

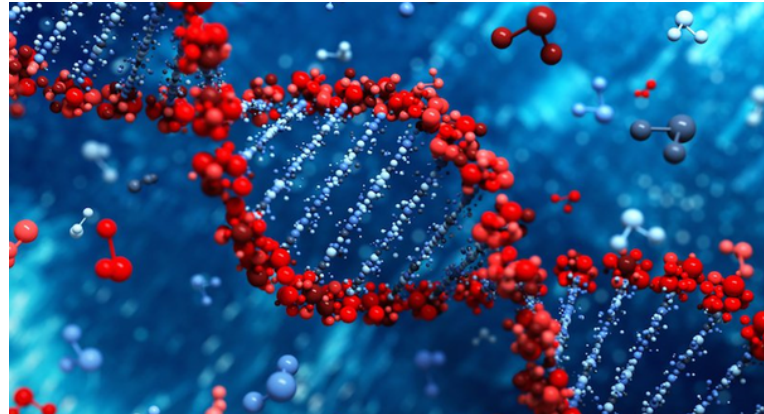
PREVENTING AND CONTROLLING AQUATIC INVASIVE SPECIES

Biological invasions proceed from introduction to establishment, spread, and impact with opportunities for management actions at each stage. As a non-native species invasion progresses through these stages, it becomes more difficult and expensive to control. Prevention and early detection are key.

Risk analysis provides a framework for considering the benefits and harms of both the pathway and any management actions under consideration. This approach is used for managing risks around pharmaceuticals, food production, and infectious disease, but its use for managing aquatic invasive species (AIS) risks has lagged behind.

With recent technology and decision support tools, risk assessment is now being used more widely and with success. The U.S. Fish and Wildlife Service (USFWS) is increasingly using formal, risk assessment procedures to identify species to bar importation. Scientists consider the traits of a species, history of invasions in other areas, whether the species carries diseases, and the climate match between the current range of the species and the U.S. Non-native species can be assessed in a matter of hours. States, live animal importers, researchers, and other interested parties have access to the information.

Improved surveillance technologies help make eradication and control technologies more effective because populations are discovered while they are still small. Early detection methods include use of environmental DNA (eDNA) and remote sensing. Species distribution modeling can show the spread of an invasion and then chemical, mechanical, and genetic methods can help control an invasion.



Fish release DNA into the environment through skin cells, secretions, and feces. This eDNA can be collected in water samples and used to detect the presence of species such as bighead and silver carp. The USFWS has been conducting eDNA testing since 2013 within the Chicago Area Waterway System and other areas of concern in the region.



Lionfish were first discovered in Florida in the early 1990s. Biophysical models have since predicted the spread of lionfish throughout the western Atlantic Ocean and can identify high-priority sites for surveillance and management.

SUPPORTING PREVENTION AND EARLY DETECTION

Foundational laws governing invasive species must be reviewed and modernized to address the existing and emergent biological threats, especially their identification and movement into the United States, between states and tribal lands.

The Lacey Act should limit interstate and intertribal movement of invasive species, provide for the emergency designation of harmful or potentially harmful non-native species and for Emergency Detection and Rapid Response (EDRR). The formulation of a methodology for the development of a species "whitelist," or presumptive prohibition on the importation of species not already approved by the USFWS is important for prevention and limiting further infestation of AIS.

Federal funding and enhanced agency coordination should be targeted at prevention and EDRR to build capacity and flexibility for when AIS outbreaks are detected.



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