

Policy & Strategy Committee Meeting AGENDA

Tuesday, November 17, 2020 – 9:00 a.m.

- 1. CALL TO ORDER**
- 2. NOMINATION & ELECTION BY BALLOT – VICE-CHAIR**
[MDL-02 – Committee Policy, Section 3.5]
- 3. ANNOUNCEMENTS, ACKNOWLEDGEMENTS, RECOGNITION**
- 4. APPROVAL OF AGENDA**
- 5. APPROVAL OF MINUTES of September 15, 2020 (as circulated)**
- 6. BUSINESS ARISING FROM MINUTES**
- 7. PRESENTATIONS - NIL**
- 8. REFERRAL FROM COUNCIL - NIL**
- 9. STAFF REPORTS**
 - 9.1. Planning Department**
 - 9.1.1 Petite Riviere Watershed Flood Mitigation Study 1-56
Melissa Rutherford, CBCL
 - 9.1.2 Sustainability Committee Terms of Reference 57-64
 - 9.2 Recreation Department**
 - 9.2.1 Update on Nova Scotia Active Smarter Kids’ Project 65-69
 - 9.3 Finance Department**
 - 9.3.1 MODL Policy 089 – Video Surveillance 70-84
- 10. MAYOR’S/DEPUTY MAYOR’S/COUNCILLORS’ MATTERS - NIL**
- 11. ADDED ITEMS**
- 12. IN CAMERA - NIL**
- 13. NEXT MEETING – December 15, 2020 – 9:00 a.m.**
- 14. ADJOURNMENT**

Petite Rivière Watershed


Flood Mitigation Study

Final Report



Prepared for



Final Report	Alexander Wilson	11/10/2020	Ying Zhang
Draft Report	Alexander Wilson	05/15/2020	Ying Zhang
<i>Issue or Revision</i>	<i>Reviewed By:</i>	<i>Date</i>	<i>Issued By:</i>
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Project Number: 191106.01



November 10, 2020

Jeff A. Merrill, MCIP, LPP
Director
Planning & Development Services
Municipality of the District of Lunenburg
210 Aberdeen Road | Bridgewater, NS B4V 4G8
Office: (902) 541-1340 | Cell: (902) 521-0925

Dear Mr. Merrill:

RE: Petite Rivière Watershed Flood Mitigation Study – DRAFT Report

CBCL Limited is pleased to present our draft report for Petite Rivière Watershed Flood Mitigation Study for the Municipality of the District of Lunenburg. This summary report describes the findings of the preliminary assessment of potential flood mitigation options.

We would like to thank you for the opportunity to work on this extremely interesting project.

Should you have any questions regarding the content of this report, please do not hesitate to contact me.

Yours very truly,

CBCL Limited

Melissa Rutherford. B.Sc., R.P.Bio, P.Biol.
Environmental Scientist
Direct: 902-421-7241, Ext.2574
Email: mrutherford@cbcl.ca

Project No: 191106.01

Suite 901
1505 Barrington Street
PO BOX 606
Halifax, Nova Scotia
B3J 2R7

T: 902 421 7241
F: 902 423 3938
info@cbcl.ca
www.cbcl.ca



Executive Summary

A need to conduct a flood risk assessment and mitigation study project for the Petite Rivière Watershed was identified by the Municipality of the District of Lunenburg (MODL), in order to understand the current flooding risks within the watershed area (notably the Fancy Lake area), the potential future risks, and the potential impacts of the flooding risks within the study region. This project is divided into two parts, which are the flood risk assessment (Phase 1) and the flood mitigation planning (Phase 2). This report presents the assessment and preliminary evaluation in Phase 2 for potential mitigation options using the Phase 1 calibrated model.

High-risk regions are identified based on the flood line determined in Phase 1, consultation with MODL, and information collected in the Public and Stakeholder meetings. Assessments and evaluations were conducted for potential mitigation options, including land use planning options and development controls, flow control measures, increase of conveyance capacity, flood protection measures, relocation and/or raising of vulnerable structures at risk, as well as accepting risks and building resilience. The top 5 preferred mitigation options were selected based on feasibility, consultation with MODL, changes in the water levels of Fancy Lake, determined through a ranking system proposed by CBCL, which considers the combination of the effectiveness in reducing flood risks around Fancy Lake, project costs, operational costs, management requirements, environmental considerations and regulatory requirements, economic impacts, and social acceptance.

The flood line and impacted areas are re-assessed for the top 5 preferred mitigation options (if necessary). Concept options presentation is provided in the form of diagrams and model results in tables and figures in this report. The ranking of potential options is provided in a summary table. The opinion of probable construction costs is also provided for potential flood mitigation options in Appendix A.

Overall, this study investigates potential flood mitigation measures and provides the top 5 preferred options, supported by re-assessed flood lines and vulnerabilities. The high-level assessment and evaluation of flood mitigation options presented in this summary report can be used to support the future floodplain and flood mitigation planning within the Petite Rivière Watershed.

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- A Ranking System
- B Flood Maps
- C Return on Investment (ROI) Calculations

1 Introduction

The Petite Rivière Watershed is located south and southwest of the Town of Bridgewater and the total area is approximately 244 km². The Petite Rivière runs through various rural communities and is approximately 40 km in length; the headwaters of the river are found at Birch Brook and descend 120 m in elevation to the river's mouth, located in Green Bay. One of the most populated areas within the watershed is around Fancy Lake, with approximately 320 residential dwellings and 700 residents.

1.1 Purpose of the Study

The Municipality of the District of Lunenburg (MODL) is undertaking a flood risk management strategy, which is being implemented through the development of planning policies and emergency management measures supported by flood mapping, and subsequently by flood mitigation measures. As part of this effort, MODL has awarded a project to CBCL Limited (CBCL) to complete the Petite Rivière Watershed Flood Risk Assessment and Mitigation Study. The purpose of this study is to understand current flooding risks within the Petite Rivière Watershed (with particular focus on the Fancy Lake area), the potential future risks, as well as the potential impacts of the flooding risks in the Petite Rivière Watershed area.

The project is divided into two phases, which are the Phase 1 Flood Risk Assessment and the Phase 2 Flood Mitigation Planning. The hydrologic and hydraulic model set up in Phase 1 is used in Phase 2 to assess various flood mitigation options. This report summarizes the findings during the investigation of potential flood mitigation options and provides the recommendation of preferred options. Estimated impacts on the flood lines and resulting vulnerabilities are presented in the form of figures and tables. Probable Project costs are also provided for potential flood mitigation options in Appendix A.

1.2 Study Approach

The study approach presented in this report is as follows:

1) Assessment of Potential Mitigation Options

Regions at high risk of flooding are identified based on the consultation with MODL, information collected in the Public and Stakeholder meetings, and the flood line determined in Phase 1. Flood mitigation options are accordingly proposed and investigated using the Phase 1 calibrated model.

Option 1:	Land use planning options and development controls: This will include an outline of recommended land use policy practices, including the requirements from the Statement of Provincial Interest.
Option 2:	Flow control measures: This will include modelling of control structures in order to evaluate upstream and downstream impacts to water levels.
Option 3:	Increase of conveyance capacity through channel geometry changes: This will consist of upgrading the capacity of the river channel, as requested by the stakeholders, and evaluating upstream and downstream impacts to water levels.
Option 4:	Flood protection measures, consisting of the use of berms: This will consist of evaluating the potential extents of flood protection structures, and evaluating the feasibility in terms of flood protection, high level costs and land requirements.
Option 5:	Relocation and or/raising of vulnerable structures at risk: This will be estimated by identifying the structures at risk, as well as the services and land uses that are within the flood extents, estimating their value based on the published land values, and applying a standard cost of relocating or raising the structures. This will include using the model to check the impact of raising land in the areas of vulnerability.
Option 6:	Accepting risks and building resilience: This option includes identifying examples of resilient design.

2) Preliminary Evaluation

The top 5 preferred mitigation options were selected based on the consultation with MODL, changes in the water levels of Fancy Lake, as well as feasibility, determined through a ranking system based on the combination of the following criteria and project risks.

To identify areas of priority, CBCL proposes a ranking system that assigns a level of priority (high, medium and low) to each one of the categories listed below. High-level commentary is provided in the form of a mitigation option task table with high-level summary information presented for each Option, alongside the items listed below, utilizing results obtained from the assessment phase.

- **Effectiveness in Reducing Flood Risks around Fancy Lake:** This includes the analysis of changes in the average water levels and water depths in Fancy Lake, flood extents around Fancy Lake, and the number of houses and buildings in the floodplain.
- **Project Costs:** This includes conceptual-level costs based on the information obtained above.
- **Operational Costs:** Where applicable, these are high level estimates based on experience.
- **Management Requirements (if relevant):** This consists of a high level outline of potential educational/informational sessions and periodic regulatory requirements, including any specific staff training requirements, or annual inspection requirements. It does not include legal costs associated with land acquisition or other, or insurance requirements and costs.
- **Environmental Considerations and Regulatory Requirements, including any down-river impacts:** This consists of determining the approximate project footprint and desktop assessment of habitats types, i.e., watercourse, and wetlands, which may be impacted by each option and over-viewing potential regulatory requirements of the top 5 preferred options, including scheduling constraints.

- **Economic Impacts:** This consists of determining the project footprint and evaluating impacts based on land uses and impacted properties. This assessment does not include assessment of secondary losses as a result of communication loss, loss of access to various services, or traffic flow impacts on the regional economy.
- **Social Acceptance:** This was determined from the feedback from the public engagement completed in Phase 1 of the scope of work.

Where necessary, flood lines and resulting vulnerabilities within the watershed were re-assessed using the Phase 1 calibrated model, presenting the mitigation effects of the selected mitigation options. Concept option presentations are presented in the form of diagrams and model results in tables and graphs. Ranking of the assessed mitigation options is presented in a summary table. Probable Project costs are provided for potential flood mitigation options.

2 Mitigation Options Assessment

2.1 Identification of Regions at Risk

Based on the following information, CBCL identified regions with high risk of flooding within the Petite Rivière Watershed, which aids in the selection of potential flood mitigation options.

- The flood line determined in Phase 1 for 1-100 year rainfall event accounting for climate change.
- Consultation with MODL.
- Collected feedback in the Public and Stakeholder Meetings in Phase 1.

As shown in Figure 1 and Figure 2, key interests within the Petite Rivière Watershed is the downstream side of Hebb Lake Dam, Fancy Lake area, and the downstream side of Fancy Lake. Those high-risk flood-prone areas are prioritized for this flood mitigation assessment due to the significant number of infrastructures and buildings that are expected to be impacted by flooding.

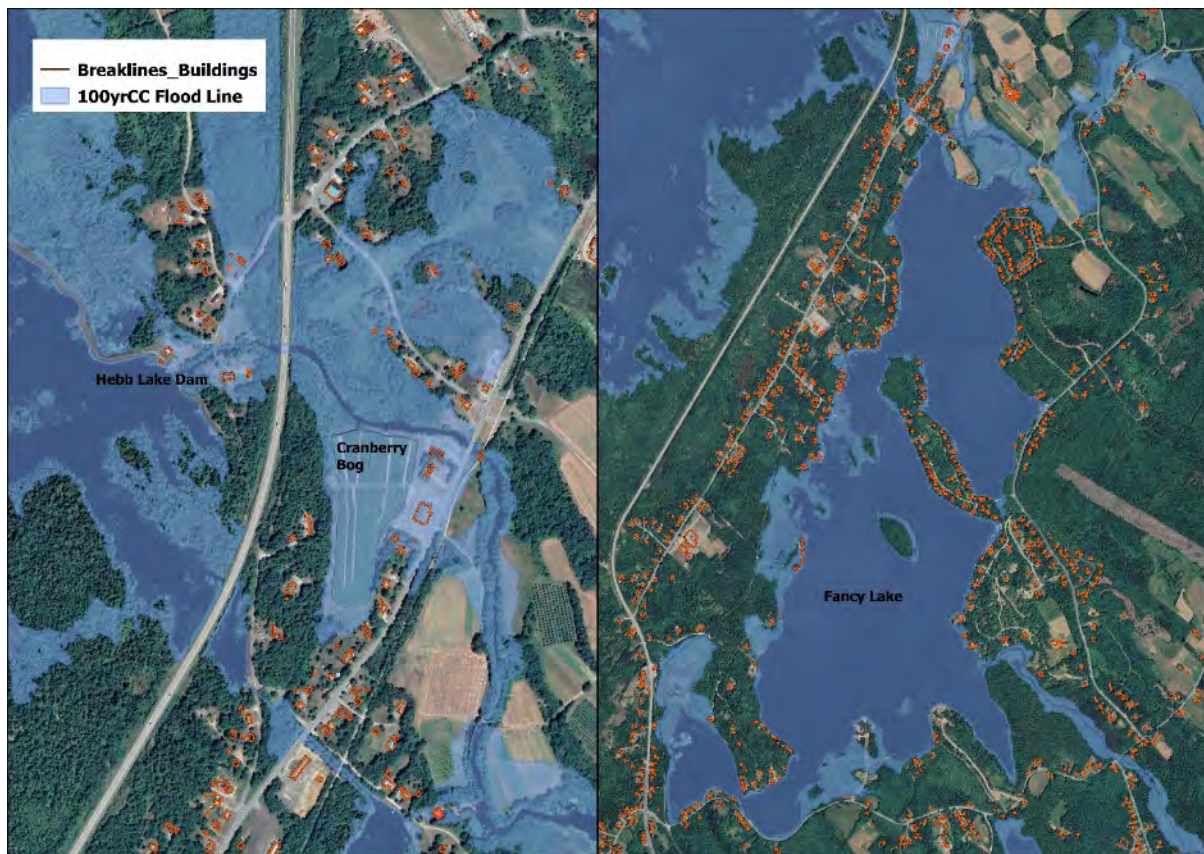


Figure 1: 100yr CC Flood Line Downstream of Hebb Lake Dam (Left) and around Fancy Lake (Right).

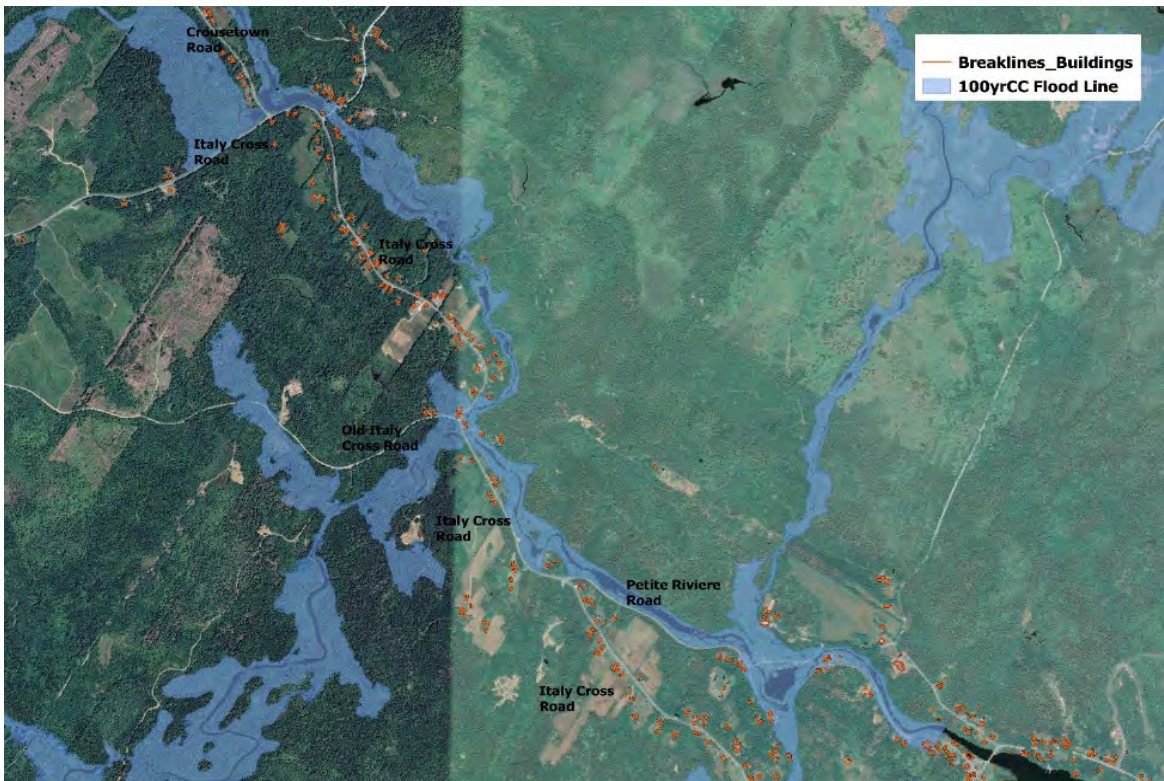


Figure 2: 100yr CC Flood Line Downstream of Fancy Lake and near the Outlet of Petite Rivière.

2.2 Potential Flood Mitigation Options

Potential flood mitigation options are proposed and assessed as follows.

2.2.1 Land Use Planning

Land use planning is a useful measure to manage floods in all stages of the flood risk management cycle, including minimizing development in flood-prone zones, reducing water runoff through development controls, designating routes and open spaces for better emergency response and recovery efforts, and enabling urban growth in flood-safe areas (Kryspin-Watson et al., 2017). Based on the consultation with MODL, this is a feasible option and would be considered in the preliminary evaluation.

2.2.2 Flow Control Measure

Flow restrictions were found in the outlet of Fancy Lake, leading to increased risks of flooding around the lake and high water levels at the outlet. A flow control structure such as an operated flow control gate can be set up at the outlet of Fancy Lake, which enables lake water to drain before the forecasted flood event and can remain open during the flood event. This can be achieved by the implementation of a forecasting and early warning system in conjunction with this option. The flow control structure remains closed in normal conditions and helps hold up water levels. Therefore, the flow control structure could not only mitigate potential flood risks but also address public concerns that the lake level is too low during the summer. The construction of flow control structures would require a significant amount of channel dredging at the outlet. Based on the consultation with MODL and modelling results, this is a valuable option and would be considered in the preliminary evaluation.

2.2.3 Increase of Conveyance Capacity

The channel at the outlet of Fancy Lake has been narrowed down by around 3m in the last few years due to the accumulation of rocks and brush, according to the consultation with MODL and the information collected in the Public and Stakeholder Meetings. Therefore, as an alternative to the option of setting up a flow control structure, widening the river channel at the outlet can be another valuable option. The widening of the channel increases the conveyance capacity and decreases the water levels in Fancy Lake during the flood event, accordingly decreasing flood risks around the lake. Based on the consultation with MODL and modelling results, this is a feasible option and would be considered in the preliminary evaluation.

There are two dams downstream of Fancy Lake, which are Conquerall Mills Dam (decommissioned dam) and Crousetown Dam. Flow restrictions were found at the dams, but preliminary results (Figure 3) indicate that removing them has very limited impacts on flood extents and flow velocity. Therefore, removing dams was not considered in the preliminary evaluation.



Figure 3: 100yr CC Flood Line for Conquerall Mills Dam Area and Crousetown Dam Area.

2.2.4 Flood Protection Measures

The use of berms can be useful in protecting the flood-prone areas from flooding. Potential locations for the berms can be just downstream of Hebb Lake dam and around Fancy Lake. However, for Fancy Lake, there are scattered homes and buildings all around the lake. Berms built at sections along the lake would cause water accumulation and increase flood risks in other sections along the lake. It is also not

feasible to build a berm all around Fancy Lake. Therefore, constructing berms in the Fancy Lake area is not considered.

Downstream of Hebb Lake dam, flooding is expected in the Cranberry Bog and surrounding area as shown in Figure 4. Modelling results indicate that the berm has limited impacts on hydraulics, therefore not increasing flooding risks upstream. Flood extents downstream would not be affected by the berm either. However, in order to protect flood-prone areas from flooding, the berm should be at least 2m in height and around 400m in length, which is not desirable based on the consultation with MODL.



Figure 4: Potential Location of the Berm and the Resulting 100yrCC Flood Line.

2.2.5 Relocation and/or Raising of Vulnerable Structures

Based on the consultation with MODL, the relocation and/or raising of vulnerable buildings and properties is not desirable and therefore, not considered. However, raising bridges that are holding water back and roads that are severely flooded is included in this assessment.

Severe flooding is expected around Fancy Lake, at the intersection of Petite Riviere Road, Tannery Road, and Wentzell Road, as well as at bridges LUN050, LUN456, LUN088, LUN089, and LUN352. During flood events, local residents may not get access to emergency services due to the flooded roads and bridges, particularly for those living in the Peninsula of Fancy Lake, as shown in Figure 1. Therefore, raising bridges and roads to provide emergency access is considered in the preliminary evaluation.

2.2.6 Accepting Risk and Building Resilience

This option would include implementing a flood forecasting and early warning system, EMO emergency plans, as well as flood preparation and recovery. This is a vital measure to flood risk management and would be considered in the preliminary evaluation.

3 Preliminary Evaluation

3.1 Evaluation of Potential Flood Mitigation Options

Based on the assessment in Section 2, both non-structural measures (i.e., land use planning & accepting risks and building resilience) and structural measures (i.e., flow control measures and channel widening at the outlet of Fancy Lake & elevated roads and elevated bridges) are evaluated in this section. The evaluation criteria and associated ranking structure is provided in Appendix A. The ranking criteria for effectiveness in reducing flood risks around Fancy Lake is provided separately from the other evaluation criteria.

