

**Progress Report on the Meeting the Invasive Species Challenge: National
Invasive Species Management Plan. FY 2004**

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INTRODUCTION

Executive Order 13112 defines an invasive species as a species that is both not native to the region or area and whose introduction causes or is likely to cause harm to the economy, the environment, or harm to animal or human health. Invasive species affect both aquatic and terrestrial habitats, and they can be plants, animals and microorganisms. They occur in all habitats ranging from lakes and rivers, forests and fields, homes and backyards to coast and oceans. Their populations expand across geographic, political, and jurisdictional boundaries. Therefore, trans-boundary coordination is essential. Executive Order 13112 created the National Invasive Species Council (NISC) to coordinate and enhance invasive species actions across boundaries. The National Invasive Species Management Plan (NISC Plan), meeting the Invasive Species Challenge, was finalized in early 2001 and is a critical coordination tool. The NISC Plan serves as a national “blueprint” for federal action on invasive species. The NISC Plan can be found at www.invasivespecies.gov.

The 57 action items in the NISC Plan contain 170 identifiable actions (Table 1). Of the 170 identifiable actions, 70 are “discrete” (i.e., calling for work that once completed will require little on-going coordination and few (if any) routine revisions or supplementations), and 100 that are “on-going” (i.e., calling for work that will require a continuing commitment of resources to coordinate). Coordination efforts for “discrete” action items are reported as either: completed; in progress; or not begun. Coordination efforts for “on-going” action items are reported as either: established; in progress; or not begun (Table 1). About 75% of the NISC Plan’s action items are completed/established or in progress, indicating both significant progress made and important work that remains to be done.

The NISC Plan action items are grouped within nine general categories:

- Leadership and Coordination
- Prevention
- Early Detection and Rapid Response
- Control and Management
- Restoration
- International Cooperation
- Information Management
- Research
- Education and Public Awareness.

Information in this report was compiled from information provided by NISC members’ representatives. In particular, NISC member representatives from the Department of Interior (DOI), United States Department of Agriculture (USDA), Department of Commerce (DOC), and Environmental Protection Agency (EPA) contributed to this report. A brief description of the action items and accomplishments under those action items are summarized in this report (for the original information received from NISC members’ agencies concerning their progress on specific action items, see www.invasivespecies.gov). Certain accomplishments advance several action items. However, accomplishments are listed under only one action item. This progress report focuses on NISC Plan implementation actions in FY 2004 and through the first part of FY

2005. Earlier implementation actions are included in the 2003 NISC Plan Report at www.invasivespecies.gov. This report contains only accomplishments reported to NISC staff members that concern NISC Plan action items; it is not a listing of the general invasive species duties or specific accomplishments of NISC staff members or NISC members' departments.

LEADERSHIP AND COORDINATION

Leadership and Coordination of the complex and extensive federal invasive species efforts is identified in the EO as central to the mission of NISC. The NISC Plan's first set of actions strengthen leadership and coordination. They call for NISC to measure and track progress under the NISC Plan; facilitate cooperation on budget and project planning; analyze federal laws and regulations related to invasive species; and monitor progress under the EO throughout the federal government.

Invasive species leadership and coordination is an enormous task. Federal invasive species spending data that are available for compilation totaled about \$1.2 billion (figure 1). There are 27 federal laws, over 300 programs, 170 groups, and 150 organizations that have some role in invasive species. NISC staff members have amassed about 800 scientific references concerning invasive species. Across the U.S. and elsewhere, NISC staff members have contact with about 2,800 individuals that are engaged on the issue. Currently, 17 States have invasive species councils or similar coordinating structures (figure 2).

Action Item 1: Establish a transparent oversight/implementation mechanism for use by federal agencies in complying with the EO.

- NISC finalized its implementation (oversight) mechanism in January 2004. This mechanism calls on NISC members to report on implementation of the EO. For example, USDA has submitted reports for all participating USDA agencies in late calendar 2004 and early 2005.
- NISC staff members are developing new reporting methods that streamline the reporting requirements contained in the EO and the NISC Plan. NISC members will soon be able to submit a single annual report to cover all regular reporting requirements, including those related to oversight and NISC Plan implementation.

Action Item 3: Conduct an evaluation and analysis of current federal invasive species legal authorities and regulations.

- NISC has contracted with the Environmental Law Institute (ELI) to conduct an evaluation of current federal legal authorities and regulations related to invasive species. ELI has completed the initial research on legal authorities and regulations and drafted an overall report outline. Currently, ELI is working with NISC to plan the second phase of the analysis concerning how existing authorities may be better utilized.
- NISC staff members provided comments on several pieces of invasive species legislation and reports including: 1) bills proposed to reauthorize the National Invasive Species Act; 2) ballast water regulations; 3) *The State of The Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States* by the H. John Heinz III Center for Science, Economics and the Environment; and 4) sections of the National Oceans Commission Report that address invasive species.

Action Item 4: NISC members shall submit reports summarizing their invasive species activities.

- NISC members are required to report to NISC staff members on their invasive species activities relating to the oversight mechanism (see action item #1), progress under the NISC Plan, general invasive species programs, and the invasive species crosscut budget.
- NISC staff members compile weekly and bi-weekly reports on invasive species activities, meetings, developments, and issues. This contributes to interdepartmental coordination and updates NISC member agencies on progress under the NISC Plan and the EO more frequently than what is achieved by the annual reporting requirements.
- The U.S. Forest Service (FS) identified invasive species one of their four priorities in their National Forest Strategy of October 2004, and FS drafted a specific strategic plan for invasive species. The FS plan is designed to in part further certain objectives of the NISC Plan.

Action Item 6: Improve coordination on at least two major invasive species issues.

- NISC staff members and Policy Liaisons continue to make progress on several specific invasive species issues, such as following up on the 2004 Brown Treesnake Program Expert Review Panel report recommendations. Multiple agencies from NISC members' departments including USDA, DOI, DOD, and DOC contributed to these efforts.
- NISC Policy Liaisons hosted a series of discussions to improve communication on biocontrol for tamarisk and implications for the endangered southwestern willow flycatcher. Both ARS and FWS participated.
- NISC was asked to coordinate federal comments on reports concerning invasive species. For example, NISC members' agencies (including BOR) provided comments to the draft in the invasive species chapter (Chapter 17) of the U.S. Commission on Ocean Policy, National Ocean Commission report identifying high priority aquatic invasive species issues.

Action Item 7: Provide OMB an invasive species crosscut budget.

- In FY 2004, NISC completed the first invasive species performance-based crosscut budget. NISC also completed crosscut budgets for FY 2005 and FY 2006 and is currently drafting a fourth crosscut budget for FY 2007. Based upon the initial efforts, changes were made that expanded and streamlined the process. It now includes two distinct sections – General Categories, which compiles total invasive species funding from participating federal departments within seven defined General Categories; and a set of Specific Invasive Species Initiatives. These initiatives require inter-agency cooperation and identify performance measures that are used to quantify the results.

- In the FY 2005 and FY 2006 invasive species performance-based crosscut budgets, 18 and 17 agencies participated, respectively. (for summaries of invasive species crosscut budgets see *www.invasivespecies.gov*).

Action Item 8: Report on progress under the NISC Plan and update and revise the NISC Plan every two years.

