

**Reaching Out to Oregon on Aquatic Invasive Species:  
From Awareness to Action**

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# CHAPTER 1. PURPOSE AND OUTLINE

## PRIORITIZING EDUCATION AND OUTREACH ACTIVITIES

*Reaching out to Oregon on Aquatic Invasive Species* documents a project that began with a deceptively simple question: How could the Oregon Invasive Species Council (OISC) prioritize its education and outreach (E/O) efforts?

The Council recognized that a number of agencies and organizations in Oregon were already engaged in activities and producing materials on invasive species. Given the limited resources available for E/O, choosing the projects that would provide the greatest benefit was crucial. The Council had no shortage of ideas – pencils, calendars, card decks, brochures, posters, speakers’ bureaus – but they lacked a focused approach for deciding which products and activities to pursue and how to measure the results.

And no wonder! The term “invasive species” encompasses a fascinating range of pests and weeds, parasites and pathogens, living in habitats from arid desert to lush meadow, cobbled brook to deep marine. Pathways by which aquatic invasive species (AIS) are transported and introduced and spread in Oregon also run the gamut: in the ballast water used by commercial shippers, as seedlings attached to gardener’s plants, in water discarded by aquarium hobbyists, on the recreational equipment used by weekend warriors, in the packaging that accompanies live seafood purchases.

Certainly other management practices for preventing and controlling invasive species must be implemented, but people can also play a major role through their actions. The key, of course, is to reach the audiences who can make a difference and motivate them to take action. That was the driving force behind this project.

This report describes the steps I followed to develop a template, strategy, and implementation plan for E/O on aquatic invasive species in Oregon. The project’s main products are 1) an inventory and assessment of existing E/O products and activities relevant to Oregon and the Western states; 2) a generic template for use when developing an E/O plan on any invasive species; and 3) a strategy and implementation plan for E/O on aquatic invasive species. In addition, I conducted a mail survey of Oregon boaters’ knowledge, attitudes, and practices related to aquatic invasive species.

As presented here, the project follows a fairly reasonable path from inventorying materials to designing the template to developing the strategy and implementation plan. In truth, the process followed a far more tortuous path. Aside from providing the project’s main deliverables, then, I hope that the steps outlined here help those planning E/O efforts on invasive species, whether in Oregon or beyond, to streamline the process and incorporate their own knowledge and experiences. Most importantly, I hope this report provides the OISC and others with a new way of thinking about education and outreach – not in terms of product and activities, but in terms of audiences reached, actions taken, and invasions thwarted.

## REPORT OUTLINE

*Reaching out to Oregon on Aquatic Invasive Species* is a lengthy report, and many readers will benefit most from focusing on just a few chapters or sections. With that in mind, below is an outline of the contents that will help readers choose the portions most applicable to their needs.

Chapter 2 describes the need for invasive species education, introduces stages of change theory, and details a number of invasive species E/O programs, both nationally and in the Western states.

Chapter 3 provides background on the OISC and outlines the method used to develop the plan.

Chapter 4 contains a primer on social marketing and a review of several campaigns that used social marketing techniques.

Chapter 5 describes the formation of the OISC E/O Subcommittee, known as the Invasive Species E/O Subcommittee or ISEOS, and the proposal to develop a statewide awareness campaign on invasive species.

Chapter 6 outlines a template that can be used to develop an E/O plan on invasive species and includes questions to define the problem, establish goals and objectives, examine the environment for an E/O program, identify audiences, messages, and channels, implement the program, and conduct monitoring and evaluation activities.

Chapter 7 reviews the aquatic invasive species on the list of “100 Most Dangerous Invaders” in Oregon and determines which audiences can act to prevent their introduction and spread.

Chapter 8 describes the inventory of AIS E/O products and materials and provides the form used.

Chapter 9 provides in-depth information on proposed products and activities to reach 13 different audiences critical to preventing the introduction and spread of AIS in Oregon and to coordinate stakeholders and provide funding.

Chapter 10 describes the Oregon boater survey conducted in Fall 2003.

Chapter 11 explains how the strategy described in Chapter 9 can be implemented for maximum impact on preventing the introduction and spread of AIS in Oregon.

Chapter 12 provides a list of recommendations to carry out the plan.

Appendix 1 contains a sample of the Information/Education Strategy and Implementation Plan developed by the Great Lakes Panel on Aquatic Nuisance Species.

Appendix 2 contains the minutes of the OISC E/O Subcommittee.

Appendix 3 contains further information on the Oregon boater survey, including the survey instruments and letters and postcards used.

## CHAPTER 2. INVASIVE SPECIES EDUCATION

### THE NEED FOR ACTION

Next to habitat loss due to land development and transformation, invasive species pose the greatest threat to native animals, plants, and microorganisms in this country and worldwide (National Invasive Species Council 2001). Invasive species cause enormous damage to the environment, economy, and human and animal health (Pimentel, Lach, Zuniga, and Morrison 1999). Examples of these damages abound: In Oregon, for example, waters in Diamond Lake were poisoned by the toxic blue-green algae (*Anabaena flosaquae*) in summer 2003 to the extent that the lake was closed to boating and swimming (ODFW 2003); oyster growers have faced the possibility of financial hardship due to predation by the European green crab (*Carcinus maenas*) and parasitism by the Japanese oyster drill (*Ceratostoma inornatum*) (Ohio Sea Grant 2000); thousands of dollars have been spent to eradicate even the limited acreage that smooth cordgrass (*Spartina alterniflora*) has colonized in the Siuslaw estuary (Pfauth, Sytsma, and Isaacson 2003); and humans and birds, especially the Corvids, are threatened with the devastation of West Nile Virus (National Invasive Species Council 2001).

Means to control invasive species include chemical, mechanical, biological, and ecological methods, but preventing invasive species from becoming established in new habitats in the first place is the best way to limit their impacts (National Invasive Species Council 2001). Many people are unaware that invasive species present problems or that their own actions can result in introduction and spread. Raising awareness therefore represents an important line of defense for prevention and control of invasives. In the long run, persuading people to act in ways that reduce the threats posed by invasive species and to avoid contributing to the problem may be more effective than passing laws or enforcing regulations (National Invasive Species Council 2001).

In the U.S. General Accounting Office's 2003 report *Invasive Species: Federal Efforts and State Perspectives on Challenges and National Leadership*, state officials identified barriers that make managing invasive species difficult. Not surprisingly, the highest-ranked barrier was a lack of federal funding to create management plans for monitoring, detection, inspection, enforcement, and research activities. But insufficient public education and outreach (E/O) efforts ranked second, identified by 60 percent of those responding as a "great" or "very great" gap in federal legislation related to both aquatic and terrestrial invasive species (U.S. GAO 2003).

Both prevention and control of invasive species require modifying human behaviors, values, and beliefs, and changing public policy, as the National Invasive Species Council (NISC) noted in their Management Plan (2001):

A successful plan to address invasive species issues will depend on the public's understanding and acceptance of the actions needed to protect our valuable resources. To that end, a wide variety of education, outreach, and training programs are needed to help motivate people to take action and raise awareness of the causes of establishment and consequences of invasive species.

In the conclusion to the NISC Management Plan, the authors emphasized that the greatest asset in meeting the invasive species challenge is an "informed and involved" public.

### ENVIRONMENTAL EDUCATION AND OUTREACH

Unfortunately, creating an "informed and involved public," particularly for environmental issues, can be a daunting challenge. Based on the results of a Roper Survey that examined environmental attitudes, knowledge, and behaviors, the National Environmental Education and Training Foundation discovered a "persistent and troubling lack of environmental knowledge among Americans today" (NEETF 2000). In the results, the NEETF noted that only 32 percent of the 1505 Americans surveyed could correctly answer 9 of 12 multiple-choice questions on recent environmental topics. Although the NEETF did not specifically test knowledge of invasive species issues, it seems likely that a survey of the general public's

understanding of this topic would produce equally mediocre results. The NEETF concluded that Americans would definitely benefit from further education about the environment.

But it's also clear that education alone is not enough – because knowledge alone does not change behavior. One theory that describes how an individual moves from a lack of awareness to consistent action is called Stages of Change Theory. Weinreich (1999) describes the various stages that an individual passes through on the way to adopting a behavior and the types of messages that will move them along the path:

- 1) *Precontemplation*: Individuals are not aware of the potential problem and don't consider themselves at risk. Messages should raise awareness of the problem.
- 2) *Contemplation*: Individuals realize a problem exists and begin to consider doing something about it. Messages should emphasize benefits and social pressure to change behavior.
- 3) *Preparation*: Individuals have decided to take action and learn how their behavior should change. Messages should motivate action, minimize barriers, and convey necessary skills.
- 4) *Action*: Individuals perform the behavior and determine whether it was worthwhile. Messages should provide positive reinforcement.
- 5) *Maintenance*: Individuals continue to perform the behavior when appropriate. Messages should provide reinforcement and tips on maintaining the commitment.

**Table 1** provides examples of messages that might be used to move a recreational boater through the stages from awareness to action.

**Table 1. Example messages to move recreational boaters from awareness to action**

<b>Stage</b>	<b>Awareness/Action</b>	<b>Message</b>
Precontemplation	Unaware, no action	Invasive plants, animals, and microorganisms can make waterways unpleasant for recreation and cause costly damage to boats.
Contemplation	Aware, considering action	Boaters can act to prevent the introduction and spread of invasive species and to keep waterways open for recreation; inaction can ruin waterways for everyone.
Preparation	Decide to take action, must learn behavior	Boaters should clean and inspect their boats before they launch in or leave a waterway by following the simple steps explained on signs posted at boat launches.
Action	Perform behavior once, consider benefit	Boat inspection and cleaning takes little time and helps ensure that waterways will remain open for recreation.
Maintenance	Perform behavior when appropriate	Clean and inspect boats every time you leave a waterway; double check while you're waiting to launch for your next outing; consider using a boat wash facility to make the job easier.

Changing behavior, then, requires determining where the target audience falls along the continuum from awareness to action and either addressing the segment with the most individuals or sequentially targeting each segment over the course of an education and outreach campaign.

## **INVASIVE SPECIES EDUCATION AND OUTREACH PROGRAMS**

In the last decade, a wide range of groups has engaged in programs to raise awareness of invasive species and their impacts in the United States. Examples include:

- government agencies (e.g., the U.S. Fish and Wildlife Service, the National Park Service, state Departments of Agriculture, and county weed districts);
- commercial interests (e.g., the aquaculture and agriculture industries)
- non-governmental organizations (e.g., The Nature Conservancy and Defenders of Wildlife);
- universities and research groups (e.g., national and state Sea Grant organizations).

Below I discuss the programs planned or being conducted by the National Invasive Species Council, the Aquatic Nuisance Species Task Force, and the Great Lakes Panel on Aquatic Nuisance Species, before turning to the activities ongoing in Idaho, Washington, and Oregon.

