APPENDIX

A PUBLIC CONSULTATION

Notice of Commencement

In order for the Municipality of Northern Bruce Peninsula to provide accessible and reliable services to its residents and to continue to grow and flourish, there is a strong need for expanded municipal drinking water and wastewater servicing. Within the Municipality, existing drinking water and wastewater services within the communities of Tobermory and Lion's Head are not meeting the current needs of the population. In particular, Tobermory has limited drinking water service and sewer service, and the Lion's Head Drinking Water System currently provides limited servicing and has no wastewater service or wastewater treatment facilities. As a result, the Ontario Clean Water Agency (OCWA) is undertaking two Municipal Class Environmental Assessment (MCEA) studies on behalf of the Municipality of Northern Bruce Peninsula to develop Water and Wastewater Master Plans for the communities.

The Water and Wastewater Master Plan studies will make recommendations on how the Municipality can expand municipal drinking water and wastewater servicing throughout Tobermory and Lion's Head, based on existing conditions, projected growth and climate risks. Each Master Plan will also identify necessary projects and implementation schedules to ensure timely phasing of future capital projects.

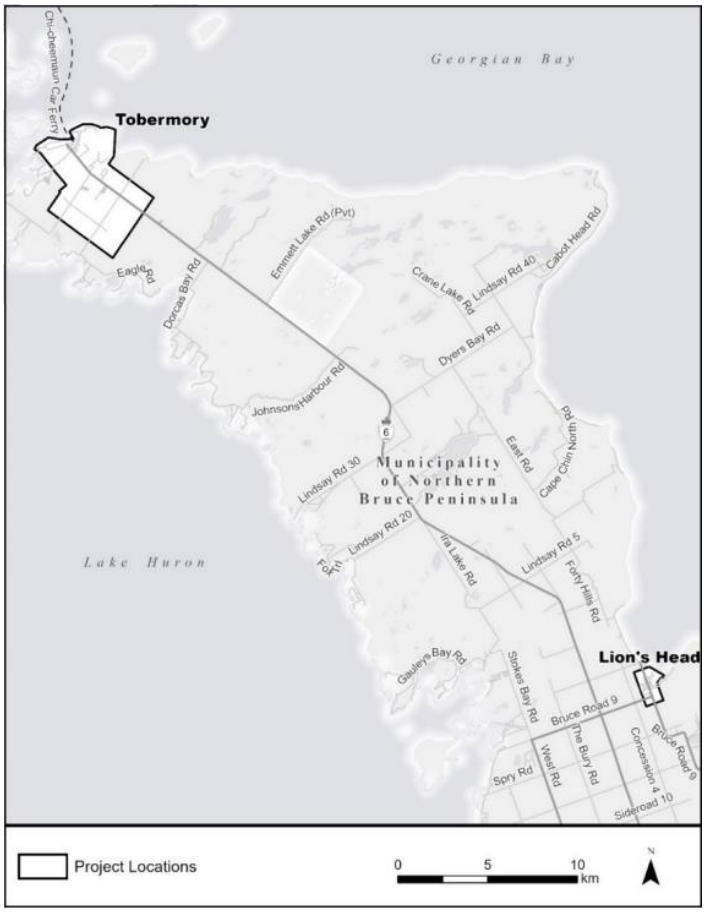
The Municipal Class Environmental Assessment Process

The Master Plan studies are being conducted in accordance with the requirements of Phase 1 and 2 of the Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011, 2015, 2023, and 2024). The Master Plan studies will address future servicing alternative solutions for drinking water and wastewater infrastructure in Tobermory and Lion's Head.

Public Information Centres

As part of the studies, Public Information Centres (PIC) are being planned for each community.

Each PIC will introduce the public to the Master Plan study and MCEA process, the existing infrastructure and problem and opportunity statement, the evaluation criteria, the alternative solutions and the preliminary preferred solution for both drinking water and wastewater services. Notifications will be provided in the near future for each PIC, to be completed in 2025.



How to Get Involved

Please direct comments or questions to the Project Team contact information provided below. For additional information about these studies or to be included on the study mailing list, please contact a Project Team member, or visit the project website: https://letstalknbp.ca.

Peggy Van Mierlo-West
Chief Administrative Officer
Municipality of Northern Bruce Peninsula
Email: admin@northernbruce.ca
56 Lindsay Road 5,
Lion's Head, ON N0H 1W0

Allison Mokracki, P.Eng.
Municipality Project Manager
OCWA
Phone: 1-905-491-3048
Email: amokracki@ocwa.com
2085 Hurontario Street, Suite 500, Mississauga, ON L5A 4G1

Chris Wilson, P.Eng.
Consultant Project Manager
WSP
Phone: 1-226-279-0315
Email: chris.wilson@wsp.com
1450 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act and the Access to Information Act. With the exception of personal information, all comments will become part of the public record. If you have any accessibility requirements in order to participate in this project, please contact one of the Project Team members.

Next Steps

Notifications will be provided in the near future for each PIC, to be completed in 2025. Following the Public Information Centres, the Project Team will evaluate the alternative solutions and select a preferred approach for future drinking water and wastewater servicing in Tobermory and Lion's Head. Future opportunities to provide comments on the studies will be advertised on the project website and notices will be published.

This Notice is issued on January 29, 2025.

Contact List
Tobermory and Lion's Head Water and Wastewater Master Plans
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

ID	Agency	Title	First Name	Last Name	Job Title	Address	Phone	Email	Notes
INDIGENOUS COMMUNITIES									
IC	Métis Nation of Ontario Lands and Resources Dept, Region 7	[redacted]			Region 7 Consultation Advisor	26 Queen St E, Sault Ste Marie ON P6A1Y3	[redacted]		Address this one, cc: consultations@metisnation.org
IC	Saugeen Ojibway Nation Environment Office				R&I Manager	10129 Hwy 6, Georgian Bluffs, ON N0H 2T0			Saugeen Chief add to cc
IC	Saugeen First Nation				Chief	6 Cameron Drive Southampton, ON N0H 2L0			To be copied in email to the Saugeen Ojibway Nation Environment Office.
IC	Chippewas of Nawash Unceded First Nation				Chief	135 Lakeshore Blvd. Neyaashiinigmiing, ON N0H 2T0			To be copied in email to the Saugeen Ojibway Nation Environment Office.
EXTERNAL AGENCIES									
Federal and Provincial									
FP	Ministry of the Environment, Conservation and Parks	[redacted]			Senior Project Evaluator	135 St Clair Ave W Toronto, Ontario M4V 1P5	[redacted]		
FP	Ministry of Natural Resources and Forestry				District Manager (Acting), Midhurst District	2284 Nursery Road Midhurst, ON L9X 1N8			
FP	Ministry of Citizenship and Multiculturalism				Karla Barboza, Team Lead - Heritage	400 University Ave. 5th Floor Toronto, ON M7A 2R9			
FP	Owen Sound Transportation Company					717875, Hwy 6 Owen Sound, ON N4K 5N7			
CROWN	Ontario Clean Water Agency				Project Manager	2085 Hurontario Street, Suite 500 Mississauga, ON L5A 4G1			No need for letter; cc on all emails
FP	Parks Canada					Parks Canada National Office 30 Victoria Street Gatineau, Quebec J8X 0B3			
FP	Impact Assessment Agency of Canada				Switchboard	55 York Street, Suite 600 Toronto, ON M5J 1R7			
Municipal									
MUN	Municipality of Northern Bruce Peninsula	[redacted]			Chief Administrative Officer	56 Lindsay Road 5 Lion's Head, ON N0H 1W0	[redacted]		No need for letter; cc on all emails
MUN	Municipality of Northern Bruce Peninsula				Public Works Manager	56 Lindsay Road 5 Lion's Head, ON N0H 1W0			No need for letter
MUN	Municipality of Northern Bruce Peninsula				Clerk	56 Lindsay Road 5 Lion's Head, ON N0H 1W0			
MUN	Bruce County Planning and Development Department				Director of Planning and Development	30 Park St., P.O. Box 70 Walkerton, ON N0G 2V0			
MUN	County of Bruce				Clerk	30 Park St., P.O. Box 70 Walkerton, ON N0G 2V0			cc CPeabody@brucecounty.on.ca
MUN	Municipality of Northern Bruce Peninsula				Parks and Facilities Manager	56 Lindsay Road 5 Lion's Head, ON N0H 1W0			
Emergency Services									
EMER	Ontario Provincial Police Grey Bruce (Wiarton) Detachment	[redacted]				50 Berford St. #6 Highway Wiarton, ON N0H 2T0	[redacted]		
EMER	Municipality of Northern Bruce Peninsula Fire Department					56 Lindsay Road 5 Lion's Head, ON N0H 1W0			

TOBERMORY AND LION'S HEAD WATER AND WASTEWATER MASTER PLANS
MASTER CONTACT LIST

EMER	County of Bruce Paramedic Services	Mr.	Steve	Schaus	Director/Chief of Paramedic Services	30 Park St., P.O. Box 70 Walkerton, ON N0G 2V0		[redacted]	
Tobermory-Specific Facilities/Institutions									
TM	Bradley Davis Seniors Apartments					7432 Hwy 6 Tobermory, ON	[redacted]		
TM	Tobermory United Church	[redacted]				5 Brock St P.O. Box 129 Tobermory, ON N0H 2R0			
TM	Bluewater District School Board					P.O. Box 190, 351 1st Avenue North Chesley, ON N0G 1L0			Includes Bruce Peninsula District School (LH)
TM	Tobermory Village Campground					7159 Highway 6 Tobermory, ON N0H 2R0			
TM	Tobermory Press and The Bruce Peninsula Press					39 Legion St. Tobermory, ON N0H2R0			
Lion's Head-Specific Facilities/Institutions									
LH	Lion's Head Library	[redacted]				90 Main St Lion's Head, ON N0H 1W0	[redacted]		
LH	Brightshores Health System-Lion's Head					22 Moore St Lion's Head, ON N0H 1W0			Contacted when a Boil water Advisory is required
Utilities									
UT-TM									
UT-LH									
GENERAL PUBLIC (Contacts to be added throughout project)									
GP		[redacted]							
GP									

RE: Notice of Commencement: Tobermory and Lion's Head Water and Wastewater Master Plan



Gryfe, Marley
To Welch, Sarah (MECP); Wilson, Chris; EA Notices to SWRegion (MECP)
Cc Fleming, Braden; Felker, Bob

Reply | Reply All | Forward | ...
Mon 2025-02-03 2:13 PM

Business Confidential\Internal and External

Streamlined_EA_Project_Information_Form.xlsx
121 KB

Hi Sarah,

The Tobermory and Lion's Head Water and Wastewater Master Plan is following Approach 1. Please find the requested Project Information Form (PIF) attached for your review.

Let us know if you need anything else.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto
marley.gryfe@wsp.com
wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington
chris.wilson@wsp.com
wsp.com

From: Welch, Sarah (MECP)
Sent: January 31, 2025 12:33 PM
To: Wilson, Chris
Cc: Gryfe, Marley
Subject: Notice of Commencement: Tobermory and Lion's Head Water and Wastewater Master Plan

Hi Chris,

I noticed that the approach (Approach 1, 2, or 3) has not been identified for the Tobermory and Lion's Head Water and Wastewater Master Plan, could you please provide me with this information?

Additionally, could you send back a PIF, which is required for you to fill out and send to us (attached), and send it to eanotification.swregion@ontario.ca.

Thanks,

Sarah Welch

What to do:
Step 1: Look for the type of EA project in column B that applies to you.
Step 2: Complete columns C to J for that project.
Step 3: Send this form in Excel format to the MECP regional office email address where the project is located.
MECP regional office email addresses are listed at
www.ontario.ca/page/preparing-environmental-assessments

	Class EA/Streamlined EA	Proponent Name	Proponent Contact	Project Name	Project Schedule	Project Type	Project Location	MOECC Region	Project Initiation Date
1	CO - Remedial flood and erosion control projects								
2	GO Transit - Class EA								
3	Hydro One - Minor transmission facilities								
4	MEA - Class EA for municipal infrastructure projects	Municipality of Northern Bruce Peninsula	Peggy Van Mierlo-West, Chief Administrative Officer pvmwest@northernbruce.ca	Tobermory and Lion's Head Water and Wastewater Master Plans	Schedule B	Master Plan	Northern Bruce Peninsula, Municipality of	Southwestern	September 21, 2022 (Kick-Off Meeting)
5	Ministry of Infrastructure - Public work								
6	MNDM - Activities of the Ministry of Northern Development and Mines under the Mining Act								
7	MNRF - Provincial parks and conservation reserves								
8	MNRF - Resource stewardship and facility development projects								
9	MTO - Provincial transportation facilities								
10	O. Reg. 101/07 - Waste management projects								
11	O. Reg. 116/01 - Electricity projects								
12	OWA - Waterpower projects								
		Enter the proponent's name.	Enter the name and email address of the person who the MECP should contact about your project. This should be the same contact person who is listed on the notice.	Enter the project name as it appears on the notice.	Select the project schedule from the drop-down menu.	Select the project type from the drop-down menu.	Select the name of the municipality or unorganized/unsurveyed area where your project is located from the drop-down menu.	Select the MECP region from the drop-down menu. Read the "MECP regions" worksheet to find the MECP region where your project is located.	Enter the date that the streamlined EA process was initiated (e.g. notice of commencement). This date may be when the project notice was first published.

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:15 AM
To: info@bwdsb.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Bluewater District School Board.pdf

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:21 AM
To: housingregistry@brucecounty.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Bradley Davis Senior Apartment.pdf

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:22 AM
To: web@gbhs.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Brightshores Health System Lion's Head.pdf

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Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:25 AM
To: cldodds@brucecounty.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Bruce County Clare Dodds.pdf

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Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:26 AM
To: LWhite@brucecounty.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Bruce County Linda White.pdf

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Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:27 AM
To: sschaus@brucecounty.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - County of Bruce Paramedic Services.pdf

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marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:47 AM
To: ontarioregion-regiondontario@iaac-aeic.gc.ca
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Impact Assessment Agency of Canada.pdf

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Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:27 AM
To: iaac.ontarioregion-regiondontario.aeic@iaac-aeic.gc.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Impact Assessment Agency of Canada.pdf

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Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:29 AM
To: lhlib@brucecounty.on.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Lion's Head Library.pdf

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:30 AM
To: eanotification.swregion@ontario.ca; Mark.Badali1@ontario.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - MECP.pdf

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Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:33 AM
To: karla.barboza@ontario.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Ministry of Citizenship and Multiculturalism.pdf

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Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:34 AM
To: john.almond@ontario.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Ministry of Natural Resources and Forestry.pdf

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Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:35 AM
To: clerk@northernbruce.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - NBP Cathy Addison.pdf

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Environmental Planner - Environmental Impact Assessment, Transportation – Toronto



marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington



chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:35 AM
To: firechief@northernbruce.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - NBP Fire Department.pdf

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Environmental Planner - Environmental Impact Assessment, Transportation – Toronto



marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington



chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:36 AM
To: mcoleman@northernbruce.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - NBP Mark Coleman.pdf

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:36 AM
To: OPP.Grey.Bruce@opp.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - OPP Bruce Wiarton.pdf

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marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:39 AM
To: info@ontarioferries.com
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Owen Sound Transportation Company.pdf

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marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:40 AM
To: information@pc.gc.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Parks Canada.pdf

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto



marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington



chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:40 AM
To: info@tobermorypress.com
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Tobermory Press (The Bruce Peninsula Press).pdf

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Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:41 AM
To: tobermoryunitedchurch@eastlink.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Tobermory United Church.pdf

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Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:41 AM
To: contact@tobermoryvillagecamp.com
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Tobermory Village Campground.pdf

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

Gryfe, Marley

From: Gryfe, Marley
Sent: February 3, 2025 10:42 AM
To: Ethan Meleg; Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Cc: information (PC); bruce-fathomfive (PC)
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)

Hi Ethan,

Thank you for confirming receipt of our MCEA Notice. We have updated your contact information.

Have a great week,
The Project Team

From: Ethan Meleg <ethan.meleg@pc.gc.ca>
Sent: February 3, 2025 9:05 AM
To: Gryfe, Marley <Marley.Gryfe@wsp.com>; Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Cc: information (PC) <information@pc.gc.ca>; bruce-fathomfive (PC) <bruce-fathomfive@pc.gc.ca>
Subject: Re: Notice of Municipal Class Environmental Assessment (MCEA)

Good morning,
I confirm receipt of these materials on behalf of Parks Canada.
Could you please direct further correspondence directly to my email: ethan.meleg@pc.gc.ca and cc: bruce-fathomfive@pc.gc.ca
Thanks!
Ethan

Ethan Meleg

Pronouns: He/Him
Pronom: Il/Lui

Acting Superintendent | Directeur intérimaire
Bruce Peninsula National Park | Parc national de la Péninsule Bruce
Fathom Five National Marine Park | Parc marin national Fathom Five
Tobermory, ON

Email | Courriel: Ethan.Meleg@pc.gc.ca
Mobile | Cellulaire: 519-270-1503

I respectfully acknowledge that the land on which I live and work is the traditional territory of the Saugeen Ojibway Nation.
Par respect envers la nation Saugeen Ojibway, je reconnais que l'endroit où j'habite et travaille est leur territoire traditionnel.

From: Teresa Fogal <teresa.fogal@pc.gc.ca>
Sent: January 31, 2025 10:22 AM

To: Ethan Meleg <ethan.meleg@pc.gc.ca>
Subject: Fw: Notice of Municipal Class Environmental Assessment (MCEA)

Sent from my Bell Samsung device over Canada's largest network.

From: information (PC) <information@pc.gc.ca>
Sent: Friday, January 31, 2025 7:46:36 AM
To: Teresa Fogal <teresa.fogal@pc.gc.ca>
Subject: FW: Notice of Municipal Class Environmental Assessment (MCEA)

Hello/Bonjour,

The National Information Service received the email below regarding *''two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.''*

Could you please respond directly to the inquirer, or forward to the appropriate contact? Please CC information@pc.gc.ca on your communication so that we may follow-up, if required.

Thank you very much.

With regards,
Stéphanie
Service national d'information | National Information Service
Direction de l'expérience du visiteur | Visitor Experience Branch
Parcs Canada | Parks Canada
information@pc.gc.ca
Renseignements généraux | General Inquiries 888-773-8888
Renseignements généraux (international) | General Inquiries (international) 819-420-9486
Téléimprimeur | Teletypewriter 866-787-6221
www.parcscanada.gc.ca | www.parkscanada.gc.ca
Gouvernement du Canada | Government of Canada
Parcs Canada - 450 000 km2 d'histoires / Parks Canada - 450 000 km2 of stories

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From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: January 29, 2025 10:40 AM
To: information (PC) <information@pc.gc.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

COURRIEL EXTERNE – FAITES PREUVE DE PRUDENCE / EXTERNAL EMAIL – USE CAUTION

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

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-LAEmHhHzdJzBlTWfa4Hgs7pbKI

Gryfe, Marley

From: Badali, Mark (He/Him) (MECP) <Mark.Badali1@ontario.ca>
Sent: January 29, 2025 10:30 AM
To: Gryfe, Marley
Subject: Automatic reply: Notice of Municipal Class Environmental Assessment (MCEA)

Thank you for your email. Please be advised that I am out of office, returning Monday, February 10th, 2025. For urgent matters related to the Renewable Energy Approvals program or Environmental Assessment Program Support, please contact Nick Colella at Nick.Colella@ontario.ca.

For routine and non-urgent matters, I will address your email when I return.

Best regards,

Mark Badali (he/him) | Senior Project Evaluator
Environmental Assessment Program Support | Environmental Assessment Branch
Ontario Ministry of the Environment, Conservation and Parks
Mark.Badali1@ontario.ca | (416) 457-2155

Gryfe, Marley

From: OPP Grey Bruce (OPP) <OPP.Grey.Bruce@opp.ca>
Sent: January 29, 2025 10:37 AM
To: Gryfe, Marley
Subject: Automatic reply: Notice of Municipal Class Environmental Assessment (MCEA)

Your email submission has been received by the Grey Bruce OPP.

Please be advised if you are submitting a Criminal Record Check/Vulnerable Sector Check you will be contacted once the Check has been completed or if any further information is required.

Thank you.

Gryfe, Marley

From: Info <info@ontarioferries.com>
Sent: January 29, 2025 10:39 AM
To: Gryfe, Marley
Subject: Automatic reply: Notice of Municipal Class Environmental Assessment (MCEA)

Thank you for contacting Owen Sound Transportation Company.

If your email is regarding a cancellation request for the MS Chi-Cheemaun or Pelee Island Ferries, emails will be processed as of date and time received.
Visit MS Chi-Cheemaun Terms & Conditions or Pelee Island Terms & Conditions for our Cancellation Policy.

For emails containing general inquiries, please allow up to 5 business days for a response.

MS Chi-Cheeman

Our 2024 season is now over – please watch ontarioferries.com/public-notice-overview/ for announcements regarding the 2025 season opening.

Travel in good spirits.

Reservations are now closed for the 2024 season, they will open in March 2025 for the 2025 sailing season. If you would like to leave a message, please call 1.800.265.3163 and someone will return your call within 5-7 business days.
For **Chi-Cheemaun updates,** please visit www.ontarioferries.com, Facebook, or X-Twitter

Pelee Island Ferries

The Pelee Islander and Pelee Islander II gives you the freedom to take a leisure trip or a family getaway to Canada's best kept secret, Pelee Island.

Daily departures between the Mainland and Pelee Island with summer service to Sandusky, Ohio. Ferry service runs until December 9, 2024.

For **Winter Air Service reservations,** please call 1.800.661.2220 during reservation hours.

Ferry Service Reservations will open March 1st 2025. Please call 1.800.661.2220 or book online at https://www.ontarioferries.com/pelee-island-ferries/

Winter Air Service flights will commence on Monday, December 9th, departing Windsor at 4 p.m.

All flights out of Windsor will be from the Great Lakes Flight Centre located at 2800 Hayes Rd, Windsor, ON. For additional information regarding the Flight Centre, please call 519-969-7052.

For **Pelee Island Ferries updates,** please visit www.ontarioferries.com, Facebook or X-Twitter

Gryfe, Marley

From: information (PC) <information@pc.gc.ca>
Sent: January 29, 2025 10:40 AM
To: Gryfe, Marley
Subject: Parcs Canada / Parks Canada

COURRIEL EXTERNE – FAITES PREUVE DE PRUDENCE / EXTERNAL EMAIL – USE CAUTION

Bonjour / Hello,
- English message below -
Merci d'avoir contacté Parcs Canada.

Ceci est un message automatique confirmant la réception de votre courriel. Il n'est pas nécessaire de répondre à ce courriel. Nous répondrons à votre demande d'information aussitôt que possible, généralement dans les délais de trois jours ouvrables.

Si vous nécessitez de l'aide immédiate, n'hésitez pas d'appeler notre Service national d'information au 1-888-773-8888 (sans frais en Amérique du Nord) ou au 1-613-860-1251 (international). Nos bureaux sont ouverts de 10h à 18h HSE, 7 jours par semaine.

****

-Message en français ci-dessus -
Thank you for contacting Parks Canada.
This is an automatic response to confirm that we have received your email. There is no need to reply to this email. We will reply to your inquiry as soon as possible (typically within three (3) business days).
If you would like immediate assistance about your inquiry, please do not hesitate to contact Parks Canada's National Information Service (toll-free within North America) at 1-888-773-8888 or 1-613-860-1251 (International). We are open 7 days/week from 10 am to 6 pm EST.

Service national d'information | National Information Service
Parcs Canada | Parks Canada
30 rue Victoria
Gatineau, Québec
J8X 0B3
information@pc.gc.ca

Renseignements généraux | General Inquiries 888-773-8888
Renseignements généraux (international) | General Inquiries (international) 613-860-1251
https://parcs.canada.ca/ | https://parks.canada.ca/
Gouvernement du Canada | Government of Canada

Gryfe, Marley

From: Steve Schaus <sschaus@brucecounty.on.ca>
Sent: January 29, 2025 10:33 AM
To: Gryfe, Marley
Cc: Wilson, Chris; Peggy Van Mierlo-West; AMokracki@ocwa.com
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)

Received, thank you.

Steve

From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: Wednesday, January 29, 2025 10:27 AM
To: Steve Schaus <sschaus@brucecounty.on.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; Peggy Van Mierlo-West <pvmwest@northernbruce.ca>; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

> You don't often get email from marley.gryfe@wsp.com. Learn why this is important

** [**CAUTION**]: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

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-LAEmHhHzdJzBITWfa4Hgs7pbKI

Steve Schaus, (He/Him)
Director/Chief
Paramedic Services
Corporation of the County of Bruce

Office: 519-881-1291

www.brucecounty.on.ca

Individuals who submit letters and other information to Council and its Committees should be aware that any personal information contained within their communications may become part of the public record and may be made available through the agenda process which includes publication on the County's website.

If you have received this communication in error, please notify the sender immediately and delete all copies (electronic or otherwise). Thank you for your cooperation.

If you feel that this email was commercial in nature and you do not wish to receive further electronic messages from the County of Bruce, please click on the following link to unsubscribe: Unsubscribe. Please be advised that this may restrict our ability to send messages to you in the future.

Gryfe, Marley

From: EA Notices to SWRegion (MECP) <eanotification.swregion@ontario.ca>
Sent: January 29, 2025 10:30 AM
To: Gryfe, Marley
Subject: Automatic reply: Notice of Municipal Class Environmental Assessment (MCEA)

This is to acknowledge your email has been delivered to the Regional email account. A Regional EA Coordinator will contact you if additional information is needed. To speak directly to a Regional EA Coordinator, go to the INFO-GO website and under our ministry, select: 1) Drinking Water and Environmental Compliance Division 2) applicable Regional Office 3) Technical Support Section 4) Air, Pesticides, and Environmental Planning 5) Environmental Planner and EA Coordinator

Gryfe, Marley

From: Thalen, Henry (OPP) <Henry.Thalen@opp.ca>
Sent: January 30, 2025 8:46 AM
To: Gryfe, Marley
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)

Received, Thanks,

A/S/Sgt. Henry Thalen #12526
Operations Manager
Ontario Provincial Police
Grey Bruce || West Region
1.800.310.1122 – OPP Communications
Cell 519.374.4606
Henry.thalen@opp.ca

Henry Thalen

From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: 29-Jan-25 10:36 AM
To: OPP Grey Bruce (OPP) <OPP.Grey.Bruce@opp.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

You don't often get email from marley.gryfe@wsp.com. Learn why this is important

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

marley.gryfe@wsp.com

wsp.com

chris.wilson@wsp.com

wsp.com

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Gryfe, Marley

From: Linda White <LWhite@brucecounty.on.ca>
Sent: January 30, 2025 9:52 AM
To: Gryfe, Marley
Cc: Wilson, Chris; Peggy Van Mierlo-West; AMokracki@ocwa.com
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)

I confirm receipt of this email.
Thanks,

From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: Wednesday, January 29, 2025 10:26 AM
To: Linda White <LWhite@brucecounty.on.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; Peggy Van Mierlo-West <pvmwest@northernbruce.ca>; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

You don't often get email from marley.gryfe@wsp.com. Learn why this is important

** [**CAUTION**]: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

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Linda White
County Clerk
Office of the CAO
Corporation of the County of Bruce

Office: 519-881-1291
Direct: 226.909.6168
www.brucecounty.on.ca



Individuals who submit letters and other information to Council and its Committees should be aware that any personal information contained within their communications may become part of the public record and may be made available through the agenda process which includes publication on the County's website.

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Gryfe, Marley

From: Mark Coleman <mcoleman@northernbruce.ca>
Sent: January 30, 2025 8:58 AM
To: Gryfe, Marley
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)

Received.

Mark Coleman
Parks and Facilities Manager
Municipality of Northern Bruce Peninsula
56 Lindsay Road 5
Lion's Head, ON N0H 1W0
Phone: 1-833-793-3537 x. 234
Fax: (519) 793-3823
mcoleman@northernbruce.ca

From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: January 29, 2025 10:36 AM
To: Mark Coleman <mcoleman@northernbruce.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; Peggy Van Mierlo-West <pvmwest@northernbruce.ca>; Allison Mokracki <AMokracki@ocwa.com>
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

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We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Welch, Sarah (MECP) <Sarah.Welch2@ontario.ca>
Sent: January 31, 2025 12:33 PM
To: Wilson, Chris
Cc: Gryfe, Marley
Subject: Notice of Commencement: Tobermory and Lion's Head Water and Wastewater Master Plan
Attachments: streamlined_ea_project_information_form_2 (1).xlsx

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Chris,

I noticed that the approach (Approach 1, 2, or 3) has not been identified for the Tobermory and Lion's Head Water and Wastewater Master Plan, could you please provide me with this information?

Additionally, could you send back a PIF, which is required for you to fill out and send to us (attached), and send it to eanotification.swregion@ontario.ca.

Thanks,

Sarah Welch

Gryfe, Marley

From: Ethan Meleg <ethan.meleg@pc.gc.ca>
Sent: February 3, 2025 9:05 AM
To: Gryfe, Marley; Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Cc: information (PC); bruce-fathomfive (PC)
Subject: Re: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head Master Plan - Parks Canada.pdf

Good morning,
I confirm receipt of these materials on behalf of Parks Canada.
Could you please direct further correspondence directly to my email: ethan.meleg@pc.gc.ca and cc: bruce-fathomfive@pc.gc.ca
Thanks!
Ethan

Ethan Meleg

Pronouns: He/Him
Pronom: Il/Lui

Acting Superintendent | Directeur intérimaire
Bruce Peninsula National Park | Parc national de la Péninsule Bruce
Fathom Five National Marine Park | Parc marin national Fathom Five
Tobermory, ON

Email | Courriel: Ethan.Meleg@pc.gc.ca
Mobile | Cellulaire: 519-270-1503

I respectfully acknowledge that the land on which I live and work is the traditional territory of the Saugeen Ojibway Nation.
Par respect envers la nation Saugeen Ojibway, je reconnais que l'endroit où j'habite et travaille est leur territoire traditionnel.

From: Teresa Fogal <teresa.fogal@pc.gc.ca>
Sent: January 31, 2025 10:22 AM
To: Ethan Meleg <ethan.meleg@pc.gc.ca>
Subject: Fw: Notice of Municipal Class Environmental Assessment (MCEA)

Sent from my Bell Samsung device over Canada's largest network.

From: information (PC) <information@pc.gc.ca>
Sent: Friday, January 31, 2025 7:46:36 AM
To: Teresa Fogal <teresa.fogal@pc.gc.ca>
Subject: FW: Notice of Municipal Class Environmental Assessment (MCEA)

Hello/Bonjour,

The National Information Service received the email below regarding *''two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.''*

Could you please respond directly to the inquirer, or forward to the appropriate contact? Please CC information@pc.gc.ca on your communication so that we may follow-up, if required.

Thank you very much.

With regards,
Stéphanie
Service national d'information | National Information Service
Direction de l'expérience du visiteur | Visitor Experience Branch
Parcs Canada | Parks Canada
information@pc.gc.ca
Renseignements généraux | General Inquiries 888-773-8888
Renseignements généraux (international) | General Inquiries (international) 819-420-9486
Téléimprimeur | Teletypewriter 866-787-6221
www.parcscanada.gc.ca | www.parkscanada.gc.ca
Gouvernement du Canada | Government of Canada
Parcs Canada - 450 000 km2 d'histoires / Parks Canada - 450 000 km2 of stories

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From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: January 29, 2025 10:40 AM
To: information (PC) <information@pc.gc.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

COURRIEL EXTERNE – FAITES PREUVE DE PRUDENCE / EXTERNAL EMAIL – USE CAUTION

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

marley.gryfe@wsp.com

wsp.com

chris.wilson@wsp.com

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Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Téléc. : 416 314-8452

February 5, 2025

Peggy Van Mierlo-West
Chief Administrative Officer
Municipality of Northern Bruce Peninsula
pvmwest@northernbruce.ca

BY EMAIL ONLY

Re: **TOBERMORY AND LION'S HEAD WATER AND WASTEWATER MASTER PLANS**
Municipality of Northern Bruce Peninsula
Municipal Class Environmental Assessment, Master Plan (Phases 1-2)
Acknowledgement of Notice of Commencement

Dear Peggy Van Mierlo-West,

This letter is in response to the Notice of Commencement for the above noted Master Plan. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Municipality of Northern Bruce Peninsula (proponent) has indicated that the study is following the approved environmental planning process for a Master Plan following Phases 1-2 under the Municipal Class Environmental Assessment (Class EA).

The **updated (August 2022)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing the projects identified in this Master Plan, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed Master Plan projects may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed projects**, the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed Master Plan projects:

- Saugeen First Nation and the Chippewas of Nawash Unceded First Nation
    - These communities work together on consultation issues and are known collectively as the Saugeen Ojibway Nation. They have requested notices be sent to the Saugeen Ojibway Nation Environment Office with a copy to the Chief and Council of Saugeen First Nation and Chippewas of Nawash Unceded First Nation.

- Métis Nation of Ontario- Lands and Resources Dept, Region 7
    - MNO Great Lakes Métis Council (please cc Métis Nation of Ontario (MNO) Lands, Resources and Consultations Branch)

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed projects are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances after initial discussions with the communities identified by the MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;

- You have reason to believe that your proposed projects may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an impasse; or
- A Section 16 Order request is expected based on impacts to Aboriginal or treaty rights

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

Please also ensure a copy of the final notice is sent to the ministry's Southwestern Region EA notification email account (eanotification.swregion@ontario.ca) after the draft report is reviewed and finalized.

Should you or any members of your project team have any questions regarding the material above, please contact me at monika.macki@ontario.ca.

Sincerely,

Monika Macki

Monika Macki
Regional Environmental Planner – Southwestern Region
Project Review Unit, Environmental Assessment Branch

Enclosed: Areas of Interest

Attached: Client's Guide to Preliminary Screening for Species at Risk

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

AREAS OF INTEREST (v. August 2022)

It is suggested that you check off each section after you have considered / addressed it.

Planning and Policy

- Applicable plans and policies should be identified in the report, and the proponent should describe how the proposed Master Plan projects adhere to the relevant policies in these plans.

- Projects located in MECP Central or Eastern Region may be subject to the **Oak Ridges Moraine Conservation Plan (2017)** or the **Lake Simcoe Protection Plan (2014)**.
- Projects located in MECP Central, Southwest or West Central Region may be subject to the **Niagara Escarpment Plan (2017)**.
- Projects located in MECP Central, Eastern, Southwest or West Central Region may be subject to the **Greenbelt Plan (2017)**.
- Projects located in MECP Northern Region may be subject to the **Growth Plan for Northern Ontario (2011).**

- The **Provincial Policy Statement (2024)** contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed projects are consistent with these policies.

- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

Source Water Protection

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**

    - The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.

    - If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if these Master Plan projects are occurring within a vulnerable area, proponents can use Source Protection Information Atlas, which is an online mapping tool available to the public. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the "Map Legend" bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

Climate Change

The document "Considering Climate Change in the Environmental Assessment Process" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

    1. Consider during the assessment of alternative solutions and alternative designs, the following:
        a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
        b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
    2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

Air Quality, Dust and Noise

- If there are sensitive receptors in the surrounding area of these Master Plan projects, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for these projects if not already advised.**

- If a quantitative Air Quality Impact Assessment is not required for a project, the MECP expects that the report contain a qualitative assessment which includes:

    - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
    - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
    - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
    - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

Ecosystem Protection and Restoration

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
    - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
    - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
    - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, for projects located in Central Region you may consider the provisions of the Rouge Park Management Plan if applicable.

Species at Risk

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at https://www.ontario.ca/page/species-risk.

- The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.

Surface Water

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any

impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

    - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
    - Watershed information, drainage conditions, and other relevant background information
    - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
    - Information on maintenance and monitoring commitments.

- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed Master Plan projects and its mitigation measures are consistent with the requirements of this regulation and the OWRA.

- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

Groundwater

- The status of, and potential impacts to any well water supplies should be addressed. If the Master Plan projects involve groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the

redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.

- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

Excess Materials Management

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit https://www.ontario.ca/page/handling-excess-soil.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance

document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014).

- All waste generated during construction must be disposed of in accordance with ministry requirements.

Contaminated Sites

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the MECP's D-4 guideline for land use considerations near landfills and dumps.
    - Resources available may include regional/local municipal official plans and data; provincial data on large landfill sites and small landfill sites; Environmental Compliance Approval information for waste disposal sites on Access Environment.

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's website).

- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

Servicing, Utilities and Facilities

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.

- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the Master Plan projects.

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's environmental land use planning guides to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

Mitigation and Monitoring

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the Master Plan projects. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

Consultation

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the Master Plan by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

Class EA Process

- There are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the Environmental Assessment Act, although the plan itself would not be. **Please include a description of the approach being undertaken (use Appendix 4 as a reference).**

- Any identified projects should also include information on the MCEA schedule associated with the project.

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.

- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and reference any relevant information in the report.

Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020
Once the EA Report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address.

The public can request a higher level of assessment on any of the Schedule B or Schedule C projects identified in the Master Plan if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an

order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project(s) within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project(s).

Therefore, the proponent cannot proceed with the Master Plan projects until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Section 16 Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project(s).

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16 Order requests on those matters should be addressed in writing to:

Minister of the Environment, Conservation and Parks
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Gryfe, Marley

From: Macki, Monika (MECP) <Monika.MacKi@ontario.ca>
Sent: February 5, 2025 2:40 PM
To: Gryfe, Marley; pvmwest@northernbruce.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; Allison Mokracki
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: MECP Acknowledgement of NOC - MEA Class EA - Municipality of Northern Bruce Peninsula - Tobermory+Lion's Head Master Plan_.pdf; Supporting Attachment - Proponent's Intro to Delegation of Procedural Aspects of Consultation with Aboriginal Communities.pdf; Supporting Attachment - Species at Risk Proponents Guide to Preliminary Screening (May 2019).pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hello,

Please find the attached letter of acknowledgement and supporting attachments in response to the Notice of Commencement of Tobermory and Lion's Head Water and Wastewater Masterplan being undertaken by the Municipality of Northern Bruce Peninsula in accordance with the Municipal Class Environmental Assessment (Masterplan, Approach 1).

Thanks

Monika Macki
Environmental Resource Planner/Environmental Assessment Coordinator
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
monika.macki@ontario.ca

From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: Wednesday, January 29, 2025 10:30 AM
To: EA Notices to SWRegion (MECP) <eanotification.swregion@ontario.ca>; Badali, Mark (He/Him) (MECP) <Mark.Badali1@ontario.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; Allison Mokracki <AMokracki@ocwa.com>
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto



marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington



chris.wilson@wsp.com

wsp.com

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Ontario

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers

issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;

- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;

- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;

- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Client's Guide to Preliminary Screening for Species at Risk

Ministry of the Environment, Conservation and Parks

Species at Risk Branch, Permissions and Compliance

DRAFT - May 2019

Table of Contents

1.0 Purpose, Scope, Background and Context 3
1.1 Purpose of this Guide 3
1.2 Scope 3
1.3 Background and Context 4
2.0 Roles and Responsibilities 5
3.0 Information Sources 6
3.1 Make a Map: Natural Heritage Areas 7
3.2 Land Information Ontario (LIO) 7
3.3 Additional Species at Risk Information Sources 8
3.4 Information Sources to Support Impact Assessments 8
4.0 Check-List 9

1.0 Purpose, Scope, Background and Context

1.1 Purpose of this Guide

This guide has been created to:

- help clients better understand their obligation to gather information and complete a preliminary screening for species at risk before contacting the ministry,
- outline guidance and advice clients can expect to receive from the ministry at the preliminary screening stage,
- help clients understand how they can gather information about species at risk by accessing publicly available information housed by the Government of Ontario, and
- provide a list of other potential sources of species at risk information that exist outside the Government of Ontario.

It remains the client's responsibility to:

- carry out a preliminary screening for their projects,
- obtain best available information from all applicable information sources,
- conduct any necessary field studies or inventories to identify and confirm the presence or absence of species at risk or their habitat,
- consider any potential impacts to species at risk that a proposed activity might cause, and
- comply with the *Endangered Species Act* (ESA).

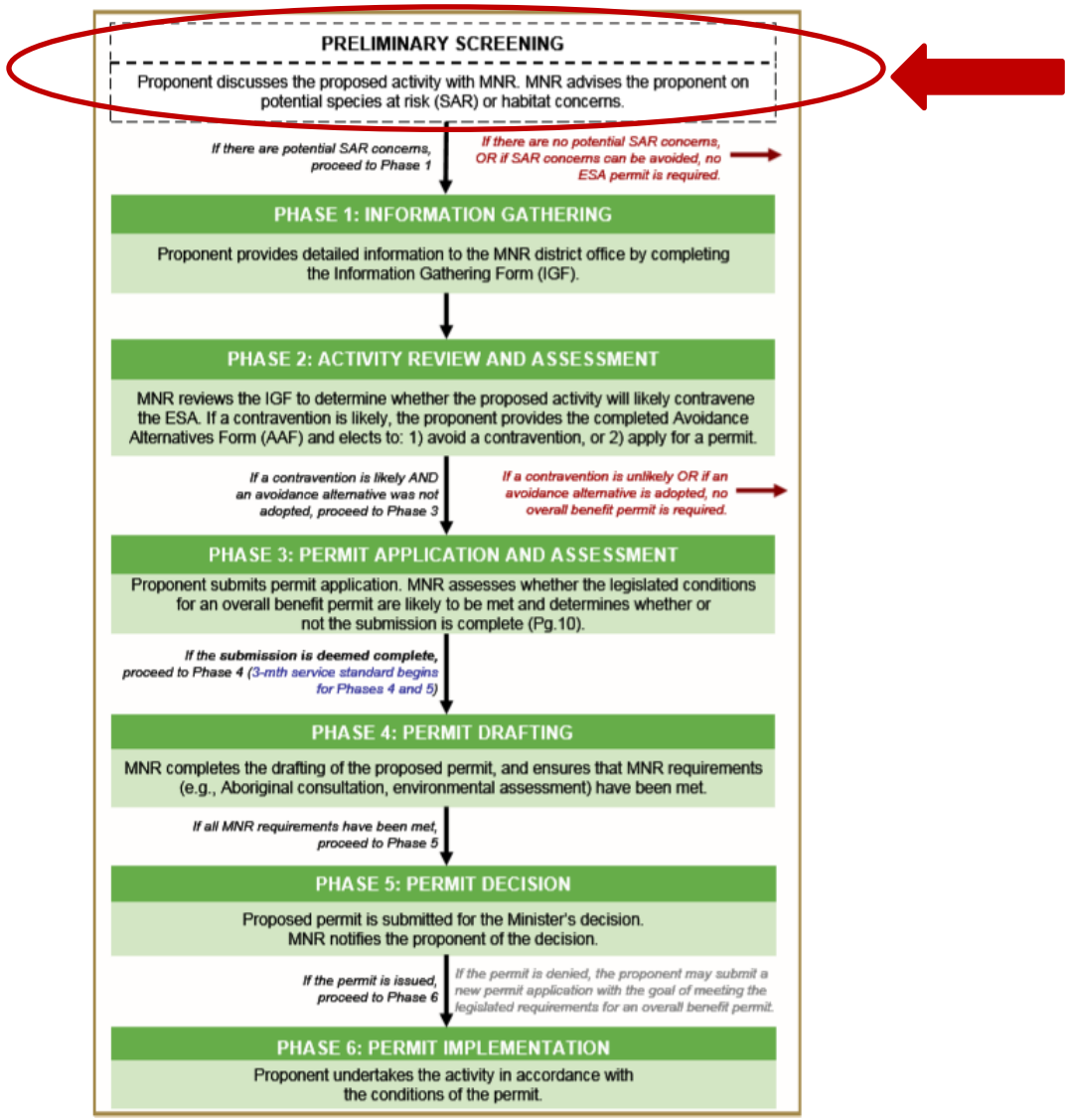
To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide, at a minimum, prior to contacting Government of Ontario ministry offices for further information or advice.

1.2 Scope

This guide is a resource for clients seeking to understand if their activity is likely to impact species at risk or if they are likely to trigger the need for an authorization under the ESA. It is not intended to circumvent any detailed site surveys that may be necessary to document species at risk or their habitat nor to circumvent the need to assess the impacts of a proposed activity on species at risk or their habitat. This guide is not an exhaustive list of available information sources for any given area as the availability of information on species at risk and their habitat varies across the province. This guide is intended to support projects and activities carried out on Crown and private land, by private landowners, businesses, other provincial ministries and agencies, or municipal government.

1.3 Background and Context

To receive advice on their proposed activity, clients must first determine whether any species at risk or their habitat exist or are likely to exist at or near their proposed activity, and whether their proposed activity is likely to contravene the ESA. Once this step is complete, clients may contact the ministry at SAROntario@ontario.ca to discuss the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. At this stage, the ministry can provide advice and guidance to the client about potential species at risk or habitat concerns, measures that the client is considering to avoid adverse effects on species at risk or their habitat and whether additional field surveys are advisable. This is referred to as the "Preliminary Screening" stage. For more information on additional phases in the diagram below, please refer to the *Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits* policy available online at https://www.ontario.ca/page/species-risk-overall-benefit-permits



2.0 Roles and Responsibilities

To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide prior to contacting Government of Ontario ministry offices for further information or advice.

Step 1: Client seeks information regarding species at risk or their habitat that exist, or are likely to exist, at or near their proposed activity by referring to all applicable information sources identified in this guide.

Step 2: Client reviews and consider guidance on whether their proposed activity is likely to contravene the ESA (see section 3.4 of this guide for guidance on what to consider).

Step 3: Client gathers information identified in the checklist in section 4 of this guide.

Step 4: Client contacts the ministry at SAROntario@ontario.ca to discuss their preliminary screening. Ministry staff will ask the client questions about the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. Ministry staff will also ask the client for their interpretation of the impacts of their activity on species at risk or their habitat as well as measures the client has considered to avoid any adverse impacts.

Step 5: Ministry staff will provide advice on next steps.

Option A: Ministry staff may advise the client they can proceed with their activity without an authorization under the ESA where the ministry is confident that:

- no protected species at risk or habitats are likely to be present at or near the proposed location of the activity; or
- protected species at risk or habitats are known to be present but the activity is not likely to contravene the ESA; or
- through the adoption of avoidance measures, the modified activity is not likely to contravene the ESA.

