

National Management Plan: Executive Summary

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Invasive species affect each of our lives, all regions of the U.S., and every nation in the world. Society pays a great price for invasive species - costs measured not just in dollars, but also in unemployment, damaged goods and equipment, power failures, food and water shortages, environmental degradation, increased rates and severity of natural disasters, disease epidemics, and even lost lives. Stimulated by the rapid global expansion of trade, transport, and travel, invasive species and their costs to society are increasing at an alarming rate.

For centuries, people have moved organisms around the world. Plants and animals, and their products, are imported into the U.S. to be used, for instance, as food, construction materials, ornamental plants, livestock, and pets. Organisms that have been moved from their native habitat to a new location are typically referred to as "non-native," "nonindigenous," "exotic," or "alien" to the new environment. Most U.S. food crops and domesticated animals are non-native species, and their beneficial value is obvious - for instance, managed livestock are examples of non-native species which are not invasive. Many other non-native species are simply benign. However, a small percentage cause serious problems in their new environments and are collectively known as "invasive species".

An "invasive species" is defined as a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. (Executive Order 13112, Appendix 1). This National Invasive Species Management Plan (Plan) focuses on those non-native species that cause or may cause significant negative impacts and do not provide an equivalent benefit to society.

The means and routes by which invasive species are imported and introduced into new environments are called "pathways." Some non-native organisms that are intentionally imported escape from captivity or are carelessly released into the environment and become invasive. While most importations are legal, smuggling of invasive species also occurs. Some invasive species arrive as hitchhikers on commodities such as produce, nursery stock, and livestock. Other invasive species are stowaways in transport equipment, such as

packing materials or a ship's ballast water.

One report indicates that the economic cost of invasive species to Americans is an estimated \$137 billion every year (Pimentel *et al.* 2000). The Formosan termite costs an estimated \$300 million in property damage annually in New Orleans (Bordes pers. comm.). Zebra mussels invaded the Great Lakes through ballast water, and clog water intake pipes needed by a variety of industries.

Up to 46% of the plants and animals Federally listed as endangered species have been negatively impacted by invasive species (Wilcove *et al.* 1998). While purple loosestrife has beautiful purple flowers, it also diminishes waterfowl habitats, alters wetland structure and function, and chokes out native plants. The Asian longhorned beetle, which probably arrived in solid wood pallets made in China, is causing the destruction of valuable city trees and could spread to natural forests. The nutria, a large rodent native to South America originally imported for a private zoo, now exists in the wild and is devastating large portions of wetland ecosystems.

The newly introduced West Nile virus, an invasive virus which is transmitted to humans by mosquitoes that feed on the blood of infected animals, now threatens people and animals in 12 eastern States and the District of Columbia. Cholera and some of the microorganisms that can cause harmful algal blooms along the U.S. coast are moved in the ballast water carried by large ships. Imported red fire ants cause painful and potentially deadly stings to humans, livestock, and pets in the southern U.S..

Farmers, ranchers, scientists, State officials, and many others have urged the Federal government to consider invasive species issues a priority and to develop a coordinated national effort to address the problem. In response, the President issued Executive Order 13112 on Invasive Species (Order) in February 1999. The Order established the National Invasive Species Council (Council), co-chaired by the Secretaries of Agriculture, Commerce and the Interior; and includes the Secretaries of State, Treasury, Defense, and Transportation, and the Administrator of the Environmental Protection Agency. The Order directs the Council to form a non-Federal Invasive Species Advisory Committee (ISAC) to advise the Council in its work. The Council (specifically, the eight department members) is to: provide national leadership on invasive species; see that their Federal efforts are coordinated and effective; promote action at local, State, tribal and ecosystem levels; identify recommendations for international cooperation; facilitate a coordinated network to document and monitor invasive species; develop a web-based information network; provide guidance on invasive species for Federal agencies to use in implementing the National Environmental Policy Act; and prepare the Plan - this document.

This Plan presents nine interrelated and equally important areas that the Council considers priorities in addressing invasive species problems. The following actions are recommended. The Council will undertake these actions in coordination and partnership with other stakeholders as appropriate:

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Leadership and Coordination: The Council is directed by the Order to

provide national leadership and oversight on invasive species and to see that Federal agency activities are coordinated, effective, work in partnership with States, and provide for public input and participation.

When appropriate, the Council and its staff will draw on various existing organizations for coordination and leadership. These include, among others, State agencies, State invasive species committees and councils, regional organizations such as regional weed boards, the Aquatic Nuisance Species Task Force (ANSTF), the Federal Interagency Committee on the Management of Noxious and Exotic Weeds (FICMNEW), the Committee on Environment and Natural Resources (CENR), and various non-government organizations. The States play a key role in the management of invasive species within their borders; therefore, this Plan reflects the need to build capacity and capability at State and local levels to coordinate, detect, and respond to invasive species. Additional steps are also needed to ensure a unified, effective, and coordinated Federal response.

