



November 2015

# AQUATIC INVASIVE SPECIES

## Additional Steps Could Help Measure Federal Progress in Achieving Strategic Goals

# GAO Highlights

Highlights of [GAO-16-49](#), a report to congressional committees

## Why GAO Did This Study

Aquatic invasive species—harmful, nonnative plants, animals, and microorganisms living in aquatic habitats—damage ecosystems or threaten commercial, agricultural, and recreational activities. The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 created the Task Force and required it to develop an aquatic nuisance (which GAO refers to as invasive) species program. The Water Resources Reform and Development Act of 2014 includes a provision that GAO assess federal costs of, and spending on, aquatic invasive species.

This report examines (1) how much Task Force member agencies expended addressing aquatic invasive species for fiscal years 2012-2014; (2) activities conducted by Task Force member agencies and challenges in addressing aquatic invasive species; and (3) the extent to which the Task Force has measured progress in achieving the goals of its 2013-2017 strategic plan. GAO sent a questionnaire to member agencies to obtain expenditures for fiscal years 2012-2014; interviewed member agency officials; and analyzed laws and strategic planning documents.

## What GAO Recommends

GAO recommends that the Task Force develop a mechanism to measure progress toward its strategic goals and help meet certain statutory requirements. Most member agencies generally concurred or had no comments, but NOAA disagreed. GAO believes its recommendation is valid as discussed further in this report.

View [GAO-16-49](#). For more information, contact Anne-Marie Fennell at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov).

November 2015

## AQUATIC INVASIVE SPECIES

### Additional Steps Could Help Measure Federal Progress in Achieving Strategic Goals

## What GAO Found

The 13 federal member agencies of the Aquatic Nuisance Species Task Force (Task Force) estimated expending an average of about \$260 million annually for fiscal years 2012 through 2014 to address aquatic invasive species. However, several member agencies identified in their questionnaire responses challenges in developing their estimates. For example, some member agencies reported that their activities to address aquatic invasive species were often integrated into larger projects, making it difficult to isolate the portion of expenditures specific to aquatic invasive species out of total expenditures for the projects. As a result, expenditure information reported by GAO generally reflects member agencies' best estimates of total expenditures, rather than actual expenditures.

Task Force member agencies conducted a wide range of activities and identified several challenges in addressing aquatic invasive species. Member agencies reported conducting activities across several activity categories, including taking actions to prevent introductions, control the spread of existing invaders, and research ecological impacts of aquatic invasive species. For instance, most conducted prevention activities—such as constructing a series of electric barriers to prevent the entry of Asian Carp from the Mississippi River Basin into the Great Lakes—recognizing that prevention activities may be the most cost-effective method of addressing aquatic invasive species. Additionally, officials from several member agencies expressed concern that their activities, though numerous, may not be adequate relative to the growing magnitude and impacts of aquatic invasive species amid decreasing or constrained agency resources.

The Task Force—which is co-chaired by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration (NOAA)—developed a 2013-2017 strategic plan to guide its member agencies but has not taken key steps to measure progress in achieving the goals laid out in its strategic plan. As called for in its strategic plan, the Task Force in 2012 planned to develop an operational plan to track and measure aquatic invasive species activities and progress. However, the Task Force did not develop an operational plan because of constrained funding and limited resources, according to Task Force representatives. The Task Force also did not meet several of the 1990 Act's requirements including describing its members' roles and activities and reporting annually to Congress on the program's progress. The representatives agreed that a mechanism to track activities and measure progress is important and said they plan to discuss the possibility of doing so at their November 2015 meeting. Task Force representatives, however, had not established a time frame or specifics for their approach. Developing and regularly using a tracking mechanism could help the Task Force measure progress in achieving its strategic goals, as well as help the Task Force meet the 1990 Act's requirements to describe its members' roles and specific activities and to report annually to Congress on the program's progress.

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## Abbreviations

Corps	U.S. Army Corps of Engineers
EPA	Environmental Protection Agency
FWS	U.S. Fish and Wildlife Service
NOAA	National Oceanic and Atmospheric Administration
Task Force	Aquatic Nuisance Species Task Force
The 1990 Act	The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
USGS	U.S. Geological Survey

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November 30, 2015

Congressional Committees

Invasive species<sup>1</sup>—harmful, nonnative plants, animals, and microorganisms—are pervasive throughout the United States and cause major economic losses to segments of the economy and significant environmental damage each year to crops, rangelands, waterways, fisheries, and ecosystems.<sup>2</sup> Invasive species, called a national crisis by the Department of the Interior,<sup>3</sup> number in the thousands and are expected to increase, with about 250 new species having invaded the United States since 2011 and more than 750 invasive species expanding their range since that time.<sup>4</sup> As we have found, the impact of invasive species in the United States is widespread, and their consequences for the economy and the environment are profound, although this can be difficult to measure.<sup>5</sup> A widely cited academic study from 2005—the most recent comprehensive study of its kind—estimated that the environmental

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<sup>1</sup>For the purposes of this report, we define an invasive species as a nonnative species—to include all taxa of animals, plants, and microorganisms—the introduction of which does or is likely to cause economic or environmental harm or harm to human health.

<sup>2</sup>GAO, *Invasive Species: Clearer Focus and Greater Commitment Needed to Effectively Manage the Problem*, GAO-03-1 (Washington, D.C.: Oct. 22, 2002); *Invasive Species: Cooperation and Coordination Are Important for Effective Management of Invasive Weeds*, GAO-05-185 (Washington, D.C.: Feb. 25, 2005); CRS, *Invasive Non-Native Species: Background and Issues for Congress* (Washington, D.C.: Nov. 25, 2002); and the Department of the Interior's *National Invasive Species Council Five-Year Review of Executive Order 13112 on Invasive Species* (Washington, D.C.: 2005).

<sup>3</sup>The Department of the Interior's 2014 Invasive Species Action Plan states that invasive species pose one of the greatest threats to the ecological, economic, and cultural integrity of U.S. landscapes. The plan also states that the number and impacts of aquatic invasive species are expected to escalate in the coming decade due to, among other things, the global movement of people and materials from increased tourism and trade that will further disperse species around the world.

<sup>4</sup>EDDMapS. August 2015. The University of Georgia, Center for Invasive Species and Ecosystem Health. Available online at [www.eddmaps.org/tools/query](http://www.eddmaps.org/tools/query).

<sup>5</sup>GAO-05-185; GAO-03-1; and GAO, *Invasive Species: Federal and Selected State Funding to Address Harmful, Nonnative Species*, GAO/RCED-00-219 (Washington, D.C.: Aug. 24, 2000).

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impacts and economic costs associated with invasive species amount to almost \$120 billion per year.<sup>6</sup>

Addressing aquatic invasive species is a complex, interdisciplinary issue with the potential to affect many sectors and levels of government operations. Multiple federal agencies, often in coordination with state and local governments, industry, international parties, and nongovernmental agencies, work to prevent, manage, eradicate, and raise awareness about invasive species. The National Invasive Species Council, which was established by an Executive Order in 1999 to, among other things, coordinate federal agencies' activities concerning invasive species,<sup>7</sup> reported that estimated expenditures for invasive species activities by more than 20 federal agencies were over \$2 billion dollars in fiscal year 2014.<sup>8</sup> This estimate encompasses expenditures for all invasive species, however, and does not separate out expenditures specific to aquatic invasive species—species found in marine, freshwater, estuarine, and riparian areas, such as fish, mollusks, snakes, plants, and pathogens or parasites of aquatic animals and plants. Aquatic invasive species, which are one type of invasive species, harm native ecosystems or commercial, agricultural, or recreational activities dependent on these ecosystems, such as by threatening commercially or recreationally important fish species, according to the National Invasive Species Council. Officials from National Oceanic and Atmospheric Administration (NOAA) and the Department of the Interior have likened aquatic invasive species to an oil spill that will continue to spread unless promptly and completely

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<sup>6</sup>D. Pimentel, R. Zuniga, and D. Morrison, "Update on the environmental and economic costs associated with alien-invasive species in the United States," *Ecological Economics* 52 (2005). This study is the most recent comprehensive assessment of the costs associated with invasive species on a national scale available, according to officials from several federal agencies that work on invasive species issues.

<sup>7</sup>64 Fed. Reg. 6183 (Feb. 8, 1999). National Invasive Species Council, Invasive Species Interagency Crosscut Budget (May 27, 2015). In 1999, Executive Order 13112 established the National Invasive Species Council, to, among other things, provide national leadership regarding invasive species and coordination of federal agency activities concerning invasive species relying to the extent feasible and appropriate on existing organizations. As part of this effort, the National Invasive Species Council has been identifying funding sources and spending by federal agencies on invasive species activities through an annual "crosscut" budget summary.

<sup>8</sup>Expenditures are the actual spending of money; an outlay. GAO, *A Glossary of Terms Used in the Federal Budget Process*, [GAO-05-734SP](#) (Washington, D.C.: September 2005).

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contained—once they have arrived and become established, aquatic invasive species are difficult to eradicate.<sup>9</sup>

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (the 1990 Act), was enacted to, among other things, prevent the unintentional introduction and dispersal of nonindigenous (which we refer to as nonnative) species into waters of the United States through the management of ballast water (water in a ship’s holding tank used for stability and safety that may be taken on in one location and discharged in another) and other requirements, and to understand and minimize economic and ecological impacts of nonnative aquatic nuisance species that become established in the United States.<sup>10</sup> The 1990 Act notes that, if preventive management measures are not taken nationwide to prevent and control unintentionally introduced nonnative aquatic species in a timely manner, further introductions and infestations of destructive species may occur. The 1990 Act created the Aquatic Nuisance Species Task Force (Task Force), which coordinates governmental efforts dealing with aquatic invasive species in the United States through regional panels, special committees, and work groups. The Task Force consists of 13 federal member agencies along with state, regional, and nongovernmental organizations.<sup>11</sup> Each of the Task Force’s

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<sup>9</sup>As we have previously found, a fundamental concept to invasiveness is that invasive species have been introduced into an environment in which they did not evolve, and they usually have no natural predators to limit their spread. [GAO-03-1](#).

<sup>10</sup>16 U.S.C. § 4701(b).

<sup>11</sup>16 U.S.C. § 4721(b). The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended, designated the following as Task Force members: the Director of the U.S. Fish and Wildlife Service, the Undersecretary of Commerce for Oceans and Atmosphere, the Administrator of the Environmental Protection Agency, the Commandant of the U.S. Coast Guard, the Assistant Secretary of the Army (Civil Works), the Secretary of Agriculture, and the head of any other federal agency the Task Force chairpersons deem appropriate. As of July 2015, the Task Force was co-chaired by representatives from the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration, and membership consists of the following 13 federal agencies and departments: (1) Animal and Plant Health Inspection Service, (2) U.S. Forest Service, (3) National Oceanic and Atmospheric Administration, (4) U.S. Army Corps of Engineers, (5) U.S. Coast Guard, (6) Bureau of Land Management, (7) Bureau of Reclamation, (8) National Park Service, (9) U.S. Fish and Wildlife Service, (10) U.S. Geological Survey, (11) Department of State, (12) Department of Transportation’s Maritime Administration, and (13) Environmental Protection Agency. In addition, the act, as amended, authorized the chairpersons to invite representatives from state agencies and other governmental entities to participate as ex-officio members of the Task Force. As of 2015, the Task Force included 13 state, regional, and nongovernment entities as ex-officio members, along with six regional panels.

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federal member agencies has a different set of responsibilities related to aquatic invasive species.<sup>12</sup>

The 1990 Act requires, among other things, the Task Force to develop and implement an aquatic invasive species program for waters of the United States. Specifically, the 1990 Act requires the Task Force to develop a program that identifies the goals, priorities, and approaches for aquatic invasive species prevention, monitoring, control, education, and research to be conducted or funded by the federal government. The act requires the Task Force to (1) describe the specific prevention, monitoring, control, education, and research activities to be conducted by each Task Force member; (2) describe the role of each Task Force member in implementing the elements of the program; and (3) include recommendations for funding to implement elements of the program.<sup>13</sup> The act also requires that the Task Force report to Congress annually on the progress of its program.<sup>14</sup> In 1994, The Task Force developed a program overview that established the core elements of its aquatic invasive species program and served to guide the work of the Task Force. The Task Force subsequently developed a series of strategic plans starting in the early 2000s to further guide its membership—the federal, state, regional, and nongovernmental organizations that conduct aquatic invasive species activities—in implementing the aquatic invasive species program. In 2012, the Task Force developed its most recent strategic plan, covering 2013 through 2017, which identified eight goals for the program.

The Water Resources Reform and Development Act of 2014 includes a provision in section 1039(a)(2) that GAO conduct an assessment of the federal costs of, and spending on, aquatic invasive species.<sup>15</sup> We briefed

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<sup>12</sup>The Task Force uses the terms “aquatic invasive species” and “aquatic nuisance species” interchangeably. The 1990 Act uses the term “aquatic nuisance species.” For purposes of this review, we use the term “aquatic invasive species.” According to the definition we used in our questionnaire, aquatic species include all animals and plants as well as pathogens or parasites of aquatic animals and plants totally dependent on aquatic ecosystems for at least a portion of their life cycle. Bacteria, viruses, parasites and other pathogens of humans are excluded.

<sup>13</sup>16 U.S.C. § 4722(b).

<sup>14</sup>16 U.S.C. § 4722(k)(2).

<sup>15</sup>Pub. L. No. 113-121, § 1039(a)(2), 128 Stat. 1193, 1237 (2014).

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your offices on our preliminary results on June 3, 2015. This report transmits our final results related to this review. This report examines (1) how much Task Force member agencies expended addressing aquatic invasive species for fiscal years 2012 through 2014; (2) activities conducted by Task Force member agencies and challenges in addressing aquatic invasive species; and (3) the extent to which the Task Force has measured progress in achieving the goals of its 2013-2017 strategic plan.

For all three objectives, we reviewed aquatic invasive species-related laws, regulations, and academic studies. To determine how much Task Force member agencies expended addressing aquatic invasive species and to obtain information on activities conducted, we conducted interviews with, and obtained documentation from the Task Force and its 13 federal member departments and agencies (member agencies) regarding any expenditure information they maintain related to aquatic invasive species. We also interviewed staff from the National Invasive Species Council to learn about their efforts to collect information on federal expenditures for invasive species activities. We then developed and disseminated a questionnaire to the 13 Task Force member agencies to obtain each member agencies' estimated annual expenditures to address aquatic invasive species for fiscal years 2012 through 2014 (the most recent years for which reliable data were available) and examples of these activities.<sup>16</sup> The expenditures reflect the agencies' best estimates of how much they spent on aquatic invasive species activities during these years. Based on our assessment of the estimated annual expenditures reported by Task Force member agencies, we found the estimates for fiscal years 2012 through 2014 were sufficiently reliable for purposes of this report—to provide general estimates of total annual expenditures by these agencies on activities related to aquatic invasive species.

To further describe activities conducted by Task Force member agencies and any challenges in addressing aquatic invasive species, we built on the information gathered through our questionnaire and conducted a series of interviews with officials from the 13 member agencies; the

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<sup>16</sup>We also requested that Task Force member agencies provide us with details about their aquatic invasive species related expenditures, such as expenditures by categories of activities and specific aquatic invasive species of concern. The agencies varied in the level of detail they were able to provide to us. Because of the incompleteness and inconsistency of the data reported across the Task Force member agencies, we did not include this information in our report.

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federal ex-officio member of the Task Force, the Smithsonian Environmental Research Center; and each of the Task Force's six regional panels. Through these interviews, we collected information and documentation on the agencies' aquatic invasive species activities and any challenges they face in addressing aquatic invasive species. Many of the activities reported by agencies were ongoing or span multiple fiscal years, and thus, the information we collected often highlights, but is not limited to, fiscal years 2012 through 2014. We also conducted site visits in Southern Florida, Northern California, and Western Washington to observe activities and interview local federal officials at the sites. We selected these locations based on the number and variety of aquatic invasive species present and federal agencies involved, as well as the types of activities conducted in those locations.

To determine the extent to which the Task Force has measured progress in achieving the goals of its 2013-2017 strategic plan, we conducted interviews with and obtained documentation from Task Force representatives, officials from the 13 Task Force member agencies, and officials representing the six regional panels. We reviewed the Task Force's 2013-2017 strategic plan and other documentation related to its strategic plan. We then compared this information to program requirements identified in the 1990 Act, our previous reports on leading practices provided by the Government Performance and Results Modernization Act of 2010, and our executive guide on strategic planning,<sup>17</sup> as appropriate. Appendix I presents a more detailed description of our objectives, scope, and methodology.

We conducted this performance audit from November 2014 to November 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>17</sup>[GAO/GGD-96-118](#).

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## Background

Aquatic invasive species can be found in all U.S. states and territories. They can enter and travel in aquatic habitats by several common pathways, including through the discharge of ships' ballast water; hull fouling, such as barnacle growth, on commercial vessels and recreational boats; and accidental or intentional release of organisms into aquatic habitats through aquaculture, bait, aquaria (fish tanks), or the pet trade. Once established in a particular location, an aquatic invasive species can spread to other locations and ecosystems. Figure 1 is an interactive map of the United States with some examples of aquatic invasive species and their known locations (i.e., reported presence of a species) as well as common pathways of invasion—these examples do not represent all types of aquatic invasive species or pathways, but rather serve as illustrative examples (see app. II for a printable version). Scientists and officials from several federal agencies said that the presence and impacts of aquatic invasive species are, and are likely to continue, growing, such as from the warming of ocean waters and the opening of shipping channels through the Arctic, allowing new species to potentially thrive in habitats previously too cold or inaccessible.

**Interactive Graphic**

**Figure 1: Interactive Map of the United States with Examples of Aquatic Invasive Species and Their Reported Presence by State, and Common Pathways**

**Instructions:**

To view species descriptions hover on the numbered photos. To view pathways descriptions click on the icons at the right of the page. To print a version containing text, see appendix II.

							
Source: © Wendy VanDyk Evans; Bugwood.com. <b>Common Water Hyacinth</b>	Source: © Wendy VanDyk Evans; Bugwood.com. <b>Chinese Mitten Crab</b>	Source: © T. Lawrence; Great Lakes Fishery Commission. <b>Sea Lamprey</b>	Source: © T. Lawrence; Great Lakes Fishery Commission. <b>Asian Carp</b>	Source: © Amy Benson. <b>Zebra and Quagga Mussels</b>	Source: USGS. <b>Northern Snakehead</b>	Source: USDA Wildlife Services. <b>Nutria</b>	Source: © Sam Kahng. <b>Snowflake Coral</b>



**PATHWAYS**

-  Trade
-  Ballast water
-  Hull fouling
-  Outdoor gear and bait
-  Boats and boat trailers
-  Aquarium release
-  Intentional introductions

To view species descriptions hover on the numbered photos.  
To view pathways descriptions hover on the icons at the right of the page.

Source: GAO; Map Resources (map).

