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Report to Congressional Committees

August 2000

INVASIVE SPECIES

Federal and Selected State Funding to Address Harmful, Nonnative Species

GAO

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Resources, Community, and
Economic Development Division

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Congressional Requesters

Invasive species—harmful nonnative plants, animals, and microorganisms[1]—pose a serious threat to U.S. agriculture and the environment, with estimated damages exceeding billions of dollars annually. Invasive species are found in all 50 states, with some states, such as Florida and Hawaii, more seriously affected than others. Examples of well-known invasive species include the zebra mussel (a mollusk that clogs water intake pipes and filtration equipment), the Asian long-horned beetle (an insect that bores into the trunk of a tree, outside the reach of pesticides), and purple loosestrife (a wetland plant that crowds out native plants and animals).

In February 1999, President Clinton issued Executive Order 13112 to help prevent the introduction of invasive species; provide for their control; and minimize their impact on the economy, the environment, and human health. The order established the Invasive Species Council, made up of the heads of eight federal departments with various responsibilities for addressing invasive species, to provide for national leadership and coordination in federal invasive species activities. Inadequate coordination between various departments and other entities was identified by organizations such as the Office of Technology Assessment and the Congressional Research Service as a weakness hindering efforts in the past. The order calls for the Council to carry out a number of duties, including issuing a National Invasive Species Management Plan by August 3, 2000, that, among other things, recommends performance-oriented goals, objectives, and specific measures of success for federal departments' invasive species programs.

[1]More specifically, invasive species are plant, animal, or microbial species that are not native to the United States or to the affected area (i.e., an ecosystem—a community of organisms and their environment) and whose introduction causes harm to the economy, the environment, or human health. This definition is largely based on the definition in Executive Order 13112.

To obtain a better understanding of the amount of government resources directed at the invasive species problem, you asked us to provide information on federal and selected state funding of invasive species activities. Specifically, you asked that we identify (1) federal funding, by department[2] and activity (such as prevention and control), for invasive species activities in fiscal years 1999 and 2000[3] and obtain the departments' views on the effectiveness of coordination efforts with states and other entities; (2) funding by selected states for invasive species activities in fiscal years 1999 and 2000 and obtain the states' views on the effectiveness of coordination with federal departments and other entities; and (3) actions taken by the Invasive Species Council to implement Executive Order 13112.

To identify federal funding for invasive species activities, we surveyed 10 federal departments—the 8 Council members (the departments of Agriculture, Commerce, Defense, the Interior, State, the Treasury, and Transportation, and the Environmental Protection Agency), as well as the Smithsonian Institution and the National Science Foundation. Combined, these departments account for the vast majority of federal resources spent on invasive species activities. Although all 10 federal departments and 7 states responded to our survey, Treasury was unable to provide information on the amount of funding it obligated for invasive species activities and Defense provided a partial response.[4]

To identify invasive species funding by selected states, we surveyed California, Florida, Hawaii, Idaho, Maryland, Michigan, and New York—seven states that have experienced serious problems with invasive species,

[2]In this report and in our survey of federal departments, we use the term "department" to refer to the departments of Agriculture, Commerce, Defense, the Interior, State, Transportation, and the Treasury; the Environmental Protection Agency; the National Science Foundation; and the Smithsonian Institution.

[3]Funding data for fiscal year 1999 are actual obligations (federal) and actual expenditures (states); data for fiscal year 2000 are estimated obligations (federal) and estimated expenditures (states). Also, although the fiscal year of the federal government and many states covers different periods (beginning in October for the federal government and July for many states), in this report we use the term "fiscal year" for each entity's fiscal year—whatever that period may be.

[4]While Treasury's Customs Service engages in some invasive species-related activities, it does not track obligations for these activities separately from its other enforcement activities. Also, Defense provided only a partial response because two of its components (the Air Force and the Army) did not provide information. According to a Defense official, these components are responsible for the largest amount of lands under Defense stewardship.

are regarded as having strong invasive species programs, and/or provided geographical representation for our survey. Because the total amount of funding for all 50 states is unknown, we could not determine the extent to which the funding reported by these 7 states is representative of all 50 states. To address the actions taken by the Invasive Species Council, we interviewed Council representatives and reviewed Council documents. Appendix I details our scope and methodology.

Results in Brief

The federal departments responding to our survey reported obligating over half a billion dollars—$513.9 million and $631.5 million in fiscal years 1999 and 2000, respectively—for activities related to invasive species. The U.S. Department of Agriculture provided far and away the largest percentage of these funds, 89 percent ($459 million) in fiscal year 1999 and 88 percent ($556.4 million) in fiscal year 2000. The eight other federal departments that reported funding information provided between 0.2 percent and about 5 percent of the federal funding directed toward invasive species over the 2 years. Activities to prevent the introduction of invasive species received the greatest percentage of federal funding—about 51 percent and 49 percent in fiscal years 1999 and 2000, respectively. Most federal departments rated coordination with state governments as either “good” or “fair.”

The seven states we surveyed reported spending between $1.6 million and $94.5 million in fiscal year 1999 (for a total of $195.3 million) and between $1.8 million and $127.6 million in fiscal year 2000 (for a total of $232.6 million) on invasive species activities. In both years, Florida spent the greatest amount of funds, $94.5 million and $127.6 million, followed by California, $82.6 million and $87.2 million. Most of the seven states directed the largest percentage of their funding in both years toward activities to control invasive species. Most of the seven states rated coordination with federal departments as “good.”

The Invasive Species Council has been slow in getting off the ground, although it has initiated several actions to implement Executive Order 13112. As of August 18, 2000, 18 months after the executive order was issued, the Council had filled two of its four permanent staff positions and had nearly completed filling the remaining two positions; when it does, it will have an organizational infrastructure to oversee implementation. The Council has also drafted and is receiving comments on its National Invasive Species Management Plan, which is expected to be issued later in the year—several months after the date stipulated in the executive order. In

addition, it has established an advisory committee and six working groups that have provided information and advice to the Council. Further, it is in the process of developing a Web site to provide a broad range of information on invasive species and is sponsoring workshops to promote information sharing.

Background

Invasive Species Have Caused Severe Ecological and Economic Harm

The impact of invasive species in the United States is widespread, and their consequences for the economy and the environment profound. They affect peoples' livelihoods, placing sustainable development and industries such as agriculture, ranching, and fisheries at significant risk: Depending on the species, they have increased pest control costs, contaminated grain, reduced the grazing capacity of rangelands, lowered water tables, and displaced native plants and wildlife habitats. Invasive species are ubiquitous. Hundreds and perhaps thousands have established populations in the United States, with almost every area of the country having at least one highly damaging invasive species.

Most invasive species arrive in conjunction with human activity, transport, or habitat modification that provides new opportunities for species' establishment. They may arrive as contaminants of bulk commodities, packing materials, shipping containers, or ships' ballast. While many invasive species have been introduced into the United States unintentionally, others have been brought in by design. For example, kudzu—a rapidly growing invasive vine that thrives in the southeastern United States—was brought in from Japan as an ornamental plant and was used by the U.S. Department of Agriculture in the 1930s to control soil erosion. Other invasive species are imported as crops, livestock, pets, or aquaculture species and later escape or are released into the environment. Not all nonnative species are invasive, however. Many nonnative species, such as cattle, wheat and soybeans, many fruits, and ornamentals (such as tulips and chrysanthemums), have been largely beneficial and their propagation controllable.

While invasive species have caused considerable damage, their precise economic impact has been poorly documented. No single organization accumulates comprehensive data on all types of invasive species, and assessing the dollar impacts on habitat—such as forests, wildlands, hay and pasturelands, and aquatic sites—is very difficult. According to a 1993 study by the Office of Technology Assessment, the number and impact of invasive species are chronically underestimated, especially for species that do not damage agriculture, industry, or human health.[5] The office estimated that damage from 79 invasive species totaled about $97 billion from 1906 through 1991. It noted that this figure is likely only a fraction of the total costs during the period because the figure includes only a small percentage of invasive species; estimates for the economic effects of most invasive species—including agricultural weeds, one of the most costly groups—were unavailable. More recently, in 2000, Cornell University scientists put total economic losses and associated control costs at approximately $137 billion a year.[6] They noted that this estimate was greater than the Office of Technology Assessment's because it included over 10 times the number of species and found higher costs reported in the literature for some of the same species identified by the office.

Although the precise total costs of invasive species are uncertain, there is little question that some cause serious damage. For example, about 400 of the 958 species listed as threatened or endangered under the Endangered Species Act are considered at risk, primarily because of competition with and/or predation by invasive species inhabiting the same areas, according to the Cornell scientists. A variety of ecological factors can enable a nonnative species to become ubiquitous: a lack of natural enemies, artificial or disturbed habitats that provide favorable conditions for propagation, and/or the introduction of a highly adaptable species or a species that is a very effective colonizer in its new ecosystem. The following are examples of some well-known invasive species:

[5]*Harmful Non-Indigenous Species in the United States*, Office of Technology Assessment, OTA-F-565, Sept. 1993.

[6]David Pimentel, et al., "Environmental and Economic Costs of Nonindigenous Species in the United States," *BioScience,* Jan. 2000, pp. 53-65.

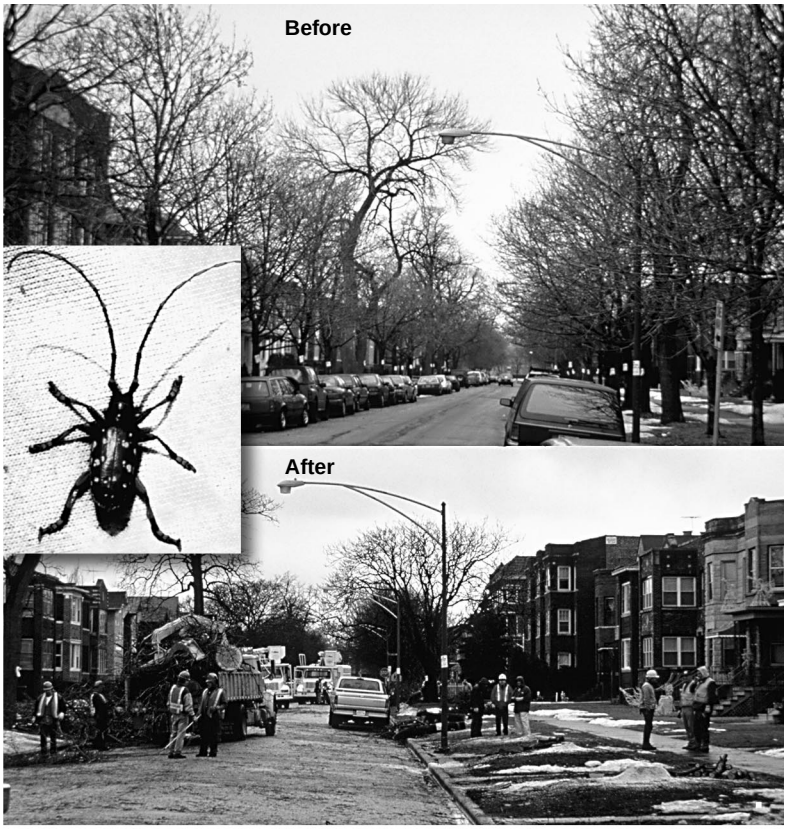
- **The zebra mussel** most likely entered the United States as mussel larvae in ballast water that was released into the Great Lakes by ships traveling from Europe. Zebra mussels invade and clog water intake pipes and water filtration and electric generating plants. Furthermore, large zebra mussel populations reduce food and oxygen for native fauna: They have been observed to completely cover native mussels, clams, and snails, thereby further threatening these species. The cost of zebra mussel prevention and remediation for electrical generation, water treatment, and industrial facilities is estimated at $100 million a year, according to the Cornell University study.[7]
- **The Asian long-horned beetle** is a recent arrival. It came to the United States about 4 years ago, most likely in packing material or pallet wood from China. According to Agriculture's Forest Service, the spread of this insect could have a significant economic, social, and ecological impact on urban, rural, and forest areas in North America. This beetle is particularly troublesome because it bores deep within a tree, where it cannot by reached by pesticides. The only known treatment is to destroy the infected tree, as well as other trees nearby that often show no signs of infestation. According to the U.S. Department of Agriculture, damages from an infestation in New York State in 1996 resulted in the removal of many trees and cost the state and federal government over $5 million.
- **Purple loosestrife** is attractive in appearance (it has showy purple flowers and is sold as an ornamental in some areas), but can have devastating consequences. Arriving from Europe in the early 1800s, it has infested wetlands in at least 42 states. It crowds out native wetland plants that are an important source of food for waterfowl and has spread through irrigation and river systems in the West. Once it gains a foothold, it is almost impossible to eradicate. The Cornell study estimated that this plant cost the U.S. economy $45 million a year.

