Evaluation of Pacific Lamprey Statoliths and Eye Lenses as Records of Age, Natal Origin, and Trophic History

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**Pacific Lamprey Are Important!**

Pacific Lamprey (\textit{E. tridentatus}) are an ancient species of fish that live in the North Pacific Ocean and its adjacent freshwater habitats. They are cartilaginous and have a similar life cycle as salmon (anadromous).

- The filter-feeding larval stage helps facilitate nutrient cycling in freshwater systems.
- The adults represent a fat-rich source of food for aquatic and terrestrial predators.
- Migrating lamprey may help alleviate sealion predation on salmon.

**Lamprey Populations Are \rightarrow**

Pacific Lamprey populations are in decline throughout their native range\textsuperscript{1}. Very little is known about the life history of this species.

**We Want to \uparrow Lamprey Knowledge**

1. Evaluate utility of statoliths and eye lenses for age determination.
2. Analyze statolith chemistry and use it to predict lamprey origins.
3. Analyze lens carbon and nitrogen stable isotopes to infer trophic history.

**How Will This Help Lamprey?**

1. Knowledge of population age structure is important for fisheries assessment and tracking cohort survival.
2. Natal origin determination is useful to assess recovery efforts and monitor supplementation projects.
3. Better understanding of host trophic position is useful to understand diet and prey selection.

**Can we determine their age?**

- Maybe! Statoliths may stop growing and thus may only reflect larval age.

**Can we determine their birthplace?**

- Yes! \~85% accuracy when using statolith chemistry to predict lamprey origins.

**Can we determine their food web position?**

- Maybe! Increasing $\delta^{15}N$ in the eye lens layers suggests increasing food chain position in lamprey.

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