3.1.1 Non-structural Measures

3.1.1.1 LAND USE PLANNING

Integrating flood risk management into land use planning is a key measure to minimize exposure to flooding and to reduce the potential impacts of flooding, especially in less urbanized areas. The understanding of potential flood risks gained in Phase 1 provides planners and decision makers with a land use framework for the Petite Rivière Watershed. With appropriate land use planning, the type and spatial locations of urban development would be regulated, maximizing the benefits from economic and recreational activities, while minimising risks of loss of life and property damage. In general, land use planning includes (Jha et al., 2012):

- Review of land availability and identification of area(s)/location(s) for specific land uses.
- Determining what flooding risks are associated with these area(s)/location(s).
- Determining and identifying sensitive or important societal or environmental features.
- Detailing minimum requirements/expectations of different land use types.

This option is evaluated in the following perspective:

Table 1: Evaluation for Land Use Planning

Evaluation Criteria	Ranking	Descriptions
Effectiveness in Reducing Flood Risks around Fancy Lake	Low	Existing houses and buildings around Fancy Lake are vulnerable to flooding.
Project Costs	Low	
Operational Costs	Low	

Evaluation Criteria	Ranking	Descriptions
Management Requirements	Low	Practical land use plans require relevant and responsible agencies/departments/institutions to establish and implement.
Environmental Considerations and Regulatory Requirements	Low	Potential impacts to environment need to be considered when establishing the land use plans.
Economic Impacts	Medium	Current and future economic activities and urban development are expected to be regulated based on land use plans.
Social Acceptance	Medium	It can be challenging to consider numerous conflicting objectives and establish land use plans that require cross-institutional working and community engagement.

3.1.1.2 ACCEPTING RISKS AND BUILDING RESILIENCE

Accepting risk and building resilience, as proposed in this study, includes EMO emergency planning, implementing a flood forecasting and early warning system, as well as preparing for flooding and recovery.

The Emergency Management Office (EMO) is responsible for emergency planning and coordinating emergency responses. The office works with municipal authorities to help plan for emergencies, coordinate provincial resources when there is an emergency and help with analysis and evaluation after an emergency. High-risk flood zones and potential impacts can be identified based on the flood risk assessment in Phase 1. Existing institutions and organizations that can help with facilitating emergency response, minimizing flooding impacts, and allocating resources within the Petite Rivière Watershed should be identified and be notified of their roles and responsibilities prior to the flood events. Areas should be evacuated when buildings and houses can potentially be washed away or severely damaged.

A forecasting and early warning system is implemented to give advance notice of an impending flood, allowing the emergency plans and evacuation plans to be put into action. CBCL has been developing a flood warning system that can translate real-time forecasted rainfall into flood hazards using modelling systems, identifying potential flood zones and providing guidance for local decision makers. If necessary, warning messages can be given to local departments, selected institutions and organizations, as well as local citizens. In this case, if a flow control measure is implemented at the outlet of Fancy Lake, its operations can be coordinated with the warning system.

Community engagement in flood preparedness and mitigation is crucial to the success of many measures, such as flood warning, emergency response, and evacuation, because they depend considerably on the involvement of local communities (Jha et al., 2012). The public and stakeholder engagement in this project is therefore valuable to local flood risk management and future planning.

There are steps that can be taken after a flood event for recovery by both local government and individuals, including draining floodwaters from affected areas, clearing flood-generated waste, restoring flood damaged buildings, as well as post-disaster reconstruction and resettlement.

This option is evaluated in the following perspective:

Table 2: Evaluation for Accepting Risks and Building Resilience

Evaluation Criteria	Ranking	Descriptions
Effectiveness in Reducing Flood Risks around Fancy Lake	Medium	Existing houses and buildings around Fancy Lake are vulnerable to flooding, but loss of life can be avoided if emergency plans, flood warning system, and evacuation plans are appropriately implemented.
Project Costs	Medium	Practical emergency plans and evacuation plans require the cooperation of multiple institutions. The implement of a flood forecasting and early warning system for the watershed requires analysis and modelling efforts.
Operational Costs	Medium	The implementation of emergency plans and evacuation plans during emergency events needs the involvement of local government, Emergency Management Office, institutions and organizations, as well as communities and individuals. The operation of flood warning system requires daily monitoring and educational sessions such as staff training.
Management Requirements	Medium	
Environmental Considerations and Regulatory Requirements	Low	Limited impacts to the environment.
Economic Impacts	Low	Limited impacts to current and future economic activities.
Social Acceptance	Low	Emergency plans and evacuation plans can be acceptable and implemented effectively if community engagement is involved in flood preparedness while relevant institutions and organizations are educated prior to the emergency.

3.1.2 Structural Measures

3.1.2.1 FLOW CONTROL MEASURE: OPERATED FLOW CONTROL GATE

PROPOSED MEASURE

Coordinated with the flood forecasting and early warning system, an operated flow control gate at the outlet of Fancy Lake can serve the purpose of mitigating risks in flood events while holding up water levels in normal conditions.

Several days ahead of the forecasted flood event, the operated flow control gate would open, allowing the water in Fancy Lake to drain downstream and accordingly decrease the lake levels. The flow control gate would remain open during the flood event. The operated flow control gate would remain closed in

normal conditions and help hold up water levels, which can meet Public and Stakeholder requests to maintain water levels in Fancy Lake during the summer.

To set up the operated flow control gate and allow the water to drain, it was proposed to dredge the original channel at the outlet by at least 2m of depth, which allows the lake levels to decrease to a level that can mitigate the flood impacts in a timely manner. The operated flow control gate should be opened 2 days ahead of the event to allow the lake to drain.

The adjusted channel length is around 700m as shown in Figure 5. Further in-depth evaluation is recommended for the design of the dredging when additional river bathymetry is available.



Figure 5: Propose Flow Gate Location and Estimated Channel that Needs Dredging.

MODELLING RESULTS

Preliminary results indicate that the following mitigation effects can be achieved by the operation of the flow control gate. Re-assessed flood lines are presented in Appendix B.

Dredge Channel by 2m of Depth

- Decrease in peak water levels in Fancy Lake and decrease in flood extents around the lake: The average change in the maximum water depth in Fancy Lake is -13%, and is -1.3% in the maximum water surface elevation. The flood extent around Fancy Lake (Figure 6) decreases by approximately 14%, leading to much lower flooding risks in the area.
- Decrease of directly impacted houses and buildings: 24 of them are no longer in the floodplain.
- A slight decrease in flood extents just downstream of Fancy Lake (i.e., from the outlet of Fancy Lake to the outlet of Petite Rivière): Two sites are shown in Figure 7 as examples.

- A slight decrease of flow velocity downstream of Fancy Lake (i.e., from the outlet of Fancy Lake to the outlet of Petite Rivière): For example, the peak velocity at Crousetown Bridge decreases from 3.96 m/s to 3.542 m/s. The peak velocity near the Petite Rivière elementary school decreases from 4.35 m/s to 4.286 m/s.

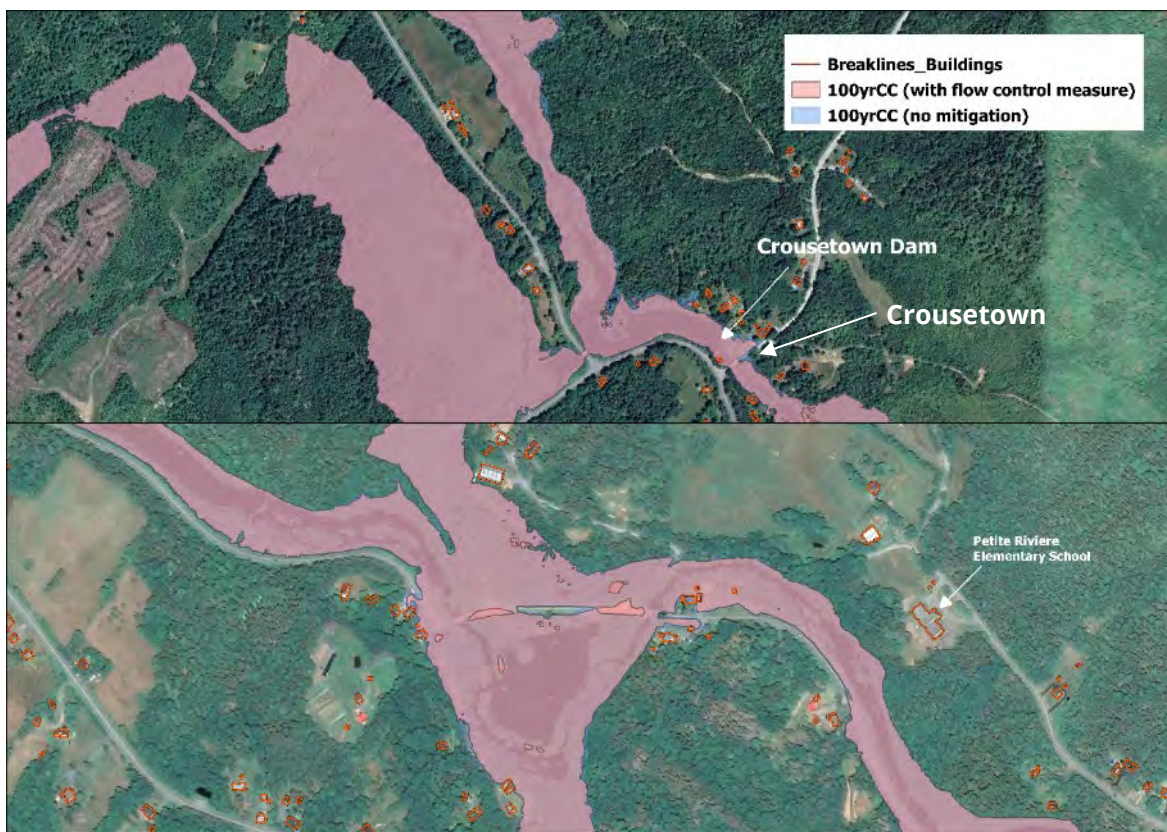


Figure 6: 100yr CC Flood Line Downstream of Fancy Lake.

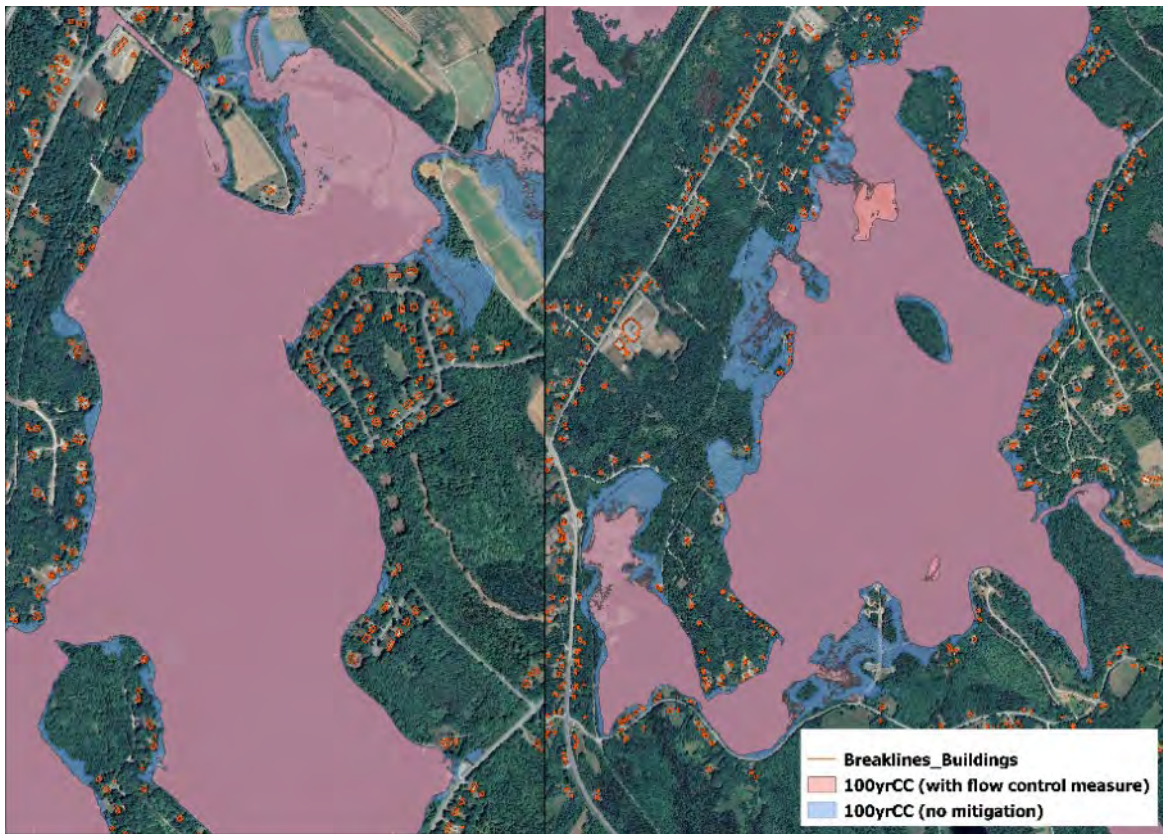


Figure 7: 100yr CC Flood Line around Fancy Lake.

EVALUATION

Table 3: Evaluation for the Operated Flow Control Gate

Evaluation Criteria	Ranking	Descriptions
Effectiveness in Reducing Flood Risks around Fancy Lake	High	Significant decrease in peak water levels of Fancy Lake, less directly impacted buildings and houses, and the slight decrease in flood extents and flow velocity downstream of Fancy Lake.
Project Costs	High	It requires the dredging of river channel at the outlet for approximately 700 meters, detailed design of the flow gate, and the implementation of a flood warning system. Using an average Canadian homeowner damage rate for flooding of \$45,000 (from the Insurance Bureau of Canada) and a response cost of \$25,000; the Return on Investment (ROI) calculation does not support the project (-40%). Assessing the project in 25-year cycles could improve the ROI, if dredging was not a routine maintenance requirement. From a cost perspective, this

Evaluation Criteria	Ranking	Descriptions
		structural project would not yield a strong ROI. (Appendix C) ¹
Operational Costs	High	The flow gate needs to remain closed during normal conditions and needs to be open prior to forecasted events.
Management Requirements	High	Regulatory requirements are required, including staff training sessions and periodic inspection requirements.
Environmental Considerations and Regulatory Requirements	High	The implementation of the operated flow control gate at the outlet can potentially affect the fish passage and water quality both in Fancy Lake and downstream of Fancy Lake. Additional environmental studies will be required as part of further design. Regulatory approvals are anticipated to be required (DFO, NSE, TC, NSLF).
Economic Impacts	Low	The net benefits from economic and recreational activities can potentially increase since the water levels in Fancy Lake during the summer can be maintained at the higher level with the use of the flow control gate, and in addition, there can be less cost for emergency response and reconstruction since 24 buildings and houses are no longer in the floodplain.
Social Acceptance	Medium	The needs from the public for higher water levels in Fancy Lake while reducing the flood risks can be fulfilled, but the operation and maintenance requirements can be more expensive. Engagement with the Mi'kmaq of Nova Scotia should be considered during the design and environmental investigations. Engagement with Mi'kmaq of Nova Scotia will be required as part of the regulatory application process and should be considered in development of off-setting plan for applications.

Note: ROI calculations are presented based on order of magnitude options of probable cost calculations for the purpose of comparing structural options at a conceptual or schematic level. The ROI is expected to change as designs are developed.

3.1.2.2 INCREASE OF CONVEYANCE CAPACITY: WIDENING CHANNEL

PROPOSED MEASURE

To mitigate flood risks around Fancy Lake, in addition to setting up the operated flow control gate, one potential mitigation option is to widen the channel at the outlet. Preliminary results indicate that the

¹ Return on investment (ROI) calculations are adapted from Public Safety Canada's NDMP program methodology.

widening can lead to an increase of conveyance capacity, which serves the purpose of flood mitigation, but the widening should be sufficient in order to notably decrease flood risks around Fancy Lake.

The proposed mitigation option is to extend the river banks by approximately 5m while preserving the existing side slope. The adjusted river channel starts from the outlet and is around 160m in length. The approximate location of river banks after the proposed geometry changes is as shown in Figure 8. Profiles of the existing channel and widened channel are as shown in Figure 9. A further in-depth evaluation is recommended for the design of the extension when additional river bathymetry is available.



Figure 8: Approximate Location of River Banks after the Channel Widening.

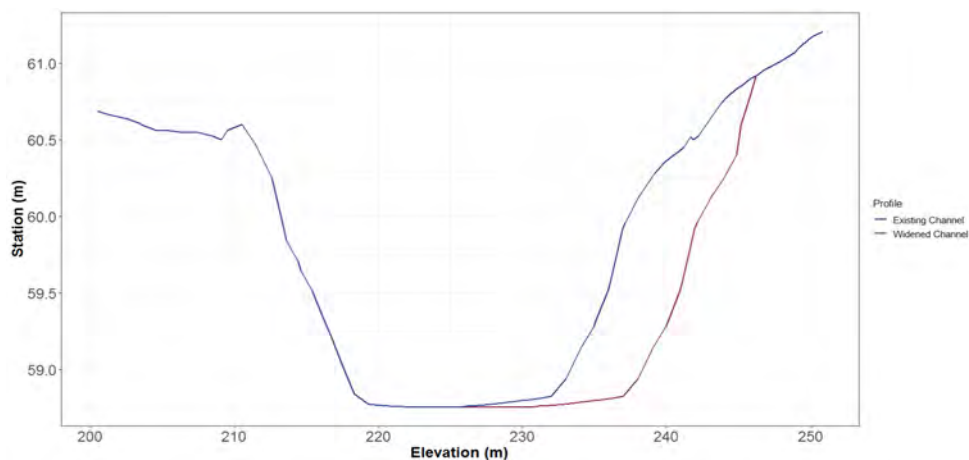


Figure 9: Profiles of Existing Channel and Widened Channel.

MODELLING RESULTS

By applying the proposed channel widening, preliminary results indicate that the average change in the maximum water depth in Fancy Lake is -13%, and is -1% in the maximum water surface elevation. Flood extents around Fancy Lake (Figure 10) would decrease by 11%. Infrastructures and buildings are at lower risk of flooding, especially for 24 buildings and houses that are no longer in the floodplain. Re-assessed flood lines are presented in Appendix B.

Velocities downstream of Fancy Lake increase due to the increased conveyance capacity of the widened channel. For example, the peak velocity at Crousetown Bridge increases from 3.96 m/s to 4.279 m/s. Although the channel widening would also increase flood depths downstream of Fancy Lake, the resulting increase in flood extents is minimal and acceptable, considering that no existing buildings are expected to be severely impacted. Two sites downstream are presented in Figure 11 as examples.

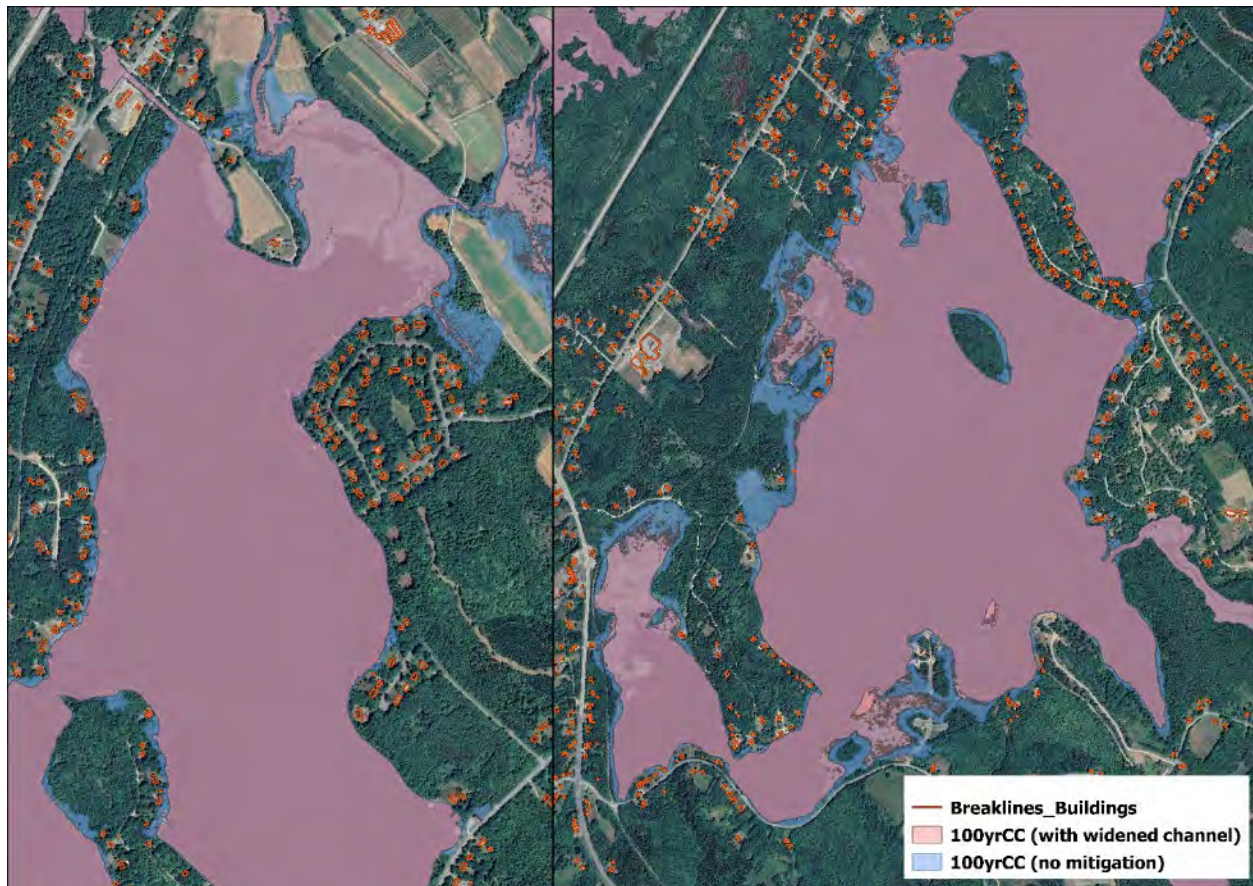


Figure 10: 100yr CC Flood Line around Fancy Lake.