### **National Invasive Species Council**

In its 2001 Management Plan, the National Invasive Species Council (NISC) called for a number of actions to develop and implement a public awareness campaign:

By December 2001 – identify and evaluate existing public surveys of attitudes and understanding concerning invasive species issues, and develop and complete a public survey to fill gaps in knowledge and to serve as a baseline for determining the success of communication strategies.

By January 2002 – compile a comprehensive assessment of current invasive species communications, education, and outreach programs and make this available on the NISC Website.

By June 2002 – develop a model public awareness program that incorporates national, regional, state, and local level invasive species public education activities, including a plan for testing the model over the following year.

The NISC also planned to develop and implement an international education campaign and a series of regional workshops on invasive species for policy makers.

Gene Cope of the National Marine Fisheries Service served on the Education/Outreach Task Force for the NISC from December 2001 to May 2002. In a telephone conversation, Cope (2003) stated that NISC had prepared a proposal to hire a social marketing organization to survey public knowledge and attitudes of invasive species issues. The survey would cost \$300,000. In addition, the Task Force proposed to compile a comprehensive assessment of invasive species E/O materials at a cost of \$100,000. Neither proposal had been approved, but the NISC eventually hoped to conduct a pilot program that would serve as a model for public awareness on invasive species.

### **Aquatic Nuisance Species Task Force**

The Aquatic Nuisance Species (ANS) Task Force was established in March 1991 following passage of the Nonindigenous Aquatic Nuisance Prevention and Control Act (U.S. Congress 1990). The Task Force coordinates national response and provides a management framework and guidance to general resource agencies about specific introduction pathways for invasive species. The Task Force, which is made up of seven federal agencies and 11 Ex Officio member organizations, works through federal agencies and a regional panel and committee structure to conduct on-the-ground prevention and control activities.

The Task Force implements a comprehensive approach to prevent and control ANS. Known as the ANS Program, the approach includes the following elements: prevention, control, detection and monitoring, research, education, and technical assistance. The Task Force has engaged in a number of education and information/outreach activities through partners such as the U.S. Fish and Wildlife Service and Sea Grant, and the ANS Task Force Web site, which was established in 1998.



A well-known effort is the “Stop Aquatic Hitchhikers!” campaign and Web site developed to inform recreational water users. Studies show that participants in activities such as boating, fishing, sailing, swimming, SCUBA diving, and other water sports will take action to avoid introducing ANS if they know what to do (Jensen 2003). The campaign’s primary sponsors include the ANS Task Force, the U.S. Fish and Wildlife Service, and the U.S. Coast Guard. Campaign sponsors use a variety of communication means, such as public service announcements, stickers, posters, magazine and newspaper articles, and television and radio programs, to make the public aware of this issue. Most materials and announcements include the [www.protectyourwaters.net](http://www.protectyourwaters.net) Web site address and encourage individuals to visit and learn how they can contribute to the solution. The site also serves as a source for support materials and invasive species news.

### **Great Lakes Panel on Aquatic Nuisance Species**

The Great Lakes Panel on Aquatic Nuisance Species (GLP) has been working to prevent and control the occurrence of ANS in the Great Lakes since 1991. The panel draws its members from U.S. and Canadian federal agencies, the eight Great Lakes states and the province of Ontario, regional agencies, user groups, local communities, tribal authorities, commercial interests, and the university and research communities. To facilitate regional coordination of information and education (I/E) activities among participants, the panel formed an I/E subcommittee to guide the development and implementation of an I/E strategy.

The long-term objective is to safeguard the ecological and economic health of the Great Lakes-St. Lawrence region by preventing the introduction and spread of ANS. The I/E strategy provides regional direction, coordination, and evaluation of I/E activities on ANS. Although some of the activities are undertaken specifically by the GLP, many other Great Lakes organizations also participate.

To provide direction, the I/E subcommittee developed an I/E strategy and implementation plan as part of the 1994 GLP Annual Report. The strategy lists the subcommittee’s goals, problems, objectives, and activities; the implementation plan identifies the lead entities, potential cooperating agencies and organizations, potential funding sources, and time frame to carry out those activities in support of the goals. Since 1994, the GLP and its partners have carried out many activities, with good results in terms of public awareness and behavior changes, according to Doug Jensen, Aquatic Invasive Species Information Center coordinator for Minnesota Sea Grant (January 2003).

The subcommittee revised the I/E strategy in 2001. Although the goals remain basically the same, the objectives and activities to support them have been fine-tuned. The subcommittee also developed a draft implementation plan in 2001. (Sample pages of the strategy and implementation plan are included in Appendix 1.)

### **Idaho Weed Awareness Campaign**

The Idaho Weed Awareness Campaign (Batt and Miller 2003) was initiated by the Idaho Weed Coordinating Committee in 2002. The overall mission or goal of the IWAC is

- “
- 1) to create a strong public awareness foundation with the citizens of Idaho about the overall problem of invasive weeds and their direct effect on Idaho.
  - 2) to enlist the support of Idaho citizens by providing a visual frame of reference so they can better identify particularly critical invasive weeds; know what actions they should take when they locate invasive weed infestations; and how they personally can help in the prevention of further infestations of invasive weeds.
- ”

An initial \$50,000 in seed money from the Idaho Department of Agriculture, U.S. Forest Service, National Resource Conservation Service, Bureau of Land Management, and Idaho Rangeland Resource

Commission was sufficient to hire Roger Batt, a part-time coordinator, and jumpstart the campaign. Many agencies and other entities provided in-kind contributions as well.

The IWAC focused on two main elements: paid media and earned media. The goal was not to replace other E/O efforts, but rather to enhance those efforts by raising awareness of weed issues in general. During the first year, the IWAC ran a highly recognizable Boise paid-media campaign; placed numerous earned-media stories in print, opinion pages, radio, and television; created ads aimed at sportsmen through the Idaho Department of Fish and Game's regulations booklet; and created publications and materials for use by various audiences.

The initial IWAC effort was seen as effective and an additional \$175,000 was raised, which made it possible to retain the coordinator on a full-time basis and expand the media campaign statewide beginning in September 2003. Although the IWAC did not evaluate the effectiveness of the campaign, anecdotal evidence suggests that the campaign has been successful in conveying the message that noxious weeds are a serious threat to Idaho's agriculture, ecology, and recreation.

Many people remain to be reached with this message, however, and targeted audiences need to receive messages to take specific actions. The IWAC advisory committee approved creating a theme for each year of the awareness campaign, and the paid-media campaign may shift to developing commercials for specific audiences, such as landowners or recreational boaters. To make sure these targeted efforts meet campaign goals, the campaign summary contains a strategic brief used to evaluate each project. Thus there is a symbiotic relationship between the statewide campaign and individual efforts.

(See Appendix 2 for additional information on the Idaho Weed Awareness Campaign in the minutes of the Oregon Invasive Species Council Education/Outreach Subcommittee for 18 December 2003.)

## **Washington State Aquatic Nuisance Species Management Plan**

The Washington ANS Management Plan for both 1998 and 2001 describes how the state plans to educate appropriate user groups on the importance of preventing the introduction and spread of AIS (Meacham 2001). The education portion of the management plan addresses four main problems:

- 1) The state of public awareness of ANS issues is inadequate to address the problem of accidental introductions that occur through actions of the general public.
- 2) Educational efforts are inadequate to help industry, research, and agency personnel understand and address ANS prevention and monitoring.
- 3) Decision-makers and natural resource managers need to be aware of ANS threats to develop effective policies, direct agencies to develop management programs, appropriate funds, and develop and implement management programs.
- 4) Few attempts are made to assess the worth of environmental education programs.

To address these problems, a number of federal, state, and local agencies and organizations work together to implement strategic actions.

To address problem 1, the group planned to compile, develop, and coordinate the dissemination of educational materials on ANS. A number of federal, state, and county organizations within Washington have already developed materials, with new publications and updates planned to keep the general public informed. Existing publications include the report "Bioinvasions: Breaching Natural Barriers," the "Bioinvasions" flyer and poster, an ANS booklet for handling and disposal of non-indigenous specimens at research labs, a guide to the least-wanted aquatic organisms of the Pacific Northwest, and brochures for *Spartina*, hydrilla, Brazilian elodea, fanwort, purple loosestrife, saltcedar, zebra mussel, green crab, and Chinese mitten crab.

The Washington Departments of Fish and Wildlife (WDFW) and of Ecology maintain Web sites on ANS and aquatic weeds, respectively. In addition, Washington organizations and agencies plan to focus on earned media and distribution of information at boat, sport, and garden shows and other public events. Another activity will be development of curricula for K-12 education and teacher training to increase awareness of ANS issues and solutions.

To address problem 2, strategic actions include developing and distributing educational information targeted at specific groups who may be potential sources for ANS introductions, including shellfish growers, restaurants and fish markets, bait shop operators, pet stores, ship captains and crews, boaters, divers, municipal and industrial water users, shoreline property owners, fishing groups, and anglers. For example, WDFW and the Puget Sound Water Quality Action Team recently produced brochures in a number of Asian languages targeted at live seafood markets and disseminated using members of appropriate ethnic communities. In addition, several organizations in Washington produced a pet store card and poster, and funded a permanent ANS exhibit at the Point Defiance Zoo and Aquarium.

To address problem 3, planned strategic actions include educational briefings on the threats and solutions to ANS invasions. These may take the form of a biennial field day to highlight invasive species problems, a biennial summary for members and staff of key legislative committees, and regional workshops. For natural resource agencies, the plan includes training on ANS to support ANS identification and management. Materials for distribution may include ANS species bulletins and wallet ID cards, the *Field Identification Guide to Washington's Aquatic Plants*, and an ANS slide library.

To address problem 4, strategic actions include evaluating and assessing the effectiveness of educational and outreach efforts in reaching target audiences, improving public understanding, and changing behaviors.

## Oregon activities

In Oregon, a variety of E/O activities on invasive species are currently under way. They can be categorized as follows:

- Source – federal, state, local, or tribal government; industry; non-governmental organizations; educational institutions
- Purpose – prevent, detect and monitor, control, regulate invasive species; explain concepts
- Invasive species focus – terrestrial plants, terrestrial animals, aquatic plants, aquatic animals, and microorganisms
- Media – brochures/pamphlets, newsletters, signs/posters, presentations/slide shows, exhibits, reports, white papers, videos, public service announcements, classroom/curriculum materials, Web sites, newspaper/magazine articles, television/radio advertisements, ID cards, regulations
- Audience – general public, youth, special interest groups (recreational boaters, anglers, hunters, gardeners), commercial interests (shippers, aquaculture operators, horticulturists, arborists, marinas), natural resource and biology professionals, educators, legislators

Table 2 provides a list of several key programs on invasive species in Oregon. (The inventory described in **Error! Reference source not found.** provides a more comprehensive listing of products and activities.) In addition, the minutes of the Oregon Invasive Species Council (OISC) Education/Outreach Subcommittee for 16 October 2003 (see Appendix 2) cover a roundtable discussion in which representatives of a variety of federal and state agencies and organizations in Oregon described their education and outreach activities and plans.