						
Source: GAO. <b>Water Lettuce</b>	Source: USGS. <b>New Zealand Mudsnail</b>	Source: GAO. <b>Alligatorweed</b>	Source: © Stephen Ausmus. <b>Hydrilla</b>	Source: © Amanda Sterne; TAMU-Galveston. <b>Lionfish</b>	Source: GAO. <b>Melaleuca</b>	Source: © Roy Wood. <b>Burmese Python</b>

Sources: USGS; NOAA; USFWS; EPA; USDA; Hawaii Invasive Species Council; Nonindigenous Aquatic Species Database; PLANTS Database; Global Invasive Species Database; GAO. | GAO-16-49

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Note: Species and pathways depicted in this interactive map are examples only and do not represent all aquatic invasive species or pathways. Species distributions, or “spread,” in these maps are by state and represent the reported presence (not establishment) of a species in at least one, but not necessarily all, bodies of water in the state. Species distributions are based on the known distributions of each species, as of July 2015, according to the U.S. Geological Survey’s (USGS) Nonindigenous Aquatic Species Database and the U.S. Department of Agriculture’s Plants Database.

The Task Force, created by the 1990 Act, is co-chaired by the U.S. Fish and Wildlife Service (FWS) and NOAA. FWS provides funding for the administration of the Task Force, including conducting annual meetings, publishing *Federal Register* notices, and supporting an Executive Secretary and other FWS staff that work as regional coordinators.<sup>18</sup> To implement its aquatic invasive species program, the Task Force relies on its 13 member agencies—each of which has a different set of responsibilities related to aquatic invasive species, based on their overall mission and areas of programmatic responsibility (see table 1). These member agencies conduct aquatic invasive species activities and commit resources to achieve the goals of the aquatic invasive species program.<sup>19</sup> According to the Task Force’s 1994 program overview, implementation of the program is a cooperative effort that will build on and fill gaps in existing activities and programs, and individual agencies will implement the program in line with their specific authorities, priorities, expertise, and funding. In addition, the Task Force is advised by six regional panels—consisting of representatives of state, tribal, and nongovernmental organizations, commercial interests, and neighboring countries—that help

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<sup>18</sup>According to Task Force representatives and FWS officials, in fiscal year 2014, about \$260,000 in funding was provided through the FWS’ Branch of Aquatic Invasive Species program budget to support administration of the Task Force.

<sup>19</sup>Several agencies have included addressing invasive species (or aquatic invasive species in particular) as part of their strategic planning efforts that guide agency activities and resource expenditures. Specifically, the Department of the Interior, with five member agencies on the Task Force, includes addressing invasive species as a stated goal as part of its departmentwide goals contained in its 2014-2018 strategic plan. Similarly, in its 2015-2020 strategic plan, the U.S. Forest Service includes addressing invasive species as part of its goal to sustain the nation’s forests and grasslands. In addition, in September 2015, FWS’s Fish and Aquatic Conservation Program released its 2016-2020 strategic plan in which managing aquatic invasive species is identified as one of seven goals. This plan described specific challenges related to aquatic invasive species that program staff plan to conduct over the 5-year period to accomplish the plan’s goals.

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identify regional priorities and coordinate regional activities.<sup>20</sup> Some funding is provided to each regional panel as well as to state governments and other entities to support implementation of species- or region-specific aquatic invasive species management plans and other activities.<sup>21</sup> Together, these federal, state, and nonfederal agencies and organizations work to prevent and control aquatic invasive species and implement the 1990 Act.

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<sup>20</sup>Each of the six regional panels meets at least once a year to share information and coordinate activities, among other things, and each panel is responsible for reporting back to the Task Force on its progress in implementing aquatic invasive species activities and to provide recommendations. The 1990 Act directed the Task Force to establish two of the six regional panels and to encourage development of additional regional panels.

<sup>21</sup>According to Task Force representatives and FWS officials, in fiscal year 2014 FWS provided over \$3 million in funding, including approximately \$1 million to support implementation of 40 state and interstate aquatic nuisance species plans with Task Force approved management plans; \$240,000 to six regional panels; \$1 million for the Quagga-Zebra Mussel Action Plan; \$300,000 for the National Asian Carp Management and Control Plan; and \$700,000 for expenditures on other national species management and control plans.

**Table 1: Aquatic Nuisance Species Task Force Member Agencies' Key Roles and Responsibilities**

Department or agency	Component agency	Key roles and responsibilities for aquatic invasive species
Department of Agriculture	Animal and Plant Health Inspection Service	Manage the Federal Noxious Weed List <sup>a</sup> and inspect imports for prohibited aquatic plants. Control and manage aquatic animals and animal pathogens with significant impact on commercial aquaculture.
	U.S. Forest Service	Control and prevent aquatic invasive species on national forest land and participate in prevention efforts through educational outreach.
Department of Commerce	National Oceanic and Atmospheric Administration	Co-chair the Task Force. Responsible for prevention, monitoring, control, education, and research to prevent introductions and spread of aquatic invasive species in aquatic habitats such as National Marine Sanctuaries.
Department of Defense	U.S. Army Corps of Engineers	Control and manage the spread of aquatic invasive species on or around the facilities, ports, harbors, and other navigable waterways it manages. Support research programs on aquatic invasive species.
Department of Homeland Security	U.S. Coast Guard	Regulate biofouling (the accumulation of organisms on a vessel's exterior surfaces) and ballast water to help ensure aquatic invasive species are not discharged into waters of the United States.
Department of the Interior	Bureau of Land Management	Prevent and control the impacts of aquatic invasive plants and animals on fish and wildlife habitat throughout the public lands it manages.
	Bureau of Reclamation	Manage programs to control aquatic invasive species in water systems it manages, including reservoirs, rivers, and distribution canals.
	National Park Service	Manage and control aquatic invasive species established in national parks and prevent the introduction of new species in national parks.
	U.S. Fish and Wildlife Service	Co-chair the Task Force. Manage multiple programs addressing prevention, management, and control of aquatic invasive species. Enforce the Lacey Act <sup>b</sup> including its prohibitions on the importation and interstate transport of injurious wildlife (which includes certain aquatic invasive species).
	U.S. Geological Survey	Conduct research and provide scientific information on aquatic invasive species to support the efforts of federal agencies and other partners.
Department of State		Fund the Great Lakes Fishery Commission and other agencies' efforts to address aquatic invasive species and coordinate with international parties.
Department of Transportation	Maritime Administration	Research ballast water and hull fouling issues and participate in ship hull cleaning efforts for ship disposal.
Environmental Protection Agency		Regulate discharges incidental to the normal operation of certain vessels, such as ballast water, under Sec. 402 of the Clean Water Act. Chair the Great Lakes Interagency Task Force overseeing the Great Lakes Restoration Initiative, which includes efforts to address aquatic invasive species.

Sources: Draft, Aquatic Nuisance Species Task Force 2014 Report to Congress (information); GAO (analysis). | GAO-16-49

Note: This list of agency roles and responsibilities for aquatic invasive species is not comprehensive; it is intended to illustrate key roles and responsibilities of each agency as they relate to aquatic invasive species.

<sup>a</sup>The Plant Protection Act authorizes the Secretary of Agriculture, who has delegated this authority to the Animal and Plant Health Inspection Service to publish, by regulation, a list of noxious weeds and to prohibit or restrict their importation, exportation, or movement in interstate commerce if necessary to prevent the introduction into the United States or the dissemination of a noxious weed within the United States (7 U.S.C. § 7712). Noxious weeds are any plant or plant product that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment.

<sup>b</sup>Among other things, the Lacey Act, as amended, prohibits the importation into the United States and interstate transport of certain animals, including aquatic invasive species listed as injurious wildlife.

Activities to address aquatic invasive species can be categorized using the seven general activity categories developed by the National Invasive Species Council. These categories reflect common activities agencies conduct along the continuum of an invasion of a species, from preventing the arrival or spread of an invading species to controlling or eradicating that species from the ecosystem. Table 2 describes each activity category.

**Table 2: Categories of Activities to Address Invasive Species**

Activity category	Definition
Prevention	Actions taken to prevent the entry, establishment, dispersal, and dissemination of invasive species.
Early detection and rapid response	Actions taken to detect incipient invasions and assess the current and potential impact of invasions; to eradicate, contain, or control a potentially invasive nonnative species introduced into an ecosystem while the infestation of that ecosystem is still localized, and to eradicate or contain invasive species populations while they are still localized.
Control and management	Actions taken to lessen and manage the impact of invasive species within their established ranges and limit their spread.
Restoration	Actions taken to assist the recovery and reestablishment of plant and animal communities that have been overwhelmed by invasive species.
Research	Actions taken to identify, evaluate, control, and understand invasive species and their interactions with the biotic (i.e., living things that shape an ecosystem) and abiotic (i.e., not derived from living organisms) elements of the environment.
Education and public awareness	Actions taken to maintain and increase public awareness of invasive species and related programs and to promote public activities that reduce the spread and impact of invasive species.
Leadership and international cooperation	Actions taken to provide leadership, oversight, and coordination to maintain and enhance the capabilities to prevent, control, manage, and understand invasive species and invasion pathways with relevant state, local and international partners, and provide for public input and participation.

Sources: The National Invasive Species Council Invasive Species Interagency Crosscut Budget Summary (2014); GAO questionnaire of 13 Task Force member agencies. | GAO-16-49

Note: These activity categories apply to all invasive species, including both aquatic and terrestrial species.

Preventing the introduction of aquatic invasive species into ecosystems is generally the most effective means of avoiding their establishment and spread, according to numerous academic reports, as well as the Task

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Force and several of its member agencies.<sup>22</sup> According to a 2006 study, the difficulties and expense of reversing biological invasions means investment in prevention is likely to be the most successful and cost-effective response to biological invasions.<sup>23</sup> Further, eradication (the elimination of an invading species from the ecosystem) and control (limiting an invasive species to a specific ecosystem) becomes increasingly difficult and costly as a species becomes established and spreads, as shown in figure 2.<sup>24</sup>

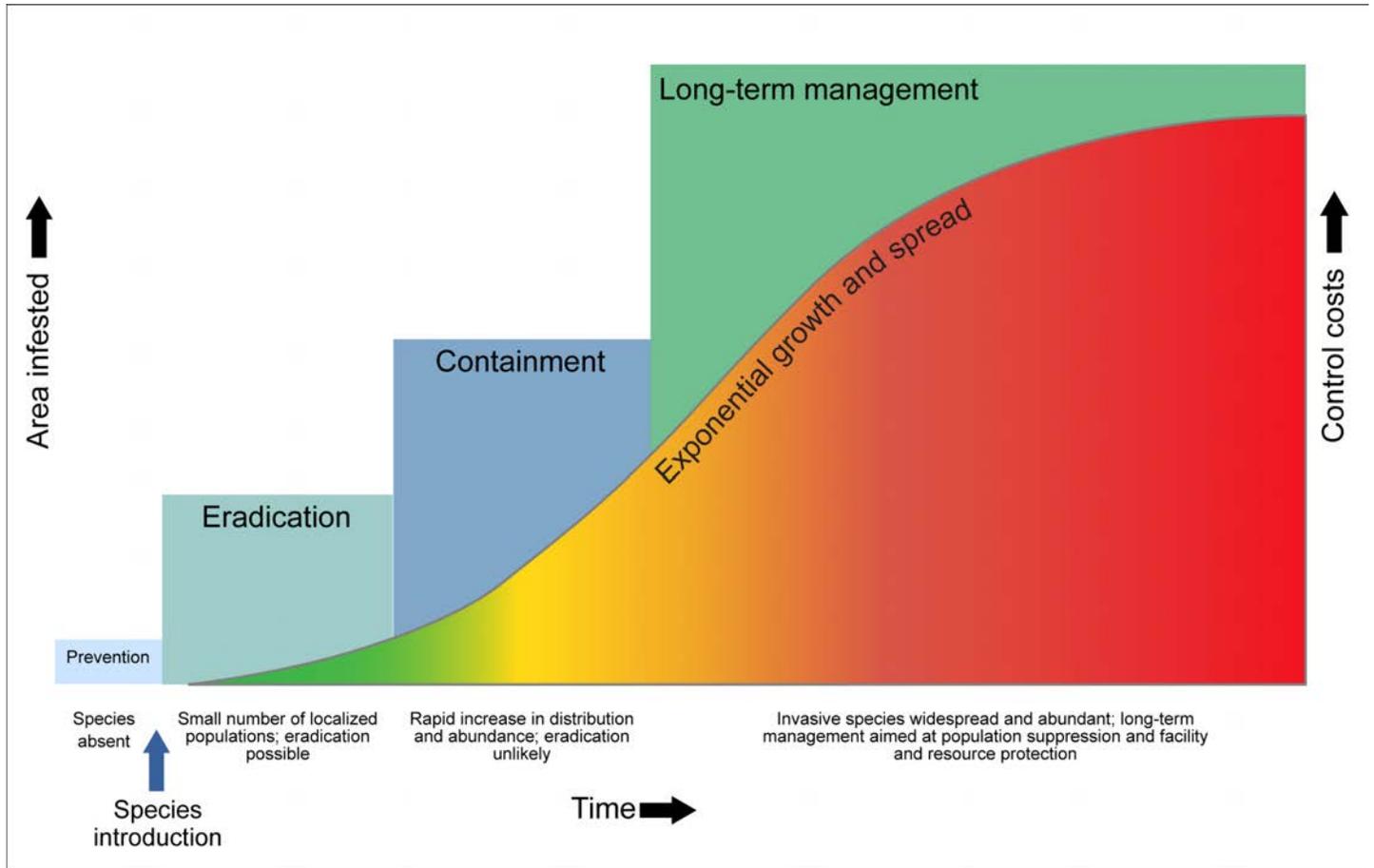
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<sup>22</sup>David M. Lodge, et al., "Biological Invasions: Recommendations for U.S. Policy and Management" in *Ecological Society of America*, 16(6) (Washington, D.C., 2006); Brian Leung et al., "An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species" in *The Royal Society*, DOI 10.1098/rspb.2002.2179; and David Finnoff et al., "Take a risk: Preferring prevention over control of biological invaders," *Ecological Economics* 62 (2007) 216-222; U.S. Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, "Overview of EPA Authorities for Natural Resource Managers Developing Aquatic Invasive Species Rapid Response and Management Plans" (Washington, D.C.: December 2005).

<sup>23</sup>David M. Lodge, et al., "Biological Invasions: Recommendations for U.S. Policy and Management" in *Ecological Society of America*, 16(6) (Washington, D.C., 2006).

<sup>24</sup>See also G.M. Ruiz and J. T. Carlton, *Invasive Species: Vectors and Management Strategies*, chapter 5, 2<sup>nd</sup> ed. (2003); and Daniel Simberloff, "How Much Information on Population Biology Is Needed to Manage Introduced Species?," *Conservation Biology* 17, no. 1 (February 2003). "The most effective way to deal with invasive species, short of keeping them out, is to discover them early and attempt to eradicate or at least contain them before they spread."

**Figure 2: Invasive Species Invasion Curve**



Sources: National Invasive Species Council; U.S. Department of Agriculture; National Park Service; U.S. Fish and Wildlife Service; Rodgers, L., South Florida Water Management District; Department of Primary Industries, State of Victoria, Australia; and GAO. | GAO-16-49

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## Task Force Member Agencies Estimated Expending an Average of About \$260 Million Annually to Address Aquatic Invasive Species in Fiscal Years 2012 through 2014

Task Force member agencies estimated expending an average of about \$260 million annually for fiscal years 2012 through 2014 to address aquatic invasive species. Several of the member agencies identified challenges and limitations associated with the expenditure information they provided in response to our questionnaire. As a result, the information reported by Task Force member agencies on annual expenditures through our questionnaire generally reflects the agencies' best estimates, rather than actual expenditures. Table 3 provides the estimated annual expenditures for each Task Force member agency during fiscal years 2012 through 2014.

**Table 3: Estimated Annual Expenditures to Address Aquatic Invasive Species, by Task Force Member Agency, Fiscal Years 2012 through 2014**

Dollars in thousands

	Fiscal year 2012 estimated expenditures	Fiscal year 2013 estimated expenditures	Fiscal year 2014 estimated expenditures
<b>Department of Agriculture</b>			
Animal and Plant Health Inspection Service	\$3,618	\$3,454	\$3,467
U.S. Forest Service	<sup>a</sup>	<sup>a</sup>	<sup>a</sup>
<b>Department of Commerce</b>			
National Oceanic and Atmospheric Administration	3,855	3,454	3,528
<b>Department of Defense</b>			
U.S. Army Corps of Engineers	134,886	133,139	148,571
<b>Department of Homeland Security</b>			
U.S. Coast Guard	2,809	3,995	3,362
<b>Department of the Interior</b>			
Bureau of Land Management	298	205	70
Bureau of Reclamation	4,728	5,352	6,335
National Park Service	3,967	4,078	5,437
U.S. Fish and Wildlife Service	13,049	13,096	15,049
U.S. Geological Survey	10,229	10,034	11,325
<b>Department of State<sup>b</sup></b>	<b>18,575</b>	<b>18,106</b>	<b>19,341</b>
<b>Department of Transportation</b>			
Maritime Administration	5,137	4,965	4,473
<b>Environmental Protection Agency<sup>c</sup></b>	<b>56,709</b>	<b>44,946</b>	<b>54,599</b>
<b>Total</b>	<b>\$257,860</b>	<b>\$244,824</b>	<b>\$275,557</b>

Sources: GAO questionnaires of 13 Task Force member agencies. | GAO-16-49

Note: The data in this table were provided by Task Force member agencies and reflect their best estimates of annual expenditures to address aquatic invasive species for fiscal years 2012 through 2014.

<sup>a</sup>The U.S. Forest Service reported that it was unable to develop estimated annual expenditures for its aquatic invasive species activities. The agency cited several reasons, including that its program management and financial accounting systems do not separately track aquatic invasive species expenditures.

<sup>b</sup>The Department of State estimates reflect amounts mostly provided to the Great Lakes Fishery Commission, largely for Sea Lamprey control and research efforts. The Great Lakes Fishery Commission provided financial resources to other Task Force member agencies and therefore to minimize double-counting, we have to the extent possible, excluded this funding from the estimates reported by the other Task Force member agencies.

<sup>c</sup>The Environmental Protection Agency's estimates reflect amounts for the Great Lakes Restoration Initiative (a program launched in 2010 to protect and restore the Great Lakes ecosystem), most of which was provided to other Task Force member agencies. To minimize double-counting, we have, to the extent possible, excluded this funding from the estimates reported by the other Task Force member agencies.

