

U.S. Department of Agriculture Report to the Invasive Species Advisory Council for the winter 2015 meeting October 28-30, 2015

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A. USDA Progress on ISAC recommendations from the October 2003 meeting

1. ISAC recommendation: Increase efforts in economic analysis to make the case for investments in invasive species efforts.

The Economic Research Service (ERS) is continuing the “Program of Research on the Economics of Invasive Species Management” (PREISM) initiated in FY03. PREISM supports economic research and the development of decision support tools that have direct implications for USDA policies and programs for protection from, control/management of, regulation concerning, or trade policy relating to invasive species. Program priorities are selected through extensive consultation with APHIS, OBPA and other agencies with responsibility for program management.

For example, ERS developed a pest-ranking decision tool for APHIS to determine which pests would be on its 2004 and 2005 Federal-State Cooperative Agricultural Pest Survey (CAPS) list, making transparent the basis for selecting the pests for which State cooperators could receive targeted pest surveillance and detections funds. Also, the rapid spread of soybean rust in South America prompted ERS, in April 2004, to publish a study of the economic and policy impacts of its windborne entry into the United States. USDA used the ERS analysis in refining rapid response strategies when APHIS confirmed the presence of soybean rust on November 10, 2004 in Louisiana. ERS extended this work to examine the value to producers of USDA’s coordinated framework to detect and

report the presence of Asian soybean rust in different producing areas and released a report in 2006.

In addition to ERS-led analyses of invasive species issues, PREISM allocated about \$6.8 million in extramural research cooperative agreements through a peer-reviewed competitive process in FY03-08. About \$1.1 million per year were allocated for extramural agreements in FY05 and FY06; \$950,000 was allocated in FY07 and \$970,000 in FY08. No funds have been allocated since FY09. The last extramural research projects were completed during FY13.

As part of its continuing work, ERS supported workshops and conducted research on the economics of managing glyphosate-resistant weeds. ERS provided financial support to the "National Summit on Strategies to Manage Herbicide-Resistant Weeds" in May 2012, conducted by the National Academy of Sciences, and conducted a workshop on the economics of glyphosate-resistant weed management at its own facilities in November 2013. ERS released an Economic Research Report titled, "The Economics of Glyphosate Resistance Management in Corn and Soybean Production" in April 2015. ERS is also conducting economic research on pollinators, including completion of a Congressionally-mandated study in August 2014, "An Economic Valuation of Honeybees in the United States." ERS hosted a workshop entitled "Economics of Pollinator Health" in September 2015.

PREISM-funded researchers addressed important issues. For example, a Virginia Polytechnic Institute and State University research team collaborated with APHIS staff to analyze a rule to allow importation of avocados from Mexico, using a framework developed under a PREISM-funded agreement. The framework and economic analysis were published in the Federal Register with the APHIS rule. PREISM-funded researchers, as part of their projects, are collaborating with agencies to address invasive species issues and decisions, such as the coordination of prevention and control strategies for Brown Tree Snakes and *Miconia calvescens* in Hawaii, management of cheat grass, management of diseases

transmitted between livestock and wildlife, insect resistance management in strawberry production, responses to outbreaks of foreign animal diseases, and prioritizing invasive plant management by public agencies. At the invitation of the Council on Food, Agricultural, and Resource Economics (C-Fare) and the Weed Science Society of America (WSSA), Muniswamy Gopinath (Oregon State U.) and Bruce Maxwell (Montana State U.) briefed congressional staff about their PREISM-funded projects on May 5, 2006.

ERS organized 8 workshops from 2003 to 2011 to provide forums for dialogue on economic issues associated with agricultural invasive species.

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 residual population that will remain which will need increased surveillance and continual management.
- 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.

Important PREISM outputs and accomplishments are documented in the 2003-2011 PREISM activities report (<http://www.ers.usda.gov/publications/AP/AP056/>).

Beginning in 2007, **NIFA's** National Research Initiative (NRI) Program, Biology of Weedy and Invasive Species in Agro ecosystems, has required an economic component in the integrated projects it funds. Specifically, the focus of such programs is the development, delivery, and implementation of ecologically-based, invasive species management programs (e.g. use of cover crops, grazing, tillage, and biocontrol agents) that include economic decision support tools to evaluate tradeoffs of different management strategies. A total of \$4 million was awarded such projects. This priority was continued in the Agricultural and Food Research Initiative (AFRI) grants program in FY09 with an additional priority focusing on the abundance of weedy and invasive species and the individual and/or collective impacts of these species on a broad suite of ecosystem services, both market and non-market, and that can be used to evaluate tradeoffs of different management strategies.

Although the Biology of Weedy and Invasive Species in Agro ecosystems Program was discontinued in AFRI in FY10, a new grant program was offered through the AFRI Foundation Program in FY11, FY12, FY13, **FY14 and FY15 entitled "Controlling Weedy and Invasive Plants"**. This priority area supports projects that focus on **compelling scientific questions underlying current issues in weed and invasive plant management in crops, managed forests and rangeland including:**

- **Ecological processes related to biocontrol and/or integrated pest management;**
- **The evolution, spread and mitigation of herbicide resistance based on an understanding of ecological fitness and gene flow; or**
- **Other ecological or evolutionary studies that would inform weed management strategies, including links between agronomic practices and weed problems.**

It is anticipated that in FY16, funding opportunities for invasive species research in the AFRI Foundational Program will apply to a broader range of invasive species types.

USFS researchers' co- authored an evaluation of the economic costs and benefits of slowing the spread of emerald ash borer in Ohio and Michigan. The emerald ash borer (*Agrilus planipennis*; EAB) first discovered in Detroit in 2002, is poised to wipe out native ashes (*Fraxinus* spp.) in North America with expected catastrophic losses to ash tree forestry. The publication provides estimates of economic impact from EAB on ash forestry in Ohio and Michigan. <http://www.treesearch.fs.fed.us/pubs/47684>.

For **NRCS** the economic analysis of the benefits of providing more funds for addressing invasive species versus other natural resource priorities is the responsibility of the individual NRCS State offices in their deliberations with partners in the individual State Technical Committees. Each State, through the input of all members of the State Technical Committee and the use of economic analyses, determines the natural resource issues that have the highest priority, and they commit their funds accordingly.

B. USDA progress on ISAC recommendations from the March 2004 meeting

2. ISAC recommendation: What are NISC agencies doing to avoid harm?

USDA has eight agencies included in its invasive species portfolio: Forest Service (USFS), Natural Resources Conservation Service (NRCS), Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS), Economic Research Service (ERS), Foreign Agricultural Service (FAS), Farm Service Agency (FSA), and National Institute of Food and Agriculture (NIFA, formerly CSREES, the Cooperative State Research, Education and Extension Service).

Securing input from the USDA agencies, the USDA Senior Invasive Species Coordinator created the USDA DO NO HARM REPORT, a report to ISAC and NISC, by fiscal year, including three categories of activities:

- a) Invasive Species Program activities USDA agencies are carrying out to do no harm;
- b) The way in which, when they do carry out other agency programs activities, they are also designed to do no harm; and
- c) A list of activities that ARE doing harm and the future actions the agency will take to change the activities so that they do no harm.

Within the above categories, agencies include their own activities as well as activities that are coordinated with other Federal agencies, per the mandate under the Invasive Species Executive Order.

The Do No Harm reports for FY 2004 to FY2014 have been presented to ISAC (meeting date in parenthesis):

- FY04 report NRCS, APHIS, ARS, CSREES & ERS (Oct. 04)
- FY04 report for US Forest Service (Feb. 05)
- FY05 report for NRCS, APHIS, CSREES, ERS & FS (Oct. 05)
- FY05 report for ARS (April 06)
- FY06 report for FS, NRCS, CSREES & ERS (May 07)
- FY06 USDA (APHIS) Do No Harm Report Part 2 (Oct. 07)
- FY07 USDA Do No Harm Report (May 08)
- FY08 USDA Do No Harm Report (May 09) for APHIS, ARS, ERS, CSREES, ERS, NRCS & USFS.
- FY09 USDA Do No Harm Report (Feb. 10) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.
- FY10 USDA Do No Harm Report (March 2011) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.
- FY 11 USDA Do No Harm report (dated February 2012) for APHIS, ARS, ERS, NIFA, NRCS & USFS.
- FY12 USDA Do No Harm report (dated 8 January 2013) for APHIS, ARS, ERS, NIFA, NRCS and USFS.
- FY13 USDA Do No Harm report (dated 6 January 2014) for APHIS, ARS, ERS, NIFA, NRCS and USFS.
- FY14 USDA Do No Harm report (dated 27 January 2015) for APHIS, ARS, ARS/NAL, ERS, NIFA, NRCS and USFS research programs was edited to include all USFS programs. The second report was dated 5 July 2015.

The FY 15 USDA Do no Harm Report is in preparation.

Copies of all the USDA reports are available online at <http://www.invasivespeciesinfo.gov/resources/orgfedusda.shtml>

- 3. ISAC recommendation: NISC should request all Federal agencies to identify existing grant programs, cooperative agreements and other mechanisms that are potential sources of funds for invasive species projects.**

USDA compiled and published a comprehensive document since 2005 with grant opportunities for work on research, technical assistance or management of invasives. The document has been updated annually. The “2016 USDA Grant and Partnership Programs That Can Address Research, Technical Assistance Prevention and Control” is in preparation. Past reports are available at www.invasivespeciesinfo.gov

C. USDA Progress on ISAC recommendations from the October 2005 meeting

- 4. ISAC recommendation: NISC policy liaisons provide guidance to ISAC Leadership and Coordination Subcommittee regarding issues the subcommittee should address.**

USDA would appreciate ISAC’s support to: (a) promote increasing support for research (knowledge and models) and increasing the awareness of decision makers about the economic impacts of invasive species; and (b) evaluate biological control programs in USFS, ARS and APHIS.

The USDA requested ISAC advice on the biocontrol programs (research, policy and management) within three of its agencies: APHIS, ARS and USFS. Documents from the agencies summarizing the programs to date and their plans for the future have been prepared for the ISAC Research Subcommittee’s deliberations and advice. APHIS provided a presentation on its biocontrol programs to the ISAC Research Subcommittee during the May 2014 ISAC meeting. Additional work is ongoing.

D. USDA Progress on ISAC recommendations from the September 2006 meeting

- 5. ISAC recommendation: That NISC support adequate and continuing funding and staffing for classical systematics research, education and operations – including the care and maintenance of systematics collections.**

Systematics clarifies the origins and movements of invasive pests, parasites and pathogens. Advances in biotechnology (including DNA sequencing, comparative genome analysis, distributed databases and high speed telecommunications) can substantially strengthen and accelerate governmental responses to these threats.

ARS Systematics Funding:

FY 2008 - \$19,439,000

FY 2009 - \$19,682,000

FY 2010 - \$20,455,000

FY 2011 - \$20,578,000

FY 2012 - \$20,398,000

FY 2013 - \$19,155,000

FY 2014 – \$20,572,000

FY 2015 Estimate – \$20,683,000

Agricultural productivity depends on access to key inputs (rich soils, fertilizers, water, and energy), the inherent genetic potential of crops and livestock, and effective defenses against diseases, pests, and environmental extremes that reduce agricultural production and producer profitability. The capacity of agricultural research effectively rests on a dynamic foundation of invaluable living animal, plant, and microbial genetic resources, and research tools in the form of scientific collections of preserved biological specimens. Such scientific collections are essential for ARS scientists, not only to advance the science of systematics, but also identify new invasive threats and to improve the success of control measures. Not all organisms respond the same way to control measures, thus it is imperative to correctly identify new pests. In 2014, the White House Office of Science and Technology Policy issued a Memorandum calling for Federal Agencies to improve the management of their

scientific collections, and ARS has been developing a policy to ensure the long-term preservation, maintenance, and accessibility of its systematic collections. ARS has hired two new insect taxonomists, and has one new vacancy still pending. A fungus taxonomist/curator position was lost due to insufficient funding to replace the position.

Addressing systematics shortfalls in the area of operations, APHIS has procured funding and began hiring in FY2014 for 24 new pest identification personnel to be located at ports of entry across the U.S. APHIS will also hire five new national taxonomists who will aid in curating and will be colocated with major research specimen collections. These 29 positions will increase efficiency in identifying exotic species arriving from foreign origins and potential new introductions of invasive plant pests detected in the U.S. by domestic surveys.

E. USDA Progress on ISAC recommendations from the May 2009 meeting

7. ISAC Recommendation: Revise and draft NEPA guidance. ISAC recommends that NISC and the Council on Environmental Quality (CEQ) revise and draft guidance under the National Environmental Policy Act (NEPA), and make it available for public comment by October 1, 2009.

USDA and APHIS participated in the latest review by NISC of the proposed invasive species guidance in 2009. The NISC staff sent the report to CEQ and is awaiting CEQ action.

8. ISAC Recommendation: Provide data on NISC member agencies' invasive species budgets. ISAC recommends that NISC member agencies annually provide in writing at the fall ISAC meeting their invasive species budgets for the preceding fiscal year in actual dollars and the budget for the current fiscal year (requested and enacted). The budget document should be divided into seven categories: Prevention, EDRR, Control and Management, Restoration,

Research, Education and Public Awareness, and Leadership/International Coordination.