Option B: Ministry staff may advise the client to proceed to Phase 1 of the overall benefit permitting process (i.e. Information Gathering in the previous diagram), where:

- there is uncertainty as to whether any protected species at risk or habitats are present at or near the proposed location of the activity; or
- the potential impacts of the proposed activity are uncertain; or
- ministry staff anticipate the proposed activity is likely to contravene the ESA.

3.0 Information Sources

Land Information Ontario (LIO) and the Natural Heritage Information Centre (NHIC) maintain and provide information about species at risk, as well as related information about fisheries, wildlife, crown lands, protected lands and more. This information is made available to organizations, private individuals, consultants, and developers through online sources and is often considered under various pieces of legislation or as part of regulatory approvals and planning processes.

The information available from LIO or NHIC and the sources listed in this guide should not be considered as a substitute for site visits and appropriate field surveys. Generally, this information can be regarded as a starting point from which to conduct further field surveys, if needed. While this data represents best available current information, it is important to note that a lack of information for a site does not mean that species at risk or their habitat are not present. There are many areas where the Government of Ontario does not currently have information, especially in more remote parts of the province. The absence of species at risk location data at or near your site does not necessarily mean no species at risk are present at that location. On-site assessments can better verify site conditions, identify and confirm presence of species at risk and/or their habitats.

Information on the location (i.e. observations and occurrences) of species at risk is considered sensitive and therefore publicly available only on a 1km square grid as opposed to as a detailed point on a map. This generalized information can help you understand which species at risk are in the general vicinity of your proposed activity and can help inform field level studies you may want to undertake to confirm the presence, or absence of species at risk at or near your site.

Should you require specific and detailed information pertaining to species at risk observations and occurrences at or near your site on a finer geographic scale; you will be required to demonstrate your need to access this information, to complete data sensitivity training and to obtain a Sensitive Data Use License from the NHIC. Information on how to obtain a license can be found online at https://www.ontario.ca/page/get-natural-heritage-information.

Many organizations (e.g. other Ontario ministries, municipalities, conservation authorities) have ongoing licensing to access this data so be sure to check if your organization has this access and consult this data as part of your preliminary screening if your organization already has a license.

3.1 Make a Map: Natural Heritage Areas

The Make a Natural Heritage Area Map (available online at http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US provides public access to natural heritage information, including species at risk, without the user needing to have Geographic Information System (GIS) capability. It allows users to view and identify generalized species at risk information, mark areas of interest, and create and print a custom map directly from the web application. The tool also shows topographic information such as roads, rivers, contours and municipal boundaries.

Users are advised that sensitive information has been removed from the natural areas dataset and the occurrences of species at risk has been generalized to a 1-kilometre grid to mitigate the risks to the species (e.g. illegal harvest, habitat disturbance, poaching).

The web-based mapping tool displays natural heritage data, including:

- Generalized Species at risk occurrence data (based on a 1-km square grid),
- Natural Heritage Information Centre data.

Data cannot be downloaded directly from this web map; however, information included in this application is available digitally through Land Information Ontario (LIO) at https://www.ontario.ca/page/land-information-ontario.

3.2 Land Information Ontario (LIO)

Most natural heritage data is publicly available. This data is managed in a large provincial corporate database called the LIO Warehouse and can be accessed online through the LIO Metadata Management Tool at https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home. This tool provides descriptive information about the characteristics, quality and context of the data. Publicly available geospatial data can be downloaded directly from this site.

While most data are publicly available, some data may be considered highly sensitive (i.e. nursery areas for fish, species at risk observations) and as such, access to some data maybe restricted.

3.3 Additional Species at Risk Information Sources

- The Breeding Bird Atlas can be accessed online at http://www.birdsontario.org/atlas/index.jsp?lang=en
- eBird can be accessed online at https://ebird.org/home
- iNaturalist can be accessed online at https://www.inaturalist.org/
- The Ontario Reptile and Amphibian Atlas can be accessed online at https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas
- Your local Conservation Authority. Information to help you find your local Conservation Authority can be accessed online at https://conservationontario.ca/conservation-authorities/find-a-conservation-authority/

  Local naturalist groups or other similar community-based organizations
- Local Indigenous communities
- Local land trusts or other similar Environmental Non-Government Organizations
- Field level studies to identify if species at risk, or their habitat, are likely present or absent at or near the site.
- When an activity is proposed within one of the continuous caribou ranges, please be sure to consider the caribou Range Management Policy. This policy includes figures and maps of the continuous caribou range, can be found online at https://www.ontario.ca/page/range-management-policy-support-woodland-caribou-conservation-and-recovery

3.4 Information Sources to Support Impact Assessments

- Guidance to help you understand if your activity is likely to adversely impact species at risk or their habitat can be found online at https://www.ontario.ca/page/policy-guidance-harm-and-harass-under-endangered-species-act and https://www.ontario.ca/page/categorizing-and-protecting-habitat-under-endangered-species-act
- A list of species at risk in Ontario is available online at https://www.ontario.ca/page/species-risk-ontario. On this webpage, you can find out more about each species, including where is lives, what threatens it and any specific habitat protections that apply to it by clicking on the photo of the species.

4.0 Check-List

Please feel free to use the check list below to help you confirm you have explored all applicable information sources and to support your discussion with Ministry staff at the preliminary screening stage.

- ✓ Land Information Ontario (LIO)
- ✓ Natural Heritage Information Centre (NHIC)
- ✓ The Breeding Bird Atlas
- ✓ eBird
- ✓ iNaturalist
- ✓ Ontario Reptile and Amphibian Atlas
- ✓ List Conservation Authorities you contacted:_____

  _____
- ✓ List local naturalist groups you contacted:_____

  _____
- ✓ List local Indigenous communities you contacted:_____

  _____
- ✓ List any other local land trusts or Environmental Non-Government Organizations you contacted:_____

  _____
- ✓ List and field studies that were conducted to identify species at risk, or their habitat, likely to be present or absent at or near the site: _____

  _____
- ✓ List what you think the likely impacts of your activity are on species at risk and their habitat (e.g. damage or destruction of habitat, killing, harming or harassing species at risk):_____

  _____

MNR SOUTHERN REGION INFORMATION PACKAGE – FOR EXTERNAL PROPONENT ENVIRONMENTAL ASSESSMENTS

MNR – SOUTHERN REGION – LUPSI

October 2024

How to Use This Information Package

Environmental Assessment (EA) is a planning and decision-making process used to promote environmentally responsible decision-making. In Ontario, this process is defined and is required pursuant to the *Environmental Assessment Act (EAA)*. The Ministry of Environment, Conservation and Parks (MECP) administers the *EAA*.

The Ministry of Natural Resources (MNR) may be asked by a proponent of a project subject to an EA or Class EA to participate as a commenting agency to ensure provincial interests within MNR's mandate are considered by the proponent in the project planning process.

Use of this Information Package "Package" is intended to help project proponents understand MNR's:

- role as a commenting agency and interests related to environmental assessment within the Ministry's mandate (refer Sections 1 through 8 of this document)
- regulatory authority to issue authorizations, permits, licenses and/or approvals (refer Appendix A – MNR Regulatory Role)

The information provided by MNR and the sources listed in this Package should not be considered exhaustive nor a substitute for consultation with other agencies, site visits and appropriate field studies. The information provided is subject to change from time to time and it is the proponent's responsibility to ensure the information used to support project planning and compliance with *EAA* requirements is current and accurate.

If no MNR interests are identified based on the information contained in this Package there is no need to further circulate MNR as a commenting agency when undertaking consultation and review under the applicable EA process. MNR Southern Region (via sr.planning@ontario.ca) may be contacted if there are any questions about the content of this Package or if specific technical information is required.

This Package is intended for use within MNR's Southern Region (SR) regional boundary only. To view the MNR SR regional boundary please see Ministry of Natural Resources and Forestry work centres | ontario.ca.

Table of Contents

1. MNR Mandate 4
2. MNR Role as Commenting Agency 4
3. Provincial Planning Policies 4
Provincial Plan Mapping 5
Greenbelt Plan, 2017 5
Niagara Escarpment Plan (NEP), 2017 5
Oak Ridges Moraine Conservation Plan (ORMCP), 2017 5
Lake Simcoe Protection Plan (LSPP), 2009 5
4. Fish, Wildlife and Natural Heritage 6
Fisheries 6
Areas of Natural and Scientific Interest 6
Wetlands 6
Significant Wildlife Habitat 7
Significant Woodlands 7
Significant Valleylands 7
5. Natural Hazards 8
Hazardous Lands (flooding, erosion and dynamic beach hazards) 8
Special Policy Areas 8
Hazardous Sites (unstable soils and bedrock) 8
Hazardous Forest Types for Wildland Fire 9
6. Oil, Gas and Salt Resources 9
7. Mineral Aggregate Resources 10
8. Crown Lands, Lakes, Rivers and Forests 10
9. Conclusion 10
Appendix A – MNR Regulatory Role 11
Fish and Wildlife Conservation Act 11
Aggregate Resources Act 11
Lakes and Rivers Improvement Act 11
Public Lands Act 12
Crown Forest Sustainability Act 12
Appendix B – Technical Guides 13

1. MNR Mandate

MNR has a mandate to protect Ontario's biodiversity while promoting economic opportunities in the resource sector and supporting outdoor recreation opportunities by:

- Sustainably managing Ontario's fish and wildlife resources.
- Leading the management of Ontario's public (also referred to as Crown) lands, including the beds of navigable waters, oil, gas, salt and aggregate resources, and access to Crown land for renewable energy projects.
- Ensuring the sustainable management of Ontario's Crown forests.
- Protecting people, property and communities from forest fires, floods, and droughts.
- Developing and applying geographic information to help manage the province's natural resources.

MNR's regulatory role is triggered when a project proponent seeks an approval under legislation administered by the Ministry. Information on the Ministry's regulatory role under applicable legislation can be found in Appendix A.

2. MNR Role as Commenting Agency

MNR's role as a commenting agency on projects subject to *EAA* requirements is to:

- Assist and enable project proponents to access relevant technical and scientific information within the scope of MNR's mandate.
- Provide legislative / regulatory / policy information and direction regarding interests within MNR's mandate.
- Support the identification and consideration of the potential effects of a project on matters within MNR's mandate.
- Identify where the project proponent may need to seek MNR approvals regarding the project.

3. Provincial Planning Policies

Provincial plans together with the *Provincial Policy Statement, 2024* (PPS) issued under section 3(1) of the *Planning Act,* provide policy direction on matters of provincial interest related to land use planning and development in Ontario. The PPS and provincial plans contain policies specific to infrastructure projects.

A summary of matters related to MNR's mandate within specific infrastructure-related provincial planning policies can be found below. Please note, this is not an exhaustive list of provincial policies that may apply to a project and other MNR mandated interests may be applicable. It is the project proponent's responsibility to review the provincial plans and PPS,

which may be amended from time to time, to determine policies applicable to the proposed project.

Provincial Plan Mapping

Mapping of provincial plan boundaries and natural heritage areas as defined in individual provincial plans is available to view or download through Make A Map: Natural Heritage Areas or Ontario GeoHub (GeoHub) - Natural Heritage System Area.

Greenbelt Plan, 2017

Section 4.2.1.2 of the Greenbelt Plan contains policies which are designed to direct infrastructure away from, or where not possible, to minimize the impacts on the Natural Heritage and Water Resource Systems. It requires that new or expanding infrastructure "shall avoid *key natural heritage features, key hydrologic features or key hydrologic areas* unless need has been demonstrated and it has been established that there is no other reasonable alternative."

Niagara Escarpment Plan (NEP), 2017

The NEP is administered by the Niagara Escarpment Commission, the government agency mandated to develop, interpret, and apply NEP policies that maintain and enhance the Niagara Escarpment's unique environmental and landscape features. In addition to Make A Map: Natural Heritage Areas, mapping of NEP Escarpment Natural Areas and Escarpment Protection Areas may be obtained from your local municipality or the Niagara Escarpment Commission.

Oak Ridges Moraine Conservation Plan (ORMCP), 2017

Section 41 of the ORMCP contains policies specific to the development of new or the upgrading/extension of existing infrastructure. This policy direction includes where development shall not be permitted unless specified criteria have been satisfied (including where applicable that there is no other reasonable alternative) and establishes required documentation to support infrastructure projects. Specific conditions apply to proposed infrastructure development within a natural core area and infrastructure crossings of key natural heritage features.

Lake Simcoe Protection Plan (LSPP), 2009

Policy 6.23-DP of the LSPP directs that development or site alteration in relation to infrastructure shall not be permitted within a key natural heritage feature, a key hydrologic feature or within a related vegetation protection zone unless the need for the project has been demonstrated through an Environmental Assessment or other similar environmental approval and it has been demonstrated there is no reasonable alternative. Some exceptions may apply.

4. Fish, Wildlife and Natural Heritage

MNR's natural heritage and natural resources geospatial data layers can be accessed through the ministry's GeoHub and Natural Resources Data Access Requests | Ontario GeoHub. Please note, these Geospatial Ontario (formerly known as Land Information Ontario) GIS data layers available from MNR and the sources listed and linked on this webpage should not be considered as a substitute for site visits and appropriate field surveys. Generally, information available from MNR can be regarded as a starting point from which to conduct further field studies, if needed. While this data represents MNR's best available current information, it is important to note that a lack of information for a site does not mean that additional features and values are not present. There are many areas where MNR does not currently have information. On-site assessments can better verify site conditions, identify natural features and values and confirm presence of species at risk and/or their habitats.

The information below provides an overview of MNR's mandated interests in natural heritage to consider within the project study area. A detailed list of provincial technical guidance material used to identify significant natural heritage features in different landscapes can be found in Appendix B.

Fisheries

All permanent and intermittent watercourses and waterbodies have potential to contain fish habitat or contribute to fisheries resources. MNR is responsible for administering and enforcing the Ontario Fishery Regulations under the *Fisheries Act*.

When agency approvals are required for a proposed project, it is the responsibility of the authorizing regulatory agency to set any in-water work timing windows in their authorizations. These timing windows may be based on the MNR's In-water Work Timing Window Guidelines.

Areas of Natural and Scientific Interest

The study area should be screened for the presence of Areas of Natural and Scientific Interest (ANSI). ANSIs are lands and waters containing features that are important for natural heritage protection, scientific study, and education. ANSIs are identified and confirmed by MNR based on their representation of Ontario's significant geological and natural heritage features and are categorized as either Earth Science or Life Science.

Wetlands

Study areas that contain unevaluated or unmapped wet features should be investigated for the presence of wetlands. Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to the surface. Wetlands may

vary in their significance, and the four major types of wetlands are swamps, marshes, bogs, and fens.

As of January 1, 2023, MNR no longer reviews and confirms wetland evaluations. MNR's role with respect to wetland evaluation includes providing the provincial framework under which wetlands in Ontario are evaluated for significance (OWES), and uploading digital wetland boundary mapping and wetland status into the Geospatial Ontario database.

Significant Wildlife Habitat

Study areas which may contain significant wildlife habitat should be investigated for its presence or absence. Significant wildlife habitat may include features such as: seasonal concentration areas for wildlife species (e.g., snake hibernaculum), rare vegetation communities (e.g., tallgrass prairie), specialized habitats of wildlife (e.g., turtle nesting and over-wintering areas), habitats of species of conservation concern (e.g., Special Concern species as identified on the Species at Risk in Ontario list) and animal movement corridors (e.g., amphibian movement corridors). Provincially tracked species data (generalized to Natural Heritage Information Centre 1 km screening grid) can be viewed in Natural Heritage Make a Map. Detailed geospatial data may be obtained through GeoHub via a data sharing agreement.

Please note, relying on online mapping tools only may not accurately reflect the presence or absence of significant wildlife habitat within the project study area. Surveys or additional site level assessment are often required to confirm presence or absence of natural heritage features and values.

Significant Woodlands

Project study areas that contain wooded areas should be investigated for the presence of significant woodlands. Significant woodlands are areas that are ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to their contribution to the broader landscape; or economically important. Local planning authorities are responsible for identifying significant woodlands in accordance with criteria established by MNR.

Significant Valleylands

Project study areas that occur in a valley or other landform depression that has water for some period of the year should be investigated for the presence of significant valleylands. The identification of valleyland significance is the responsibility of the local planning authority. MNR recommends criteria for determination of valleyland significance.

5. Natural Hazards

In Ontario, development is generally directed away from areas impacted by natural hazards to prevent risks from inappropriate development on and around these lands and to ensure that the risks to public health and safety are minimized. Keeping people and property out of harm's way is a cost-effective, socially responsible, and proactive approach to addressing natural hazards. Various policies and programs direct people and development outside of natural hazard areas.

Responsibility for natural hazard management and implementation of programs and policies for most natural hazards has been delegated to municipalities and Conservation Authorities (CA) where they exist. MNR supports implementation of natural hazard policies by local municipalities and CAs by providing a series of natural hazard technical guidelines (see Appendix B).

Hazardous Lands (flooding, erosion and dynamic beach hazards)

The project location should be reviewed for the presence of hazardous lands. These may include lands subject to flooding and/or erosion and dynamic beaches. These lands become hazardous when people and property locate in these areas. The local municipality and CA should be contacted for further guidance where required.

Special Policy Areas

Some localized areas of the province may be subject to an approved Special Policy Area (SPA), as defined by the PPS. If the study area is located within or adjacent to a SPA, special consideration for any impacts to the flood plain and site-specific SPA policies may be necessary. Any proposed change or modification to the official plan policies, land use designations or boundaries applying to SPA lands, requires joint approval by the Ministers of the Ministry of Municipal Affairs and Housing (MMAH) and MNR.

Local official plans may be reviewed to identify the presence of SPAs within the study area. MNR may have additional information regarding SPAs which can be made available upon request.

Where applicable, information should be identified at the EA stage regarding any expected changes to the floodplain or potential modifications to the SPA subject to provincial approval.

Hazardous Sites (unstable soils and bedrock)

The project location should be reviewed for the presence of hazardous sites. These may include unstable soils (sensitive marine clays [leda], organic soils) or unstable bedrock (karst topography). General information and mapping tools available to assist in identifying the

potential presence of hazardous sites (e.g., karst and organic soils) include, but are not limited to:

- GeologyOntario (gov.on.ca) is maintained by the Ministry of Mines and provides access to all Ontario Geological Survey maps, reports and digital datasets.
- Wetland mapping
- Soil information and mapping maintained by the Ministry of Agriculture, Food and Rural Affairs is available at Soil Survey Complex (GeoON) or AgMaps

Hazardous Forest Types for Wildland Fire

Project study areas containing wooded areas should be screened for the presence of hazardous forest types for wildland fire. Data to identify potential areas that meet this definition can be found in GeoHub - Potential Hazardous Forest Types for Wildland Fire. Note that this data layer is based on forest type data at a coarse scale. Complete assessment of risk and determination of appropriate mitigation measures can only be done with confidence on a site-specific basis.

6. Oil, Gas and Salt Resources

Oil, gas or salt wells are regulated under the *Oil, Gas and Salt Resources Act*, and the supporting regulations and operating standards.

To help determine the presence of petroleum wells within the proposed project area, basic mapping information can be found through the GeoHub portal or the Ontario Oil, Gas and Salt Resources Library (www.ogsrlibrary.com). The 'Definitions and Terminology Guide' listed in the publications section on the library website may provide a better understanding of the well and resource information available.

The Ontario Petroleum Institute (OPI) is an industry association that can assist with retaining the services of a consultant who can provide information about the potential resources located below the property.

If any unanticipated petroleum wells or associated works are encountered during a project, the proponent should cease work immediately and contact MNR's Petroleum Operations Section (POS) to further understand the proponent's obligations under the *Oil, Gas and Salt Resources Act*. The POS may be contacted at POSRecords@ontario.ca or 519-873-4634. In the event of a spill, the project proponent should report it to the Spills Action Centre at 416-325-3000, 1-800-268-6060 (toll free), or 1-855-889-5775 (TTY).

7. Mineral Aggregate Resources

Mineral aggregate resources are usually sand, gravel, clay, earth and bedrock. They are used to make roads, subway tunnels, homes and other structures. Mineral aggregate resources are a non-renewable resource that exist in fixed locations.

MNR has an interest in protecting mineral aggregate resources from incompatible development so they may continue to be available for future extraction. Data to map known deposits of mineral aggregate resources is available from Geology Ontario at GeologyOntario (gov.on.ca).

Project proponents should consider mineral aggregate resources by screening for existing aggregate operations at Find Pits and Quarries | ontario.ca, and consider any potential to preclude or hinder operations and the use of aggregate resource deposits through incompatible development.

8. Crown Lands, Lakes, Rivers and Forests

MNR manages public lands including the beds of most lakes and rivers. Some activities on shore lands (both public and private) are also managed by the MNR.

Public land boundaries (mapping is representative only) and applicable Crown land use policies can be viewed at Crown Land Use Policy Atlas | ontario.ca. Provincial parks and conservation reserves are managed by MECP under the *Provincial Parks and Conservation Reserves Act*.

MNR manages the health of Crown forests so they may continue to provide ecological, economic, and social benefits. Most of Ontario's Crown forests are managed by forest companies under 20-year Sustainable Forest Licences. These companies are responsible for working with government and others to prepare and implement a forest management plan for their licence area, monitoring compliance with the plan and renewing the forest after harvesting trees.

9. Conclusion

The list of interests within MNR's mandate described in this document is not exhaustive. For additional information on legislation and programs the ministry administers see Ministry of Natural Resources | ontario.ca.

If you have identified any MNR interests in your project planning and require additional information, please direct your specific questions to the designated Regional Planner for the project, or to SR.planning@ontario.ca.

Appendix A – MNR Regulatory Role

MNR's regulatory role is triggered when a project proponent seeks an approval under legislation administered by the Ministry. This Appendix provides information about some of the more commonly applicable approvals issued by MNR. Please note, MNR may not be able to confirm the requirement for an approval until a detailed project and site plan have been provided to the Ministry.

A proposal for an MNR approval may engage the ministry's duty to consult Indigenous peoples.

Where MNR is considering an application, the ministry must also ensure its own obligations under the *EAA* are satisfied prior to a final decision. Where an approval would dispose of rights to Crown Resources for a project that has already completed *EAA* requirements under another process, MNR will require written documentation from the applicant setting out how *EAA* requirements for the project have been met prior to MNR issuing any requested approval.

Fish and Wildlife Conservation Act

The *Fish and Wildlife Conservation Act, 1997* regulates the relocation of fish and wildlife. Accordingly, should a project require:

- The relocation of fish outside of the work area, a Licence to Collect Fish for Scientific Purposes will be required.
- The relocation of wildlife outside of the work area (including amphibians, reptiles, and small mammals), will require a Wildlife Collector's Authorization.
- The destruction, taking or possession of any nests or eggs of species not protected by the *Migratory Birds Convention Act (*MBCA*)* or excluded under section 7(2) of the FWCA may also require a Wildlife Collector's Authorization.

To learn more about the management of Fish and Wildlife in Ontario, or to apply for permits or licenses, please visit the Natural Resources Information Portal.

Aggregate Resources Act

The *Aggregate Resources Act* (ARA) is the primary legislative framework for regulating aggregate resource extraction in Ontario. The MNR administers the *ARA* and issues licenses, permits and approves amendments to existing approvals. Information on existing pits and quarries and when an aggregate permit or license may be required can be accessed from MNR's Aggregates Section or GeoHub – Additional Resources

Lakes and Rivers Improvement Act

The *Lakes and Rivers Improvement Act* (LRIA) provides the MNR with regulatory authority over the design, construction, operation, maintenance and safety of dams in Ontario. For

information regarding when a MNR approval may be required and how the LRIA is administered by the Ministry visit Lakes and Rivers Improvement Act administrative guide | ontario.ca

Public Lands Act

The use of public land and shore lands are regulated under the *Public Lands Act*. A work permit must be obtained from MNR to undertake certain activities on public land and shore lands. To occupy public lands in Ontario, you must receive prior approval from MNR unless the use is permitted by regulation. Visit Natural Resources Information Portal for information on when a permit or approval is required and how to submit an application.

Crown Forest Sustainability Act

Any activities that involve a proposal to cut Crown forest resources (e.g., trees on Crown land) may require approval under the *Crown Forest Sustainability Act, 1994.*

Appendix B – Technical Guides

The following technical guides are the province's best available information to support identification of significant natural heritage features in different landscapes:

- Natural Heritage Reference Manual (2010)
- Greenbelt Technical Paper (2005)
- Oak Ridges Moraine Technical Paper 1 (Natural Heritage Features)
- Oak Ridges Moraine Technical Paper 2 (Significant Wildlife Habitat)
- Oak Ridges Moraine Technical Paper 7 (Significant Woodlands)
- Lake Simcoe Protection Plan Technical Paper
- Ontario Wetland Evaluation System (OWES)
- Significant Wildlife Habitat Technical Guide
    - Ecoregion Criterion Schedules for the identification of Significant Wildlife Habitat
        - Ecoregion 5E
        - Ecoregion 6E
        - Ecoregion 7E
    - Significant Wildlife Habitat Mitigation Support Tool (MiST)

Other supporting information may be found at Ontario GeoHub or Natural Resources Data Access Requests | Ontario GeoHub.

The following technical guides are the province's best available information to support implementation of MNR's interest in natural hazards (contact MNR to request pdf copies):

- Understanding Natural Hazards (2001)
- Special Policy Areas Procedures (2009)
- Technical Guide – River & Stream Systems: Flooding Hazard Limit (2002)
- Technical Guide – River & Stream Systems: Erosion Hazard Limit (2002)
- Great Lakes-St. Lawrence River Shorelines: Flooding, Erosion and Dynamic Beaches (2001)
- Technical Guide for Large Inland Lakes Shorelines: Flooding, Erosion and Dynamic Beaches (1996)
- Hazardous Sites Technical Guide (1996)
- Technical Bulletin: Flooding Hazards: Data Survey and Mapping Specifications (2023)
- Wildland Fire Risk Assessment and Mitigation Reference Manual (2017)

The following technical guide is the province's best available information supporting implementation of MNR's mandated interest in mineral aggregate resources (contact MNR to request pdf copy):

- Non-renewable Resources Training Manual (1997)

Gryfe, Marley

From: Rich, Kevin (MNR) <Kevin.Rich@ontario.ca>
Sent: February 25, 2025 5:15 PM
To: Gryfe, Marley
Cc: Wilson, Chris; pvmwest@northernbruce.ca; Allison Mokracki; Almond, John (MNR)
Subject: FW: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: MNR Southern Region Information Package – For External Proponent Environmental Assessments_Ver2.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Marley Gryfe,
The Ministry of Natural Resources (MNR) received this Notice of Commencement regarding two Municipal Class Environmental Assessment (MCEA) studies concerning separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head on January 29, 2025. Thank you for circulating this notice to our office. Our apologies for not replying to this email sooner.

MNR has prepared the attached **MNR Southern Region Information Package – For External Proponent Environmental Assessments** (Package) to help project proponents understand MNR's role as a commenting agency and interests related to environmental assessment within the Ministry's mandate. The Package also provides information on the Ministry's regulatory authority to issue authorizations, permits, licenses and/or approvals. The information provided is subject to change from time to time and it is the proponent's responsibility to ensure the information used to support project planning and compliance with *Environmental Assessment Act* requirements is current and accurate. It is the proponent's responsibility to be aware of, and comply with, all relevant federal or provincial legislation, municipal by-laws and/or other agency approvals.

Please note the ministry has not completed a screening of natural heritage or other resource values at this time. If no MNR interests are identified based on the information contained in this Package, there is no need to further circulate MNR as a commenting agency when undertaking consultation and review under the applicable EA process. If you have identified any MNR interests in your project planning and require additional technical information, or if you have questions about the content of this Package, please feel free to contact me, or SR.planning@ontario.ca.

Regards,

Kevin Rich (He/Him)
Regional Planner | Land Use Planning and Strategic Issues Section
Ministry of Natural Resources | Ontario Public Service
705 772-3096 | kevin.rich@ontario.ca

Ontario

From: Almond, John (MNR) <john.almond@ontario.ca>
Sent: Wednesday, January 29, 2025 10:49 AM
To: Southern Region Planning Inbox (MNR) <SR.Planning@ontario.ca>
Cc: McLay, Jason (MNR) <Jason.McLay2@ontario.ca>
Subject: FW: Notice of Municipal Class Environmental Assessment (MCEA)

FYI

John Almond (he/him)
A/District Manager | Aurora Midhurst Owen Sound District/Regional Operations Division
Ministry of Natural Resources | Ontario Public Service
289-380-1039 | john.almond@ontario.ca

Ontario

Taking pride in strengthening Ontario, its places and its people

"Please note: As part of providing accessible customer service, if you have any accommodation needs, require communication supports, or alternate formats please let me know."

From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: Wednesday, January 29, 2025 10:34 AM
To: Almond, John (MNR) <john.almond@ontario.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; Allison Mokracki <AMokracki@ocwa.com>
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

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Gryfe, Marley

From: Abrazhevich, Anastasia (MCM) <Anastasia.Abrazhevich2@ontario.ca>
Sent: February 28, 2025 2:07 PM
To: Gryfe, Marley; Barboza, Karla (She/Her) (MCM)
Cc: Wilson, Chris; pvmwest@northernbruce.ca; Allison Mokracki
Subject: RE: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: 2025-02-28-Tobermory_MCEA_MasterPlan_InitialLetter.pdf; 2025-02-28-Lions_Head_MCEA_MasterPlan_InitialLetter.pdf; Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Dear Marley,

Thanks for sending the Notice of Commencement for the above referenced project to the Ministry of Citizenship and Multiculturalism. Please find attached MCM's preliminary comments on this Addendum.

As the notice involves two different projects, we are providing two separate initial letters for your review.

If you have any questions or require clarification, do not hesitate to contact us.

Kind regards,

Anastasia Abrazhevich
Heritage Planner | Citizenship, Inclusion and Heritage Division
Ministry of Citizenship and Multiculturalism | Ontario Public Service
437 240 2379 anastasia.abrazhevich2@ontario.ca

Ontario

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From: Gryfe, Marley <Marley.Gryfe@wsp.com>
Sent: Wednesday, January 29, 2025 10:33 AM
To: Barboza, Karla (She/Her) (MCM) <Karla.Barboza@ontario.ca>
Cc: Wilson, Chris <Chris.Wilson@wsp.com>; pvmwest@northernbruce.ca; Allison Mokracki <AMokracki@ocwa.com>
Subject: Notice of Municipal Class Environmental Assessment (MCEA)

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto



marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington



chris.wilson@wsp.com

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Ministry of Citizenship and Multiculturalism

Heritage Planning Unit
Heritage Operations Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Toronto, ON M5G 1S7
Tel.: 437.240.2379

Ministère des Affaires civiques et du Multiculturalisme

Planification relative au patrimoine
Opérations relatives au patrimoine
Division des affaires civiques, de l'inclusion et du patrimoine
5e étage, 400, av. University
Toronto, ON M5G 1S7
Tél.: 437.240.2379

Ontario

February 28, 2025 EMAIL ONLY

Chris Wilson
Consultant Project Manager
Manager, Land Development & Municipal Engineering
WSP
1450 1st Avenue West, Suite 101
Owen Sound, ON N4K 6W2
chris.wilson@wsp.com

MCM File	**:**	**0023163**
Proponent	**:**	**Municipality of Northern Bruce Peninsula & Ontario Clean Water Agency**
Subject	**:**	**Municipal Class Environmental Assessment – Master Plan - Notice of Commencement**
Project	**:**	**Lion's Head Water and Wastewater Master Plan**
Location	**:**	**Lions Head, Municipality of Northern Bruce Peninsula Bruce County, ON**

Dear Chris Wilson:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Commencement for the above-referenced project.

MCM's interest in this master plan relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources, and cultural heritage landscapes.

MCM understands that master plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. The Municipal Class Environmental Assessment (MCEA) outlines a framework for master plans and associated studies which should recognize the planning and design Process of this Class EA and should incorporate the key principles of successful environmental assessment planning identified in Section A.1.1. The master planning process will, at minimum, address Phases 1 and 2 of the Planning and Design Process of the MCEA.

This letter provides advice on how to incorporate consideration of cultural heritage in the above-mentioned master planning process by outlining the technical cultural heritage studies and the level of detail required to address cultural heritage in master plans. In accordance with the MCEA,

cultural heritage resources should be identified early in the process in order to determine known and potential resources and potential impacts.

Master Plan Summary
The notice of comments informs that the existing drinking water and wastewater services within the communities of Tobermory and Lion's Head are not meeting the current needs of the population. The Lion's Head Drinking water system currently provides limited servicing and has no wastewater service or wastewater treatment facilities. The Water and Wastewater Master Plan studies will make long term recommendations on how Lion's Head can improve existing services and identify new opportunities for municipal water and wastewater services.

The Ontario Clean Water Agency (OCWA) is undertaking two Municipal Class Environmental Assessment (MCEA) studies on behalf of the Municipality of Northern Bruce Peninsula to develop Water and Wastewater Master Plans for the communities.

Comments

This letter relates to the Lion's Head Water and Wastewater Master Plan. A separate letter will be sent on Tobermory Water and Wastewater Master Plan.

It is unclear what approach is being taken in accordance with the Master Planning Process outlined in the Municipal Class Environmental Assessment (MCEA). We recommend that you clearly identify your proposed study approach. Any individual undertakings proceeding as part of this master plan should be screened for impacts to cultural heritage resources.

MCM understands that the final public notice for the master plan could become the notice of completion for the Schedule B and C MCEAs within it and that this approach would likely result in extensive documentation should the master plan include numerous Schedule C MCEA undertakings. In regard to cultural heritage resources, the Master Plan document should:

- identify existing baseline environmental conditions;
- identify expected environmental impacts; and
- Include measures to mitigate potential negative impacts.

Archaeological Resources
Any undertakings included as part of the master plan should be screened using the Ministry's *Criteria for Evaluating Archaeological Potential* and *Criteria for Evaluating Marine Archaeological Potential* (if shoreline or in-water works are proposed) to determine if an archaeological assessment is needed. If the EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by an archaeologist licensed under the Ontario Heritage Act and submitted for MCM review prior to the completion of the master plan. We are aware that Bruce County was developing an Archaeological Management Plan, and we recommend that you contact the County planner for further advice.

Built Heritage Resources and Cultural Heritage Landscapes
The Ministry's *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether this EA project may impact known or potential built heritage resources and/or cultural heritage landscapes.

If there is potential for built heritage resources and/or cultural heritage landscapes within the project area, then a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment shall be undertaken for the entire study area during the planning phase and be summarized in the EA Report. This study will:

1. Describe the existing baseline cultural heritage conditions within the study area by identifying all known or potential built heritage resources and cultural heritage landscapes, including a historical summary of the study area. The Ministry has developed screening criteria that may assist with this exercise: *Criteria for Evaluating for Potential Built Heritage Resources and Cultural Heritage Landscapes*.

2. Identify preliminary potential project-specific impacts on the known and potential built heritage resources and cultural heritage landscapes that have been identified. The report should include a description of the anticipated impact to each known or potential built heritage resource or cultural heritage landscape that has been identified.

3. Recommend measures to avoid or mitigate potential negative impacts to known or potential built heritage resources and cultural heritage landscapes. The proposed mitigation measures are to inform the next steps of project planning and design.

Given that this project covers a large study area, MCM recommends that the Cultural Heritage Report is carried out so that step 1 described above is undertaken early in the planning process. Then, steps 2 and 3 can be undertaken once the preferred alternatives have been selected.

Where a known or potential built heritage resource or cultural heritage landscape may be directly and adversely impacted, and where it has not yet been evaluated for Cultural Heritage Value or Interest (CHVI), completion of a Cultural Heritage Evaluation Report (CHER) is required to fully understand its CHVI and level of significance. The CHER must be completed as part of the final EA report. If a potential resource is found to be of CHVI, then a Heritage Impact Assessment (HIA) will need to be undertaken and included in the final EA report. Please send the HIA to MCM for review and make it available to local organizations or individuals who have expressed interest in review.

While some cultural heritage landscapes are contained within individual property boundaries, others span across multiple properties. For certain cultural heritage landscapes, it will be more appropriate for the CHER and HIA to include multiple properties, in order to reflect the extent of that cultural heritage landscape in its entirety.

Community input should be sought to identify locally recognized and potential cultural heritage resources. Sources include, but are not limited to, municipal heritage committees, community heritage registers, historical societies and other local heritage organizations.

Cultural heritage resources are often of critical importance to Indigenous communities. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Indigenous communities includes a discussion about known or potential cultural heritage resources that are of value to them.

Environmental Assessment Reporting

Technical cultural heritage studies are to be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed. Please advise MCM whether any technical heritage studies will be completed for this master plan and provide them to MCM before issuing a Notice of Completion.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and

contact information remain unchanged. Please continue to send any notices, report and/or documentation to both Karla Barboza and myself.

- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | karla.barboza@ontario.ca
- Anastasia Abrazhevich, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 437-240-2379 | anastasia.abrazhevich2@ontario.ca

Thank you for consulting MCM on this project. Please continue to do so through the master plan process and contact me for any questions or clarification.

Sincerely,

Anastasia Abrazhevich
Heritage Planner
anastasia.abrazhevich2@ontario.ca

Copied to: Peggy Van Mierlo-West, CAO, Municipality of Northern Bruce Peninsula
Marley Gryfe, Environmental Planner, WSP
Allison Mokracki, Municipality Project Manager, OCWA
Karla Barboza, Team Lead, Heritage Planning Unit, MCM

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery and Procurement, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Ministry of Citizenship and Multiculturalism

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Heritage Operations Branch
Citizenship, Inclusion and Heritage Division
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February 28, 2025 EMAIL ONLY

Chris Wilson
Consultant Project Manager
Manager, Land Development & Municipal Engineering
WSP
1450 1st Avenue West, Suite 101
Owen Sound, ON N4K 6W2
chris.wilson@wsp.com

MCM File	**:**	**0023162**
Proponent	**:**	**Municipality of Northern Bruce Peninsula & Ontario Clean Water Agency**
Subject	**:**	**Municipal Class Environmental Assessment – Master Plan - Notice of Commencement**
Project	**:**	**Tobermory Water and Wastewater Master Plan**
Location	**:**	**Tobermory, Municipality of Northern Bruce Peninsula, Bruce County, ON**

Dear Chris Wilson:

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MCM's interest in this master plan relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources, and cultural heritage landscapes.

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level of detail required to address cultural heritage in master plans. In accordance with the MCEA, cultural heritage resources should be identified early in the process in order to determine known and potential resources and potential impacts.

Master Plan Summary
The notice of commencement informs that existing drinking water and wastewater services within the communities of Tobermory and Lion's Head are not meeting the current needs of the population. Tobermory has limited drinking water supply service and sanitary sewer and wastewater treatment facilities. The Water and Wastewater Master Plans is being developed to explore possible alternative solutions to meet these needs. The Water and Wastewater Master Plan studies will make recommendations on how the Municipality can expand municipal drinking water and wastewater servicing throughout Tobermory and Lion's Head, based on existing conditions, projected growth and climate risks. Each Master Plan will also identify necessary projects and implementation schedules to ensure timely phasing of future capital projects.

The Ontario Clean Water Agency (OCWA) is undertaking two Municipal Class Environmental Assessment (MCEA) studies on behalf of the Municipality of Northern Bruce Peninsula to develop Water and Wastewater Master Plans for the communities.

Comments
This letter relates to the Tobermory Water and Wastewater Master Plan. A separate letter will be sent on Lion's Head Water and Wastewater Master Plan.

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- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | karla.barboza@ontario.ca
- Anastasia Abrazhevich, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 437-240-2379 | anastasia.abrazhevich2@ontario.ca

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Sincerely,

Anastasia Abrazhevich
Heritage Planner
anastasia.abrazhevich2@ontario.ca

Copied to: Peggy Van Mierlo-West, CAO, Municipality of Northern Bruce Peninsula
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Allison Mokracki, Municipality Project Manager, OCWA
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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:43 AM
To: Chief@nawash.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head_January 2025 - Chippewas of Nawash Unceded First Nation.pdf

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Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

wsp.com

Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:43 AM
To: EthanR@metisnation.org
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head_January 2025 - Metis Ethan Roy.pdf

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

Marley Gryfe, MPL
Environmental Planner - Environmental Impact Assessment, Transportation – Toronto

marley.gryfe@wsp.com

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:44 AM
To: sfn@saugeen.org
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head_January 2025 - Saugeen First Nation.pdf

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We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

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Gryfe, Marley

From: Gryfe, Marley
Sent: January 29, 2025 10:45 AM
To: manager.ri@saugeenojibwaynation.ca
Cc: Wilson, Chris; pvmwest@northernbruce.ca; AMokracki@ocwa.com
Subject: Notice of Municipal Class Environmental Assessment (MCEA)
Attachments: Notice of Commencement_Tobermory+Lion's Head_January 2025.pdf; Letter_NOC_Tobermory and Lion's Head_January 2025 - Saugeen Ojibway Nation Environmental Office.pdf

The Municipality of Northern Bruce Peninsula with the Ontario Clean Water Agency (OCWA) acting as agent, is undertaking two Municipal Class Environmental Assessment (MCEA) studies to complete two separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head.

Please find attached a letter regarding the Master Plans and combined Notice of Commencement.

We kindly request that receipt of this email be confirmed. Please reach out to all those copied if you require clarification or have any questions.

Thank you,

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Chris Wilson, P.Eng.
Manager - Land Development & Municipal Engineering – Owen Sound/Burlington

chris.wilson@wsp.com

wsp.com

NOTICE OF PUBLIC INFORMATION CENTRE

Municipality of Northern Bruce Peninsula
Tobermory and Lion's Head Water and Wastewater Master Plans

Background

The Municipality of Northern Bruce Peninsula are undertaking separate Water and Wastewater Master Plan studies for Tobermory and Lion's Head, which will make recommendations on how the Municipality can expand municipal drinking water and wastewater servicing throughout Tobermory and Lion's Head, based on existing conditions, projected growth and climate risks. Each Master Plan will also identify necessary projects and implementation schedules to ensure timely phasing of future capital projects.

Public Information Centre

As part of the studies, in-person Public Information Centres (PICs) are being planned for each community separately. Each PIC will introduce the public to the Master Plan study and Municipal Class Environmental Assessment process, the existing infrastructure and problem and opportunity statement, the evaluation criteria, the alternative solutions, the preliminary preferred solution for both drinking water and wastewater services, and next steps.

The PICs will occur:

Tobermory Water and Wastewater Master Plan	**Lion's Head Water and Wastewater Master Plan**
Date: Wednesday, August 27, 2025 **Time:** 10:00 a.m. to 12:00 p.m. **Location:** Tobermory Community Centre 7420 Hwy. 6, Tobermory, ON N0H 2R0	**Date:** Wednesday, August 27, 2025 **Time:** 1:30 p.m. to 3:30 p.m. **Location:** Rotary Hall 59 Main Street, Lion's Head, ON N0H 1W0

For those who are unable to attend in-person, presentation boards will be available for review on the municipality's website https://letstalknbp.ca/ during the question and comment period following the PICs. The question and comment period will close on Monday, September 22, 2025, at 4:30 p.m. Instructions on how to submit comments will be provided on the municipality's website.

Please contact the undersigned if you have any questions, comments or wish to be added to the mailing list.

Issued on August 6th 2025

Peggy Van Mierlo-West
Chief Administrative Officer
Municipality of Northern Bruce Peninsula
Email: admin@northernbruce.ca
56 Lindsay Road 5,
Lion's Head, ON N0H 1W0

Chris Wilson, P.Eng.
Consultant Project Manager
WSP
Phone: 1-226-279-0315
Email: chris.wilson@wsp.com
957 4th Ave E.,
Owen Sound, Ontario N4K 2N9

Tobermory Water and Wastewater Master Plan

Public Information Centre

Municipal Class Environmental Assessment Study

August 27, 2025



Land Acknowledgement



We acknowledge that we are situated on the traditional territory of the Nawash and Saugeen Nations, a place that has long served as a site of meeting and exchange amongst many First Nations including The Iroquois Confederacy, Huron/Wendat, Abenaki, and Anishinabek.

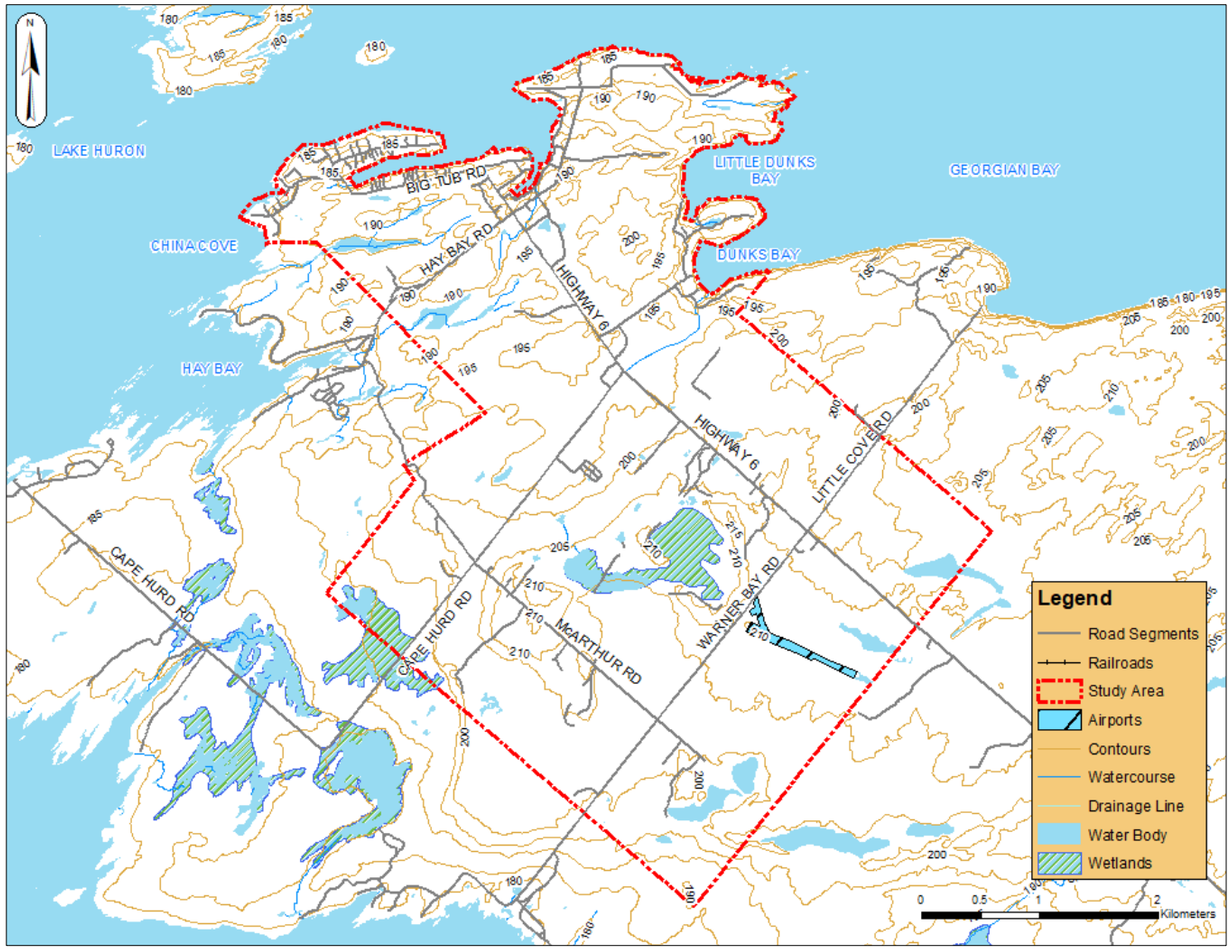
We recognize and respect the Anishinabek as the traditional custodians of the lands and water. We are committed to supporting the Anishinabek and Haudenosaunee Peoples, among other First Nations, Inuit, Métis, and Indigenous Peoples globally.