Based on Table 2 and the 16 October 2003 discussion, I reached several conclusions:

- Generally, invasive species E/O efforts focus on either aquatic or terrestrial species, despite the similar issues involved in preventing the introduction and spread of both. AIS E/O could benefit from building conceptual links with familiar terrestrial invaders, such as weeds and insects.
- The emphasis on detection, monitoring, and control for terrestrial plants is far greater than that for aquatic plants and animals.
- On the other hand, the emphasis on prevention for aquatic plants and animals is greater than that for terrestrial species, probably due to the fact that pathways of introduction can often be more clearly identified for the former. Aquatic invasive plants in many instances cannot move from one water body to another without human intervention; but an acre of terrestrial invasive plants means an acre of seeds that can readily be spread simply by the action of the wind.
- Few E/O efforts address terrestrial animals or microorganisms.
- E/O on invasive species tends to target special interest groups, such as boaters, or segments of the general public, such as those who visit aquariums, science centers, and special exhibits.
- Few activities use mass media, such as newspapers, magazines, radio, and television, to inform and educate Oregon's 3.4 million people.
- A greater emphasis on informing and educating natural resource personnel and environmental organization staff could leverage their access to the general public.
- Although many agencies and organizations in Oregon have management activities in place for invasive species and are eager to incorporate E/O components, few have developed a strategy that identifies the messages and media best suited to reach their target audiences or are implementing a program with specific, measurable goals.
- Beyond a few studies addressing particular audiences (e.g., recreational boaters), limited information exists about the relative effectiveness of various E/O activities on invasive species. This, combined with variation among audiences and regions, requires new E/O efforts to make use of focus groups or other evaluation tools to ensure that educational strategies will be successful.
- Many agencies and organizations support a statewide campaign to raise awareness of invasive species issues and actions that people can take to prevent their introduction and spread.

**Table 2. Major invasive species E/O activities in Oregon**

Source	Purpose	Invasive species	Media	Audience
Local governments, weed districts	Detection, control	Terrestrial plants	Brochures, talks	General public, gardeners
ODA, agriculture industry	Prevention, detection, control	Terrestrial plants	Brochures, presentations, media releases	Farms, nurseries
OSG	Prevention, detection, explain concepts	Aquatic plants, animals, microorganisms	Video ("You ought to tell someone")	General public, natural resource managers, aquaculture operators
OSG	Prevention, detection, explain concepts	Aquatic plants, animals	Exhibit, Hatfield Marine Science Center	General public
OSG	Explain concepts	Aquatic plants, animals	Traveling trunk	Youth, adults, educators, natural resource managers
Various, including OSG and PSU	Explain concepts, prevention, detection	Aquatic plants, animals	Presentations, brochures, other written materials	Special interest groups, youth, general public
PSU	Explain concepts, prevention, detection and monitoring	Aquatic plants, animals	Zebra mussel monitoring program; mitten crab, <i>Spartina</i> education	General public, special interest groups
OSU Extension	Control	Terrestrial plants	Talks, brochures, weed identification books	Farms, nurseries, natural resource personnel
OSU researchers	Explain concepts, detection, control	Various	Talks, displays	General public, special interest groups
TNC	Control	Terrestrial plants	Projects	Special interest groups
USACE	Explain concepts	Aquatic plants, animals	Display, signs	General public
OSMB	Prevention, detection	Aquatic plants, animals	Display, brochure, Web site	Recreational boaters
ODF&W	Prevention, detection	Aquatic plants, animals	Page in fishing regulations, magazine article, Wildlife Integrity Rules	Anglers, hunters
PSMFC	Prevention, detection	Aquatic plants, animals	Signs, brochures	General public, boaters, anglers
OISC	Prevention, detection	All invasive species	Hotline, pencils, 100 worst invaders	General public

Oregon Department of Agriculture (ODA)  
 Oregon Department of Fish & Wildlife (ODF&W)  
 Oregon Invasive Species Council (OISC)  
 Oregon Sea Grant (OSG)  
 Oregon State Marine Board (OSMB)

Oregon State University (OSU)  
 Pacific States Marine Fisheries Commission (PSMFC)  
 Portland State University (PSU)  
 The Nature Conservancy of Oregon (TNC)  
 U.S. Army Corps of Engineers (USACE)

## CHAPTER 3. FORGING A PLAN

### THE OREGON INVASIVE SPECIES COUNCIL

The Oregon Invasive Species Council (OISC) was created in January 2002 by the Oregon legislature (ORS 561.685). According to the OISC bylaws adopted 19 June 2002, the purpose of the council is “to conduct a coordinated and comprehensive effort to keep invasive species out of Oregon and to eliminate, reduce, or mitigate the impacts of invasive species already [sic] established in Oregon.” The scope of coverage includes “non-native organisms that cause economic or environmental harm and are capable of spreading to new areas of the state.” These do not include humans, domestic livestock, beneficial crops, or nonharmful exotic organisms (OISC 2002).

The statute (ORS 561.685) identifies four main functions for the Council. First, the Council is directed to create and publicize a system for reporting sightings of invasive species and referring those reports to the appropriate agency. Second, the Council is directed to undertake educational activities to increase awareness of invasive species issues. Third, the statute directs the Council to develop a statewide plan for dealing with invasive species. Finally, the Council is authorized to administer a trust account for funding eradication and education projects.

To measure the OISC’s effectiveness, each year the Council develops a list of the “100 Most Dangerous Invaders Threatening Oregon” and then tracks the Council’s success in keeping these species out of the state or limited in distribution. The Council considers these organisms likely to invade at any time and to have a serious negative economic or ecological impact if they were to become widely established in the state. The OISC’s success or failure in preventing the introduction of these species is tracked in annual report cards and by the Oregon Progress Board.

#### Education and outreach efforts

As mentioned above, the OISC is charged with increasing awareness among Oregonians about invasive species, including

- publicizing the existence of Internet sites and toll-free numbers to report invasive species sightings
- producing educational materials and press releases concerning invasive species
- conducting educational meetings and conferences
- soliciting proposals and reviewing applications for grants or loans to further projects providing education about invasive species.

During OISC meetings in 2002, Council members discussed a variety of activities and products aimed at informing and educating target audiences about invasive species. To pursue these activities in a manner that best uses the limited resources available and achieves the greatest benefits, the OISC needed an education and outreach (E/O) plan for invasive species. The plan will serve as one component of the overall OISC Statewide Action Plan on Invasive Species.

The purpose of the current project was to accomplish the following objectives:

- Identify best practices gleaned from other environmental awareness campaigns
- Provide statewide direction and coordination of activities among stakeholders
- Engage in activities to raise public awareness, particularly those that emphasize concepts linking all invasive species
- Generate a template for developing an E/O plan to address any invasive species in Oregon
- Inventory and evaluate existing materials and activities on aquatic invasive species (AIS) within Oregon and the region
- Apply the template’s concepts to produce an E/O strategy and implementation plan on AIS in Oregon

## **METHODS**

### **Identify best practices**

A review of other public awareness campaigns, particularly those on environmental issues, helped identify the techniques best suited for E/O on invasive species in Oregon. The focus was on social marketing campaigns – those that use commercial marketing techniques to promote adoption of behaviors that improve the well-being of an individual or society as a whole (Weinreich 1999). Included in campaigns for review were those of the Canadian Climate Change Action Fund (2002), the Coalition for Acid Rain (Enviros-RIS 1999), Hawaii's "Silent Invasion" Campaign (Holt 1999), and the Idaho Weed Awareness Campaign (Batt and Miller 2003).

### **Coordinate activities among stakeholders**

Although many federal and state agencies and organizations in Oregon engage in activities aimed at preventing the introduction and spread of invasive species, including E/O activities, these groups often know little about each other's efforts. The OISC, however, has responsibility for all invasive species in the state, no matter what form they take, where they are located, or whom they impact. The OISC therefore can serve as the initiator of a forum where other stakeholders can discuss projects, find partners, improve coordination, propose strategies, receive feedback, and identify resources.

### **Raise public awareness**

The OISC needed to establish overarching messages that emphasize similar concepts linking all invasive species, whether terrestrial or aquatic, animal, plant, or microbe. A campaign that revolves around these themes would 1) enhance messages targeted to prevent the introduction and spread of specific species, and 2) help develop the political will and constituency necessary to convince the legislature to increase resources devoted to invasive species issues.

### **Generate a template to develop an E/O plan for any invasive species**

Regardless of the particular invasive species, similar steps are involved in developing an E/O plan to build awareness of potential impacts and motivate behavior change to halt introduction and spread. All plans require the developer to acquire and apply the following information: pathways of introduction; environmental, economic, social, and health impacts; available scientific research; existing knowledge among various audiences; actions people can take to combat introduction and spread of the invasive species; target audiences, key messages, and effective distribution channels; funding sources; and measures for evaluation and feedback. The E/O template will help developers work through the steps necessary to produce an E/O plan for any invasive species in Oregon.

### **Inventory AIS E/O materials relevant to Western states**

Conducting a systematic inventory and evaluation of AIS E/O products and activities helped enhance coordination among stakeholders. The inventory contains materials and activities relevant to species targeted by the OISC for control and prevention.

The method for conducting the inventory included these basic steps:

- 1) develop and distribute a survey form for collecting E/O materials
- 2) develop a database and physical library to categorize products according to topic, target audience, format, and geographic coverage
- 3) assess the adequacy of materials for meeting OISC goals
- 4) develop a searchable online database for the inventory.

## **Apply the template's concepts to produce an E/O plan on AIS in Oregon**

The best way to test the concepts contained in the template was to use them to develop an E/O strategy and implementation plan on AIS in Oregon. Focusing on AIS allowed us to tie in with national programs on AIS E/O, such as those conducted by the ANS Task Force; leverage the E/O work of the regional panels on ANS; and promote actions known to be effective for interrupting the introduction and spread of AIS.

As members of the Canadian Climate Change Action Fund noted in their summary of public awareness campaigns (2002), the most successful public outreach initiatives target specific audiences, set clear goals, clarify expected results, pilot test the approach, and monitor and evaluate results. (See Chapter 4 for further information.) I modified their method as follows to develop an E/O plan on AIS in Oregon.

### Determine goals and objectives

Setting goals for AIS E/O ensured that the campaign focused on activities that serve the primary purpose. Possible goals for such a program could include any of the following:

- 1) To build awareness and understanding among the Oregon public about AIS issues, including pathways of introduction; environmental, economic, and health impacts; and prevention, detection, monitoring, and control
- 2) To encourage and motivate Oregonians to take personal actions to reduce the introduction and spread of AIS
- 3) To promote changes to public policy that will limit the introduction and spread of AIS
- 4) To ensure the availability of adequate resources to fund long-term E/O activities on AIS.

