Severn Sound Board Meeting

State of Severn Sound 20-years Post Delisting

Trent University

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Report Framework

Assess the status and trend of indictors

- Status = current data compared to indicator guidelines/criteria
- Trend = direction of indicator from 2003 to present as it relates to improving/deteriorating/unchanging conditions (Mann-Kendall)

General Template/Outline

1. Delisting Impairment
2. Available Data and Indicators
3. Overall Assessment
4. Basin/Location Specific Assessment
5. Implications and Recommendations

Indicators

Indicator	Status
Phytoplankton	
Taste and odor	
Beaches	
Benthos	
Dreissenid Mussels	*
Fish Consumption	*
Fish Population	
Sediment	
Land Cover	
Tributary Water Quality	
Open Water Quality	
Zooplankton	
Invasive Species	
WWTP	

- Draft assessment report complete
- Data compiled and preliminary analysis complete
- Data acquired
- Data requested

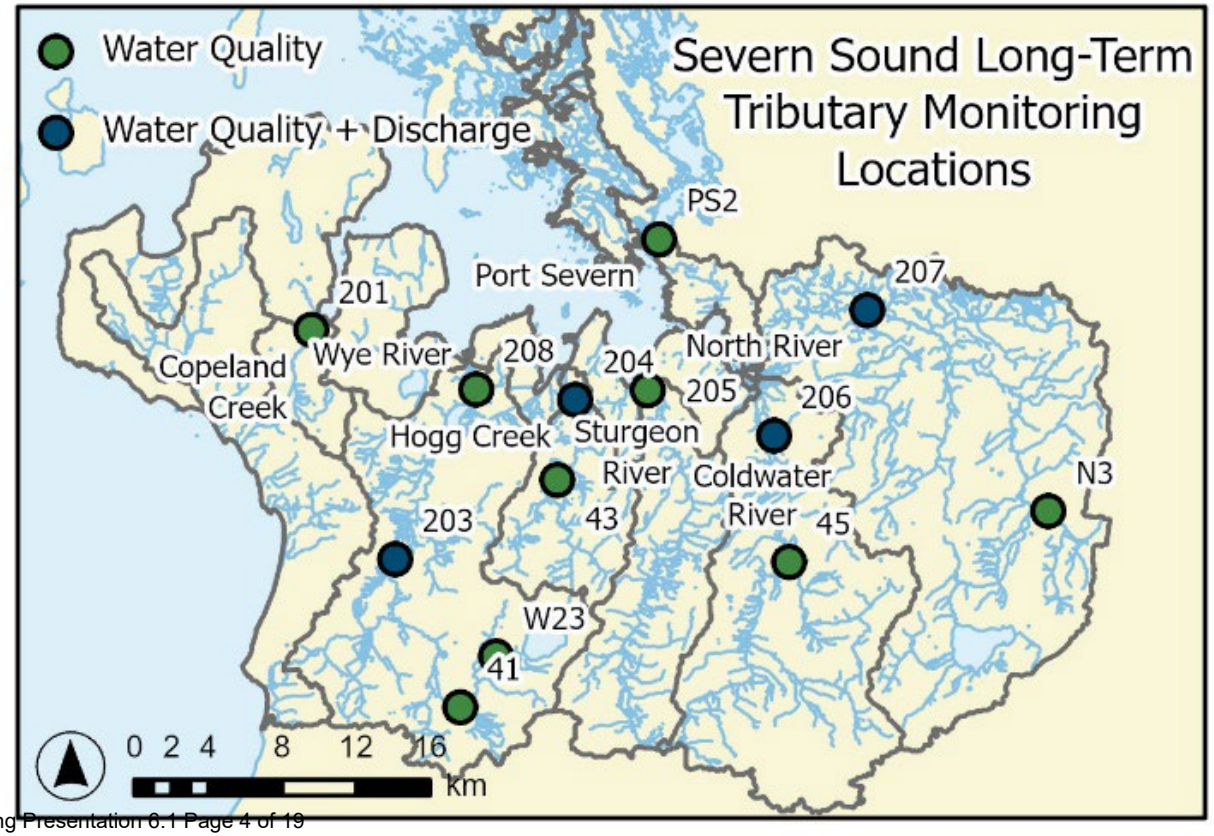
* Data limitations

Tributary Water Quality

Delisting Impairment: **Eutrophication or undesirable algae**

- Watershed inputs to Severn Sound should have total phosphorus concentrations of less than **0.030 mg L^{-1}** and loadings decreased by **20%**.

Water quality monitored approximately monthly in association with Ontario's PWQMN