- This NISC Plan Progress Report summarizes NISC member activities and programs through the first quarter of FY 2005. In particular, NISC member representatives from the DOI, DOC, USDA, and EPA contributed to this report along with combined input from all three NISC co-chair departments.
- In FY 2004, leaders of USTR and NASA joined NISC.
- The NISC Plan and EO call for NISC to revise and update the NISC Plan regularly (i.e., every two years). Based on recommendation of ISAC, NISC delayed the NISC Plan update for one year. In FY 2004, NISC began plan revision. NISC staff members drafted a detailed “Road Map” for NISC Plan revision based on input from NISC members’ representatives, ISAC, OMB, and GAO.

Action Item 9: Assess the effectiveness of Executive Order 13112 after five (5) years.

- On May 13, 2005, NISC approved the five-year EO assessment report. It is due to be finalized and submitted to OMB on September 25, 2005, following OMB acceptance, it will be available to the public.

Action Item 10: Facilitate communication and cooperation on international agreements relevant to invasive species.

- NISC has established several mechanisms which are detailed the International section of this report that concern communication and cooperation on international agreements.

Action Item 12: Draft, in cooperation with CEQ, guidance to federal agencies on addressing the prevention and control of invasive species issues in the context of NEPA.

- NISC staff members and Policy Liaisons have prepared an initial draft of the guidance which is being reviewed by CEQ.
- BOR is currently revising its NEPA policies and maintaining inter-service agreements.
- NPS has developed two multi-park NEPA compliance documents regarding invasive plants.
- BLM is currently developing a programmatic environmental impact statement for vegetation management, including invasive plants that will assist in future site-specific NEPA analysis.

PREVENTION

Prevention is the first line of defense against invasive species and is a primary focus of NISC. Prevention efforts must have the coordinated support of many federal agencies as well as states, tribes, local entities, industry and other stakeholders. Regulatory and non-regulatory actions such as management plans, codes-of-conduct and education and outreach efforts all are important tools that can be applied within a comprehensive strategy to prevent the establishment of invasive species.

Action Item 13: Adding human and financial resources to strengthen inspection services at ports of entry.

- To prevent invasive species arriving at ports, additional APHIS and FWS resources for port inspections were secured in FY 2004. APHIS spending in its agricultural quarantine inspection program totaled about \$144 million in FY 2004, including \$119 million from AQI user fees. In addition, approximately \$194 million in AQI user fees were transferred to DHS for port-of-entry inspection activities.
- On December 10, 2004, APHIS published an Advance Notice of Proposed Rulemaking concerning regulations in 7 CFR Part 319.37 (Plant Quarantine 37). Currently, unless their importation is specifically prohibited, plant propagative materials are allowed to enter the U.S. if they have a phytosanitary certificate and are free of pests. APHIS is considering several changes, including establishing a category of plant propagative material that could not be imported until risk evaluation and approval was complete and reevaluating the risks posed by currently prohibited plants. Additionally, APHIS is working to determine the volume, type, and origin of plants entering the U.S.
- ARS scientists in Maryland have determined the scientific names of over 3,682 “urgent/priority” insects and mites that were intercepted at the ports-of-entry by APHIS. This effort is a vital to the interception work that prevents invasive species from entering the U.S. through imported commodities.

Action items 14 & 15: Develop risk-base screening processes for evaluating potential invasiveness on proposed introductions of non-native species.

- FS researchers evaluated and adapted the Australian/New Zealand Weed Risk Assessment protocol for use in Hawaii and other Pacific islands. It is currently being used by the State of Hawaii to develop outreach programs that reduce the sale of potentially invasive species.
- NISC and ANSTF formed joint screening working groups. These include the Hawaiian Island Screening Working Group, the Aquatic Species Screening Working Group, and the Propagative Plants Screening Working Group. These three screening working groups

are coordinated by the Prevention Committee made up of NISC, ISAC, and ANSTF representatives.

Action item 16: Address unintentional introductions by mitigating ballast water and solid wood packing material pathways.

- NOAA and the Great Lakes Panel of ANSTF sponsored a meeting of Great Lakes and Baltic scientists that work on invasive species prevention and other research areas.
- NOAA and FWS continue to fund research on new ballast water technologies including filtration, thermal treatment, UV radiation, ozone injection, nitrogen injection, and biocides. Certain technologies are showing promise, and the Maritime Administration of DOT and USGS are providing testing platforms for full-scale tests of promising technologies.
- In order to adopt sanitation measures for ballast water handling, Sea Grant and USCG have issued information on ballast handling techniques and St. Lawrence Seaway Development Corporation has issued regulations covering such techniques.
- APHIS amended its regulations for the importation of “unmanufactured wood” for solid wood packing materials. The standard calls for wood packaging material to be either heat treated or fumigated with methyl bromide. Treated products are to be marked with an approved international symbol certifying treatment. The rule takes effect September 16, 2005.

Action item 17: Implementation of a process for identifying high priority invasive species that are likely to be introduced unintentionally.

- APHIS initiated the design and development and pilot scale tests of OPIS which is a global exotic pest surveillance program that uses a web-accessible database tool for collection, reporting, analysis, dissemination, and utilization of information on the status of significant plant and animal pests and diseases in foreign countries.

Action item 19: Develop guidelines to minimize the spread of invasive species during U.S. based international assessment and relief programs.

- The Peace Corps, in consultation with NISC, issued guidance to all Associate Peace Corps Country Directors in all Peace Corps countries regarding avoiding using invasive species in volunteer development projects, and encouraging the use of native species whenever possible.

Action item 20: Develop a system for evaluating invasive species pathways and mitigation strategies.

- NISC and ANSTF jointly formed a Pathways Working Group to address this action item. The goal-oriented Pathways Working Group is being coordinated with a Risk Analysis

Working Group and three Screening Working Groups through a Prevention Committee made up of NISC, ISAC, and ANSTF members.

EARLY DETECTION & RAPID RESPONSE:

Costs of detecting, containing, and eradicating initial invasive populations, though substantial, are far less than those of control programs for widely established species. EDRR efforts are critical to the prevention of the establishment of invasive species. NISC and ISAC recognize the importance of advanced planning and preparedness, that results in well-planned, decisive, coordinated, and timely responses to invasions. These are the critical aspects of EDRR.

Action Item 21: NISC will improve detection and identification of introduced invasive species.

- Many NISC agencies have established and improved specific EDRR monitoring and detection programs. One example is the invasive plant pathogen that causes Sudden Oak Death (SOD - also called Ramorum Blight), that is receiving coordinated interdepartmental attention. This pathogen (*Phytophthora ramorum*) is a type of Oomycete, and it could devastate forests in the U.S. if not found and eradicated. NPS is monitoring for SOD at Great Smokies and Shenandoah National Parks. This work is done in cooperation with ARS and the FS, whose Forest Health Monitoring Program for SOD now includes 37 states. The Plant Diagnostic Laboratory Network developed by CSREES held diagnostic training workshops for SOD and other invasive plant pathogens, and NRCS distributed information to its centers encouraging monitoring for SOD.
- USGS's Invasive Species Research Center in Fort Collins, Colorado, working with several partners, has created a web-based early detection and rapid reporting database for use by volunteer groups trained to assist in identifying local invasive species. The database is publicly available to any agencies that wish to use the data and may help local mapping and response efforts.
- NOAA's Charleston Lab has developed a genetic profile for detection of the invasive human pathogen *Vibrio spp.* This bacterium can cause Cholera in humans, and it can be moved in ships' ballast water. NOAA is studying the potential for horizontal gene transfer in *Vibrio cholerae* to better understand this disease causing agent.
- Along the Gulf Coast of the U.S., NPS is assisting APHIS in preparing a research permit to use pheromone traps to detect cactus moth (*Cactoblastis cactorum*) that may have blown inland during the 2004 hurricanes. ARS scientists in Miami, Florida have developed a synthetic lure for the cactus moth. Laboratory and field tests performed by ARS and APHIS-CPHST are underway in Florida to determine the optimum release rates and ratios of the lure chemicals. This lure will allow scientists to monitor the spread of the cactus moth as well as determine effectiveness of control treatments.