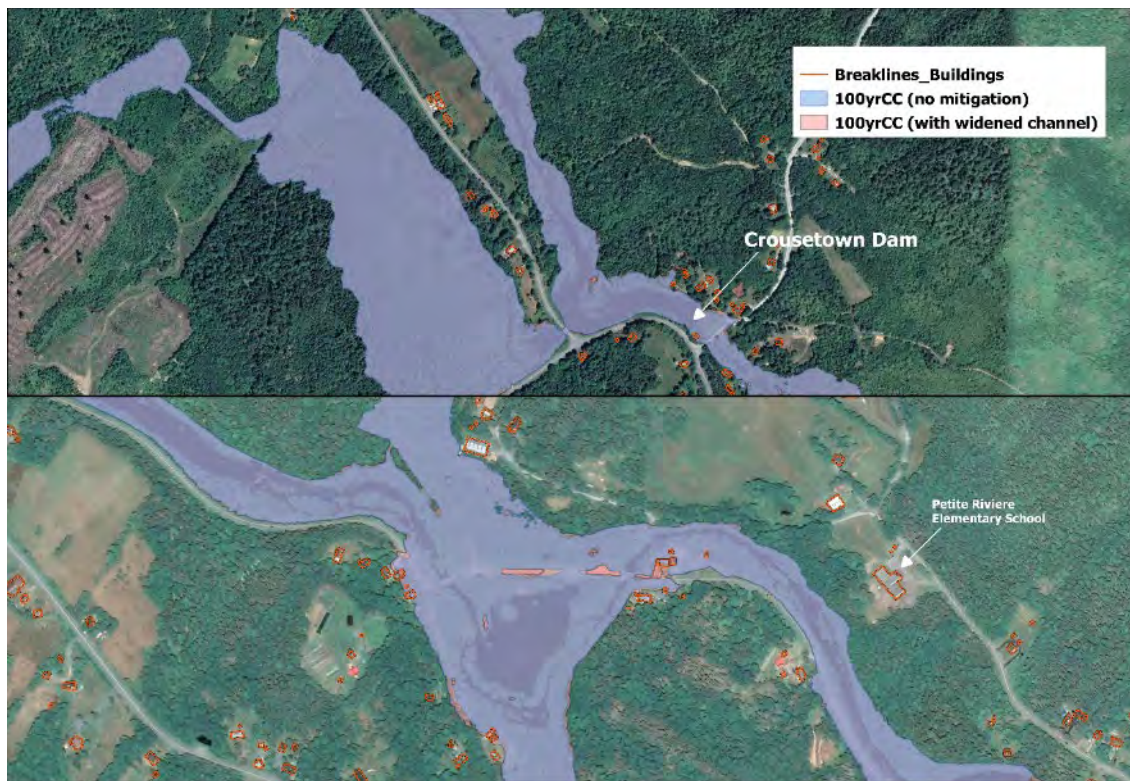


Figure 11: 100yr CC Flood Line Downstream of Fancy Lake.

EVALUATION

Table 4: Evaluation for the Channel Widening

Evaluation Criteria	Ranking	Descriptions
Effectiveness in Reducing Flood Risks around Fancy Lake	Medium	Significant decrease in peak water levels of Fancy Lake but slight increase in flood extents and flow velocity downstream of Fancy Lake.
Project Costs	Medium	It requires the widening of river channel at the outlet for approximately 160m. This project yields an approximate onetime ROI of 50%. If sediment build up requires routing channel dredging, this would reduce the ROI over the life cycle of the project. From a cost perspective, this project yields the highest ROI of all structural projects considered (Appendix C).
Operational Costs	Low	Limited requirements for operations and maintenance.
Management Requirements	Low	
Environmental Considerations and Regulatory Requirements	High	The widening of river channel at the outlet can potentially affect the fish passage and water quality both in Fancy Lake and downstream of Fancy Lake. Additional environmental studies will be required as part of further design. Regulatory approvals are anticipated to be required (DFO, NSE, TC, NSLF).

Evaluation Criteria	Ranking	Descriptions
Economic Impacts	Low	Limited impacts to economic and recreational activities but less cost for emergency response and reconstruction since 24 buildings and houses are no longer in the floodplain.
Social Acceptance	Medium	Flood risks around the lake can be reduced but the needs from the public for higher water levels in Fancy Lake cannot be fulfilled, and in the meantime, the current water levels can potentially decrease due to the increased conveyance capacity from the widened outlet channel. Engagement with the Mi'kmaq of Nova Scotia should be considered during the design and environmental investigations. Engagement with Mi'kmaq of Nova Scotia will be required as part of the regulatory application process and should be considered in development of off-setting plan for applications.

Note: ROI calculations are presented based on order of magnitude options of probable cost calculations for the purpose of comparing structural options at a conceptual or schematic level. The ROI is expected to change as designs are developed.

3.1.2.3 RAISING VULNERABLE STRUCTURES: ELEVATED ROADS AND ELEVATED BRIDGES

PROPOSED MEASURE AND MODELLING RESULTS

As shown in Figure 12, preliminary results indicate that raising the bridges LUN050 and LUN456 helps reducing flood risks at the bridges but has little impacts on the surrounding flood extents. Therefore, raising those two bridges is not considered as a flood mitigation option. However, a more in-depth evaluation is recommended for the bridge design when they need to be replaced.



Figure 12: 100yr CC Flood Line at the Bridges LUN050 and LUN456.

While at the at the intersection of Petite Riviere Road, Tannery Road, and Wentzell Road, sections of the roads and the three bridges (i.e., LUN088, LUN089, and LUN352) are severely flooded as shown in Figure 13 (up). According to the simulation results, to protect structures from being flooded and provide emergency access to people, sections of Petite Riviere Road and Tannery Road need to be raised by around 1m, Wentzell Road needs to be raised by around 0.5m, the bridges LUN088 and LUN089 need to be raised by 1m, and the bridge LUN352 needs to be raised by at least 1.3m. Further in-depth evaluations are recommended for bridge and road design when they need to be replaced.

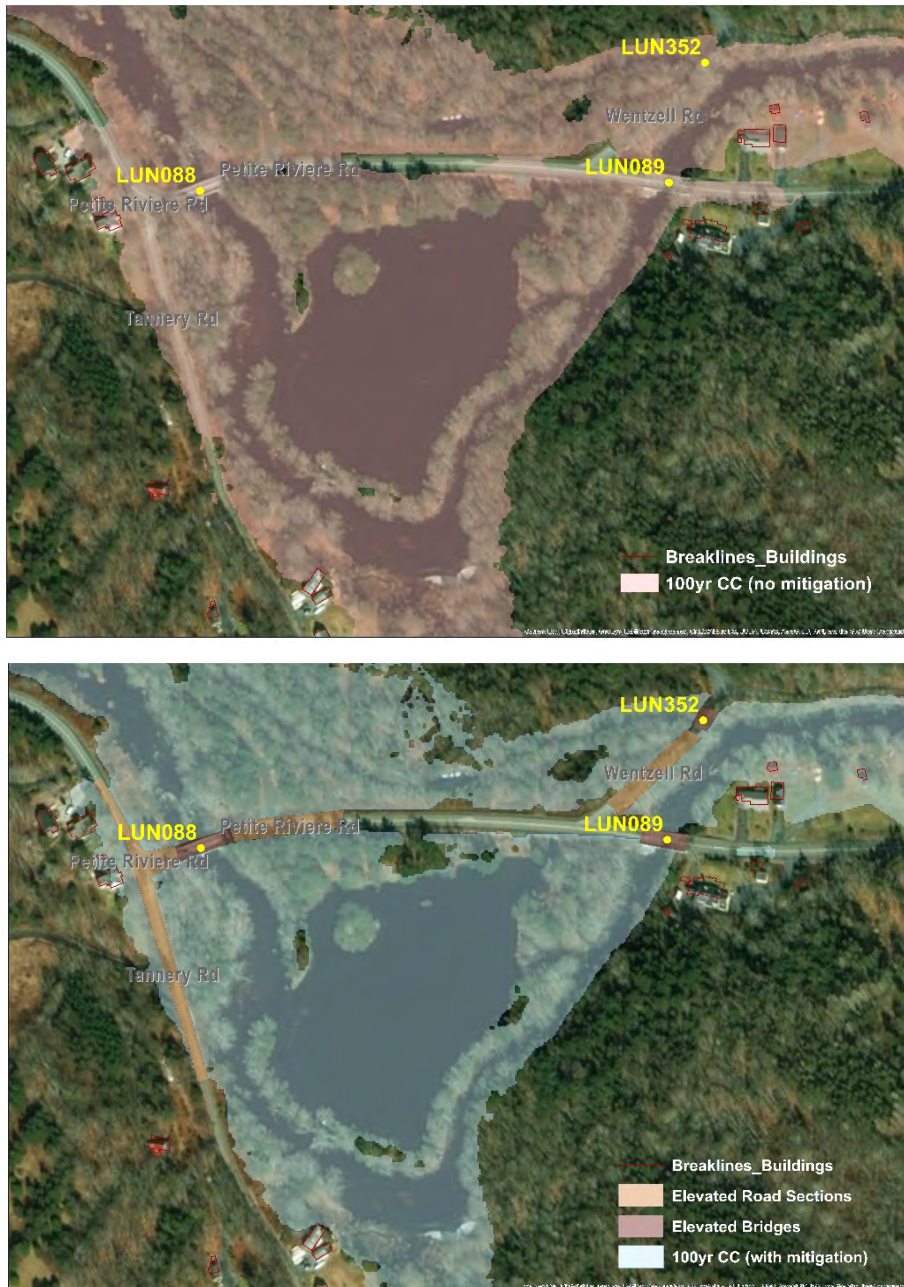


Figure 13: 100yr CC Flood Line at the Intersection of Petite Rivière Road, Tannery Road, and Wentzell Road.

In Fancy Lake area, there are two locations where existing roads can be elevated by 0.1~0.2m to provide emergency access roads for people in homes and buildings. The locations are as shown in Figure 14. Since the elevated roads would not affect the hydraulics, they are not included in the modelling.



Figure 14: Elevated Roads in Fancy Lake Area.

EVALUATION

Table 5: Evaluation for the Elevated Roads and Elevated Bridges Option

Evaluation Criteria	Ranking	Descriptions
Effectiveness in Reducing Flood Risks around Fancy Lake	Low	Existing houses and buildings around Fancy Lake are vulnerable to flooding.
Project Costs	High / Medium	Elevating existing roads and bridges have High project costs. However, some options may have Medium project costs. Project cost may significantly outweigh the cost of emergency response and therefore produce a negative ROI. The costs associated with early onset deterioration or damage to the road surface/structure from inundation was not considered (Appendix C).
Operational Costs	Low	Limited requirements for operations and maintenance.
Management Requirements	Low	
Environmental Considerations and Regulatory Requirements	Medium	Depending on the needs for construction, there may be potential environmental impacts and need for regulatory approvals. Additional environmental survey may be required.

Evaluation Criteria	Ranking	Descriptions
Economic Impacts	Low	Limited impacts to economic and recreational effects.
Social Acceptance	Low	The emergency access roads and raising bridges should be acceptable to the public.

Note: ROI calculations are presented based on order of magnitude options of probable cost calculations for the purpose of comparing structural options at a conceptual or schematic level. The ROI is expected to change as designs are developed.

3.2 Summary of Options and Ranking System

Non-structural measures aim at providing flood mitigation and protection for the entire watershed, while structural measures are proposed in this study with the major focus to mitigate flood risks around Fancy Lake, which is one of the most populated areas in Petite Rivière Watershed and is identified as a high-risk flood zone. Three structural measures are proposed as follows to reduce flooding risks around Fancy Lake and their corresponding mitigation effects are summarized in Table 6:

- Elevating existing roads to provide emergency access roads for people in homes and buildings.
- Dredging channel at the outlet and set up an operated flow control gate.
- Widening channel at the outlet to increase conveyance capacity.

Table 6: Mitigation Options for Fancy Lake Area and Corresponding Mitigation Effects

Mitigation Option	Average Decrease in Water Depths of Fancy Lake	Average Decrease in Maximum Water Surface Elevation of Fancy Lake	Average Decrease in Maximum Flood Extents around Fancy Lake	Impacts to Downstream Areas of Fancy Lake	Changes in the Number of Potentially Flood-impacted Houses and Buildings
Elevated Roads around Fancy Lake	/	/	/	/	No changes but provide access roads for people in dozens of buildings and houses.
Operated Flow Control Gate (channel is dredged by 2m)	13%	1.3%	14%	A slight decrease in flood extents and flow velocity.	Decrease to 3 (compared to 27 in the condition of no mitigation).
Operated Flow Control Gate (channel is dredged by 1m)	4%	0.4%	4%	A slight decrease in flood extents and flow velocity.	Decrease to 10 (compared to 27 in the condition of no mitigation).

Mitigation Option	Average Decrease in Water Depths of Fancy Lake	Average Decrease in Maximum Water Surface Elevation of Fancy Lake	Average Decrease in Maximum Flood Extents around Fancy Lake	Impacts to Downstream Areas of Fancy Lake	Changes in the Number of Potentially Flood-impacted Houses and Buildings
Channel Widening	11%	1%	11%	A slight increase in flood extents and flow velocity in some sections.	Decrease to 3 (compared to 27 in the condition of no mitigation).

Table 1 to 5 present the evaluation for selected flood mitigation options while Appendix A summarizes the ranking system for all options considered in the assessment and preliminary evaluation. The ranking considers the combination of effectiveness in reducing flood risks around Fancy Lake, project costs, operational costs, management requirements, environmental considerations and regulatory requirements, economic impacts, and social acceptance.

From a cost perspective, an early warning system would effectively achieve the same goals as elevating roads and bridges at a significantly reduced cost. Of the structural options investigated, channel widening achieves the highest calculated return on investment based on the best available information at the time of this assessment (Appendix C).

The top 5 preferred mitigation options were proposed as follows, which are selected based on feasibility, consultation with MODL, changes in the water levels of Fancy Lake, and determined through the ranking system.

- I. Land use planning.
- II. Accepting risks and building resilience: This includes implementing a flood forecasting and early warning system, EMO emergency plans, as well as preparing for flooding and recovery.
- III. An operated flow control gate at the outlet of Fancy Lake: The gate is closed in normal conditions to hold up water levels, and is open several days ahead of the forecasted flood event and remains open during the flood event to maintain the lower water levels in Fancy Lake.
- IV. Widening river channel at the outlet of Fancy Lake: Channel widening increases the conveyance capacity and helps mitigate flood risks around Fancy Lake.
- V. Elevating roads in Fancy Lake area, which are not needed if option II, III or option IV is in place, as well as elevating roads and elevating bridges at the intersection of Petite Riviere Road, Tannery Road, and Wentzell Road.

Re-assessed flood lines are presented in Appendix B for option III, IV, and V. Probable construction costs are provided in Appendix A.

4 Consultation Summary

This phase of the Project included consultation with key stakeholder groups. Consultation sessions were held with the Hebbville Village Commission, the Bridgewater Public Service Commission (BPSC) and regulatory agencies, Nova Scotia Environment (NSE) and Fisheries and Oceans Canada (DFO). The consultation sessions included a summary of the overall need for the project, and potential mitigation options. A summary of the feedback from the sessions is provided in the following subsections.

4.1 Hebbville Village Commission

CBCL and MODL met with the Hebbville Village Commission on April 23, 2020. The objective was to exchange information on the potential flood mitigation measures and seek input and feedback on potential alternatives. Following the presentation, the Hebbville Village Commission provided the following feedback:

- The group was interested in flood mitigation options which did not reduce the average water elevation in Fancy Lake.
- Flooding occurs occasionally, and flooding was not happening daily/weekly.
- Generally, land ownership should be considered during further design of any potential flood mitigation options.
- Flow control measure: Generally, this option was the most favourable option by the group. The group mentioned that more considerations are needed for the management of the structure and the option could work with other mitigation measures. They thought the dredging of the channel for the flow control structure by 2m was too much considering the cost and feasibility. They thought that more consideration should be put onto the dredging height, channel distance, and draining time. For example, would it be possible to drain some water ahead of the event, such as a like 1 month earlier; or investigate if it would be possible to drain more water a few days ahead of the event.
- Increase in conveyance capacity: This flood mitigation measure, widening the outlet at Fancy Lake, was identified as not being able to maintain the lake level and there were concerns for the draining of the lake in dry seasons. There was also concerns regarding changes to the conveyance capacity permanently.
- Raising vulnerable structures: These were noted as improving emergency response; however, it was noted that the selected roads are private roads.
- Accepting risk and building resilience: The development of a warning system was also identified as favourable by the group and they proposed this potential flood mitigation measure could be used in conjunction with other potential measures.

- Other potential approaches were also identified for MODL consideration. However, these alternatives were identified within the BPSC watershed management area and not included within the identified potential flood mitigation measures, such as water retention upstream of the Hebb Lake dam and increasing discharge from Weagles Dam.

4.2 Bridgewater Public Service Commission

CBCL and MODL met with BPSC on May 21, 2020. The objective was to exchange information on the potential flood mitigation measures, and seek input and feedback on potential alternatives. Following the presentation, MODL identified that land use planning is being developed within the municipality included around Fancy Lake. The BPSC confirmed that management of the water level of the Hebb Lake Dam occurs year-round, including removal of a stop log during the winter. Updated procedures were put into place around 2015 and 2016 and were developed in consultation with DFO.

CBCL noted that any potential flood mitigation measures should be developed with understanding of the whole system. BPSC noted that in the spring the upstream watershed had less available storage capacity and areas such as wetlands were usually inundated. Flooding risk was lower in the fall, when there was more storage capacity available. In some cases, it may take 3 days for water levels to peak after a heavy rain event. The BPSC may be able to provide support with the integration of a warning system, however, requested further information following development of a conceptual warning system.

4.3 Regulatory Agencies

CBCL and MODL met with NSE and DFO on March 24, 2020. The objective was to exchange information on the potential flood mitigation measures and seek input and feedback on potential alternatives. Following the presentation, the regulatory agencies noted that construction or operation of a structure may affect fish habitat or the passage of fish. Based on their understanding of the potential flood mitigation measures, the flow control structure and channel widening would require regulatory approvals. They recommended that any potential flood mitigation measures should take into consideration fish passage, Atlantic whitefish protection and coordination with the BPSC. NSE noted that if a flow control structure is selected as an option; NSE would require documentation that the watercourse and residents up and downstream of the structure are not detrimentally affected by flooding. Any of the projects would need to maintain the ecological maintenance flow downstream of the structure following NSE guidance. Mr. MacDonald and Ms. Nurse noted that dredging was not a common activity in this watershed. It was noted that the location of the proposed water control structure and channel widening was not presently placed within the critical habitat of the Atlantic whitefish.

Both agencies mentioned future phases should include baseline biological studies to identify habitat and fish passage in the project area. This would aid in the understanding of effects to species as a result of construction or water management (drawing the water down). Also, additional modelling may be needed to understand the effects of operation and maintenance of a water control structure.

Specific to approvals, the flow control structure and channel widening would require an NSE Alteration of the Waterbody Approval and a *Fisheries Act* Authorization for the harmful alteration, disruption and destruction of fish habitat. The flow control structure would also require a plan to monitor the passage of fish through the structure. A *Species at Risk Act* Approval maybe required, and any flood mitigation measures proposed must be in support of the Recovery Plan for Atlantic Whitefish. NSE and DFO noted that consultation with Indigenous groups would be required for any approvals. The regulatory agencies noted that engagement with Indigenous groups by MODL in advance of applications would be beneficial for the applications.

5 Summary and Recommendations

5.1 Study Approach Summary

Based on the consultation with MODL, information collected in the Public and Stakeholder meetings, and the flood line determined in Phase 1, regions at high risk of flooding were identified. CBCL conducted an assessment of potential flood mitigation options, including land use planning options and development controls, flow control measures, conveyance capacity increase through channel geometry changes, flood protection measures, relocation and/or raising of vulnerable structures at risk, as well as accepting risks and building resilience. Preliminary evaluation was carried out with the use of the Phase 1 calibrated model for selected mitigation options.

A ranking system was proposed by CBCL, which considers the combination of the effectiveness in reducing flood risks around Fancy Lake, project costs, operational costs, management requirements, environmental considerations and regulatory requirements, economic impacts, and social acceptance. Based on the ranking system along with the consultation with MODL, the top 5 preferred mitigation options are proposed as follows and are supported by re-assessed flood lines. Probable estimates of construction costs are also provided in Appendix A.

- I. Land use planning.
- II. Accepting risks and building resilience.
- III. An operated flow control gate at the outlet of Fancy Lake.
- IV. River channel widening at the outlet of Fancy Lake.
- V. Elevated roads and bridges.

5.2 Recommendations

In order to decrease water levels in Fancy Lake during flood events and accordingly mitigate flood risks around the lake, the river channel at the outlet of Fancy Lake can either be dredged for the construction of an operated flow control gate or widened for increased conveyance capacity. A further in-depth evaluation is recommended for the design of channel dredging or channel widening, which would require the acquisition of additional river bathymetry at the site.