### Identify target audiences, develop key messages, and determine effective distribution channels

Once goals for an AIS E/O effort had been set, the next step was to determine how best to achieve them. The process began by identifying the target audiences, then developing messages and channels for each of these audiences. Pretesting will be necessary to ensure messages resonate with each audience and channels effectively reach them.

### Learn about each audience through interviews, focus groups, and surveys

In most cases, the cost of market research instruments such as focus groups, surveys, or intercept interviews to determine an audience's knowledge, attitudes, and practices related to invasive species is prohibitively expensive. To a large extent, individuals conducting E/O activities can rely on experts' understanding of each target audience in Oregon, on secondary research conducted in other locations, and on less expensive methods for gathering information, such as observation.

One exception to that approach related to recreational boaters. Overland transport of recreational boats poses significant risks for introducing and spreading AIS, because boats and associated equipment carry AIS from one water body to another. With some 197,000 registered boats in Oregon and another 500,000 unregistered craft, this represents a major pathway for AIS to become established in the state.

To help shape an E/O campaign on AIS targeted at recreational boaters and to measure its effectiveness, the Center for Lakes & Reservoirs at Portland State University developed and conducted a KAP survey prior to implementing a plan. AIS and boating surveys have already been conducted by mail in a number of states and in person in Connecticut, Louisiana, and the province of Manitoba (Jensen 2003).

Surveying boaters will allow us to compare the knowledge, attitudes, and practices of Oregon boaters with those in other states; to define the strategy that will best accomplish OISC goals related to boaters; and to establish a baseline to evaluate and fine-tune a public awareness campaign.

### Identify funding sources for AIS E/O activities

A successful AIS E/O program in Oregon depends on the availability of adequate resources. The OSIC needed to identify and seek financial resources and/or in-kind services from state and federal agencies as well as private businesses, organizations, and foundations.



### Develop an implementation plan for AIS E/O

To effectively conduct AIS E/O activities in Oregon will require an implementation plan that details the following for each product and activity included in the strategy:

- Responsible agency or organization
- Partners
- Cost
- Labor hours
- Schedule

### **DELIVERABLES**

- Inventory, library, and online database of existing E/O materials on AIS relevant to Oregon and the Western states
- Review of key social marketing campaigns and methods
- Template for developing an E/O plan to address any invasive species in Oregon
- Survey of knowledge, attitudes, and practices related to AIS among recreational boaters
- Strategy for E/O on AIS in Oregon, including goals, objectives, activities, audiences, messages, and distribution channels
- Implementation plan for E/O on AIS in Oregon

## CHAPTER 4. BEST PRACTICES

### PUBLIC AWARENESS AND SOCIAL MARKETING CAMPAIGNS

A review of campaigns on environmental issues, combined with information on how to conduct them, helped us identify techniques best suited for OISC education/outreach (E/O) on aquatic invasive species (AIS) in Oregon. I focused mainly on social marketing campaigns: those that use the techniques of commercial marketing to promote behavior that improves the well-being of an individual or society as a whole (Weinreich 1999).

Included in this review are several campaigns – the Coalition for Acid Rain; the Canadian Climate Change Action Fund; the Coordinating Group on Alien Pest Species’ “Silent Invasion” campaign in Hawaii; the state of Minnesota’s E/O campaign to educate boaters on AIS; and the Idaho Weed Awareness Campaign. The review starts with Doug McKenzie-Mohr’s introduction to community-based social marketing, a quick reference based on his excellent book *Fostering Sustainable Behavior*, co-authored with William Smith (1999).

#### Quick reference

[McKenzie-Mohr, Doug. 1999. Community-Based Social Marketing. <http://www.cbsm.com/Reports/CBSM.pdf>.](http://www.cbsm.com/Reports/CBSM.pdf)

McKenzie-Mohr started this quick reference with the disheartening news that numerous studies show behavior change rarely occurs as a result of simply providing information. How then can we influence behavior? Perhaps through community-based social marketing, which he said was “based upon research in the social sciences that demonstrates that behavior change is most effectively achieved through initiatives delivered at the community level which focus on removing barriers to an activity while simultaneously enhancing the activities’ benefits.”

The paper listed four steps to community-based social marketing and a brief description of each.

#### 1) Identify the barriers and benefits of an activity.

Almost every form of behavior that we want audiences to adopt has both barriers and benefits. Barriers can be both internal – lack of knowledge or motivation, for example – and external – lack of facilities or prohibitive costs to carry out a behavior. Barriers and benefits can be determined by reviewing relevant literature; obtaining qualitative information through focus groups and observation to explore in-depth attitudes and behavior; and conducting a survey with a random sample of the population.

#### 2) Develop a strategy that uses “tools” effective in changing behavior.

McKenzie-Mohr described a number of tools used to promote behavior change. These include the following:

- *Commitment* is thought to be effective, because when people commit to an initial request, it may change the way they perceive themselves. This may cause their future behavior to change as well. Also, most people have a strong desire to be seen as consistent. Particularly effective were written commitments rather than oral; public commitments; commitments made in groups; commitments that required active involvement; and commitments made at natural points of contact.
- *Prompts* help counteract a human weakness: forgetting. Prompts are visual or auditory aids that remind people to carry out an activity they might otherwise forget. These are effective if they are noticeable; self-explanatory; presented as close as possible to where the action should take place; and used to encourage people to engage in positive behaviors.
- *Norms* guide how people should behave. Most people tend to behave at least somewhat similarly to those around them. To work, norms must be visible – people must be able to see others acting in the preferred way – and result from personal contact.
- *Communication* is part of every program to change behavior but varies according to how the communication is developed. Effective communications use captivating information; depend on a good sense of the audience’s attitudes, beliefs, and behaviors; use a credible source; often emphasize losses that occur as a result of inaction rather than the benefits that occur from action; stress concrete actions individuals can take to reduce threats; rely on easy-to-remember messages; provide personal or

community goals; emphasize personal contact; and provide feedback about the results of people's actions.

- *Incentives* are particularly useful when motivation to engage in action is low or people are not performing an activity as effectively as they could. Incentives must be visible; carefully considered in terms of size; closely paired with behavior; and used to reward positive behavior. Extra thought must be given to removing incentives and preparing for attempts to avoid the incentive (for example, single occupants attempting to beat the system by driving in high occupancy lanes).

3) Remove external barriers.

McKenzie-Mohr explained that using the behavior change tools presented above can have a significant influence on behavior only if external barriers to performing the behavior are absent. A key step then is identifying these barriers and planning for their removal.

4) Pilot the strategy

Obtaining feedback before launching a full-scale campaign helps prevent costly mistakes and ineffective efforts. Focus groups can provide feedback on whether messages resonate or channels will reach the intended audience. A pilot program consisting of two groups – one that experiences the proposed campaign and another that does not – helps assess results, but the focus must be on behavior change rather than measures of awareness or attitude change. Once the strategy has been implemented, evaluation should continue by comparing involvement in a behavior over time to a baseline measure.

## Campaigns

Enviros-RIS. 1999. Discussion Paper on Public Policy and Social Change: The Role of Awareness Building.

Enviros RIS (formerly Resource Integration Systems Ltd.) is an environmental consulting firm with 25 years of professional expertise in policy, research, and development, project management, engineering, strategic planning, communications, facilitation, and training.

The Canadian Public Policy and Outreach Table (a committee) contracted with Enviros-RIS to prepare a discussion paper summarizing what the company found about the relationship between public policy, public awareness, and social change through analysis of eight case studies and from study experts. Although the case study on the Coalition for Acid Rain campaign is most relevant, the authors identified a number of findings that run through most of the case studies.

First, they found that the role of the media is crucial; for example, the Coalition for Acid Rain used very clever, catchy slogans to get out their message. Several groups showed considerable savvy in using the media to their advantage.

Second, the authors noted that the media do not communicate complicated issues. The media likes short sound bites, not concepts that are complicated to explain or problems that take years to solve. In particular, people aged 10 to 20 respond best to TV messages, because it is difficult to get their attention.

Third, public awareness, public policy, and social change are all intertwined. Politicians follow public opinion polls and will address an issue if they see that it is important to the public. For example, the issue of acid rain took hold in both the United States and Canada once the Coalition for Acid Rain was able to get significant amounts of print space devoted to the subject. President George Bush used the public's concern about acid rain to attack Michael Dukakis on the environment and increase his popularity. He promised to act on acid rain and eventually did in the 1990 Clean Air Act. Sometimes, however, the policy change must come first, followed by public awareness and behavior change.

Fourth, some policies take years to achieve, with acid rain legislation being one of them. Social change is no different, and often the amount of behavior change is limited. In particular, where individuals are asked to make a lifestyle change (e.g., to quit smoking and start exercising), the number of participants increases to a point, but incremental additions are hard to achieve.

Fifth, independent organizations often have more freedom and may suit single-issue campaigns best. The Coalition for Acid Rain, for example, was a non-government group that could make its own decisions, decide on its own strategies, and not have to undergo the government review process. Their unique, non-government-related image might have helped, because some members of the public remain suspicious of messages directly from the government.

Sixth, most policies and campaigns need good science and research to garner support. For example, the solid science behind the acid rain issue was significant in changing public opinion. It is not sufficient, however; information alone will not bring about policy changes.

Seventh, successful policies need a strong, committed political champion. In the case of Canada, the minister in charge of the relevant department was often a strong supporter of policy change and went to bat for it within the political system.

#### Case Study: The Coalition for Acid Rain

The Coalition for Acid Rain was established in 1981 as an independent, one-issue organization with two objectives: public awareness and reducing acid rain emissions by 50 percent. The group included 56 organizations, each representing a group impacted by acid rain (e.g., Canadian Nature Federation, Pollution Probe, Northern Ontario Outfitters Association, Greenpeace, tourist operators, anglers, and cottagers). The Coalition allowed no direct government involvement, although Ontario and federal governments funded about a third of the \$3.6 million cost; the remainder came from the 1.2 million members. In addition, the Coalition received significant in-kind contributions from well-positioned members.

The Coalition raised the issue of acid rain with the public through strategic use of the press and other media. They set up offices in Washington and Ottawa, lobbied politicians and their staffs relentlessly, and engaged powerful people (such as wealthy cottagers) who would be impacted personally.

The group conducted targeted education efforts that made the issue real and personal. Credible scientific evidence was crucial. The Coalition showed the impact on local fisheries or statues or maple syrup and then gave people something tangible to do, such as calling politicians before a vote. In one campaign, the Coalition distributed half-full bottles of maple syrup to U.S. members of Congress to dramatize damage to trees in Canada and the northeastern United States.

The Coalition ran radio ads on thousands of stations, distributed acid rain pamphlets and posters, used bumper stickers (including one that said "Acid Rain Burns My Bass"), and even ran radio commercials targeted at U.S. visitors in Ontario to support legislation before Congress.

Public awareness of acid rain moved from about zero in 1981 to very high levels in the late 1980s. This case study shows that commitment needs to be long-term: It can take a long time (4 to 10 years) to significantly raise public awareness and to implement necessary policies. The group disbanded in 1990 with the passage of the U.S. Clean Air Act.

