

# **USDA FY 2016 AVOIDING HARM FROM INVASIVE SPECIES (USDA Do No Harm 2016 Report)**

**A USDA Report to the Invasive Species Advisory Committee and the National Invasive Species Council by Hilda Diaz-Soltero, USDA Senior Invasive Species Coordinator**

November 16, 2016

There are eight U.S. Department of Agriculture (USDA) agencies that work on invasive species issues: the Agricultural Research Service (ARS); Animal Plant Health Inspection Service (APHIS); National Institute of Food and Agriculture (NIFA); Economic Research Service (ERS); Farm Service Agency (FSA); Foreign Agricultural Service (FAS); USDA Forest Service (FS) and the Natural Resources Conservation Service (NRCS).

Previous USDA Do No Harm Reports cover:

- (1) Fiscal year (FY) 2004 activities;
- (2) FY 2005 activities for ARS, APHIS, CSREES, ERS and NRCS (first report dated October 2004);
- (3) FY 2005 activities for the Forest Service (report dated February 2005);
- (4) FY 2006 activities for ARS/NAL, CSREES, ERS, NRCS and USFS (report dated March 2007);
- (5) FY 2006 activities for APHIS (report dated August 20, 2007); FY 2006 activities for ARS (report dated September 22, 2007);
- (6) FY 2007 activities for APHIS, ARS, ARS/NAL, APHIS, CSREES, ERS, FAS, FS and NRCS (report dated 20 March 2008);
- (7) FY 2008 activities for APHIS, ARS, ARS/NAL, APHIS, CSREES, ERS, FAS, FS and NRCS (report dated March 3, 2009);
- (8) FY 2009 activities for ARS, ARS/NAL, APHIS, NIFA, ERS, FS and NRCS (report dated February 17, 2010);
- (9) FY 2010 activities for ARS, ARS/NAL, APHIS, NIFA, ERS, USFS and NRCS (report dated 14 March 2011);
- (10) FY 2011 activities for ARS, ARS/NAL, APHIS, NIFA, ERS, USFS and NRCS (report dated 27 Feb 2012);
- (11) FY 2012 activities by ARS, ASR/NAL, APHIS, NIFA, ERS, USFS and NRCS;

(12) FY 2013 activities by ARS, ARS/NAL, APHIS, NIFA, ERS, USFS (Research & Development and State & Private Forestry programs only; does not include National Forest System program) and NRCS; (13) 2014 activities by ARS, ARS/NAL, APHIS, NIFA, ERS, NRCS and USFS); and (14) FY 2015 activities by ARS, ARS/NAL, APHIS, FAS, NIFA, ERS, USFA and NRCS.

**This is the fifteenth “USDA Do No Harm Report” to the Invasive Species Advisory Committee and the National Invasive Species Council. It covers the FY 2016 activities for ARS/NAL, APHIS, FAS, NIFA, ERS, USFS and NRCS. The report is dated November 16, 2016.**

The report is divided by agency activities. Each agency will report on:

- a) Invasive species program activities the agency is carrying out to do no harm;
- b) The way in which, when the agency carries out other programs activities, they are also designed and implemented to do no harm;
- c) Activities that are doing harm and future actions the agency will take to change the activities so that they do no harm.

Within the above categories, the agency will include its own activities as well as activities where the agency is coordinating and/or collaborating with another federal agency, per the mandate of the Invasive Species Executive Order (EO 13112).

## **I. USDA Research Agencies:**

### **A. Agricultural Research Service (ARS)**

The **Agricultural Research Service (ARS)** Agricultural Research Service (ARS) is the principal in-house research agency of the USDA. With a staff of over 8,000 employees, ARS carries out research at over 100 laboratories throughout the Nation and in several foreign countries. ARS research is organized under four broad categories: Animal Production and Protection; Nutrition, Food Safety, and Quality; Crop Production and Protection; and Natural

Resources and Sustainable Agricultural Systems. Pest management, including invasive species, is a major research component across all these areas. Research infrastructure dedicated to pest management includes personnel and facilities in domestic and foreign laboratories that also provide support to other agencies, organizations, and state governments. ARS is committed to performing its research programs and projects in a manner that does not cause or promote the introduction or spread of invasive species in the United States (U.S.) or elsewhere, ensuring that all feasible and prudent measures are taken to minimize risk of harm.

## **1. Activities that do no harm**

### **A. Informational Activities.**

- **e-Government and Public Communication Initiatives.**  
USDA's National Invasive Species Information Center (NISIC) at the National Agricultural Library (NAL) maintains and manages the [www.invasivespeciesinfo.gov](http://www.invasivespeciesinfo.gov) Web site as a reference gateway to information, organizations, and services about invasive species. The Center supports the work of the U.S. Department of Agriculture and the National Invasive Species Council in meeting the information requirements of the [Executive Order 13112](#). The Center and its Web site serve a broad customer base, from students, to farmers, researchers, and government officials.
- NISIC's site pulls together extensive invasive species information in one source as a portal that does not exist elsewhere, and provides up to date federal information that supports the National Invasive Species Management Plan's Implementation Tasks.
- As the resources available through NISIC continue to increase, the site maintains its reputation as authoritative portal for identification of, and access to Federal invasive species resources and activities. The [www.invasivespeciesinfo.gov](http://www.invasivespeciesinfo.gov) Web site is frequently cited in many news articles as a good source of invasive species information. NISIC's Web site consistently is ranked highly in all major search engines and is

linked to many invasive species related Web sites (Federal, State, International, and non-profit organizations).

- NISIC maintains a high quality online web presence and provides reference services to a wide variety of stakeholders (local, state, tribal, federal managers, scientists, policy-makers, landowners and land managers, agricultural producers, teachers, students, media journalists, and others), with very limited staff resources (1 FTE).

- **FY 2016 NISIC Statistics:**

NISIC is the smallest staffed of NAL's Information Centers, with one of the highest web site page views of NAL's Information Centers and other NAL programs.

Statistical data from Google Analytics (Oct 1, 2015 – Sep 30, 2016):

- Web site statistics:
  - NISIC Site:
    - Pageviews – 3,902,292
    - Users – 1,116,632
    - Searches – 158,388
  - ITAP.gov
    - Pageviews – 15,124
    - Users – 11,928
    - Searches - 26
  - Twitter Statistics - [Invasiveinfo](#):  
Notable followers include many various Federal, State and Non-profit organizations (including many Twitter verified official accounts).
    - Total followers – 2,856

- **Reference Requests:**

- NISIC responded to more than 200 reference requests for FY 2016. Questions come from NISIC "Ask a Question" form as well as other messages forwarded from USDA and ARS's Ask the Expert, and NAL's Agricultural Reference if they are related to invasive species issues.

- NISIC received reference requests from a variety of patrons.
  - The types of questions NISIC received routinely range broadly from students to international researchers, general public, media, and other government agency personnel.
  
- **NISIC Hosts Unique Content:**
  - Extensive [Invasive Species Conference Calendar](#)
    - Includes Global and all taxa related conferences
    - Many sites link to NISIC's calendar, instead of creating/maintaining their own resource
  - Provides relevant invasive species information across Federal agencies (highlighting Federal press releases, USDA blog items, Federal Register notices, invasive species legislation, grants and funding, etc.).
  - NISIC Site Hosted Content:
    - **USDA Reports:**
      - USDA Do No Harm Reports to the Invasive Species Advisory Committee (ISAC) and the National Invasive Species Council
      - USDA Reports to the Invasive Species Advisory Committee (ISAC)
    - USDA Grants Workbook (updated yearly) – U.S. Department of Agriculture Grant and Partnership Programs that Can Address Invasive Species Research, Technical Assistance, Prevention and Control
    - **Various additional reports and conference proceedings not hosted elsewhere**
  
- **NISIC Supports USDA/ARS and Other Federal Initiatives**
  - **National Invasive Species Council Support.**  
 NISIC continued to support the activities of National Invasive Species Council by posting relevant information and as requested by Hilda Diaz-Soltero, USDA Senior Invasive Species Coordinator (conferences, federal register notices, Invasive Species Advisory Committee information, etc.), as well as additional information from

the Federal Agencies representing the National Invasive Species Council.

