Assessing and Enhancing the Resilience of Great Lakes Coastal Wetlands

Information Sharing Meeting #2

Black Creek Village, Toronto
March12, 2020

Environment and Climate Change Canada
Environnement et Changement climatique Canada

In support of the Great Lakes Protection Initiative

In partnership with:

ONTARIO CLIMATE CONSORTIUM

CLIMATE RISK INSTITUTE

Why Focus on Coastal Wetland Vulnerability and Resilience?

- Ecological, social, spiritual and economic importance
- Unprecedented climate change impacts and biodiversity loss
- Vulnerability, resilience, adaptation has not been a focus
- Engineering and infrastructure solutions are costly and possibly maladaptive
- Wetland management and biodiversity can be improved via resilience and adaptation

Coastal wetlands are among the most vulnerable ecosystem types in the Great Lakes

Low Water Level Blues

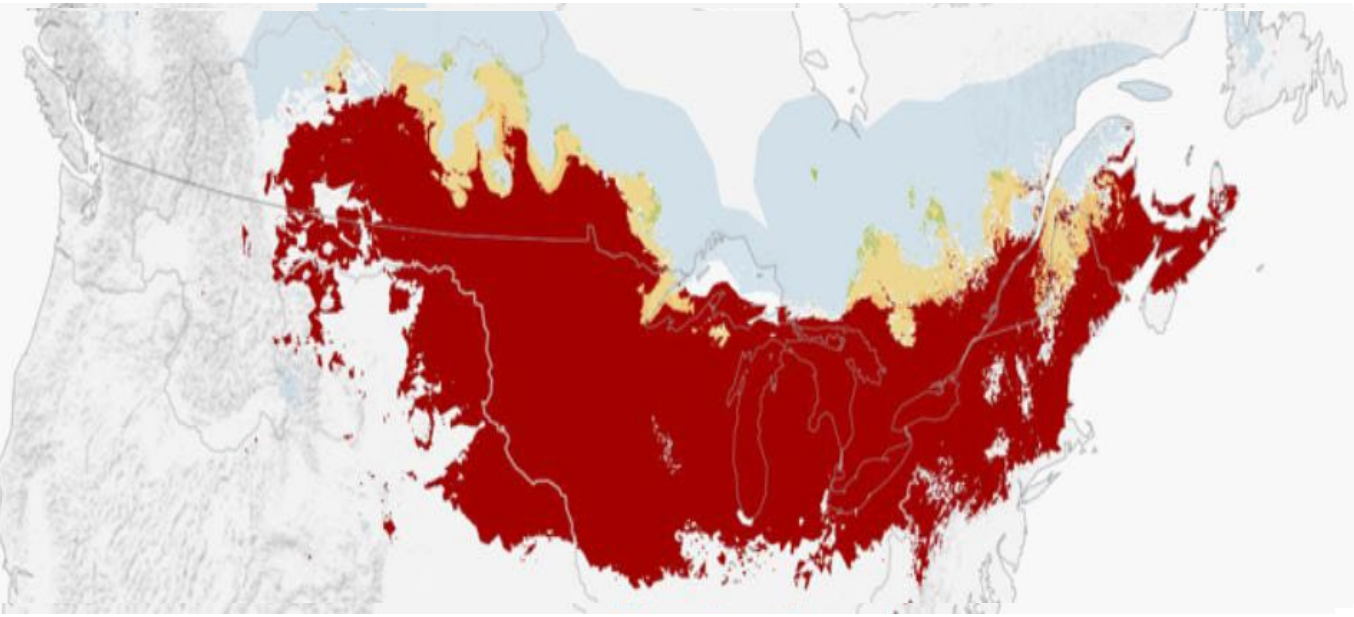
Georgian Bay Wetland Stranding

High Water Level Impacts

Hillman Marsh Breach- Zuzek Inc. 2019

Point Pelee Wetland Breach - Zuzek Inc. 2019

Two-thirds of North American birds are at increasing risk of extinction from global temperature rise