Tributary Water Quality

Status: Total Phosphorus

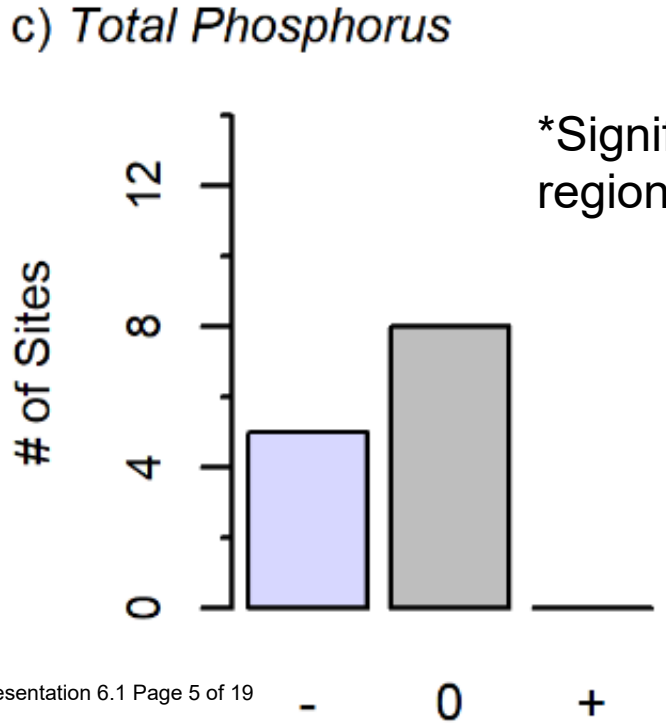
Good < 0.024 mg/L
0.024 mg/L < Fair < 0.030 mg/L
Poor > 0.030 mg/L

Median = 0.020 mg/L
Min = 0.010 mg/L
Max = 0.051 mg/L

In 2022, 12/13 sites are < 0.030 mg/L and most sites are **Good**

Trend: Total Phosphorus

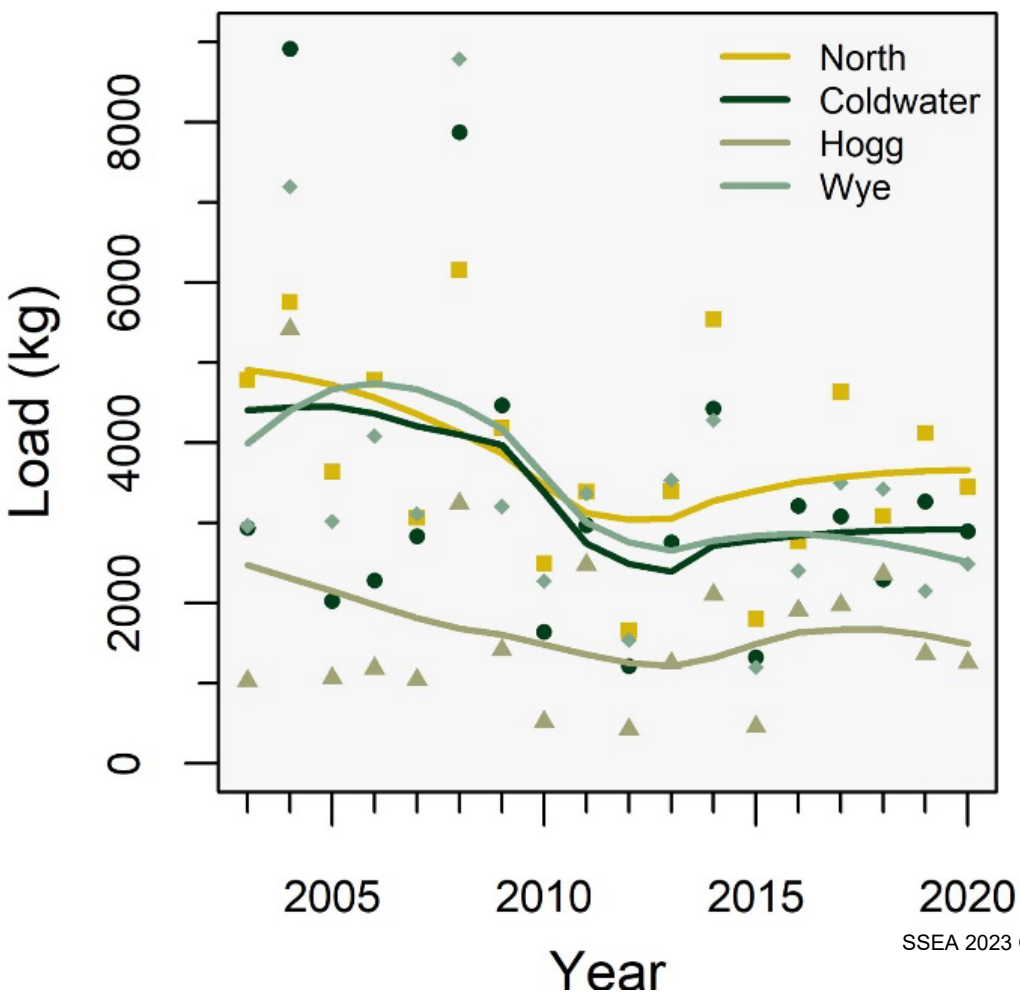
Decrease = Improving
Increase = Deteriorating



*Significant improvement at regional scale

Tributary Water Quality

Trend: Total Phosphorus Load



*No significant changes in TP load at the regional or site-specific scale

*No significant changes in annual stream flow

Tributary Water Quality

Total Phosphorus = Particulate + Dissolved Phosphorus

Soluble Reactive Phosphorus (SRP) is a form of dissolved phosphorus that is directly taken up by algae