Figure 1 shows the impact of these three species on the environment.

[7]David Pimentel, et al., "Environmental and Economic Costs of Nonindigenous Species in the United States," pp. 53-65.

Figure 1: Worker Removing Zebra Mussels From Water Intake Pipes, Purple Loosestrife, and Destruction of Trees Caused by Asian Long-Horned Beetles

Worker standing inside a water intake pipe removing zebra mussels



Asian long-horned beetle and street before and after an infestation

Man in a field of purple loosestrife

Sources: Cluster of zebra mussels, J. Ellen Marsden, Lake Michigan Biological Station; Worker removing zebra mussels from water intake pipes, Ron Peplowski, Detroit Edison, Monroe Michigan Power Station; Purple loosestrife and Asian long-horned beetle and resulting damage, U.S. Department of Agriculture's Animal and Plant Health Inspection Service.

Federal and State Governments Are Involved in a Variety of Invasive Species Activities

The federal departments and states we surveyed are involved, to varying degrees, in eight key activities that address various aspects of the invasive species problem.[8] (See table 1 for a description of these activities.) The U.S. Department of Agriculture has the largest federal role in combating invasive species as a result of its (1) authority to quarantine and conduct port-of-entry inspections, (2) management of over 190 million acres of public lands, and (3) large control projects related to agricultural pests.

Because invasive species often cross territorial and governmental boundaries, federal, state, and local governments and other entities sometimes cooperate in implementing invasive species programs. For example, Agriculture's Animal and Plant Health Inspection Service works with state and local agencies, as well as with private landowners, to eradicate newly introduced weeds on private lands. Table 1 outlines the major invasive species activities, and appendixes II and III provide further information on federal and state invasive species activities.

Table 1: Major Invasive Species Activities

Activity	Definition
Prevention	Activities to prevent the introduction 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.
Detection	Surveillance for the existence and location of an invasive species that may have been introduced.
Control (management)	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.
Monitoring	Ongoing research and surveys to track the presence and status of invasive species over time and at varying geographic locales to evaluate the impact of such species on ecosystems and to evaluate the effectiveness of prevention, control, and restoration activities.

[8]A ninth activity was a miscellaneous category: "other invasive species activities."

(Continued From Previous Page)

Activity	Definition
Restoration	Activities to reinstate ecosystem structure and function that have been affected by invasive species, using native species or noninvasive, nonnative species where possible.
Research and development	Developing scientific knowledge, methods, and technologies to prevent, detect, control, and monitor invasive species or to restore native species and habitat.
Education, outreach, partnerships, and cooperative activities	Actions to support public education programs and cooperative efforts with stakeholders. Includes actions in support of international agreements with foreign nations and international organizations.
Information management	Activities to facilitate access to and exchange of information on invasive species, including information on the distribution and amount of invasive species; life histories of such species and invasive characteristics; economic, environmental, and human health impacts; management techniques; and laws and programs for management, research, and public education. Includes storage of data and information-sharing activities, such as providing access to databases or other forms of information.

Executive Order 13112 Is Intended to Improve the Management of Invasive Species Activities

Executive Order 13112—signed by President Clinton on February 3, 1999—highlights invasive species as a serious problem and creates a structure and process for identifying federal gaps in managing it.[9] The order established an Invasive Species Council, co-chaired by the Secretaries of Agriculture, Commerce, and the Interior. Major duties of the Council are to issue, by August 3, 2000, a National Invasive Species Management Plan; evaluate its progress in achieving the plan's goals; and update the plan every other year.

Other Council responsibilities include (1) ensuring that federal departments' invasive species activities are coordinated, complementary, cost-efficient, and effective, and rely, as appropriate, on existing invasive species-related organizations (including the Aquatic Nuisance Species Task Force, Federal Interagency Committee for Management of Noxious and Exotic Weeds, and Committee on Environment and Natural Resources); (2) encouraging planning and action to achieve the plan's goals and objectives; (3) developing recommendations for international cooperation; (4) developing guidance for federal agencies on preventing and controlling invasive species; (5) helping to develop a coordinated network among federal agencies to document, evaluate, and monitor impacts from invasive

[9]Executive Order 13112 replaces Executive Order 11987 (1977).

species; and (6) helping to establish an up-to-date information-sharing system that uses the Internet. Appendix IV provides comments by federal and state officials on changes needed in the executive order were the Congress to enact legislation incorporating its provisions.

Federal Funding for Invasive Species Activities Totaled Over Half a Billion Dollars in Fiscal Years 1999 and 2000

The federal departments we surveyed reported that they obligated a total of $513.9 million in fiscal year 1999 for invasive species activities; for fiscal year 2000, reported obligations were $631.5 million. Agriculture was the greatest source of federal funding for these activities, accounting for 89 and 88 percent of the total, respectively—$459 million in fiscal year 1999 and $556.4 million in fiscal year 2000. The eight other federal departments reporting funding information provided between 0.2 percent and about 5 percent of the federal funding directed toward invasive species over the 2 years. As shown in table 2, Interior and Defense provided the second and third largest amounts of funding—Interior accounting for 4 percent and 5 percent in fiscal years 1999 and 2000, respectively, and Defense accounting for 2 percent in both years.[10] See appendix V for a summary of department responses to the survey.

[10] Defense provided only a partial response to this question because two of its components (the Air Force and the Army) did not provide information.

Table 2: Obligations for Invasive Species Activities, by Federal Department, Fiscal Years 1999 and 2000[a]

Dollars in millions

Federal department	Fiscal year 1999	Fiscal year 2000
Agriculture	$459.0	$556.4
Interior	18.1	31.1
Defense	12.5	14.5
State	7.5	9.2
Commerce	5.4	5.1
National Science Foundation	4.7	5.2
Transportation	3.5	4.0
Smithsonian Institution	2.1	1.9
Environmental Protection Agency	1.1	4.1

[a]Treasury was unable to provide information on its obligations for invasive species activities.

Source: GAO's survey of 10 federal departments.

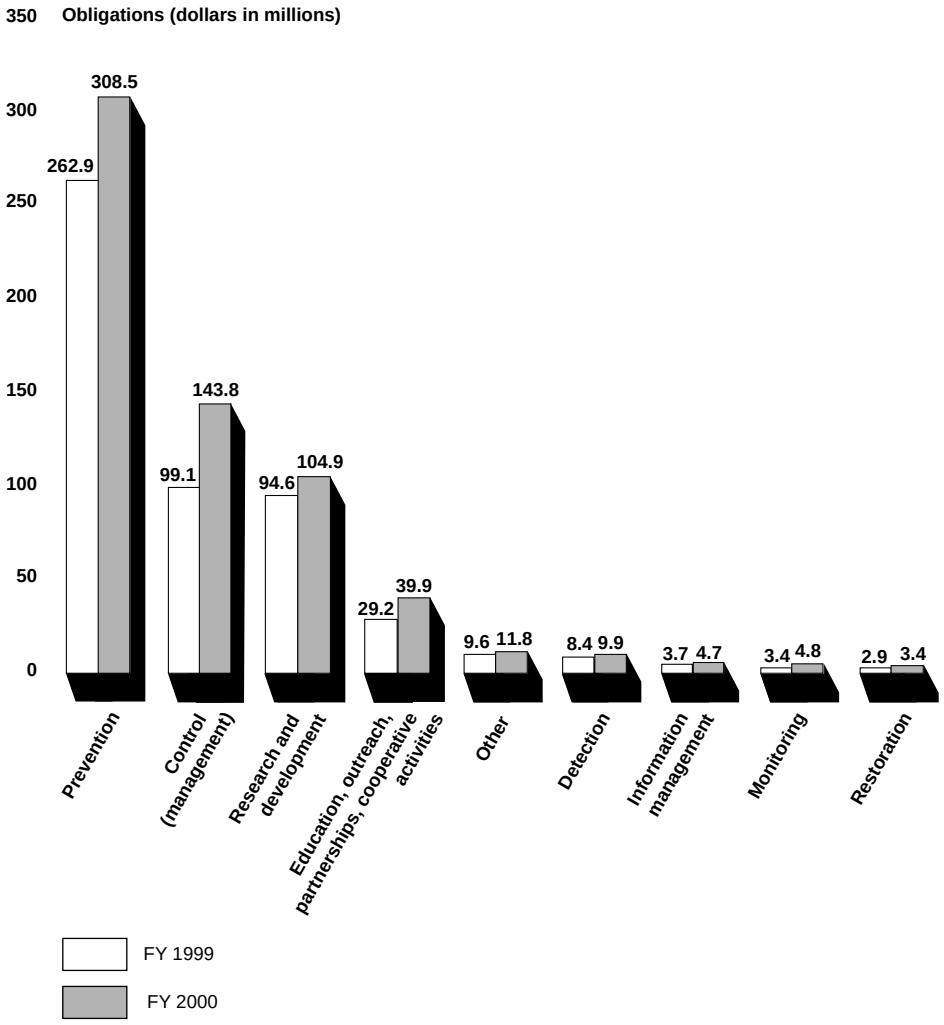
In addition to direct appropriations, Agriculture, the Smithsonian Institution, and Defense reported receiving user fees[11] to support their fiscal year 1999 invasive species obligations. User fees provided about 14 percent of Agriculture's, 4 percent of the Smithsonian Institution's, and 2 percent of Defense's invasive species obligations for that year.

Prevention Activities Accounted for About Half the Federal Funding for Invasive Species Activities

In fiscal years 1999 and 2000, about half (51 percent and 49 percent, respectively) of the total federal obligations for invasive species were directed toward prevention activities. Activities to control invasive species received the next highest percentage of funding—about 19 percent and 23 percent, respectively, in the 2 fiscal years—followed by research and development, which received about 18 percent of the total funding in fiscal year 1999 and about 17 percent in the following year. (See fig. 2 for the total amount of federal funding obligated for each invasive species activity for fiscal years 1999 and 2000.)

[11]For example, Agriculture's Animal and Plant Health Inspection Service collects user fees for agricultural quarantine inspection and enforcement activities—activities that are key in preventing the introduction of new invasive species into the United States.

Figure 2: Federal Obligations by Invasive Species Activity, Fiscal Years 1999 and 2000



Source: GAO's survey of 10 federal departments.

Regarding which invasive species activity most needed additional attention from the respondent's department, half of the departments (four of eight respondents) chose control activities; two chose prevention; and two chose research and development.

Terrestrial Arthropods: The Category of Invasive Species That Received the Most Federal Funding

In fiscal year 1999, about 55 percent ($284.5 million) of the $513.9 million in reported federal obligations for invasive species were directed toward specific categories of invasive species, rather than toward activities addressing multiple categories of species. Over half ($154.5 million) of the funding for specific categories of invasive species went to terrestrial arthropods (a category of invertebrates—primarily insects—that includes fruit flies and Asian long-horned beetles). The plant category, which includes terrestrial noncrop (such as purple loosestrife), terrestrial crop (crop weeds such as johnsongrass), and aquatic plants, received the second greatest amount of funding—$70.7 million, or about 25 percent of the funding for specific categories of invasive species. As shown in table 3, microorganisms and diseases was the third highest category, receiving about 12 percent ($33.1 million) of the funding for specific categories.

Table 3: Federal Funding for Categories of Invasive Species, Fiscal Year 1999

Dollars in millions

Category of invasive species	Total federal funding
Terrestrial arthropods	$154.5
Plants	70.7
Animal and plant microorganisms/diseases	33.1
Fish and aquatic invertebrates	20.4
Reptiles and amphibians	4.8
Mammals	0.8
Birds	0.2

Source: GAO's survey of 10 federal departments.

Regarding which individual invasive species received the greatest amount of funding in fiscal year 1999, five species were cited by the seven departments that responded to this question. Agriculture directed its greatest funding for a single invasive species—$36.2 million—toward fruit flies. Defense and Commerce cited zebra mussels (funded at $2.7 million and $1.0 million, respectively); the Interior and the Smithsonian Institution reported that brown tree snakes[12] received the greatest amount of their funds ($1.9 million and $0.2 million, respectively). State directed the largest amount of its funding ($7.5 million) toward sea lampreys (an eel-like ocean fish that fastens onto other fish and eats until sated). See appendix V for the complete responses to this question.

