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Landscape Approaches: Balancing Connectivity with Sea Lamprey Control in the Great Lakes

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Balancing connectivity with sea lamprey control in the Great Lakes

Jessica Barber
U.S. Fish and Wildlife
Service



Sea Lamprey Control Program

- Sea lampreys are a parasitic fish native to the Atlantic Ocean; Welland Canal
- Spread throughout the Great Lakes by the late 1930s
- Decimated native lake trout populations by the early 1960s (2% of average annual catch)
- Sea Lamprey Control Program created under the Great Lakes Fishery Commission



Sea Lamprey Control Program

- Program relied exclusively on electric barriers in its infancy; high mortality rate, safety concerns
- Research other forms of control
- TFM developed in late 1950s; effective control
- Renewed barrier interest in 1980s to reduce reliance on TFM



Sea Lamprey Barrier Program

- Barriers are the backbone of the Program
 - Reduce or eliminate stream miles requiring treatment
 - Eliminate need to treat in difficult areas
 - Eliminate need to treat where endangered or threatened species are present
 - Reduce recruitment through trapping



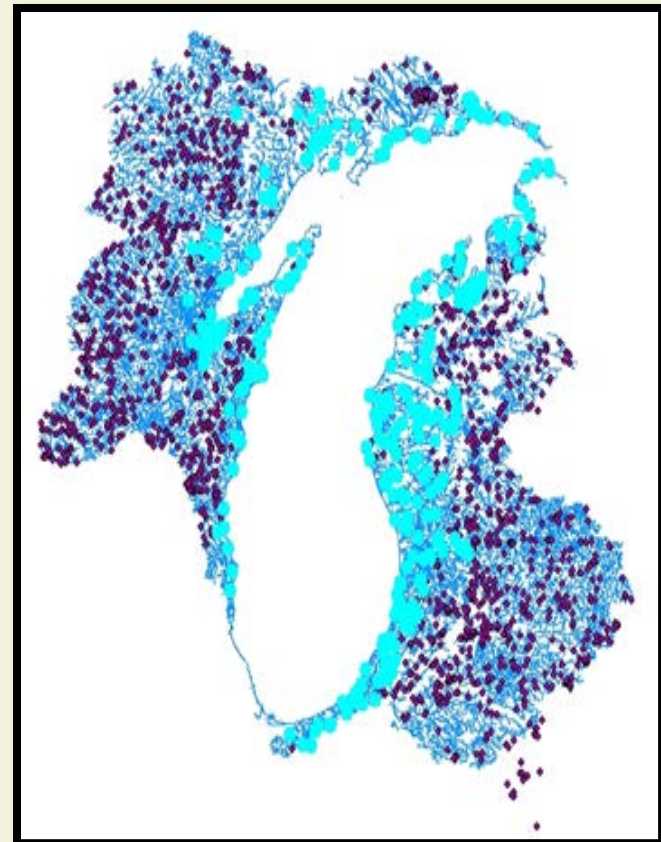
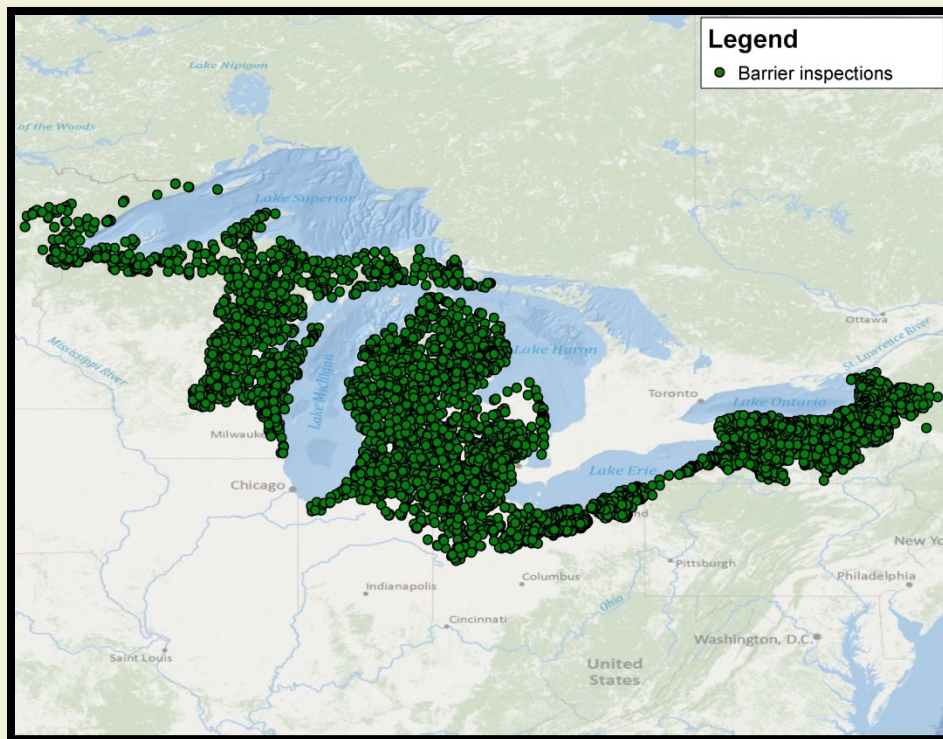
Sea Lamprey Barrier Program