5.3 Study Limitations

The findings and recommendations are based on information collected to date at the time of writing, with uncertainties associated with the lack of river bathymetry at the outlet of Fancy Lake, as well as modelling approximations inherent to this type of study. We recommend that the projected flood elevations be revisited by the municipality as new information becomes available.

We would like to thank you again for the opportunity to work on this very interesting study.

Yours very truly,



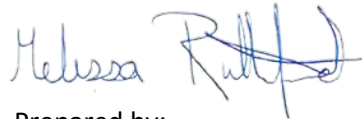
Prepared by:

Ying Zhang
Municipal Engineer-in-Training
Direct: 902-421-7241, Ext. 2684
Email: yingzhang@cbcl.ca



Reviewed by:

Alexander Wilson, M.Eng., P.Eng.
Practice Lead – Water Resources
Direct: 902-421-7241, Ext. 2502
Email: alexanderw@cbcl.ca



Prepared by:

Melissa Rutherford, B.Sc.
Environmental Scientist
Direct: 902-421-7241, Ext. 2574
Email: mrutherford@cbcl.ca

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6 References

Jha, A. K., Bloch, R., & Lamond, J. (2012). *Cities and flooding: a guide to integrated urban flood risk management for the 21st century*. The World Bank.

Kryspin-Watson, J., Dharmavaram, S., Stanton-Geddes, Z., & Chia, B. (2017). *Land Use Planning for Urban Flood Risk Management*. Urban Floods Community of Practice (UFCOP).

Ranking System

CATEGORY EXPLANATION

For the effectiveness in reducing flood risks around Fancy Lake:

High means the option is highly effective, **Medium** means medium effectiveness, and **Low** means the option has low or limited effectiveness in reducing flood risks around Fancy Lake

For the other evaluation criteria:

High: High flood risk around Fancy Lake, high project costs, high operational costs, high management requirements, high environmental considerations and regulatory requirements, high negative economic impacts, low level of social acceptance. Project Costs may range from approximately \$1,000,000 to \$5,000,000.

Medium: Medium flood risk around Fancy Lake, medium project costs, medium operational costs, medium management requirements, medium environmental considerations and regulatory requirements, medium negative or medium positive economic impacts, medium level of social acceptance. Project Costs may range from approximately \$100,000 to \$1,000,000.

Low: Low flood risk around Fancy Lake, low or limited project costs, low or limited operational costs, low or limited management requirements, low or limited environmental considerations and regulatory requirements, low negative or high positive economic impacts, high level of social acceptance. Project Costs may range to approximately \$100,000.

RANKING FOR PROPOSED MEASURES

	Option 1	Option 2	Option 3	Option 5	Option 6
Evaluation Criteria	Land Use Planning Options and Development Controls	Flow Control Measures	Conveyance Capacity	Relocation and/or Raising of Vulnerable Structures	Accepting Risks and Building Resilience
	Land Use Planning	Operated Flow Control Gate at the Outlet of Fancy Lake	Widening Channel at the Outlet of Fancy Lake	Raising Bridges and Roads	Emergency Plans, Evacuation Plans, and Warning System
Effectiveness in Reducing Flood Risks around Fancy Lake	Low – for existing structures High - for future development	High	Medium	Low	Medium
Project Costs	Low	High	Medium	High Medium	Medium
Operational Costs	Low	High	Low	Low	Medium
Management Requirements	Low	High	Low	Low	Medium
Environmental Considerations and Regulatory Requirements	Low	High	High	Medium	Low
Economic Impacts	Medium	Low	Low	Low	Low
Social Acceptance	Medium	Medium	Medium	Low	Low

RANKING FOR OTHER MEASURES

	Option 3	Option 3	Option 4
Evaluation Criteria	Conveyance Capacity	Conveyance Capacity	Flood Protection Measures
	Remove Conquerall Mills Dam	Remove Crousetown Dam	Berms Downstream of Hebb Lake Dam
Effectiveness in Reducing Flood Risks around Fancy Lake	Low	Low	Low
Project Costs	High	High	High
Operational Costs	Low	Low	Low
Management Requirements	Low	Low	Medium
Environmental Considerations and Regulatory Requirements	High	High	High
Economic Impacts	Medium	Medium	Medium
Social Acceptance	High	High	High



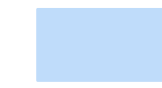
APPENDIX B

Flood Maps



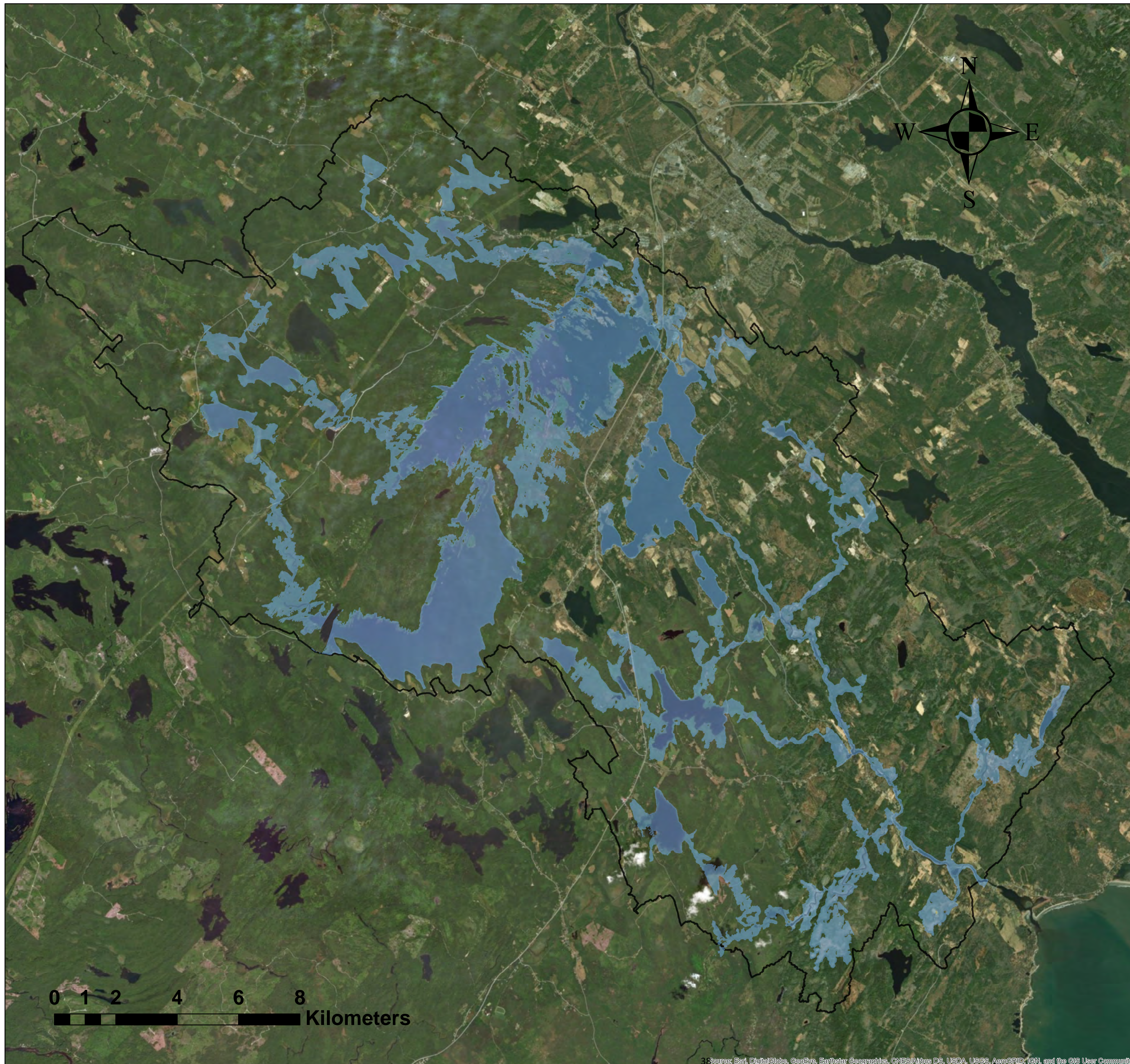
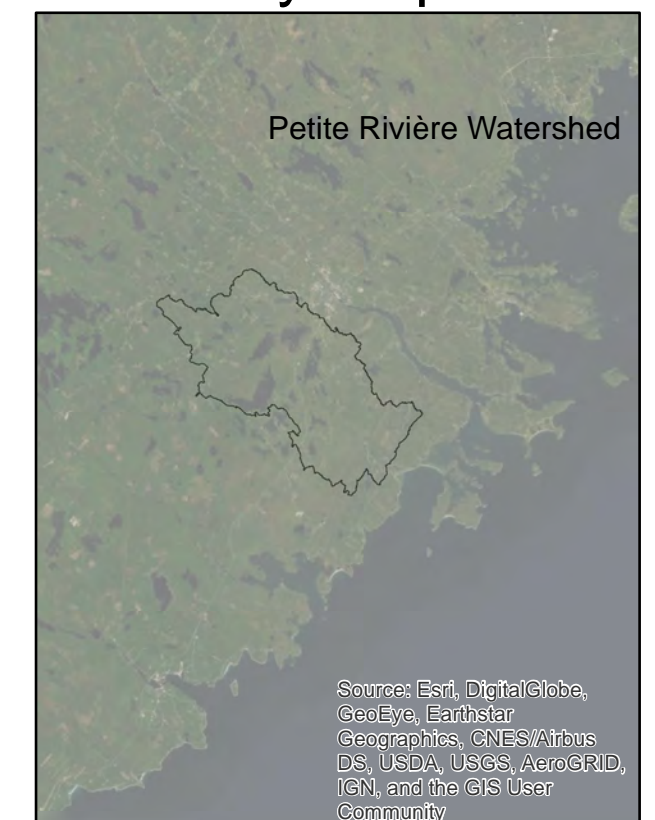
Petite Rivière Watershed Flood Mitigation Study Floodplain Mapping

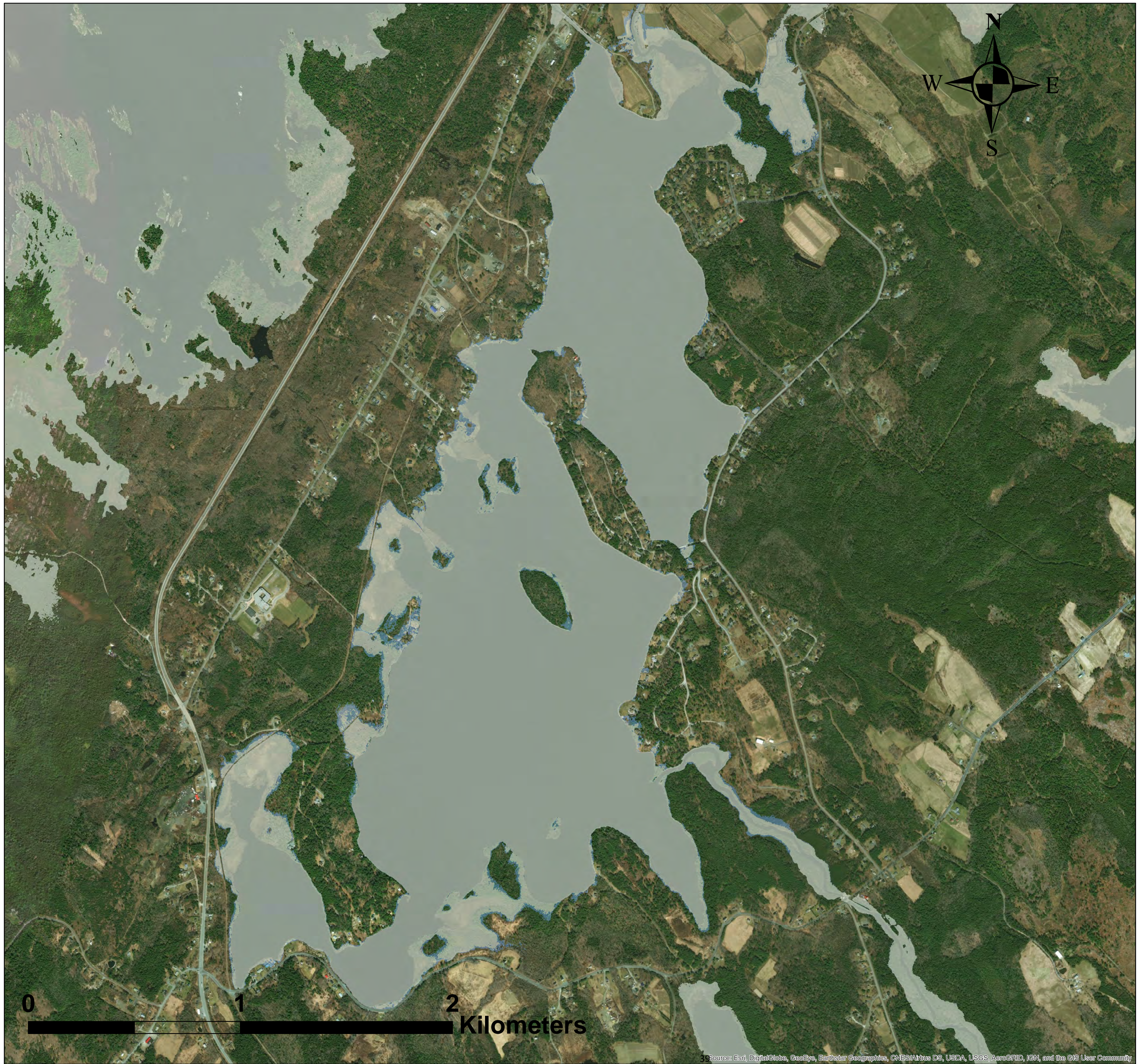
Floodlines

-  100-yr Floodline CC
(flow control measure;
river channel is
dredged by 1m)

Flood Map Tile Petite Rivière Watershed

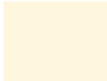

Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

-  100-yr Floodline CC
(flow control measure;
river channel is
dredged by 1m)
-  100-yr Floodline CC
(no mitigation)

Flood Map

Tile
Fancy Lake Area
Petite Rivière Watershed

Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

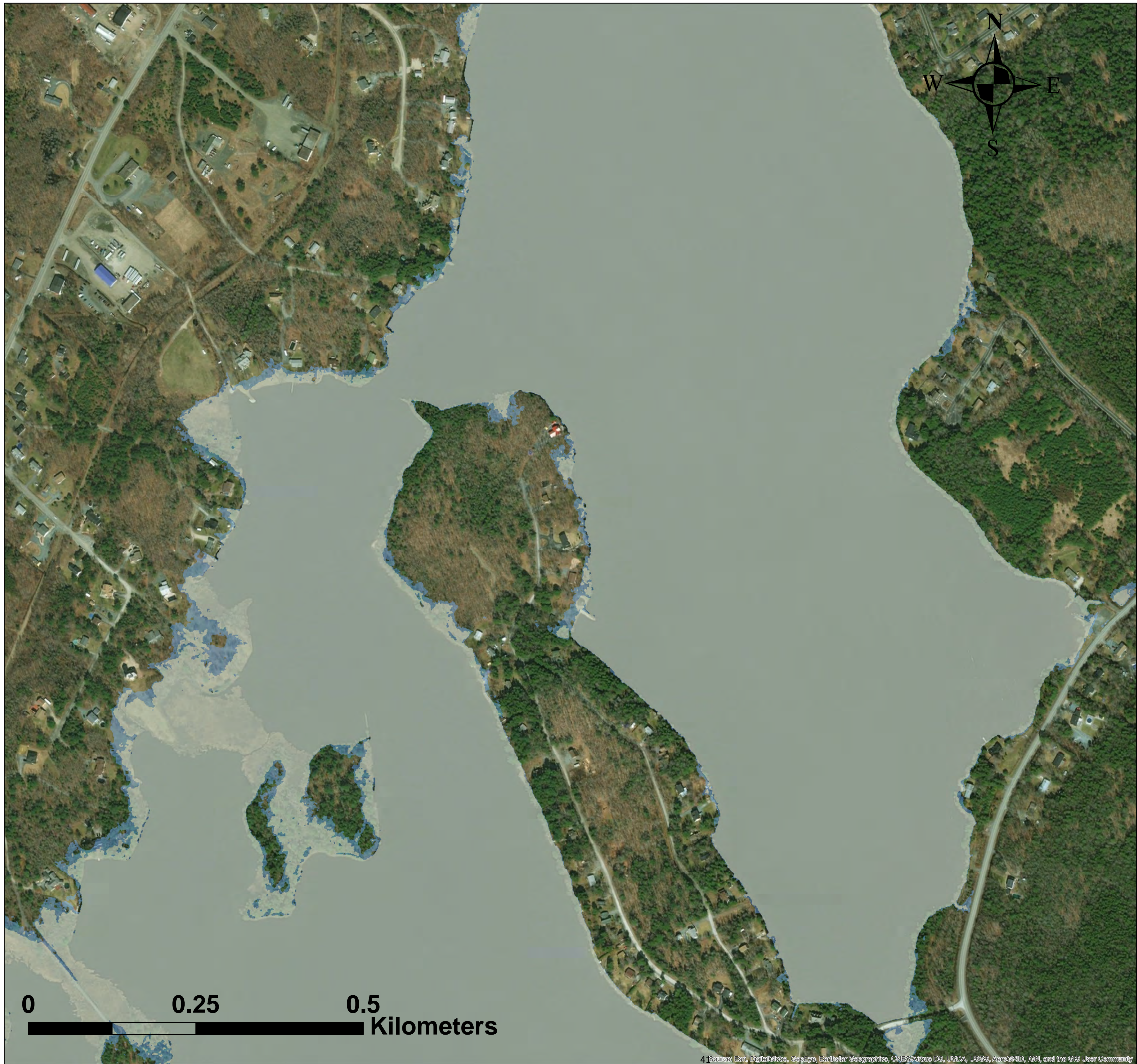
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(flow control measure;
river channel is
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(no mitigation)

Flood Map

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Fancy Lake Area
Petite Rivière Watershed

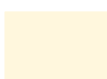

Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

-  100-yr Floodline CC
(flow control measure;
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-  100-yr Floodline CC
(no mitigation)

Flood Map

Tile
Fancy Lake Area
Petite Rivière Watershed

Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

- 100-yr Floodline CC
(flow control measure;
river channel is
dredged by 1m)
- 100-yr Floodline CC
(no mitigation)

Flood Map

Tile
Fancy Lake Area
Petite Rivière Watershed

Key Map





**Petite Rivière Watershed
Flood Mitigation Study
Floodplain Mapping**

Floodlines

100-yr Floodline CC
(flow control measure;
river channel is
dredged by 2m)



