy Fringed Lichen				S3S4	125	21.0 ± 0.01	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
N	*Evernia prunastri*	Valley Oakmoss Lichen				S3S4	8	45.7 ± 0.01	NS
N	*Heterodermia neglecta*	Fringe Lichen				S3S4	67	9.5 ± 0.01	NS
P	*Clethra alnifolia*	Coast Pepper-Bush	Endangered	Threatened	Vulnerable	S2	2	75.5 ± 0.2	NS
P	*Fraxinus nigra*	Black Ash	Threatened		Threatened	S1S2	432	13.4 ± 0.01	NS
P	*Juncus caesariensis*	New Jersey Rush	Special Concern	Special Concern	Vulnerable	S3	246	44.3 ± 0.1	NS
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Vulnerable	S3	2	98.8 ± 0.05	NS
P	*Floerkea proserpinacoides*	False Mermaidweed	Not At Risk			S2S3	28	12.2 ± 7.07	NS
P	*Salix candida*	Sage Willow			Endangered	S1	57	59.5 ± 0.01	NS
P	*Arnica lonchophylla*	Northern Arnica				S1	1	21.9 ± 7.07	NS
P	*Betula minor*	Dwarf White Birch				S1	1	68.6 ± 0.01	NS
P	*Cardamine dentata*	Toothed Bittercress				S1	4	28.7 ± 0.5	NS
P	*Cochlearia tridactylites*	Limestone Scurvy-grass				S1	4	42.4 ± 0.1	NS
P	*Draba norvegica*	Norwegian Whitlow-Grass				S1	1	95.7 ± 2.5	NS
P	*Stellaria crassifolia*	Fleshy Stitchwort				S1	1	36.5 ± 2.0	NS
P	*Hudsonia tomentosa*	Woolly Beach-heath				S1	7	40.7 ± 1.7	NS
P	*Bistorta vivipara*	Alpine Bistort				S1	1	31.9 ± 1.0	NS
P	*Montia fontana*	Water Blinks				S1	2	5.5 ± 3.0	NS
P	*Agalinis tenuifolia*	Slender Agalinis				S1	1	41.4 ± 0.01	NS
P	*Scrophularia lanceolata*	Lance-leaved Figwort				S1	2	25.3 ± 1.5	NS
P	*Carex alopecoidea*	Foxtail Sedge				S1	4	38.8 ± 0.2	NS
P	*Carex granularis*	Limestone Meadow Sedge				S1	21	31.9 ± 0.01	NS
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S1	2	44.1 ± 0.5	NS
P	*Carex tincta*	Tinged Sedge				S1	2	38.8 ± 0.2	NS
P	*Carex viridula ssp. brachyrrhyncha*	Greenish Sedge				S1	1	46.4 ± 0.01	NS
P	*Carex viridula var. elatior*	Greenish Sedge				S1	59	28.5 ± 0.01	NS
P	*Carex grisea*	Inflated Narrow-leaved Sedge				S1	6	48.7 ± 0.01	NS
P	*Cyperus lupulinus ssp. macilentus*	Hop Flatsedge				S1	15	39.8 ± 0.01	NS
P	*Eleocharis erythropoda*	Red-stemmed Spikerush				S1	7	40.1 ± 0.01	NS
P	*Rhynchospora capillacea*	Slender Beakrush				S1	8	51.3 ± 10.0	NS
P	*Scirpus atrovirens*	Dark-green Bulrush				S1	3	46.3 ± 0.01	NS
P	*Iris prismatica*	Slender Blue Flag				S1	4	65.0 ± 0.1	NS
P	*Triantha glutinosa*	Sticky False-Asphodel				S1	18	59.4 ± 0.01	NS
P	*Malaxis monophyllos var. brachypoda*	North American White Adder's-mouth				S1	1	19.4 ± 7.07	NS
P	*Calamagrostis stricta ssp. inexpansa*	Slim-stemmed Reed Grass				S1	3	21.0 ± 0.01	NS
P	*Torreyochloa pallida var. pallida*	Pale False Manna Grass				S1	2	83.8 ± 1.5	NS
P	*Graphephorum melicoides*	Purple False Oats				S1	2	89.6 ± 0.01	NS
P	*Potamogeton nodosus*	Long-leaved Pondweed				S1	1	87.0 ± 5.0	NS
P	*Sparganium androcladum*	Branching Bur-Reed				S1	3	37.3 ± 1.0	NS
P	*Dryopteris goldieana*	Goldie's Woodfern				S1	4	70.3 ± 0.2	NS
P	*Equisetum palustre*	Marsh Horsetail				S1	8	50.3 ± 0.01	NS
P	*Botrychium ascendens*	Upswept Moonwort				S1	1	55.4 ± 0.2	NS
P	*Bolboschoenus robustus*	Sturdy Bulrush				S1?	2	68.9 ± 5.0	NS
P	*Allium schoenoprasum*	Wild Chives				S1?	1	68.8 ± 0.2	NS
P	*Allium schoenoprasum var. sibiricum*	Wild Chives				S1?	3	22.5 ± 7.07	NS
P	*Huperzia selago*	Northern Firmoss				S1?	4	82.1 ± 0.01	NS
P	*Sanicula odorata*	Clustered Sanicle				S1S2	8	22.2 ± 0.5	NS
P	*Ageratina altissima*	White Snakeroot				S1S2	2	48.5 ± 7.07	NS
P	*Cornus suecica*	Swedish Bunchberry				S1S2	5	39.6 ± 6.0	NS
P	*Anemone virginiana var. alba*	Virginia Anemone				S1S2	6	45.8 ± 1.5	NS
P	*Parnassia parviflora*	Small-flowered Grass-of-				S1S2	18	54.5 ± 1.2	NS