- **Other e-Government and Public Communication Initiatives.** Invasivespeciesinfo.gov Web site links: NISIC's Web site links to the 13 Federal Agencies that are members of the National Invasive Species Council, as well as links to the many Agency specific programs and resources relevant to invasive species issues. NISIC also includes extensive resources for State, Professional and Non-Profit, and International programs with an interest in the prevention, control, or eradication of invasive species.
- **Information management support to ITAP.** NISIC provides technical and information management support for the Federal Interagency Committee for Invasive Terrestrial Animals and Pathogens (ITAP), a Federal scientific and technical interagency advisory group. This includes:
  - Web site – [www.itap.gov](http://www.itap.gov) (developed, maintained and hosted at NAL)
  - ITAP Listserv for committee-wide communication.

## **2. Other ARS Research activities also designed to do no harm:**

Invasive species information portal: USDA's National Invasive Species Information Center (NISIC) at the National Agricultural Library's Web site ([invasivespeciesinfo.gov](http://invasivespeciesinfo.gov)) provides an information gateway to invasive species information; covering Federal, State, local and international sources. The site pulls together extensive invasive species information in one source as a portal that does not exist elsewhere, and provides up to date federal information that supports the National Invasive Species Management Plan's Implementation Tasks.

Information management support to ITAP: USDA's National Invasive Species Information Center (NISIC) at the National Agricultural Library provides technical and information management support for

ITAP, the Federal Interagency Committee for Invasive Terrestrial Animals and Pathogens ([itap.gov](http://itap.gov)), a Federal scientific and technical interagency advisory group.

**B. ARS Research Activities will be in a second report for FY16**

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**B. National Institute of Food and Agriculture (NIFA)**  
**(previously named the Cooperative State Research,**  
**Education and Extension Service- CSREES)**

**1. Activities to do no harm**

Technical Advisory Group for the Biological Control of Weeds: NIFA is a member of the Technical Advisory Group (TAG) for the Biological Control of Weeds. This advisory group is made up of representatives from various Federal agencies that evaluate candidate biological control agents for their economic, environmental, and ecological safety. Should the candidate biocontrol agents receive approval for release against a given target weed, this helps ensure that harmful non-target effects from the natural enemies are minimized. TAG advises APHIS.

National Animal and Plant Diagnostic Laboratory Networks: The safety of U.S. plant and animal production systems depends on our ability to rapidly identify foreign pathogens and other pests, whether introduced intentionally (through bio-terrorism) or unintentionally. NIFA has established two national networks of existing diagnostic laboratories to rapidly and accurately detect and report pathogens of national interest and to provide timely information and training to state university diagnostic laboratories.

The National Plant Diagnostic Network is led by five regional laboratories (Cornell University, University of Florida, Michigan State University, Kansas State University, and University of California-Davis) and one support laboratory (at Texas Tech. University).

The National Animal Health Laboratory Network (NAHLN) is led by 12 Core Laboratories and 58 total laboratories (receiving training/reagent/exercise support and being linked) in 43 states. NIFA is currently helping labs (other than the 12 core laboratories) with funding to set up electronic (secure, standards-based) messaging regarding FAD findings. These facilities will help to link growers, field consultants and other university diagnostic labs to coordinate regional detection and provide inter-regional communication in the event of an outbreak. For more information on the NAHLN see [http://www.aphis.usda.gov/animal\\_health/nahln/downloads/NAHLNBriefingCurrent.pdf](http://www.aphis.usda.gov/animal_health/nahln/downloads/NAHLNBriefingCurrent.pdf)

## **2. Other Agency Activities, also designed to do no harm**

Integrated Pest Management: Section 15 of the Federal Noxious Weed Act of 1974, and the Executive Order 13112 on Invasive Species (signed in 1999) direct Federal agencies to use an integrated pest management (IPM) approach for the management of undesirable plants on Federal lands using all available tools, including: education; preventive measures; cultural, mechanical, physical, biological and chemical control; and general land management practices such as revegetation, manipulation of livestock or wildlife grazing, and improvement of livestock and wildlife habitat.

Integrated Pest Management provides a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. The adoption and utilization of IPM is being encouraged through other legislative authorities within Federal departments. For example, US Code (Title 7, Chapter 6, Subchapter II, Sec. 136r-1. Integrated Pest Management) states: "The Secretary of Agriculture, in cooperation with the Administrator, shall implement research, demonstration and education programs to support adoption of Integrated Pest Management." It



further states "Federal agencies shall use Integrated Pest Management Techniques in carrying out pest management activities and shall promote Integrated Pest Management through procurement and regulatory policies and other activities. IPM is also being encouraged across Federal agencies within the Department of the Interior.

Because of the complexity of economic, social, and environmental issues associated with invasive species management, and the biological and ecological attributes associated with each particular invasive species, programs that are based on a combination of technologies tend to be most successful and sustainable. As indicated in the National Invasive Species Council's (NISC) National Invasive Species Management Plan of 2001, the IPM approach considers the best available scientific information, updated target population monitoring data, and the environmental effects of control methods in selecting a range of complementary technologies and methods to implement to achieve a desired objective. Some of the factors to consider in selecting control methodologies include environmental compatibility, efficacy, cost-effectiveness, inter-compatibility of different types of control measures, practicality and safety. The adoption of an IPM approach for invasive species management will certainly help minimize harm to the environment, human health and wildlife.

### **3. Activities that are doing harm and future agency actions to change them so that they do not continue to do harm**

Pesticide use that has negative impacts: Conventional pest management strategies using pesticides are still emphasized in the management of invasive species with potential negative side effects to humans, the environment and wildlife. NIFA is helping to facilitate the adoption of an Integrated Pest Management Roadmap (IPM Roadmap) that will certainly help minimize harm to non-target species and the environment.

The goal of the IPM Road Map is to increase nationwide communication and efficiency through information exchanges among Federal and non-Federal IPM practitioners and service providers including land managers, growers, structural pest managers, and public and wildlife health officials. Development of the Road Map for the National Integrated Pest Management (IPM) Program began in February 2002, with continuous input from numerous IPM experts, practitioners, and stakeholders. The Road Map identifies strategic directions for IPM research, implementation, and measurement for pests in all major settings, throughout the nation. This includes pest management for areas including agricultural, structural, ornamental, turf, museums, public and wildlife health pests, and encompasses terrestrial and aquatic invasive species.

The goal of the National IPM Program is to increase the economic benefits of adopting IPM practices and to reduce potential risks to human health and the environment caused by the pests themselves or by the use of inappropriate pest management practices. The National IPM Roadmap can be found on the USDA-OPMP (Office of Pest Management Policy) website or at the following url:

<http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjvr56h0pfQAhUj5oMKHT1zB4cQFggbMAA&url=http%3A%2F%2Fwww.ipmcenters.org%2FDocs%2FIPMRoadMap.pdf&usg=AFQjCNH-IGBKSt9AZcCwBKmlwKuLYJldQA&bvm=bv.137904068,d.eWE>

Pest Management Grant Programs: NIFA has several competitive grant programs designed to emphasize IPM, while reducing pesticide residues on food and in the environment. These include the Crop Protection and Pest Management Program, Organic Transitions Program, Methyl Bromide Transitions Program, the Agriculture and Food Research Initiative (AFRI) Foundational Programs, and the AFRI Challenge Area Programs. The emphasis of IPM and bio-based pest management in these NIFA competitive grant programs will certainly help minimize harmful side

effects to non-target species and the environment when these strategies are used in invasive species management.

Pest Information Platform for Extension and Education (PIPE): PIPE is a reporting and tracking system, developed collaboratively with the USDA Risk Management Agency, to manage pest and disease information flow via the Web. The PIPE system provides real-time useful information to U.S. crop producers, and a “one stop shopping” center for timely, unbiased, national, and local pest information. PIPE fosters good farming practices by encouraging growers to: avoid unnecessary or ill-timed chemical applications; use the proper control tactics with the proper timing to manage crop loss risk; and document practices for crop insurance purposes. The PIPE system for soybean rust saved growers hundreds of millions of dollars in 2007 by providing real-time information that enabled the growers to avoid unnecessary fungicide applications. Additional active ipmPIPE components include: soybean aphid, legume diseases, cucurbit downy mildew, pecan, and southern corn rust.

## **C. Economic Research Service (ERS)**

### **1. Activities to do no harm**

ERS is the main source of economic information and research from the U.S. Department of Agriculture. ERS research informs and enhances public and private decision-making on economic and policy issues related to agriculture, food, natural resources, and rural development.

