PROCEEDINGS

INVASIVE SPECIES SCREENING WORKSHOP

– Minimizing Risk / Maximizing Use –

January 8-9, 2002
Las Vegas, NV

Host:

Sponsors:

Western Governor's Association
Western Regional Panel On Aquatic Species (of the
Aquatic Nuisance Species Task Force)
U.S. Fish and Wildlife Service
Washington Department of Fish and Wildlife

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Thanks to the sponsors… The Invasive Species Screening Workshop would not have happened without sponsorship from the Western Governor's Association, the Aquatic Nuisance Species Task Force, the Western Regional Panel On Aquatic Species, the U.S. Fish and Wildlife Service, and the Washington Department of Fish and Wildlife.

Thanks to the organizers… The Workshop was efficiently and effectively organized by Tina Proctor (U.S. Fish and Wildlife Service) and Scott Smith and Pam Meacham (Washington Department of Fish and Wildlife).

Thanks to the participants… The participants worked hard, kept their focus, and engaged in joint problem solving. Thanks for that spirit of collaboration

INTRODUCTION

Is the current system of regulating intentional importation and releases of aquatic invasive species adequate?

Is some type of new screening program needed?

These questions brought together national leaders from commerce, universities, environmental conservation, and state and federal government in a search for common ground around the issue of invasive species screening as a management tool. The Invasive Species Screening Workshop convened in Las Vegas, NV on January 8-9, to:

- Create a forum for frank, open discussion,
- Seek solutions for those issues where agreement exists,
- Seek understanding about those issues where agreement does not exist, and
- Examine the appropriate roles for governments, industries, and stakeholders.

The first day of the Workshop was for information sharing (see Appendix 1 for the agenda). A full day of presentations from government, industry, and environmental stakeholders covered concerns, opportunities, and management options associated with the importation and intentional release of non-native aquatic plants and animals. The second (one-half) day of the workshop was a facilitated work session oriented toward finding solutions. The objectives for the facilitated session were to seek consensus and define the problems where consensus was lacking.

A screening process was defined as:

> ***A risk assessment system designed to evaluate the invasive potential of a species prior to importation or introduction into a new ecosystem.***

Participants focused on aquatic environments and regional management needs.

THE CHALLENGE

Non-native species often cause negative changes to ecosystems and resource-based economies. However, there are benefits derived from some intentional uses of non-native species. Repeated experiences around the world show that the ecological and economic cost of coping with an unwanted infestation is usually much more significant than prevention. Consequently, managing intentional introductions of non-native species is receiving increased attention across the nation. Screening procedures are being examined as a potential tool for preventing unwanted introductions and thereby avoiding negative ecological and economic impacts.

Fourteen presentations formed the first day of the Workshop. The presenters gave perspectives from commerce, environmental conservation, government, science, and management (see Appendix 2 for abstracts from eleven of these presentations).

All speakers covered risks and benefits of introducing non-native species and articulated the crux of the public policy debate as the trade off between these. In their own words, here is a sample of how workshop presenters defined this challenge.[1]

The beneficial use of nonnative species has improved the quality of life, as exemplified by enormously popular fisheries that rely upon nonnative species. The misuse of nonnative species has also caused serious economic and ecological impact.

– *Larry Peck, Deputy Director*
Washington Department of Fish and Wildlife, Olympia, Washington

The shellfish industry recognizes the importance of adequate screening and monitoring for species invasiveness, but also continues to work with state authorities to ensure that as processes are developed and/or modified, they are operationally and economically feasible, scientifically sound, and adequately funded.

– *Diane Cooper, Environmental Policy Manager*
Taylor Shellfish Farms, Shelton, Washington

The objective [of Australia's Quarantine and Inspection Program] is to protect Australia's agriculture industry and

[1]From the presenters' abstracts (see Appendix 2).

natural environment by managing the risks within an appropriately conservative quarantine framework, whilst still permitting desirable plant and animal imports.

– *Craig Walton, Pest Management Strategy Group Queensland, Australia*

While the problem of biological pollution … is becoming better recognized, the revenue available for preventing and controlling it remains woefully inadequate … Without such [new economic] policy changes, the taxpayer, the public, and the environment will continue to be saddled with the costs and damage of harmful introductions, and funding will remain chronically inadequate to take the [management and control] steps called for by virtually every invasives expert…

– *Peter Jenkins, Attorney/Policy Analyst, Center for Food Safety, International Center for Technology Assessment, Washington, D.C.*

Note: This abstract is from a comprehensive paper authored by Mr. Jenkins: '***Who* should pay? A proposal for legislation to apply the Polluter Pays Principle to biological pollution through a fee-based Invasive Species Prevention, Quarantine and Control Trust Fund.'** For those wishing to obtain a copy of this larger work, Peter Jenkins can be reached at: International Center for Technology Assessment, 660 Pennsylvania Ave. SE, Suite 302, Washington, DC 20003 USA, Tel: 202.547.9359 ext. 13, Fax: 202.547.9429, Email: peterjenkins@icta.org.

One thing is clear, the need for screening processes for the introduction of intentional non-native species is real… The challenge to those who develop the screening processes… and how it is administered (whether regulatory, codes-of-conduct, best management practices or hybrids of the three) is that the process must be effective, fair, and based on the best evidence, while also being responsive to the needs and freedoms of the American people.

– *Richard Orr, Senior Entomologist, U.S. Department of Agriculture, Riverdale, Maryland*

How best to manage the risks to achieve the benefits was the focus of the second day of the workshop.

THE START TOWARD A SOLUTION

The second day of the Workshop was a facilitated work session with a panel comprised of all the available speakers along with two invited participants (Table 1). All audience members were invited to participate.

Table 1. Panel members at the facilitated work session of the Invasive Species Screening Workshop.

John Chapman - Oregon State University, Corvallis, Oregon
Diane Cooper - Taylor Shellfish Farms, Shelton, Washington
Domingo Cravalho, Jr. - Department of Agriculture, Honolulu, Hawaii
Alan Holt -The Nature Conservancy, Washington, D.C.
Harry Hutchins - Puget Sound Steamship Operators Association, Seattle, Washington
Peter Jenkins - Center for Food Safety / International Center for Technology Assessment, Washington, D.C.
Cindy Kolar - University of Notre Dame, Notre Dame, Indiana
Dennis Lassuy - United States Fish and Wildlife Service, Portland, Oregon
Marshall Meyers - Pet Industry Advisory Council, Washington, D.C.
Richard Orr - U.S. Department of Agriculture, APHIS, Riverdale, Maryland
Craig Regelbrugge - American Nursery and Landscape Association, Washington, D.C.
Scott Smith - Washington Department of Fish and Wildlife, Olympia, Washington
Mary Toohey - Washington Department of Agriculture, Olympia, Washington
Craig Walton - Department of Natural Resources and Mines, Queensland, Australia
Randy Westbrooks - U.S. Geological Survey, Whiteville, North Carolina

A sequence of questions covering the need, content, roles, responsibilities, and implementation of a screening program was addressed in this discussion (see Appendix 3 for the facilitator's seed questions and Appendix 4 for the complete transcription of the meeting notes).