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P	*Carex haydenii*	Parnassus Hayden's Sedge				S1S2	3	34.5 ± 0.05	NS
P	*Platanthera huronensis*	Fragrant Green Orchid				S1S2	12	15.4 ± 0.2	NS
P	*Calamagrostis stricta ssp. stricta*	Slim-stemmed Reed Grass				S1S2	1	71.2 ± 1.0	NS
P	*Selaginella selaginoides*	Low Spikemoss				S1S2	5	39.8 ± 0.8	NS
P	*Carex vacillans*	Estuarine Sedge				S1S3	3	38.9 ± 0.5	NS
P	*Zizia aurea*	Golden Alexanders				S2	13	42.1 ± 5.0	NS
P	*Rudbeckia laciniata*	Cut-Leaved Coneflower				S2	2	48.5 ± 7.07	NS
P	*Arabis pycnocarpa*	Cream-flowered Rockcress				S2	1	97.9 ± 0.1	NS
P	*Anemonastrum canadense*	Canada Anemone				S2	3	20.2 ± 3.0	NS
P	*Ranunculus sceleratus*	Cursed Buttercup				S2	1	74.6 ± 7.07	NS
P	*Comandra umbellata*	Bastard's Toadflax				S2	43	39.4 ± 0.01	NS
P	*Carex gynocrates*	Northern Bog Sedge				S2	15	32.4 ± 0.01	NS
P	*Carex livida*	Livid Sedge				S2	24	34.8 ± 5.0	NS
P	*Juncus greenei*	Greene's Rush				S2	1	40.8 ± 1.5	NS
P	*Juncus alpinoarticulatus ssp. americanus*	Northern Green Rush				S2	11	26.9 ± 1.0	NS
P	*Luzula spicata*	Spiked Woodrush				S2	1	48.8 ± 0.01	NS
P	*Lilium canadense*	Canada Lily				S2	43	8.8 ± 0.01	NS
P	*Cypripedium parviflorum var. pubescens*	Yellow Lady's-slipper				S2	39	9.1 ± 7.07	NS
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	17	17.6 ± 0.01	NS
P	*Cypripedium reginae*	Showy Lady's-Slipper				S2	410	19.9 ± 0.2	NS
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S2	1	23.7 ± 1.5	NS
P	*Platanthera macrophylla*	Large Round-Leaved Orchid				S2	6	17.9 ± 1.67	NS
P	*Bromus latiglumis*	Broad-Glumed Brome				S2	11	9.4 ± 0.01	NS
P	*Cinna arundinacea*	Sweet Wood Reed Grass				S2	24	8.9 ± 0.01	NS
P	*Elymus wiegandii*	Wiegand's Wild Rye				S2	9	13.3 ± 0.01	NS
P	*Sparganium hyperboreum*	Northern Burreed				S2	4	50.3 ± 0.1	NS
P	*Cryptogramma stelleri*	Steller's Rockbrake				S2	17	45.7 ± 0.01	NS
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S2?	7	38.5 ± 7.07	NS
P	*Rumex persicarioides*	Peach-leaved Dock				S2?	1	59.2 ± 0.01	NS
P	*Crataegus submollis*	Quebec Hawthorn				S2?	2	68.5 ± 7.07	NS
P	*Thuja occidentalis*	Eastern White Cedar			Vulnerable	S2S3	8	42.7 ± 0.2	NS
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2S3	20	30.0 ± 1.0	NS
P	*Bidens hyperborea*	Estuary Beggarticks				S2S3	3	49.1 ± 1.0	NS
P	*Erigeron philadelphicus*	Philadelphia Fleabane				S2S3	15	40.0 ± 7.07	NS
P	*Impatiens pallida*	Pale Jewelweed				S2S3	29	14.0 ± 1.0	NS
P	*Caulophyllum thalictroides*	Blue Cohosh				S2S3	26	13.4 ± 0.01	NS
P	*Draba arabisans*	Rock Whitlow-Grass				S2S3	3	47.5 ± 1.6	NS
P	*Boechera stricta*	Drummond's Rockcress				S2S3	2	93.6 ± 1.0	NS
P	*Stellaria humifusa*	Saltmarsh Starwort				S2S3	4	86.1 ± 0.1	NS
P	*Oxybasis rubra*	Red Goosefoot				S2S3	3	50.3 ± 7.07	NS
P	*Hypericum majus*	Large St John's-wort				S2S3	5	52.5 ± 0.01	NS
P	*Hypericum x dissimulatum*	Disguised St. John's-wort				S2S3	2	32.0 ± 1.0	NS
P	*Empetrum atropurpureum*	Purple Crowberry				S2S3	1	37.6 ± 3.0	NS
P	*Euphorbia polygonifolia*	Seaside Spurge				S2S3	15	24.1 ± 0.01	NS
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S2S3	4	18.7 ± 7.07	NS
P	*Hedeoma pulegioides*	American False Pennyroyal				S2S3	1	64.8 ± 5.0	NS
P	*Oenothera fruticosa ssp. tetragona*	Narrow-leaved Evening Primrose				S2S3	1	68.2 ± 1.5	NS
P	*Polygonum aviculare ssp. buxiforme*	Box Knotweed				S2S3	1	94.4 ± 7.07	NS
P	*Polygonum oxyspermum ssp. raii*	Ray's Knotweed				S2S3	9	30.2 ± 1.0	NS