Please see the updated budget report starting on Page 41 of this document with current information up to the FY16 budget.

F. USDA Progress on ISAC recommendations from the June 2010 meeting

9. ISAC Recommendation: That agency partners submit their annual reports according to the deadlines specified in Performance Element OC.7.1.1 of the NISC 2008-2012 National Invasive Species Management Plan, which reads: *“Each NISC member submits one formal (draft and final) report per fiscal year, tracking the implementation of the NISC 2008 Plan. NISC Staff will complete a streamlined reporting template within three months. Annual summary report by NISC is available on its website by February 28 of each year along with the individual NISC member reports.”*

USDA agencies submitted to NISC their reports related to their implementation of activities in the National Invasive Species Management Plan of 2008. APHIS, ARS, NRCS, NIFA, USFS, FAS, FSA and ERS have submitted their report for FY14. USDA agencies are currently compiling their accomplishments of activities for the FY15 report. NISC has not published the report tracking all NISC agencies accomplishments implementing the Plan.

10. ISAC Recommendation: That NISC adopts the Invasive Species and the Green Economy paper and recommendations within (see below).

We (ISAC) call on the member Departments and Agencies of the National Invasive Species Council (NISC) and potential partners to:

□ Establish a national survey of invasive species, to be administered at the state-level. Support this program by substantially increasing Federal and state jobs at all technical

levels to survey, identify, map, catalog, and model patterns/trends of invasive plants and animals. Include the existing state and regional invasive species committees/councils in the development and implementation process. Place priority on invasive species known or projected to have substantial impacts.

APHIS assists state partners via its National Cooperative Agricultural Pest Survey Program which uses appropriated funds and with funds from Section 10007 of the 2014 Farm Bill.

The Cooperative Agricultural Pest Survey (CAPS) Pest Detection program **strengthens APHIS' emergency preparedness efforts through the early detection of exotic, harmful, or economically significant plant pests, pathogens, and noxious weeds.** Discovering these pests before they spread can prevent small outbreaks from becoming emergencies. APHIS and its State cooperators carry out surveys for pests of regulatory significance through the CAPS program. The CAPS Program enables APHIS to maintain a comprehensive network of cooperators and stakeholders to facilitate its mission of safeguarding America's plant resources.

In FY 2014, APHIS and cooperators conducted a total of 253 commodity- and taxon-based surveys in 50 States and 2 territories (with 116 surveys conducted by States and 137 by APHIS). The program targeted 117 high-risk pests of national concern for survey in corn, oak, pine, small grains, soybean, and nursery crop commodities, as well as exotic wood boring bark beetles and cyst nematodes, among others, representing 85.5 percent of the target pests suggested for survey in the 2014 CAPS Survey Guidelines. Including pests of State priority, the Program targeted 247 unique pests for survey in FY 2014, surpassing its performance target of 200. Surveys consisted of multiple pests for efficiency and economy of survey, with an average of five to six pests per survey and two to three surveys per State.

With sequestration and no increases in funding to the line item, the Pest Detection program leveraged funding in the Farm Bill Plant Pest and Disease Management and Disaster Prevention (Section 10007) Program to enhance survey efforts. Specialty-crop surveys in apple, citrus, grape, orchard crops, palm, solanaceous crops, and stone fruits, in addition to mollusk and Khapra beetle surveys and others, were conducted. The addition of these surveys to the Pest Detection effort enhanced the overall performance of the Program by adding 108 additional surveys in commodities that were not able to be funded through the CAPS Program. The enhanced Farm Bill funding allowed the Program to increase the number of high-risk pests of national concern that were targeted for survey to 124, now representing 86% of national priority pests suggested for survey in the 2014 CAPS Survey Guidelines. The number of unique pests that were targeted in FY14 increased to 334 with the enhanced effort.

FY15 surveys funded by the Pest Detection line item are ongoing. In 2015, the Pest Detection Program is conducting **a total of 259 commodity- and taxon-based surveys in 50 States and 3 territories; 120 surveys are being conducted by state cooperators and 139 by PPQ.** The Program is surveying for 248 unique pests, of which 117 are National Priority Pests, representing 86% of the target pests suggested for survey in the 2015 National Survey Guidelines. As of September 1, 2015, **36,230 records have been entered to date into the NAPIS database for 340 unique pests. Of these, 218 pests have only negative records indicating freedom from these pests in the United States.** These data directly support agriculture and the environment, and facilitate exports. Due to the funding timeline, **information on FY15 Farm Bill surveys is not complete at this time, but will be included in later reports.**

In FY14 a total of 17 new species in the United States were detected and confirmed through Pest Detection surveys or otherwise reported to APHIS through entry in the National Agricultural Pest Information System database as new or re-introduced to the United States. All

17 new plant pests were significant and listed as reportable/actionable and as quarantine pests where action would be taken if detected on conveyance at a port of entry. Examples include *Syricoris launana* (Dark strawberry tortrix) in Oregon, *Podosphaera caricae-papayae* (a powdery mildew fungus) and *Orobanche aegyptiaca* (Egyptian broomrape) in California, *Eriococcus lagerstroemiae* (Crepemyrtle scale) in Texas, *Lycorma delicatula* (Spotted lantern fly) in Pennsylvania, *Helicoverpa armigera* (Old world bollworm) in Puerto Rico, and *Aceria tounefortiae* (an eriophyid mite) in Florida. The Program detected 88% of the significant pest introductions before they spread from the area of original colonization and caused significant economic or environmental damage. Only one of these pests (*Helicoverpa armigera* in Puerto Rico) were high-risk pests of national concern specifically targeted for survey through the two programs; in effect, demonstrating freedom from high-risk pests nationally. A complete accounting for new pest detections in FY15 will be included in a later report.

USFS cooperative agreements with states support a wide range of native and invasive species detection and monitoring activities to help prioritize national treatments. S&PF aerial and ground surveys are compiled into a national annual report available to the public, titled *Major Forest Insect and Disease Conditions* in the United States. The report focuses on the 20 major insects and diseases that annually cause defoliation and mortality in forests of the United States.

2014 Farm Bill Section 10007

Section 10007 of the Farm Bill combined the National Clean Plant Network (NCPN), formally Section 10202, with the Plant Pest and Disease Management and Disaster Prevention (PPDMDP) program, formally Section 10201, and provided additional funding for these two programs. The Farm Bill made the NCPN a permanent program with dedicated funding. The NCPN provides reliable sources of pathogen-free planting stock of high-value specialty crops such as fruit trees, grapes, citrus, berries, hops, roses and sweet potato. Through Section 10007, APHIS also provides Commodity Credit Corporation

funding to cooperators who suggest projects aimed at strengthening the Nation's infrastructure for pest detection and surveillance, identification, and threat mitigation, as well as safeguarding nursery production. The 2014 Farm Bill increased the combined funding for these two programs to \$62.5 million through fiscal year (FY) 2017, and to \$75 million in FY 2018 and beyond. After sequestration, \$57.9 million is available for FY 2015. At least \$5 million must go towards the NCPN.

In FY13, under the 2008 Farm Bill Section 10201, APHIS funded 398 projects with hundreds of cooperators in 50 state departments of agriculture, universities, other agencies in USDA, and non-profit organizations. Of the many projects funded, examples include: surveys for pests of national significance such as *Phytophthora ramorum*, grape pests (including the European grapevine moth), and honey bee pests; training canine teams for domestic survey detection activities in California and Florida, and for detecting snails in cargo and rail yards; developing, provide training for, and deploying survey procedures and tools that improve our ability to rapidly detect and accurately identify pests of regulatory significance, and development and implementation of a National Survey Supply Program to oversee timely procurement and delivery of quality survey supplies to APHIS field personnel and State cooperators; developing science-based, best-management, and risk-mitigation practices that exclude, contain, and control regulated plant pests from the nursery production chain as well as developing and harmonizing audit-based nursery certification programs; developing formal volunteer programs for exotic pest surveillance through outreach and education, and Tribal Nations engagement and involvement dealing with plant pest issues across the U.S.; and rapidly responding to plant health emergencies, such as Mexican Fruit Fly in TX, European Grape Vine Moth eradication efforts in CA, Citrus Canker in LA, Oriental Fruit Fly in CA, and the detection of Cucumber Green Mottle Mosaic Virus in CA.

Over the last several years, Section 10201 projects such as these have played a significant role in many USDA successes in protecting

American agriculture and educating the public about the threat of invasive species. Section 10201 funding directly strengthens and protects agriculture production and protection in all 50 States. This Farm Bill provision truly supports and enhances the Federal and State partnership in safeguarding the agriculture production capacity of the United States.

In 2015, FS was instrumental in organizing and launching the new inter-agency brief series on science concepts and management activities in the Great Basin. Given their critical nature in helping to solve fire, invasive species and restoration problems in the Great Basin, fact sheets are now posted on sites managed by several interagency partnerships, including the Great Basin Landscape Conservation Cooperative's site <http://www.greatbasinlcc.org/update/new-great-basin-fact-sheet-series>, the Great Basin Fire Sciences Exchange site (<http://www.gbfiresci.org/>) and the Sage Grouse Initiative's site <http://www.sagegrouseinitiative.com/category/great-basin-factsheet-series/>. The Great Basin Fact Sheet series provides managers with brief, accessible summaries of current science concepts related to conservation and restoration of the sagebrush sea, as well as associated management strategies, including control of invasive species

The NRCS maintains, through its National Plant Data Center in Greensboro, NC, the **PLANTS database** (<http://plants.usda.gov>) which, in addition to providing up-to-date descriptive and distribution information for plants of the U.S., provides invasive species lists for all States and references for more information about each of the invasive species. The PLANTS data is used as an authoritative source for the invasive plants in the U.S. by the global Invasive Species Compendium.

□ In order to counter the dramatic decline in taxonomic capacity (i.e. the decrease in the number of people trained to identify specific species), provide grants to support

research/education/training in taxonomy as well as job creation for taxonomists and parataxonomists (people who lack formal higher-level education, but who are trained to undertake species identification tasks).

In FY15, PPQ's Identification Technology Program (ITP) delivered to APHIS PPQ's programs and external partners:

- Major updates to four of ITP's web-based identification tools [Grasshoppers of the Western U.S., Edition 4 <<http://idtools.org/id/grasshoppers/>>, Federal Noxious Weed Disseminules of the U.S., Edition 2.2 <<http://idtools.org/id/fnw/>>; Aquarium and Pond Plants of the World, Edition 2.1 <<http://idtools.org/id/appw/>>; and Longicorn ID, Edition 3 <<http://cerambycids.com/longicornid/>>];
- One new identification mobile app for smartphones [Grasshoppers of the Western U.S., Android <<https://play.google.com/store/apps/details?id=com.lucidcentral.mobile.aphis.grasshoppers&hl=en>>; iOS <<https://itunes.apple.com/us/artist/united-states-department-agriculture/id511305053>>];
- Significant updates to 10 identification smartphone apps [Android <<https://play.google.com/store/search?q=USDA%20APHIS%20ITP%20Lucid&c=apps&hl=en>>; iOS <<https://itunes.apple.com/us/artist/united-states-department-agriculture/id511305053>>];
- Release of 11 identification mobile apps for iPads [<https://itunes.apple.com/us/artist/united-states-department-agriculture/id511305053>]; and
- eleven screening aids covering 22 species of exotic Bark/Wood Borer Beetles [CAPS web site <<https://caps.ceris.purdue.edu/node/34>>].

APHIS PPQ's Greater Caribbean Safeguarding Initiative, in partnership with the University of West Indies in Trinidad, provided the Plant Quarantine Inspector training to 20 representatives from the Greater Caribbean Region. The GCSI program also funded training workshops on red palm weevil, mollusks, and fruit flies for National Plant Protection Organization representatives.

APHIS International Services organized **capacity building trainings and workshops to train international National Plant Protection Organization (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.).

During FY 2015 USDA APHIS Plant Protection and Quarantine (PPQ), in concert with the APHIS International Services, supported nearly 60 International Technical and Regulatory Capacity Building (ITRCB) events, including 28 visitations by international foreign delegations interested in plant health issues. PPQ support for these events included the delivery of informational presentations, coordination of tours through USDA/collaborator facilities, as well as the contribution of plant health subject matter experts (SME) to review products and participate in technical meetings with international stakeholders. Through these collaborator engagements PPQ was able to work with trading partners and stakeholders from the Balkans, Burkina Faso, Cameroon, Canada, Caribbean nations, Costa Rica, Columbia, India, Japan, Malaysia, Morocco, New Zealand, Pakistan, Paraguay, South Africa, Taiwan, and others to refine trading partner capability to meet obligations and standard of the International Plant Protection Convention (IPPC).

Examples:

AFRICA

Zambia - Strengthening Zambia's capacity to safeguard plants and plant products from damaging pest introductions took place in Zambia at three ports of entry with high traffic of plants and plant products imported into Zambia; and to strengthen critical collaboration with other border agencies and stakeholders as an alternative, cost-effective approach to increase the Zambia NPPOs' capacity for pest detection. The design of this project was aimed at bringing in all these agents to be well informed of the mission of the NPPO as it pertains to phytosanitary border safeguarding. In total 30 individuals participated in the workshops.