Program of Research on the Economics of Invasive Species Management (PREISM): ERS initiated a new program of work in fiscal year 2003, the Program of Research on the Economics of Invasive Species Management (PREISM), to examine the economic issues related to managing invasive species in increasingly global agricultural markets. Through PREISM, ERS primarily funded extramural research through a competitive awards program that focuses on national decision

making concerning invasive species of agricultural significance or affecting, or affected by, USDA programs. In addition to ERS-led analyses of invasive species issues, ERS has disbursed \$6.8 million through the competitive awards program to 45 recipients, including universities, other USDA agencies, and private non-profit institutions, for research on the economics of invasive species during FY 2003 to FY 2008. About \$1.1 million per year were allocated for extramural agreements in FY 2005 and FY 2006, while \$950,000 was allocated in FY 2007 and \$970,000 in FY 2008. No Funds have been allocated since FY 2008. ERS also organized annual workshops from 2003 to 2011 to provide a forum for dialogue on economic issues associated with agricultural invasive species.

Accomplishments of PREISM and outputs of PREISM-funded projects are reported in **Program of Research on the Economic of Invasive Species Management: Fiscal 2003-2011 Activities, which can be access at:**

<http://www.ers.usda.gov/publications/ap-administrative-publication/ap-056.aspx>

Following are some findings from PREISM-funded research projects:

- Prevention and management resources should be allocated to species and strategies with the highest return (in terms of damage reduction over time). Ideally, marginal benefits and costs should be equal across species and strategies.
- Decision-support tools that follow sound economic principles and reveal underlying scientific assumptions and value judgments provide a basis for expert and stakeholder involvement in decision-making and promote efficient allocations of funds.
- Optimal invasive species management strategies depend upon the stage of the invasion and associated rates of growth and spread. Eradication may be optimal for small invasions; reduction to a containment level for larger

invasions. If eradication is feasible, the effort will reduce discounted damages more if it occurs early when populations are small. Delays result in more damages. If total cost increases rapidly as population increases, eradication when the population is small followed by prevention may be the best strategy.

- Under-funded eradication or management efforts can be cost-ineffective or wasteful, with little or no effect on invasive species growth and total damage. Higher initial expenditures can reduce long term damages and control costs, even if the species is not eradicated.
- For established invasive species infestations, per unit costs of removal can increase as populations decrease or become more isolated, making complete eradication difficult or cost-inefficient. In some cases, accommodation to low levels of invasion is economically preferable to the high cost of eradication. The higher is the cost of removal, the larger the population that will be accommodated.
- Higher invasive species infestation or population growth rates reduce benefit-cost ratios of control efforts, and at high enough rates, control might not be worthwhile. If population has surpassed that of maximum growth rate, the best strategy could be a pulse-like effort that drives populations below a critical population level and growth rate, followed by containment strategy.
- Probability of occurrence maps for invasive weeds based on GIS and other inventory or survey data and related population growth rates can improve weed management efficiency by reducing: 1) costs by targeting sites to monitor invasiveness, and/or 2) damage by initiating control of highly invasive populations before they spread.
- Coordination of regulations across U.S.-Canada, State, and provincial boundaries could: 1) more effectively reduce the cross-border spread of exotic horticultural plants that

become invasive, and 2) reduce incentives for cross-border firm relocations to take advantage of more lenient regulations.

- Ecological and agronomic differences influence cross-State differences in noxious weed and weed-seed lists, but stakeholder lobbying also has significant effects.

## **2. Other Agency Activities, also designed to do no harm**

In 2014, ERS published the report “The Effects of Phytosanitary Regulations on U.S. Imports of Fresh Fruits and Vegetables” which considered the extent to which APHIS import regulations acted as trade barriers that might disproportionately impede developing countries from shipping to the U.S. The report found that, across import pathways, large and small traders had approximately equally likelihoods of having a required treatment as a condition of importation. About 8 percent of import pathways have more than 5 percent of the shipments ordered to have discretionary treatments following an inspection.

In 2015, ERS revised the format and added information to the *Phytosanitary Regulation* dataset to include import regulation requirements and the rates at which 29 fruits and vegetables are rejected or have treatments ordered following a pest inspection for the period between 2006 and 2013.

## **3. Activities that are doing harm and future agency actions to change them so that they do not continue to do harm**

None.

## **II. USDA Regulatory and Resource Management Agencies**

### **A. Animal and Plant Health Inspection Service (APHIS)**

## 1. Activities to do no harm

“Protecting American agriculture” is the basic charge of the U.S. Department of Agriculture’s (USDA) Animal and Plant Health Inspection Service (APHIS). APHIS provides leadership in ensuring the health and care of animals and plants and plays a vital role in ensuring the free flow of safe agricultural trade. The agency improves agricultural productivity and competitiveness and contributes to the national economy and the public health. APHIS has major regulatory authority to implement action programs to achieve these responsibilities.

For more detailed information and up to date highlights of program activity, please visit the APHIS Web Site (<http://www.aphis.usda.gov/>).

Invasive Species Prevention Programs: Specifically the APHIS mission, stated in its current strategic plan, is to protect the health and value of American agriculture and natural resources. To carry out this mission, APHIS works to achieve two interdependent goals:

- Safeguard the health of animals, plants, and ecosystems in the United States (U.S.)
- Facilitate safe agricultural trade

It does so through a system of interdependent objectives addressing exclusion (i.e., prevention), detection, emergency response, management, trade issue resolution, and capacity building. These areas correspond closely to elements of the National Invasive Species Management Plan.

APHIS tries to ensure that other entities in the private and public sectors, including other Federal agencies, "do no harm" by introducing or spreading invasive species. APHIS prevention programs – a comprehensive set of risk-based regulations and enforcement efforts -- are directed at animals, plants, and their products that may bring invasive species or be pathways for the introduction of invasive species. As such, the Agency addresses both unintentional and intentional introductions of invasives. A description of some of the applicable regulations follows.

1. Regulation of certain animals and animal products:  
APHIS regulates, as set forth in 9 CFR parts 91 through 99, the importation of animals and animal products to guard against the introduction of animal diseases into the U.S. in accordance with the Animal Health Protection Act.

2. Regulation of certain plants and plant products:  
Regulations contained in 7 CFR part 319 prohibit or restrict the importation of plants, plant parts, and plant products into the U.S. in accordance with the Plant Protection Act. APHIS enforces the part 319 regulations and considers requests to amend the part 319 regulations to allow the importation of plants, plant parts, or plant products that are not currently allowed importation under the regulations. The requirements apply to many commodities, including nursery stock.

3. Listing of noxious weeds:  
Under the authority of the Plant Protection Act, APHIS regulates, in 7 CFR parts 360 and 361, the importation and interstate movement of plants and plant products that may be noxious weeds, i.e., plants that can directly or indirectly injure or cause damage to crops, livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources, public health, or the environment.

USDA APHIS's Website Online Newsroom: this page (<http://www.aphis.usda.gov/wps/portal/aphis/newsroom/news>) provides links to several issues of interest such as efforts underway to eradicate various invasive pests. APHIS also posts spotlights regarding various activities and useful information on its homepage: <http://www.aphis.usda.gov/wps/portal/aphis/home/>.

### **APHIS Plant Protection and Quarantine (PPQ)**

PPQ safeguards agriculture and natural resources from the entry, establishment, and spread of animal and plant pests and



noxious weeds into the U.S.; and supports trade and exports of U.S. agricultural products.

Risk Analysis Process: The risk analysis process examines the plant pests and diseases that are known to be associated with a commodity, identifies those pests that are likely to remain on the commodity upon importation into the U.S., and evaluates the mitigations that may be required to avoid, reduce, or eliminate the risk of pest introduction into the U.S. APHIS conducts risk analyses in accordance with International Standard for Phytosanitary Measures No. 11, “Pest Risk Analysis for Quarantine Pests,” and its supplements, set by the International Plant Protection Convention.

Plants and Plant Products Permits: Permits are required for the importation into the U.S. and transit through the U.S. of regulated plants and plant products for consumption or propagation. Plant and plant product permits include plants for planting such as nursery stock, small lots of seed, and post entry; plant products such as fruits and vegetable, timber, cotton and cut flowers; protected plants and plant products such as orchids, and threatened and endangered plant species; transit permits to ship regulated articles into, through and out of the U.S.; and controlled import permits to import prohibited plant materials for research. The permitting system ensures that shippers and importers are aware of which products are enterable, and the conditions under which they are enterable, thus allowing for safe trade by preventing the spread of harmful plant pests and disease. This process, along with scientific risk analysis, allows for an ample and diverse food supply as well as safe propagative material.