(Bruce County Land Acknowledgment)

Introduction

Why is the Tobermory Water and Waster Master Plan taking place?

- The existing drinking water and wastewater services in Tobermory are not meeting current community needs.
- Currently, the Tobermory Drinking Water System provides municipal drinking water servicing to a limited area within the community, including the ferry terminal building, Harbour Masters's Office, municipal marina and the public washrooms and shower building adjacent. The existing water system consists of a water treatment plant and pumping station at Front St., pumping water from northwest of Little Tub Harbour.
- Municipal wastewater servicing within the community includes the same area as the water servicing, but expands into a slightly larger area including a component of Hwy. 6, Bay St., Brock St., Head St. and Harpur Dr. The existing wastewater system includes gravity sewer and forcemains, pumping to the wastewater treatment plant located on Highway 6, southwest of Maple Golf Crescent.
- The goal of the Master Plan is to develop a preferred strategy to provide accessible and reliable **drinking water** and **wastewater services** in Tobermory to meet **current and future needs, to 2046 and beyond**.



The purpose of this public consultation is to tell you about:

- The study and the Municipal Class Environmental Assessment process being followed
- The alternative solutions being evaluated and the preliminary preferred solutions
- How **you** can be involved and stay informed!

What is a Master Plan?





A Master Plan is a high-level strategic document that sets out growth-related goals, objectives and priorities for municipal infrastructure. It identifies existing issues and future servicing requirements to help support ever-growing communities.

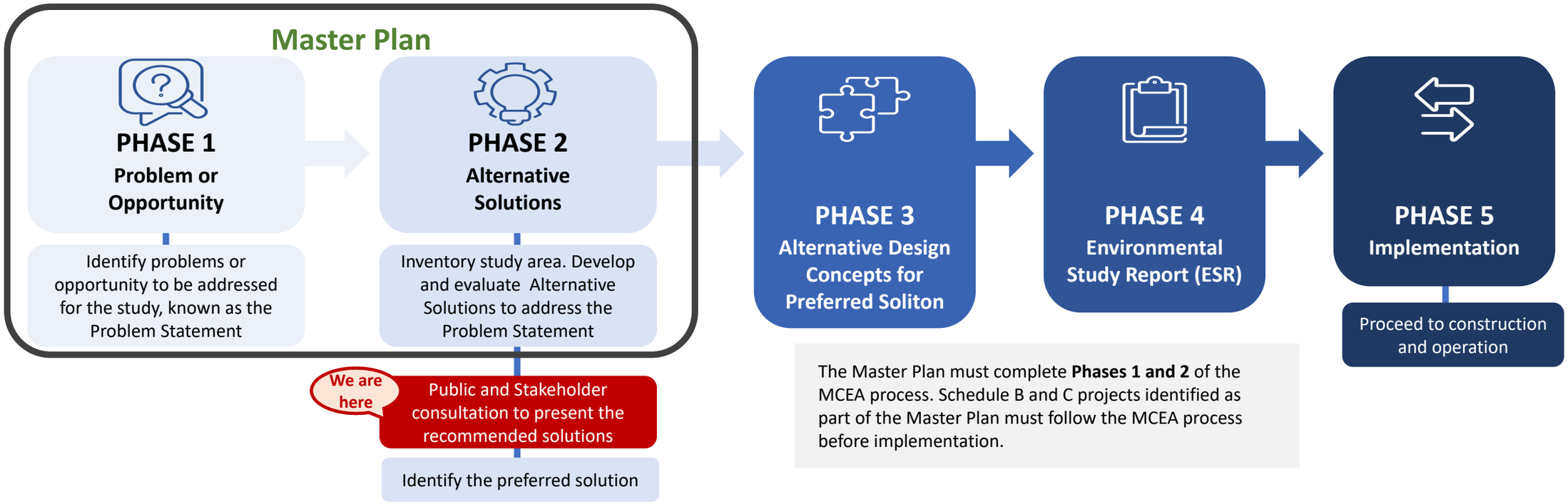
A Master Plan is developed using Environmental Assessment planning principles and fulfills Phase 1 and Phase 2 of the Municipal Class Environmental Assessment process. Future projects identified as part of the Master Plan are then subject to further assessment, either through completing the Schedule B or Schedule C process of the MCEA.

The Master Plan will take into consideration climate change and social and economic impacts, as well as current limitations to each community's growth, given the existing infrastructure.

Master Plan Approach and Process

The current approach for the Master Plan is **Approach No.1** per the MCEA process (**broad master planning where identified projects are subject to project specific requirements**).

- Involves the analysis on a regional or systems scale, which enables the proponent to identify needs and establish broader infrastructure alternatives and solutions
- Specific projects are that required to achieve the preferred solution described in the Master Plan may be identified within the Master Plan document, however the level of detail at a project-specific level is minimal
- Therefore, more detailed investigations at the project-specific level are required to fulfil the Class EA requirements for the specific Schedule B and C projects identified within the Master Plan



The Master Plan must complete **Phases 1 and 2** of the MCEA process. Schedule B and C projects identified as part of the Master Plan must follow the MCEA process before implementation.

Problem Statement

To service the existing and future needs of the community of Tobermory's Water and Wastewater Systems, the following Problem Statement was adopted to guide the master planning study analysis, in accordance with the MCEA process:

"To develop an infrastructure plan for the community of Tobermory which meets servicing needs for today and future development to 2046 and beyond, considering climate change and social and economic impacts, as well as current limitations to Tobermory's growth due to the extents of the existing municipal drinking water service and lack of municipal water and wastewater service."

Evaluation Criteria

Criteria	Indicators	What does this mean?
Natural Environment (20%)	Surface and groundwater (30%)	Impacts to the environment from infrastructure development
	Natural Heritage (30%)	Potential impacts due to construction on natural habit and species at risk
	Climate Change (40%)	Potential impacts to surrounding natural environment from climate change events
Social/Economic Environment (20%)	Impact to existing infrastructure (private and municipal) (25%)	Disruption to residents and businesses during construction
	Aesthetics (20%)	The presence of infrastructure in communities
	Redundancy and security of supply (25%)	Ability of system to provide a consistent Level of Service
	Climate change (30%)	Impacts to residents and businesses during climate change events to provide Level of Service
Technical Suitability (20%)	Existing capacity (25%)	Current/proposed infrastructure to service existing water/wastewater demand capacity
	Impacts on future expansion (25%)	Opportunity to service the greater community and ability to connect future areas under expansion
	Full build out (20%)	Opportunity to service full-build out of the community
	Climate change (30%)	Impacts from climate change events which impact maintaining Level of Service
Constructability (20%)	Ease of construction and site access (20%)	When traditional construction approaches are applied, the impacts associated with installation
	Impact on operations during construction (25%)	Impacts associated with maintaining the current level of Service
	Ease of integration with existing infrastructure (25%)	Impacts associated with tie-in to existing infrastructure or disconnection of old infrastructure
	Climate change (30%)	Impacts from climate change events on the installation and timing of projects
Cost (20%)	Capital Costs (50%)	Cost to construct new infrastructure to establish the system or existing system upsizing and/or replacement
	Relative operation and maintenance costs (50%)	Cost to maintain yearly operations

Description of Alternatives

Drinking Water Servicing Alternatives

Alternatives	Description of Alternatives
1. Do Nothing	❖ Maintain existing level of service as is.
2. Expand to Downtown Core and Community Area	❖ Review and assess existing level of service and optimize; ❖ Expand drinking water servicing to the downtown core and community area.
3. Expand Drinking Water Servicing to Existing and New Developments	❖ Review and assess existing level of service and optimize; ❖ Expand drinking water servicing to the downtown core and community area. ❖ Expand drinking water servicing to existing residents, commercial buildings and existing municipal buildings not currently serviced (including existing municipality owned buildings along Highway 6); ❖ Expand drinking water servicing to all new development (commercial, residential, institutional).

Wastewater Servicing Alternatives

Alternatives	Description of Alternatives
1. Do Nothing	❖ Maintain existing level of service as is.
2. Expand to Downtown Core and Community Area	❖ Review and assess existing level of service and optimize; ❖ Expand WW servicing to downtown core and community area that is not serviced.
3. Expand Wastewater Servicing to Existing Residents and New Developments	❖ Review and assess existing level of service and optimize; ❖ Expand WW servicing to downtown core and community area that is not serviced. ❖ Expand WW servicing to existing residents and commercial buildings and existing municipal owned buildings not currently serviced (including existing municipality owned buildings along Highway 6); ❖ Expand WW servicing to all new development (commercial, residential, institutional).

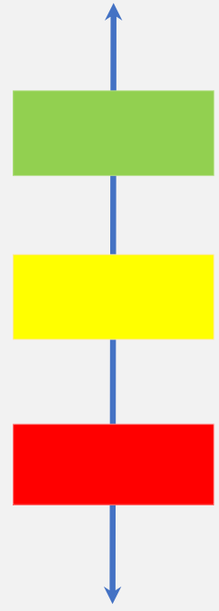
Evaluation of Alternatives – Drinking Water Servicing

Evaluation Criteria – Tobermory Drinking Water	1. Maintain Existing Level of Service	2. Expand to Downtown Core and Community Area	3. Expand Drinking Water Servicing to Existing and New Developments
Natural Environment			
Social/Economic Environment			
Technical Suitability			
Constructability			
Cost			

Preferred Solution

EVALUATION COLOUR RATING SYSTEM

Most Preferred



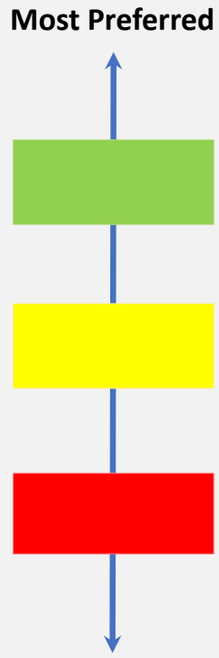
Least Preferred

Evaluation of Alternatives – Wastewater Servicing

Evaluation Criteria – Tobermory Drinking Water	1. Maintain Existing Level of Service	2. Expand to Downtown Core and Community Area	3. Expand Drinking Water Servicing to Existing and New Developments
Natural Environment			
Social/Economic Environment			
Technical Suitability			
Constructability			
Cost			

Preferred Solution

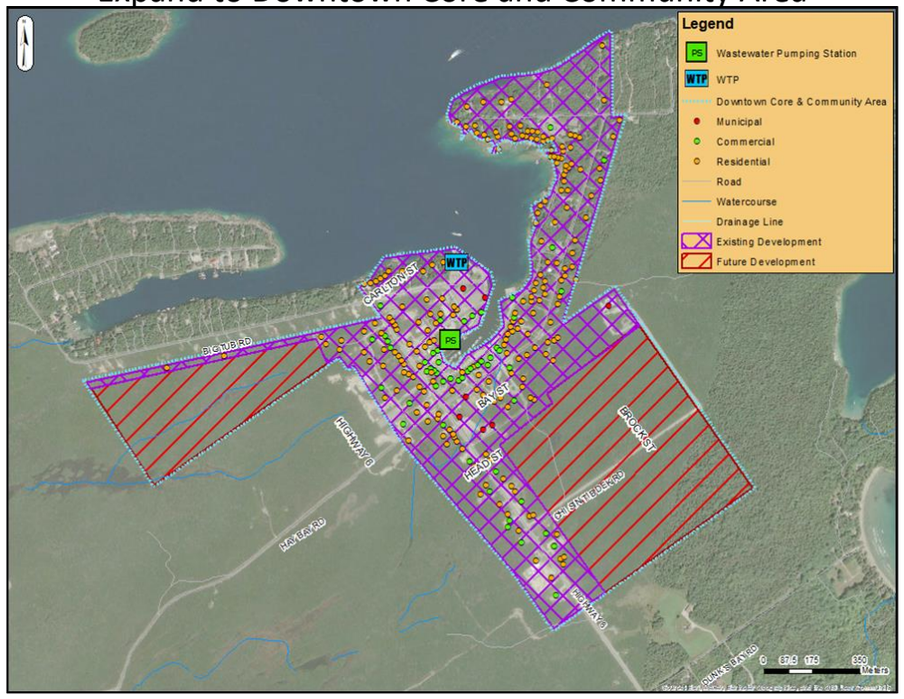
EVALUATION COLOUR RATING SYSTEM



Preliminary Preferred Solutions and Rationale

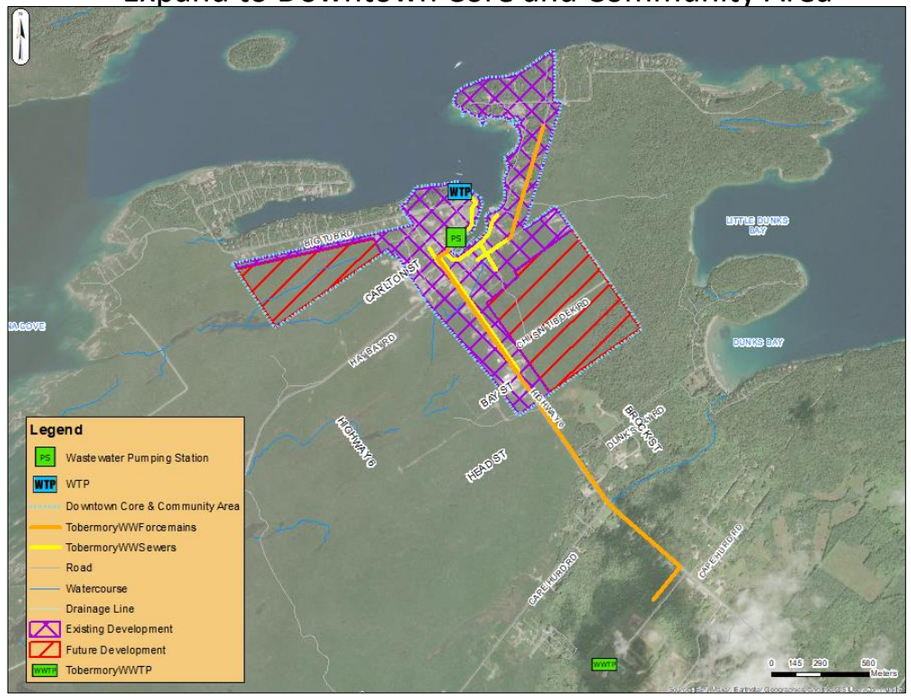
Drinking Water Servicing Alternative 2:

Expand to Downtown Core and Community Area



Wastewater Servicing Alternative 2:

Expand to Downtown Core and Community Area



Rationale for Preferred Drinking Water Servicing Alternative	Rationale for Preferred Wastewater Servicing Alternative
❖ Alternative 2 has the least impact on the overall Natural Environment ❖ Has less impact on Constructability compared to Alternative 3 (which also expands the servicing) ❖ Has less costs associated with it compared to Alternative 3 (which also expands the servicing)	❖ Alternative 2 has the least impact on the overall Natural Environment and Social / Economic Environment ❖ Has less impact on Constructability compared to Alternative 3 (which also expands the servicing) ❖ Has less costs associated with it compared to Alternative 3 (which also expands the servicing)

Capital Construction Costs and Funding Opportunities

• Water/wastewater upgrades (treatment, pumping, storage, distribution) = tens of millions depending on location, size, conditions, labor & materials.

• Master Plan provides broad estimates; detailed costs developed in Schedule B/C projects (e.g., new wastewater treatment facility).

• Funding strategy: Municipality to pursue provincial/federal grants once preferred options/phasing are identified.

• Completed Master Plan & future assessments strengthen applications by showing support for growth, clean water access, and improved wastewater management.

Evaluation Criteria and Alternatives

Next Steps

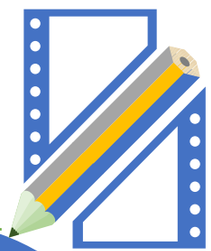
- **September/October 2025** - Receive and consider input from public, agencies, stakeholders, and First Nations communities to evaluate the alternatives presented, and confirm the preferred alternatives.
- **October/November 2025** - Prepare the draft Master Plan Report to fully document the process including all consultation and engagement.
- **November/December 2025** – Prepare and present the draft Master Plan Report to Council for approval.
- **January 2026** – Finalize Master Plan and Notice of Completion for 30-day Public Comment Period.
- **February 2026** – If no issues are raised within the 30-day comment period, the Master Plan Project is closed.

Stay Engaged!

If you have any questions or comments, please fill out a **comment sheet today** or submit your comments by **September 26, 2025**, to:

Peggy Van Mierlo-West
Chief Administrative Officer
Municipality of Northern Bruce Peninsula
Email: **admin@northernbruce.ca**
56 Lindsay Road 5
Lion's Head, ON N0H 1W0

Chris Wilson, P. Eng.
Consultant Project Manager
WSP
Phone: 1-226-279-0315
Email: **chris.wilson@wsp.com**
1450 1st Avenue West, Suite 101
Owen Sound, ON N4K 6W2



For more information about this project, please visit our project webpage: letstalknbp.ca/

PLEASE SIGN-IN TO RECEIVE PROJECT UPDATES!

PUBLIC INFORMATION CENTRE

TOBERMORY WATER AND WASTEWATER MASTER PLAN

Your personal information will not be shared. **Comments and information regarding this study are being collected in accordance with the *Freedom of Information and Protection of Privacy Act*, and solely for the purpose of conducting the environmental assessment and detail design. With the exception of personal information, all comments will become part of the public record.**

DATE: Wednesday, August 27, 2025

NAME	ADDRESS	EMAIL
John & Charlotte Hindman	[redacted]	
Mary Catherine & Fred Jamieson		
[illegible]		
Linda Godbee		
[illegible]		
Debbie Golden		
ED. HARPER		

Rick Peacock	[redacted]
Mike Brown	
Chad Peacock	
DAVID ALMACK	
Jack Schenk	
Janice Patterson	
Carl Churchill	
Carl Churchill	
Smoky Golden	
John Francis	
Donna Cole	

Name	Address	Email
Tom Buckley	[redacted]	
S GRIFFITH		
Leo-Paul Frigault		

Tobermory and Lion's Head Water and Wastewater Master Plans
Agency Comment Tracking
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

Comment Tracking

#	Name and Email Address	Comment Received *Note: Comments are reproduced verbatim including typos and/or grammatical errors*	Action / Status Notes	Response Sent
1	Steve Schaus sschaus@brucecounty.on.ca	**Received 01/29/2025** Received, thank you.	No Response Required	
2	Ontario Provincial Police Grey Bruce (Wiarton) Detachment OPP.Grey.Bruce@opp.ca	**Received 01/29/2025** Your email submission has been received by the Grey Bruce OPP. Thank you.	No Response Required	
3	Henry Thalen Henry.thalen@opp.ca	**Received 01/30/2025** Received, Thanks.	No Response Required	
4	Mark Coleman mcoleman@northernbruce.ca	**Received 01/30/2025** Received.	No Response Required	
5	Linda White lwhite@brucecounty.on.ca	**Received 01/30/2025** I confirm receipt of this email.	No Response Required	
6	Sarah Welch Sarah.welch2@ontario.ca	**Received 01/31/2025**	Response Required	**Sent 02/03/2025** Hi Sarah,

Tobermory and Lion's Head Water and Wastewater Master Plans
Agency Comment Tracking
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

#	Name and Email Address	Comment Received *Note: Comments are reproduced verbatim including typos and/or grammatical errors*	Action / Status Notes	Response Sent
		I noticed that the approach (Approach 1, 2, or 3) has not been identified for the Tobermory and Lion's Head Water and Wastewater Master Plan, could you please provide me with this information? Additionally, could you send back a PIF, which is required for you to fill out and send to us (attached), and send it to eanotification.swregion@ontario.ca. Thanks.		The Tobermory and Lion's Head Water and Wastewater Master Plan is following Approach 1. Please find the requested Project Information Form (PIF) attached for your review.
7	Ethan Meleg Ethan.meleg@pc.gc.ca	**Received 02/03/2025** I confirm receipt of these materials on behalf of Parks Canada. Could you please direct further correspondence directly to my email: ethan.meleg@pc.gc.ca and cc: bruce-fathomfive@pc.gc.ca Thanks!	Response Required	**Sent 02/03/2025** Hi Ethan, Thank you for confirming receipt of our MCEA Notice. We have updated your contact information.
8	Monika Macki (MECP) monika.macki@ontario.ca	**Received 02/05/2025** Please find the attached letter of acknowledgement and supporting attachments in response to the Notice of Commencement of Tobermory and Lion's	No Response Required	

Tobermory and Lion's Head Water and Wastewater Master Plans
Agency Comment Tracking
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

#	Name and Email Address	Comment Received *Note: Comments are reproduced verbatim including typos and/or grammatical errors*	Action / Status Notes	Response Sent
		Head Water and Wastewater Masterplan being undertaken by the Municipality of Northern Bruce Peninsula in accordance with the Municipal Class Environmental Assessment (Masterplan, Approach 1). Thanks.		
9	Kevin Rich (MNR) Kevin.Rich@Ontario.ca	**Received 02/25/2025** The Ministry of Natural Resources (MNR) received this Notice of Commencement regarding two Municipal Class Environmental Assessment (MCEA) studies concerning separate Water and Wastewater Master Plans for the communities of Tobermory and Lion's Head on January 29, 2025. Thank you for circulating this notice to our office. Our apologies for not replying to this email sooner. MNR has prepared the attached **MNR Southern Region Information Package – For External Proponent Environmental Assessments** (Package) to help project proponents understand MNR's role as a commenting agency and interests related to environmental assessment within the Ministry's mandate. The Package also	No Response Required	

Tobermory and Lion's Head Water and Wastewater Master Plans
Agency Comment Tracking
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

#	Name and Email Address	Comment Received *Note: Comments are reproduced verbatim including typos and/or grammatical errors*	Action / Status Notes	Response Sent
		provides information on the Ministry's regulatory authority to issue authorizations, permits, licenses and/or approvals. The information provided is subject to change from time to time and it is the proponent's responsibility to ensure the information used to support project planning and compliance with *Environmental Assessment Act* requirements is current and accurate. It is the proponent's responsibility to be aware of, and comply with, all relevant federal or provincial legislation, municipal by-laws and/or other agency approvals. Please note the ministry has not completed a screening of natural heritage or other resource values at this time. If no MNR interests are identified based on the information contained in this Package, there is no need to further circulate MNR as a commenting agency when undertaking consultation and review under the applicable EA process. If you have identified any MNR interests in your project planning and require additional technical information, or if you have questions about the content of this Package, please feel free to contact me, or SR.planning@ontario.ca.		

Tobermory and Lion's Head Water and Wastewater Master Plans
Agency Comment Tracking
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

#	Name and Email Address	Comment Received *Note: Comments are reproduced verbatim including typos and/or grammatical errors*	Action / Status Notes	Response Sent
		Regards.		
10	Anastasia Abrazhevich (MCM) anastasia.abrazhevich2@ontario.ca	**Received 02/28/2025** Thanks for sending the Notice of Commencement for the above referenced project to the Ministry of Citizenship and Multiculturalism. Please find attached MCM's preliminary comments on this Addendum. As the notice involves two different projects, we are providing two separate initial letters for your review. If you have any questions or require clarification, do not hesitate to contact us. Kind regards.	No Response Required	

General Summary of Comments Received from Public (After the Public Information Centres)
Tobermory and Lion's Head Water and Wastewater Master Plans
Municipality of Northern Bruce Peninsula

Project No: 221-09586-00

Tobermory

1. Concerns on certain lots not being included in the preliminary preferred alternative solutions boundaries, and how the boundaries were decided.
2. Comments on costs being fairly divided and not pushing out businesses.
3. Concerns on paying costs for the new works, when already have a well and septic system, and not in the project areas.
4. Suggestion for implementation of tourist tax to support paying for projects.
5. Comments on costs should not be spread to all taxpayers within the Municipality. Value of properties connected will increase, compared to others not connected.
6. Concerns on costs significantly paid for by residential rate fees for the benefit of a very restricted closely held business community.
7. Concerns on not attempting more options for drilled wells for a communal system.
8. Concerns on funding options available to small communities, and potential partnerships.
9. Comments on commercial properties should be able to provide and treat their own water.
10. Comments on support for Tobermory to have water and sewer infrastructure for its ability to grow and keep its residents and visitors safe.
11. Comments on support for municipal wastewater to eliminate septic systems which have the potential to contaminate drinking water.
12. Concern about rental properties i.e. mapping doesn't differentiate between existing residential lots being rental properties or full-time residents.
13. Comments on why the Public Information Centre were not completed as a presentation with an open question period at the end, and if a second meeting would occur with a presentation.
14. Concerns on not enough details shown for Option 1 and 3. Questioned if more details would be provided.
15. Comments on if Council be willing to make the plan a ballot issue.

Lion's Head

1. Comments on not expanding water to Ferndale, and not to provide communal sanitary system in Lion's Head.
2. Suggestion for another Public Information Centre on a weekend, or in the evening on weekdays.

3. Comments on request for formal survey to owners to be completed for Isthmus Bay Rd. and Whippoorwill Rd. water servicing considerations.
4. Comments on what is the schedule, can more costing information by provided, funding options reviewed, is project to drive tourism, etc.
5. Comments on existing water plant capacity being not utilized (suggested at 30% capacity currently).
6. Comments on need for fire capacity, and storage.
7. Comments on need for wastewater system, due to cost. If concerns are on contamination from septic's, have inspections and owners repair them.
8. Concerns on cost related to how many homes are in the community, residents on fixed incomes, having to move if cannot afford connection fees, etc.
9. Comments on planned developments to help fund the potential projects within the Master Plan.
10. Comments on the preliminary preferred options, and if cost prohibitive, will it be shelved or scaled back, phased, etc.
11. Comments on support of the preliminary preferred option, noting water and wastewater infrastructure is important for Health and Education.
12. Concerns on environmental and public safety, noting increasingly severe rain events and the proximity of high-density septic fields and the risk for E. coli and other pathogen contamination of the water in the harbour.
13. Concerns on the limitations to new development in the community, such as the redevelopment of the Golden Dawn, the Peninsula Family Health team offices and the hospital.
14. Comments on the east end of Moore St. in Lion's Head, and if Moore St. East is being forced into Alternative 2.
15. Concerns on significant impacts to cost of living e.g. taxes, water bills, possible "new" wastewater bills for the residents of the 2 communities, and the entire municipality.
16. Comments on cost, and that if they are not going to benefit, then why should they pay for this work.
17. Comments that there are technologies that can be implemented for property owners that are competitive with a municipal sewer system. Opportunities for septic system inspection and certification with corrective bylaw enforcement, to mitigate environmental concerns, and make individual violators financially responsible without a cost increase for all.
18. Comments on property owners who have already invested in modern, compliant septic systems will be forced to pay the capital cost for the municipal system, as well as financing the connection and decommissioning of their compliant septic.
19. Comments on streets being single lane or dead ends, resulting in difficult construction and access issues for residential, EMS, etc.

20. Concerns with Main Street commercial business that do not have adequate sanitary facilities, resulting in unsightly port-a-potties on Main Street.
21. Concerns on the ratings for Natural Environment, and how we ended up with the colour scheme for the 4 water options.
22. Concerns on why the Cost criteria was only 20% and not higher.

APPENDIX

B CALCULATIONS

Tobermory Flow & Storage Calculations

Future Flow Calculations																			
Residential																			
Equivalent Population (2022)	95	Persons																	
Equivalent Population (2022 + Alternative 2- Downtown Core)	1,289	Persons																	
Equivalent Population (2022 + Alternative 3 - Existing plus Expanded)	4,372	Persons																	
Equivalent Population (Near Term)	1,964	Persons																	
Equivalent Population (Mid Term)	2,180	Persons																	
Equivalent Population (Long Term)	2,612	Persons																	
Equivalent Population (Future Long Term)	2,756	Persons																	
Density (persons/unit)	2	Residential																	
Flow (L/cap/day)	425																		
Historical ADF (2021)	23.8	Little Tub WTP WISKI Data (2021)	**Alt 2 Incremental Increase**				**Alt 2 Total**					**Alt 3 Incremental Increase**				**Alt 3 Total**			
Growth in Tobermory Area	***Existing***	***Alt2: Existing + Downtown***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	***Alt 3: Existing + Expanded***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	
Increase in Serviced Population	0	1289	288	504	936	1,080	288	504	936	1,080	4,372	288	504	936	1,080	288	504	936	1,080	Persons
Total Design Equivalent Population	**95**	**1,289**	-	-	-	-	**1,577**	**1,793**	**2,225**	**2,369**	**4,372**	-	-	-	-	**4,660**	**4,876**	**5,308**	**5,452**	Equivalent Persons
Total Equivalent Population ADF	23.8	531.25	122.4	214.2	397.8	459	653.65	745.45	929.05	990.25	1,841.53	122.4	214.2	397.8	459	1963.925	2055.725	2239.325	2300.525	m3/day
Total Max Day Flow	117	1,328	306	536	895	1,033	1,634	1,864	2,090	2,228	3,683	245	428	796	918	3,928	4,111	4,479	4,601	m3/day
Total Peak Hour Flow	176	1,992	459	803	1,345	1,551	2,451	2,795	3,140	3,347	5,525	367	643	1,193	1,377	5,892	6,167	6,718	6,902	m3/day

Assumed Peaking Factors for Tobermory Service Area									
Equivalent Persons	30	150	300	450	500	500-1,000	1,000-2,000	2,000-3,000	3,001 - 10,000
Max Day Factor	9.5	4.9	3.6	3.0	2.9	2.75	2.50	2.25	2
Peak Hour Factor	14.3	7.4	5.4	4.5	4.3	4.13	3.75	3.38	3

Storage Calculation																			
			Incremental Increase				***Total After Increase***					***Incremental Increase***				***Total After Increase***			
	Existing	***Alt 2: Existing + Downtown***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	***Alt 3: Existing + Expanded***	***Near-Term***	***Mid-Term***	***Long-Term***	***Future***	***Near-Term***	***Mid-Term***	***Long-Term***	***Fututre***	
Peak Hour Demand	0.176	1.992	0.46	0.80	1.34	1.55	2.451	2.795	3.140	3.347	5.525	0.37	0.64	1.19	1.38	5.892	6.167	6.718	6.902	ML/day
Max Day Demand	0.117	1.328	0.31	0.54	0.90	1.03	1.634	1.864	2.090	2.228	3.683	0.24	0.43	0.80	0.92	3.928	4.111	4.479	4.601	ML/day
Fire Flow	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	183.3	L/s
Fire Flow Duration	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	Hr
Max Day + FF	1.601	2.813	1.791	2.020	2.380	2.517	3.119	3.348	3.575	3.713	5.168	1.730	1.913	2.280	2.403	5.413	5.596	5.963	6.086	ML/day
Peak Demand	1.601	2.813	1.791	2.020	2.380	2.517	3.119	3.348	3.575	3.713	5.525	1.730	1.913	2.280	2.403	5.892	6.167	6.718	6.902	ML/day
Firm Capacity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
Other Zone Demands (MD)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
Eligible Supply	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
Storage Requirements																				
A= Fire Storage	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	1484.73	m3
B= Equalization	29.16	332.03	76.50	133.88	223.76	258.19	408.53	465.91	522.59	557.02	920.76	61.20	107.10	198.90	229.50	981.96	1027.86	1119.66	1150.26	m3
C= Emergency	378.47	454.19	390.31	404.65	427.12	435.73	473.32	487.66	501.83	510.44	601.37	386.48	397.96	420.91	428.56	616.67	628.15	651.10	658.75	m3
Required Storage (A+B+C)	1892.36	2270.95	1951.54	2023.26	2135.62	2178.65	2366.58	2438.30	2509.15	2552.18	3006.87	1932.41	1989.79	2104.54	2142.79	3083.37	3140.74	3255.49	3293.74	m3

Storage Calculations Assumptions Summary

Required Storage Calculation: (MOECC Guidelines)
Total Treated Water Storage Requirements = A + B + C
A = Fire Storage (Peak Demand - Pumping Station Stand-by Capacity) x Fire Duration
B = Equalization Storage (25% of Max Day Demand)
C = Emergency Storage (25% of A + B)

APPENDIX

C EVALUATION MATRIX

Tobermory Water Servicing Evaluation Matrix

CRITERIA	CRITERIA WEIGHTING	INDICATOR	% of Criteria	INDICATOR WEIGHTING FACTOR	MAINTAIN EXISTING LEVEL OF SERVICE		EXPAND WATER SERVICING TO DOWNTOWN CORE AND COMMUNITY AREA		EXPAND WATER SERVICING TO EXISTING AND NEW DEVELOPMENT	
					DWS1		DWS2		DWS3	
					SCORE	WEIGHTED SCORE (WITHIN FACTOR)	SCORE	WEIGHTED SCORE (WITHIN FACTOR)	SCORE	WEIGHTED SCORE (WITHIN FACTOR)
NATURAL ENVIRONMENT	20%	Surface and groundwater			0	0.00	2	0.12	3	0.18
		Notes: Impacts to the environment from infrastructure development	30.0%	6.0%	No construction involved, therefore no impacts.		Establishment of new surface water source/new wellheads and/or expansion of existing surface water source and treatment.		Establishment of new surface water source /new wellheads and/or expansion of surface water source and treatment with higher capacity.	
		Natural heritage features/vegetation			0	0.00	1	0.06	3	0.18
		Notes: Potential impacts due to construction on natural habitat and species at risk	30.0%	6.0%	No construction involved, therefore no impacts.		Impacts are limited to previously impacted lands; however, some impacts due to new construction.		Greater impacts to natural environment as new watermain construction increases, potential along more sensitive habitats to service new development.	
		Climate change			4	0.32	1	0.08	1	0.08
		Notes: Potential impacts to surrounding natural environment from climate change events	40.0%	8.0%	Does not mitigate climate change or provide resilient infrastructure. Service disruption may occur.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.	
Total Natural Environment Score					4	0.32	4	0.26	7	0.44
Total Natural Environment Rank					2		1		3	
SOCIAL/ ECONOMIC ENVIRONMENT	20%	Existing infrastructure (private and municipal)			0	0.00	2	0.10	3	0.15
		Notes: Potential impacts to private or municipal systems, such as roadways, buildings, watermains, wells, sewers, septic tanks, etc.	25.0%	5.0%	No construction involved, therefore no impacts.		Conversion from private wells to public system and installation of new watermain in right-of-way.		Conversion from private wells to public system and installation of new watermain in right-of-way over a larger area.	
		Aesthetics			0	0.00	2	0.08	2	0.08
		Notes: Potential impacts on the community from the presence of new infrastructure/open space useage	20.0%	4.0%	No construction involved, therefore no impact to the visual appearance of the community.		Establishment of new water treatment, pumping and storage infrastructure within the community.		Establishment of new water treatment, pumping and storage infrastructure within the community.	
		Redundancy and security of supply			5	0.25	2	0.10	1	0.05
		Notes: Ability of system to provide a consistent Level of Service	25.0%	5.0%	Development would be limited by ability to establishment new surface water source/new wellheads and/or expansion of existing surface water source.		Increased security of water supply from a maintained and regulated system.		Increased security of water supply from maintained and regulated system. More opportunities to provide redundancy in a looped network.	
		Climate change			5	0.30	1	0.06	1	0.06
		Notes: Impacts to public during climate change events to provide Level of Service	30.0%	6.0%	Does not mitigate climate change or provide resilient infrastructure. Service disruption may occur.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.	
Total Social/Economic Environment Score					10	0.55	7	0.34	7	0.34
Total Social/Economic Environment Rank					3		1		1	
TECHNICAL SUITABILITY	20%	Existing capacity			3	0.2	0	0.0	0	0.0
		Notes: Current/proposed infrastructure to service existing water demand capacity	25.0%	5.0%	Existing capacity is currently being met but is limited to a few serviced buildings only. No provisions for fire flow		New systems are designed to service existing and future capacity requirements; however, limited to downtown core and community area.		New systems are designed to service existing and future capacity requirements including phased development for connecting the greater community.	
		Further expansion			5	0.3	3	0.2	1	0.1
		Notes: Opportunity to service the greater community and ability to connect future areas under expansion	25.0%	5.0%	Development would be limited due to lack of municipal water servicing. Does not address Class EA Problem Statement.		New systems are designed to service the existing and future capacity requirements, however limited to downtown core and community area.		New systems are designed to service existing and future capacity requirements including phased development for connecting the greater community.	
		Full build out			5	0.2	3	0.1	2	0.1
		Notes: Opportunity to service full-build out of the community	20.0%	4.0%	Without municipal water servicing there will be difficulty with implementing a full build out.		Meets the requirements to establish full-build out of the downtown core and community area; however, limited to expanding out to the surrounding community.		Provides infrastructure to the largest service area; however, the rate of full expansion is limited by phased development of a larger distribution system.	
		Climate change			5	0.3	1	0.1	2	0.1
		Notes: Impacts from climate change events which impact maintaining Level of Service	30.0%	6.0%	Does not mitigate climate change or provide resilient infrastructure. Service disruption may occur.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages. The smaller network of infrastructure is easier to maintain.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages. The larger network of infrastructure requires more watermain to maintain.	
Total Technical Suitability Score					18	0.90	7	0.33	5	0.25
Total Technical Suitability Rank					3		2		1	
CONSTRUCTABILITY	20%	Ease of construction and site access			0	0.00	3	0.12	5	0.20
		Notes: When traditional construction approaches are applied, the impacts associated with installation	20%	4.0%	N/A		Moderate impacts for construction access within downtown core; however, network of roads provide good access to install new watermain.		Installation of new watermain over a larger area along defined roadways or newly established easements will result in longer phased construction.	
		Operations during construction			0	0.00	1	0.05	1	0.05
		Notes: Impacts associated with maintaining the current Level of Service	25%	5.0%	N/A		Minor impacts anticipated as private water systems may be maintained during construction.		Minor impacts anticipated as private water systems may be maintained during construction.	
		Ease of integration with existing infrastructure			0	0.00	1	0.05	3	0.15
		Notes: Impacts associated with tie-in to existing infrastructure or disconnection of old infrastructure	25%	5.0%	NA		Minor impacts in the downtown core and community area since there is limited existing infrastructure within the ground.		More moderate impacts anticipated for establishment of new infrastructure due to phasing of work and longer construction to connect services to properties located outside the community area.	
		Climate change			0	0.00	2	0.12	2	0.12
		Notes: Impacts from climate change events on the installation and timing of projects	30%	6.0%	NA		Minor impacts due to climate change events when construction is carried out during warm-weather months.		Minor impacts due to climate change events when construction is carried out during warm-weather months.	
Total Constructability Score					0	0.00	7	0.34	11	0.52
Total Constructability Rank					1		2		3	
COST	20%	Capital costs			0	0.00	2	0.20	5	0.50
		Notes: Cost to construct new infrastructure to establish the system	50%	10.0%	System is currently established. No construction involved; therefore, no impacts and no capital costs are anticipated.		Moderate capital costs to install new water treatment, pumping and storage facilities, and distribution network.		More significant capital costs to install new larger water treatment, pumping and storage facilities, and distribution network.	
		Relative operation and maintenance costs			2	0.20	3	0.30	4	0.40
		Notes: Cost to maintain yearly operations, including eq replacement	50%	10.0%	No additional operation and maintenance costs; however, current facilities are aging and not localized. Existing infrastructure will need replacement over time.		Moderate costs for yearly operations of facilities and upkeep of distribution network.		Greater costs for yearly operations of larger facilities and upkeep of distribution network.	
Total Cost Score					2	0.20	5	0.50	9	0.90
Total Cost Rank					1		2		3	
OVERALL SCORE					**0.39**		**0.35**		**0.49**	
OVERALL RANK					**2**		**1**		**3**	

Indicator Impacts Score Legend
0 = no impact
1-2 = minor impact
3-4 = moderate impact
5 = significant impact

Tobermory Wastewater Servicing Evaluation Matrix

CRITERIA	CRITERIA WEIGHTING	INDICATOR	% of CRITERIA	INDICATOR WEIGHTING IN FACTOR	MAINTAIN EXISTING LEVEL OF SERVICE		EXPAND WASTEWATER SERVICING TO DOWNTOWN CORE AND COMMUNITY AREA		EXPAND WASTEWATER SERVICING TO EXISTING AND NEW DEVELOPMENT	
					WWS1		WWS2		WWS3	
					SCORE	WEIGHTED SCORE (WITHIN FACTOR)	SCORE	WEIGHTED SCORE (WITHIN FACTOR)	SCORE	WEIGHTED SCORE (WITHIN FACTOR)
NATURAL ENVIRONMENT	20%	Surface and groundwater	30.0%	6.00%	2	0.12	1	0.06	1	0.06
		Notes: Impacts to the environment from infrastructure development			No construction involved, therefore no impacts; however, degree of private septic bed impacts is unknown.		Installation of new pumping and pipe infrastructure anticipated to reduce impacts by directing wastewater to municipal treatment.		Installation of new pumping and pipe infrastructure anticipated to reduce impacts by directing wastewater to municipal treatment.	
		Natural heritage features/vegetation	30.0%	6.0%	0	0.00	1	0.06	3	0.18
		Notes: Potential impacts due to construction on natural habit and species at risk			No construction involved, therefore no impacts.		Impacts are limited to previously impacted lands; however, some impacts due to new construction.		Greater impacts to natural environment as new sanitary construction increases, potential along more sensitive habitats to service new development.	
		Climate change	40.0%	8.0%	4	0.32	1	0.08	1	0.08
		Notes: Potential impacts to surrounding natural environment from climate change events			Does not mitigate climate change or provide resilient infrastructure. Service disruption may occur.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.	
Total Natural Environment Score					6	0.44	3	0.20	5	0.32
Total Natural Environment Rank					3		1		2	
SOCIAL/ ECONOMIC ENVIRONMENT	20%	Existing infrastructure (private and municipal)	25.0%	5.0%	0	0.00	2	0.10	3	0.15
		Notes: Disruption to residents during construction			No construction involved, therefore no impacts.		Conversion from private septic to public system and installation of new sanitary main and potential forcemain in right-of-way.		Conversion from private septic to public system and installation of new sanitary main and potential forcemain in right-of-way over a larger area.	
		Aesthetics	20.0%	4.0%	0	0.00	2	0.08	2	0.08
		Notes: The presence of infrastructure in communities			No construction involved, therefore no impact to the visual appearance of the community.		Establishment of new wastewater treatment and pumping infrastructure within the community - including odour control.		Establishment of new wastewater treatment and pumping infrastructure within the community - including odour control.	
		Redundancy and security of service	25.0%	5.0%	5	0.25	2	0.10	1	0.05
		Notes: Ability of system to provide a consistent Level of Service			Development would be limited by ability to install new septic systems in proximity to existing surface water source and wells.		Increased security to wastewater collection from a maintained and regulated system.		Increased security to wastewater collection from a maintained and regulated system. More opportunities to provide collection services to reduce higher concentration discharge from septic systems.	
		Climate change	30.0%	6.0%	3	0.18	1	0.06	1	0.06
		Notes: Impacts to residents during climate change events to provide Level of Service			Does not mitigate climate change or provide resilient infrastructure. Service disruption may occur.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages.	
Total Social/Economic Environment Score					8	0.43	7	0.34	7	0.34
Total Social/Economic Environment Rank					3		1		1	
TECHNICAL SUITABILITY	20%	Existing capacity	25.0%	5.0%	3	0.15	0	0.00	0	0.00
		Notes: Current/proposed infrastructure to service existing demand capacity			Existing capacity is currently being met but is limited to a few serviced buildings only.		New systems are designed to service existing and future capacity requirements, however limited to downtown core and community area.		New systems are designed to service existing and future capacity requirements including phased development for connecting the greater community.	
		Further expansion	25.0%	5.0%	5	0.25	3	0.15	1	0.05
		Notes: Opportunity to service the greater community and ability to connect future areas under expansion			Development would be limited due to lack of municipal water servicing. Does not address Class EA Problem Statement.		New systems are designed to service the existing and future capacity requirements, however limited to downtown core and community area.		New systems are designed to service the greater community with connections for further expansion throughout the community.	
		Full build out	20.0%	4.0%	5	0.20	3	0.12	2	0.08
		Notes: Opportunity to service full-build out of the community			Without municipal water servicing there will be difficulty with implementing a full build out.		Meets the requirements to establish full-build out of the downtown core and community area; however, limited to expanding out to the surrounding community.		Provides infrastructure to the largest service area; however, the rate of full expansion is limited by phased development of a larger distribution system.	
		Climate change	30.0%	6.0%	4	0.24	1	0.06	2	0.12
		Notes: Impacts from climate change events which impact maintaining Level of Service			Does not mitigate climate change or provide resilient infrastructure. Service disruption may occur.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages. The smaller network of infrastructure is easier to maintain.		New infrastructure designed with climate change resiliency to provide the required Level of Service during severe weather and power outages. The larger network of infrastructure requires more sanitary piping to maintain.	
Total Technical Suitability Score					17	0.84	7	0.33	5	0.25
Total Technical Suitability Rank					3		2		1	
CONSTRUCTABILITY	20%	Ease of construction and site access	20%	4.0%	0	0.00	3	0.12	5	0.20
		Notes: When traditional construction approaches are applied, the impacts associated with installation			N/A		Moderate impacts for construction access within downtown core; however, network of roads provide good access to install new sanitary main and potential forcemain.		Installation of new sanitary main and potential forcemain over a larger area along defined roadways or newly established easements will result in longer phased construction.	
		Operations during construction	25%	5.0%	0	0.00	1	0.05	1	0.05
		Notes: Impacts associated with maintaining the current level of Service			N/A		Minor impacts anticipated as private septic systems may be maintained during construction.		Minor impacts anticipated as private septic systems may be maintained during construction.	
		Ease of integration with existing infrastructure	25%	5.0%	0	0.00	1	0.05	3	0.15
		Notes: Impacts associated with tie-in to existing infrastructure or disconnection of old infrastructure			N/A		Minor impacts in the downtown core and community area since there is limited existing infrastructure within the ground.		More moderate impacts anticipated for establishment of new infrastructure due to phasing of work and longer construction to connect services to properties located outside the community area.	
		Climate change	30%	6.0%	0	0.00	2	0.12	2	0.12
		Notes: Impacts from climate change events on the installation and timing of projects			N/A		Minor impacts due to climate change events when construction is carried out during warm-weather months.		Minor impacts due to climate change events when construction is carried out during warm-weather months.	
Total Constructability Score					0	0.00	7	0.34	11	0.52
Total Constructability Rank					1		2		3	
COST	20%	Capital costs	50%	10.0%	0	0.00	3	0.30	5	0.50
		Notes: Cost to construct new infrastructure to establish the system			System is currently established. No construction involved; therefore, no impacts and no capital costs are anticipated.		Moderate capital costs to install new wastewater treatment, pumping facilities and forcemain, and collection network.		More significant capital costs to install new larger wastewater treatment, pumping facilities and forcemain, and collection network.	
		Relative operation and maintenance costs	50%	10.0%	3	0.30	3	0.30	4	0.40
		Notes: Cost to maintain yearly operations, including eq replacement			No additional operation and maintenance costs; however, current facilities are aging and not localized. Existing infrastructure will need replacement over time.		Moderate costs for yearly operations of facilities and upkeep of collection network.		Greater costs for yearly operations of larger facilities and upkeep of collection network.	
Total Cost Score					3	0.30	6	0.60	9	0.90
Total Cost Rank					1		2		3	
OVERALL SCORE					0.40		0.36		0.47	
OVERALL RANK					2		1		3	

Indicator Impacts Score Legend
0 = no impact
1-2 = minor impact
3-4 = moderate impact
5 = significant impact

EVALUATION COLOUR RATING SYSTEM
Most Preferred
Least Preferred

APPENDIX

D CLIMATE CHANGE MEMO

Municipality of Northern Bruce Peninsula

Tobermory and Lion's Head Water & Wastewater Servicing Master Plan

Climate Change Impacts and Risk Assessment

September 11, 2026 Final Report



Tobermory and Lion's Head Water & Wastewater Servicing Master Plan

Climate Change Impacts and Risk Assessment

Municipality of Northern Bruce Peninsula

Final Report

Project No.: 211-09586
Date: September 11, 2026

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December 23, 2022	Draft		
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REVISION 1			
August 11, 2023	Draft		
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REVISION 2			
March 7, 2025	Draft		
Prepared by	Reviewed by	Approved by	
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REVISION 3			
April 14, 2025	Final Draft		
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REVISION 4			
May 30, 2023	Final Draft 2		
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REVISION 5			
July 14, 2025	Final Draft		
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REVISION 6			
September 11, 2026	Final		
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September 11, 2026

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September 11, 2026



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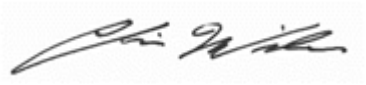
September 11, 2026



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September 11, 2026

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1 INTRODUCTION 1

2 OVERVIEW 2

2.1 Objectives 2

2.2 Scope 2

2.2.1 Assumptions and Limitations 2

2.3 Future Servicing Options 3

3 METHODOLOGY 4

4 GOALS 6

5 DATA ELEMENTS 8

5.1 Timeframe 8

5.2 RCP 8

6 CLIMATE 10

6.1 Climate Parameters, Hazards, and Indicators 10

6.2 Climate Data Projections 11

6.2.1 Heat Waves 11

6.2.2 Very Cold Days 11

6.2.3 Freeze-Thaw Cycles 11

6.2.4 Wet Days 11

6.2.5 Drought 12

6.3 Likelihood 12

7 DISCUSSION 13

7.1 Risk Assessment 13

7.1.1 Tobermory Water 14

7.1.2 Tobermory Wastewater 1

7.1.3 Lion's Head Water 1

7.1.4 Lion's Head Wastewater 1

7.1.5 Effect on Drinking Water 1

7.1.6 Effect on Drinking Water Demands 2

7.1.7 Potential Flooding of Water and Wastewater Facilities 2

7.1.8 Effect on Wastewater Collection 3
7.2 Mitigation and Adaptation Recommendations 4
7.2.1 Mitigation 4
7.2.2 Adaptation 5
7.3 Future Servicing Options Considerations 5
8 CONCLUSION 11

Tables

Table 6-1: Climate Parameters, Hazards, and Indicators 10

Table 6-2: Tobermory Climate Hazard Likelihood Score (L) 12

Table 6-3: Lion's Head Climate Hazard Likelihood Score (L) 12

Table 7-1: Consequence Score 13

Table 7-2: Tobermory Future Servicing Options Considerations 5

Table 7-3: Lion's Head Future Servicing Options Considerations 7

Figures

Figure 1-1: Study Areas 1

Figure 3-1: PIEVC HLSG Application Map . 4

Figure 4-1: Northern Bruce Peninsula Climate Action Plan 6

Figure 7-1: Tobermory Water 1

Figure 7-2: Tobermory Wastewater 1

Figure 7-3: Lion's Head Water 1

Figure 7-4: Lion's Head Wastewater 1

Figure 7-5: Lake Michigan-Huron Historical and Projected Decadal Mean Lake Levels 3

Appendices

A Climate Data

B Risk Assessment Matrix

C Reference Reports

1 INTRODUCTION

The municipality of Northern Bruce Peninsula (NBP) in partnership with Ontario Clean Water Agency (OCWA) has retained WSP Canada Inc. (WSP) to develop a Water and Wastewater Master Plan for Tobermory and Lion's Head (Figure 1-1). This technical memorandum describes the researched impacts of climate change on water and wastewater infrastructure in these communities, and methods and strategies to be used to design and operate resilient infrastructure in the future. Climate change risks will be identified and prioritized in order to identify appropriate adaptation responses that reduce those risks. The information presented in this document will be incorporated into the Master Plan Report.

