“Make no little plans”: Developing Biodiversity Conservation Strategies for the Great Lakes

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In a Nutshell

➢ ***PROBLEM***: *Current lake basin plans, such as the Lakewide Area Management Plans (LAMPS), do not adequately address biodiversity conservation.*

➢ ***PROJECT***: *Working with multiple partners, we have developed strategies for the restoration and conservation of the native biodiversity and ecosystem function of Great Lakes Ontario, Huron, Erie and Michigan.**

➢ ***OUTPUT***: *A shared set of biodiversity conservation strategies that will complement and be incorporated into the LAMPS for all lakes.*

➢ ***OUTCOMES***: *Agencies, organizations, and communities at the Federal, State/Province, regional and local scales understand, implement, monitor, and adapt biodiversity conservation strategies in both lakes.*

*Nature Conservancy of Canada has recently completed a viability and threats assessment for Lake Superior.

Conservation Planning for Great Lakes

Biodiversity conservation strategies for the four Great Lakes and their immediate coastal areas are complete. These “blueprints” define multi-agency visions for biodiversity conservation, offer shared strategies to protect and restore the lakes, describe the benefits to people, generated baseline information on species and habitats, and promote coordinated conservation action.

Figure 1. Covers of Great Lakes biodiversity assessments and strategies over DEM derived image of Great Lakes

The plans can be downloaded from the following locations: **Lakes Erie, Huron, Michigan and Ontario:** www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/projects/biodiversity
Lake Superior: support.natureconservancy.ca/pdf/on/lake-superior/Biodiversity-Conservation-Assessment-for-Lake-Superior-Vol1-FinalDraft.pdf

Project Funding

The Great Lakes biodiversity plans were funded primarily by the US EPA – Great Lakes National Program Office and Region 2. Additional support was provided by the Canada-Ontario Agreement Respecting the Great Lakes, Environment Canada, The Erb Foundation, The Chrysler Foundation, The Mott Foundation, The Nature Conservancy, and Nature Conservancy of Canada.

Planning Approach

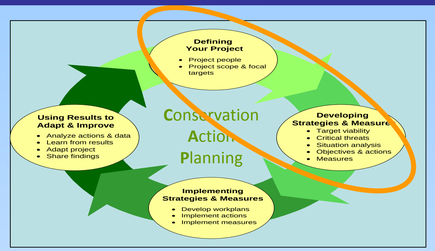

Figure 2. Four phases of the CAP process. The plans here cover the first two phases.

We employed the Conservation Action Planning (CAP) method to develop the plans (www.conservationgateway.org/ConservationPlanning/ActionPlanning). The purpose of CAP is to help conservation practitioners:

1) Identify and assess the health or viability of conservation targets
2) Identify and rank threats to conservation targets
3) Develop strategies to abate the most critical threats and enhance the health of the conservation targets
4) Identify measures for tracking project success

Conservation Focus and Viability

Each plan identified a set of conservation targets (Table 1). To assess current viability (health) status of the conservation targets, we developed a set of Key Ecological Attributes (KEAs) and indicators, building on previous efforts in each lake. For many indicators we completed GIS analyses to establish current status ratings. For others we relied on the judgment of experts. An example of a single indicator is in Figure 2.

Figure 3. Examples of GIS analysis used to rate a Coastal Wetland indicator for Lake Huron.

Table 1. Definitions and viability status ranks for conservation targets in four Great Lakes biodiversity conservation strategies. Ratings are given by color: Orange = Fair; Green = Good (on a scale of Poor, Fair, Good, and Very Good).

Conservation Target	Lake Ontario	Lake Huron	Lake Erie	Lake Michigan	Average Viability
Open Water Benthic and Pelagic System (Lakes Huron, Erie, and Michigan) **Benthic and Pelagic Offshore Systems** (Lake Ontario)	Fair	Fair	Fair	Fair	Fair
Nearshore Zone (<20 m for Lake Ontario, <15 m for Lake Erie, <30 for Lake Michigan and Lake Huron)	Fair	Fair	Fair	Fair	Fair
Native Migratory Fish	Fair	Fair	Fair	Fair	Fair
Islands	Good	Good	Fair	Good	Good
Coastal Wetlands	Fair	Fair	Fair	Good	Fair
Aerial Migrants	NA	Fair	Good	Fair	Fair
Coastal Terrestrial Systems	Fair	Fair	Fair	Fair	Fair
Rivers, Estuaries, & Connecting Channels	Fair	NA	Fair	NA	Fair
Overall Biodiversity Viability Rank	**FAIR**	**FAIR**	**FAIR**	**FAIR**	**FAIR**

Priority Area Analysis

Participants in each blueprint project expressed the desire for a detailed set of spatial priority conservation areas that focused more on coastal and aquatic systems. Coastal terrestrial systems and coastal wetlands were ranked spatially in all blueprints, and aerial migrants, tributaries, islands, and migratory fish were considered in some. Each plan applied criteria to assess biological significance and condition to rank spatial units on a relative scale (see for example, Figure 3). The criteria varied by plan.