Crop Biosecurity and Emergency Response: PPQ, the Federal response agency for plant health emergencies, develops and delivers strategic science-based regulatory programs designed to protect U.S. crops and natural resources. PPQ strives to deliver an effective systems approach to mitigate risks posed by regulated pests.

Accreditation, Certification, and Network Services: The Accreditation, Certification, and Network Services (ACNS) team manages the National Seed Health System; the U.S. Nursery Certification Program; the U.S. Greenhouse Certification Program; the State National Harmonization Program for seed potatoes; potato minituber (*Solanum tuberosum*) pathogen testing accreditation with private laboratories in support of export certification; Special Foreign Inspection and Certification programs; Plants in Growing Media; Post entry Quarantine, Audit-based Certification Systems pertaining to section 10201(d)(1) of the Farm Bill; and the National Clean Plant Network pertaining to section 10007 of the Farm Bill.

Preclearance and Offshore Programs (POP) conducts pest mitigation activities in countries which request preclearance for fruit, vegetable, and nursery stock shipments destined to the United States. The preclearance program protects the U.S. from invasive plant pests and diseases including fruit flies and false codling moth. In addition, POP partners with the Department of Defense to prevent the entry of invasive plant and animal diseases on military equipment and cargo being returned to the U.S. POP also collaborates with countries in the Caribbean and in Asia to reduce risks of invasive pests such as Asian gypsy moth and giant African snail from entering the U.S. on cargo and maritime vessels.

Pest Detection and the Cooperative Agricultural Pest Survey (CAPS) Program supports APHIS' goal of safeguarding U.S. agricultural and environmental resources by ensuring that new introductions of harmful plant pests and diseases are detected as soon as possible, before they have a chance to cause significant damage. The program uses a multi-pronged strategy to accomplish its mission, involving a structured, transparent assessment process to identify pest threats, the development of scientifically sound pest diagnostics and survey protocols, conducting the actual pest surveys, and the timely reporting of pest survey results through the National Agricultural Pest Information System (NAPIS). These efforts are accomplished by involving stakeholders and the scientific community, and leveraging efforts by other Agencies in USDA,

government entities, State departments of agriculture, universities, and industry partners. APHIS and its State cooperators carry out surveys for high-risk pests through a network of cooperators in the Cooperative Agricultural Pest Survey (CAPS) program. Additional cooperative survey efforts are carried out through MOUs or pilot projects designed to leverage the interest, commitment, and willingness of non-APHIS entities to work with APHIS in the Pest Detection effort.

The Center for Plant Health Science and Technology (CPHST) is the scientific support division for PPQ. CPHST is responsible for ensuring that PPQ has the information, tools and technology to make the most scientifically valid regulatory and policy decisions possible. In addition, CPHST ensures PPQ's operations have the most scientifically viable and practical tools for pest exclusion, detection, and management.

CPHST Plant Epidemiology and Risk Analysis Laboratory (PERAL): PERAL includes a diverse group of scientists and professionals comprising the primary office in Plant Protection and Quarantine (PPQ) for pest risk analysis. PERAL is responsible for providing essential scientific support to risk-based policy making across a broad range of phytosanitary issues. The staff uses scientific principles, procedures and evidence to analyze issues relevant to safeguarding plant health from the threats of harmful exotic pests of cultivated and natural plant systems. This includes most risk analyses required by PPQ for pests, Commodities, and pathways but it does not currently include risk analyses associated with plant pest permits, genetically modified organisms, or Federal Noxious Weeds.

PERAL serves a wide range of functions within PPQ. The overarching responsibility is to provide comprehensive, accurate information in support of the decision making process ensuring that resulting actions are the most appropriate and "Do No Harm". For more in-depth information regarding PERAL, please visit

[http://www.aphis.usda.gov/plant\\_health/cphst/peral.shtml](http://www.aphis.usda.gov/plant_health/cphst/peral.shtml)

A good example of one of these functions is the New Pest Advisory Group (NPAG). The NPAG is located in the APHIS Center for Plant Health Science and Technology (CPHST), Plant Epidemiology and Risk Analysis Laboratory (PERAL). The overall goal of NPAG is to safeguard American agriculture and natural resources. The NPAG assesses new and imminent exotic plant pest introductions into the U.S. to recommend appropriate Plant Protection and Quarantine's (PPQ) policy and actions to respond to the potential threat posed by such pests. In this case a pest is defined as: *Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products* [FAO, 1990; revised FAO. 1995; IPPC, 1997].

NPAG may address pests in many taxa including arthropods, plant pathogens, mollusks and weeds. It determines whether the pest is a present or an imminent threat, and if the pest meets the definition of a quarantine pest. If the pest meets the definition, NPAG may convene an ad hoc panel of Subject Matter Experts from PPQ, other Federal, state, and university sources with regulatory and scientific expertise for that particular exotic pest. Through literature searches, data sheet preparation and discussion with the panel, NPAG provides findings and recommendations via the NPAG Report to the APHIS Deputy Administrator and the APHIS Executive Team (represented by PPQ's management) in response to the pest introduction.

Phytosanitary Issues Management: The Phytosanitary Issues Management (PIM) unit facilitates and negotiates, through the use of scientifically based processes, the safe export and import of plant-based agricultural commodities. By so doing, it prevents the introduction of invasive pest species from other countries, and ensures that the United States is an active participant in international efforts to prevent the spread of invasive pests.

### **APHIS Wildlife Services (WS) Activities**

Nonnative, invasive species can be devastating to ecosystems where a lack of natural enemies and competition for resources

can allow these species to thrive, wiping out other native wildlife in the process. APHIS WS' efforts target these introduced and invasive species. The top invasive species of concern for WS include feral swine, European starlings, brown tree snakes (BTS), Gambian rats, and nutria. Other invasive species WS works to manage include Coquí frogs, pigeons, house sparrows, and Burmese pythons.

Feral Swine: APHIS received \$20 million to implement a collaborative, national feral swine management program in all 39 states where there is a recognized feral swine population. The overarching goal of the APHIS National Feral Swine Damage Management Program is to protect agricultural and natural resources, property, animal health, and human health and safety by reducing feral swine populations in the United States. APHIS' feral swine damage management program supports the USDA strategic goals and objectives by improving the health and prosperity of rural America. APHIS WS will reduce problems by suppressing populations in States where feral swine populations are large and widely distributed. In States where feral swine are emerging or populations are low, APHIS will cooperate with federal, state, tribal, and local entities to implement strategies to eliminate them. APHIS also will target feral swine emerging in urban areas where they pose a danger to people and property. APHIS will also conduct research to develop and evaluate new and emerging tools to further reduce damage inflicted by feral swine. WS removed a total of 42,450 swine in 36 states in FY 2015.

APHIS published the federal register notice for the Final Environmental Impact Statement for feral swine damage management in the United States on June 12, 2015. APHIS signed the Record of Decision for Final Environmental Impact Statement Feral Swine Damage Management: A National Approach on July 14, 2015. APHIS' decision was to select Alternative 2, the preferred alternative, to implement a nationally coordinated, integrated feral swine damage management (FSDM) program, in cooperation with other agencies at the international, federal, state, territorial, Native

American tribal, and local levels, and the cooperation of private management interest.

In FY 2015, APHIS and partners successfully eliminated feral swine from four States - Washington, Idaho, New York, and Maryland. In FY 2016, APHIS and partners successfully eliminated feral swine from an additional two States - New Jersey and Wisconsin. These States will continue to be monitored for two additional years to ensure successful elimination. Feral swine populations are still low enough that elimination is considered possible in 19 States. In the other 16 States, efforts have been focused on suppressing feral swine populations and minimizing damage to resources.

In FY 2014, APHIS established The National Feral Swine Genetic Archive. To date, the Archive has received and processed 5,110 samples from 38 states beginning December 1, 2014 with the receipt of 100 samples.

European starlings are an invasive species that cause damage to agricultural resources, especially dairy and livestock facilities where they consume and contaminate feed. Starlings also pose threats to safe aircraft operations, and may cause property damage due to accumulations of feces and other activities. Starlings and blackbirds often occur together in damage situations in agricultural and suburban areas, and on airports. The estimated annual damage to grain, fruit, and berry crops from blackbirds and starlings exceeds \$150 million in direct costs. Additional costs, not estimated, include those spent to prevent health and safety hazards and those from damage management efforts. From 1990 to 2014, European starlings were involved in 3,663 aircraft strikes resulting in \$7,068,897 in damage costs to the airlines. WS removed 1,290,815 starlings in 45 states in FY 2015.