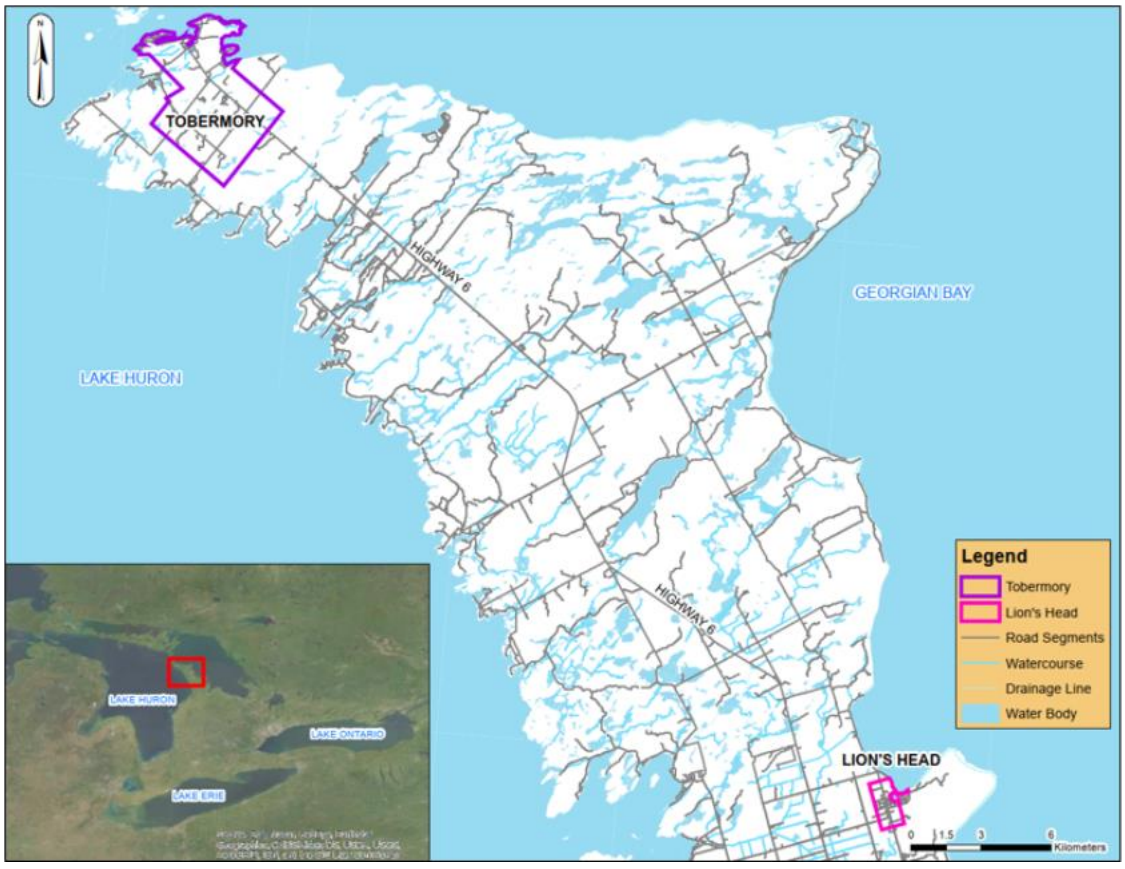


Figure 1-1: Study Areas

2 OVERVIEW

2.1 Objectives

The assessment objectives for Tobermory and Lion's Head are to evaluate risks to the drinking water and wastewater systems from the impacts of climate change and determine potential mitigation measures to minimize the risks. The analysis was completed to review the potential impacts to existing and proposed infrastructure.

2.2 Scope

The assessment will include identification of water and wastewater assets and their criticality, selection of a time horizon, study of trends in relevant climate parameters and determination of the likelihood of said trends, calculation of risk to assets, and high-level recommendation of mitigation and adaption measures.

Focus will be on the following risks to drinking water and wastewater systems:

1. Effect on drinking water quantity and quality
2. Effect on drinking water demands
3. Potential flooding of water and wastewater facilities
4. Effect on wastewater collection

In addition to the identified risks the report also includes a review of Northern Bruce Peninsula Climate Action Plan sustainability goals for alignment along with the identification of climate change mitigation strategies which aim to reduce green house gas (GHG) emissions.

2.2.1 Assumptions and Limitations

This assessment follows the Public Infrastructure Engineering Vulnerability Committee (PIEVC) High Level Screening Guide which is part of the PIEVC Protocol originally developed by Engineers Canada. The review is limited to the identified climate parameters based on research of the local region and industry recognized climate model data collected from ClimateData.ca and ClimateAtlas.ca developed in part by Environment and Climate Change Canada.

To address uncertainty in the data, both climate data set model data was reviewed to ground the risk assessment on the latest Representative Concentration

Pathway RCP climate change projections. This data comes from the joint research by the internationally recognized Intergovernmental Panel on Climate Change (IPCC).

This scope of this assessment does not include dedicated climate change studies in the local region.

2.3 Future Servicing Options

When considering the future servicing options for each community, climate change is just one of the factors that will be considered as part of the overall water and wastewater servicing objectives for the Municipality. The inputs from this assessment will inform the Municipal Class Environmental Assessment (MECA) Phase 1 and 2 process as part of the evaluation of servicing alternatives. This includes separate future servicing options for Tobermory and Lion's Head.

For Tobermory, there are the following alternatives:

1. Maintain existing level of service
2. Expand water and wastewater servicing to downtown core and Community Centre
3. Expand water and wastewater servicing to existing residents, commercial, municipal, and new development

For Lion's Head, there are the following alternatives:

1. Maintain existing level of service
2. Expand water to service new growth in Lion's Head and surrounding area to provide sufficient volume for fire flow
3. Expand water to send to Ferndale
4. Expand water to send to Isthmus Bay and Barrow Bay
5. Construct new wastewater treatment facility and provide wastewater servicing to downtown Lion's Head

3 METHODOLOGY

The PIEVC High Level Screening Guide (HLSG) is a process used to complete vulnerability, risk, and resilience assessments on existing and proposed infrastructure. Climate change risk scenarios are characterized and ranked, and those of highest priority are identified to allow for adaptation planning or further comprehensive analysis. The process is summarized in Figure 3-1.

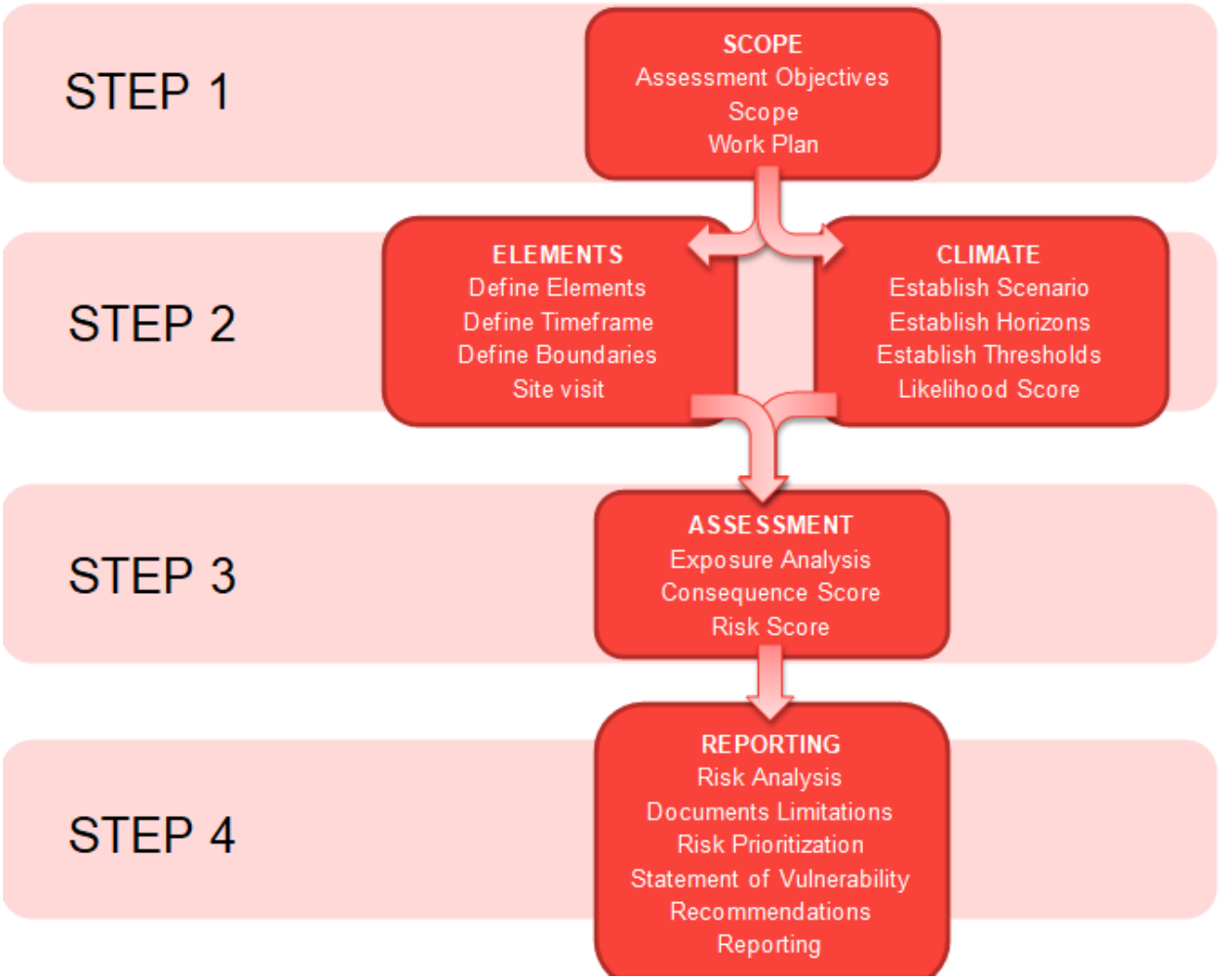


Figure 3-1: PIEVC HLSG Application Map

For this analysis, the PIEVC HLSG map was used as a guideline. As seen in Section 2.1 and Section 2.2, the objectives and scope were identified first. Then, the elements for analysis were established, as shown in Section 5. In this case, the focus of the assessment was on existing and potential built infrastructure in Tobermory and Lion's Head. For the climate data, as summarized in Section 6, the climate parameters,

hazards, and indicators were determined and then their likelihoods were estimated. Risk assessment was completed using a risk assessment worksheet which was directly tailored and adapted from the PIEVC HLSG approach as amended in **Appendix B.** The assessment process involved completing an exposure analysis and consequence assessment, and calculation of a risk score. Details are included in Section 7. Finally, in the reporting stage, the risk is evaluated and assessed, and recommendations are developed. This is then summarized in a report such as this one.

4 GOALS

The goals of the Municipality of Northern Bruce Peninsula are to reduce consumption of energy from sources that produce greenhouse gases, protect the environment's ability to sequester carbon, increase use of electric energy instead of fossil fuels, and reduce the generation of solid waste to reduce associated emissions (Climate Action on the Peninsula, May 2022). These goals are summarized in Figure 4-1.



Figure 4-1: Northern Bruce Peninsula Climate Action Plan

From the action plan, there were four applicable priority sector goals related to sustainable land use, water, wastewater and GHG reduction. The construction and operation of water and wastewater infrastructure are all in alignment by these priority sector goals and provide an opportunity for existing and proposed infrastructure.

Under the Nurture Nature goal, the opportunity to address goals which support climate compatible agriculture, and to support local ecosystem health include:

- 4.3 Project Farmland, woodlots and wetlands – Agricultural and natural areas frequently face pressures from further development. Through municipal zoning/planning policy, we will protect the status and climate mitigation potential of these areas.
- 4.5 Improve Monitoring of Ecosystem Health – There have been numerous initiatives to analyze local ecosystem health. We will implement a regular monitoring program that coordinates these previous efforts to measure climate change impacts.

Under the Protecting the Peninsula goal, the plan specifically indicates the following goal to reduce risks due to major storms and to increase resilience of infrastructure

- 5.6 Increase Resilience of Our Infrastructure - The Peninsula's roads, bridges, and other infrastructure were build for climate conditions that will soon change. We will update our design standards, map specific risks, and conduct upgrades to prepare

5 DATA ELEMENTS

Built infrastructure, specifically for water and wastewater treatment and distribution/collection, will be considered in this assessment. The existing infrastructure to be assessed is as follows:

Tobermory

- Water Distribution System
  - Water Distribution Lines
  - Reservoirs
- Water Treatment Plant
  - Intake
  - Treatment
  - Building/HVAC/Electrical
- Wastewater Collection System
  - Lift Stations/Forcemains
  - Gravity Sewers
- Wastewater Treatment Plant
  - Treatment
  - Outlet
  - Building/HVAC/Electrical

Lion's Head

- Water Distribution System
  - Water Distribution Line
  - Reservoirs
- Water Treatment Plant
  - Intake
  - Treatment
  - Building/HVAC/Electrical

5.1 Timeframe

The infrastructure in Tobermory and Lion's Head are being assessed for their condition over the next 20-years, using data from the last 30 years. The climate change projection horizon review includes for short (0-5 years), medium (5-30 years) and long (30+ years) term horizon projections. The long-term projection timeframe is considered in the assessment given that infrastructure, such as underground piping, will have an expected lifespan expectancy greater than 50 years.

5.2 RCP

The Representative Concentration Pathway (RCP) used in this analysis is RCP 8.5. It represents a future where minimal action on climate change is enacted and greenhouse gas emissions continue "business-as-usual" and is considered the worst-case scenario.

This scenario is appropriate when assessing critical infrastructure, such as water distribution networks and wastewater collection systems, that will be in operation with a long lifespan expectancy.

6 CLIMATE

6.1 Climate Parameters, Hazards, and Indicators

Climate parameters, hazards, and indicators are used in conjunction to measure climate conditions. The climate conditions relevant to this project are summarized in Table 6-1.

Table 6-1: Climate Parameters, Hazards, and Indicators

Climate Parameters	Climate Hazards and Potential Consequences	Climate Indicators
Temperature	**Heat waves:** prolonged periods of high temperatures ***Potential Consequences**: Lowering of lake levels - impacting water supply intakes and increases in risks to poor water quality. A trend of higher water consumption during heat waves for watering lawns may impact water storage and supply. Heat waves may lead to increased risk of wildfires that can impact water/wastewater infrastructure.*	Daily minimum temperature > 15°C Daily maximum temperature > 25°C Duration of ≥ three (3) days
	Cold weather: very cold days ***Potential Consequences**: Risk of prolonged groundwater water freezing for multiple cold days can lead to limitations in service/treatment. Watermain pipe bursting due to groundwater freezing.*	Temperature < -20°C
	Freeze/Thaw: temperature hovering around 0°C ***Potential Consequences**: Freezing can lead to limitations in service/treatment. Watermain pipe bursting due to groundwater freezing. Impacts do to higher than seasonal snow melt with impacts to infiltration and inflow into wastewater collection systems and risk of flooding events.*	Daily maximum temperature > 0°C Daily minimum temperature < -1°C
Precipitation	**Wet days:** days with significant rain event ***Potential Consequences:** Significant rain events can lead to higher infiltration/inflow and impacts leading to higher peak flow conditions within wastewater collection systems. A higher risk of flooding from significant impacts and impact service/treatment of Water/Wastewater systems.*	Precipitation > 10 mm/day
	Drought: prolonged periods without precipitation ***Potential Consequences**: Lowering of lake levels - impacting water supply intakes and increases in risks to poor water quality. A trend of higher water consumption of municipal water during drought for watering lawns may impact water storage and supply. Drought may lead to increased risk of wildfires that can impact water/wastewater infrastructure.*	Precipitation = 0 mm/day

These climate parameters were directly selected for the risk assessment given their potential impact to water and wastewater infrastructure systems including the surrounding environment. The data for these parameters are readily available though research from the ClimateData.ca and ClimateAtlas.ca climate models.

6.2 Climate Data Projections

The following climate data projections for each identified climate parameter and climate hazard are based on the combined climate model data from ClimateData.Ca and ClimateAtlas.ca for the RCP 8.5 projection. The 10th, 50th, and 90th percentiles are shown as p10, p50, and p90 in the following graphs. This demonstrates the range of predicted values, statistically. The 50th percentile, or p50, represents the median.

Refer to **Appendix A1** for graphical results and **Appendix A2** for tabular results.

6.2.1 Heat Waves

Effects of climate change on frequency of heat waves are shown in **Appendix A1**, **Section 1.1**, where a heat wave is defined as a period of at least three (3) days with a minimum temperature above 15°C and a maximum temperature above 25°C. The data indicates that heat waves have become more frequent over the last 30 years and will continue to increase in frequency in the future.

6.2.2 Very Cold Days

Effects of climate change on frequency of very cold days are shown in **Appendix A1**, **Section 1.2**, where a cold day is defined as a day with a minimum temperature below -20°C. The data indicates that very cold days have become less frequent over the last 30 years and will continue to decrease in frequency in the future.

6.2.3 Freeze-Thaw Cycles

Effects of climate change on frequency of freeze-thaw cycles are shown in **Appendix A1**, **Section 1.3**, where the freeze/thaw cycle is defined as a day with temperatures hovering around 0°C. The data indicates that freeze-thaw cycles have become less frequent over the last 30 years and will continue to decrease in frequency in the future.

6.2.4 Wet Days

Effects of climate change on frequency of wet days are shown in **Appendix A1**, **Section 1.4**, where a wet day is defined as having precipitation greater than 10 mm/day. The data indicates that wet days have become more frequent over the last 30 years and will continue to increase in frequency in the future.

6.2.5 Drought

Effects of climate change on length of droughts are shown in **Appendix A1**, **Section 1.5**, where the drought is measured as the greatest number of consecutive days with 0 mm of precipitation. The data indicates that drought length has remained steady over the last 30 years and will continue this trend in the future.

6.3 Likelihood

The likelihood of each climate hazard is estimated on a scale of 1-5, with 1 being likely to occur less frequently than the current climate, 3 being likely to occur as frequently as the current climate, and 5 being likely to occur more frequently than the current climate. The likelihoods of each climate trend in Tobermory based on the estimated values for each parameter are summarized in Table 6-2. The likelihoods of each climate trend in Lion's Head based on the estimated values in days for each parameter are summarized in Table 6-3.

Table 6-2: Tobermory Climate Hazard Likelihood Score (L)

Climate Parameter (P)	Present (1991-2020) Estimated Value (Days)	Baseline Likelihood Score (L)	2050s (2041-2070) Estimated Value (Days)	2050s Likelihood Score (L)	2080s (2071-2100) Estimated Value (Days)	2080s Likelihood Score (L)
Heat Waves	2.33	3	5.57	4	5.82	4
Cold Weather	3.98	3	0.17	1	0.00	1
Freeze/Thaw	62.52	3	55.33	2	46.33	1
Precipitation	23.58	3	27.42	4	28.40	4
Drought (days)	13.02	3	12.60	3	13.70	3

Table 6-3: Lion's Head Climate Hazard Likelihood Score (L)

Climate Parameter (P)	Present (1991-2020) Estimated Value (Days)	Baseline Likelihood Score (L)	2050s (2041-2070) Estimated Value (Days)	2050s Likelihood Score (L)	2080s (2071-2100) Estimated Value (Days)	2080s Likelihood Score (L)
Heat Waves	3.05	3	6.32	4	6.33	4
Cold Weather	3.23	3	0.12	1	0.00	1
Freeze/Thaw	61.37	3	54.72	2	45.63	1
Precipitation	24.15	3	28.72	4	29.72	4
Drought (days)	11.97	3	11.63	3	12.48	3

7 DISCUSSION

The risk to any of the infrastructure elements is defined as the effect of uncertainty on their ability to service their communities safely and effectively. Low risk requires no action, medium risk requires further attention and study, and high risk requires immediate action. The effects of climate change are increasing the risk to the infrastructure in Tobermory and Lion's Head.

The processes of mitigation and adaptation are both methods of handling climate change. Mitigation involves limiting emissions of greenhouse gases to reduce the effects of climate change. Adaptation involves planning around the predicted impacts of climate change in order to design resilient infrastructure.

7.1 Risk Assessment

The risk assessment was completed using a risk assessment worksheet. Within this worksheet, an exposure analysis was completed by considering the elements' interaction with the climate parameters. If an element could be exposed to a climate parameter, it is then given a consequence score. This score represents the consequence of the element being exposed to that specific climate parameter. As such, with the impacts of climate change, the consequences do not change, the likelihood changes. The scoring system is summarized in Table 7-1.

Table 7-1: Consequence Score

Consequence Score	
1	Very Low
2	Low
3	Moderate
4	High
5	Very High

Finally, the risk is calculated by multiplying the exposure by the consequence and likelihood, as shown in Equation 1.

Equation 1: Risk

$$R = ECL$$

R = Risk

E = Exposure, if Yes=1, if No=0

C = Consequence, as defined in Table 7-1

L = Likelihood, as defined in Table 6-2 and Table 6-3

The risk to each element based on the climate parameters are calculated for each time period (present, 2050s, and 2080s) and averaged to get the risk to each element. The risk to the whole system is then taken as the average of the risks to each element. There are three risk scenarios prepared – low, medium, and high. Medium risk is 100% of the calculated risk, whereas low risk is 36% of the calculated risk, and high risk is 190% of the calculated risk.

7.1.1 Tobermory Water

Within the Tobermory water distribution system are five elements: the water source (Georgian Bay), private wells (Groundwater and GUDI), watermains, Water Treatment Plant, and reservoirs or booster stations.

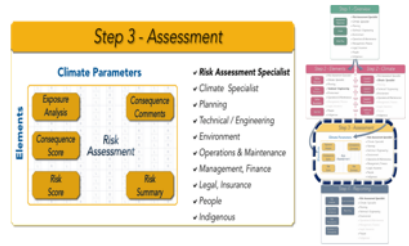
For the water source, heat waves impact water quality and result in increased water usage, while droughts impact water quantity. The same can be said for private wells, but to a lesser degree. For watermains, cold weather and freeze/thaw cycles can result in pipes bursting or freezing, which could prevent water from being distributed to large sections of the community. For the water treatment plant, like the water source and private wells, the impact is based on heat waves and drought, but to a greater degree. Finally, a booster station or reservoir may not be able to be maintained during heat waves and drought if there are impacts on the available supply.

The risk assessment is summarized in Figure 7-1. There appears to be reduced risk in the future projection, however this is primarily due to there being a higher risk on the system from cold weather and freeze/thaw cycles that will be reduced in the future. This does not negate the increased risk to critical infrastructure from other climate parameters, such as heat waves, precipitation, and drought.

Risk Assessment Worksheet

Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

		Climate Parameters (P)					Summary
		Heat Waves	Cold Weather	Freeze/Thaw	Precipitation	Drought	
Climate Projections	Present	3 L	3 L	3 L	3 L	3 L	
	2050	4 L	1 L	2 L	4 L	3 L	
	2080	4 L	1 L	1 L	4 L	3 L	



Elements (E)			Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R		Low	Med	High	Consequence Comments
1	Tobermory Water Source - Georgian Bay	Present	Y	3	2	6	Y	3	5	15	Y	3	5	15	Y	3	3	9	Y	3	2	6	Present	3.7	10.2	19.6	Heat impacts water quality (eg. higher risk in Algae Blooms) and may also result in increased water usage; cold weather and freeze/thaw cycles could result in a frozen intake; preciptation impacts surface water quality;
		2050		4		8		1		5		2		10		4		12		3		6	2050	3.0	8.2	15.7	
		2080		4		8		1		5		1		5		4		12		3		6	2080	2.6	7.2	13.8	
2	Tobermory Private Wells	Present	Y	3	1	3	N	L		R	N	L		R	N	L		R	Y	3	1	3	Present	0.4	1.2	2.3	Heat impacts water quality and results in increased water usage; drought impacts water quantity.
		2050		4		4		L		R		L		R		L		R		3		3	2050	0.5	1.4	2.7	
		2080		4		4		L		R		L		R		L		R		2		2	2080	0.4	1.2	2.3	
3	Tobermory Watermains	Present	N	L		R	Y	3	4	12	Y	3	5	15	N	L		R	N	L		R	Present	1.9	5.4	10.4	Cold weather could result in freezing and/or bursting of watermains
		2050		L		R		1		4		2		10		L		R		L		R	2050	1.0	2.8	5.4	
		2080		L		R		1		4		1		5		L		R		L		R	2080	0.6	1.8	3.5	
4	Tobermory Water Treatment Plant	Present	Y	3	3	9	N	L		R	N	L		R	N	L		R	Y	3	3	9	Present	1.3	3.6	6.9	Heat impacts water quality; drought impacts water quantity. Infrastrcuture impacts due to high temp/drought such as risk of wildfire, or high precipitation causing flooding.
		2050		4		12		L		R		L		R		L		R		3		9	2050	1.5	4.2	8.1	
		2080		4		12		L		R		L		R		L		R		2		6	2080	1.3	3.6	6.9	
5	Tobermory Reservoir or Booster Station	Present	N	L		R	N	L		R	N	L		R	Y	3	2	6	N	L		R	Present	0.4	1.2	2.3	Precipitation could impact the ability to perform maintenance on the booster station or reservoir
		2050		L		R		L		R		L		R		4		8		L		R	2050	0.6	1.6	3.1	
		2080		L		R		L		R		L		R		4		8		L		R	2080	0.6	1.6	3.1	

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnece, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

Risk Summary		Low	Med	High
	Present	1.6	4.3	8.2
	2050	1.3	3.6	6.9
	2080	1.1	3.1	5.9

Figure 7-1: Tobermory Water

7.1.2 Tobermory Wastewater

Within the Tobermory wastewater collection system are five elements: private septic tanks, the sanitary pump station and forcemains, gravity sewers, wastewater treatment plant, and receiving water body.

For the septic tanks, freeze/thaw cycles can cause ground heaves that can damage septic tanks, but impacts would be localized. Sanitary pump stations, forcemains, and gravity sewers would all experience increased flows from heat waves due to increased water demand and therefore increased wastewater production. Precipitation would also cause an increase in flows from infiltration and inflow. Cold weather and freeze/thaw cycles risk damage or freezing of pipes. Drought decreases wastewater flows. The wastewater treatment plant would see increased flows from heat waves and precipitation, and decreased flows from droughts. The existing wastewater treatment plant is a sewage lagoon, which is susceptible to freeze/thaw cycles and cold weather. Finally, the receiving water body could be impacted by heat waves which can cause reductions in water quality, and drought and precipitation can impact water levels. Cold weather and freeze/thaw cycles impact the state of the receiving water body at the outfall location or where shallow piping at the outfall is subject to frost impacts.

The risk assessment is summarized in Figure 7-2. There appears to be reduced risk in the future projection, however this is primarily due to there being a higher risk on the system from cold weather and freeze/thaw cycles that will be reduced in the future. This does not negate the increased risk to critical infrastructure from other climate parameters, such as heat waves, precipitation, and drought.

Risk Assessment Worksheet

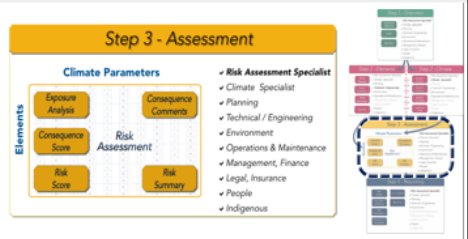
Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Parameters (P)

Climate Projections

	Heat Waves			Cold Weather			Freeze/Thaw			Precipitation			Drought		
		L			L			L			L			L	
Present	3	L		3	L		3	L		3	L		3	L	
2050	4	L		1	L		2	L		4	L		3	L	
2080	4	L		1	L		1	L		4	L		2	L	

Summary



Elements (E)			Heat Waves Y/N	L	C	R	Cold Weather Y/N	L	C	R	Freeze/Thaw Y/N	L	C	R	Precipitation Y/N	L	C	R	Drought Y/N	L	C	R		Low	Med	High	Consequence Comments
1	Private Septic Tanks	Present	N	0		0	N	0		0	Y	3	3	9	N	0		0	N	0		0	Present	0.6	1.8	3.5	Freeze/thaw cycles can cause ground heaves which can damage septic tanks
		2050		0		0		0		0		2		6		0		0		0		0	2050	0.4	1.2	2.3	
		2080		0		0		0		0		1		3		0		0		0		0	2080	0.2	0.6	1.2	
2	Tobermory Sanitary Pump Station and Forcemains	Present	Y	3	1	3	Y	3	1	3	Y	3	3	9	Y	3	3	9	Y	3	1	3	Present	1.9	5.4	10.4	Heat waves impact water usage and thus wastewater production; precipitation causes increase in flows from infiltration and inflow and potential sewage bypasses; drought causes less flow
		2050		4		4		1		1		2		6		4		12		2		2	2050	1.8	5.0	9.6	
		2080		4		4		1		1		1		3		5		15		2		2	2080	1.8	5.0	9.6	
3	Tobermory Gravity Sewers	Present	Y	3	1	3	Y	3	4	12	Y	3	4	12	Y	3	4	12	Y	3	1	3	Present	3.0	8.4	16.1	Heat waves impact water usage and thus wastewater production; cold weather and freeze/thaw cycles can result in freezing of pipes; precipitation causes increase in flows from infiltration and inflow; drought causes less flow
		2050		4		4		1		4		2		8		4		16		2		2	2050	2.4	6.8	13.1	
		2080		4		4		1		4		1		4		5		20		2		2	2080	2.4	6.8	13.1	
4	Tobermory Wastewater Treatment Plant	Present	Y	3	1	3	Y	3	1	3	Y	3	4	12	Y	3	4	12	Y	3	1	3	Present	2.4	6.6	12.7	A sewage lagoon is susceptible to freeze/thaw cycles; precipitation leads to increased flows from infiltration and inflow
		2050		4		4		1		1		2		8		4		16		2		2	2050	2.2	6.2	11.9	
		2080		4		4		1		1		1		4		5		20		2		2	2080	2.2	6.2	11.9	
5	Receiving Water Body	Present	Y	3	2	6	Y	3	1	3	Y	3	1	3	Y	3	2	6	Y	3	2	6	Present	1.7	4.8	9.2	During a heat wave/drought the water quality could be impacted; precipitation and drought impact water levels of the receiving water body
		2050		4		8		1		1		2		8		4		8		2		4	2050	1.7	4.6	8.8	
		2080		4		8		1		1		1		4		4		8		2		4	2080	1.6	4.4	8.4	

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnce, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

	Low	Med	High
Present	1.9	5.4	10.3
2050	1.7	4.8	9.0
2080	1.7	4.6	8.7

Risk Summary

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Figure 7-2: Tobermory Wastewater

7.1.3 Lion's Head Water

Within the Lion's Head water distribution system are six elements: the water source (Isthmus Bay), private wells, watermains, hydrants, water treatment plant, and reservoirs or booster stations.

The consequences to the water distribution system in Lion's Head are the same as Tobermory, with the addition hydrants. Heat waves can increase the risk of house fires and require fire flow. However, at this time, fire flow is not provided by the Lion's Head water distribution system.

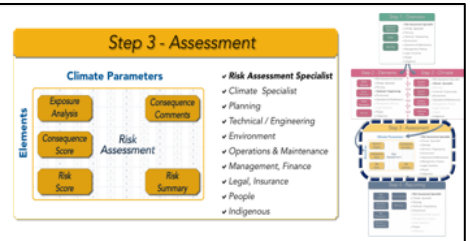
The risk assessment is summarized in Figure 7-3. There appears to be reduced risk in the future projection, however this is primarily due to there being a higher risk on the system from cold weather and freeze/thaw cycles that will be reduced in the future. This does not negate the increased risk to critical infrastructure from other climate parameters, such as heat waves, precipitation, and drought.

Risk Assessment Worksheet

Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Projections		Heat Waves			Cold Weather			Freeze/Thaw			Precipitation			Drought		
	Present	3	L		3	L		3	L		3	L		3	L	
	2050	4	L		1	L		2	L		4	L		3	L	
	2080	4	L		1	L		1	L		4	L		3	L	

Summary



Elements (E)			Heat Waves Y/N	L	C	R	Cold Weather Y/N	L	C	R	Freeze/Thaw Y/N	L	C	R	Precipitation Y/N	L	C	R	Drought Y/N	L	C	R		Low	Med	High	Consequence Comments
1	Lion's Head Source - Isthmus Bay	Present	Y	3	2	6	Y	3	5	15	Y	3	5	15	Y	3	3	9	Y	3	2	6	Present	3.7	10.2	19.6	Heat impacts water quality (eg. higher risk in Algae Blooms) and may also result in increased water usage; cold weather and freeze/thaw cycles could result in a frozen intake; preciptation impacts surface water quality;
		2050		4		8		1		5		2		10		4		12		3		6	2050	3.0	8.2	15.7	
		2080		4		8		1		5		1		5		4		12		3		6	2080	2.6	7.2	13.8	
2	Lion's Head Private Wells	Present	Y	3	1	3	N	L		R	N	L		R	N	L		R	Y	3	1	3	Present	0.4	1.2	2.3	Heat impacts water quality and results in increased water usage; drought impacts water quantity
		2050		4		4		L		R		L		R		L		R		3		3	2050	0.5	1.4	2.7	
		2080		4		4		L		R		L		R		L		R		3		3	2080	0.5	1.4	2.7	
3	Lion's Head Watermains	Present	N	L		R	Y	3	4	12	Y	3	5	15	N	L		R		L		R	Present	1.9	5.4	10.4	Cold weather could result in freezing and/or bursting of watermains
		2050		L		R		1		4		2		10		L		R		L		R	2050	1.0	2.8	5.4	
		2080		L		R		1		4		1		5		L		R		L		R	2080	0.6	1.8	3.5	
4	Lion's Head Hydrants	Present	Y	3	2	6	N	L		R	N	L		R	N	L		R		L		R	Present	0.4	1.2	2.3	Heat waves could result in increased risk of house fires and thus require fire flow
		2050		4		8		L		R		L		R		L		R		L		R	2050	0.6	1.6	3.1	
		2080		4		8		L		R		L		R		L		R		L		R	2080	0.6	1.6	3.1	
5	Lion's Head Water Treatment Plant	Present	Y	3	3	9	N	L		R	N	L		R	N	L		R	Y	3	3	9	Present	1.3	3.6	6.9	Heat impacts water quality; drought impacts water quantity. Infrastrcuture impacts due to high temp/drought such as risk of wildfire, or high precipitation causing flooding.
		2050		4		12		L		R		L		R		L		R		3		9	2050	1.5	4.2	8.1	
		2080		4		12		L		R		L		R		L		R		3		9	2080	1.5	4.2	8.1	
6	Lion's Head Reservoir or Booster Station	Present	N	L		R	N	L		R	N	L		R	Y	3	2	6	N	L		R	Present	0.4	1.2	2.3	Precipitation could impact the ability to perform maintenance on the booster station or reservoir
		2050		L		R		L		R		L		R		4		8		L		R	2050	0.6	1.6	3.1	
		2080		L		R		L		R		L		R		4		8		L		R	2080	0.6	1.6	3.1	

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnce, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

	Low	Med	High
Present	1.4	3.8	7.2
2050	1.2	3.3	6.3
2080	1.1	3.0	5.6

Risk Summary

Figure 7-3: Lion's Head Water

7.1.4 Lion's Head Wastewater

Within the Lion's Head wastewater collection system are two elements: private septic tanks and receiving water body.

For the septic tanks, freeze/thaw cycles can cause ground heaves that can damage septic tanks, but impacts would be localized. Finally, the receiving water body could be impacted by heat waves which can cause reductions in water quality, and drought and precipitation can impact water levels. Cold weather and freeze/thaw cycles impact the state of the receiving water body. This concern may also impact any new or proposed wastewater treatment facilities that are to meet target discharge requirements based on the ecology of the receiving waterbody.

The risk assessment is summarized in Figure 7-4. There appears to be reduced risk in the future projection, however this is primarily due to there being a higher risk on the system from cold weather and freeze/thaw cycles that will be reduced in the future. This does not negate the increased risk to critical infrastructure from other climate parameters, such as heat waves, precipitation, and drought.

Risk Assessment Worksheet

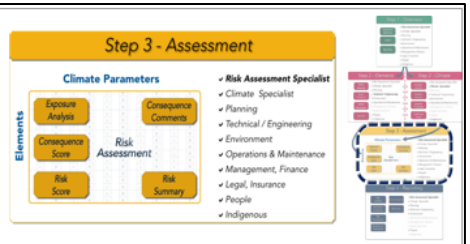
Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Parameters (P)

Climate Projections		Heat Waves				Cold Weather				Freeze/Thaw				Precipitation				Drought			
		P	L			P	L			P	L			P	L			P	L		
	Present	3	L			3	L			3	L			3	L			3	L		
	2050	4	L			1	L			2	L			4	L			3	L		
	2080	4	L			1	L			1	L			4	L			3	L		
Elements (E)		Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R
1 Private Septic Tanks	Present	N	0		0	N	0		0	Y	3	3	9	N	0		0	N	0		0
	2050		0		0		0		0		2		6		0		0		0		0
	2080		0		0		0		0		1		3		0		0		0		0
2 Receiving Water Body	Present	Y	3	2	6	Y	3	1	3	Y	3	1	3	Y	3	2	6	Y	3	2	6
	2050		4		8		1		1		2		2		4		8		2		4
	2080		4		8		1		1		1		1		4		8		2		4

Summary

	Low	Med	High
Present	0.6	1.8	3.5
2050	0.4	1.2	2.3
2080	0.2	0.6	1.2
Present	1.7	4.8	9.2
2050	1.7	4.6	8.8
2080	1.6	4.4	8.4



Consequence Comments

Freeze/thaw cycles can cause ground heaves which can damage septic tanks

During a heat wave the water quality could be impacted; precipitation and drought impact water levels of the receiving water body

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnce, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

	Low	Med	High
Present	1.2	3.3	6.3
2050	1.0	2.9	5.5
2080	0.9	2.5	4.8

Risk Summary

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Figure 7-4: Lion's Head Wastewater

7.1.5 Effect on Drinking Water

Quantity

Drinking water quantity is impacted by drought and water levels of the raw water source.

Drought can result in drawdown of groundwater table levels, thus causing water shortages for residences on well water. However, in Tobermory and Lion's Head, the length of droughts is not expected to increase nor the frequency. Droughts will still occur, but at a similar length to the current and historical trends. Therefore, the threat of droughts can be disregarded during the analysis of the future servicing options based on the risk assessment score.

Water levels of the supplying water body can impact the availability of water to the community. If the water level is low enough, it can drop below the intake to the water treatment plant, thus impacting water supply. In addition, the water level of the surface water can be linked to the groundwater table levels, thus impacting water quantity from wells under a GUDI system. The water level in Lake Huron is expected to drop below the record lower water level by 2030. Potential variations in water levels should be considered when designing a water treatment plant or drilling public wells.

Therefore, in terms of water quantity, the effects of climate change are expected to have comparable impact on well water and treated surface water.

Quality

Drinking water quality is a result of temperature, precipitation, and the water level of the raw water source.

Climate change is set to increase average temperatures, thus increasing the frequency of heat waves, and decreasing the frequency of freeze-thaw cycles and very cold days. As a result, raw water may require more treatment. Higher temperatures in water can result in a higher frequency, duration, and severity of algal blooms and microbial activity. Higher water temperature is also associated with odour and offensive taste. Therefore, the quality of water can be reduced with higher temperatures. For the future servicing options, water sources that do not rely on surface water as a source, such as wells, may be preferred. Otherwise, the potential for poorer quality of raw water must be considered in the design of a water treatment plant.

Due to the increase in temperature, very cold days and freeze-thaw cycles are expected to be less frequent, thus reducing the risk for watermain breaks or frozen intake structures from the surface water. This will reduce the probability and potential of an impacted water distribution network to enter a boil-water advisory because of damaged infrastructure. Therefore, it is less likely for there to be an issue with intakes or buried infrastructure such as watermains in the future.