- Little may be known about certain new invasive species. The correct identification of specimens is critical. NOAA developed a list of over 100 taxonomic experts who can identify specimens. Further, ITAP developed a survey to be sent out to federal institutions to identify taxonomic experts and gaps in taxonomic knowledge.
- New invasions may be found fortuitously by individuals. To help with this, NRCS identification aids have been distributed to the public urging them to check federal and state noxious weed lists, view current invasive plant distribution maps, submit records of the occurrence of these plants, and report new sightings.
- Effective EDRR requires strong public awareness and involvement. Many agencies have public education programs that support EDRR efforts with cross training and volunteer programs. They have increased public curiosity and awareness of the environment. For example, BLM is collaborating with local Coordinated Weed Management Areas and the state of Wyoming to test the different elements of FICMNEW EDRR plan for invasive plant. The concepts of the FICMNEW EDRR plan have been integrated into all of BLM's actions with over 50 Coordinated Weed Management Areas in the western U.S.
- Monitoring high risk areas and knowing what is present before an invasive species arrived (baseline data) are essential to the early detection of new invasions. ANSTF members have instituted systematic monitoring programs for aquatic invasive species in San Francisco Bay, Puget Sound, the Lower Columbia River, Prince William Sound, Honolulu Harbor, Mobile Bay, Chesapeake Bay, and Massachusetts Bay. This is providing baseline surveys of aquatic organisms that occur in those systems as well as looking for new invasions.
- FS Early Detection Program has extended its invasive insect monitoring to an additional 10 U.S. ports. Ports are often the first place invasive species arrive and become established.
- To help halt the establishment of new invasive species populations, NPS became a partner in NOAA Sea Grant Stop Aquatic Hitchhikers campaign. Five federal agencies & State governments have entered into a MOU to support EDRR efforts in the Great Lakes.

Action Item 23: NISC in coordination with other federal, state, local, and tribal agencies will develop a program for coordinated rapid response to incipient invasions of both natural and agricultural areas and pursue increases in discretionary spending to support this program. Actions include: establishment of invasive species "rapid response" teams that include management and scientific expertise; creating a guide for rapid response teams; development and testing of methods to determine which rapid response measures are most appropriate for a situation; and providing input and comments or help coordinate comments on proposed legislation, revisions of policies and procedures or regulations.

- Once invasions are detected, a rapid response can prevent their establishment and spread. Interagency rapid response strike teams have been crucial to invasive weed control and have been established in FS, FWS, and NPS. The 16 NPS EPMT treated over 132,000

acres and worked with 1.5 million dollars from partnerships to eradicate invasive weeds. NPS worked cooperatively with FWS to initiate the Florida and Great Plains FWS mobile strike teams. EDRR funding was provided to all of the FS Regions by FS to eradicate new infestations of invasive plants. BLM expanded its cooperative efforts with several CWMA to focus on Tamarisk in the Southwest and Leafy spurge in the Northern Great Plains.

- ARS scientists have used aerial surveillance, ground-truthing, and underwater video technology to discover the presence of curlyleaf pondweed in Lake Tahoe, Nevada. This highly invasive plant has been damaging in other countries and has significantly affected aquatic systems in the Northeastern U.S. An EDRR team was established to determine the extent of the infestation and try to eradicate this weed before it spreads and alters aquatic systems in the West.
- The FWS and USGS are testing predictive models established at Hart Mountain National Wildlife Refuge that provide a refuge-wide survey of the invasive species. In North Carolina and Oregon, FS established early warning research centers for invasive species of forests and rangelands.

CONTROL & MANAGEMENT:

The primary focus of NISC is prevention of new invasions. However, currently many invasive species are established widely. Sustainable long-term management of established invasive species populations will continue to receive attention. Control measures (e.g., biological control agents) are used to reduce their population growth, spread, and overall impacts. Invasive populations often cross jurisdictional boundaries and cover extensive areas. To be successful, control efforts must be coordinated across jurisdictions and amass the resources needed for what are often large-scale complex projects.

Action item 26: Calls on NISC to develop and adopt sanitation methods that reduce the likelihood that invasive species will be spread. Preventing and slowing the spread of invasive species are important aspects of control efforts. A wide variety of sanitation measures are being adopted by NISC members' agencies.

- BLM has identified preventing the spread of invasive species as a consideration for all of their programs and actions, and prevention and other aspects of invasive weed management are identified in Healthy Forests Initiative, National Fire Plan, and BLM's Standards and Guidelines for Rangeland Management.
- FS has implemented equipment sanitation policies to avoid invasive seed contaminated soils from spreading along transportation routes. They have developed a standard portable vehicle washer system for fire equipment; and they released Dutch elm disease resistant and white pine blister-resistant trees.

- NPS has deployed hiking boot washers to reducing the spread of the invasive plant pathogens, adopted weed free forage requirements in some parks to prevent the spread of invasive plants, and developed a Firewood Pest Alert to prevent the spread of invasive insects.
- NOAA funded a feasibility study for the construction of an aquatic invasive species barrier in the Lake Chaplain canal.
- BOR provided education materials to watercraft users help prevent the spread of aquatic invasive species.

Action Item 27: Calls for the drafting of legislation to authorize funds for State invasive species initiatives. Supporting State, Private, and federal programs is critical to controlling invasive species.

- Authorizing legislation, the Noxious Weed Control and Eradication Act of 2004 (formerly S.144) was passed. It requires the Secretary of Agriculture to establish a program to provide assistance to eligible weed management entities to control or eradicate noxious weeds on public and private land. Thus far, no funds have been appropriated under this legislation.

Action Item 28: calls for the development of an accelerated process for the development of biological control agents. Biological control agents can be very effective on certain invasive species.

- To develop biological controls, USDA FS scientists investigated a naturally occurring fungus *Ustilago bullata* to control cheatgrass, developed strategies for biological control of hemlock wooly adelgid, sudden oak death, and emerald ash borer, and hosted the 2004 Interagency Research Forum on gypsy moth.
- ARS released natural enemies for many invasive pests, including: *Diorhabda elongata* (beetle) for Tamarisk; *Cyrtobagous salviniae* (weevil) for giant salvinia; *Puccinia jaceae* (rust fungus) for yellow star thistle; *Oxyops vitiisa* (weevil) and *Boreioglycaspis melaleucae* (psyllid) for melaleuca; two *Pseudacteon* species (decapitating flies) for fire ants; natural enemies of the olive fruit fly; and many others.
- BOR is working with USDA to develop post-release monitoring protocols for biological control agents.

Action Item 29: calls for the testing and training of personnel in the proper use of pesticides. Well trained individuals are essential to control efforts.