- 73 Program structures
- Thousands of existing structures that function as sea lamprey barriers
- Prevent or reduce passage of other fishes
- Connectivity impediment
- Tradeoffs – value or importance
- Compromise



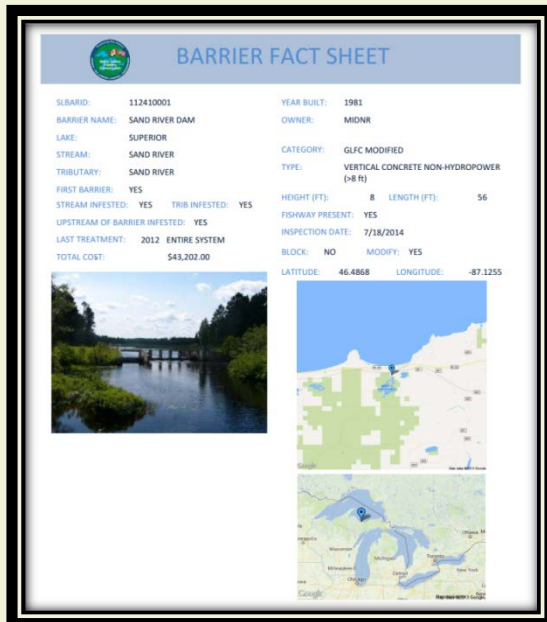
Sea Lamprey Barrier Program

- GLFC invested effort to inventory and catalog existing structures throughout the Great Lakes






Sea Lamprey Barrier Program

- Creation of a barrier database
- Approximately 9,000 barriers
- 1,000 of which provide protection against upstream sea lamprey migration
- Focus monitoring/repair efforts on the important barriers



BARRIER FACT SHEET

SLBARID: 112410001 YEAR BUILT: 1981
BARRIER NAME: SAND RIVER DAM OWNER: MIDNR
LAKE: SUPERIOR CATEGORY: GLFC MODIFIED
STREAM: SAND RIVER TYPE: VERTICAL CONCRETE NON-HYDROPOWER (1-8 R)
TRIBUTARY: SAND RIVER
FIRST BARRIER: YES HEIGHT (FT): 8 LENGTH (FT): 56
STREAM INFESTED: YES TRIB INFESTED: YES FISHWAY PRESENT: YES
UPSTREAM OF BARRIER INFESTED: YES INSPECTION DATE: 7/18/2014
LAST TREATMENT: 2012 ENTIRE SYSTEM BLOCK: NO MODIFY: YES
TOTAL COST: \$43,202.00 LATITUDE: 46.4868 LONGITUDE: -87.1255



Sea Lamprey Barrier Program

- Removal scenarios
- Production potential field studies
 - Limited information upstream of barriers
 - Habitat assessment
 - Larval density estimate



