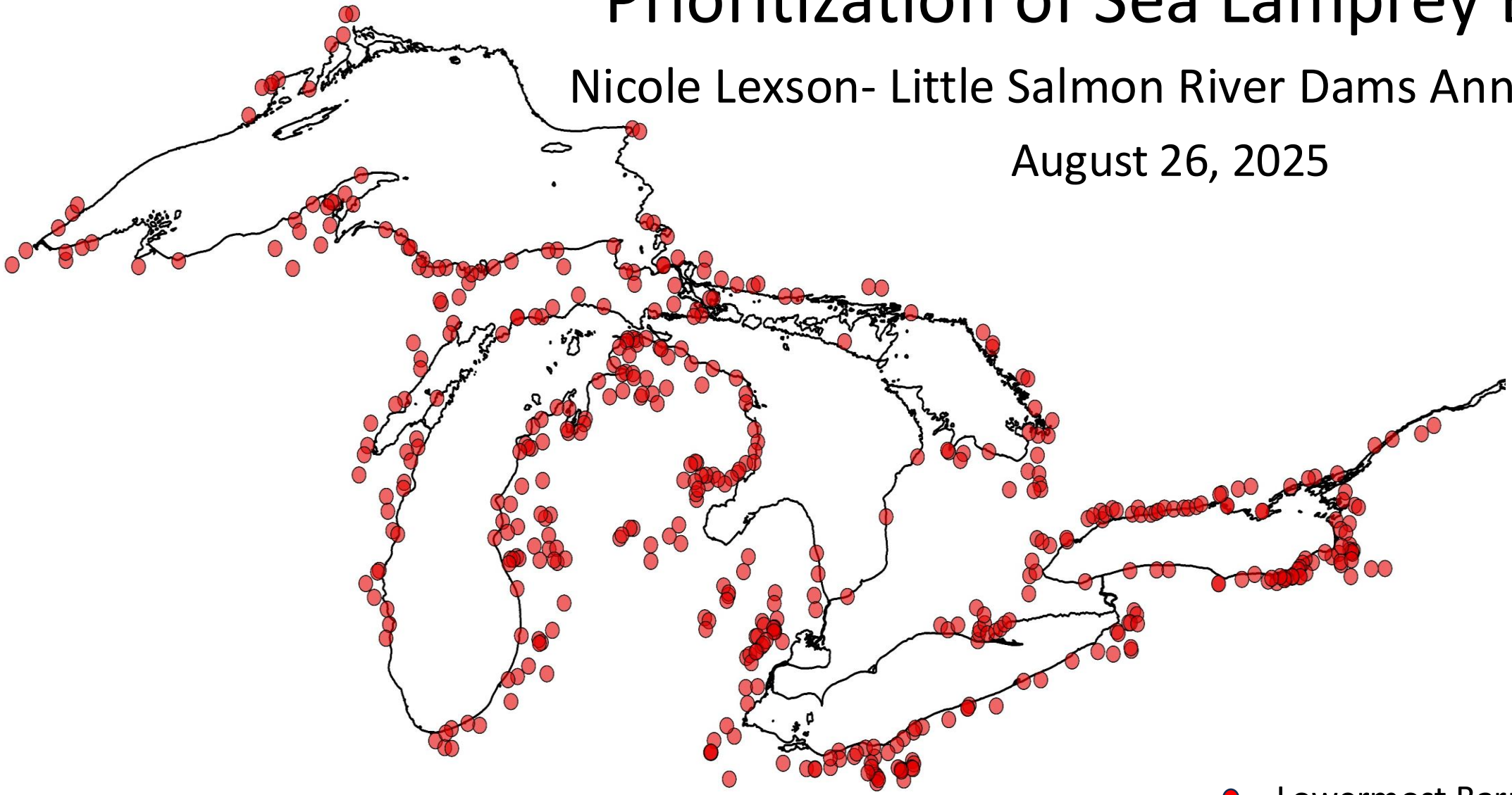
Prioritization of Sea Lamprey Barriers

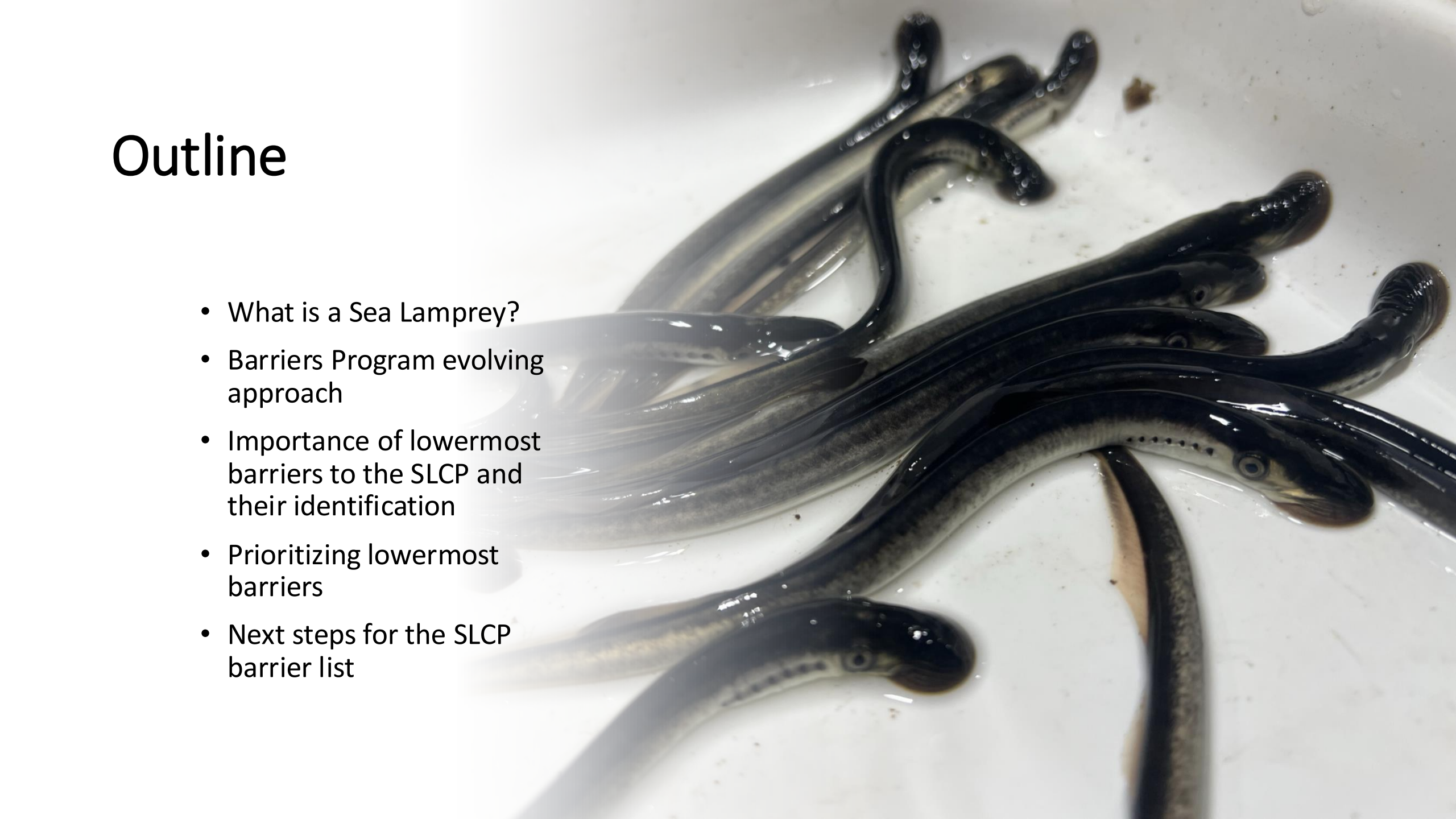
Nicole Lexson- Little Salmon River Dams Annual Meeting