+ 3 C Warming Scenario

56% range gained

12% range maintained

88% range lost

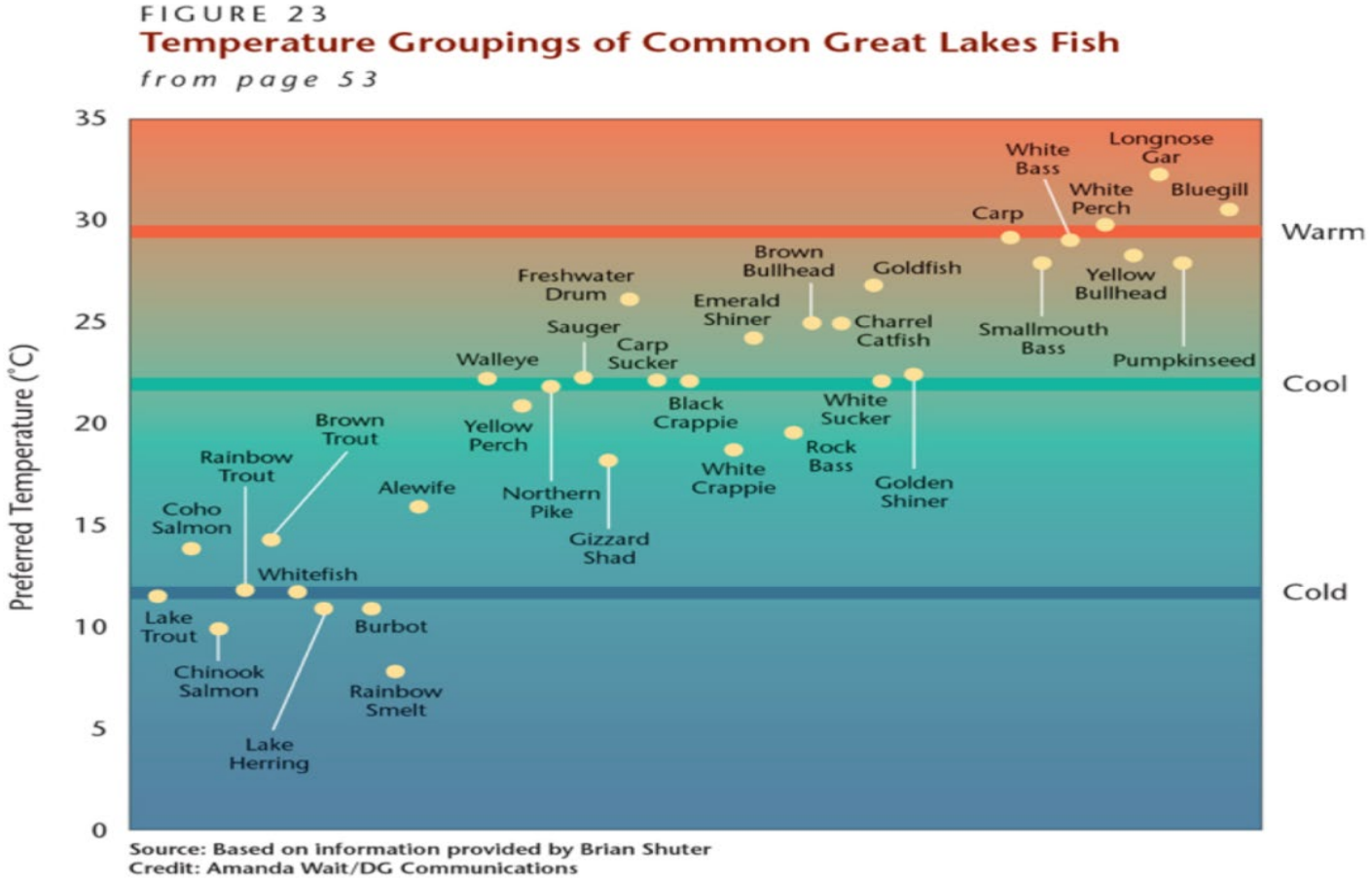
Overall species vulnerability status:

High

Survival by Degrees:
389 Bird Species on the Brink

Brinkhttps://www.audubon.org/climate/survivalbydegrees

Climate change is transforming where fish live in the Great Lakes



Warming temperatures in the Great Lakes are causing population shifts among cold water and warm water fish

Study Objectives

- **Assess coastal wetland vulnerability to climate change** and how wetlands are likely to respond;

- **Develop guidance to enhance resilience and adaptation** of coastal wetlands to climate change impacts; and,

- **Engagement, information sharing, building consensus and collaboration** on resilience and adaptation priorities with rights holders and stakeholders

Program Development and Science

Strategic Policy Branch
Regional Director General Office Ontario
Burlington, ON

Meteorological Service of Canada
National Hydrologic Services –
- Boundary Water Issues Unit Burlington,
- Ecohydraulics Section Québec City

Canadian Wildlife Service
Ontario Region, Downsview

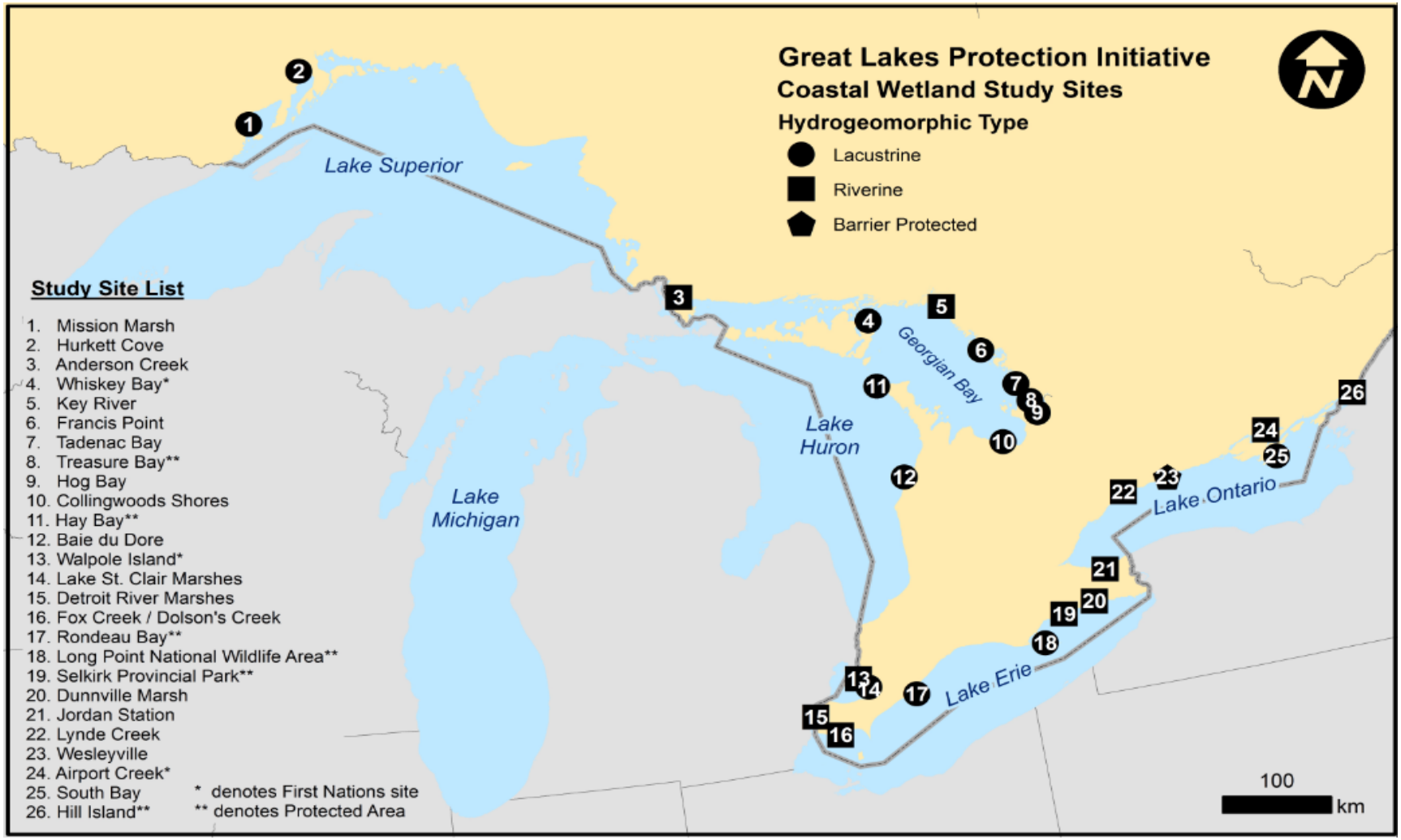
Science and Technology Branch
Wildlife and Landscape Science Directorate
Ottawa