The Need for a Screening Process

The panel and participants were able to agree to the following statements concerning the need for screening:

> ***The current system of regulating intentional importation and releases of aquatic species is not adequate.***
>
> ***Improvements to the screening process are needed.***

Guiding Principles for Setting Up a Screening Process

Nine requirements for building a screening program emerged from the discussion:

1. Learn from past mistakes,
2. Get wide-spread, societal buy-in,
3. Deal with scientific uncertainty and data gaps by erring on the side of environmental protection,
4. Stimulate active involvement of the federal Invasive Species Council,
5. Consider economics, policy and science,
6. Make it cost effective,
7. Ensure there are clear measures of success,
8. Assess all proposed imports for invasiveness to determine if they should be regulated or permitted for general use, and
9. Identify funding mechanisms.

The Panel discussed how to structure a screening process to implement these principles. Unfortunately, the limited time available for this discussion makes these the most tentative results from the Workshop. Additional work will be needed to refine this process and improve consensus. The workshop participants agreed that a new source of funding was needed to implement all elements of a successful screening program.

The following, three-phase implementation scheme was discussed:

1. Screening

   Suggestion: A systematic process designed to evaluate the risk of a proposed introduction (import or release) becoming invasive within a new ecosystem.

Implementation Principles. The classification process is:

1. Conducted by a science-based panel with industry participation,

2. Easy to administer and capable of providing an assessment within a reasonable time frame, and

3. Focused on the invasive risk posed by the new species if released into a new ecosystem and not on the risk of the species being released as a result of it's intended use (i.e., pet store distribution, live food distribution).

2. Classification

Suggestion: A process of classifying a species proposed for introduction based upon the species' potential for invasiveness as defined in screening, the risk of its release based upon the intended use, and its social and economic fit. Classification relies on science and risk management to determine the allowable use of a species and the appropriate management required to balance beneficial use and minimize invasive potential.

Example: A species could be classified as prohibited because it has a high level of invasive risk and still be imported for use in highly controlled situations, such as a research facility. That species may be denied broad distribution to pet stores where the control of potential release is considered low and the economic and social gain to society is also low. A different species could be considered highly invasive in screening, such as domestic cats, but may be classified as unregulated because of their existing wide distribution and high social value.

Implementation Principles. The process will:

1. Be conducted by the appropriate federal and/or state agencies, and

2. Consider social and economic factors in addition to the risk assessment result from screening.

3. Management

Suggestion: An integrated federal, state and industry program will implement and enforce the management policies defined in the classification process and use voluntary, industry standards to improve compliance.

Implementation Principles. The process will:

1. Be an adaptive system that provides feedback to improve screening and classification based upon experience,

2. Clearly define federal, state and industry roles, and

3. Utilize both voluntary and regulatory means to encourage and enforce compliance.

Obstacles

A preliminary list of obstacles to effective screening processes includes:

- training enforcement agents in the often subtle species identification distinctions;
- funding;
- unresolved value conflicts among differing social sectors;
- insufficient inspection capacity;
- incomplete data bases; and
- jurisdictional fragmentation (i.e., regulation of the same organisms are sometimes spread among several agencies).

Roles and Responsibilities

The Panel and participants came up with a beginning job sharing scheme for a screening program (see Appendix 4 for the complete transcription). This approach contemplates logical partitioning of roles between government, industry, and stakeholders as follows:

Federal government: manage point of entry, cross-regional coordination, international coordination, national database management, national prohibited and acceptable list management, setting national criteria, national-level outreach, and national funding.

State governments: manage point of sale and release, interstate movement consistent with federal law, state prohibited and acceptable lists, program evaluation, and local outreach and education.

Regional or interjurisdictional entities: manage regional panels and facilitate state and federal support of regional cooperation.

Industry: initiates within-sector industry standards (e.g., codes of conduct, best management practices), assists member compliance, manages greater vendor involvement (outreach), assures legality of the process, and coordinates with government authorities for maximizing benefit and minimizing risk.

MEETING EVALUATION

The participants offered the following suggestions to make this kind of workshop more successful in the future:

- Allocate more time (a big and complex agenda needs attention) although two days is a large allocation of individual participants' time;
- Secure some up-front (before the meeting) agreements to expedite the discussions (e.g., consensus on terms);
- Create more opportunity for informal exchanges;
- More clearly identify the purposes for each portion of the meeting (e.g., information sharing versus decision making); and
- Send out pre-work or readings to prepare participants.

The participants evaluated the following attributes of this meeting as valuable and worth retaining:

- The diversity of participants;
- The format that initiated excellent dialogue; and
- Abandoning a traditional panel discussion for a work session to generate a specific work product.

APPENDIX 1 - AGENDA

INVASIVE SPECIES SCREENING WORKSHOP
January 8-9, 2002
Las Vegas, NV

First Day: January 8, 2002

8:30 - 8:45 a.m.	Scott Smith - Introduction
8:45 - 9:00 a.m.	Senator Debbie Regala - Keynote
9:00 - 9:15 a.m.	Harry Hutchins - Stopping the Importation of Invasive Species: A Shipping Industry Perspective
9:15 - 9:45 a.m.	Randy Westbrooks - Describing the Issue
9:45 - 10:15 a.m.	Craig Walton - Australia's Invasive Species Screening Program
10:15 - 10:45 a.m.	Richard Orr - Federal Screening Process Under Consideration by the national Invasive Species Council and the ANS Task Force
10:45 - 11:00 a.m.	BREAK
11:00 - 11:30 a.m.	Craig Regelbrugge - Nursery Industry Perspective
11:30 - 12:00 a.m.	Marshall Meyers - Pet Industry Perspective
12:00 - 1:00 p.m.	LUNCH
1:00 - 1:30 p.m.	Larry Peck - Washington State Fish and Wildlife Agency Perspective
1:30 - 2:00 p.m.	Larry Cooper - Oregon's Invasive Species Screening Program (Mr. Cooper was unable to attend and Dennis Lassuy, United States Fish and Wildlife Service, Portland, Oregon, kindly substituted for him)
2:00 - 3:30 p.m.	Diane Cooper - Aquaculture Industry Perspective
2:30 - 3:00 p.m.	Mary Toohey - Washington State Department of Agriculture Perspective
3:00 - 3:30 p.m.	BREAK
3:30 - 4:00 p.m.	Domingo Cravalho - Hawaii's Invasive Species Screening Program
4:00 - 4:30 p.m.	Cindy Kolar - Progress in Invasion Biology: Predicting Invaders
4:30 - 5:00 p.m.	Peter Jenkins - Who Should Pay? A Proposal for a Proactive State and Regional Role in Using Economic Policy Tools to Improve Prevention and Control of Harmful Invasives Carried Through Intercontinental Trade and Travel

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Second Day: January 9, 2002

9:00 - 12:00	Panel Discussion - All speakers served on a panel along with Alan Holt (The Nature Conservancy), Dr. John Chapman (Oregon State University), and Dr. David Lodge (University of Notre Dame).