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P	*Rumex triangulivalvis*	Triangular-valve Dock				S2S3	9	8.5 ± 6.0	NS
P	*Anemone quinquefolia*	Wood Anemone				S2S3	16	69.1 ± 1.5	NS
P	*Caltha palustris*	Yellow Marsh Marigold				S2S3	32	53.5 ± 1.5	NS
P	*Amelanchier fernaldii*	Fernald's Serviceberry				S2S3	3	41.9 ± 1.0	NS
P	*Potentilla canadensis*	Canada Cinquefoil				S2S3	1	12.0 ± 2.6	NS
P	*Salix pellita*	Satiny Willow				S2S3	6	6.9 ± 1.6	NS
P	*Tiarella stolonifera*	Stoloniferous Foamflower				S2S3	1	4.1 ± 3.81	NS
P	*Agalinis purpurea var. parviflora*	Small-flowered Purple False Foxglove				S2S3	8	31.6 ± 0.01	NS
P	*Carex adusta*	Lesser Brown Sedge				S2S3	2	38.9 ± 4.5	NS
P	*Carex comosa*	Bearded Sedge				S2S3	1	73.9 ± 1.5	NS
P	*Carex hystericina*	Porcupine Sedge				S2S3	37	30.6 ± 0.01	NS
P	*Carex scirpoidea*	Scirpuslike Sedge				S2S3	2	98.2 ± 4.0	NS
P	*Eleocharis ovata*	Ovate Spikerush				S2S3	2	40.6 ± 0.01	NS
P	*Scirpus pedicellatus*	Stalked Bulrush				S2S3	9	9.7 ± 0.01	NS
P	*Spiranthes casei var. novaescotiae*	Case's Ladies'-Tresses				S2S3	3	59.5 ± 0.2	NS
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S2S3	27	41.6 ± 0.01	NS
P	*Potamogeton friesii*	Fries' Pondweed				S2S3	7	14.4 ± 0.01	NS
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S2S3	6	45.2 ± 10.0	NS
P	*Woodsia glabella*	Smooth Cliff Fern				S2S3	6	45.2 ± 7.07	NS
P	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort				S2S3	7	30.7 ± 0.2	NS
P	*Botrychium simplex*	Least Moonwort				S2S3	3	37.2 ± 5.0	NS
P	*Ophioglossum pusillum*	Northern Adder's-tongue				S2S3	1	93.6 ± 5.0	NS
P	*Angelica atropurpurea*	Purple-stemmed Angelica				S3	27	8.0 ± 0.01	NS
P	*Hieracium robinsonii*	Robinson's Hawkweed				S3	3	93.2 ± 1.6	NS
P	*Senecio pseudoarnica*	Seabeach Ragwort				S3	22	6.6 ± 1.0	NS
P	*Symphyotrichum boreale*	Boreal Aster				S3	67	28.5 ± 0.01	NS