Brown tree snakes have eliminated 10 of the 13 native bird, most lizard, and bat species on the island of Guam, are responsible for large economic losses from damaged electrical lines and resultant power outages, and pose a hazard to human safety. APHIS Wildlife Services coordinates operational efforts

on Guam aimed at keeping the snake from reaching other Pacific Islands including Hawaii and the continental United States. Wildlife Services personnel use snake trapping in high-risk areas, trained snake-detector dogs in cargo, nighttime spotlight searches, toxicants, and public education as tools to achieve this goal. The Agency removed 21,517 BTS on Guam in 2014. APHIS WS National Wildlife Research Center scientists at the Fort Collins, Colorado headquarters conducted numerous studies on BTS including studies of reproductive biology of male BTS, BTS detector dogs, artificial lures and baits, chemical or thermal cargo fumigation, and automation of aerial delivery of toxic BTS baits. NWRC conducted an economic assessment of a hypothetical translocation of the BTS from the Territory of Guam to the Hawaiian Islands. The total annual projected economic impact of the translocation of BTS to Hawaii was estimated to fall within the range of \$473 million to \$1.8 billion. These projections underscore the value of a BTS interdiction and control program on Guam.

The Gambian rat is a very large rodent native to northern Africa. Gambian rats can harm livestock species and habitats, damage agricultural crops, consume livestock feed, and are associated with a variety of pathogenic diseases that could be spread to humans, livestock, and wildlife. When requested, APHIS works with the Florida Fish and Wildlife Conservation Commission, the U.S. Fish and Wildlife Service, the South Florida Water Management District, and the Florida Park Service to move toward the eradication of the Gambian rat from the Florida Keys. WS' removal efforts have been successful and rat numbers are down significantly from previous years. Due to the low numbers of Gambian rats, the Florida Fish and Wildlife Conservation Commission is the agency currently implementing reduction efforts.

Nutria are large, semi-aquatic rodents native to South America, but are now established in 17 states and cause extensive damage to wetlands, agricultural crops, and structural foundations such as dykes and roads. Nutria may also pose a risk to human health and safety and serve as a reservoir for tularemia and other diseases. APHIS is leading the first large-

scale North American effort to eradicate a mainland population on the Delmarva Peninsula in Maryland where the rodents have devastated coastal Chesapeake Bay marshes. The Chesapeake Bay Nutria Eradication Project (CBNEP) was established under the direction of a management team initially composed of representatives from the U.S. Fish and Wildlife Service, Maryland Department of Natural Resources, Tudor Farms, USDA, and University of Maryland. APHIS Wildlife Services, assumed primary responsibility for project implementation. APHIS and CBNEP have removed almost 14,000 nutria since its inception in 2002. As a result, approximately 250,000 acres of coastal marshes on the Delmarva Peninsula are now protected. APHIS and CBNEP are conducting intensive monitoring surveys designed to detect nutria in low densities in previously depopulated areas. APHIS and CBNEP Wildlife Specialists have developed and refined new detection techniques that include the use of camera traps and monitoring platforms outfitted with hair snares. It has partnered with APHIS' National Detector Dog Training Center to procure, train, and employ the use of nutria scat detector dogs. The agency also uses a state-of-the-art GIS based data collection system to document efforts and fuel its landscape planning efforts for nutria eradication. Through careful population monitoring, APHIS has successfully prevented the re-infestation of this area, and marsh grasses and native muskrat populations are quickly recovering throughout the impacted areas.

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In addition to the five species highlighted, WS provides assistance to the general public upon request to resolve



damage caused by invasive species. Last fiscal year, WS provided direct control assistance to resolve damage caused by 14 of the 23 bird, mammal, and reptile species identified by the World Conservation Union (IUCN) as being among the top 100 invasive species in the world. These species included brown tree snakes, giant toad, Coquí frog, red-vented bulbul, common myna, European starling, nutria, house mouse, roof rat, small Indian mongoose, feral swine, cats and goats.

### **APHIS Veterinary Services (VS) Activities**

The National Animal Health Laboratory Network (NAHLN) is a state-federal cooperative effort including the APHIS National Veterinary Services Laboratories (NVSL), which provide reference and confirmatory laboratory services including training, proficiency testing, and prototypes for diagnostic tests. The State/University laboratories in the NAHLN perform routine diagnostic tests for endemic animal disease as well as targeted surveillance and response testing for foreign animal diseases. The network assists in early detection and rapid, scalable response to an exotic animal disease. For example, 17 NAHLN laboratories (and NVSL) performed testing in the 2014-2015 H5Nx highly pathogenic avian influenza (HPAI) outbreak. Sixty laboratories have been trained and proficiency tested to perform testing for high consequence diseases, including foot and mouth disease (FMD), bovine spongiform encephalopathy (BSE), chronic wasting disease (CWD), classical and African swine fever (CSF and ASF), pseudorabies (PRV), influenza A in swine (SIV) and poultry (AIV), and exotic Newcastle disease (END)s. A surveillance program for classical swine fever (a vesicular disease present in the Dominican Republic and Haiti) was conducted with testing conducted in NAHLN laboratories. In January 2016, the NAHLN, in a cooperative effort with state and NIFA completed a restructure based on a previous needs assessment and distribution study. Funding was provided to levels 1, 2, and 3 laboratories.

Cattle fever is a severe and often fatal disease of cattle transmitted by two species of tick. The ticks were eradicated from the continental U.S. in 1943, with the exception of a buffer zone between Texas and Mexico. An increase in movement of

deer and stray livestock across the border has led to increased fever tick infestations in recent years despite a partial tick control border fence, livestock movement quarantines, and tick treatments for cattle and deer. APHIS is collaborating with ARS, the Texas Animal Health Commission, and a commercial US vaccine manufacturer to employ an anti-tick vaccine as an adjunct tick control measure (see ARS section above).

Influenza A viruses in swine and poultry: APHIS continues to cooperate with Centers for Disease Control (CDC), ARS, state animal and public health officials in response to influenza A virus spillovers from animals into humans (and vice-versa). Epidemiology, virus sequencing and characterizations are performed to assess the risk of establishment and spread within the species. VS, in cooperation with state animal health officials used the lessons learned from the massive outbreak of Eurasian H5 highly pathogenic avian influenza (HPAI) in 2014-15 to quickly eradicate a smaller outbreak of an N. American H7 HPAI in 2016, and continued to plan for new and reintroductions. Testing of wild waterfowl samples by NAHLN and NVSL laboratories for surveillance resulted in the detection of Eurasian H5 in an Alaskan wild mallard.

Foot and Mouth Disease (FMD) is the most communicable disease known, and is exotic to the U.S. APHIS activities have recently included vaccine and pen-side diagnostics studies and validation of bulk-tank milk assays was completed this year. Assay development and reagent sharing were conducted to improve 'vaccine matching' for FMD.

FMD Vaccination policy: The policy regarding FMD vaccination vs. stamping out has shifted to make vaccination more likely in a large outbreak, in turn making eradication more likely in multiple scenarios. "Secure Milk Supply" plans for FMD, are being developed with commodity groups, states, and universities, to replicate the success of the "Secure Egg Supply" plan for HPAI. Such plans making compliance more likely, in turn making eradication more likely. Vaccine needs,

prioritization and funding policy discussions were held with animal agriculture and state representatives.

Rift Valley Fever is an arthropod-borne zoonotic disease that infects humans and non-humans of Africa. U.S. mosquito species have been proven competent. APHIS activities have included diagnostic test validation, geospatial collaborations, and vaccine approval advice, steps and licensure.

Nipah virus is spread from fruit-eating bats to swine and can infect humans (from bats or swine). APHIS has collaborated with other agencies regarding vaccine approval advice.

Foreign animal disease diagnosticians training was continued (four courses).

Regulations on livestock testing: APHIS changed regulatory requirements for surveillance and pre-movement testing of livestock for brucellosis and tuberculosis after consultation with states, tribes, and the animal industry. In the U.S., these diseases of wildlife, livestock and humans currently exist only in limited wildlife foci. The changes should allow more efficient use of resources to allow continued control of the disease.

Disease spread modeling: APHIS is applying disease spread models to examine alternative control strategies for a variety of livestock diseases. The effects of vaccination, zoning, and outbreak resource constraints are specific areas of study. APHIS is partnering with university, government, and industry entities to increase the value of its disease spread modeling programs by adding livestock movement data and the interface between domestic livestock and wildlife. Models evaluating exotic or emerging animal disease spread must account for livestock movement as well as local spread factors such as wildlife.