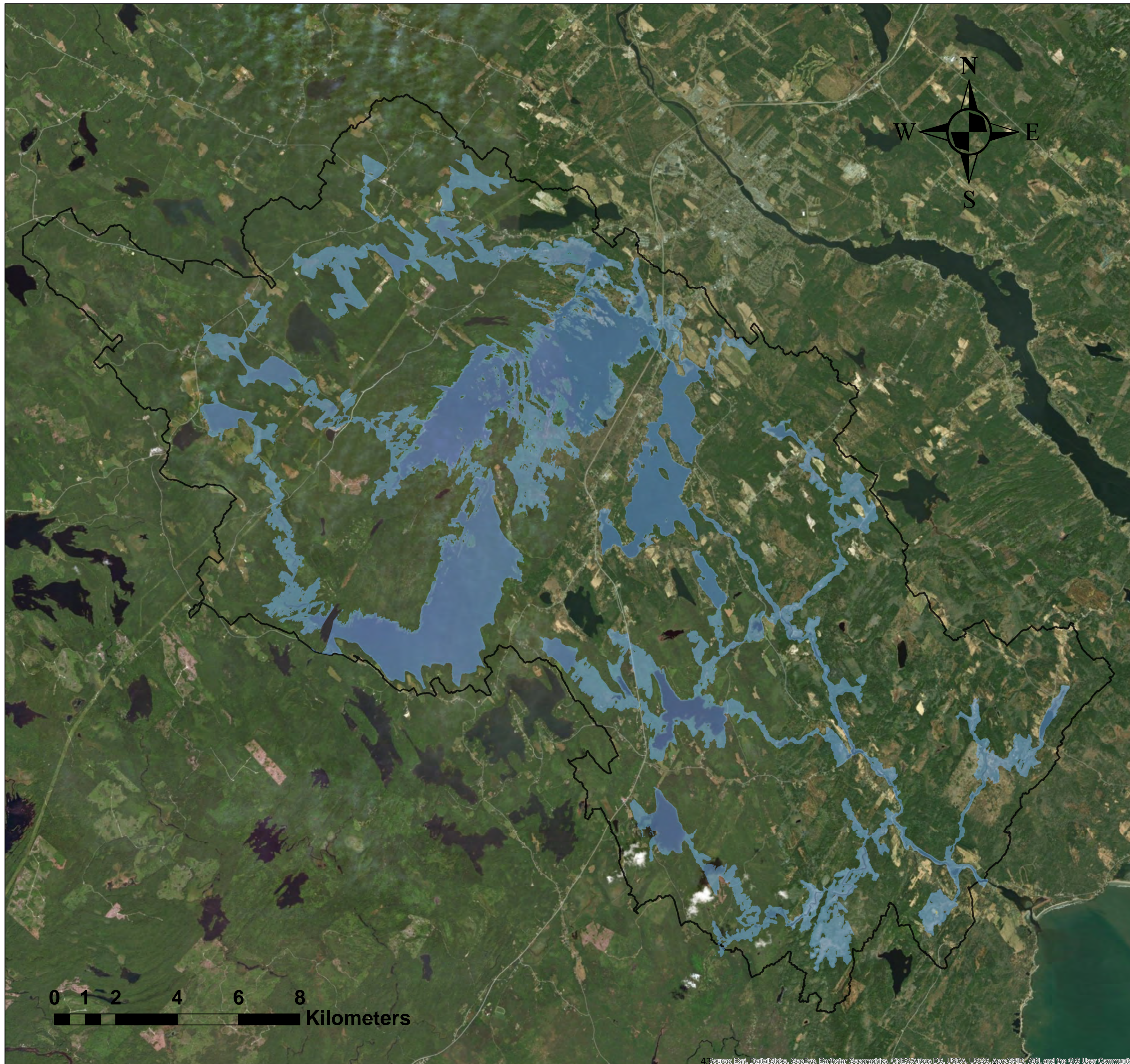
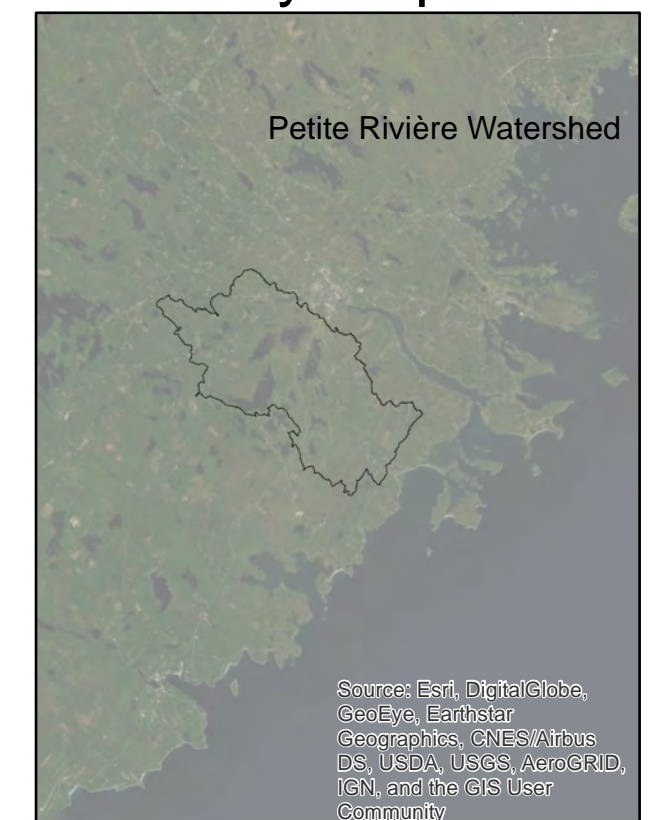
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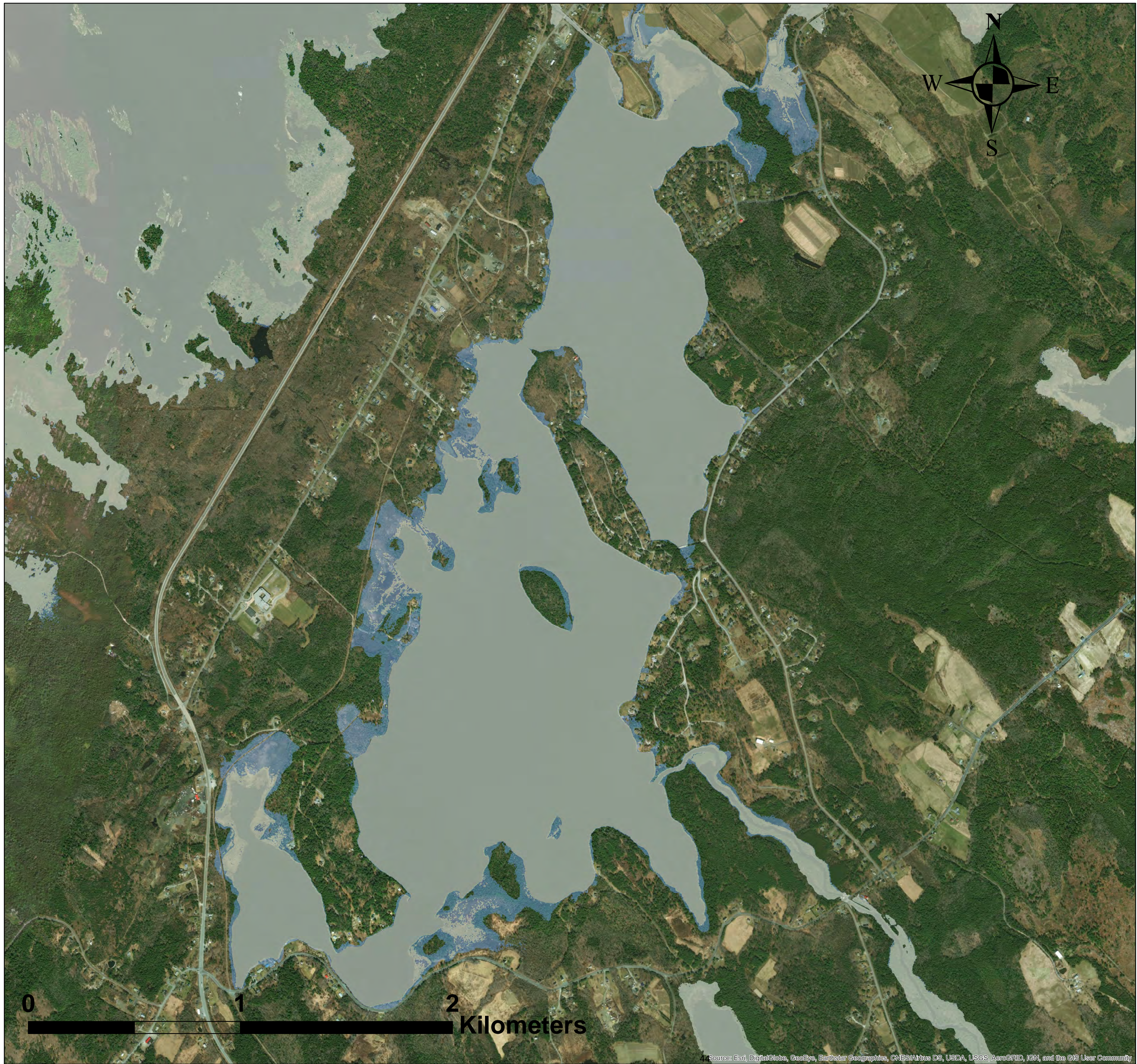
Flood Map

Tile

Petite Rivière Watershed



Key Map





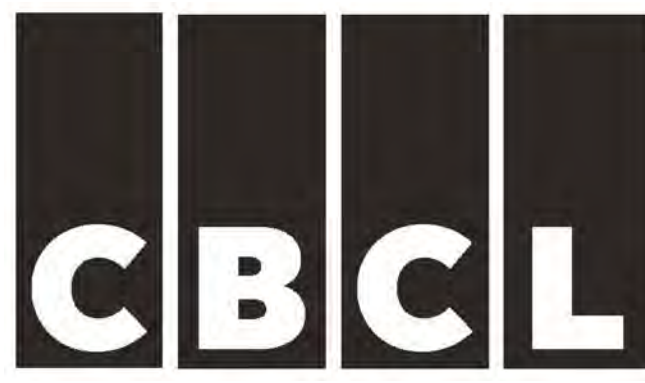
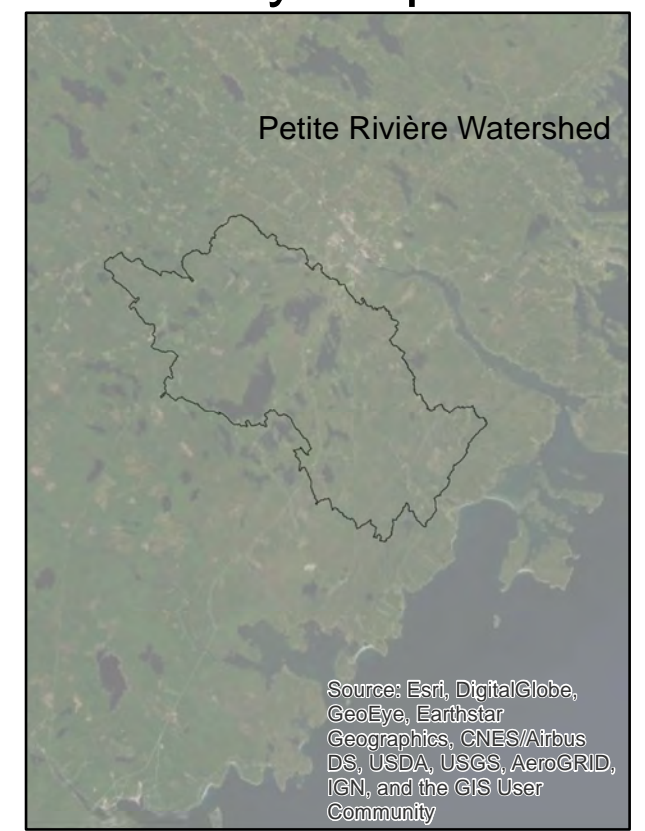
**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

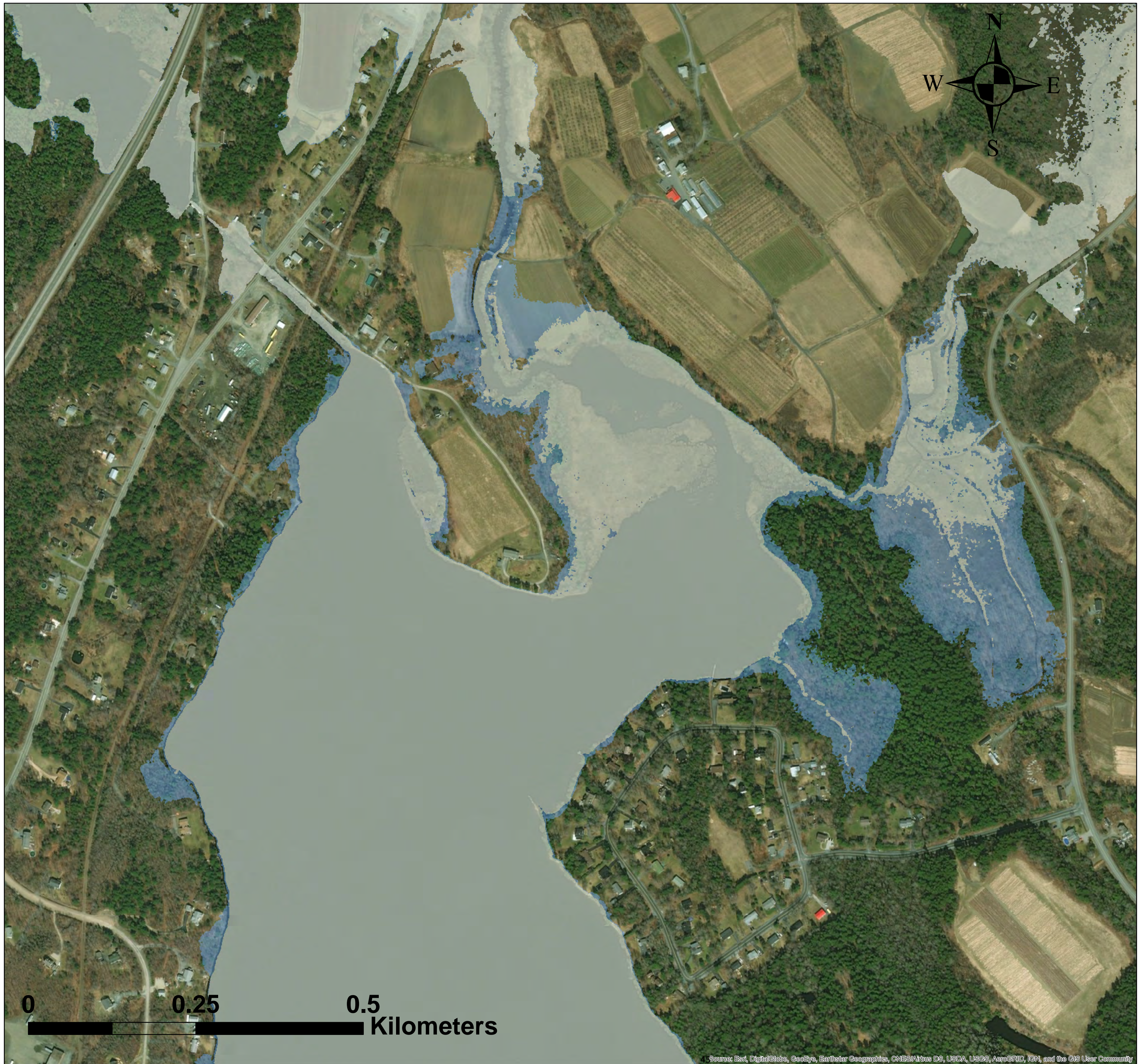
Floodlines

-  100-yr Floodline CC
(flow control measure;
river channel is
dredged by 2m)
-  100-yr Floodline CC
(no mitigation)

**Flood Map
Tile
Fancy Lake Area
Petite Rivière Watershed**

Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

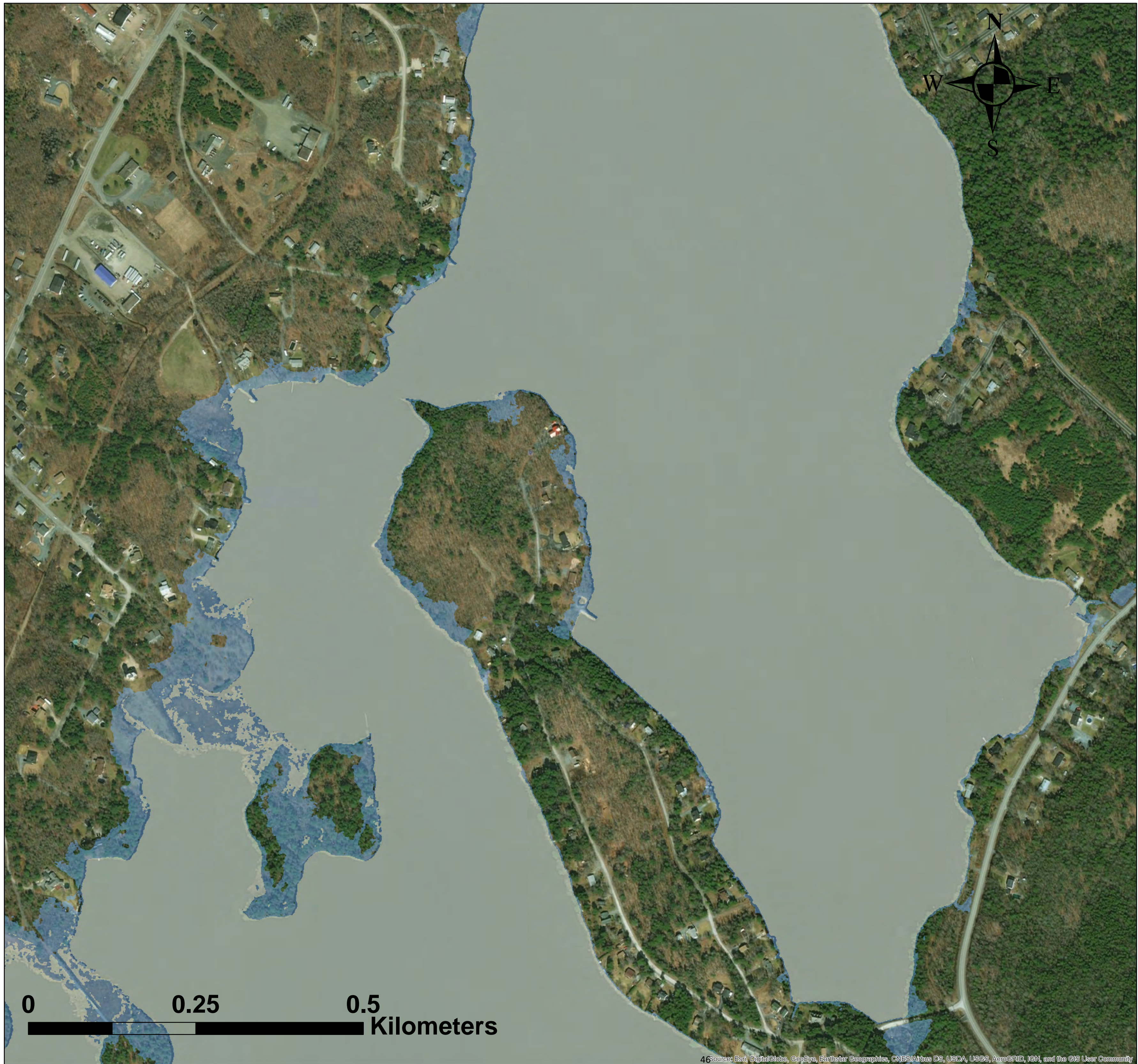
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river channel is
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(no mitigation)

Flood Map

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Fancy Lake Area
Petite Rivière Watershed

Key Map





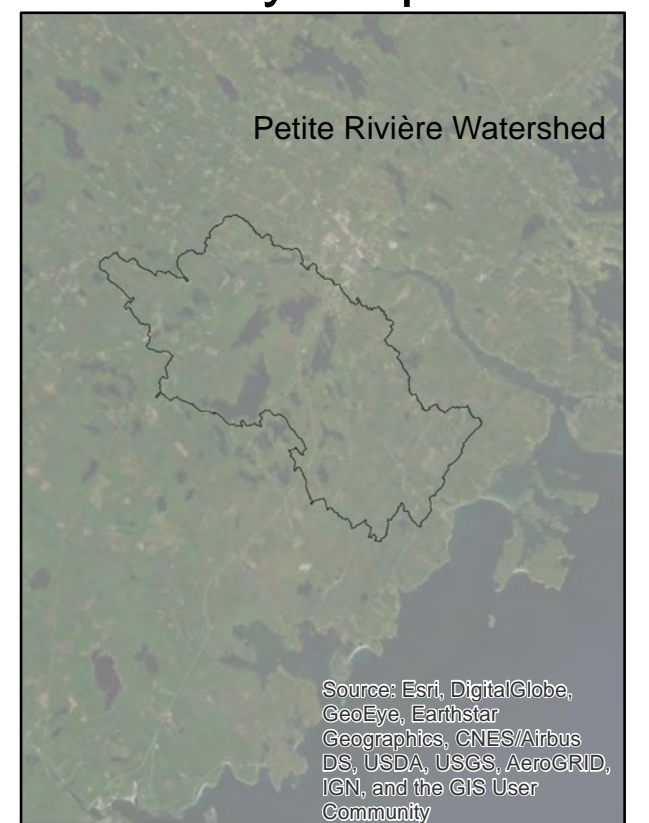
**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

- 100-yr Floodline CC
(flow control measure;
river channel is
dredged by 2m)
- 100-yr Floodline CC
(no mitigation)

Flood Map
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Fancy Lake Area
Petite Rivière Watershed


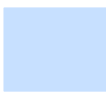
Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

-  100-yr Floodline CC
(flow control measure;
river channel is
dredged by 2m)
-  100-yr Floodline CC
(no mitigation)