- The USDA FS provided pesticide applicator training to rangeland and forest health specialists.

- NPS developed Student Conservation Association Invasive Species Project Teams. Five teams have been deployed. The National Park Service developed a standard Integrated Pest Management training module with USDA CSREES and other agencies.
- On refuges, the U.S. FWS has established six volunteer programs to map and monitor invasive plant infestations. These partnerships help develop professionals and involve the public in conservation while serving forests, parks, and refuges.
- To assist in invasive species coordination efforts, an IPM-policy specialist position was created at BOR, and the BOR has established working relationships, maintained existing Memorandums of Understanding (MOU), and entered into new MOUs with State agencies that involve invasive species.

Action Item 31: calls for funding requests consistent with Administration policy to be requested within the appropriation process. Certain control efforts require significant financial resources to be shared among partners engaged in coordinated efforts.

- Several control initiatives are included in the Invasive Species Performance Based Crosscut Budget (see Leadership and Coordination).
- Since 2000, BLM has inventoried over 567 million acres for invasive plants, treated invasive plants on 1.4 million acres while partnering to control invasive species with over \$7.5 million dollars.

Action item 32: calls on NISC to develop and issue guidance for ranking the priority of invasive species control projects at local, regional, and ecosystem-based levels. Planning is essential to coordination.

- To help guide the process of establishing priorities, NISC developed and approved the first version of the Guidelines for Ranking Invasive Species Control Projects.
- NPS developed a best management practices manual to assist park managers in planning prevention and control efforts.
- NRCS's Invasive Species policy was published to help decision makers understand invasive species and control efforts.

RESTORATION:

Once invasive species are removed, plant and animal communities may be able to recover with little additional action. However, impact of certain species is so profound that plant and animal communities cannot recover. In addition, efforts used to control invasive populations may be highly specific for that species and have little effect on other invasive species. The removal of the dominant invasive species may release a less prevalent invasive species from competition allowing it to proliferate. Therefore, restoration efforts are critical to the long-term success of invasive species of certain control efforts.

Action item 33: Identify sources of propagative material for native species in areas of restoration or reclamation projects.

- To aid identification and sourcing of native propagative materials for restoration projects, NRCS Plant Materials and PLANTS websites provided over 500 Plant Guides and Fact Sheets. Additional fact sheets are being added as they become available. An NRCS Plant Materials publication module (PM Pubs) was added to the website to provide access to the scientific literature concerning restoration and monitoring. NRCS's PMC continued to improve their ability to support restoration projects, such as by providing plants and restoration technologies for use in arid lands and other areas. In addition, PMC are working specifically with tribes to protect culturally significant plants from damage by invasive species such as black ash which is at risk from emerald ash borer in Michigan.

Action item 35: Develop and issue recommendations and guidelines for Federal land and water management agencies to use in restoration activities.

- BLM has developed a restoration course entitled "*Selecting Native plant materials to meet management goals.*" BLM also developed the "*Seeds of Success*" native plant program to promote plant regeneration practices.
- BLM has established national policy and guidance from BLM's National Seed Warehouse for transplantation, augmentation, and reestablishment of habitat on public land will be tested and certified weed free before it is purchased and used on BLM managed lands.
- To address certain restoration programs mandated by law, the NPS has developed and tested a restoration assessment tool for invasive species. The purpose of the tool, known as the Restoration Rapid Assessment Tool is to conduct rapid assessments which require little gathering of additional information to rate a site. Sites are ranked in two categories; on their feasibility of restoration and their site value. Results of field testing and subsequent adaptation to current invasive species restoration guidelines and monitoring procedures will occur in FY 2005.
- BOR is working to recover saltcedar habitats by identifying native and non-native plant materials for restoration efforts.

INTERNATIONAL COOPERATION

Invasive species issues are global. The U.S. cannot be fully successful without the cooperation of international partners. The capacity of other nations to manage their invasive species and to cooperate with the U.S. is critical for success.

Action item 37: Further develop and apply international standards and agreements for invasive species.

- NOAA experts were involved in the IMO development of international standards for ballast water.
- APHIS officials have continued to work closely with their international counterparts on the development and implementation of invasive species plant and animal health standards.
- ARS operates overseas biological control laboratories (in Montpellier, France; Beijing, China; Brisbane, Australia; Rome, Italy; Hurlingham, Argentina; and Thessaloniki, Greece) to facilitate discovery, collection and testing of host-specific natural enemies for key invasive species, including developing formal and informal relationships with many groups and countries.

Action item 38: Develop a North American invasive species strategy to be built upon existing tripartite agreements and regional organizations.

- Completion of a NISC interagency working group concluded that direct involvement within the existing regional organizations would provide the best direction to an overall North American invasive species strategy if followed up with direct bilateral/trilateral talks with our immediate neighbors.
- Communication is underway for NISC to expand their involvement in NAFTA-CEC and to open communication channels with Canada and Mexico directly.
- BOR aided NISC coordination efforts by meeting with representatives of Mexico regarding trans-border saltcedar issues.

Action item 39: Development of an ongoing process to address the risks of invasive species during the development of U.S. trade agreements.

- All international U.S. position papers and negotiated language from the Department of State, on invasive species, is now being coordinated through the NISC offices to help insure the consistency of federal government-wide comment.
- An interagency committee looking at the environmental implication of proposed free trade agreements now includes NISC and considers invasive species implications.

Action item 42: Initiate a study, with the GISP on examining international assistance as an invasion pathway.

- USAID, in cooperation with Global Invasive Species Program (GISP), performed a study of international assistance as a pathway for invasive species to address Action Item 42.

Their findings were summarized in a report entitled “*Linkages Between Development Assistance and Invasive Alien Species in Freshwater Systems in Southeast Asia.*”

RESEARCH:

Research supports each aspect of the NISC Plan by helping to optimize and prioritize resources, provide new tools, increase understanding of current conditions, and provides technical information for public outreach efforts.

Action Item 43: calls upon NISC to work with others to gather information and produce a catalog of existing control methods. Information concerning control methods is a critical to invasive species efforts.

- FS developed a protocol to assess impacts of invasive plants, and conducted research concerning invasive tree management in Puerto Rico. Information was cataloged in the on-line publication “Tree Search”.
- NRCS conducted field trials to evaluate invasive species treatment protocols.
- ERS studied the economic implications of soybean rust entry into the U.S. The role of fire in Tamarisk (Saltcedar) ecology was investigated by the ERS.
- BOR and the interaction of fire frequency and intensity on invasive plants was studied by FS.
- BLM developed tools to reduce cheatgrass-caused wildfires and foster sagebrush recovery in the Great Basin States.
- ARS compiled a list of all its biological control programs, locations and targets.

Action Item 44: calls upon NISC to enhance international research collaborations. International experts, research, and technical support are important to invasive species efforts. NISC members’ agencies are conducting a wide variety of international research collaborations.

- NPS with the University of Florida and USDA continues to address the invasive plants in U.S. Virgin Islands. Part of this project is technical assistance to Grenada and Dominican Republic. Mexican officials observed the deployment of EPMT. These teams are considered models for similar efforts in other countries.
- BOR met Mexican representatives regarding joint tamarisk research opportunities. Similar efforts are underway with BLM field offices along the California, Arizona, and New Mexico international borders.
- The USDA FS is working internationally to develop protocols for detection, monitoring and control of sudden oak death and emerald ash borer.

