“Smart skin” for sea lamprey detection

by **Xiaobo Tan**

The ability to selectively pass fish along a waterway has emerged as a high priority for the conservation, management, and restoration of Great Lakes fish communities. Deterioration of dams in Great Lakes tributaries and the recognized need to restore connectivity between lakes and tributaries have increased the urgency of developing strategies to allow passage of native and desirable fishes while blocking and/or removing invasive or undesirable fishes. A primary challenge to developing selective fish passage structures in the Great Lakes is preventing successful passage of sea lamprey (*Petromyzon marinus*) at fishways near dams, where their detection is key.

Funded by the Great Lakes Fishery Commission Sea Lamprey Research Program, researchers at Michigan State University and the United States Geological Survey’s Hammond Bay Biological Station are working on a “smart skin” technology that can autonomously detect the suction of adult sea lampreys. The smart skin consists of arrays of soft pressure sensors embedded in a flexible substrate, which allows it to be mounted on variably shaped surfaces within or near fishways. Using the distinct pressure profile created by lamprey mouth suction, the researchers hope to detect the attachment of lamprey to the smart skin and then trigger a localized electrical stimulus to repel or deter it. In addition to its potential use for selective fish passage, smart skin technology also could be deployed in streams to determine the timings of sea lamprey entry and upstream migration for improving understanding of their refuge-seeking behavior.



Photo by Hongyang Shi

A sea lamprey attaching to a smart skin prototype.

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