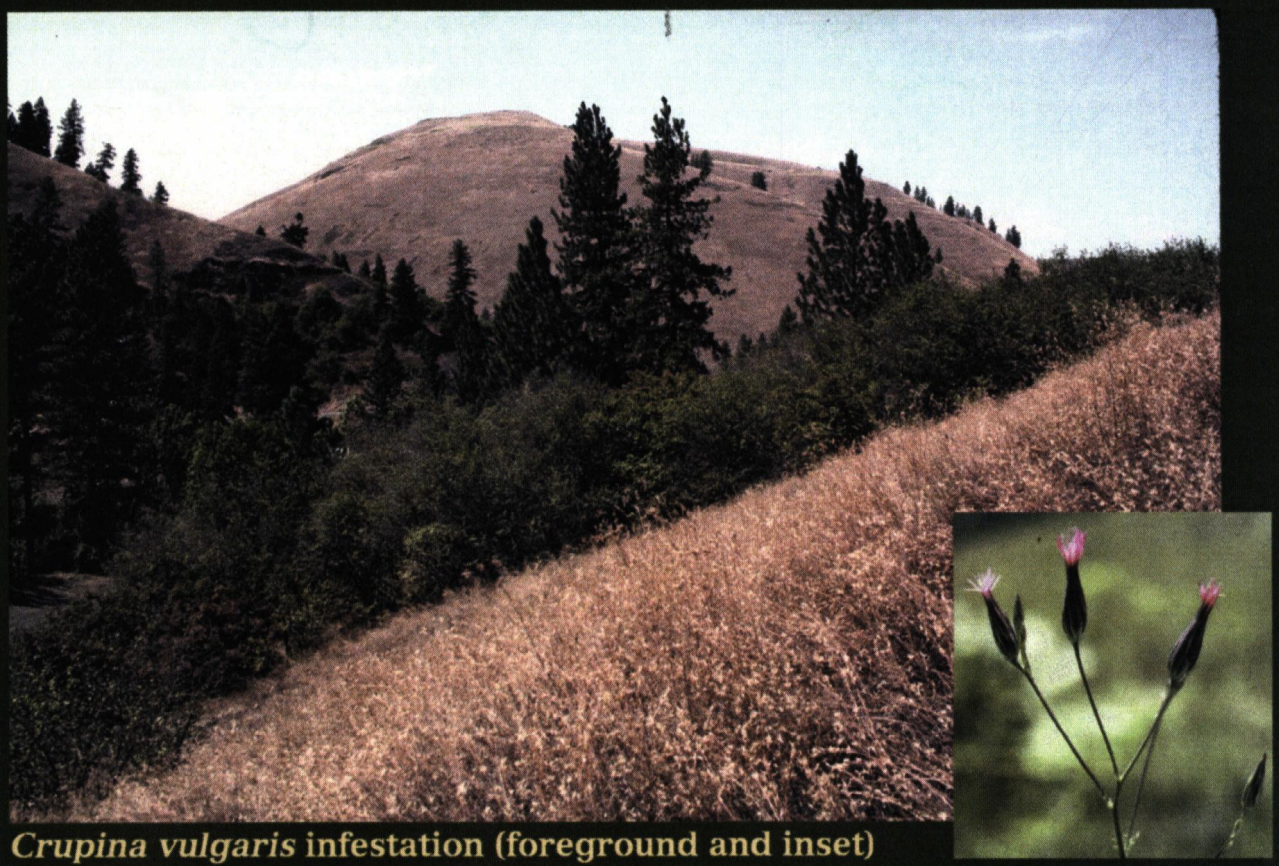
A National Early Detection and Rapid Response System for Invasive Plants in the United States

Conceptual Design



Crupina vulgaris infestation (foreground and inset)
Photos by C. Roché

Federal Interagency
Committee for the Management of
Noxious and Exotic Weeds

Washington, DC
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On behalf of the 16-member Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), we are sincerely grateful to the many public and private contributors to the elements of this project since its beginning in 1998. The need for a national system to detect, assess, and respond to invasive species infestations in their early stages of establishment has energized FICMNEW to develop this conceptual design for such a system for invasive plants. With the rapidly growing threat from all invasive species, we are confident that this conceptual design can be a useful building-block for the eventual establishment of a broader early detection and rapid response system for all invasive species in the United States.

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Introduction

In recent years, there has been a growing awareness that introduced invasive species are having significant and increasing impacts on the U.S. economy, ecosystems, native species, and human health. With tremendous biome-level diversity and a large inventory of relatively intact ecosystems, the United States is particularly vulnerable to biological invasions. Until recently, biological invasions were not much of a threat due to the relative isolation of the North American continent from other biogeographical realms. However, increased global trade and travel have created many new pathways for intentional and incidental spread of exotic species and have significantly increased the threat of new and recurring biological invasions. Increased international trade in ornamental plants (including seeds) is a special concern because many of the currently known exotic invasive plants in the United States were originally imported as ornamentals. Increased trade in ornamental plants with biologically diverse countries, such as China and South Africa, will likely increase this problem. While the majority of introduced plant species are not harmful to the American economy or the environment, a small percentage of them are very damaging and need to be eradicated as soon as they are detected.