Mr. Michael Fraidenburg facilitated the panel discussion. The discussion was guided by series of questions (see Appendix 3).

APPENDIX 2 - PRESENTERS' ABSTRACTS

Title: Invasive Species, Coming to America. New Strategies for Biological Protection through Prescreening, Early Warning, and Rapid Response.

Author: Randy G. Westbrooks, U. S. Geological Survey Field Office for Invasive Species, 233 Border Belt Drive, Whiteville, NC 28472. Phone: 910-648-6762, rwestbrooks@weblnk.net.

Abstract: Introduction. Since the breakup of the supercontinent Pangaea about 180 million years ago, North America has been geographically isolated from the rest of the world, and thus largely protected from biological invasions. However, that changed in a short time with the onset of European colonization about 500 years ago, and has become a very serious problem with the development of modern transportation and travel in the past century.

During colonial days, when global trade and travel were minimal, crop pests, which threatened crop production, were the primary concern. Invasive species of natural areas had few pathways and opportunities to spread beyond their native ranges in other regions of the world. In those days, before natural areas were invaded by alien invasive species, there was little concern or even notice of the thousands of plant and animals that were being imported for utilitarian purposes such as game fishing (carp), soil erosion [kudzu (Pueraria montana)], windbreaks [Russian olive (Eleagnus angustifolia)], medicinal herbs (purple loosestrife (Lythrum salicaria)], and for ornamental use [salt cedar (Tamarix chinensis)]. In fact, such introductions were widely encouraged. Today, as a result of such activities, many natural areas are being overrun by exotics that were intentionally introduced and soon escaped from cultivation.

Prohibited Lists – The Heart of the Current U.S. Crop Protection System. The current U.S. federal/state crop protection system was developed in the late 1800s and early 1900s in response to outbreaks of serious plants and animal pests such as foot and mouth disease, Mediterranean fruitfly (Caratitis capitata), and gypsy moth (Lymantria dispar). The current system includes programs that form two lines of defense against invasion through:

1. Exclusion of Foreign Agricultural Pests
   a. Production of pest free commodities in exporting countries (e.g., disease free beef)
   b. Preclearance at ports of export
   c. Inspection and clearance at ports of entry

2. Early Warning and Rapid Response to Incipient Infestations.
   a. Early Detection
   b. Rapid Assessment
   c. Rapid Response

On the surface, it would seem that this system could provide protection against invasion by all types of invasive species. However, in reality, the system was set up to facilitate trade by protecting American agriculture from invasion by high profile, devastating plant and animals pests and diseases. Under this system, known alien pests of concern are assessed for invasiveness and prohibited introduction into the U.S. under a menagerie of federal laws (now superseded by the omnibus Plant Protection Act of 2000).

While the new law provides equal authority for regulation of all types of invasive species, including invasive plants, the decision to assess a candidate species for invasiveness remains a subjective decision by responsible federal officials. As a result, most species that are imported into the United States are not being assessed for invasiveness – in general, the system does not require it. (The exception to this is new fruits and vegetables, which must be assessed for invasiveness prior to importation). In order for the nation to effectively meet, the challenge it faces with invasive species in all types of environments, new approaches for preventing introduction, establishment, and spread of invasive species must be developed and implemented.

Prescreening – A Regulatory Yield Sign Needed to Slow Down the Global Movement and Spread of Invasive Species. Based on past history in Hawaii and New Zealand, it is has been concluded that a very low percentage of all introduced plants will become invasive in a new area over time. Therefore, since intentionally introduced species represent a very high percentage of all species that become invasive, prescreening of plants and animals proposed for importation into a country could go a long way toward stemming the biological tide that is now moving around the world.

To meet this new and growing threat to biodiversity and to crop production, all new plants and animals should be assessed for invasiveness before they are imported into the United States. For continuity with the current plant regulatory system, the proposed system should continue to focus on 'prohibited species', but require that all proposed new species be assessed to determine if they should be regulated or not. The resulting 'permitted list' would not be a regulatory 'clean' or 'white' list – it would be used for future reference only. Under this approach, proposed species that are determined to be already widespread in distribution in the U.S. (either in trade or in free living populations) would be automatically approved for entry pending other regulatory issues. Kudzu, which is definitely a very serious invader, would not be prohibited entry because it is too widespread to regulate.

New Approaches for Early Warning and Rapid Response to New Invasive Plants.

Under the current crop protection system, federal and state plant regulatory agencies work to protect the nation from economically important plant and animal pests and diseases. However, due to a lack of resources and organized constituencies, new invasive plants (both agricultural weeds and invasive plants of natural areas) are seldom addressed on public or private land until populations become widespread and prevention/eradication becomes impractical. The recent appearance of the Brazilian

floating fern giant salvinia (Salvinia molesta) in 30+ water bodies in nine states, is a notable example of the problem, and has highlighted the serious need for a new and systematic approach for addressing new invasive species, and, in particular, invasive plants.

With this in mind, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) hosted a workshop in Ft. Collins, Colorado, in June, 2000, on creating a National Early Warning and Rapid Response System for Invasive Plants. Subsequently, the proceedings of the workshop were posted on the FICMNEW Home Page. During 2001, an Early Warning/Rapid Response Action Plan was developed that closely follows major recommendations that were developed at the workshop, as well as relevant recommendations under the National Invasive Species Management Plan, which was approved by the National Invasive Species Council in January 2001.

The overall purpose of the National Early Warning and Rapid Response System will be to provide a coordinated framework of public and private partners at the local, state, regional, and national levels to more effectively address new invasive plants through:

-Early detection and reporting of suspected new plants to appropriate officials through creation of a National Early Detection Network of Amateur and Professional Botanists and Weed Specialists,

-Identification and vouchering of submitted specimens by designated botanists,

-Verification of suspected new state, regional, and national plant records

-Archival of new records in designated regional and national plant databases such as the INVADERS Plant Database (University of Montana), and the USDA Plants Database,

-Rapid assessment of confirmed new records

-Rapid response to new records that are determined to be invasive

-Development of a coordinated framework of public and private partners at the local, state, regional, national, and international level, to promote early warning and rapid response.

Once fully implemented across the United States, the proposed early warning and rapid response system will provide an important second line of defense against invasive plants, that will work in concert with federal efforts to prevent unwanted introductions at the ports of entry (the first line of defense). With both systems in place, the nation will be better able to defend against future economic and environmental losses due to “plants out of place”.

Conclusions. In order to effectively address new environmental invaders that have no obvious political constituency, we need to develop a science based Biological Protection System for more effectively preventing the introduction, establishment and spread of invasive species in natural and managed areas of the United States. To accomplish this, we need to:

•Prescreen all new plants and animals proposed for importation into the United States, to determine if they should be regulated at the federal and/or state level.

•Develop a National Early Warning and Rapid Response System for Invasive Species

•Create new local, state, and regional interagency partnerships to rapidly assess and respond to new invaders.

TITLE: Australia's Invasive Species Screening Programs

AUTHOR: Craig Walton, Pest Management Strategy Group, Department of Natural Resources and Mines, Queensland; Formerly: Plant Policy, Australian Quarantine and Inspection Service, Department of Agriculture, Fisheries and Forestry – Australia, Canberra.