#### Climate Change Action Fund. 2002. Public Information Campaigns to Support Household Action for Environment: Lessons and Best Practices.

This summary paper from the Canadian Climate Change Action Fund describes the lessons they learned from research on public education and outreach campaigns and from implementing a short-term funding program to support local actions. The influence of Doug McKenzie-Mohr is obvious in the campaign strategy. The group reached three main conclusions:

- 1) Information is essential but not enough; people who know more may not necessarily change their behavior.
- 2) Complex issues require a variety of tools and approaches, but a uniform "backdrop" provides needed consistency and support for local efforts.

- 3) Involving partners is crucial to ensure consistent messaging and to avoid duplicating efforts, particularly when resources are limited.

The Public Education and Outreach Table (PEO) brought together more than 30 representatives from government, business, and industry, plus environmental non-governmental organizations, educators, social marketing professionals, and stakeholders. This group developed the strategy document "Reaching out to Canadians on Climate Change: The Public Education and Outreach Strategy" (CCAF 1999).

The PEO supported research in several areas, including evaluations of previous or existing outreach initiatives in several sectors; developing outreach strategies for raising awareness within key audiences; reviewing and conducting studies related to behavioral change and barriers to action; and testing climate change themes and messages.

These studies led to the following lessons learned:

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- Successful public outreach initiatives provide simple, consistent messages over the long term.
- Effective activities use interactive approaches to communications and promote "brand" identity.
- Public education and public policy must be consistent and support each other. Outreach will not have a significant impact without a supportive policy context.
- Successful campaigns make their key messages personal, real, and vivid.
- Social marketing approaches are effective to increase the acceptability of a social idea and/or practice. Many successful initiatives use community-based social marketing that involves commitment tools, prompts, and incentives to go beyond awareness building to voluntary individual behavior change.
- Demonstrating solutions in action and sharing success at the local level is powerful.
- Successful public outreach initiatives target specific audiences, set clear goals, clarify expected results, pilot test the approach, and monitor and evaluate results.
- Coordination of widespread activities, messages, and measurements of success is important. Partnered delivery is often a key component.

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Ultimately the strategy developed had three main objectives:

- 1) To build awareness and understanding among Canadians of climate change, including the science, impacts, and adaptation, and the associated environmental, economic, and social issues.
- 2) To develop support from Canadians for policy changes and actions that will be required as part of the National Climate Change Implementation Strategy.
- 3) To encourage and motivate Canadians to take personal action to reduce greenhouse gas emissions.

The initial activities of the Climate Change Action Fund in public education and outreach relied on \$30 million spent over three years on two main activities:

- A national campaign (\$12 million) that included community newspaper and radio advertising, a national newspaper supplement, a Government of Canada climate change Web site that averages 300,000 hits per month, a toll-free hotline, exhibits, and information kits aimed at building awareness and encouraging action.
- Funding for 152 projects (\$18 million) that involved a wide variety of audiences and sectors from every province and territory, and covered areas such as transportation, energy efficiency, and science outreach as they relate to climate change.

The PEO evaluated the strategy after the first three years and made modifications that they hope will make the campaign more effective. But the PEO noted, "In terms of awareness, such public opinion research as we have indicates that we have not moved the needle to a significant degree." However, the group felt that they had made progress and that an education and outreach campaign on an issue as complex and multi-faceted as climate change must be long-term in nature.

Holt, Alan. 1999. A Social Marketing Handbook for Engaging Communities in Invasive Species Management.

Alan Holt is currently Director of Conservation Programs for The Nature Conservancy (TNC) of Washington; he previously held the same position for TNC of Hawaii.

Holt described the problem of invasive species along with all sectors' low awareness of potential damage. He suggested using social marketing techniques to systematically approach the problem: a thorough assessment of the potential audiences, a clear definition of the objectives, development of key messages, and an overall strategy that makes sure messages are consistent but uniquely persuasive to each audience.

The handbook offered a step-by-step guide to applying social marketing techniques to invasive species work and then illustrated these techniques by reviewing two campaigns – one in Hawaii and another in South Africa. The seven steps covered as part of motivating specific people to take measurable actions for the good of the community are as follows:

- 1) Conduct an initial assessment
- 2) Build a partnership task force
- 3) Design the preliminary strategy
- 4) Conduct market research
- 5) Develop and implement an integrated marketing plan
- 6) Conduct monitoring and evaluation
- 7) Refine the marketing strategy.

In a case study, Holt summarized how some social marketing practices were used in Hawaii's "Silent Invasion" campaign. The Coordinating Group on Alien Pest Species (CGAPS), consisting of 14 government, business, and non-profit organizations, was founded in 1995. The group's first major project was a campaign designed to raise awareness of invasive species among stakeholders and decision-makers, including community and state officials, educators, businesspeople, and the media.

The group raised \$30,000 from state and private sources to produce campaign materials. The centerpiece was a report entitled "The Silent Invasion," which was endorsed by all 14 CGAPS member agencies. The materials were designed to present alien species as visually unattractive to create a negative emotional impact. This reinforced the negative impact that invasive species have on various businesses, health, the environment, and citizens themselves. The materials described a 10-point plan for solving the invasive species problem with specific actions. By gathering data, quotable facts, and striking images on a range of topics, the materials provided a rich information resource.

Holt made the key point that a telephone survey conducted shortly before release of the report confirmed that the general public did not understand terms like "alien" or "invasive species"; but they were concerned about "harmful pests" and believed more should be done.

The campaign was launched in a press conference convened by the Governor and attended by top leaders. In addition, organizers encouraged media personnel to attend. At the same time, CGAPS focused on making visible progress on two prominent pest problems: the brown tree snake, which had not yet invaded Hawaii, and an invasive Central American weed, which was established on four islands. This resulted in a tripling of federal funding to halt invasive species and led to eradication of the weed from two islands and strong programs to contain it on the other two.

The "Silent Invasion" campaign garnered extensive print and broadcast news coverage, and one television station turned the report into a series of commercially funded, prime-time ads. Also, a new curriculum on invasive species was introduced in Hawaii's public schools and supplemented by an exhibit organized by the Bishop Museum. A hotline fields calls from the public on invasive species.

Holt summed up the “Silent Invasion” campaign as primarily a successful media campaign that relied on some social marketing concepts. To transform it into a social marketing campaign, messages and strategies needed to be based on research and market assessment, then pre-tested to ensure they resonated with target audiences. The campaign also had no call to action, so it had little impact on how people dealt with invasive species. The call to action should lead to change, and changes must be made attractive by offering concrete incentives and benefits.

Of the campaign, Holt said: “We’ve generated lots of background music, but still haven’t made the fundamental changes we need to solve the problem.”

#### Jensen, Doug. 2003. Minnesota Boater Awareness Campaign.

Conversations with Doug Jensen, coordinator of the Aquatic Invasive Species Information Center at University of Minnesota Sea Grant, provided much useful information about conducting an education and outreach campaign on invasive species targeted at recreational boaters. Although many human-mediated pathways exist for overland transport of AIS, recreational boaters are recognized as a primary pathway. After zebra mussels were found in the Great Lakes in the late 1980s, education efforts targeted at boaters and anglers began in earnest in Minnesota.

In 1993, Minnesota Sea Grant began using surveys to track boaters’ knowledge, attitudes, and practices related to AIS. At the time, 70 percent of Minnesota boaters took action to prevent the spread of AIS. The survey was repeated in other states throughout the 1990s and in five freshwater and marine states (Minnesota, Ohio, Kansas, California, and Vermont) in 2000. In the second survey, 90 percent of Minnesota boaters reported taking actions to combat AIS, an increase of 20 percent during the seven-year period.

According to Jensen, results show that education can significantly change boater behavior to reduce their risk of spreading invasive species. The states of Minnesota and Vermont have invested more in invasive species E/O and used a greater variety of effective methods than other states surveyed in 2000. The results for Minnesota appear above; and for Vermont, 82 percent of boaters reported taking actions to prevent the spread of AIS. Although Ohio boater awareness of AIS was also high, only 45 percent took actions to prevent AIS spread. Boater awareness of AIS was lower still in California and Kansas, and the percent of boaters who took appropriate actions at water accesses (40 percent and 30 percent, respectively) reflected this fact.

Results indicate that boaters are generally willing to act if they know what to do, according to Jensen. Their motivations for taking actions were most often to keep AIS “out of my lake” or because “it is my personal responsibility.” Jensen noted that effective public education taps these motivations, stresses why preventing the spread of AIS is important, and delivers concise, consistent messages.

How should these messages be delivered? Boaters cited the best sources as newspaper and magazine articles and TV spots; boating and fishing regulations; signs at boat launches; and watercraft inspection/education programs. The state of Minnesota, for example, has installed 6000 signs at water access points around the state at a cost of \$3 to \$10 per sign.

Another technique that Jensen felt might be effective was low-power radio or Traveler Information Systems. He noted that the 100<sup>th</sup> Meridian Initiative was using TIS as a communication means to prevent the westward spread of zebra mussels.

### **Implications for *Reaching out to Oregon on Aquatic Invasive Species***

Based on a review of the campaigns presented in this chapter, I reached the following conclusions on how the OISC can benefit from the experiences of those who have already conducted E/O campaigns:

- 1) Be certain that the environment in which E/O activities will be conducted is conducive to success. One way to do this is to begin by identifying the barriers and benefits to action. For example, at

present commercial shippers may find it extremely difficult to comply with the coastal exchange requirements for ballast water. This serves as an effective barrier to action; therefore E/O efforts will probably not be as successful as they could be. Policy changes will be required before the environment supports compliance.

- 2) Understand how to use all the tools that can effectively change behavior. Encouraging people to take specific actions can definitely be a step in the right direction but, for example, getting them to agree orally or in writing that they will commit to acting will be even more effective. One commitment could occur while teaching boaters to inspect and clean their watercraft: Demonstrators could ask for boater to commit that they will continue the activity every time they launch in or leave a water body.
- 3) Pilot the strategy before setting in motion a full-scale campaign. Even the best-laid plans may go awry if you do not know in advance how your audience will react. Research in advance whether messages resonate and channels will reach the intended audience, then test the activity or product with a small group first. For example, Alan Holt noted that during the telephone survey conducted as part of Hawaii's "Silent Invasion" campaign, the general public did not understand terms like "alien" or "invasive species," but they were concerned about "harmful pests." This example points out the importance of identifying the messaging that will resonate with Oregonians.
- 4) The media can play a crucial role in disseminating key messages about invasive species and preventive measures, yet in Oregon public relations activities have barely been used to reach the public on invasive species. In the Coalition for Acid Rain's successful campaign, the media effort was a crucial element.
- 5) Policymakers must also take up the cause of invasive species before effective policies and adequate funding for research and management activities becomes available. Involving the constituents of approachable policymakers could prove invaluable, as the Coalition for Acid Rain found. For AIS, constituents could include oyster growers who might be impacted by *Spartina* or lake residents whose property could be devastated by aquatic weeds.
- 6) Expect increasing awareness and action above a certain point to be extremely difficult; in other words, the number of individuals who decide to act will probably reach a plateau, and incremental change beyond that point will come slowly. This may have been the case for the Canadian Climate Change Action Fund, which failed to see much impact from a national and local awareness campaign, despite a \$30 million expenditure. (Note, however, that the paper doesn't explain how the evaluation was conducted; in fact, the reference is to "such public opinion research as we have . . . .")
- 7) Sharing success stories detailing invasive species management and control will be critical to letting Oregonians know that the invasive species situation is not hopeless. Sharing success, especially at the local level, was one of the keys to keeping people motivated, according to the Public Education and Outreach Table of the Canadian Climate Change Action Fund.
- 8) Without monitoring and evaluation, the success of a campaign cannot be determined. Although it's tempting to point to the number of posters printed or brochures distributed or visitors who attended a sports show, in truth this provides no information whatsoever on the effectiveness of E/O efforts. Only baseline and follow-up techniques can provide information on the success of a campaign.