The capacity building training was organized into 3 teams to run concurrent workshops with a facilitator team consisting of 2 plant protection officers, one entomologist and one plant pathologist.

Although the main participants are Plant Health Inspectors, it was critical to include port Veterinary Officers, Agribusiness Officers, Extension Agents, Customs officers, Immigration officers, Port Health officials, and Clearing Agents/brokers who can assist the NPPO personnel to have a better coordination in intercepting and detecting plant pests at the borders.

Each workshop included:

- Presentations of ISPM #23: Guidelines for Inspection; ISPM #32: Categorization of Commodities According to their Pest Risk; ISPM #31: Methodologies for Sampling of Consignment.
- Group discussions on development of inspection schemes and improvement of inspection and sampling Regulations, Protocols, and Manuals.
- Basic training on entomology and plant pathology of targeted pests and disease.
- Basic training on use of inspectional tools.

The Capacity Building activity is in support of International Services Goal to enhance global health and U.S. biosecurity through the development of science-based regulatory systems and policies around the world. A key activity is to enhance developing countries' capacity to implement science-based regulatory approaches and policies to implement WTO-related concepts and requirements such as risk analysis, inspection and certification to prevent the spread of invasive species.

Caribbean - Pest Diagnostic Network, Technical Working Group in Tobago - The Caribbean Pest Diagnostic Network (CPDN) is a major component of the Caribbean Invasive Species Surveillance and Information Project (CISSIP), which operationalizes the Caribbean Regional Invasive Species Intervention Strategy (CRISIS) an output of the Caribbean Invasive Species Working Group (CISWG). The objective of the CPDN is to provide a coordinated Regional safeguarding mechanism, designed to protect the Region from invasive pests, and help Member States meet international sanitary and phytosanitary reporting requirements. The CPDN's working group currently comprises key plant health personnel from Barbados, the Cayman Islands, Dominican Republic, Guyana, Haiti, Jamaica, Martinique and Trinidad and Tobago, together with representatives of

the partner organizations, namely the Centre for Agricultural Biosciences International (CABI), Caribbean Agricultural Research and Development Institute (CARDI), Caribbean Community (CARICOM) Secretariat, Inter- American Institute for Cooperation on Agriculture (IICA), USDA – APHIS, and the University of Florida Institute of Food and Agricultural Sciences (UF IFAS).

The CPDN is a network and an internet based Lab Information Management System (LIMS), which facilitates the digital upload of samples obtained in the field for rapid diagnosis and pest identification. Diagnoses are made online through interactions between extension officers and plant protection experts, and the problems presented are quickly assessed and the results and solutions communicated.

Since 2007, USDA - APHIS strengthened the Network by training plant health personnel, and supplying diagnostic equipment to Barbados, CARDI Dominica, Cayman Islands, Guyana, Jamaica and Trinidad and Tobago.

Tobago - A Small Technical Committee was established to develop a Regional Pest List – USDA APHIS, in collaboration with CABI, CARICOM Secretariat, and the CARDI hosted a technical committee to formulate and prioritize a regional pest list. The technical committee is comprised of the following specialists: economist, weed scientist, malacologist, entomologist, pathologist, and epidemiologist; along with the chairperson of the CPHDs and the chairperson of the Emergency Preparedness Plans and Mechanisms for Response TWG. It was established to create a prioritized pest list for the region.

The formulation of the Regional Priority Pest List (RPPL) encompassed a series of steps, which involved pairwise comparison of criteria, the determination of a short list of the top ten high risk pests for the Region, and pairwise comparison of the short listed pests to determine their order of priority.

Japan - Asian Gypsy Moth (AGM) Port Outreach – An on-going collaboration and outreach program, established with U.S.-Canada-Japan AGM offshore summer ship inspection and certification

operations continued to strengthen safeguards of North American forests from the introduction of AGM from Japan from the pathways of ships' superstructure and bulk or container cargo carrying life-forms of AGM into urban and rural parks and forests. There were two project objectives: 1) conduct outreach interviews in key ports in each of the (5) AGM risk zones with ship's agents and Japan's 3rd-party inspection companies to improve the percentage of ships arriving to U.S. ports with no certification, and 2) survey the same important ports for key contacts to build an AGM Forest Ecology network of interested AGM scientists and naturalists.

Europe – APHIS International Services furthers global capacity to strengthen trade and safeguard plant health. International Services represents the North American Region at the International Plant Protection Convention (IPPC), Capacity Development Committee (CDC). The CDC is comprised of technical representatives from all global regions who oversee the development of tools to strengthen global capacity to trade efficiently while safeguarding plant resources from the threat of pests. The CDC has approved 285 technical resources (such as Pest Risk Analysis Awareness Materials and a Market Access Guide) to further member countries' capacity development that are publicly available on the IPPC's Web site. In addition, the CDC members determined capacity development priorities to combat invasive pest threats. The priorities include supporting a harmonized approach to the electronic phytosanitary certification (ePhyto) process, increasing the pool of trained facilitators to administer the phytosanitary capacity evaluation (PCE) tool, and analyzing the effectiveness of the regulation of wood packaging material in international trade (ISPM 15).

Europe – APHIS International Services in Europe plays a key role in coordinating and facilitating sterile insect techniques-related projects (SIT) in fruit flies between FAO/IAEA and PPQ. The overall goal of these projects is to reduce the threat of invasive exotic fruit flies and especially the Mediterranean fruit fly of negatively impacting food production and trade between the U.S., Mexico and Central America.

IS Europe has secured funding to support a site visit to Croatia's "Mandarin Pilot Project" that employs the Sterile Insect Technique to address the spread of the Mediterranean Fruit Fly; thus strengthening

the capacity of Trading Partners' to address the threat at the origin. The visit was conducted in summer of 2014.

In FY15: IS Europe has secured funds for a Regional training course on plant pest risk assessment and management with emphasis on fruit flies for Eastern European countries and for the purchase of fruit fly traps and attractants to those countries to expand the monitoring area in the region. In addition funds were secured for the participation of ministry officials from Eastern Europe in a regional training course on early detection of animal diseases in post flooding environment, with emphasis on vector borne diseases.

IS Europe provides subject-matter expertise to UNVIE (US Embassy to the United Nations in Vienna) for FAO/IAEA plants and animal health projects to be considered for funding under Peaceful Uses Initiatives (PUI). Below are the current projects funded by PUI:

- Improving animal disease diagnostic capacities of veterinary laboratories at the regional level in Africa and Asia by transfer of nuclear and nuclear-related techniques.
- Contributing to sustainable agricultural development in the Balkans through environmentally-friendly pest suppression to facilitate fruit exports.
- Feasibility study and capacity building for control of fruit flies of economic significance in West Africa.
- Supporting fruit fly pest prevention and management in the Balkans and the Eastern Mediterranean area.

□ Substantially increase Federal and state agency staffing in the areas of import/border inspection for agriculture and wildlife, specimen identification, pest risk analysis (including pre-import screening), and invasive species program management (especially public education/outreach, regulatory enforcement, and early detection/rapid response).

APHIS PPQ continues to work with Customs and Border Protection (CBP) to increase the capacity for identifying pest and disease submissions from ports of entry. PPQ has initiated the hiring of 18 area identifiers and 6 Plant Health Safeguarding Specialist/Pest Identifiers to be placed strategically throughout the country to better

service the trade community. Additionally, PPQ has expanded the use of digital imaging to alleviate delays in identification for outlier ports and has worked with CBP to better utilize their cargo release authorities to provide recognition of innocuous pest-interceptions in order to facilitate the movement of cargo.

APHIS PPQ SITC (Smuggling Interdiction and Trade Compliance) continues to increase collaboration with CBP in FY15 to conduct special operations on international cargo at ports of entry. SITC also works very closely with CBP to target prohibited high risk agriculture commodities that have been found in commerce.

APHIS implemented Risk Based Sampling at all PPQ plant inspection stations. This method of sampling will enhance APHIS' ability to evaluate risk levels of country/commodity combinations and target inspections appropriately based on that level.

Since APHIS developed its predictive weed risk assessment (WRA) model in 2010, it has evaluated 92 species that represent either new US detections, proposed plant imports, or other species that pose a weed or invasive plant threat. APHIS' WRAs are used to support management decisions concerning the import of propagative material and the potential regulation of plants as Federal Noxious Weeds. However, the WRAs can also be used by APHIS stakeholders to support decisions or actions at a regional or local level. Because the majority of plant species are generally admissible into the United States, it is critical that APHIS proactively identifies potential weed threats that should be more closely evaluated with a WRA. In 2012, APHIS developed a quick screening tool that it uses to identify such potential threats. Since then, weed experts have screened over 1,000 species. While many of these are species that are either native, or too widely distributed for regulatory action by APHIS, others are good candidates for full evaluations with its weed risk assessment process.

Establishment of NAPPRA plants for planting category– In May 2011, PPQ established a new regulatory category called NAPPRA (not authorized pending pest risk analysis) for plants for planting (nursery stock) that pose a quarantine pest risk; these plants may no longer be imported unless PPQ first conducts a pest risk analysis (PRA). NAPPRA is a huge shift in plants for planting policy for the

USDA. It allows PPQ to quickly take action to regulate the importation of plants that could pose a pest risk to the U.S. and then conduct a PRA to ensure that all pest risks are addressed before the plants are brought into the country. Few plants for planting PRAs have been conducted in the past. NAPPRA makes plants for planting restrictions more similar to current requirements for fruit and vegetables. Also in 2011, PPQ made available for public comment the first round of NAPPRA taxa: 41 taxa of plants for planting as quarantine pests and 107 as hosts of quarantine pests. From these proposed candidates PPQ published in the Federal Register, **31 new quarantine pest plant taxa and 107 new host taxa of quarantine pests were added to the NAPPRA list.**

Simultaneously, **APHIS-PPQ published a second round of approximately 20 additional quarantine pest plants and approximately 30 hosts of quarantine pest plants as proposed candidates** for NAPPRA listing. Public comments on these proposed candidates are being evaluated. A final notice will be published in the Federal Register placing these pests on NAPPRA list. APHIS-PPQ is preparing to propose yet another group of quarantine pest plants and hosts of quarantine pest candidates for NAPPRA listing.

The Restructuring of the Plants for Planting Regulations – In April 2013, APHIS published a plants for planting proposed rule which would restructure the regulations governing the importation of plants for planting. The main changes include:

- 1) moving restrictions in the CFR concerning specific types of plants for planting to the online Plants for Planting Manual, thereby **utilizing the notice and comment rule making process which will improve speed and efficiency of changing import restriction;**
- 2) **consolidating all restrictions involving plants for planting** into Subpart – Plants for Planting in the CFR: and
- 3) **adding general requirements for the development of integrated pest risk management measures for specific types of plants for planting.**

We are currently working on moving the restrictions to the manual and providing simultaneous clarifications. Once the move is complete, the final rule will be in the Federal Register.

The APHIS VS re-organization emphasizes imports and port activities, and with the recent modest increase in budgets, filling of 'field vacancies' will be emphasized.

APHIS work in exporting countries to prevent introductions of invasive species to the U.S. - APHIS IS works with foreign counterparts to strengthen their ability to inspect shipments prior to export and phytosanitary certification. In Mexico, APHIS International Services (IS) coordinates monitoring and suppression activities of *huanglongbing* (citrus greening or HLB) to prevent the spread of the disease caused by the Asian citrus psyllid, a small insect that feeds on the leaves and stems of citrus trees. IS tracks Asian citrus psyllid populations in northern Mexico that could threaten California's citrus industry. The focus and surveillance operations are similar to California's HLB Multi-Agency Coordination Group and USDA's Citrus Health Program.

USDA APHIS PPQ POP (Precognance and Offshore Programs) conducts commodity preclearance programs in exporting countries to reduce the risk of plant pests and diseases entering the U.S. on fruit, vegetable, and nursery stock shipments. In the Netherlands, POP collaborates with the Dutch Ministry and the growers to inspect and certify pest-free bulbs and perennial plants for export to the United States. POP also partners with the Department of Defense to conduct military preclearance programs in Africa, Asia, and Europe. This inspection and certification program prevents the entry of harmful agricultural pests and diseases into the U.S. on returning military equipment, cargo, and service members' household effects. In addition, POP conducts offshore activities for pests such as the Asian gypsy moth (AGM). POP collaborates with the Canadian Food Inspection Agency and the shipping industry in Asia to reduce the number of maritime vessels arriving into North America with AGM egg masses.