ABSTRACT: The Australian Quarantine and Inspection Service (AQIS) is responsible for regulating the importation of plants and animals into Australia. AQIS operates on the principle of managed risk. The objective is to protect Australia's agricultural industry and natural environment by managing the risks within an appropriately conservative quarantine framework, whilst still permitting desirable plant and animal imports. In 1997, AQIS introduced a new system for screening new plant imports to reduce the levels of exotic weed pests entering Australia.

A wide range of issues were considered when developing the policy on new plant imports, from obligations under international agreements, to the accuracy of risk assessment systems and the costs of administering them. This paper outlines the process for assessing proposed new plant imports that currently operates in Australia, and discusses the development of the policy underpinning the process. The paper also briefly discusses other systems put in place to assess and/or address the risk from the importation of large vertebrates and pests associated with shipping and international mail.

Australia has put in place a "white list" approach for both plant and animal imports. The result of this approach should be a reduction in the cost of new pest problems to Australia in the long term. Changes in government policy to implement these systems have been generally successful but only when prefaced by general community support and only within the context of increased environmental awareness and concerns over the risks of importing new agricultural pests and diseases such as foot and mouth and siam weed. It must be noted that factors including Australia's geography, political system and history had a bearing on the system put in place and unlike other countries many industry groups are supportive of these actions.

TITLE: Progress on the development of the concepts and policies surrounding the screening of non-native organisms.

AUTHOR: Richard Orr, Senior Entomologist, USDA, APHIS, PPD, Risk Analysis Development, 4700 River Road, Unit 117, Riverdale, MD 20737, (301) 734-8939, richard.l.orr@aphis.usda.gov.

ABSTRACT: The concept/discussion paper, *Screening Concepts and Policies for Evaluating the Invasiveness of Non-Native Intentional Introductions* is currently being developed by the Aquatic Nuisance Species (ANS) Task Force's Risk Assessment and Risk Management (RAM) Committee. This effort was initiated by the ANS Task Force in response to Action item # 14 & 15(e) of the National Invasive Species Council's Management Plan which states in part: *... the Council will develop a fair, feasible and risk-based comprehensive screening system for evaluating ... intentionally .... introduced non-native aquatic organisms for any purpose (e.g. fish or shellfish stocking, aquarium organisms, aquaculture stock, aquatic plants and biological control agents) within the continental United States*.

The RAM committee consists of a wide range of knowledgeable representatives from the National Aquaculture Association, U.S.D.A. Animal and Plant Health Inspection Service, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S.G.S. Biological Resources Division, U.S. Department of Interior, Pet Industry Joint Advisory Council, and the National Marine Fisheries Service.

The expected purpose of the screening paper is to provide a background discussion, provide current approaches and methods, and identify the policy issues (and what options are available) surrounding the development of future screening processes for non-native aquatic organisms. The concept/discussion paper when completed, will not be an single screening process ready for implementation, but a blue print and guidance document for developing future screening processes, methods, and policies.

The screening paper is a work-in-progress. It was started at the last RAM committee meeting in Rusken, Florida on May 1-3, 2001. A draft for full peer review is planned for April, 2002 and the final paper is scheduled to be presented to the ANS Task Force by August, 2002.

The final paper will contain screening examples showing a variety of pathways and methods and an explanation as to what might work best and under what circumstances. It is clear that different approaches to screening will have to be taken depending upon the pathways (industries) involved, the characteristics of the taxa of organisms being screened, and the geographical area covered.

Equally important the paper will cover an in-depth discussion of those policy issues surrounding screening. When appropriate, it will provide policy options that regulatory or non-regulatory decision makers will most likely encounter when it comes to initiating a screening system. Most likely policies may have to be tailored depending upon the specific pathways or the specific industries impacted while still maintaining a reasonably consistent level of risk protection.

The paper will examine the strengths and weakness of a screening process supported by codes-of-conduct, best management practices, or using a traditional regulatory approach. From the Committee's work completed so far, it is apparent that what may be appropriate for one pathway or major taxa will not necessarily be appropriate for another. In addition, hybrids between the different approaches often provide a synergistic effect that a single approach (e.g. strictly regulatory) could not accomplish on its own.

One thing is clear, the need for screening processes for the introduction of intentional non-native species is real. And it is coming. The challenge to those who develop the screening processes (whether international, federal, state, or local) and how it is administered (whether regulatory, codes-of-conduct, best management practices or hybrids of the three) is that the processes must be effective, fair, and based on the best evidence, while also being responsive to the needs and freedoms of the American people. The processes must not be unduly restrictive or place unnecessary demands on individuals and business. It will have to be developed by broad open public input and discussion. No small task.

TITLE: Pet Industry Perspective

AUTHOR: Marshall Meyers, Executive Vice President and General Counsel, Pet Industry Joint Advisory Council, 1220 19th Street, NW, Washington, DC 20036, (202) 452-1525, mmeyers@pijac.org.

ABSTRACT: Historically, the pet industry has been dependent upon non-native species and recognizes its responsibility to avoid introducing harmful invasive species. Currently, the industry, on a regular basis, trades in thousands of species (field-collected and captive-bred) of mammals, birds, reptiles, amphibians, aquatic organisms (freshwater and marine), and terrestrial invertebrates. Such trade is essential for the industry to remain competitive and grow domestically as well as in the global market. Virtually every pet owned in this country is technically an "alien," "non-native," or "exotic," some of which are classified as "injurious" or "invasive" at the federal or state level.

The complexity of dealing with invasives needs to be addressed in a non-regulatory and non-confrontational arena. Ascertaining which "non-natives" are or may become a "harmful" invasive requires a review mechanism that is science-based, transparent, and credible. It requires the involvement of all relevant stakeholders and should not be driven by the regulators ultimately charged with regulating activities involving demonstrated or potential invasives.

The pet industry has a long history of involvement with invasive species issues. Industry is opposed to wholesale, nationwide bans absent clear demonstration that a species is, in fact, harmful on a nationwide basis. Similarly, industry is opposed to simplistic, non-science-based solutions at the state level, such as listing an entire genus when only one or two species within that genus have been shown to be invasive. On the

other hand, industry works closely with state and federal government agencies in regulating and sometimes prohibiting, the importation, captive rearing, sale and/or possession of certain species that have been demonstrated to be harmful invasives.

The pet industry remains committed to seeking more effective ways to minimize adverse impacts from species in our trade. We continue to support collaborative initiatives that address issues involving data gaps, standardizing terminology, decision-making models, regulatory mechanisms, screening and monitoring techniques, research protocols, science-based criteria for determining/predicting invasiveness, and last but not least, public awareness and education. We believe that such collaboration will help encourage appropriate responses to this complex issue in a fashion that does not unduly impede the sustainability and growth of the pet industry in general, and the ornamental aquarium industry in particular.

TITLE: Nonnative Species: Balancing Risk and Benefit in the Management of Fish and Wildlife

AUTHOR: Mr. Larry Peck, Deputy Director, Washington Department of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501, pecklwp@dfw.wa.gov, (360) 902-2225.