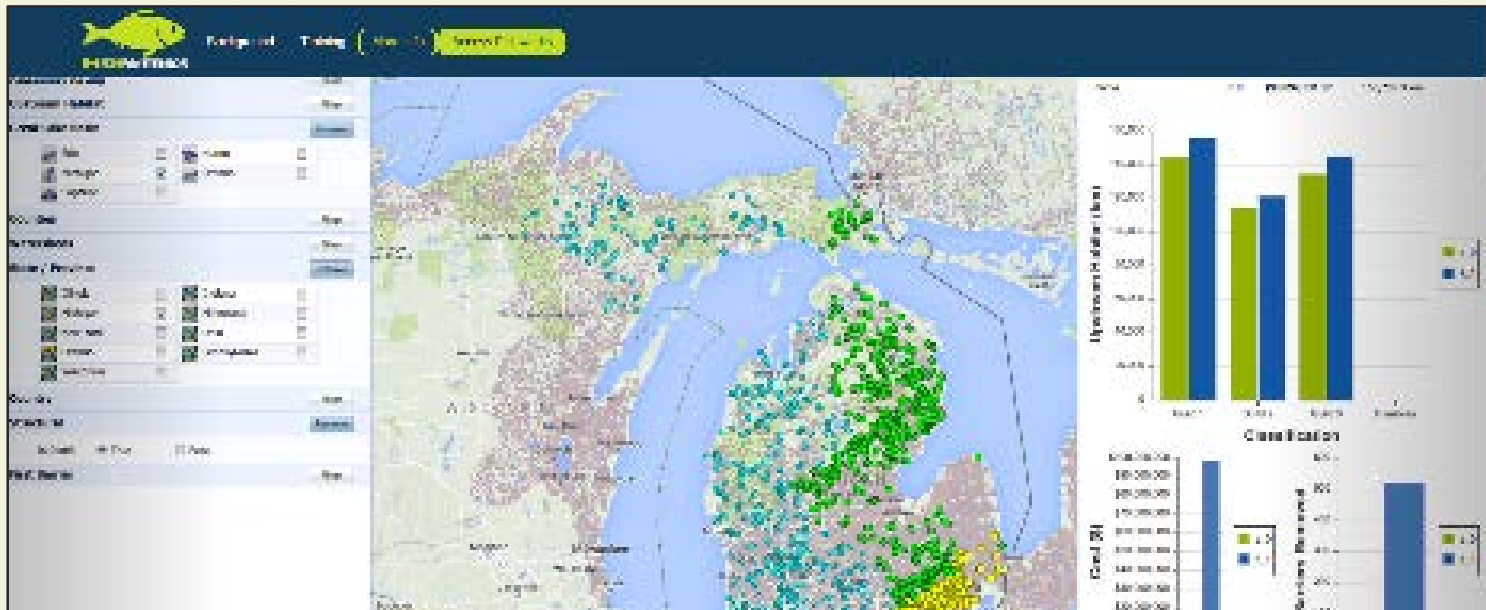
Sea Lamprey Barrier Program

- Native lamprey densities used as a surrogate for sea lampreys
- Estimated larval abundance
- Treatment costs, migrants
- Information used to respond to connectivity project requests
- Ranking projects