FS develops a new method that assesses the suitability of preemptive quarantine measures at the level of small geographical subdivisions (U.S. counties): FS researchers demonstrate the approach with a decision support model that estimates the suitability of preemptive quarantine across multiple counties that surround areas infested with the emerald ash borer

(*Agrilus planipennis* Fairmaire (EAB), Coleoptera: Buprestidae), an emerging major threat to ash tree species (*Fraxinus* spp.) in North America. The model identifies the U.S. counties where the installation of preemptive quarantine would most effectively slow the spread of EAB populations and reduce risk to high-value areas. - See more at: <http://www.srs.fs.usda.gov/pubs/47726#sthash.S1SAzmz5.dpuf>

□ Mandate that, prior to receiving Federal support: 1) renewable energy projects (esp. solar, wind, and biofuel) have adequate invasive species mitigation plans in place and 2) biofuel developers/producers demonstrate that nonnative species are of low invasion risk (to the propagation site, area of potential dispersal, and along transport pathways) based on a competent invasive species risk analysis.

APHIS leads a team of eight USDA agencies to consider and determine whether plantings of two invasive species, *Arundo donax* and *Pennisetum purpureum*, either inherently or with planned mitigations, do or do not present a significant likelihood of spread beyond the planting area. This USDA-led activity is required under an EPA regulation published in July 2013. The team has conducted one such evaluation to date. Additionally when EPA has been petitioned to add species to its list of eligible species as feedstocks or biofuel sources, this team has advised EPA on expected risks associated with plantings of these species.

G. USDA Progress on ISAC recommendations from the December 2010 meeting

13. ISAC Recommendation: That NISC adopts the Invasive Species and the Climate Change paper and recommendations within.

Invasive Species and Climate Change

Approved by ISAC on December 9, 2010

Issue

Climate change interacts with and can often amplify the negative impacts of invasive species. These interactions are not fully appreciated or understood. They can result in threats to critical ecosystem functions on which our food system and other essential provisions and services depend as well as increase threats to human health. The

Invasive Species Advisory Committee to the National Invasive Species Council recognizes the Administration's commitment to dealing proactively with global climate change. However, unless we recognize and act on the impact of climate change and its interaction with ecosystems and invasive species, we will fall further behind in our effort to prevent, eradicate and manage invasive species. We are already seeing such climate change impacts and need to act now.

Decisive Action is Required

Policy makers at all levels of government must integrate invasive species considerations into climate change policies. The strong interrelationships between climate change and the dynamic nature of invasive species, changing ecosystems, and human activities necessitate such integration. It is critical that practices be developed that strengthen environmental monitoring, management and control of invasive species to minimize impacts on the broad range of ecosystem resources upon which humans depend. The physical process of climate change interacts with the biological and physical processes of the earth's ecosystems, and these are, in turn, linked to the socio-economics of human activities.

Background

Climate change and biological invasions are dynamic, interconnected and interdependent phenomena. They affect human health and well-being through their impact on resources, goods and services provided by ecosystems. These ecosystems are critical to agriculture and forests, food security, water supplies and other natural resources. They affect wildlife, recreation, and public health and safety nationwide. Even without climate change, invasive species have repeatedly and rapidly disrupted many ecosystems in the US. While climate change may have either a positive or negative effect on individual invasive species, which can be projected in various models, it is likely to have a negative effect on many specialist native species that are more restricted in their ranges. Invasive species often show higher ability to acclimate to environmental change compared to related native species. Thus, invasive species that tend to be more adaptable are expected to expand and further compromise sensitive native plant and animal communities.

The ongoing change in climate and the expected speed of this change are likely to exacerbate problems by increasing the ability of invasive species to become established, spread through, and disrupt ecosystems. At a minimum, invasive species can reshuffle the landscape for agricultural services and resources including food, fuel, feed, fiber and forests along with quickly changing land use decision pressures. As a parallel, in marine and/or aquatic ecosystems, climate change can induce fisheries collapse as mid-trophic structure species are lost opening new potential niches for tolerant invasive species. Finally, climate induced shifts in invasive disease vectors, such as those for malaria or avian flu, are of increasing concern.

Evidence indicates that climate change may alter the efficacy of management strategies for invasive species. Furthermore, changes in land cover caused by invasive plants can influence weather and climate. In some regions, both climate change and invasive species are likely to increase the frequency of wildfires which in turn will further facilitate the establishment of fire adapted invasive species leading to even more frequent and intensive fires.

Recommendations

Policy and Legal Responsibilities

We applaud the U.S. Department of Interior's establishment of a Climate Change Response Council to synthesize data and coordinate appropriate management of our nation's lands and waters. We acknowledge the U.S. Department of Agriculture's (USDA) recent presentation of the impact of climate change in its publication: "*Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States.*" We fully support the Department of Commerce's National Oceanographic and Atmospheric Administration's (NOAA) proposal to establish the NOAA Climate Service to meet essential national needs.

Executive Order 13112 requires Federal agencies to address invasive species and establishes the National Invasive Species Council to coordinate planning and response. The International Plant Protection Convention requires analyses of pest risk. Agencies may be able to integrate climate change considerations into their existing risk-assessment protocols and procedures. Environmental laws such as the Endangered Species Act and the National Environmental Protection Act (NEPA) can be used more powerfully to address invasive species.

Opportunities for Action

We call on the member Departments and Agencies of the National Invasive Species Council and potential partners to:

ISAC Recommendation: Use the Global Change Research Act of 1990 (GCRA)48 (PL 101-606) to aggregate information about the implications of a changing climate for invasive species spread so scientific data may be synthesized through existing authorities to inform policy-makers.

ARS continues to include invasive species as part of its climate change research program. ARS conducts basic and applied research on the interacting effects of climate change on endemic and exotic pests, weeds and diseases. Resistance to management actions designed to control these types of species is also addressed. The ARS climate change research program includes synthesis activities specifically designed to inform policy-makers.

Climate, trees, pests, and weeds: Change, uncertainty, and biotic stressors in eastern US National Park forests. The US National Park Service (NPS) manages over 8900 sq. km of forest area in the eastern United States where climate change and nonnative species are altering forest structure, composition, and processes. Understanding potential forest change in response to climate and nonnative tree pests, diseases and invasive plants are vital for forward-looking land management.

USFS researchers and their collaborators examined potential changes in tree habitat suitability using data for 121 national parks, 134 tree species, 81 nonnative tree pests, and nonnative vascular plants. The combination of rapid climate change and nonnative stressors may accelerate decline of some tree species and inhibit other species from occupying suitable habitat. Stewarding forests for continuous change is a challenge for park managers.
<http://www.treesearch.fs.fed.us/pubs/45907>

ISAC Recommendation: Streamline and focus agency programs to address invasive species climate interactions effectively and efficiently by establishing:

- 1) strategic plans that anticipate climate impacts on invasives,

The USDA Climate Change Science Plan includes invasives as a part of Element 1: Understand the direct and indirect effects of climate change on natural and managed ecosystems, including feedbacks to the climate system, and Element 2: Develop knowledge and tools to enable adaptation to climate change and to improve the resilience of natural and managed ecosystems. ARS includes invasives as part of its Climate Change, Soils and Emissions National Program Action Plan as part of Component 3: Enable agriculture to adapt to climate change with Problem statements of: Understand the responses of agricultural systems to anticipated climate change, and Understand the impact of anticipated climate change on endemic and exotic pests, weeds and diseases. In the Forest Service Global Change Research Strategy (2009-2019), invasives are included in Element 1: Research To Enhance Ecosystem Sustainability (Adaptation).

A changing climate will cause an even longer wildfire seasons, extreme weather events, shifting crop patterns, increased costs for weed control and invasive species management, and increase insect infestations in forests.

In FY12 all USDA agencies were asked to prepare a Climate Change Adaptation Plan and designate an agency Climate change Coordinator. Adaptation Plans are being implemented and their accomplishments are tracked.

The USDA has responded to the President's Executive Orders on Climate Change dated 2013 and 2014. Reports of USDA activities are available on the department's website.

In 2014, USDA established seven regional Climate Hubs and 3 Sub Hubs to develop and deliver science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access to assistance to implement those decisions. The hubs are located in existing USDA research facilities in Colorado, Iowa, North Carolina, New Hampshire, New Mexico, Oklahoma and Oregon. They provide outreach to farmers through existing networks such as Cooperative Extension and the USDA Service Centers and public education about the risks of climate change; perform climate risks and vulnerability assessments.

USDA increased the disaster assistance and crop insurance payments (FY12 to FY15) to farmers due to droughts, wildfires and other natural events.

APHIS-PPQ continues to investigate methods to address invasive species climate interactions. APHIS-PPQ has established a single framework, called SAFARIS, to contain climate change drivers (environmental variables) as well as supporting a variety of forecasting models. The framework will focus on regulatory risk analysis with applications to commodity risk assessments, pest spread modeling, impact analysis, and other regulatory applications. The SAFARIS framework compartmentalizes climatology, General Circulation Model (GCM) output, biological parameters and forecast models. This approach allows systematic incorporation of climate change drivers into all epidemiological forecasts. For example, the models that are part of the framework utilize outputs to predict plant pest distribution and spread and assess potential pest risks. Two distinct environmental drivers are climatology (historical weather archives) and GCM output (long term weather forecasts).

During the past calendar year, APHIS PPQ in cooperation with North Carolina State University completed development of a web-based version of its new spatial modeling framework. PPQ scientists and

cooperators have used the existing framework to inform decision-making associated with emergency programs, including forecasts for the old world bollworm, fruit flies and several other pests linked to trade issues. Next year, alternative approaches to use climate change data as drivers are being investigated. The options being tested include single general circulation model output vs. ensemble modelling. Additionally, APHIS PPQ is evaluating methods to establish, characterize and communicate uncertainty.

2) forward-looking environmental compliance documents (e.g., NEPA, nationwide Environmental Impact Statements on invasives prevention, management, and restoration)

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. ARS also conducts research to reduce pollution caused by agricultural practices. Large scale projects simulating commercial practices are normally implemented in cooperation with other agencies of the Federal or State Governments.

APHIS is developing internal guidance for incorporating climate change into its NEPA documents in order to address greenhouse gases and impacts of climate change per Executive Order 13514 and draft guidance from CEQ. In December 2014, CEQ published revised draft guidance on when and how Federal agencies should consider the effects of greenhouse gas emissions and climate change in risk analysis required by NEPA. During February 2015, APHIS submitted comments on the proposed guidance noting it will

be more practical, less onerous, and ultimately more informative than previously drafted versions. APHIS supported the guidance because it retains the opportunity for the meaningful climate change information to enter the public discourse. Lastly, APHIS agreed that when agency estimates of greenhouse gas (GHG) emissions are unlikely to meet the 25,000 metric ton reference value, the commensurate agency analytic burden appears reasonable. **APHIS is incorporating CEQ's revised draft guidance into development of its Agency-specific guidance for addressing climate change in its NEPA documents.**

and,

3) focus awareness programs to anticipate and manage potential climate driven ecosystem changes.

ARS conducts research on the effects of anticipated climate-driven ecosystem changes. Specifically in the area of climate change, ARS is tasked with the following:

- 1) understand the impact of climate change on agricultural systems including crops, animal systems, ecosystem services, and soil, water and air resources;
- 2) develop genetic resources for crop and animal varieties for increased production quantity and quality under changing climate conditions;
- 3) develop sustainable production systems to maintain, and where possible improve, soil, water and air quality;
- 4) develop risk management tools for countering climate driven threats from pathogens, insects, weeds and
- 5) improve the efficiency of water management and use

ARS conducts research on the effects of anticipated climate-driven ecosystem changes. Laboratory, plot-level, landscape, and simulation-focused research are focused on developing risk management tools to maintain the resilience of agricultural systems and the natural resources base (water, soil, air) needed to maintain production and ecosystem services.

ISAC Recommendation: Assess new climate driven invasion pathways and strengthen prevention programs to address invasives in ballast water, bio-fouling, interstate and international movement of materials

and equipment (e.g., energy development, wildfire response, national defense), and screening of plant and animal imports taking account of climate impacts.

ARS conducts basic and applied **research on the interacting effects of climate change on endemic and exotic pests, weeds and diseases. Resistance to management actions** designed to control these types of species is being addressed.

ISAC recommendation: Support monitoring and adaptive management programs for invasive species at the landscape scale so that natural resource managers can identify new threats and respond quickly and appropriately to invasive species in changing climatic conditions.

ARS is conducting **research on remote sensing and pheromone trapping technologies for new invasive pests**, such as the brown marmorated stink bug and coffee berry borer, **to enable mapping and tracking of invasive species, and the effectiveness of eradication measures**. ARS is also developing trapping technology for the coffee berry borer, and is developing an areawide pest control program to eradicate this pest from Hawaii before it becomes well established.

Emerald Ash Borer Natural Enemies Increased in the United States: USFS researchers evaluated the establishment of one biological control agent, *Tetrastichus planipennisi*, imported and tested since 2007 for classical biological control of the invasive emerald ash borer (EAB). These natural enemies are tiny beneficial insects that eat EAB eggs and larvae. Between 2007-2010, *T. planipennisi* adults were released into each of six forest sites in southern Michigan. By the fall of 2012, 21.2% of EAB were parasitized in the parasitoid-release plots. These results demonstrate that *T. planipennisi* is established in southern Michigan and that its populations are increasing and expanding; therefore it will likely play a critical role in suppressing emerald ash borer populations in Michigan. <http://www.treesearch.fs.fed.us/pubs/43739>

USFS National Forest System has expanded its corporate record keeping system and integrated survey and inventory information with treatment records to help provide critical information for adaptive management against invasive species. USFS policy (Forest Service Manual 2900) requires use of a structured decision making process

and an adaptive resource management approach when dealing with invasive species.