Many Entities Received Federal Funds for Invasive Species Activities

Federal departments provided invasive species funding to a variety of entities, including other federal departments; state and local governments; universities or colleges; private nonprofit organizations; individual researchers; international organizations (e.g., the Great Lakes Fisheries Commission—United States and Canada); and private landowners. Four of the 10 departments reported that individual researchers received the greatest amount of their funds for invasive species activities. The other six departments spread their responses among five categories: other federal departments, state governments, universities or colleges, international organizations, and private landowners.

Federal Departments Most Often Rated Coordination Efforts With States as Either Good or Fair

Most federal departments rated coordination with state governments on invasive species issues as good or fair; at the same time, most respondents rated coordination within their own department, between departments, and between their department and universities/colleges as either good or excellent. As shown in table 4, coordination between departments and local governments received one of the lowest ratings. One department stated that improved coordination was needed at local levels. It noted, for example, that weed eradication projects may need to involve several federal departments, state and county governments, and private landowners, and that failure to involve any one of these entities could result in failure.

[12]A snake that has caused major disruptions to power transmission, telephone service, computers, tourism, and military operations in Guam. Hawaii and the Commonwealth of the Northern Mariana Islands are also believed to be at particular risk of introduction of this invasive species.

Table 4: Federal Departments' Views on Coordination Between a Variety of Entities

	Number of department responses[a]					
Coordinating entities	**Excellent**	**Good**	**Fair**	**Poor**	**Very poor**	**Not applicable**
Between governmental entities						
Units within own department	3	4	2			
Federal departments	1	6	2			
Federal departments and *state governments*	1	4	4			
Federal departments and *local governments*	1	2	2	2		2
Between federal departments and nongovernmental entities						
Federal departments and *universities/colleges*	2	5		1		1
Federal departments and the *private sector*	1	3	3	1	1	
Between federal departments and other reported entities						
International organizations		1	1			
Interest groups			1			
Irrigation districts	1					
Tribal governments	1					
Foreign governments	1					
Other governments		1				

[a]Nine federal departments responded to this question.

Source: GAO's survey of 10 federal departments.

Funding for Invasive Species Varied Considerably Among the Seven States

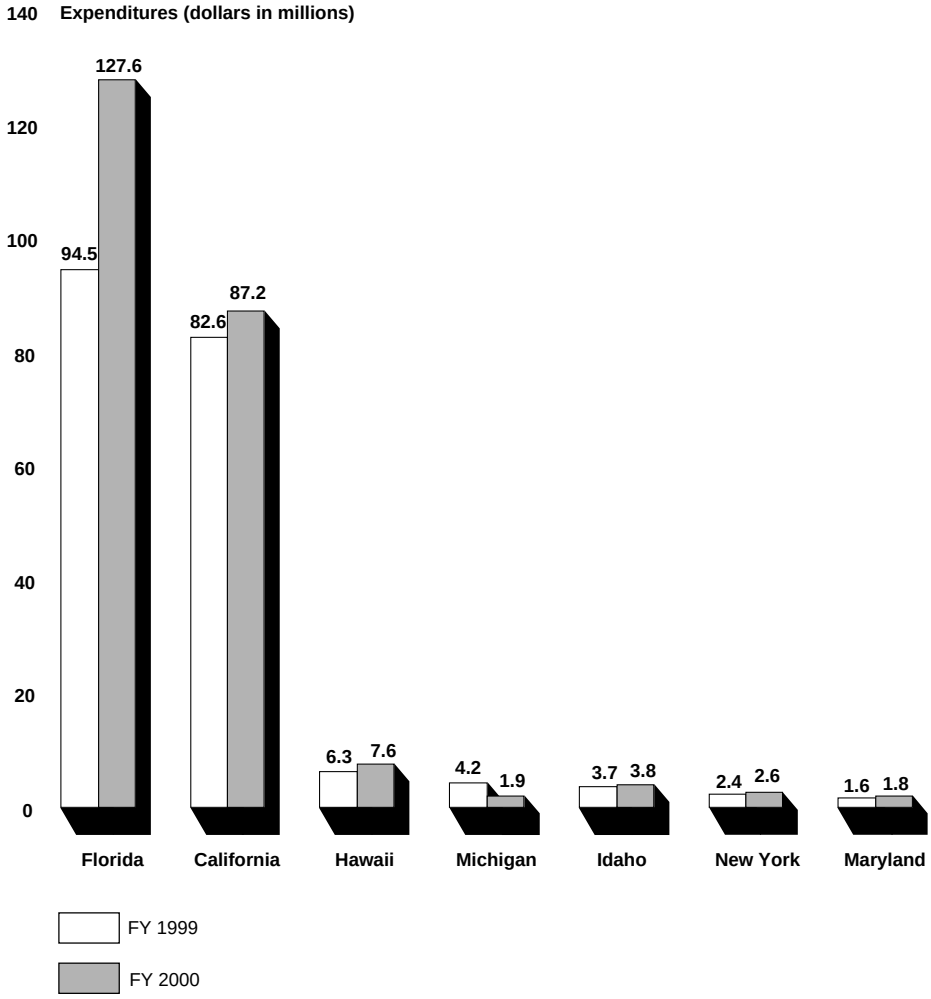
In fiscal year 1999, the state governments we surveyed reported expenditures for invasive species activities ranging from $1.6 million to $94.5 million (for a total of $195.3 million); in fiscal year 2000, the range was $1.8 million to $127.6 million (for a total of $232.6 million). Appendix VI provides a summary of state responses to the survey.

Florida and California Had the Highest Invasive Species Expenditures

Florida and California each spent considerably more than the other five states on invasive species activities. In fiscal years 1999 and 2000, Florida reported spending $94.5 million[13] and $127.6 million, respectively; California's reported spending for those years was $82.6 million and $87.2 million. The expenditures for Hawaii, Michigan, Idaho, New York, and Maryland ranged from $1.6 million to $7.6 million for the 2 years, as shown in figure 3.

[13]Florida's fiscal year 1999 expenditures were overstated by up to $3.7 million because the precise amount of invasive species funding by activity could not be separated out for several programs that covered areas other than invasive species.

Figure 3: Seven States' Expenditures for Invasive Species Activities, Fiscal Years 1999 and 2000



Source: GAO's survey of seven states.

In addition to state government expenditures, several other government entities provided invasive species funding to many of the seven states. (This funding was not included in the funding reported by the states.) The largest nonstate funding source was the federal government, which provided about $0.3 million to $31.5 million to each of the seven states in fiscal years 1999 and 2000.[14] Counties were a source of government funding for three states—Idaho received $3.8 million and $4.9 million; Florida, $1.3 million and $1.5 million; and Maryland, $0.3 million in each of the 2 years.

State Funding Focused on Control Activities

Of the eight major activities, those directed toward controlling invasive species received the most funding from every state except California (and Michigan in fiscal year 2000), as shown in table 5.

Table 5: Invasive Species Activities Receiving the Greatest Funding from Each State, Fiscal Years 1999 and 2000

Dollars in millions

	Fiscal Year 1999			Fiscal Year 2000		
State	Largest activity	Expenditure for activity	Percent of state's total expenditures[a]	Largest activity	Expenditure for activity	Percent of state's total expenditures[a]
California	Prevention	$33.8	41	Prevention	$33.7	39
Florida	Control	71.0	75	Control	100.9	79
Hawaii	Control	2.1	34	Control	2.2	29
Idaho	Control	1.9	52	Control	1.3	35
Michigan	Control	3.4	81	Monitoring	0.6	32
Maryland	Control	0.7	41	Control	0.8	42
New York	Control	0.7	30	Control	0.8	31

[a]This represents the percentage of each state's total expenditures for invasive species activities.

Source: GAO's survey of seven states.

Four of the states reported that preventing the introduction of new invasive species was the activity in greatest need of more attention from their

[14]This refers to funding that federal departments provided to states to carry out state invasive species programs.

states. Control, detection, and monitoring were each reported by one state as the primary activity needing more attention.

Plants and Terrestrial Arthropods: The Categories of Invasive Species Receiving the Greatest Amounts of State Funding

In fiscal year 1999, plants—terrestrial noncrop, terrestrial crop, and aquatic—was the category of invasive species that received the most funding from three states, with Florida providing the single greatest amount—$54.2 million. In three other states, terrestrial arthropods was the highest-funded category, with California providing the greatest funding ($43.7 million) for this category. Table 6 shows the categories of invasive species that received the greatest funding from each state in fiscal year 1999.

Table 6: Invasive Species Receiving the Greatest Funding from Each State, Fiscal Year 1999

Dollars in millions

State	Category of invasive species with the greatest funding	State funding
Florida	Plants	$54.2
California	Terrestrial arthropods	43.7
Idaho	Plants	3.7
Michigan	Fish and aquatic invertebrates	3.1
Hawaii	Plants	1.7
New York	Terrestrial arthropods	1.1
Maryland	Terrestrial arthropods	0.6

Source: GAO's survey of seven states.

For individual invasive species, no two states reported giving the greatest amount of their funding to the same species—for example, citrus canker (a highly contagious bacterial disease that infects citrus crops) received the greatest amount of funding ($29.1 million) in Florida, and the medfly (the Mediterranean fruit fly—a serious pest that attacks over 250 types of fruits, vegetables, and nuts) was the top recipient of funds ($9.4 million) in California.

Within the plant category, terrestrial noncrop plants (such as purple loosestrife) were selected by Florida, Hawaii, and Maryland as the primary category of invasive species needing more attention from their state governments; aquatic plants (such as hydrilla—an aggressive submerged

plant that can choke lakes and water supplies) were selected by three other states (California, Idaho, and New York). The seventh state—Michigan—selected microorganisms and diseases.

Many Entities Received State Funds for Invasive Species Activities

States provided invasive species funds to a variety of entities to carry out invasive species activities within their states: Two states reported that multi-stakeholder organizations (such as the Chesapeake Bay Program) received the greatest amount of funding for invasive species activities; two others reported universities or colleges; and local governments, private nonprofit organizations, and lake associations were each reported by one state.

States Most Often Rated Coordination With the Federal Government as Good

The states rated coordination with the federal government on invasive species issues most frequently as good. Coordination within states, between states and universities/colleges, and between states and local governments was also rated good by most states, as shown in table 7. Some states had suggestions for improving coordination. For example, one state thought that the primary federal responsibility and direction for invasive species programs should reside with one federal department; another noted that interstate regional planning councils were needed to coordinate responses to new invasions.

Table 7: States' Views on Coordination Between Several Entities

	Number of state responses				
Coordinating entities	**Excellent**	**Good**	**Fair**	**Poor**	**Very poor**
Between governmental entities					
Between this state's government entities (e.g., departments within the state)		4	3		
Between this state government and *other state governments*		3	4		
Between this state government and the *federal government*		4	3		
Between this state government and *local governments*		4	1	2	
Between state governments and nongovernmental entities					
Between this state government and *universities and colleges*		5	1	1	
Between this state government and the *private sector*		2	4	1	
Between state governments and other reported entities					
Nonprofit organizations	1				
Exotic Pest Plant Council	1				
Regional water management districts	1				
Tribes				1	
The Nature Conservancy		1			

Source: GAO's survey of seven states.

Actions Taken by the Invasive Species Council to Implement Executive Order 13112

Although the Invasive Species Council has been slow in getting off the ground, it has initiated several actions in its first 18 months. Specifically, as of August 18, 2000, the Council

- was in the final stages of staffing the organizational infrastructure that will oversee the implementation of the executive order;
- had drafted and was receiving comments on its National Invasive Species Management Plan—which the executive order stipulated was to be issued by August 3, 2000;
- had established an advisory committee, which has held three meetings, and six working groups, which have provided information and advice to the Council; and

- was in the process of developing a Web site and sponsoring workshops to promote information sharing.

Organizational Infrastructure Is Almost Completed

As of August 18, 2000, the Council had filled two of its four permanent positions (the executive director and one program assistant) and was close to filling its two remaining positions (two assistant directors—one for domestic and one for international policy). Until August, the Council's activities were conducted primarily by three persons detailed from Agriculture, Commerce, and the Interior who work part-time on Council activities and part-time on their other job duties. The Council is also assisted part-time by a scientist on detail from Agriculture and by a full-time program assistant who has been on-board since March 2000.[15]

In addition, each of the eight department heads who serve on the Council have appointed technical liaisons. These liaisons represent an interdepartmental group that works directly with the Council to facilitate the flow and exchange of information between the Council and the federal departments represented on the Council.

The Council Has Drafted a Management Plan

The Council has drafted a National Invasive Species Management Plan—one of its major responsibilities—and is obtaining comments on the plan from stakeholders, including representatives from state governments, industry, academia, and the public. Council staff anticipate that notice of the plan and a 60-day comment period will be published in the *Federal Register* in September 2000. The draft plan provides recommendations on the following issues: federal coordination; communication, education, and outreach; prevention; early detection and rapid response; control; restoration; research, database management, and monitoring; information management; and international cooperation and capacity building. The Council staff expect that the final plan will be issued later in the year—several months after the date stipulated in the executive order.