Response:

- Establish a transparent oversight mechanism for use by Federal agencies in complying with the Order and reporting on implementation.
- Ensure that a clearly defined process will be developed and procedures will be in place to resolve jurisdictional and other disputes regarding invasive species issues.
- Conduct an evaluation of current legal and regulatory authorities relevant to invasive species.
- Prepare an analysis of legal and policy barriers to coordinated and joint actions among Federal agencies.
- Identify at least two major invasive species issues, regulations, or policies where coordination is inadequate and take action that fixes the problem.
- Coordinate and provide to the Office of Management and Budget (OMB) a proposed cross-cut budget for Federal agency expenditures concerning invasive species.
- Convene a working group of agency leads on international agreements relevant to invasive species.
- Prepare a 2-year work plan identifying specific initiatives to work with State, local and regional organizations.
- Prepare and issue guidance on invasive species for Federal agencies to use in implementing the National Environmental Policy Act (NEPA).

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Prevention: The first line of defense is prevention. Often, the most cost-effective approach to combating invasive species is to keep them from becoming established in the first place. Diverse tools and methods are needed to prevent invasive species from becoming established in ecosystems where they are not native. A risk-based approach is mandated by the Order and requires consideration of the likelihood an invasive species will establish and spread as well as the degree of harm it could cause.

Response:

- Develop a fair, feasible, risk-based comprehensive screening system for evaluating first-time intentionally introduced non-native species in consultation with the Invasive Species Advisory Committee (ISAC), State governments, scientific and technical experts and societies, and other stakeholders, including affected industries and environmental groups.
- Develop modifications to the screening system or other comparable management measures (i.e., codes of conduct, pre-clearance or compliance agreements) to formulate a realistic and fair phase-in evaluation of those intentional introductions currently moving into the U.S., in consultation with ISAC, State governments, scientific and technical experts and societies, and other stakeholders, including affected industries and environmental groups.
- Identify the pathways by which invasive species move, rank them according to their potential for ecological and economic impacts, and develop mechanisms to reduce movement of invasive species.
- Take the steps to interdict pathways that are recognized as significant sources for the unintentional introduction of invasive species.
- Implement a process for identifying high priority invasive species that are likely to be introduced unintentionally and for which effective mitigation tools are needed.
- Develop a risk assessment program for the intentional and accidental introduction of non-native species through U.S. international assistance programs and encourage other countries and international organizations to do the same.

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Early Detection and Rapid Response: We cannot prevent all introductions. However, early detection of introductions and quick, coordinated response can eradicate or contain invasive species at much lower cost than long-term control, which may be infeasible or prohibitively expensive. Invasive species should be detected and dealt with before they become established and spread. An integrated approach involving research and development, technical assistance, and operations is needed to facilitate and implement effective action. No comprehensive national system is in place for detecting and responding to incipient invasions. Unfortunately, inadequate planning, jurisdictional issues, insufficient resources and authorities, limited technology, and other factors often hamper early detection and rapid response in many locations.

Response:

- Take steps to improve detection and identification of introduced invasive species, recognizing the need for jurisdictional coordination.
- Develop a program, in close cooperation with State and local efforts, for coordinated rapid response to incipient invasions.
- Develop and recommend to the President draft legislation, in consultation with the States, to address rapid responses to incipient

invasions, possibly including permanent funding for rapid response activities.

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Control and Management: When invasive species appear to be permanently established, the most effective action may be to prevent their spread or lessen their impacts through control measures. Control and management of invasive species encompasses diverse objectives such as eradication within an area, population suppression, limiting spread, and reducing effects. Complete eradication is not generally feasible for widespread invasive species or where adequate control methods are not available. Integrated pest management (IPM) is an approach to pest control (including invasive species) that flexibly considers available information, technology, methods, and environmental effects. Methods include physical restraints (e.g., fences and electric dispersal barriers), mechanical removal (e.g., hand-pulling, burning and mowing), judicious use of pesticides, release of biological control agents (such as host-specific predatory organisms), cultural practices (e.g., crop rotation), and interference with reproductive capacity (e.g., pheromone-baited traps and release of sterile males). Consideration of cumulative environmental impacts requires that environmentally sound methods be deployed, especially in vulnerable areas. Because control actions have local effects and cross jurisdictional borders, they are often carried out by or in cooperation with State or local agencies. Adequate funding and public awareness are critical to success.

Response:

- Land management agencies will seek additional resources - through the annual appropriations process consistent with Administration policy - to significantly enhance control and management of invasive species on Federal lands.
- Develop and recommend to the President draft legislation to authorize matching Federal funds for State programs to manage invasive species.
- Explore and, as appropriate, adopt sanitation and exclusion methods for preventing spread of invasive species.
- Develop and issue a protocol for ranking priority of invasive species control projects at local, regional, and ecosystem-based levels.
- Develop a proposal for accelerating the development, testing, assessment, transfer, and post-release monitoring of environmentally safe biological control agents.
- Develop a proposal for cooperation with private industry to utilize current programs and to facilitate development, testing, transfer and training concerning use of environmentally compatible pesticides and herbicides in controlling invasive species.
- Prepare a list of connecting waterways to develop a strategy for preventing movement of aquatic species among watersheds and initiate a research program on methods to prevent such movement.
- Expand opportunities to share information, technologies, and technical capacity on the control and management of invasive species with other countries, promoting environmentally sound practices.