Once established, invasive plant species frequently have long lag times before they begin to have dramatic effects. Introduced species that initially escaped many decades ago are only now being recognized as invasive. Introduced as an ornamental to south Florida in the early 1900s, Melaleuca (Melaleuca quinquenervia)—an Australian paper bark tree—was not recognized as a serious threat to the Everglades and other wetlands for many decades. Due to a lack of attention to free-living exotic species, exotic plants now comprise a growing percentage of the flora of all States (e.g., Hawaii 43 percent, New York 36 percent, Missouri 25 percent, California 18 percent, and Texas 10 percent) (Rejmanek and Randall 1994). With continual introductions over the past 100 years, it can be expected some exotics that are not currently identified as invasive will become significant problems in the future. Therefore, there is an urgent need to document and address species that were introduced in past years, as well as the potentially invasive species that are being introduced today. Without a coordinated national system for early detection and rapid response, integrated with general vegetation surveys, some free-living exotic plants will continue to incubate until they become the invasive plants of tomorrow–the major weeds of the 21st century and beyond.

Throughout the 5-year evolution of this Conceptual Design for a National Early Detection and Rapid Response (EDRR) System for Invasive Plants, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) has distributed modified versions through member agencies, the general public, Non-Government Organizations (NGOs), and invasive plant management stakeholders. FICMNEW released at least six formal requests for review, with the most recent call for final official (written) comments in July 2002.

With the requests for comment, FICMNEW asked that special consideration be given to answering four recurring questions—

1. Where should the permanent position of the National EDRR Coordinator be housed and which Department/agency should have the primary leadership role?

2. Should the regional coordinators be Federal positions or supported by the States within that region?

3. What are your suggestions on developing a standard ecological risk assessment protocol?

4. What are your suggestions for selection criteria for the proposed pilot/demonstration projects?

These questions were given focus in order to address issues that had been raised by FICMNEW member agencies and major non-Federal stakeholders. It should be noted that the responses received by FICMNEW to the first two questions (related to the national and State coordination of the proposed system) were not emphasized in the development of the draft conceptual design, yet the input received will be valuable in developing the FICMNEW Testing Plan for the National EDRR System for Invasive Plants.

To date, efforts to address many widespread invaders have been confounded by the conflict between control efforts and the need to minimize collateral environmental damages they sometimes cause (both biological and chemical). As a result, there is often a tendency to ignore many invasive species due to the lack of environmentally acceptable control methods, except in cases where public welfare is clearly at risk (e.g., invasive species that would negatively impact human health, important industries, or important conservation resources). The decision to tolerate the problem (invasive species) at the expense of the cure (some forms of control) has led to an ecological crisis of epic proportions, with no simple solutions in sight.

Clearly, there is no single strategy that will solve the invasive species problem. However, a combination of strategies will work to minimize it. These include inspection and pest mitigation at the borders, EDRR to new invaders, and long-term management.

Of all these options, FICMNEW suggests that EDRR is the most cost-effective and most environmentally sound approach—

- EDRR does not restrict trade and movement of species that may or may not become invasive;

- EDRR addresses only species that have established free-living, self-perpetuating populations;

- EDRR causes minimal and short-term impacts on the invaded habitat; and

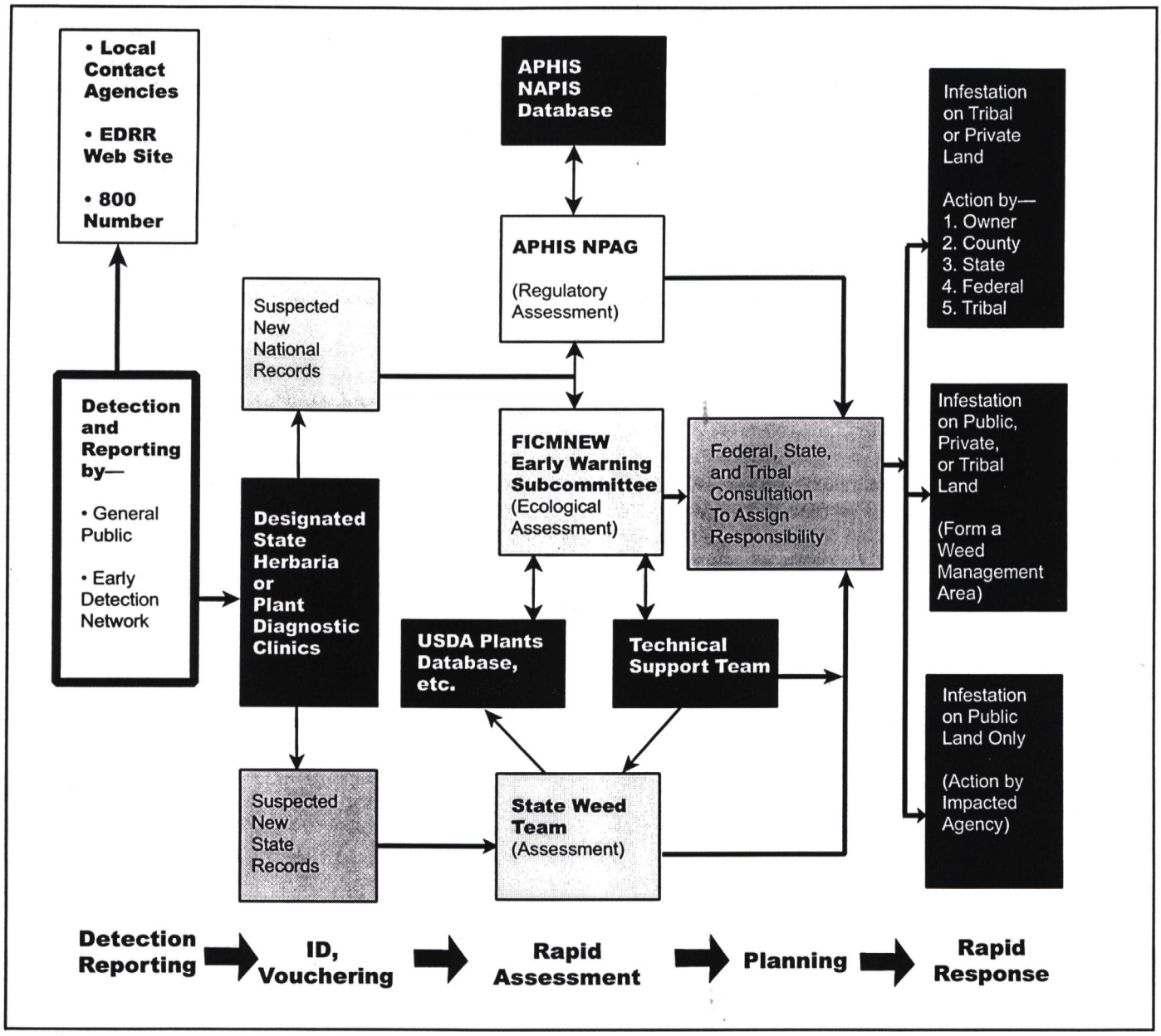
EDRR aims to restore the invaded habitat to meet management objectives.

