Aquatic Nuisance Species Task Force

2020-2025 Strategic Plan

Aquatic Nuisance Species Task Force Strategic Plan for 2020 – 2025

Executive Summary

Aquatic nuisance species (ANS)[1] are nonindigenous species that threaten the diversity or abundance of native species, the ecological stability of infested waters, or any commercial, agricultural, aquacultural, or recreational activities dependent on such waters. As the world trade network continues to grow, new markets and trade routes continually open. This growth will increase the number of new species introductions and the frequency with which such introductions occur. Unchecked, ANS have the potential to imperil public health and transform ecosystems, resulting in widespread environmental degradation. ANS also threaten sectors of the Nation's economy that depend upon natural resources and native ecosystems. Aquaculture, tourism, recreation, shipping, and water resource infrastructure, including hydropower facilities, may be adversely impacted by ANS. Most ANS introductions cannot be eradicated once established, and the invasion itself becomes irreversible. Proactive and coordinated management is necessary to protect the waters of the United States from ANS.

In 1990, Congress established the Aquatic Nuisance Species Task Force (ANS Task Force) with the passage of the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA), which was reauthorized with the passage of the National Invasive Species Act (NISA) in 1996 (collectively, the Act). The Act charges the ANS Task Force with the responsibility of developing and implementing a program for waters of the United States to prevent the introduction and dispersal of ANS, to monitor, control, and study such species; and to disseminate related information. The ANS Task Force is co-chaired by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration, and consists of 13 Federal agency representatives and 13 ex-officio representatives. These members work in conjunction with six regional panels and issue-specific committees to coordinate efforts among agencies as well as efforts of the private sector and other North American interests.

The Mission of the Aquatic Nuisance Species Task Force is to protect the waters of the United States by creating a coordinated, unified network that raises awareness and takes action to prevent and manage aquatic nuisance species.

The ANS Program document created in 1994 guides the work of the ANS Task Force by establishing the core elements of the ANS program, prioritizing activities, and charting a course for implementation of the Act. Strategic Plans that followed maintain the key elements of the ANS Program document, but placed more emphasis on prevention strategies and called attention to other areas of ANS management, including habitat restoration and research. The ANS Task Force Strategic Plan for 2020 – 2025 builds upon this work by establishing six goals, each with a targeted set of objectives and associated strategies that are intended to be completed in the next 5 years. The goals of this plan are:

COORDINATION: The ANS Task Force was created to facilitate cooperation and coordinate efforts between Federal, State, tribes, and local agencies, the private sector, and other North American interests. This goal focuses on maximizing the organizational effectiveness of the ANS Task Force by establishing effective processes that create opportunities for members and participants to work collaboratively across agency and organizational lines. The objectives under the Coordination Goal include strengthening cooperation at national, regional, state, and community levels and establishing processes to prioritize and address ANS management needs.

PREVENTION: Preventing harmful introductions before they occur is the most effective means to avoid the risk of ANS. Long-term success in prevention will reduce the rate of introductions, the rate of establishment, and avoid many of the long-term economic, environmental, and social costs associated with ANS. The Prevention Goal focuses on efforts to evaluate and refine risk analysis procedures, conduct pathway assessments, and expand implementation of regulatory and non-regulatory approaches to interdict ANS

[1] The term ANS is often used interchangeably with aquatic invasive species (AIS), the preferred term of Federal and State managers.

CONTROL AND RESTORATION: In those cases where ANS populations are abundant and widespread, implementing management actions to minimize their impacts and long-term costs may be needed. Habitat restoration is also important to guard against future invasions and to minimize harm from ANS. The objectives under the Control and Restoration Goal include evaluation and support for ANS control and management plans, development of innovative control and restoration techniques, and mitigation of ANS impacts that may result from restoration activities.

EARLY DETECTION AND RAPID RESPONSE: When prevention measures fail, it is essential to detect new invasions and respond quickly to keep the species from becoming established and spreading. By slowing the range expansion of ANS, Early Detection and Rapid Response avoids the need for costly long-term control efforts. Objectives under the Early Detection and Rapid Response Goal include evaluating existing monitoring programs, determining needs for additional early detection monitoring, prioritizing potential ANS threats and management needs, and building capacity to respond rapidly to newly detected species.

RESEARCH: Information and research can quantify and clarify the effects that ANS are having on native species and habitats, socio-economics, and human health. Research supports all facets of this Strategic Plan and is necessary to increase the effectiveness of prevention and management of ANS. To ensure that ANS research addresses critical needs, the objectives under the Research Goal focus on prioritizing research needs at regional and national levels and working to ensure research priorities are funded.

OUTREACH & EDUCATION: One of the largest management obstacles facing managers can be the lack of understanding by the public in regards to the wide-ranging impacts of ANS and actions that should be taken to prevent their introduction and spread. Educating people about ANS threats, the importance of their actions, influencing motivations and removing barriers to actions will help to achieve and sustain the goals outlined in this plan. Accordingly, objectives under the Outreach and Education Goal focus on assessing the efficacy of existing outreach campaigns and programs and developing more effective messages to influence targeted at-risk audiences.

Management of ANS is challenging; however, considerable success is being achieved. Prevention efforts, research and information exchange, new detection and eradication techniques, innovative control methodologies, and collaborative models are increasing our capacity to manage ANS. The ANS Task Force Strategic Plan for 2020 – 2025 is an umbrella strategy that presents a coordinated approach to prevent, respond to, and manage ANS. This involves taking advantage of what has been learned and creating next steps that are well planned and coordinated. The Strategic Plan contains a target set of priority goals, objectives, and associated strategies that are intended to be completed in the next 5 years. However, the success of the Plan depends on the ability of the ANS Task Force to work collaboratively with Federal agencies, States, tribes, industries, non-profits, and stakeholders to realize the ANS Task Force's goals and better safeguard the Nation against ANS. The ANS Task Force looks forward to continuing to work collaboratively with its partners to manage ANS and protect the waters of the United States.

Introduction

Aquatic nuisance species (ANS) are nonindigenous species that threaten the diversity and abundance of native species, the ecological stability of infested waters, and water dependent commercial, agricultural, aquacultural, and recreational activities. ANS can spread to new ecosystems through many different pathways, but a vast majority are transported because of human activity. Pathways include ballast water and hulls of ships, canals and waterways, fish stocking, the aquarium pet and water garden trades, the bait industry, recreational activities, classrooms, biological research, and the transport of marine debris (Table 1).

TABLE 1: COMMON PATHWAYS OF AQUATIC NUISANCE SPECIES

Transportation Pathways:	Living Industry Pathways:	Miscellaneous Pathways:
This category includes all the various pathways related to transportation of people and goods.	This category includes all the various pathways associated with the commerce of living organisms and/or their by-products.	This category includes various pathways that do not fit into the other two categories.
• Commercial shipping • Tourism • Recreation boating • Transportation of Military Vehicles • Fire-fighting and other emergency responses	• Aquarium, water garden, and pet trade • Live bait • Authorized or unauthorized stocking • Live food industry • Zoos and aquarium escapes • Classroom releases	• Biological control • Biological Surveys and Field Activities • Religious or live releases • Marine debris • Canals, dams & diversions • Natural transboundary spread

Unchecked, ANS have the potential to transform ecosystems, resulting in widespread economic, environmental, and societal harm. The invasion curve below (Figure 1) shows that prevention is the most cost-effective means to avert the risk of harmful species introductions. Once introduced, ANS often spread quickly. If a species is not detected and removed early, intensive, long-term control efforts will be unavoidable.