August 26, 2025



Outline

- What is a Sea Lamprey?
- Barriers Program evolving approach
- Importance of lowermost barriers to the SLCP and their identification
- Prioritizing lowermost barriers
- Next steps for the SLCP barrier list



What is a Sea Lamprey?

How did they get here?

SEA LAMPREY: AN INVASIVE PARASITE

WHAT IS A SEA LAMPREY?

- Parasitic fish (Petromyzon marinus) native to the Atlantic Ocean
- Feed by sucking blood and body fluids from other fish
- Have remained largely unchanged for more than 340 million years
- Survived through at least four major extinction events

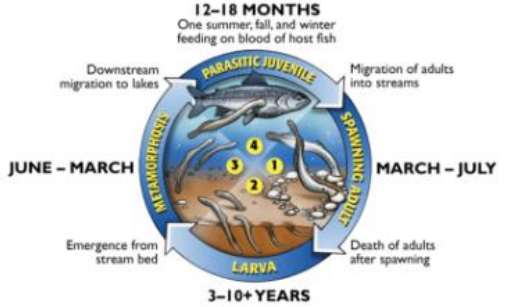
HOW TO CONTROL?

Pheromone & Alarm Cues

Traps

Barrier

Lampricides



ONE FEMALE CAN LAY UP TO 10,000 EGGS
(10% SURVIVAL RATE)

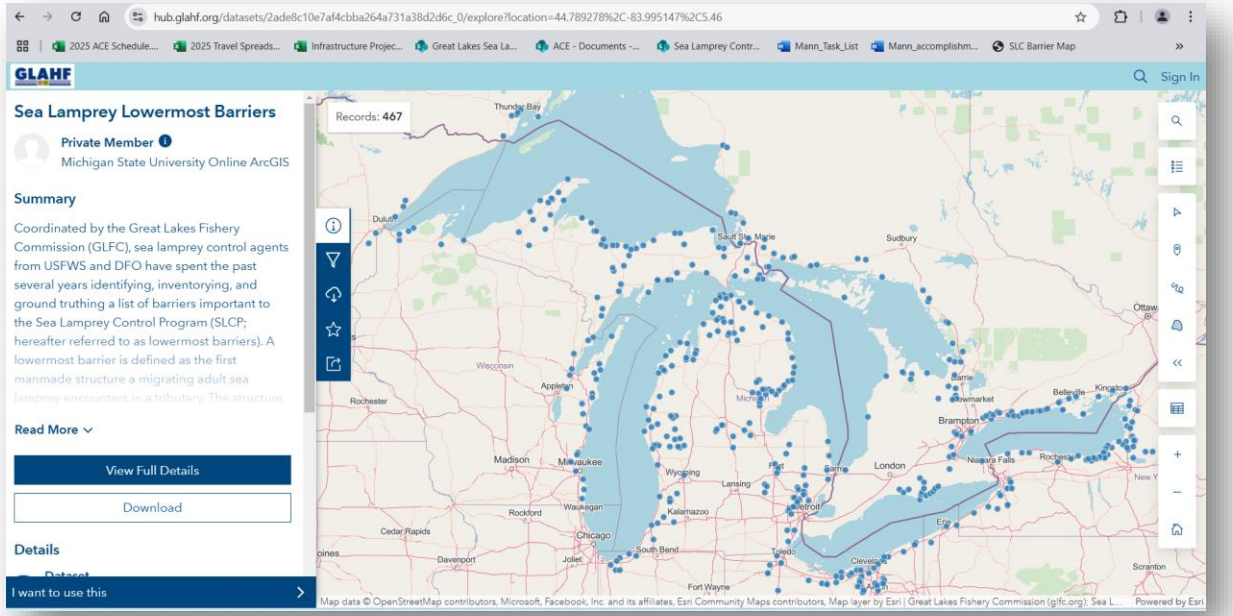
HOW DO THEY KILL?

- First, they use their suction-cup mouth to stick onto a fish.
- Next, they dig their teeth into the fish's skin to hold on tight.
- Then, they scrape through the scales and skin with their sharp tongue.
- Finally, they drink the fish's body fluids. They release a special enzyme that keeps the blood from clotting, similar to how leeches feed.

