**Program of Research on the Economics of Invasive Species Management (PREISM) Workshop**

October 20-21, 2005
Washington, DC

## Workshop Summary

USDA currently manages programs affecting the entry and spread of agricultural invasive species, which can cause economic losses to consumers, producers, and other stakeholders. In 2003, the Economic Research Service (ERS) initiated a competitive awards program entitled Program of Research on the Economics of Invasive Species Management (PREISM) to address economic issues associated with invasive species management. This program focused on national decision-making concerning invasive species of agricultural significance which are affecting, or are affected by, USDA programs.

On October 20-21, 2005, the ERS and Farm Foundation co-sponsored a review of several studies funded by PREISM in 2003 and 2004. The objective of the workshop was to review progress of PREISM awardees and provide a forum for dialogue on economic issues associated with agricultural invasive species. Information on the PREISM competitive awards program is available on the ERS Invasive Species briefing room: http://www.ers.usda.gov/Briefing/InvasiveSpecies/. The workshop brought together academic researchers as well as representatives from a variety of Federal agencies concerned with various economic aspects of preventing, monitoring and managing invasive species. About 100 people registered for the workshop.

The 2003 PREISM funded studies in three broad areas: 1) Resource implications of alternative policies for invasive species exclusion, monitoring, management, and compensation; 2) Bio-economic integration and risk assessment; and 3) Economics of trade and invasive species. The 2004 PREISM added two other priority research areas: 1) Stakeholders and incentives for efficient invasive species program management and 2) practical decision tools for invasive species management. Within each of these areas, the funded studies exhibited extensive heterogeneity in analytic approaches as well as in the invasive species and agricultural commodities selected for case studies (see below for a brief description of the various funded activities). The presentations focused on accomplishments to date and/or preliminary results.

In addition to the presentations by PREISM cooperators, Dr. John Mumford, Imperial College London, gave the keynote speech on “Consistent Frameworks for Evolving Biosecurity Decisions” and Alan Burdick, Senior Editor--Discover Magazine, offered a luncheon talk on “Why Not Love Aliens? What Invasive Species Can Tell Us about How Nature Does — and Doesn't — Work.”

The program for the 2005 PREISM workshop, which includes links to biographies of the speakers and presentations by the PREISM awardees, can be found at: (this would be a Farm Foundation site with a link to each PPT as well as the speaker bios).

**PREISM WORKSHOP TOPICS**

- Development of a Geographic Information Systems (GIS)-based decision support tool to help managers assess tradeoffs among ecosystem indicators, to control costs and prioritize invasive plant populations for management.

- Evaluation of economic issues associated with the design and operation of voluntary insurance and mandatory check-off programs that provide assistance for agricultural producers' management of risks associated of Asiatic canker.

- Examination, using a modeling framework that accounts for wildlife and livestock ecosystems and human economic activities, of issues associated with controlling disease transmitted between livestock and white tailed deer.

- Development and illustration of practical and credible components of decision support tools to prioritize regional responses to invasive weeds, particularly cheatgrass.

- Examination, using a dynamic optimization framework, of tradeoffs between invasive species prevention, control and eradication efforts.

- Development of a framework to balance potential benefits of intentional introduction of Asian oysters in the Chesapeake Bay against the risks that the species becomes invasive and causes harm.

- An interdisciplinary project to extend the development and application of bioeconomic modeling to integrate economic and biological feedback to improve risk assessments for policy responses to leafy spurge.

- Simulation of control policies to examine spatial management of cheatgrass in the Great Basin.

- Evaluation of the economic impacts of alternative livestock and poultry disease control strategies.

- Evaluation of the ecological and economic factors influencing noxious weed lists and the impact of weed lists on interstate trade.

- Examination of economic implications of invasive species policy within the context of trade and agricultural policies such as commodity programs and crop insurance.

- Construction of a decision tool to develop efficient border protection protocols for potentially damaging species under conditions of extreme uncertainty and limited budgets.