ABSTRACT: The beneficial use of nonnative species has improved our quality of life, as exemplified by enormously popular fisheries that rely upon nonnative species. The misuse of nonnative species has also caused serious economic and ecological impact. Fish and Wildlife agencies are becoming more involved in the management of nonnative species. Our goal is to maximize benefit and minimize risk. Everyone that uses nonnative species, including Fish and Wildlife agencies, should strive for responsible use. Proper planning through a science-based program designed to screen-out harmful nonnative species is needed. The indiscriminate importation, distribution or release of nonnative species is unacceptable. Educational programs and regulations are needed to ensure that everyone abides by a responsible set of requirements that reduce the risk of new invasive species introductions. International, federal, state and industry partnerships are necessary for effective implementation.

TITLE: Oregon's Invasive Species Screening Program

AUTHOR: Larry Cooper Nonnative Species Program Coordinator, Oregon Department of Fish and Wildlife, P.O. Box 59, Portland, OR 97207, Phone (503) 872-5260 ext. 5347, Fax (503) 872-5269, larry.d.cooper@state.or.us.

ABSTRACT: History has shown that importation and possession of nonnative species can impact native wildlife populations and the habitats upon which they rely. Numerous examples are available describing impacts to Oregon wildlife and habitats. With increases in technology, husbandry skills, and demand for exotic pets and alternative livestock, potential threats to native wildlife will only increase without regulatory control. For these reasons in 1994 the Oregon Fish and Wildlife Commission (Commission) developed a Task Group, which included potentially affected citizens and state and federal agencies. This group was charged with providing ODFW staff with the overall guiding principles used to develop the Wildlife Integrity Rules (WIR). During the two years this group met, the single most difficult decision was whether to establish a "dirty" or "clean" list. Most members believed the "clean" list approach did more to protect native wildlife from potential harmful effects of nonnative species. The Commission adopted WIR on December 13, 1996. The rules were designed to protect the integrity of Oregon's native fish and wildlife and their habitats from potential negative effects of nonnative species. The rules were also designed to allow private ownership of exotic species not potentially harmful to native wildlife. WIR governs activities such as importation, sale, possession, confinement, and transport of nonnative species. WIR also developed an on-going process to place exotic species in one of three categories, based on their potential to harm native wildlife: Prohibited, Noncontrolled and Controlled. A six-member scientific Review Panel was enlisted to review and analyze requests for species classification. Their charge was to review scientific information and based on ten risk assessment criteria, determine the risk potential to Oregon's wildlife and habitats and make classification recommendations to the Commission. I will provide detailed information about each of these criteria in addition to information about other requirements of the WIR during the workshop. Currently over 16,000 species of nonnative wildlife have undergone the risk assessment process and have been classified.

TITLE: Invasive Aquatic Species: The Shellfish Industry Perspective

AUTHOR: Diane Cooper, Environmental Policy Manager; Taylor Shellfish Farms SE 130 Lynch Road, Shelton, Washington 98584, (360) 426-6178, DianeC@taylorshellfish.com.

ABSTRACT: The shellfish industry in Washington State continues to grow and is currently the country's largest producer of Manila clams and farmed oysters.

Technological advances in hatchery production of seed over the past three decades have positioned the northwest states as world leaders in farmed shellfish production. However with the reduction of shellfish growing areas because of pollution and land use conflicts, increased public and regulatory scrutiny on historic farming practices, and the listing of a variety of marine species, it is becoming more and more important for the industry to diversify the species for cultivation in order to remain competitive and sustainable in a world market.

In response to our enhanced understanding of invasive species and recognizing our role as both victim and vector of an invasive aquatic species, the shellfish industry is proactively partnering with State regulatory authorities to form processes that allow for the cultivation of new species as well as the continued cultivation of established species. While each State has a slightly different approach to evaluating new species introductions, most western States require an environmental assessment of the species to be introduced and the biota of the receiving water body, the facility/farm quarantine practices, if applicable, and monitoring protocols.

The shellfish industry recognizes the importance of adequate screening and monitoring for species invasiveness, but also continues to work with State authorities to ensure that as processes are developed and/or modified, they are operationally and economically feasible, scientifically sound, and adequately funded. This three-part test will help ensure continued industry participation and process effectiveness.

As a major stakeholder, the shellfish industry will continue to actively participate in Federal and State efforts to develop invasive species programs.

TITLE: Washington State Department of Agriculture Perspective

AUTHOR: Mary Toohey, Assistant Director, Laboratory Services Division, Washington Department of Agriculture, P.O. Box 42560, 1111 Washington St., Olympia, WA 98504, (360) 902-1907, mtoohey@agr.wa.gov

ABSTRACT: The Washington State Department of Agriculture (WSDA) is the other agency that regulates invasive species in Washington state. We are partners with several agencies, including the Washington State Department of Fish and Wildlife, and our statutory authorities overlap somewhat. In general, my agency has regulatory authority over what our statutes refer to as “plant pests” – insects, plant diseases, both aquatic and terrestrial weeds, and other species that have a negative impact on plants. Plant pests do not normally include things like mitten crabs and zebra mussels, because they have no direct detrimental effect on plants. Those are regulated by the state Fish and Wildlife agency.

Today I intend to outline a little about my agency’s invasive species programs and observations, and then I will share my concerns and reasons for opposition to many of the screening proposals, the so-called “clean” or “white” list concepts, that have been discussed at the state level.

Washington is a border state with extremely active international trade, which means not only heavy container cargo traffic coming in with all its potential hitchhikers, but goods from all over North America funneling out through our ports. We share a very long open border (no customs, no border stations) with Oregon and another with Idaho. Our northern border with Canada is biologically porous to the point that we have traced the progress of various exotic insect species south, literally through the Peace Park at Blaine.

With our cooperators, my agency:

•Surveys for many exotic species – both because we need early warning to identify and locate the worst invaders while they are eradicable and because it is often necessary to demonstrate with a scientifically valid survey that Washington state does not have some pests in order to maintain trade relationships.

•Conducts public information campaigns. One of our chief concerns is a lack of public consensus about what to do when something nasty enters the state. There are environmental consequences to attempting to control or eradicate new introductions, and sometimes there is no widespread agreement on the risk/benefit issue.

•Conducts control efforts,

•Eradicates new bad actors when possible,

•Excludes some species, and

•Enforces quarantine and phytosanitary restrictions.

We are, more often than not, the last line of defense for the state and sometimes for the continent, and the program that does this has fewer than 15 year-round people.

We utilize a "blacklist," a quarantine approach that is highly flexible and meets our regulatory needs. Many WSDA rules deal with not only whether an organism can be sold or introduced, but also enact conditions for risk reduction. With regard to plants, our usual quarantine authorities are augmented by the state noxious weed laws. These construct a county-based system of 44 volunteer county weed boards and weed districts, most of which have paid staff, to conduct educational and regulatory activity aimed at reducing or eliminating selected nonnative weed species. This broad based scheme directly involves landowners, concerned agencies on all levels – from federal to local, unpaid volunteers, and the universities. There is also a State Noxious Weed Control Board. The state board determines the state noxious weed list, which mandates various levels of control for approximately 114 species of both terrestrial and aquatic plant species.