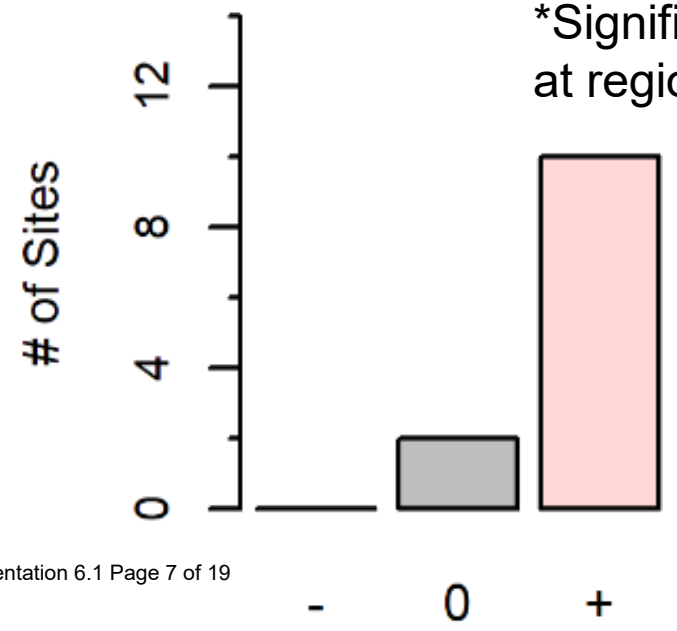
Often attributed to **eutrophication and undesirable algae**

No set guidelines, but < 0.010 mg/L

Status: Median = 0.012 mg/L
Min = 0.009 mg/L
Max = 0.033 mg/L

Trend:

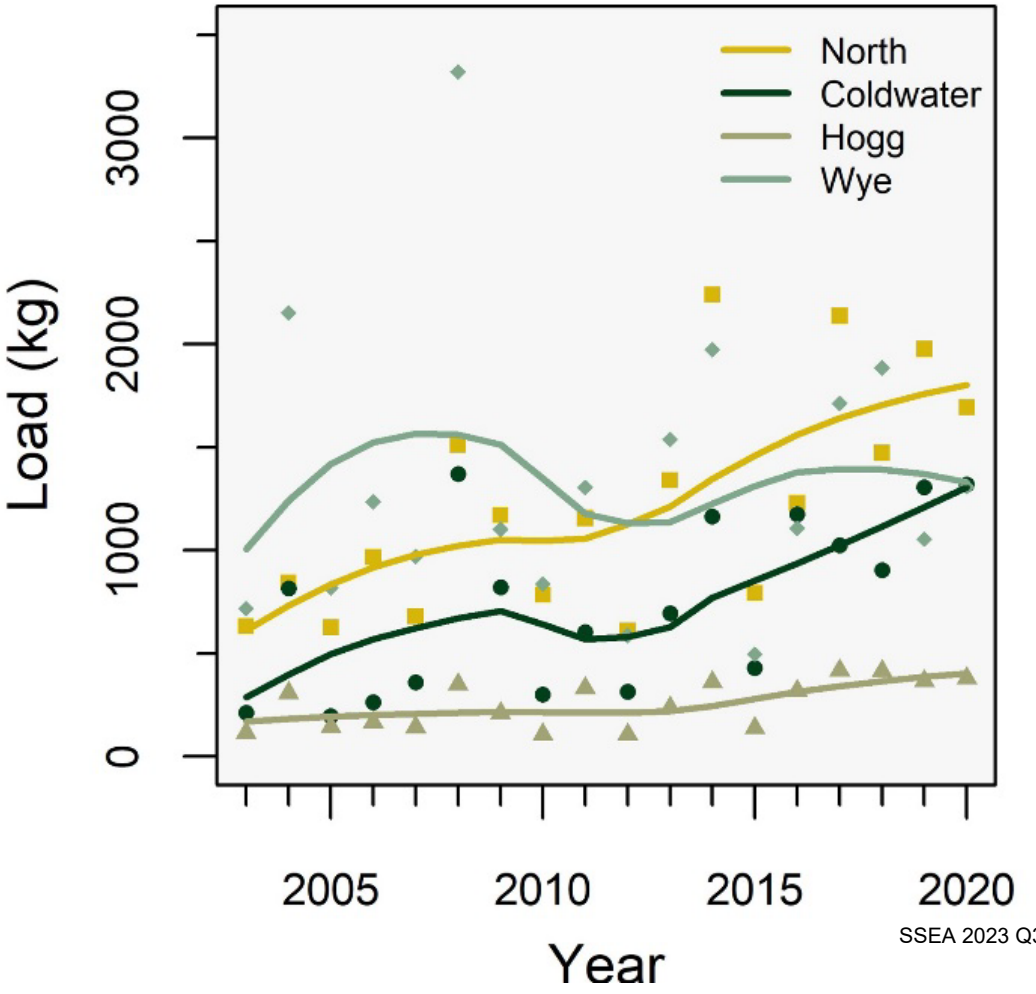
d) *Soluable Reactive Phosphorus*



*Significant deterioration at regional scale

Tributary Water Quality

Trend: Soluble Reactive Phosphorus Load



*Significant increase in SRP load at the regional and site-specific scale

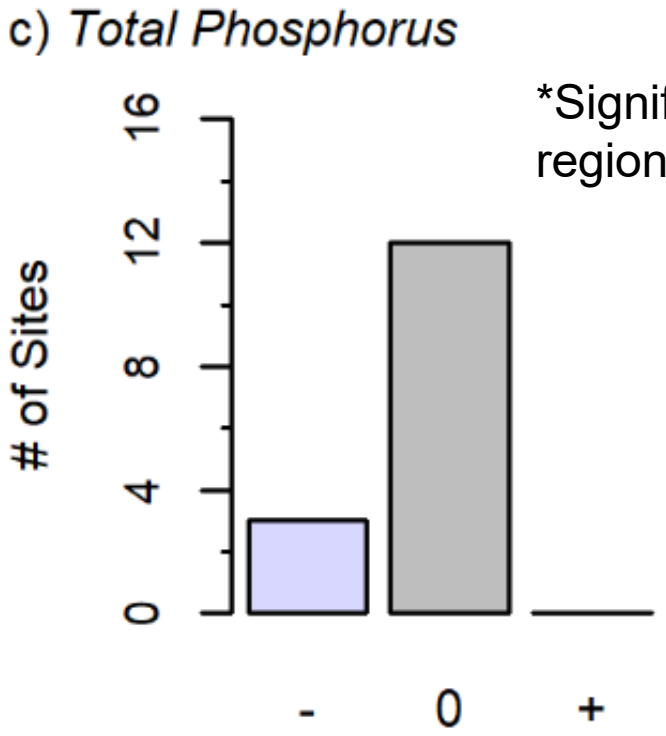
*No significant changes in annual stream flow

Long-term change in phosphorus load speciation increasing the risk of eutrophication and undesirable algae

Open Water Quality

Delisting Impairment: **Eutrophication or undesirable algae**

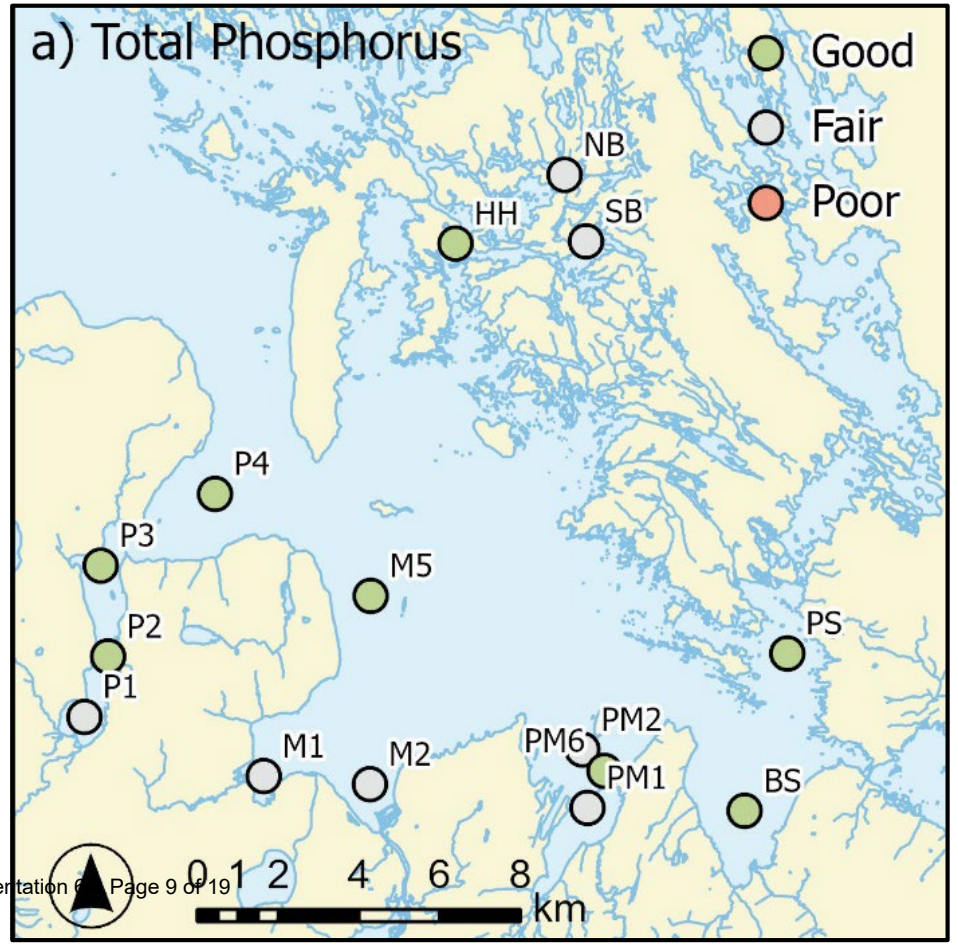
- *TP concentration < 15 µg/L in open waters and < 20 µg/L in Penetang Bay*