PHASE I
VULNERABILITY ASSESSMENT

- Site selection, access, local involvement
- Physical and biological data collection
- Climate and water level projections
- Wetland response model development & validation
- Wetland sensitivity and adaptive capacity
- Spatial analysis and interpretation
- Expert input and review

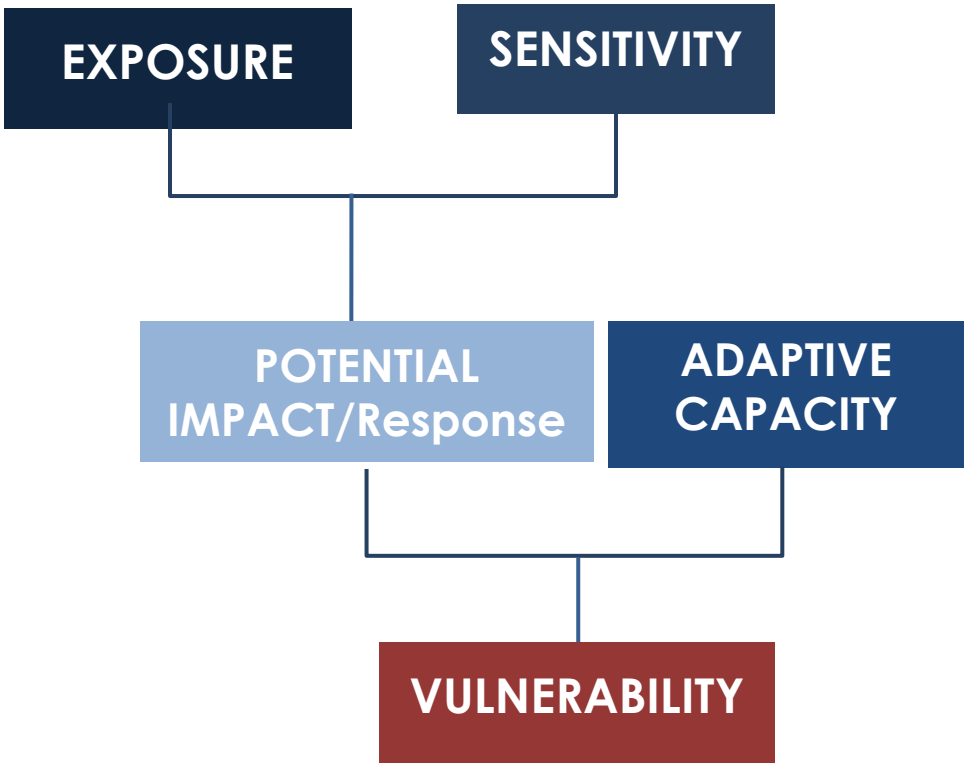
Emergent marsh dominated coastal wetland in Weller's Bay National Wildlife Area, Lake Ontario

26 Study Sites



Variety of hydrogeomorphic types, disturbance gradients, ecological significance and local interest. Involves First Nation communities, national & provincial parks, businesses, land owners.