Emergency management: A 'dashboard' allowing visualization of sampling, outbreaks, response measures, laboratory capacities, etc., has been developed by APHIS in collaboration with Department of Homeland Security (DHS) and one of their

Centers of Excellence, which should allow syndromic surveillance (earlier detection) and more rapid and effective response to foreign and emerging diseases. Continued development of the national response database (Emergency Management Response System based on needs identified in the last outbreak was accomplished.

### **APHIS International Services**

International Services (IS) supports APHIS' mission of protecting U.S. agriculture and natural resources in an international environment. An important activity is international capacity-building to prevent introduction of exotic pests and diseases.

Under 7 CFR § 371.8, IS is responsible for "monitoring and reporting the presence and movement of plant and animal diseases and pests in foreign countries." IS' field employees are the "eyes and ears" for the early detection and confirmation of emerging threats to U.S. agriculture. These employees are a critical component of APHIS' combined activities in detection and reporting of exotic threats, and all technical IS employees are expected to dedicate part of their time to these activities. These functions are part of IS' broader obligations to meet the APHIS mission in safeguarding U.S. agriculture, and surveillance activities are a routine function of IS personnel stationed overseas. The information provided by IS is used by the other APHIS program units (particularly Veterinary Services and PPQ) and may result in changes in regulatory status, entry requirements, etc.

IS performs various training programs abroad to enhance technical, administrative, and diplomatic skills and competencies. It contributes to international technical capacity building by supporting development of other countries' diagnostic and species identification resources. For example, IS distributed new Lucent keys to international partners (i.e. IICA, FAO, CARDI, CABI, OIRSA) and national plant protection organization (NPPO) counterparts via IS offices overseas. IS also forwarded the new identification materials/links to the

University of Florida (UF) for dissemination to diagnosticians in the Caribbean Pest Diagnostic Network (CPDN) (which includes five countries where IS provided distance diagnostic equipment). The new keys were included in the resource materials provided to participants in the Regional Plant Quarantine Officers class funded by PPQ Greater Caribbean Safeguarding Initiative (GCSI) and given at the University of the West Indies (UWI) in Trinidad (in 2011, 2012 and 2014).

IS organized numerous capacity building trainings and workshops to train international NPPO inspectors and identifiers, to enable them to identify new pests entering their countries or to identify indigenous pests in phytosanitary export inspections (prior to export to the U.S.). Two examples include training in Asian Gypsy Moth Surveillance in Chile and a Giant African Snail Workshop in the southern half of South America.

## **2. Other Agency Activities, also designed to do no harm**

Program protocols: APHIS follows protocols to ensure that its own activities and those of its state cooperators, carried out to exclude, detect, diagnose, control, and eradicate invasive species, do not contribute to the problem. These ongoing efforts include, in a general sense, agency personnel adherence to established biosafety procedures in programs to detect, diagnose, and conduct control operations for plant and animal diseases and pests, both in laboratories and in the field; and assessment, in advance, of the probable impact of the use of biocontrol agents in programs to control invasive species.

## **3. Activities that are doing harm, and future agency actions to change them so that they do not continue to do harm**

None. APHIS actions are consistent with the “DO NO HARM” objective of the Executive Order on Invasive Species.

## **B. Natural Resources Conservation Service (NRCS)**

## 1. Activities to do no harm

The NRCS is well aware of the past, the present, and the potential future harm to the private lands in the U.S. from invasive species. The negative environmental and economic impacts of invasive species continue to be a large and growing problem for our Nation's private landowners.

The primary invasive species focus for NRCS has been on terrestrial and aquatic invasive plants. Invasive plants have had large negative environmental impacts upon the intended uses of many privately owned lands and wetlands in the U.S. There have also been large negative economic impacts associated with the costs of invasive plant control. Invasive plants compete for soil nutrients and water in croplands and wild lands and often require the use of herbicides, biological control agents, or innovative control techniques. Invasive plants, often of poor forage quality, may out-compete native plants in grazing lands and wild lands rendering large acreages no longer useful for supporting livestock or wildlife. Invasive aquatic plants rapidly spread in water bodies and wetlands, removing the open water component necessary for many wildlife species. Of particular concern are the negative impacts from invasive plants, invasive invertebrates, and pathogens upon populations of native and introduced pollinators and their habitats as well as upon native threatened or endangered species and their habitats. The invasive species could have devastating effects on desirable cropland and wild land plants and animals.

### Publication and Revision of Agency Invasive Species Policy:

NRCS published its NRCS Invasive Species Policy in November 2004 and revised it in July 2010. The policy is available at

<http://policy.nrcs.usda.gov/ViewRollUp.aspx?hid=17018&sf=1>

The policy addresses the invasive species responsibilities at all levels (e.g., National headquarters, regional, state, and field offices) of the agency. It requires awareness by NRCS employees of the presence of invasive species and potential problems associated with them. It requires NRCS to work with

partners and to use its human and financial resources for control, suppression, and/or eradication of invasive plants. The policy also requires that native plant species be used in vegetative conservation practices unless it can be demonstrated that no native species can achieve the desired conservation goals, or the desired native species is not available in the quantity required. Interim use of non-native, non-invasive species is allowed to provide the conservation function desired until native species can be established.

Assisting in the control and eradication of invasive plants: NRCS provides U.S. private landowners with financial and technical assistance to control and/or eradicate invasive plants in an effort to maintain the desired vegetation (e.g., food crops and forage), to maintain the desired characteristics of the land (e.g., wetland open water), and to diminish invasive plants spreading to neighboring lands. NRCS frequently partners with local and regional weed control organizations for control of weeds on and off private lands. The agency encourages the use of integrated pest management (IPM) which may involve appropriate herbicides when necessary, the use of approved biological control organisms, and innovative cultural control methods for specific problems (e.g., black plastic). NRCS has placed increased emphasis upon the protection of wildland habitats for pollinators and other wildlife

Landowners may participate in NRCS financial assistance programs, such as the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP), or in easement programs such as the Agricultural Conservation Easement Program (ACEP) or the Wetland Reserve Enhancement Partnership (WRE). A new grant program, the Regional Conservation Partnership Program (RCPP), is also available to expand NRCS conservation work. NRCS also provides technical assistance for the Farm Service Agency's Conservation Reserve Program (CRP). All of these programs have requirements to manage or control invasive plant species, especially noxious invasive species. NRCS provides technical and financial assistance, depending on the

program, to help private landowners control invasive plants.

NRCS Conservation Practice Standards: NRCS has created a toolbox of 170 practice standards that provide guidance for applying conservation technology on the land and that set the minimum levels for acceptable application of the technology. These practice standards undergo periodic review for incorporation of new technology (generally every 5 years). Emphasis continues to be placed upon the identification and consideration of the potential invasive qualities of recommended vegetation, the use of native vegetation, and the protection and enhancement of pollinator habitat.

The NRCS Plant Materials Centers (PMCs): NRCS operates 25 PMCs nationwide to evaluate plants and plant technologies used for vegetative conservation practices to support NRCS conservation activities and programs. PMCs encourage the use of the most appropriate plants to solve a restoration, reclamation, or conservation issue. Native plants are often recommended, especially for restoration efforts, natural areas, and wildlife and pollinator habitat.

The Plant Materials Program uses an Environmental Evaluation to assess the potential invasiveness of plants being considered for release to ensure that the potential for invasiveness is minimized. PMCs have also used the Environmental Evaluation to review all prior NRCS conservation plants released over the past 75 years. For plant releases that are known or determined to be invasive or otherwise environmentally harmful, PMCs discontinued their production. Once a PMC discontinues a plant release, NRCS plant materials specialists work with the appropriate states to remove the invasive plant releases from NRCS state standards and recommendations so the plant is not recommended in the future.

Invasive Species and Compliance with the National Environmental Policy Act: The NRCS National Invasive Species Specialist previously provided an overview of invasive species and the NRCS responsibilities through an agency-wide webinar



as part of an Environmental Evaluation Series of webinars focused upon Special Environmental Concerns. Our agency's – and all Federal agencies' – responsibility to “Do No Harm” was addressed in the webinar. This overview is available at <http://www.forestrywebinars.net/webinars/environmental-evaluation-series-planning-for-prime-and-unique-farmland-and-invasive-species-special-environmental-concerns>.