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Based on information reported through our questionnaire, estimated expenditures by Task Force member agencies for fiscal year 2014 ranged from a high of about \$149 million by the U.S. Army Corps of Engineers (Corps) to a low of \$70,000 by the Bureau of Land Management. Specifically, the Corps reported that the majority of its estimated annual expenditures were for controlling and managing existing aquatic invasive species at multiple projects it manages, and mostly came from the respective project's operations and maintenance funding. The Bureau of Land Management's estimates for fiscal year 2014 comprised the annual cost to develop and place aquatic invasive species awareness advertisements in print materials focusing on outdoor activities such as hunting, fishing, and boating. Also, for fiscal year 2014, the Bureau of Land Management reported that it did not have funding to provide to its state offices to coordinate or carry out aquatic invasive species activities in their local areas, as it did in fiscal years 2012 and 2013. Estimates for Task Force member agencies generally reflected a variety of activities undertaken or funded by the respective agency spanning multiple species and regions within their areas of programmatic responsibility. In contrast, estimates for some agencies reflected efforts specific to a particular region or activity. For example, the Environmental Protection Agency (EPA) reported that its estimates mostly reflected expenditures of funding transferred to other agencies to carry out activities in support of the Great Lakes Restoration Initiative—a program launched in 2010 to protect and restore the Great Lakes ecosystem. One of the Initiative's main focus areas includes prioritizing efforts to prevent the introduction of new invasive species into the Great Lakes.<sup>25</sup>

In responding to our questionnaire, several of the Task Force member agencies identified challenges and limitations in collecting information on how much they estimated expending to address aquatic invasive species. These included the following:

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<sup>25</sup>Great Lakes Interagency Task Force, *Great Lakes Restoration Initiative Action Plan Fiscal Years 2010-2014*, 09-P-0231 (Washington, D.C.: Feb. 21, 2010.) The plan includes a "zero tolerance policy" for invasive species. We recently reported on information available about the Initiative's activities and results, including those addressing invasive species, see GAO, *Great Lakes Restoration Initiative: Improved Data Collection and Reporting Would Enhance Oversight*, [GAO-15-526](#) (Washington, D.C.: July 21, 2015).

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- **Expenditures on aquatic invasive species activities are not specifically tracked.** Seven of the 13 Task Force member agencies reported that their budget structures and financial accounting systems were not designed to specifically track expenditures on aquatic invasive species activities. For instance, the U.S. Forest Service reported that many aquatic invasive species related activities are conducted throughout the agency, but the agency's program management and financial accounting systems do not separately track aquatic invasive species expenditures. Specifically, U.S. Forest Service officials said they could not identify the portion of funding expended directly for aquatic invasive species because these activities were often integrated into larger projects—such as inspecting and cleaning equipment used in fighting wildfires. For example, the agency has developed specific protocols to inspect, assess, and decontaminate equipment, such as the inside of a fire pump, to help make sure it is clear of any invasive algae or mussels that may be unintentionally transferred to a new watershed when moving water between areas to fight fires. U.S. Forest Service officials further explained that this is one step of many in cleaning and preparing the equipment for its next use, and its management and financial accounting systems are not set up to capture or break out activities to this level of detail. Similarly, the Bureau of Reclamation reported that expenditures for aquatic invasive species activities at its water projects—such as clearing water control structures to maintain water delivery through pipes and canals—are funded mostly through the operations and maintenance budget for each project and are not tracked as expenditures specific to aquatic invasive species.
  - **Decisions on expenditures for aquatic invasive species are made at the local or regional level.** Four of the 13 member agencies reported that decisions on expenditures for aquatic invasive species activities are delegated to a regional or local level and are not tracked at the national level. For example, the National Park Service reported that once funding is provided to a national park, headquarters management does not generally direct how the funding is expended at that park. Instead, park management generally determines how the funding will be used to accomplish park objectives, including whether and how to prioritize funding for aquatic invasive species activities. Similarly, the Bureau of Land Management reported that numerous decisions and activities take place at its local or state office level that are not tracked by headquarters, including expenditures on aquatic invasive species, and, therefore, annual expenditures on aquatic invasive species across the agency are unknown. The U.S. Forest Service also reported in its questionnaire that many of its aquatic

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invasive species activities are conducted through cooperative partnership agreements at the local and regional level and expenditures for these activities are not reported at the national level.

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## Task Force Member Agencies Conducted a Wide Range of Activities and Identified Several Challenges in Addressing Aquatic Invasive Species

Through our questionnaire and interviews with officials from the Task Force and its member agencies, we found that member agencies conducted a wide range of activities and faced several challenges in addressing aquatic invasive species. Most member agencies reported conducting activities across the seven general activity categories developed by the National Invasive Species Council, including taking actions to prevent introductions of new aquatic invasive species and control the spread of existing ones (see app. III). Task Force member agencies also identified several challenges in addressing aquatic invasive species. Some of these challenges are overarching, and others relate to how member agencies plan or conduct aquatic invasive species activities specific to the activity categories.

Regarding overarching challenges, several Task Force member agencies—including officials from the Departments of the Interior and Agriculture, the Corps, and NOAA—expressed concern that their activities, though numerous, may not be adequate relative to the growing magnitude and impacts of aquatic invasive species amid decreasing or constrained agency resources. Task Force representatives further said that many of the member agencies have faced competing priorities in carrying out aquatic invasive species-related activities, with some member agencies having limited flexibility to conduct work in multiple areas. According to officials from the U.S. Geological Survey (USGS), for example, much of the agency’s aquatic invasive species activities have been focused on identifying methods to treat and control Asian Carp in accordance with the Great Lakes Restoration Initiative and other funding for this work. USGS officials said that though their work on Asian Carp has been critical, it has sometimes meant that they have not been able to prioritize other needs, such as identifying marine invaders from nonballast water sources or new marine and arctic threats given the warming of ocean waters.

The following are examples of activities Task Force member agencies conducted to address aquatic invasive species along with challenges they identified related to specific activity categories, based on the responses we received to our questionnaire and interviews with officials from the Task Force and its member agencies. These examples include activities from each of the seven activity categories—(1) prevention, (2) early

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detection and rapid response, (3) control and management, (4) restoration, (5) research, (6) education and public awareness, and (7) leadership and international cooperation. These examples do not represent all activities conducted or challenges identified by member agencies, but rather they illustrate the nature and type of activities and challenges discussed.

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## Prevention

Eleven of the 13 Task Force member agencies reported conducting a range of prevention activities, often related to managing specific pathways to help prevent the introduction of aquatic invasive species into new aquatic habitats. Task Force member agencies repeatedly highlighted the importance of conducting prevention-oriented activities as a cost-effective means of addressing aquatic invasive species. Officials from some member agencies also said that they would like to conduct more prevention-oriented activities, but that they have faced challenges in doing so, in part because of policy or funding decisions within their respective agencies.<sup>26</sup> For example, Corps officials said they believed that it would be most cost-effective to treat certain aquatic invasive plants upstream from project boundaries before the species spreads downstream and potentially threatens project infrastructure; however, it is generally the agency's policy to treat areas within rather than outside project boundaries.<sup>27</sup> Some Task Force member agencies also told us that prevention activities cannot be conducted at the expense of activities aimed at controlling aquatic invasive species already established, and

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<sup>26</sup>The preference to do more prevention-oriented activities, according to officials from several member agencies, includes activities under both the *prevention* and *early detection and rapid response* activity categories.

<sup>27</sup>To treat aquatic invasive species outside project boundaries in the past, the Corps partnered with state and local agencies. Specifically, the River and Harbor Act of 1958, as amended, authorizes a comprehensive U.S. Army Corps of Engineers program to provide for the prevention, control, and progressive eradication of noxious aquatic plant growths and aquatic invasive species from navigable and other waters of the United States. The law requires a cost share from local interests for the program's projects (known as the Aquatic Plant Control program). Before 1996, the Corps utilized this authority to fund aquatic invasive plant control projects with local and state governments. According to Corps officials, Corps management stopped requesting funding for this control program in 1996 based on a determination that the local and state governments receiving the benefits of this work should be responsible for paying all of the costs. From fiscal year 1998 through fiscal year 2012, the Corps conducted limited activities under this Aquatic Plant Control program when Congress would appropriate or direct funds for it, according to Corps officials.

that a more balanced approach between prevention and control activities may be warranted.

#### Prevention Efforts to Control the Spread of Quagga and Zebra Mussels

Several Task Force member agencies are involved in activities to prevent the spread of invasive Quagga and Zebra Mussels throughout the western United States. For example, U.S. Fish and Wildlife Service (FWS) and the National Park Service support implementation of the Quagga-Zebra Mussel Action Plan, which was developed by several state and federal agencies, as well as nongovernmental organizations in the western United States. This plan serves as a road map for identifying and prioritizing specific actions needed to prevent the further spread of Quagga and Zebra Mussels, respond to new infestations, and manage existing ones. FWS has installed signs at National Wildlife Refuges to alert boaters about the risk of these species and has funded training in 18 states on inspecting boats and other watercraft to identify and remove the mussels. The National Park Service expended approximately \$2 million in fiscal year 2014 on mussel prevention and control and monitoring at nine western parks. In addition, the Bureau of Reclamation has conducted a series of public education and outreach efforts, including the dissemination of informational pamphlets at boat shows, designed to educate the public on practices they can follow to help prevent the spread of Quagga and Zebra Mussels.



Source: Bureau of Reclamation. | GAO-16-49  
Quagga Mussels covering infrastructure

Examples of prevention activities include the following:

- **Regulations.** The U.S. Coast Guard and EPA regulate the management of ballast water—a primary pathway for the introduction of new aquatic invasive species into and within the United States—and other vessel discharges into waters of the United States. In 2012, the Coast Guard updated its ballast water regulations to include a standard for the allowable concentrations of living organisms allowed in a vessel's ballast water discharged in waters of the United States. In 2013, EPA issued a general permit that contains numeric technology-based limitations on acceptable concentrations of living organisms in ballast water discharge.<sup>28</sup>
- **Inspections.** FWS's Office of Law Enforcement inspects certain wildlife shipments to help ensure that prohibited species, including certain aquatic invasive species, do not enter the country. FWS's has about 120 inspectors at 49 ports of entry nationwide that review import documentation and conduct visual inspections of some shipments to help prevent species listed as injurious wildlife under the Lacey Act from being illegally brought into the country or across state lines.<sup>29</sup>
- **Physical barriers.** The Corps operates a series of electric barriers in the Chicago Area Waterway System located approximately 25 miles

<sup>28</sup>78 Fed. Reg. 21938 (Apr. 12, 2013). In October 2015, the United States Court of Appeals for the Second Circuit ruled that EPA acted arbitrarily and capriciously with respect to five aspects of the permit and remanded these aspects to EPA to adequately address them; however, the permit remains in force while EPA does so.

<sup>29</sup>A species can be added to the list of injurious wildlife by statutory amendment or by FWS rulemaking. The most recent listings were in March 2015, when FWS added four reptiles to the list. See 80 Fed. Reg. 12702 (Mar. 10, 2015). As of April 2015, there were about 240 mammals, birds, reptiles, fish, crustaceans, and mollusks—of which about 150 are considered aquatic invasive species—that were listed as injurious wildlife. This includes species of walking catfish (100), snakeheads (28), zebra mussels (6), carp (4), mitten crab (3) and snakes (9). In addition, FWS officials indicated that all salmonids (approximately 170 species) are listed due to their pathogen risk, which renders them injurious. In October 2015, FWS finalized a change to the process by which it adds new species to its list of injurious wildlife to make it more efficient and allow the agency to better prevent the introduction of species that are injurious. 80 Fed. Reg. 66554 (Oct. 29, 2015).

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from Lake Michigan to prevent the entry of Asian Carp and other aquatic invasive species from the Mississippi River Basin into the Great Lakes. These barriers send out pulses to form an electric field in the water that discourages fish from crossing.

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## Early Detection and Rapid Response

Ten of the 13 Task Force member agencies reported conducting early detection and rapid response activities—activities to detect the presence of aquatic invasive species in an area and remove any newly detected species while they are localized and before they become established and spread to new areas. Aside from preventing introductions, the most cost-effective way to address an invasive species is to detect and respond to invasions early, according to documents from the U.S. Forest Service and NOAA. However, coordinated rapid response efforts have been challenging to implement due, in part, to constraints in existing funding, according to officials from some agencies. Consequently, 11 Task Force member agencies are part of a federal work group, co-led by the Department of the Interior and the National Invasive Species Council, that in January 2015 started developing a framework for a national early detection and rapid response program and a plan for an emergency rapid response fund.<sup>30</sup> The work group reported in July 2015 that it plans to issue a report of recommendations to implement an early detection and rapid response framework, including mechanisms for funding, to the White House and the Council on Climate Preparedness and Resilience in the fall of 2015.

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<sup>30</sup>This work was initiated in response to the October 2014 Priority Agenda Enhancing the Climate Resilience of America's Natural Resources, issued by the White House Council on Climate Preparedness and Resilience.

### Early Detection Technique Using Environmental DNA

Detection methods such as the use of environmental DNA have become widespread among Task Force member agencies, such as the U.S. Geological Survey (USGS), the U.S. Army Corps of Engineers (Corps), the National Park Service, the Bureau of Reclamation, and the U.S. Fish and Wildlife Service (FWS). Environmental DNA—genetic material shed into the environment by organisms that can be detected in samples of air, water, or soil—is a relatively new tool being used to detect invasive species, particularly in areas where the species is not abundant or is difficult to detect. For example, because they are well camouflaged in the environment, visual detection of Burmese Pythons in South Florida is difficult, with detection rates of less than 1%. Use of environmental DNA methods, however, can increase python detection rates to more than 90%, according to USGS officials. Since spring 2015, USGS researchers have been working with FWS to test water from the Loxahatchee National Wildlife Refuge in Florida to determine whether Burmese Pythons may have spread to the refuge. Although environmental DNA helps confirm the presence of an aquatic invasive species in an area, it neither confirms whether the species has become established in the area, nor does it provide information on the number or current location of any species detected.



Source: © Camp Walker, Catalyst Charters, Islamorada, Florida. | GAO-16-49

Environmental DNA testing can detect Burmese Pythons

Examples of early detection and rapid response activities include the following:

- **National early detection database.** The USGS maintains the Nonindigenous Aquatic Species Database, a publicly accessible database, to track information on the locations of aquatic invasive animals throughout the United States. Federal agencies, as well as state and local agencies and the public, can report aquatic invasive species sightings and when verified, the sightings are added to the database and updated daily by the USGS.<sup>31</sup>
- **Rapid response strike teams.** The FWS has five regional strike teams in place to help eradicate any new invasions as soon as possible after they are detected in the nation's 563 wildlife refuges. These strike teams survey a small portion of the acreage within national wildlife refuges when new invasions are suspected, according to FWS officials, to determine the presence of any invasions and then take actions to eradicate or contain confirmed invasions before populations spread.

<sup>31</sup>USGS officials told us that, before 2012, the Nonindigenous Aquatic Species Database also included data on aquatic invasive plants, but that they stopped including plant data in the database because of funding constraints at the time. In June 2015, USGS officials told us that an increase in funding to their Invasive Species Program in fiscal year 2015 has allowed them to resume their efforts to collect and report data on aquatic invasive plants as part of this database, and that adding plant information back to the database was a high funding priority for the agency partly due to requests from other federal agencies and partners to do so.

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## Control and Management

Eleven of the 13 Task Force member agencies reported conducting activities designed to lessen and mitigate the impact or spread of aquatic invasive species on the facilities or areas they manage. Such activities may be designed to eradicate an invading species, but where eradication is not deemed feasible, such activities are designed to manage the invader by controlling the impact of the species and its spread. Activities aimed at controlling or managing the impact and spread of invasions represent a substantial portion of overall aquatic invasive species-related activities conducted, in terms of both effort and funding, according to Task Force representatives and officials from several member agencies. Some of these officials stressed the importance of sustaining efforts to control and manage aquatic invasive species to avoid reintroductions or spread of the species. For example, Corps officials said that, after eliminating infestations of *Melaleuca*, an invasive wetland tree, over a prescribed 10-year treatment period, periodic treatments would still be necessary to ensure new populations do not become established. Officials from several member agencies including the Corps noted, however, that limited or inconsistent funding has, at times, made it challenging to consistently manage areas as prescribed—potentially leading to the reemergence of aquatic invasive species.

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### Multipronged Method to Control and Manage Melaleuca

Melaleuca, an Australian tree that has destroyed many southern Florida wetlands, can be managed through a combination of biological, chemical, and physical and mechanical controls. For instance, through the introduction of weevils, a type of beetle that serves as a biological control, Melaleuca can be controlled. Researchers from the U.S. Department of Agriculture said, however, that the ability of Melaleuca trees to grow in various water depths has prevented the weevils—which require ground to burrow in—from successfully reproducing and eating the Melaleuca in swampy areas. According to National Park Service officials, Melaleuca can also be controlled if it is consistently treated over a 10-year period using the method in which the trees are first cut or hacked down with a machete or mechanical device and then sprayed with herbicides designed to kill them on the first, second, fourth, seventh, and tenth years of treatment. If this process is not followed as prescribed, however, the trees may regrow and spread. The National Park Service Exotic Plant Management Team and Everglades National Park have contributed to control of Melaleuca in South Florida, as shown in the photo below.



Source: National Park Service. | GAO-16-49  
Partially treated Melaleuca forest

Examples of control and management activities include the following:

- **Biological controls.** To control and manage the spread of Alligatorweed, a leafy aquatic invasive plant found in the southeastern United States and California, officials from the Corps told us they are using a beetle that feeds and reproduces only on Alligatorweed. According to officials from the Corps and the U.S. Department of Agriculture, the beetle has been successful in controlling the weed, and the need for additional treatments, such as herbicide applications, has been nearly eliminated in Florida.
- **Chemical controls.** The Department of State, through the Great Lakes Fishery Commission, along with the Corps, FWS, USGS and other federal and state partners, are primarily using chemicals called lampricides to kill Sea Lamprey, an invasive fish, in their larval stage before they can attach and prey upon native fish. According to Department of State officials, as of 2015, chemical controls have led to a 90 percent reduction in the Sea Lamprey population over its historical high level.
- **Physical and mechanical controls.** The Bureau of Reclamation uses physical and mechanical control methods to remove Water Hyacinth, an aquatic invasive plant, from one of its California facilities. Bureau of Reclamation officials said that, if left untouched, Water Hyacinth clogs canals, pumps, and fish screens, which can kill the fish they are working to protect. Bureau of Reclamation officials told us that, between 2013 and 2015, they removed between 10,000 and 20,000 truckloads of Water Hyacinth from the area surrounding the facility—with a dump truck filled with Water Hyacinth leaving the facility every 5 minutes during the height of its growing season.

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## Restoration

Ten of the 13 Task Force member agencies reported conducting a variety of activities to restore aquatic habitats adversely affected by aquatic invasive species. Officials from a few Task Force member agencies said that it may be possible to begin restoring habitats or ecosystems while control and management activities are under way, but in some cases aquatic invasive species may need to first be controlled or contained. According to a few member agencies, this creates a challenge in that

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restoration activities must wait until control activities are finished, meaning that restoration may be delayed.