The first recorded observation of a sea lamprey in the Great Lakes was in 1835 in Lake Ontario. Niagara Falls served as a natural barrier, confining sea lampreys to Lake Ontario and preventing them from entering the remaining four Great Lakes. However, in the late 1800s and early 1900s, improvements to the Welland Canal, which bypasses Niagara Falls and provides a shipping connection between Lakes Ontario and Erie, allowed sea lampreys access to the rest of the Great Lakes.

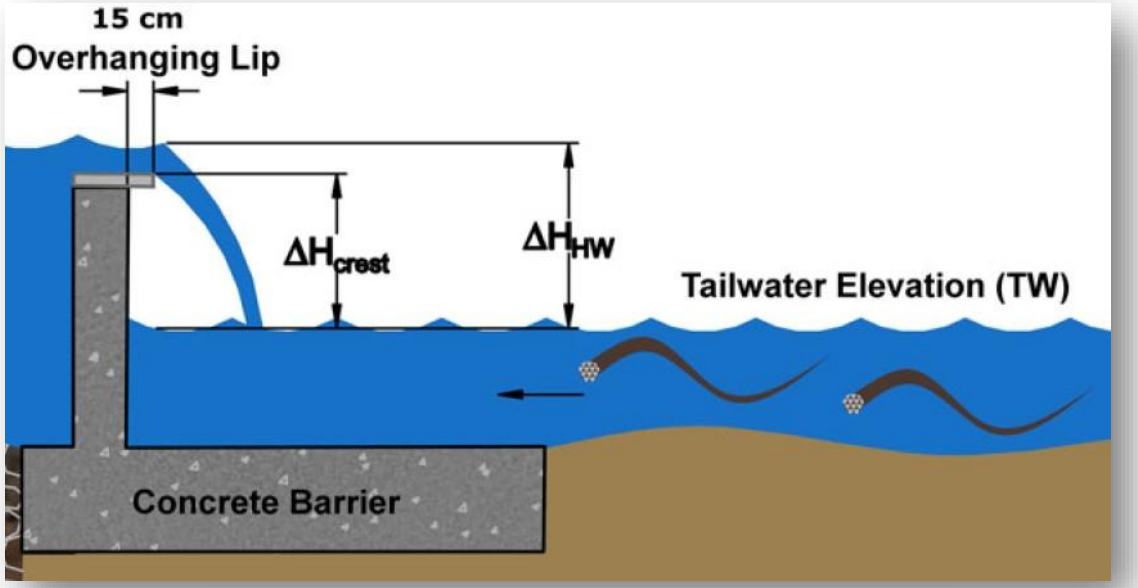
Barriers Program evolving approach

- More holistic approach to streams and barriers
- Need for continual communication on removal/construction projects

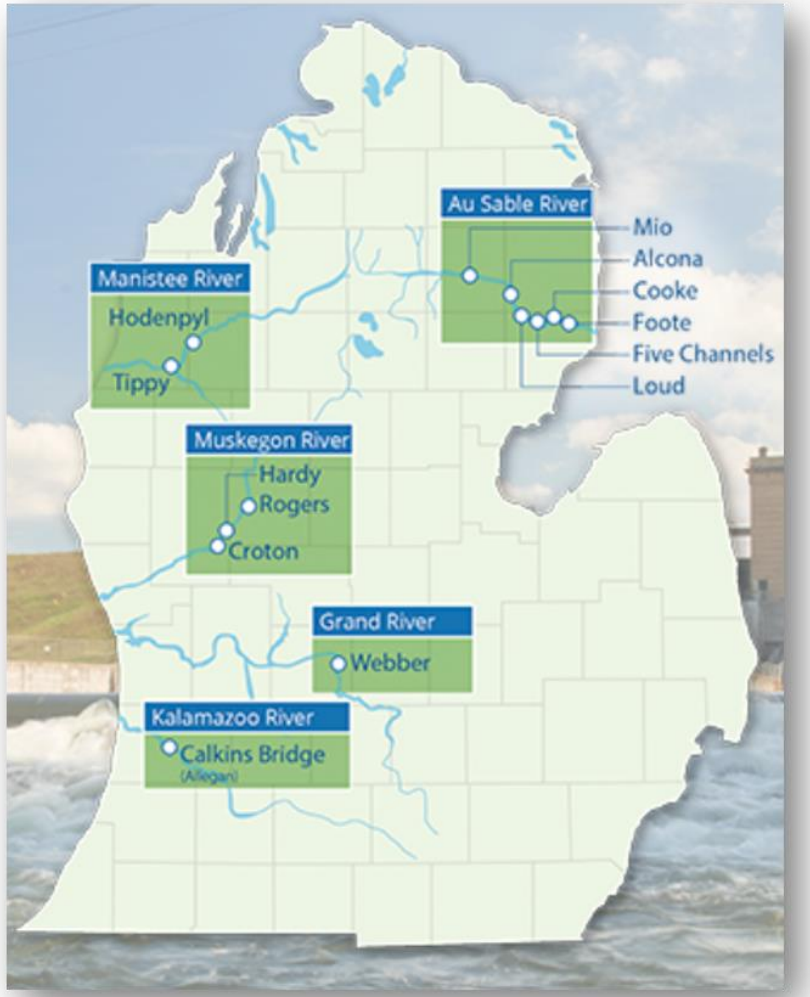


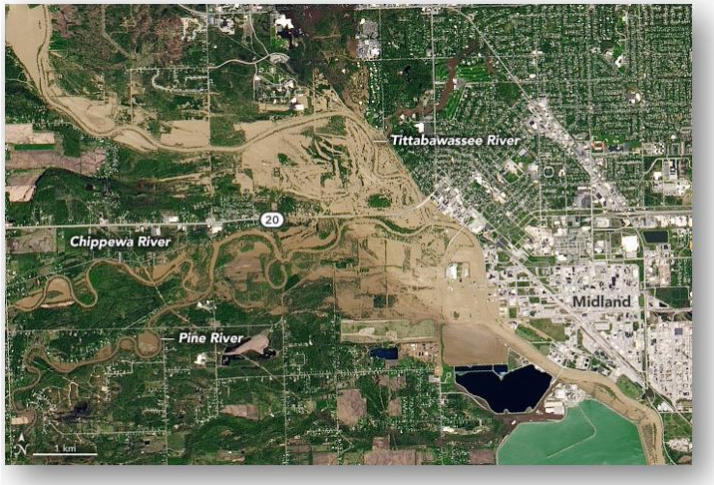
Why does the Sea Lamprey Program rely on Barriers?

