Halifax Watershed Studies: Sandy Lake and Preston Area for the Regional Watersheds Advisory Board

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Two Watershed Study Areas



Kilometers

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Atlantic Ocean







Sandy Lake - Objectives

- What are the existing lake water quality conditions?
 - Historical data and three sampling events
 - Set Water Quality Objectives based on historical and recent data
- What are the potential impacts of future development on lake water quality?
 - Lakeshore Capacity Model
 - 3 scenarios of development
- What areas are suitable/not-suitable for development?
 Constraints map

Sandy Lake – Existing water quality conditions



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Sandy Lake – Lakeshore Capacity Model

- Phosphorus load modeling
 - Land Use map
 - Phosphorus export for each land use type
- Phosphorus flux + hydraulic budget = average concentration
- Model Uncertainty
- Four scenarios
 - Modeling Scenario 1: Existing Conditions;
 - Modeling Scenario 2: Future Developments;
 - Modeling Scenario 3: Future Developments plus; and
 - Modeling Scenario 4: Future Developments (Scenario 3) with Advanced Stormwater Management

Sandy Lake – Lakeshore Capacity Model

Scenario	Sandy Lake Predicted Phosphorus (µg/L)	Marsh Lake Predicted Phosphorus (µg/L)
Scenario 1: Existing Conditions	12	11
Scenario 2: Planned Developments	16	15
Scenario 3: Planned Developments + removal of Uplands WWTF and Septic Systems near Sandy Lake	15	14
Scenario 4: Future Developments (Scenario 3) with Advanced Stormwater Management	13	12
Recommended Water Quality Objective	18	15.5



Sandy Lake Summary

- Increasing total phosphorus concentrations
- Future development will impact water quality
- Mitigation measures
 - Septic and WWTF to municipal waste water
 - Advanced stormwater management



Break for Questions regarding Sandy Lake



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Preston Study Area

Little Salmon River

- Lake Major
- Long Lake
- Tributaries to Major
- Cole Harbour

Partridge River

- Winder Lake
- Eagle Lake
- Frog Lake
- Lawrencetown Lake

Protected Areas

- Lake Major PWA
- Waverley Game Sanctuary
- Waverley Salmon River Long Lake Wilderness Area
- Additional Sampling



Objectives

- What are the conditions of the surface water?
 - Historical data and sampling completed.
- Are there groundwater issues in areas that rely on groundwater?
 - Residential well survey





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Salmon River Watershed

- Lake Major total phosphorus
 - Inputs to Lake Major: 8 to 17 µg/L
 - Lake Major: 2 to 7 μg/L
 - Oligotrophic
- Long Lake TP
 - 2 to 34 µg/L
 - Mesotrophic



Partridge River Watershed

- Winder Lake (n=17)
 - Total Phosphorus: 100 to 300 µg/L (median 100 µg/L) Eutrophic
- Eagle Lake (n=3)
 - Total Phosphorus: 15, 27, 20 µg/L
 Mesotrophic/Eutrophic
- Frog Lake (n=2)
 - Total Phosphorus: 23, 33 µg/L Eutrophic
- Partridge River Outlet (n=3)
 - 15, 15, 21 μg/L
 Mesotrophic



Additional Lake Sampling

- Nelson Lake

 May 2014: 24 µg/L
 July 2014: 16 µg/L
- Robinson Lake

 May 2014: 22 µg/L
 July 2014: 18 µg/L
- Gammon Lake

 May 2014: 21 µg/L
 July 2014: 16 µg/L



Preston Residential Well Survey



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Arsenic in Groundwater



Preston residential well results summary



Preston Area Summary

- Lake Major water quality is good
- North Preston WWTP is impacting Eagle Lake and Frog Lake
 - Both lakes may be eutrophic
- Groundwater Quality
 - Arsenic in Montague and Mineville/Lawrencetown
 - Bacteria in dug wells in Preston



Thank You

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