Halifax Regional Municipality Watershed Studies Preston Area and Sandy Lake

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Regional Watershed Advisory Board
March 12, 2014

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Outline – Sandy & Preston Area Watershed Studies

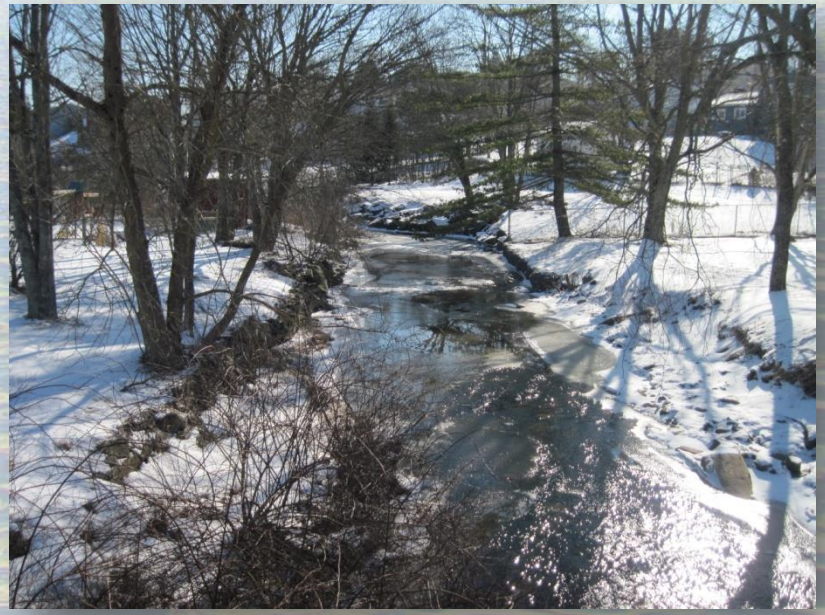
1. Origin
2. Study Areas
3. Study Objectives
4. Work to Date – Milestones
5. Proposed Water Quality Objectives
6. Next Steps

What is a Watershed Study?

1. A systematic assessment of the **ecological and hydrological** features and functions of a watershed.

2. An approach to understanding **impacts** to these features and functions as a result of **future land use changes.**

3. An evaluation of mitigation options for **protection** of the watershed.



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Origin of the Watershed Studies – 2006 Regional Plan

Sandy Lake:

A. Urban Settlement Designation

- Central water & wastewater services to be provided (25 years)

B. Requirement for Watershed Study prior to Secondary Planning

- Assesses development on a watershed scale
- Evaluates assimilative capacity of the watershed prior to development

Preston Area:

A. Rural Settlement Designation

- Rural Commuter
- Limited growth forecast

B. Groundwater Quality Concerns

- On-site wells and septic systems

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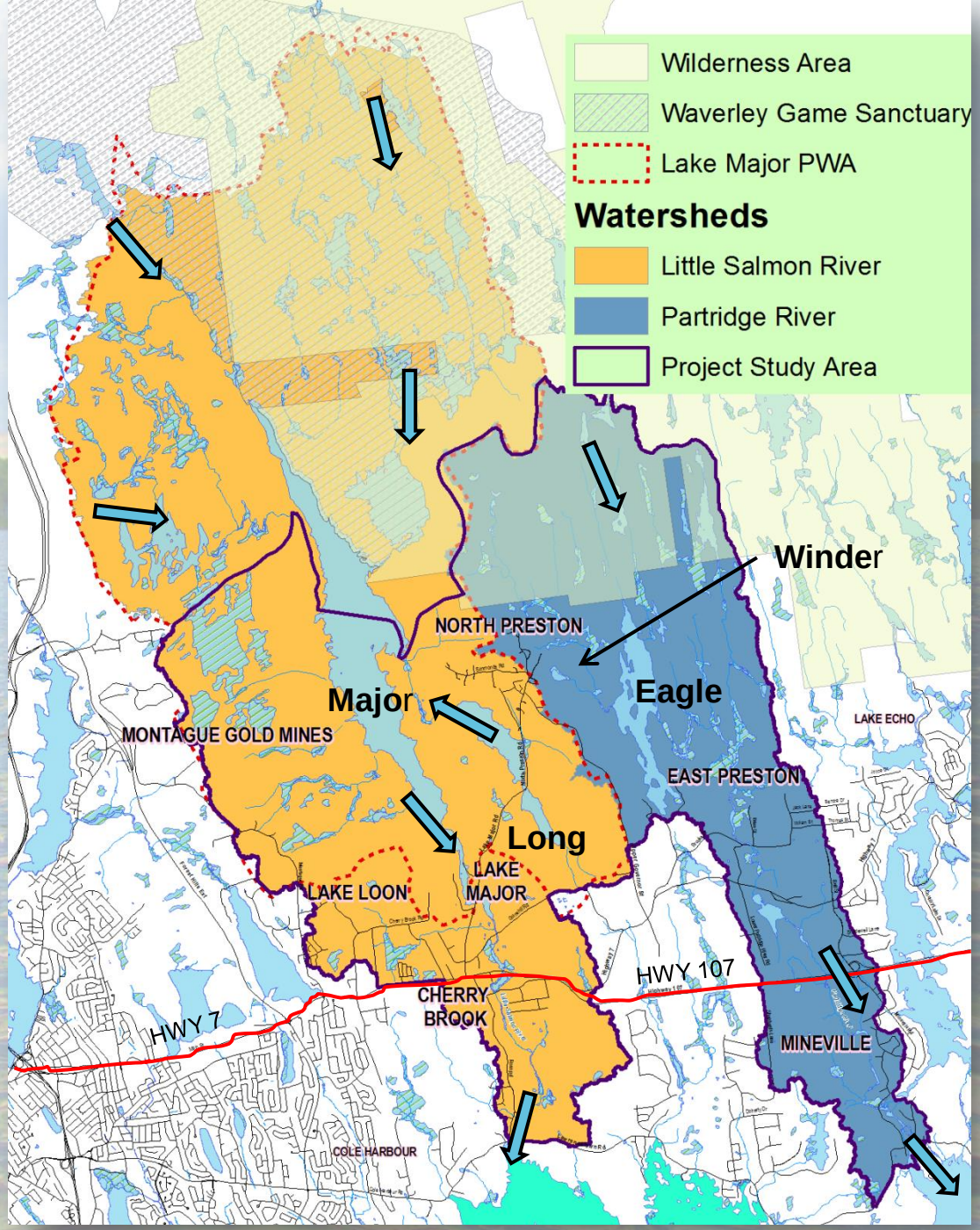
Preston Study Area

- **Little Salmon River**
  - Lake Major
  - Long Lake
  - Tributaries to Major
  - Cole Harbour
- **Partridge River**
  - Eagle Lake
  - Winder
  - Lawrencetown Lake
- Protected Areas
  - Lake Major PWA
  - Waverley Game Sanctuary
  - Waverley Salmon River Long Lake Wilderness Area