- Block lampreys from spawning/rearing habitat
- Limit the amount of TFM needed
- Assessment & research purposes (trapping)



Importance of lowermost barriers to the SLCP and their identification



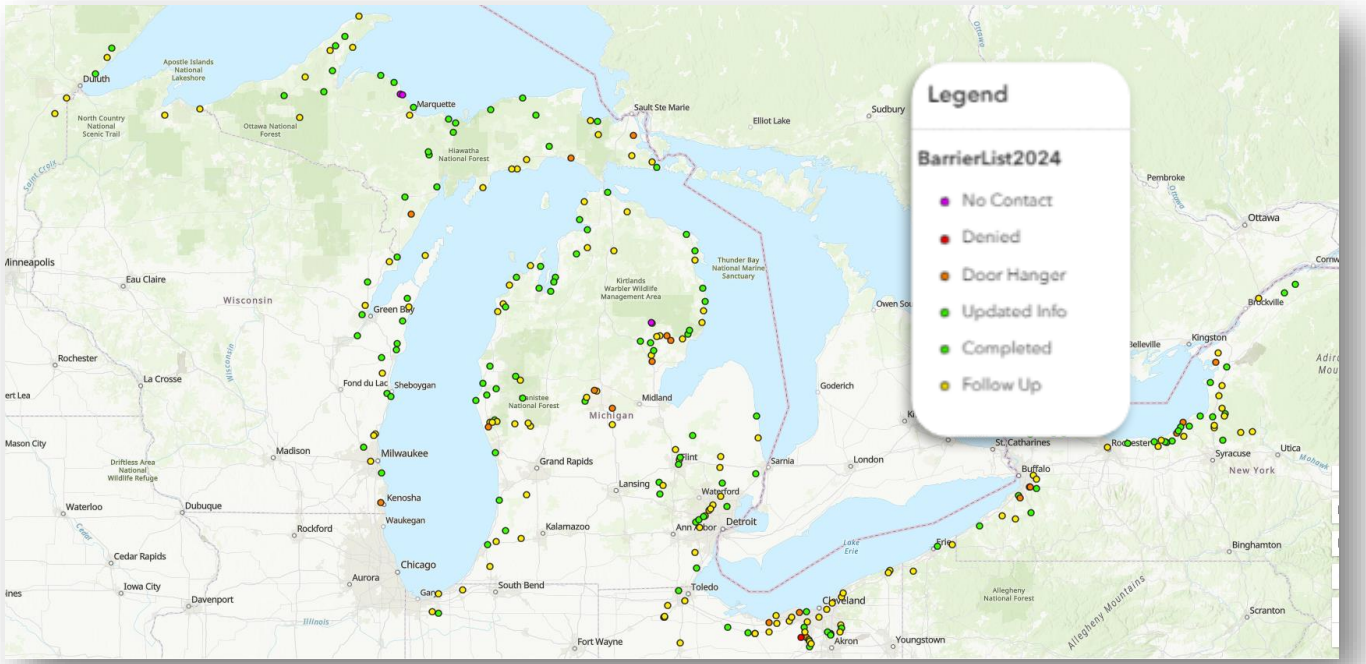


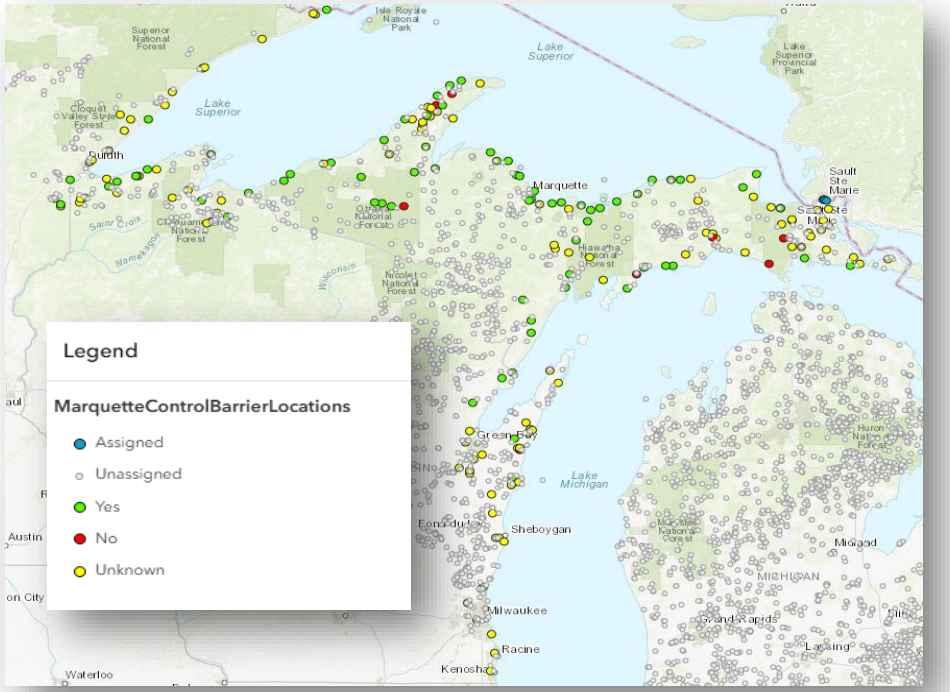
Risks to Sea Lamprey Control

- Loss of social license
- “Connectivity conundrum”
- Dam failures & removals

Importance of lowermost barriers to the SLCP and their identification

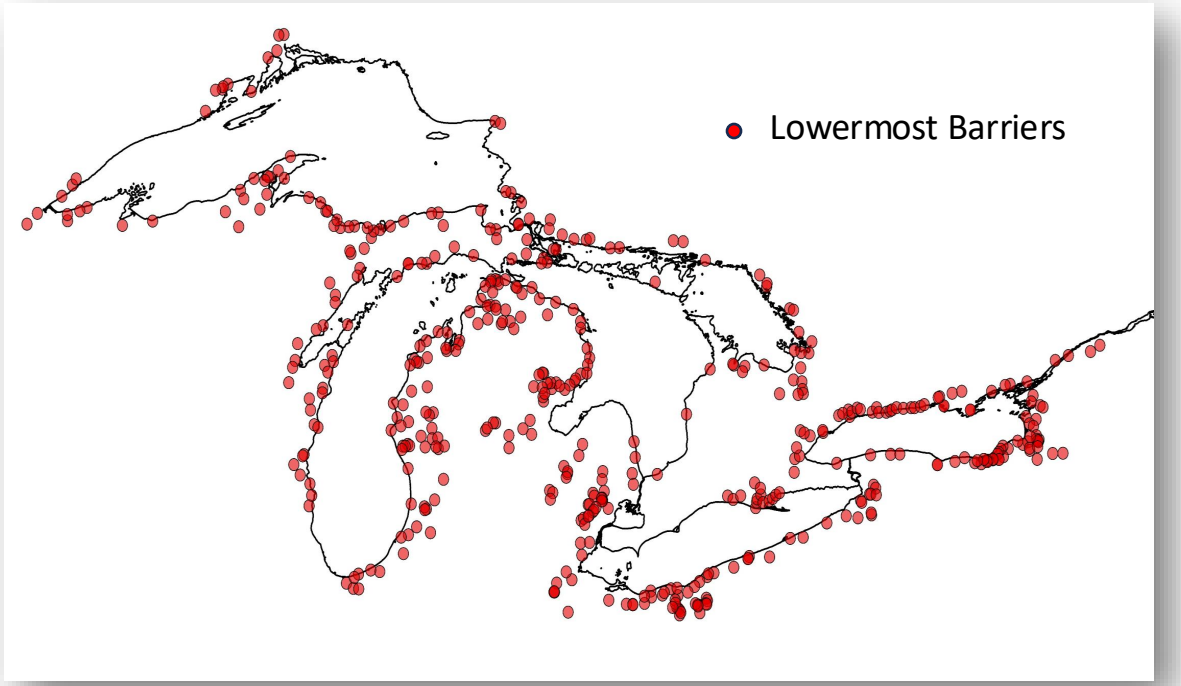
- 2018 identification process
  - Control agents identifying blocking structures
  - Determined miles protected, cost savings vs TFM Treatment etc.





Prioritizing lowermost barriers

- SLCP Prioritization process & ranking metrics
  - Upstream distance, treatment costs, T&E presence, etc.
  - Does not currently include Canadian barriers!