National Forest System is drafting invasive species management directives to utilize structure decision making and adaptive management to follow standards and guidelines, and contribute to meeting invasive species objectives over time.

USFS provides programs and services that direct and implement measures to prevent, slow, or suppress unwanted native and nonnative insects, pathogens, and invasive plants affecting trees and forests. Forest Health Monitoring (FHM) is a national program which analyzes survey and monitoring data to detect and predict changes in forest health in a scientific and quantitative manner. FHM also ensures national standards are in place for conducting survey and monitoring activities. Information from FHM activities are intended to enhance Forest Health Management activities.

The USFS Forest Health Technology Enterprise Team (FHTET) develops leading-edge computer technologies that help USFS and its partners to monitor, manage, and inform the public about forest health concerns. Technology development also includes the creation of biotechnologies which can improve specific pest management techniques and also determine non-target impacts of pesticides.

ISAC Recommendation: Foster collaboration of existing networks to address the broad geographic nature and altered management of invasive species issues in a time of climate change. This will allow the national response to be coordinated, efficient, and capitalize on current capacities using a synergistic approach.

ARS, USFS, NRCS and APHIS have members in FICMNEW (Federal Interagency Committee for Management of Noxious and Exotic Weeds) and ITAP (federal Interagency Committee on Invasive Terrestrial Animals and Pathogens) to inform other Federal agencies of research activities on invasive species and to coordinate efforts among agencies.

In FY15, ARS and APHIS initiated regular discussions to identify issues related to pests/pathogens/weeds that could benefit from

further collaboration between the two agencies. Program leaders from ARS and APHIS meet monthly to review common agency priorities. The two agencies also meet regularly as part of the Technical Advisory Committee regarding the safety of proposed new biocontrol agents, and to review invasive weed risks that may be associated with new biofuel crops.

ISAC Recommendation: Increase research and development

targeted at climate change and invasive species by supporting and expanding the USDA-ARS and US Forest Service Climate Change Programs, as well as competitive research programs such as USDA's Agricultural and Food Research Initiative, the Environmental Protection Agency's Project Grants, NSF's Conservation and Biology program, and NOAA's Sea Grant program. Better understanding of the interaction of climate change and invasive species will result in more relevant prioritization and management on the ground. This includes recognizing the economic basis for invasive species management decisions and supporting work that integrates economic, ecological and biological data providing policy and management support.

ARS is continually examining its portfolio of research projects relevant to climate change and invasive species. The goal is to expand an informal working group of ARS scientists focused on climate change and invasive species for the purposes of increasing opportunities for collaboration. New funding for additional research in this area was proposed in the President's FY16 budget.

NIFA continued to offer funding opportunities to address climate change in FY15 through the Agriculture and Food Research Initiative (AFRI). This grant program Challenge Area is entitled: Agriculture and Natural Resources Science for Climate Variability and Change. This grant program focuses on the societal challenge to adapt agro ecosystems and natural resource systems to climate variability and change and implement mitigation strategies in those systems. In the Agriculture and Natural Resources Science for Climate Variability and Change Challenge Area RFA, specific program areas are designed to achieve the long-term outcome of reducing the use of energy, nitrogen, reducing GHG emissions from practices, and water in the production of food, feed, fiber, and fuel; reduce GHG emissions from these agro ecosystems; and increase carbon sequestration. Project types supported by AFRI within this RFA included multi-function

integrated research, education, and/or extension projects and Food and Agricultural Science Enhancement (FASE) Grants.

Another source of NIFA funding for work relevant to the Agriculture and Natural Resources Science for Climate Variability and Change Challenge Area is the *National Robotics Initiative* (joint with National Science Foundation, NIH, National Aeronautics and Space Administration, and Department of Defense). The total Program Funds are approximately \$5 million from AFRI. Information is available at http://nsf.gov/funding/pgm_summ.jsp?pims_id=503641

USFS Research prioritizes research according to the nature and magnitude of current and anticipated problems and information required by managers for effective national resources management now and into the future. The scale of the problems and management needs differ between and among local, State, regional, national and even global levels. Research priorities, whether long- or short-term, are decided based on the Agency's mission to provide leadership in management of natural resources, mandates from Congress, and Executive Branch priorities.

ISAC recommendation: Use climate matching and ecological niche models to prioritize management of species that are most likely to cause the greatest harm in the future as a result of climate change. This will require the Federal response to be coordinated, empowered, and appropriately funded.

ARS co-sponsored the workshop *Advancing Pest and Disease Modeling* in Feb. 2015, Gainesville, FL. The workshop was part of the Agricultural Model Intercomparison and Improvement Project (AgMIP). The workshop brought together **researchers developing models for projections of crop yields under changing climate with those developing models for pest population dynamics. The purpose was to identify research needs and approaches for developing models to predict the spread of invasive pests and pathogens under conditions of global climate change.** Possible collaborative research projects are still being discussed.

NRCS has historically been a key source of this information for ARS. **NRCS with its partners have developed tools to estimate the amount**

of carbon stored and GHG emissions reduced at the field and producer level. [COMET-VR](#) is a web-based, interactive decision support tool that includes the effects of land-management changes and is authorized for voluntary GHG reporting under section 1605(b) of the 1992 Energy Policy Act. It is a cooperative effort between NRCS and Colorado State University. Tools like COMET-VR make it easier for producers to estimate carbon storage and GHG emissions reductions for their entire holdings. The market for carbon credits trading in the form of carbon emissions reduction is in its formative stages and agricultural producers stand to benefit. NRCS provides an Environmental Credit Trading Handbook, an Environmental Credit Trading Information Series, and Environmental Credit Training courses to better prepare its State and Field Office personnel for responding to environmental credit trading questions from landowners. NRCS provides a climate change website (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/climatechange/>) that provides valuable information about climate change and the NRCS responsibilities and opportunities.

ARS is in dialogue with APHIS concerning priorities for research and development of relevant technologies.

H. USDA Progress on ISAC recommendations from the June 2011 meeting

14. ISAC Recommendation: To enhance the effectiveness of biological control programs at their inception, ISAC recommends that NISC Departments and Agencies working on biological control of invasive organisms, plan, conduct, and evaluate their programs in the context of an Integrated Pest Management (IPM) approach. This may require integrating biological control in concert with other management options (i.e., physical, cultural, and chemical) to achieve maximum effectiveness. For example, many invasive species are susceptible to both biological control agents and competitive interactions. As a result, using these approaches in concert can provide synergy towards achieving the desired land management objectives. ISAC has previously recommended an IPM

approach to invasive management strategies. While most biological control efforts often consider themselves a stand-alone, silver bullet solution, a more integrated approach should increase the probability of success.

This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.1.2:

Identify and address strategic gaps in regional invasive species control and management efforts and tools.

In support of the USDA's Integrated Pest Management (IPM) goals and other IPM needs, ARS currently focuses IPM research on minimizing pesticide inputs through the development of classical and augmentation biological control, host-plant resistance, behavior modifying chemicals (e.g., pheromone mating disruptors and attracticides), sterile insect release techniques, pesticide resistance management, cultural and mechanical practices, improved pesticide application technologies, and combining these pest control tactics into sustainable ag systems. Target pests include a multitude of insects, mites, and ticks; plant pathogens and nematodes; and weeds.

Unfortunately, the future of classical biological control is being threatened by an ever increasing difficulty associated with obtaining permits to removed potential agents from the country of origin as a result of the Convention on Biological Diversity.

NIFA supports IPM research, education and extension through a number of grant programs including the Crop Protection and Pest Management Program, the AFRI Food Security Challenge Area, the Specialty Crop Research Initiative, the Organic Transitions Program, and the Organic Agriculture Research and Extension Initiative.

In addition, ARS funds the Areawide Pest Management Program, which supports IPM projects to facilitate the implementation and adoption of ARS-developed IPM technologies to control or suppress agricultural pests over large areas through partnerships with growers, commodity groups, and State institutions of higher education, Federal and State agencies, and the private sector. In 2015, ARS funded projects to control the coffee berry borer (in HI and PR), invasive

aquatic weeds in the San Joaquin river delta, the soybean aphid, and the emerald ash borer.

NRCS is an advocate for the use of integrated pest management, and encourages the use of methods that will successfully address the pest problem with the least negative impact upon the natural resources and the environment. Discussions by members of the State Technical Committee in each state set priorities and methods of addressing natural resource issues, including invasive species. NRCS offices across the nation are also active members of a number of Cooperative Weed Management Areas (CWMAs) that address invasive species from a regional perspective.

APHIS develops and applies biological control agents as part of an overall pest management program. There are areas infested with invasive plant pests that may not be treated with conventional pesticides or other cultural practices due to environmental sensitivity or public concern. Biological control may offer the only sustainable solution in these areas. For example, APHIS is partnering with ARS to evaluate natural enemies of the brown marmorated stink bug. Because of the broad host range of this pest, it is not possible to develop an integrated area-wide management program without incorporating biological control with other control methods.

In another example, APHIS is using a biological control organism as part of a management program for Asian citrus psyllid (ACP) which vectors the devastating disease called Huanglongbing (HLB, citrus greening). Citrus growers in the Lower Rio Grande Valley of Texas, in Florida and in southern California, have implemented an area-wide management program to suppress psyllid populations in commercial groves. However, this program does not reach residential citrus trees or organic groves. APHIS has worked with local residents as well as state, industry and commercial biological control producers to rear and release a biocontrol organism to reduce psyllid populations in these areas. Additionally, biocontrol agents from California are being released in Arizona and, through APHIS International Services, biocontrol agents produced in Texas are being released along the U.S.-Mexico border.

APHIS has released a **second biocontrol agent in California which attacks a different stage of the psyllid. Additionally, several projects are underway using a commercially available fungal biocontrol agent that could attack all stages of the ACP.** These biocontrol agents may become established in residential, organic, and natural areas while agricultural production areas may require the use of other control tactics to maintain the pest below economically damaging levels.

APHIS IS and PPQ have worked together to set up biological control programs and to supply biocontrol organisms to countries starting their own colonies (for example, using biocontrol organisms against pink hibiscus mealybug in Haiti, Dominican Republic (DR), Jamaica, and Sri Lanka; against *Anastrepha* species in Barbados and DR; and against papaya mealybug in DR). **The results have been very successful, lowering the impact of the pest to negligible levels.**

The USFS biological control program is part of the broader Forest Service National Strategic Framework for Invasive Species Management as well as regional plans dealing with invasive species. The focus of the biological control program is to demonstrate leadership in the development and implementation of biological control technologies to manage wide spread infestations of invasive species and to use biological control as a viable component for integrated invasive pest management efforts.

USFS provides support to **EDDMapS** (see <http://www.eddmaps.org/>), a web-based application, for use nationwide by cooperators, including Cooperative Weed Management Areas, for mapping and monitoring of invasive plants, pests, and biocontrol releases for invasive plant management.

I. **USDA Progress on ISAC recommendations from the December 2011 meeting**

See table below.

18. ISAC Recommendation: Please prepare a **special report on the budget impacts to invasive species programs** for the next ISAC meeting.