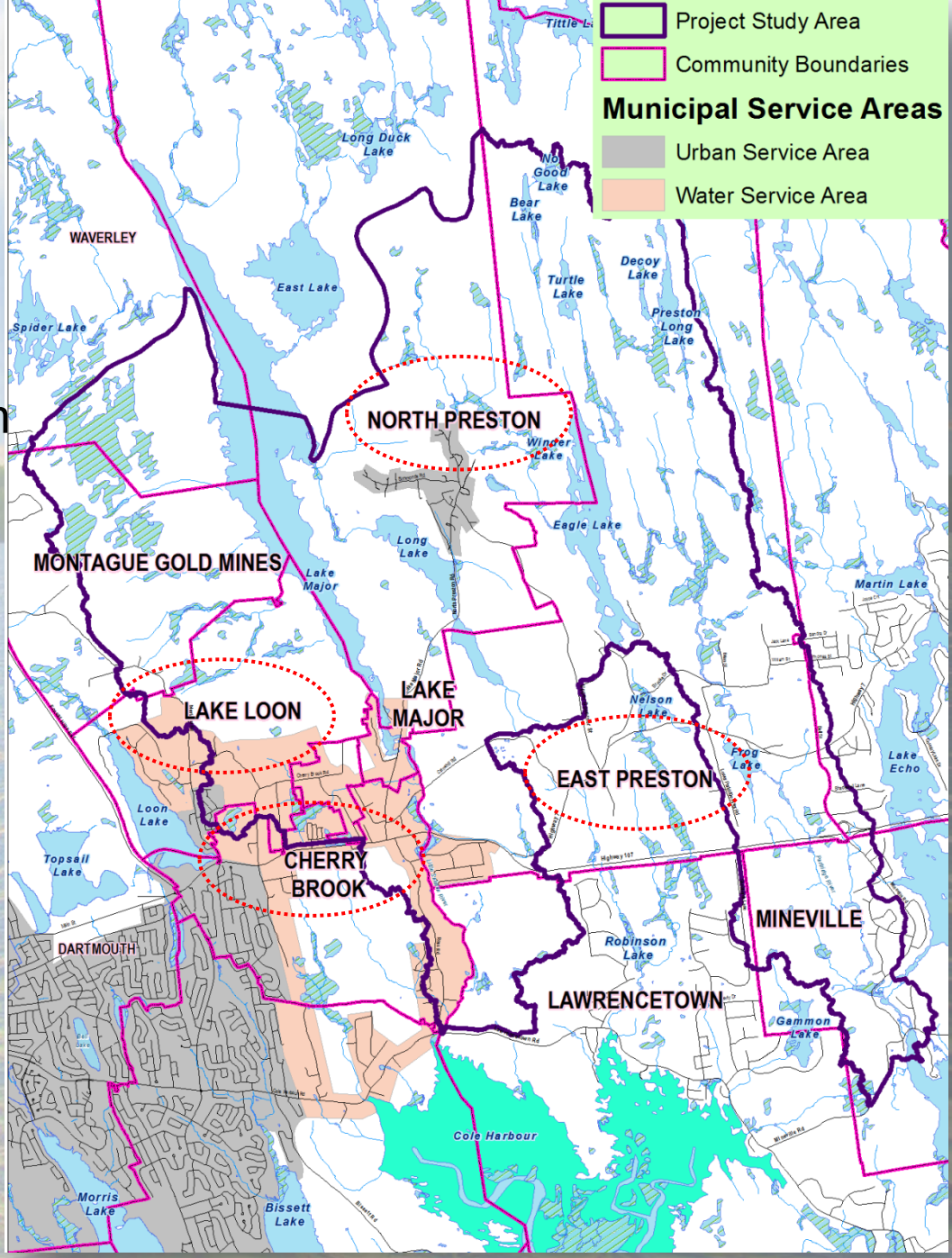


Preston Communities

HRM Regional Plan (Table 3.1)