## **2. Other Agency Activities, also designed to do no harm**

PLANTS Database: The information about plant materials available through the PLANTS database (<http://plants.usda.gov>) is used by conservation professionals and the public to determine beneficial plants that do well particularly for use in restoration activities following removal of invasive plants within a particular geographical location. It also has information on plants which should not be planted within a particular environment (e.g., Federal and state noxious weed lists). The database information provides assistance in assessing the potential invasiveness of specific plants. The PLANTS database has over 650 fact sheets on-line and provides services through over 70,000 user sessions per day. Future capabilities of the PLANTS database will include invasive species lists (in addition to the existing noxious weed lists) for each state and information about the pollinators upon which specific plants are dependent, and recommended forage to encourage specific pollinators.

Addressing Herbicide-resistant weeds: Due to the increasing occurrence of weeds that become resistant to the herbicides being used to control them, NRCS developed the Conservation Activity Plan (CAP Code 154) under the Environmental Quality Incentives Program that provides requirements for a conservation activity plan for which financial assistance may be provided. The Integrated Pest Management (IPM) Herbicide Resistance Weed Conservation Plan documents decisions by producers who agree to implement a system of conservation practices and IPM techniques. This plan puts an emphasis on herbicide use orientation to suppress herbicide resistant weeds and, at same time, to reduce the potential for herbicide resistant

weeds to again establish in the treated area of cropland by utilizing the four IPM strategies: Prevention, Avoidance, Monitoring and Suppression. This approach will be implemented with the augmentation of one or more of the following key essential conservation practices: Crop Rotations, Cover Crops, and Residue Tillage Management practices.

### **3. Activities that are doing/have done harm, and agency actions to change them so that they do not continue to do harm**

Recommending invasive plants in conservation plans. During the “Dust Bowl” days of our nation, immediate action was necessary to mitigate excessive wind and water erosion of our nation’s soils. Plants, including the use of non-native materials, were often used for primary soil stabilization. Unfortunately, some of these plant species later became too persistent, and unfortunately have had negative impacts on the environment. NRCS no longer recommends such plants. The use of the Environmental Evaluation by the PMCs before recommending specific plant materials for conservation is proving to be beneficial to avoid present and future problems of this kind. Also, encouraging the use of native plants whenever they can meet the conservation needs is enhancing awareness at NRCS state and field offices about invasive species problems and NRCS responsibilities.

The implementation of the NRCS Invasive Species Policy has made clear to all levels of the agency the responsibilities to respond to invasive species problems, and to minimize or avoid future invasive species problems.

The state-specific Field Office Technical Guides provide technical guidance information for the specifics of each conservation practice standard within the specific State. Technical Guides may, in some cases, still recommend the use of plant materials that, in some situations, may have the potential to become invasive. NRCS has conducted and continues a review of all vegetative conservation practice standards to identify where this situation exists, and to work

with the appropriate PMCs to recommend other appropriate and non-invasive plant material.

Use of herbicides or other methods that may have detrimental effects on native pollinators: Treatments recommended in some conservation practice standards for invasive plants may, in some cases, include the use of herbicides or other methods that may have detrimental effects directly or indirectly (e.g., habitat destruction) on native pollinators. NRCS continues to review and to revise all practice standards to identify such methods, and to recommend revisions that minimize or eliminate negative impacts to native pollinators. NRCS is developing a module within the PLANTS database that identifies specific plant-pollinator relationships and encourages the use of “pollinator friendly” plants in agricultural and wild land situations.

### **C. U.S. Forest Service (USFS)**

#### **1. Activities to do no harm**

Policy Implementation - Invasive Species Management on National Forests and Grasslands: Throughout FY2016, Forest Service Manual (FSM 2900) for invasive species management on the National Forest System has strengthened invasive species management activities across the 193 million acre National Forest System, by providing policy requirements and guidance to more effectively manage aquatic and terrestrial invasive species using an integrated and proactive approach.

Policy Development - NFS Invasive Species Management Handbook: Forest Service Manual 2900 has laid the foundation for the accompanying Forest Service Handbook (FSH 2909.11 – NFS Invasive Species Management Handbook). Development work on the Handbook continued through FY 2016, including completing formal Tribal consultation. When completed, the Handbook will articulate specific policy direction, management guidance, standards, criteria, rules, procedures

for aquatic and terrestrial invasive species management on the National Forest System.

Supporting the President's Priority Agenda on Enhancing the Climate Resilience of America's Natural Resources – Development of the National EDRR Framework for Invasive Species: Promoted various aspects of the National Framework for a National Early Detection and Rapid Response (EDRR) System against aquatic and terrestrial invasive species for all lands and waters of the National Forest System and adjacent areas. The development of a proposal for creating an emergency response fund to increase the capacity of interagency and inter-jurisdictional teams is necessary for full implementation of the Framework and to tackle emerging invasive species issues across landscapes and jurisdictions.

USFS continued to expand prevention and control activities against high risk invasive species throughout FY2016 - in coordination with interagency groups such as ANSTF, ITAP, and FICMNEW, states, and others. For example, USFS personnel work closely with USFWS and other groups at the state, regional, and national levels to address the spread of White-nose syndrome disease in native bats. In addition, USFS personnel play a key role in preventing the spread of aquatic invasive species, particularly focusing on inspections, decontaminations, and interdictions at recreational use water-bodies and public use facilities located on National Forests and Grasslands. Close Coordination with the National Invasive Species Council, Aquatic Nuisance Species Task Force (ANSTF), and other state and federal agencies resulted in the Federal Regulatory Roles and Responsibilities for AIS inspection and prevention policy and activities on Federal Lands. National Forests and Grasslands play a key role in the implementation of the requirements of the Quagga- Zebra Mussel Action Plan for Western U.S. Waters, the ANSTF Strategic Plan, and USDA's priorities against aquatic invasive species, and maintains close coordination with other federal and state agencies.

### Invasive Species Management Accomplishments -

In FY2016, the National Forest System increased program performance targets for invasive species treatments and expanded the integration of funding to accomplish these activities - including increased focus on outcome accomplishments under the new Integrated Resource Restoration budget structure. A variety of funding sources were used for invasive species management work across the National Forest System. FY2016 performance accomplishments for the treatment of aquatic and terrestrial invasive species (including plants, pathogens, vertebrates, invertebrates, and fungi) on National Forest System lands and waters indicated that 377,000 priority areas were treated to prevent and control invasive species, with nearly 300,000 acres restored or protected.

### USFS/S&PF/Forest Health Protection (FHP)

FHP provides technical assistance on forest health-related matters, including non-native insects, pathogens, and invasive plants. FHP works closely with land managers and resource staff with the National Forest System, the Department of the Interior, Department of Defense, other federal agencies, Tribes, all 50 States, U.S. Territories, universities, private landowners and other countries.

FHP provides forest insect, disease and invasive plant survey and monitoring information, and technical and financial assistance to prevent, suppress and control outbreaks threatening forest resources. FHP helps to maintain, enhance, and restore healthy forest conditions and look for links between changing climate and pest conditions. FHP provides specialized assistance to incorporate disturbance considerations in forest planning and management.

FHP programs and services direct and implement measures to prevent, slow, or suppress unwanted native and nonnative insects, pathogens, and plants affecting trees and forests. FHP also provides technical assistance and shares forest health

technologies worldwide on various techniques available to maintain healthy forests.

FHP's Forest Health Monitoring (FHM) program studies the forests of the United States to identify detrimental changes or improvements in forest health occurring over time, and provides annual reports of such monitoring.

Our Pesticide Use Management program provides technical information, advice, and training in managing and coordinating the use of pesticides in forest integrated pest management programs, and prepares human health and ecological risk assessments for a variety of chemical and biological pest management tools.

FHP's Technology Development program, through the Forest Health Technology Enterprise Team (FHTET), develops leading-edge technologies that help our many partners carry out forest health protection work with more accuracy and cost efficiency. We work closely with USDA Animal and Plant Health Inspection Service to detect introductions of new forest pests into the States and eradication of introductions that pose significant threats to forest resources.