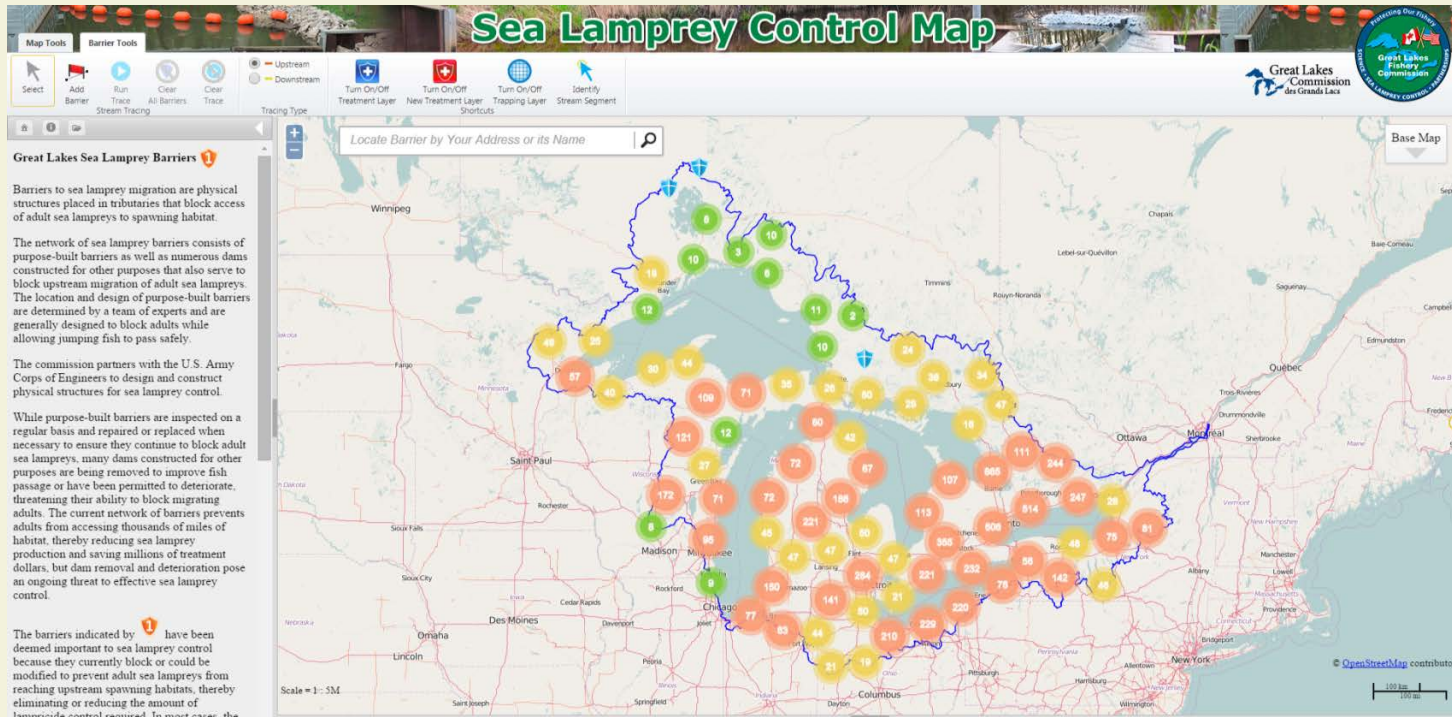
Connectivity Tools

- FishWerks – UW Madison (McIntyre Lab)
 - Optimization tool to target candidate barriers aimed at maximizing the return on investment
 - Incorporates sea lamprey control information such as lampricide control costs, historical infested length, first barriers



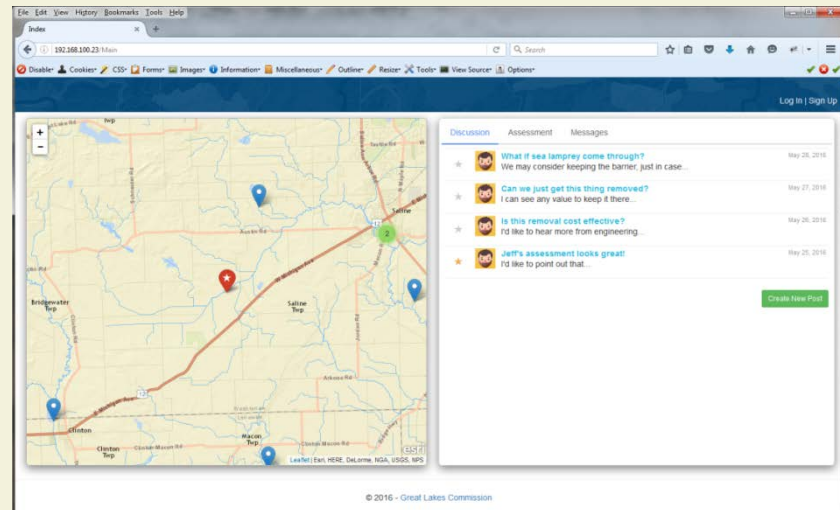
Connectivity Tools

- Barrier Mapping Tool – Great Lakes Fishery Commission
 - Linked to Sea Lamprey Control Program databases
 - Impact tool to add/remove barriers to determine number of impacted stream miles