P	*Symphyotrichum ciliolatum*	Fringed Blue Aster				S3	3	31.2 ± 0.01	NS
P	*Betula michauxii*	Michaux's Dwarf Birch				S3	14	53.7 ± 0.01	NS
P	*Betula pumila*	Bog Birch				S3	11	31.6 ± 0.01	NS
P	*Palustricodon aparinoides*	Marsh Bellflower				S3	5	43.3 ± 5.0	NS
P	*Lobelia kalmii*	Brook Lobelia				S3	100	24.8 ± 0.01	NS
P	*Sagina nodosa*	Knotted Pearlwort				S3	3	37.3 ± 5.0	NS
P	*Stellaria longifolia*	Long-leaved Starwort				S3	1	13.8 ± 0.01	NS
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S3	202	30.4 ± 0.01	NS
P	*Viburnum edule*	Squashberry				S3	2	96.2 ± 7.07	NS
P	*Crassula aquatica*	Water Pygmyweed				S3	4	31.8 ± 7.07	NS
P	*Empetrum eamesii*	Pink Crowberry				S3	1	83.9 ± 0.01	NS
P	*Vaccinium uliginosum*	Alpine Bilberry				S3	3	74.8 ± 0.5	NS
P	*Halenia deflexa*	Spurred Gentian				S3	24	15.9 ± 0.01	NS
P	*Geranium bicknellii*	Bicknell's Crane's-bill				S3	1	66.4 ± 0.2	NS
P	*Myriophyllum verticillatum*	Whorled Water Milfoil				S3	5	28.6 ± 0.01	NS
P	*Utricularia resupinata*	Inverted Bladderwort				S3	1	55.8 ± 0.8	NS
P	*Epilobium densum*	Downy Willowherb				S3	21	8.5 ± 5.0	NS
P	*Polygala sanguinea*	Blood Milkwort				S3	9	47.3 ± 0.01	NS
P	*Persicaria arifolia*	Halberd-leaved Tearthumb				S3	8	32.5 ± 0.01	NS
P	*Plantago rugelii*	Rugel's Plantain				S3	1	41.4 ± 0.01	NS
P	*Primula laurentiana*	Laurentian Primrose				S3	1	89.5 ± 7.07	NS
P	*Samolus parviflorus*	Seaside Brookweed				S3	23	35.1 ± 0.01	NS
P	*Pyrola minor*	Lesser Pyrola				S3	10	46.0 ± 2.0	NS
P	*Anemone virginiana*	Virginia Anemone				S3	30	41.5 ± 0.01	NS
P	*Galium kamtschaticum*	Northern Wild Licorice				S3	14	40.6 ± 0.2	NS
P	*Galium labradoricum*	Labrador Bedstraw				S3	100	28.5 ± 0.01	NS
P	*Salix pedicellaris*	Bog Willow				S3	12	31.3 ± 0.01	NS
P	*Salix sericea*	Silky Willow				S3	1	69.2 ± 0.01	NS