Examples of restoration activities include the following:

- **Habitat restoration.** NOAA reported providing funding and technical expertise for community-based habitat restoration projects, such as providing about \$925,000 in 2012 for the Lower Black River Habitat Restoration Project in Ohio. The goal of this project is to restore fish and wildlife habitat in the lower Black River through actions such as the removal of aquatic invasive plants by chemical and manual techniques followed by the planting of native shrubs.
- **Native fish restoration.** The National Park Service reported removing nonnative fish from waters in a number of parks to restore native species and enhance natural aquatic biodiversity. Officials told us that they have been expending about \$1 million per year since 2013 at Yellowstone National Park on lake trout removal efforts in Yellowstone Lake. These efforts include contracting with commercial fishing crews to remove invasive lake trout that have caused a significant decline in populations of the native Yellowstone Cutthroat Trout.

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## Research

All 13 Task Force member agencies reported conducting or sponsoring research designed to support activities to help prevent, detect, or control the impacts or spread of aquatic invasive species, as well as determine their impacts on aquatic habitats. Research is critical to identify effective techniques for prevention, detection, control, and management of aquatic invasive species and to help clarify and quantify the effects aquatic invasive species have on native species and habitats, as well as economic costs and impacts to human health, according to Task Force documents. Officials from several member agencies and Task Force representatives noted that significant gaps in knowledge in certain areas related to aquatic invasive species is a challenge and, therefore, would like to see additional research, such as a comprehensive study to identify and assess the environmental impacts and economic costs associated with invasive species in the United States. Such information is critical to understanding the magnitude of the impacts from aquatic invasive species and for obtaining funding to address problems they are causing, according to these officials. In addition, limits in scientific knowledge about newly introduced species and the levels at which they may become established or harmful, especially in ballast water, affect member agencies' ability to manage the ballast water pathway, according to

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officials from NOAA and the Smithsonian Environmental Research Center. Officials from the U.S. Coast Guard said that it is difficult to set regulations or establish allowable concentrations of organisms that can be safely released in ballast water when the threshold for establishment of a new potentially invasive species may not be well understood.

#### Federal Research on Hydrilla

Federal research on Hydrilla, a submerged invasive plant that has clogged navigation channels and other water systems across the United States, involves efforts by several Task Force member agencies. For example, the U.S. Army Corps of Engineers (Corps) conducted research on the biology of Hydrilla during 2015 to provide a better understanding of the invasion ecology of this species in northern rivers and glacial lakes. The Corps has also researched chemical treatments and application strategies to control or alter the reproduction of Hydrilla. Chemical treatments developed through research have been successful in controlling some strains of Hydrilla, according to Corps officials. Aquatic herbicides developed through research have also been successful in controlling Hydrilla, but some strains have become resistant. In addition, the Animal and Plant Health Inspection Service, in collaboration with the Corps, is researching biological controls for Hydrilla, such as releasing insects that will eat the plant.



Source: © Stephen Ausmus. | GAO-16-49

Collection of Hydrilla for chemical research

Examples of research activities include the following:

- **Species research.** The Corps is researching various types of invasive aquatic vegetation and options for managing such species through its Aquatic Plant Control Research Program, which is authorized by statute.<sup>32</sup> In 2014, Corps' researchers completed field studies in Montana that used selective management strategies to control Eurasian Watermilfoil, a plant that is invasive throughout most states, including Alaska.
- **Impacts research.** Officials from USGS and NOAA have conducted research aimed at improving scientific knowledge about how aquatic invasive species may be adversely affecting ecosystems. In 2015, USGS continued research to identify whether newly established nonnative species may warrant being considered "high priority invaders," such as the Burmese Python in the Everglades. Since 2009, NOAA has conducted research to determine how certain aquatic invasive species have affected endangered salmon feeding behavior and habitat in the Pacific Northwest as part of its effort to understand the impacts that aquatic invasive species have on these native species and the ecosystems upon which they depend.
- **Pathways research.** The Maritime Administration sponsors the operation of three research facilities—in California, Maryland, and Wisconsin—that are testing the capability of treatment systems for ballast water to determine whether those systems may be approved by the U.S. Coast Guard pursuant to its ballast water regulations.

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<sup>32</sup>33 U.S.C. § 610(a)(1).

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## Education and Public Awareness

Eleven of the 13 Task Force member agencies reported engaging in education and public awareness activities to increase awareness about aquatic invasive species and their impacts and help minimize or prevent further introductions. According to Task Force documents, the lack of public awareness about the impacts and threats posed by some invasive species and how they are introduced is a substantial challenge for Task Force member agencies in addressing aquatic invasive species.

### Lionfish Education and Public Awareness

Several Task Force member agencies are involved in raising awareness about Lionfish, a highly invasive fish that has spread throughout coastal waters of the southeast and the Caribbean. To help raise awareness, the National Oceanic and Atmospheric Administration, along with nonprofit partners, has sponsored numerous Lionfish derbies since 2010, including 10 public tournaments in 2014 in which divers could hunt the edible fish with spears. The National Park Service produced a Lionfish Response Plan in 2012 that aims to help inform the public about the Lionfish invasion and prevent and mitigate impacts to parks. Biscayne National Park, in Florida, conducts an education program in which Lionfish removed from the park are sent to classrooms for safe dissection by students. National Park Service officials told us that concentrated education efforts like this have been effective in educating the public about Lionfish. In addition, the Department of State provided funding to work with partners in the Gulf of Mexico and the Caribbean to launch a web portal that provides managers and the public with access to the latest information on Lionfish and impacts in the Atlantic Ocean.



Source: © Rachel Bowman. | GAO-16-49

Lionfish hunter with speared Lionfish

Examples of education and public awareness activities include the following:

- **National awareness campaigns.** The Task Force, Bureau of Land Management, FWS, U.S. Forest Service, and the U.S. Coast Guard are among the federal agencies that collaborate on the “Stop Aquatic Hitchhikers!” campaign. Since 2002, this multimedia campaign has used television, billboards, and social and print media to encourage users of outdoor recreational areas to help stop the transport and spread of aquatic invasive species by, for example, making sure they clean, drain, and dry their boats and boat trailers before transporting them to different aquatic areas.
- **Local awareness events.** The National Park Service, along with state agencies and nongovernmental organizations, hosted the inaugural 5K “Race Against Invasives” run through Everglades National Park in February 2015 to raise awareness about invasive species, especially those in Florida.

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## Leadership and International Cooperation

Ten of the 13 Task Force member agencies have been involved in activities to provide leadership to the aquatic invasive species community—which includes federal and nonfederal as well as international agencies working on aquatic invasive species issues—and to enhance cooperation and collaboration, such as by participating and serving as members in a range of international, national, regional, state, and local task forces, councils, and other entities. Given the often complex and widespread nature of aquatic invasive species, working across jurisdictional boundaries is the most effective approach to combating aquatic invasive species, according to Task Force officials and documents. Moreover, working with other federal and nonfederal agencies and organizations helps the Task Force to identify areas where legislation may be needed to fill gaps in statutory authority, suggest priority policy issues, and define roles and responsibilities for managing aquatic invasive species, according to Task Force documents. Officials from the regional panels told us, however, that one challenge in such work is that constrained agency funding has meant that they have not been able to consistently attend Task Force, regional panel, or other cooperative meetings.<sup>33</sup>

Examples of leadership and international cooperation activities include the following:

- **Aquatic Nuisance Species Task Force activities.** The Task Force conducts semiannual meetings that provide an open and public forum for members to exchange information and coordinate their aquatic invasive species activities. For example, the Task Force's May 2015 meeting included presentations on a wide range of topics, from the adoption of species-specific national management plans to recommendations from its regional panels on issues of local significance.

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<sup>33</sup>Some regional panel representatives told us that it has been difficult for them to fully conduct activities, including attending semiannual Task Force meetings, due to decreased funding provided to the panels. Beginning in fiscal year 2012, funding for the regional panels decreased from \$300,000 to \$240,000 annually, which represents a decrease from \$50,000 to \$40,000 per panel. Similarly, Task Force representatives said that funding to support implementation of state and interstate management plans has remained level at about \$1 million annually, but that the number of approved plans eligible for assistance has increased each year, resulting in less funding being awarded per state plan.

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- **International cooperation.** Officials from the Corps and the U.S. Department of Agriculture have collaborated with scientists in China, South Korea, and Switzerland to identify and develop insect biological control agents to target invasive aquatic plants such as Hydrilla and Eurasian Watermilfoil. For example, in fiscal year 2014, Corps officials reported expending about \$450,000 on developing such control agents, which included collecting 350 plant samples from more than 90 field sites to help match invasive plants located in the United States with their countries of origin to improve the success of identifying insects to control these species.

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## The Task Force Has Not Taken Key Steps to Measure Progress in Achieving Its Strategic Goals

The Task Force has not taken key steps to measure progress in achieving the goals laid out in its 2013-2017 strategic plan.<sup>34</sup> In 2012, the Task Force developed its 2013-2017 strategic plan, which serves to guide Task Force member agencies in conducting aquatic invasive species-related activities to implement the aquatic invasive species program. The strategic plan identifies eight goals for the program—which generally align with the seven activity categories developed by the National Invasive Species Council—as well as a number of targeted action items for Task Force member agencies to achieve these goals (see table 4).<sup>35</sup>

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<sup>34</sup>For the Task Force's 2013-2017 strategic plan, see <http://anstaskforce.gov/Documents/ANSTF%20Strategic%20Plan%202013-2017.pdf>.

<sup>35</sup>We have previously found that, though a legal requirement specific to federal agencies and departments, the Government Performance and Results Modernization Act of 2010 serves to guide executive federal agency planning and provides leading practices for strategic planning at agencies and entities that work closely with or are a part of the federal government, including task forces. (See GAO, *Environmental Justice: EPA Needs to Take Additional Actions to Help Ensure Effective Implementation*, [GAO-12-77](#) (Washington, D.C.: Oct. 6, 2011.) The identification of goals in the Task Force's Strategic Plan is consistent with such leading practices.

**Table 4: Aquatic Nuisance Species Task Force’s 2013-2017 Strategic Goals and Examples of Action Items**

Goal	Examples of action items
Coordination - <i>Maximize the organizational effectiveness of the Aquatic Nuisance Species Task Force.</i>	<ul style="list-style-type: none"> <li>• Coordinate the development and implementation of species and pathways management plans.</li> <li>• Increase communication among members, regional panels, and committees of the Task Force to prioritize issues and activities.</li> </ul>
Prevention - <i>Develop strategies to identify and prevent the establishment of new aquatic invasive species and slow the spread of existing ones in the waters of the United States.</i>	<ul style="list-style-type: none"> <li>• Recommend amendments to the injurious wildlife provisions of the Lacey Act<sup>a</sup> to allow a proactive approach for preventing the establishment of new invasive species through the trade of live organisms.</li> <li>• Develop and maintain a priority list for aquatic invasive species pathways.</li> </ul>
Early detection and rapid response - <i>Identify and respond to aquatic invasive species within a timely manner following introduction to prevent their establishment and/or spread.</i>	<ul style="list-style-type: none"> <li>• Increase public and industry involvement in reporting sightings of aquatic invasive species through the U.S. Geological Survey’s online reporting form for its publicly available database on locations of aquatic invasive species.</li> <li>• Develop a rapid response technical support network that can provide resources and technical support in response to newly detected species.</li> </ul>
Control and management - <i>Control established aquatic invasive species when feasible and when the benefits of managing the established species outweigh the costs of removing them with respect to harm to the environment, the economy, and public health.</i>	<ul style="list-style-type: none"> <li>• Increase the number of training workshops for natural resource managers and the total number of personnel and volunteers trained in control measures for aquatic invasive species.</li> <li>• Identify gaps in control efforts and tools.</li> </ul>
Restoration - <i>Protect and rehabilitate native species and ecosystems by conducting habitat restoration efforts on multiple scales.</i>	<ul style="list-style-type: none"> <li>• Ensure that federal land and water management guidance manuals consider aquatic invasive species issues during the planning and development of habitat restoration projects.</li> <li>• Compile, highlight, and share lessons learned for both restoration successes and failures within the United States.</li> </ul>
Education and outreach - <i>Increase awareness concerning the threats of aquatic invasive species, emphasizing the impacts, importance of prevention and containment, and recommendations for appropriate domestic and international actions.</i>	<ul style="list-style-type: none"> <li>• Utilize the internet and social media as well as traditional media sources to disseminate information and promote awareness of aquatic invasive species.</li> <li>• Cooperate with media outlets to reach a broad range of the public with aquatic invasive species messages.</li> </ul>
Research - <i>Facilitate research to address environmental, economic, and human health risks and impacts associated with aquatic invasive species.</i>	<ul style="list-style-type: none"> <li>• Develop and maintain a list of aquatic invasive species research priorities and communicate this list to the scientific community.</li> <li>• Improve data collection at ports of entry so numbers and identification of species entering the United States through commerce in living organisms are available and accessible.</li> </ul>
Funding - <i>Coordinate federal agency budgets to support the Aquatic Nuisance Species Task Force’s priorities and establish a clear process that links state and regional needs in their areas of responsibility.</i>	<ul style="list-style-type: none"> <li>• Compose an annual report focused on aquatic invasive species and use it as an opportunity to reach decisionmakers and other leaders on the need for policies and funding for aquatic invasive species efforts.</li> <li>• Prioritize actions based on anticipated efficacy, threat level, and costs/benefits to natural resources.</li> </ul>

Source: Aquatic Nuisance Species Task Force Strategic Plan (2013-2017). | GAO-16-49

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Note: The action items included in this table are not comprehensive, but rather they serve as examples of the action items associated with each strategic goal and are intended to illustrate the types of actions that Task Force member agencies may take to implement the strategic plan.

<sup>3</sup>Among other things, the Lacey Act, as amended, prohibits the importation into the United States and interstate transport of certain animals, including aquatic invasive species listed as injurious wildlife.

The action items identified in the strategic plan were intended to be completed over the 5-year period of the plan, but the strategic plan also stated that accomplishing the items would be dependent upon the budgets of individual agencies. The strategic plan did not identify or describe roles or activities to be conducted by specific member agencies or measures to track progress in achieving its eight strategic goals. Rather, the strategic plan called for the Task Force to develop an operational plan to specify how Task Force member agencies would put the strategic plan into operation.<sup>36</sup> According to the strategic plan, the function of the operational plan was to ensure the strategic goals were measurable and accountable. Specifically, the operational plan was intended to contain the following elements: (1) a description of short-term efforts to support and implement the strategic plan and its goals; (2) the roles of Task Force member agencies; (3) when available, the time frames, lead agencies or groups, and funding; and (4) regular updates with its actions reported annually to measure progress toward accomplishing the goals of the strategic plan. The elements envisioned for the operational plan are also largely required by the 1990 Act.<sup>37</sup>

Before the strategic plan went into effect, however, the Task Force decided not to develop an operational plan as envisioned in the strategic plan. Instead, the Task Force decided to develop a reporting matrix in the form of a spreadsheet to collect information on member agencies' aquatic invasive species-related activities, according to the Task Force's autumn 2012 meeting minutes. This reporting matrix was designed to collect

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<sup>36</sup>We have previously found that the Government Performance and Results Modernization Act of 2010—which calls for a performance plan to implement an agency's strategic plan—provides leading practices for strategic planning for task forces. The operational plan described in the Task Force's Strategic Plan is consistent with such leading practices.

<sup>37</sup>The 1990 Act requires the Task Force to submit a report to Congress annually detailing the progress of its program, as well as to develop a program that (1) describes the specific prevention, monitoring, control, education and research activities to be conducted by each Task Force member; (2) describes the role of each Task Force member in implementing the elements of the program; and (3) includes recommendations for funding to implement elements of the program.

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information on the aquatic invasive species activities that member agencies had planned to conduct related to the goals of the strategic plan. This reporting matrix was also designed to collect funding information associated with each of these activities, which could serve as a starting point for the Task Force to identify funding gaps and priorities and develop recommendations for funding to implement elements of its aquatic invasive species program as required by the 1990 Act. The reporting matrix was disseminated to Task Force member agencies in August 2012, but fewer than half (6 of 13) of the Task Force member agencies provided information to the Task Force.<sup>38</sup> According to Task Force representatives, the Task Force did not disseminate or collect additional information using the reporting matrix after 2012.

According to Task Force representatives, the Task Force decided not to develop an operational plan or use the reporting matrix after 2012 because of constrained funding and limited resources. In particular, they said they were limited in their efforts because of the constrained funding environment that emerged from sequestration in 2013 and 2014.<sup>39</sup> According to Task Force representatives, the retirement in 2013 and the continued vacancy of its Executive Secretary has resulted in the Task Force being without dedicated staff to support updates to the reporting matrix. Task Force representatives further explained that, given the limited staff devoted directly to the Task Force, they rely on staff from member agencies to contribute to the administration of the program, but member agencies have had competing priorities and have not had the resources to contribute to developing an operational plan in the way that was originally envisioned when the strategic plan was developed. In addition, Task Force representatives said that, since 2014, the Task Force along with member agency staff, has been focused on drafting a report to Congress, an annual requirement under the 1990 Act.<sup>40</sup> Since its inception, the Task Force has provided one report to Congress, in 2004.

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<sup>38</sup>All six regional panels also provided information to the Task Force for the reporting matrix in 2012.

<sup>39</sup>As a result of sequestration in 2013 and 2014, federal agencies reduced or delayed some services and disrupted agency operations. For information on 2013 sequestration, see GAO, *2013 Sequestration: Agencies Reduced Some Services and Investments, While Taking Certain Actions to Mitigate Effects*, [GAO-14-244](#) (Washington, D.C.: Mar. 6, 2014).

<sup>40</sup>The 1990 Act requires the Task Force, beginning in 1992, to submit a report to Congress annually detailing the progress of its program. 16 U.S.C. § 4722(k)(2).

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Task Force representatives said they expect to finalize and issue their draft report by the end of 2015. In reviewing a draft of the report, we found that the draft provided an overview and examples of aquatic invasive species activities conducted by the Task Force, member agencies, regional panels, and states since the Task Force's 2004 report, as well as some information on the role of Task Force member agencies in aquatic invasive species management. After they finalize the 2015 report, Task Force representatives have not indicated that they would begin submitting reports annually to meet this reporting requirement in the future.

Task Force representatives also said they have no plans to develop an operational plan, as called for in the strategic plan, but acknowledged the importance of developing a means to regularly track various member agencies' aquatic invasive species activities and measure progress toward meeting the strategic goals. Specifically, in response to our inquiry into the status of an operational plan, Task Force representatives told us in May 2015 that they planned to discuss the possibility of reviving or modifying the reporting matrix they had used in 2012. Task Force representatives subsequently told us that, during a June 2015 meeting, member agencies agreed that a tracking mechanism was important. However, they also told us that they did not determine what such a mechanism would look like, how it would be implemented and by whom, or how to address concerns expressed by some member agencies that the mechanism not burden agency staff already working at capacity in light of constrained funding. Task Force representatives said they plan to further discuss the idea of reviving or modifying the reporting matrix at their next semiannual Task Force meeting in November 2015. But, representatives could not tell us when they planned to make a decision on the approach they would take or provide specifics on what information they would collect or how they would measure progress in achieving their strategic goals.