## CHAPTER 5. COORDINATING STAKEHOLDERS

### THE OISC EDUCATION/OUTREACH SUBCOMMITTEE

To help provide statewide direction and coordination of invasive species education and outreach (E/O) activities among stakeholders and to receive feedback on aquatic invasive species (AIS) E/O activities, I initiated efforts to develop an OISC subcommittee focused on E/O. Because the OISC is the organization within Oregon charged with preventing the introduction and spread of all invasive species, the Council represented the logical choice to provide a forum where other stakeholders can suggest strategies, discuss projects, receive feedback, find partners, and identify resources.

Mark Sytsma, chair of the OISC, initiated a teleconference on 5 September 2003 to discuss forming the subcommittee and to identify prospective participants. The group agreed to hold an in-person meeting in Salem, Oregon, on 16 October 2003. I contacted some 50 potential attendees by e-mail and phone, and invited them to attend. Twenty-three individuals representing a wide variety of federal, state, and local agencies and organizations in Oregon attended and discussed E/O activities on invasive species. After that meeting, a core group of about a dozen individuals decided to explore the possibility of a statewide E/O campaign on invasive species.

The group met on 18 December 2003 to continue the discussion and decided to present a proposal for a statewide E/O campaign to the OISC. The E/O subcommittee agreed that a campaign to raise awareness would 1) complement invasive species messages targeted at specific audiences, and 2) help develop the political will and constituency necessary to encourage the legislature to devote resources to invasive species issues.

Paul Heimowitz, a member of the OISC and Aquatic Invasive Species Coordinator for the U.S. Fish and Wildlife Service in Portland, presented the proposal to the full OISC on 21 January 2004. The OISC approved the proposal for action but cautioned that the campaign should reflect all stakeholder interests and thoroughly involve the entire council. (See Appendix 2 for the proposal.)

#### 5 September 2003 teleconference

On 5 September 2003, interested individuals representing a variety of agencies and organizations in Oregon held a teleconference to discuss forming an E/O subcommittee on invasive species. (See Appendix 2 for a summary.) The group agreed that a subcommittee could serve several key functions:

##### 1) Coordinate E/O efforts on invasive species in Oregon

The group agreed that establishing a committee focused on invasive species E/O would not duplicate existing efforts. Talking with others involved in E/O would develop synergy, improve coordination, and increase program effectiveness. Each organization would still retain autonomy over its own programs.

##### 2) Develop common messages/themes related to invasive species

The group could develop a common message that addresses all invasive species in Oregon, whether terrestrial, aquatic, marine, plant, animal, or pathogen. This would enhance efforts to reach specific audiences with messages and delivery channels targeted specifically for them. By building a matrix, the group could determine which audiences are being reached successfully and where the gaps lie.

(Note: Early in this project, the OISC recognized the benefit of developing overarching themes that would tie together all invasive species that could pose a threat in Oregon – whether aquatic or terrestrial, animal, plant, or microbe. The OISC discussed generic messages on invasive species during the 25 September 2003 meeting in Newport, Oregon (OISC 2003). Ideas included educating people on the impacts that invasive species cause in terms of the economy and ecosystem. Council members agreed that the message needs to emphasize that people can make a difference and that the effort is not hopeless.)

### 3) Review E/O strategies and offer feedback

Sharing activities, samples, publications, and ideas could help avoid redundant efforts, coordinate similar projects, and improve end products. The group could also draw from existing strategies, including national and state level efforts. Keys to streamlining the review process could include a listserv for interested parties and a Web site where items could be posted for review.

### 4) Assist in program implementation

The group can help identify funding opportunities for program members and offer agency resources where appropriate.

The group agreed to meet in person on 16 October 2003 to determine whether a subcommittee would serve a viable purpose.

## **16 October 2003 meeting**

The second meeting attracted 23 individuals representing a wide range of federal, state, and local agencies, academic institutions, and environmental and educational organizations. (See Appendix 2 for minutes.) Mark Sytsma, Portland State University, explained the purpose of the OISC and need for an Education/Outreach Subcommittee to help develop an E/O strategy and implementation plan for invasive species in Oregon.

Paul Heimowitz, US Fish & Wildlife Service, led a round table discussion to identify audiences, messages, media, and geographic coverage for invasive species E/O activities in Oregon. Although many organizations had management activities in place for invasive species and were eager to incorporate E/O components, few had developed a strategy that identified the messages and media best suited to reach their target audiences or were implementing a program with specific, measurable goals.

The group discussed what the focus of the OISC Education/Outreach Subcommittee should be. Many individuals expressed support for a statewide campaign to raise awareness of invasive species issues and the actions that humans can take to prevent their introduction and spread. Other functions of the subcommittee might include 1) sharing information on new projects; 2) evaluating tools and data; 3) cataloguing materials and activities; and 4) generating a common message hierarchy. The group agreed on the need for follow-up to determine how each agency and organization wants to participate in invasive species E/O.

## **18 December 2003 meeting**

The OISC Education/Outreach Subcommittee meeting to discuss a statewide campaign brought together 10 individuals representing several federal and state organizations and agencies. (See Appendix 2 for minutes.) Mark Sytsma, Portland State University, briefly explained the purpose of the OISC and the E/O Subcommittee. He noted that the subcommittee had gathered to discuss a possible statewide campaign on invasive species, an activity supported by many of the participants at the 16 October 2003 meeting.

Members of the subcommittee discussed public awareness/information campaigns in which they had been involved and identified a number of components that might be part of a statewide campaign on invasive species.

Stephen Anderson, communications director for The Nature Conservancy of Oregon, described the Idaho Weed Awareness Campaign. (For more information, see Chapter 1.) The campaign includes both paid and earned media, and began with a part-time coordinator and \$50,000 in seed money used to support activities in the Boise market. The group raised an additional \$175,000 and is now running a series of TV and radio spots statewide. In addition, the media in Idaho have run a number of stories on invasive weeds.

The OISC E/O subcommittee discussed next steps in conducting a statewide campaign on invasive species in Oregon. Discussion focused on the advantages of targeting specific audiences with tailored messages versus a generic campaign to raise awareness of invasive species issues. Most members of the subcommittee felt that a generic campaign would enhance efforts to promote specific actions. In addition, a generic campaign could generate a political will and constituency to provide resources to address the invasive species problem.

Several members of the E/O subcommittee agreed to prepare a draft proposal to be presented to the OISC at the committee's 21 January 2004 meeting. The proposal would recommend obtaining the expertise and funding to conduct a paid and earned media campaign to combat invasive species in Oregon.

### **Plans for 2004**

The OISC E/O Subcommittee plans to continue meeting in 2004 to discuss a generic statewide campaign on invasive species. The subcommittee recognizes the need for professional expertise and financial resources to conduct a paid and earned media campaign but agrees that a campaign will be the best means to enhance ongoing activities conducted by agencies and organizations within Oregon. First tasks will include 1) obtaining the marketing expertise necessary to develop a proposal that can be used to solicit the funds necessary to conduct a full-scale campaign; and 2) hiring a part-time coordinator who can assist the committee in developing both paid and earned media campaigns.

Although the initial effort of a statewide campaign will be to raise awareness of invasive species in general, targeted messages may be included at a later point in much the same way that the IWAC has developed different themes to promote each year. (See Chapter 1.) For that reason, the strategy and implementation plan for E/O on aquatic invasive species does not contain paid-media elements. Paid media should be considered, however, to reach large target audiences, such as boaters.

In addition, to continue the momentum and synergy generated by pulling together a large number of individuals either already involved or poised to develop E/O products and activities on invasive species, the OISC Web site should be modified to facilitate sharing and review of E/O materials and activities by developing a listserv for interested parties and a Web site where items could be posted for review.

## CHAPTER 6. DEVELOPING A PLAN

### THE TEMPLATE

My original intent was to develop a template for developing a strategy and implementation plan for any invasive species in Oregon and then to follow the steps to develop the plan for aquatic invasive species (AIS). Although in theory this seemed like a good plan, in practice I found I needed to work through much of the strategy and implementation plan first and then develop the template based on the process. So the template below has not been tested to produce a plan; however, I believe if I had followed it, I would have improved upon the plan I did produce and spent far less effort putting it together.

The template that appears below should now provide a much more reasonable and streamlined approach for developing a strategy and implementation plan to address invasive species problems. Although some of the template stems from my own work and experience, much relies on three excellent sources: *Hands-on social marketing: A step-by-step guide* (Weinreich 1999); *Fostering sustainable behavior: An introduction to community-based social marketing* (McKenzie-Mohr and Williams 1999); and *A Social Marketing Handbook for Engaging Communities in Invasive Species Management* (Holt 1999).

The education/outreach plan described here is intended to address all AIS in Oregon, but in practice a substantial effort was required to identify all species, pathways, and audiences involved, and then to develop a strategy and implementation plan. A much more manageable task would be to focus on species with similar pathways and impacts – aquatic weeds introduced by aquarium hobbyists or water gardeners, for example – and work to answer the questions below based on a more narrowly defined problem.

In addition, education/outreach on AIS often needs to begin before all the answers are available about the best ways to control aquatic species or about the impacts that certain behavior changes might have. So adaptability is critical during the planning and implementation stage, and even in the messages developed.

Although the template begins by focusing on the species whose introduction and spread you might want to prevent or control, in truth this process is only intended to serve the more important purpose of identifying the audiences you need to reach. Ultimately the template provides a way to determine the problems you face and the goals you want to achieve in terms of invasive species, and then to define audiences, messages, and channels in a way that will produce the end results you want. It's tempting to consider the job done once you've implemented the plan, but evaluation is an absolute necessity to ensure that the activities produce the results you want.

#### **Problem definition**

What invasive species challenge will you address?

Which species will you prevent from being introduced or spread in your region?