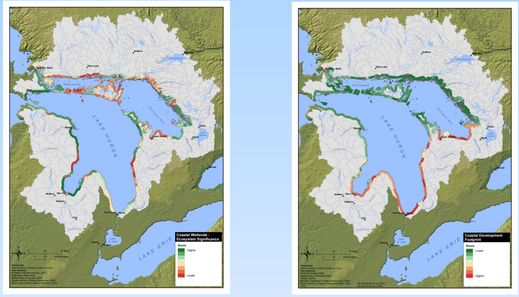

Figure 3. a. Coastal wetland biological significance through the Lake Huron basin b. Coastal development or human impact around Lake Huron.

Comparison of Threats

…ch source/target combination based on the scope, …y. The Lake Ontario and Lake Huron project teams …reats during expert workshops, with one group of experts …rget, at the whole-lake scale. In contrast, the Lake …lueprints developed an initial list of threats by drawing …ding previous blueprints) and seeking further input from their project steering committees. Then, they conducted online surveys of experts to rate the threat in each of the reporting units (major geographic sub-units) in each lake. Finally, the teams combined individual ratings using a weighted averaging process to obtain final ranked list of threats. The top five ranked threats for each plan are summarized in Table 3.

Table 3. Threat ratings (colors) and ranks (numbers) within each lake. Ratings are indicated by color: Red = Very High; Orange = High; Green = Medium. The relative rank of each threat within one lake is indicated by the numeric value.

Threat	Lake Ontario	Lake Huron	Lake Erie	Lake Michigan	Average rank
Aquatic invasive species	2	1	1	1	1.25
Incompatible development	1	2	5	3	2.75
Climate change	4	3	2	4	3.25
Terrestrial invasive species	8	4	3	2	4.25
Dams and other barriers	3	5	8	5	5.25
Non-point source pollutants	5	6	4	7	5.50

Strategies – Consistent Themes

Table 3. Thematic comparison of strategies from four Great Lakes blueprints.

Theme	Coastal Conservation	Invasive Species	Connectivity/ Hydrology	Fish Restoration	Nearshore water quality	Climate change adaptation
Lake Ontario	• Protection • Watershed planning • Public lands management • Private land stewardship	• Ballast water • Canals – ecol. separation • Rec boating • Live trade • Rapid-response plan • Control to benefit lake trout/native fish	• Priority dams/barriers • Hydropower siting guidelines • Restore lake-level variability	• Restore predators and mid-level prey	• BMPs in rural priority areas • Decrease urban NPS	• Corridors and linkages • Adapt lake level and watershed management
Lake Huron	• Land protection • Restoration • Build local policy and planning • Increase community engagement • Integrative frameworks for coastal management	• Restore native species • Early detection/rapid response network • Risk assessment • Develop new control techniques • Eliminate ballast water vector	• Integrative barrier management		• Target ag BMPs • Improved septic & conversion to sewers • Incentivize ecosystem service protection • Assess ecosystem service values • Watershed vulnerability assessment	• Educate public • Monitor climate change & biodiversity in sentinel sites • Assess ecosystem service value • Watershed vulnerability assessment
Lake Michigan	• Coordinate planning to align future development with biodiversity conservation	• Interstate agreement • Early detection & rapid response network	• Comprehen-sive lowest barrier decision tool • Increase connectivity at large scale	• Restore cisco in Lake Michigan • Broaden constituency for sea lamprey control	• Ag. community communications network • Nutrient trading • Promote and implement green infrastructure & strengthen NPS management	(incorporated into strategies)
Lake Erie	• Build business case for coastal conservation • Healthy shoreline education/outr each program	• Common framework for control and management • Coordinated action plan for Common Reed	• Comprehen-sive Lowest Barrier Decision Tool		• Nutrient BMPs to lower SRP • Promote infield drainage management • Municipal stormwater management	(incorporated into strategies)

Lessons Learned and Recommendations

1. Engage representative stakeholders
2. Use stratification units to report results at various spatial scales and account for regional heterogeneity
3. Viability and threat assessments should be refined as new information becomes available
4. Threat assessments should account for professional or regional bias
5. Give equal weight to restoration needs in strategy development
6. Define the scope of strategies and key constraints at the outset of plan
7. Priority area identification in the context of conservation planning for large ecosystems should provide general guidance, representing a first step
8. Evaluate how implementing conservation strategies will benefit people

Note: The poster’s title refers to a paper of the same title that is in review:
Pearsall, D.R., M.L. Khoury, J. Paskus, D. Kraus, P.J. Doran, S.P. Sowa, R.F. Taylor, and L.K. Elbing, 2013. “Make no little plans”: developing biodiversity conservation strategies for the Great Lakes. Environmental Practice *(in review)*.