The overall goal of the FICMNEW National EDRR System for Invasive Plants is to minimize the establishment and spread of new species through a coordinated framework of public and private partners and processes through—

- Early detection and reporting of suspected new plant species to appropriate officials,
- Identification and vouchering of submitted specimens by designated specialists,
- Verification of suspected new State and national plant records,
- Archiving of new records in designated regional and plant databases,
- Rapid assessment of confirmed new records, and
- Rapid response to verified new infestations that are determined to be invasive.

Once fully implemented across the United States, an EDRR system will provide an important second line of defense against invasive plants that will work in concert with Federal efforts to prevent unwanted introductions at the U.S. ports of entry. With an EDRR system in place, the Nation will be better able to defend against future economic and environmental losses resulting from "plants out of place."

Diagram 1. Proposed National Early Detection and Rapid Response System for Invasive Plants.



DETECT—ASSESS—RESPOND

Conceptual Design Development Processes

The National EDRR System for Invasive Plants will be released in two major phases. The first phase is the conceptual design for the system. It is presented in this document. The second phase is a testing plan—components of which were implemented by some external partners in the summer of 2003 and will be implemented by FICMNEW agencies in fiscal year (FY) 2004. These two phases are described below.

Phase I. Preparing the Conceptual Design

To address the growing threat from invasive plants, FICMNEW formally identified the need for a National EDRR System in the United States at the fall 1998 work-planning meeting in Shepherdstown, WV. Because no such system existed at that time, FICMNEW decided to begin investigating options for leading the effort. Those efforts continued and during June 21-23, 2000, FICMNEW—in cooperation with the U.S. Department of Agriculture (USDA) and the U.S. Department of the Interior's (USDI) U.S. Geological Survey—conducted a national workshop on the creation of a National EDRR System for Invasive Plants in the United States. The workshop was held at the Mid-Continent Science Research Center in Ft. Collins, CO, and culminated in the drafting of the first draft proposal for the national EDRR system for plants. Participants in the June 2000 workshop included Federal, State, industry, environmental, and private landowner representatives, as well as international experts, who had been active in noxious weed or invasive plant issues. The proceedings of the June 2000 workshop were published by fall 2000 on the FICMNEW Web site.

FICMNEW initially crafted the conceptual design from the major concepts that were developed at the 2000 workshop, and later revised it using relevant recommendations under the National Invasive Species Management Plan (published in 2001). In November 2001, FICMNEW publicly released an early draft of the conceptual design for informal review by FICMNEW representatives, workshop participants, and other stakeholders.

In April 2002, FICMNEW provided the conceptual design to over 100 agencies and organizations for final review and comment. FICMNEW received most comments by mid-summer 2002, and FICMNEW co-chairs made a final call for written comments (through a nationwide public review via several venues) in July 2002. Following requests for a limited comment period extension, FICMNEW accepted comments from a number of interested agencies and organizations through November 2002. Between December 2002 and January 2003, the staff of the U.S. Geological Survey office in Reston, VA, assisted FICMNEW by developing an analysis of each set of comments and compiled those analyses in "FICMNEW EDRR Plan—2003 Summary of Final Comments." Using that analysis document, FICMNEW updated the draft of the conceptual design accordingly. A task team led by the FICMNEW co-chairs completed the final edits and publication design. The release of the conceptual design in the summer of 2003 formally completed Phase I.

Phase II. Evaluation and Adaptation of the Conceptual Design—Development and Field Testing

In order to evaluate the components identified in the conceptual design and to adapt the design to address any overlooked facets, FICMNEW will coordinate internally among the member agencies and with external partners to further develop and test the elements of the proposed system. The overall goal of the first part of Phase II of the project is to develop and test the elements and processes in the system, top to bottom, in several States.

System Development and Field Testing

In the remaining months of FY 2003, external partner groups will help field test State and local elements of the conceptual design that can be implemented without additional funding, or with funding that might be obtained from system partners in 2003/2004 (see Section IV). In FY 2004, FICMNEW and cooperating agencies will continue this development process and will identify opportunities to begin developing and field-testing remaining elements of the system.

National Implementation

Once FICMNEW and external cooperators develop and test key system elements and processes, they will develop a plan to guide nationwide adoption and implementation of foundational elements of the system. Ultimately, national implementation of the system depends on lessons learned during development and testing of the conceptual design and how EDRR systems for other invasive species might function complementarily.