For each species, provide the following:

- Category: aquatic, marine, terrestrial; plant, animal, microorganism, fungi
- Description: Include origin, habit, reproduction, pathway of introduction into the United States
- Risk: Describe reason for concern the species may be introduced or spread, e.g., proximity to known populations, illegal sales
- Pathways of introduction: Explain how the species is spread and whether intentional or passive
- Policies: Describe the regulations that govern the invasive species at its origin and destination, and the people responsible for enforcement
- Environmental impacts: Describe the impacts on the ecosystem, including those on other species
- Economic impacts: Describe the costs of damage and controlling the species, as well as the cost to those who transport or supply the species
- Health impacts: Describe the known effects on human and animal health

- Means of prevention/control: List the actions that humans can take to prevent the species from being introduced or spread
- Target audiences: List the groups who can take action to prevent or control the species

For each species, what E/O approaches are used in your region to combat each species? If the species is not present, what approaches are used to combat similar species or the same species elsewhere?

For each species, who can you interview for further information about biology, prevention and control, and environmental, economic, and health impacts?

For each species, who can you interview for further information about possible E/O approaches?

Which species merit the highest priority for E/O products and activities in terms of

- Invasibility
- Impacts
- Benefits of taking action
- Available resources

### **Goals and objectives**

What is the overall mission of your E/O program?

What goals will help you achieve that mission?

What are the key objectives for each goal?

### **Environment for E/O program**

Where will your E/O products and activities be used?

What trends or other factors might affect your program?

- Social
- Economic
- Demographic
- Political

What policies would encourage the actions you want your audience to take?

What pending legislation might affect how your audience reacts?

Who do you foresee opposing your E/O program? (Organizations, community leaders, others)

Who do you foresee supporting your E/O program? (Organizations, community leaders, others)

### **Audience**

Which audiences can act to alleviate the invasive species problem?

What actions can each audience take to alleviate the invasive species problem?

What methods will you use to research each audience? (secondary research, informal information gathering, in-depth interviews, observations, focus groups, KAP surveys, intercept surveys, databases)

Describe the audience in terms of

- Knowledge of the invasive species problem
- Attitude related to the invasive species problem

- Behaviors related to the invasive species problem

Describe the audience in terms of lifestyle, personality, values, and social norms.

Who are the most credible sources of information for the target audience?

Who is most influential for your target audience, both in terms of opinion leaders and peer networks?

For each audience, what barriers exist to taking actions to help combat the invasive species problem?

How can you minimize the barriers to action?

For each audience, what benefits exist for taking actions to help combat the invasive species problem?

Does the audience have the skills/abilities necessary to take action?

Where will the audiences make decisions about taking action to help combat the invasive species problem?

### **Messages and channels**

What specific objectives do you hope to achieve through this E/O product and activity?

What message do you want to convey to each audience?

What tools of behavior change will you use? (commitments, prompts, norms, communication, incentives)

How can you make the message credible?

What E/O products or activities will best communicate your message to the target audience?

Which communication channels will best reach the target audience?

What means will you use to distribute your E/O product or information about your activity?

Who are the most promising partners to join forces in your E/O program?

How will you pre-test your messages, products, and/or activities?

### **Implementation**

Who will oversee development of this E/O product or activity?

How much staff time is needed to oversee development of this E/O product or activity?

Is the expertise of an outside agency needed to carry out the proposed E/O product or activity?

What funds are available for this E/O product or activity?

What organizations could partner on this E/O product or activity?

Who will distribute E/O products or take responsibility for the activity?

Who will respond to requests for further information about the E/O product or activity or to comments, criticisms, and general questions?

## **Monitoring and evaluation**

How will you track the progress of your implementation?

Have resources, including funds and staff time, been allocated to monitoring and evaluation?

Are funds available for monitoring and evaluation?

Who will evaluate whether your E/O product or activity achieved your objective?

When will you evaluate whether your E/O product or activity achieved your objective?

How will you evaluate whether your E/O product or activity achieved your objective?

How will you use evaluation results to fine-tune or modify your E/O product or activity?

## CHAPTER 7. IDENTIFYING AUDIENCES AND ACTIONS

### TARGET PATHWAYS, PEOPLE, AND BEHAVIOR

One of the basic premises underlying the education/outreach (E/O) strategy and implementation plan for aquatic invasive species (AIS) is that humans can take action to prevent invasions. A key to developing the plan then was to identify 1) which species the OISC wanted to keep from being introduced or spread in Oregon; 2) who could act to prevent or slow an invasion; and 3) what actions these individuals could take to effect a positive outcome.

As described in Chapter 3, each year the OISC develops a list of the “100 Most Dangerous Invaders Threatening Oregon” and then tracks its success in preventing these species from becoming established in the state. So the aquatic species that the OISC most wants to keep from being introduced in Oregon are determined annually. Table 3 provides an analysis of each of these species that includes the species’ category, description, risk of introduction, pathways of introduction, environmental, economic, and health impacts, means of prevention and control, and target audience. Unfortunately, in some cases information on the species is sparse, particularly in terms of quantifying impacts. In most cases, however, it’s clear how the species enters the state and which individuals could act to prevent its introduction.

That, of course, is the key to identifying the people who could act to prevent the introduction of aquatic and marine species in Oregon. These audiences include the following:

- Commercial shippers and dredgers
- Aquaculture operators, commercial fishers, live bait harvesters
- Life seafood trade, bait dealers, consumers
- Aquarium and pet trade, aquarium hobbyists, laboratories and educational facilities
- Plant wholesalers, nurseries, landscapers, water gardeners, shoreline restorers
- Boaters, marina and boat launch operators
- Anglers and hunters
- Water and power facility personnel
- Natural resource personnel, environmental organization staff

Table 4 lists aquatic species already established in Oregon but that the OISC does not want to see spread. By examining the table, it’s clear that at least one of the audiences already identified above could take actions to stymie the spread of each of these species. For example, boaters could take preventive measures to avoid the spread of almost every aquatic plant listed.

In addition to these audiences, several other groups can be instrumental in supporting and sustaining education and outreach efforts to prevent the introduction and spread of AIS species in Oregon. These audiences include the following:

- Educators
- News media
- Watershed councils
- Policy makers

What actions can each of these audiences take to prevent the introduction and spread of AIS in Oregon? Chapter 8 will provide a more thorough look at the pathways of introduction, objectives, current status, and proposed activities through which each of these audiences could contribute to OISC goals.



**Table 3. Analysis of freshwater and marine aquatic species on OISC “100 Most Dangerous Invaders Threatening Oregon”**

<b>Species</b>	<b>Category</b>	<b>Description</b>	<b>Risk</b>	<b>Pathways of Introduction</b>	<b>Impacts</b>	<b>Means of prevention/control</b>	<b>Target Audiences</b>
African waterweed ( <i>Lagarosiphon major</i> )	Aquatic plant	Native to South Africa; discovered in Australia in 1944	Listed as noxious weed in 35 states	Sold as an oxygenating plant for aquaria and ponds	<i>Environmental:</i> Forms thick mats that displace native species  <i>Economic:</i> Potential seed contaminant  <i>Health:</i> Unknown	Noxious weed quarantine Discourage sales and use	Aquarium trade; aquarium owners; landscapers; water gardeners; boaters; anglers; natural resource personnel
Caulerpa seaweed ( <i>Caulerpa taxifolia</i> )	Aquatic plant	Green algae native to tropical seas; escaped from a Monaco Oceanographic Museum in 1984; blankets thousands of acres in the Mediterranean; populations in California are under eradication	Populations in California; water temperatures in southern Oregon Coast would support species; not known from the wild in Oregon	Popular aquarium species	<i>Environmental:</i> Forms thick mats that displace native species  <i>Economic:</i> First year eradication program for two California populations cost \$1.21 million  <i>Health:</i> None	Discourage sales and use	Aquarium trade; aquarium owners; boaters; anglers; natural resource personnel
Cordgrasses ( <i>Spartina spp</i> )	Aquatic plant	Native to the East Coast	Introduced to Willapa Bay, WA, in 1894; now infesting ~ 25,000 acres there Established in Puget Sound and San Francisco Bay; infestation in Tillamook Bay eradicated; Cox Island infestation under eradication	Originally through packing material for oyster shipments or as a shore stabilizer; now spread by movement of water, humans, or animals	<i>Environmental:</i> Colonizes mudflats and converts them to salt marshes. Mudflats are critical for many types of shellfish and birds  <i>Economic:</i> Increased flooding leads to loss of recreation and waterfront property  <i>Health:</i> Unknown	Manual removal and chemical treatments by governmental agencies and public	Shellfish growers; waterfront property land-owners; boaters; anglers; natural resource personnel

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Dead man's fingers ( <i>Codium fragile tomentoides</i> )	Aquatic plant	Probably Japanese native; invaded the north Atlantic, Mediterranean, Australia, New Zealand.	Invaded the San Francisco Bay	New outbreaks have been associated with trade of oysters and shellfish	<p><i>Environmental:</i> Displaces native species</p> <p><i>Economic:</i> First year eradication program in California cost \$1.1 million; second year monitoring cost nearly the same</p> <p><i>Health:</i> Unknown</p>	Enforce stringent quarantine and decontamination procedures for shellfish translocations; reduce ship hull fouling	Commercial shipping industry; aquaculture ; boaters; anglers; natural resource personnel
European water chestnut ( <i>Trapa natans</i> )	Aquatic plant	Native to Eurasia, introduced to Australia and northeastern North America	First introduced to New England around 1859 as a medicinal and food source; now common in many waters in New England	Introduced as medicinal or food source; transported on boats and trailers; sold in Asian food stores	<p><i>Environmental:</i> Dense surface mats displace native species</p> <p><i>Economic:</i> Dense surface mats impeded boating; cost for control program in Lake Champlain from 1982-2001 was over \$4.3 million</p> <p><i>Health:</i> Spiny fruits hazardous to bathers</p>	Noxious weed quarantine; discourage use; encourage boaters to follow voluntary guidelines for clean boating	Landscapers; water gardeners; boaters; anglers; natural resource personnel
Giant salvinia ( <i>Salvinia molesta</i> )	Aquatic plant	Native to Brazil, discovered in United States in 1998, found in 7 states	Found in California	Sold as pond plant; transported on boats and trailers	<p><i>Environmental:</i> Grows rapidly and forms dense mats; shades native vegetation, reduces dissolved oxygen</p> <p><i>Economic:</i> Interferes with recreation, irrigation, drainage, etc.; potential seed contaminant</p> <p><i>Health:</i> Unknown</p>	Noxious weed quarantine; discourage sales and use; encourage boaters to follow voluntary guidelines for clean boating	Aquarium trade; aquarium owners; landscapers; water gardeners; boaters; anglers; natural resource personnel