Rural Commuter Local Designation

- North Preston
- East Preston
- Cherry Brook
- Lake Loon



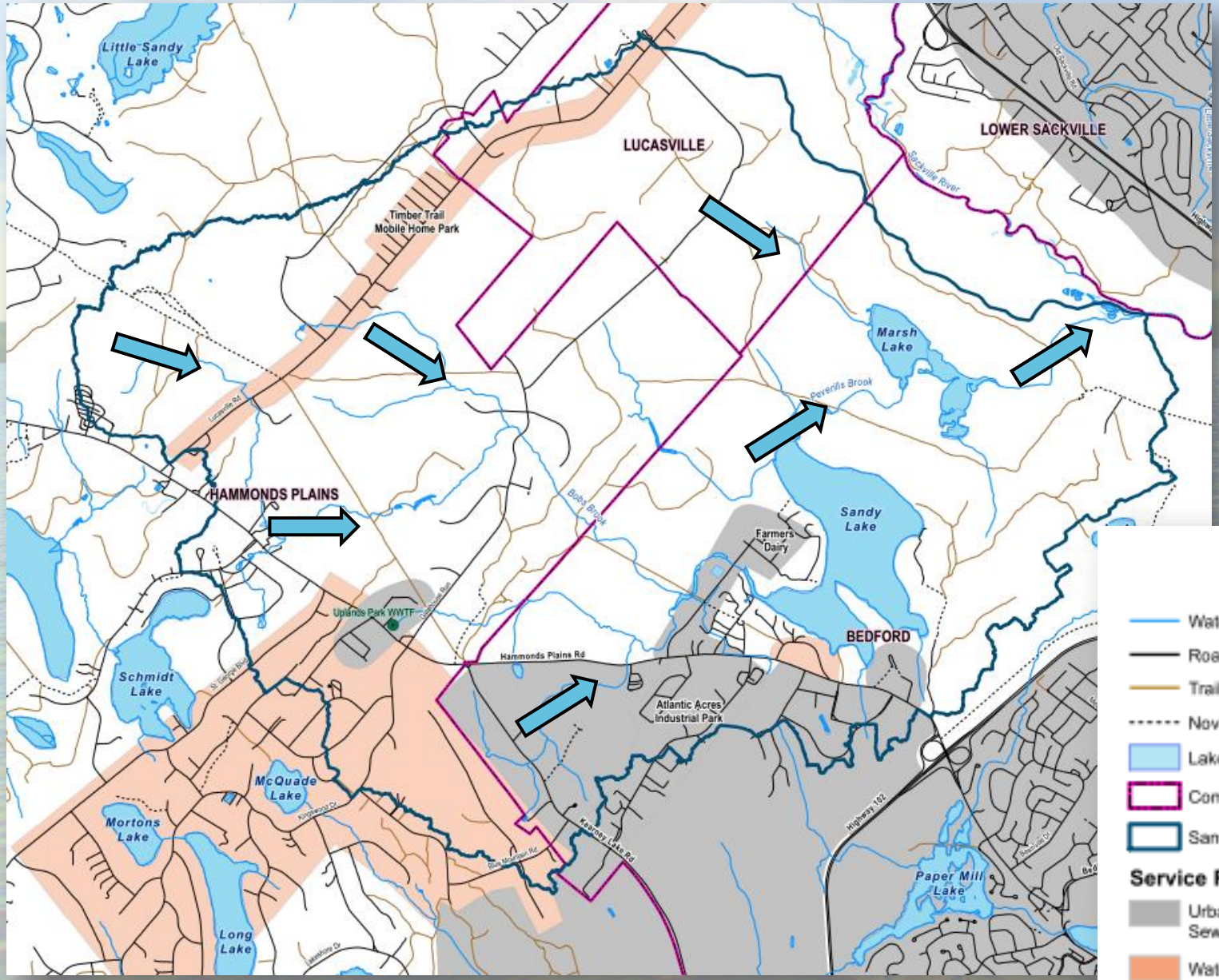
Sandy Lake Watershed

Google Maps Image

Sandy Lake Watershed

Water Service - Pink

Sewer Service - Grey



Watershed Studies Objectives

HRM Regional Plan Policy E-17:

*These watershed studies shall determine the **carrying capacity** of the watersheds to meet the **water quality objectives** which shall be adopted following the completion of the studies.*

The **Preliminary Report** recommends Water Quality Objectives.

The **Final Report**

- Assesses the carrying capacity
- And the other objectives of Policy E-17

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Watershed Studies Objectives

- **Policy E-17 Objectives**
  1. Identify surface and groundwater quality issues.
  2. Recommend **water quality objectives (WQOs).**
  3. Recommend areas suitable and not suitable for development.
  4. Make recommendations to protect and manage quality and quantity (both surface and groundwater).
  5. Recommend management strategies to achieve WQOs.
  6. Recommend a monitoring plan to determine if water quality objectives are being met.

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Methodology (Phase 1): Data Compilation and Analysis

- Compile ecological and hydrological information
- Review existing water data
  - HRM water quality
  - DFO
  - Wastewater discharge monitoring
  - Private data
- Add data from field sampling
- Assess current water quality conditions
- Identify Indicator Parameters
- Establish Water Quality Objectives
- Presentations

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Water Quality Objectives

Water Quality Objectives assume:

- Current conditions should be maintained
  - Protect aquatic life and aesthetic appeal
  - Protect recreational activities: swimming, boating, fishing

"Although it is not the intention of this Plan to **achieve pristine conditions** for every watershed, there is a desire to … maintain the existing trophic status of our lakes and waterways to the extent possible. **Our lakes, waterways and coastal waters should not be further degraded.**"

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Field Program: Surface Water Sampling

Sandy and Marsh Lakes

Lakes Major, Long, Eagle, Outlet of Partridge River

Samples collected:

- Summer 2013
- Fall 2013
- Spring 2014

Purpose

- Characterize current water quality
- Use information in LCM

Public Outreach

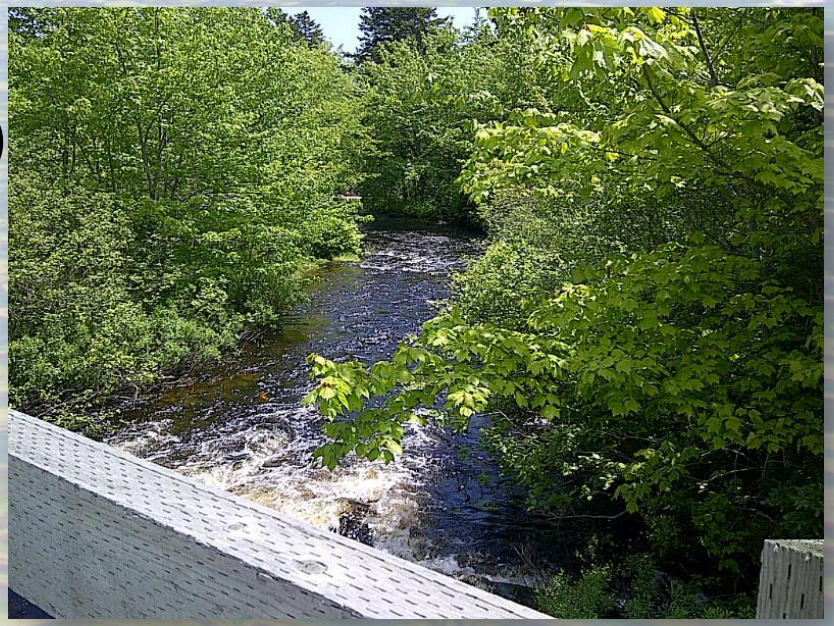
Preston Area

- Presentation 1: Study Overview (July 2013)
- Presentation 2: Preliminary Report (December 2013)
  - Posted for Public Comment

Sandy Lake

- Presentation 1: Draft Preliminary Report (February 2014)
  - Posted for Public Comment

Draft Final Reports (Summer 2014)
- Posted for Public Comment
- Will be Presented
- Submit Final Report to HRM



Methodology: Water Quality Indicator Parameters

- Parameters likely to be impacted from land use changes
  - Total Phosphorus
  - Nitrate
  - Ammonia
  - Total Suspended Solids
  - Chloride
  - *E. coli* bacteria

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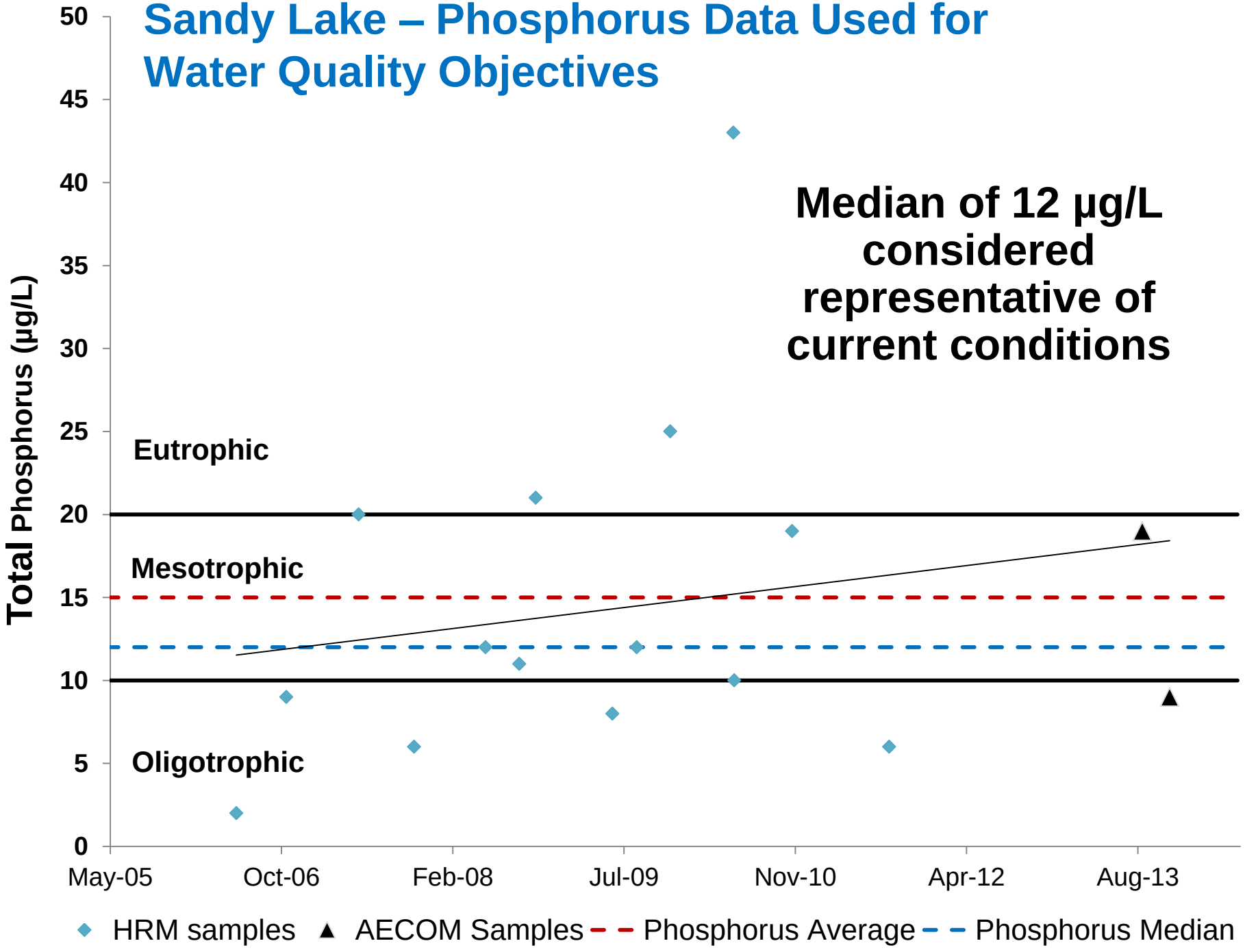
Sandy Lake – Phosphorus Data Used for Water Quality Objectives