Elements of the National Early Detection and Rapid Response System for Invasive Plants

FICMNEW has identified three minimum aspects of any successful EDRR System—detection, assessment, and response. To be successful, these aspects must be conducted in a timely manner.

The proposed National EDRR System for Invasive Plants is comprised of five elements:

- Detection and Reporting
- Identification and Vouchering
- Rapid Assessment
- Planning
- Rapid Response

Detection and Reporting

The most critical step in addressing new invasive plant problems is to know they exist. Detecting newly discovered invasive plants will require the help of many interested citizens. In the process of detecting new invasive plants, the American public can learn even more about the state of the Nation's flora and fauna.

Goal

Develop a National Early Detection and Reporting System for Invasive Plants.

Objective
Develop mechanisms for early detection and reporting of suspected new plants by the general public and a formal network of amateur and professional collectors.

Action 1: Establish National Early Detection Network for New Plant Species.

- Establish cadres of professionals to conduct active detection and coordinate with a network of volunteers nationwide. The volunteer network should function and support detection at all levels

- Develop a National Early Detection Network of active amateur and professional plant enthusiasts across the United States to assist in detecting and reporting new plant species—this includes cooperating with the USDA Animal and Plant Health Inspection Service (APHIS), U.S. Geological Survey, and others to develop a Web-based system for monitoring the sale of invasive plants on the Internet. Encourage detection and reporting by concerned landowners, ranchers, farmers, certified crop consultants, master gardeners, public land volunteer groups, Exotic Pest Plant Councils (EPPC), and others.

Action 2: Create Early Detection Network Directory and Listserve.

- Create an Early Detection Network Directory and Listserve for communicating with network members.

Action 3: Develop Incentives for Plant Enthusiasts.

- Develop incentives for enthusiasts to become active in the network.

Action 4: Develop a Volunteer Training and Certification Program.

- Develop a volunteer training and certification program for detection of target invasive plants.

Action 5: Create Lists of Target Species.

- Develop a computer-assisted system for identifying target species that pose a risk to particular land units (e.g., forests, preserves, refuges, parks, counties, States) in cooperation with the Biota of North America Program.

Action 6: Establish a Toll-Free Number and Web Site.

- Establish a toll-free number and Web site for the general public to use in seeking information about suspected new invasive plants or coordinate with existing Web sites, systems, or networks.

Action 7: Support Local Contact Agencies.

- Request that personnel at local offices—of agencies such as USDI's Bureau of Land Management and Fish and Wildlife Service and USDA's Natural Resources Conservation Service (NRCS); Forest Service; Cooperative State Research, Education, and Extension Service (CSREES); APHIS—and County weed directors, certified crop advisors, and taxonomists act as local contacts for the Early Detection system.

Identification and Vouchering

Rapid and accurate identification of a potential threat is a critical first step before targeting acquisition of and eliminating that threat.

Goal

Improve the capacity to effectively and rapidly identify, voucher, and report suspected invasive plants.

Objective

Develop standard protocols for early detection, submission of specimens, identification/vouchering, verification, archiving of information, and reporting of suspected new invasive plants.

Action 1: Use North American Weed Management Association (NAWMA) Data Collection Standards.

- Use the NAWMA Standards for collecting information about new infestations.

Action 2.: Develop and Use Web-based Identification Keys.

- Facilitate development and use of computer-based identification keys, digital images, and other Web-based tools to enhance plant identifica tion capabilities with initial emphasis on plants that are known to be invasive in the United States and elsewhere.

Action 3: Designate Herbaria and Plant Diagnostic Labs.

- Ensure that participating State Weed Teams designate one or more State herbaria or plant diagnostic laboratories to assist in developing the Early Detection Network and to identify and voucher suspected new plant species.

Action 4: Identify Difficult Specimens.

- In cooperation with the Flora of North America project, identify recognized plant systematists to assist State botanists in identifying difficult plant specimens that are suspected to be new to State and national plant records.

Action 5: Verify Suspected New State and National Plant Records.

- Cooperate with the PLANTS Database, the Synthesis of North American Flora, and field botanists in verifying whether a newly identified plant is, in fact, a new State or national plant record.

Action 6: Encourage Archiving Confirmed New Plant Records.

- Encourage participating State partner groups to establish online data bases for archiving their own new plant records and to provide appropriate new records to cooperating regional databases, such as IPANE, SWEMP (U.S. Geological Survey), and INVADERS (Montana). New State and national records should also be archived in the USDA PLANTS Database in cooperation with the Synthesis of North American Flora.

Action 7: Develop Procedures for Submitting New Plant Records.

- Develop protocols and procedures for submitting confirmed new plant records to EDRR System member databases.

Action 8: Report Confirmed New Plant Records to Designated Officials.

- Establish protocols and procedures for reporting new State and national plant records to designated officials.

Rapid Assessment

Once a new plant has been identified and then verified as a new State, regional, or national record, a rapid assessment will be undertaken to determine its potential threat to different habitats and its appropriate State and Federal regulatory status. Rapid assessment determines what should be done and how to do it.

Goal

Conduct accurate and reliable science-based rapid assessments of verified new plants.

Objective 1

Conduct ecological assessments to determine the potential invasiveness of verified new plant species in the United States.

Action 1: Develop an Ecological Assessment Process.

- Conduct workshops to develop an ecological assessment process for evaluating new State and national plant records for invasiveness, habitats they might invade, and potential long-term impacts on the U.S. economy.

Action 2.: Conduct Ecological Assessments of New State Plant Records.

- Ensure that a State Rapid Assessment Committee, under the direction of a State Weed Team, will conduct ecological assessments of new State plant records.