To meet the order's requirement that the Council encourage planning at regional, state, local, tribal, and ecosystem-based levels, the Council involved these and other parties in developing the national plan. For example, an advisory committee and six working groups made up of

[15]In addition, the Council has generally had a summer intern.

federal and nonfederal members have played key roles in the plan's development. After drafting its plan, the Council obtained comments from the eight departmental Council members and held public meetings to discuss the plan in Oakland, California; Denver, Colorado; West Palm Beach, Florida; Chicago, Illinois; and Albany, New York.

The Council Has Established an Advisory Committee and Six Working Groups

Since its inception, the Council has held two meetings. In addition, to assist it in carrying out its responsibilities, the Council has established an advisory committee of 32 members from universities, state governments, associations, and other entities. The advisory committee—selected from nominations received in response to a *Federal Register* notice—has met three times. Also, the Council has established six working groups—a total of more than 250 members from various levels of government as well as industry—to address issues such as policy, regulations, and international activities.

The Council Is Developing a Web Site and Holding Workshops to Promote Information Sharing

The Council is developing a Web site—*www.invasivespecies.gov*—and holding workshops to promote information sharing. The Web site now contains information about the Council's activities, the draft management plan, and links to the Web sites of governmental and nongovernmental entities that are engaged in invasive species activities. In addition, the Web site provides an e-mail address for comments on the draft plan. The Council plans to add additional information, such as the invasive species that are regulated by its department members, on an ongoing basis. The Council is also developing a capability that will enable Web site visitors to click on a state or county to learn about the invasive species in that area, efforts to control those species, and ways they can help with those activities.

In addition, Council members have sponsored workshops and other meetings to obtain input from a variety of stakeholders on the integration and sharing of databases.[16] The next workshop, scheduled for September 2000, on western rangeland weed management will examine and provide suggestions regarding (1) better use of existing databases and (2) future data collection and sharing.

[16]These meetings are part of a project conducted by the Charles Valentine Riley Memorial Foundation and sponsored by Agriculture, the Interior, the David and Lucile Packard Foundation, and industry.

Agency Comments

We provided the Invasive Species Council co-chairs with a draft of this report for their review and comment. The Executive Director and representatives of the co-chairs, in commenting on the section on Council actions, agreed with the facts presented in the section and provided technical comments, which we incorporated as appropriate. In addition, we provided appendix II to the officials who responded to GAO's survey for the 10 federal departments. These officials agreed with the facts in this appendix on federal programs and provided clarifying comments, which we incorporated as appropriate.

We conducted our work from April through July 2000 in accordance with generally accepted auditing standards.

We are sending copies of this report to interested congressional committees and members; the Honorable Dan Glickman, Secretary of Agriculture; the Honorable Norman Y. Minetta, Secretary of Commerce; the Honorable William S. Cohen, Secretary of Defense; the Honorable Bruce Babbitt, Secretary of the Interior; the Honorable Madeleine K. Albright, Secretary of State; the Honorable Lawrence H. Summers, Secretary of the Treasury; the Honorable Rodney E. Slater, Secretary of Transportation; the Honorable Carol M. Browner, Administrator, the Environmental Protection Agency; the Honorable Rita R. Colwell, Director, National Science Foundation; and the Honorable Lawrence M. Small, Secretary of the Smithsonian Institution. Copies are also being sent to the Governors of California, Florida, Hawaii, Idaho, Maryland, Michigan, and New York. We will also make copies available to others upon request.

If you or your staff have any questions about this report, please contact me on (202) 512-5138. The key contributors to this report are listed in appendix VII.

Lawrence J. Dyckman
Director, Food and
Agriculture Issues

List of Congressional Requesters

The Honorable Sherwood Boehlert
Chairman, Subcommittee on Water Resources
and Environment
Committee on Transportation and Infrastructure
House of Representatives

The Honorable Wayne T. Gilchrest
Chairman, Subcommittee on Coast Guard
and Maritime Transportation
Committee on Transportation and Infrastructure
House of Representatives

The Honorable Richard Pombo
Chairman, Subcommittee on Livestock and Horticulture
Committee on Agriculture
House of Representatives

The Honorable Jim Saxton
Chairman, Subcommittee on Fisheries Conservation,
Wildlife and Oceans
Committee on Resources
House of Representatives

Scope and Methodology

To address the first and second objectives of our review—federal and selected state funding information for fiscal years 1999 and 2000 for invasive species activities and information on coordination efforts—we mailed surveys to federal departments and selected states.

The survey to 10 federal departments requested information on federal obligations for fiscal years 1999 (actual) and 2000 (estimated) and their views on the effectiveness of coordination efforts with states and other entities. The term "departments" refers to the following entities: the departments of Agriculture, Commerce, Defense, the Interior, State, Transportation, the Treasury, and the Environmental Protection Agency (all of which are members of the Invasive Species Council); and the National Science Foundation and the Smithsonian Institution. The latter two entities were identified by officials of Agriculture, the Interior, and Commerce as providing significant funding for various invasive species activities.

The survey to seven states requested information on state expenditures for fiscal years 1999 (actual) and 2000 (estimated) and the states' views on the effectiveness of coordination efforts with federal departments and other entities. The seven states surveyed—California, Florida, Hawaii, Idaho, Maryland, Michigan, and New York—were selected on the basis of recommendations from Agriculture, the Interior, and Commerce officials with expertise on invasive species. They recommended these states for one or more of the following reasons: the state has significant problems with invasive species, has implemented strong and/or innovative programs, and/or provides geographical representation.

We did not independently verify the accuracy of the federal department or state government officials' responses to our surveys. However, we pretested drafts of our surveys to obtain comments from federal and state government officials and incorporated their comments where appropriate. We also reviewed each survey response to identify internal data inconsistencies and other issues needing clarification, followed up with survey respondents to resolve questions, and made agreed-upon changes to their responses as appropriate.

The federal and state surveys requested information on obligations/expenditures for eight invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education/outreach/partnerships/cooperative activities. We coordinated with staff from the Invasive Species Council in developing the survey

instruments and used definitions for invasive species-related terms that the Council developed. In addition, to put the magnitude of the invasive species problem into perspective, we reviewed several studies that addressed environmental and economic costs as well as other harmful effects associated with invasive species. We did not, however, analyze or verify the information contained in these studies.

In completing the survey, we asked federal departments to obtain information from appropriate staff (that is, their staff with responsibilities or knowledge of their department's invasive species programs). Similarly, we asked state officials to obtain information from all their departments/agencies that conducted invasive species activities and to incorporate the information into one state response. Federal obligations were based on the federal fiscal year, which runs between October 1 and September 30. However, the state expenditures were based on the states' fiscal years, which generally run from July 1 through June 30.

We recognize that the total funding amount reported for invasive species could be under- or over-estimated because of differences in both federal and state departments' and agencies' reporting, budgeting, and accounting practices. Also, in some cases, funding for invasive species activities could not be separated from other activities. Some federal and state officials sent in several individual responses from their various departmental or state entities, which we consolidated into a single department or state response. In these instances, we returned the consolidated survey to the respondent for review and approval.

We received survey responses from all respondents—10 federal departments and 7 states. However, two responses were missing significant information. While Treasury's Customs Service engages in some invasive species-related activities, it does not track obligations for these activities separately from its other enforcement activities. The Department of Defense submitted only a partial response, which included the Navy, Army Corps of Engineers, and the Marine Corps. The Army and the Air Force did not provide information.

To address our third objective—the actions taken by the Invasive Species Council to implement Executive Order 13112—we met with representatives from (1) Agriculture, Commerce, and Interior and (2) the Invasive Species Council's three co-chairs and attended several public meetings held by the Invasive Species Advisory Committee and the Council. In addition, we reviewed documents, memos, reports, and

working draft policy papers developed by the advisory committee working groups. Finally, we reviewed a draft of the National Invasive Species Management Plan, which the Council prepared as directed by Executive Order 13112. We did not, however, evaluate the extent to which the draft plan meets the requirements of the executive order.

We performed our work from April through July 2000, in accordance with generally accepted government auditing standards.

Federal Invasive Species Activities

The federal government sponsors numerous invasive species activities carried out by many departments with various unique, complex, and integrated missions. These activities span waterways, wetlands, U.S. ports of entry, public and private lands, the environment, roadsides, and farmland. The 10 federal departments that we surveyed—Agriculture, Commerce, Defense, the Interior, State, Transportation, the Treasury; the Environmental Protection Agency, the National Science Foundation, and the Smithsonian Institution—work with each other, state agencies, nongovernmental organizations, and private citizens to prevent, detect, control, and eradicate a variety of invasive species. Table 8 describes the federal departments' and their component agencies' involvement in invasive species programs and activities.

Table 8: Federal Involvement in Invasive Species Activities

Department and agency	Activities
Department of Agriculture	Involved in all invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities.
Agricultural Research Service	Provides scientific and technical support for Agriculture and other federal agencies focusing on detection technology for ports of entry; systematics (i.e., the study of natural patterns and processes relating to the history of a species and the factors responsible for its origin and evolution) for rapid identification of invading species; and pesticide application technology. Also develops biologically based controls and helps monitor target pests of integrated pest management programs (such as ground, aerial, and satellite monitoring of leafy spurge and other weed species).
Animal and Plant Health Inspection Service	Through its agriculture quarantine inspection and regulatory enforcement programs at 172 U.S. ports of entry, conducts preclearance activities, risk analysis and permit decisions, treatment efforts, detection surveys, and eradication efforts to prevent the introduction of foreign pests that would threaten U.S. agricultural production and natural ecosystems. Foreign pests include insects, plant and animal diseases, mollusks, mites, and invasive plants. Cooperates with federal and state agencies and nongovernmental organizations to detect, contain, and eradicate infestations of quarantined significant foreign pests before they become well established and spread.
Cooperative State Research, Education, and Extension Service	Funds integrated projects and competitively based research relevant to improving public understanding of invasive species; funds research on cost-effective management, environmentally safe control of invasive species using biological, chemical, cultural, and mechanical practices and supports invasive species management to maximize effective and economical pest control and exclusion. Also provides linkages to address invasive species problems with local, state, and regional stakeholders.
Economic Research Service	Develops decision-making tools for comparing the consequences of invasive plant species with possible control costs. Considers both direct and indirect human costs of ecosystem disruptions and costs and potential adverse consequences of alternative weed treatments.
Farm Service Agency	Requires all of its program participants to control weeds (including noxious weeds), insects, pests, and other undesirable species on enrolled lands.

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Department and agency	Activities
Forest Service	Manages 191 million acres of federal lands for many purposes, including protection from invasive weeds, and is Agriculture's lead agency for nuisance weed control. Conducts research on invasive plant species, including ecological studies to support restoration of sites after treatment of exotic weeds and control of invasive plants, such as kudzu in the southern United States and yellow starthistle, spotted knapweed, and leafy spurge in Idaho. Seeks to control and mitigate the impact of invasive species, such as the Asian long-horned beetle, gypsy moth, hemlock woolly, and browntail moth. Conducts disease research, such as the control of butternut canker and selection of trees that are genetically resistant to Dutch elm disease, pitch canker, chestnut blight, and white pine blister rust. Works closely with state agencies, private landowners, and tribal governments through its regulatory and enforcement programs to prevent and control invasive species and provides funding and technical assistance through its state and private forestry programs.
Natural Resources Conservation Service	Provides technical assistance to cooperating landowners on managing invasive species that inhabit lands used for agricultural production—has a significant program for range management and restoration, which includes an invasive species control element. Maintains a database that includes extensive information on invasive plant species and operates plant materials centers that promote the use of native species for soil erosion control.
Department of Commerce	Involved in all invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities.
National Oceanic and Atmospheric Administration	Funds research, education and outreach, and control activities primarily through the National Sea Grant Program, with some activities funded through the National Ocean Service and National Marine Fisheries Service. Efforts focus on marine systems and the Great Lakes. Research efforts include monitoring the impacts of invasive species on coastal and other ecosystems, developing control and mitigation options, and preventing new introductions by, among other things, developing new technologies for ballast water management. Performs economic evaluations of the costs of aquatic invasive species and conducts control programs to eradicate and prevent their spread. Has regulatory authority to prevent the introduction of invasive species that may affect marine sanctuaries, such as the Florida Keys National Marine Sanctuary; endangered or threatened species; coastal areas; and essential fish habitats.
Department of Defense	Involved in all invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities. Engages in management and control of invasive species: (1) prevents the entry of invasive species in the United States, (2) controls invasive species on Defense installations, and (3) restores Defense lands using native plants. Developed and implemented the Navy's ballast water management policy and set discharge standards for vessel ballast water to address the environmental impact of invasive species in ballast water. Other efforts include partnerships to control brown tree snakes, prevent the spread of invasive plants, and maintain a noxious and nuisance plant management information system.
Army Corps of Engineers	Supports aquatic plant control, which primarily involves invasive species in non-Corps waters. Spends several million dollars annually on removal of aquatic growth, predominantly for invasive species, and supports zebra mussel research efforts.
Environmental Protection Agency	Involved in all invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities. Deals with invasive species in three general areas—(1) eliminating ballast water as a pathway for plants, animals, or microbial species not native to the United States, (2) regulating pesticides that may be used to control invasive species, and (3) conducting research on the ecological impacts of invasive species.
Department of the Interior	Involved in all invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities.