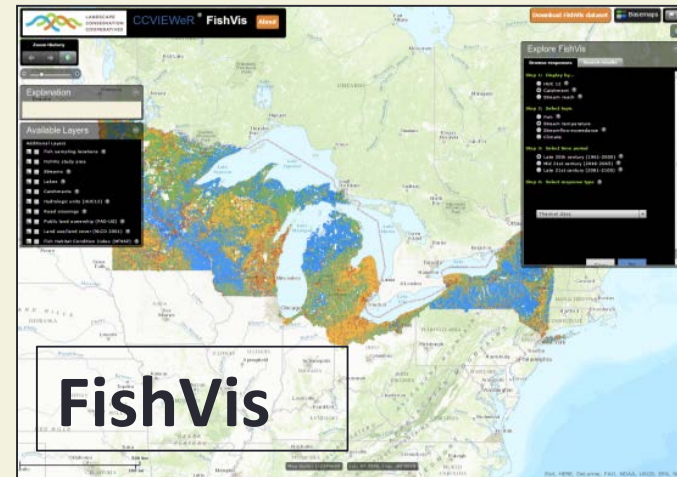
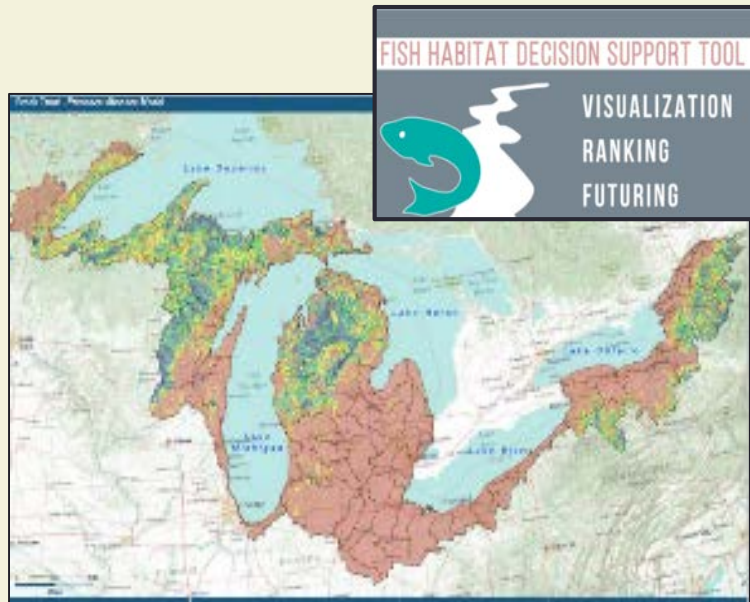
Connectivity Tools

- Barrier Removal Collaborative Suite – Great Lakes Commission
 - Focuses on communication, data sharing, and consensus
 - Propose a barrier removal project, describe benefits
 - Develop user-defined ranks/scores for relevant project criteria
 - Share it with others for review and comment



Connectivity Tools

- Many other tools



Connectivity Tools

- Selective Fish Passage – Great Lakes Fishery Commission
 - Develop and implement selective bi-directional fish sorting technology as an adaptive management experiment
 - Determine protocols and methods for implementation
 - Set solutions in a global context so the approach can be used broadly



Summary

- Sea Lamprey Control Program uses multiple tools to control the abundance of sea lampreys
- Barriers remain the backbone of the Program
- Investigating tradeoffs between control and connectivity
- A number of tools available to assist with that task
- Selective fish passage is the future

Questions?