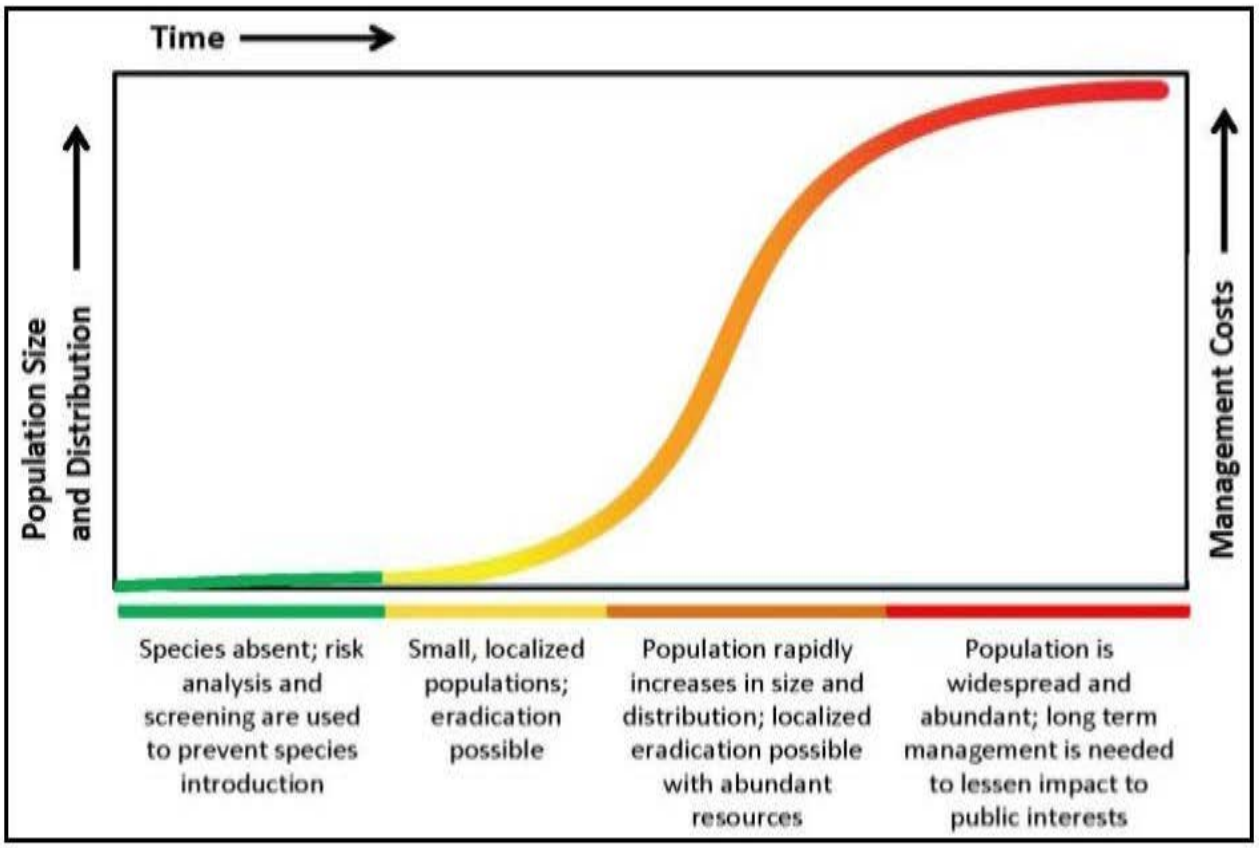

Figure 1: The invasive species curve help natural resource managers understand how to assess the risk presented by different stages of invasion.

To combat the threat of ANS, Congress established the ANS Task Force with the passage of the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) in 1990, which was reauthorized with the passage of the National Invasive Species Act (NISA) in 1996 (collectively, the Act).

The Act charges the ANS Task Force with developing and executing a program that:

- Coordinates ANS programs and activities of ANS Task Force members and affected State agencies;
- Prevents the introduction and dispersal of ANS;
- Monitors, controls and studies such species;
- Conducts research on methods to monitor, manage, control and eradicate such species; and
- Educates and informs the general public and program stakeholders about the prevention, management, and control of these species.

ANS Task Force Membership

The ANS Task Force consists of 13 Federal agency representatives and 13 ex-officio, non-Federal members. Working collaboratively, member actions fulfill the responsibilities of the ANS Task Force outlined in the Act and help meet the challenges identified in the ANS Task Force Strategic Plan.

Federal members of the ANS Task Force:

- U.S. Fish and Wildlife Service
- National Oceanic and Atmospheric Administration
- Bureau of Land Management
- Bureau of Reclamation
- Department of State
- Environmental Protection Agency
- National Park Service
- U.S. Army Corps of Engineers
- U.S. Coast Guard
- U.S. Department of Agriculture, Animal and Plant Health Inspection Service
- U.S. Department of Transportation, Maritime Administration
- U.S. Forest Service
- U.S. Geological Survey

Ex-officio members of the ANS Task Force:

- Great Lakes Commission
- Lake Champlain Basin Program
- Chesapeake Bay Program
- San Francisco Estuary Partnership
- American Public Power Association
- American Water Works Association
- Association of Fish and Wildlife Agencies
- Gulf States Marine Fisheries Commission
- Mississippi Interstate Cooperative Resources Association
- Native American Fish and Wildlife Society (represented by 2 tribal members)
- Smithsonian Environmental Research Center
- Tahoe Regional Planning Agency

ANS Task Force Regional Panels

While the ANS Task Force has a national focus, it leverages actions taken at the regional, State, and local levels to achieve national ANS solutions. Six regional panels (Figure 2) have been established under the ANS Task Force as an essential mechanism for achieving the goals of the ANS Task Force and a means to unify local action into a regionally-coordinated response.