Funding Available for Invasive Species General Categories, Departmental Template – USDA (dollars in thousands)

USDA	Agency	FY 2010 Actual	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget
Prevention	APHIS b/	\$ 62,108	\$ 58,910	\$ 60,625	\$ 56,737	\$ 60,756	\$ 63,113	\$ 71,093
Prevention	ARS	\$ 5,691	\$ 5,440	\$ 5,518	\$ 5,044	\$ 5,599	\$ 5,599	\$ 5,599
Prevention	NIFA	\$ 3,123	\$ 2,241	\$ 1,635	\$ 2,046	\$ 1,935	\$ 1,935	\$ 1,950
Prevention	ERS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Prevention	USFS	\$ 38,218	\$ 37,103	\$ 36,731	\$ 25,757	\$ 19,506	\$ 19,786	\$ 19,477
Prevention	NRCS	\$ 8,655	\$ 8,448	\$ 8,157	\$ 10,825	\$ 5,225	\$ 8,957	\$ 8,957
Prevention Total		\$ 117,795	\$ 112,142	\$ 112,666	\$ 100,409	\$ 93,019	\$ 99,390	\$107,706
EDRR	APHIS	\$ 294,242	\$ 262,102	\$ 244,512	\$ 231,138	\$ 238,859	\$ 244,788	\$242,394
EDRR	ARS	\$ 8,087	\$ 7,838	\$ 5,933	\$ 5,582	\$ 6,321	\$ 6,321	\$ 6,321
EDRR	NIFA	\$ 5,860	\$ 4,278	\$ 3,270	\$ 3,902	\$ 3,631	\$ 3,634	\$ 3,674
EDRR	ERS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EDRR	USFS b/	\$ 700	\$ 590	9,500	\$ 10,667	\$ 10,929	\$ 10,945	\$ 12,009
EDRR	NRCS	\$ 8,655	\$ 8,448	\$ 8,157	\$ 10,825	\$ 5,225	\$ 8,957	\$ 8,957
EDRR Total		\$ 317,544	\$ 283,256	\$ 271,372	\$ 262,114	\$ 264,965	\$ 274,645	\$273,355

USDA	Agency	FY2010 Actual	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget
Control	APHIS	\$ 358,406	\$ 339,306	\$ 333,124	\$ 267,995	\$ 310,570	\$ 307,323	\$282,327
Control	ARS	\$ 100,264	\$ 94,752	\$ 81,895	\$ 76,791	\$ 79,788	\$ 79,866	\$ 79,866
Control	NIFA c/	\$ 13,997	\$ 10,536	\$ 9,809	\$ 9,571	\$ 8,432	\$ 8,432	\$ 8,603
Control	ERS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Control	USFS	\$ 42,664	\$ 49,902	\$ 49,403	\$ 50,237	\$ 51,738	\$ 51,602	\$ 54,056
Control	NRCS	\$ 86,549	\$ 84,484	\$ 81,570	\$ 108,254	\$ 52,248	\$ 89,572	\$ 89,572
Control Total		\$ 601,880	\$ 578,980	\$ 555,801	\$ 511,848	\$ 502,772	\$ 536,795	\$514,424
Research	APHIS	\$ 54,546	\$ 56,481	\$ 60,190	\$ 55,274	\$ 59,318	\$ 61,877	\$ 61,979
Research	ARS	\$ 124,888	\$ 122,166	\$ 117,153	\$ 108,066	\$124,901	\$124,377	\$124,377
Research	NIFA	\$ 18,370	\$ 13,832	\$ 13,078	\$ 12,561	\$ 11,017	\$ 11,022	\$ 11,251
Research	ERS a/	\$ 1,000	\$ 1,000	\$ -	\$ 500	\$ 835	\$ 835	\$ 835
Research	USFS	\$ 37,463	\$ 36,004	\$ 35,800	\$ 34,010	\$ 34,010	\$ 35,106	\$ 32,451
Research	NRCS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Research Total		\$ 236,267	\$ 229,483	\$ 226,221	\$ 210,411	\$ 230,081	\$ 233,217	\$230,893
Restoration	APHIS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Restoration	ARS	\$ 296	\$ 353	\$ 442	\$ 378	\$ 383	\$ 383	\$ 383
Restoration	NIFA	\$ 2,416	\$ 1,808	\$ 1,635	\$ 1,644	\$ 1,461	\$ 1,462	\$ 1,489
Restoration	ERS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Restoration	USFS	\$ 7,222	\$ 7,580	\$ 7,504	\$ 2,220	\$ 1,114	\$ 1,111	\$ 1,128
Restoration	NRCS	\$ 25,964	\$ 25,345	\$ 24,471	\$ 32,967	\$ 16,174	\$ 27,728	\$ 27,728
Restoration Total		\$ 35,898	\$ 35,086	\$ 34,052	\$ 37,218	\$ 19,132	\$ 33,684	\$ 30,728

USDA		Agency	FY 2010 Actual	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 Actual	FY 2015 Enacted	FY 2016 President's Budget
Edu & PA	APHIS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Edu & PA	ARS		\$ 46,356	\$ 44,342	\$ 39,058	\$ 36,309	\$ 38,268	\$ 38,286	\$ 38,286
Edu & PA	NIFA		\$ 4,111	\$ 2,996	\$ 1,635	\$ 2,745	\$ 2,696	\$ 2,699	\$ 2,713
Edu & PA	ERS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Edu & PA	USFS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Edu & PA	NRCS		\$ 43,275	\$ 42,242	\$ 40,785	\$ 54,127	\$ 26,124	\$ 44,786	\$ 44,786
Edu & Public Awareness Total			\$ 93,742	\$ 89,580	\$ 81,478	\$ 93,181	\$ 67,088	\$ 85,771	\$ 85,785
Lead/Intl. Coop.	APHIS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Lead/Intl. Coop.	ARS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Lead/Intl. Coop.	NIFA		\$ 3,405	\$ 2,520	\$ 1,635	\$ 2,304	\$ 2,194	\$ 2,196	\$ 2,218
Lead/Intl. Coop.	ERS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Lead/Intl. Coop.	FS		\$ 180	\$ 315	\$ 250	\$ 220	\$ 220	\$ 220	\$ 110
Lead/Intl. Coop.	NRCS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Lead/Intl. Coop. Total			\$ 3,585	\$ 2,835	\$ 1,885	\$ 2,524	\$ 2,414	\$ 2,416	\$ 2,328
USDA AGENCIES TOTAL									
APHIS			\$769,302	\$716,799	\$698,451	\$611,144	\$669,503	\$677,101	\$657,793
ARS			\$285,582	\$274,891	\$249,999	\$232,170	\$255,260	\$254,832	\$254,832
NIFA			\$ 51,282	\$ 38,211	\$ 32,697	\$ 34,773	\$ 31,360	\$ 31,380	\$ 31,898
ERS			\$ 1,000	\$ 1,000	\$ -	\$ 500	\$ 835	\$ 835	\$ 835
USFS			\$126,447	\$131,494	\$139,188	\$123,111	\$117,067	\$118,770	\$119,231
NRCS			\$173,098	\$168,967	\$163,140	\$217,007	\$105,026	\$180,000	\$180,000
Agriculture Dept. TOTAL			\$1,406,711	\$1,331,362	\$1,283,478	\$1,218,705	\$1,179,471	\$1,262,918	\$1,244,589

NOTES:

a/ ERS contributes to the USDA invasive species efforts through the pesticide use and pesticide management systems economic research and analysis program, which contributes to Integrated Pest Management (IPM), Food Quality Protection Act implementation, invasive species and the areawide IPM programs.

b/ Forest Service data now captures Eradication and rapid Response expenditures, based of refinement of the workplace database tracking systems for invasive species work. FY 2012 figures revised to include NFS data.

c/ NIFA expenditures are impacted and vary from year to year due to the availability of grant funding.

APHIS Examples of Budget Impacts on Invasive Species Activities

APHIS in FY 2013

- APHIS' FY 13 appropriation was \$761.4 million (post-rescissions and sequester), a decrease of \$58 million from the FY12 funding level.
- APHIS tried to minimize the impact to plant and animal health activities. The Agency identified cost savings measures where possible, such as implementing hiring controls and eliminating development funding for low priority information technology investments. The Agency also identified operating efficiencies and process improvements that allow us to continue providing the same level of services but at a lower cost. These areas include switching telecommunications technology, further consolidating information technology customer service support, and streamlining business processes related to biotechnology petition review and licensing of veterinary biologics.
- APHIS initiated program planning and EIS on invasive feral swine.

APHIS in FY 2014

- APHIS' FY 2014 appropriation is \$844.896 million, including \$20 million provided for the Multi-Agency Coordination Group on Citrus Greening, a devastating, invasive disease of citrus trees. Other than this directed funding, the FY 2014 appropriation is consistent with the FY 2013 enacted level of \$825.026 (prior to rescissions and sequestration). The increased funding over FY 2013 levels will support most APHIS programs, including those targeting invasive species.
- The appropriation included a significant increase to implement a national program to manage and begin reducing the feral swine population in the United States (\$20 million). Also included was a continued funding directive (\$1 million) for invasive honey bee pests.
- The FY 2014 Farm Bill provided increased funding for the Plant Pest and Disease Management and Disaster Prevention program that enhances survey and pest and disease prevention activities for a variety of invasive species. It also provided

funding for the National Clean Plant Network which provides a reliable, disease-free source of nursery stock (both are funded under Section 10007 of the FY 2014 Farm Bill).

APHIS in FY 2015

- APHIS' FY 2015 Appropriation is \$874,490,000. This is an increase of \$49.594 million above the FY 2014 appropriation, not including the \$20 million received in 2014 for Citrus Greening. The increase is primarily due to a transfer of \$42.567 million for APHIS' portion of the decentralization of the USDA General Services Administration Rental and Department of Homeland Security Payments account. These funds were previously provided to lessors directly from GSA but now are paid through APHIS accounts. It therefore does not reflect as large of an actual increase as it may appear.
- The appropriation also includes increases for:
 - the **Overseas Technical & Trade Operations** program (\$2 million) to help resolve sanitary and phytosanitary trade issues that could result in the opening of new markets and retaining and expanding existing market access for U.S. agricultural products;
 - the **Swine Health** program (\$2 million) in support of increased biosecurity and herd management efforts for porcine epidemic diarrhea virus;
 - the **Citrus Health Response Program within the Specialty Crop Pest line item** (\$4.5 million) for to help address the damaging effects of citrus greening, and
 - the **Wildlife Damage Management** program (\$2.6 million) for priority initiatives such as oral rabies vaccinations, livestock protection, predator damage management, and preventing the transport of invasive snakes and other harmful species.
- A decrease was included for the Cotton Pests program (\$1.2 million).

- In addition, the FY 2014 Appropriation Act included \$4 million for the National Clean Plant Network in the Plant Protection Methods Development line item. The FY 2014 Farm Bill also included funds for the National Clean Plant Network. Accordingly, with approval from the Appropriations Committees, \$4 million was reprogrammed from the Plant Protection Methods activities. A decrease of this amount is reflected in the FY 2015 appropriation.
- APHIS has \$57.938 million available under Section 10007 of the Plant Pest and Disease Management and Disaster Prevention Program (including \$5 million for the National Clean Plant Network).

APHIS in FY 2016

- The FY 2016 President's Proposed Budget requests \$855.016 million of funding for APHIS and proposes *increases* for:
 - **Swine Health** for \$2.55 million to continue enhancing surveillance for swine enteric coronavirus diseases and other emerging swine diseases;
 - **Anti-Microbial Resistance/Zoonotic Disease Management** for \$10 million to implement the USDA Anti-Microbial Resistance Action Plan;
 - **Agriculture Quarantine Inspection** for \$2 million to increase staffing needs at peak travel times, replace aging equipment, and increase the number of canine teams used in pre-departure inspection operations;
 - **Citrus Greening Multi-Agency Coordinating (MAC) Group** within the Specialty Crop Pests line item for \$7.5 million to continue developing tools and techniques to address huanglongbing (HLB), or citrus greening; and
 - **Lacey Act/Agriculture Import-Export (\$5.5 million)** to enhance the implementation of the Lacey Act, specifically to fully automate the current electronic and paper reporting system and maximize the number of products subject to review.

Decreases are proposed for the:

- **Cotton Pests program** (\$3.3 million);

- a net reduction in **Specialty Crops** of \$11.1 million, and
- a reduction in the **Tree and Wood Pests** line.

Economic Research Service Invasive Species Activities
Program of Research on the Economics of Invasive Species Management (PREISM): Extramural and Intramural Research

- Since FY03, \$7.5 million funded 53 extramural research projects.
- PREISM resulted in over 100 journal articles and book chapters, numerous conference papers, and close to 20 doctoral dissertations and Master’s theses.
- Recipients presented results to APHIS and other Federal and State agencies; several participated in the National Academy review of the light brown apple moth program.
- ERS intramural research addressed soybean rust, integration of prevention and control strategies, and approaches to pest exclusion.
- Eight PREISM Workshops (FY03 to FY11) discussed economics of invasive species and presented results.

ERS Program Impacts Based on Reduced Funding

- ERS reduced funding to new extramural projects on the economics of invasive species management through PREISM, but continues to emphasize intramural research and the annual PREISM workshops. In FY12, FY13 and FY14, ERS’ research supports intramural economic analysis of invasive species management, which addresses USDA program and policy issues, especially with respect to climate change.

ARS Examples of Budget Impacts on Invasive Species Activities

ARS Invasive Species Research FY10-15)

Please see budget table above.

ARS Systematics Funding:

Update September 2015

ARS Systematics Funding:

FY 2008 - \$19,439,000

FY 2009 - \$19,682,000

FY 2010 - \$20,455,000

FY 2011 - \$20,578,000
 FY 2012 - \$20,398,000
 FY 2013 - \$19,155,000
 FY 2014 – \$20,572,000
 FY 2015 Estimate – \$20,683,000

ARS Scientist Years

<u>Fiscal Year</u>	<u>All projects</u>	<u>Invasive Species projects</u>
FY09	2,152 scientist yrs.	347 scientist yrs.
FY10	2,130 scientist yrs.	340 scientist yrs.
FY11	2,113 scientist yrs.	339 scientist yrs.
FY12	1,990 scientist yrs.	290 scientist yrs.
FY13	1,966 scientist yrs.	283 scientist yrs.
FY14	1,902 scientist yrs.	279 scientist yrs.

NIFA Examples of Budget Impacts on Invasive Species Activities

NIFA in FY 2013

- The failure of Congress to pass the 2012 Farm Bill resulted in major cuts in mandatory program funding for NIFA in FY13, including the loss of the Specialty Crop Research Initiative (\$47.3 million (M)), the Organic Agricultural Research and Extension Initiative (\$19 M), and the Beginning Farmers and Ranchers Program (\$19 M).
- NIFA’s Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), and Critical Issues Programs were again not funded in FY13.

