

*Note (August 4, 2023)– This is a working draft document developed by the ISAC Subcommittee on National Priorities for Invasive Species. All content is still in draft form and is in review by the ISAC membership.*

# National Priorities of the 2022-2024 Invasive Species Advisory Committee

## Executive Summary

*To be completed once the paper is finalized.*

## Introduction

The Invasive Species Advisory Committee (ISAC) was established in 1999 by Executive Order 13112 and furthered by Executive Order 13751 to provide consultation, feedback, information on issues, and expert advice generally for consideration by the National Invasive Species Council (NISC). ISAC is composed of distinguished, experienced volunteers from various organizations that are appointed to serve on the Committee by the Secretary of the Interior. Their task is to develop assessments on many aspects of the invasive species issue in the United States and to provide recommendations to manage, control, and respond to key invasive species issues as articulated in the Executive Orders.

Current efforts to prevent the importation, establishment, expansion, and impact of invasive species are insufficient to protect the United States. Recent publications have estimated that from 1960 to 2020 reported costs of U.S. biological invasions were at least \$1.22 trillion and that annual invasion costs increased from \$2 billion between 1960–69 to \$21 billion between 2010–20 (<https://doi.org/10.1016/j.scitotenv.2021.151318>).

The recommendations in this paper are subject to available funding, agency capacities, and legal authorities. The ability to leverage resources across federal agencies and alongside states, local governments and tribes will further a successful national invasive species effort in order to protect the resources of this nation. ISAC encourages full appropriation of invasive species authorized programs and activities.

## Overarching Priorities

### **Biosecurity**

Biosecurity is defined by the Food and Agriculture Organization of the United Nations as a strategic and integrated approach that encompasses the policy and regulatory frameworks for analyzing and managing relative risks to human, animal and plant life and health and associated risks to the environment (FAO 2016). Gravitating toward a more comprehensive and holistic approach of invasive

species policy in the United States would bring together a stronger and more effective strategy to address invasive species. The globalization of commodities and human activities brings biosecurity to the forefront as a method by which the United States may better protect, prepare, identify, and respond to invasive species. A biosecurity approach may be the most viable option for our ability to address invasive species considering climate change. To strengthen the biosecurity of the United States, including the territories and freely associated states, against the introduction and spread of invasive species, the ISAC makes the following recommendations related to biosecurity:

- The federal agencies should conduct a comprehensive analysis of existing laws, regulations, policies, and operations related to biosecurity and invasive species to identify gaps and recommend both policy and operational changes that will decrease the likelihood of invasive species being imported into the country and to reduce spread throughout the USA.
  - One example of a regulatory gap: NAPPRA (Not Approved Pending Pest Risk Analysis), a USDA program that lists plants for planting not allowed entry into the U.S. from cited countries. Plant parts such as cut flowers, seeds, or other plant parts are not defined as plants to enter the U.S. and are still capable of carrying pests of concern, such as plant rusts.
- The ISAC recommends support for a prohibited species database: Develop and maintain an online database of federal and state listed prohibited/restricted non-native invertebrates and vertebrates.
- Increase staff, resources, and cross-jurisdictional collaboration for Injurious Wildlife (Lacey Act), the Federal Noxious Weed List, regulated pests and pathogens, and National ANS Management Plans, including education, training, risk assessment, research, importation, enforcement, and empowering public-private partnerships with industry.
- Support the evaluation of commodities and conveyances to mitigate invasive species risk.
- Develop a national biosecurity plan.

### **Leadership Support and Coordination**

Leadership and coordination for invasive species is critical to advancing strategies that protect the United States from the detrimental impacts of invasive species. The overarching duty of the NISC is to provide the high-level vision and leadership necessary to sustain and expand Federal efforts to safeguard interests of the United States by preventing, eradicating, and controlling invasive species, as well as restoring ecosystems and other assets impacted by invasive species. The ISAC recommends NISC to convene annual meetings for NISC member agencies to maintain and strengthen coordination on invasive species among member agencies.

Coordination across the United States is needed to ensure that information can be shared efficiently and duplication of effort is minimized. There are multiple coordination mechanisms and bodies that may serve as a model to strengthen existing coordination, including state invasive species councils, Cooperative Invasive Species Management Areas, Partnership for Regional Invasive Species Management, and other statewide and regional collaborative groups. These coordination bodies can be used to bring greater focus to invasive species and create productive relationships among stakeholders for a suite of purposes. Across the US, there are currently 15 state invasive species councils that address a cross section of interests and are able to advance consensus based invasive species priorities. The ISAC

recommends that NISC support the establishment and coordination of state invasive species councils or other coordinating bodies for invasive species.

### Information Access and Data Sharing

Engaging people in observing, reporting, and assisting in invasive species monitoring are all areas that have been identified as positive to the management of invasive species. Multiple key reports on invasive species for the first detections in the US were made by community members; including zebra and quagga mussels, moss balls, northern giant hornet (*Vespa mandarinia*), and long-horned beetles (*Anoplophora glabripennis*). The ISAC recommends harmonized information systems for reporting invasive species to improve public–agency interface and agency response.