Components of Vulnerability



Glick et. al., 2011. Scanning the Conservation Horizon: A Guide to Climate change Vulnerability Assessment

Exposure: Amount and rate of climate change to which wetlands are likely to be exposed.

Sensitivity: The degree to which wetlands are likely to be affected by or responsive to climate change.

Adaptive capacity: Ability of wetlands to cope and persist under changing climate conditions.

Vulnerability is a function of the sensitivity of a wetland, its exposure to climate change and its capacity to adapt.

CONCEPTUAL FRAMEWORK FOR WETLAND VULNERABILITY

Climate Exposure

- Temperature (Air/Water)
- Precipitation
- Wind-Driven Waves
- Water Levels
- Ice Cover

Incorporated into model

Sensitivity

Wetland Size	Score 0-10
Vegetation Class Area	Score 0-10
Wetland Interspersion	Score 0-10
Wetland Diversity	Score 0-10

→ Response Score

Adaptive Capacity

Potential to Migrate	Score 0-10
Landscape Condition	Score 0-10
Invasive Species	Score 0-10
Protection	Score 0-10
Sediment Dynamics	Score 0-10
Biotic Community Condition	Score 0-10
Water Quality	Score 0-10

→ Adaptive Capacity Score

Adaptive Capacity →

Response ↑

HL	HM	HH
ML	MM	MH
LL	LM	LH

Vulnerability - Very High; High; Moderate; Low

Phase II:
Enhancing Wetland Resilience

- Outreach & engagement
- Literature reviews
- Interviews / questionnaires
- Focus group discussions and meetings
- Synthesis, priority setting and guidance
- Reporting

The ability of a wetland to absorb a disturbance while retaining the same basic structure and function