Action 3: Conduct ecological Assessments of New National Plant Records.

- Conduct ecological assessments of new national plant records by weed specialists from a variety of local, State, and Federal agencies, and NGOs, as appropriate. Share results of assessment with the APHIS New Pest Advisory Group (NPAG) and interested/impacted State partner groups.

Objective 2
Determine the appropriate State and Federal regulatory status of new State and national plant records.

Action 1: Conduct Federal Regulatory Weed Risk Assessments.

- Support the APHIS NPAG in conducting regulatory risk assessments of all new national plant records to determine if confirmed new national plant records should be formally listed as Federal Noxious Weeds.

Action 2: Conduct State Regulatory Weed Risk Assessments.

- Support impacted State partner groups in conducting State-level regulatory risk assessments of new State and national plant records.

Objective 3
Establish and coordinate technical support from Federal agencies to State partner groups to rapidly assess new plants detected.

Action: Provide Technical Support for Rapid Assessment Initiatives.

- Establish a cadre of technical support specialists to provide on-site and distant support for rapid assessment of confirmed new State and national plant records.

Planning

Effective planning will require a visionary approach that reaches far beyond the limits of today and defines the long-term end for which Americans strive. In ecological terms, FICMNEW needs to plan rapid response management activities to provide conditions that will help the American public attain healthier ecosystems in the long term through prevention and eradication of invasive plants that can disrupt the balance and threaten the desired healthy condition.

Goal

Develop the capacity to effectively plan for regulatory and management actions for rapid response to new plant detections.

Objective
Develop standardized approaches for determining appropriate regulatory and management actions that should be taken against new invasive plants.

Action 1: Develop an Action Classification System.

- Develop an action classification system for confirmed new invasive plants that is based on potential invasiveness in particular habitats, distribution, and recommended regulatory action category.

Action 2: Develop Database of Completed Assessments.

- As new plant species are assessed for invasiveness and regulatory status, develop an online database of completed assessments for use by land managers, administrators, and others, as needed

Rapid Response

Once a rapid assessment has been completed and action is recommended, impacted landowners and appropriate public officials will be organized to mount an on-the-ground campaign against the invader. Rapid response is where action is taken quickly to contain, deny reproduction, and, if possible, eliminate the invader.

Goal

Foster and coordinate rapid response to eradicating verified new infestations.

Objective 1
Foster the development of local, State, Tribal, and regional capabilities for rapid response.

Action: Develop Generic Rapid Response Plan.

- Develop generic (broadly applicable) rapid response protocols and action procedures for use by local, State, Tribal, and regional partner groups. Include basic protocols for detection and delimiting survey data to be collected during treatment efforts, and methods for post-treatment appraisal surveys. Provide these generic rapid response plans on various invasive plant Web sites or in related publications.

Objective 2
Develop and provide technical expertise on rapid response methods and procedures.

Action 1: Expand Technical Support Capabilities.

- Develop a cadre of scientists and technical specialists to provide on-site and distant support on rapid response initiatives.

Action 2: Identify Technical Support for Development of New Methodologies.

- Where methods of management/eradication are lacking or ineffective, identify research needs to develop management/eradication technologies.

Objective 3
Develop improved systems and approaches to identify biologically sound management options and priorities.

Action: Develop Decision Support Systems for Management.

- Develop, modify, or adapt Web-based, computer-assisted, decision support systems to aid land managers in identifying and developing management options and priorities for addressing new invasive plants.

Objective 4
Identify and remove barriers that will impede rapid response initiatives.

Action: Identify Barriers to Rapid Response.

- Identify State, Federal, and Tribal policies, rules, regulations, and laws that authorize/impede control of new invasive plants on public and private lands. Work to remove barriers that impede timely action on new plant invaders.

Objective 5
Identify and implement post-management (post-response) monitoring protocols.

Action 1: Develop, Test, and Implement Post-Response Monitoring Protocols.

- Collaborate with State and national partners to develop, test, and implement post-response monitoring protocols.

Action 2: Train Agency Personnel, Volunteers, and Others in the Use of Protocols.

- Conduct workshops and develop guidance for "train-the-trainer" programs on the use of post-response monitoring protocols.

- Initiate statewide and regional training on the consistent and systematic use of post-response monitoring protocols.

Action 3: Foster Adaptive Management Feedback.

- Establish mechanism for reporting post-management monitoring results and alert network if more action is needed (adaptive management feedback loop).

Early Detection and Rapid Response System Coordination, Support, and Oversight

The National Early Detection and Rapid Response System for Invasive Plants will be a network of independent elements working together to achieve a common goal . . .To detect new invasive plants early and to act against them quickly.

Oversight and Coordination

Goal

Establish a mechanism for further development and coordination of the National EDRR System for Invasive Plants.

Objective
Establish mechanisms to coordinate the development, testing, and implementation of the National EDRR System for Invasive Plants at the national, regional, and State levels.

Action 1: Establish National and Regional Coordination.

- FICMNEW will (as an interim measure) coordinate regional and national groups and relevant agencies within the National Invasive Species Council to refine and implement a national EDRR system design plan for invasive plants. A final decision on national and regional coordination of the FICMNEW proposed EDRR system may depend on the structure that is established nationally that supports other (non-plant) EDRR systems.

Action 2: Establish State and Local Coordination.

- In cooperation with the North American Weed Management Association and other invasive plant management organizations or stakeholders, FICMNEW will compile a list of designated State early detection coordinators to coordinate the testing, development, and implementation of State and local elements of the EDRR system in participating States. Coordination of Rapid Response efforts following early detection efforts may be managed by the State coordinators depending upon results of the nationwide testing of those elements.