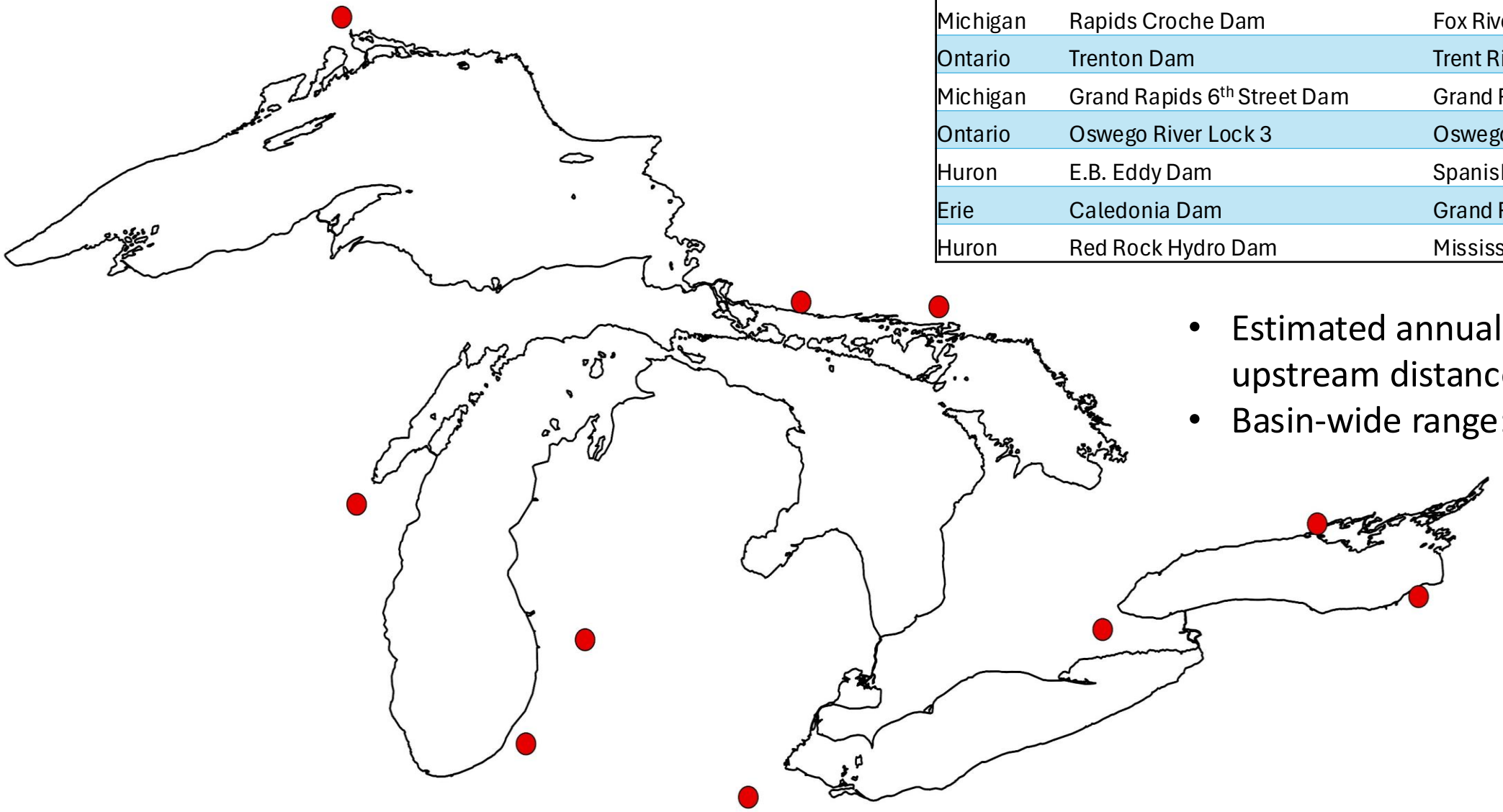


Category	Objectives	Ranking Scores		
		1	3	5
Treatments	Estimated Treatment Costs	<$100K	$100-$500K	>$500K
	Positive or Negative stream	Negative		Positive
Barrier Metrics	Structure age	<10	10-50	>50
	Upstream Escapement	No		Yes
	Structure Condition	Satisfactory/Good	Unknown/Unrated	Fair/Poor
	Hazard rating	None	Low	Significant or High
Risk	T&E species and treatment issues	No restrictions	Treatment Restrictions	No treatment
Support	Permission/willingness to work with GLFC	No	Unknown	Yes
Habitat	River kilometers blocked	<15	15-75	>75

Prioritizing lowermost barriers

Basin-wide top 10 – based on annual cost savings

Lake	Barrier Name	Mainstream	Estimated Annual Treatment Cost
Erie	Providence Dam	Maumee River	$1,440,885
Michigan	Berrien Springs Dam	St. Joseph River	$1,155,369
Superior	Alexander Falls Generating Station	Nipigon River	$1,039,596
Michigan	Rapids Croche Dam	Fox River	$835,935