Increased wet days as a result of climate change are expected to impact water quality. An increase in rainfall causes an increase in stormwater runoff, as well as a potential increase in wastewater collected because of infiltration and inflow, both of which carry pollutants that reduce water quality of the receiving water body. Stormwater runs directly into surface water sources without treatment, and if the wastewater flows are too high because of a high intensity rainfall event, the wastewater will bypass treatment and enter the receiving water body untreated. Therefore, raw water quality is expected to potentially worsen, which should be considered for future servicing options. Wells may be preferable to treating water from Georgian Bay, otherwise this change in raw water quality would need to be considered during the design of a water treatment plant.

The supplying water body's water levels can impact its quality. Low water levels can result in reduced water quality. As mentioned previously, the water level in Lake Huron is expected to drop significantly by 2030.

Therefore, climate change is predicted to reduce the quality of surface water used as sources for water treatment plants, thus making private or public well systems preferable.

7.1.6 Effect on Drinking Water Demands

During heat waves and droughts, water demand potentially increases due to changes in water consumption habits, such as increased frequency of watering lawns. As the frequency of heat waves increases, water demand during the summer months will increase and may impact the maximum day demand or peak hour demand. Since it is not expected for droughts to increase in length, there is less concern about their impact on water consumption. Coupled with expected growth of the communities, climate change will cause an increase in water demand. This can put stress on a community reliant on well water, thus making a centralized municipal water system preferable.

7.1.7 Potential Flooding of Water and Wastewater Facilities

Despite potential increases in water level of Lake Huron and Georgian Bay, there is not expected to be any flooding of the water and wastewater facilities due to the size of the

water bodies. In 2040, the water level in Lake Huron is expected to reach a record high of 177.8 m, however this would not be high enough to flood any of the existing facilities. Figure 7-5 shows historical and predicted lake levels, which should be considered when proposing any new facilities.

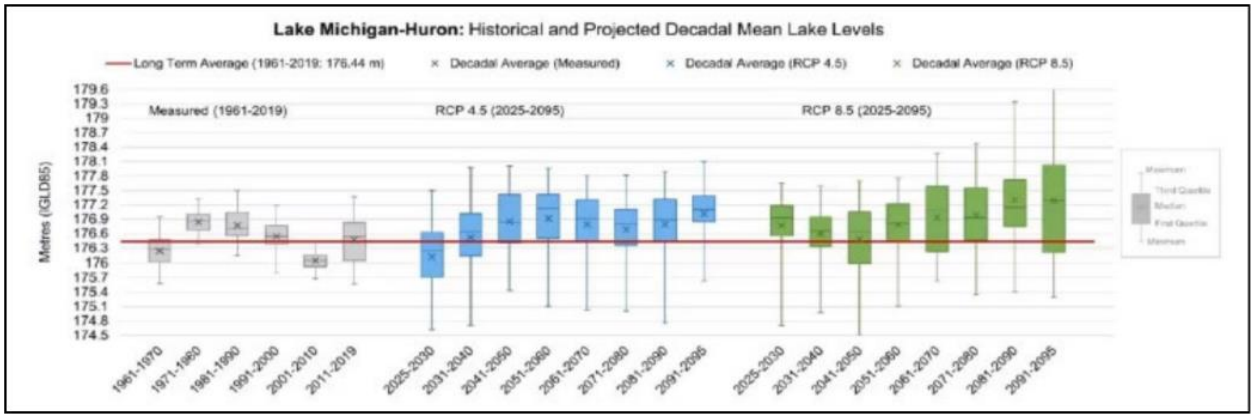


Figure 7-5: Lake Michigan-Huron Historical and Projected Decadal Mean Lake Levels

Infiltration and inflow is a phenomenon that occurs in sanitary sewers, where stormwater enters the sewers through pipe joints (infiltration) and manholes (inflow), and increases the volume of wastewater to be transported. Increased precipitation causes higher rates of infiltration and inflow into sewers, thus creating the possibility of surcharging of wastewater treatment facilities and pumping stations if pipes are not adequately sized to accommodate these increased flows. Private septic tank systems are also somewhat impacted by infiltration but somewhat resilient depending on the local groundwater conditions. These systems can be impacted by longer duration rain activity, and saturated ground conditions can lead to widespread and localized sceptic tank tile bed run off and contamination in prolonged conditions. New collection systems are typically designed to reduce the impacts of infiltration and inflow as well as being sized accordingly to account for the wet weather average daily flow to make them more resilient.

7.1.8 Effect on Wastewater Collection

Surges of wet weather increasing wastewater flows due to infiltration and inflow will have an impact on wastewater collection. Sanitary sewers may need to be upsized to compensate for increased infiltration and inflow or forcemains may need to be designed for higher peak flow during heavy prolonged wet weather conditions. Overall, the opportunity for new wastewater collection systems is that piping will be buried infrastructure that is typically protected from surface weather climate.

References are located in **Appendix C**.

7.2 Mitigation and Adaptation Recommendations

7.2.1 Mitigation

Applying the goals set by the Municipality as explained in Section 4, the following mitigation strategies can be considered as an opportunity for existing and future proposed water and wastewater infrastructure.

- Cutting consumption can be enacted by using high efficiency pumps in pumping stations and upgrading treatment plants to reduce the amount of energy use for both water booster stations and wastewater pumping systems. (NBP Goal: Electrify Everything and Cut Consumption)
- New Water and Wastewater Treatment plants can be transitioned to electricity for energy instead of fossil fuels, or consideration for energy development on-site may be considered. This may include, for example, the installation of on-site solar energy production on new buildings or designing for heat-capture for anaerobic digester systems at wastewater treatment plans. Currently only the Lion's Head Water Treatment Plant uses natural gas for heating which may be a candidate for conversion to a heat pump system. Selecting a site with space provision to install these within the grounds as part of sustainable site selection process may be considered. (NBP Goal: Electrify Everything)
- Sites identified for development for both water and wastewater systems should consider the retention or enhancement natural systems where possible, such as the retention of forests and wetlands which provide natural carbon capture and sequestering. Specifically for wastewater treatment facilities the site selection needs to consider balance of land requirements for treatment processes and the ultimate outlet receiving systems capacity. (NBP Goal: Nurture Nature)
- New buildings or facilities for both water and wastewater systems may consider construction to a EVISION Certification or Net-Zero Carbon standard which aims to reduce energy use and consumption. (NBP Goal: Cut Consumption, Electrify Everything)
- Methane can be captured, and sequestration can be installed to wastewater treatment plants to reduce the amount of methane being released into the atmosphere. Additionally, new systems can implement biosolid byproduct harvest and reuse to cut consumption and waste and to mitigate GHG emissions through effective stockpiling practices. (NBP Goal: Cut Consumption, Nurture Nature)

— During the design of new infrastructure, materials should be selected that require less greenhouse gas intensive production. Similarly, less greenhouse gas intensive construction methods should be considered, which includes material selection and manufactured product delivery to site.

7.2.2 Adaptation

It's important to recognize that a system's vulnerability is related to the nature, magnitude, and variability of climate change that it is exposed to, therefore the application of adaptation strategies should be inherit in the design of the systems which factor the weighting of climate change impacts. As part of the design consideration and when identifying opportunities to design infrastructure with climate change resiliency features the trade-offs between natural environment, constructability, technical suitability, social/economic impact, and overall cost feasibility impacts should also be assessed. Existing Infrastructure that is to remain may be upgraded to meet resiliency targets and current design standards, however if these systems do not provide reliable service or the upgrades are comparable to installing a new system, then there is an opportunity to consider alternative servicing options. Facilities should also be designed with consideration for redundancy and flexibility in operations and maintenance to ensure that infrastructure impacted by climate change may remain in operation and account for the variable climate hazards identified.

7.3 Future Servicing Options Considerations

The opportunities and constraints for each alternative for Tobermory's water and wastewater systems are summarized in Table 7-2.

Table 7-2: Tobermory Future Servicing Options Considerations

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
Maintain existing level of service	Opportunities — No construction Constraints — Existing water treatment plant continues to operate at current energy efficiency and remains reliant on fossil fuels — Low water levels in Lake Huron can result in lowered groundwater table which can impact GUDI systems	Opportunities — No construction Constraints — Existing pump stations continue to operate at current energy efficiency — Existing wastewater treatment plant continues to operate at current efficiency

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
	— Increased water consumption from increased heat waves can put stress on well water systems	and remains reliant on fossil fuels — Risk of flooding of septic tanks from increased infiltration and inflow
Expand water servicing to downtown core and Community Centre Expand wastewater servicing to downtown core that is not serviced	Opportunities — A new water treatment plant could be developed with climate change measures inherit in the design including selection of efficient electrical equipment to reduce GHG emissions — Increased temperatures will reduce risk of frozen pipes or intakes — Municipal water system is better equipped to handle increased water consumption due to increased heat waves Constraints — Emissions from construction and manufacturing of materials — Low water levels in Lake Huron can result in water levels below the intake to the water treatment plant — Low water levels in Lake Huron can also result in reduced water quality — Increased temperature can cause poor surface water quality — Increased precipitation can reduce surface water quality	Opportunities — Opportunity to develop resilient collection systems to infiltration and inflow with new piping — Pump stations and wastewater treatment plant can be upgraded to improve efficiency Constraints — Emissions from construction and manufacturing of materials Risk of flooding of wastewater treatment plant and pump stations from infiltration and inflow due to increased precipitation
Expand water servicing to existing residents, commercial, municipal and new development Expand wastewater system existing residents,	Opportunities — Water treatment plant could be upgraded to improve efficiency and retrofitted to run on electricity instead of fossil fuels — A new water treatment plant could be developed with climate change measures inherit in the design including selection of efficient	Opportunities — Pump stations and wastewater treatment plant can be upgraded to improve efficiency Constraints

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
commercial, municipal and new development	electrical equipment to reduce GHG emissions — Municipal water system is better equipped to handle increased water consumption due to increased heat waves Constraints — Emissions from construction and manufacturing of materials — Low water levels in Lake Huron can result in water levels below the intake to the water treatment plant — Low water levels in Lake Huron can also result in reduced water quality — Increased temperature can cause poor surface water quality — Increased temperatures will reduce risk of frozen pipes or intakes — Increased precipitation can reduce surface water quality	— Emissions from construction and manufacturing of materials — Risk of flooding of wastewater treatment plant and pump stations from infiltration and inflow due to increased precipitation

The opportunities and constraints for each alternative for Lion's Head's water and wastewater systems are summarized in Table 7-3.

Table 7-3: Lion's Head Future Servicing Options Considerations

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
Maintain existing level of service	Opportunities — No construction Constraints — Existing water treatment plant continues to operate at current energy efficiency and remains reliant on fossil fuels — No capacity for fire flow	Opportunities — No construction Constraints — Risk of flooding of septic tanks from increased infiltration and inflow

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
Expand water servicing to new growth and provide sufficient volume for fire flow	Opportunities — Water treatment plant could be upgraded to improve efficiency and retrofitted to run on electricity instead of fossil fuels for heating. — Fire flow would no longer need to be trucked to site — Increased temperatures will reduce risk of frozen pipes or intakes — Municipal water system is better equipped to handle increased water consumption due to increased heat waves Constraints — Emissions from construction and manufacturing of materials — Low water levels in Lake Huron can result in water levels below the intake to the water treatment plant — Low water levels in Lake Huron can also result in reduced water quality — Increased temperature can cause poor surface water quality — Increased precipitation can reduce surface water quality	N/A
Expand water to Ferndale	Opportunities — Water treatment plant could be upgraded to improve efficiency and retrofitted to run on electricity instead of fossil fuels for heating — Increased temperatures will reduce risk of frozen pipes or intakes — Municipal water system is better equipped to handle increased	N/A

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
	water consumption due to increased heat waves Constraints — Low water levels in Lake Huron can result in water levels below the intake to the water treatment plant — Emissions from construction and manufacturing of materials — Low water levels in Lake Huron can also result in reduced water quality — Increased temperature can cause poor surface water quality —Increased precipitation can reduce surface water quality	
Expand water to Isthmus Bay and Barrow Bay	Opportunities — Water treatment plant could be upgraded to improve efficiency and retrofitted to run on electricity instead of fossil fuels for heating — Increased temperatures will reduce risk of frozen pipes or intakes — Municipal water system is better equipped to handle increased water consumption due to increased heat waves Constraints — Emissions from construction and manufacturing of materials — Low water levels in Lake Huron can result in water levels below the intake to the water treatment plant — Low water levels in Lake Huron can also result in reduced water quality — Increased temperature can cause poor surface water quality	N/A

Alternative	Opportunities and Constraints on Water System	Opportunities and Constraints on Wastewater System
	— Increased precipitation can reduce surface water quality	
Construct new wastewater treatment facility and provide servicing to downtown Lion's Head	N/A	Opportunities — Opportunity to develop resilient collection system to infiltration and inflow with new piping — Pump stations and wastewater treatment plant can be upgraded to improve efficiency — Wastewater treatment plant can be constructed to run on electricity instead of fossil fuels for heating Constraints — Emissions from construction and manufacturing of materials — Risk of flooding of wastewater treatment plant and pump stations from infiltration and inflow due to increased precipitation

8 CONCLUSION

The findings from this climate change impact assessment will be used in the evaluation of future servicing options for both the Tobermory and Lion's Head communities as part of the Master Plan and MECA process. Water and wastewater infrastructure for existing and future proposed systems in this region were found to be generally resilient to changing climate impacts anticipated over the next twenty years in the area, with the identified risks and effects to the water systems being impacted for both quantity and quality and wastewater collection systems being impacted by potential surges from wet weather conditions from infiltration and inflow. This analysis is limited to the information available at the time of the assessment. Findings in this report is used to support the evaluation of water and wastewater system alternatives being considered for the future servicing options.

APPENDIX

A CLIMATE DATA

APPENDIX A1

A1.1 HEAT WAVES

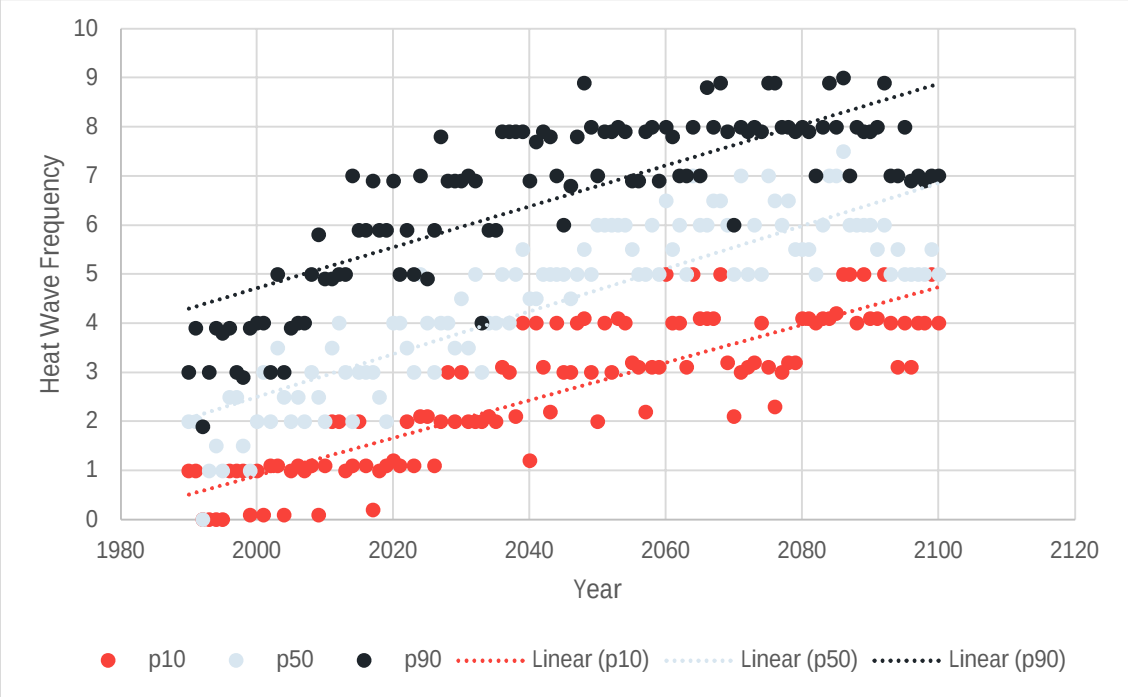


Figure A-1: Tobermory Heat Wave Frequency

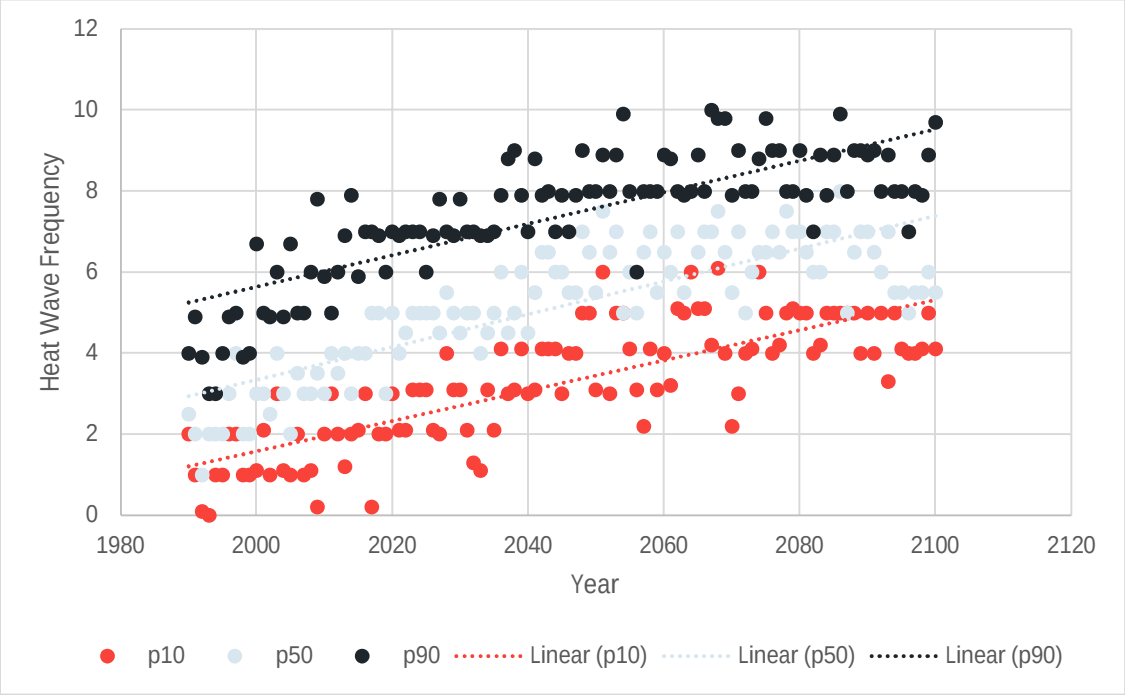


Figure A-2: Lion's Head Heat Wave Frequency

APPENDIX A1

A1.2 VERY COLD DAYS

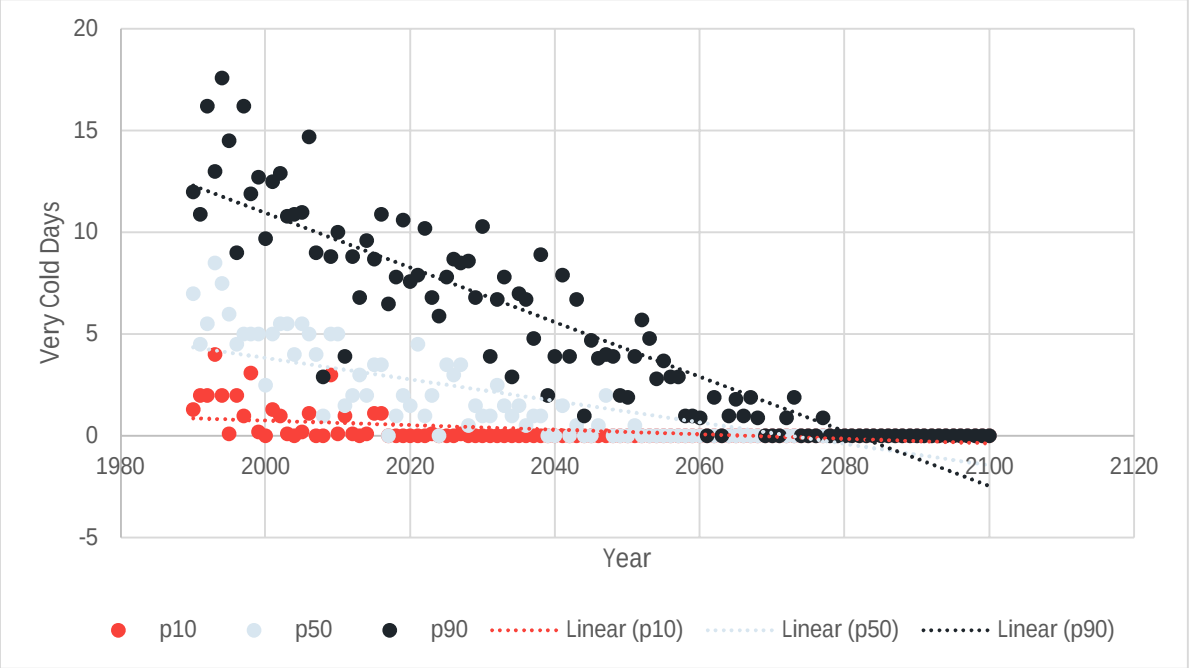


Figure A-3 Tobermory Very Cold Day Frequency

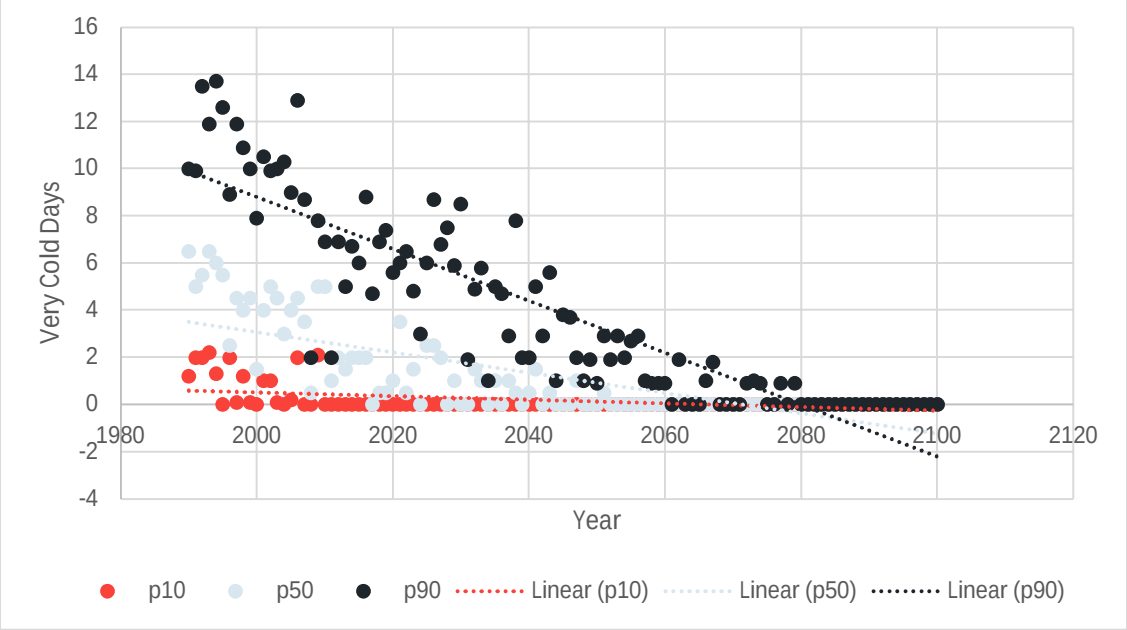


Figure A-4: Lion's Head Very Cold Day Frequency

APPENDIX A1

A1.3 FREEZE-THAW CYCLES

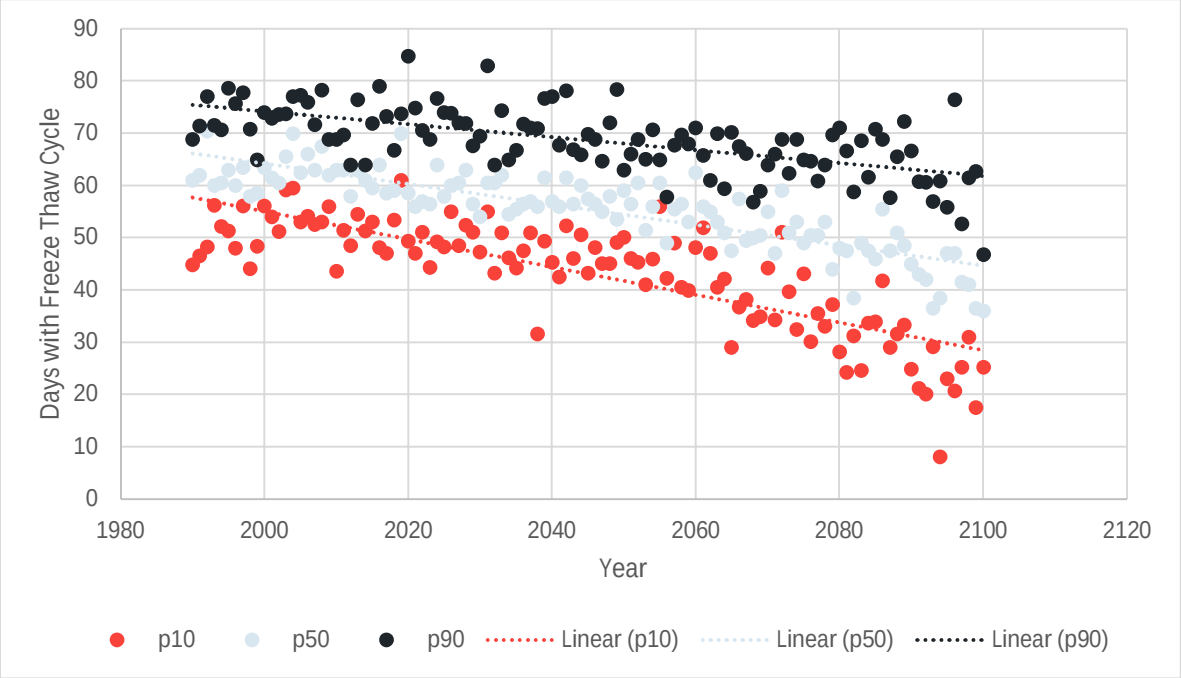


Figure A-5: Tobermory Freeze-Thaw Cycle Frequency

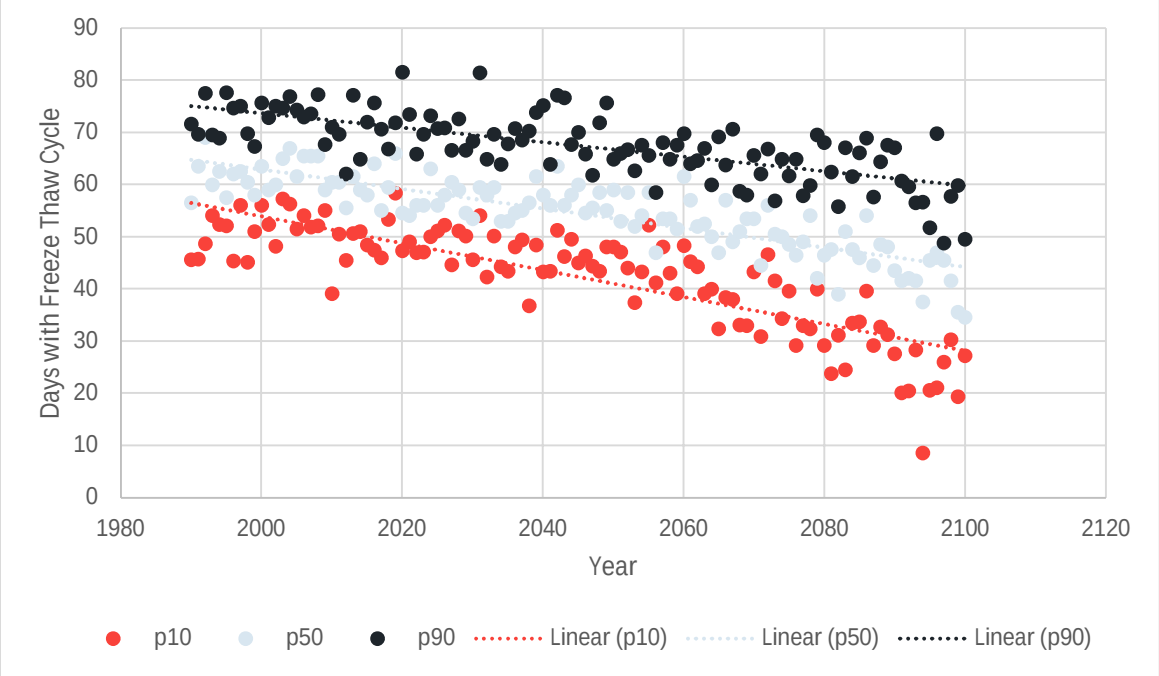


Figure A-6: Lion's Head Freeze-Thaw Cycle Frequency

APPENDIX A1

A1.4 WET DAYS

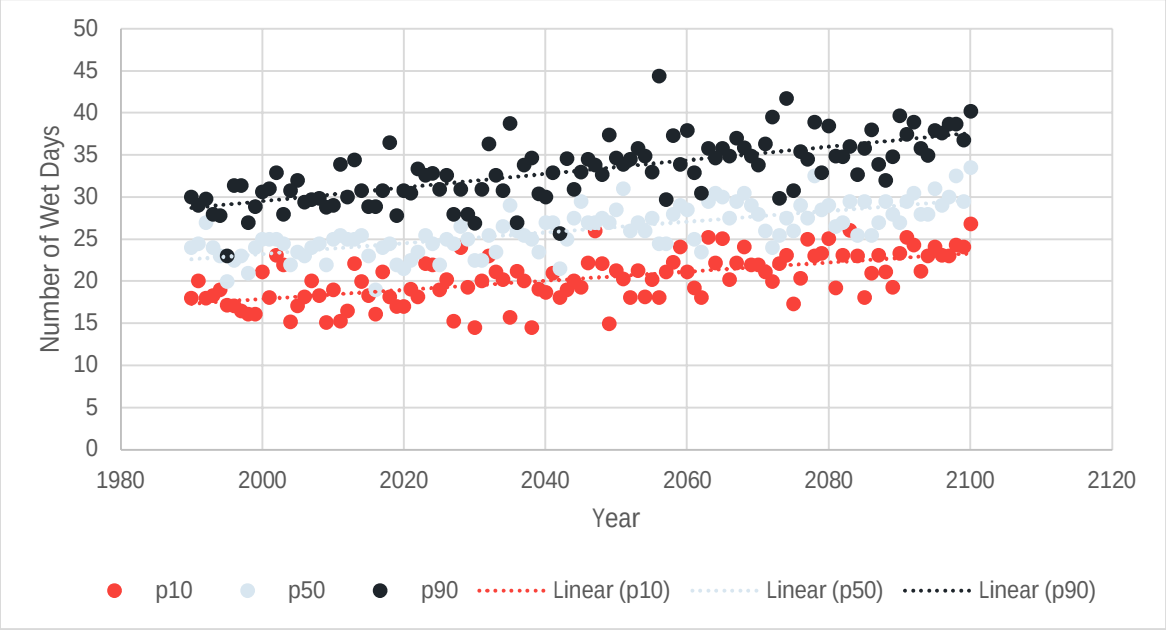


Figure A-7: Tobermory Wet Day Frequency

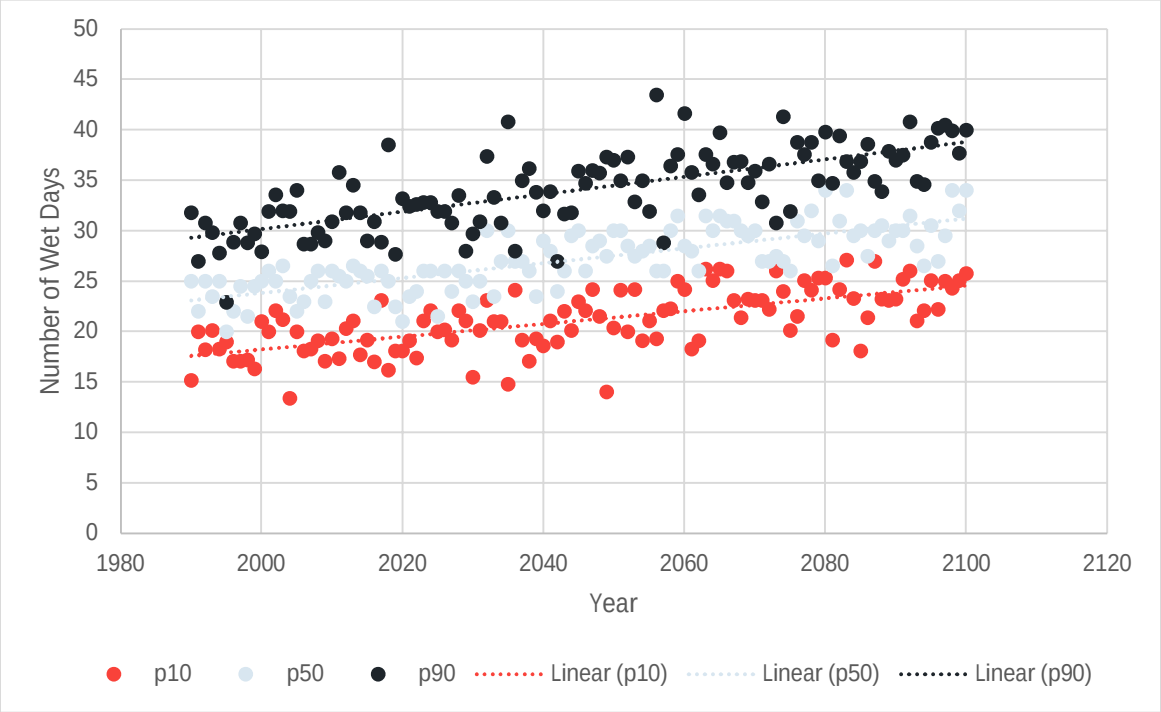


Figure A-8: Lion's Head Wet Day Frequency

APPENDIX A1

A1.5 DROUGHT

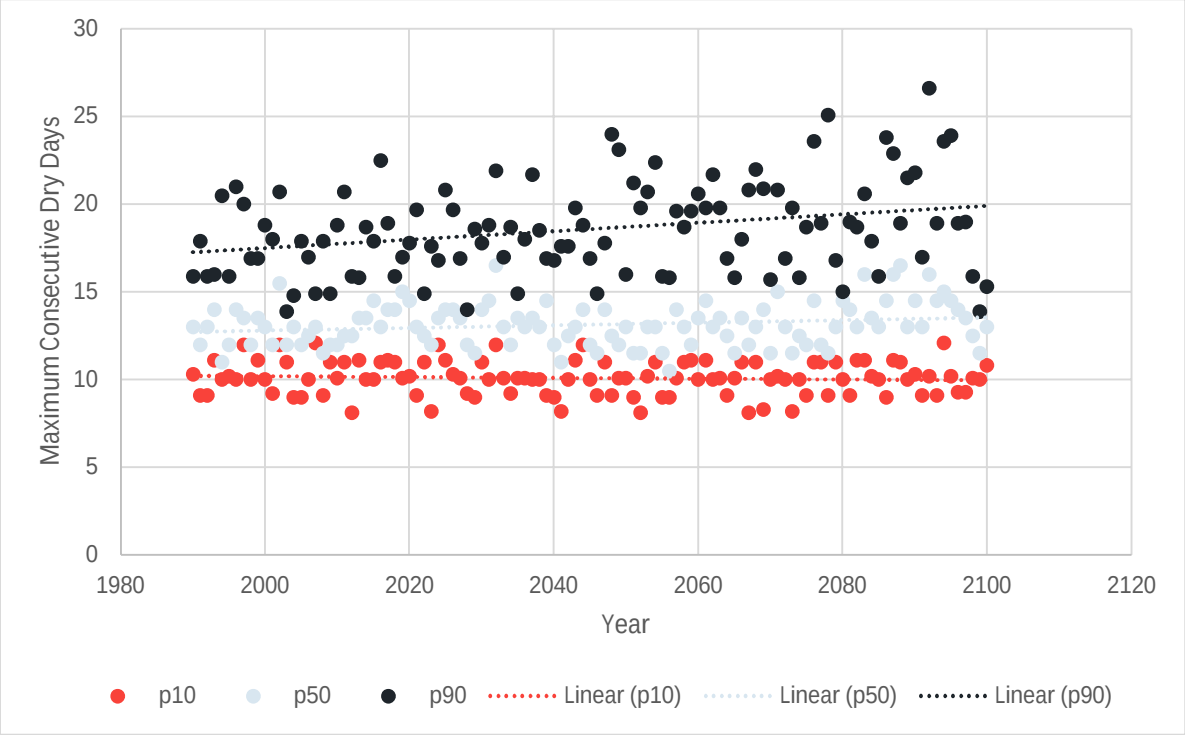


Figure A-9: Tobermory Longest Drought

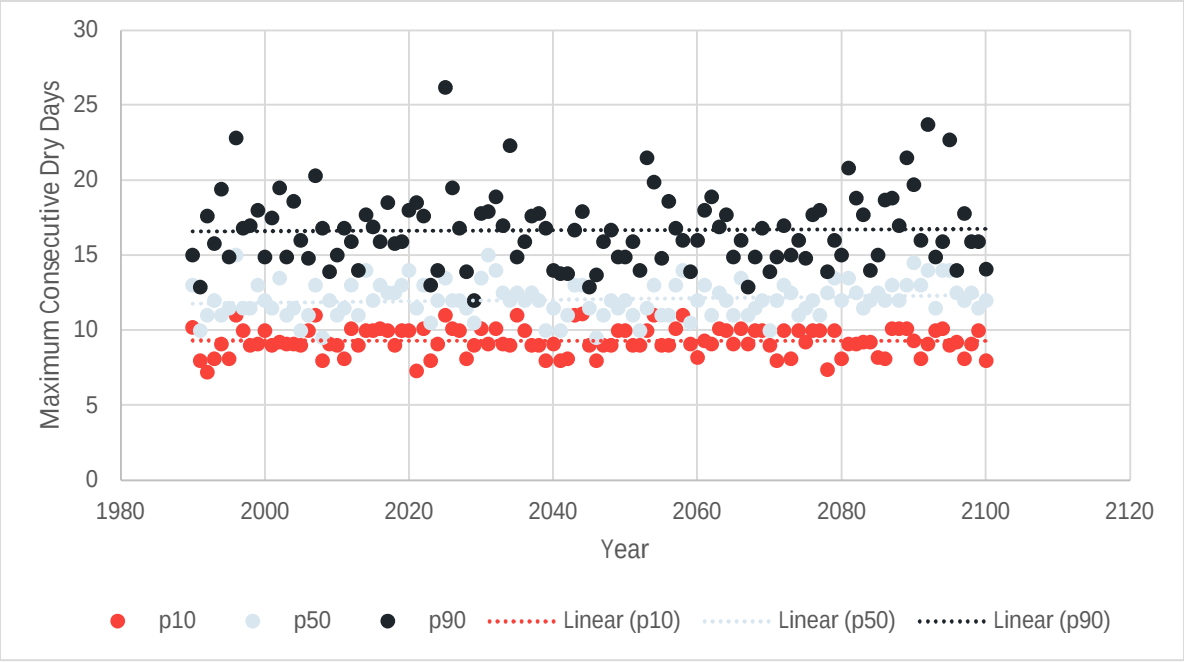
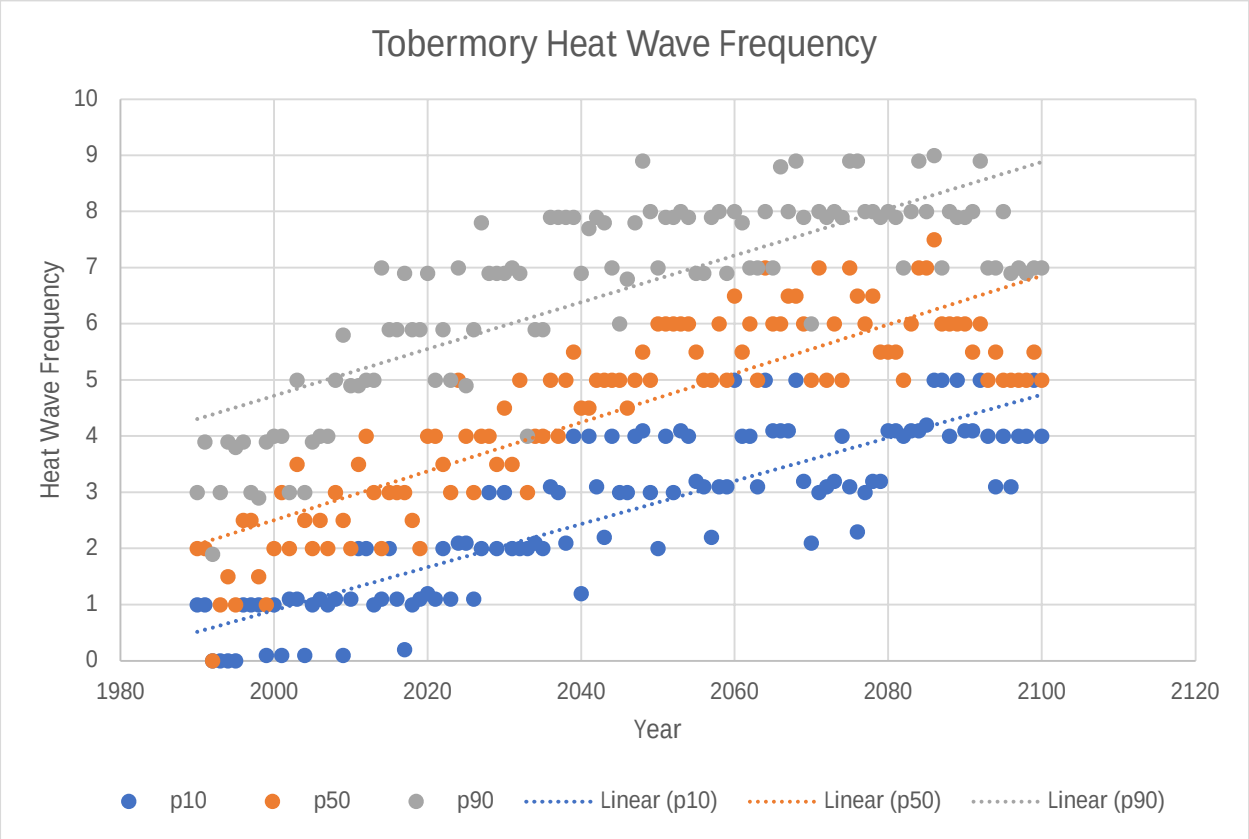


Figure A-10: Lion's Head Longest Drought

Heat Wave Frequency
Daily Min Temp > 15oC
Daily Max Temp > 25oC
Duration of at least 3 days

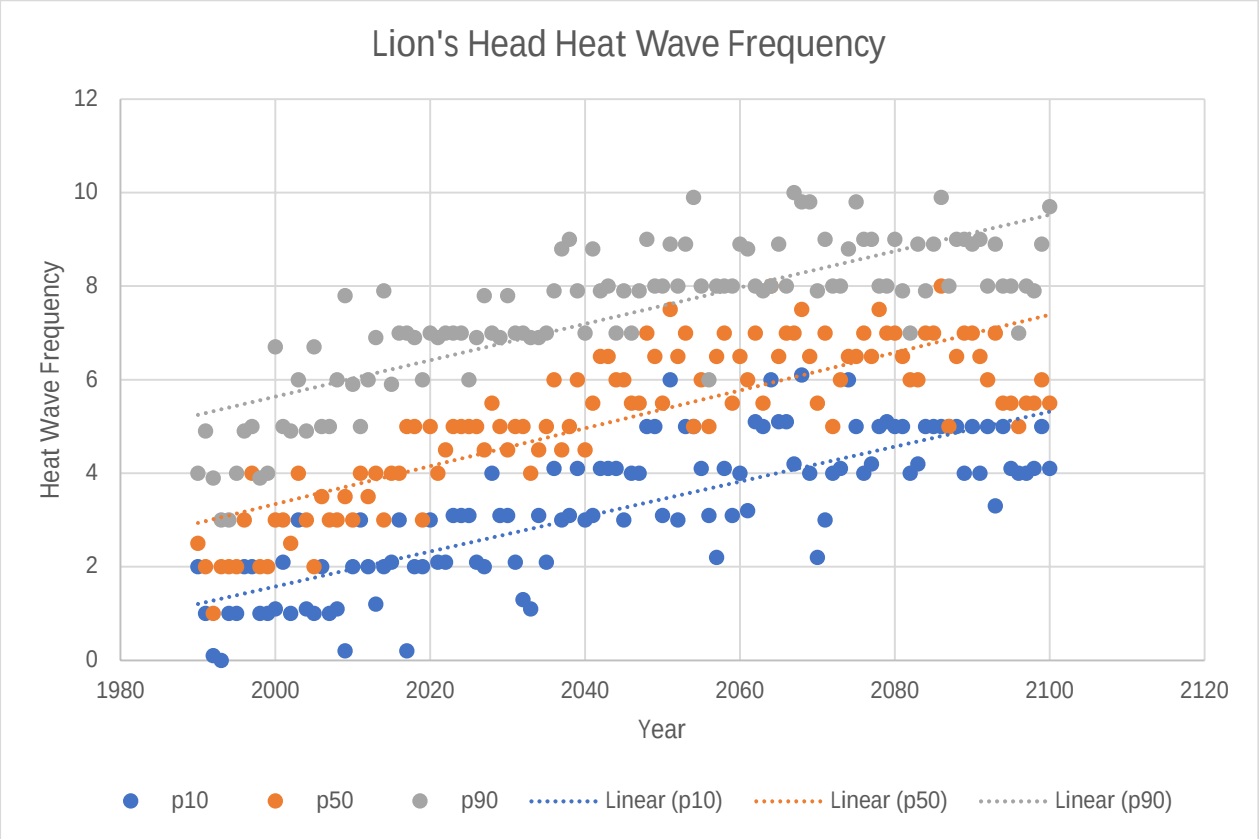


Tobermory

lat	lon	time	year	rcp	p10	p50	p90	
45.29167	-81.62500238	1990-01-01 12:00	1990	rcp85	1	2	3	
45.29167	-81.62500238	1991-01-01 12:00	1991	rcp85	1	2	3.9	
45.29167	-81.62500238	1992-01-01 12:00	1992	rcp85	0	0	1.9	
45.29167	-81.62500238	1993-01-01 12:00	1993	rcp85	0	1	3	
45.29167	-81.62500238	1994-01-01 12:00	1994	rcp85	0	1.5	3.9	
45.29167	-81.62500238	1995-01-01 12:00	1995	rcp85	0	1	3.8	
45.29167	-81.62500238	1996-01-01 12:00	1996	rcp85	1	2.5	3.9	
45.29167	-81.62500238	1997-01-01 12:00	1997	rcp85	1	2.5	3	
45.29167	-81.62500238	1998-01-01 12:00	1998	rcp85	1	1.5	2.9	
45.29167	-81.62500238	1999-01-01 12:00	1999	rcp85	0.1	1	3.9	
45.29167	-81.62500238	2000-01-01 12:00	2000	rcp85	1	2	4	
45.29167	-81.62500238	2001-01-01 12:00	2001	rcp85	0.1	3	4	
45.29167	-81.62500238	2002-01-01 12:00	2002	rcp85	1.1	2	3	
45.29167	-81.62500238	2003-01-01 12:00	2003	rcp85	1.1	3.5	5	
45.29167	-81.62500238	2004-01-01 12:00	2004	rcp85	0.1	2.5	3	
45.29167	-81.62500238	2005-01-01 12:00	2005	rcp85	1	2	3.9	2.333333
45.29167	-81.62500238	2006-01-01 12:00	2006	rcp85	1.1	2.5	4	
45.29167	-81.62500238	2007-01-01 12:00	2007	rcp85	1	2	4	