With regard specifically to aquatic and wetland plants, WSDA currently quarantines approximately 22 species, and the state noxious weed board lists for control approximately 15 species. In addition to its regulatory activities, WSDA coordinates a multi-agency control effort for Spartina (cordgrass) eradication and Lythrum (purple loosestrife) control and conducts various on-the-ground eradication efforts. Another agency, the Washington State Department of Ecology, conducts and funds control of many freshwater weed species.

We have a pretty good track record. We have had some significant successes – notably:

•Exclusion of purple nutsedge, an extraordinarily harmful weed,

•Tremendous inroads made into Lythrum populations by a program of biological controls put in place several years ago,

•Continuing progress in eradicating Spartina in Puget Sound. If the funding continues, I believe we will eradicate Spartina in Puget Sound in the foreseeable future.

•Despite virtually annual new introductions, we have eradicated Gypsy moth from the state for two decades, and

•A national system to exclude Japanese beetle from the west coast.

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I am extremely proud of the people who do this work, their commitment, and what they have accomplished on a shoestring. It is a privilege to work among them.

That is the good news. The bad news is we are getting overwhelmed. A good deal of the cause is increased trade volumes, some of it is just a larger and increasingly mobile human population, and some of it is probably climate fluctuation. WSDA cannot control any of these forces.

The state of Washington is in the hardly unique position of an income downturn that is rapidly turning into a budget crisis. Funding is decreasing. I am very much afraid that worthy sounding initiatives like a state "white list" will siphon off what little funding we do have and offer few, if any benefits on the ground.

When I look at such proposals on a state level, I see a number of objections:

1. We cannot enforce a white list. We do not have border stations, and we are not able to physically isolate the state. The nursery industry – in Washington aquarium shops that sell plants also have to be licensed as nurseries – supports through fees a small enforcement staff with many duties, one of which is quarantine enforcement. We can give these inspectors a list of 150 or so forbidden plant species (of which 30 or 40 of them are aquatic) and they can inspect all of the probable sales outlets once a year and respond to all complaints. To travel with three or four lists of several thousand species and to identify them in the field – it is not possible for any agency.

2. The necessary knowledge does not exist yet. In the end, the factors that are predictive for invasiveness will be identified, and the issue of quantifying invasiveness potential will become less of a barrier. In the meantime, all listings are and will continue to be done with the same mix of hard data, experience elsewhere, instinct, and best guesses that we dignify with the name "pest risk analysis".

3. A "white list" is an attempt to fix the least broken part of the current system. Please note, I did not say the system was not broken, just that the priorities should be different. Although deliberate introductions are a part of the

picture, they are not by any means the most significant part of the picture at a state level. The following are my three recent major worries, which are all unintentional introductions:

- Kudzu, which was found in a fence row in Clark County (the portion of Washington immediately across the Columbia River from Portland) this summer. The Clark County Noxious Weed Control Board eradicated a very small infestation upon discovery.
- Citrus long-horned beetle, which escaped from bonsai trees in federal post-entry quarantine facilities this August.
- *Spartina densiflora*, a half acre patch of which was found by state Department of Fish and Wildlife personnel in Gray's Harbor, on the coast, very recently.

USDA does a great deal of evaluation and warning for the states, and by and large they do a good job. We knew all three of these species were bad actors before they showed up, and we were on the lookout for them, which is why we have hopes of eventually eradicating all of them.

4. We cannot fund a "white list" at a state level without sacrificing field activities I am very much afraid to lose. What exists now on the state level is a fairly efficient process to seek public comment and, assuming the proposal is adequately supported, to declare quarantine against obvious problem species. Its size and the data gaps for most plant species make a "white list" a much more expensive proposition.

5. If we are very lucky, budget at the state level will be a zero sum game in many states. In my state, it may well be negative sum meaning reduced funding, at least for natural resource issues. We are extremely unlikely to obtain any new funding sources other than federal money, and new fees are politically impossible for at least the near future.

I am very opposed to sacrificing the state's current system, which has its flaws but which is relatively effective and efficient, to experiment with a less reliable, potentially unaffordable structure.

TITLE: Protect Hawaii: Achieving a Balance

AUTHOR: Domingo Cravalho, Jr.; Invertebrate and Aquatic Biota Specialist, State of Hawaii, Department of Agriculture, Plant Industry Division, Plant Quarantine Branch 701 Ilalo Street, Honolulu, Hawaii 96813-5524, PH: (808) 586-0858, pqdcrav@elele.peacesat.hawaii.edu.

ABSTRACT: The Hawaii Department of Agriculture (HDOA) is the lead State agency in protecting Hawaii's agricultural and horticultural industries, animal and public health, and natural resources and environment from the introduction of invasive species. To accomplish this task, the HDOA has charged the Plant Quarantine Branch (PQB) of the Plant Industry Division with being the First-Line-of-Defense against pests entering Hawaii.

In 1888, King David Kalakaua instituted the first plant quarantine program for the Kingdom of Hawaii by preventing the import of coffee plants and plant parts. Coffee was grown commercially during this period and is still considered today an important agricultural crop in Hawaii. A few years later in 1890, the Board of Agriculture and Forestry was created, which broadened the inspectional responsibility to include all plant materials entering the Hawaiian Islands. Then in 1905, quarantine officials intercepted a shipment of fourteen live snakes, which included six rattlesnakes, In response to this interception, the quarantine on agricultural commodities was then further expanded to cover all live non-domestic animals.

The PQB achieves its mission by:

Preventing the introduction of invasive plant species, harmful insects and other invertebrate species, animal and plant diseases, illegal non-domestic animals and other pest species.

Preventing the further spread of pest species (animals and plants) from one island to another, or from an infested area to an un-infested area on the same island.

Facilitating the export of allowable agricultural materials to other states, territories, or foreign areas.

Hawaii's import requirements encompass the entry of all agricultural commodities into the State. Pursuant to State law, the Board of Agriculture (Board) maintains several lists of prohibited, restricted and conditionally approved organisms. Presently, permits are required for the import of certain regulated plant materials and for listed non-domestic animals and microorganisms. Requests submitted to the Board for its review must go through a three-tier review process whereby information concerning the biology and ecology of the organism, as well as issues of environmental, social and economic importance are considered by the Board. This review process strikes a delicate balance

between protecting Hawaii's agriculture, its natural resources and environment, and at the same time providing for economic development.

TITLE: Progress in Invasion Biology: predicting invaders

AUTHOR: Cindy Kolar (Ph.D. Candidate) and **David Lodge** (Professor), University of Notre Dame, Contact information for Kolar: Department of Biological Sciences, University of Notre Dame, Notre Dame, IN 46556, 219-631-4153, ckolar@nd.edu.