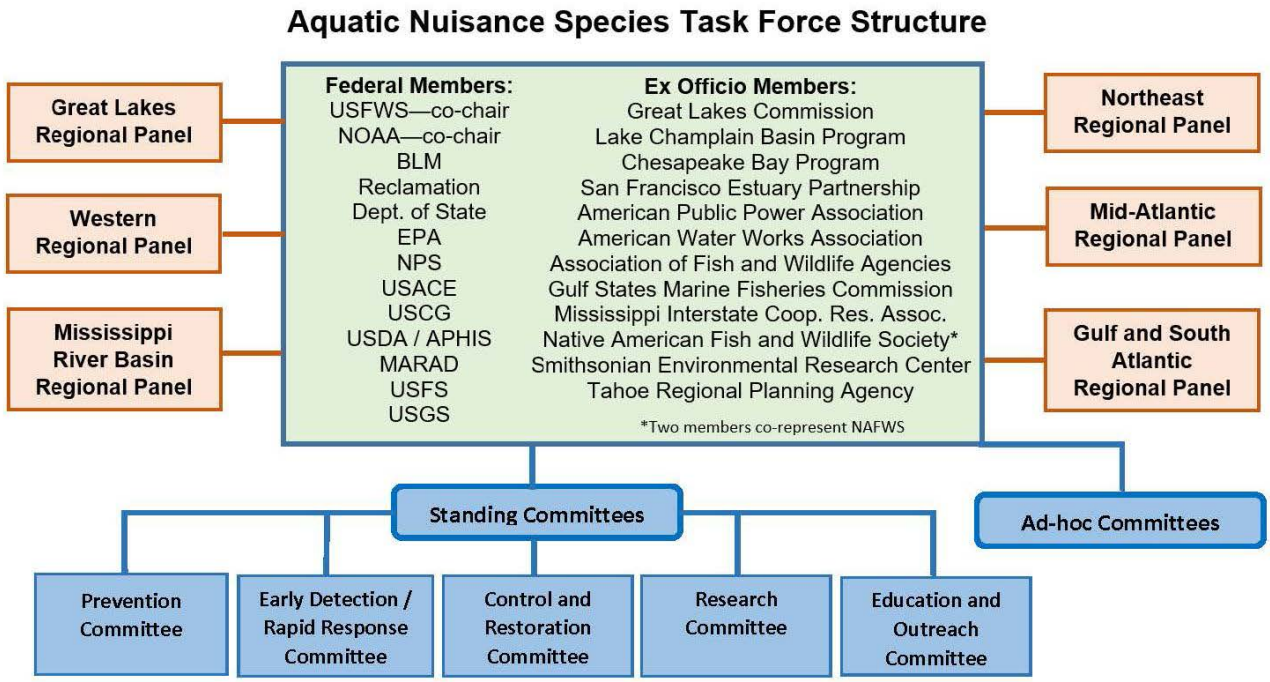

Figure 2: Structure of the ANS Task Force, depicting the relationship between the ANS Task Force members, regional panels, and committees

The regional panels (Figure 3) established under the ANS Task Force include:

- Great Lakes Regional Panel (established 1991);
- Western Regional Panel (established 1997);
- Gulf and South Atlantic Regional Panel (established 1999);
- Northeast Aquatic Nuisance Species Regional Panel (established 2001);
- Mississippi River Basin Regional Panel (established 2002); and
- Mid-Atlantic Regional Panel (established 2003).

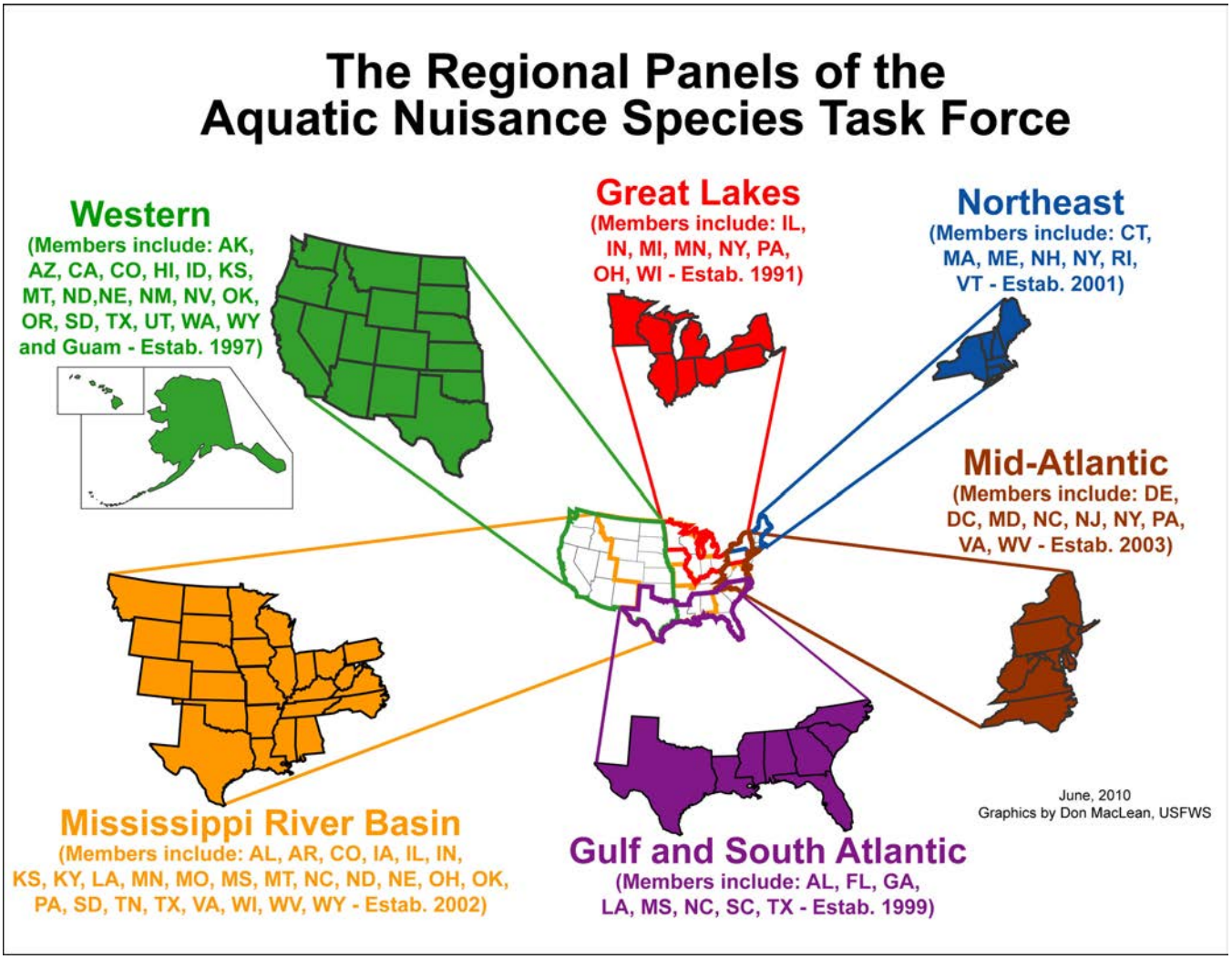

Figure 3: The six regional panels were established by the ANS Task Force as a means to unify local action into a regionally-coordinated response.

Members within each of the six regional panels include representatives of State and Federal agencies, tribes, non-governmental organizations, commercial interests, as well as Mexico and Canada. The panels provide a forum that allows for information sharing, collaboration, and coordination and ensures that local and regional operations are efficient and avoid duplication of efforts and use of resources. The unique position of the regional panels also allows them to coordinate with a broad spectrum of parties on a wide range of complex ANS issues across regional boundaries. The specific roles of each panel include:

- Identifying regional priorities;
- Making recommendations to the ANS Task Force;
- Coordinating regional ANS activities in the region;
- Providing advice pertinent to regional ANS issues; and
- Reporting annually to the ANS Task Force.

ANS Task Force Committees

The ANS Task Force has also established several standing and ad hoc committees. Committee members consist of representatives from ANS Task Force member organizations, regional panels, subject matter experts, and stakeholders. In the past, committee activities have included the development of public awareness campaigns, species-specific control and management plans, and standardized scientific protocols. Advancement of the strategies under this Strategic Plan will require the commitment of several committees. The ANS Task Force may also choose to establish standing or ad hoc committees to address a specific discipline or issue.

