NUISANCE SPECIES - Updates to Listings

What is being considered?
The Department would like to update its nuisance species list to reflect changing understandings of which species may present a danger to Maryland's native species and ecosystems. These changes are based on risk assessments conducted by the Department to determine the potential for certain species to have significant negative impacts. The changes include: 1) delisting candiru, 2) expanding the listing of swamp eels to apply to an entire family of fish rather than a specific species, 3) listing both Chinese pond mussel and waterwheel as species which a person may not import, transport, purchase, possess, propagate, sell, or release into State waters, and 4) making a number of technical updates based on information that has developed since the last update to these lists.

Why is this change necessary?
The Department performed a risk assessment for candiru and determined that it is a lower risk invasive species than originally feared. Candiru is native to the Amazon and Orinoco River Basins in South America and is not currently found in the United States. Because it is a tropical species, it is not likely to be able to survive winters in Maryland, or establish a population, in the event that it were to be accidentally released into State waters. It is also not a common fish in the aquarium trade as it is a blood parasite.

It is necessary to expand the list of swamp eels to apply to the entire family of Synbranchidae, rather than the specific Asian swamp eel currently listed, because there are several species that are sold for human consumption in live food markets and circulated in the aquarium trade all of the same family. Swamp eels are primarily freshwater fishes distributed in tropical and subtropical regions of Asia, Australia, Africa, and Central and South America. There are no swamp eel species native to North America. Swamp eels are considered tropical to sub-tropical species that inhabit mostly freshwater slow-moving systems including ponds, swamps, and ephemeral wetlands. These eels are environmentally tolerant as a group. The two most commonly-traded species are known to tolerate low dissolved oxygen concentrations (as they are air breathers), a wide range of salinity (up to 16 ppt) and can survive freezing temperatures and ice cover, meaning that it is likely they would be able to survive a Maryland winter and expand throughout the Chesapeake Bay watershed if given the opportunity. On the human health side, swamp eels are a common source of human gnathostomiasis (a parasitic infection) and have been observed to contain a high parasite load including nematodes, acanthocephalans, and digenean parasites. Although impacts to invaded areas outside of Maryland have been relatively minimal, swamp eels can attain large size (up to 1 meter in length) and prey on a variety of organisms, and it is possible that impacts have been underreported. The risk analysis that was run on the entire family determined that there is a high risk of invasiveness due to environmental and climate matching, indicating most of Maryland is suitable for establishment by these species.

It is necessary to list the Chinese pond mussel as a species which a person may not import, transport, purchase, possess, propagate, sell, or release into State waters based on the results of the Department's risk assessment. The Chinese pond mussel is a large freshwater unionid mussel native to eastern Asia. It is currently found throughout Europe, as well as in Indonesia, Central America, and North America. It is a filter-feeder with a larval stage (glochidia) that parasitizes

fishes. As a result, it competes with native unionid mussels for space, nutrients, and host fish. It has been observed to be a successful competitor that may compose up to 90% of the total unionid biomass in systems where it has been established, completely replacing some native species. The Department's risk assessment indicated that the species had a high climate match score with Maryland. That score combined with the species' high fecundity and generally high tolerance of disturbance and pollution indicate that Chinese pond mussel could establish in Maryland if it were introduced. Its success as a competitor would be detrimental to stocks of native Maryland unionid mussels, many of which are already imperiled. Listing this species in the most restrictive category of nuisance species will hopefully deter this outcome.

It is necessary to list waterwheel as a species which a person may not import, transport, purchase, possess, propagate, sell, or release into State waters based on the results of the Department's risk assessment. Waterwheel is a carnivorous, perennial, free-floating, rootless aquatic herbaceous plant, with a simple or sparsely branched stem possessing successive whorls of bristled, prey-catching leaves. It is native to Eurasia, Africa, and Australia, has been grown by carnivorous plant enthusiasts in outdoor ponds since the 1980s and was introduced/reported from the wild in the U.S. as early as 1999. Waterwheel has been found in Virginia and has shown highly invasive tendencies there. This species' primary method of reproduction is vegetative, with individual plants growing continuously in the right conditions and doubling in mass in as little as 12 days. It forms dormant buds called "turions" that sink to the bottom of the waterbody to overwinter, with new plants growing from these structures in the spring. Whole plants, plant fragments, or turions may be transported by birds, flowing water, or boats and other contaminated recreation equipment. If it becomes established, it may have a significant impact on invertebrate and zooplankton communities, with individual plants containing as many as 200 traps that have a capture efficiency of up to 40%. As such, waterwheel may compete with native aquatic carnivorous plants, and could reduce populations of rare aquatic invertebrates through predation, especially in sensitive aquatic habitats. Additionally, thick growth of waterwheel could shade out native aquatic macrophytes and may even clog waterways used for fishing, boating, and irrigation. If this species expands beyond its currently limited U.S. populations and continues to find the same levels of success, then it could prove itself to be a damaging aquatic invader. Listing it in the most restrictive category of nuisance species will hopefully deter this outcome.

It is necessary to make a number of technical changes based on updated science on currently-listed species. Specifically, the Department would update the scientific name of Alabama bass from "Micropterus hensalli" to "Micropterus henshalli" and remove the scientific name "Notropis lutrensis" from the listing for red shiner. These changes reflect corrected spelling and update how these species are categorized.

Who will this affect?
These changes would affect anyone who intended to obtain a previously unlisted species of swamp eel, Chinese pond mussel, or waterwheel.

When would this be effective?
The Department projects that this change could be effective in the winter of 2025-2026. However, the exact date cannot be determined. The Department will follow our normal procedures if this concept moves forward.

Has this change been discussed with advisory bodies or other interested individuals?

- These changes were recommended by the Department of Natural Resources Invasive Species Matrix Team after a review of the most up-to-date scientific literature on the species.
- Scoped with the Sport Fisheries Advisory Commission (SFAC) and Tidal Fisheries Advisory Commission (TFAC) at their meetings in October 2025.