- The Brazilian Agricultural Research Corporation and ARS signed a MOU to cooperate on agricultural research topics (including invasive species) that are of interest to both countries.

Action Item 45: calls upon NISC to establish and maintain the research capacity through competitive grants and other means. Maintaining and enhancing the current research capacity is critical to NISC's research infrastructure.

- In FY 2004, CSREES' support of invasive species research through the NRI Grant Program was increased.
- FS administered a competitive grant program to plan, manage, coordinate and support sudden oak death and southern pine beetle research.
- USCG established the Environmental Technology Validation program in conjunction with the EPA that will evaluate technologies such as those used to remove invasive species from ballast water.
- NOAA held an internal workshop in Sept. 2004 to identify research priorities.
- ERS PRESIM competitive grants program for economic invasive species management research was continued.
- NISC staff members have compiled and organized over 800 scientific invasive species references.

INFORMATION MANAGEMENT:

The Council is charged with establishing a coordinated, up-to-date information-sharing system which emphasizes the use of the Internet for documenting, evaluating, and monitoring impacts from invasive species on the economy, the environment, and human and animal health.

Action items 47, 48 & 49: Maintenance and enhancement of the www.invasivespecies.gov website, including information on international databases, meetings, and agreements as well as "case studies" highlighting successful efforts.

- NISC's website is hosted and maintained by NAL and is among the most comprehensive web-based resources on the topic. It consists of 500 pages and is linked to a large number of unique invasive species resources. In FY 2004, 7 additional success stories from ARS, 17 additional species profiles, and information concerning domestic and international meetings was added to the site. To assist with the on-going improvements to the site, a website redesign report was finalized October of 2003.

- NISC staff members, working with agencies and programs, highlight a different invasive species approximately every month on www.invasivespecies.gov. The goal of the program is to illustrate the depth and complexity of invasive species issues and offer a chance for the wide variety of federal agencies that work on invasive species issues to be featured. The species are chosen to be representative and are presented for educational purposes.

Action item 50: Development of a federal invasive species assessment and monitoring network.

- FS is developing national data management protocols for invasive species inventory and treatment information and collaborating with Natureserve on the I-Ranks system to assess the risks of invasives in the National Forests System.

Action item 52: Link the NISC website to major federal, state, and international invasive species programs and information websites.

- NRCS PLANTS database is linked to the Council site and receives over 18 million hits each month. The majority of the 50 most frequently viewed pages concern specific invasive species. The distribution of invasive plants in 46 states will be available on the website. Arkansas and Mississippi are slated for addition in 2006. Through an agreement with North Carolina State University the available within-state county-level distributions of invasive species will be added, and further augmented by NRCS data.
- BLM maintains the National Weed Database (linked to NISC site), and NPS and BLM developed the Weeds Gone Wild Calendar for 2005.
- Information on aquatic invasive species is available on the Sea Grant SGNIS website (linked to NISC site), and the ANSTF has a list of primary state contact persons for aquatic invasive species. USGS, FS, and FWS also have websites dedicated to invasive species issues.

Action item 53: Produce an Invasive Species Compendium for North America that includes a broad array of invasive species information.

- The State Department, USDA and DOI continue to provide leadership in developing a Global Invasive Species Network to improve global information sharing. As stated in the Plan, ARS in close cooperation with CABI, has taken the lead in organizing a multi-departmental effort to produce an Invasive Species Compendium for North America.

EDUCATION & PUBLIC AWARENESS:

Public assistance in preventing the spread of invasive species is critical. People may inadvertently contribute to the introduction and spread of invasive species. However, they are also important to the detection of new species and to control efforts. The public is encouraged

to take coordinated and informed action through numerous education and public awareness activities. In addition to federal efforts, many public outreach efforts are produced by local, state and county governments and the private sector. While, many people are aware of individual invasive species, many are not aware that these individual species are facets of the larger invasive species problem. Well-targeted messages that encourage effective action are the primary component of education and outreach efforts on invasive species.

Action Item 56: NISC will coordinate development and implementation of a national public awareness campaign, emphasizing public and private partnerships.

- BLM developed a comprehensive invasive species education plan entitled, “*Within Our Grasp*” as part of Partners in Resource Education. This is a national partnership of educators from BLM, FWS, FS, NRCS, and NPS and the National Environmental Education and Training Foundation. BLM has expanded its environmental education program to provide weed brochures and on-line information BLM Learning Landscapes.
- BOR has established a national awareness campaign that posts public notices concerning invasive species control measures at boat launches.
- Pet Industry Joint Advisory Committee has established a code of conduct for owners of reptiles and amphibians in accordance with The National Reptile Improvement Plan report entitled, *Best Management Practices for Reptile Trade and Hobbyists*. In addition, PIJAC and other partners, i.e., NOAA and FWS, launched a large-scale campaign, entitled “*HABITATTITUDE*,” to encourage pet owners to dispose of aquatic pets and plants responsibly.
- Partners from both the public and private sectors worked together on a volunteer’s toolkit project sponsored by SeaStudios in conjunction with National Geographic’s series, *Strange Days on Planet Earth*. This impact campaign involves training and equipping volunteers at recognized public zoos, science centers, and public aquaria to assist in data collection for early detection and reporting of invasive species. Many NISC members’ agencies and ISAC members participated in “brainstorming” and organizational work on this project, which was pilot tested in May of 2005 at the Sonoran Desert Museum in Arizona.
- NISC also began collecting information from NISC members’ agencies on how to best establish a portal or catalog web resource for collecting and sharing materials, tools, and programs already available for education and outreach on invasive species issues. This effort will be ongoing.
- BLM has utilized the volunteers from SCA and has developed an entire program around Interior’s weed education and outreach efforts, putting college students to work in BLM field offices. They help prevent weeds by educating the community and showing land users how to spot new infestations.

SUMMARY & CONCLUSIONS:

Significant progress on the NISC Plan was made in FY 2004 and in early FY 2005. The effort and resources required to establish or complete individual action items vary widely. However, approximately 76% of the NISC Plan action items are completed, established or begun (Table 1). Major accomplishments in the period covered by this report include:

- NISC Staff members had a role on developing U.S. positions for major international meetings.
- Joint Prevention committees between NISC and ANSTF were established, and within those committees, 5 working groups were initiated and established work plans.
- NISC approved the Guidelines for Ranking Invasive Species Control Projects.
- USTR and NASA joined NISC.

NISC Plan progress tracking is difficult. The NISC Plan is a “blueprint” for coordinated action. Often efforts advance several NISC Plan elements and other objectives simultaneously. To improve the accuracy of tracking these complex efforts, in FY 2004 NISC staff members prepared a comprehensive list of identifiable actions within the NISC Plan and requested specific input from NISC members’ representatives on those actions (Table 1).

Coordination itself requires significant resources. Invasive species coordination is often a collateral duty for people and requires significant commitment of time and other resources. Continued success depends upon a sustained support for coordination and recognition of individuals that contribute to interdepartmental efforts.