ANS Task Force Strategic Planning

Section 1202 of the Act authorizes the ANS Task Force to develop and implement a program for waters of the United States to prevent the introduction and dispersal of ANS; to monitor, control, and study such species; and to disseminate related information. From 1994 to 2002, the ANS Program document guided the work of the ANS Task Force. The document tracked the requirements outlined in NANPCA (1990) by establishing the core elements of

the ANS program (prevention, detection and monitoring, control) and support elements (research, education, and technical assistance), providing for prioritization of activities, and charting a course for implementation of the Act. The ANS Task Force Strategic Plans for 2002–2007 and 2007-2012 maintained the key elements of the ANS Program document, but provided a broader focus for activities consistent with provisions of NISA (1996). These plans provided more emphasis on prevention strategies, particularly for intentional introductions. The ANS Task Force Strategic Plan for 2013 – 2017 remained focused on prevention, monitoring, control and outreach of ANS while, at the same time, placing an increased emphasis on habitat restoration and research.

To develop the Strategic Plan for 2020 – 2025 (hereafter the Strategic Plan), the ANS Task Force members reviewed its past accomplishments and identified ANS priorities for the next five years that can be achieved using existing resources. The goals, objectives, and strategies identified under this Strategic Plan are consistent with the national focus of the ANS Task Force, while also encouraging individual members to advance more localized ANS needs and priorities. The ANS Task Force Strategic Plan for 2020 – 2025 establishes six goals: Coordination, Prevention, Early Detection and Rapid Response, Control and Restoration, Research, and Outreach and Education (Figure 4). The goals serve as a blueprint for the ANS Task Force. The order in which the goals are presented in the Plan represent the logical arrangement determined by the ANS Task Force and do not reflect individual importance or priority level.

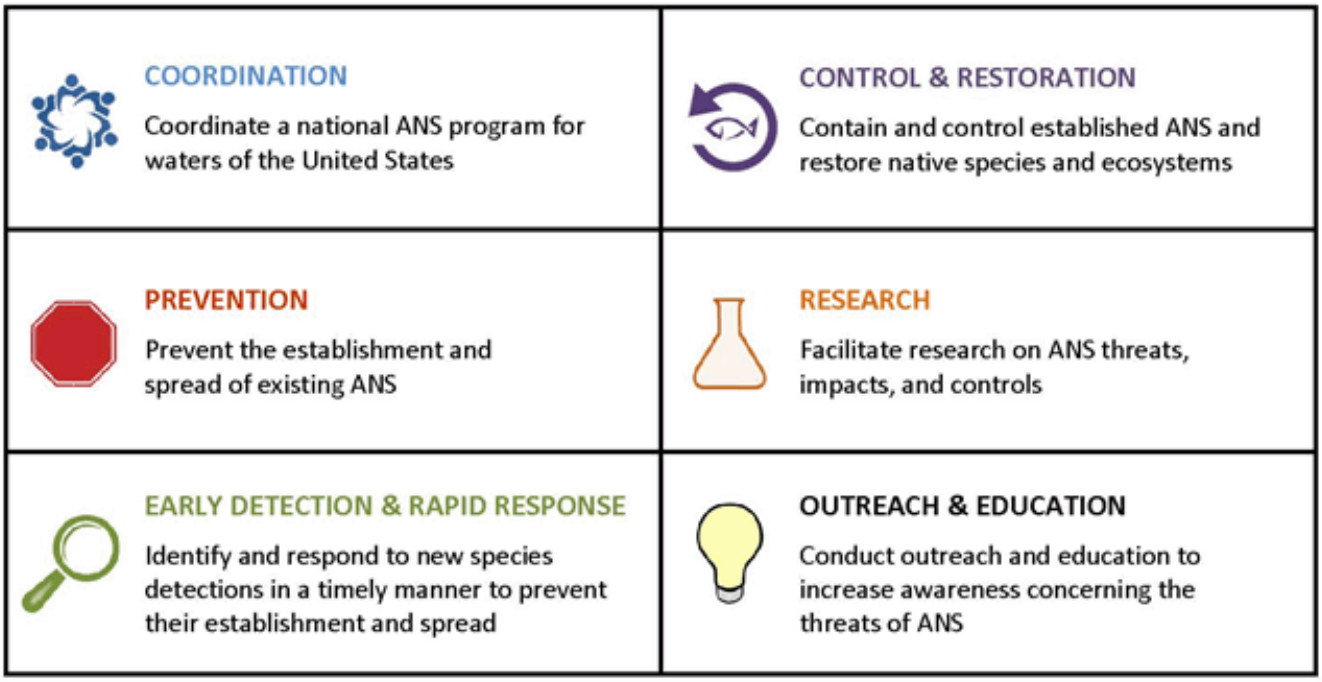

Figure 4: The goals established under the ANS Task Force Strategic Plan for 2020 – 2025

Under each Goal, three objectives (Figure 5) provide detail about how to accomplish each goal. Each objective has a list of strategies, or specific activities, to achieve over the next 5 years. The accomplishment of specific objectives and strategies will be dependent upon the budgets of the individual member agencies, organizations, and regional panels of the ANS Task Force. In some cases, outcomes may be dependent on changes in the broader legal and regulatory environment.

The ANS Task Force Strategic Plan for 2019-2024 will help coordinate and prioritize activities of the ANS Task Force and its members, ensuring that the program remains focused on national priorities across sectors and regional, state and local jurisdictions. The desired outcomes of this plan are:

- A well informed, engaged ANS Task Force that works collaboratively to advance the Strategic Plan's Goals
- Cooperative efforts between ANS Task Force members, regional panels, and partners that prevent new introductions and spread of existing ANS in the waters of the United States
- ANS Task Force members, regional panels, and partners equipped to detect new ANS early in the invasion process and prepared to rapidly respond to prevent the establishment or spread of ANS
- Cooperative efforts between ANS Task Force members, regional panels, and their partners that suppress or eradicate ANS populations and restore native ecosystems
- Research by ANS Task Force members, regional panels, and their partners on high priority needs to improve all aspects of ANS management
- Consistent and coordinated outreach campaigns and materials that increase public awareness and change behaviors to help prevent the introduction and spread of ANS

Ultimately, the success of the Plan lies in the ability of the ANS Task Force to work collaboratively with a broad array of Federal agencies, States, tribes, industries, and stakeholders to realize the Plan's ambitious goals and better safeguard the waters of the United States against ANS.