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Department and agency	Activities
Bureau of Indian Affairs	Helps support the management of invasive species on Indian lands through exotic weed eradication and other programs.
Bureau of Land Management	Focuses primarily on controlling invasive plants on the 264 million acres it manages, primarily in western states and Alaska. Initiated strategy to prevent and control the spread of noxious weeds on public lands by using biological, chemical, and physical treatment for invasive plants. Responsible for protecting and managing wild horses and burros that, although not native, have a legally protected status.
Bureau of Reclamation	Focuses on invasive species infestation of water systems, including reservoirs, rivers, thousands of miles of distribution canals, rights-of-way, wetlands, and recreational areas. Invasive species of concern include zebra mussels, Chinese mitten crabs, hydrilla, water hyacinth, purple loosestrife, saltcedar and leafy spurge. These species can obstruct water flow, hinder access for maintenance and recreation, cause structural damage, and negatively affect water system operations, water quality, wildlife habitat and public use.
Fish and Wildlife Service	Protects and conserves fish and wildlife resources; controls invasive plants and animals, such as feral pigs, melaleuca, salt cedar, purple loosestrife, in the 93-million acre National Wildlife Refuge System; works with private landowners to implement on-the-ground restoration projects that eradicate and control and manage invasive species; regulates imports of injurious wildlife; evaluates imported animals to determine injurious status; conducts activities to prevent, control and monitor aquatic nuisance species such as zebra mussel, Asian swamp eel, Chinese mitten crab, brown tree snake and others that threaten native species and the aquatic ecosystems; and provides cost-share grants to implement approved state aquatic nuisance species management plans.
Geological Survey	Focuses on researching factors influencing the invasion by invasive species and the effects of invasive species on ecosystem processes, native species, and landscape dynamics, especially on Department of the Interior land; facilitates documentation, dissemination and integration of invasive species information; focuses on small number of highly invasive species, with emphasis on the Great Lakes and eastern waterways and wetlands, riparian ecosystems, and Hawaii, as well as invasive plants on western rangelands. Also, manages the national Nonindigenous Aquatic Species Database and several regional databases (such as Hawaii, Colorado plateau, and northern prairie).
Minerals Management Service	Routinely conducts ecological monitoring projects to measure potential or actual impacts of outer continental shelf oil and gas development on marine, coastal, and human lives. Invasive species level taxonomic identifications conducted during these monitoring efforts provide useful information for documenting occurrences and geographic extensions of marine invasive species in near-shore and offshore waters.
National Park Service	About 190 of the 300 National Park Service units have identified exotic species as a significant resource management concern in their management plans. When managing invasive species, relies on an integrated pest management approach that permits the use of biological and other types of controls. Some parks, such as Hawaii Volcanoes, Everglades, and Big Cypress, have programs to address specific invasive species such as melaleuca, goats, pigs or invasive plants. In addition, a number of parks work collaboratively with neighbors or other groups to manage invasive species.
Office of Insular Affairs	Created a brown tree snake program supporting a number of operational, research, and education activities in accordance with a long-term brown tree snake control plan.
National Science Foundation	Involved in the following invasive species activities: research and development; and education, outreach, partnerships, and cooperative activities. Funds basic and applied research on invasive species, including their roles in population and ecological processes, their relationship to biological conservation activities, and their role as a disturbance agent in the ecosystem.

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Department and agency	Activities
Smithsonian Institution	Involved in the following invasive species activities: prevention, detection, control (management), monitoring, research and development, information management, and education, outreach, partnerships, and cooperative activities. Research addresses the pattern, impact, and management of invasive species. Smithsonian Environmental Research Center programs measure the pattern of transfer, invasion, and impact of invasive species on coastal marine and estuarine systems. Conducts specific projects to test methods to reduce the risk of species transfer in ship ballast water; documents the history of invasive species invasions in the Chesapeake Bay. In cooperation with Coast Guard, established the National Ballast Water Information Clearinghouse to measure the changing patterns of ballast water delivery, manages vessels arriving in U.S. ports, and synthesizes national data on patterns and impacts of alien species in coastal ecosystems.
Department of State	Involved in the following invasive species activities: information management; and education, outreach, partnerships, and cooperative activities. Engages in negotiations, international treaty activities, and cooperative intergovernmental efforts to address invasive species issues—e.g., catalyzes formation of a voluntary intergovernmental initiative to address the problem, negotiates in the International Maritime Organization to develop a treaty to address the introduction of invasive species in ballast water, and works with South Pacific countries to raise awareness of the need to control brown tree snakes. These international efforts focus on safeguarding biodiversity, reducing negative ecological and economic impacts from invasive species, and reconciling the need to identify and manage invasive species pathways with the need to continue globalization and increase trade and travel.
Department of Transportation	Involved in the following invasive species activities: prevention, research and development, information management, and education, outreach, partnerships, and cooperative activities.
U.S. Coast Guard	Responsible for developing and implementing a ballast water management program to minimize the likelihood that invasive species can be transported to the United States in the ballast water of long-distance ocean vessels.
Federal Highway Administration	Focuses primarily on vegetation management, including developing guidelines for combating roadside invasive species.
Department of the Treasury	Involved in the following invasive species activities: prevention, detection, information management, and education, outreach, partnerships, and cooperative activities. The U.S. Customs Service has a major operational role in preventing or restricting the entry of imported merchandise and its containers that could potentially be or are infested with invasive species. Customs personnel inspect passengers, baggage, and cargo at U.S. ports of entry to enforce or cooperate, as appropriate, in enforcing regulations/procedures of other federal agencies. Customs selectively inspects incoming passengers, baggage, and cargo based on risk management criteria, such as country-of-origin and other factors.

Source: GAO's survey of 10 federal departments; *Harmful Non-Native Species: Issues for Congress*, Congressional Research Service, Sept. 1999; and *Harmful Non-Indigenous Species in the United States*, Office of Technology Assessment, OTA-F-656, Sept. 1993.

Seven States' Invasive Species Activities

The seven states we surveyed conduct a variety of invasive species activities through many of their departments and entities. Table 9 presents the edited responses from the seven states. The table is followed by descriptions of three states' innovative invasive species programs.

Table 9: Seven States' Invasive Species Activities

State and responsible department or other entity	Reported invasive species activities
California	Involved in prevention, detection, control (management), monitoring, research and development, information management, environmental compliance, planning, program supervision, and education, outreach, partnerships, and cooperative activities.
Department of Boating and Waterways	Maintains open waterways in some areas through control of water hyacinths and Egeria densa (a plant used in home aquariums—it forms dense mats that choke out native plants when introduced into lakes).
Department of Food and Agriculture	Conducts pest prevention programs that focus on species problematic to agriculture.
Department of Fish and Game	Manages a variety of wildlife and game preserves (and vegetation in preserves), and controls nondesirable vertebrates.
Department of Forestry and Fire Protection	Assists landowners with forest pest problems.
Department of Transportation	Conducts vegetation management of roadways, although this is not a discrete mission.
Department of Water Resources	Focuses on water supply issues and controls Spartina (an aggressive, deep-rooted cordgrass that has invaded open mud-flat estuaries and displaced native vegetation).
Department of Parks and Recreation	Focuses on vegetation management of parks, although this is not a discrete mission.
State Lands Commission	Manages ballast water management programs.
Florida	Involved in prevention, detection, control (management), monitoring, restoration, research and development, information management, field testing of new chemicals and treatments from companies, and education, outreach, partnerships, and cooperative activities.
Department of Environmental Protection	Maintains the largest invasive plant management program in the United States; manages invasive plants throughout the state park system; and controls invasive plants on its managed lands.
Fish and Wildlife Conservation Commission	Monitors invasive species, including Perna viridis (i.e., a green mussel that can restrict water flow in pipes and increase drag on structures such as boat hulls). Monitors such invasive species by (1) examining known or potential areas of infestation and (2) providing posters to power plants, marinas, and tackle shops in known or potentially infested areas.
Water management districts	Detects, controls, and monitors invasive species on district-owned lands; conducts restoration projects to improve water quality and wildlife habitat; provides a potential source of matching funds for local governments to complete water management projects; provides clearinghouse for documents and information; maintains an Aquatic Wetland and Invasive Plant Information Retrieval System database online; and retains an invasive plant control section that conducts the largest field application studies using both biological and chemical methods.

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State and responsible department or other entity	Reported invasive species activities
Hawaii	Involved in prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities.
Department of Agriculture	Protects Hawaii's agricultural industries, natural resources, and the public from the entry and establishment of detrimental insects, weeds, and other pests; protects livestock and poultry industries through the control and prevention of pests and diseases; and conducts animal disease surveillance and epidemiology, laboratory diagnosis, rabies quarantine, and animal and bird importation inspection.
Department of Health	Implements and enforces vector-control activities to minimize the dangers and annoyances caused by mosquitoes, rats, and other vectors; supports investigations to suppress vector-borne diseases; and develops control techniques to prevent the establishment of new vector and vector-borne diseases from abroad.
Department of Land and Natural Resources	Manages approximately 800,000 acres of state lands for mixed uses, including hunting, forestry, recreation, and native species preservation. Ensures enforcement of relevant laws on department-managed lands and on marine waters. Provides important participation in state- and community-based efforts to control alien species through early detection, rapid response, and public education.
Department of Transportation	Complies with all applicable state and federal regulations to ensure the protection of Hawaii's environmental and natural resources.
Idaho	Involved in prevention, detection, control (management), monitoring, restoration, research and development, information management, mapping/remote sensing, and education, outreach, partnerships, and cooperative activities.
Department of Agriculture	Designates a state noxious weed coordinator and determines what weeds are to be declared "noxious;" establishes and supports cooperative weed management areas; establishes minimum requirements and proficiency training for county weed superintendents; enters into agreements with and coordinates and cooperates with federal agencies in planning and applying weed management and control; ensures that county commissioners carry out the duties and powers ascribed to counties in the Idaho Weed Law; and administers cost-share funds provided by the legislature for counties, cooperative weed management areas, and other cooperators.
Department of Fish and Game	Owns and manages about 118,000 acres, located primarily in several wildlife management areas.
Department of Lands	Manages about 2,474,000 acres of state endowment lands.
Department of Parks and Recreation	Manages over 38,000 acres of mostly scenic and high-quality recreation areas.
Department of Transportation	Allocates around $3.5 million annually to vegetation management. Treats weeds along roads and highways with herbicides.
University of Idaho	Performs research and technology transfer directed at weeds and diseases of important Idaho crops; provides diagnostic and weed identification services and research on remote sensing to locate and map invasive species.
Maryland	Involved in prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities.
Department of Agriculture	Carries out noxious weed control program; plant pest/disease survey; nursery inspection; and integrated pest management programs for crop pests, including the Mexican bean beetle, corn earworm, and Colorado potato beetle. Also conducts survey program for pests of quarantine significance; maintains integrated pest management of the gypsy moth; and detects and monitors several other invasive forest pests, insects, and diseases.

