**Early Detection and Monitoring of Non-Native Fishes in Lake Huron, 2019**

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, 2019*.

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Summary:

This report summarizes the 2019 comprehensive efforts for early detection and monitoring (EDM) of non-native fishes in Lake Huron as implemented by the U.S. Fish and Wildlife Service (USFWS), Alpena Fish and Wildlife Conservation Office (FWCO) and partner agencies. The Alpena FWCO Aquatic Invasive Species (AIS) EDM program incorporated a number of changes during 2019 to improve efficiency including a shift away from random sampling to target rare species and unique habitats, the use of electronic data entry, real-time catch monitoring to maximize efficiencies, and reduced fish handling. Efforts were also made to expand sampling to include a number of top-risk locations across our area of coverage.

Nine locations (Au Gres River, Au Sable River, Cheboygan River, Port Dolomite, Presque Isle, Rogers City, Saginaw Bay, St. Marys River, and the Thunder Bay area) were selected for sampling. The selections were made to prioritize locations where a new non-native species was most likely to be introduced, as well as locations where non-native species were historically introduced. Saginaw Bay and the St. Marys River were of greatest consideration for invasion and are monitored annually. The remaining seven locations were added in 2019. Gear used to target juvenile and adult fish included nighttime electrofishing, paired fyke nets, single fyke nets, miniature fyke nets, gill nets, bottom trawls, and beach seining. Crews examined over 36,600 fish collected at 278 sampling sites for the presence of undocumented non-native species. Seventy-two species were recorded.

 **No novel invasive species were identified at Lake Huron locations during 2019.** Range expansions were documented for Eurasian Ruffe *Gymnocephalus cernua* in the St. Marys River and Tubenose Goby *Proterorhinus semilunaris* in the Cheboygan River. These sightings reinforce the critical nature of this monitoring program as an essential part of non-native and invasive species management. Common and previously established non-native species were also captured (e.g., Common Carp *Cyprinus carpio*, Rainbow Smelt *Osmerus mordax*, Round Goby *Neogobius melanostomus*, Threespine stickleback *Gasterosteus aculeatus*, and White Perch *Morone americana*).

Multiyear catch data for Saginaw Bay and the St. Marys River were evaluated using rarefaction curves to examine the rate at which species were detected; rarefaction analyses were deemed inappropriate for the remaining seven locations due to the lack of multiyear data. Efforts in Saginaw Bay from 2017 to 2019 sampled 160 sites and captured 41 species, its estimated species richness is 54 resulting in an estimated efficiency of 76%. Efforts in the St. Marys River from 2013 to 2019 sampled 405 sites and captured 68 species, its estimated species richness is 116 resulting in an estimated efficiency of 79%.

Contemporary species lists for Saginaw Bay and the St. Marys River were also evaluated to determine the percentage of “rare” species collected. Sixty-seven percent of designated rare species were collected at Saginaw Bay and forty-eight percent of designated rare species were collected at the St. Marys River.

We incorporated a number of changes into the AIS EDM program in 2019 that made sampling more efficient. IPads were used to collect data electronically in the field with Survey123 and cloud-based hosting of data. We also used an electronic dashboard to provide real-time information on our sampling efforts and catch. We also reduced fish handling by recording fish lengths on 10 specimens per species per site. These measures created efficiencies that allowed sampling the additional seven at-risk locations in Lake Huron in 2019. Adaptive cycle of evaluation will continue to be implemented into the future.