Ontario	Trenton Dam	Trent River	$832,946
Michigan	Grand Rapids 6th Street Dam	Grand River	$783,675
Ontario	Oswego River Lock 3	Oswego River	$730,262
Huron	E.B. Eddy Dam	Spanish River	$710,459
Erie	Caledonia Dam	Grand River	$671,034
Huron	Red Rock Hydro Dam	Mississagi River	$631,061



- Estimated annual treatment cost (total upstream distance)
- Basin-wide range: $1,284 -$1,440,885

Prioritizing lowermost barriers

Lake Ontario top 10 – based on annual cost savings

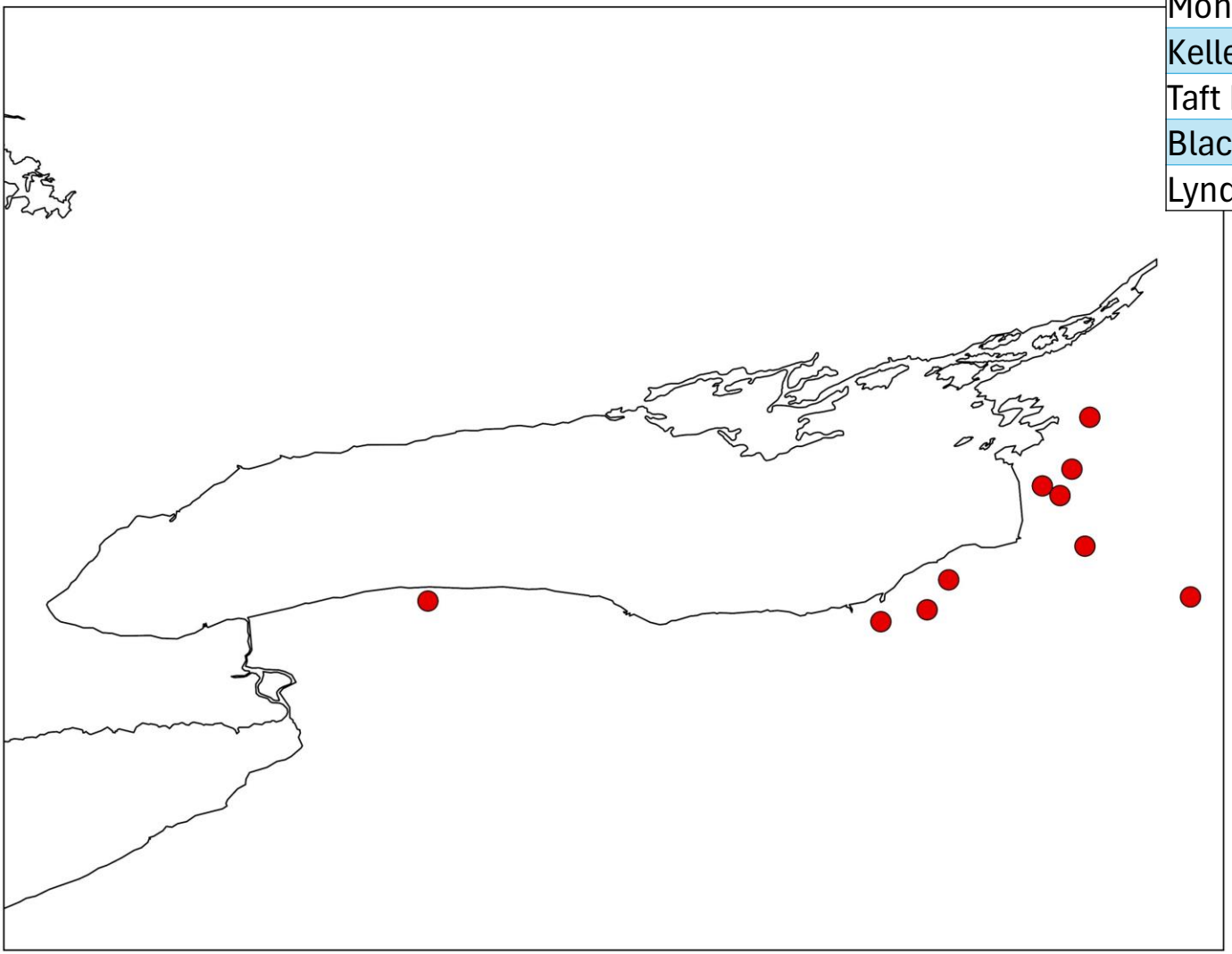
Barrier Name	Mainstream	Estimated Annual Treatment Cost
Trenton Dam	Trent River	$832,946
Oswego River Lock 3	Oswego River	$730,262
Black River Dam	Black River	$390,504
Lott Dam	Moira River	$310,405
Old Mill Weir	Humber River	$183,289
Gananoque Dam	Gananoque River	$162,986
Kingston Mills Locks	Cataraqui River	$153,126
Reid Milling Dam	Credit River	$144,700
Taberg Dam	Oswego River	$137,239
Salmon R. Sea Lamprey Barrier	Salmon River	$133,966