**Flood Map
Tile
Fancy Lake Area
Petite Rivière Watershed**

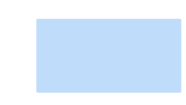
Key Map





**Petite Rivière Watershed
Flood Mitigation Study
Floodplain Mapping**

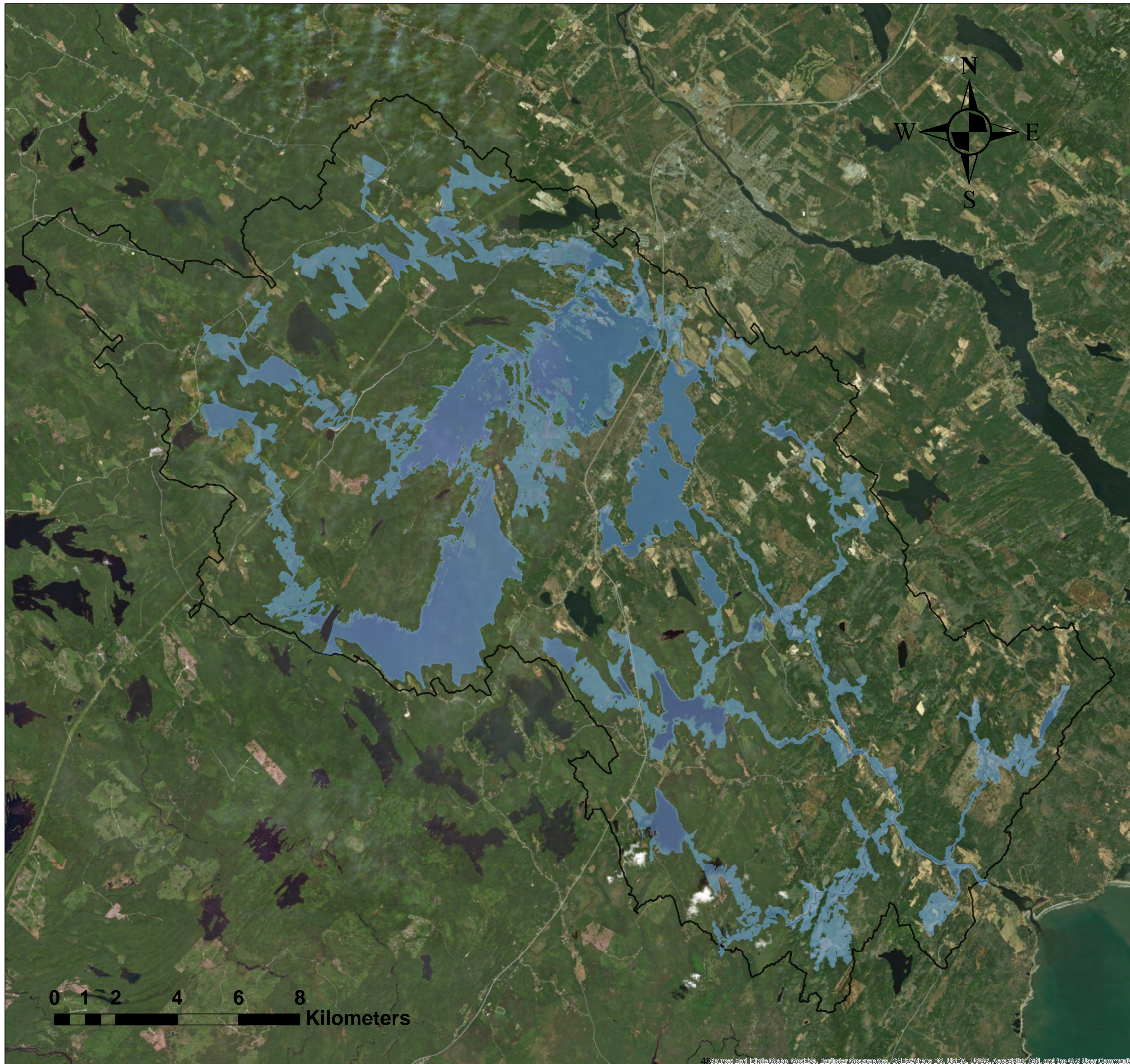
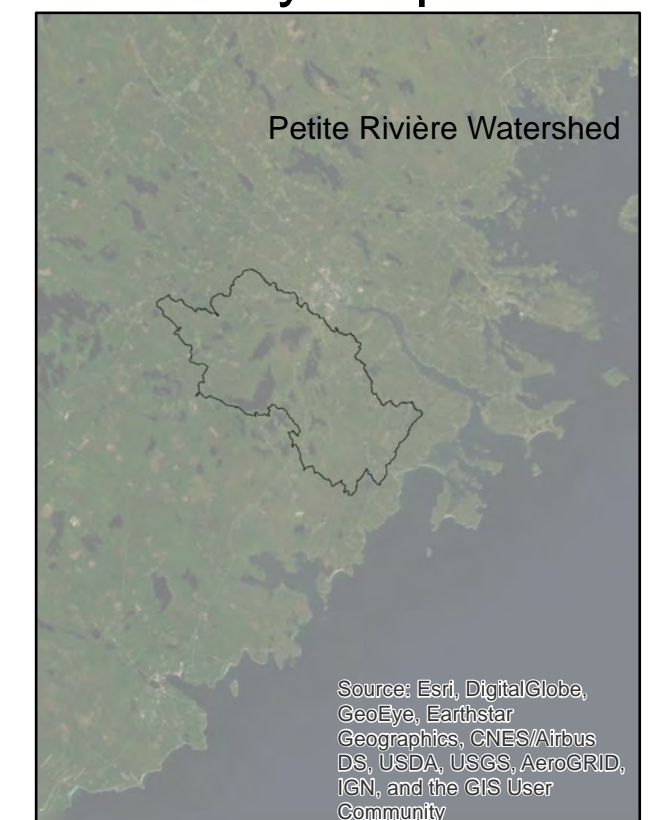
Floodlines

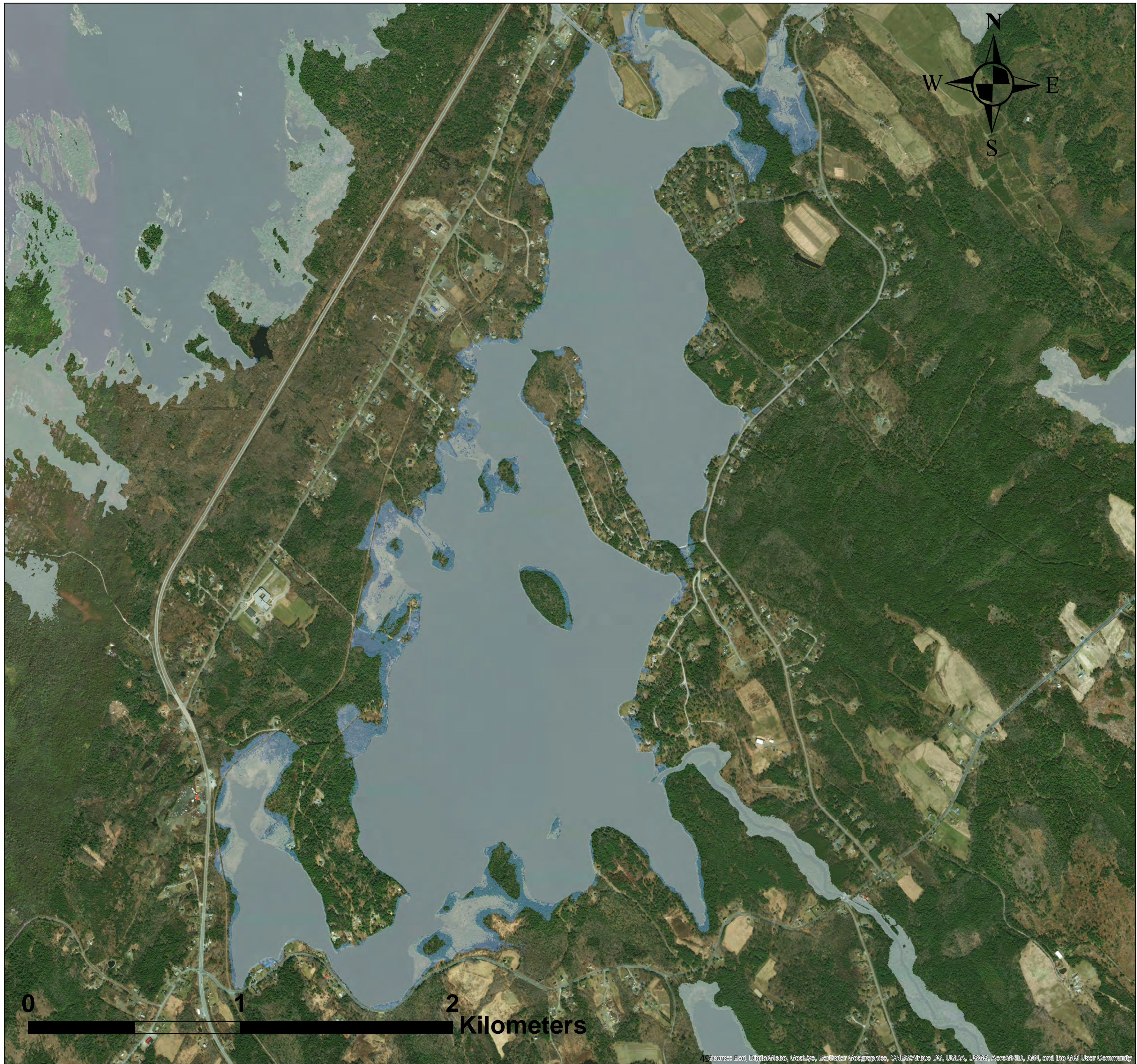
 100-yr Floodline CC
(widened river channel)

Flood Map

**Tile
Petite Rivière Watershed**

Key Map





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

Floodlines

- 100-yr Floodline CC
(widened river channel)
- 100-yr Floodline CC
(no mitigation)

Flood Map

Tile
Fancy Lake Area
Petite Rivière Watershed

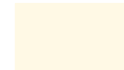

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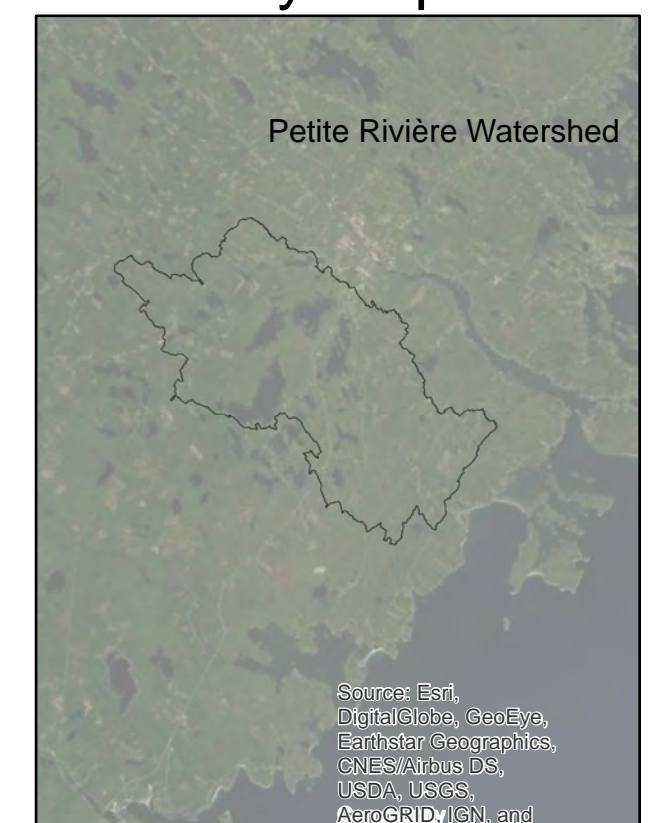
**Petite Rivière Watershed
Flood Mitigation Study
Floodplain Mapping**

Floodlines

-  100-yr Floodline CC (widened river channel)
-  100-yr Floodline CC (no mitigation)

**Flood Map
Tile
Fancy Lake Area
Petite Rivière Watershed**

Key Map

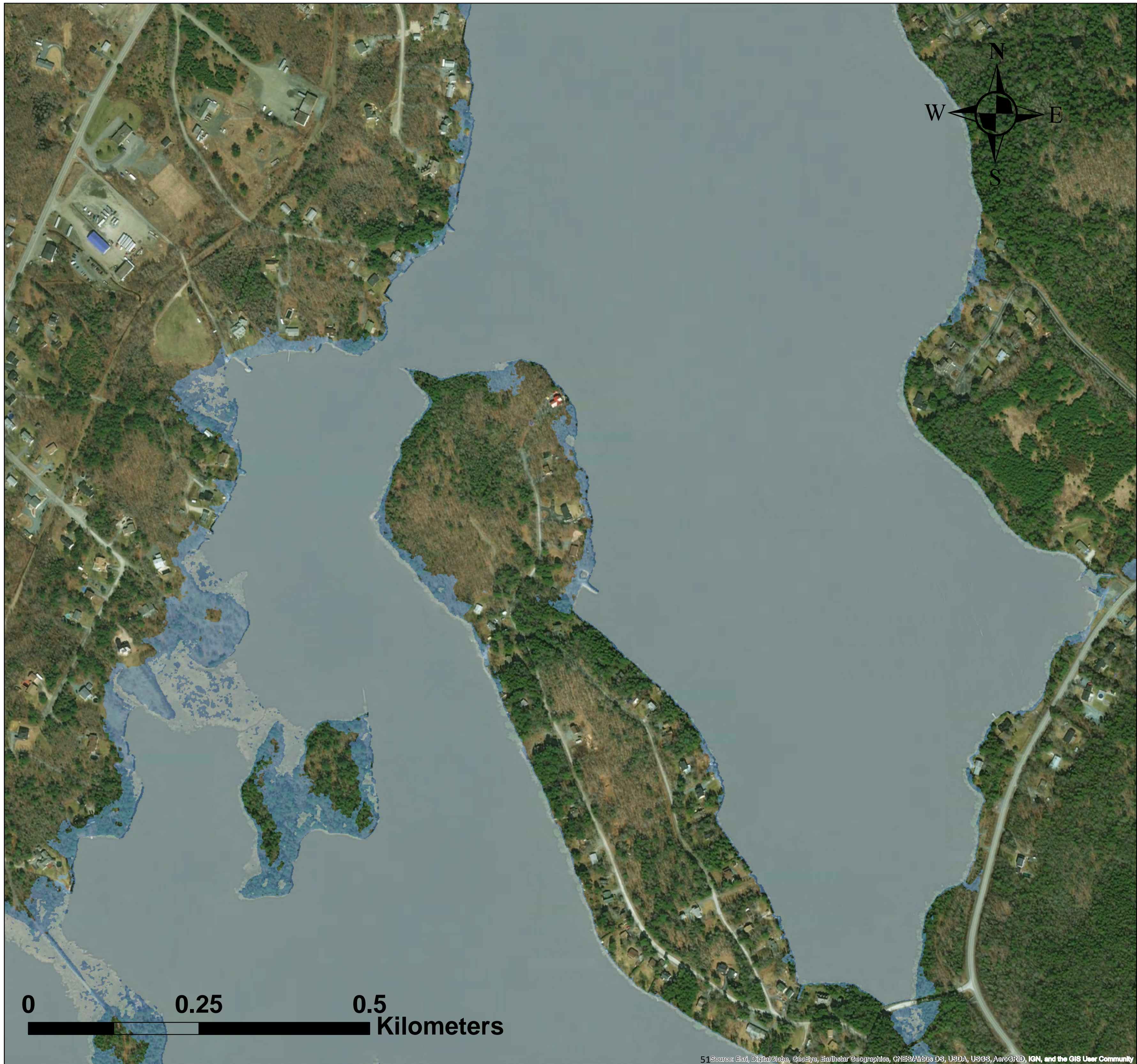


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





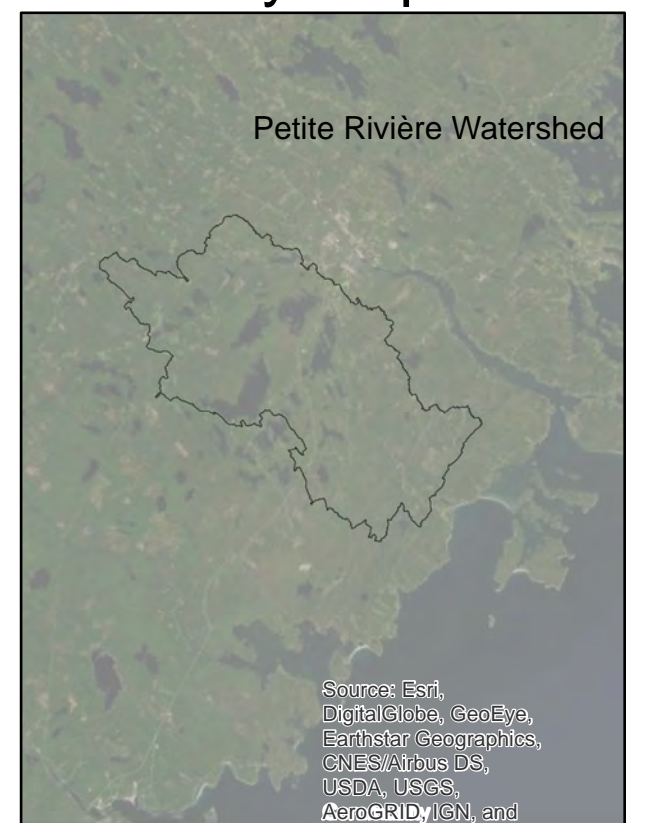
**Petite Rivière Watershed
Flood Mitigation Study
Floodplain Mapping**

Floodlines

- 100-yr Floodline CC
(widened river channel)
- 100-yr Floodline CC
(no mitigation)

**Flood Map
Tile
Fancy Lake Area
Petite Rivière Watershed**

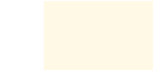
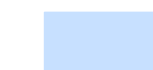
Key Map





**Petite Rivière Watershed
Flood Mitigation Study
Floodplain Mapping**

Floodlines

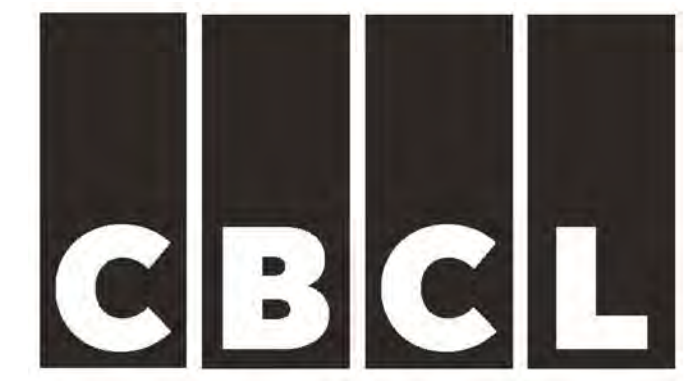
-  100-yr Floodline CC (widened river channel)
-  100-yr Floodline CC (no mitigation)

**Flood Map
Tile
Fancy Lake Area
Petite Rivière Watershed**

Key Map



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





**Petite Rivière Watershed
Flood Risk Assessment
Floodplain Mapping**

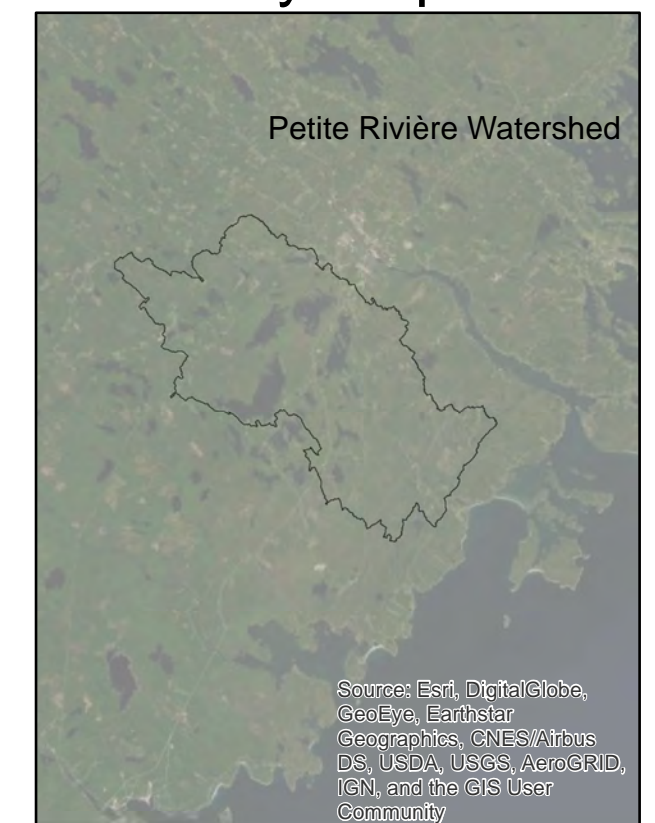
Floodlines

- 100-yr Floodline CC (with elevated roads and bridges)
- 100-yr Floodline CC (no mitigation)

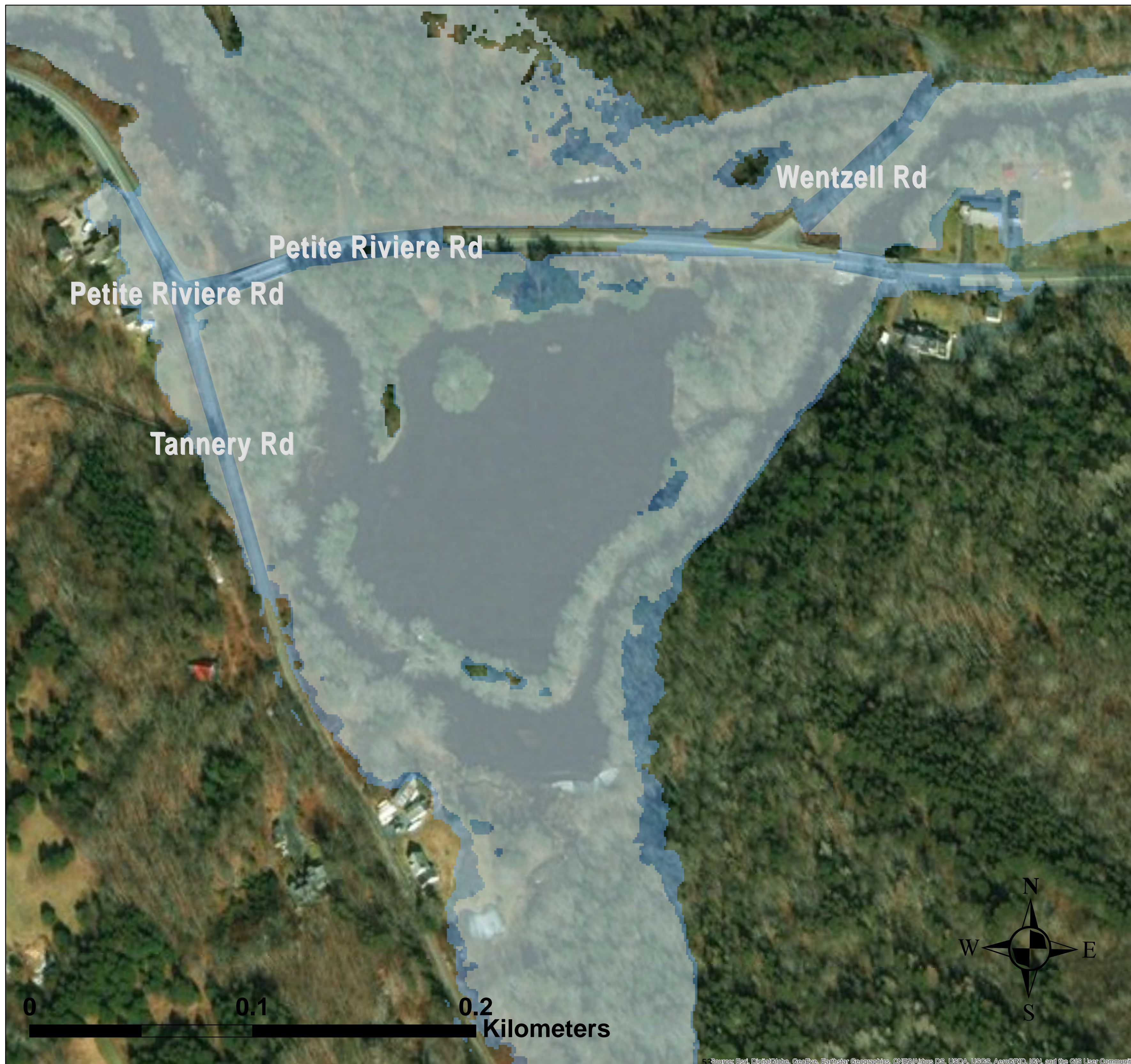
Flood Map

Tile
Intersection of Petite Riviere Road,
Tannery Road, and Wentzell Road
Petite Rivière Watershed