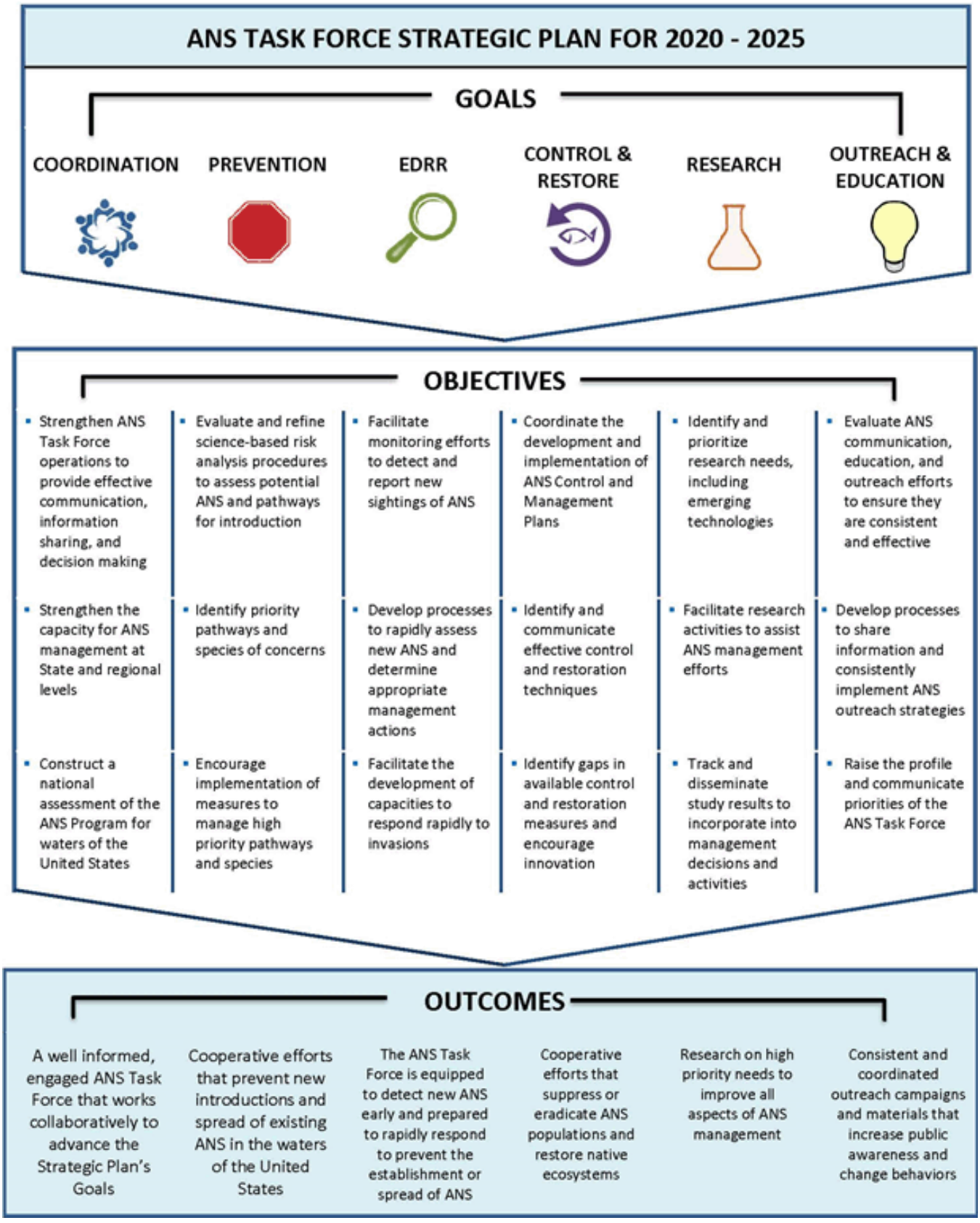

Figure 5: The goals, associated objectives, and desired outcomes of the ANS Task Force Strategic Plan that will be used to coordinate and prioritize activities for the ANS program established by the ANS Task Force

Goal 1: Coordinate a national ANS program for waters of the United States

ANS issues are significant in their breadth and scope as these threats involve numerous taxa which endanger aquatic resources around the globe. A variety of pathways are capable of transporting ANS into new environments including ballast water and hulls of ships, canals and waterways, fish stocking, the aquarium and pet trade, the bait industry, recreational activities, biological research, and the transport of marine debris. ANS management includes actions taken to prevent the introduction, establishment, and spread of ANS as well as for species eradication and control to minimize adverse impacts to the environment, economy, human health, and cultural resources. Research and outreach offer critical support to these efforts. Research is needed to improve the understanding of ANS and develop innovative monitoring and control techniques. Outreach is vital to communicate the impacts of ANS, build public support, and motivate people to take action to prevent the introduction and spread of ANS.

ANS are not constrained by political or jurisdictional boundaries. Thus, it is essential that efforts be coordinated to maximize cross-organizational effectiveness, identify gaps and redundancies, and maintain a unified management response. Created by Congress, the ANS Task Force facilitates cooperation and coordinate efforts among Federal, State, tribes, and local agencies, the private sector, and other North American interests. Collaboration facilitated by the ANS Task Force provides an opportunity for its members to identify priorities and establish a unified, well-coordinated approach to ANS management. Working with other agencies and organizations also allows the ANS Task Force to identify gaps in statutory authority, emerging policy issues, and better define future ANS Task Force roles and responsibilities for managing ANS. The Act also provides an opportunity for the Task Force to communicate annually in a report to Congress its progress in addressing this challenging and important threat. The ANS Task Force strives to create opportunities and synergies among members and participants by sharing resources, expertise, and ideas across agency and organizational lines. To achieve this goal, the ANS Task Force works in conjunction with six regional ANS panels and issue-specific committees to provide a national and regional infrastructure on important ANS issues at Federal, State, and local levels. The ANS Task Force also reviews and approves State and interstate management plans to detect and monitor ANS, prevent their establishment and spread, and control established species.

Fulfilling the Coordination Goal requires ongoing cooperation, communication, and dialogue as well as an understanding of the views and roles of all agencies and organizations involved. The strategies below will allow the ANS Task Force to lower institutional barriers to efficiency and effectiveness, beginning with enhanced Federal agency collaboration. This section includes strategies to clarify the roles and responsibility of Federal agencies, ex-officio members, and regional panels. Monitoring and evaluation of the ANS Task Force accomplishments are also encouraged in order to identify gaps and opportunities, establish future priorities, and provide measures of success under this Strategic Plan.

Objective 1.1: Strengthen ANS Task Force operations to provide effective communication, information sharing, and decision making

Strategies:

a. Hold regular ANS Task Force meetings that have a focused agenda and specific outcomes that advance strategic plan goals, objectives, and strategies
b. Identify the roles and responsibilities in implementing the ANS Task Force Strategic Plan for each ANS Task Force member and the regional panels
c. Respond to regional panel recommendations made to the ANS Task Force
d. Ensure new and existing members are informed on the ANS Task Force mission and operations
e. Facilitate information sharing by ensuring information on the ANS Task Force website is up-to-date and accessible
f. Ensure relevant ANS announcements and notifications are communicated in a timely manner
g. Increase communication with industries, stakeholders, and other parties involved with, or impacted by, ANS and encourage their participation in ANS Task Force activities and committees

Objective 1.2: Strengthen the capacity for ANS management at State and regional levels

Strategies:

a. Support State efforts to develop or revise State and Interstate ANS Management Plans
b. Strengthen the coordination efforts of the regional panels and their ability to fulfill panel responsibilities under the Act
c. Leverage staff resources and funds of ANS Task Force members to advance State and regional priorities

Objective 1.3: Construct a national assessment of the ANS Program for waters of the United States

Strategies:

a. Annually report on ANS Task Force Member and regional panel accomplishments that support the ANS Task Force Strategic Plan
b. Evaluate accomplishment reports from the ANS Task Force members and regional panels for collaboration opportunities, gaps, and redundancies to ensure activities are efficient and effective
c. Communicate and report on the collective progress of implementing State and Interstate ANS Management Plans approved by the ANS Task Force
d. Report to Congress on a regular basis to communicate accomplishments and build support for ANS Task Force priorities
e. Identify opportunities where Federal agency authorities align with ANS priority needs that can be met with additional resources

Outcome for Coordination: A well informed, engaged ANS Task Force that works collaboratively to advance the Strategic Plan's Goals

Goal 2: Develop strategies to prevent the establishment and spread of existing ANS in the waters of the United States

Preventing harmful introductions before they occur is the most effective means to avoid the costs and negative consequences from ANS. Long-term success in prevention will reduce the rate of introductions, the rate of establishment, and avoid many of the long-term economic, environmental, and social costs associated with ANS. This will require Federal agency support and cooperation with regional and State entities, private organizations, academia, and other stakeholders.