NIFA in FY 2014

- NIFA’s Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), and Critical Issues Programs were again not funded in FY14.

NIFA in FY 2015

- As requested by Congress, NIFA has consolidated five different pest management budget lines into one program called the Crop Protection and Pest Management Program (CPPM). The CPPM Program is under the Section 406 authority of the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA) (7 U.S.C. 7626), as reauthorized by Section 7306 of the Food, Conservation, and Energy Act of 2008

(FCEA) (Pub. L. 110-246). Because this Authority allows the recovery of indirect costs on project awards that previously did not allow recovery of indirect costs, this will result in the loss of up to 30 percent of funds available for project activities.

NIFA in FY 2016:

- The CPPM Program will continue in FY 2016. However, at this time it is unclear whether the program will remain under the Section 406 authority or be authorized under the Smith-Lever Authority. If the program remains under the 406 authority, the recovery of indirect costs will result in the loss of up to 30 percent of funds available for project activities. If the CPPM Program is authorized under the Smith-Lever Authority, then only Extension activities will be supported and no funds will be available for research.

NRCS Examples of Budget Impacts on Invasive Species

Activities

NRCS in FY 2013

- Funds used by the NRCS State offices to address invasive species in FY 2013 were an increase of about 33 percent over the funds that were used in FY 2012. This large increase in FY 2013 may be attributed to the following:
 - 506 more contracts addressing “noxious invasive weeds” were written in FY 2013 than in FY 2012
 - Funding for these 506 additional contracts required \$7,805,242 more in FY 2013 than in FY 2012
 - The NRCS new Working Lands for Wildlife partnership with the U.S. Fish and Wildlife Service used agency technical expertise combined with \$33 million in financial assistance from the Wildlife Habitat Incentive Program to combat the decline of seven specific wildlife species whose decline can be reversed. Additional funds of \$7,805,242 were required to address invasive species problems in order to provide quality habitat for the seven wildlife species, especially for the Gopher Tortoise, the Golden-Winged Warbler, the Lesser Prairie, and the New England Cottontail.
 - The partnership effort among the Natural Resources Conservation Service (NRCS), Farm Service Agency and Rural

Development entitled the “Strike Force”, which was initiated by Secretary Vilsack in 2013, has reached out to underserved landowners in 137 counties in Arkansas, Georgia and Mississippi, and has provided these three States with an additional \$6 million in financial and technical assistance. The amount of these funds used to address invasive species in 2013 was approximately \$782,614 for 146 new conservation contracts

- The focus areas for the FY 2013 Conservation Innovative Grants did not include invasive species.

NRCS in FY 2014

- Due to decreasing budgets, NRCS *had reduced funding available* for addressing invasive species concerns. The focus areas for the FY14 Conservation Innovation Grants do not include invasive species.

NRCS in FY 2015

- NRCS anticipates that the funds obligated for addressing invasive species concerns in 2015 will be about 70% higher than the 2014 obligations.

USFS Examples of Budget Impacts on Invasive Species

Activities

USFS in FY 2013

- 5% decrease in Forest Service research budget and loss of 7% research capability on invasive species (Emerald Ash Borer, Asian Longhorned Beetle, Hemlock Woolly Adelgid, Gypsy Moth, Gold Spotted Oak Borer, Thousand Canker Disease, Laurel Wilt, Beech Bark Disease, Oak Wilt, Butternut Canker, Invasive Plants, Terrestrial and Aquatic Invasives).
- 98% reduction in Sudden Oak Death research (\$75K).
- Loss of insect rearing facility in California.
- Elimination of lower priority lines of invasive research and funding to partners.
- Agency-wide Travel Constraint: Limited travel to professional meetings and for field work.

USFS in FY 2014

The FY 2014 Enacted budget included \$35,106,000 for invasive species research, an increase of \$1,096,000 from the FY 2013 Consolidated Appropriations Act. At that level, Forest Service R&D will maintain capacity to address priority research areas, including the introduction and spread of non-native species.

I. USDA Progress on ISAC recommendations from the May 2012 meeting

19. ISAC Recommendation: ISAC recommends that NISC adopt the Validation of PCR-Based Assays and Laboratory Accreditation for Environmental Detection of Aquatic Invasive Species (AIS) White Paper.

To encourage the development of a validation/accreditation system for AIS environmental DNA (eDNA) detection methodologies and laboratories ISAC recommends the following:

ISAC Recommendation 19-11: Utilize lessons learned in establishing a laboratory performance testing system to fully develop a validation/accreditation program(s) for other invasive species eDNA methodologies and laboratories.

ARS supports projects on the development of DNA-based technologies for accurately identifying certain invasive species, especially when there has been some reason to believe that a particular pest may be part of a species complex, rather than just one species. In these cases, DNA-based techniques may be required for proper identification.

The National Plant Diagnostic Network system (NPDN), with support from the USDA-NIFA and through the collective efforts of many individuals representing Land Grant Universities, federal agencies, state departments of agriculture, and other stakeholders, has grown into an internationally respected consortium of plant diagnostic laboratories. These diagnostic laboratories use conventional and/or molecular genetic taxonomic approaches to quickly detect high consequence pests and pathogens that have been introduced into

agricultural and natural ecosystems, identify them, and immediately report them to appropriate responders and decision makers. The NPDN, with support from NIFA, **is in the process of establishing an accreditation and standards system** so that NPDN laboratories may reliably perform sensitive diagnostic tests with the oversight and recognition required by the regulatory authorities in APHIS.

J. USDA Progress on ISAC recommendations from the May 2014 meeting

ISAC ACTION item: ISAC's Research and Information Management Subcommittee: requests that NISC agencies and departments include in their reports to ISAC, information by fiscal year (for FY 2012 and onward) on funding for:

- a) Curation and management of each biological systematics collection held by the agency;
- b) research using each of these collections, numbers of researchers and support staff; and,
- c) systematics collections support through extramural grant programs.

ARS has the following systematics collections that may be relevant to invasive species studies: Bacteria, Fungi, Nematodes, Plant Viruses, Specialty-Crop-Associated Plant Pathogens, Vertebrate Protozoan Parasites, Vertebrate Viruses, Arthropod Borne Viruses, Avian Viruses, Insects and Mites, Pollinating Insects, Lepidoptera and Coleoptera, Insect Biological Control Agents, Biting Midges and Mosquitoes, Herbaria (including the National Arboretum, Washington, DC), and several germplasm repositories (including the National Center for Genetic Resources Preservation, Ft. Collins, CO).

ARS has supplied data on the funding used for systematics collections, and the research conducted by the laboratories that maintain those collections. However, scientists from many institutions (private and public), and from many countries use these collections, and ARS does not have the means to assess the value of

that research (items a and b above). ARS does not have grants, so item c does not apply to ARS.

NIFA grant programs do occasionally support taxonomic studies when they're relevant to the particular grant program's goals and objectives. However, they do not support systematics collections per se.

J. USDA Progress on ISAC recommendations from the May 2015 meeting

ISAC Recommendation on Systematics:

Background:

Systematics

Systematics is the science that identifies and groups organisms by understanding their origins, relationships, and distributions. It is fundamental to understanding life on earth, crops, wildlife, and diseases, and provides the scientific foundation to recognize and manage invasive species. Invasive species are a growing threat to biosecurity; human and animal health; agricultural security and trade; environmental security; and economic health.

The Federal Interagency Coordinating Committee for Invasive Terrestrial Animals and Pathogens (ITAP) Systematics Subcommittee prepared the Situation Report "Protecting America's Economy, Environment, Health, and Security against Invasive Species Requires a Strong Federal Program in Systematic Biology" (2008). The purpose was to create awareness of the crisis in systematics in Federal agencies and to advocate the need for a permanent, viable, and coordinated Federal Systematics Program.

The Situation Report demonstrates how systematics is a vital cornerstone for work on biodiversity and invasive species. It describes the crisis in systematics:

- Lack of systematists;
- Lack of training at universities and post graduate training/mentoring;
- Lack of permanent, life-long job opportunities in systematics;

- Biological collections are incomplete and/or in poor condition; they languish in substandard facilities, lacking adequate staffing, technology and coordination.
- Lack of appropriate facilities for collections (e.g., buildings with climate control, fire prevention, information technology hardware/software, research labs, plans for continuation of operations in case of a natural or terrorist catastrophic event).
- Lack of a comprehensive national/global exchange of bioinformatics.

Where is the crisis in systematic happening? It is evident in many places: in the United States Federal government; at universities, zoological parks and botanical gardens; as well as in similar institutions in other countries.

The Situation Report includes a recommendation for a comprehensive Survey of the federal systematics capacity and needs. The survey will inform a 10 year ACTION Plan by the federal government to enhance the systematics capabilities of federal agencies with the vision *“To strengthen national and global systematics to enable prediction, effective prevention, and management of invasive species to ensure biosecurity; public health; economic, environmental, and agricultural security; and sustainability”*. The Plan will delineate actions and budget estimates for consideration by Agency and Congressional decision makers. It will catalyze strengthening of systematics resources for Federal agencies to predict, prevent and manage invasive species.

The Invasive Species Advisory Committee (ISAC) makes recommendations to the Federal government agencies that have an invasive species portfolio. This systematics recommendation strives to motivate action in the agencies that have been identified in the Situation Report as the agencies with systematics capabilities in the Federal government.

The USDA Agricultural Research Service (ARS) and the Smithsonian Institution are repositories of a large amount of the systematics collections and human capabilities for systematics essential work on invasive species. Conducting the Survey of their systematics capabilities and needs is urgent. The Survey will describe actions in

research, specimen-based collections, a biodiversity informatics network, and educating future systematists.

Systematics expertise and use is distributed across the federal agencies so participation needs to be inclusive and coordinated, particularly in the areas of research, specimen-based collections, informatics networks, and the education of future systematists. The Situation Report recommends that a Systematics Interagency Coordinating Group incorporating relevant federal agencies monitor implementation of the Plans; document successes and failures; and provide information to the White House, Office of Management and Budget, and federal agencies to facilitate decision-making on systematics programs.

ISAC Recommendation: ISAC recommends that:

- 1. The USDA Agricultural Research Service (ARS) and the Smithsonian Institution conduct a survey and gap analysis of their Federal systematics collections, associated resources, and capabilities.**
- 2. Survey results should be translated into an ARS 10 Year Systematics Action Plan and a Smithsonian Institution 10 Year Systematics Action Plan.**
- 3. The Plans should be used by agency leaders to improve the systematics capabilities and resources of the agencies in all taxa to strengthen their ability to predict, prevent and manage invasive species.**
- 4. The coordination of federal systematics efforts referenced in the Federal Interagency Committee for Invasive Terrestrial Animals and Pathogens (ITAP) *Situation Report* should be implemented.¹**
- 5. The ITAP's Systematics Subcommittee should assist the agencies in the Surveys recommended by the Situation Report.**

The ITAP Systematics Subcommittee has taken responsibility for this effort. It is impossible to do the ARS and Smithsonian Systematic

¹ Federal Interagency Committee on Invasive Terrestrial Animals and Pathogens (ITAP) Systematics Subcommittee. 2008. Protecting America's Economy, Environment, Health, and Security against Invasive Species Requires a Strong Federal Program in Systematic Biology.

Surveys concurrently because only one ITAP member is leading the effort. It was decided to start with the ARS systematics Survey. Initial meetings have been held. ARS has done a recent evaluation of all its collections, including the systematics collections. A meeting has been set to identify if any of the recent ARS effort can/should be incorporated into the ITAP/ARS Systematics Survey effort.

ISAC Action Item from the Research and Management and Control Subcommittees: **Request NISC staff to liaise with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to identify and resolve issues that impede the timely and successful completion of Section 7 consultations under the Endangered Species Act for biological control agents.**

APHIS, NIFA, ARS, and BLM have been in contact with USFWS to help resolve the Section 7 Consultation issues. Progress will be reported by USFWS at the October 2015 ISAC meeting.

ISAC Action Item from the Prevention Subcommittee: **Request a speaker from USDA to provide an update at the next ISAC meeting on the Caribbean and Pacific Safeguarding Initiatives and the regulatory structure that underlies them.**

The workload of the worst pandemic in the history of the US, avian influenza, has not allowed APHIS to respond to this ISAC request.

ISAC Action Item from the Communication, Education and Outreach Subcommittee:

Conveying the gravity of loss and continued risk to our economy and natural environment from invasive species is very difficult, yet important. We use tools of communication, education, and outreach to move citizens and leaders. ISAC would like to better understand how we do this, and how well we are doing it.

ISAC ACTION ITEM: Request NISC, for our next meeting, to provide summary reports on current regional and national invasive species outreach campaigns conducted by agencies, including, if available: (1) estimated funding, (2) target audiences, (3) scope, (4) and their effectiveness and evaluation metrics used.

APHIS has submitted a report on their “Hungry Pests” national invasive species campaign and NIFA has submitted a report on their national education effort. They were transmitted early September 2015 to the ISAC Communications Subcommittee for their use.