A tremendous amount of information relevant to invasive species prevention, regulatory compliance, and incidence, is being collected by individual federal agencies for their internal use purposes; this same information could be immensely useful to academic researchers, inter-agency cooperation, and private entities seeking to reduce their exposure to invasive species risks. While it is important for data to be cleared and released upon request, data should be considered for public accessibility and a process for data sharing in public online spaces must be developed at the policy level, so that the information transparency itself becomes a tool for continuous improvement of invasive species prevention and management.

The ISAC recommends continued support and maintenance of the [National Invasive Species Information Center](#).

The following recommendations included in this paper are categorized based on the primary areas of invasive species management: Prevention, Early Detection and Rapid Response, Long-term Management, including control, containment and eradication, with additional focal emphasis on Climate, Regulations and Research.

Key examples of invasive species include:

- Feral Hog (*Sus scrofa*) - Feral hogs carry parasites and diseases while polluting streams and rivers with their feces, and destroy natural and agricultural resources. This invasive animal is a highly adaptable habitat generalist, an opportunistic feeder with high reproductive potential and low natural mortality. A biosecurity approach would allow comprehensive management for this invasive species threat.
- Hydrilla (*Hydrilla verticillata*) is a federally listed noxious weed...
- Northern Pike (*Esox lucius*) is an invasive fish species that has the potential to greatly harm any progress made in decades of salmon restoration efforts in the Pacific Northwest, where billions of dollars (Harrison, John, 2018) have been invested. (biodiversity and cultural impacts)
- Spotted lanternfly (*Lycorma delicatula*) - Spotted lanternfly feeds on 70+ plant species, many important to forestry and agriculture. It has also become a public nuisance to citizens across the northeast U.S. (agricultural stability impacts).
- Zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*) are among the most well-known invasive species due to the significant economic, ecological, and social impacts on the US since their arrival in the late 1980s. The invasive mussels hitchhiked on transoceanic ships into the Great Lakes and have since expanded their range to include 36 states

through natural dispersal and by traveling overland on recreational watercraft. The *Quagga Zebra Action Plan for Western US Waters* is a regional collaborative effort to prevent the spread into new waters through watercraft inspection and decontamination (WID) programs for both prevention and containment purposes, and is partly implement/funded through U.S. Fish and Wildlife Service grants. The Water Resources Development Act authorizes the U.S. Army Corp of Engineers to cost-share WID programs, in addition to monitoring, rapid response, and other aquatic invasive plant control programs. The Great Lakes Invasive Mussel Collaborative is coordinating on much needed research in places that the invaders have infested the longest. Current funding levels to prevent, contain, manage, and control invasive mussels is not adequate to mitigate the existing impacts and to prevent future infestations that threaten the nation's natural resources and water infrastructure for municipal, industrial, and recreational uses. In addition to increased capacity (funding and staffing) and coordination, harmonization of federal and state laws and regulations are needed to improve cross-jurisdictional prevention and management of zebra and quagga mussels. Finally, the U.S. Fish and Wildlife Service funded a collaborative effort between the boating industry and ANS Professionals to develop guidelines for watercraft manufacturers to develop boats that will reduce the risk of invasive species hitchhiking on recreational watercraft and to improve the efficacy and safety of WID operations. There has been little progress to date implementing the guidelines and further efforts are needed to encourage and potentially incentivize the boating industry to build boats that are less likely to move AIS.

## Prevention

The following priority addresses prevention where expanding capabilities and knowledge will build opportunities to prevent introduction and establishment of invasive species.

### **Adopt, Support, Implement, and Expand Upon Existing Pathway Prevention Programs**

Science-based education campaigns and proven field standards provide consistent messaging across jurisdictions that are focused on unique user groups and are intended to achieve behavior change through recommended actions that stops the spread of invasive species across the landscape. The following are existing successful regional or national campaigns that serve as pathway prevention programs: [Certified Weed Free Products](#), [Don't Let it Loose](#), [Don't Move Firewood](#), [Habitattitude](#), [Hungry Pests](#), [PlayCleanGo](#), [Stop Aquatic Hitchhikers](#) and [Watercraft Inspection and Decontamination \(WID\)](#). The ISAC recommends that all NISC member agencies adopt, support, implement, and expand upon the existing national prevention pathway programs.

## Early Detection and Rapid Response

Early Detection and Rapid Response (EDRR) is a coordinated set of actions to find and eradicate new and emerging invasive species in a specific location before they can spread and cause harm. It is one of the most cost-effective and ecologically viable methods for controlling invasive species. Detection is the process of observing and documenting an invasive species, response is the process of reacting to the detection once the organism has been authoritatively identified and response options have been assessed.

### **National EDRR Program**

The ISAC recommends consideration of a national EDRR program include:

- Full implementation of the pilot Rapid Response fund to address high priority invasive species projects to initiate rapid response activities.
- Development of regional “invasive species management teams”, where teams are trained in Incidence Response and invasive species management for multiple taxa. These teams would be available to assist with any new priority invasive species response.
- Continued national leadership and coordination are needed for an effective National EDRR Program in which federal agencies work in tandem with state programs and is inclusive of stakeholders that need to be engaged in this effort to ensure success.
- Development of consistent taxonomy and unified reporting platforms.
- Develop and maintain contact lists and the protocols for who to contact and the responsibilities of each party need to be developed and identified by all entities as part of the program and framework. Determine these protocols for each species group for clarity.
- Clearly define notification processes of new detections between federal and non-federal organizations.