Success under the NISC Plan increases the complexity of the coordination challenge. The 57 NISC Plan action items contain a total of 170 identifiable actions conducted by one or more of the 13 NISC departments (Table 1). About 60% of the NISC Plan action items require on-going efforts. As more of these action items are established our capacity to deal with invasive species increases. However, so does the complexity of coordinating those efforts. Additionally, invasive species continue to arrive and spread, further increasing the magnitude of the challenge. NISC coordinated public outreach efforts reach increasing numbers of people. As a result, significant efforts by other countries, states, tribes, local governments and the private sector have been initiated and expanded. The challenge of knowing what is being done, staying current with the scientific literature, tracking legislation, avoiding duplications, identifying strategic approaches, obtaining technical and stakeholder inputs, analyzing efforts, reporting, answering media and public inquires, and supporting decision makers continues to grow. This expansion underscores the need for continued efforts to enhance and expand coordination, planning and collaboration with many partners to minimize harmful effects of invasive species.



Figure 1. State invasive species councils or similar coordination mechanisms (May 2005).

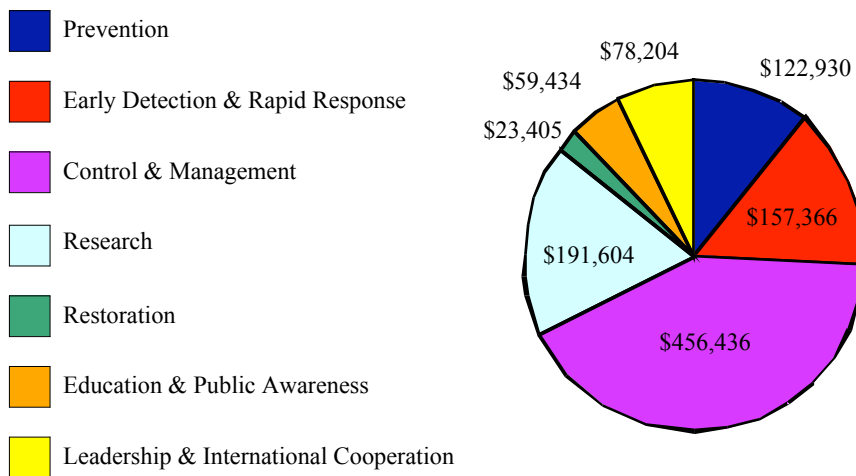


Figure 2. FY 2004, Federal invasive species spending by Category (\$million).

ACRONYMS USED:

ANSTF—Aquatic Nuisance Species Task Force
 APHIS—Animal and Plant Health Inspection Service
 AQI—Agricultural Quarantine Inspection
 ARS—Agricultural Research Service
 BLM—Bureau of Land Management
 BOR—Bureau of Reclamation
 CABI—Commonwealth Agriculture Bureau International
 CEQ—Council on Environmental Quality
 CFR—Code of the Federal Register
 CSREES—Cooperative State Research Education and Extension Service
 CWMA—Cooperative Weed Management Area
 DHS—Department of Homeland Security
 DOC—Department of Commerce
 DOD—Department of Defense
 DOI—Department of Interior
 DOT—Department of Transportation
 EDRR—Early Detection and Rapid Response
 ELI—Environmental Law Institute
 EO—Executive Order on Invasive Species 13112
 EPA—U.S. Environmental Protection Agency
 EPMT—Emergency Plant Management Teams
 ERS—Economic Research Service
 FICMNEW—Federal Interagency Committee for the Management of Noxious and Exotic Weeds
 FS—USDA Forest Service
 FWS—U.S. Fish and Wildlife Service
 GAO—Government Accountability Office
 GISN—Global Invasive Species Information Network
 GISP—Global Invasive Species Programme
 IMO—International Monetary Fund
 ISAC—Invasive Species Advisory Committee
 ITAP—Interagency Committee for Terrestrial Animals and Pathogens
 MOU—Memorandum of Understanding
 NAFTA-CEC—North America Free Trade Agreement-Commission on Environmental Cooperation
 NAL—National Agricultural Library
 NASA—National Aeronautics and Space Administration
 NEPA—National Environmental Policy Act
 NISC—National Invasive Species Council
 NOAA—National Oceanographic and Atmospheric Administration
 NPS—National Park Service
 NRCS—Natural Resource Conservation Service
 OMB—Office of Management and Budget
 OPIS—Offshore Pest Information System
 PIJAC—Pet Industry Joint Advisory Council
 PMC—Plant Material Center

PRESIM—Program of Research on the Economics of Invasive Species Management

ACRONYMS USED Cont.:

SCA—Student Conservation Association

SGNIS—Sea Grant Nonindigenous Invasive Species

SOD—Sudden Oak Death

USAID—U.S. Agency for International Development

USCG—U.S. Coast Guard

USDA—U.S. Department of Agriculture

USGS—U.S. Geological Survey

USTR—U.S. Trade Representative

Table 1. NISC Plan Progress Report FY2004/2005.

The National Invasive Species Management Plan actions are listed with a brief summary. Of the 170 identifiable actions, 70 are “discrete” and 100 are “on-going”. Discrete actions require little on-going coordination and revision once completed and, they are characterized as either: Completed, In-Progress, or Not Begun. On-going action items require continuing coordination and, they are characterized

as either: Established, In Progress, or Not Begun. The NISC Plan contains nine general categories of action: Leadership and Coordination (L&C); Prevention (Pre) ; Early Detection and Rapid Response (EDRR); Control and Management (Control); Restoration (Restore); International Cooperation (IC); Information Management (IM) ; Research (Res); and Education and Public Outreach (Ed & PA).

Action #	Action Letter	Sub-element #	Section	Action Item Summary	Sub-element Summary	Duration	Complete - Discrete	Estab - On-going	In progress	Not Begun
1		NA	L&C	Oversight Mechanism for Federal agencies complying with the Order that engages public	none	Discrete			X	
2		NA	L&C	Jurisdictional dispute resolution process defined & process in place.	none	Discrete			X	
3		NA	L&C	Evaluation of current legal authorities & possible recommendations	none	Discrete			X	
4		NA	L&C	Each member submit Departmental IS Report & crosscut budget	none	On-going		X		
5		1	L&C	Analysis of barriers	Legal Barriers	Discrete			X	
5		2	L&C	Analysis of barriers	Policy Barriers	Discrete			X	
5		3	L&C	Analysis of barriers	Fund transfer & pooling barriers	Discrete			X	
6		1	L&C	At least two Major Invasive species issues identified & addressed.	Issue #1	Discrete	X			
6		2	L&C	At least two Major Invasive species issues identified & addressed.	Issue #2	Discrete		X		
7		NA	L&C	Invasive species cross-cut budget submitted to OMB	none	On-going		X		
8	a	NA	L&C	Report every two years on the success in achieving goals of the Plan.	none	On-going			X	
8	b	NA	L&C	issue updated version of the Plan	none	On-going		X		
9		NA	L&C	Assessment of EO 13122	none	Discrete			X	
10		NA	L&C	Convene an international agreements working group	none	On-going		X		
11		NA	L&C	Prepare a joint invasive species two-year work plan	none	Discrete			X	
12		NA	L&C	Provide NEPA guidance concerning invasive species actions	none	Discrete			X	
13		NA	Pre	Additional APHIS & FWS (now DHS) resources for port inspection.	none	On-going		X		
14		1	Pre	Develop a risk-based screening for first time introductions	Recommendations for the scope of taxonomic coverage	On-going		X		