*Significant improvement at regional scale

But status and trend of dissolved phosphorus is unknown

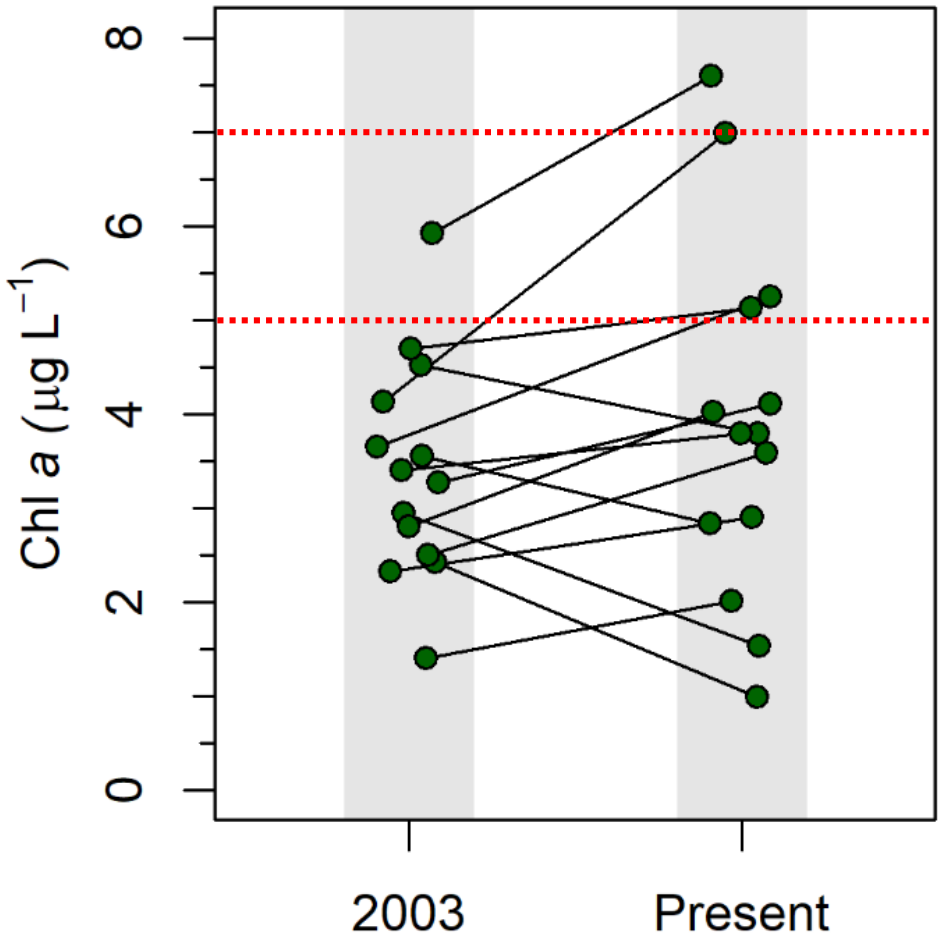
Water quality monitored approximately biweekly



Open Water Quality

Delisting Impairment: **Eutrophication or undesirable algae**

- TP concentration < 15 µg/L in open waters and < 20 µg/L in Penetang Bay
- *Chlorophyll a concentration* ***< 5 µg/L*** *in open waters and* ***< 7 µg/L in*** *Penetang Bay* *
- Water clarity to be SDV > 3 m (or on bottom) in open waters and > 2 m in Penetang Bay



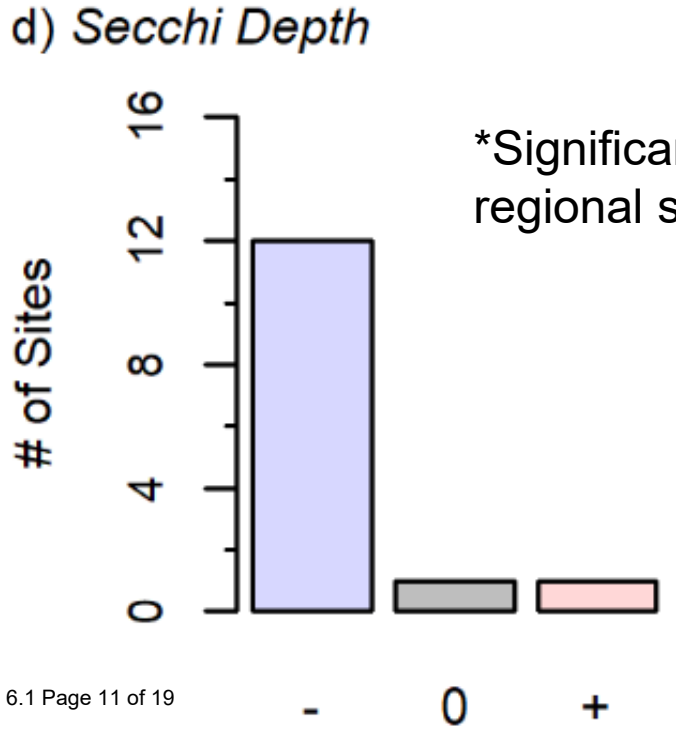
*Due to gaps in monitoring, there is insufficient data to evaluate trends

Open Water Quality

Delisting Impairment: **Eutrophication or undesirable algae**

- TP concentration < 15 µg/L in open waters and < 20 µg/L in Penetang Bay
- Chlorophyll a concentration < 5 µg/L in open waters and < 7 µg/L in Penetang Bay
- *Water clarity to be SDV > 3 m (or on bottom) in open waters and > 2 m in Penetang Bay*

Status: All SDV < 3 m



*Significant deterioration at regional scale

Effective Ecological Monitoring

High quality long-term monitoring is fundamentally important for:

- Documenting baseline ecosystem conditions
- Evaluating ecosystem responses to disturbance
- Detecting changes in ecosystem structure and function; and,
- Scientific endeavors (e.g., question generation, testing theories, modeling, and data mining)