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State and responsible department or other entity	Reported invasive species activities
Department of Natural Resources	Monitors and controls aquatic plants, such as hydrilla and water chestnut; nutria (a beaver-like rodent that forages the root stalks of native wetland vegetation); phragmites (a perennial reed that grows in and along wetlands and displaces species that provide food for wildlife); and mute swans.
Michigan	Involved in prevention, detection, control (management), monitoring, restoration, research and development, information management, and education, outreach, partnerships, and cooperative activities.
Department of Environmental Quality	Conducts research and policy analysis, with an emphasis on prevention activities, and coordinates statewide program relating to the unintentional introduction of nonnative, aquatic species. Works to control zebra mussels, Eurasian watermilfoil, and curlyleaf pondweed.
Department of Natural Resources	Works to manage sea lampreys in the Great Lakes. Performs control and education activities on gypsy moths; monitors pine shoot beetles; monitors and provides education on beech scale (an insect that contributes to beech bark disease), and Asian long-horned beetles.
Michigan State University	Provides education on gypsy moths, pine shoot beetles, Japanese beetles, beech scale, and Asian long-horned beetles.
New York	Involved in detection, control (management), monitoring, restoration, research and development, information management, technology transfer, and education, outreach, partnerships, and cooperative activities.
Department of Agriculture and Markets	Manages and controls all nonnative plants and insects.
Department of Environmental Conservation	Surveys and monitors for aquatic species; controls sea lampreys; and manages purple loosestrife programs.
Great Lakes Research Consortium	In addition to research, conducts education/outreach programs and some detection and prevention work.
Nature Conservancy/ Invasive Plants Council	Monitors terrestrial invasive plant education, research, and control programs.
Sea Grant	Performs education and outreach and funds research on aquatic nuisance species.
State museum	Conducts education and outreach and original zebra mussel research.

Source: GAO's survey of seven states.

Innovative State Invasive Species Programs

California, Florida, and Idaho described programs within their states that used what they considered to be innovative approaches to invasive species problems.

California

- The Regional Yellow Starthistle[1] Control Project is a weed control program that began as a community's battle to preserve its quality of life and property values. A program task force—made up of local government representatives and volunteers—was established in 1996. The program's goals include (1) mapping infested areas throughout the Tehachapi region, (2) exploring available integrated control options, and (3) soliciting community support through an educational outreach campaign. Since the program's inception, volunteers have mapped the yellow starthistle and implemented mechanical control of the weed in selected areas, and the task force has implemented a landowner assistance program that has provided low-cost, subsidized weed treatments for over 200 sites.

- The Golden Gate National Recreation Area is the focus of restoration and weed control programs that rely heavily on short- and long-term volunteer efforts. The programs have different teams that carry out different functions. For example, volunteers in the Invasive Plant Patrol detect, map, and control new infestations of invasive plant species. The Golden Gate National Recreation Area and Point Reyes National Seashore recently received $601,000 from the National Park Service for a joint 3-year Cape ivy (Delairea odoranta)[2] control project. The project's objectives include containing and reducing the size of all infestations in the parks, sharing knowledge with other resource management agencies, and increasing public awareness and involvement in controlling Cape ivy.

- The Ballast Water Management for Control of Non-Indigenous Species Act, which took effect on January 1, 2000, specified responsibilities and tasks to address nonindigenous aquatic species in California's waters. Under the act, the State Lands Commission was given responsibility for ballast water inspection and monitoring. In the first 3 months after establishing its program, the Commission succeeded in getting 67 percent of regulated ships to report to them using the U.S. Coast Guard Ballast Report form, and program staff directly inspected the ballast water of 25 percent of the ships. Educating the regulated vessel

[1]The yellow starthistle is an annual herb that grows up to 3 feet—it infests over 9 million acres of rangeland in the western United States.

[2]Cape ivy, native to South Africa, is a twining, succulent climber and scrambler. It has the ability to root at every leaf node and along the stem.

community is also a large part of the Commission's effort. In addition to ballast water inspection, the act requires California's Department of Fish and Game to determine the location and extent of aquatic nuisance species in California, the State Water Resources Control Board to evaluate alternatives for managing ballast water, and the Board of Equalization to collect inspection fees.

- California's Department of Agriculture has run a Weed Detection and Eradication Program for over 40 years in cooperation with county agriculture departments. Through their efforts, 14 weed species have been eradicated statewide and several others are close to being eradicated. The program employs 8 to 10 biologists, located in districts across the state, who maintain contact with county and other biologists knowledgeable about the lands, weeds, and botany of the district. The program biologists travel throughout their districts looking for target weed species—their goal is to find an infestation when it is small and easily controlled. These early finds often result in the complete destruction of weed populations with a single visit. Biologists generally visit other, more established infestations at least twice each year, applying treatments whenever possible.

Florida

- Since 1997, the state's upland plant program has completed or initiated over 150 invasive plant removal projects on federal, state, and local conservation lands. To provide an infrastructure for planning and implementing plant-related invasive species activities, Florida established 11 regional invasive upland plant working groups—made up of local, city, county, state, and federal land managers—covering all of Florida. These groups identify and set priorities for invasive plant management needs within their areas and can choose from several control operation methods, including regional contractors, independent subcontractors, or in-house staff. In addition, the groups can obtain funding from Florida's Department of Environmental Protection's Bureau of Invasive Plant Management Upland Program.

Idaho

- The state implemented a statewide, systematic, coordinated planning process for managing noxious weeds. It convened a Governor's Idaho Weed Summit, which set the framework for its strategic plan. The plan proposed several actions to be carried out at all levels and by all agencies and organizations that have a stake in managing invasive species. In August 1999, Idaho established a Statewide Weed

Coordinating Committee to implement the plan. As an indication of the importance placed on the plan, Idaho's governor recently participated in a ceremony at which participants—including representatives from state and federal agencies, a university, an Indian tribe, and others—signed a Memorandum of Understanding regarding the plan.

- The state has created 21 geographically oriented or watershed-based cooperative weed management areas, which are locally led and include all partners in the designated area. The areas cover about 75 percent of the state and include private, state, and federal lands. Each area will have a steering committee to oversee the development of an integrated weed management plan for its area. To encourage this effort, Idaho's Department of Agriculture offers cost-share grants to supplement local resources in implementing the local plans. To qualify for cost-share grants, area steering committees are required to develop an annual operating plan and an annual accomplishment report.

Federal and State Comments on Changes Needed in Executive Order 13112

In response to GAO's survey, officials in four federal departments and four states provided their views on changes they believed were needed in Executive Order 13112 should the Congress enact legislation incorporating the order's language. Many comments on the executive order focused on concerns regarding definitions and the roles of various entities.

Officials from two departments and one state raised concerns over definitions in the executive order. They indicated that the definitions should be (1) expanded to facilitate consistent identification of invasive species and (2) clarified to exclude domesticated animals—such as cattle, sheep, and horses—and domesticated grasses. In addition, one official indicated that the terms "control" and "management" should be defined differently.

Officials from three departments and two states reported concerns regarding the roles of various entities with regard to invasive species. For example, several officials stated that the respective roles of federal, state, and local government need to be more clearly defined. One official said that a national center is needed to (1) help bridge environmental and agricultural interests and (2) enhance information exchange among affected federal, state, and local governments and the private sector. Another official stated that a network of expert centers should be established and authorized to provide information, research, and technical assistance. This official added that the Invasive Species Council and the Federal Interagency Committee for the Management of Noxious and Exotic Weeds should be established through legislation.

Responses to GAO's Survey of 10 Federal Departments On Budget Obligations for Invasive Species

GAO

Survey of Federal Agencies Regarding Budget Obligations for Invasive Species

Introduction

The U.S. General Accounting Office (GAO), an agency that assists the U.S. Congress in evaluating federal programs, has been asked by several committees of the Congress to determine the amount of resources devoted to invasive species activities in the federal government and selected states.

As part of this effort, we are asking you to complete this survey on resources devoted to invasive species activities. Specifically, we are asking for information on the following invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education/outreach/partnerships/cooperative activities. Definitions for these activities and other terms in the survey are in alphabetical order in Attachment I (page 8).

Instructions

For the purposes of this survey, as defined in Executive Order 13112, invasive species are species that are not native to a particular ecosystem and whose introduction does or is likely to cause economic or environmental harm or harm to human health.

When answering the questions in this questionnaire, please coordinate with the appropriate staff in all parts of your department who have responsibilities for invasive species activities.

Throughout the questionnaire, we are using the term department to refer to each of the following entities: Agriculture, Commerce, Defense, Environmental Protection Agency, Interior, National Science Foundation, Smithsonian, State, Transportation, and Treasury.

We ask that the person designated on the attached letter be responsible for ensuring the responses are consolidated prior to forwarding them to us. If you have difficulty providing the data as requested, please call:
Beverly Peterson, (202) 512-7438 or
Jacqueline Cook, (202) 512-2737.

We need your responses to this questionnaire by **May 31, 2000**. Please fax or mail your completed questionnaire to the following address.

Attn: Jacqueline Cook
U.S. General Accounting Office
441 G Street, NW - 2T23
Washington, DC 20548-0001

FAX: (202) 512-9936

If you have any questions about specific items in the questionnaire, call or e-mail your questions to:

- Beverly Peterson at (202) 512-7438 (petersonb.rced@gao.gov)
- Jacqueline Cook at (202) 512-2737 (cookj.rced@gao.gov)

Please provide the following information for the person we should contact if we have any questions.

Name: _____

Title: _____

Organization: _____

Phone #: ( ) _____ Fax: _____

E-mail: _____

Invasive Species Program

1. In what types of invasive species activities is your department involved? (*Check all that apply)*

   1. Operations - to plan for and conduct day-to-day actions regarding invasive species

      a. [8] Prevention - activities to prevent the introduction of invasive species

      b. [7] Detection - surveillance for the existence and location of an invasive species that may be introduced

      c. [6] Control (management) - measures to reduce or eliminate the effects of invasive species

      d. [6] Monitoring - ongoing surveys to track the presence and status of an invasive species over time and to evaluate effectiveness of prevention, control and restoration activities

      e. [5] Restoration- activities to reinstate ecosystem structure and function that have been impacted by invasive species

   2. [8] Research and development - the development of scientific knowledge, methods, and technologies to prevent, detect, control and monitor invasive species or to restore native species and habitat

   3. [10]Education, outreach, partnerships, cooperative activities - actions taken to support public education programs and cooperative efforts with stakeholders, including international agreements

   4. [9] Information management - activities to facilitate access to and exchange of information concerning invasive species. Includes storage and sharing of data and databases

   5. [4] Other invasive species activities (*Please specify*)

      See note in next column →

2. Please list below the agencies and programs within your department that are involved in invasive species activities. Please provide a brief description for each of the programs listed. If necessary, attach additional sheets.

   7 responses

Note: Four departments listed other invasive species activities: collection management; management planning; pest risk assessments and criminal investigations; and bilateral sea lamprey control efforts.

Obligations for Invasive Species Activities

3. In the table below, please provide your department's actual fiscal year (FY) 1999 obligations and estimated FY 2000 obligations for invasive species activities. (*Enter dollar amount; if none, enter '0'*)

INVASIVE SPECIES ACTIVITIES	FY 1999 Obligations (N=10)	Estimated FY 2000 Obligations (N=10)
1. Operations		
a. Prevention	$262,866,000	$308,459,000
b. Detection	$ 8,370,000	$ 9,909,000
c. Control (management)	$ 99,139,868	$143,754,775
d. Monitoring	$ 3,428,000	$ 4,758,000
e. Restoration	$ 2,879,000	$ 3,367,500
Operations Total	$376,682,868	$470,248,275
2. Research & Development	$ 94,606,500	$104,852,000
3. Education, Outreach, Partnerships, Cooperative Activities	$ 29,234,500	$ 39,893,500
4. Information Management	$ 3,746,500	$ 4,727,500
5. Other invasive species activities (*Please specify*) ***See note below***	$ 9,592,628	$ 11,825,000
Total Obligations for Invasive Species Activities	$513,862,996	$631,546,275

Note: Five departments reported the following: management planning; administrative support and contingency; international activities and criminal investigations; producing taxonomic revisions, identification tools, and administrative support of a collection; and support to control sea lamprey in the Great Lakes through the Great Lakes Fishery Commission.

4. If your responses to the budget items in question 3 do not provide a clear or accurate representation of your department's budget or if it represents an anomaly compared to past years, please explain the reasons below.

The 2 responses:

(1) The State Department, upon the issuing of E.O. 13112, has taken on new international activities relating to invasive species. Prior to this year, a minimal amount of State's budget was devoted to this issue. State expects that, subject to available resources, spending on invasive species will increase in the near future.

(2) In the Smithsonian Institution's budget, cost-sharing from USDA and DOD is not included. Approximately $1.0 million of $1.2 million of expenditures is derived from extramural grants and contracts rather than direct federal appropriations.

Funding Sources

5. What proportion of your department's FY 1999 obligations for invasive species was supported by the following sources? (*Enter percentage; if none, enter '0'*)

1. Direct appropriations 0-100 %
2. Offsetting collections from the public:
   - User fees 0-13.9 %
   - Fines & penalties 0 %
   - Other collections [Note a] 0-45.4 %
3. Transfers from other federal departments 0-15.4 %

Note a: The "other collections" category also represents collections from nonpublic sources.