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Restoration: Executive Order 13112 requires Federal agencies to "provide for restoration of native species and habitat conditions in ecosystems that have been invaded." Without restoration, areas may become reinfested by the same or new invasive species.

Response:

- Develop and issue recommendations, guidelines and monitoring procedures for Federal land and water management agencies to use, where feasible, in restoration activities.
- Identify sources of propagative material for native species in areas of restoration or reclamation projects.
- Prepare draft legislation to authorize tax incentives and otherwise encourage participation of private landowners in restoration programs.
- Develop criteria for the use of non-native species in overseas restoration projects.

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International Cooperation: The U.S. cannot succeed in addressing its domestic invasive species problems unless it takes a leadership role in international cooperation and invests in strategies that raise the capacity of other nations to manage the movement of invasive species. Our ability to prevent invasive species from entering the U.S. depends a great deal on the capability of other countries to effectively manage invasive species and invasion pathways domestically. Once invasive species become established within one country, they pose a threat to an entire region, as well as to trading partners and every country along a trading pathway. If an invasive species never leaves its native country, it will never become a problem in the U.S.. Actions by the U.S. have sometimes contributed to the invasive species problems faced by other countries. Despite good intentions, we have occasionally facilitated the introduction of invasive species to other countries through development assistance programs, military operations, famine relief projects, and international financing.

Response:

- Strengthen and expand U.S. participation in mutually supportive standards and codes of conduct within international fora.
- Develop a strategy and support materials for U.S. representatives to encourage and assist all countries with development of coordinated policies and programs on invasive species.
- Identify the limitations and strengths of existing international agreements and develop a program of work to further strengthen them.
- Outline an approach to a North American invasive species strategy.
- Establish an ongoing process to consider the risks of invasive species during the development of U.S. trade agreements.
- Sponsor technical assistance workshops in other countries.
- Provide financial and technical support to international meetings of policy makers, as well as regional and global programs.

- Conduct a study of international assistance as an invasion pathway.

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Research: Research supports each aspect of the Plan. Complementary research projects ranging from basic investigations with broad application to highly targeted applied efforts are required. Federal research outcomes, where appropriate, will be transferred to Federal, State, local, tribal and private sector stakeholders for their utilization.

Response:

- Include, as part of the cross-cut budget proposal, an initiative to adequately fund Federal invasive species research programs.
- Establish and coordinate a long- and short-term research capacity that encompasses the range from basic to applied research for invasive species. This initiative will build on existing efforts that reflect a range of perspectives and program approaches.
- Prepare a catalog of existing aquatic and terrestrial control methods.
- Develop and implement a plan to strengthen international research collaborations between the U.S. and other countries.

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Information Management: The Council is charged with establishing a coordinated, up-to-date information-sharing system. Although there are many sources of information concerning invasive species, incompatible database formats and other factors impede information sharing. The Council is currently developing an information "gateway" accessible through the Council's website - www.invasivespecies.gov. The long-term goal is to provide accessible, accurate, referenced, up-to-date, comprehensive, and comprehensible information on invasive species that will be useful to local, State, tribal, and Federal managers, scientists, policy-makers, teachers, students, and others.

Response:

- Develop guidance for managing information concerning invasive species in aquatic and terrestrial environments.
- Maintain and enhance the Council's website, www.invasivespecies.gov, on a continuing basis.
- Post and maintain "case studies" on control and rapid response efforts on the Council's website.
- Include a locator for occurrences of invasive species in the United States by county.
- Link the website to major U.S. databases, websites, and most State information networks that deal with invasive species, and to websites in other nations that have active invasive species programs.
- Develop and implement a memorandum of understanding among appropriate Federal Departments to establish an invasive species assessment and monitoring network.
- Expand the website to include information on internationally relevant agreements, codes of conduct, meetings, publications, experts, programs, and financial resources, as well as regional and global invasive species databases.

- Produce an Invasive Species Compendium for North America.

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Education and Public Awareness: How invasive species are viewed is molded by human values, decisions, and behaviors. The prevention and control of invasive species will require modifying behaviors, values, and beliefs and changing the way decisions are made regarding our actions to address invasive species. A wide variety of education, outreach, and training programs are needed.

Response:

- Coordinate development and implementation of a national public awareness campaign, emphasizing public and private partnerships.
- Identify and evaluate existing public surveys of attitudes and understanding concerning invasive species issues.
- Compile a comprehensive assessment of current invasive species communications, education, and outreach programs.
- Develop a model public awareness program that incorporates national, regional, State, and local level invasive species public education activities, including a plan for testing the model over the next year.
- Coordinate development and implementation of an international education campaign.
- Develop a series of education materials to guide organizations in development assistance, industry, international finance, and government sectors to write and implement "codes of conduct."
- Co-host a series of international workshops on invasive species in different regions for policy makers.

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