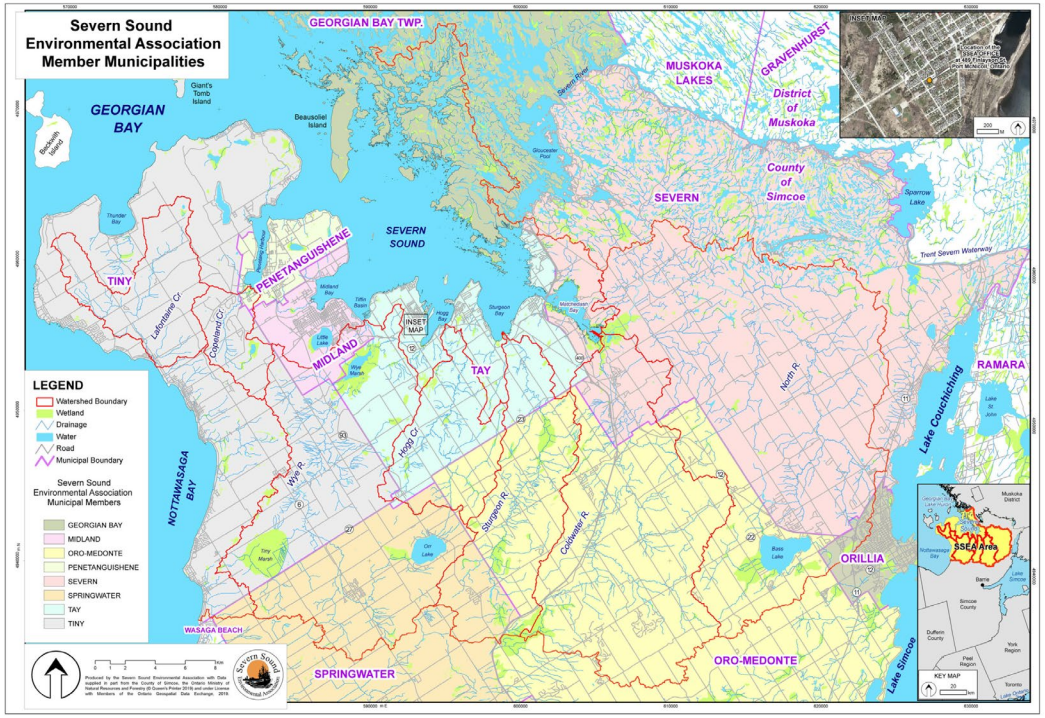
Cannot go back and collect data

Data integrity and ensuring that appropriate phenomena are measured (or adapting to include others) is critical to program success

Effective Ecological Monitoring

Other components for success:

- Well-developed partnerships
- Strong management/leadership
- Use of data/productivity



Beach Quality (E. Coli)

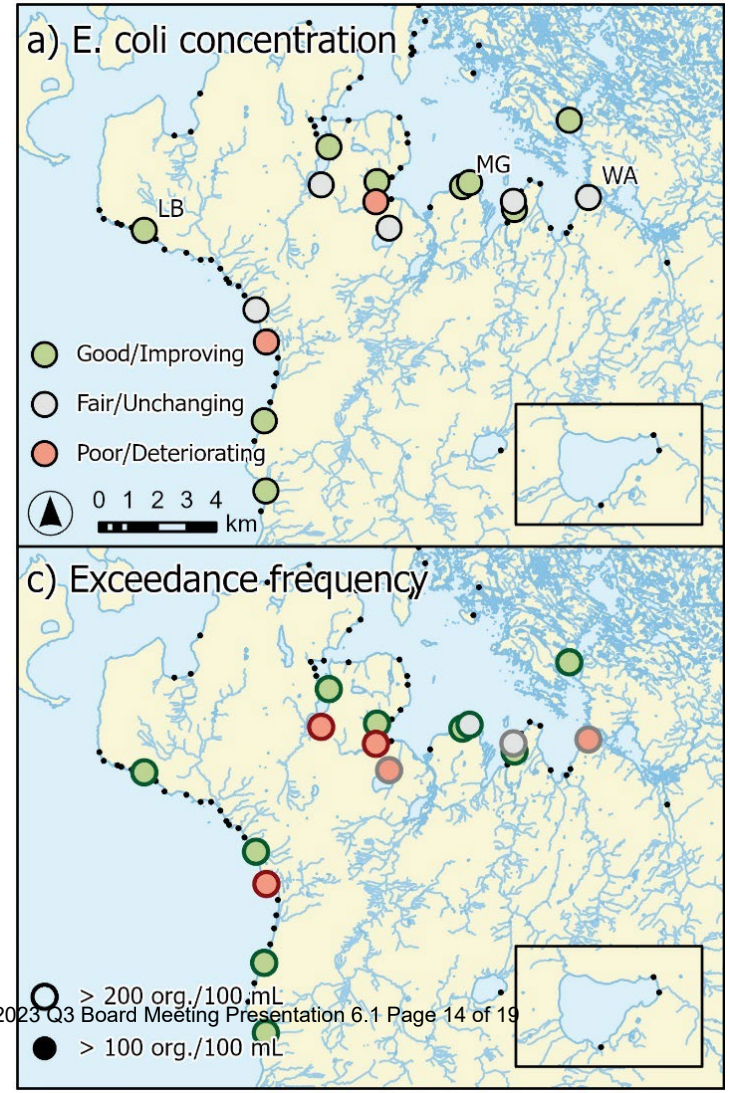
Beaches monitored weekly by SMHU (previously SSEA) from June to Sept.