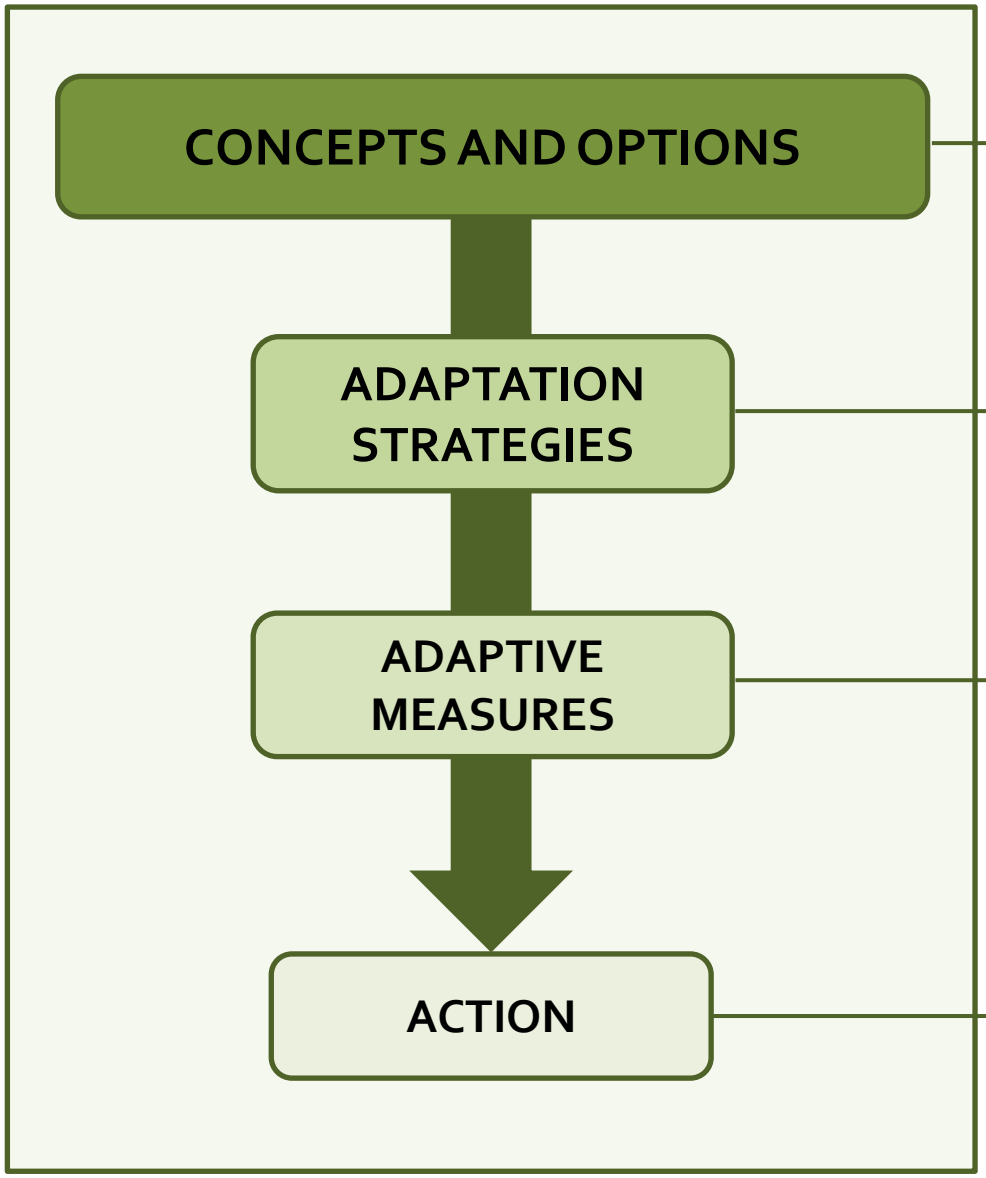
Resilience/Adaptation Goals

- GLWQA: conserve, protect, restore and ***enhance the resilience of native species and their habitat*** and support essential ecosystem services
- Engagement, knowledge transfer, foster dialogue and promote collaborative problem solving
- Understand climate change concerns, needs and opportunities
- Jointly develop strategies and measures to enhance resilience
- Share results to improve understanding and build capacity to respond to climate change impacts

Recommended Adaptation Strategies, Measures and Actions

- A spectrum of approaches to help :
  - Sustain GLs coastal wetlands and achieve management goals in the face of climate change;
  - Provide a framework of strategies from which managers select options best suited to their needs;
  - Potentially used to implement projects or pilots

Conceptual Adaptation Framework



Foundational adaptation concepts/options - *based on real or anticipated vulnerabilities, risks and impacts*

Broad-based adaptation response - *applicable across lakes and regions and wetland types*

More detailed adaptation measures to specific risks and impacts - *eventually supported by modeled, spatial and interpreted wetland response and wetland sensitivity*

Recommended lake, regional and place-based actions - *for use by natural resource managers*

Positive Signs on the Horizon

- UN Nature-based Solutions to Climate Coalition and the Post-2020 Convention on Biological Diversity negotiations
- Federal programs:
  - Nature Legacy/Fund: Protect 30% by 2030;
  - Nature-based Climate Solution Fund;
  - Green Infrastructure Fund;
  - Disaster and Mitigation and Adaptation Fund;
  - Climate Change Adaptation Platform (NRCAN);
  - North American Waterfowl Management Plan Fund; and
  - Community funding programs – e.g., Eco-Action and others

Today's Guidance

- Think Big! Don't let cost limit creativity!
- Rely on your experience and observations!
- Focus on cross scale connections – watershed influences, natural processes
- Level of detail:
  - Focus on implementable strategies and specific implementable measures
  - If possible, identify place-based actions

Today's Guidance

- High level recommendations (science, monitoring, funding, governance, collaboration) have been obtained