14		2	Pre	Develop a risk-based screening for first time introductions	Recommendations for the degree of initial screening coverage.	On-going		X		
14		3	Pre	Develop a risk-based screening for first time introductions.	Recommendation regulatory risk-reducing tools.	On-going		X		
15	a	NA	Pre	Intentional introductions - animal biocontrol agents	none	On-going			X	
15	b	1	Pre	Intentional introductions to islands	aquatic organisms	On-going			X	
15	b	2	Pre	Intentional introductions to islands	terrestrial organisms	On-going			X	
15	c	NA	Pre	Intentional introductions - plant propagative materials	none	On-going			X	
15	d	NA	Pre	Intentional introductions - aquatic organisms for any reason.	none	On-going		X		
15	e	NA	Pre	Intentional introductions - land animals for any reason.	none	On-going				X
16	a	NA	Pre	Pathway Interdiction -Ballast-Research	none	On-going		X		
16	b	NA	Pre	Approval of Ballast Water technologies	none	Discrete		X		
16	c	NA	Pre	Pathway Interdiction - Solid wood packing materials.	none	Discrete	X			
17		1	Pre	Process to identify high priority species	plants	Discrete			X	
17		2	Pre	Process to identify high priority species	Aquatic animal species	Discrete			X	
17		3	Pre	Process to identify high priority species	Animals	Discrete				X
17		4	Pre	Process to identify high priority species	Animal Pathogens	Discrete				X
17		5	Pre	Process to identify high priority species	Plant Pathogens	Discrete				X
18		1	Pre	Campaign for travelers to reduced risks	aviation	On-going		X		
18		2	Pre	Campaign for travelers to reduced risks	travelers	On-going		X		
18		3	Pre	Campaign for travelers to reduced risks	tourism	On-going		X		
19		1	Pre	Risk assessments for intentional non-native species.	U.S. International Assistance Programs	On-going				X
19		2	Pre	Risk assessments for accidental introduction of non-native species	encourage other countries to do the same	On-going				X
20		NA	Pre	Implement a system to rank pathways	none	Discrete			X	
21	a	NA	ED&RR	Detection - Taxonomy Experts Lists	none	On-going		X		
21	b	1	ED&RR	Detection - New parasites & pathogens	human - zoonotic	On-going			X	
21	b	2	ED&RR	Detection - New parasites & pathogens	animals - wildlife/live-stock	On-going			X	
21	b	3	ED&RR	Detection - New parasites & pathogens	Plant Pathogens	On-going			X	
21	c	1	ED&RR	Detection - Institute Systematic Monitoring for	Plants/Weeds	On-going		X		
21	c	2	ED&RR	Detection - Institute Systematic Monitoring for	Animal Pathogens	On-going			X	
21	c	3	ED&RR	Detection - Institute Systematic Monitoring for	Plant Pathogens	On-going			X	
21	c	4	ED&RR	Detection - Institute Systematic Monitoring for	Aquatic animal species	On-going			X	
21	d	1	ED&RR	Detection - Maps of high priority species	Plant maps	On-going			X	
21	d	2	ED&RR	Detection - Maps of high priority species	Animal maps	On-going				X
21	d	3	ED&RR	Detection - Maps of high priority species	Aquatic species maps	On-going			X	

21	e	NA	ED&RR	Early Detection Module on PLANTS	PLANTS Database	On-going		X		
22		NA	ED&RR	Global ED&RR expand regional networks	none	On-going			X	
23	a	NA	ED&RR	Rapid Response - Interagency RR Teams	none	On-going			X	
23	b	NA	ED&RR	Rapid Response - Testing RR methods	none	On-going			X	
23	c	1	ED&RR	Rapid Response - Policy & procedure revision- .	advanced approval for quarantine actions	On-going		X		
23	c	2	ED&RR	Rapid Response - Policy & procedure revision -	Pesticide applications.	On-going			X	
23	c	3	ED&RR	Rapid Response - Policy & procedure revision -	interagency agreements	On-going				X
23	d	1	ED&RR	Guide for RR teams	Jurisdictional issues	Discrete			X	
23	d	2	ED&RR	Guide for RR teams	budget issues	Discrete			X	
24		1	ED&RR	Draft Legislation for rapid response	permanent funding	Discrete			X	
24		2	ED&RR	Draft Legislation for rapid response	matching grants to States	Discrete			X	
25		NA	Control	International Information, technology, & technical capacity sharing.	none	On-going		X		
26		1	Control	Adopt sanitation measures	contaminated soils & fills.	On-going				X
26		2	Control	Adopt sanitation measures	cleaning fire fighting equipment.	On-going		X		
26		3	Control	Adopt sanitation measures	pest-free forage & mulch & weed free soil.	On-going		X		
26		4	Control	Adopt sanitation measures	construction equipment.	On-going		X		
26		5	Control	Adopt sanitation measures	ballast water	On-going			X	
27		NA	Control	Draft Legislation, for matching funds for State programs.	none	On-going			X	
28		1	Control	Accelerating biological control agent	development	Discrete			X	
28		2	Control	Accelerating biological control agent	testing & assessment	Discrete			X	
28		3	Control	Accelerating biological control agent	post release monitoring	Discrete			X	
29		1	Control	Pesticide training	training material development	On-going		X		
29		2	Control	Pesticide training	training	On-going			X	
29		3	Control	Pesticide training.	testing & assessment	On-going				X
29		4	Control	Pesticides	support for registration	On-going		X		
30		NA	Control	List of inter-connecting waterways & strategy for preventing inter-watershed movement.	none	Discrete			X	
31		NA	Control	Additional funding for control efforts requested, using volunteers wherever possible.	none	On-going		X		
32		NA	Control	Guidelines for ranking, prioritizing control efforts & consultations with ANSTF	none	Discrete	X			
33		NA	Restore	Identify sources of propagative materials	none	On-going		X		
34		NA	Restore	Draft legislation for tax incentives for landowners to participate in restoration projects.	none	Discrete			X	
35	a	1	Restore	Guidelines & monitoring procedures - mandated by law.	natural disasters	Discrete			X	