By developing and regularly using a tracking mechanism—that would include the elements envisioned for an operational plan and required by the 1990 Act—the Task Force could better position itself to (1) measure progress in achieving its strategic goals and (2) comply with certain requirements in the 1990 Act for the aquatic invasive species program. Addressing aquatic invasive species is a complex, interdisciplinary issue with the potential to affect many sectors and levels of government operations. Strategic planning is a way to respond to this governmentwide problem on a governmentwide scale. Our past work on crosscutting issues has found that governmentwide strategic planning can integrate

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activities that span a wide array of federal, state, and local entities, as well as provide a comprehensive framework for making resource decisions and holding agencies accountable for achieving strategic goals.<sup>41</sup> With its strategic plan, the Task Force has a framework in place to guide and integrate the numerous and varied aquatic invasive species activities spanning many member agencies. In addition to measuring progress in achieving the Task Force's strategic goals, developing and regularly using a tracking mechanism could also help the Task Force meet the 1990 Act's requirements to describe its members' roles and specific activities and to report annually to Congress on the program's progress.

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## Conclusions

Aquatic invasive species, a serious and growing problem affecting all states and U.S. territories, have been likened to a never-ending oil spill, given that they are notoriously difficult to eradicate once they become established. Though hard to calculate, the economic and ecological harm caused by aquatic invasive species is vast. Capturing how much federal agencies have expended—and will likely need to expend—to effectively address aquatic invasive species is also challenging. Consequently, it is not possible to identify how much may be needed to fully address aquatic invasive species, both in terms of current invasions or measures to prevent future invasions. Capturing how much progress federal agencies have made in combatting aquatic invasive species is similarly challenging.

The Task Force and its member agencies have taken significant steps—including conducting a wide array of activities and developing a strategic plan to guide their efforts—to address the threats and impacts of aquatic invasive species. However, the Task Force has not met several of the 1990 Act's requirements, including reporting annually to Congress on the program's progress, or developed a mechanism to ensure its strategic goals are measurable and accountable, such as through an operational plan, as called for in its strategic plan, because of constrained funding and limited resources. Task Force member agencies agreed that a mechanism to track activities and measure progress was important, but the Task Force has not decided what the mechanism would look like, how

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<sup>41</sup>GAO, *Climate Change: Adaptation: Strategic Federal Planning Could Help Government Officials Make More Informed Decisions*, [GAO-10-113](#) (Washington, D.C.: Oct. 7, 2009).

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it would be implemented and by whom, or how to address concerns that it not burden agency staff already working at capacity. Developing and regularly using a tracking mechanism could help the Task Force measure progress in achieving its strategic goals, as well as help the Task Force meet the 1990 Act's requirements to describe its members' roles and specific activities and to report annually to Congress on the program's progress. Moreover, such a mechanism could provide a starting point for identifying funding gaps and priorities, better positioning the Task Force to meet the 1990 Act's requirement to include recommendations for funding to implement elements of its aquatic invasive species program.

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## Recommendation for Executive Action

As the Aquatic Nuisance Species Task Force considers how to measure progress toward accomplishing its strategic goals, we recommend that the Task Force develop and regularly use a tracking mechanism, to include elements envisioned for an operational plan and to largely meet requirements in the 1990 Act, including:

- specifying the roles of member agencies related to its strategic plan,
- tracking activities to be conducted by collecting information on those activities and associated funding,
- measuring progress member agencies have made in achieving its strategic goals, and
- reporting to Congress annually on the progress of its program.

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## Agency Comments and Our Evaluation

We provided the Secretaries of Agriculture, Commerce, Defense, Homeland Security, Interior, State, and Transportation and the Administrator of the EPA a draft of this report for their review and comment. Only the Department of the Interior and the Department of Commerce's NOAA provided written comments, which are included in appendixes V and VI, respectively. Interior generally agreed with the report's findings and recommendation, and NOAA disagreed, as further discussed below. The Department of Defense's U.S. Army Corps of Engineers, the Department of State, and EPA indicated that they had no comments on our report through e-mail communications provided through departmental audit liaisons on October 19, October 21, and October 23, 2015, respectively. We also received e-mails provided through audit liaisons from the following departments that stated that the departments agreed with the report's findings and recommendation and had no other

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comments: The Department of Agriculture's Animal and Plant Health Inspection Service and U.S. Forest Service (dated October 29, and October 30, 2015, respectively); the Department of Transportation (dated October 26, 2015); and the Department of Homeland Security (dated October 15, 2015).

In its written comments, the Department of the Interior stated that it generally agreed with the findings of our report and concurred with our recommendation. Interior stated that it appreciated our review of the challenges faced by the Task Force in addressing and managing risks posed by the introduction and proliferation of aquatic invasive species. Interior stated that the Task Force, of which its FWS is a co-chair, is currently evaluating the reporting matrix to improve its utility as a tracking mechanism. Additionally, Interior stated that, at its November 2015 meeting, the Task Force agreed to track accomplishments using a modified activity tracking tool while its members continue to evaluate how best to track their activities going forward. Interior also stated that the Task Force's report to Congress is undergoing final agency review, and it is expected to be delivered to Congress in the coming months, which, together with its tracking efforts, will help provide the Task Force with a mechanism to both measure and communicate progress toward its strategic goals, as called for in our report. We agree that using a modified activity tracking tool and completing the report to Congress will be positive first steps in the Task Force's measuring progress toward accomplishing its strategic goals and meeting requirements in the 1990 Act, in accordance with our recommendation. Interior also provided technical comments, which we incorporated, as appropriate.

In its written comments, NOAA disagreed with several aspects of our findings, conclusions, and recommendation. In addition, NOAA stated that our report did not sufficiently address certain aspects of the mandate to conduct the review contained in section 1039(a)(2) of the Water Resources Reform and Development Act of 2014. First, NOAA stated that the report did not mention future costs to mitigate the impacts of aquatic invasive species and that, although it may be difficult to give specific numbers, some information could be speculated upon. In the opening paragraph of our report, we state that the impacts of invasive species in the United States are widespread and expected to increase, with profound consequences for the economy and the environment. We cite a 2005 academic study—the most recent comprehensive study of its kind—that estimates the environmental impacts and economic costs associated with invasive species at almost \$120 billion per year. Additionally, through our questionnaire, we requested that federal member agencies provide

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planned activities and estimated expenditures for future years. However, as we describe in the scope and methodology appendix (app. I) of our report, we decided not to report future estimated expenditures given the limited information provided by some member agencies. We believe that reporting partial information could be misleading and could underestimate likely future expenditures.

Second, NOAA stated that our analysis could have gone into more detail about current federal spending on prevention activities. We limited our reporting of expenditures for fiscal years 2012 through 2014 to estimates of *total* annual expenditures for each Task Force member agency because many member agencies reported that they could not provide estimates of their expenditures by activity category, including prevention. Third, NOAA stated that we did not address whether federal spending is adequate for the maintenance and protection of services provided by federal facilities. As we note in our report, capturing how much federal agencies have expended—and will likely need to expend—to effectively address aquatic invasive species is challenging. Given the limited information available from the Task Force member agencies on current and planned expenditures related to aquatic invasive species, we determined we would not be able to reliably conduct an analysis of the adequacy of federal spending. Lastly, NOAA stated that we chose to focus on the Aquatic Nuisance Species Task Force and its strategic plan rather than documenting other legislative and programmatic efforts that target the prevention, control, and management of aquatic invasive species. The scope of our review includes all federal member agencies of the Task Force, and in discussing activities and challenges those member agencies face in addressing aquatic invasive species, our report highlights many of the legislative and programmatic efforts those agencies are undertaking, such as efforts by the U.S. Coast Guard and EPA to regulate and manage ballast water through updated regulations.

NOAA also stated that our report did not mention federal mandates intended to address aquatic invasive species other than the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, the National Invasive Species Act of 1996, and Executive Order 13112. NOAA stated that at its exit conference with us on July 14, 2015, it noted that many federal agencies receive additional directions or mandates to address or respond to aquatic invasive species and their impacts and that each agency must balance these mandates. We agree that federal agencies may have multiple responsibilities in addressing aquatic invasive species—we outline many of these responsibilities in table 1 of the background of our report where we describe the key roles and

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responsibilities of Task Force member agencies under various federal laws. Also, in describing examples of the activities and challenges member agencies face in addressing aquatic invasive species in the second objective of our report, we identify and describe many of the requirements and mandates member agencies must follow. For example, we describe efforts of the FWS' Office of Law Enforcement to enforce the Lacey Act, which prohibits the importation and interstate transport of wildlife listed as injurious, among other things. NOAA also stated that balancing and responding to various requirements ultimately affects the agencies' ability to adequately respond to this national issue. We agree with this statement, and in our discussion of challenges faced by member agencies in addressing aquatic invasive species, we report that many of the member agencies have faced competing priorities in carrying out aquatic invasive species-related activities, with some member agencies having limited flexibility to conduct work in multiple areas.

In addition, NOAA stated that the interactive map (fig. 1) may be misleading, inaccurate, or confusing. First, NOAA stated that the reported presence of a species in USGS' Nonindigenous Aquatic Species database (one of two key sources we used to prepare species' location information for the map) does not mean that the species is established in a particular state's waters as the map portrays. In our draft report, in a note to the figure, we included a statement to clarify that species distributions in the map represent the reported presence of a species in at least one, but not necessarily all, bodies of water in the state, and do not necessarily indicate establishment of the species in any part of the state. To further clarify this point so as not to potentially mislead readers, in response to NOAA's comment, we have updated the figure title and note and also added a statement to this effect in the body of the report. Second, NOAA stated that *Caulerpa*, one aquatic invasive species we highlighted in the figure, had been eradicated. Upon receipt of this information from NOAA and in light of obtaining additional supporting data, we removed *Caulerpa* from the figure. Third, NOAA stated that providing points of pathways of invasion as part of the interactive figure was confusing or inaccurate in some cases. We agree that the manner in which we linked our description of the pathways of invasion to the map in the draft report could be misinterpreted; consequently, in response to NOAA's comment, we disassociated the description of pathways from the map. We believe that providing a description of various pathways aquatic invasive species may use to enter and spread into new areas is important context for our report.

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Furthermore, concerning our recommendation that the Task Force develop and regularly use a tracking mechanism, to include elements envisioned for an operational plan and to largely meet requirements in the 1990 Act, NOAA stated that it does not believe the recommendation can address problems faced by the Task Force. NOAA stated that, with respect to measuring progress, the Task Force agreed to use an activity matrix to compile information, but the matrix has not been updated since 2012 for several reasons, including because of uncertainties in funding, shifting priorities, and the loss of the Task Force Executive Secretary position, which has not been filled since the former Executive Secretary retired in 2013. NOAA further stated that the report does not address the underlying causes that have hindered Task Force efforts to track progress, including the limited budget under which the Task Force operates, which has been reduced significantly in recent years. Our recommendation was not intended to comprehensively address the problems faced by the Task Force, but rather was more narrowly focused. Specifically, the intent of our recommendation is to help the Task Force regularly track progress toward achieving its strategic goals in a manner that ensures it also largely meets requirements in the 1990 Act, such as reporting to Congress annually on the progress of its program. In our report, we discuss the constrained funding environment and limited resources the Task Force and its member agencies reported working under, including having limited staff devoted directly to the Task Force and facing the constrained funding environment that emerged from sequestration in 2013 and 2014. We believe that by implementing our recommendation—that is, by developing and regularly using a tracking mechanism to include the roles of member agencies, activities conducted and associated funding, and progress made in achieving strategic goals—the Task Force would be in a better position to identify and communicate its progress, as well as funding or resource needs to address problems faced by the Task Force. As we note in our report, capturing how much federal agencies have expended—and will likely need to expend—to effectively address aquatic invasive species is challenging. But by developing and regularly using a tracking mechanism, we believe the Task Force would be better-positioned to assess funding gaps and priorities and begin to identify solutions to address the challenges member agencies face in addressing aquatic invasive species.

Finally, NOAA identified examples where it stated information portrayed in our report could have evolved into recommendations. For example, NOAA commented that a recommendation that calls for a more balanced approach in conducting prevention activities would be beneficial. In our

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report, we state that member agencies repeatedly highlighted the importance of conducting prevention-oriented activities as a cost-effective means of addressing aquatic invasive species. We also note that officials from some member agencies said they would like to conduct more prevention-oriented activities, but that prevention activities cannot be conducted at the expense of activities aimed at controlling aquatic invasive species already established, and that a more balanced approach between prevention and control activities may be warranted. We include this and the other examples NOAA references in our report to provide context on an issue, provide examples of activities being undertaken by member agencies, or describe challenges faced by member agencies in addressing aquatic invasive species—consistent with the objectives and scope of work conducted for this review. Consistent with government auditing standards, we are to have sufficient, appropriate evidence to provide a reasonable basis for findings and conclusions before we can develop recommendations. Based on our work, we did not have sufficient evidence to provide a reasonable basis for making recommendations on the examples NOAA identified. We encourage NOAA to continue to work with Task Force member agencies and others to pursue areas they identify as needing additional work, such as identifying ways to take a more balanced approach across prevention and control activities. We believe that by implementing our recommendation, NOAA, as one of the co-chairs of the Task Force, would be in a better position to identify funding gaps and priorities, and determine recommendations for funding based on emerging needs.

NOAA also provided technical comments, which we incorporated, as appropriate.

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We are sending copies of this report to the appropriate congressional committees; the Secretaries of Agriculture, Commerce, Defense, Homeland Security, the Interior, State, and Transportation; the Administrator of the Environmental Protection Agency; and other interested parties. In addition, the report is available at no charge at the GAO website at <http://www.gao.gov>.

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If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to the report are listed in appendix VII.

A handwritten signature in black ink that reads "Anne-Marie Fennell". The signature is written in a cursive style with a large initial "A" and a long horizontal line extending from the end of the name.

Anne-Marie Fennell  
Director, Natural Resources and Environment

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*List of Committees*

The Honorable Jim Inhofe  
Chairman  
The Honorable Barbara Boxer  
Ranking Member  
Committee on Environment and Public Works  
United States Senate

The Honorable Lisa Murkowski  
Chairman  
The Honorable Maria Cantwell  
Ranking Member  
Committee on Energy and Natural Resources  
United States Senate

The Honorable Bill Shuster  
Chairman  
The Honorable Peter A. DeFazio  
Ranking Member  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable Rob Bishop  
Chairman  
The Honorable Raul M. Grijalva  
Ranking Member  
Committee on Natural Resources  
House of Representatives

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# Appendix I: Objectives, Scope, and Methodology

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This report examines (1) how much the Aquatic Nuisance Species Task Force (Task Force) member agencies expended addressing aquatic invasive species from fiscal year 2012 through 2014; (2) activities conducted by Task Force member agencies and challenges in addressing aquatic invasive species; and (3) the extent to which the Task Force has measured progress in achieving the goals of its 2013-2017 strategic plan.

For all three objectives, we reviewed aquatic invasive species-related laws, including the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (the 1990 Act),<sup>1</sup> regulations, and academic studies. We conducted interviews with, and obtained documentation from, the co-chairs of the Task Force and other Task Force representatives; officials from the 13 Task Force federal member departments and agencies (member agencies);<sup>2</sup> and representatives from each of the Task Force's six regional panels to learn about their roles and responsibilities, aquatic invasive species-related activities, and any expenditure information they maintain related to those activities. In addition, we interviewed staff from the National Invasive Species Council to learn about their efforts to collect information on federal expenditures for invasive species activities.

To determine how much Task Force member agencies expended addressing aquatic invasive species for fiscal years 2012 through 2014 and obtain information on activities conducted, we developed and disseminated a questionnaire to the 13 Task Force member agencies, requesting information on their estimated expenditures and activities conducted to address aquatic invasive species. Specifically, the questionnaire requested member agencies to provide estimates of their expenditures for the activities they conducted in each of the following seven aquatic invasive species activity categories: (1) prevention, (2) early detection and rapid response, (3) control and management, (4) research, (5) restoration, (6) education and public awareness, (7) and leadership and international cooperation.<sup>3</sup> These were the same activity

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<sup>1</sup>16 U.S.C. §§ 4701-4751.

<sup>2</sup>We defined our scope to include the 13 federal department and agencies that are the federal members of the Aquatic Nuisance Species Task Force, as established by the 1990 Act. Other federal agencies may also conduct aquatic invasive species-related activities.

<sup>3</sup>We also included an eighth category labeled "other" for member agencies to report any activities they determined did not fit within any of the seven categories.

categories used by the National Invasive Species Council to collect and report information for its annual invasive species interagency “crosscut” budget summary. The council’s annual budget summary includes estimates of federal agency expenditures and planned funding on activities to address all types of invasive species, but it does not include a breakdown of expenditure by type, including expenditures specific to aquatic invasive species. Therefore, the council’s annual budget summary provided a framework for us to follow in developing our questionnaire, but we could not use information from the budget summary to obtain or report information on federal expenditures specific to aquatic invasive species. Several Task Force member agency officials recommended that we follow the council’s framework for our questionnaire since many of the member agencies provide information to the council, and they suggested that following a similar framework would facilitate their ability to respond to our request. In developing our questionnaire, we worked with staff from the National Invasive Species Council and conducted pretests with three member agencies to obtain their comments, which were incorporated as appropriate.

In our questionnaire, we requested that each member agency provide (1) its estimated expenditures for fiscal years 2012 through 2014 (the most recent years for which member agencies reported reliable data were available), (2) examples of aquatic invasive species activities conducted during this time period, and (3) its planned activities and estimated expenditures for future years, which we defined as fiscal years 2015 and 2016. We also included questions about how the Task Force member agencies prepared their estimates, their sources of information, any challenges or limitations in preparing the estimates, and whether the estimates were reviewed by their budget or financial offices. Appendix IV provides a blank copy of our questionnaire.

We received completed responses from all 13 of the Task Force member agencies. The member agencies provided information on their activities conducted to address aquatic invasive species, but member agencies varied in the level of detail they provided about their estimated expenditures. Twelve of the 13 member agencies included at least some information on their estimated expenditures for fiscal years 2012 through 2014, but the U.S. Forest Service reported that it was unable to provide estimates. For the other 12 agencies, they varied in their ability to provide consistent and complete information on their estimated expenditures at the level of detail we requested in our questionnaire. With respect to the expenditure information for fiscal years 2012 to 2014, some agencies were able to provide estimates of their expenditures by activity category,

but many reported that they could not provide estimates at this level of detail. For example, the Environmental Protection Agency reported its expenditures supported activities for five of the seven activity categories, but because it could not provide separate estimates for each of these categories it reported all of its expenditures under the prevention category. Similarly, the National Park Service reported conducting activities in all seven activity categories in fiscal years 2012 and 2013, but provided estimates for two activity categories (research and restoration) and reported that it was unable to determine how much of its estimated expenditures went toward the other five activity categories in these years. Based on inconsistencies and incomplete responses across the 13 member agencies, we decided to limit our reporting for fiscal years 2012 through 2014 to estimates of total annual expenditures for each Task Force member agency.