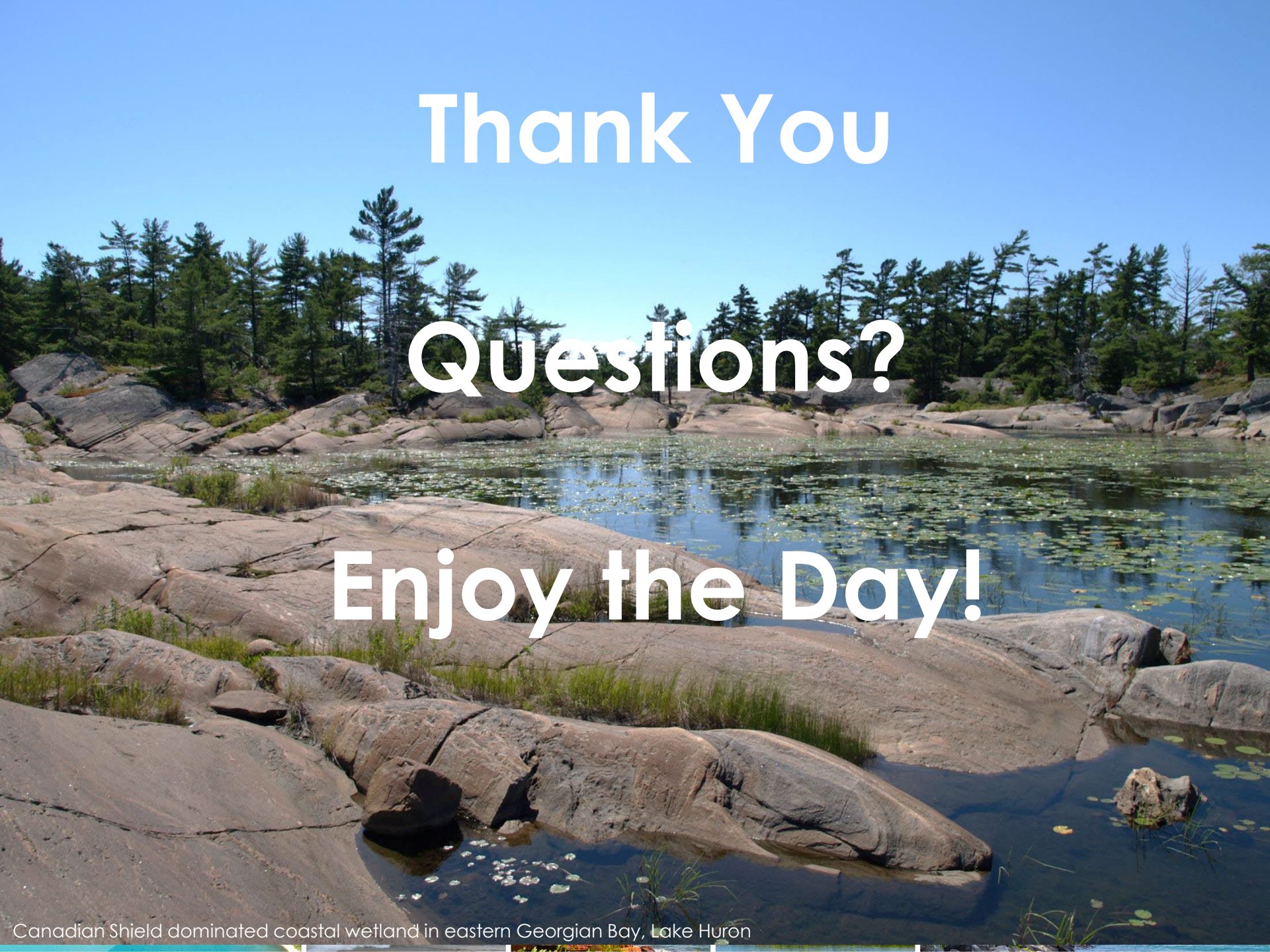
Other considerations for today:

- Links with existing programs e.g., nature-based

Thank You

Questions?

Enjoy the Day!



Canadian Shield dominated coastal wetland in eastern Georgian Bay, Lake Huron