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P	*Saxifraga paniculata ssp. laestadii*	Laestadius' Saxifrage				S3	5	43.7 ± 7.07	NS
P	*Lindernia dubia*	Yellow-seeded False Pimperel				S3	4	13.1 ± 0.01	NS
P	*Laportea canadensis*	Canada Wood Nettle				S3	19	9.2 ± 0.01	NS
P	*Pilea pumila*	Dwarf Clearweed				S3	1	89.5 ± 6.0	NS
P	*Viola nephrophylla*	Northern Bog Violet				S3	10	15.0 ± 0.01	NS
P	*Carex bebbii*	Bebb's Sedge				S3	35	34.7 ± 0.01	NS
P	*Carex castanea*	Chestnut Sedge				S3	19	28.6 ± 0.01	NS
P	*Carex cryptolepis*	Hidden-scaled Sedge				S3	16	11.3 ± 0.7	NS
P	*Carex eburnea*	Bristle-leaved Sedge				S3	176	47.7 ± 0.01	NS
P	*Carex hirtifolia*	Pubescent Sedge				S3	11	13.3 ± 0.01	NS
P	*Carex lupulina*	Hop Sedge				S3	10	50.3 ± 0.01	NS
P	*Carex rosea*	Rosy Sedge				S3	6	44.9 ± 0.01	NS
P	*Carex tenera*	Tender Sedge				S3	3	22.7 ± 1.0	NS
P	*Carex tribuloides*	Blunt Broom Sedge				S3	14	13.9 ± 1.0	NS
P	*Carex tuckermanii*	Tuckerman's Sedge				S3	2	74.9 ± 0.01	NS
P	*Carex atratiformis*	Scabrous Black Sedge				S3	2	45.2 ± 7.07	NS
P	*Eleocharis flavescens var. olivacea*	Bright-green Spikerush				S3	3	54.3 ± 5.0	NS
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S3	34	32.5 ± 0.01	NS
P	*Eriophorum gracile*	Slender Cottongrass				S3	8	32.2 ± 0.01	NS
P	*Schoenoplectus americanus*	Olney's Bulrush				S3	1	48.8 ± 0.01	NS
P	*Juncus stygius ssp. americanus*	Moor Rush				S3	31	39.7 ± 1.0	NS
P	*Oreojuncus trifidus*	Highland Rush				S3	2	48.5 ± 0.75	NS
P	*Cypripedium parviflorum*	Yellow Lady's-slipper				S3	168	12.4 ± 0.2	NS
P	*Goodyera oblongifolia*	Menzies' Rattlesnake-plantain				S3	13	73.7 ± 10.0	NS
P	*Neottia bifolia*	Southern Twayblade				S3	56	3.3 ± 0.01	NS
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	57	8.8 ± 0.01	NS
P	*Platanthera hookeri*	Hooker's Orchid				S3	3	8.3 ± 0.1	NS
P	*Poa glauca*	Glaucous Blue Grass				S3	11	45.7 ± 0.01	NS
P	*Stuckenia filiformis*	Thread-leaved Pondweed				S3	43	8.6 ± 0.01	NS
P	*Potamogeton praelongus*	White-stemmed Pondweed				S3	16	23.6 ± 0.1	NS
P	*Potamogeton richardsonii*	Richardson's Pondweed				S3	10	14.8 ± 0.01	NS
P	*Potamogeton zosteriformis*	Flat-stemmed Pondweed				S3	10	54.9 ± 7.07	NS
P	*Asplenium viride*	Green Spleenwort				S3	30	17.0 ± 0.01	NS
P	*Dryopteris fragrans*	Fragrant Wood Fern				S3	2	10.5 ± 7.07	NS
P	*Polystichum lonchitis*	Northern Holly Fern				S3	5	26.9 ± 5.0	NS
P	*Sceptridium dissectum*	Dissected Moonwort				S3	2	71.1 ± 1.0	NS
P	*Polypodium appalachianum*	Appalachian Polypody				S3	13	20.1 ± 0.01	NS
P	*Persicaria amphibia var. emersa*	Long-root Smartweed				S3?	1	62.0 ± 0.01	NS
P	*Spiranthes ochroleuca*	Yellow Ladies'-tresses				S3?	36	14.9 ± 0.2	NS
P	*Diphasiastrum x sabinifolium*	Savin-leaved Ground-cedar				S3?	12	47.8 ± 1.0	NS
P	*Erigeron hyssopifolius*	Hyssop-leaved Fleabane				S3S4	88	48.3 ± 0.01	NS
P	*Hieracium paniculatum*	Panicled Hawkweed				S3S4	1	78.9 ± 0.2	NS
P	*Bidens beckii*	Water Beggarticks				S3S4	9	54.7 ± 0.5	NS
P	*Packera paupercula*	Balsam Groundsel				S3S4	180	9.7 ± 0.2	NS
P	*Atriplex glabriuscula var. franktonii*	Frankton's Saltbush				S3S4	5	6.4 ± 0.01	NS
P	*Shepherdia canadensis*	Soapberry				S3S4	171	50.0 ± 0.01	NS
P	*Vaccinium boreale*	Northern Blueberry				S3S4	19	41.9 ± 1.0	NS
P	*Vaccinium cespitosum*	Dwarf Bilberry				S3S4	22	70.6 ± 0.01	NS
P	*Vaccinium corymbosum*	Highbush Blueberry				S3S4	2	90.0 ± 0.2	NS
P	*Fagus grandifolia*	American Beech				S3S4	579	6.1 ± 0.2	NS
P	*Bartonia virginica*	Yellow Bartonia				S3S4	1	33.0 ± 0.1	NS