Sandy Lake – Current Water Quality

Sample Name	Statistical Summary	Anthropogenic Influence Indicator Parameters				Nutrient Enrichment and Trophic Status Indicator Parameters			Water Clarity Indicator Parameter
		Chloride	Nitrate	Total Ammonia	E. Coli	TKN	Total Phosphorus	Chlorophyll α	Total Suspended Solids
		mg/L	mg/L	mg/L	MPN/ 100mL	mg/L	µg/L	µg/L	mg/L
Sandy Lake	n	16	14	13	5	15	15	15	15.0
	min	21	0.01	0.05	1	0.30	2.0	0.3	1.0
	max	50	0.16	0.08	41	3.60	43.0	13.2	5.0
	average	35	0.07	0.05	17	0.73	14.9	5.5	3.1
	median	37	0.05	0.05	4	0.40	12.0	4.3	2.0

Water Quality Objectives: Nitrate, TSS, Chloride, E.coli

Parameter	Derivation of Objective	Sandy Lake Watershed Water Quality Objective	Early Warning Alert Value	Evaluation Method for Objective/Alert Value
NO_3 – Nitrate	CCME	13 mg NO_3/L **(0.5)**	≤10 mg/L	75th percentile of 3 year historical data
Total Suspended Solids (TSS)	CCME	Short term: 25 mg/L increase Long term: 5 mg/L increase **(2.0)**	Lake dependent	75th percentile of 3 year historical data not to exceed base line by more than 5 mg/L
Chloride	CCME	120 mg/L **(37)**	≤90 mg/L	75th percentile of 3 year historical data
E. coli	Nova Scotia and Health Canada	200 E. coli/100 mL (geometric mean of 5 samples) **(4; max 41)**	200 E. coli/100 mL	Geometric mean of 5 most recent samples

Water Quality Objectives: Total Phosphorus

Lake	Trophic State Objective	Numerical Objective	Early Warning	Evaluation
Sandy Lake	Mesotrophic	< 18 µg/L	15µg/L	Based on 3 year running average
Marsh Lake	Mesotrophic	< 15 µg/L	13 µg/L	Based on 3 year running average.

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Preston Area Water Quality Objectives: Total Phosphorus

Lake	Trophic State Objective	Numerical Objective	Early Warning	Evaluation
Lake Major	Oligotrophic	< 10 µg/L	9 µg/L	Based on a 3 year running average
Long Lake	Mesotrophic	< 20 µg/L	15 µg/L	
Eagle Lake	Mesotrophic	< 20 µg/L	18 µg/L	
Winder Lake	Eutrophic / Hyper eutrophic	<100 µg/L	Not Applicable	Winder should be maintained at its current median phosphorus concentration of 100 µg/L.

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Preston Groundwater Evaluation

- Residential well survey
  - 27 residences
    - 6 dug wells
    - 21 drilled wells

Results indicate:

1. Bacteria and well yield are issues for **dug** wells
2. Arsenic, iron and manganese are issues for **drilled** wells
3. Arsenic distribution appears to be related to bedrock type (high in Goldenville Group)

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Next Steps

Sandy Lake

- Impacts of future land use changes will be evaluated
  - **Scenarios** will be defined with HRM
- Changes to water quality will be modeled
  - **Lakeshore Capacity Model (LCM)** – looks at changes to phosphorus export as land use changes in each watershed

Preston Area

- Expand surface water sampling to include lakes outside of watershed
- Evaluate groundwater quality and yield using existing data

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Submissions, Questions and Contact Information

Report: Available on HRM Website OR Google
“Sandy Lake AECOM Report HRM”
“Preston Area AECOM Report HRM”

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