## Long-Term Management

The following recommended are intended to further mitigation capabilities to reduce invasive species impacts in the United States.

### **Biological Control**

Biological control of invasive species is a valuable long-term management option for widespread and well-established species. ISAC recommends that NISC member agencies collaborate to improve communication, streamline processes, coordinate programs and increase funding that advance the research, implementation, and monitoring.

### **Chemical Control**

ISAC supports efforts among NISC member agencies to improve pesticide permitting including streamlined approvals, special allowances for rapid response, improved protections for threatened and endangered species, and a more expeditious process, all of which have the capacity to affect invasive species eradication/control efforts.

## Climate Change as Synergy

Executive Order 13751 (Sec 4 (b)) states that “Federal agencies shall consider the impacts of climate change when working on issues relevant to the prevention, eradication and control of invasive species

including research and monitoring efforts and integrate invasive species into Federal climate change coordinating frameworks and initiatives.” This integration of historically separate disciplines is becoming more prevalent; however, there is also a need to recognize and consider the impacts of invasive species when working on climate change issues and initiatives. The integration must go beyond Executive Order 13751, which calls on federal agencies to, “refrain from authorizing, funding, or implementing actions that are likely to cause or promote the introduction, establishment, or spread of invasive species in the United States.”

The changing climate is resulting in the unpredicted introduction and spread of novel species from new source regions, the spread of species outside of their native range or migrations, and the weakening of native ecosystems to favor invasive species, amplifying the impacts of invasive species. These two change-drivers—invasive species and climate change — interact and synergize, making predictions, modeling, and planning for resilient communities much more difficult and multi-disciplinary.

Prevention and EDRR policies and strategies must take into account and plan for “novel species from novel regions”. One study found that a quarter of new species introductions are the result of climate-related changes, underscoring the need for new prediction, interdiction, and monitoring protocols and technologies.

Some of the most important assets that the United States possesses in mitigating climate change is the existing natural infrastructure of healthy forests, grasslands, nearshore ecosystems, and other natural areas. Investments in climate mitigation must include the protection and enhancement of the nation’s existing natural infrastructure against new and established invasive species, in addition to funding new infrastructure, technologies, and initiatives.

Agencies must prioritize and commit to meaningful community engagement when considering the purposeful movement of species, such as for “assisted migration”, biological control, or other strategies.

Many funding opportunities called for in the Justice 40 Initiative (climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure) could serve multiple priorities if they are set up by cross-functional teams of climate and invasive species personnel. For example, a clean transit project could include testing of technologies for the in-water cleaning and capture of vessel biofouling, which could result in significant benefits for the shipping industry and environment. Without a clear call for federal agencies to consider invasive species and climate change as a cross-functional group, opportunities like this are not maximized. The ISAC recommends integration of climate change and invasive species as a cross-functional group into agency policy.

## Conclusion

Biological invasions present a constant current of “unknown unknowns”. Many are imported through novel pathways and their ecologies defy old models. It is impossible to predict and prevent all new exotic pests, weeds and pathogens if the research enterprise is supported to only study the already established ones.

From AI-guided detection to social research on attitude change, many research areas promise beneficial technologies to control invasives. However, support for the exploration and adoption of emerging

technologies is lacking. If innovations in management are adopted, they often originate in other sectors. For example, most herbicide chemistries utilized by natural area resource managers were initially developed for agriculture, and as such they may not be suitable for applications in natural or urban areas.

It is not only applied research that agencies need to invest in, but also basic, fundamental research. History of science shows that breakthrough solutions are rarely devised via incremental, short-term research. Unexpected ideas routinely originate through unexpected discoveries in curiosity-driven research. Management of poorly understood invasive pests can be locked in the use of outdated or ineffective tools, that lack emerging knowledge on the species' weaknesses. Federal agencies responsible for fundamental research can be tasked with investment to innovation related to invasive species. For example, a program dedicated to invasion biology could reside in the National Science Foundation. Other agencies which are regulatory but have research arms, such as USDA Agricultural Research Service, would benefit from a dedicated investment in fundamental research, not incremental, short-term deliverables.

Agencies responding to invasive species should incorporate project monitoring and outcome assessment. Whether it is the agency carrying out the management, or funding external partners, an assessment plan needs to be a part of the strategy from the onset. It is difficult to adapt and improve management strategies if the outcomes are not known. It is also difficult to communicate success to stakeholders, policy makers, and the media, and also weakens the justification for further funding. However, it is important that reporting be result-oriented (e.g., whether the species was actually controlled, or ecosystem and economic services restored), not just measurements of activities (e.g., acreage treated or person hours expended). One of the main impediments in adopting new technologies for invasive species response is the coordination among federal and non-federal partners.