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P	*Decodon verticillatus*	Swamp Loosestrife				S3S4	5	30.5 ± 7.07	NS
P	*Persicaria pensylvanica*	Pennsylvania Smartweed				S3S4	11	8.7 ± 1.0	NS
P	*Fallopia scandens*	Climbing False Buckwheat				S3S4	18	9.1 ± 0.01	NS
P	*Rumex pallidus*	Seabeach Dock				S3S4	1	50.0 ± 0.01	NS
P	*Pyrola asarifolia*	Pink Pyrola				S3S4	10	34.8 ± 0.01	NS
P	*Endotropis alnifolia*	Alder-leaved Buckthorn				S3S4	511	9.6 ± 0.01	NS
P	*Amelanchier spicata*	Running Serviceberry				S3S4	7	9.6 ± 0.01	NS
P	*Fragaria vesca ssp. americana*	Woodland Strawberry				S3S4	72	15.9 ± 0.01	NS
P	*Fragaria vesca*	Woodland Strawberry				S3S4	3	53.7 ± 1.53	NS
P	*Galium aparine*	Common Bedstraw				S3S4	3	49.0 ± 0.01	NS
P	*Geocaulon lividum*	Northern Comandra				S3S4	83	4.9 ± 0.01	NS
P	*Limosella australis*	Southern Mudwort				S3S4	4	40.8 ± 5.0	NS
P	*Ulmus americana*	White Elm				S3S4	111	8.0 ± 3.0	NS
P	*Verbena hastata*	Blue Vervain				S3S4	43	40.3 ± 0.2	NS
P	*Viola selkirkii*	Great-Spurred Violet				S3S4	1	8.9 ± 1.0	NS
P	*Carex argyrantha*	Silvery-flowered Sedge				S3S4	1	63.4 ± 0.5	NS
P	*Triglochin gaspensis*	Gaspé Arrowgrass				S3S4	6	6.3 ± 0.01	NS
P	*Juncus acuminatus*	Sharp-Fruit Rush				S3S4	4	43.6 ± 0.01	NS
P	*Juncus subcaudatus*	Woods-Rush				S3S4	9	39.3 ± 0.01	NS
P	*Luzula parviflora ssp. melanocarpa*	Black-fruited Woodrush				S3S4	13	71.7 ± 5.0	NS
P	*Goodyera repens*	Lesser Rattlesnake-plantain				S3S4	23	14.8 ± 0.01	NS
P	*Liparis loeselii*	Loesel's Twayblade				S3S4	20	12.5 ± 0.01	NS
P	*Platanthera obtusata*	Blunt-leaved Orchid				S3S4	10	10.5 ± 10.0	NS
P	*Platanthera orbiculata*	Small Round-leaved Orchid				S3S4	8	25.5 ± 0.01	NS
P	*Alopecurus aequalis*	Short-awned Foxtail				S3S4	17	14.4 ± 0.01	NS
P	*Dichanthelium clandestinum*	Deer-tongue Panic Grass				S3S4	97	70.6 ± 0.01	NS
P	*Panicum philadelphicum*	Philadelphia Panicgrass				S3S4	1	24.9 ± 0.01	NS
P	*Koeleria spicata*	Narrow False Oats				S3S4	5	48.9 ± 0.01	NS
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S3S4	12	8.3 ± 0.2	NS
P	*Equisetum pratense*	Meadow Horsetail				S3S4	22	30.5 ± 0.01	NS
P	*Diphasiastrum complanatum*	Northern Ground-cedar				S3S4	7	30.5 ± 5.0	NS
P	*Diphasiastrum sitchense*	Sitka Ground-cedar				S3S4	32	9.4 ± 0.01	NS
P	*Huperzia appressa*	Mountain Firmoss				S3S4	2	46.3 ± 1.0	NS
P	*Sceptridium multifidum*	Leathery Moonwort				S3S4	6	34.5 ± 10.0	NS
P	*Botrychium matricariifolium*	Daisy-leaved Moonwort				S3S4	6	13.8 ± 10.0	NS
P	*Viola canadensis*	Canada Violet				SH	1	50.1 ± 0.25	NS