With respect to future expenditures for fiscal years 2015 to 2016, a few member agencies indicated they did not have estimates of expenditures for future years, though others had partial estimates. To avoid reporting potentially misleading information that could underestimate likely future expenditures compared to amounts reported for fiscal years 2012 through 2014, we decided not to report the future expenditure estimates provided to us. Similarly, 9 of the 13 member agencies reported that they were not able to provide estimates for how much they expended addressing specific aquatic invasive species, citing reasons such as expenditures being tracked at a project level rather than by a specific species. Therefore, we do not include species-specific expenditure information in our report.

After receiving completed questionnaires, we followed up with Task Force member agency officials to obtain clarification or additional information, as needed. We did not independently verify the accuracy of the estimated expenditures reported by the member agencies, which likely include some over- and some under-estimates. For example, in its response, the U.S. Fish and Wildlife Service (FWS) described various activities that were implemented through projects supported with grant funding from the Wildlife Sport Fish Restoration Program.<sup>4</sup> But, FWS did not include expenditure estimates for these project activities because it could not reliably estimate how much of the grant funding should be attributed to

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<sup>4</sup>50 C.F.R. pt. 80-86.

the aquatic invasive species component of the grant-funded projects. We asked each of the Task Force member agencies for their assessment of whether their estimated expenditures for fiscal years 2012 to 2014 were an underestimate, overestimate, or about right. Ten of the member agencies responded that their estimates were “about right,” and two indicated they were underestimates (one member agency did not provide estimates). Accordingly, the expenditures reflect the agencies’ best estimates of how much they expended on aquatic invasive species activities during these years. Based on our assessment of these responses, along with the responses provided through the questionnaire, we determined that the expenditure estimates for fiscal years 2012 through 2014 were sufficiently reliable for purposes of this report—to provide general estimates of total annual expenditures by Task Force member agencies on activities to address aquatic invasive species.

To describe the activities conducted by Task Force member agencies and any challenges in addressing aquatic invasive species, we built on the information gathered through our questionnaire and conducted a series of interviews with officials from the 13 member agencies, the federal ex-officio member of the Task Force (the Smithsonian Environmental Research Center), and each of the Task Force’s six regional panels. Through these interviews, we collected information and documentation on aquatic invasive species activities conducted and any challenges agencies identified in addressing aquatic invasive species. Many of the activities and challenges relate to ongoing activities that span multiple fiscal years and thus the information we collected often highlights, but is not limited to, fiscal years 2012 through 2014. We also conducted site visits in Southern Florida, Northern California, and Western Washington to interview local federal officials and observe activities at the sites, such as inspections of shipments of live fish to search for aquatic invasive species and research being conducted at research facilities. We selected these locations based on the number and variety of aquatic invasive species and federal agencies, as well as the types of activities conducted in those locations. Information we obtained from our interviews and site visits on activities conducted and challenges identified are not generalizable, but we believe the examples we obtained provide important insights into the wide array of aquatic invasive species activities being undertaken across the 13 Task Force member agencies and the challenges agencies face in conducting those activities.

To determine the extent to which the Task Force has measured progress in achieving the goals of its 2013-2017 strategic plan, we conducted interviews with and obtained documentation from Task Force

representatives, officials from the 13 Task Force member agencies, and officials representing the six regional panels. We reviewed the Task Force's 2013-2017 strategic plan, its 2012 reporting matrix, and other documentation related to the Task Force's efforts to collect information related to its strategic plan. We then analyzed and compared this information to program requirements identified in the 1990 Act,<sup>5</sup> our previous reports on leading practices provided by the GPRA Modernization Act of 2010,<sup>6</sup> and our executive guide on strategic planning,<sup>7</sup> as appropriate.

We conducted this performance audit from November 2014 to November 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>5</sup>16 U.S.C. § 4722(b).

<sup>6</sup>GPRA Modernization Act of 2010, Pub. L. No. 111-352, 124 Stat. 3866 (2011).

<sup>7</sup>[GAO/GGD-96-118](#).

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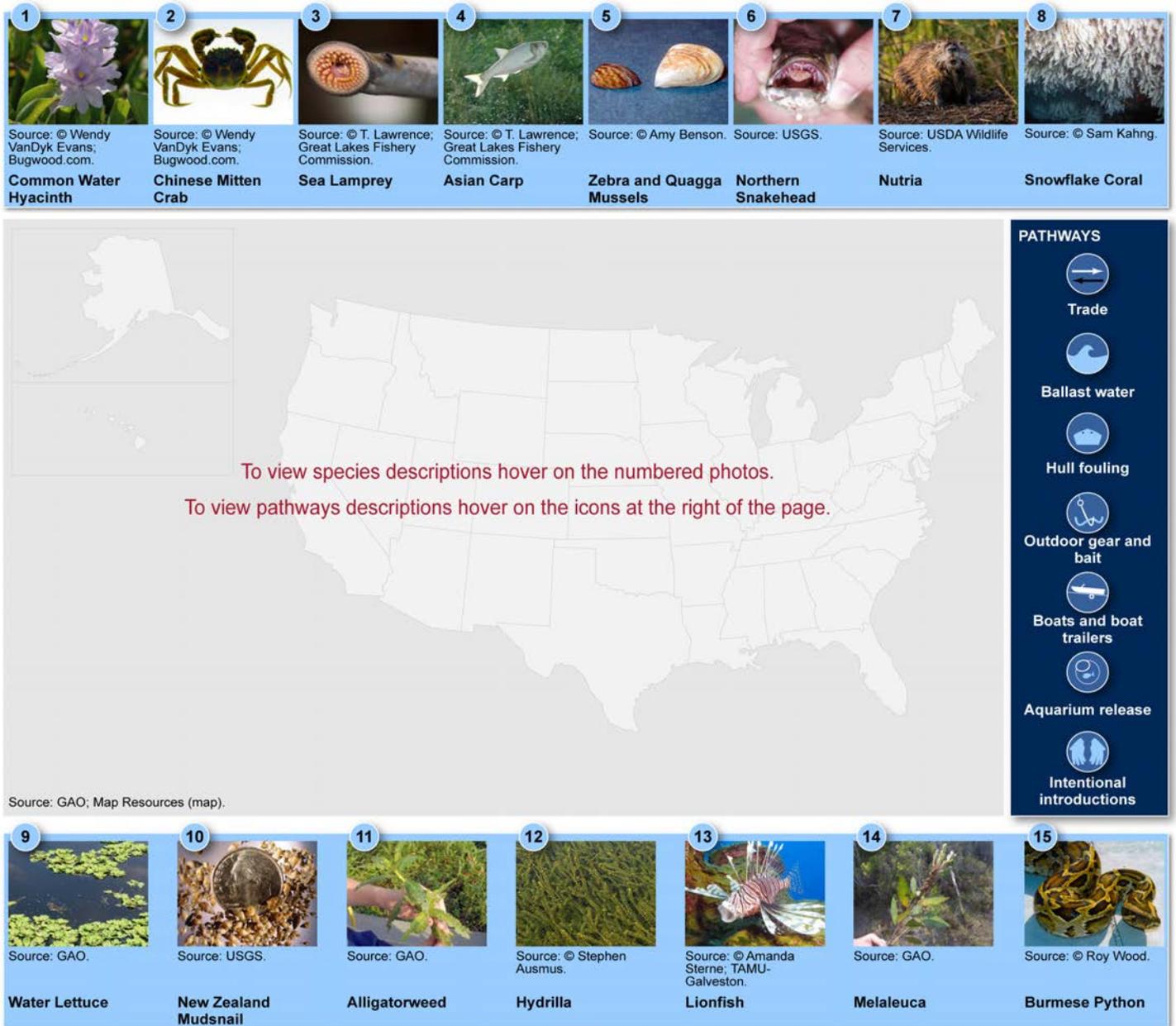
# Appendix II: Map of the United States with Examples of Aquatic Invasive Species and Their Reported Presence by State, and Common Pathways (Corresponds to fig. 1)

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Figure 3 shows examples of aquatic invasive species and their known locations (i.e., reported presence of a species) as well as common pathways of invasion (see interactive fig. 1) and includes the figure's rollover information. Table 5 provides descriptions of the aquatic invasive species used as examples, and table 6 provides descriptions of common pathways of invasion.

Appendix II: Map of the United States with Examples of Aquatic Invasive Species and Their Reported Presence by State, and Common Pathways (Corresponds to fig. 1)

Figure 3: Map of the United States with Examples of Aquatic Invasive Species and Their Reported Presence by State, and Common Pathways (Corresponds to fig. 1)



Sources: USGS; NOAA; USFWS; EPA; USDA; Hawaii Invasive Species Council; Nonindigenous Aquatic Species Database; PLANTS Database; Global Invasive Species Database; GAO. | GAO-16-49

Note: Species and pathways depicted in this interactive map are examples only and do not represent all aquatic invasive species or pathways. Species distributions, or "spread," in these maps are by state and represent the reported presence (not establishment) of a species in at least one, but not necessarily all, bodies of water in the state. Species distributions are based on the known

**Appendix II: Map of the United States with  
Examples of Aquatic Invasive Species and  
Their Reported Presence by State, and  
Common Pathways (Corresponds to fig. 1)**

distributions of each species, as of July 2015, according to the U.S. Geological Survey's (USGS) Nonindigenous Aquatic Species Database and the U.S. Department of Agriculture's Plants Database.

**Table 5: Description of Examples of Aquatic Invasive Species**

<b>Species</b>	<b>States affected</b>	<b>Species description</b>
Common Water Hyacinth	Alabama; Arizona; Arkansas; California; Colorado; Connecticut; Delaware; Florida; Georgia; Hawaii; Illinois; Kentucky; Louisiana; Massachusetts; Mississippi; Missouri; New Jersey; New York; North Carolina; Oregon; South Carolina; Tennessee; Texas; Virginia; Washington	A free-floating flowering plant that forms dense colonies that block sunlight and crowd out native species, and can clog water intake structures, canals, and irrigation systems, therefore damaging ecosystems, raising operation costs, and impacting navigation of waterways. Common Water Hyacinth has become established in the Southeast, Northeast, and along the Pacific Coast of the United States after being introduced from South America through the ornamental aquarium trade.
Chinese Mitten Crab	California; Connecticut; Delaware; Louisiana; Maryland; Michigan; New Jersey; New York; Ohio; Oregon; Washington	Crustaceans that threaten fisheries and aquatic ecosystems, cause clogging at water intake structures, and have the potential to transport disease to humans. Chinese Mitten Crabs are native to the Pacific Coasts of China and Korea. They were introduced to California, the Great Lakes, and the Mid-Atlantic Coast through ballast water discharge and the intentional or accidental release of these crabs purchased as food. Chinese Mitten Crabs are listed as an injurious species under the Lacey Act, making it illegal to import or transport them between states.
Sea Lamprey	Illinois; Indiana; Michigan; Minnesota; New York; Ohio; Pennsylvania; Wisconsin	Fish that prey on native fish by attaching to the outside of a native host fish and draining its nutrients, often killing the host fish. Sea Lamprey can devastate native fish populations and harm fishing industries. They are native to the Atlantic Ocean, but invaded the Great Lakes by passing through canals.
Asian Carp	Every state but Alaska, Montana, and Rhode Island	Collectively refers to four species: Grass Carp, Bighead Carp, Black Carp, and Silver Carp. These fish harm ecosystems, threaten native species, and are also a danger to human health when they jump out of the water, which can injure or distract recreational boaters. Found naturally in Russia and China, each species of Asian Carp was intentionally introduced in the United States to improve water systems. Specifically, Grass Carp were intended for vegetation control, Bighead and Silver Carp for water quality improvement, and Black Carp for aquaculture-related work on parasite control. However, these fish escaped their introduction areas and, as a group, Asian Carp have invaded lakes in nearly all U. S. states, including the invasion of Grass Carp into the Great Lakes. Bighead Carp, Black Carp, and Silver Carp are listed as injurious species under the Lacey Act, making it illegal to import or transport them between states.

**Appendix II: Map of the United States with  
Examples of Aquatic Invasive Species and  
Their Reported Presence by State, and  
Common Pathways (Corresponds to fig. 1)**

<b>Species</b>	<b>States affected</b>	<b>Species description</b>
Zebra and Quagga Mussels	Alabama; Arizona; Arkansas; California; Colorado; Connecticut; Delaware; Georgia; Illinois; Indiana; Iowa; Kansas; Kentucky; Louisiana; Maryland; Massachusetts; Michigan; Minnesota; Mississippi; Missouri; Nebraska; Nevada; New Jersey; New York; North Dakota; Ohio; Oklahoma; Pennsylvania; South Dakota; Tennessee; Texas; Utah; Vermont; Virginia; West Virginia; Wisconsin	Distinct species of mussels that cause similar types of damage to native ecosystems by destroying native fish habitat and food webs. Both species of mussels colonize on water supply pipes, which can impact hydroelectric and nuclear power plants, public water supply plants, and industrial facilities. These mussels also affect navigation and boating by increasing the weight on vessels and sinking navigation buoys. They arrived in the United States from the Black, Caspian, and Azov Seas through ballast water discharge and have spread across much of the continental United States from recreational boats and fishing gear. Zebra Mussels (but not Quagga Mussels) are listed as an injurious species under the Lacey Act, making it illegal to import or transport them between states.
Northern Snakehead	Arkansas; California; Delaware; Florida; Illinois; Maryland; Massachusetts; New Jersey; New York; North Carolina; Pennsylvania; Virginia	A fish that competes with native species for food and habitat and can eat small birds and mammals in addition to other fish and aquatic reptiles. It originates from China, Russia, and Korea and has invaded numerous areas of the north and Mid-Atlantic Coast of the United States as well as Florida, Illinois, Arkansas, and California. The U.S. Fish and Wildlife Service estimates that snakeheads arrived in U.S. waters as an import for the live food market and became invasive by intentional release from the aquarium trade. Northern Snakehead is listed as an injurious species under the Lacey Act, making it illegal to import or transport them between states.
Nutria	Alabama; Arizona; Arkansas; California; Delaware; Florida; Georgia; Idaho; Iowa; Kansas; Kentucky; Louisiana; Maryland; Minnesota; Mississippi; Missouri; Nebraska; Nevada; New Mexico; New York; North Carolina; Ohio; Oklahoma; Oregon; Pennsylvania; Tennessee; Texas; Virginia; Washington; West Virginia	An aquatic invasive mammal, resembling a beaver, which has destroyed habitat and threatened endangered species in many states. Nutria overgraze wetland habitats, destroying ecosystems. It is native to southern South America and was originally imported into Louisiana for fur farming, but escaped to areas including Louisiana, Maryland, Oregon, Texas, and Washington. In Maryland, populations of Nutria have largely been eliminated, according to Animal and Plant Health Inspection Service officials.
Snowflake Coral	Hawaii	A soft, nonreef forming coral that grows over hard surfaces, but also grows quickly over native corals and reef surfaces, which kills native reefs, especially the native black coral that supports a vibrant economy and ecosystem in Hawaii. Snowflake Coral also feeds on zooplankton that supports reef ecosystems. It is native to the Caribbean and was introduced through hull fouling to Hawaii.
Water Lettuce	Arizona; California; Colorado; Connecticut; Delaware; Florida; Georgia; Hawaii; Kansas; Louisiana; Maryland; Mississippi; Missouri; New Jersey; New York; North Carolina; Ohio; South Carolina; Texas	A floating aquatic invasive plant that grows into dense mats that can clog waterways and water intake structures. Scientists disagree as to whether the plant is native to the continental United States or originated from South America or Africa, but agree that it was likely transported by ballast water across the United States and is invasive in Hawaii.

**Appendix II: Map of the United States with  
Examples of Aquatic Invasive Species and  
Their Reported Presence by State, and  
Common Pathways (Corresponds to fig. 1)**

<b>Species</b>	<b>States affected</b>	<b>Species description</b>
New Zealand Mudsail	Arizona; California; Colorado; Idaho; Illinois; Minnesota; Montana; New York; Nevada; Ohio; Oregon; Pennsylvania; Utah; Washington; Wisconsin; Wyoming	A small freshwater snail that can cause declines in native snail populations by out competing them and can alter stream ecosystems through their rapid spread. The New Zealand Mudsail originates from New Zealand and adjacent small islands and has become established in the western United States and the Great Lakes. It is believed that the snail was introduced to the Great Lakes and western states through ballast water discharge and hull fouling.
Alligatorweed	Alabama; Arkansas; California; Florida; Georgia; Illinois; Kentucky; Louisiana; Mississippi; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia	A leafy aquatic plant that forms dense mats that crowd out native species and impedes recreational activities such as boating, swimming, and fishing. Alligatorweed originates from South America and was introduced through ballast water discharge in the southeastern United States and California.
Hydrilla	Alabama; Arizona; Arkansas; California; Connecticut; Delaware; Florida; Georgia; Indiana; Iowa; Kentucky; Louisiana; Maine; Maryland; Massachusetts; Mississippi; New Jersey; New York; North Carolina; Pennsylvania; South Carolina; Tennessee; Texas; Virginia; Washington	A submersed aquatic plant that can grow in thick mats and has the ability to regrow from small pieces of the plant. It can clog canals, irrigation, and structure vents. Hydrilla is listed as a Federal Noxious Weed, which restricts its importation, exportation, and interstate movement. According to U.S. Army Corps of Engineer officials, bacteria can grow on the surface of Hydrilla, such as <i>Aetokthonos hydrillicola</i> , and kill some waterfowl and Bald Eagles when they ingest the bacterium. Hydrilla is found in the Southeast, Northeast, Washington, California, Arizona, Indiana, and Iowa. It was introduced from Asia through the aquarium trade.
Lionfish	Alabama; Florida; Georgia; Louisiana; Mississippi; New Jersey; New York; North Carolina; Rhode Island; South Carolina; Texas; Virginia	A saltwater fish that preys on native fish communities and damages fragile coral ecosystems. Lionfish have several spines that contain potent venom that can administer a painful sting to humans and potential predators. As a result, it has few natural predators outside its native habitat. Lionfish are native in the western Pacific Ocean, Indian Ocean, and Red Sea; they are invasive in the western Atlantic Ocean, Caribbean Sea, and Gulf of Mexico. The arrival of Lionfish in the Atlantic Ocean is attributed to the aquarium trade and intentional release of pet Lionfish.
Melaleuca	Florida; Hawaii; Louisiana	An invasive tree that crowds out native species and causes damage to ecosystems, especially delicate wetlands. Melaleuca has adapted to grow at varying levels of water and each tree can hold millions of seeds, which allow this invasive tree to spread rapidly. It is originally from Australia and was brought to the United States as an ornamental plant used for erosion control. It is found in Hawaii, Florida, and Louisiana and is listed as a Federal Noxious Weed, which restricts its importation, exportation, or interstate movement.
Burmese Python	Florida	A constrictor snake that preys on and competes with native species. It is native to Southeast Asia and is invasive in Southern Florida. It was introduced by pet owners through escape or intentional release. The Burmese Python is listed as injurious wildlife under the Lacey Act, making it illegal to import or transport the snake between states.