Partnerships and Networking

Currently, there are many agencies and organizations in the United States that are engaged in the "war on weeds." However, invasive plants freely cross jurisdictional boundaries and efforts to address them are often fragmented and piecemeal. In order to address them effectively, Americans need to marshal and focus the resources and expertise of the Nation through a coordinated framework of local, State, Tribal, regional, and national partnerships.

Goal 1

Foster interagency cooperation and establish new partnerships to address new and emerging invasive plants.

Objective 1
Encourage local, State, Tribal, and Federal agencies and appropriate NGOs to form local, State, and regional interagency invasive species partnership groups. One of their goals should be to apply EDRR to new invasive plants.

Action 1: Establish Invasive Plant Partnership Guidelines.

- Develop and publish guidelines for local, State, and regional invasive plant partnerships. A recent example is the Cooperative Weed Management Area Cookbook–A Recipe for Success, published by the Idaho Noxious Weed Coordinating Committee and the USDA Forest Service in 2003.

Action 2: Develop an Early Detection Partner Listserve.

- Develop an Early Detection Partner Listserve, which includes local, State, and regional interagency early detection partner groups.

Action 3: Sponsor Regional and National EDRR Partner Meetings.

- Sponsor or host regional and national meetings of State and regional invasive species partnerships to encourage information sharing and the development of the National EDRR System for Invasive Plants.

Action 4: Encourage Participation in EDRR Partner Groups.

- Encourage all relevant local, State, and Federal agencies and private organizations, such as The Nature Conservancy (TNC) and Exotic Pest Plant Councils, to participate in local, State, and regional early detection partner groups.

Goal 2

Since the majority of invasive species in the United States originated in other countries, it is imperative that Americans begin to explore ways to minimize the global spread of invasive species including spread of invasive plants from the United States to other countries.

Ultimately, partnering at the international level will improve the effectiveness of the national early detection system.

Foster international collaboration and establish new partnerships to address new and emerging invasive plant problems.

Objective
Cooperate with international agencies and organizations to develop EDRR capabilities in other countries.

Action 1: Share Information with International Partners.

- Develop protocols for information sharing on new and emerging invasive plants, including e-commerce in species of concern, with agencies in designated partner nations.

Action 2: Develop a Global Early Warning System for Invasive Species.

- Cooperate with international groups—such as the Global Invasive Species Program, the International Union for the Conservation of Nature and Natural Resources (IUCN-The World Conservation Union) Invasive Species Specialist Group, and the International Weed Science Society—to facilitate the development of a Global Early Detection System for sharing information on new and emerging invasive species.

Action 3: Expand Global Outreach and Awareness Efforts.

- Cooperate with international organizations—such as Global Invasive Species Program and IUCN-Invasive Species Specialist Group—to develop a plan for conducting a global education and awareness campaign on the need to strengthen national and global capabilities for early detection, rapid assessment, and rapid response.

Action 4: Provide Technical Assistance to Other Countries.

- Cooperate with international organizations—such as Global Invasive Species Program and Invasive Species Specialist Group—to provide technical assistance to other countries in development of EDRR systems, including information management and taxonomic capabilities.

Action 5: Connect the EDRR System to Global Trade Initiatives.

- Explore ways to tie EDRR issues to major trade initiatives, such as the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT).

Information Management

A tremendous amount of information has been developed on invasive species over the past several decades. Putting this information in the hands of landowners and responsible officials through a distributed, Web-based information management system—a system that connects otherwise independent online plant databases—will give them the knowledge and tools needed to mount an effective and proactive campaign against a new invader.

Goal

Improve accessibility of information management systems regarding new detections of invasive plants.

Objective 1
Foster the development of a Web-based distributed information system (comprised primarily of existing online databases) that provides readily accessible information on the taxonomy, distribution, ecology, biology, classification (regulatory and ecological), impacts, and management of known and potentially invasive plants.

Action 1: Share Information.

- Encourage information sharing between regional, national, and global plant databases such as the following. See attachment 1 for a more complete list of Web sites.

  ✓ Aquatic Nonindigenous Species Database (U.S. Geological Survey)
  ✓ Synthesis of the North American Flora (John Kartesz)
  ✓ National Forest System NRIS Database (Forest Service)
  ✓ Forest Health Monitoring Database (Forest Service)
  ✓ IUCN Invasive Species Database (Invasive Species Specialist Group, World Conservation Union)
  ✓ Invaders Plant Database (University of Montana)
  ✓ Invasive Plant Atlas of New England (University of Connecticut)
  ✓ Inter-American Biodiversity Information Network (IABIN)
  ✓ National Agricultural Pest Information System (NAPIS) (APHIS)
  ✓ USDA PLANTS Database (NRCS)
  ✓ Southwestern Exotic Mapping Program (SWEMP) (U.S. Geological Survey)
  ✓ TNC Wildland Weeds Database; TNC Stewardship Abstract System
  ✓ U.S. Fish and Wildlife Service Refuge System Database
  ✓ Other Federal or State databases, as appropriate.

Action 2: Develop North American Biodiversity Information Network.

- Foster development of the North American Biodiversity Information Network to link and integrate existing plant databases through a central, searchable Internet gateway.

Action 3: Develop Early Detection Module in the USDA PLANTS Database.

- Develop an Early Detection Module within the USDA PLANTS database with information on new invasive plants, as well as information about and links to the National EDRR System for Invasive Plants.

Objective 2
Establish electronic mechanisms to assist the public in learning about the EDRR System and in reporting suspected new invasive plants.

