

Lake Michigan Steelhead: Where were you hatched?

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Lake Michigan steelhead are a mix of hatchery-produced and wild fish. Mixed-stock populations such as this can complicate management, due to the unequal contributions from the different stocks. It is essential to understand where these fish come from, but how?

The answer may lie in steelhead otoliths. Otolith chemistry can provide researchers with a naturally occurring fingerprint of the fish's life history through the natural inclusion of elements into the calcium carbonate matrix of the otolith. This fingerprint comes in the form of a unique chemical signature that is influenced by the ambient water in which the fish resides. As the fish migrates from one region (the natal stream) to the lake, the chemical signature will change accordingly. Thus providing a natural chronology of the fish's life history without any artificial marking or tagging.

To determine if such an approach can be used for Lake Michigan steelhead, juveniles of this species were collected during spring and late summer/fall in both 2013 and 2014 from Michigan and Wisconsin tributaries of Lake Michigan. This sampling will be repeated again in the 2015 sampling season. Preliminary findings show distinct chemical signatures occurring between fish from different natal streams, allowing for the classification of fish origin to a high degree of accuracy. Strontium was found to be the most distinct trace element, with the highest natural concentrations found in the Manistee watershed.

In addition to overall classification accuracy, this collaborative research between Central Michigan University and Michigan Department of Natural Resources will also consider three factors: the effect of inter-annual variation on classification accuracy, the ability to classify the natal origins of steelhead at various spatial scales, and the effect of fish age (i.e., age-0 and age-1) on classification accuracy. This research will pave the way for future studies to determine the natal origins of adult steelhead, thus benefiting the management of both the steelhead and their natal habitats.