45.29167	-81.62500238	2008-01-01 12:00	2008	rcp85	1.1	3	5
45.29167	-81.62500238	2009-01-01 12:00	2009	rcp85	0.1	2.5	5.8
45.29167	-81.62500238	2010-01-01 12:00	2010	rcp85	1.1	2	4.9
45.29167	-81.62500238	2011-01-01 12:00	2011	rcp85	2	3.5	4.9
45.29167	-81.62500238	2012-01-01 12:00	2012	rcp85	2	4	5
45.29167	-81.62500238	2013-01-01 12:00	2013	rcp85	1	3	5
45.29167	-81.62500238	2014-01-01 12:00	2014	rcp85	1.1	2	7
45.29167	-81.62500238	2015-01-01 12:00	2015	rcp85	2	3	5.9
45.29167	-81.62500238	2016-01-01 12:00	2016	rcp85	1.1	3	5.9
45.29167	-81.62500238	2017-01-01 12:00	2017	rcp85	0.2	3	6.9
45.29167	-81.62500238	2018-01-01 12:00	2018	rcp85	1	2.5	5.9
45.29167	-81.62500238	2019-01-01 12:00	2019	rcp85	1.1	2	5.9
45.29167	-81.62500238	2020-01-01 12:00	2020	rcp85	1.2	4	6.9
45.29167	-81.62500238	2021-01-01 12:00	2021	rcp85	1.1	4	5
45.29167	-81.62500238	2022-01-01 12:00	2022	rcp85	2	3.5	5.9
45.29167	-81.62500238	2023-01-01 12:00	2023	rcp85	1.1	3	5
45.29167	-81.62500238	2024-01-01 12:00	2024	rcp85	2.1	5	7
45.29167	-81.62500238	2025-01-01 12:00	2025	rcp85	2.1	4	4.9
45.29167	-81.62500238	2026-01-01 12:00	2026	rcp85	1.1	3	5.9
45.29167	-81.62500238	2027-01-01 12:00	2027	rcp85	2	4	7.8
45.29167	-81.62500238	2028-01-01 12:00	2028	rcp85	3	4	6.9
45.29167	-81.62500238	2029-01-01 12:00	2029	rcp85	2	3.5	6.9
45.29167	-81.62500238	2030-01-01 12:00	2030	rcp85	3	4.5	6.9
45.29167	-81.62500238	2031-01-01 12:00	2031	rcp85	2	3.5	7
45.29167	-81.62500238	2032-01-01 12:00	2032	rcp85	2	5	6.9
45.29167	-81.62500238	2033-01-01 12:00	2033	rcp85	2	3	4
45.29167	-81.62500238	2034-01-01 12:00	2034	rcp85	2.1	4	5.9
45.29167	-81.62500238	2035-01-01 12:00	2035	rcp85	2	4	5.9
45.29167	-81.62500238	2036-01-01 12:00	2036	rcp85	3.1	5	7.9
45.29167	-81.62500238	2037-01-01 12:00	2037	rcp85	3	4	7.9
45.29167	-81.62500238	2038-01-01 12:00	2038	rcp85	2.1	5	7.9
45.29167	-81.62500238	2039-01-01 12:00	2039	rcp85	4	5.5	7.9
45.29167	-81.62500238	2040-01-01 12:00	2040	rcp85	1.2	4.5	6.9
45.29167	-81.62500238	2041-01-01 12:00	2041	rcp85	4	4.5	7.7
45.29167	-81.62500238	2042-01-01 12:00	2042	rcp85	3.1	5	7.9
45.29167	-81.62500238	2043-01-01 12:00	2043	rcp85	2.2	5	7.8
45.29167	-81.62500238	2044-01-01 12:00	2044	rcp85	4	5	7
45.29167	-81.62500238	2045-01-01 12:00	2045	rcp85	3	5	6
45.29167	-81.62500238	2046-01-01 12:00	2046	rcp85	3	4.5	6.8
45.29167	-81.62500238	2047-01-01 12:00	2047	rcp85	4	5	7.8
45.29167	-81.62500238	2048-01-01 12:00	2048	rcp85	4.1	5.5	8.9
45.29167	-81.62500238	2049-01-01 12:00	2049	rcp85	3	5	8
45.29167	-81.62500238	2050-01-01 12:00	2050	rcp85	2	6	7
45.29167	-81.62500238	2051-01-01 12:00	2051	rcp85	4	6	7.9
45.29167	-81.62500238	2052-01-01 12:00	2052	rcp85	3	6	7.9
45.29167	-81.62500238	2053-01-01 12:00	2053	rcp85	4.1	6	8
45.29167	-81.62500238	2054-01-01 12:00	2054	rcp85	4	6	7.9

45.29167	-81.62500238	2055-01-01 12:00	2055	rcp85	3.2	5.5	6.9	5.566667
45.29167	-81.62500238	2056-01-01 12:00	2056	rcp85	3.1	5	6.9	
45.29167	-81.62500238	2057-01-01 12:00	2057	rcp85	2.2	5	7.9	
45.29167	-81.62500238	2058-01-01 12:00	2058	rcp85	3.1	6	8	
45.29167	-81.62500238	2059-01-01 12:00	2059	rcp85	3.1	5	6.9	
45.29167	-81.62500238	2060-01-01 12:00	2060	rcp85	5	6.5	8	
45.29167	-81.62500238	2061-01-01 12:00	2061	rcp85	4	5.5	7.8	
45.29167	-81.62500238	2062-01-01 12:00	2062	rcp85	4	6	7	
45.29167	-81.62500238	2063-01-01 12:00	2063	rcp85	3.1	5	7	
45.29167	-81.62500238	2064-01-01 12:00	2064	rcp85	5	7	8	
45.29167	-81.62500238	2065-01-01 12:00	2065	rcp85	4.1	6	7	
45.29167	-81.62500238	2066-01-01 12:00	2066	rcp85	4.1	6	8.8	
45.29167	-81.62500238	2067-01-01 12:00	2067	rcp85	4.1	6.5	8	
45.29167	-81.62500238	2068-01-01 12:00	2068	rcp85	5	6.5	8.9	
45.29167	-81.62500238	2069-01-01 12:00	2069	rcp85	3.2	6	7.9	
45.29167	-81.62500238	2070-01-01 12:00	2070	rcp85	2.1	5	6	
45.29167	-81.62500238	2071-01-01 12:00	2071	rcp85	3	7	8	
45.29167	-81.62500238	2072-01-01 12:00	2072	rcp85	3.1	5	7.9	
45.29167	-81.62500238	2073-01-01 12:00	2073	rcp85	3.2	6	8	
45.29167	-81.62500238	2074-01-01 12:00	2074	rcp85	4	5	7.9	
45.29167	-81.62500238	2075-01-01 12:00	2075	rcp85	3.1	7	8.9	
45.29167	-81.62500238	2076-01-01 12:00	2076	rcp85	2.3	6.5	8.9	
45.29167	-81.62500238	2077-01-01 12:00	2077	rcp85	3	6	8	
45.29167	-81.62500238	2078-01-01 12:00	2078	rcp85	3.2	6.5	8	
45.29167	-81.62500238	2079-01-01 12:00	2079	rcp85	3.2	5.5	7.9	
45.29167	-81.62500238	2080-01-01 12:00	2080	rcp85	4.1	5.5	8	
45.29167	-81.62500238	2081-01-01 12:00	2081	rcp85	4.1	5.5	7.9	
45.29167	-81.62500238	2082-01-01 12:00	2082	rcp85	4	5	7	
45.29167	-81.62500238	2083-01-01 12:00	2083	rcp85	4.1	6	8	
45.29167	-81.62500238	2084-01-01 12:00	2084	rcp85	4.1	7	8.9	
45.29167	-81.62500238	2085-01-01 12:00	2085	rcp85	4.2	7	8	5.816667
45.29167	-81.62500238	2086-01-01 12:00	2086	rcp85	5	7.5	9	
45.29167	-81.62500238	2087-01-01 12:00	2087	rcp85	5	6	7	
45.29167	-81.62500238	2088-01-01 12:00	2088	rcp85	4	6	8	
45.29167	-81.62500238	2089-01-01 12:00	2089	rcp85	5	6	7.9	
45.29167	-81.62500238	2090-01-01 12:00	2090	rcp85	4.1	6	7.9	
45.29167	-81.62500238	2091-01-01 12:00	2091	rcp85	4.1	5.5	8	
45.29167	-81.62500238	2092-01-01 12:00	2092	rcp85	5	6	8.9	
45.29167	-81.62500238	2093-01-01 12:00	2093	rcp85	4	5	7	
45.29167	-81.62500238	2094-01-01 12:00	2094	rcp85	3.1	5.5	7	
45.29167	-81.62500238	2095-01-01 12:00	2095	rcp85	4	5	8	
45.29167	-81.62500238	2096-01-01 12:00	2096	rcp85	3.1	5	6.9	
45.29167	-81.62500238	2097-01-01 12:00	2097	rcp85	4	5	7	
45.29167	-81.62500238	2098-01-01 12:00	2098	rcp85	4	5	6.9	
45.29167	-81.62500238	2099-01-01 12:00	2099	rcp85	5	5.5	7	
45.29167	-81.62500238	2100-01-01 12:00	2100	rcp85	4	5	7	



Lion's Head

lat	lon	time	year	rcp	p10	p50	p90
44.95833	-81.2916691	1990-01-01 12:00	1990	rcp85	2	2.5	4
44.95833	-81.2916691	1991-01-01 12:00	1991	rcp85	1	2	4.9
44.95833	-81.2916691	1992-01-01 12:00	1992	rcp85	0.1	1	3.9
44.95833	-81.2916691	1993-01-01 12:00	1993	rcp85	0	2	3
44.95833	-81.2916691	1994-01-01 12:00	1994	rcp85	1	2	3
44.95833	-81.2916691	1995-01-01 12:00	1995	rcp85	1	2	4
44.95833	-81.2916691	1996-01-01 12:00	1996	rcp85	2	3	4.9
44.95833	-81.2916691	1997-01-01 12:00	1997	rcp85	2	4	5
44.95833	-81.2916691	1998-01-01 12:00	1998	rcp85	1	2	3.9
44.95833	-81.2916691	1999-01-01 12:00	1999	rcp85	1	2	4
44.95833	-81.2916691	2000-01-01 12:00	2000	rcp85	1.1	3	6.7
44.95833	-81.2916691	2001-01-01 12:00	2001	rcp85	2.1	3	5
44.95833	-81.2916691	2002-01-01 12:00	2002	rcp85	1	2.5	4.9
44.95833	-81.2916691	2003-01-01 12:00	2003	rcp85	3	4	6
44.95833	-81.2916691	2004-01-01 12:00	2004	rcp85	1.1	3	4.9
44.95833	-81.2916691	2005-01-01 12:00	2005	rcp85	1	2	6.7
44.95833	-81.2916691	2006-01-01 12:00	2006	rcp85	2	3.5	5
44.95833	-81.2916691	2007-01-01 12:00	2007	rcp85	1	3	5

3.05

44.95833	-81.2916691	2008-01-01 12:00	2008	rcp85	1.1	3	6
44.95833	-81.2916691	2009-01-01 12:00	2009	rcp85	0.2	3.5	7.8
44.95833	-81.2916691	2010-01-01 12:00	2010	rcp85	2	3	5.9
44.95833	-81.2916691	2011-01-01 12:00	2011	rcp85	3	4	5
44.95833	-81.2916691	2012-01-01 12:00	2012	rcp85	2	3.5	6
44.95833	-81.2916691	2013-01-01 12:00	2013	rcp85	1.2	4	6.9
44.95833	-81.2916691	2014-01-01 12:00	2014	rcp85	2	3	7.9
44.95833	-81.2916691	2015-01-01 12:00	2015	rcp85	2.1	4	5.9
44.95833	-81.2916691	2016-01-01 12:00	2016	rcp85	3	4	7
44.95833	-81.2916691	2017-01-01 12:00	2017	rcp85	0.2	5	7
44.95833	-81.2916691	2018-01-01 12:00	2018	rcp85	2	5	6.9
44.95833	-81.2916691	2019-01-01 12:00	2019	rcp85	2	3	6
44.95833	-81.2916691	2020-01-01 12:00	2020	rcp85	3	5	7
44.95833	-81.2916691	2021-01-01 12:00	2021	rcp85	2.1	4	6.9
44.95833	-81.2916691	2022-01-01 12:00	2022	rcp85	2.1	4.5	7
44.95833	-81.2916691	2023-01-01 12:00	2023	rcp85	3.1	5	7
44.95833	-81.2916691	2024-01-01 12:00	2024	rcp85	3.1	5	7
44.95833	-81.2916691	2025-01-01 12:00	2025	rcp85	3.1	5	6
44.95833	-81.2916691	2026-01-01 12:00	2026	rcp85	2.1	5	6.9
44.95833	-81.2916691	2027-01-01 12:00	2027	rcp85	2	4.5	7.8
44.95833	-81.2916691	2028-01-01 12:00	2028	rcp85	4	5.5	7
44.95833	-81.2916691	2029-01-01 12:00	2029	rcp85	3.1	5	6.9
44.95833	-81.2916691	2030-01-01 12:00	2030	rcp85	3.1	4.5	7.8
44.95833	-81.2916691	2031-01-01 12:00	2031	rcp85	2.1	5	7
44.95833	-81.2916691	2032-01-01 12:00	2032	rcp85	1.3	5	7
44.95833	-81.2916691	2033-01-01 12:00	2033	rcp85	1.1	4	6.9
44.95833	-81.2916691	2034-01-01 12:00	2034	rcp85	3.1	4.5	6.9
44.95833	-81.2916691	2035-01-01 12:00	2035	rcp85	2.1	5	7
44.95833	-81.2916691	2036-01-01 12:00	2036	rcp85	4.1	6	7.9
44.95833	-81.2916691	2037-01-01 12:00	2037	rcp85	3	4.5	8.8
44.95833	-81.2916691	2038-01-01 12:00	2038	rcp85	3.1	5	9
44.95833	-81.2916691	2039-01-01 12:00	2039	rcp85	4.1	6	7.9
44.95833	-81.2916691	2040-01-01 12:00	2040	rcp85	3	4.5	7
44.95833	-81.2916691	2041-01-01 12:00	2041	rcp85	3.1	5.5	8.8
44.95833	-81.2916691	2042-01-01 12:00	2042	rcp85	4.1	6.5	7.9
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44.95833	-81.2916691	2054-01-01 12:00	2054	rcp85	5	5	9.9

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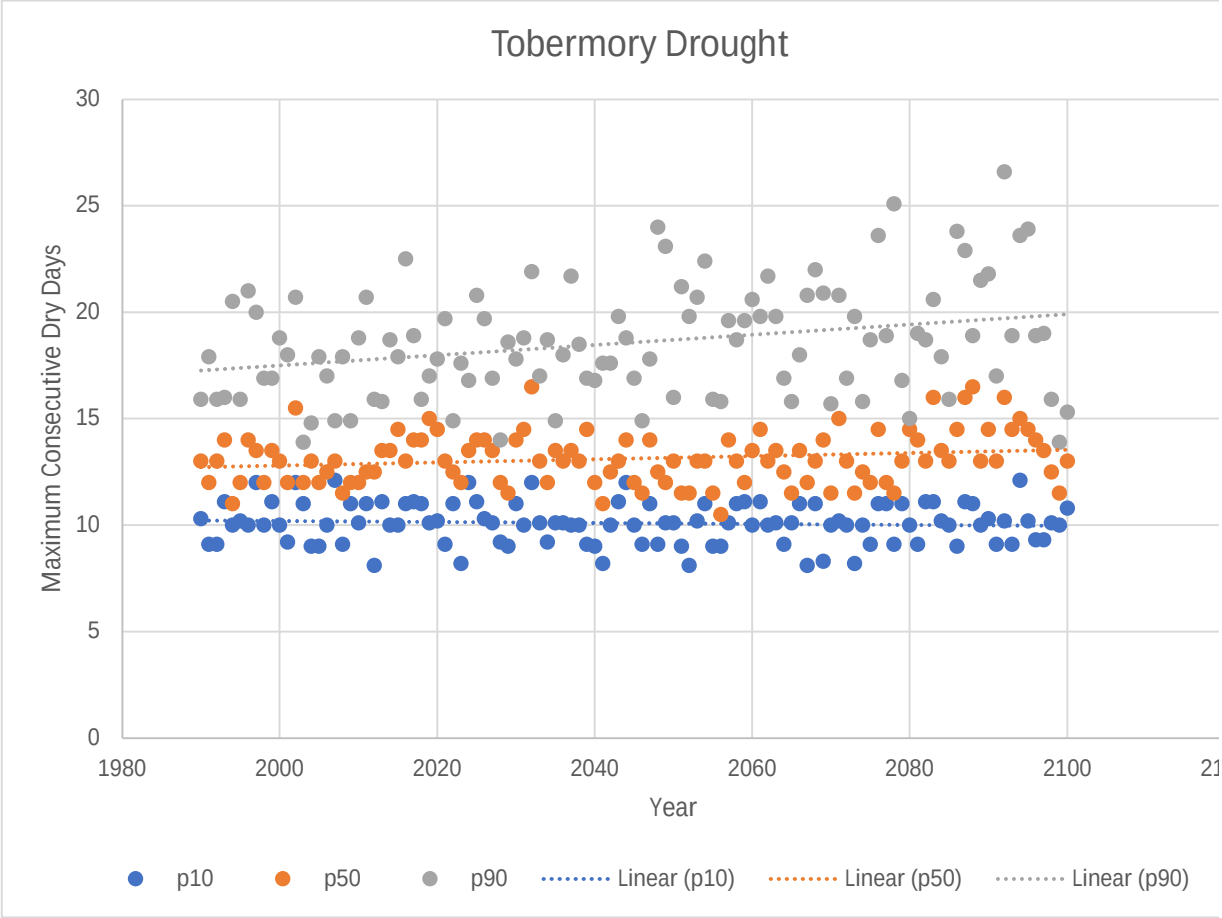
Maximum Consecutive Dry Days
Precipitation < 0



Tobermory

lat	lon	time	year	rcp	p10	p50	p90	
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45.29167	-81.625	1993-01-01 12:00	1993	rcp85	11.1	14	16	
45.29167	-81.625	1994-01-01 12:00	1994	rcp85	10	11	20.5	
45.29167	-81.625	1995-01-01 12:00	1995	rcp85	10.2	12	15.9	
45.29167	-81.625	1996-01-01 12:00	1996	rcp85	10	14	21	
45.29167	-81.625	1997-01-01 12:00	1997	rcp85	12	13.5	20	
45.29167	-81.625	1998-01-01 12:00	1998	rcp85	10	12	16.9	
45.29167	-81.625	1999-01-01 12:00	1999	rcp85	11.1	13.5	16.9	
45.29167	-81.625	2000-01-01 12:00	2000	rcp85	10	13	18.8	
45.29167	-81.625	2001-01-01 12:00	2001	rcp85	9.2	12	18	
45.29167	-81.625	2002-01-01 12:00	2002	rcp85	12	15.5	20.7	
45.29167	-81.625	2003-01-01 12:00	2003	rcp85	11	12	13.9	
45.29167	-81.625	2004-01-01 12:00	2004	rcp85	9	13	14.8	
45.29167	-81.625	2005-01-01 12:00	2005	rcp85	9	12	17.9	
45.29167	-81.625	2006-01-01 12:00	2006	rcp85	10	12.5	17	13.01667
45.29167	-81.625	2007-01-01 12:00	2007	rcp85	12.1	13	14.9	

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45.29167	-81.625	2009-01-01 12:00	2009	rcp85	11	12	14.9
45.29167	-81.625	2010-01-01 12:00	2010	rcp85	10.1	12	18.8
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45.29167	-81.625	2014-01-01 12:00	2014	rcp85	10	13.5	18.7
45.29167	-81.625	2015-01-01 12:00	2015	rcp85	10	14.5	17.9
45.29167	-81.625	2016-01-01 12:00	2016	rcp85	11	13	22.5
45.29167	-81.625	2017-01-01 12:00	2017	rcp85	11.1	14	18.9
45.29167	-81.625	2018-01-01 12:00	2018	rcp85	11	14	15.9
45.29167	-81.625	2019-01-01 12:00	2019	rcp85	10.1	15	17
45.29167	-81.625	2020-01-01 12:00	2020	rcp85	10.2	14.5	17.8
45.29167	-81.625	2021-01-01 12:00	2021	rcp85	9.1	13	19.7
45.29167	-81.625	2022-01-01 12:00	2022	rcp85	11	12.5	14.9
45.29167	-81.625	2023-01-01 12:00	2023	rcp85	8.2	12	17.6
45.29167	-81.625	2024-01-01 12:00	2024	rcp85	12	13.5	16.8
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45.29167	-81.625	2026-01-01 12:00	2026	rcp85	10.3	14	19.7
45.29167	-81.625	2027-01-01 12:00	2027	rcp85	10.1	13.5	16.9
45.29167	-81.625	2028-01-01 12:00	2028	rcp85	9.2	12	14
45.29167	-81.625	2029-01-01 12:00	2029	rcp85	9	11.5	18.6
45.29167	-81.625	2030-01-01 12:00	2030	rcp85	11	14	17.8
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45.29167	-81.625	2035-01-01 12:00	2035	rcp85	10.1	13.5	14.9
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45.29167	-81.625	2037-01-01 12:00	2037	rcp85	10	13.5	21.7
45.29167	-81.625	2038-01-01 12:00	2038	rcp85	10	13	18.5
45.29167	-81.625	2039-01-01 12:00	2039	rcp85	9.1	14.5	16.9
45.29167	-81.625	2040-01-01 12:00	2040	rcp85	9	12	16.8
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45.29167	-81.625	2042-01-01 12:00	2042	rcp85	10	12.5	17.6
45.29167	-81.625	2043-01-01 12:00	2043	rcp85	11.1	13	19.8
45.29167	-81.625	2044-01-01 12:00	2044	rcp85	12	14	18.8
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45.29167	-81.625	2047-01-01 12:00	2047	rcp85	11	14	17.8
45.29167	-81.625	2048-01-01 12:00	2048	rcp85	9.1	12.5	24
45.29167	-81.625	2049-01-01 12:00	2049	rcp85	10.1	12	23.1
45.29167	-81.625	2050-01-01 12:00	2050	rcp85	10.1	13	16
45.29167	-81.625	2051-01-01 12:00	2051	rcp85	9	11.5	21.2
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45.29167	-81.625	2054-01-01 12:00	2054	rcp85	11	13	22.4

45.29167	-81.625	2055-01-01 12:00	2055	rcp85	9	11.5	15.9	12.6
45.29167	-81.625	2056-01-01 12:00	2056	rcp85	9	10.5	15.8	
45.29167	-81.625	2057-01-01 12:00	2057	rcp85	10.1	14	19.6	
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45.29167	-81.625	2068-01-01 12:00	2068	rcp85	11	13	22	
45.29167	-81.625	2069-01-01 12:00	2069	rcp85	8.3	14	20.9	
45.29167	-81.625	2070-01-01 12:00	2070	rcp85	10	11.5	15.7	
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45.29167	-81.625	2072-01-01 12:00	2072	rcp85	10	13	16.9	
45.29167	-81.625	2073-01-01 12:00	2073	rcp85	8.2	11.5	19.8	
45.29167	-81.625	2074-01-01 12:00	2074	rcp85	10	12.5	15.8	
45.29167	-81.625	2075-01-01 12:00	2075	rcp85	9.1	12	18.7	
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45.29167	-81.625	2079-01-01 12:00	2079	rcp85	11	13	16.8	
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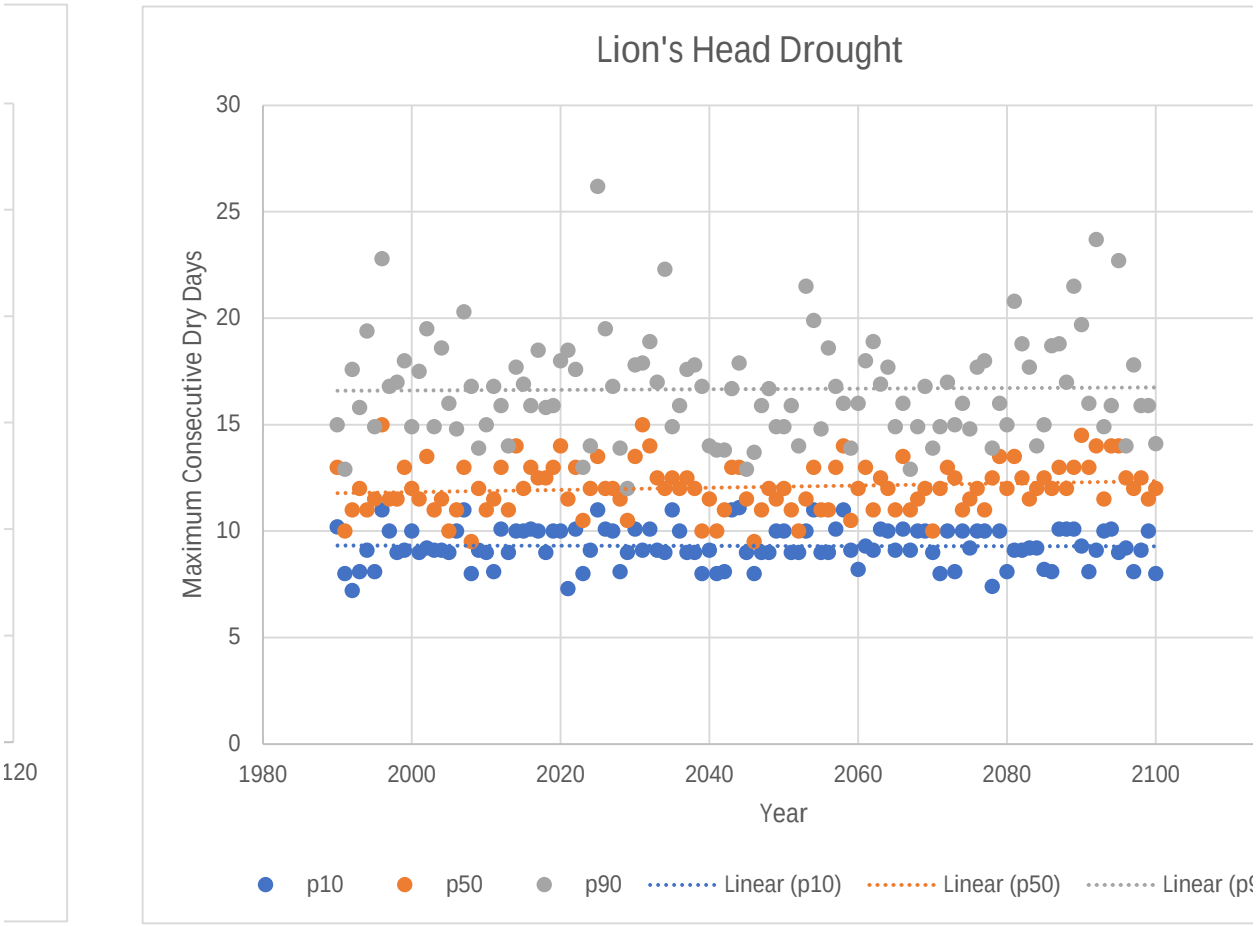

Lion's Head

lat	lon	time	year	rcp	p10	p50	p90
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44.95833	-81.2917	1996-01-01 12:00	1996	rcp85	11	15	22.8
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44.95833	-81.2917	1998-01-01 12:00	1998	rcp85	9	11.5	17
44.95833	-81.2917	1999-01-01 12:00	1999	rcp85	9.1	13	18
44.95833	-81.2917	2000-01-01 12:00	2000	rcp85	10	12	14.9
44.95833	-81.2917	2001-01-01 12:00	2001	rcp85	9	11.5	17.5
44.95833	-81.2917	2002-01-01 12:00	2002	rcp85	9.2	13.5	19.5
44.95833	-81.2917	2003-01-01 12:00	2003	rcp85	9.1	11	14.9
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44.95833	-81.2917	2017-01-01 12:00	2017	rcp85	10	12.5	18.5
44.95833	-81.2917	2018-01-01 12:00	2018	rcp85	9	12.5	15.8
44.95833	-81.2917	2019-01-01 12:00	2019	rcp85	10	13	15.9
44.95833	-81.2917	2020-01-01 12:00	2020	rcp85	10	14	18
44.95833	-81.2917	2021-01-01 12:00	2021	rcp85	7.3	11.5	18.5
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44.95833	-81.2917	2038-01-01 12:00	2038	rcp85	9	12	17.8
44.95833	-81.2917	2039-01-01 12:00	2039	rcp85	8	10	16.8
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44.95833	-81.2917	2058-01-01 12:00	2058	rcp85	11	14	16
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44.95833	-81.2917	2060-01-01 12:00	2060	rcp85	8.2	12	16
44.95833	-81.2917	2061-01-01 12:00	2061	rcp85	9.3	13	18
44.95833	-81.2917	2062-01-01 12:00	2062	rcp85	9.1	11	18.9
44.95833	-81.2917	2063-01-01 12:00	2063	rcp85	10.1	12.5	16.9
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44.95833	-81.2917	2065-01-01 12:00	2065	rcp85	9.1	11	14.9
44.95833	-81.2917	2066-01-01 12:00	2066	rcp85	10.1	13.5	16
44.95833	-81.2917	2067-01-01 12:00	2067	rcp85	9.1	11	12.9
44.95833	-81.2917	2068-01-01 12:00	2068	rcp85	10	11.5	14.9
44.95833	-81.2917	2069-01-01 12:00	2069	rcp85	10	12	16.8
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44.95833	-81.2917	2072-01-01 12:00	2072	rcp85	10	13	17
44.95833	-81.2917	2073-01-01 12:00	2073	rcp85	8.1	12.5	15
44.95833	-81.2917	2074-01-01 12:00	2074	rcp85	10	11	16
44.95833	-81.2917	2075-01-01 12:00	2075	rcp85	9.2	11.5	14.8
44.95833	-81.2917	2076-01-01 12:00	2076	rcp85	10	12	17.7
44.95833	-81.2917	2077-01-01 12:00	2077	rcp85	10	11	18
44.95833	-81.2917	2078-01-01 12:00	2078	rcp85	7.4	12.5	13.9
44.95833	-81.2917	2079-01-01 12:00	2079	rcp85	10	13.5	16
44.95833	-81.2917	2080-01-01 12:00	2080	rcp85	8.1	12	15
44.95833	-81.2917	2081-01-01 12:00	2081	rcp85	9.1	13.5	20.8
44.95833	-81.2917	2082-01-01 12:00	2082	rcp85	9.1	12.5	18.8
44.95833	-81.2917	2083-01-01 12:00	2083	rcp85	9.2	11.5	17.7
44.95833	-81.2917	2084-01-01 12:00	2084	rcp85	9.2	12	14
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44.95833	-81.2917	2088-01-01 12:00	2088	rcp85	10.1	12	17
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44.95833	-81.2917	2091-01-01 12:00	2091	rcp85	8.1	13	16
44.95833	-81.2917	2092-01-01 12:00	2092	rcp85	9.1	14	23.7
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44.95833	-81.2917	2094-01-01 12:00	2094	rcp85	10.1	14	15.9
44.95833	-81.2917	2095-01-01 12:00	2095	rcp85	9	14	22.7
44.95833	-81.2917	2096-01-01 12:00	2096	rcp85	9.2	12.5	14
44.95833	-81.2917	2097-01-01 12:00	2097	rcp85	8.1	12	17.8
44.95833	-81.2917	2098-01-01 12:00	2098	rcp85	9.1	12.5	15.9
44.95833	-81.2917	2099-01-01 12:00	2099	rcp85	10	11.5	15.9
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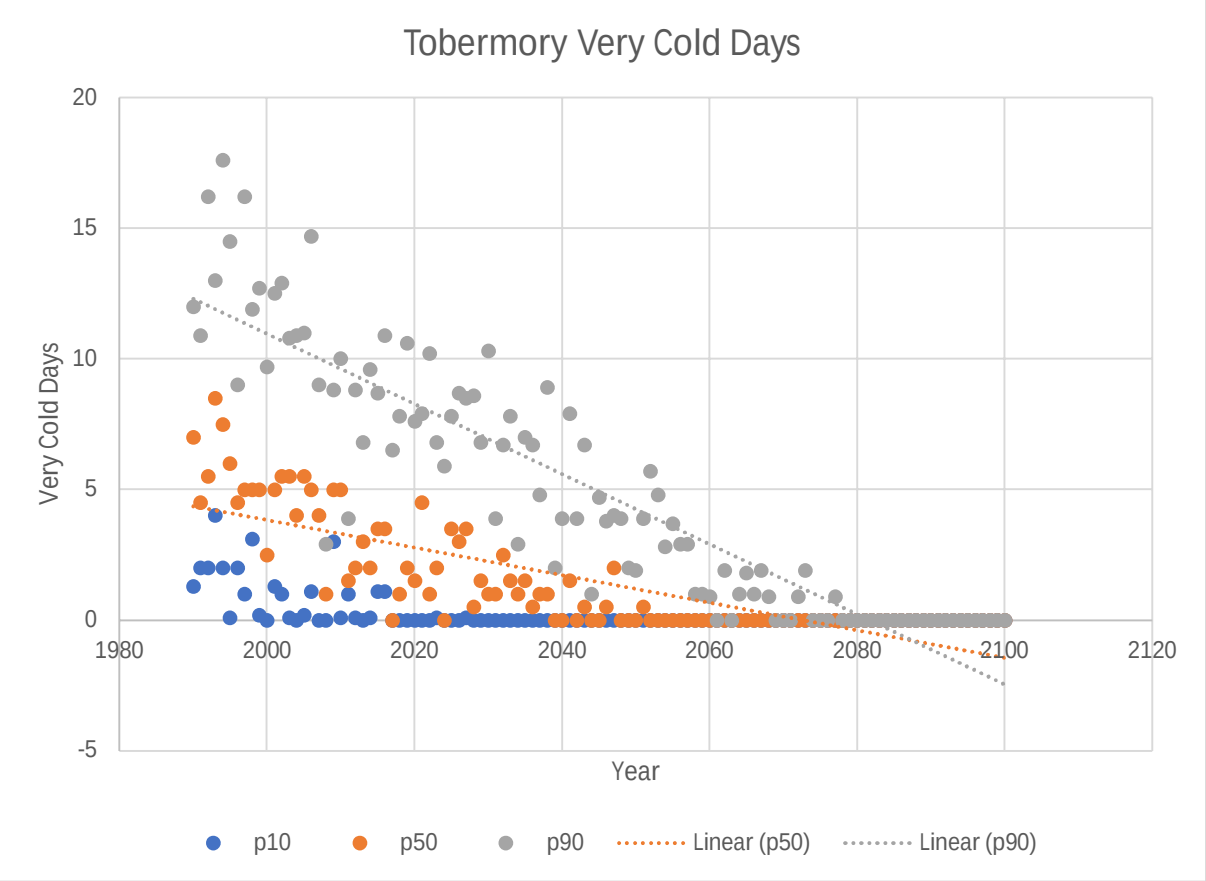
Days Below Tmin
Daily Min Temp < -20oC



Tobermory

lat	lon	time	year	rcp	p10	p50	p90	
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45.29167	-81.625	1994-01-01 12:00	1994	rcp85	2	7.5	17.6	
45.29167	-81.625	1995-01-01 12:00	1995	rcp85	0.1	6	14.5	
45.29167	-81.625	1996-01-01 12:00	1996	rcp85	2	4.5	9	
45.29167	-81.625	1997-01-01 12:00	1997	rcp85	1	5	16.2	
45.29167	-81.625	1998-01-01 12:00	1998	rcp85	3.1	5	11.9	
45.29167	-81.625	1999-01-01 12:00	1999	rcp85	0.2	5	12.7	
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45.29167	-81.625	2001-01-01 12:00	2001	rcp85	1.3	5	12.5	
45.29167	-81.625	2002-01-01 12:00	2002	rcp85	1	5.5	12.9	
45.29167	-81.625	2003-01-01 12:00	2003	rcp85	0.1	5.5	10.8	
45.29167	-81.625	2004-01-01 12:00	2004	rcp85	0	4	10.9	
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45.29167	-81.625	2006-01-01 12:00	2006	rcp85	1.1	5	14.7	
45.29167	-81.625	2007-01-01 12:00	2007	rcp85	0	4	9	

45.29167	-81.625	2008-01-01 12:00	2008	rcp85	0	1	2.9
45.29167	-81.625	2009-01-01 12:00	2009	rcp85	3	5	8.8
45.29167	-81.625	2010-01-01 12:00	2010	rcp85	0.1	5	10
45.29167	-81.625	2011-01-01 12:00	2011	rcp85	1	1.5	3.9
45.29167	-81.625	2012-01-01 12:00	2012	rcp85	0.1	2	8.8
45.29167	-81.625	2013-01-01 12:00	2013	rcp85	0	3	6.8
45.29167	-81.625	2014-01-01 12:00	2014	rcp85	0.1	2	9.6
45.29167	-81.625	2015-01-01 12:00	2015	rcp85	1.1	3.5	8.7
45.29167	-81.625	2016-01-01 12:00	2016	rcp85	1.1	3.5	10.9
45.29167	-81.625	2017-01-01 12:00	2017	rcp85	0	0	6.5
45.29167	-81.625	2018-01-01 12:00	2018	rcp85	0	1	7.8
45.29167	-81.625	2019-01-01 12:00	2019	rcp85	0	2	10.6
45.29167	-81.625	2020-01-01 12:00	2020	rcp85	0	1.5	7.6
45.29167	-81.625	2021-01-01 12:00	2021	rcp85	0	4.5	7.9
45.29167	-81.625	2022-01-01 12:00	2022	rcp85	0	1	10.2
45.29167	-81.625	2023-01-01 12:00	2023	rcp85	0.1	2	6.8
45.29167	-81.625	2024-01-01 12:00	2024	rcp85	0	0	5.9
45.29167	-81.625	2025-01-01 12:00	2025	rcp85	0	3.5	7.8
45.29167	-81.625	2026-01-01 12:00	2026	rcp85	0	3	8.7
45.29167	-81.625	2027-01-01 12:00	2027	rcp85	0.1	3.5	8.5
45.29167	-81.625	2028-01-01 12:00	2028	rcp85	0	0.5	8.6
45.29167	-81.625	2029-01-01 12:00	2029	rcp85	0	1.5	6.8
45.29167	-81.625	2030-01-01 12:00	2030	rcp85	0	1	10.3
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45.29167	-81.625	2033-01-01 12:00	2033	rcp85	0	1.5	7.8
45.29167	-81.625	2034-01-01 12:00	2034	rcp85	0	1	2.9
45.29167	-81.625	2035-01-01 12:00	2035	rcp85	0	1.5	7
45.29167	-81.625	2036-01-01 12:00	2036	rcp85	0	0.5	6.7
45.29167	-81.625	2037-01-01 12:00	2037	rcp85	0	1	4.8
45.29167	-81.625	2038-01-01 12:00	2038	rcp85	0	1	8.9
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45.29167	-81.625	2040-01-01 12:00	2040	rcp85	0	0	3.9
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45.29167	-81.625	2048-01-01 12:00	2048	rcp85	0	0	3.9
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45.29167	-81.625	2051-01-01 12:00	2051	rcp85	0	0.5	3.9
45.29167	-81.625	2052-01-01 12:00	2052	rcp85	0	0	5.7
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45.29167	-81.625	2054-01-01 12:00	2054	rcp85	0	0	2.8

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45.29167	-81.625	2061-01-01 12:00	2061	rcp85	0	0	0		
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45.29167	-81.625	2068-01-01 12:00	2068	rcp85	0	0	0.9		
45.29167	-81.625	2069-01-01 12:00	2069	rcp85	0	0	0		
45.29167	-81.625	2070-01-01 12:00	2070	rcp85	0	0	0		
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45.29167	-81.625	2072-01-01 12:00	2072	rcp85	0	0	0.9		
45.29167	-81.625	2073-01-01 12:00	2073	rcp85	0	0	1.9		
45.29167	-81.625	2074-01-01 12:00	2074	rcp85	0	0	0		
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45.29167	-81.625	2078-01-01 12:00	2078	rcp85	0	0	0		
45.29167	-81.625	2079-01-01 12:00	2079	rcp85	0	0	0		
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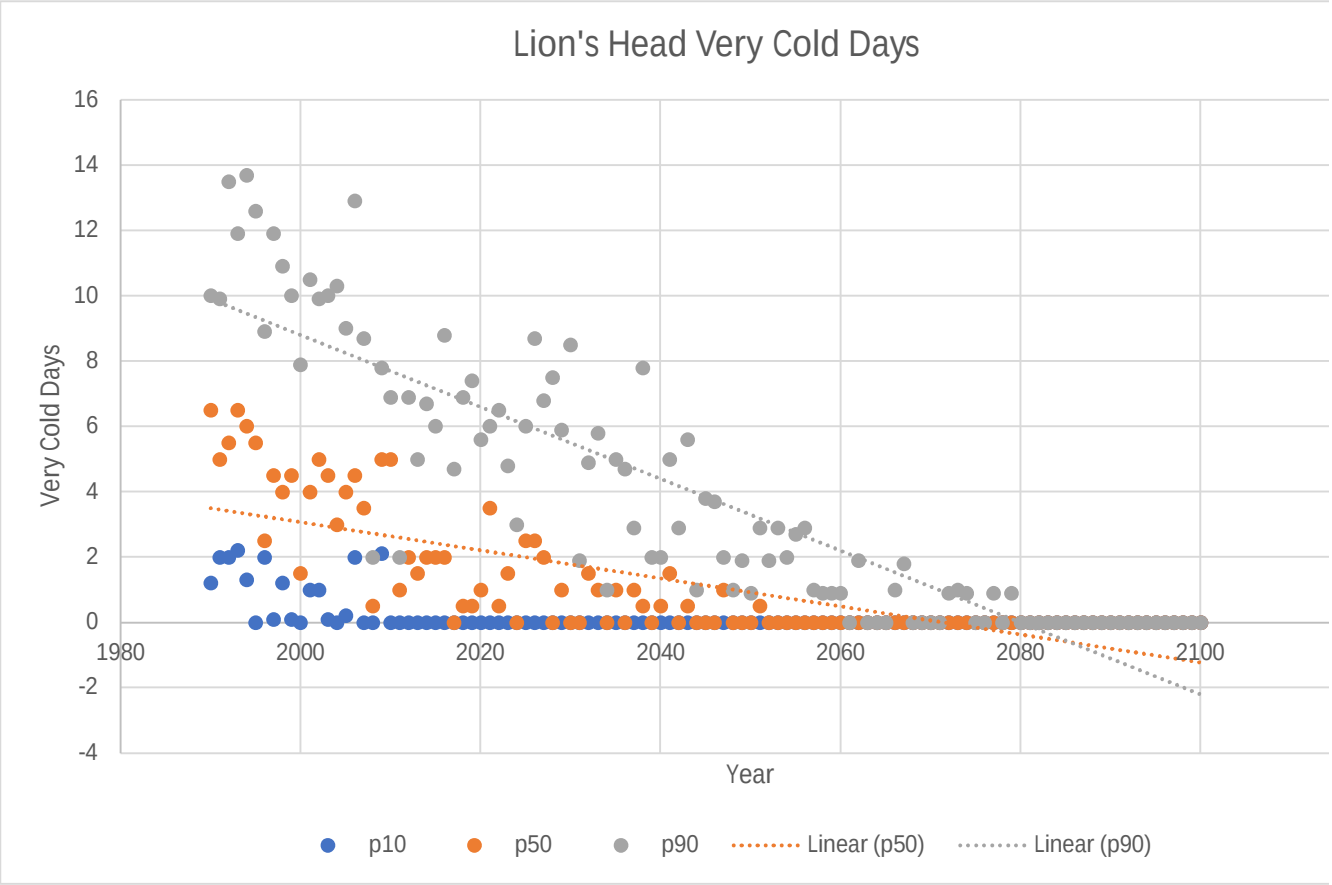

Lion's Head

lat	lon	time	year	rcp	p10	p50	p90	
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44.95833	-81.2917	1991-01-01 12:00	1991	rcp85	2	5	9.9	
44.95833	-81.2917	1992-01-01 12:00	1992	rcp85	2	5.5	13.5	
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44.95833	-81.2917	1998-01-01 12:00	1998	rcp85	1.2	4	10.9	
44.95833	-81.2917	1999-01-01 12:00	1999	rcp85	0.1	4.5	10	
44.95833	-81.2917	2000-01-01 12:00	2000	rcp85	0	1.5	7.9	
44.95833	-81.2917	2001-01-01 12:00	2001	rcp85	1	4	10.5	
44.95833	-81.2917	2002-01-01 12:00	2002	rcp85	1	5	9.9	
44.95833	-81.2917	2003-01-01 12:00	2003	rcp85	0.1	4.5	10	
44.95833	-81.2917	2004-01-01 12:00	2004	rcp85	0	3	10.3	
44.95833	-81.2917	2005-01-01 12:00	2005	rcp85	0.2	4	9	3.233333
44.95833	-81.2917	2006-01-01 12:00	2006	rcp85	2	4.5	12.9	
44.95833	-81.2917	2007-01-01 12:00	2007	rcp85	0	3.5	8.7	

