

Environmental DNA Surveillance of the Bait Trade for Aquatic Invasive Species

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Over 180 non-native species have been introduced in the Great Lakes region, many posing threats to native diversity and ecosystem functioning. One potential pathway for these introductions is the commercial bait trade as unknowing or unconcerned anglers commonly release unused bait into aquatic systems. Previous surveillance efforts for this vector relied on visual inspection of bait stocks in retail bait shops, which can be time consuming and requires a trained individual that can rapidly and accurately identify cryptic species. Environmental DNA (eDNA) surveillance, a molecular tool that has been employed for surveillance in aquatic environments, has the ability to detect species at low abundances with increasing ease and efficiency. In this study eDNA samples were collected and analyzed from 525 retail bait shops throughout the Laurentian Great Lake states. eDNA monitoring techniques were then applied to screen samples for multiple aquatic invasive species (AIS) that have the potential to be transported in the bait trade, including bighead (*Hypophthalmichthys nobilis*) and silver carp (*H. molitrix*), round goby (*Neogobius melanostomus*), tubenose goby (*Proterorhinus marmoratus*), Eurasian rudd (*Scardinius erythrophthalmus*), and goldfish (*Carassius auratus*). A total of 27 samples screened positive for at least one target species (4.7 % of samples) with all target species being found at least once except bighead carp. Goldfish and round goby were the most common species detected (20), with most of these detections concentrated near southern Lake Michigan and western Lake Erie, respectively. Despite current regulations, the bait trade remains a potential pathway for invasive species introductions in the Great Lakes region. Alterations to existing management strategies regarding the collection, transportation, and use of live bait are warranted, including new and/or updated regulations, to prevent future introductions of invasive species in the Great Lakes via the bait trade.