



Life history and migration of American eels in the Penobscot River, Maine

1. Develop a model to forecast the downstream migration timing of American eels based on environmental factors (e.g., weather, lunar phase)

Eels exhibit a complex, catadromous life history, migrating to the Sargasso Sea as large “silver” eels to spawn and die. Their progeny are carried by ocean currents as willow leaf-shaped leptocephalus larvae, metamorphosing into “glass” eels as they enter into river systems whereupon they initiate feeding and become “yellow” eels. Yellow eels take up residence in areas from the estuary to up river sites and grow.

This growth phase can last more than 25 years before undergoing a second transformation, including color change, to a downstream-migrating silver eel. Historically the American eel was the target species of a lucrative fishery however this fishery has collapsed over the last few decades and eels are in decline worldwide. Such declines are troubling as eels play an integral role in maintaining biotic integrity in fish communities. As such, eel conservation has become a high priority of both fishery managers and conservationists in many freshwater ecosystems.

The proposed work will use field data to inform a predictive forecasting modeling framework as to both timing of migration and behavior and survival of American eel at dams. Such a model could serve as a useful tool to managers to inform management and conservation decisions as to hydropower facility operation. Results from ongoing telemetry work will be used to inform our developing model. If successful, these efforts would allow sensitivity analysis of turbine shut downs to balance conservation and financial objectives for this commercially and ecologically important fish

The project is in the beginning stages of consolidating data and constructing a modeling framework.

Investigator: Daniel Weaver (Postdoc)

Advisors: Joseph D. Zydlewski (Advisor)

Duration: September 2018—December 2020

Cooperators:

The Nature Conservancy

U.S. Geological Survey – Maine Cooperative Fish and Wildlife Research Unit