44.95833	-81.2917	2008-01-01 12:00	2008	rcp85	0	0.5	2
44.95833	-81.2917	2009-01-01 12:00	2009	rcp85	2.1	5	7.8
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44.95833	-81.2917	2013-01-01 12:00	2013	rcp85	0	1.5	5
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44.95833	-81.2917	2015-01-01 12:00	2015	rcp85	0	2	6
44.95833	-81.2917	2016-01-01 12:00	2016	rcp85	0	2	8.8
44.95833	-81.2917	2017-01-01 12:00	2017	rcp85	0	0	4.7
44.95833	-81.2917	2018-01-01 12:00	2018	rcp85	0	0.5	6.9
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44.95833	-81.2917	2030-01-01 12:00	2030	rcp85	0	0	8.5
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44.95833	-81.2917	2078-01-01 12:00	2078	rcp85	0	0	0	
44.95833	-81.2917	2079-01-01 12:00	2079	rcp85	0	0	0.9	
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44.95833	-81.2917	2093-01-01 12:00	2093	rcp85	0	0	0	
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44.95833	-81.2917	2099-01-01 12:00	2099	rcp85	0	0	0	
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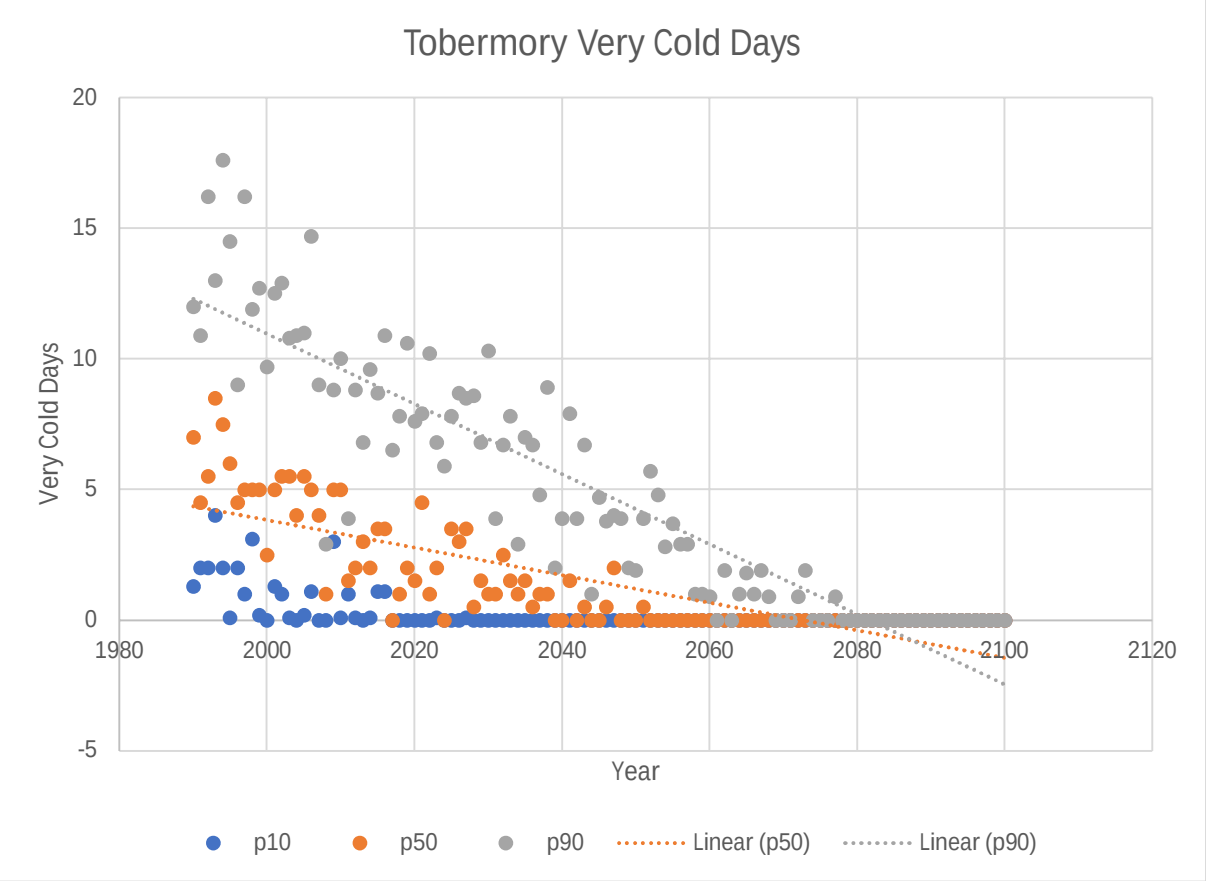
Days Below Tmin
Daily Min Temp < -20oC



Tobermory

lat	lon	time	year	rcp	p10	p50	p90	
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45.29167	-81.625	1992-01-01 12:00	1992	rcp85	2	5.5	16.2	
45.29167	-81.625	1993-01-01 12:00	1993	rcp85	4	8.5	13	
45.29167	-81.625	1994-01-01 12:00	1994	rcp85	2	7.5	17.6	
45.29167	-81.625	1995-01-01 12:00	1995	rcp85	0.1	6	14.5	
45.29167	-81.625	1996-01-01 12:00	1996	rcp85	2	4.5	9	
45.29167	-81.625	1997-01-01 12:00	1997	rcp85	1	5	16.2	
45.29167	-81.625	1998-01-01 12:00	1998	rcp85	3.1	5	11.9	
45.29167	-81.625	1999-01-01 12:00	1999	rcp85	0.2	5	12.7	
45.29167	-81.625	2000-01-01 12:00	2000	rcp85	0	2.5	9.7	
45.29167	-81.625	2001-01-01 12:00	2001	rcp85	1.3	5	12.5	
45.29167	-81.625	2002-01-01 12:00	2002	rcp85	1	5.5	12.9	
45.29167	-81.625	2003-01-01 12:00	2003	rcp85	0.1	5.5	10.8	
45.29167	-81.625	2004-01-01 12:00	2004	rcp85	0	4	10.9	
45.29167	-81.625	2005-01-01 12:00	2005	rcp85	0.2	5.5	11	3.983333
45.29167	-81.625	2006-01-01 12:00	2006	rcp85	1.1	5	14.7	
45.29167	-81.625	2007-01-01 12:00	2007	rcp85	0	4	9	

45.29167	-81.625	2008-01-01 12:00	2008	rcp85	0	1	2.9
45.29167	-81.625	2009-01-01 12:00	2009	rcp85	3	5	8.8
45.29167	-81.625	2010-01-01 12:00	2010	rcp85	0.1	5	10
45.29167	-81.625	2011-01-01 12:00	2011	rcp85	1	1.5	3.9
45.29167	-81.625	2012-01-01 12:00	2012	rcp85	0.1	2	8.8
45.29167	-81.625	2013-01-01 12:00	2013	rcp85	0	3	6.8
45.29167	-81.625	2014-01-01 12:00	2014	rcp85	0.1	2	9.6
45.29167	-81.625	2015-01-01 12:00	2015	rcp85	1.1	3.5	8.7
45.29167	-81.625	2016-01-01 12:00	2016	rcp85	1.1	3.5	10.9
45.29167	-81.625	2017-01-01 12:00	2017	rcp85	0	0	6.5
45.29167	-81.625	2018-01-01 12:00	2018	rcp85	0	1	7.8
45.29167	-81.625	2019-01-01 12:00	2019	rcp85	0	2	10.6
45.29167	-81.625	2020-01-01 12:00	2020	rcp85	0	1.5	7.6
45.29167	-81.625	2021-01-01 12:00	2021	rcp85	0	4.5	7.9
45.29167	-81.625	2022-01-01 12:00	2022	rcp85	0	1	10.2
45.29167	-81.625	2023-01-01 12:00	2023	rcp85	0.1	2	6.8
45.29167	-81.625	2024-01-01 12:00	2024	rcp85	0	0	5.9
45.29167	-81.625	2025-01-01 12:00	2025	rcp85	0	3.5	7.8
45.29167	-81.625	2026-01-01 12:00	2026	rcp85	0	3	8.7
45.29167	-81.625	2027-01-01 12:00	2027	rcp85	0.1	3.5	8.5
45.29167	-81.625	2028-01-01 12:00	2028	rcp85	0	0.5	8.6
45.29167	-81.625	2029-01-01 12:00	2029	rcp85	0	1.5	6.8
45.29167	-81.625	2030-01-01 12:00	2030	rcp85	0	1	10.3
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45.29167	-81.625	2032-01-01 12:00	2032	rcp85	0	2.5	6.7
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45.29167	-81.625	2034-01-01 12:00	2034	rcp85	0	1	2.9
45.29167	-81.625	2035-01-01 12:00	2035	rcp85	0	1.5	7
45.29167	-81.625	2036-01-01 12:00	2036	rcp85	0	0.5	6.7
45.29167	-81.625	2037-01-01 12:00	2037	rcp85	0	1	4.8
45.29167	-81.625	2038-01-01 12:00	2038	rcp85	0	1	8.9
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45.29167	-81.625	2040-01-01 12:00	2040	rcp85	0	0	3.9
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45.29167	-81.625	2044-01-01 12:00	2044	rcp85	0	0	1
45.29167	-81.625	2045-01-01 12:00	2045	rcp85	0	0	4.7
45.29167	-81.625	2046-01-01 12:00	2046	rcp85	0	0.5	3.8
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45.29167	-81.625	2048-01-01 12:00	2048	rcp85	0	0	3.9
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45.29167	-81.625	2051-01-01 12:00	2051	rcp85	0	0.5	3.9
45.29167	-81.625	2052-01-01 12:00	2052	rcp85	0	0	5.7
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45.29167	-81.625	2060-01-01 12:00	2060	rcp85	0	0	0.9		
45.29167	-81.625	2061-01-01 12:00	2061	rcp85	0	0	0		
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45.29167	-81.625	2068-01-01 12:00	2068	rcp85	0	0	0.9		
45.29167	-81.625	2069-01-01 12:00	2069	rcp85	0	0	0		
45.29167	-81.625	2070-01-01 12:00	2070	rcp85	0	0	0		
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45.29167	-81.625	2072-01-01 12:00	2072	rcp85	0	0	0.9		
45.29167	-81.625	2073-01-01 12:00	2073	rcp85	0	0	1.9		
45.29167	-81.625	2074-01-01 12:00	2074	rcp85	0	0	0		
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45.29167	-81.625	2078-01-01 12:00	2078	rcp85	0	0	0		
45.29167	-81.625	2079-01-01 12:00	2079	rcp85	0	0	0		
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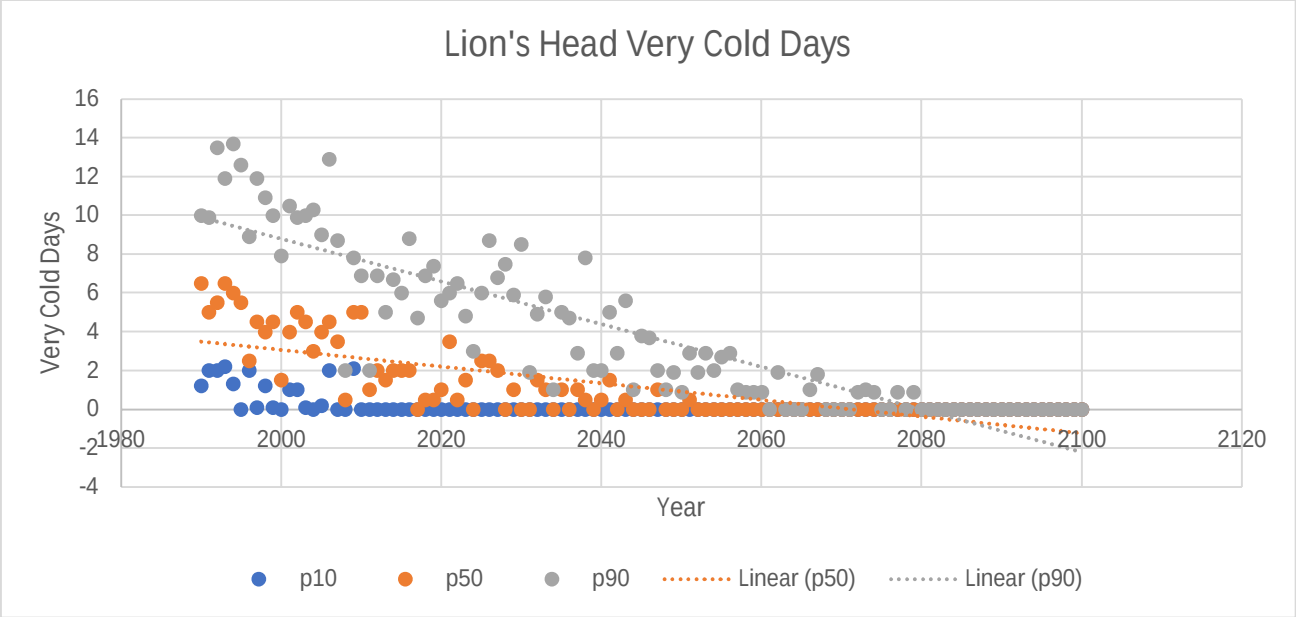

Lion's Head

lat	lon	time	year	rcp	p10	p50	p90	
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44.95833	-81.2917	1993-01-01 12:00	1993	rcp85	2.2	6.5	11.9	
44.95833	-81.2917	1994-01-01 12:00	1994	rcp85	1.3	6	13.7	
44.95833	-81.2917	1995-01-01 12:00	1995	rcp85	0	5.5	12.6	
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44.95833	-81.2917	1997-01-01 12:00	1997	rcp85	0.1	4.5	11.9	
44.95833	-81.2917	1998-01-01 12:00	1998	rcp85	1.2	4	10.9	
44.95833	-81.2917	1999-01-01 12:00	1999	rcp85	0.1	4.5	10	
44.95833	-81.2917	2000-01-01 12:00	2000	rcp85	0	1.5	7.9	
44.95833	-81.2917	2001-01-01 12:00	2001	rcp85	1	4	10.5	
44.95833	-81.2917	2002-01-01 12:00	2002	rcp85	1	5	9.9	
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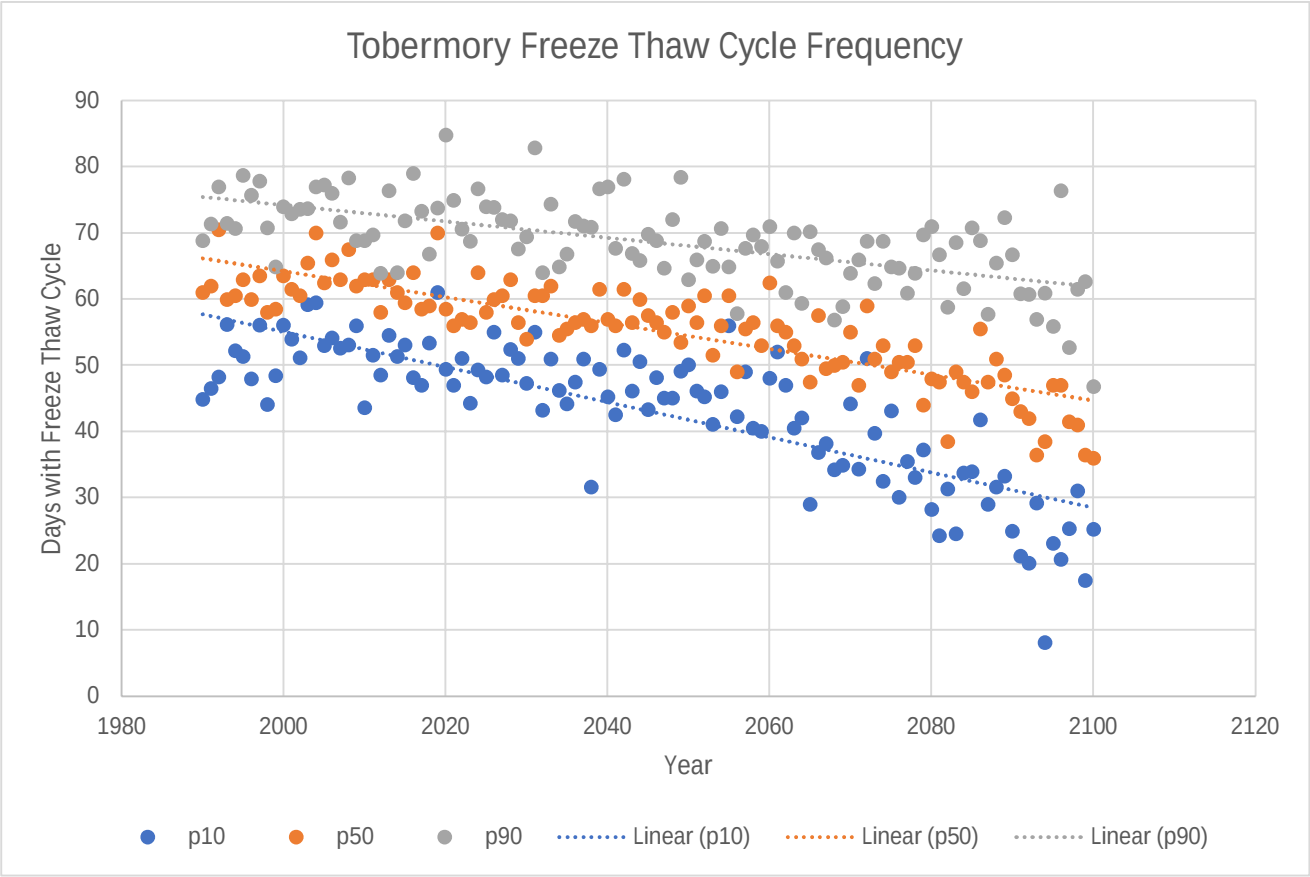
44.95833	-81.2917	2100-01-01 12:00	2100	rcp85	0	0	0	

Days with a Freeze-Thaw Cycle
Daily Max >0oC
Dailly Min < -1oC



Tobermory

lat	lon	time	year	rcp	p10	p50	p90	
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45.20833	-81.625	1993-01-01 12:00	1993	rcp85	56.2	60	71.5	
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45.20833	-81.625	1996-01-01 12:00	1996	rcp85	48	60	75.7	
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45.20833	-81.625	1999-01-01 12:00	1999	rcp85	48.4	58.5	64.9	
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45.20833	-81.625	2006-01-01 12:00	2006	rcp85	54.2	66	76	
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45.20833	-81.625	2013-01-01 12:00	2013	rcp85	54.5	63	76.4
45.20833	-81.625	2014-01-01 12:00	2014	rcp85	51.3	61	64
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45.20833	-81.625	2016-01-01 12:00	2016	rcp85	48.2	64	79
45.20833	-81.625	2017-01-01 12:00	2017	rcp85	47	58.5	73.3
45.20833	-81.625	2018-01-01 12:00	2018	rcp85	53.4	59	66.8
45.20833	-81.625	2019-01-01 12:00	2019	rcp85	61	70	73.8
45.20833	-81.625	2020-01-01 12:00	2020	rcp85	49.4	58.5	84.8
45.20833	-81.625	2021-01-01 12:00	2021	rcp85	47	56	74.9
45.20833	-81.625	2022-01-01 12:00	2022	rcp85	51.1	57	70.6
45.20833	-81.625	2023-01-01 12:00	2023	rcp85	44.3	56.5	68.8
45.20833	-81.625	2024-01-01 12:00	2024	rcp85	49.3	64	76.7
45.20833	-81.625	2025-01-01 12:00	2025	rcp85	48.3	58	74
45.20833	-81.625	2026-01-01 12:00	2026	rcp85	55	60	73.9
45.20833	-81.625	2027-01-01 12:00	2027	rcp85	48.5	60.5	72
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45.20833	-81.625	2029-01-01 12:00	2029	rcp85	51.1	56.5	67.6
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45.20833	-81.625	2036-01-01 12:00	2036	rcp85	47.5	56.5	71.8
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45.20833	-81.625	2043-01-01 12:00	2043	rcp85	46.1	56.5	66.9
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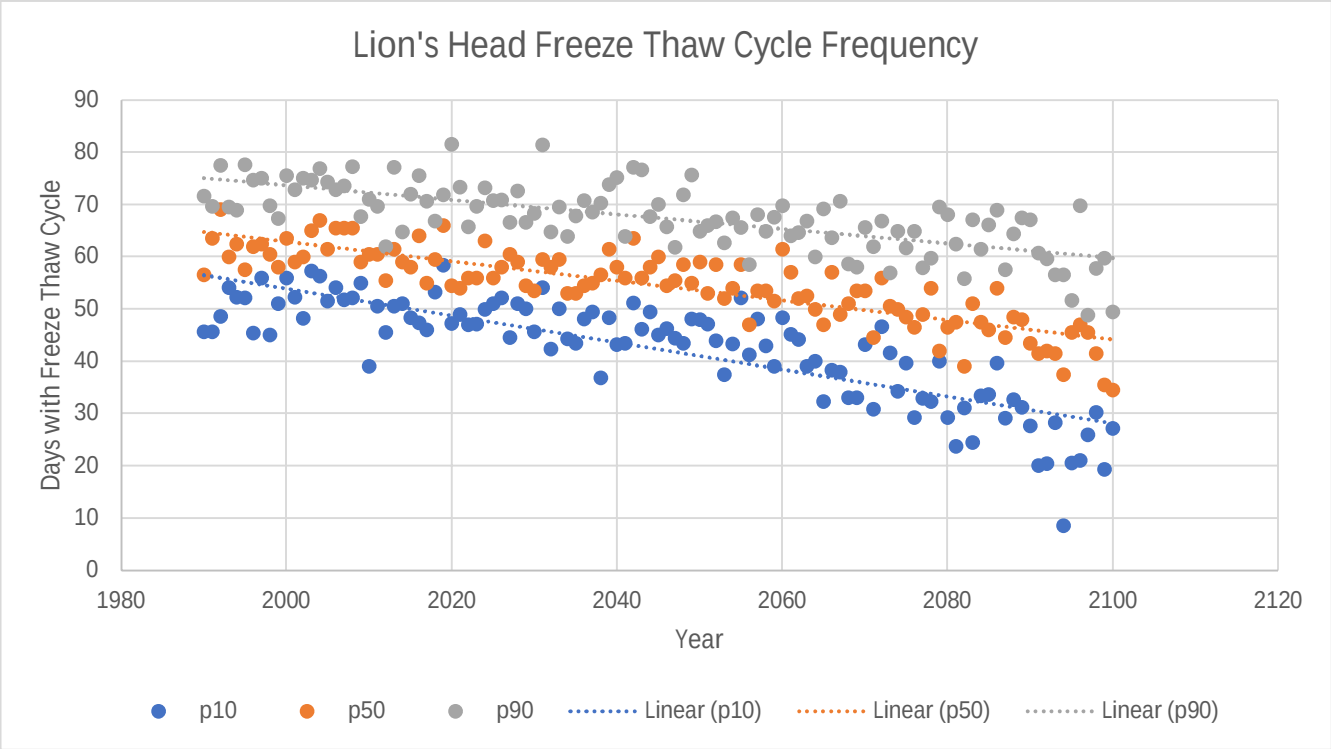


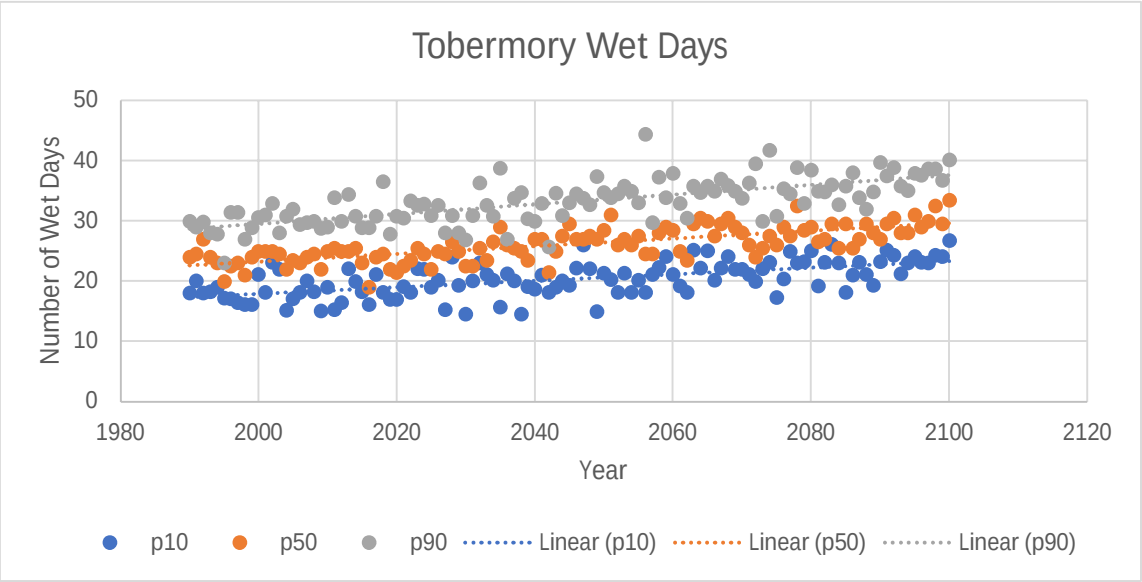
Lion's Head

lat	lon	time	year	rcp	p10	p50	p90	
44.95833	-81.2917	1990-01-01 12:00	1990	rcp85	45.6	56.5	71.6	
44.95833	-81.2917	1991-01-01 12:00	1991	rcp85	45.7	63.5	69.7	
44.95833	-81.2917	1992-01-01 12:00	1992	rcp85	48.6	69	77.5	
44.95833	-81.2917	1993-01-01 12:00	1993	rcp85	54.1	60	69.5	
44.95833	-81.2917	1994-01-01 12:00	1994	rcp85	52.3	62.5	68.9	
44.95833	-81.2917	1995-01-01 12:00	1995	rcp85	52.1	57.5	77.6	
44.95833	-81.2917	1996-01-01 12:00	1996	rcp85	45.4	62	74.7	
44.95833	-81.2917	1997-01-01 12:00	1997	rcp85	56	62.5	75	
44.95833	-81.2917	1998-01-01 12:00	1998	rcp85	45.1	60.5	69.8	
44.95833	-81.2917	1999-01-01 12:00	1999	rcp85	51	58	67.3	
44.95833	-81.2917	2000-01-01 12:00	2000	rcp85	56	63.5	75.6	
44.95833	-81.2917	2001-01-01 12:00	2001	rcp85	52.3	59	72.8	
44.95833	-81.2917	2002-01-01 12:00	2002	rcp85	48.2	60	75.1	
44.95833	-81.2917	2003-01-01 12:00	2003	rcp85	57.3	65	74.7	
44.95833	-81.2917	2004-01-01 12:00	2004	rcp85	56.3	67	76.9	
44.95833	-81.2917	2005-01-01 12:00	2005	rcp85	51.5	61.5	74.3	61.36667
44.95833	-81.2917	2006-01-01 12:00	2006	rcp85	54.1	65.5	72.9	
44.95833	-81.2917	2007-01-01 12:00	2007	rcp85	51.8	65.5	73.6	

44.95833	-81.2917	2008-01-01 12:00	2008	rcp85	52.1	65.5	77.2
44.95833	-81.2917	2009-01-01 12:00	2009	rcp85	55	59	67.7
44.95833	-81.2917	2010-01-01 12:00	2010	rcp85	39.1	60.5	71
44.95833	-81.2917	2011-01-01 12:00	2011	rcp85	50.5	60.5	69.7
44.95833	-81.2917	2012-01-01 12:00	2012	rcp85	45.5	55.5	62
44.95833	-81.2917	2013-01-01 12:00	2013	rcp85	50.6	61.5	77.1
44.95833	-81.2917	2014-01-01 12:00	2014	rcp85	51	59	64.8
44.95833	-81.2917	2015-01-01 12:00	2015	rcp85	48.4	58	72
44.95833	-81.2917	2016-01-01 12:00	2016	rcp85	47.4	64	75.6
44.95833	-81.2917	2017-01-01 12:00	2017	rcp85	46	55	70.6
44.95833	-81.2917	2018-01-01 12:00	2018	rcp85	53.3	59.5	66.8
44.95833	-81.2917	2019-01-01 12:00	2019	rcp85	58.4	66	71.9
44.95833	-81.2917	2020-01-01 12:00	2020	rcp85	47.3	54.5	81.6
44.95833	-81.2917	2021-01-01 12:00	2021	rcp85	49	54	73.4
44.95833	-81.2917	2022-01-01 12:00	2022	rcp85	47	56	65.8
44.95833	-81.2917	2023-01-01 12:00	2023	rcp85	47.1	56	69.7
44.95833	-81.2917	2024-01-01 12:00	2024	rcp85	50	63	73.2
44.95833	-81.2917	2025-01-01 12:00	2025	rcp85	51.1	56	70.8
44.95833	-81.2917	2026-01-01 12:00	2026	rcp85	52.2	58	70.9
44.95833	-81.2917	2027-01-01 12:00	2027	rcp85	44.6	60.5	66.6
44.95833	-81.2917	2028-01-01 12:00	2028	rcp85	51.1	59	72.6
44.95833	-81.2917	2029-01-01 12:00	2029	rcp85	50.1	54.5	66.6
44.95833	-81.2917	2030-01-01 12:00	2030	rcp85	45.6	53.5	68.3
44.95833	-81.2917	2031-01-01 12:00	2031	rcp85	54.1	59.5	81.4
44.95833	-81.2917	2032-01-01 12:00	2032	rcp85	42.3	58	64.8
44.95833	-81.2917	2033-01-01 12:00	2033	rcp85	50.1	59.5	69.6
44.95833	-81.2917	2034-01-01 12:00	2034	rcp85	44.3	53	63.9
44.95833	-81.2917	2035-01-01 12:00	2035	rcp85	43.4	53	67.8
44.95833	-81.2917	2036-01-01 12:00	2036	rcp85	48.1	54.5	70.8
44.95833	-81.2917	2037-01-01 12:00	2037	rcp85	49.4	55	68.6
44.95833	-81.2917	2038-01-01 12:00	2038	rcp85	36.8	56.5	70.3
44.95833	-81.2917	2039-01-01 12:00	2039	rcp85	48.4	61.5	73.8
44.95833	-81.2917	2040-01-01 12:00	2040	rcp85	43.2	58	75.2
44.95833	-81.2917	2041-01-01 12:00	2041	rcp85	43.4	56	63.9
44.95833	-81.2917	2042-01-01 12:00	2042	rcp85	51.2	63.5	77.1
44.95833	-81.2917	2043-01-01 12:00	2043	rcp85	46.2	56	76.6
44.95833	-81.2917	2044-01-01 12:00	2044	rcp85	49.5	58	67.7
44.95833	-81.2917	2045-01-01 12:00	2045	rcp85	45	60	70
44.95833	-81.2917	2046-01-01 12:00	2046	rcp85	46.3	54.5	65.8
44.95833	-81.2917	2047-01-01 12:00	2047	rcp85	44.4	55.5	61.8
44.95833	-81.2917	2048-01-01 12:00	2048	rcp85	43.4	58.5	71.9
44.95833	-81.2917	2049-01-01 12:00	2049	rcp85	48.1	55	75.7
44.95833	-81.2917	2050-01-01 12:00	2050	rcp85	48	59	64.9
44.95833	-81.2917	2051-01-01 12:00	2051	rcp85	47.1	53	66
44.95833	-81.2917	2052-01-01 12:00	2052	rcp85	44	58.5	66.7
44.95833	-81.2917	2053-01-01 12:00	2053	rcp85	37.4	52	62.7
44.95833	-81.2917	2054-01-01 12:00	2054	rcp85	43.3	54	67.5

44.95833	-81.2917	2055-01-01 12:00	2055	rcp85	52.2	58.5	65.6	54.71667
44.95833	-81.2917	2056-01-01 12:00	2056	rcp85	41.2	47	58.5	
44.95833	-81.2917	2057-01-01 12:00	2057	rcp85	48.1	53.5	68.1	
44.95833	-81.2917	2058-01-01 12:00	2058	rcp85	43	53.5	64.9	
44.95833	-81.2917	2059-01-01 12:00	2059	rcp85	39.1	51.5	67.6	
44.95833	-81.2917	2060-01-01 12:00	2060	rcp85	48.3	61.5	69.8	
44.95833	-81.2917	2061-01-01 12:00	2061	rcp85	45.2	57	64	
44.95833	-81.2917	2062-01-01 12:00	2062	rcp85	44.2	52	64.6	
44.95833	-81.2917	2063-01-01 12:00	2063	rcp85	39.1	52.5	66.9	
44.95833	-81.2917	2064-01-01 12:00	2064	rcp85	40	50	60	
44.95833	-81.2917	2065-01-01 12:00	2065	rcp85	32.3	47	69.2	
44.95833	-81.2917	2066-01-01 12:00	2066	rcp85	38.3	57	63.7	
44.95833	-81.2917	2067-01-01 12:00	2067	rcp85	38	49	70.6	
44.95833	-81.2917	2068-01-01 12:00	2068	rcp85	33.1	51	58.7	
44.95833	-81.2917	2069-01-01 12:00	2069	rcp85	33	53.5	58	
44.95833	-81.2917	2070-01-01 12:00	2070	rcp85	43.2	53.5	65.6	
44.95833	-81.2917	2071-01-01 12:00	2071	rcp85	30.9	44.5	62	
44.95833	-81.2917	2072-01-01 12:00	2072	rcp85	46.6	56	66.8	
44.95833	-81.2917	2073-01-01 12:00	2073	rcp85	41.6	50.5	56.9	
44.95833	-81.2917	2074-01-01 12:00	2074	rcp85	34.3	50	64.9	
44.95833	-81.2917	2075-01-01 12:00	2075	rcp85	39.6	48.5	61.7	
44.95833	-81.2917	2076-01-01 12:00	2076	rcp85	29.2	46.5	64.9	
44.95833	-81.2917	2077-01-01 12:00	2077	rcp85	32.9	49	57.9	
44.95833	-81.2917	2078-01-01 12:00	2078	rcp85	32.3	54	59.8	
44.95833	-81.2917	2079-01-01 12:00	2079	rcp85	40	42	69.5	
44.95833	-81.2917	2080-01-01 12:00	2080	rcp85	29.2	46.5	68.1	
44.95833	-81.2917	2081-01-01 12:00	2081	rcp85	23.7	47.5	62.4	
44.95833	-81.2917	2082-01-01 12:00	2082	rcp85	31.1	39	55.8	
44.95833	-81.2917	2083-01-01 12:00	2083	rcp85	24.5	51	67.1	
44.95833	-81.2917	2084-01-01 12:00	2084	rcp85	33.4	47.5	61.5	
44.95833	-81.2917	2085-01-01 12:00	2085	rcp85	33.7	46	66.1	45.63333
44.95833	-81.2917	2086-01-01 12:00	2086	rcp85	39.6	54	68.9	
44.95833	-81.2917	2087-01-01 12:00	2087	rcp85	29.1	44.5	57.6	
44.95833	-81.2917	2088-01-01 12:00	2088	rcp85	32.7	48.5	64.4	
44.95833	-81.2917	2089-01-01 12:00	2089	rcp85	31.2	48	67.5	
44.95833	-81.2917	2090-01-01 12:00	2090	rcp85	27.6	43.5	67.1	
44.95833	-81.2917	2091-01-01 12:00	2091	rcp85	20.1	41.5	60.7	
44.95833	-81.2917	2092-01-01 12:00	2092	rcp85	20.4	42	59.6	
44.95833	-81.2917	2093-01-01 12:00	2093	rcp85	28.3	41.5	56.5	
44.95833	-81.2917	2094-01-01 12:00	2094	rcp85	8.5	37.5	56.6	
44.95833	-81.2917	2095-01-01 12:00	2095	rcp85	20.5	45.5	51.7	
44.95833	-81.2917	2096-01-01 12:00	2096	rcp85	21	47	69.8	
44.95833	-81.2917	2097-01-01 12:00	2097	rcp85	26	45.5	48.8	
44.95833	-81.2917	2098-01-01 12:00	2098	rcp85	30.2	41.5	57.8	
44.95833	-81.2917	2099-01-01 12:00	2099	rcp85	19.3	35.5	59.8	
44.95833	-81.2917	2100-01-01 12:00	2100	rcp85	27.2	34.5	49.5	

Wet Days
Precipitation > 10 mm/day



Tobermory

lat	lon	time	year	rcp	p10	p50	p90	
45.29167	-81.625	1990-01-01 12:00	1990	rcp85	18	24	30	
45.29167	-81.625	1991-01-01 12:00	1991	rcp85	20.1	24.5	29	
45.29167	-81.625	1992-01-01 12:00	1992	rcp85	18	27	29.8	
45.29167	-81.625	1993-01-01 12:00	1993	rcp85	18.3	24	28	
45.29167	-81.625	1994-01-01 12:00	1994	rcp85	19	23	27.8	
45.29167	-81.625	1995-01-01 12:00	1995	rcp85	17.2	20	23	
45.29167	-81.625	1996-01-01 12:00	1996	rcp85	17.1	22.5	31.4	
45.29167	-81.625	1997-01-01 12:00	1997	rcp85	16.5	23	31.4	
45.29167	-81.625	1998-01-01 12:00	1998	rcp85	16.1	21	27	
45.29167	-81.625	1999-01-01 12:00	1999	rcp85	16.1	24	28.9	
45.29167	-81.625	2000-01-01 12:00	2000	rcp85	21.1	25	30.6	
45.29167	-81.625	2001-01-01 12:00	2001	rcp85	18.1	25	31	
45.29167	-81.625	2002-01-01 12:00	2002	rcp85	23.1	25	32.9	
45.29167	-81.625	2003-01-01 12:00	2003	rcp85	22	24.5	28	
45.29167	-81.625	2004-01-01 12:00	2004	rcp85	15.2	22	30.8	
45.29167	-81.625	2005-01-01 12:00	2005	rcp85	17.1	23.5	32	23.58333
45.29167	-81.625	2006-01-01 12:00	2006	rcp85	18.2	23	29.4	
45.29167	-81.625	2007-01-01 12:00	2007	rcp85	20.1	24	29.7	

45.29167	-81.625	2008-01-01 12:00	2008	rcp85	18.3	24.5	29.9
45.29167	-81.625	2009-01-01 12:00	2009	rcp85	15.1	22	28.8
45.29167	-81.625	2010-01-01 12:00	2010	rcp85	19	25	29
45.29167	-81.625	2011-01-01 12:00	2011	rcp85	15.3	25.5	33.9
45.29167	-81.625	2012-01-01 12:00	2012	rcp85	16.5	25	30
45.29167	-81.625	2013-01-01 12:00	2013	rcp85	22.1	25	34.4
45.29167	-81.625	2014-01-01 12:00	2014	rcp85	20	25.5	30.8
45.29167	-81.625	2015-01-01 12:00	2015	rcp85	18.3	23	28.9
45.29167	-81.625	2016-01-01 12:00	2016	rcp85	16.1	19	28.9
45.29167	-81.625	2017-01-01 12:00	2017	rcp85	21.1	24	30.8
45.29167	-81.625	2018-01-01 12:00	2018	rcp85	18.2	24.5	36.5
45.29167	-81.625	2019-01-01 12:00	2019	rcp85	17	22	27.8
45.29167	-81.625	2020-01-01 12:00	2020	rcp85	17	21.5	30.8
45.29167	-81.625	2021-01-01 12:00	2021	rcp85	19.1	22.5	30.5
45.29167	-81.625	2022-01-01 12:00	2022	rcp85	18.2	23.5	33.4
45.29167	-81.625	2023-01-01 12:00	2023	rcp85	22.1	25.5	32.6
45.29167	-81.625	2024-01-01 12:00	2024	rcp85	22	24.5	32.8
45.29167	-81.625	2025-01-01 12:00	2025	rcp85	19	22	30.9
45.29167	-81.625	2026-01-01 12:00	2026	rcp85	20.2	25	32.6
45.29167	-81.625	2027-01-01 12:00	2027	rcp85	15.3	24.5	28
45.29167	-81.625	2028-01-01 12:00	2028	rcp85	24	26.5	30.9
45.29167	-81.625	2029-01-01 12:00	2029	rcp85	19.3	25	28
45.29167	-81.625	2030-01-01 12:00	2030	rcp85	14.5	22.5	26.9
45.29167	-81.625	2031-01-01 12:00	2031	rcp85	20.1	22.5	30.9
45.29167	-81.625	2032-01-01 12:00	2032	rcp85	23	25.5	36.3
45.29167	-81.625	2033-01-01 12:00	2033	rcp85	21.1	23.5	32.6
45.29167	-81.625	2034-01-01 12:00	2034	rcp85	20.2	26.5	30.8
45.29167	-81.625	2035-01-01 12:00	2035	rcp85	15.7	29	38.8
45.29167	-81.625	2036-01-01 12:00	2036	rcp85	21.2	26	27
45.29167	-81.625	2037-01-01 12:00	2037	rcp85	20.1	25.5	33.8
45.29167	-81.625	2038-01-01 12:00	2038	rcp85	14.5	25	34.7
45.29167	-81.625	2039-01-01 12:00	2039	rcp85	19.1	23.5	30.4
45.29167	-81.625	2040-01-01 12:00	2040	rcp85	18.7	27	30
45.29167	-81.625	2041-01-01 12:00	2041	rcp85	21	27	32.9
45.29167	-81.625	2042-01-01 12:00	2042	rcp85	18.1	21.5	25.7
45.29167	-81.625	2043-01-01 12:00	2043	rcp85	19	25	34.6
45.29167	-81.625	2044-01-01 12:00	2044	rcp85	20.1	27.5	30.9
45.29167	-81.625	2045-01-01 12:00	2045	rcp85	19.3	29.5	33
45.29167	-81.625	2046-01-01 12:00	2046	rcp85	22.2	27	34.5
45.29167	-81.625	2047-01-01 12:00	2047	rcp85	26	27	33.8
45.29167	-81.625	2048-01-01 12:00	2048	rcp85	22.1	27.5	32.7
45.29167	-81.625	2049-01-01 12:00	2049	rcp85	15	27	37.4
45.29167	-81.625	2050-01-01 12:00	2050	rcp85	21.3	28.5	34.7
45.29167	-81.625	2051-01-01 12:00	2051	rcp85	20.3	31	33.9
45.29167	-81.625	2052-01-01 12:00	2052	rcp85	18.1	26	34.5
45.29167	-81.625	2053-01-01 12:00	2053	rcp85	21.3	27	35.8
45.29167	-81.625	2054-01-01 12:00	2054	rcp85	18.2	26	34.9

45.29167	-81.625	2055-01-01 12:00	2055	rcp85	20.2	27.5	33	27.41667
45.29167	-81.625	2056-01-01 12:00	2056	rcp85	18.1	24.5	44.4	
45.29167	-81.625	2057-01-01 12:00	2057	rcp85	21.1	24.5	29.7	
45.29167	-81.625	2058-01-01 12:00	2058	rcp85	22.3	28	37.3	
45.29167	-81.625	2059-01-01 12:00	2059	rcp85	24.1	29	33.9	
45.29167	-81.625	2060-01-01 12:00	2060	rcp85	21.1	28.5	37.9	
45.29167	-81.625	2061-01-01 12:00	2061	rcp85	19.2	25	32.9	
45.29167	-81.625	2062-01-01 12:00	2062	rcp85	18.1	23.5	30.5	
45.29167	-81.625	2063-01-01 12:00	2063	rcp85	25.2	29.5	35.8	
45.29167	-81.625	2064-01-01 12:00	2064	rcp85	22.2	30.5	34.7	
45.29167	-81.625	2065-01-01 12:00	2065	rcp85	25.1	30	35.8	
45.29167	-81.625	2066-01-01 12:00	2066	rcp85	20.2	27.5	34.9	
45.29167	-81.625	2067-01-01 12:00	2067	rcp85	22.2	29.5	37	
45.29167	-81.625	2068-01-01 12:00	2068	rcp85	24.1	30.5	35.9	
45.29167	-81.625	2069-01-01 12:00	2069	rcp85	22	29	34.9	
45.29167	-81.625	2070-01-01 12:00	2070	rcp85	22	28	33.8	
45.29167	-81.625	2071-01-01 12:00	2071	rcp85	21.1	26	36.3	
45.29167	-81.625	2072-01-01 12:00	2072	rcp85	20	24	39.5	
45.29167	-81.625	2073-01-01 12:00	2073	rcp85	22.1	25.5	29.9	
45.29167	-81.625	2074-01-01 12:00	2074	rcp85	23.1	27.5	41.7	
45.29167	-81.625	2075-01-01 12:00	2075	rcp85	17.3	26	30.8	
45.29167	-81.625	2076-01-01 12:00	2076	rcp85	20.4	29	35.4	
45.29167	-81.625	2077-01-01 12:00	2077	rcp85	25	27.5	34.5	
45.29167	-81.625	2078-01-01 12:00	2078	rcp85	23	32.5	38.9	
45.29167	-81.625	2079-01-01 12:00	2079	rcp85	23.3	28.5	32.9	
45.29167	-81.625	2080-01-01 12:00	2080	rcp85	25.1	29	38.5	
45.29167	-81.625	2081-01-01 12:00	2081	rcp85	19.2	26.5	34.9	
45.29167	-81.625	2082-01-01 12:00	2082	rcp85	23.1	27	34.8	
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45.29167	-81.625	2088-01-01 12:00	2088	rcp85	21.1	29.5	32	
45.29167	-81.625	2089-01-01 12:00	2089	rcp85	19.3	28	34.8	
45.29167	-81.625	2090-01-01 12:00	2090	rcp85	23.3	27	39.7	
45.29167	-81.625	2091-01-01 12:00	2091	rcp85	25.2	29.5	37.5	
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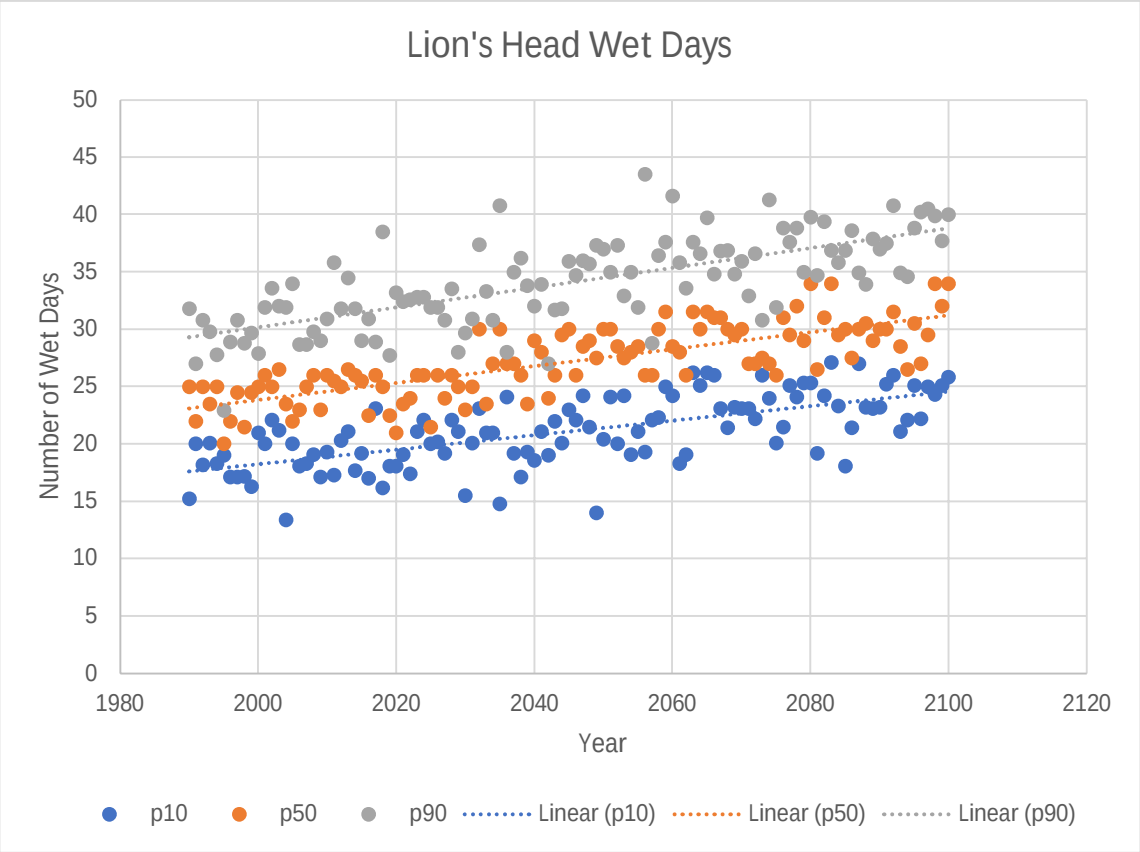
45.29167	-81.625	2097-01-01 12:00	2097	rcp85	23	30	38.7	
45.29167	-81.625	2098-01-01 12:00	2098	rcp85	24.3	32.5	38.7	
45.29167	-81.625	2099-01-01 12:00	2099	rcp85	24.1	29.5	36.8	
45.29167	-81.625	2100-01-01 12:00	2100	rcp85	26.8	33.5	40.2	