- Analysis of economic issues associated with the design and operation of two pest exclusion policy options, port of entry inspections and pre-export certifications. (No link.)

- Analysis of consequences of alternative response strategies such as prevention and/or control activities carried out in foreign countries, at U.S. ports of entry and within the U.S.

- Examination, using dynamic optimal control methodology, of exclusion and control strategies for pests that are an established invader, a potentially explosive invader not yet introduced and an eradicable or controllable invader.

**PREISM WRAP-UP PANEL DISCUSSION**

The workshop wrap-up panel was charged with identifying research gaps and emerging issues in invasive species management. The panel members discussed a wide variety of topics from various academic, regulatory and international perspectives.

Invasive species management research typically encompasses four key components: ecology, economics, technology, and regulation but one or more of these components are often missing from invasive species analysis. However, predicting invasions is problematic. Furthermore, economic models need to account for or at least recognize technological change over time (i.e., induced innovation due to invasive species spread or policy decisions). Invasive species management research may need to focus more on cost-effectiveness especially when benefits are not quantifiable.

Invasive species issues evolved separately from sanitary and phyto-sanitary (SPS) policy-making: many invasive species issues appear to be focused on natural environments while SPS policy is oriented toward agricultural pests—both research efforts and policy-making needs to bring these two concepts together. Invasive species research does not seem to incorporate data from SPS activities—especially with respect to risk assessment—invasiveness is only one aspect of an SPS risk assessment. The release of bio-control agents may be another good source of information on invasive species spread. In the case of natural ecosystems, the baseline becomes important (i.e., what state of nature are we trying to preserve or restore and how can we value changes from that state-- which quickly leads to issues of non-market valuation). Furthermore, what is the interplay between invasive species and bio-diversity?

Inspection is no longer the key invasive species management tool—surveillance is becoming much more important (i.e., similar to recent changes in public health policy). But it raises a question about how many resources should be devoted to monitoring and what is the optimal survey design for a successful surveillance program.

The panel members suggested that invasive species management research would benefit from a greater focus on international pathways and the role of multi-lateral agreements in

preventing movement of invasive species. Convention on Biological Diversity, International Plant Protection Convention, Asian-Pacific Economic Cooperation, Central American Free Trade Agreement, and North American Plant Protection Organization are examples of institutions with varying efforts/focus on reducing the risks of invasive species spread (e.g., SPS standard arbitration, ballast water regulations, etc.). The precautionary principle is often promoted by several of these institutions but the panel noted that this concept needs to be risk-based rather than arbitrarily applied. The panel also noted that, in some countries, there is often competition rather than complementarities between environmental agencies and agricultural agencies in providing information.

The political economy of invasive species is an appropriate topic for research (i.e., identify/quantify winners/losers from invasive species and related policies)—e.g., what is the link between invasive species targets and the political process. Related research/policy issues include: who should pay for recovery from invasive species establishment and what is the potential for industry/government interaction after establishment? Another fruitful research area would be on motivations of persons/agents attempting to avoid regulations and related policy options (e.g., smuggling, circumventing quarantines, etc.).

The panel suggested that the invasive species research program should consider multi-disciplinary studies which include ecologists and taxonomist/systematicists as well as specialists on risk communication to policy-makers and the public. New or more comprehensive economic modeling efforts could explicitly incorporate such topics as: population spread dynamics (i.e., time scales, lag times, etc.) including real-time models for day-to-day decision-making; risk aversion by producers; ex-post analysis to expose unintended consequences of past policy decisions—e.g., case studies/assessment of selected eradication programs; multi-agent and weakest link concepts; feedback between climate change and invasive species spread; type and extent of monitoring; human health risk, for zoonotic invasive species; multiple pest/diseases rather than single organism threats; legal constraints such as quarantines/compensation; joint spatial-temporal aspects of invasive species spread; and treatment/controls and their risks (i.e., traditional pesticides (e.g., methyl bromide), new pesticides, biologicals, etc. and their impact on on-target species).