Obligations for Specific Types of Invasive Species

6. Please estimate your department's FY 1999 obligations for the following types of invasive species activities. (*Enter dollar amount; if none, enter '0'.*)

Types of Invasive Species	FY 1999 Obligations *(10 responses)*
Obligations for specific types of invasive species	
1. Microorganisms/diseases	$ 33,051,000
2. Plants [Note a]	$ 70,660,268
a. Terrestrial non-crop	$ 26,162,300
b. Terrestrial crop	$ 22,823,000
c. Aquatic	$ 20,155,700
3. Terrestrial arthropods	$154,546,000
4. Fish and Aquatic Invertebrates	$ 20,440,228
5. Reptiles and Amphibians	$ 4,775,000
6. Birds	$ 220,000
7. Mammals	$ 765,600
8. Other types: *(Please specify)*	$ 0
Obligations that cut across or cover more than one type of invasive species	$229,404,900
Total	$513,862,996

Note a: This category includes $1,519,268 that crosscuts the listed subcategories of plants and represents plant expenditures that federal departments were unable to allocate into any of the three existing sub-categories.

7. Which invasive species (such as Asian long-horned beetle or melaleuca) received the greatest amount of funding from your department in FY 1999? Please provide the FY 1999 obligations directed to the activities for this invasive species. (*Enter dollar amount; if none, enter '0'*)

[3] Not applicable--invasive species activities are not funded by specific species

Invasive Species *(No. of Depts.)*	Funds Obligated
Brown tree snake *(2)*	$ 200,000, $1,915,000
Zebra mussel *(2)*	$ 1,000,000, $2,660,600
Fruit flies *(1)*	$36,245,000
Gypsy moths *(1)*	$ 294,000
Sea lamprey *(1)*	$ 7,492,628

8. To which of the following entities does your department provide funds for invasive species activities? (*Check one for each.*)

	Yes	No
1. Other federal departments	6	4
2. State governments (excluding universities and colleges)	5	4
3. Local governments	4	4
4. Universities or colleges	6	2
5. Private, non-profit organizations	7	2
6. Individual researchers	6	3
7. Other (*Please specify*) ***International organizations; and private landowners, irrigation districts, water authority, and tribal governments.***	2	

9. To which one of the following entities does your department provide the greatest amount of funds for invasive species activities? (*Check one*)

1. [1] Other federal departments
2. [1] State governments (excluding universities)
3. [ ] Local governments
4. [1] Universities or colleges
5. [ ] Private, non-profit organizations
6. [4] Individual researchers
7. [2] Other (*Please specify*) ***International organization and private landowners/organizations.***

10. Of the funds obligated to invasive species in FY 1999, about what percentage went to the entity checked above in question 9? (*Enter percentage*)
0-99 %

Economic or Environmental Harm

11. Has your department either conducted or sponsored any major studies on the economic cost or environmental harm associated with invasive species? (*Check one*)

1. [6] Yes→ If readily available, please provide a copy of each of no more than ten of these study(ies)
2. [4] No

12. In your department's opinion, what is the primary invasive species activity needing more attention from your department? (*Check one*).

1. Operations
   a. [2] Prevention
   b. [ ] Detection
   c. [4] Control (management)
   d. [ ] Monitoring
   e. [ ] Restoration
2. [2] Research and development
3. [ ] Education, outreach, partnerships, and cooperative activities
4. [ ] Information management
5. [ ] Other invasive species activities (*Please specify*)

_____

13. In your department's opinion, what is the primary type of invasive species needing more attention from your department? *(Check one.)*

1. [1] Microorganisms and diseases
2. [ ] Plants
   a. [2] Terrestrial – non-crop
   b. [ ] Terrestrial - crop
   c. [ ] Aquatic
3. [ ] Terrestrial arthropods
4. [2] Fish and aquatic invertebrates
5. [2] Reptiles and amphibians
6. [ ] Birds
7. [ ] Mammals
8. [1] Other types *(Please specify)*
   Marine estuarine fish, invertebrates, and algae.

14. How would your department rate the coordination efforts related to invasive species between the following entities? *(Check one for each row)*

Coordinating entities	Excellent	Good	Fair	Poor	Very Poor	Does not apply
1. Between units within own department	3	4	2			
2. Between federal departments	1	6	2			
3. Between federal departments and state governments	1	4	4			
4. Between federal departments and local governments	1	2	2	2		2
5. Between federal departments and universities/colleges	2	5		1		1
6. Between federal departments and the private sector	1	3	3	1	1	
7. Other entities *(Please specify)*						
International organizations		1	1			
Interest groups			1			
Irrigation district	1					
Tribal governments	1					
Foreign governments	1					
Other governments		1				

15. Please discuss below your responses to question 14 related to your assessment of coordination efforts, including suggestions for improvement.

6 responses

Comments

16. The intent of Executive Order 13112 is to improve the management of federal agencies in:
    - preventing the introduction of invasive species,
    - providing for their control, and
    - minimizing the economic, ecological, and human health impacts that they cause.

    In your department's opinion, in the event that Congress were to enact legislation incorporating the provisions of the order, what changes, if any, should be made in the order's language?

6 responses

17. What key actions has your department taken in response to Executive Order 13112?

9 responses

Thank you for your help!

Attachment I
Invasive Species Study
Definitions

Control: measures to eliminate or reduce the effects of invasive species, including efforts to eradicate infestations, reduce populations of invasive species, prevent the spread of invasive species, and/or mitigate the impact of invasive species on ecosystems or economic activities.

Detection: surveillance for the existence and location of an invasive species that may be introduced.

Ecosystem: the complex of a community of organisms and its environment.

Education/Outreach/Partnerships/Cooperative Activities: actions taken to support public education programs and cooperative efforts with stakeholders. It also includes actions in support of international agreements, with foreign nations and international organizations.

Information Management: activities to facilitate access to and exchange of information concerning invasive species, including, but not limited to, information on distribution and abundance of invasive species; life histories of such species and invasive characteristics; economic, environmental, and human health impacts; management techniques; and laws and programs for management, research, and public education. Includes storage of data and information-sharing activities, such as providing access to databases or other forms of information.

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

Invasive species: a nonnative species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Monitoring: ongoing research and surveys to track the presence and status of nonnative species over time and at varying geographic scales, to evaluate the impact of such species on receiving ecosystems, and to evaluate the effectiveness of prevention, control, and restoration activities.

Native species: with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

Nonnative species: with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem. (Note that Executive Order 13112 refers to nonnative species as "alien" species.)

Operations: to plan for and conduct day-to-day actions regarding invasive species.

Prevention: includes activities to prevent the introduction of invasive species. Such activities include monitoring the international and domestic movement of invasive species, evaluation of individual species for invasiveness prior to introduction, and identification and interdiction of pathways for introduction.

Research and Development: the development of scientific knowledge, methods, and technologies to prevent, detect, control, and monitor invasive species or to restore native species and habitat.

Restoration: activities to reinstate ecosystem structure and function that have been affected by invasive species, using native species or non-invasive nonnative species where possible.

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.

Stakeholders: includes, but is not limited to, state, tribal, and local government agencies; academic institutions; the scientific community; nongovernmental entities, including environmental, agricultural, and conservation organizations, trade groups, commercial interests, and private landowners.

Responses to GAO's Survey of Seven States On Expenditures for Invasive Species Activities

GAO

Survey of States Regarding Expenditures for Invasive Species Activities

Introduction

The U.S. General Accounting Office (GAO), an agency that assists the U.S. Congress in evaluating federal programs, has been asked by several committees of the Congress to determine the amount of resources devoted to invasive species activities in the federal government and selected states.

As part of this effort, we are asking you to complete this survey on resources devoted to invasive species activities. Specifically, we are asking for information on the following invasive species activities: prevention, detection, control (management), monitoring, restoration, research and development, information management, and education/outreach/partnerships/cooperative activities. Definitions for these activities and other terms in the survey are in alphabetical order on page 2.

Instructions

For the purposes of this survey, as defined in Executive Order 13112, invasive species are species that are not native to a particular ecosystem and whose introduction does or is likely to cause economic or environmental harm or harm to human health.

When answering the questions in this questionnaire, please obtain input from staff in your state agencies/departments (e.g., state agriculture and natural resources departments) that have responsibilities for invasive species activities.

When we ask for fiscal year data, please give the data for your **state's fiscal year** (which may differ from the federal government's fiscal year).

We ask that the person designated on the attached letter be responsible for ensuring the responses are consolidated prior to forwarding them to us. If you have difficulty providing the data as requested, please call:
Beverly Peterson, (202) 512-7438 or
Jacqueline Cook, (202) 512-2737.

We need your responses to this questionnaire by **June 13, 2000**. Please fax or mail your completed questionnaire to the following address.

Attn: Jacqueline Cook
U.S. General Accounting Office
441 G Street, NW - 2T23
Washington, DC 20548-0001

FAX: (202) 512-9936

If you have any questions about specific items in the questionnaire, call:

- Beverly Peterson at (202) 512-7438 (petersonb.rced@gao.gov)
- Jacqueline Cook at (202) 512-2737 (cookj.rced@gao.gov)

Please provide the following information for the person we should contact if we have any questions.

Name: _____

Title: _____

Organization: _____

Phone #: ( ) Fax: _____

E-mail: _____

Invasive Species Study
Definitions

Control: measures to eliminate or reduce the effects of invasive species, including efforts to eradicate infestations, reduce populations of invasive species, prevent the spread of invasive species, and/or mitigate the impact of invasive species on ecosystems or economic activities.

Detection: surveillance for the existence and location of an invasive species that may be introduced.

Ecosystem: the complex of a community of organisms and its environment.

Education/Outreach/Partnerships/Cooperative Activities: actions taken to support public education programs and cooperative efforts with stakeholders. It also includes actions in support of international agreements, with foreign nations and international organizations.

Information Management: activities to facilitate access to and exchange of information concerning invasive species, including, but not limited to, information on distribution and abundance of invasive species; life histories of such species and invasive characteristics; economic, environmental, and human health impacts; management techniques; and laws and programs for management, research, and public education. Includes storage of data and information-sharing activities, such as providing access to databases or other forms of information.

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

Invasive species: a nonnative species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Monitoring: ongoing research and surveys to track the presence and status of nonnative species over time and at varying geographic scales, to evaluate the impact of such species on receiving ecosystems, and to evaluate the effectiveness of prevention, control, and restoration activities.

Native species: with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

Nonnative species: with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem. (Note that Executive Order 13112 refers to nonnative species as "alien" species.)

Operations: to plan for and conduct day-to-day actions regarding invasive species.

Prevention: includes activities to prevent the introduction of invasive species. Such activities include monitoring the international and domestic movement of invasive species, evaluation of individual species for invasiveness prior to introduction, and identification and interdiction of pathways for introduction.

Research and Development: the development of scientific knowledge, methods, and technologies to prevent, detect, control, and monitor invasive species or to restore native species and habitat.

Restoration: activities to reinstate ecosystem structure and function that have been affected by invasive species, using native species or non-invasive nonnative species where possible.

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.

Stakeholders: includes, but is not limited to, state, tribal, and local government agencies; academic institutions; the scientific community; nongovernmental entities, including environmental, agricultural, and conservation organizations, trade groups, commercial interests, and private landowners.

Invasive Species Program

1. In what types of invasive species activities is your state involved? (*Check all that apply)*

   1. Operations - to plan for and conduct day-to-day actions regarding invasive species

      a. [6] Prevention - activities to prevent the introduction of invasive species

      b. [7] Detection - surveillance for the existence and location of an invasive species that may be introduced

      c. [7] Control (management) - measures to reduce or eliminate the effects of invasive species

      d. [7] Monitoring - ongoing surveys to track the presence and status of an invasive species over time and to evaluate effectiveness of prevention, control and restoration activities

      e. [6] Restoration- activities to reinstate ecosystem structure and function that have been impacted by invasive species

   2. [7] Research and development - the development of scientific knowledge, methods, and technologies to prevent, detect, control and monitor invasive species or to restore native species and habitat

   3. [7] Education, outreach, partnerships, cooperative activities - actions taken to support public education programs and cooperative efforts with stakeholders, including international agreements

   4. [7] Information management - activities to facilitate access to and exchange of information concerning invasive species. Includes storage and sharing of data and databases

   5. [4] Other invasive species activities (*Please specify*)

      See note in next column →

Note: Four states listed other invasive species activities: technology transfer; mapping/remote sensing; field testing new chemicals and treatments from companies; and environmental compliance, planning, and program supervision.

