



## **SEA LAMPREY CONTROL BOARD RESEARCH PRIORITIES**

The Sea Lamprey Control Board has identified these research priorities as critical research needs to understand and improve the control of sea lamprey in the Great Lakes. Investigators are encouraged to use this list to develop research ideas. The research priorities addressed by a proposal are considered during proposal evaluation.

**Note:** This is an unranked list of research needs.

### Larval Assessment:

1. How can we determine the specific stream, channel, or lentic area where an individual sea lamprey lived as a larva?
2. What are sea lamprey life stage survival rates and the factors that influence them (natural survival)?
3. To what extent are the costs and levels of accuracy in our ability to measure density, distribution, and occurrence of larval sea lamprey impeding overall sea lamprey control in the Great Lakes? How can accuracy, precision, and efficiency in assessments of larval sea lamprey distributions, demographics, and dynamics be improved through alternative modeling or assessment techniques?

### Lampricides:

4. What are the key environmental and biological variables that contribute to residual sea lamprey (i.e. those that survive a lampricide treatment)?
5. What unique physiological, ecological and biological vulnerabilities do sea lamprey have that we can use to develop new lampricides?
6. What are the physiological effects of lampricide treatments on non-target organisms, particularly species of concern including but not limited to lake sturgeon, mudpuppies, native lamprey, and native mussels and their hosts?
7. What are the population level effects of lampricide treatments on non-target organisms, particularly species of concern including but not limited to lake sturgeon, mudpuppies, native lamprey, and native mussels and their hosts?
8. Can novel lampricides or formulations be developed that are as environmentally compatible as TFM and maintain or improve lampricide efficacy and selectivity?

### Trapping:

9. How can sea lamprey be captured and removed from large, open rivers?
10. What environmental factors regulate timing and rates of encounter and entrance to traps for both migratory adult and juvenile sea lamprey?
11. What is the most precise and accurate way to track lake-wide abundance of parasitic sea lampreys?

### Barriers:

12. What are the social, cultural, economic and biological factors, including the effects of extreme weather events and climate change, which influence barrier decisions (removal, construction, and modification)?
13. What hydraulic/hydrologic characteristics of barrier/fishway designs most effectively facilitate passage needs, exploiting the natural behavior and motivation of sea lamprey and non-targets (native non-jumping species)?
14. What factors, including existing blocking structures and upstream habitat, best predict the sea lamprey and desired fish species production of newly opened systems (barrier removal)?
15. What suite of technologies will block, guide or pass fish, specifically electricity and water velocity. Technologies like automation, optical sorting, chemical repellants, strobe lights, sound, bubble curtain, temperature, and other innovative strategies will also be considered.
16. What are the critical hydraulic and hydrological characteristics of barriers and integrated traps that enhance human safety without reducing effectiveness?

### FishLamp:

17. What is the lethality of lamprey attacks on hosts (salmonines, burbot, coregonines) and what factors determine lethality?
18. How do sea lampreys locate, select, and attach to hosts (salmonines, burbot, coregonines) in the lake?
19. What is the relationship between localized larval sea lamprey production and the distribution of parasitic juveniles in the lake?
20. What proportion of recently metamorphosed sea lampreys survive to feed, and what proportion of parasitic juveniles survive to spawn?

### Other:

21. What is the mechanism for the stock recruitment relationship and how is it influenced by adult and larval habitat?
22. How do adult sea lamprey distribute themselves to spawning habitat (from the lake to stream)?