Sources: USGS; NOAA; USFWS; EPA; USDA; Hawaii Invasive Species Council; Nonindigenous Aquatic Species Database; PLANTS Database; Global Invasive Species Database; GAO. | GAO-16-49

**Appendix II: Map of the United States with  
Examples of Aquatic Invasive Species and  
Their Reported Presence by State, and  
Common Pathways (Corresponds to fig. 1)**

**Table 6: Examples of Common Pathways**

Common pathways	Description of common pathways
Trade	The transport of items through commerce or other exchanges—by boat, airplane, the mail, or other transportation methods—increases the probability of introducing aquatic invasive species. Aquatic invasive species can be intentionally sent through trade or mail routes such as with Chinese Mitten Crabs for human consumption, or they can hitchhike by various transportation modes or on other species.
Ballast water	Water in a ship’s holding tank that is used for stability and safety. When ballast water is acquired in one body of water or location and released in another, the potential for invasive species to be released and impact coastal communities is immense. Ballast water discharge is a common pathway through which aquatic invasive species are introduced into U.S. waters. Ballast water can introduce aquatic invasive species at any port in fresh or saltwater around the United States. For example, the introductions of Quagga and Zebra Mussels have been attributed to ballast water discharges.
Hull fouling	The accumulation of organisms on a vessel’s exterior surfaces can occur on commercial, recreational, or military vessels. Also called biofouling, hull fouling can introduce aquatic invasive species into any water body where boats or other water vessels are used and species become detached from surfaces. Snowflake Coral, for example, was introduced to Hawaii through this pathway.
Outdoor gear and bait	Fishing and hiking gear, as well as live bait, from outdoor activities has been known to spread aquatic invasive species to new waters. Fishing equipment, diving gear, and other recreational items that are transported among water bodies increase the risk of introduction. Discarding unused live bait after fishing can also introduce species that disrupt their new ecosystems and eliminate competing native species. For example, New Zealand Mudsnails have been unintentionally transported on fishing equipment across water bodies throughout the United States.
Boats and boat trailers	Recreational boats and boat trailers are a common pathway of introduction for aquatic invasive species, such as Hydrilla. Small pieces of this plant can survive on trailers and boat motors and regrow in new locations. Boat trailers are a common pathway for species to move from one water body to another and numerous federal and state agencies are invested in preventing species’ spread through this pathway through the “Stop Aquatic Hitchhikers!” campaign and cleaning stations at boat launches across the United States. Boats and boat trailers, for example, are estimated to have spread Quagga and Zebra Mussels from the Great Lakes to other water bodies in the United States.
Aquarium release	Escape or intentional release of unwanted pets and ornamental or aquarium plants, as well as escape or intentional release of species from aquaculture farms, can be a source of invasive species in all parts of the country. Lionfish and Burmese Pythons, for example, were introduced to U.S. waterways after being released from aquaria.
Intentional introductions	Illegal stocking and the live food industry can introduce aquatic invasive species. Although it may be prohibited by law, people release fish into new waters for sport fishing, which can have severe impacts on ecosystems. The import of live, exotic plants and animals and the release of those species in new locations to create local live food sources is another pathway of intentional introduction. The Northern Snakehead, for example, is thought to have been introduced in Maryland from the live food industry after it became a popular food source.

Sources: USGS; NOAA; USFWS; EPA; USDA; Hawaii Invasive Species Council; Nonindigenous Aquatic Species Database; PLANTS Database; Global Invasive Species Database; GAO. | GAO-16-49

# Appendix III: Aquatic Invasive Species Activities Conducted by Task Force Member Agencies

Through our questionnaire to the 13 federal member agencies of the Aquatic Nuisance Species Task Force (Task Force), we requested that member agencies identify the types of aquatic invasive species activities they conducted during fiscal years 2012 through 2014, including how those activities fell within the seven general activity categories developed by the National Invasive Species Council. The Task Force member agency responses are summarized in table 7.

**Table 7: Aquatic Invasive Species Activities Conducted by Task Force Member Agencies, by Activity Category, Fiscal Years 2012 through 2014**

Agency	Prevention <sup>a</sup>	Early detection and rapid response <sup>b</sup>	Control and management <sup>c</sup>	Restoration <sup>d</sup>	Research <sup>e</sup>	Education and public awareness <sup>f</sup>	Leadership and international cooperation <sup>g</sup>
<b>Department of Agriculture</b>							
Animal and Plant Health Inspection Service	✓	✓	✓	✓	✓	✓	✓
U.S. Forest Service	✓	✓	✓	✓	✓	✓	✓
<b>Department of Commerce</b>							
National Oceanic and Atmospheric Administration	✓	✓	✓	✓	✓	✓	✓
<b>Department of Defense</b>							
U.S. Army Corps of Engineers	✓	✓	✓	✓	✓	✓	✓
<b>Department of Homeland Security</b>							
U.S. Coast Guard	✓		✓		✓	✓	✓
<b>Department of the Interior</b>							
Bureau of Land Management			✓	✓	✓	✓	
Bureau of Reclamation	✓	✓	✓	✓	✓	✓	✓
National Park Service	✓	✓	✓	✓	✓	✓	✓
U.S. Fish and Wildlife Service	✓	✓	✓	✓	✓	✓	✓
U.S. Geological Survey		✓			✓		✓
<b>Department of State</b>							
	✓	✓	✓	✓	✓	✓	✓
<b>Department of Transportation</b>							
Maritime Administration	✓				✓		
<b>Environmental Protection Agency</b>							
	✓	✓	✓	✓	✓	✓	
<b>Total number of agencies conducting activity</b>	11	10	11	10	13	11	10

Sources: GAO questionnaires of 13 Task Force member agencies. | GAO-16-49

Note: These seven activity categories were developed by the National Invasive Species Council Activities and reflect common activities agencies conduct along the continuum of an invasion of a species. These activity categories apply to all invasive species, including both aquatic and terrestrial species.

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**Appendix III: Aquatic Invasive Species  
Activities Conducted by Task Force Member  
Agencies**

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<sup>a</sup>*Prevention* includes actions taken to prevent the entry, establishment, dispersal, and dissemination of aquatic invasive species.

<sup>b</sup>*Early Detection and Rapid Response* includes actions taken to detect the presence of an aquatic invasive species and assess current and potential impact of the introduction. Rapid Response includes activities taken to eradicate, contain, or control a potentially invasive species introduced into an ecosystem before it spreads.

<sup>c</sup>*Control and Management* includes actions taken to lessen and manage the impact of aquatic invasive species within their established ranges and limit their spread.

<sup>d</sup>*Restoration* includes actions taken to assist the recovery and reestablishment of aquatic plant and animal communities that have been overwhelmed by aquatic invasive species.

<sup>e</sup>*Research* includes actions taken to identify, evaluate, control, and understand aquatic invasive species and their interactions with the biotic and abiotic elements of the environment.

<sup>f</sup>*Education and Public Awareness* includes actions taken to maintain and increase public awareness of aquatic invasive species and programs and to promote public actions that reduce the spread and impact of aquatic invasive species.

<sup>g</sup>*Leadership and International Cooperation* includes actions taken to provide leadership, oversight and coordination to maintain and enhance the capabilities to prevent, control, manage, and understand aquatic invasive species and invasion pathways with relevant state, local, and international partners, and provide for public input and participation.

# Appendix IV: Copy of GAO Questionnaire Disseminated to Task Force Member Agencies



United States Government Accountability Office

## Questions About Federal Activities and Spending to Address Aquatic Invasive Species

### Introduction

The United States Government Accountability Office (GAO), an independent, legislative branch agency, has been mandated to assess the federal costs of, and spending on, aquatic invasive species. As part of this review, we are requesting the 13 federal agencies that are members of the Aquatic Nuisance Species Task Force to complete this questionnaire to gather information about their activities and spending to address aquatic invasive species from fiscal year 2012 through fiscal year 2016.

To answer some of the questions, you may need to coordinate your responses with other staff familiar with your agency's aquatic invasive species activities and spending.

### Instructions

The questionnaire can be completed using MS Word and returned via e-mail to [MeleadyM@gao.gov](mailto:MeleadyM@gao.gov). To do this, first save this MS Word file containing the questionnaire to your computer. You may then enter your responses directly into that file.

To complete the questionnaire, follow these steps:

- Please use your mouse to navigate by clicking on the field or check box  you wish to answer.
- To select a check box or button, simply click on the center of the box.
- To change or deselect a check box response, simply click on the check box and the 'X' will disappear.
- To answer a question that requires you to write a comment, click on the answer box \_\_\_\_\_ and begin typing. The box will expand to accommodate your answer.
- When returning the questionnaire, please also attach any relevant supporting documentation in your e-mail response.

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**Appendix IV: Copy of GAO Questionnaire  
Disseminated to Task Force Member Agencies**

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**Definitions:**

**Aquatic species:** For purposes of this questionnaire, *aquatic species* are all animals and plants as well as pathogens or parasites of aquatic animals and plants totally dependent on aquatic ecosystems for at least a portion of their life cycle. We are using the phrase to include aquatic species in both marine and freshwater environments.

**Aquatic invasive species:** For purposes of this questionnaire, *aquatic invasive species* is being used synonymously with *aquatic nuisance species* to refer to nonindigenous species that threaten the diversity or abundance of native species, the ecological stability of infested waters, and/or any commercial, agricultural, aquacultural, or recreational activities dependent on such waters.

Definitions for key terms are provided in the questionnaire and listed in alphabetical order in [Attachment I](#).

If you have any questions about this questionnaire or have difficulty providing the information requested, please call or e-mail Michael Meleady at 206-287-4831 ([MeleadyM@gao.gov](mailto:MeleadyM@gao.gov)) or Natalie Block at 206-287-4853 ([BlockN@gao.gov](mailto:BlockN@gao.gov)).

Thank you in advance for your cooperation.

**I. Federal Activities and Spending on Aquatic Invasive Species in Fiscal Years 2012-2014**

1. During the time period from fiscal year 2012 through 2014, has your agency been involved in the following types of aquatic invasive species activities? (For more detailed definitions of each activity, see *Attachment I*.)

- a.  Yes  No. Prevention – activities to prevent the introduction of aquatic invasive species.
- b.  Yes  No. Early Detection and Rapid Response – activities taken to detect the presence of an aquatic invasive species and assess current and potential impact of the introduction.
- c.  Yes  No. Control and Management – includes actions taken to lessen and manage the impact of aquatic invasive species within their established ranges and limit their spread.
- d.  Yes  No. Restoration – includes actions taken to assist the recovery and reestablishment of aquatic plant and animal communities that have been overwhelmed by aquatic invasive species.
- e.  Yes  No. Research – includes actions taken to identify, evaluate, control, and understand aquatic invasive species and their interactions with the biotic and abiotic elements of the environment.
- f.  Yes  No. Education and Public Awareness – includes actions taken to maintain and increase public awareness of aquatic invasive species and programs, and to promote public actions that reduce the spread and impact of aquatic invasive species.
- g.  Yes  No. Leadership and International Cooperation – includes actions taken to provide leadership, oversight and coordination to maintain and enhance the capabilities to prevent, control, manage, and understand aquatic invasive species and invasion pathways with relevant state, local and international partners, and provide for public input and participation.
- h.  Yes  No. Other (please specify):

\_\_\_\_\_

**I. Federal Activities and Spending on Aquatic Invasive Species in Fiscal Years 2012-2014**

1. During the time period from fiscal year 2012 through 2014, has your agency been involved in the following types of aquatic invasive species activities? *(For more detailed definitions of each activity, see Attachment I.)*
- a.  Yes  No. Prevention – activities to prevent the introduction of aquatic invasive species.
  - b.  Yes  No. Early Detection and Rapid Response – activities taken to detect the presence of an aquatic invasive species and assess current and potential impact of the introduction.
  - c.  Yes  No. Control and Management – includes actions taken to lessen and manage the impact of aquatic invasive species within their established ranges and limit their spread.
  - d.  Yes  No. Restoration – includes actions taken to assist the recovery and reestablishment of aquatic plant and animal communities that have been overwhelmed by aquatic invasive species.
  - e.  Yes  No. Research – includes actions taken to identify, evaluate, control, and understand aquatic invasive species and their interactions with the biotic and abiotic elements of the environment.
  - f.  Yes  No. Education and Public Awareness – includes actions taken to maintain and increase public awareness of aquatic invasive species and programs, and to promote public actions that reduce the spread and impact of aquatic invasive species.
  - g.  Yes  No. Leadership and International Cooperation – includes actions taken to provide leadership, oversight and coordination to maintain and enhance the capabilities to prevent, control, manage, and understand aquatic invasive species and invasion pathways with relevant state, local and international partners, and provide for public input and participation.
  - h.  Yes  No. Other (please specify):  
\_\_\_\_\_

2. For each activity you answered "Yes" in question 1, briefly describe two or three examples of the most important activities your agency has been involved with during this period to address aquatic invasive species (*the comment box will expand as you enter text*). You may also include additional documentation, if available, as an attachment to your e-mail submission of the completed questionnaire.

a. Prevention:

\_\_\_\_\_

b. Early Detection and Rapid Response:

\_\_\_\_\_

c. Control and Management:

\_\_\_\_\_

d. Restoration:

\_\_\_\_\_

e. Research:

\_\_\_\_\_

f. Education and Public Awareness:

\_\_\_\_\_

g. Leadership and International Cooperation:

\_\_\_\_\_

h. Other activities (please specify):

\_\_\_\_\_

3. In the space provided below, please provide two or three of the most important examples of your agency's efforts to coordinate and collaborate with other entities on aquatic invasive species activities, including a brief description of the goal(s) of the effort, the aquatic invasive species of concern, the federal agencies and other entities involved, and the geographic area. You may also include additional documentation, if available, as an attachment to your e-mail submission of the completed questionnaire.

\_\_\_\_\_

**Appendix IV: Copy of GAO Questionnaire  
Disseminated to Task Force Member Agencies**

4. In the table below, please provide estimates of your agency's actual expenditures on aquatic invasive species activities in fiscal years 2012 through 2014. (Enter dollar amount; if none, enter '0'. If you are unsure or don't know, enter 'DK').

Activity	FY 2012 Actual Expenditures	FY 2013 Actual Expenditures	FY 2014 Actual Expenditures
a. Prevention			
b. Early Detection and Rapid Response			
c. Control and Management			
d. Research			
e. Restoration			
f. Education and Public Awareness			
g. Leadership and International Cooperation			
h. Other activities (please specify): _____			
<b>Total expenditures</b>			

5. For each "DK" response provided in question 4, if any, please provide an explanation for this response.

\_\_\_\_\_

6. Do the estimated expenditure amounts provided in question 4 include administrative costs, which are costs not directly incurred in undertaking aquatic invasive species activities, but rather are the general expenses incurred in controlling and directing the agency (including but not limited to human resource personnel, accounting, information technology, depreciation expenses for equipment, space used in administration, as well as supplies and utilities)?

Yes  No

a. If yes, please explain how you estimated these costs.

\_\_\_\_\_

b. If no, please explain why these were not included.

\_\_\_\_\_

7. Are there any activities related to aquatic invasive species undertaken by your agency which are not reflected in the estimated expenditures provided in response to question 4?

Yes  No

If you answered "Yes" to question 7, please provide a description, including specific examples, of these activities and describe why it was not possible to include estimates of your agency's expenditures for these activities.

\_\_\_\_\_

8. For your agency's fiscal year 2014 estimated expenditures on aquatic invasive species activities reported in question 4, in the table below please indicate the amount that was supported with funding from the following sources:

Funding Source	FY2014 Expenditures ( <i>Enter dollar amount; if none, enter '0'; if unsure or don't know, enter 'DK'</i> )
a. Appropriations	_____
b. User fees	_____
c. Fines & penalties	_____
d. Other revenue collections	_____
e. Transfers from other federal agencies (e.g., grants)	_____
f. Others ( <i>please specify</i> ): _____	_____
<b>Total expenditures</b>	

9. For each "DK" response provided in question 8, please provide an explanation for this response.

\_\_\_\_\_

**Appendix IV: Copy of GAO Questionnaire  
Disseminated to Task Force Member Agencies**

10. Did your agency provide funding for aquatic invasive species activities to the following entities in fiscal year 2014, and if yes, what was the estimated amount provided?

Entity	Did you provide funding to this entity in FY2014?	If yes, enter the FY2014 expenditures ( <i>Enter dollar amount; if none, enter '0'; if unsure or don't know, enter 'DK'</i> )
a. Other federal agency(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
b. State government(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Local government(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
d. Tribal government(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
e. Academic institution(s) (universities/colleges)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
f. Nonprofit organization(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
g. Private sector	<input type="checkbox"/> Yes <input type="checkbox"/> No	
h. Others ( <i>please specify</i> ): _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Total expenditures</b>		

11. For each "DK" response provided in question 10, please provide an explanation for this response.

\_\_\_\_\_

12. In fiscal year 2014, what were the top three aquatic invasive species on which your agency spent the most? Please provide the estimated amount of expenditures spent on all activities to address each of these aquatic invasive species. (Enter dollar amount; if none, enter '0'. If you are unsure, don't know, or unable to provide, enter 'DK').

Aquatic Invasive Species	FY2014 Expenditures (Enter dollar amount; if none, enter '0'; if unsure or don't know, enter 'DK')
a. _____	_____
b. _____	_____
c. _____	_____
<b>Total expenditures</b>	

If you entered "DK" for question 12, please provide an explanation for this response.

\_\_\_\_\_

13. For your response to question 12, are the estimated expenditures typical of your agency's annual spending on these aquatic invasive species compared to past years?

Yes  No

If you answered "No" to question 13, please provide an explanation for this response.

\_\_\_\_\_

**II. Data Reliability Questions**

The following set of questions relate to your responses to question 4, 8, 10, and 12 which asked for estimates of your actual expenditures on aquatic invasive species activities for fiscal years 2012 through 2014.

14. How did you develop the estimated expenditure amounts provided in question 4, 8, 10 and 12?

\_\_\_\_\_

15. What is the source(s) for the estimated expenditure amounts provided in question 4, 8, 10 and 12? (Please provide any additional documentation, if available, of the source(s) used as an attachment with your e-mail response.)

\_\_\_\_\_

16. Are there any challenges your agency encountered in developing the estimated expenditures for activities taken to address aquatic invasive species in question 4, 8, 10 and 12?

Yes  No

If you answered "Yes" to question 16, please describe these challenges.

\_\_\_\_\_

17. Are there any limitations or caveats that would affect GAO's intended use of the estimated expenditures provided in question 4, 8, 10 and 12?

Yes  No

If you answered "Yes" to question 17, please further explain these limitations or caveats.

\_\_\_\_\_

18. Has there been any review by your agency, such as by the Budget Office or Chief Financial Officer, to assess the quality and accuracy of the estimated expenditures provided in response to question 4, 8, 10 and 12?