Action 1: Establish Early Detection System Toll-Free Number.

- Establish a nationwide phone number for reporting suspected new plants and for providing State contact information.

Action 2: Develop Early Detection System Web site.

- Develop a Web site specifically for EDRR in coordination with, and linked to, existing Web sites such as http://www.invasivespecies.gov.

Science and Technology Support

Goal

Facilitate development of technology and invest in science to support EDRR for invasive plants.

Objective
Provide/develop state-of-the-art technologies to ensure continued effectiveness and efficiency of all system elements.

Action 1: Identify Research Needs.

- Identify EDRR research needs.

Action 2: Provide State-of-the-Art Technology for EDRR.

- Based on identified research needs, request partner agencies—such as the U.S. Geological Survey Biological Resources Division and USDA's Forest Service, Agricultural Research Service, and CSREES—provide state-of-the-art technologies for early detection, identification, rapid assessment, and environmentally sound management approaches for new invasive plants.

- Expand partnerships with private sector and universities to fill science and technology gaps related to EDRR.

Public Outreach and Awareness

Since only a small percentage of the American population is actively engaged in agriculture and land management, it is vital to bring the message about the threat of invasive species to the American people. Success of other environmental protection programs is due in large part to a well-informed and supportive citizenry.

Goal

Increase public awareness and understanding of the need for early detection, rapid assessment, and rapid response to new invasive plants.

Objective 1
Develop new outreach strategies.

Action: Develop National Media Campaign on Early Detection.

- Develop a media campaign to raise general awareness of the problem and the EDRR system. Model similar to public awareness campaign for national health issues, fire prevention, and homeland security.

Objective 2
Develop new educational resources for EDRR.

Action 1: Develop a Directory of Specialists.

- Identify and develop a directory of specialists who can provide information on new species for use in development of weed alerts and other literature.

Action 2: Develop Outreach Materials.

- Develop posters, pamphlets, fact sheets, brochures, etc., that can be used as outreach multipliers to reach the general public through sport/recreation retailers, horticultural plant distributors, national and State parks, national forests, etc.

Objective 3
Publicize the National EDRR System for Invasive Plants.

Action 1: Provide Seminars.

- Provide seminars and presentations on the system to scientific groups.

Action 2: Publish Articles.

- Publish articles on the system in magazines and journals.

Action 3: Produce a Documentary.

- Produce a documentary film on the National EDRR System.

Action 4: Develop EDRR System Web Site.

- Develop a National EDRR System Web site that includes links to all State sites and local early detection partner groups.

Action 5: Make Presentations.

- Talk to community groups, garden clubs, hiking clubs, schools, etc.

Objective 4
Develop linkages with industry groups, academia, and others to foster cooperation on EDRR efforts.

Action 1: Establish Communication Links.

- Establish communication linkages between FICMNEW and other plant groups (horticultural interests, seed trade, researchers, botanical gardens, and etc.).

Action 2: Establish Communication Links with Other EDRR Systems.

- Establish active communication linkages with other EDRR systems for other taxa.

Resources Needed To Establish This System

The following is a selection of resources that relate to weed prevention and can help support the EDRR system. Each is defined in one of three categories: (1) Resources already in place, (2) Resources that can be developed by drawing from existing funding or programs, and (3) Resources that will require substantial new funding or program development. These example resources are linked to each of the primary elements of the proposed EDRR system, and may not be all-inclusive. System Elements are (A) Detection and Reporting, (B) Identification and Vouchering, (C) Rapid Assessment, (D) Planning, (E) Rapid Response.

Resources Already in Place

Resource (Activity, Organization, or Program)	System Element
General Public, Concerned Landowners, Local Land Stewards, etc.	A, E
Agencies and Organizations that Address Invasive Plants	A, B, C, D, E
Local Contact Agencies, including USDA's CSREES, NRCS, and APHIS and County Weed Boards Weed Management Areas	A, D, E
Certified Crop Advisors	A
State Herbaria	B
State Weed Teams	D
State Weed Coordinators (Federal, State)	A, C, D,E
Weed Scientists (Federal, State, & University)	A, B, C, D, E
FICMNEW and Associated Agencies	C, D, E (interagency coordination aspects)
APHIS New Pest Advisory Group	C
Online Plant Databases PLANTS, INVADERS, SWEMP, etc.	A, B, C
NAWMA Data Collection Standards	A, D
NGOs (Weed Science Society of America, North American Weed Management Association, Exotic Plant Pest Councils, Garden Clubs of America, etc.)	A, D, E

Resources That Can Be Developed by Drawing from Existing Funding or Programs

Resource (Activity, Organization, or Program)	System Element
Public Lands Volunteers or "Friends" Groups	A
Master Gardeners	A
County Weed Supervisors, Field Botanists, Others	A
State Herbaria	B
New Weed Management Areas	A,B,C,D,E
New State Weed Teams	D
New State Weed Coordinators	A,B,C,D,E
FICMNEW (regional and national coalitions)	C (ecological assessments)
Guidelines for State and Local Interagency Partnerships	A, B,C, D, E
EDRR Web Site for Invasive Plants	A
Generic Plans for Ecological Assessments of New Plant Records (workshop)	C
Generic Plans for Rapid Response Initiatives (workshop)	E
EDRR Module in the PLANTS Database	A
Internet Monitoring Effort by APHIS, U.S. Geological Survey, NCSU	A, C
North American Biodiversity Information and existing plant databases linked through a network on a World Wide Web gateway; queried by special Internet search engine	A,C,E