State Government Expenditures for Invasive Species Activities

2. How much funding did the **federal** government and **other** non-state sources provide to your state government for invasive species activities in fiscal years (FY) 1999 and 2000?

Sources of State Gov. Expenditures for Invasive Species Activities	FY 1999	Estimated FY 2000
Federal sources	$274,320 - $8,718,072	$491,220 - $31,491,110
Other non-state sources *(please list each source separately; if necessary, attach additional sheets)* ***Counties, universities, private industry, and international grants.***	$0 - $3,800,000	$0 - $4,900,000

3. In the table below, please provide your state government's actual FY 1999 expenditures and estimated FY 2000 expenditures for invasive species activities. (*Please exclude federal and other funding—e.g., grants—provided to your state by non-state entities.)*

INVASIVE SPECIES ACTIVITIES	State Gov. FY 1999 Expenditures	State Gov. Estimated FY 2000 Expenditures
1. Operations		
a. Prevention	$0 - $33,793,620	$0 - $33,725,000
b. Detection	$75,250 - $17,878,500	$225,750 - $15,994,000
c. Control (management)	$658,000 - $70,997,504	$404,500 - $100,903,507
d. Monitoring	$127,100 - $4,931,851	$117,100 - $5,025,462
e. Restoration	$0 - $5,798,150	$0 - $ 8,166,653
Operations Total	$1,398,000 - $90,069,787	$1,341,600 - $123,202,811
2. Research & Development	$73,143 - $2,943,500	$115,464 - $4,701,500
3. Education, Outreach, Partnerships, Cooperative Activities	$64,500 - $909,556	$72,599 - $846,738
4. Information Management	$10,000 - $1,278,824	$10,000 - $982,546
5. Other invasive species activities (*Please specify*) ***See note a below***	$0 - $1,101,100	$0 - $1,433,000
Total State Gov. Expenditures for Invasive Species Activities	$1,618,500 - $94,486,730[b]	$1,819,000 - $127,642,125[b]

Note a: Six states reported the following: management overhead, matching grant programs, brown tree snake contract, mapping/GIS, program coordination, and technology transfer.

Note b: The low ranges of expenditures for all of the activities do not add up to the low range of the total expenditures because one state does not have the low range in every activity. This is also true for the high range.

4. If your responses in question 3 do not provide a clear or accurate representation of your state government's budget or if it represents an anomaly compared to past years, please explain.

The 3 responses:
(1) Idaho's budget does not include funding given to the University of Idaho; (2) Maryland increased spending on plum pox virus survey for 2000 and beyond; and (3) New York's federal aid grant support for Lake Champlain Sea Lamprey control is temporarily unavailable while NEPA documentation/ approval is being updated for long term programs. New York expects federal support (through Interior's Fish and Wildlife Service, Sportfish Restoration Program) to resume at an est. $200,000 per year in 2001.

State Government Expenditures for Specific Types of Invasive Species

5. Please estimate your state government's FY 1999 expenditures for the following:

Types of Invasive Species	FY 1999 Expenditures
Expenditures for specific types of invasive species	
1. Animal and plant microorganisms/diseases	$ 0 - $23,965,920
2. Plants	$328,755 - $54,225,930
a. Terrestrial non-crop	$0 - $30,198,540
b. Terrestrial crop	$0 - $375,000
c. Aquatic	$0 - $23,652,390
3. Terrestrial arthropods	$0 - $43,723,000
4. Fish and aquatic invertebrates	$0 - $3,050,000
5. Reptiles and amphibians	$0 - $ 88,000
6. Birds	$0 - $ 75,000
7. Mammals	$0 - $874,000
8. Other types	$0
Expenditures that cut across or cover more than one type of invasive species	$0 - $25,118,100
Total State Gov. Expenditures for Invasive Species Activities	$1,618,500 - $90,836,680 Note a

Note a: (1) Florida's fiscal year 1999 actual expenditures are overstated by up to $3.7 million because several programs could not separate out the precise invasive species funding by activity. (2) The low ranges of expenditures for all of the activities do not add up to the low range of the total expenditures because one state does not have the low range in every activity. This is also true for the high range.

6. Which invasive species (such as Asian long-horned beetle or melaleuca) received the greatest amount of funding from your state government in FY 1999? Please list up to 5 species and provide the FY 1999 expenditures directed to the activities for these invasive species. (*Enter dollar amount*)

[0] Not applicable--invasive species activities are not funded by specific species

For detailed answers, see last page of this survey

Invasive Species 1: ***Citrus canker (FL)***

FY 1999 Expenditures: ***$ 29,081,992***

Invasive Species 2: ***Hydrilla (FL and CA)***

FY 1999 Expenditures: ***$ 21,193,805***

Invasive Species 3: ***Medfly (CA)***

FY 1999 Expenditures: ***$ 9,434,000***

Invasive Species 4: ***Pink bollworm (CA)***

FY 1999 Expenditures: ***$ 6,492,000***

Invasive Species 5: ***Fruit flies (FL)***

FY 1999 Expenditures: ***$ 6,356,602***

7. To which three of the following entities does your state government provide the greatest amount of funds for invasive species activities? (*Please rank the top 3 in order of magnitude, with 1 receiving the greatest amount of funding).*

	1	2	3 ← Ranking	
1.	2	1	1	Multi-stakeholder organizations focused on invasive species
2.	1	1	0	Local governments
3.	2	2	2	Universities or colleges
4.	1	1	2	Private, non-profit organizations
5.	0	1	0	Individual researchers
6.	1	0	1	Other (*Please specify*)

private landowners and lake associations

8. Of the total state government expenditures for invasive species in FY 1999, about what percentage went to the entity receiving the greatest amount in question 7? (*Enter percentage*)

   7 – 90 %

9. Consider the **public and private entities** funding invasive species activities in your state. If you know the annual expenditures of these entities (e.g., private landowners) for invasive species activities in your state, please list the entity, amount, and activity below. If necessary, attach additional sheets. *(Please exclude federal and state government activities.)*

   [2] We do not know what other entities spent.

   Entities, activities, annual expenditures

   FL – counties, N/A, $19,600,000; citrus industry, citrus canker decontamination, $30,000,000.

   ID –private landowners, operations, $175,000,000.

   MI – counties, gypsy moth control, $1,800,000; private property owners, gypsy moth control, $10,000,000.

   NY - state invasive plant council, education, control, research, $81,700.

Economic or Environmental Harm

10. Has your state either conducted or sponsored any major studies on the economic cost or environmental harm associated with invasive species? (*Check one*)

    1. [4] Yes→ If readily available, please provide a copy of each of no more than three of these study(ies)

    2. [3] No

11. In your opinion, what is the *primary* invasive species activity needing more attention from your state government? (*Check one*).

    1. Operations

       a. [4] Prevention

       b. [1] Detection

       c. [1] Control (management)

       d. [1] Monitoring

       e. [ ] Restoration

    2. [ ] Research and development

    3. [ ] Education, outreach, partnerships, and cooperative activities

    4. [ ] Information management

    5. [ ] Other invasive species activities (*Please specify*)

    _____

12. What is the *primary* invasive species activity needing more attention in your state from the federal government? (*Check one*).

    1. Operations

       a. [4] Prevention

       b. [ ] Detection

       c. [2] Control (management)

       d. [1] Monitoring

       e. [ ] Restoration

    2. [ ] Research and development

    3. [ ] Education, outreach, partnerships, and cooperative activities

    4. [ ] Information management

    5. [ ] Other invasive species activities (*Please specify*)

    _____

13. In your opinion, what is the *primary* type of invasive species needing more attention from your state government? *(Check one.)*

    1. [1] Microorganisms and diseases
    2. [ ] Plants
        a. [3] Terrestrial – non-crop
        b. [ ] Terrestrial - crop
        c. [3] Aquatic
    3. [ ] Terrestrial arthropods
    4. [ ] Fish and aquatic invertebrates
    5. [ ] Reptiles and amphibians
    6. [ ] Birds
    7. [ ] Mammals
    8. [ ] Other types *(Please specify)*

    _____

14. In your opinion, what is the *primary* type of invasive species needing more attention in your state from the federal government? *(Check one.)*

    1. [1] Microorganisms and diseases
    2. [ ] Plant
        a. [4] Terrestrial – non-crop
        b. [ ] Terrestrial - crop
        c. [1] Aquatic
    3. [1] Terrestrial arthropods
    4. [ ] Fish and aquatic invertebrates
    5. [ ] Reptiles and amphibians
    6. [ ] Birds
    7. [ ] Mammals
    8. [ ] Other types *(Please specify)*

    _____

15. Please list below the (1) agencies/departments and (2) programs within your state government that are involved in invasive species activities. Provide a brief description for each of the programs listed. In addition, please indicate, which, if any, of these programs are ones you consider to be particularly *innovative* and provide further descriptions of these. If necessary, attach additional sheets.

    6 responses

16. To what extent does your state government work with the following federal agencies in addressing invasive species activities in your state? (*Check one for each row*)

Federal agency	Very great	Great	Moderate	Little	None
1. Agriculture	1	6			
2. Commerce	1		1	3	2
3. Defense	1		2	3	1
4. Environmental Protection Agency			3	3	1
5. Interior	1	4	2		
6. National Science Foundation	1		1	2	3
7. Smithsonian			2	3	2
8. State			2	2	3
9. Transportation			4	1	2
10. Treasury				2	5
11. Other *(Please specify)*					
Aquatic Nuisance Species Task Force				1	
Aquatic Nuisance Species Task Force – Gulf of Mexico			1		
Army Corps of Engineers			1		

17. How would you rate the invasive species coordination efforts between the following entities? (*Check one for each row*)

Coordinating entities	Excellent	Good	Fair	Poor	Very Poor	Does not apply
1. Between this state's government entities (e.g., departments)		4	3			
2. Between this state government and other state governments		3	4			
3. Between this state government and the federal government		4	3			
4. Between this state government and local governments		4	1	2		
5. Between this state government and universities/colleges		5	1	1		
6. Between this state government and the private sector		2	4	1		
7. Other entities (*Please specify*)						
Non-profits	1					
Exotic Pest Plant Council	1					
Regional water management districts	1					
Tribes				1		
The Nature Conservancy		1				

18. Please discuss below your responses to question 17 above, related to your assessment of coordination efforts, including differences in state entity (e.g., department) answers, suggestions for improvement, and invasive species/activities for which coordinating entities (e.g., regional) are needed.

    6 responses

Comments

19. The intent of Executive Order 13112 is to improve the management of federal agencies in:
    - preventing the introduction of invasive species,
    - providing for their control, and
    - minimizing the economic, ecological, and human health impacts that they cause.

    In your opinion, in the event that Congress were to enact legislation incorporating the provisions of the order, what changes, if any, should be made in the order's language?

    6 responses

20. In your state, what are the key roles of (a) the federal government, (b) the state government, and (c) local governments regarding invasive species activities? How should these roles be different, if at all, than they are?

A. Federal government role

7 responses

How should this role be different, if at all?

7 responses

B. State government role

7 responses

How should this role be different, if at all?

7 responses

C. Local government role

7 responses

How should this role be different, if at all?

7 responses

Thank you for your help!

Responses to Question 6

The table below lists the top five invasive species for the seven states, from greatest to least, according to their fiscal year 1999 reported expenditures.

Table 10: Invasive Species Receiving the Greatest Funding from Surveyed States

	Expenditures for Each State's Top 5 Invasive Species, FY 1999				
State	**1**	**2**	**3**	**4**	**5**
California	Medfly $9,434,000	Pink bollworm $6,492,000	Red imported fire ants $3,077,000	Hydrilla $2,269,000	Water weed $2,155,000
Florida	Citrus canker $29,081,992	Hydrilla $18,924,805	Fruit flies $6,356,602	Melaleuca $4,004,587	Did not report 5th species
Hawaii	Banana bunchy top disease $350,000	Fire tree $100,000	Ivy gourd $100,000	Brown tree snake $78,700	Miconia $50,000
Idaho	Scotch thistle $2,742,863	Spotted knapweed Unknown	Leafy spurge Unknown	Rush skeletonweed Unknown	Yellowstar thistle Unknown
Maryland	Asian tiger mosquito $250,000	Gypsy moth $209,000	Phragmites $43,000	Nutria $43,000	Pine shoot beetle $35,000
Michigan	Sea lamprey $3,000,000	Eurasian watermilfoil $115,000	Purple loosestrife $65,000	Curlyleaf pondweed $50,000	Zebra mussels $16,000
New York	Asian long-horned beetles $1,500,000	Sea lamprey $275,000	Eurasian watermilfoil $260,000	Zebra mussels $150,000	Purple loosestrife $40,000

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