Updates to USFS National Invasive Species Program Web Site: USFS updated the portals, navigation, and content for the national website on invasive species. It provides user information on USFS activities related to invasive species, policy, authorities, news and emerging issues. The site provides key contact information for invasive species program managers, access to cooperative projects and research, geographic information, species profiles, and techniques for preventing and controlling a wide variety of species. The website is <http://www.fs.fed.us/science-technology/invasive-species-pests-disease>

**USFS Research on invasive species:**

For FY 2016 USFS produced 274 tools related to invasive species, calculated on a 5 year rolling average. A tool is a peer

reviewed publication, a new or refined technology or a science delivery product. Below are a selection of these products illustrating the diversity of USFS research on invasive species that can result in less harm? Some have been published in 2016 and can be referenced at the Treesearch website, <http://www.treesearch.fs.fed.us/>

Recently, USFS researchers identified a native fungus, *Fusarium*, which created die-backs in *Bromus tectorum* patches in the Great Basin. The sporadic natural phenomenon of complete stand failure ('die-off') of this invader may present opportunities to restore native plants. A recent die-off in Nevada was precision-planted with seeds of the native grasses *Poa secunda* (Sandberg bluegrass) and *Elymus elymoides* (bottlebrush squirreltail), of both local and nonlocal origin. Seed emergence and growth of native seeds was lower in die-off than control plots early in year one, but in year two, seedlings in die-offs had increased vigor and growth, at equal or higher densities, than control plots. The results warrant further investigation into die-off restoration after an invasive species die-off, either naturally or from treatment.

<http://www.treesearch.fs.fed.us/pubs/49559>

Brown trout (*Salmo trutta*) are widely introduced in western North America where their presence has led to declines of several native species. To assist conservation efforts aimed at early detection and eradication of this species, we developed a quantitative PCR marker to detect the presence of brown trout DNA in environmental samples. The marker strongly amplified brown trout eDNA, and produced no amplification of eDNA from 17 other species commonly found in western North America. We field tested this marker and demonstrated positive detections in field samples where brown trout presence was known. <http://www.treesearch.fs.fed.us/pubs/52088>.

USFS representatives staffed a "Bad Bugs in the Woods" booth highlighting invasive insects threatening eastern forests. The booth was at the BugFest 2016, an annual event, held in Raleigh North Carolina. Visitors at the booth learned about such "bad bugs" as the emerald ash borer, Asian longhorned beetle, and hemlock woolly adelgid, as well as the redbay

ambrosia beetle and walnut twig beetle, both associated with fungal diseases. "Many were amazed that these tiny insects could kill a tree," said one researcher.

USFS scientists and collaborators in the Pacific South West used automated sound-recording devices and pattern-recognition software to develop a novel, nonintrusive method to inventory and monitor the Sierra Nevada's secretive Great Gray Owl. The owls' nocturnal nature can make them difficult to detect by traditional surveying methods, so researchers collected months of nocturnal audio recordings. They used pattern-recognition software to detect 7,445 male, 13,163 female and 43,004 juvenile calls. Genetic analyses also discovered that the Sierra Nevada population, *Strix nebulosa yosemitensis*, is its own unique subspecies. The use of non-intrusive audio recordings reduced both the intrusion into the owl habitat, but also the disturbance on the grown from human traffic.

Use of Internet: The USFS Research Program improved use of the internet to disseminate research results. The national office website was redesigned to provide a "one-stop" umbrella for research programs in all the USFS Research Stations. All USFS research publications can be found at the TreeSearch website. The use of internet sites has substantially reduced the use of paper and energy in mailing and printing of reprints. See: <http://www.fs.fed.us/research/invasive-species/> ; <http://www.treesearch.fs.fed.us/>.

## **2. Other Agency Activities, also designed to do no harm**

Continue Implementation of Prevention Activities – Vehicle and Equipment Cleaning: Throughout FY2016, USFS national forests and grasslands continued to implement vehicle and equipment inspection and decontamination activities/systems/protocols with public and private partners to prevent the accidental spread of invasive species during operations conducted in aquatic and terrestrial areas of those public lands. Special efforts were conducted to develop and implement prevention protocols linked to aquatic invasive



species during fire suppression activities, resulting in national interagency standards developed in collaboration with other federal fire management organizations.

#### Invasive Species Considered during Land Management

Planning Activities: National invasive species management policy for the National Forest System (Forest Service Manual 2900), required invasive species management considerations to be part of all planning and implementation of energy development and transmission programs, transportation, and other land management activities conducted on the National Forest System. The national policy prohibits the use of invasive species for bio-fuels/bio-energy production on National Forests and Grasslands. Forests and grasslands are incorporating invasive species management provisions into plans, EIS's, and other NEPA related documents.

#### Review of Land Management Plans for Several National

Forests – Invasive Species Issues: USFS worked closely with local, regional, and national offices and agency leadership to conduct a national review of developing Forest Plans. They were assessed on how well they addressed the invasive species issues and identified additional related deficiencies identified in each Forest Plan tied to monitoring and actions. The work required many weeks of detailed analysis of the various planning documents prepared by each forest. The validity of the objections were assessed, and the official WO responses and guidance to the Regional Forester and Forest Supervisors addressed the concerns raised. Regional and Washington office officials discussed potential and necessary changes in each Forest Plan based on the analysis and recommendations.

#### Invasive Species Prevention and Control on Electric Energy

Rights-of-Way Corridors and Related Facilities: Applicable USFS offices worked closely with other federal agencies and other stakeholders to address invasive species and native vegetation management on electrical energy rights of way across public lands throughout FY2016. A draft national Memorandum of Understanding was finalized between federal

land management agencies in USDA and USDI, EPA, and industry representatives (The Edison Electric Institute, Member Companies and Affiliates; The American Public Power Association; The Utility Arborist Association; The National Rural Electric Cooperative Association). The information incorporated into the MOU related to best management practices for invasive species prevention and control, wildlife habitat conservation, native plant conservation, and pollinator habitats protection and restoration. The MOU was signed in late FY2016.

Coweeta Hydrologic Laboratory, Otto, NC recently co-sponsored a “Low-Volume Private-Access Road Construction and Maintenance” workshop in partnership with Mainspring Conservation Trust. Poorly constructed and maintained private access roads are a significant source of sediment to streams in the Southern Appalachian Mountains. Participating forestland owners, farmland owners, homeowners and others learned that proper road construction and maintenance is a win–win for landowners and the environment. It results in reduced long-term maintenance costs and more soil staying on site and out of waterways.

USFS scientists and collaborators in the Pacific South West used automated sound-recording devices and pattern-recognition software to develop a novel, nonintrusive method to inventory and monitor the Sierra Nevada’s secretive Great Gray Owl. The owls’ nocturnal nature can make them difficult to detect by traditional surveying methods, so researchers collected months of nocturnal audio recordings. They used pattern-recognition software to detect 7,445 male, 13,163 female and 43,004 juvenile calls. Genetic analyses also discovered that the Sierra Nevada population, *Strix nebulosa yosemitensis*, is its own unique subspecies. The use of non-intrusive audio recordings reduced both the intrusion into the owl habitat, but also the disturbance on the grown from human traffic.

### **3. Activities that are doing harm, and future agency actions to change them so that they do not continue to do harm**

None.

#### **D. Foreign Agricultural Service (FAS)**

##### **1. Activities to do no harm**

None.

##### **2. Other Agency Activities, also designed to do no harm**

In implementing the transparency obligations under the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), FAS functions as the central government authority, known as the National Notification Authority, responsible for the notification of U.S. SPS measures to the WTO. FAS also functions as the National Enquiry Point for monitoring foreign SPS notifications and addressing questions from other Members about SPS measures and related issues.

FAS plays a role in negotiating bilateral and multilateral free trade agreements and participated in the negotiation of the Trans-Pacific Partnership (TPP) Agreement which was signed in February 2016. TPP is one of the most ambitious trade agreements ever negotiated to open markets and raise environmental standards in the world's fastest growing region. The TPP's Environment Chapter contains a provision to identify cooperative opportunities to share information and management experiences on the movement, prevention, detection, control and eradication of invasive alien species, with a view to enhancing efforts to assess and address the risks and adverse impacts of invasive alien species.

FAS international capacity building and development programs increase partner countries' capacities for agricultural productivity, food security, and participation in international trade. FAS does not have a program for explicitly combatting Invasive Alien Species, though some FAS program activities address this area. For example, in FY 2015-2016, in

collaboration with USDA/APHIS, FAS managed a grant agreement with the Centre for Agriculture and Bioscience International (CABI) to link data on Invasive Alien Species with CABI's Invasive Species Compendium. More broadly, FAS activities to help partner countries strengthen their plant health, animal health and food safety systems may also help to avoid harm from Invasive Alien Species.

**3. Activities that are doing harm, and future agency actions to change them so that they do not continue to do harm**

None.