Lion's Head

lat	lon	time	year	rcp	p10	p50	p90	
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44.95833	-81.29166906	1993-01-01 12:00	1993	rcp85	20.1	23.5	29.8	
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44.95833	-81.29166906	1997-01-01 12:00	1997	rcp85	17.1	24.5	30.8	
44.95833	-81.29166906	1998-01-01 12:00	1998	rcp85	17.2	21.5	28.8	
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44.95833	-81.29166906	2031-01-01 12:00	2031	rcp85	20.1	25	30.9
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44.95833	-81.29166906	2070-01-01 12:00	2070	rcp85	23.1	30	35.9	
44.95833	-81.29166906	2071-01-01 12:00	2071	rcp85	23.1	27	32.9	
44.95833	-81.29166906	2072-01-01 12:00	2072	rcp85	22.2	27	36.6	
44.95833	-81.29166906	2073-01-01 12:00	2073	rcp85	26	27.5	30.8	
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44.95833	-81.29166906	2077-01-01 12:00	2077	rcp85	25.1	29.5	37.6	
44.95833	-81.29166906	2078-01-01 12:00	2078	rcp85	24.1	32	38.8	
44.95833	-81.29166906	2079-01-01 12:00	2079	rcp85	25.3	29	35	
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44.95833	-81.29166906	2081-01-01 12:00	2081	rcp85	19.2	26.5	34.7	
44.95833	-81.29166906	2082-01-01 12:00	2082	rcp85	24.2	31	39.4	
44.95833	-81.29166906	2083-01-01 12:00	2083	rcp85	27.1	34	36.9	
44.95833	-81.29166906	2084-01-01 12:00	2084	rcp85	23.3	29.5	35.8	
44.95833	-81.29166906	2085-01-01 12:00	2085	rcp85	18.1	30	36.9	29.71667
44.95833	-81.29166906	2086-01-01 12:00	2086	rcp85	21.4	27.5	38.6	
44.95833	-81.29166906	2087-01-01 12:00	2087	rcp85	27	30	34.9	
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44.95833	-81.29166906	2092-01-01 12:00	2092	rcp85	26	31.5	40.8	
44.95833	-81.29166906	2093-01-01 12:00	2093	rcp85	21.1	28.5	34.9	
44.95833	-81.29166906	2094-01-01 12:00	2094	rcp85	22.1	26.5	34.6	
44.95833	-81.29166906	2095-01-01 12:00	2095	rcp85	25.1	30.5	38.8	
44.95833	-81.29166906	2096-01-01 12:00	2096	rcp85	22.2	27	40.2	
44.95833	-81.29166906	2097-01-01 12:00	2097	rcp85	25	29.5	40.5	
44.95833	-81.29166906	2098-01-01 12:00	2098	rcp85	24.3	34	39.9	
44.95833	-81.29166906	2099-01-01 12:00	2099	rcp85	25.1	32	37.7	
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APPENDIX

B RISK ANALYSIS

Master Plans for Tobermory and Lions Head
Climate Change Impact Assessment
Table B-1 - Tobermory Water System Risk Assessment

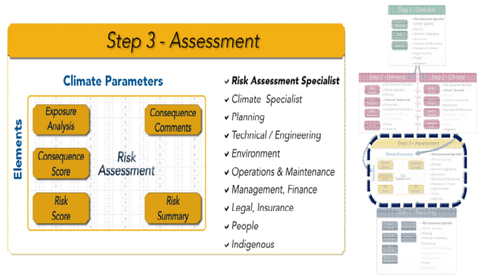
Risk Assessment Worksheet

Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Parameters (P)

Heat Waves	Cold Weather	Freeze/Thaw	Precipitation	Drought

Summary



Climate Projections

	Heat Waves			Cold Weather			Freeze/Thaw			Precipitation			Drought		
Present	3	L		3	L		3	L		3	L		3	L	
2050	4	L		1	L		2	L		4	L		3	L	
2080	4	L		1	L		1	L		4	L		3	L	

Elements (E)

			Heat Waves Y/N	L	C	R	Cold Weather Y/N	L	C	R	Freeze/Thaw Y/N	L	C	R	Precipitation Y/N	L	C	R	Drought Y/N	L	C	R		Low	Med	High
1	Tobermory Water Source - Georgian Bay	Present	Y	3	2	6	Y	3	5	15	Y	3	5	15	Y	3	3	9	Y	3	2	6	Present	3.7	10.2	19.6
		2050		4		8		1		5		2		10		4		12		3		6	2050	3.0	8.2	15.7
		2080		4		8		1		5		1		5		4		12		3		6	2080	2.6	7.2	13.8
2	Tobermory Private Wells	Present	Y	3	1	3	N	L		R	N	L		R	N	L		R	Y	3	1	3	Present	0.4	1.2	2.3
		2050		4		4		L		R		L		R		L		R		3		3	2050	0.5	1.4	2.7
		2080		4		4		L		R		L		R		L		R		2		2	2080	0.4	1.2	2.3
3	Tobermory Watermains	Present	N	L		R	Y	3	4	12	Y	3	5	15	N	L		R	N	L		R	Present	1.9	5.4	10.4
		2050		L		R		1		4		2		10		L		R		L		R	2050	1.0	2.8	5.4
		2080		L		R		1		4		1		5		L		R		L		R	2080	0.6	1.8	3.5
4	Tobermory Water Treatment Plant	Present	Y	3	3	9	N	L		R	N	L		R	N	L		R	Y	3	3	9	Present	1.3	3.6	6.9
		2050		4		12		L		R		L		R		L		R		3		9	2050	1.5	4.2	8.1
		2080		4		12		L		R		L		R		L		R		2		6	2080	1.3	3.6	6.9
5	Tobermory Reservoir or Booster Station	Present	N	L		R	N	L		R	N	L		R	Y	3	2	6	N	L		R	Present	0.4	1.2	2.3
		2050		L		R		L		R		L		R		4		8		L		R	2050	0.6	1.6	3.1
		2080		L		R		L		R		L		R		4		8		L		R	2080	0.6	1.6	3.1

Consequence Comments

Heat impacts water quality (eg. higher risk in Algae Blooms) and may also result in increased water usage; cold weather and freeze/thaw cycles could result in a frozen intake; preciptation impacts surface water quality;
Heat impacts water quality and results in increased water usage; drought impacts water quantity.
Cold weather could result in freezing and/or bursting of watermains
Heat impacts water quality; drought impacts water quantity. Infrastrcuture impacts due to high temp/drought such as risk of wildfire, or high precipitation causing flooding.
Precipitation could impact the ability to perform maintenance on the booster station or reservoir

Risk Assessment:

1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnece, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

	Low	Med	High
Present	1.6	4.3	8.2
2050	1.3	3.6	6.9
2080	1.1	3.1	5.9

Risk Summary

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

z

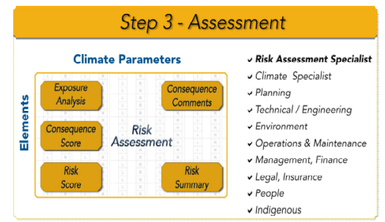
Master Plans for Tobermory and Lions Head
Climate Change Impact Assessment
Table B-2 - Tobermory Wastewater Systems Risk Assessment

Risk Assessment Worksheet

Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Parameters (P)

Summary





Climate Projections		Heat Waves			Cold Weather			Freeze/Thaw			Precipitation			Drought		
	Present	3	L		3	L		3	L		3	L		3	L	
	2050	4	L		1	L		2	L		4	L		3	L	
	2080	4	L		1	L		1	L		4	L		2	L	

Elements (E)			Heat Waves Y/N	L	C	R	Cold Weather Y/N	L	C	R	Freeze/Thaw Y/N	L	C	R	Precipitation Y/N	L	C	R	Drought Y/N	L	C	R	Summary	Low	Med	High	Consequence Comments
1	Private Septic Tanks	Present	N	0		0	N	0		0	Y	3	3	9	N	0		0	N	0		0	Present	0.6	1.8	3.5	Freeze/thaw cycles can cause ground heaves which can damage septic tanks
		2050		0		0		0		0		2		6		0		0		0		0	2050	0.4	1.2	2.3	
		2080		0		0		0		0		1		3		0		0		0		0	2080	0.2	0.6	1.2	
2	Tobermory Sanitary Pump Station and Forcemains	Present	Y	3	1	3	Y	3	1	3	Y	3	3	9	Y	3	3	9	Y	3	1	3	Present	1.9	5.4	10.4	Heat waves impact water usage and thus wastewater production; precipitation causes increase in flows from infiltration and inflow and potential sewage bypasses; drought causes less flow
		2050		4		4		1		1		2		6		4		12		2		2	2050	1.8	5.0	9.6	
		2080		4		4		1		1		1		3		5		15		2		2	2080	1.8	5.0	9.6	
3	Tobermory Gravity Sewers	Present	Y	3	1	3	Y	3	4	12	Y	3	4	12	Y	3	4	12	Y	3	1	3	Present	3.0	8.4	16.1	Heat waves impact water usage and thus wastewater production; cold weather and freeze/thaw cycles can result in freezing of pipes; precipitation causes increase in flows from infiltration and inflow; drought causes less flow
		2050		4		4		1		4		2		8		4		16		2		2	2050	2.4	6.8	13.1	
		2080		4		4		1		4		1		4		5		20		2		2	2080	2.4	6.8	13.1	
4	Tobermory Wastewater Treatment Plant	Present	Y	3	1	3	Y	3	1	3	Y	3	4	12	Y	3	4	12	Y	3	1	3	Present	2.4	6.6	12.7	A sewage lagoon is susceptible to freeze/thaw cycles; precipitation leads to increased flows from infiltration and inflow
		2050		4		4		1		1		2		8		4		16		2		2	2050	2.2	6.2	11.9	
		2080		4		4		1		1		1		4		5		20		2		2	2080	2.2	6.2	11.9	
5	Receiving Water Body	Present	Y	3	2	6	Y	3	1	3	Y	3	1	3	Y	3	2	6	Y	3	2	6	Present	1.7	4.8	9.2	During a heat wave/drought the water quality could be impacted; precipitation and drought impact water levels of the receiving water body
		2050		4		8		1		1		2		2		4		8		2		4	2050	1.7	4.6	8.8	
		2080		4		8		1		1		1		1		4		8		2		4	2080	1.6	4.4	8.4	

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnce, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

Present	1.9	5.4	10.3
2050	1.7	4.8	9.0
2080	1.7	4.6	8.7

Risk Summary

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

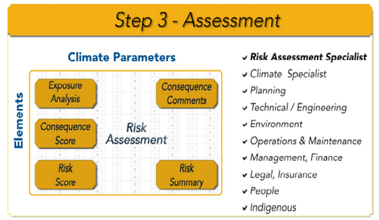
Master Plans for Tobermory and Lions Head
Climate Change Impact Assessment
Table B-3 - Lions Head Water Systems Risk Assessment

Risk Assessment Worksheet

Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Parameters (P)

Summary



Climate Projections

	Heat Waves			Cold Weather			Freeze/Thaw			Precipitation			Drought		
Present	3	L		3	L		3	L		3	L		3	L	
2050	4	L		1	L		2	L		4	L		3	L	
2080	4	L		1	L		1	L		4	L		3	L	

Elements (E)

			Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R		Low	Med	High
1	Lion's Head Source - Isthmus Bay	Present	Y	3	2	6	Y	3	5	15	Y	3	5	15	Y	3	3	9	Y	3	2	6	Present	3.7	10.2	19.6
		2050		4		8		1		5		2		10		4		12		3		6	2050	3.0	8.2	15.7
		2080		4		8		1		5		1		5		4		12		3		6	2080	2.6	7.2	13.8
2	Lion's Head Private Wells	Present	Y	3	1	3	N	L		R	N	L		R	N	L		R	Y	3	1	3	Present	0.4	1.2	2.3
		2050		4		4		L		R		L		R		L		R		3		3	2050	0.5	1.4	2.7
		2080		4		4		L		R		L		R		L		R		3		3	2080	0.5	1.4	2.7
3	Lion's Head Watermains	Present	N	L		R	Y	3	4	12	Y	3	5	15	N	L		R		L		R	Present	1.9	5.4	10.4
		2050		L		R		1		4		2		10		L		R		L		R	2050	1.0	2.8	5.4
		2080		L		R		1		4		1		5		L		R		L		R	2080	0.6	1.8	3.5
4	Lion's Head Hydrants	Present	Y	3	2	6	N	L		R	N	L		R	N	L		R		L		R	Present	0.4	1.2	2.3
		2050		4		8		L		R		L		R		L		R		L		R	2050	0.6	1.6	3.1
		2080		4		8		L		R		L		R		L		R		L		R	2080	0.6	1.6	3.1
5	Lion's Head Water Treatment Plant	Present	Y	3	3	9	N	L		R	N	L		R	N	L		R	Y	3	3	9	Present	1.3	3.6	6.9
		2050		4		12		L		R		L		R		L		R		3		9	2050	1.5	4.2	8.1
		2080		4		12		L		R		L		R		L		R		3		9	2080	1.5	4.2	8.1
6	Lion's Head Reservoir or Booster Station	Present	N	L		R	N	L		R	N	L		R	Y	3	2	6	N	L		R	Present	0.4	1.2	2.3
		2050		L		R		L		R		L		R		4		8		L		R	2050	0.6	1.6	3.1
		2080		L		R		L		R		L		R		4		8		L		R	2080	0.6	1.6	3.1

Consequence Comments

Heat impacts water quality (eg. higher risk in Algae Blooms) and may also result in increased water usage; cold weather and freeze/thaw cycles could result in a frozen intake; preciptation impacts surface water quality;

Heat impacts water quality and results in increased water usage; drought impacts water quantity

Cold weather could result in freezing and/or bursting of watermains

Heat waves could result in increased risk of house fires and thus require fire flow

Heat impacts water quality; drought impacts water quantity. Infrastrcuture impacts due to high temp/drought such as risk of wildfire, or high precipitation causing flooding.

Precipitation could impact the ability to perform maintenance on the booster station or reservoir

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnce, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

	Low	Med	High
Present	1.4	3.8	7.2
2050	1.2	3.3	6.3
2080	1.1	3.0	5.6

Risk Summary

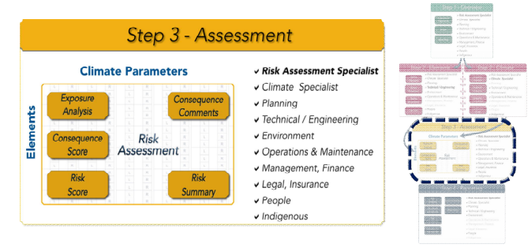
Master Plans for Tobermory and Lions Head
Climate Change Impact Assessment
Table B-4 - Lions Head Wastewater Systems Risk Assessment

Risk Assessment Worksheet

Consequence Score (C)
1 - Very Low
2 - Low
3 - Moderate
4 - High
5 - Very High

Climate Parameters (P)

Summary



Climate Projections		Heat Waves			Cold Weather			Freeze/Thaw			Precipitation			Drought		
	Present	3	L		3	L		3	L		3	L		3	L	
	2050	4	L		1	L		2	L		4	L		3	L	
	2080	4	L		1	L		1	L		4	L		3	L	

Elements (E)			Heat Waves Y/N	L	C	R	Cold Weather Y/N	L	C	R	Freeze/Thaw Y/N	L	C	R	Precipitation Y/N	L	C	R	Drought Y/N	L	C	R
1	Private Septic Tanks	Present		0		0		0		0		3		9		0		0		0		0
		2050	N	0		0	N	0		0	Y	2	3	6	N	0		0	N	0		0
		2080		0		0		0		0		1		3		0		0		0		0
2	Receiving Water Body	Present		3		6		3		3		3		3		3		6		3		6
		2050	Y	4	2	8	Y	1	1	1	Y	2	1	2	Y	4	2	8	Y	2	2	4
		2080		4		8		1		1		1		1		4		8		2		4

	Low	Med	High
Present	0.6	1.8	3.5
2050	0.4	1.2	2.3
2080	0.2	0.6	1.2
Present	1.7	4.8	9.2
2050	1.7	4.6	8.8
2080	1.6	4.4	8.4

Consequence Comments

Freeze/thaw cycles can cause ground heaves which can damage septic tanks

During a heat wave the water quality could be impacted; precipitation and drought impact water levels of the receiving water body

Risk Assessment:
1. Assess interaction (E and P) by performing a Exposure Analysis (Yes/No)
2. Assess consequence: For each (Yes) interaction assess a Consequnce, Score (C)
3. Record why a score was chosen (Consequence Comments)
4. Calculate the Risk (R) for each interaction (R=C x L)
5. Review Risk Summary

	Low	Med	High
Present	1.2	3.3	6.3
2050	1.0	2.9	5.5
2080	0.9	2.5	4.8

Risk Summary

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Master Plans for Tobermory and Lions Head
Climate Change Impact Assessment
Table B-5 - Tobermory Climate Hazard Likelihood Score (L)

General Climate Measures	Climate Parameter (P)	Index Description	Present (1991-2020) Estimated Value	Baseline Likelihood Score (L)	2050s (2041-2070) Estimated Value	2050s Likelihood Score (L)	2080s (2071-2100) Estimated Value	2080s Likelihood Score (L)	Occurrence Definition	Climate Scenario	Reference Location	Parameter Source
Temperature	Heat Waves	Periods of at least 3 days with minimum temperature above 15oC and maximum temperature above 25oC	2.33	3	5.57	4	5.82	4	Annual	RCP 85	Tobermory	https://climatedata.ca/
	Cold Weather	Number of cold days (<-20oC) per year	3.98	3	0.17	1	0	1	Annual	RCP 85	Tobermory	https://climatedata.ca/
	Freeze/Thaw	Number of days hovering around 0oC	62.52	3	55.33	2	46.33	1	Annual	RCP 85	Tobermory	https://climatedata.ca/
Precipitation	Precipitation	Number of days with precipitation (>10 mm/day)	23.58	3	27.42	4	28.4	4	Annual	RCP 85	Tobermory	https://climatedata.ca/
	Drought	Greatest number of consecutive days with 0 mm rain	13.02	3	p	3	13.7	3	Annual	RCP 85	Tobermory	https://climatedata.ca/

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

Master Plans for Tobermory and Lions Head
Climate Change Impact Assessment
Table B-6 - Lions Head Climate Hazard Likelihood Score (L)

General Climate Measures	Climate Parameter (P)	Index Description	Present (1991-2020) Estimated Value	Baseline Likelihood Score (L)	2050s (2041-2070) Estimated Value	2050s Likelihood Score (L)	2080s (2071-2100) Estimated Value	2080s Likelihood Score (L)	Occurrence Definition	Climate Scenario	Reference Location	Parameter Source
Temperature	Heat Waves	Periods of at least 3 days with minimum temperature above 15oC and maximum temperature above 25oC	3.05	3	6.32	4	6.33	4	Annual	RCP 85	Lion's Head	https://climatedata.ca/
	Cold Weather	Number of cold days (<-20oC) per year	3.23	3	0.12	1	0	1	Annual	RCP 85	Lion's Head	https://climatedata.ca/
	Freeze/Thaw	Number of days hovering around 0oC	61.37	3	54.72	2	45.63	1	Annual	RCP 85	Lion's Head	https://climatedata.ca/
Precipitation	Precipitation	Number of days with precipitation (>10 mm/day)	24.15	3	28.72	4	29.72	4	Annual	RCP 85	Lion's Head	https://climatedata.ca/
	Drought	Greatest number of consecutive days with 0 mm rain	11.97	3	11.63	3	12.48	3	Annual	RCP 85	Lion's Head	https://climatedata.ca/

PIEVC High Level Screening Guide
Risk Assessment Worksheet
Source: https://pievc.ca/

APPENDIX

C REFERENCE REPORTS

AECOM

Prepared for:
Georgian Bay Forever

Prepared by:
AECOM Technical Services, Inc.
June 3, 2016

Providing Structural Solutions for Adaptive Management in the Great Lakes

Creating Climate Resilience

Executive Summary





Managing Water Levels in the Great Lakes: The Search for New Solutions

Study Background:

Georgian Bay Forever (GBF), a nonprofit organization dedicated to scientific research and public education, has had a long-standing concern over the adverse impacts of pronounced water level fluctuations on Georgian Bay, Lake Huron and, more generally, the Great Lakes-St. Lawrence River System. An economic impact assessment released in 2014 by The Council of the Great Lakes Region, for example, found that plausible future declining water levels in the system will result in $18.82B in economic loss over the next 35 years if structural interventions do not take place.

Building on that work, GBF commissioned an internationally recognized water resources planning and engineering consultancy, AECOM Technical Services, Inc. (AECOM) to prepare a study to "provide viable structural options for the long-term climate resilient protection of water levels in the upper Great Lakes." The study addressed an unmet need acknowledged by the International Joint Commission (IJC) when releasing the 2012 International Upper Great Lakes Study (IUGLS): the need for a detailed examination of additional lake level control structures.

Study Process:

The study entailed the examination of over a dozen structural alternatives for lake level control within the Great Lakes-St. Lawrence River System. The alternatives are categorized as: *Compensatory Structures* (i.e., submerged sills, weirs, jetties, river training walls, wing dikes); *Power Generating Structures* (i.e., conventional hydroelectric dams, In-stream turbines); *Adaptive Management Structures* (i.e., inflatable flap gates, inflatable dams, control/sector gates); and *"Other" Structures* (i.e., ice booms, landfill and control gate structures). They include well-established, extensively researched structures, emerging technologies, and new ideas developed specifically to address lake level controls within the Great Lakes-St. Lawrence River System.

These various alternatives were examined in light of existing data and information, and subsequently evaluated on the basis of seven criteria that include performance, implementation feasibility, cost, regulatory requirements, climate resiliency, environmental impacts, and social/cultural considerations. The evaluation culminated in the selection of three alternatives for additional analysis and "concept level" development. These included:

- **In-stream Turbines** to be installed on the river bed of the Upper St. Clair River by the Blue Water Bridge, as well as upstream of the St. Mary's River Compensation Works. By reducing river flow when in operating mode, the turbines impact river hydrodynamics, increasing water levels upstream and decreasing levels downstream, as needs dictate. Power generation is a significant ancillary benefit.

- **Inflatable Dams** to be installed in the St. Clair River at Stag and/or Fawn Islands. When the inflated dams are operational, river flow is reduced with a resultant increase in upstream water levels. During higher than desired levels, the dams are deflated to allow for increased river flow.

- **A Park Fill/Control Gates System** to be constructed at the mouth of St. Clair River. The proposed structure is composed of two new islands (involving stone revetment, sand fill, topsoil and landscaping) and two flood control gates that will be adjusted, as needed, to reduce river flow and increase upstream water levels. The gates can be opened to allow for increased river flow when water levels are higher than desired. An important ancillary benefit is the creation of a park offering the public many opportunities for water-based recreational activities.

The analysis of these alternatives was complemented by conversations with various interested parties to gain perspectives on the notion of additional structural controls for Georgian Bay and Lake Huron.

Study Outcome:

Based on previous modeling work, evaluation outcomes and "concept level" analyses, it was found that these three structural alternatives (In-stream Turbines, Inflatable Dams, Park Fill and Control Gate System) have potential merit as additional lake level control mechanisms. Their individual benefits are substantial and, if implemented collectively, will be even more pronounced. Singly or in combination, they address the GBF goal for the "long-term climate resilient protection of the water levels of the upper Great Lakes." For example:

Deploying an array of large **In-stream Turbines** (56 in total) in the St. Clair River near the Blue Water Bridge will raise water levels by as much as 9 cm (3.5 inches) under average flow conditions, according to a study by the National Research Council (2001). If the number of turbines totaled 151 in that general location, upstream water levels will increase by 19 cm (7.5 in). Power production is estimated at 1.3 MW for the former and 2.5 MW for the latter. Additionally, an in-stream turbine array upstream of the St. Mary's River Compensation Works would complement the St. Clair River array in terms of both lake level control capability and power generation capacity. This emerging technology has been applied in multiple locations in the United States and overseas. Primary applications to date are for "clean" power generation, but modeling exercises have also demonstrated applicability for water level control purposes.



In-stream Turbine Array
(courtesy Verdant Technologies)



Inflatable Dam - Stag Island, St. Clair River
(aerial courtesy Google Maps)

Installing **Inflatable Dams** at Stag and Fawn Islands in the St. Clair River will raise upstream water levels by an estimated 21 cm (8.3 in). This increasingly popular semi- adjustable technology has been successfully installed in multiple states as well as overseas. Composed of a highly durable membrane and permanent sill, this structure is known to perform well in extreme weather conditions. It features automated control system technology as well as remote monitoring and controls to facilitate inflation/ deflation according to water level variations.

Constructing a **Park Fill and Control Gate System** at the mouth of the St. Clair River would raise upstream water levels by as much as 19 cm (7.5 in). This alternative has additional benefits, as it entails the construction of two islands that also provide upland habitat, fish spawning structure and water-based recreational opportunities. Control gates are readily adjustable based upon water level variations.



Park Fill and Control Gate System- Mouth of St. Clair River (aerial courtesy Google Maps)

Individually and collectively, these structural alternatives have the potential to provide significant relief to pronounced fluctuations in water levels. They are proven technologies readily adaptable to changing conditions: each can be quickly activated or de-activated based upon current and anticipated water levels.

Next Steps:

All three of these structural alternatives have significant strengths: they are proven technologies in freshwater systems, are adaptable to changing climate and water level conditions and, compared to other alternatives investigated, have favourable environmental and socio-economic characteristics.

Although these technologies are promising, they have only been examined at the conceptual level based on existing data and information. Data gaps and information needs must be fully addressed to ascertain, in detail, their potential applicability to the Great Lakes. This includes additional research and modeling to determine, with a degree of precision, factors such as their individual and collective water level control capabilities, desired engineering and design features, installation and operational costs, regulatory considerations, and perspectives of affected parties.

Recommendation:

It is recommended that the International Joint Commission and the two federal governments support detailed design work on these alternatives to better understand their potential to augment existing lake level control plans, procedures and structures.

For Further Information:
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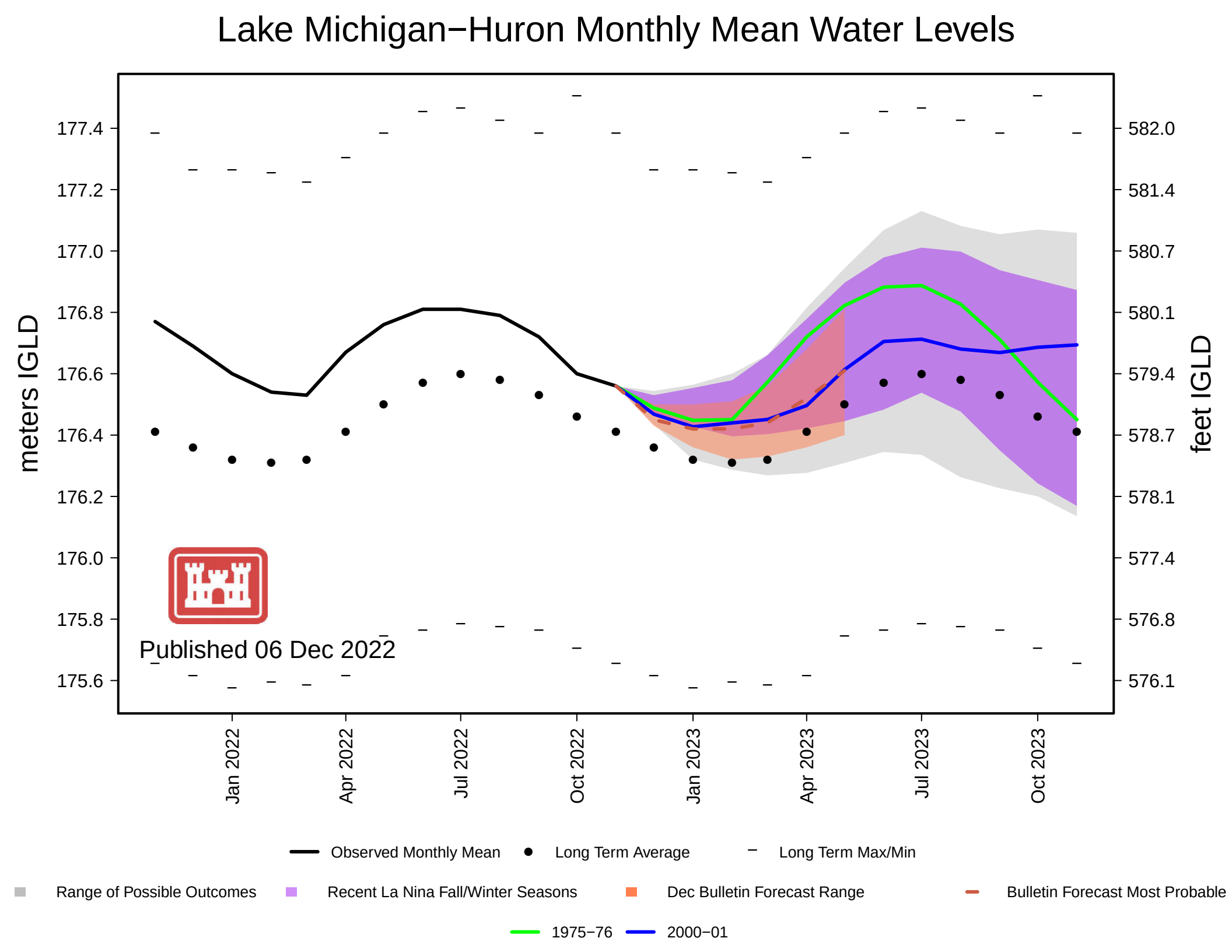
AECOM American Center Building 27777 Franklin Road, Suite 2000 Southfield, MI 48034 www.aecom.com


Lake Michigan−Huron Monthly Mean Water Levels
meters IGLD
feet IGLD
177.4
177.2
177.0
176.8
176.6
176.4
176.2
176.0
175.8
175.6
582.0
581.4
580.7
580.1
579.4
578.7
578.1
577.4
576.8
576.1
Jan 2022
Apr 2022
Jul 2022
Oct 2022
Jan 2023
Apr 2023
Jul 2023
Oct 2023
Published 06 Dec 2022
Observed Monthly Mean
Long Term Average
Long Term Max/Min
Range of Possible Outcomes
Recent La Nina Fall/Winter Seasons
Dec Bulletin Forecast Range
Bulletin Forecast Most Probable
1975−76
2000−01

APPENDIX

E CAPITAL COSTS

TOBERMORY WATER AND WASTEWATER MASTER PLAN
PRELIMINARY WATER SERVICING COST ESTIMATE

ALTERNATIVE DW2 - SERVICE TO EXPANED DOWNTOWN CORE OF TOBERMORY WITH A MUNICIPAL SYSTEM

WATER OPTION 1 - RETROFIT EXISTING LITTLE TUB WATER TERATMENT TO LOW LIFT PUMPING STATION AND NEW CENTRALIZED WATER TREATMENT PLANT WITH WATER STORAGE

Item	Quantity	Unit	Unit Price	Cost Estimated	Notes
Part A - Facilities					
New Water Treatment Plant with Fire Flow Pumps	1	LS	$ 26,935,986.27	$ 26,935,986	Refer to Water Inf. Cost
New Storage Reservoir at the same proposed WTP	1	LS	$ 13,845,000	$ 13,845,000	Refer to Water Inf. Cost
		Sub-Total		$ 40,780,986	
Part B - Watermain					
Distribution System Piping (200mm dia x $2150/m c/w pipes, valves and service connections) - 7 km	1	LS	$ 18,060,000	$ 18,060,000	Incl. rock ex & restoration
Supply and install hydrant including valve and valve box, 150mm lateral and main connection	70	ea	$ 10,800	$ 756,000	
		Sub-Total		$ 18,816,000	
Part C - Intakes	1				
Upgrades to Existing WTP/Raw Water Intake to Low Lift/Booster Pumping Sation	1	LS	$ 5,895,000	$ 5,895,000	Refer to Water Inf. Cost
Water Treatment Plant RAW water intake piping (1.2 km - 250 mm dia. x $1300/m)	1	LS	$ 1,872,000	$ 1,872,000	
		Sub-Total		$ 7,767,000	
		Total Part A, B and C		$ 80,836,784	

WATER OPTION 2 - NEW LOW LIFT PUMPING STATION, WATER INTAKE AND CENTRALIZED WATER TREATMENT PLANT WITH WATER STORAGE

Item	Quantity	Unit	Unit Price	Cost Estimated	Notes
Part A - Facilities					
New Water Treatment Plant with Fire Flow Pumps	1	LS	$ 26,935,986.27	$ 26,935,986	Refer to Water Inf. Cost
New Elevated Tower at a deidcated site	1	LS	$ 13,845,000	$ 13,845,000	Refer to Water Inf. Cost
		Sub-Total		$ 40,780,986	
Part B - Watermain					
Distribution System Piping (200mm dia x $2150/m c/w pipes and valves) - 7 km	1	LS	$ 18,060,000	$ 18,060,000	See note 1
Supply and install hydrant including valve and valve box, 150mm lateral and main connection	70	ea	$ 10,800	$ 756,000	
		Sub-Total		$ 18,816,000	
Part C - Intakes	1				
New Raw Water Intake and Low Lift/Pumping Sation	1	LS	$ 19,040,000	$ 19,040,000	Refer to Water Inf. Cost
Decomissioning of Little Tup WTP and Intake	1	Ls	$ 900,000	$ 900,000	
Water Treatment Plant RAW water intake piping (1.2 km - 250 mm dia. x $1300/m)	1	LS	$ 1,597,488	$ 1,597,488	
		Sub-Total		$ 21,537,488	
		Total Part A, B and C		$ 97,361,369	

Notes:

1. Pipe unit price includes reinstatement of road surface with granular materials.
   - Minimum trench width = Outer Diameter (OD) + 1.5
   - Additional restoration in Dense Urban land use area includes restoration of the road within the trench width
2. Refer to Water Infrastrcuture Costing Sheet for additional costing notes and assumptions
3. Items not included in Infrastructure Costing Sheet include 20% Engineering and Contingency

TOBERMORY WATER AND WASTEWATER MASTER PLAN
PRELIMINARY WATER SERVICING COST ESTIMATE

FACILITY SUMMARY COSTS

ALTERNATIVE DW2 - SERVICE TO EXPANED DOWNTOWN CORE OF TOBERMORY WITH A MUNICIPAL SYSTEM

WATER OPTION 1: RETROFIT THE EXISTING LITTLE TUB WTP INTAKE AND DEVELOP A NEW CENTRALIZED WTP C/W RESERVOIR

Capital Cost Components				Additional Cost Components																	
Title	Capacity	Unit	Capital Cost Estimate	1. Planning & EA Cost as % of the Capital Cost		2. Design Cost as % of the Capital Cost		3. Program Mangement Cost as % of the Capital Cost		4. Contract Administration Cost as % of the Capital Cost		5. Environmental Enhance Cost as % of the Capital Cost		6. Environmental Monitoring Cost as % of the Capital Cost		7. Project Contingency Cost as % of the Capital Cost		8. Land Cost		Total Cost
																		ha	Cost	
New Reservoir/Tower	2552	m^3	$ 10,500,000.00	4%	$420,000.00	5%	$525,000.00	2%	$210,000.00	2%	$210,000.00	1%	$105,000.00	2%	$210,000.00	15%	$1,575,000.00	0.50	$90,000.00	$13,845,000.00
New WTP	2,228	m^3/day	$ 20,424,417.00	4%	$816,976.68	5%	$1,021,220.85	2%	$408,488.34	2%	$408,488.34	1%	$204,244.17	2%	$408,488.34	15%	$3,063,662.55	1.00	$180,000.00	$26,935,986.27
Intake Retrofit	991	m^3/day	$ 4,500,000.00	4%	$180,000.00	5%	$225,000.00	2%	$90,000.00	2%	$90,000.00	1%	$45,000.00	2%	$90,000.00	15%	$675,000.00	0	$0.00	$5,895,000.00
			$35,424,417.00		$1,416,976.68		$1,771,220.85		$708,488.34		$708,488.34		$354,244.17		$708,488.34		$5,313,662.55		$270,000.00	$46,675,986.27

Notes:

1. Facility land requirements approximate based on size of facilities
2. Approximate cost of land = 180,000 $/ha, Approximate reservoir land requirements - Assumed to be located on exsting municipal property
3. Program Management is the estimated cost to administer each infrastructure project.
4. WTP Assumes membrane filtration c/w chlorine contact tanks and reervoir, pumping, online contintios monitoring, chemical feed of soium, standby power, Instrumentation and control and residue management.

WATR OPTION 2: NEW LOW LIFT PUMPING STATION, WATER INTAKE AND CENTRALIZED WATER TREATMENT PLANT WITH WATER STORAGE

Capital Cost Components				Additional Cost Components																	
Title	Capacity	Unit	Capital Cost Estimate	1. Planning & EA Cost as % of the Capital Cost		2. Design Cost as % of the Capital Cost		3. Program Mangement Cost as % of the Capital Cost		4. Contract Administration Cost as % of the Capital Cost		5. Environmental Enhance Cost as % of the Capital Cost		6. Environmental Monitoring Cost as % of the Capital Cost		7. Project Contingency Cost as % of the Capital Cost		8. Land Cost		Total Cost
																		ha	Cost	
New Reservoir/Tower	2552	m^3	$ 10,500,000.00	4%	$420,000.00	5%	$525,000.00	2%	$210,000.00	2%	$210,000.00	1%	$105,000.00	2%	$210,000.00	15%	$1,575,000.00	0.50	$90,000.00	$13,845,000.00
New WTP	2228	m^3/day	$ 20,424,417.00	4%	$816,976.68	5%	$1,021,220.85	2%	$408,488.34	2%	$408,488.34	1%	$204,244.17	2%	$408,488.34	15%	$3,063,662.55	1.00	$180,000.00	$26,935,986.27
New Intake Low Lift	991	m^3/day	$ 14,500,000.00	4%	$580,000.00	5%	$725,000.00	2%	$290,000.00	2%	$290,000.00	1%	$145,000.00	2%	$290,000.00	15%	$2,175,000.00	0.25	$45,000.00	$19,040,000.00
			$45,424,417.00		$1,816,976.68		$2,271,220.85		$908,488.34		$908,488.34		$454,244.17		$908,488.34		$6,813,662.55		$315,000.00	$59,820,986.27

Notes:

1. Facility land requirements approximate based on size of facilities
2. Approximate cost of land = 180,000 $/ha, Approximate reservoir land requirements - Assumed to be located on exsting municipal property
3. Program Management is the estimated cost to administer each infrastructure project.
4. WTP Assumes membrane filtration c/w chlorine contact tanks and reervoir, pumping, online continuous monitoring, chemical feed of sodium, standby power, Instrumentation and control and residue management.

TOBERMORY WATER AND WASTEWATER MASTER PLAN
WASTEWATER SERVICING ALTERNATIVES COST SUMMARY

ALTERNATIVE DW2 - SERVICE TO EXPANED DOWNTOWN CORE OF TOBERMORY WITH A MUNICIPAL SYSTEM

OPTION 1- EXPANDED WWTP

Item	Quantity	Unit	Unit Price	Cost Estimated	Notes
Part A - Facilties					
WWTP Expansion	1	ls	$ 19,740,000	$ 19,740,000	Refer to note 1
Updaged Sewage Pumping Sation	1	ls	$ 1,625,000	$ 1,625,000	
		Sub Total		$ 21,365,000	
Part B - Gravity Sewers					
Supply and install sanitary sewer pipe (250-370 mm dia. CONC. + services	4,000	m	$ 4,356	$ 17,424,000	Refer to note 1
1200 mm dia. Per OPSD 701.010	60	ea	$ 10,800	$ 648,000	
		Sub Total		$ 18,072,000	
Part C - Forcemains					
Supply and install sanitary forcemain pipe (250 mm dia. HDPE)	3,000	m	$ 1,392	$ 4,176,000	
		Sub Total		$ 4,176,000	
		Total Part A, B and C		$ 30,649,200	

OPTION 2 - NEW WWTP

Item	Quantity	Unit	Unit Price	Cost Estimated	Notes
Part A - Facilties					
New WWTP & Decomissioning of Existing	1	ls	$ 33,110,000	$ 33,110,000	Refer to note 1
Updaged Sewage Pumping Sation	1	ls	$ 1,625,000	$ 1,625,000	
		Sub Total		$ 34,735,000	
Part B - Gravity Sewers					
Supply and install sanitary sewer pipe (250-370 mm dia. CONC.)	4,000	m	$ 4,356	$ 17,424,000	Refer to note 1
1200 mm dia. Per OPSD 701.010	60	ea	$ 10,800	$ 648,000	
		Sub Total		$ 18,072,000	
Part C - Forcemains					
Supply and install sanitary forcemain pipe (250 mm dia. HDPE)	3,000	m	$ 1,392	$ 4,176,000	
		Sub Total		$ 4,176,000	
		Total Part A, B and C		$ 46,693,200	

Note

1. Pipe unit price includes reinstatement of road surface with granular materials.
   - Minimum trench width = Outer Diameter (OD) pipe + 1.5 m
   - Additional restoration in Dense Urban land use area includes restoration of the road within the trench width
   - Rock Excavation
2. Refer to wastewater Infrastructure Costing Sheet for additional costing notes and assumptions
3. Items not included in Infrastructure Costing Sheet include 20% Engineering and Contingency

TOBERMORY WATER AND WASTEWATER MASTER PLAN
PRELIMINARY WASTEWATER FACILTIES COST

Capital Cost Components						Additional Cost Components																	
Title	Description	Rated Capacity l/s	Existing Capacity l/s	Expansion Capacity l/s	Capital Cost Estimate	1 Planning & EA Cost as % of the Capital Cost		2 Design Cost as % of the Capital Cost		3 Program Mgmt Cost as % of the Capital Cost		4 Contract Admin Cost as % of the Capital Cost		5 Environ Enhance Cost as % of the Capital Cost		6 Environ Monitor Cost as % of the Capital Cost		7 Project Contingency Cost as % of the Capital Cost		8 Land Cost		Total Cost
																				ha	Cost	
Upgraded SPS	2 pumps x 25 L/s	25	17	25	$1,250,000.00	4%	$50,000.00	5%	$62,500.00	2%	$25,000.00	2%	$25,000.00	0%	$0.00	2%	$25,000.00	15%	$187,500.00	0	$0.00	$1,625,000.00
Expanded WWTP	2,191 m^3/day peak capaicty	50	0	50	$15,000,000.00	4%	$600,000.00	5%	$750,000.00	2%	$300,000.00	2%	$300,000.00	1%	$150,000.00	2%	$300,000.00	15%	$2,250,000.00	0.5	$90,000.00	$19,740,000.00
New WWTTP	2,191 m^3/day peak capaicty	50	0	85	$25,000,000.00	4%	$1,000,000.00	5%	$1,250,000.00	2%	$500,000.00	2%	$500,000.00	1%	$250,000.00	2%	$500,000.00	15%	$3,750,000.00	2	$360,000.00	$33,110,000.00

Notes
1. SPS land requirements approximately = 0.5 Ha --> currenly assumed to resuse exsting SPS site
2. Cost of land approximately = 180,000 $/ha
3. Program Management is the cost to administer each infrastructure project