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

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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
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?