- Estimated Annual Treatment Cost (total upstream distance)
- Range for Lake Ontario: $4,774 - $832,946

Prioritizing lowermost barriers

Lake Ontario top 10 – based on priority to maintain

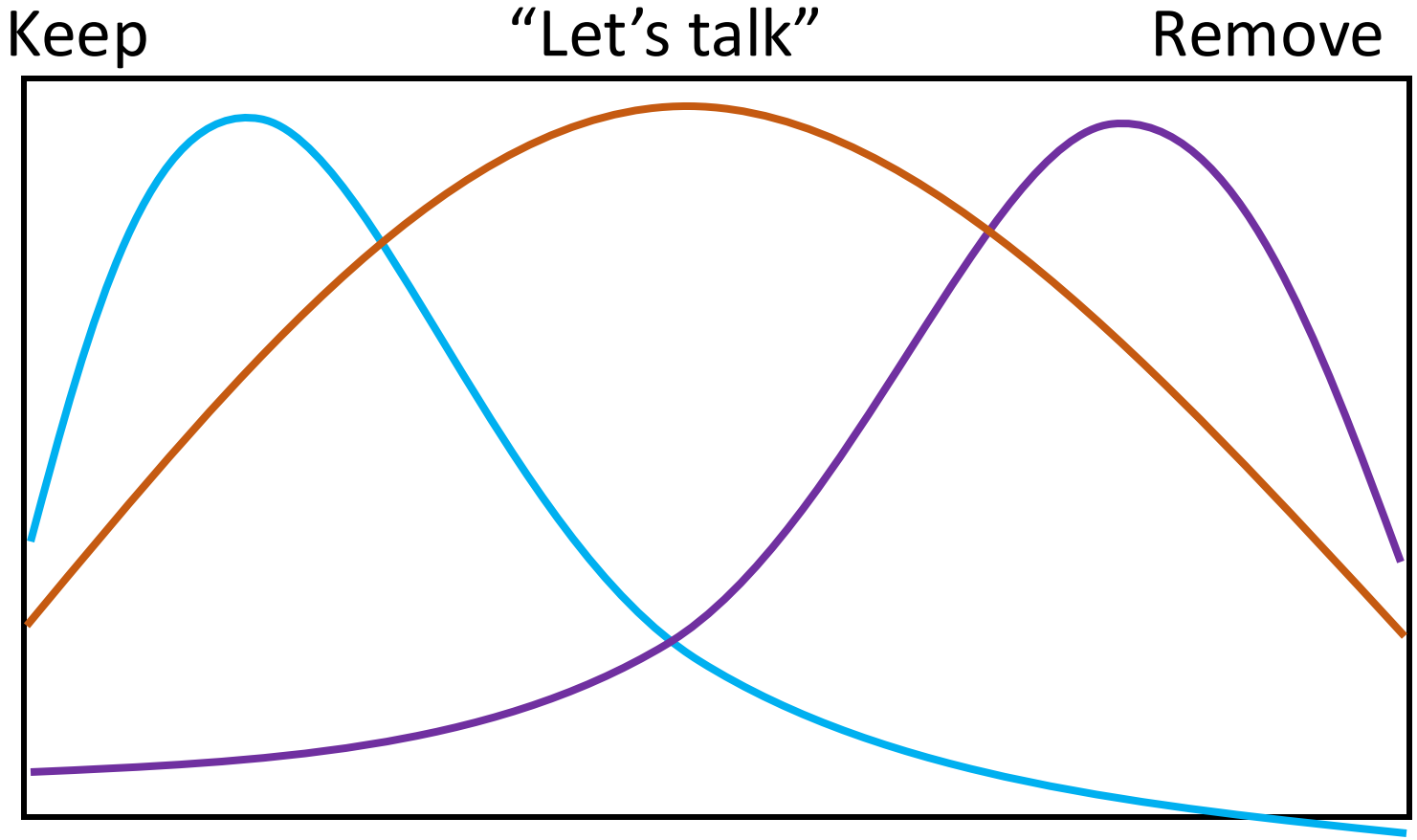
Barrier Name	Mainstream	Total Score
Oswego River Lock 3	Oswego River	37
Lighthouse Hill Dam	Salmon River	33
Taberg Dam	Oswego River	31
Hannibal Center Dam	Ninemile Creek	31
Red Creek Dam	Red Creek	31
Monitor Mills Dam	South Sandy Creek	29
Keller‘s Dam	Skinner Creek	29
Taft Hydro Dam	North Sandy Creek	27
Black River Dam	Black River	27
Lyndonville Dam	Johnson Creek	27



- Estimated Annual Treatment Cost savings (to next upstream barrier)
- Positive/Negative stream
- Structure Age
- Upstream Escapement
- Condition
- Hazard Rating
- T&E Species
- Barrier owner interest
- River Km Blocked (to next upstream barrier)
  - Score Range: 12 - 37 (out of 45)