Resources That Will Require Substantial New Funding or Program Development

Resource (Activity, Organization, or Program)	System Element
National Early Detection Coordinating Mechanism	D
Regional Coordinators for Invasive Plants	D
Taxonomic Expertise (various sources)	B
Regional Interagency Technical Support Teams	E
EDRR Toll-Free Number	A
Incentives for Collectors	A
Brochures and Fact Sheets on the System	A
Web-based Tools To Enhance Plant Identification	A, B
Regional and National Meetings of Early Warning Partner Groups	D
Database of Completed Ecological/Regulatory Assessment	C
Online Decision Support Systems with Options for Addressing New Species	C
National Early Warning Media Campaign and	A
Directory of Resource Specialists	
North American EDRR Plan for Invasive Plants (with Canada and Mexico)	D
Global Early Warning System for Invasive Species	D
System Coordination and Support Elements	D
Rapid Assessments and Rapid Response Initiatives	C,E
Pilot Project to Test State and Local Elements in Several States	D
Enhancement of Participating Herbaria Capability	A,B

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Rejmanek, and J. Randall. 1994. Invasive Alien Plants in California: 1993 Summary and Comparison With Other Areas in North America. *Madrono*. 41(3): 161-177.

Westbrooks, R. 1998. Invasive Plants. Changing the Landscape of America. Washington, DC: Federal Interagency Committee for the Management of Noxious and Exotic Weeds. 123 p.

FICMNEW Contact Information

For more information about the Federal Interagency Committee for the Management of Noxious and Exotic Weeds or this conceptual design for a national EDRR system for invasive plants, contact the committee Co-chairpersons:

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Associated Web Sites

Animal and Plant Health Inspection Service (APHIS)
<http://www.aphis.usda.gov/ppq/weeds/>

Biota of North America Program (BONAP)
<http://www.bonap.org/>

Center for Integration of Natural Disaster Information (CINDI)
(U.S. Geological Survey)
<http://cindi.usgs.gov/>

Cooperative State Research, Education, and Extension Service.
<http://www.reeusda.gov/>

Council on Environmental Quality (CEQ)
<http://www.whitehouse.gov/ceq/>

Exotic Pest Plant Councils (State and Regional Chapters)
<http://www.se-eppc.org/>

FL-EPPC Online Database on Non-native Plants in Florida Natural Areas
<http://www.fleppe.org/database/query.asp>

Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW)
<http://ficmnew.fws.gov>

Flora of North America Project
<http://hua.huh.harvard.edu/FNA/>

Giant Salvinia (Salvinia molesta D.S. Mitchell) Fact Sheet and Distribution Map
<http://nas.er.usgs.gov/plants/sa_molesta/docs/sa_mol.html>

Global Invasive Species Program (GISP)
< http://jasper.stanford.edu/GISP/>

Integrated Taxonomic Information System (ITIS)
<http://www.itis.usda.gov/>

National Invasive Species Council
<http://www.invasivespecies.gov/council/main.shtml>

National Invasive Species Management Plan (NISC)
<http://www.invasivespecies.gov/council/nmp.shtml>

North American Weed Management Association (NAWMA)
<http://www.nawma.org/>

Weed Science Society of America (WSSA)
<http://www.wssa.net/>

Center for Invasive Plant Management
<http://www.weedcenter.org/>

Online Plant-Related Databases (Examples)

- AQUATIC NONINDIGENOUS SPECIES DATABASE (U.S. Geological Survey) <http://nas.er.usgs.gov/>
- GLOBAL INVASIVE SPECIES DATABASE (Invasive Species Specialist Group, World Conservation Union) <http://www.issg.org/database/welcome/>
- GLOBAL INVASIVE SPECIES PROGRAMME < http://jasper.stanford.edu/GISP/>
- INTER-AMERICAN BIODIVERSITY INFORMATION NETWORK (IABIN) < http://www.iabin-us.org/index.html>
- INVADERS Plant Database (University of Montana) <http://invader.dbs.umt.edu/>
- INVASIVE PLANT ATLAS OF NEW ENGLAND (U-CONN) <www.eeb.uconn.edu/invasives/ipane>
- NATIONAL AGRICULTURAL PEST INFORMATION SYSTEM (NAPIS) (USDA Animal and Plant Health Inspection Service) <http://www.ceris.purdue.edu/napis>
- PLANTS Database (USDA - Natural Resources Conservation Service) <http://plants.usda.gov>
- SOUTHWESTERN EXOTIC MAPPING PROGRAM (SWEMP) (U.S. Geological Survey) < http://www.usgs.nau.edu/swemp/>
- THE NATURE CONSERVANCY <http://tncweeds.ucdavis.edu/>

Additional Agency Sites

- United States Department of Agriculture (USDA) <http://www.usda.gov/>
- United States Department of the Interior (DOI) <http://www.doi.gov/>
- United States Environmental Protection Agency (EPA) <http://www.epa.gov/>
- United States General Accounting Office (GAO) <http://www.gao.gov/>
- United States Geological Survey (USGS) < http://www.usgs.gov/>
- USDA Agricultural Research Service <http://www.ars.usda.gov/>
- USDA Forest Service (FS) <http://www.fs.fed.us/>
- U.S. GEOLOGICAL SURVEY Biological Resources Division <http://biology.usgs.gov/>
- USDA Natural Resources Conservation Service <http://www.nrcs.usda.gov/>
- USDI Bureau of Land Management (BLM) < http://www.blm/weeds.gov/>
- USDA Cooperative State Research, Education, and Extension Service < http://www.reeusda.gov/>
- USDI Bureau of Indian Affairs < http://www.doi.gov/bureau-indian-affairs.html/>