ABSTRACT: Alien species are a leading threat to global biodiversity, pose a human health risk, are economically costly (one estimate is $137 billion annually in the U.S. alone), and lead to ecological damage (the costs of which are large but incalculable). To date, most research on alien species has focused on mitigation and control efforts after alien species are established, after eradication is no longer a viable management option, and well after prevention efforts could have precluded the entry of a high risk species. Although it has been hypothesized for decades that successful alien species share characteristics, attempts to discover the 'Holy Grail' of characteristics--applicable to all taxa of species in all ecosystems and at every stage in the invasion process (i.e., transportation, establishment, spread, and impact)--have failed.

Recently, more focused studies controlling for these potentially confounding factors (taxon, ecosystem, and invasion stage) have shown that patterns of characteristics do exist. Several studies, for instance, have identified species characteristics common to successfully establishing birds, and to terrestrial plants that become weeds. Once characteristics common to successful alien species have been identified, statistical models can be developed to identify high risk species for a given ecosystem. Use of these models would allow the development of risk assessment protocols and species-specific management strategies that concentrate on preventing the entry of high risk species. The challenge for model developers will be to develop rigorous models in a timely manner that are practical (i.e., that do not require large amounts of difficult-to-come-by life history and environmental tolerance data), and that can be used by natural resource managers, policy makers, and industry leaders. We will use our research on fish invasions in the Great Lakes as an example of how these models may be developed and implemented. Our general approach, however, could be applicable to a variety of ecosystems and taxa, and would be relevant to both intentional and unintentional introductions.

At least 45 fishes have been introduced into the Great Lakes since the 1700's via human activity. The past two decades alone have brought Eurasian ruffe, round gobies, tubenose gobies, rudd, and the fourspine stickleback to at least portions of the Great Lakes. We developed statistical models based on species life history characteristics to differentiate fishes introduced successfully from those that failed to become established in the Great Lakes. We considered 26 variables (14 life history characteristics, 5 environmental tolerances, 6 aspects of invasion history, and degree of

human use) and found that four (relative growth rate, range of inhabitable temperatures, range of salinity tolerance, and history of invasion) accurately discriminated successful from unsuccessful species with 87-96% accuracy based on discriminant analysis and categorical and regression tree analysis. Using our statistical models and life history information from Eurasian fishes, we next identified 18 fishes from the Ponto-Caspian basin, a donor region for species in the Great Lakes, at a high risk of becoming established in the Great Lakes if introduced. We also used similar models to discriminate fishes that have spread quickly through the Great Lakes ecosystem from those that have spread more slowly, and discriminated fishes perceived as a nuisance from those that are not. New management efforts are needed to prevent the realization of these predictions. We will discuss specific potential management options, and how these might relate to state and national policy approaches.

TITLE: Who Should Pay? A Proposal for a Proactive State and Regional Role in Using Economic Policy Tools to Improve Prevention and Control of Harmful Invasives Carried Through Intercontinental Trade and Travel

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ABSTRACT: While the problem of biological pollution (aquatic and terrestrial) is becoming better recognized, the revenue available for preventing and controlling it remains woefully inadequate. Further, inadequate economic disincentives or penalties exist to deter risky activities that lead to harmful introductions (both intentional and so-called unintentional). This talk discusses six economic policy tools that might ensure that those parties who cause biological pollution are responsible to pay for appropriate management actions. These approaches to the Polluter Pays ideal include: insurance requirements; bonding requirements; civil fines; criminal penalties and fines; fees; and corrective taxes. While each of these economic policy tools may be very useful in certain circumstances, only the latter two tools - fees and corrective taxes - appear capable of providing reliable revenue generation and broad deterrence functions. There is a positive precedent for using these tools -- the relatively successful U.S. and international effort to reduce ozone-depleting substances. The keys to making these tools proactive and measurably effective is to apply the tools at the very time the potentially damaging activity occurs (rather than after the fact) and to apply them at the industry sector level.

It would be administratively impractical, probably unfair, and less biologically urgent to seek to apply new fees or corrective taxes to all international trade and travel. The greatest biological pollution risks clearly arise from intercontinental activities. Corrective taxes and fees may be fairly readily applied by States to trade and travel from other continents to address biological pollution. Specifically, the fees/taxes should apply

to three broad pathways: 1) intentional importation of live plants, animals, and (non-food) seeds from other another continent; 2) travelers arriving from another continent by ship or plane; and 3) arrivals of cargo ships and cargo planes from another continent. The levels of fees/taxes within each of these three broad pathways must be fair and at least roughly appropriate to the level of risk, be correlated with the amount of trade and travel, and provide sustained funding for the long term. The whole effort must be sensible to industry, consumers, travelers, and policy makers. Such an approach must be carefully tailored to avoid the appearance of a restrictive tariff or trade barrier and to avoid Constitutional defects.

States will need to be the leaders in this, preferably on a regional basis with Pacific/Western States in front. The reason is that the current U.S. Administration likely will not take it on, as the Administration is focused on liberalizing trade and is generally opposed to new fees/taxes. Further, Pacific/Western States generally have more at risk ecologically and economically from potential new invasions than other States, and much of the predicted trade and travel increase from new risky export areas will arrive in West Coast ports and airports, especially from China. On the positive side, however, the Administration may be more supportive of economic policy tools rather than new restrictive regulations. The Administration may be more responsive to a policy initiative such as this arising from State Governors rather than from other sources.

Without such policy changes, the taxpayers, the public, and the environment will continue to be saddled with the costs and damage of harmful introductions, and funding will remain chronically inadequate to take the steps called for by virtually every invasives expert (e.g., Carlton, 2001, Pew Oceans Commission report on Introduced Species). If Pacific/Western States take an aggressive lead, as they have done in related areas such as oil spill prevention and cleanup, they can help drive national and even international policy improvements.

APPENDIX 3 - PANEL FACILITATION QUESTIONS

Facilitation Approach

Screening Workshop Panel Discussion

SCREENING PROGRAM ISSUE	QUESTION(S) TO EXPLORE
NEED	Is the current system of regulating intentional importation and releases of aquatic invasive species adequate? Is some type of new screening program needed?
CONTENT	How would you describe the ideal screening program? What is the appropriate content in a screening process? (Discussion could spring board from the Australian, Hawaiian, or draft Washington screening process as a straw dog proposal). What can be done on a regulatory, educational, or volunteer level to reduce the risk of deleterious introductions for each pathway?
ROLES AND RESPONSIBILITIES	What is the proper federal, state, industry, and stakeholder role in implementing programs to reduce risk of deleterious introductions? What should be the responsibilities of each player?
IMPLEMENTATION	What are the obstacles that need to be cleared away? What are ways to clear these obstacles? How do we fund it? Others ???

APPENDIX 4 - COMPLETE TRANSCRIPTION OF THE MEETING RECORD

Western Regional Panel on Aquatic Nuisance Species
Screening Process Workshop
Panel Discussion - January 9, 2002
Facilitator: Michael Fraidenburg

Today's discussion is focused on an **aquatic** perspective and a **regional** perspective.

Need:

Is the current system of regulating intentional importation and releases of aquatic species adequate?
NO.

Are improvements to screening programs needed?
YES.

Content:

How would you describe the ideal screening program?