35	a	2	Restore	Guidelines & monitoring procedures - mandated by law- e.g.,	oil spills	Discrete			X	
35	a	3	Restore	Guidelines & monitoring procedures - mandated by law- e.g.,	chemical spills	Discrete			X	
35	a	4	Restore	Guidelines & monitoring procedures - mandated by law- e.g.,	acid mine discharge	Discrete				X
35	b	1	Restore	Identify native & non-native materials	Plants	On-going			X	
35	b	2	Restore	Identify native & non-native materials	Fish/animals	On-going				X
35	b	3	Restore	Promote regeneration practices	Plants	On-going				X
35	b	4	Restore	Promote regeneration practices	Fish/animals	On-going				X
35	c	1	Restore	Guidelines for restoring arid habitats	arid lands	On-going			X	
35	c	2	Restore	Guidelines for restoring aquatic habitats	aquatics	On-going			X	
35	c	3	Restore	Guidelines for restoring highly eroded or disturbed habitats	high eroded/disturbed sites	On-going			X	
36		NA	Restore	Overseas restoration project criteria	none	Discrete				X
37	a	NA	IC	Agreements - strengthen & expand U.S. participation in standards & codes of conduct develop coordinated policies.	none	On-going		X		
37	b	NA	IC	agreements - analysis of limitations & strengths of existing international agreements	none	On-going				X
38		NA	IC	Outline an approach for a North American strategy	none	Discrete		X		
39		NA	IC	Establish process for USTR to include invasive species during trade agreement development	none	On-going		X		
40		1	IC	Three technical assistance seminars in Africa.	Seminar #1	Discrete				X
40		2	IC	Three technical assistance seminars in Africa.	Seminar #2	Discrete				X
40		3	IC	Three technical assistance seminars in Africa.	Seminar #3	Discrete				X
41		1	IC	International meeting support for	Technical support	Discrete				X
41		2	IC	International meeting support for	Financial support	Discrete				X
42		NA	IC	Study international assistance as a pathway for invasive species initiated.	none	On-going		X		
43	a	NA	Res	Control catalog of existing control methods	Validation of methods to evaluate removal effectiveness	Discrete			X	
43	b	NA	Res	Control catalog of treatment	effectiveness protocols	Discrete			X	
43	c	1	Res	Control catalog of treatment	adaptive management measures biological	Discrete			X	
43	c	2	Res	Control catalog of adaptive management measures with biological factors	adaptive management measures ecological	Discrete			X	
44	a	1	Res	Strengthen international research concerning biological aspects of invasive species.	monitoring technologies	Discrete			X	
44	a	2	Res	Strengthen international research concerning biological aspects of invasive species.	control technologies	Discrete			X	
44	b	NA	Res	Strengthen international research, scientist exchanges.	none	Discrete			X	
45	a	NA	Res	Improve federal core research capabilities	none	On-going			X	

45	b	1	Res	Enhance current competitive grants & co-op research support	Universities	On-going			X	
45	b	2	Res	Enhance current competitive grants & co-op research support	Federal & State gov-ernments	On-going				X
45	b	3	Res	Enhance current competitive grants & co-op research support	private sector	On-going				X
46	a	1	Res	Cross-cut budget proposal to study invasive abilities of species & their	biological factors	On-going			X	
46	a	2	Res	Cross-cut budget proposal to study invasive abilities of species & their	economic factors	On-going			X	
46	a	3	Res	Cross-cut budget proposal to study invasive abilities of species & their	cultural factors	On-going				X
46	a	4	Res	Cross-cut budget proposal to study invasive abilities of species & their	ecological factors.	On-going			X	
46	b	1	Res	Cross-cut budget proposal for lag phase re-search to support -	monitoring efforts	Discrete				X
46	b	2	Res	Cross-cut budget proposal for lag phase re-search to support -	control efforts	Discrete				X
46	b	3	Res	Cross-cut budget proposal for lag phase re-search to support -	restoration efforts	Discrete				X
46	c	1	Res	determine to what extent invasive species affect -	native species	On-going			X	
46	c	2	Res	determine to what extent invasive species affect -	endangered species.	On-going			X	
46	c	3	Res	determine to what extent invasive species affect -	habitats.	On-going			X	
46	c	4	Res	determine to what extent invasive species affect -	animal health.	On-going			X	
46	c	5	Res	determine to what extent invasive species affect	human health.	On-going			X	
46	d	1	Res	Cross-cut budget proposal to study invasive species effects on	water quality.	Discrete				X
46	d	2	Res	Cross-cut budget proposal to study invasive species effects on	hydrology.	Discrete			X	
46	d	3	Res	Cross-cut budget proposal to study invasive species effects on	nutrient cycling.	Discrete			X	
46	d	4	Res	Cross-cut budget proposal to study invasive species effects on	disturbance regimes such as fire cycles.	Discrete			X	
46	e	1	Res	Develop & test monitoring & control proto-cols that support	introduction & spread activities	Discrete			X	
46	e	2	Res	Develop & test monitoring & control proto-cols that support	rapid response activi-ties	Discrete				X
46	e	3	Res	Develop & test monitoring & control proto-cols that support	restoration activities	Discrete			X	
46	e	4	Res	Develop & test monitoring & control proto-cols that support	containment activities	Discrete				X
47		NA	IM	Maintain website & Steering committee	none	On-going		X		
48		NA	IM	Up-date on international agreements	none	On-going		X		
49		NA	IM	Case studies highlighting invasive species efforts	none	On-going		X		
50		NA	IM	MOU for assessment & monitoring	none	Discrete			X	
51	a	1	IM	Information Management guidance concern-ing emerging technologies for -	information collec-tion-GIS	On-going			X	

51	a	2	IM	Information Management guidance concerning emerging technologies for -	information collection- remote sensing.	On-going			X	
51	b	1	IM	Standard information management protocols for	taxonomy	On-going		X		
51	b	2	IM	Standard information management protocols for	identification of species	On-going		X		
51	b	3	IM	Standard information management protocols for	inventory & mapping	On-going				X
51	b	4	IM	Standard information management protocols for	monitoring	On-going		X		
51	b	5	IM	Standard information management protocols for	assessments of invasive species populations	On-going			X	
51	c	1	IM	Most effective contacts for sharing information with	local governments	On-going				X
51	c	2	IM	Most effective contacts for sharing information with	state governments	On-going			X	
51	c	3	IM	Most effective contacts for sharing information with	tribal governments	On-going				X
51	c	4	IM	Most effective contacts for sharing information with	federal government agencies	On-going		X		
51	c	5	IM	Most effective contacts for sharing information with	International governments	On-going				X
52		NA	IM	Website will be linked to invasive species sites.	none	On-going		X		
53		NA	IM	Compendium of North American invasive species.	none	Discrete			X	
54		1	IM	Occurrence of invasive species by county.	Plants	On-going			X	
54		2	IM	Occurrence of invasive species by county.	Animals	On-going				X
54		3	IM	Occurrence of invasive species by county.	Pathogens	On-going				X
55		NA	IM	Profiles of currently regulated invasive species.	none	On-going		X		
56	a	NA	Ed & PA	National public awareness Campaigns identified & evaluated	none	Discrete	X			
56	b	1	Ed & PA	comprehensive assessment of existing campaigns for	public communication & outreach	On-going			X	
56	b	2	Ed & PA	comprehensive assessment of existing campaigns for	education	On-going			X	
56	c	1	Ed & PA	Model National Public Awareness Campaign program development that will	identify key messages	Discrete		X		
56	c	2	Ed & PA	Model National Public Awareness Campaign program development that will	identify target audiences	Discrete		X		
56	c	3	Ed & PA	Model National Public Awareness Campaign program development that will	determine delivery techniques	Discrete		X		
56	c	4	Ed & PA	Model National Public Awareness Campaign program development that will	Provide training	Discrete			X	
56	c	5	Ed & PA	Model National Public Awareness Campaign program development that will	provide public & private partnerships	Discrete			X	
56	c	6	Ed & PA	Model National Public Awareness Campaign program development that will	measures for evaluation	Discrete				X
56	c	7	Ed & PA	Model National Public Awareness Campaign program development that will	identify contacts	Discrete				X

56	c	8	Ed & PA	Model National Public Awareness Campaign program development that will	budget for implementation	Discrete					X
57	a	1	Ed & PA	Develop series of international educational materials	write codes of conduct	On-going				X	
57	a	2	Ed & PA	Develop series of international educational materials	implement codes of conduct	On-going					X
57	b	NA	Ed & PA	Hold a series of regional international workshops	none	Discrete			X		
						Totals	4	44	82	40	
					Grand Total = 170	% of Total	2	26	48	24	