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The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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Appendix G ARIA Acceptance Letter

NOVA SCOTIA
Communities, Culture, Tourism and Heritage
Special Places Protection

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July 9, 2025

Jonathan Kyte
Stantec Consulting
40 Highfield Park Drive #102
Dartmouth, NS
B3A 0A3

Dear Jonathan Kyte:

RE: Heritage Research Permit Report
A2024NS103 – Landrie Lake Water Utility ARIA

We have received and reviewed the report on work conducted under the terms of Heritage Research Permit A2024NS103 – Landrie Lake Water Utility ARIA, in Richmond County, Nova Scotia.

The Landrie Lake Water Utility, c/o the Town of Port Hawkesbury plans to reinstate the Little River Transfer Pumphouse (LRTP) and enhance yield at the Landrie Lake Industrial Water Utility located in Point Tupper, Richmond County, Nova Scotia. The proposed development area is approximately 2.6 km long and its adjoining access road runs for an additional 2 km. The assessment area's width is 20 m. Stantec Consulting (Stantec) was retained to conduct an archaeological resource impact assessment (ARIA) for the proposed development area. This ARIA involved Mi'kmaq engagement, background study, predictive modeling, and field reconnaissance.

Background study indicated that the surrounding area has been occupied by the Mi'kmaq for millennia, long prior to the arrival of Europeans. European settlement in the area began in the 17th-century. There are sixteen registered archaeological sites within 5 km of the proposed development area, all dating to within the historic period. Field reconnaissance showed the proposed development areas to be characterized by undulating and low, sloping and saturated terrain. Evidence of disturbance from past impact activities was observed. The current water levels at Landrie Lake and Little River were altered when both Sea Coal Brook and the Little River were dammed and do not reflect past shorelines. No areas of moderate to high archaeological potential, significant archaeological features, or cultural materials were identified during the assessment, and the proposed area was ascribed low archaeological potential.

Based on the above Stantec recommended that the water utility and access road will not require any future additional mitigation. If the boundaries of the PDA change or expand, then then another ARIA will need to be completed.

CCH Staff have reviewed the report and find it acceptable as submitted. Please do not hesitate to contact me with any questions or concerns.

Sincerely,

John Cormier
Coordinator, Special Places