**Early Detection and Monitoring of Non-Native Fishes in Lake Huron, 2017**

Below is a summary of the USFWS-Alpena Fish and Wildlife Conservation Office’s Aquatic Invasive Species Program report titled *Early Detection and Monitoring of Non-Native Fishes in Lake Huron, 2017*.

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Summary:

The Laurentian Great Lakes have encountered numerous aquatic non-native and invasive species introductions since Europeans settled in North America (Mills et al. 1994). The impact of aquatic invasive species (AIS) on the Great Lakes has been widely documented by the scientific community (Leung et al. 2002; Mills et al. 1994; Rosaen et al. 2012). Despite increasing regulations aimed at reducing the likelihood of the introduction and spread of AIS into the Great Lakes, there remains a need to monitor for and detect new species before they become established (GLRI 2014; GLWQA 1987). This is especially true given the costs and difficulty of attempting to control or eradicate a non-native species once it is established (Trebitz et al. 2009). If a non-native species is detected prior to becoming well established, rapid response decisions can be made in an effort to eradicate or control the species from further spread. Furthermore, continuous monitoring also allows resource managers to document the baseline community, look at historical data, and assess the impact of future invasions (Trebitz et al. 2009).

This report summarizes the 2017 efforts for early detection of non-native fishes in Lake Huron as implemented by the U. S. Fish and Wildlife Service (USFWS), Alpena Fish and Wildlife Conservation Office and partner agencies. Two locations in Lake Huron, the lower St. Marys River and Saginaw Bay, were selected for sampling during 2017 using the best information available. These locations were chosen following an in-house ranking of a suite of locations across U.S. waters of Lake Huron. Location ranking took into account the likelihood of a new non-native species to become introduced at a location and locations where non-native species were historically introduced (USFWS 2016). Consideration was also given to at-risk locations provided by The Nature Conservancy (Chadderton et al. 2016). Sites within sampling locations were stratified by suitable gear type according to sampling depth and randomly selected from all sites meeting each depth criteria. Gear used to target juvenile and adult fish were utilized and included night electrofishing, paired fyke nets, and bottom trawls. All three gears were fished in the lower St. Marys River during 2017 in continuation of annual sampling initiated during 2013. Saginaw Bay was first sampled in 2017 and only paired fyke nets and bottom trawls were used during sampling.

A new sighting of invasive Tubenose Goby *Proterorhinus semilunaris* was collected in the lower St. Marys River during sampling in 2017. Tubenose Goby have been collected within the Great Lakes Basin, and the St. Marys River finding indicated a range expansion for this species.

Species accumulation analysis and extrapolated species richness was used to gauge juvenile and adult fish species diversity (observed species versus predicted extrapolated species richness). Non-native species may be low in abundance, or rare, early during invasion. The goal is to detect as many species as possible that are predicted to be present at a given location. Detecting rare species present at low abundances is beneficial for the sampling regime to be most effective (Hoffman et al. 2011).

Crews examined 17,735 juvenile and adult fish over 72 sampling sites for the presence of undocumented non-native species. Catch information was recorded on all fish examined comprising 44 species. Previously established non-native species were captured often (e.g., Common Carp *Cyprinus carpio*, Rainbow Smelt *Osmerus mordax*, Round Goby *Neogobius melanostomus*, Threespine stickleback *Gasterosteus aculeatus*, and White Perch *Morone americana*).

Early detections reinforce the critical nature of this monitoring program as an essential part of non-native and invasive species management. This program discovered range expansion of Tubenose Goby into the St. Marys River on Lake Huron in 2017 and range expansion of Blueback Herring *Alosa aestivalis* on Lake Erie during similar early detection efforts conducted by the USFWS during 2016 (USFWS 2017). The USFWS Ashland FWCO detected a range expansion of bloody red shrimp *Hemimysis anomala* into Lake Superior where they were collected at Allouez Bay near the St. Louis River in western Lake Superior during 2017 (Jared Myers, USFWS, personal communication). These detections reinforce the importance of the USFWS early detection and monitoring program across the Great Lakes.

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