The APHIS report follows:

**The Animal and Plant Health Inspection Service
Education Outreach on Invasive Species
September 2015
Information for the ISAC Oct 2015 meeting**

APHIS has several educational and outreach initiatives to support our work at detecting, controlling, managing and/or eradicating invasive species. They include the **multi-pest Hungry Pests Initiative and Save Our Citrus**, which is geared towards alerting consumers to the various citrus diseases and advising them on the best ways to buy and move citrus products, and an outreach and education effort supporting Asian longhorned beetle eradication activities. Please note the web addresses listed will be available through the end of the year 2015. By the end of the year, all content is expected to have completed migration to the APHIS website. They will no longer be available in the form currently seen on the .com and .org locations.

**Hungry Pests Initiative
2015**
www.hungrypests.com

The APHIS Hungry Pests outreach Initiative began in 2009 as a California-based program that highlighted the European Grapevine Moth as well as other pests impacting in California. APHIS understands that public outreach is a crucial component to keeping invasive pests out of the United States (US) and stopping the spread of those that have slipped in. In 2009, Hungry Pests provided a platform to talk about the impact these pests can have on our agricultural and ecological systems to California residents.

By 2012, Hungry Pests emerged as a strategic national public education/awareness campaign on a variety of invasive pests that threaten the US. At that time, APHIS expanded the campaign to

include 11 other states in addition to California: Florida, Georgia, Illinois, Michigan, Minnesota, New York, North Carolina, Ohio, Pennsylvania, Texas, and Washington. The Hungry Pests campaign is now the central hub of our outreach efforts to members of the public engaged in activities that could introduce or spread invasive pests in the US. It **highlights 15 damaging plant pests** and uses social media and paid advertisement as well as public relations strategies to inform the public about these pests, urge them to report them if they see them and highlight the actions they can take to keep invasive pests out of the United States or stop the spread if the pests are already here. The site is located at www.Hungrypests.com.

The invasive pests that are highlighted in the Hungry Pests outreach program were chosen with the assistance of APHIS' Plant Protection and Quarantine program expertise. They are:

- Asian Citrus Psyllid
- Asian Longhorned Beetle
- Citrus Greening
- Coconut Rhinoceros Beetle
- Emerald Ash Borer
- European Grapevine Moth
- European Gypsy Moth
- False Codling Moth
- Giant African Snail
- Imported Fire Ant
- Khapra Beetle
- Light Brown Apple Moth
- Mediterranean Fruit Fly
- Mexican Fruit Fly
- Old World Bollworm
- Oriental Fruit Fly
- Spotted Lantern Fly
- Sudden Oak Death

These pests were selected for inclusion in the Hungry Pests outreach initiative because they are damaging insects or plant diseases/pathogens that have one or more of the following characteristics:

- They have a significant impact on agriculture or natural resources,
- They can be recognized and reported by informed citizens,
- They move by human transport,
- They are pests that are the focus of ongoing regulatory actions including quarantines, and/or
- They are pests with active control and eradication activities projects.

The program started with 12 pests and in intervening years APHIS has added the imported fire ant, the khapra beetle, the giant African snail, coconut rhinoceros beetle, old world bollworm and spotted lanternfly to the list that is highlighted via www.Hungrypests.com . One note, the khapra beetle is not actively established in the US. However, the potential threat it poses to our agricultural systems is so great that we want to highlight it via Hungry Pests to help inform travelers who might come to the United States about the damage it could cause were it to become established. Travelers from other countries can bring the khapra beetle if they bring certain products from their home countries to the United States. The giant African snail was added to Hungry Pests after an infestation of the snails was discovered in the Miami area in 2011.

The goal of Hungry Pests is to:

- Elevate the issue of invasive pests among the general public in the target States and nationwide. Highlight the pathways by which these pests spread;
- Educate the public about the threats that invasive pests pose while promoting everyday activities that can help prevent invasive pest introductions;
- Highlight effective solutions to invasive pest, things that people can do to stop their entry and spread;
- Increasing awareness about safe and effective solutions to control or eradicate; and,
- Encouraging people to learn more at HungryPests.com.

The messages are appropriate for all people as we increase their understanding of the invasive pest issues we face in the United States. However, the targeted audiences are those living in the 12

partner states and those involved in agricultural work, who recreate outdoors, and those who travel around the US and internationally.

The Hungry Pests outreach and education initiative received \$400,000 in support through the FY 2015 Farm Bill, Section 10007: Plant Pest and Disease Management and Disaster Prevention Programs. These funds will allow us to continue the outreach program through September 2016.

Hungry Pests funds are now dedicated paid advertisement placements, managing the existing website (the website will move to the APHIS platform at the end of 2015 and will no longer exist as a .com.). It is developing a curriculum geared towards middle school students, and promoting that curriculum; media and public relations efforts, including a radio media tour where an expert from APHIS conducts multiple interviews with media across the US discussing invasive pests and what people can do to stop their entry and spread over the course of a morning; and social media engagement.

- The Hungry Pests website is available in English and Spanish.
- The Hungry Pests websites average more than 1,500 -1,700 visits a month. FY15 cumulative traffic has already surpassed total traffic from the previous year, due to advertising on social media outlets.
- The top visited English-language website pages included the Home Page and The Spread pages on firewood and passenger baggage. The top Spanish-language pages were all pest-specific pages – European Gypsy Moth, Mediterranean fruit fly and Giant African Snail.
- The campaign in 2015 conducts paid advertising on Facebook and YouTube designed to drive people to the website. We have also used search engine marketing in past years. The advertising tends to run various times of the year for short periods. The summer months, when people are engaged in outdoor activities, are an important time to drive traffic to the website so they can learn more and obtain good tools/resources. In July 2015, Hungry Pests posted paid

visuals geared towards sharing information for outdoor enthusiasts, travelers, people who might move outdoor furniture, and on citrus disease. The visuals feature Vin Vasive, our creepy “spokesperson” who cautions about the damage done by invasive pests.

- Vin Vasive is featured in numerous Public Service Announcements that can be seen on the APHIS You Tube Channel. <https://www.youtube.com/user/USDAAPHIS>. He provides guidance on a number of pathways by which invasive pests enter and move around our country. APHIS also has pull-up shade displays and cutout Vin Vasive figures which are very popular. They were made available (along with brochures, pamphlets and posters) to State Departments of Agriculture in the 12 partner states and to APHIS employees engaged in invasive pest outreach all around the US for use at fairs, conventions, meetings and other public engagement opportunities. APHIS will also customize a Hungry Pests brochure for our State partners that enable them to highlight pests of concern in their states.
- A new Hungry Pests curriculum was added to the site in January 2015. The lessons are free of charge and APHIS piloted the new curriculum in two schools, one in Baltimore Maryland and the other in Sacramento California. This upcoming fiscal year, APHIS will be promoting wider use of the curriculum lessons in schools during the 2015-16 school year.
- In 2015-2016 Hungry Pests will be focusing on developing tools and existing information to will educate people using the pathways by which invasive pests spread.

**Save Our Citrus Initiative
September 2015**

www.Saveourcitrus.org

The Save Our Citrus campaign increases public awareness about the potential risks associated with moving citrus plants and products. The

overall goal is to change the human behaviors that contribute to the spread of citrus pests and diseases.

The communications drive target audiences to the Save Our Citrus website and generate buzz about the consequences of citrus diseases. The campaign includes advertising and interactive engagement strategies including search engine marketing, web display advertising, social media and an i-Phone app to reach previously untapped audiences. All communications including the website, videos, advertising and iPhone app are provided in Spanish and English.

We are migrating this .org to reside on the APHIS web services and will no longer have a branded webpage by the end of the year.

The Save Our Citrus outreach and education initiative received \$350,000 in support through the FY 2015 Farm Bill, Section 10007: Plant Pest and Disease Management and Disaster Prevention Programs. These funds will allow us to continue the outreach program through September of 2016. We have no guaranteed funding after that point.

Throughout the years that the Save Our Citrus effort has been underway, we have effectively increased website traffic from 133% to 516% when we are actively advertising. We advertise twice a year. We highlight fall into winter a time when people harvest and may move citrus trees or cuttings for gifts. Advertising drives people to the website where they can learn more about citrus diseases: Huanglongbing (citrus greening), citrus blackspot, sweet orange scab and citrus canker. The Asian citrus psyllid is also highlighted.

The 2015/2016 campaign continues to use tools that will increase the awareness of citrus disease and stop its spread. Digital media has proven to drive high traffic volume at a low cost per impression and click-through. The current campaign includes the following elements:

- Pay Per Click Advertising Search Engine Marketing: Ads are served when triggered by searches for citrus-relevant keywords and phrases on the major Search Engines (Google, Yahoo, Bing).
- Display Advertising - On-line display advertising is used for local coverage in specific markets (AZ, CA, FL, LA, TX),

allowing for a geo-targeted presence on gardening and lifestyle sites, as well as TV, radio, newspaper and other news/information sites.

- Social Media and paid geo-targeted Facebook advertising (Facebook, Twitter, YouTube, Save Our Citrus Blog).
- We have an interactive i-Phone app reporting tool which is a free app for users to report suspected citrus diseases. Users can take photos of their tree, they are submitted to experts for review and a response is given.
- We also have a quiz posted recently asking “WHAT’S YOUR TREE HIDING?” and urging people to check for Citrus Diseases if they have a tree in their backyard.
- The initiative has Public Service Announcements and You Tube videos available on the APHIS website.

Asian Longhorned Beetle Initiative
www.asianlonghornedbeetle.com

The Asian longhorned beetle (ALB) website and outreach activities support the ongoing pest eradication programs in New York, Massachusetts and Ohio. The website serves as a central location for residents to access current and information about eradication activities, pest identification guidance, and a place where they can report potential sightings of the ALB. The program conducts multiple outreach activities including paid advertising, public service announcements, and educational materials -- including an elementary and middle school curriculum and information that can be downloaded and shared at no cost.

The program shares a newsletter, typically issued every month to provide up-to-date information and facts about the ongoing efforts to remove the beetle from all impacted areas. The program supports August as Tree-Check Month. During Tree Check Month APHIS urges people to take ten minutes and check their neighborhood trees for any sign of damage caused by the Asian longhorned beetle and to look for the beetle itself. Any suspected insects can be reported online. August was selected because it is a time of peak emergence for the beetle and is most likely when the adult beetle can be seen infesting trees.

The program also holds a yearly radio media tour to engage media and their listeners. This year the media availability took place in late July. This year's tour featured USDA Marketing and Regulatory Program's Elvis Cordova, who served as spokesperson to promote national awareness about Tree Check Month and to urge people to check their trees. More than a dozen interviews were conducted with radio and television media around the US to enhance awareness.

The ALB website takes reports of suspected ALB. Between the summer of 2014 and this summer 2015 the website received more than 500 reports of suspected ALB from members of the public. Fortunately, we have not found any new ALB infestations from these reports, but having people engaged and looking in new areas is critical for finding new infestations early and saving trees.

Various other outreach, public and media relations activities also support the goal of developing an aware, engaged community activity looking for and reporting suspected ALB and coming to a hub where they can find information.

You Tube

Please visit the APHIS You Tube page for videos supporting our invasive pest outreach activities and our information sharing goals.

The [NIFA report](#) follows:

Response to ISAC Regarding NIFA's Current Regional and National Invasive Species Outreach Activities:

NIFA is actively engaged in the battle against invasive species through leadership in the implementation of the National Invasive Species Management Plan; through funding from the Section 406 Pest Management Programs and the Agriculture and Food Research Initiative; through the IPM Centers; establishment of the National Plant and Animal Diagnostic Laboratory Networks and the Pest Information Platform for Extension and Education; Hatch funding of Agricultural Experiment Station Projects, Smith-Lever 3(d) Pest Management Programs, and regional coordination of efforts through multi-state committees; and through the administration of special grants concerning invasive species.

Pest Information Platform for Extension and Education *ipm*PIPE

*ipm*PIPE is a system for managing pest and disease information flow via the Web.

It provides real-time useful information to US crop producers, and a “one stop shopping” center for timely, unbiased, national, and local pest information. It also fosters good farming practices by encouraging growers to:

- o Avoid unnecessary or ill-timed chemical applications
- o Use the proper control tactics with the proper timing to manage crop loss risk
- o Document practices for crop insurance purposes

IPM³ Training Consortium

www.umn.edu/ipm3

Integrated Pest Management (IPM) 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 (US Code Sec. 136r-1.).

NIFA is actively involved in the IPM³ Training Consortium, which provides Integrated Pest Management Training to federal workers and beyond that are involved in pest management issues and activities. Increased IPM education and training will help federal agency personnel better address elements of the National Invasive Species Management Plan.

Increasing the quality and consistency of IPM training and implementation among federal agencies will help ensure that the most economically feasible and sustainable programs are developed for the management of pests on federal lands in the future.

eXtension Invasive Species Community of Practice

www.extension.org/invasive_species

Provides a wealth of information about all aspects of invasive species. Dr. Robert Nowierski is the Federal Liaison and Steering Committee Member of the Invasive Species Community of Practice.

I respectfully submit this report to ISAC. If you have any questions, please do not hesitate to contact me. Thank you.

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