Yes  No.

If you answered "Yes" to question 18, please explain the process and results of the review.

\_\_\_\_\_

19. Is there any additional information about the way your agency developed the estimated expenditures that would help inform our understanding of the amounts provided in question 4, 8, 10 and 12?

Yes  No.

If you answered "Yes" to question 19, please explain this response.

\_\_\_\_\_

**III. Projected Future Spending on Aquatic Invasive Species in Fiscal Years 2015-2016**

20. During the time period from fiscal years 2015 through 2016, does your agency anticipate being involved with the following types of aquatic invasive species activities? (For more detailed definitions of each activity, see [Attachment I](#).)

- a.  Yes  No. Prevention – activities to prevent the introduction of aquatic invasive species.
- b.  Yes  No. Early Detection and Rapid Response – activities taken to detect the presence of an aquatic invasive species and assess current and potential impact of the introduction.
- c.  Yes  No. Control and Management – includes actions taken to lessen and manage the impact of aquatic invasive species within their established ranges and limit their spread.
- d.  Yes  No. Restoration – includes actions taken to assist the recovery and reestablishment of aquatic plant and animal communities that have been overwhelmed by aquatic invasive species.
- e.  Yes  No. Research – includes actions taken to identify, evaluate, control, and understand aquatic invasive species and their interactions with the biotic and abiotic elements of the environment.
- f.  Yes  No. Education and Public Awareness – includes actions taken to maintain and increase public awareness of aquatic invasive species and programs, and to promote public actions that reduce the spread and impact of aquatic invasive species.
- g.  Yes  No. Leadership and International Cooperation – includes actions taken to provide leadership, oversight and coordination to maintain and enhance the capabilities to prevent, control, manage, and understand aquatic invasive species and invasion pathways with relevant state, local and international partners, and provide for public input and participation.
- h.  Yes  No. Other activities (please specify): \_\_\_\_\_

21. For each activity you answered "Yes" in question 20, briefly describe two or three examples of the most important activities your agency anticipates it will be involved with during this period to address aquatic invasive species (*the comment box will expand as you enter text*). You may also include additional documentation, if available, as an attachment to your e-mail submission of the completed questionnaire.

a. Prevention:

\_\_\_\_\_

b. Early Detection and Rapid Response:

\_\_\_\_\_

c. Control and Management:

\_\_\_\_\_

d. Restoration:

\_\_\_\_\_

e. Research:

\_\_\_\_\_

f. Education and Public Awareness:

\_\_\_\_\_

g. Leadership and International Cooperation:

\_\_\_\_\_

h. Other activities (please specify):

\_\_\_\_\_

**Appendix IV: Copy of GAO Questionnaire  
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22. Has your agency developed estimates of planned expenditures or budget request amounts for anticipated aquatic invasive species activities?

Yes  No. *If no, skip to question 29.*

If you answered "Yes" to question 22, in the table below, please provide your agency's estimates of planned expenditures and amounts in the President's Budget Request for aquatic invasive species activities for fiscal years 2015 and 2016. (Enter dollar amount; if none, enter '0'. If you are unsure or don't know, enter 'DK').

Activity	FY 2015 Planned Expenditures	FY 2016 President's Budget Request
a. Prevention		
b. Early Detection and Rapid Response		
c. Control and Management		
d. Research		
e. Restoration		
f. Education and Public Awareness		
g. Leadership and International Cooperation		
h. Other activities (please specify): _____		
<b>Total expenditures</b>		

23. How did you develop the estimates for the amounts provided in question 22?

\_\_\_\_\_

24. What is the source(s) for the estimated amounts provided in question 22? (Please provide any additional documentation, if available, of the source(s) used as an attachment with your e-mail response.)

\_\_\_\_\_

25. Are there any challenges or difficulties your agency encountered in providing estimates of planned expenditures and budget request amounts for activities to be taken to address aquatic invasive species in fiscal years 2015 and 2016?

Yes  No

If you answered "Yes" to question 25, please describe these challenges or difficulties.

\_\_\_\_\_

26. Are there any limitations or caveats that would affect GAO's intended use of the estimated amounts provided in question 22?

Yes  No

If you answered "Yes" to question 26, please further explain these limitations or caveats.

\_\_\_\_\_

27. Has there been any review by your agency, such as by the Budget Office or Chief Financial Officer, to assess the quality and accuracy of the estimates provided in response to question 22?

Yes  No

If you answered "Yes" to question 27, please explain the process and results of the review.

\_\_\_\_\_

28. Is there any additional information about the way your agency prepared the estimates provided in response to question 22 that would help inform our understanding of the estimates?

Yes  No

If you answered "Yes" to question 28, please explain this response.

\_\_\_\_\_

**V. Other Information**

29. Please use the space provided below to provide any additional details you may wish to share about your responses to this questionnaire or about your agency's activities and spending to address aquatic invasive species.

\_\_\_\_\_

30. Please provide the following information for the person GAO should contact for any follow-up questions we may have.

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Agency/Organization name: \_\_\_\_\_

E-mail: \_\_\_\_\_

Phone #: \_\_\_\_\_

**THANK YOU VERY MUCH FOR YOUR ASSISTANCE!**

**Attachment I**  
**Federal Spending on Aquatic Invasive Species Activities**  
**Definitions**

Aquatic Invasive Species: see the definition of aquatic nuisance species.

Aquatic Nuisance Species: nonindigenous species that threaten the diversity or abundance of native species, the ecological stability of infested waters, and/or any commercial, agricultural, aquacultural, or recreational activities dependent on such waters.

Aquatic Species: all animals and plants as well as pathogens or parasites of aquatic animals and plants totally dependent on aquatic ecosystems for at least a portion of their life cycle. Bacteria, viruses, parasites and other pathogens of humans are excluded.

Budget Estimates: estimates of budget authority, outlays, receipts, budget amendments, supplemental requests from the President, or other budget measures that cover the current budget and future years, as reflected in the President's budget and budget updates.

Control and Management: includes actions taken to lessen and manage the impact of invasive species within their established ranges and limit their spread. Measures to eliminate or reduce the effects of invasive species, including eradicating infestations, reducing populations of invasive species, preventing their spread, and/or mitigating their impact on the economy.

Education and Public Awareness: includes actions taken to maintain and increase public awareness of invasive species and programs, and to promote public actions that reduce the spread and impact of invasive species.

Early Detection and Rapid Response: includes actions taken to detect incipient invasions and assess the current and potential impact of invasions. Rapid Response: A systematic effort to eradicate, contain, or control a potentially invasive non-native species introduced into an ecosystem while the infestation of that ecosystem is still localized, and to eradicate and/or contain invasive species populations while they are still localized.

Expenditure: the actual spending of money; an outlay.

Fiscal Year: means the Federal Government's accounting period. It begins on October 1 and September 30, and is designated by the calendar year in which it ends.

Introduction: the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.

Leadership and International Cooperation: includes actions taken to provide leadership, oversight and coordination to maintain and enhance the capabilities to prevent, control, manage, and understand invasive species and invasion pathways with relevant state, local and international partners, and provide for public input and participation.

Pathways: are the varieties of ways that aquatic invasive species are introduced or spread intentionally or unintentionally through some form of human mediation into a new environment.

Prevention: includes actions taken to prevent the entry, establishment, dispersal, and dissemination of invasive species. Includes monitoring the international and domestic movement of invasive species, evaluating individual species for invasiveness prior to introduction, and identifying and interdicting pathways for introduction.

Projections: estimates of budget authority, outlays, receipts, or other budget amounts extending several years into the future. Projections are generally intended to indicate the budgetary implications of existing or proposed programs and legislation. Projections may include alternative program and policy strategies and ranges of possible budget amounts. Projections are not firm estimates of what will occur in future years, nor are they intended to be recommendations for future budget decisions.

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**Appendix IV: Copy of GAO Questionnaire  
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Research: includes actions taken to identify, evaluate, control, and understand invasive species and their interactions with the biotic and abiotic elements of the environment. Developing scientific knowledge, methods, and technologies to prevent, detect, control, and monitor invasive species or to restore native species and habitat.

Restoration: includes actions taken to assist the recovery and reestablishment of aquatic plant and animal communities that have been overwhelmed by invasive species.

Species: a group of organisms all of which have a high degree of physical and genetic similarity,

generally interbreed only among themselves, and show persistent differences from members of allied groups of organisms.

User Fee/User Charge: a fee assessed to users for goods or services provided by the federal government.

# Appendix V: Comments from the Department of the Interior



## United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, DC 20240

NOV 09 2015

Ms. Anne-Marie Fennell  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Ms. Fennell:

Thank you for providing the Department of the Interior (Department) the opportunity to review and comment on the draft Government Accountability Office (GAO) Report entitled, *Aquatic Invasive Species - Additional Steps Could Help Measure Federal Progress in Achieving Strategic Goals* (GAO-16-49). The Department generally agrees with the findings and concurs with the recommendation.

We appreciate GAO's review of the challenges faced by the interagency Aquatic Nuisance Species Task Force (ANSTF) in addressing and managing risks posed by the introduction and proliferation of aquatic invasive species.

The ANSTF coordinates among agencies and with other partners and stakeholders on a number of fronts to prevent the introduction, establishment, and spread of aquatic invasive species. For example, the ANSTF is working closely with a wide range of stakeholders to educate the public on the risks that these species can pose (e.g. *Stop Aquatic Hitchhikers*). Discussions with the boating industry are currently underway to develop new boat design standards that reduce the risk of boats moving invasive species from one body of water to another. The ANSTF through the U.S. Fish and Wildlife Service (USFWS) as co-chair is also working to fund state and regional initiatives being undertaken by the ANSTF regional panels as well as by individual states as part of their approved state management plans.

GAO recommended that the ANSTF develop a mechanism to measure progress toward its strategic goals and help meet certain statutory requirements.

The ANSTF developed an Activity Reporting Matrix that tracks member activities pursuant to the strategic plan. The ANSTF is currently evaluating the matrix to improve its utility. At its November 2015 meeting, the ANSTF agreed to track accomplishments in FY 15 using a modified activity tracking tool while the members continue to evaluate how best to track their activities going forward.

In addition, the ANSTF's new report to Congress is also in progress and undergoing final agency review. It is expected to be delivered to Congress in the coming months. Together, these efforts will help to provide the ANSTF with a mechanism to both measure and communicate progress toward its strategic goals, as called for in GAO's report.

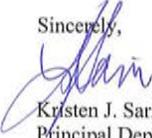
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**Appendix V: Comments from the Department  
of the Interior**

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Please note that we previously submitted a separate document with the Department's technical comments for your consideration when finalizing the report. If you have any questions, or need additional information, please contact me.

Sincerely,



Kristen J. Sarri  
Principal Deputy Assistant Secretary  
Policy, Management and Budget

# Appendix VI: Comments from the Department of Commerce



THE DEPUTY SECRETARY OF COMMERCE  
Washington, D.C. 20230

October 27, 2015

Ms. Anne-Marie Fennell  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Ms. Fennell:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report entitled *Aquatic Invasive Species: Additional Steps Could Help Measure Federal Progress in Achieving Strategic Goals* (GAO-16-49). Enclosed are the National Oceanic and Atmospheric Administration's programmatic comments to the draft report.

If you have any questions, please contact me or Jim Stowers, Acting Assistant Secretary for Legislative and Intergovernmental Affairs, at (202) 482-3663.

Sincerely,

A handwritten signature in blue ink, appearing to read "B. H. Andrews", with a long horizontal flourish extending to the right.

Bruce H. Andrews  
Deputy Secretary of Commerce

Enclosure

Department of Commerce  
National Oceanic and Atmospheric Administration  
Response to the Draft GAO Report Entitled  
*Aquatic Invasive Species: Additional Steps Could Help  
Measure Federal Progress in Achieving Strategic Goals*  
(GAO-16-49, October 2015)

**General Comments**

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report on aquatic invasive species (AIS). Please see below for our comments.

First, the report did not address sufficiently the initial objectives mandated by the Water Resources Reform and Development Act of 2014 (Pub. L. No. 113-121). Specifically, it partially addressed the first objective while the second and third objectives did not seem to be acknowledged. During this review, GAO received input from many agencies with respect to funding to address prevention strategies, and also received information with respect to each agency's capacity to address each activity category noted in Table 2 (see page 9 of the report). GAO should have been able to identify categories, in part, where Federal spending was adequate or not. This could be of value to the Congressional leaders receiving this report.

The Act directed GAO to assess the following key questions with regards to the Federal costs of and spending on AIS:

1. *Identification of current Federal spending and projected future costs of operation and maintenance related to mitigating the impacts of aquatic invasive species on federally owned or operated facilities.*
  - The report did not mention future costs to mitigate the impacts of AIS. Although it may be difficult to give specific numbers, some information could be speculated upon. For example, increased trade and climate change will almost certainly increase the number of non-native species entering the United States, requiring increased funds to adequately manage invasive species.
2. *Identification of current Federal spending on aquatic invasive species prevention.*
  - This information was completed for the years 2012, 2013, and 2014; however, analysis could go into more detail such as looking at declining or inclining trends, or comparing prevention funds to those within the other categories. GAO may be able to identify categories, in part, where Federal spending is adequate or not.
3. *Analysis of whether current Federal spending is adequate for the maintenance and protection of services provided by Federal facilities.*
  - This was not addressed in the report.
4. *Any other aspect deemed appropriate.*
  - GAO chose to focus on the Aquatic Nuisance Species Task Force (ANSTF) and its Strategic Plan rather than documenting other legislative and programmatic efforts (e.g., National Invasive Species Council (NISC), U.S. Army Corps of Engineer Research and Development Center, U.S. Environmental Protection Agency Vessel

General Permit, and U.S. Coast Guard Ballast Water Regulations) that target the prevention, control, and management of AIS.

Second, the report did not mention other Federal mandates that are intended to address AIS matters other than the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990, National Invasive Species Act (NISA) of 1996, and Executive Order 13112. As discussed during the July 14, 2015, GAO exit conference, NOAA noted that many Federal agencies receive additional directions or mandates to address or respond to AIS and their impacts. Also, NOAA mentioned that each agency must balance all these mandates each year when preparing spend plans. Balancing and responding to all these requirements affects ultimately the agencies' ability to adequately respond to this national issue.

Finally, an interactive figure (see Figure 1 on page 39 of the report) was accompanied with the draft report, but it presents information that may be misleading to the readers. The reported presence of a species in the U.S. Geological Survey's National Aquatic Species (USGS NAS) database does not mean that the species is established in the State's waters as the map portrays. Non-native species often fail to thrive following introduction or, in the case of *Caulerpa*, are eradicated through control operations. In addition, providing points for pathways on the map is confusing and inaccurate in some cases. This information may not be useful in context of the focus of the report and the recommendations.

#### **NOAA's Response to GAO Recommendation**

The draft GAO report states, "As the Aquatic Nuisance Species Task Force considers how to measure progress toward accomplishing its strategic goals, we recommend that the Task Force:"

**Recommendation 1:** "Develop and regularly use a tracking mechanism, to include elements envisioned for an operational plan and to largely meet requirements in the 1990 Act, including:

- specifying the roles and responsibilities of member agencies related to its strategic plan,
- tracking activities to be conducted by collecting information on those activities and associated funding,
- measuring progress member agencies have made in achieving its strategic goals, and
- reporting to Congress annually on the progress of its program."

**NOAA Response:** NOAA does not believe that this recommendation can address problems faced by the ANSTF. With respect to measuring progress, the ANSTF agreed to use an Activity Reporting Matrix (see May 2012 meeting minutes) to compile information with respect to progress. The matrix has not been updated since 2012 for several reasons: 1) uncertainties in funding have made it difficult for federal agencies to project future activities; 2) priorities shifted to complete the ANSTF report to Congress, which is in its final stages of review; and, perhaps most importantly, 3) the Executive Secretary of the ANSTF retired in 2013, and the position has not been filled permanently as of October 2015. As a result, the ANSTF has lacked dedicated staff support assigned to conduct this work. The Activity Reporting Matrix has assisted the ANSTF in compiling information with respect to progress.

The report does not address the underlying causes that have hindered the ANSTF efforts to track progress. The ANSTF operates within a limited budget provided through the U.S. Fish and Wildlife Service to conduct semi-annual meetings and provides a small fraction of the support needed to achieve goals identified by the regional panels and ANSTF-approved management plans and to implement programs that reflect the goals within the ANSTF Strategic Plan. In recent years, both the staff and resources dedicated to the Task Force have been reduced significantly. In order for tracking mechanisms to be developed, and sustained, the Task Force will require sufficient funding and support for this operation.

Improving ANSTF tracking process is not the sole solution to address the larger challenges of preventing and controlling invasive species nationally. Key challenges include the following: 1) declining or stagnant funds for an issue that continues to grow in magnitude, 2) a reauthorization of the 1990 (and 1996) Act to incorporate recent scientific knowledge and management approaches, and 3) focusing priorities on the prevention of new invasions rather than reacting to highly problematic, widespread species.

Here are examples of situations where information portrayed in the report could have evolved into recommendations:

*Page 1, first paragraph:*

The report noted that the impact to the environment and economy from AIS is difficult to measure and that the last comprehensive (all-taxa) economic study was the Pimental, et al., 2005 study. Given this information, it may be beneficial to address the gaps in pursuing an updated economic study that focuses on aquatic invaders and their impacts.

*Page 7:*

There is a brief mention of the status of the funds given to the regional panels, state aquatic nuisance species plans, and species control Plans. As a result of reduced funding there has been a reduction in the capability to act and respond to AIS matters nationwide. This issue poses a significant impact to the ability of the ANSTF to meet its mission and objectives. Highlighting this issue and noting recommendations to address the matter would be beneficial.

*Page 16:*

This section notes that preventative actions are not conducted in part because agencies are using resources to control existing populations. A recommendation that calls for a more balanced management approach would be beneficial.

*Page 18:*

The section discusses developing an early detection and rapid response framework and a plan for an emergency rapid response fund. A recommendation could be developed to implement this framework after it is finalized.

*Page 31, lines 3-6:*

The following is stated in the report: "Consequently, it is not possible to identify how much may be needed to fully address aquatic invasive species, both in terms of current invasions or measures to prevent future invasions. Capturing how much progress federal agencies have made

in combatting aquatic invasive species is similarly challenging.” With increasing pathways and new species being recognized as invasive, more funding will be required for the ANSTF. Unfortunately, this report is silent with respect to the funding gaps to address the emerging needs.

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# Appendix VII: GAO Contact and Staff Acknowledgments

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## GAO Contact

Anne-Marie Fennell, (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov).

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## Staff Acknowledgments

In addition to the individual named above, Alyssa M. Hundrup (Assistant Director), Natalie Block, Mark Braza, Greg Campbell, Virginia Chanley, Armetha Liles, Michael Meleady, Kelly Rubin, Jeanette Soares, Anne Stevens, Sara Sullivan, Kiki Theodoropoulos, and Tama Weinberg made key contributions to this report.

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