Rather than focusing efforts on one species at a time, it is more effective and economical to invest in strategies that manage the pathways through which species can move into and within the United States. ANS may utilize a myriad of pathways, including ballast water and hulls of ships, canals and waterways, fish stocking, the aquarium pet and water garden trades, the bait industry, recreational activities, classrooms, biological research, and the transport of marine debris. Preventing the introduction and movement of ANS through a pathway can be accomplished by employing measures such as decontaminating and treating watercraft and gear that could transport ANS, restricting the importation or release of potentially harmful species, and enforcing current laws and regulations designed to reduce the risk of introduction and spread of ANS. Managing an entire pathway allows managers to focus on high risk locations and activities that might lead to the introduction or spread of potentially numerous species.

Risk analysis is an essential component of prevention to make decisions about how to best prevent possible ANS and manage those that have already arrived. It integrates environmental, economic, social and cultural factors, and human health considerations to inform regulatory and non-regulatory actions that either permit or prohibit the entry of certain non-native species at jurisdictional borders.

Risk analysis is a multi-step process that includes:

- Risk assessment: estimates the likelihood of species introduction and evaluates the potential consequences of introduction.
- Risk management: recommends management approaches to lower the risk of ANS to an acceptable level.
- Risk communication: conveys the results of risk assessments to the public and other stakeholders to inform decisions about their behaviors.

A central focus of the Prevention Goal is the evaluation and refinement of risk analysis procedures. These procedures can identify priority species and pathways, develop and improve interdiction strategies, and enhance collaboration efforts among Federal and State agencies, local governments, tribal entities, industry, non-governmental organizations, and other stakeholders. Advancing the Prevention Goal may also require changes in existing statutes, regulations, and improving campaigns and programs.

Objective 2.1: Evaluate and refine science-based risk analysis procedures to assess potential ANS and pathways for introduction

Strategies:

a. Evaluate and refine existing risk analysis and forecasting tools
b. Expand the scope of risk analysis and forecasting methods and offer recommendations to improve or increase use of these tools
c. Make risk analysis operating procedures and results publically accessible online

Objective 2.2: Identify priority pathways and species of concern

Strategies:

a. Evaluate and prioritize pathways and species of concern
b. Identify and address information gaps for pathways or species where there is insufficient information to make a priority determination
c. Identify and assess current approaches to risk management

Objective 2.3: Encourage implementation of measures to manage high priority pathways and species

Strategies:

a. Develop national strategies for priority pathways (identified in Objective 2.2) and recommend risk management measures
b. Work with ANS Task Force members to inform their invasive species regulatory actions, consistent with their authorities and responsibilities, to reduce risk of ANS introduction and spread
c. Expand the implementation of non-regulatory approaches (e.g., Best Management Practices, no trade agreements, public-private partnerships) to prevent the introduction or spread of ANS

Outcome of Prevention: Cooperative efforts between ANS Task Force members, regional panels, and partners that prevent new introductions and spread of existing ANS in the waters of the United States

Goal 3: Facilitate early detection and rapid response efforts to identify and respond to new species detections in a timely manner to prevent their establishment and spread

Despite the best preventive efforts, new ANS introductions into waters of the United States are expected. Unchecked, ANS can reproduce very quickly, often with significant harmful consequences. When a new species is introduced, the best strategy is early detection and rapid response (EDRR). This includes monitoring habitats at greatest risk of invasion (also known as biological hotspots), detecting high-risk species soon after introduction, and acting quickly to keep the species from becoming established and spreading. EDRR relies on sufficient resources and capacity to increase the likelihood of finding, containing, and eradicating localized ANS populations before they become widely established. Effective EDRR, however, can avoid the need for costly long-term control efforts.

Early detection programs should make the best possible use of available resources, avoid duplication of effort, and focus available resources on areas and species at highest risk of invading and causing harm. Horizon-scanning is a systematic approach for exploring emerging trends and prioritizing potential threats posed by species which are not yet established. This tool may be useful to identify and prioritize critical points of entry and other vulnerable areas for targeted surveillance.

Early detection programs often generate large quantities of data, often covering a wide geographic area and multiple species. Since ANS can cross jurisdictional boundaries, it is important to be able to share monitoring information. The U.S. Geological Survey's Nonindigenous Aquatic Species (NAS) database provides a central repository for spatially referenced biogeographic accounts of introduced aquatic species and ensures that scientific reports, real-time queries, data sets, distribution maps, and general species information are readily available. Additionally, the NAS alert system provides notification of new sightings of species in specific areas, increasing the possibility of eradicating new ANS before they become established and cause harm.

Novel approaches to enhance early detection, including molecular-based methods, are being developed that will improve the ability to detect new invaders early in the invasion process. Taxonomic expertise is also critical to identify potential ANS. The ANS Task Force maintains an ANS Experts Database, a nationwide list of ANS researchers and managers. This database provides access to individuals who can address and assist with ANS management questions and efforts, such as identifying non-indigenous species or participating in ANS response teams and management plan development.

Integrated rapid response plans and emergency funds are essential to eradicate, contain, or control ANS immediately upon introduction into the environment. Response planning requires a streamlined risk analysis process for determining appropriate options and implementing a response without lengthy decision or approval processes. Rapid response plans often incorporate the Incident Command System (ICS), as this process has earned a reputation as an "all risk, all hazard" response tool. The use of ICS and common terminology allows communication and coordination across agencies and jurisdictions. This common planning process and objective-driven management scheme shifts an incident from an initial reactive response to a proactive one.

In February 2016, the Federal government released Safeguarding America's Lands and Waters from Invasive Species: A National Framework for Early Detection and Rapid Response (EDRR Framework). The EDRR Framework serves as the first step in the development and implementation of a national program for early detection of and rapid response to non-native species that have the potential to affect priority landscapes and waters. The strategies identified under this goal support the implementation of the EDRR Framework by evaluating existing EDRR programs, providing information on invasion patterns and future management needs, and emphasizing the value of taxonomic expertise as an essential component of EDRR. Together, these strategies will equip the ANS Task Force members, regional panels, and their partners with tools to detect and rapidly respond to new ANS to prevent their establishment or spread and minimize harm to public interests.