simcoe muskoka DISTRICT HEALTH UNIT

E. coli Concentration
Good < 40 org./100 mL
Poor > 100 org./100 mL

Exceedance Frequency
Good < 20%
Poor > 30%

Status:



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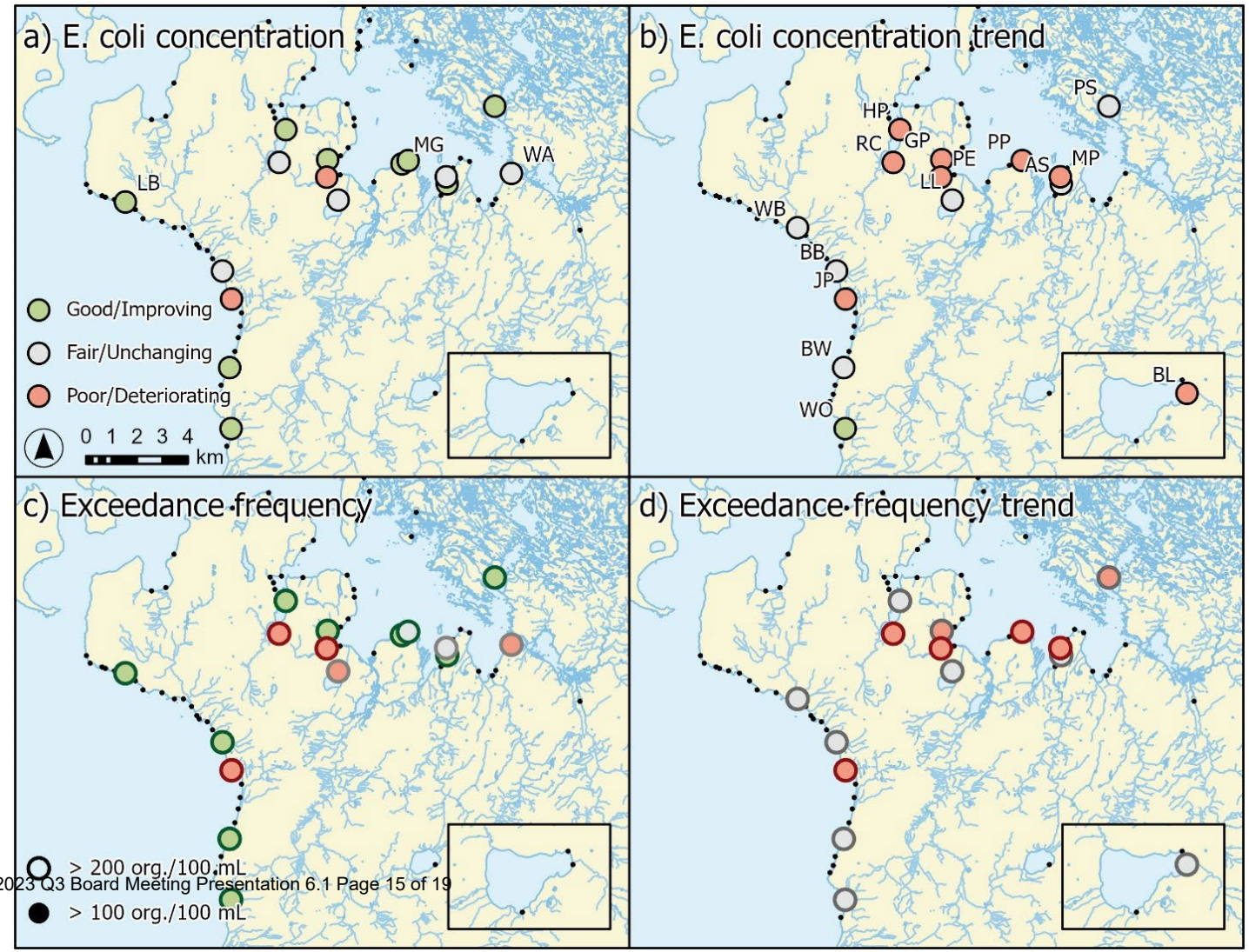


Land Cover

Agriculture and Agri-Food Canada

Semi-decadal land cover time series data product (2000 – 2020)

	Watershed		Riparian
Status	Agriculture	Settlement	Natural
Poor	> 50%*	> 27%*	> 45%
Fair	20 – 50%*	6 – 27%*	30 – 45%
Good	< 20%	< 6%	< 30 %