Key Map



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



5: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



APPENDIX C

Return on Investment (ROI) Calculations

Appendix C

ROI Calculation Summary

Assumptions and ROI per Project	Option 1	Option 2	Option 3	Option 5
	Elevated Access Roads to 320 Dwellings on Fancy Lake	Elevated Roads & Bridges	Operational Flow Gate + 2m Channel Dredging	Channel Widening (5m)
Loss avoided [LA] (\$)	-\$200,000	-\$950,000	-\$995,000	\$405,000
Return on Investment [ROI] (%)	-44%	-79%	-45%	49%

Reference data:

- A flooded basement costs an average of \$43,000 (2018) to repair, according to the latest numbers from the Insurance Bureau of Canada (IBC). Reference: <https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2019/04/Home-Flood-Protection-Program-Report-1.pdf>
<https://www.insurance-canada.ca/2019/04/16/intact-climate-centre-basement-flooding/>
- Flood insurance can help cover that cost, but older plans won't help at all if the water comes from heavy rainfall – Source: Blair Feltmate, head of the Intact Centre on Climate Adaptation at the University of Waterloo. (<https://globalnews.ca/news/5206297/flooded-basement-cost-canada/>)



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www.CBCL.ca

Nova Scotia: Halifax, Sydney
Prince Edward Island: Charlottetown
New Brunswick: Saint John, Fredericton, Moncton
Newfoundland & Labrador: St. John's, Happy Valley-Goose Bay
Ontario: Ottawa



Municipality of the District of Lunenburg

REQUEST FOR DECISION

REPORT TO: Council

SUBMITTED BY: Jeff Merrill, Director of Planning & Development Services and
Sherry Conrad, Municipal Clerk

DATE: September 17, 2020

RE: Terms of Reference - Sustainability Committee

ORIGIN: Council October 22, 2019

RECOMMENDATION

That Council:

- 1. Assign the Policy and Strategy Committee to provide advice on the development and implementation of a corporate emission reduction plan;*
- 2. Approve the terms of reference for the Sustainability Committee as presented.*

BACKGROUND

On October 22, 2019 Council declared a climate emergency; added “climate emergency” as a priority in its strategic plan; passed a resolution to join the Partners for Climate Protection (PCP) program and work through the five milestones at the corporate and community level; and passed a motion to form a Sustainability Committee.

The PCP program aims to provide municipal governments with the support they require to identify and address local sources of greenhouse gas emissions (GHG). Guided by a five-milestone framework, participants work to develop local GHG inventories, set GHG

reduction targets, develop and carry out local climate change action plans, and monitor results. PCP recommends engaging with a range of municipal and community stakeholders in every step of the milestone framework.

The five milestones are:

- 1: Create a Baseline Emissions Inventory and Forecast
- 2: Set Emissions Reduction Targets
- 3: Develop a Local Action Plan
- 4: Implement the Local Action Plan
- 5: Monitor Progress and Report Results

There are two streams to work through the five-milestone framework: **Corporate**, and **Community**.

DISCUSSION

The PCP program recommends involving a range of municipal and community stakeholders in every step of the milestone framework. The two streams (Corporate and Community) will have different stakeholder involvement. For example, the Corporate stream will involve greater engagement of Municipal Staff, the Strategic Management Team and Council while the Community stream will include more engagement with the public. Because the corporate and community stakeholders are different staff recommends that Council appoint an existing committee to provide input on leading the municipality through the corporate milestones and that Council creates a new sustainability committee to lead the municipality and public through the community milestones.

There is overlap between corporate and community emissions however for action planning these boundaries are generally used.

Corporate emissions = municipal fleet vehicles, wastewater infrastructure, municipally owned buildings and any other emissions under control of municipal operations.

Community emissions = all other energy use within the municipality including utilities, solid waste management, transportation, space heating and cooling in all homes and buildings, as well as all energy use from appliances like generators and refrigerators.

Corporate

To lead the municipality through the corporate milestones Council can appoint an existing committee such as the Policy & Strategy Committee, Finance committee, or the Planning Advisory Committee.

During the development of the municipality's Integrated Community Sustainability Plan (ICSP) the municipality had appointed a Sustainability Committee. The municipality's Planning Advisory Committee (PAC) served double duty as the members of PAC were all appointed as members of the Sustainability Committee.

Staff recommends that the Policy & Strategy Committee be tasked with providing advice to staff and Council on the development and implementation of a **corporate** action plan to reduce corporate greenhouse gas emissions.

Community

Stakeholder engagement will be crucial in the development and implementation of community emission reduction targets. For the action plan to be successful the community needs to be deeply engaged in the process. The municipality can take a leadership role by engaging its residents and stakeholders to take action to reduce their emissions. However, the community needs to have ownership in the action plan for it to be successful.

On the public participation spectrum, staff recommends that the community engagement be *collaboration*. With public participation being collaborate Council will look to the public for advice and innovation in formulating solutions and will incorporate the advice and recommendations into the decisions to the maximum extent possible.

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives and/or solutions.	To obtain public feedback on analysis, alternatives and/or decision.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Developed by the International Association for Public Participation

Staff has prepared a draft terms of reference for a Sustainability Committee for Council's consideration, see attached.

Section 8 outlines the proposed mandate and responsibilities of the Sustainability Committee.

- 1 *To provide advice to staff and council on the development and implementation of an action plan to reduce community greenhouse gas emissions.*
- 2 *To serve as a conduit for interested stakeholders passionate about sustainability issues to ensure efforts are maximized and not duplicated.*
- 3 *To serve in an ambassador role for promoting sustainability issues and initiatives.*
- 4 *To advise and promote communication of the Action Plan to the community.*
- 5 *To provide advice to staff and council on continued success with the FCM Partners for Climate Protection Program.*

Staff recommends that the majority of the committee members be members-at-large with at least one member-at-large being a youth (18-25 years old.) The ideal

candidates for the sustainability committee are those passionate about sustainability topics that can be ambassadors for promoting the issues and initiatives.

BUDGET IMPLICATIONS

Member-at-large positions are volunteer positions. Travel costs for members will be based on Council's established per kilometre rate.

STRATEGIC PLAN

Climate Emergency is a strategic priority of Council.

WORK PROGRAM IMPLICATIONS

The CAO, or designate, and Director of Planning and Development Services, or designate, will sit as staff resources on the Committee.

ALTERNATIVES

1. Appoint one committee to deal with both the Corporate and Community milestones.
2. Edit the draft Sustainability Committee terms of reference as necessary.

CONCLUSION

The development and implementation of corporate and community emission reduction plans include different stakeholder groups with different challenges. Therefore, staff recommends that Council use an existing committee to deal with the corporate plan and create a community sustainability committee, with half of the members being members-at-large, to guide the development and implementation of a community emission reduction plan.

**Municipality of the District of Lunenburg
Sustainability Committee
Terms of Reference**

1.0 Purpose

The primary purposes of the Sustainability Committee are to guide the development of projects and initiatives in an environmentally, sustainable manner and to provide a venue for the Committee to educate, promote and provide feedback on issues related to sustainability, advocacy and stewardship within the Municipality of the District of Lunenburg.

2.0 Scope

This Policy covers activities of the Council of the Municipality of the District of Lunenburg.

3.0 References

- 3.1 *Nova Scotia Municipal Government Act*
- 3.2 Policy MDL-02 Committees
- 3.3 Policy MDL-01 Proceedings of the Council
- 3.4 Municipality of the District of Lunenburg Integrated Community Sustainability Plan
- 3.5 Municipality of the District of Lunenburg Municipal Climate Change Adaptation Plan
- 3.6 MDL Code of Conduct Policy - 37

4.0 Definitions

- 4.1 **Committee** – a group of people appointed for a specific function, typically consisting of members of a larger group.
- 4.2 **Council** – means the Council for the Municipality of the District of Lunenburg
- 4.3 **Sustainability** – a state at which the demands placed on the biological environment can be met without reducing its capacity to allow all people to live well, now and in the future.

5.0 Membership

- 5.1 The Sustainability Committee will consist eight (8) members, four (4) members of Council and four (4) members of the public, with one (1) member of the public being a youth (18-25 years of age), who shall be appointed by Council.

- 5.2 All Committee members shall serve in a volunteer capacity without remuneration, other than travel costs which will be based on Council's established per kilometre rate.
- 5.3 Committee members will serve two (2) year terms to maintain the knowledge base. The four (4) members at large will rotate off in opposite years to maintain continuity. In the first year, two members will sit for a one (1) year term.
- 5.4 If a member vacates the Committee for any reason at any time before that member's term would normally expire, council shall appoint a new member to the Committee to hold office for the unexpired term.
- 5.5 Applications for member at large appointments to the Committee shall be invited by public advertisement.

6.0 Qualifications

- 6.1 Members at large will be selected based on either a professional expertise or a general background in one or more of the following subjects: Watershed, Forestry, Parks/Recreation, Sustainability, Planning/Development, Utilities, Wildlife, Solid Waste and Recycling, Air Quality, Climate Change, or Green Practices. This knowledge could have been acquired through many avenues including professional practiced or community involvement activities.
- 6.2 All applications for the member at large positions will be reviewed by the Nominating Committee. The Nominating Committee will recommend appointment(s) to Council and Council will have final approval.
- 6.3 Any member at large may re-offer for a second two-year term when their term expires, however, the member will have to apply through the recruitment process undertaken for that position.
- 6.4 Every member of the Committee, who is absent from three consecutive meetings of the Committee, forfeits office, unless the absence is caused by illness or is authorized by resolution of the Committee and noted in the Committee minutes. Any member who so forfeits office is eligible for reappointment following the remainder of the unexpired term.

7.0 Rules of Engagement

- 7.1 The Committee shall meet on an as needed basis at the call of the Chair or as directed by Council.
- 7.2 All Committee meetings will be open to the public.

- 7.3 The Committee shall select a Chair and Vice Chair by secret ballot at their first meeting following Council's November appointments. The sitting Chair and Vice Chair may re-offer for the same position.
- 7.2 All meetings shall be conducted in accordance with Policy MDL-01 Proceedings of the Council; Policy MDL-37 "Code of Conduct" and the Government of Nova Scotia's *Municipal Conflict of Interest Act* unless otherwise stated in this Terms of Reference.
- 7.3 The Committee may receive presentations from the public upon approval of the Chair.
- 7.4 The Committee and its mandate will be reviewed (by council) upon completion and approval of Milestone 3 of the PCP Program.

8.0 Mandate and Responsibilities

- 8.1 To provide advice to staff and council on the development and implementation of an action plan to reduce community greenhouse gas emissions.
- 8.2 To serve as a conduit for interested stakeholders passionate about sustainability issues to ensure efforts are maximized and not duplicated.
- 8.3 To serve in an ambassador role for promoting sustainability issues and initiatives.
- 8.4 To advise and promote communication of the Action Plan to the community.
- 8.5 To provide advice to staff on continued success with the FCM Partners for Climate Protection Program.

9. Resources

The CAO, or designate, and Director of Planning and Development Services, or designate, will sit as staff resources on the Committee.

The Committee may invite resource people to the Committee meetings as needed.


Approved by Council:



NOVA SCOTIA ASK
▪ active smarter kids ▪

1

What is ASK?



Word Study

Active Smarter Kids (ASK) is a model for curriculum delivery that has been developed and researched in Norway.

ASK uses **Physically Active Learning** (PAL), which consists of fun and active lessons that combine physical activity with academic content as part of instructional time.

Examples:

- star jumps while spelling need-to-know vocabulary words
- Relay races to complete review work sheets as a team

ASK lessons are used primarily to reinforce and review academic content already covered in class.

ASK is NOT a binder approach!

2

What is ASK?



- highly researched tool for curriculum delivery
- low-cost and simple
- commonly delivered outdoors (woods, open space/field, hill, slide)
- contributes to students' engagement, cooperation, sense of belonging and enjoyment during instructional time
- commonly delivered in 20–30 minutes
- well suited for math, language and social studies classes; most commonly used for math in SSRCE
- tool to reinforce and practice concepts
- formative assessment tool in a playful, low-stress manner
- Helped teachers meet the NS requirement of 50 mins/week of PAT

3

Origins of ASK



ASK was brought to Nova Scotia through a pilot in 2018–2019 in the South Shore Regional Centre for Education (SSRCE) led by MODL's Active Living Coordinator (ALC).

- **2018-19:** Three grade 5 classes in two schools in SSRCE
- **2019-2020:** six schools, six classrooms (grades 4–6), among 13 teachers (MODL ALC seconded to NS ASK Project Lead Position)
- **2020-2021:** 50% expansion of ASK methods to all interested schools and teachers across the SSRCE, and 50% supporting the expansion of ASK in other interested Regional Centres for Education. (MODL ALC seconded to NS ASK Project Lead Position)



4

ASK Project Update



NS ASK Project Provincial Summary (September – October)

Teachers and Educational Assistants trained in NS ASK: 180 (148 of which are in SSRCE, serving MODL residents).

No. of schools that have received PD and Implementation Support (I.S.): 5

No. of schools that have submitted requests for NS ASK PD and I.S.: 13

No. of schools that have expressed informal interest in ASK PD: 3

No. of RCE's engaged with the NS ASK Project: 5

Strategic integration within RCEs:

Collaboration with SSRCE Instructional Coaches to support the implementation of NS ASK physically active learning

Project supporting the creation of NS ASK champion teams in other RCEs

New Resources for teachers and schools:

25 minute instructional video on NS ASK to meet PD request needs

Produced print resources for teachers

5

ASK and Health



- Global epidemic of obesity and mental health issues (both detriments to learning)
- In North America, as high as 80% (4/5) children are insufficiently active
- Within the school day, classroom instruction is the most inactive period of a child's day
- Most children spend ½ of their waking hours in school for between 6-12 years of their lives
- We CAN do better for them! PAL is a part of the solution
- Health behaviours track across the lifespan – healthier students now = healthier NS population down the road
- Reach is wide – most children attend public school
- ASK not only good at increasing PA and health, has broad range of educational benefits too.

6

Benefits of PAL



"[I had] kids dreading math – doing it in the ASK model just changed everything...The kids were not only not dreading it, they were looking forward to it." - ASK pilot Teacher

"there is an abundance of learning going on when running an ASK lesson...because of the physical activity levels, engagement, the problem solving, the quick check-in for assessment all in one lesson." – ASK pilot Teacher

Physical Activity during Instructional Time

- research-based –PA helps kids learn and retain info
- Learning Quality – enhanced learning, **engagement** and on-task behaviour. Supports more focus during in-classroom time.
- health and wellbeing benefits for students **and** teachers to be more active and less sedentary during the school day
- Helps teachers meet Physically Active Time requirement (50mins/week)

Enhanced Teaching and Learning Quality

- Teaching Quality – diverse methods and learning environments
- Formative Assessment Tool– fun and low-stress, kids unaware they are being assessed which is a stressor for many in Math

Social-Emotional Well-Being

- Inclusive Learning
- Reduction of Stress and Anxiety
- Relationship Building and Connection
- Enjoyment and Fun During Instructional Time

7

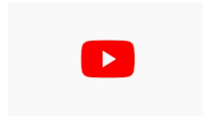
Teacher and Student Reflections



- "ASK has brought some of the joy back to teaching math. Like I'm enjoying it again because I like getting outside and playing games. As opposed to being inside and you're trying to drill things into their heads in the same way that you've been doing for so long." (NS ASK Teacher, 2019)
- "I immediately see the benefits of ASK. Best PD ever!" (NS ASK Teacher, 2020)
- "I just wanted to touch base and tell you how PALs / ASK is saving my life this year." (NS ASK Teacher, Nov. 2020)
- "ASK is fun. You get to work with your classmates, you get to learn outside, and it helps improve your health." (NS ASK Student)
- "You ticked me into learning!" (NS ASK Student)

8

NS ASK Videos and Resources



Resources

Further [Information](#)

9

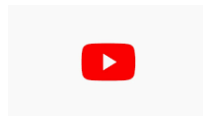
Thank you!



Britt Vegsund
NS ASK Project Lead

britt.vegsund@modl.ca

(902) 212-0474 (mobile)
(902) 541-1336 (desk)



@nsaskproject

10



Municipality of the District of Lunenburg

REQUEST FOR A DECISION

REPORT TO: Policy & Strategy Committee

SUBMITTED BY: Elana Wentzell, CPA, CMA

DATE: November 17, 2020

RE: Establishment of a Video Surveillance MODL Policy 089

RECOMMENDATION

“that the Policy and Strategy Committee recommends to Municipal Council that Municipal Council approves the proposed MODL Policy 089 Video Surveillance;

And

hereby gives seven (7) days’ notice of its intention to approve the proposed MODL Policy 089 at the November 24, 2020 Council meeting.”

BACKGROUND

The Video Surveillance Policy was initially presented to the Policy and Strategy Committee on November 19, 2019. Some typographical changes were made at the suggestion of the Committee: changing “Municipality” to “Municipal” in section 5.2.1 and changing “his or her” to “their” throughout the policy. These changes were made, and the policy was sent for legal review to McInnes Cooper. The reviewed document was received recently and the attached policy reflects the changes made.

EXECUTIVE SUMMARY

The new Municipal Services Building is equipped with video surveillance as one of its security measures. In order to ensure consistency of corporate surveillance and compliance with the Freedom of Information and Protection of Privacy Act (FOIPOP), the enclosed policy has been written based on guidelines from the Office of the Information and Privacy Commissioner of Nova Scotia.

The Policy outlines the responsible use of video surveillance as it is used for recording, monitoring, and storing video on all properties owned or occupied by the Municipality and its affiliates for the express purposes of enhancing safety and security, preventing and deterring crime, identifying suspects, and gathering evidence.

OPTIONS

In order for video surveillance to be installed on any municipal property, Council should establish a policy that meets the legislative requirements as set out in FOIPOP.

BUDGET IMPLICATIONS

Video surveillance has been included as a security measure in the construction of the new Municipal Services Building. The operational surveillance costs will be minimal as information will be stored on existing servers and only accessed per the policy guidelines.

STRATEGIC PRIORITIES

N/A

CONCLUSION

Staff recommend that a Video Surveillance Policy be established to meet legislative requirements of FOIPOP.

Department: Finance and Administration

Report Prepared By: Elana Wentzell

Date: Nov 9, 2020

Report Approved By: _____

Date _____

Reviewed By CAO: _____

Date _____

Municipality of the District of Lunenburg POLICY

Title: Video Surveillance	
Policy No. MODL 089	
Effective Date:	Amended Date:

1. Purpose:

- 1.1. The purpose of this Policy is to assist the Municipality in deciding whether collection of Personal Information by means of surveillance cameras is both lawful and justifiable, to assist the Municipality in understanding how privacy protection measures can be built into the use of a Video Surveillance System, and to ensure clarity for the public and employees of the Municipality with respect to the purposes for which a Video Surveillance System may be used. This Policy is also meant to:
 - 1.1.1. Ensure that any Video Surveillance System complies with the Municipal Government Act and the *Freedom of Information and Protection of Privacy Act*, as applicable.
 - 1.1.2. Ensure consistency of corporate surveillance undertaken by and within the Municipality.
 - 1.1.3. Outline the responsible and acceptable use of a Video Surveillance System as it is used for recording, monitoring and storing video on all properties owned or occupied by the Municipality of the District of Lunenburg (the "Municipality") and its affiliates for the express purposes of enhancing safety and security, preventing and deterring crime, identifying suspects, and gathering evidence.

2. Scope:

- 2.1. This Policy applies to the Video Surveillance System and video records administered by the Municipality; it does not apply to video recordings gathered in other circumstances (e.g., recordings of Council Meetings).
- 2.2. For the purpose of this Policy, the Municipality's environment includes all streets, public places, land and buildings that are owned or leased by the Municipality.

3. Definitions:

- 3.1. **Authorized Personnel** – means personnel authorized by the Chief Administrative Officer to operate surveillance equipment and access live or recorded material.
- 3.2. **CCTV** – means Closed Circuit TV, referring to the self-contained Video Surveillance System described in this Policy.
- 3.3. **Chief Administrative Officer** – means the Chief Administrative Officer of the Municipality of the District of Lunenburg.
- 3.4. **Clerk** – means the Clerk of the Municipality of the District of Lunenburg.