Objective 3.1: Facilitate monitoring efforts to detect and report new sightings of ANS

Strategies:

a. Identify existing monitoring initiatives and promote data sharing with the USGS Nonindigenous Aquatic Species database
b. Assess horizon scanning tools and develop a framework for ANS Task Force members and partners to conduct targeted monitoring in high priority areas for high priority taxa
c. Increase the capacity of the USGS Nonindigenous Aquatic Species database to serve as a national EDRR alert system, including distributing notifications about ANS detected in priority areas to inform management responses
d. Support and help build capacity for regional and State citizen science ANS training and reporting programs

Objective 3.2: Develop processes to rapidly assess new species detections and determine appropriate management actions

Strategies:

a. Maintain and assess the use of the ANS Task Force Expert Database to strengthen its use as a tool to facilitate EDRR preparedness and response
b. Develop decisional tools to translate patterns of positive eDNA detections into risk profiles interpretable by natural resource managers
c. Improve decisional tools that establish threshold criteria and provide guidelines for when, how, and by whom rapid response efforts should be taken

Objective 3.3: Facilitate the development of capacities to respond rapidly to new invasions

Strategies:

a. Facilitate Incident Command System processes by providing training and identifying personnel and assets that can be used to implement a response
b. Develop agreements that allow sharing of capabilities and assets across jurisdictions and regions in implementing a response
c. Identify obstacles and explore opportunities to establish an emergency rapid respond fund
d. Identify environmental processes and permits that may delay response efforts and recommend solutions to ensure a more timely response
e. Support development of additional rapid response plans for aquatic invasions based on taxonomic groups, jurisdictional authorities, and pathways

Outcome for Early Detection and Rapid Response: ANS Task Force members, regional panels, and partners equipped to detect new ANS early in the invasion process and prepared to rapidly respond to prevent the establishment or spread of ANS

Goal 4: Facilitate capabilities to contain and control established ANS and restore native species and ecosystems

Control of established ANS populations is necessary to slow the rate of range expansion, lessen the impacts to public interests, and increase the likelihood of eradication. At this stage of invasion, multiple tools and significant resources are needed to remove and contain ANS populations as well as to guide management decisions (Figure 1). Risk analysis, benefit-cost analysis, and other tools can help identify and select high-priority ANS to be targeted for control as well as the most appropriate and cost-effective mitigation measures to be undertaken. Habitat restoration is also important to ensure that native and managed ecosystems recover once ANS are controlled. Adequate funding, public awareness, and management expertise are critical to success, particularly because ANS can span geographic and jurisdictional boundaries and do not recognize political boundaries or agency jurisdictions. Therefore, Federal

and State agencies, local governments, non-profits, tribes, and private organizations should coordinate on an ecosystem-level approach to managing ANS.

The Act specifies that the ANS Task Force may develop cooperative efforts to control established ANS and minimize the risk of harm to the environment and society. When the ANS Task Force determines that control of an ANS is warranted, recommended actions are organized into a comprehensive management plan that focuses on essential tasks designed to minimize the impact to areas where ANS have already invaded and prevent spread into additional habitats. Species management plans are developed through a cooperative process, with committee members from Federal and State agencies, non-governmental organizations, industry representatives, subject matter experts, and others. The plans also undergo review by the ANS Task Force members and regional panels, with opportunities for public review. Successful implementation of these plans requires the participation of Federal, State, tribe, and regional entities. There are currently nine National ANS Management and Control Plans[2] approved by the ANS Task Force:

- Brown tree snake (*Boiga irregularis*), approved June 1996.
- Eurasian ruffe (*Gymnocephalus cernuus*), approved November 1996.
- European green crab (*Carcinus maenas*), approved November 2002.
- Mitten crabs (Genus *Eriocheir*), approved November 2003.
- *Caulerpa* species (an invasive algae), approved October 2005.
- Snakehead (Family *Channidae*), approved November 2006, revision approved May 2015.
- New Zealand mudsnail (*Potamopyrgus antipodarum*), approved May 2007.
- Asian carp (black carp (*Mylopharyngodon piceus*), bighead carp (*Hypophthalmichthys nobilis*), grass carp (*Ctenopharyngodon idella*), and silver carp (*H. molitrix*)), approved November 2007.
- Lionfish (*Pterois volitans* and *P. miles*), approved May 2015.

Control programs, including those incorporated into National ANS Management and Control Plans, are necessary when populations of ANS become so well established that eradication is no longer logistically or economically feasible. Management objectives may include eradication within an area, suppressing a population, limiting spread, and reducing impacts. Control measures may include physical, mechanical, chemical, genetic, or biological tools that integrate into pest management strategies. Habitat and ecosystem restoration should be conducted whenever the control or eradication of ANS is planned since rehabilitation is often necessary to restore ecological processes. Restoration activities may include planting or stocking organisms or improving predator-prey relationships to attain food webs similar to pre-invasion conditions. ANS can be transported by materials, equipment, vehicles, or personnel used to conduct restoration activities; accordingly, all habitat restorations, even those not focused on ANS control, should call attention to actions (e.g., HACCP) that prevent establishment or reduce risk of ANS spread to an acceptable level not yet present within the project site.

The strategies under this goal seek to identify, improve, and execute control and habitat restoration tools. These strategies require inter-jurisdictional communication and regionally coordinated action through the continued development and implementation of ANS control and management plans. The Control and Restoration Goal also promotes mitigation measures and monitoring to ensure that any ANS introduced because of habitat restoration are responded to in a rapid, effective and efficient manner.

Objective 4.1: Coordinate the development and implementation of ANS Management and Control Plans

Strategies:

a. Evaluate implementation of ANS Task Force approved ANS Management and Control plans
b. Refine process for the selection and development of new ANS Management and Control plans
c. Provide technical support and expertise for development of new ANS and implementation of existing Management and Control plans

Objective 4.2: Identify and communicate effective control and restoration techniques

Strategies:

a. Make ANS control and restoration protocols and Best Management Practices accessible to ANS Task Force members, regional panels, and partners
b. Encourage restoration of areas following ANS eradication or control efforts
c. Document successful control and restoration operations

[2] Development of the Quagga-Zebra Mussel Action Plan for Western U.S. Waters was led by the Western Regional Panel and approved for implementation by the ANS Task Force. However, since the internal coordination document did not undergo a formal public review, it not an official ANS Task Force National Management and Control Plan.

Objective 4.3: Identify gaps in available control and restoration measures and encourage innovation

Strategies:

a. Identify circumstances where control or restoration options are not available
b. Identify and partner with entities that have the resources and expertise to advance control and restoration measures
c. Facilitate information sharing of newly developed control and restoration techniques

Outcome for Control and Restoration: Cooperative efforts between ANS Task Force members, regional panels, and their partners that suppress or eradicate ANS populations and restore native ecosystems

Goal 5: Facilitate research on ANS threats, impacts, and controls

Information and research can quantify and clarify the effects that ANS are having on native species and habitats as well as to socio-economics and human health. Although much research has been conducted for some ANS, there are many species for which little is known. Increased knowledge of the biology, potential impacts, associated control methods, and interaction with climate change and other major drivers of change will allow for the most effective management of ANS. The National ANS Management and Control Plans described under Goal 4 are focused on specific species that are already well-established in the United States. Objectives in these plans support the highest priority needs for the species and includes research to better understand the pathways of spread and potential impacts on aquatic ecosystems, as well as to develop more effective surveillance, control, and eradication methods. However, research is also needed to move invasion ecology from a reactive to a predictive discipline and develop technological innovations to reduce the impacts of ANS. Research supports all facets of this Strategic Plan and is necessary to increase the effectiveness of prevention, detection, response, and control and management of invasive species.