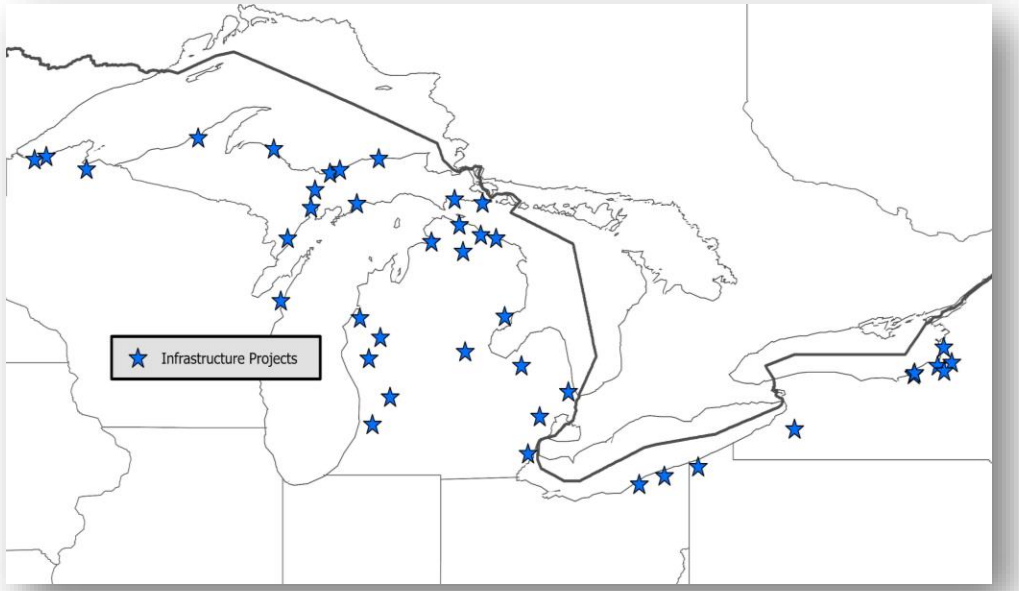
Next steps for the SLCP barrier list

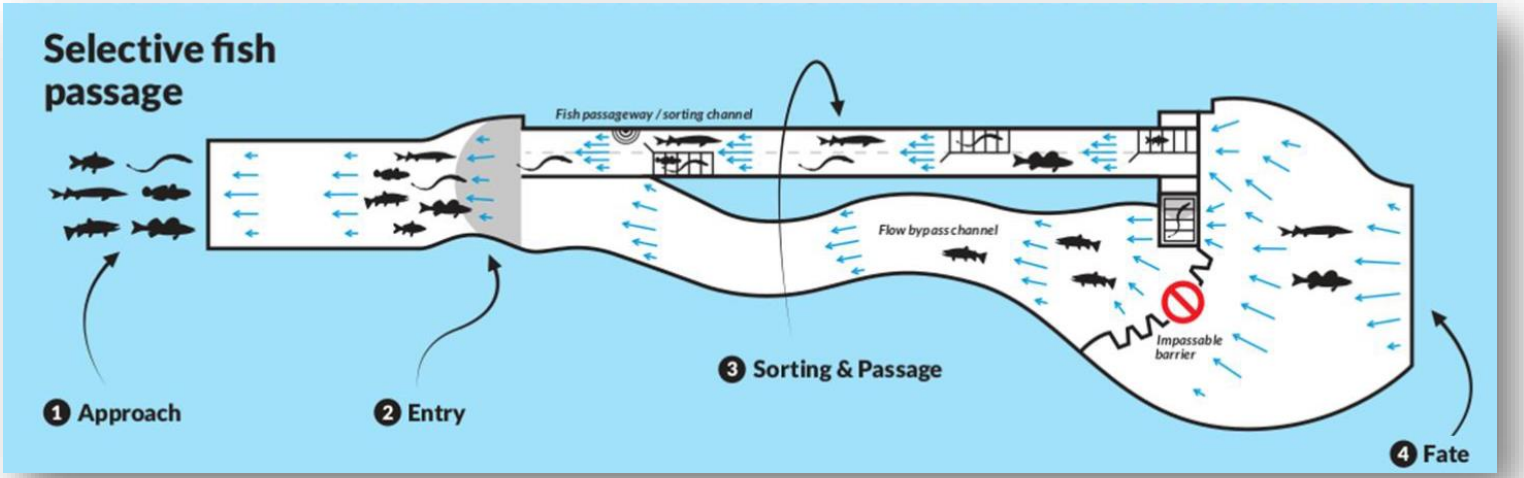
- Using the newly ranked list to continue dialog between SLCP and others
  - www.glfc.org/pubs/slcp/lowermost-barriers.xlsx

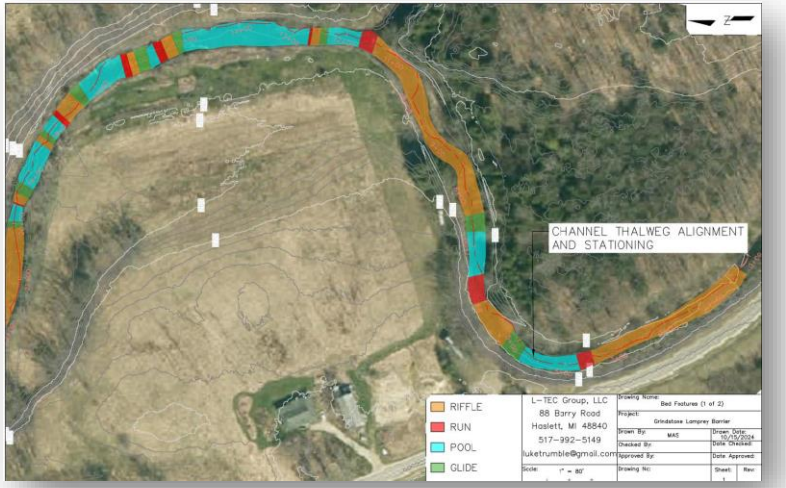


Next steps for the SLCP barrier list

- Develop a GLFC asset management plan to direct investment in;
  - Fish passage
  - Barrier maintenance
  - Monitoring stream function (geomorphology)
  - New construction







Questions?