- 3.5. **Covert Surveillance** - refers to the secretive continuous or periodic observation of person, vehicles, and places or objects to obtain information concerning the activities of individuals.
- 3.6. **Director** – means director or department head of the Municipality of the District of Lunenburg.
- 3.7. **FOIPOP** - means the *Freedom of Information and Protection of Privacy Act*, SNS 1993, c. 5.
- 3.8. **MGA** – means *Municipal Government Act of Nova Scotia*, SNS 1998, c 18.
- 3.9. **Overt Surveillance** - refers to the non-secretive continuous or periodic observation of persons, vehicles, places or objects to obtain information concerning the activities of individuals.
- 3.10. **Personal Information** – means recorded information about an identifiable individual including the individual's name, address or telephone number, the individual's race, national or ethnic origin, colour, or religious or political beliefs or associations, the individual's age, sex, sexual orientation, marital status or family status, an identifying number, symbol or other particular assigned to the individual, the individual's fingerprints, blood type or inheritable characteristics, information about the individual's health-care history, including a physical or mental disability, information about the individual's educational, financial, criminal or employment history, anyone else's opinions about the individual, and the individual's personal views or opinions, except if they are about someone else.
- 3.11. **Privacy Impact Assessment (PIA)** - is a process that can be applied to any public body for the purpose of determining the level of protection and security afforded to personal information that is collected, used or disclosed in a new modified information system. The security of information refers to the technical, physical and procedural measures taken to protect personal information from the time it is collected until a public body disposes of it.
- 3.12. **Reception Equipment** - refers to the equipment or device used to receive or record Personal Information collected through a surveillance system, including a video monitor.
- 3.13. **Record** - a record of information in any form and includes books, letters, vouchers, and papers and any other information that is written, photographed, recorded or stored in any manner, but does not include software or any mechanism that produces records.
- 3.14. **Storage Device** - refers to a videotape, computer disk or drive, CD or DVD or computer chip used to store the recorded visual images captured by a surveillance system.
- 3.15. **Surveillance Equipment** – means any closed circuit television (CCTV) cameras and any other video/image monitoring and recording equipment systems used to monitor and record public, and restricted areas of property owned or leased by the Municipality.
- 3.16. **Municipality** – means the Municipality of the District of Lunenburg, and as referred to in this Policy shall include all departments and offices which make up the Municipality's administration, as well as any agency of the Municipality which has agreed to be bound by this Policy.
- 3.17. **Video Surveillance System** - refers to a mechanical or electronic system or device that enables continuous or periodic video recording, observing or monitoring of personal information about individuals in open, public spaces, public buildings or public transportation, and includes all recorded records collected by same.

4. Policy Statement:

- 4.1. Subject to this Policy, the Chief Administrative Officer has the sole authority to oversee and coordinate the use of any Video Surveillance System on Municipality Property.
- 4.2. The Municipality recognizes the need to balance an individual's right to protection of privacy against the Municipality's duty to promote a safe environment for all citizens, and to protect municipal property.
- 4.3. Any Video Surveillance System implemented under this Policy will be designed and operated in a manner that minimizes privacy intrusion and that is reasonably necessary to achieve the lawful goals of the Municipality.
- 4.4. The Municipality shall only use a Video Surveillance System for the following purposes:
 - 4.4.1. to record unlawful acts and breaches of Municipality security;
 - 4.4.2. to ensure public health and safety;
 - 4.4.3. to prevent or deter unlawful acts and breaches of Municipality security; and
 - 4.4.4. to aid law enforcement investigations.
- 4.5. Personal Information obtained by the Municipality through its Video Surveillance System will be used for security, health and safety and law enforcement purposes only. For greater clarity, a Video Surveillance System will not be used by the Municipality to monitor or evaluate Municipality employees, except as specifically authorized pursuant to Section 6.5.
- 4.6. All Personal Information obtained through the Video Surveillance System is confidential and will only be viewed or released as per Sections 6.6 & 6.7 of this Policy.
- 4.7. Authorized Personnel involved in the use of the Video Surveillance System will be appropriately trained and supervised in the responsible use of the Video Surveillance System.
- 4.8. All existing uses of a Video Surveillance System will be brought into compliance with this Policy within twelve months of the approval of this Policy.

5. Responsibilities:

- 5.1. **Municipal Council is responsible for:**
 - 5.1.1. Approval of this Policy and any subsequent amendments.
- 5.2. **Chief Administrative Officer is responsible for:**
 - 5.2.1. Overseeing and coordinating the use of any Video Surveillance System on Municipal Property.
 - 5.2.2. Overseeing consistent adherence to this Policy.
 - 5.2.3. The approval of the installation of Surveillance Equipment, including video cameras, on all Municipality owned and leased properties.
 - 5.2.4. Monitoring the effectiveness of the Policy, and recommending changes to the Policy where considered appropriate.
- 5.3. **Authorized Personnel are responsible for:**
 - 5.3.1. Establishing and maintaining an internal reporting network relating to control mechanisms

and advising the Chief Administrative Officer;

5.3.2. Budgeting for the cost of the Video Surveillance System requirements;

5.3.3. Ensuring Privacy Impact Assessments are conducted on new surveillance initiatives and on significant upgrades to existing surveillance systems;

5.3.4. Informing the Chief Administrative Officer of:

5.3.4.1. Proposed changes to authorized video surveillance which may affect the security of the Municipality;

5.3.4.2. Proposed changes in internal reporting network relating to proposed installation of new Surveillance Equipment that may be affected by this Policy.

5.3.4.3. Any new legislation pertaining to the use of video surveillance that must be incorporated into this Policy.

5.3.5. Reviewing all proposed changes to existing any Video Surveillance System and newly proposed systems to ensure that they meet all the requirements of this Policy.

5.4. **Employees are responsible for:**

5.4.1. Reviewing and complying with this Policy in performing their duties and functions related to the operation of a Video Surveillance System;

5.4.2. Attending training relating to this Policy, where available.

6. **Procedures:**

6.1. **Privacy Risk Assessment:**

6.1.1. The following steps/factors must be considered before a Video Surveillance System is implemented:

6.1.1.1. A Privacy Risk Assessment shall be conducted on the effects that a proposed Video Surveillance System may have on personal privacy and the ways in which any adverse or disproportionate effects can be mitigated;

6.1.1.2. A Security Threat Assessment (Schedule 1) shall be completed;

6.1.1.3. The use of the Video Surveillance System must be justified on the basis of verifiable, specific reports of incidents of crime or significant safety concerns;

6.1.1.4. A Video Surveillance System should only be considered after other measures of deterrence or detection have been considered and rejected as not workable;

6.1.1.5. The proposed design and operation of the Video Surveillance System should minimize privacy intrusion.

6.2. **Public Consultation:**

6.2.1. The Municipality acknowledges the importance of public consultation when a new or additional Video Surveillance System is considered for in public areas of Municipality-owned buildings and properties. The extent of public consultation may vary depending on the extent of public access to the building or property in question.

6.2.2. When a new or additional Video Surveillance System is being considered for open public spaces such as streets or parks, the Municipality shall consult with relevant stakeholders and the public to determine the necessity and acceptability. When a new or additional Video Surveillance System is being considered for Municipality owned or operated building to which the public are invited, such as a library, art gallery, or Municipal Office, notice shall be provided at the site with an opportunity for public feedback. When a new or additional Video Surveillance System is contemplated inside municipal buildings or parking lots where there may be a high security risk to staff or clients (or their property), consultation shall not be required.

6.3. Design and Installation and Acceptable Use of Surveillance Equipment:

- 6.3.1. Video surveillance currently recorded by the Municipality is stored directly to hard drives. Other methods of recording/storage are acceptable provided requirements of this Policy are met.
- 6.3.2. Given the open and public nature of the Municipality's facilities and the need to provide for the safety and security of employees and the general public who may be present at all hours of the day, a Video Surveillance System may operate at any time in a 24 hour period.
- 6.3.3. Reception Equipment such as video cameras may be installed in identified public areas where surveillance is a necessary and viable detection or deterrence activity.
- 6.3.4. Reception Equipment shall not be positioned, internally or externally, to monitor areas outside a building, or to monitor other buildings, unless necessary to protect external assets or to ensure personal safety. Cameras should not be directed to look through the windows of adjacent buildings.
- 6.3.5. Reception Equipment shall not monitor areas where the public and employees have a reasonable expectation of privacy e.g. showers, restrooms, change-rooms.
- 6.3.6. Consideration should be given to the use of surveillance being restricted to periods when there is a demonstrably higher likelihood of crime being committed and detected in the area under surveillance, such as when a building is ordinarily not occupied. Only Authorized Personnel shall have access to the Video Surveillance System's controls and to its Reception Equipment.
- 6.3.7. Reception Equipment should be in a controlled access area. Only Authorized Personnel shall have access to the Reception Equipment. Video monitors shall not be located in a position that enables public viewing.

6.4. Public Awareness of Cameras:

- 6.4.1. The public/individuals must be notified, using clearly written signs prominently displayed at the entrance to and the perimeters of surveillance areas, so the public has ample warning that surveillance is or may be in operation before entering any area under surveillance.
- 6.4.2. The notification signs must inform individuals of the legal authority for the collection of Personal Information; the principal purpose(s) for which the Personal Information is intended to be used; and the title, business address, and telephone number of the individual who can answer questions about the collection. (Notices should conform with the example in Schedule 2)

- 6.4.3. In addition, the notice may also be provided via the Municipality's Website, but will not be a substitute for signage in the areas captured by cameras.
- 6.5. Covert Surveillance:**
- 6.5.1. Covert Surveillance will be used only in exceptional cases and only with the approval of the Chief Administrative Officer.
- 6.5.2. Where it appears that Covert Surveillance may be required, the Director will first conduct an assessment of the specific circumstances of the situation and make a recommendation to the Chief Administrative Officer.
- 6.5.3. The Director's assessment must demonstrate that Covert Surveillance is the only reasonable option in the circumstances, that the benefits derived from the information obtained outweigh the violation of privacy of the individuals observed and that the Covert Surveillance is consistent with the law.
- 6.5.4. Surveillance Equipment will be positioned in a way that minimizes unnecessary or collateral surveillance (e.g. in the case of ongoing computer theft problem, the camera will be positioned so that individuals will be recorded only if they approach the equipment of concern).
- 6.5.5. In all cases, Covert Surveillance will be time-limited.
- 6.6. Request to View Live or Recorded Information:**
- 6.6.1. Only Authorized Personnel are permitted to operate Surveillance Equipment and access live or recorded material. However, in exceptional circumstances, the Chief Administrative Officer may designate other individuals to operate Surveillance Equipment and access live or recorded material on behalf of the Municipality.
- 6.6.2. Notwithstanding section 6.6.1, all requests by Municipality staff or law enforcement agencies to view live or recorded information must be made to and are subject to the approval of the Chief Administrative Officer. Where the permission is granted to view live or recorded information, that information must be viewed in the presence of Authorized Personnel.
- 6.6.3. All other requests to view recorded information must be made as a FOIPOP application to the Clerk or a production order under the *Criminal Code*.
- 6.6.4. The Municipality may, on its own initiative, in connection with reporting a suspected breach of any law, statute or ordinance disclose recordings to an applicable law enforcement agency, with the approval of the Chief Administrative Officer.
- 6.6.5. Access may be provided to live or recorded content from the Video Surveillance System in the event of an imminent or significant risk of harm to any individual, provided that such access would reasonably be expected to reduce, mitigate or investigate the risk of harm.
- 6.6.6. The Chief Administrative Officer and /or Clerk can be contacted by Email: info@modl.ca, Phone: 902-543-8181, or Mail: 10 Allée Champlain Drive, Cookville, NS B4V 9E4.
- 6.7. Personal Access to Information Request Process:**
- 6.7.1. The Municipality recognizes that an individual whose Personal Information has been collected by a Video Surveillance System has a right to access their Personal Information under FOIPOP.

- 6.7.2. All inquiries related to or requests for video surveillance Records shall be directed to the Clerk. A person requesting access shall follow the procedure for obtaining access as per Section 6 of FOIPOP or Section 466 of the MGA. Processing of the request will be in accordance with the provisions of FOIPOP and the MGA, and take into consideration the protection of the privacy of third parties.
 - 6.7.3. If the access to a video surveillance record is required for the purpose of a law enforcement investigation, the requesting Officer must complete the Municipality's Request Form and forward it to the Clerk.
- 6.8. Custody, Control, of Video Records/Recordings**
- 6.8.1. The Municipality retains custody and control of all original video surveillance Records. Video Records are subject to the access and privacy requirements of FOIPOP and the MGA, which includes but is not limited to the prohibition of all Municipal Staff from access or use of information from the Video Surveillance System, its components, files, or data base for personal reasons.
 - 6.8.2. Short retention periods minimize risk of improper use and disclosure. The Municipality's video recorders continually record for a period of up to 30 days depending on the recording device and technology before recording over data.
 - 6.8.3. A Record of an incident will only be retained on an external storage device where it may be required as part of a criminal, safety, or security investigation or for evidentiary purposes. Such Record shall be copied from the hard drive onto an external storage device that cannot be over written and stored securely in a locked receptacle located in a controlled access area.
 - 6.8.4. All storage devices that are not in use shall be stored securely in a locked receptacle located in a controlled access area. All storage devices that have been used shall be numbered and dated.
 - 6.8.5. Access to storage devices shall only be by Authorized Personnel.
 - 6.8.6. A logbook will be kept with regard to the use of each external storage device. The Authorized Personnel will take control of the external storage device in question and secure it in a sealed envelope with the time and date of the seizure and initials of the Authorized Personnel on the seal of the envelope.
 - 6.8.7. A logbook shall be kept by Authorized Personnel with regards to the use of Surveillance Equipment. The logbook shall reflect all instances where:
 - 6.8.7.1. Authorized Personnel or person designated under Section 6.6.1 views a recording;
 - 6.8.7.2. A request is made to view a video Record/recording;
 - 6.8.7.3. The Chief Administrative Officer denies a request to view a video Record/recording and the reasons for the denial;
 - 6.8.7.4. The Chief Administrative Officer permits an individual to view a recording (this will include the reasons the request was granted, who viewed the recording, when, and identify the Authorized Personnel who was present during the viewing);
 - 6.8.7.5. A request for Release of Record to Law Enforcement Agency (Schedule 3); and
 - 6.8.7.6. The Chief Administrative Officer releases a Record to a Law Enforcement Agency.

- 6.8.8. Personal Information stored on an external storage device used for law enforcement, safety, or security investigation or for evidentiary purposes shall be retained for one year after its use.
- 6.8.9. Video Records requested by the RCMP for investigation purposes must be accompanied by a warrant or production order and shall be copied on an external storage device and kept secure by the Authorized Personnel until it is retrieved by the RCMP. Following the investigation and any corresponding legal action the RCMP shall be required to destroy the video record.
- 6.9. **Unauthorized/Inadvertent Disclosure:**
 - 6.9.1. A person who becomes aware of any unauthorized or inadvertent disclosure of a video Record in contravention of this Policy should immediately notify the Chief Administrative Officer.
 - 6.9.2. After this disclosure is reported the Chief Administrative Officer shall confirm the existence of the disclosure.
 - 6.9.3. Upon confirmation of the existence of the disclosure, the Chief Administrative Officer will make reasonable efforts to mitigate the extent of the disclosure, take all reasonable actions to recover the video record, review the adequacy of privacy protection with the existing Policy, and, where required, notify the affected parties whose personal information was inappropriately disclosed.
 - 6.9.4. Intentional unauthorized disclosure, or disclosure caused by negligence, by employees of the Municipality may result in disciplinary action up to and including dismissal. Intentional unauthorized disclosure, or disclosure caused by negligence, by service providers to the Municipality, may result in termination of their contract.
- 6.10. **Retention and Disposal of Video surveillance record:**
 - 6.10.1. The Municipality's Video Surveillance System(s) continually record for a period of up to thirty (30) days depending on the recording device and technology, before recording over data. Video records shall not be retained on an external storage device unless in accordance with Section 6.8.3.
 - 6.10.2. A Record retained on an external storage device in accordance to Section 6.8.3 shall be retained for a period of one (1) year.
 - 6.10.3. The Municipality will take all reasonable efforts to ensure the security of Records in its control/custody and ensure their safe and secure disposal.
 - 6.10.3.1. Storage devices must be securely disposed of by shredding, burning or magnetically erasing the information.

Schedule 1 – Surveillance Video Security Threat Assessment
To Determine the Requirements for a Video Surveillance System

Site Name:

Location:

Proposed Video Location:

Requestor:

Department:

Date:

1. Is there already a video surveillance and/or camera on site? If so, please describe and advise if their setup adheres to Municipality of the District of Lunenburg's Video Surveillance Policy. (use separate page if required).

2. Video surveillance must only be considered after other measures of deterrence or detection have been considered and rejected as unworkable.

Have the following security counter measures been reviewed and rejected as unworkable?

Security Counter Measure	Reviewed (Y/N)	Rejected (Y/N)	Comments
a. Security Procedures	<input type="checkbox"/>	<input type="checkbox"/>	
b. Duress Buttons	<input type="checkbox"/>	<input type="checkbox"/>	
c. Door Locking Hardware	<input type="checkbox"/>	<input type="checkbox"/>	
d. Alarm System	<input type="checkbox"/>	<input type="checkbox"/>	
e. Access Control Panel	<input type="checkbox"/>	<input type="checkbox"/>	
f. Signage	<input type="checkbox"/>	<input type="checkbox"/>	
g. Security Guard/Officer Patrols	<input type="checkbox"/>	<input type="checkbox"/>	
h. Lighting	<input type="checkbox"/>	<input type="checkbox"/>	
i. Other	<input type="checkbox"/>	<input type="checkbox"/>	

3. The use of each video surveillance camera should be justified on the basis of verifiable, specific reports of incidents of crime of significant safety concerns.

Are there any documented incidents of crime or significant safety concerns in any of the following formats?

<u>Documentation Formats</u>	<u>Yes</u>	<u>No</u>	<u>Comments</u>
a. Security Occurrence Reports	<input type="checkbox"/>	<input type="checkbox"/>	
b. Police Reports	<input type="checkbox"/>	<input type="checkbox"/>	
c. JOH&S Committee	<input type="checkbox"/>	<input type="checkbox"/>	
d. Internal Memos	<input type="checkbox"/>	<input type="checkbox"/>	
e. Other	<input type="checkbox"/>	<input type="checkbox"/>	

4. An assessment must be conducted on the effects that the proposed video surveillance system may have on personal privacy and the ways in which adverse effects can be mitigated.

Have the following effects and mitigation strategies been considered?

<u>Effects & Mitigation Strategies</u>	<u>Yes</u>	<u>No</u>	<u>Comments</u>
a. Is proposed camera situated in an area that will minimize privacy intrusion?	<input type="checkbox"/>	<input type="checkbox"/>	
b. Is the proposed camera location one where the public and employees do not have a higher expectation of privacy (i.e. not in washroom or change room, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	
c. Is the location of the proposed video camera visible?	<input type="checkbox"/>	<input type="checkbox"/>	
d. Can the video surveillance be restricted to the recognized problem area?	<input type="checkbox"/>	<input type="checkbox"/>	
e. Is space allocated for proper video surveillance signage?	<input type="checkbox"/>	<input type="checkbox"/>	
f. Has a drawing been attached showing the camera location?	<input type="checkbox"/>	<input type="checkbox"/>	
g. Have any other effects/mitigation strategies been considered?	<input type="checkbox"/>	<input type="checkbox"/>	

5. The proposed design and operation of the video surveillance system should minimize privacy intrusion. Have the following design and operation factors been considered for each proposed camera location?

Measure to Mitigate Effects	Yes	No	Comments
a. Can the proposed camera be restricted through hardware or software to ensure that operators cannot adjust or manipulate cameras to overlook spaces that a threat assessment has not been completed for?	<input type="checkbox"/>	<input type="checkbox"/>	
b. Will the reception equipment be located in a strictly-controlled access area?	<input type="checkbox"/>	<input type="checkbox"/>	
c. Can the video surveillance monitor be installed in such a way that it will be hidden from public view?	<input type="checkbox"/>	<input type="checkbox"/>	
d. Other	<input type="checkbox"/>	<input type="checkbox"/>	

Comments:

Completed By (Print)

Signature

Position Title

Date



This area may be monitored by (Closed Circuit TV Video Surveillance - CCTV)

The personal information collected by the use of the CCTV is collected under the authority of the *Municipal Government Act*, 1998. This information is used for the purpose of security, promoting public safety and the reduction of crime at this site.

Questions about the collection of the personal information may be addressed to the Chief Administrative Officer of the Municipality of the District of Lunenburg, 10 Allée Champlain Drive, Cookville, NS B4V 9E4.

Phone (902) 541-1320

Schedule 3 – Law Enforcement Officer Request Form



Release of Record to Law Enforcement Agency

(Under Section 27(m) of the *Freedom of Information and Protection of Privacy Act*)

To: Municipality of the District of Lunenburg

I, _____, of the
Print Name of Officer _____ Print Name of Police Force

Request a copy of the following record(s):

Date: _____ Time Period: _____ to _____

Municipal Facility: _____

To aid an investigation undertaken with a view to a law enforcement proceeding or from which a law enforcement proceeding is likely to result as duly noted on the attached warrant/production order.

I confirm that the record will be destroyed by the RCMP after use by the agency.

Signature of Officer _____ Badge # _____ Date _____

Return completed original forms to the Clerk at the Municipality of the District of Lunenburg, 10 Allée Champlain Drive, Cookville, NS B4V 9E4

I _____ consent to; OR refuse; this release of record.
Chief Administrative Officer

Signature _____

Personal information is collected under the authority of the *Municipal Government Act* for the purpose of creating a record relating to the release of video surveillance record to a law enforcement agency. Questions about the collection of personal information may be addressed to the Chief Administrative Officer of the Municipality of the District of Lunenburg, 10 Allée Champlain Drive, Cookville, NS B4V 9E4 Phone: 902-543-8181.