The ANS Task Force should strive to influence research priorities, both within the Federal government and externally, to help guide research programs to fill knowledge gaps in ANS management programs. To ensure that ANS research addresses critical needs, the strategies suggested below focus on identifying research priorities and encouraging the continued development of socio-economic studies and risk analysis tools to characterize the likelihood and severity of potential ANS impacts to the environment, the economy, and human health and the means and methods to manage identified risks. The principal role of the ANS Task Force will be to provide guidance to Federal, State, and tribal governments, academia, and other participating entities on priority research needs and to provide feedback to researchers on the effectiveness of the management tools they develop.

Section 12029(f) of the Act instructs the ANS Task Force to conduct research concerning the environmental and economic risks and impacts associated with the introduction of ANS; the principal pathways by which ANS are introduced and dispersed; possible methods for the prevention, monitoring and control of ANS; and the assessment of the effectiveness of prevention, monitoring and control methods.

Objective 5.1: Establish ANS Task Force research priorities and identify prospective partners

Strategies:

a. Identify and prioritize ANS Task Force research needs at the regional and national level
b. Identify entities that are activity engaged in ANS research that have the resources and expertise to address priority research needs for all aspects of ANS management

Objective 5.2: Facilitate activities that support priority ANS research needs

Strategies:

a. Promote priority research needs within the scientific community
b. Leverage agency resources to conduct priority ANS research
c. Investigate funding opportunities to administer a competitive research grant program as envisioned in the Act

Objective 5.3: Track and disseminate study results to incorporate into ANS management decisions and activities

Strategies:

a. Share new scientific information and results from prioritized research with members of the ANS Task Force, regional panels, and appropriate partners

b. Make research results and scientific papers from prioritized ANS research accessible online to provide information on completed or ongoing ANS projects in waters of the United States

Outcome for Research: Research by ANS Task Force members, regional panels, and their partners on high priority needs to improve all aspects of ANS management

Goal 6: Conduct outreach and education to increase awareness concerning the threats of ANS

To protect the waters of the United Species, the public must understand the wide-ranging impacts of ANS and actions that can be taken to prevent their introduction and spread. Many ANS introductions happen through the actions of uninformed members of the public. For example, disposing of bait, launching contaminated recreational boats, aquarium releases, water garden escapes, and stocking a private pond can each lead to the introduction and spread of ANS. The importation of organisms through trade has allowed ANS to be introduced and spread, sometimes by hitchhiking on or even in another intentionally imported species. In many instances, the intentional introduction of species for economic or recreational purposes happened without full knowledge and understanding of the threats for potential ANS impacts that these actions could have on the environment, recreation, and communities that depend upon healthy lakes, rivers, estuaries and oceans for jobs and vibrant economies.

The ANS Task Force works alongside its partners to implement two national ANS campaigns: Stop Aquatic Hitchhikers! and Habitattitude.TM. The Stop Aquatic Hitchhikers! campaign is used to empower recreational water users to take action to prevent the spread of ANS, whereas the Habitattitude™ campaign is used to inspire and educate people to be responsible pet owners and environmental stewards. Achieving the goals of these campaigns can confound other messages and outreach efforts implemented at the regional, state, and local levels. Multiple jurisdictions and organizations do not always coordinate and collaborate on their outreach and education initiatives that may result in messages that create confusion among users and lose effectiveness in delivery. Strategies under this goal focus on assessing the efficacy of existing outreach programs and developing more effective and coordinated campaigns and consistent messages to influence targeted audiences.

Robust public awareness will help the public understand the important impacts caused by ANS so they can be part of the solution to the problem. Education and outreach campaigns and initiatives should also facilitate on-the-ground action through stewardship programs and public events that directly connect effective management of ANS. Such efforts recognize the shared responsibilities of governments and stakeholders, as well as the benefits of collective action. Breaking down the barriers for awareness, motivation, and behaviors for appropriate actions is critical to successes in ANS prevention. Actions to manage ANS will require support and collaboration among and between Federal, State and tribal agencies, business, industry, non-profits, academia and local governments. Outreach to diverse audiences, coupled with inclusive engagement, will help to achieve and sustain each of the ambitious goals established by this plan.

Objective 6.1: Evaluate current ANS education and outreach efforts to ensure messaging is consistent and effective

Strategies:

a. Assess the effectiveness of existing ANS campaigns, ANS Task Force voluntary guidelines, and public marketing efforts
b. Promote social science research to better understand how to achieve well-defined change in behaviors that prevent the introduction and spread of ANS
c. Develop a long-range communication plan that provides guidance and tools for the development, implementation, and evaluation of ANS outreach campaigns and identifies target audiences and tailored messages to encourage ANS prevention behaviors

Objective 6.2: Develop processes to share information and consistently implement ANS outreach

Strategies:

a. Encourage evaluations of other ANS outreach campaigns and education materials to ensure they also achieve desired outcomes
b. Develop a process to share existing ANS outreach campaigns and materials and to analyze evaluation data from practitioners
c. Identify and engage members to participate in a community of practice that advances outreach strategies
d. Facilitate and support the implementation of outreach strategies and programs by ANS Task Force members, regional panels, partners, and stakeholders to reduce the risk of ANS introduction and spread

Objective 6.3: Raise the profile and communicate shared priorities of the ANS Task Force

Strategies:

a. Provide educational materials and briefings to Congress to communicate ANS priorities established by the ANS Task Force
b. Share ANS Task Force activities and accomplishments with agency leadership
c. Engage with and inform relevant professional communities of ANS priorities and activities

Outcome for Outreach and Education: Consistent and coordinated outreach campaigns and materials that increase public awareness and change behaviors to help prevent the introduction and spread of ANS

Conclusion

Management of ANS is challenging; however, considerable success is being achieved in the prevention, detection, eradication, control, research, and outreach efforts of ANS. Additional research and information exchange, new detection and eradication techniques, innovative control methodologies, and collaborative models are increasing our capacity to manage ANS. Since the establishment of the ANS Task Force in 1990, awareness of the problems caused by ANS has dramatically improved, as evidenced by increased activity at Federal, State, regional, and local levels. Despite the significant increase in activity and awareness, much remains to do to prevent and mitigate the harmful impacts of ANS. The intent of the ANS Task Force Strategic Plan for 2020 – 2025 is to create a strategic and coordinated approach to minimize harm to the environment, recreation, economy, and human health that results from ANS.

This new Strategic Plan provides a framework for guiding the ANS Task Force over the next five years. The purpose of the Plan is to serve as a foundational tool for making well-informed decisions and implementing effective ANS management actions in a strategic and holistic manner. In the near-term, it will help focus limited resources and capacity on the highest priorities of the ANS Task Force and its partners. The Plan is a living document that incorporates new information to address current and emerging challenges.

The ANS Task Force Strategic Plan for 2020 – 2025 is an umbrella strategy that presents a coordinated approach to prevent, respond to, and manage the presence of ANS. It identifies priority goals, objectives, and strategies to strengthen existing ANS initiatives and fill gaps. Ultimately, however, the success of the Plan depends on the ability of the ANS Task Force to work collaboratively with Federal agencies, States, tribes, industries, and other stakeholders to realize the Plan's ambitious goals and to safeguard the Nation against ANS. The ANS Task Force looks forward to continuing to work collaboratively with its partners to manage ANS and protect the waters of the United States.

ANS Task Force

For additional information on the ANS Task Force:

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