Listing of Principles:

1. Learn from past mistakes.

2. Gets widespread societal buy-in
    a. transparent
    b. stakeholder involvement in all stages
    c. screening analysis should be done in isolation of special interests
    d. responsive, i.e. timely decision with clear, precise findings
    e. easy to understand even though it might be complicated.
    f. fair and even application
    g. enforcement

3. Deals with scientific uncertainty/data gaps by erring on the side of environmental protection
    a. screening system excludes species in absence of adequate/any information
    b. for new introductions: burden of proof should be placed on importers/users
    c. lack of data/information does not presume acceptance
    d. easily updated to reflect new information
    e. no introduction is so urgent that it needs to proceed without adequate review

4. Stimulates active involvement of federal Invasive Species Council

a. national view
b. ballast water screening:
    i. must be geographically consistent
    ii. ideally international, but certainly continent or nationwide
    iii. at a minimum, regional
c. coordinated North American approach
d. process integrated across governmental layers
e. acknowledge state rights
f. integrated state and federal programs
g. improves/strengthens ability of states to work together
h. develop generic state level model
i. one size does not fit all

5. Consideration of economics plus policy plus science
    a. process should be science-based
    b. adequately address ecological/economic risk vs. ecological/economic benefit based on sound science and political reality
    c. cost effective

6. Cost effective

7. Clear Measures of Success
    a. long-term results (~100 years) and multi-scale

8. Access all proposed imports for invasives to determine if they should be regulated or permitted for general use
    a. address by-products contaminants and packaging
    b. includes all imports (food, pets, plants, etc.)
    c. process should consider new introductions only
    d. target new introductions, then selected other organisms moving in trade in limited amounts
    e. past introductions may present new risks in new areas and may need screening
    f. identify - classify existing introductions

9. Funding mechanisms need to be identified
    a. funding mechanisms need to be identified
    b. collective funding sources: federal, state, industry
    c. costs of screening needs to be borne by the profit-seekers
    d. provides funding for related public education

Listing of Implementation Considerations

10. Screening

a. initial screening should be based on biology/ecology alone
b. off-setting societal and economic benefits should be considered separately
c. effectively identify which organisms are threats
d. screen to be laid out as a dichotomous key
e. address pathways - different uses means different relative risks
    i. aquarium
    ii. nursery
    iii. aquaculture
    iv. wild bait
    v. fish stocking
    vi. live food
    vii. dead food
f. use computerized format to minimize influence from preparers/stakeholders
g. see New Zealand model for import certification rules. Produce specific rules for each combination of import and port of origin and destination.
h. geographical definitions of risk for NIS sources and destinations = first level of success
i. screen existing introductions
j. coordinate - classify
k. science and risk based
l. recognize that species evolve and products move
m. primarily state drive; some federal involvement
n. importer provides the following
    i. common and scientific name, including quantity
    ii. shipper/applicant name and address
    iii. reason for introduction
    iv. person responsible
    v. method of disposition
    vi. abstract of organism: biology, ecology, disease issues, etc.
o. ask importer to provide information required by the Hawaii permit process
p. screening should apply to all imports regardless of intended use: as pets, food items, bait, aquascapes, etc.
q. when considering a new intentional proposed import, consider the new imports potential as a pathway, e.g. a plant that might carry other organisms as contaminants (frogs, snails, slugs), and packaging/medium, e.g. lucky bamboo which may carry mosquito larvae in the water
r. screening must eventually include existing organisms. We may have many sleeping giants currently within our borders that must be addressed ASAP.
s. scientific and policy review committees to guide discussions
    i. composed of technical experts on taxa/ecosystems
    ii. composed of diverse interest groups
    iii. public review process before decision finalized
t. incorporate the uncertainly in each parameter/estimate so as to capture the total uncertainty

u. include socio-economic costs of a species becoming invasive as well as the socio-economic benefits
v. use ANS weed risk assessment system as model for prescreening system

11. Classification
    a. use the smiley face system that Richard Orr suggested
    b. set up regulatory classification system based on invasiveness of proposed organism, distribution in the country or state, plus other pertinent factors
    c. design an explicit process for weighting economic information (benefits) vs. biological information (costs) in risk analysis
    d. screening and economics
    e. classification process should receive science input and then make decisions involving stakeholders
    f. one classification list:
        i. prohibited
        ii. good to go
        iii. somewhere in between (may or may not need layers)
        iv. grand fathered (first screen done)
    g. how will NEPA be integrated into this process

12. Management
    a. enforceable
    b. increased funding
    c. enable all implementors to combine and compare date measures of success
    d. inspection staff at port-of-entry, facility post-entry and departure inspection or regulated items.
    e. management and implementation must be integrated and cooperative between authorities states, agencies, etc.
    f. implementation: point of entry, point of sale, point of release
    g. mandatory labeling
    h. create simple fact sheets/signs web sites/ other tools to explain process and results to various user groups
    i. all for triggers in process, to review classification based on new information, e.g. invasive problems that appear elsewhere
    j. include liabilities to importer, if species becomes invasive
    k. education, education, education
    l. one-size-fits all will not work, e.g. different pathways, different jurisdictions

13. **Obstacles**
    a. training enforcement agents
    b. differing authorities (e.g. plant vs. animal, state vs. fed.)
    c. PETA vs. disposal of enforcement byproducts
    d. complex screening process

e. litigation
f. lack of integrated databases
g. lack of capacity
h. clearly define beneficial - this can have broad interpretation
i. resources limited and should not be siphoned from field activities
j. authorities

14. **Roles and Responsibilities:**

a. Federal agencies:

i. Point of entry screening
ii. Coordinate State and regional approaches to harmonize across boundaries
iii. Coordinate international programs
iv. Database management
v. Responsible for national prohibited list management
vi. Set national numerical criteria
vii. Establish national funding mechanism
viii. Outreach (and coordination and consistency)
ix. Information repository

b. States:

i. Address point of entry/sale and point of release
ii. Manage interstate movement as legally appropriate
iii. Species already in commerce: responsible for prohibited list management at a minimum
iv. Responsible for approving new species.
v. Measuring the effectiveness of screening process
vi. Outreach (and coordination and consistency)

c. Regional or Interjurisdictional Efforts
i. Manage Regional Panel efforts
ii. Assist state and federal authorities in creating regional approaches

d. Industry

i. Initiate voluntary efforts such as codes of conduct/BMP/outreach/education
ii. Assist its members with compliance
iii. Assist or manage greater vendor involvement
iv. Assure legality of the process
v. Coordinate with federal and state management

e. Mikes suggestion: Get someone to organize electronic meeting to finish this process.

15. **How to make this kind of meeting more valuable**:

a. need more time
b. up front consensus of terms
c. more unstructured time during the day
d. good- diversity of participants
e. good - initiated excellent dialogue
f. good-abandoned traditional panel - gave everyone paper and tape
g. more focus on technical sessions on screening process
h. technical session on computer modeling
i. distinguish between informational meeting vs. decision-making meeting
j. send out pre-work or readings to prepare participants
k. summary table of existing programs (Sharon - someone Is doing this)
l. discuss how we link our decisions in to broader efforts
m. need more specific role discussions
n. incorporate the tribes