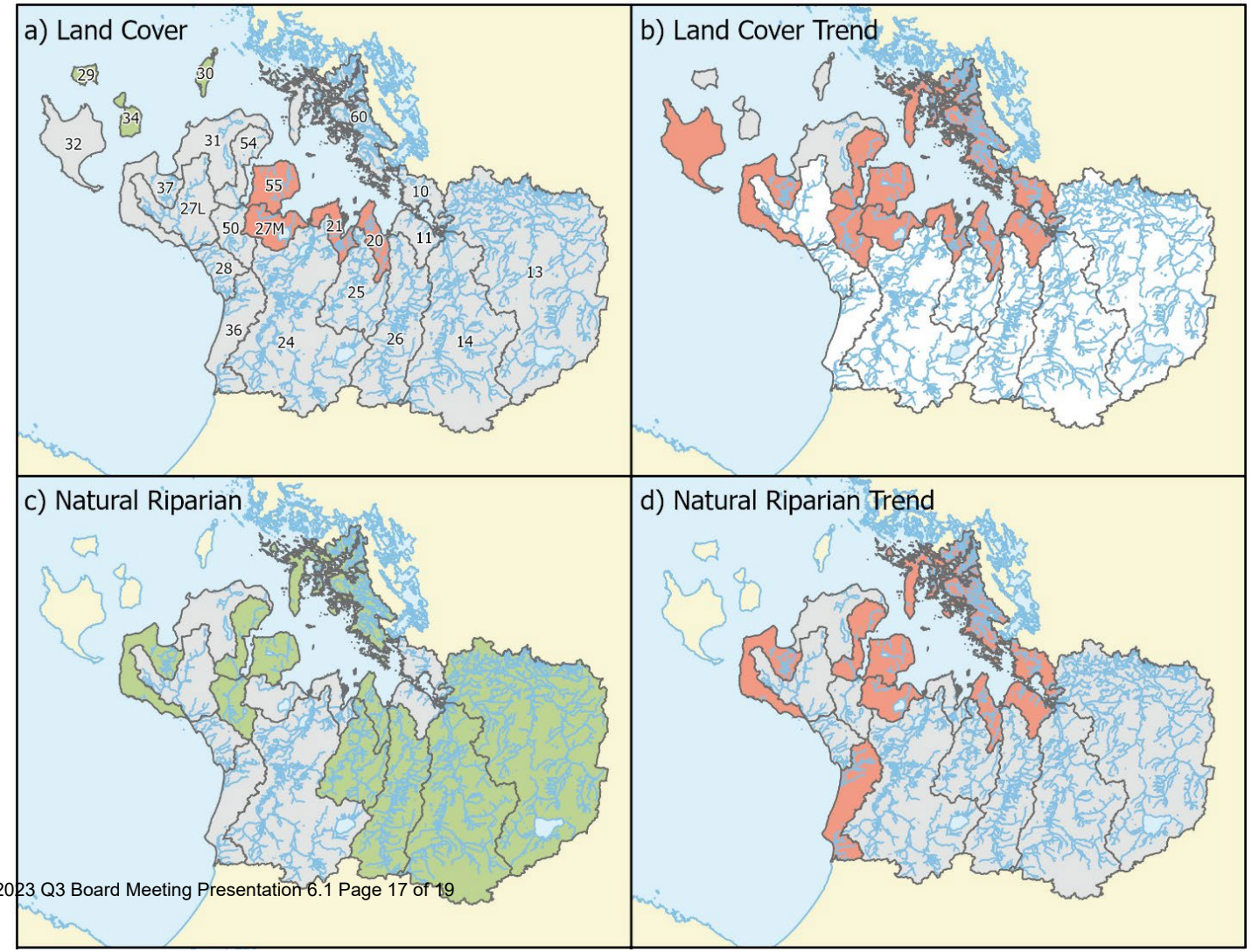
Natural land to anthropogenic land at 0.1% per year = deteriorating trend

Land Cover

Agriculture and Agri-Food Canada

Semi-decadal land cover time series data product (2000 – 2020)

Status: **Trend:**



- Good/Improving
- Fair/Unchanging
- Poor/Deteriorating
- Undetermined

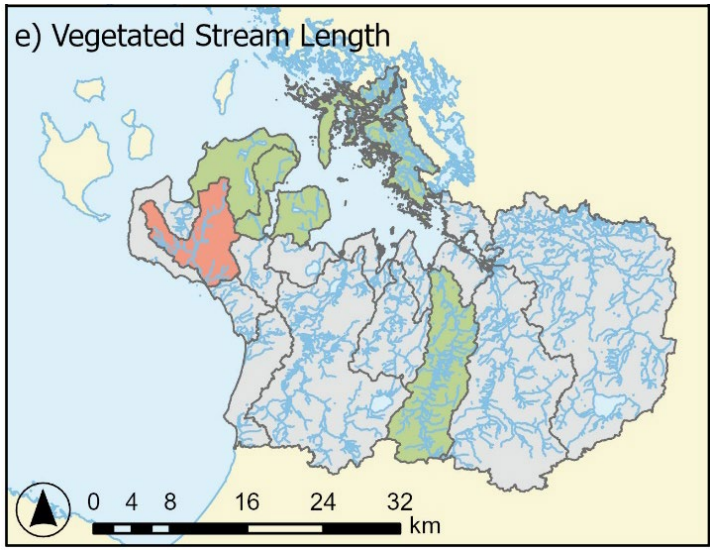
Land Cover

Agriculture and Agri-Food Canada

Semi-decadal land cover time series data product (2000 – 2020)

Targeted spatial analysis to facilitate **best management practices** and **sustainable development**

Status:



Good/Improving
Fair/Unchanging
Poor/Deteriorating
Undetermined

Vegetated Stream Length
Good > 75%
Poor < 50%

Acknowledgements

Long-term monitoring programs are fundamental to evidence-based decision making

This project is funded by the Government of Ontario

www.severnsound.ca