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Golden algae ( <i>Prymnesium parvum</i> )	Aquatic plant	Causes fish kills in Europe and Middle East; established in United States	Caused large fish kill in Texas in 2001	Found in drained fish hatchery ponds	<i>Environmental:</i> Releases a toxin that causes fish kills <i>Economic:</i> Aquaculture, commercial fishing <i>Health:</i> None	?	Consultants who identify phytoplankton; natural resource personnel; water recreationists
Toxic cyanobacteria ( <i>Cylindrospermopsis raciborskii</i> )	Aquatic plant	Cosmopolitan	Toxin requires closures of waterways to boaters, swimmers, and anglers	Transported on boats and trailers; empties live bait waters	<i>Environmental:</i> Implicated in animal health issues <i>Economic:</i> Requires immediate cleanup; contaminates drinking water sources; limits recreation <i>Health:</i> Implicated in serious human health issues	Encourage boaters to follow voluntary guidelines for clean boating; encourage proper use of bait wells; others unknown	Consultants who identify phytoplankton; natural resource personnel; water recreationists
Asian clam ( <i>Potamocorbula amurensis</i> )	Aquatic invertebrate	Introduced via ballast water to San Francisco Bay in 1986, reaches densities of 50,000 clams per square meter	Established in San Francisco Bay; not known in Oregon	Ballast water	<i>Environmental:</i> Alters food web dynamics <i>Economic:</i> Changes the benthic and phytoplankton communities resulting in the collapse of fisheries <i>Health:</i> Unknown	Ballast water exchange	Commercial shipping industry; aquaculture; boaters; anglers; natural resource personnel
Asian tapeworm ( <i>Bothriocephalus acheilognath</i> )	Aquatic invertebrate	Asian fish parasite; introduced to the United States around 1960 and in several European countries in the 1970s and 1980s.	Established in California	Imported with stocked fish; infestation of carp	<i>Environmental:</i> Can weaken or kill hosts <i>Economic:</i> Can make gamefish unsuitable for consumption <i>Health:</i> Unknown	Discourage the release of any bait fish into local waters	Grass carp users; commercial fishing industry; boaters; anglers; natural resource personnel

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Fishhook waterflea ( <i>Cercopagis pengoi</i> )	Aquatic invertebrate	Native to the Caspian and Black Seas; discovered in the Great Lakes in 1998	Established in the Great Lakes	Ballast water; transported on boats and trailers; transported by anglers	<i>Environmental:</i> Preys on smaller zooplankton, reducing food for native fish  <i>Economic:</i> Known to cause biofouling of nets and trawls in commercial fishing operations  <i>Health:</i> Unknown	Encourage boaters to follow voluntary guidelines for clean boating; encourage anglers to discard contaminated equipment	Commercial fishing industry; boaters, anglers, marinas and boat launches; water and power facilities; natural resource personnel
Japanese shore crab ( <i>Hemigrapsus sanguineus</i> )	Aquatic invertebrate	Native to Asian Pacific coasts, discovered in New Jersey in 1988, now distributed from Maine to North Carolina	Established along the East Coast of the United States	Ballast water, packing material, lobsters and other seafood, scientific specimens	<i>Environmental:</i> Omnivorous species with an appetite for young clams, scallops, oysters, algae, fish larvae, etc. Displaces native crabs in the rocky intertidal zone  <i>Economic:</i> Threat to shellfish cultivating  <i>Health:</i> Unknown	Ballast water exchange; encourage boaters to follow voluntary guidelines for clean boating	Commercial shipping; anglers; boaters; live seafood industry; natural resource personnel
Japanese oyster drill ( <i>Ceratostoma inornatum</i> )	Aquatic invertebrate	Introduced to Washington with Pacific oysters imported from Japan in the early 1900s; found in Willapa Bay	Established in Washington	Introduced with oysters	<i>Environmental:</i> A pest in oyster beds; mortality up to 25%  <i>Economic:</i> Impacts aquaculture industry  <i>Health:</i> Unknown	Existing rules on shellfish transport	Aquaculture industry; live seafood industry; natural resource personnel
Leidy's comb jelly ( <i>Mnemiopsis leidy</i> )	Aquatic invertebrate	Native to the East Coast; introduced to the Black and Caspian Seas	Unknown	Ballast water	<i>Environmental:</i> Reproduce rapidly; compete with native fish for zooplankton  <i>Economic:</i> Potential impact on commercial fishing  <i>Health:</i> Unknown	Ballast water exchange	Commercial shipping; boaters; anglers; natural resource personnel; aquaculture

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Mitten crabs ( <i>Eriocheir spp</i> )	Aquatic invertebrate	Native to China and Japan; first collected in San Francisco Bay in 1993; by 1998, 30,000/day collected at a bay area pump station; migrate hundreds of miles up freshwater rivers	Present in San Francisco Bay; one adult mitten crab was caught in the lower Columbia in 1997; others reported but not verified since	Ballast water, human introduction, dredging, boat equipment	<p><i>Environmental:</i> Alter biological communities through competition and predation; overwhelm structural elements of fish passage and screening facilities; potentially eat salmonid and sturgeon eggs and juveniles</p> <p><i>Economic:</i> Fish salvage operations, levee stability, water operations, fishing nets and catch</p> <p><i>Health:</i> Host for Oriental lung fluke</p>	Ballast water exchange; anglers remove from water; discourage release from illegal live seafood trade	Commercial shipping; anglers; live seafood trade; boaters; anglers; natural resource personnel
New Zealand isopod ( <i>Sphaeroma quoyanum</i> )	Aquatic invertebrate	Native to New Zealand, arrived in San Francisco Bay early in the 20 <sup>th</sup> century	Detected in Coos Bay in 1995	Ballast water	<p><i>Environmental:</i> Bores into banks, increasing erosion and bank instability</p> <p><i>Economic:</i> Bores into wood, peat, sandstone, and Styrofoam</p> <p><i>Health:</i> Unknown</p>	Ballast water exchange	Commercial shipping; anglers; boaters; natural resource personnel
New Zealand sea slug ( <i>Philine auriformis</i> )	Marine invertebrate	Native to New Zealand	Established along the California Coast	Thought to have been introduced in ballast water	<p><i>Environmental:</i> Can become the dominant marine organisms on soft bottoms; feeds on bivalves and other mollusks</p> <p><i>Economic:</i> Information not readily available</p> <p><i>Health:</i> Unknown</p>	Ballast water exchange	Commercial shipping; aquaculture; boaters; anglers; natural resource personnel

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Rusty crayfish ( <i>Orconectes rusticus</i> )	Aquatic invertebrate	Native to the Ohio River basin, spreading in the northeast and north central states.	Information not readily available	Used as bait; spread by anglers	<i>Environmental:</i> Large, aggressive species that can displace native crayfish and reduce aquatic vegetation  <i>Economic:</i> Unknown  <i>Health:</i> Unknown	Discourage the release of any live or dead bait into local waters	Anglers; aquaculture; aquarium and pond trade; biological supply trade; live bait trade; natural resource personnel
Spiny waterflea ( <i>Bythotrephes cederstroemi</i> )	Aquatic invertebrate	Native to northern Europe, introduced to the Great Lakes in the mid- 1980s	Has spread to other inland lakes near the Great Lakes in United States and Canada	Ballast water; potentially transported by boats and trailers	<i>Environmental:</i> Barely 1 cm long, reproduces rapidly, competes with young fish for food  <i>Economic:</i> Potential negative impacts on commercial and recreational fishing  <i>Health:</i> Unknown	Ballast water exchange; encourage boaters to follow voluntary guidelines for clean boating	Commercial shipping; boaters, anglers, marinas and boat launches, water and power facilities; natural resource personnel
Veined rapa whelk ( <i>Rapana venosa</i> )	Aquatic invertebrate	Native to the Sea of Japan; established in Chesapeake Bay	Information not available	Ballast water; transported along with products from marine farming	<i>Environmental:</i> Predatory species that attacks oysters, clams, and mussels  <i>Economic:</i> Potential negative impacts on natural and cultivated farming of oysters and mussels  <i>Health:</i> Unknown	Ballast water exchange; bounty program	Commercial shipping; aquaculture; boaters; anglers; aquaculture; natural resource personnel

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Zebra mussel ( <i>Dreissena polymorpha</i> )	Aquatic invertebrate	Native to Caspian and Black Seas	Present in 22 states and in many river basins, including the Mississippi	Ballast water, transported on boats and trailers	<i>Environmental:</i> Reduce phytoplankton, zooplankton, colonize and threaten native mussels  <i>Economic:</i> Build up on grates, intake pipes, outboard motors costing millions to owners of boats and shoreline residences, water and power facilities  <i>Health:</i> Unknown	Ballast water exchange; encourage boaters to follow voluntary guidelines for clean boating	Commercial shipping; boaters, anglers, marinas and boat launches, water and power facilities; natural resource personnel
Asian carp ( <i>Hypophthalmichthys nobilis</i> , <i>H. molitrix</i> )	Fish	Imported from China in 1973 to improve water quality in aquaculture ponds; escaped into Midwestern rivers	Established populations are expanding; may spread to the Great Lakes through the Chicago Shipping and Sanitary Canal	Aquaculture escapee	<i>Environmental:</i> Could impact other species, disrupt native river ecosystems  <i>Economic:</i> May reduce the populations of native sport and commercial fish  <i>Health:</i> Unknown	Stricter guidelines for aquaculture and/or enforce existing guidelines	Aquaculture; policy makers; boaters; anglers; natural resource personnel
Atlantic salmon ( <i>Salmo salar</i> )	Fish	Native to North Atlantic, widely used in aquaculture; ODFW has hatchery and stocking program	Escapees from net pens have been detected in British Columbia and Puget Sound	Aquaculture escapees	<i>Environmental:</i> Could compete with native salmon if they become established in the Pacific Northwest  <i>Economic:</i> Reduction in native sport fishing  <i>Health:</i> Unknown	Stricter guidelines for aquaculture and/or enforce existing guidelines	Aquaculture; policy makers; boaters; anglers; natural resource personnel

Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Black carp ( <i>Mylopharyngodon piceus</i> )	Fish	Native to eastern Asia; Introduced to the United States in the 1970s as a contaminant in Asian carp shipments and later as a control for yellow grubs and as a fish farming product	Maintained in research and fish production facilities in Arkansas, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, and Texas	Potential aquaculture escapees	<i>Environmental:</i> Fish grow to lengths greater than 1 meter and can weigh up to 150 pounds; 4-year-old black carp eat 3-4 pounds of mollusks per day; may result in a reduction in the native aquatic mollusk biodiversity and bio-abundance  <i>Economic:</i> Reduction in aesthetic, recreational, and economic values of native mollusks  <i>Health:</i> Danger to recreational boaters	Reduction or elimination of populations maintained for any purpose; Wildlife Integrity Rules	Aquaculture; laboratory facilities; policy makers; boaters; anglers; natural resource personnel
Muskellunge, northern pike ( <i>Esox</i> spp)	Fish	Native to lakes and rivers in central United States; prized as game fish	Found and eradicated in two reservoirs in California	Introduced as game fish by anglers	<i>Environmental:</i> Voracious predators, negative impact on native fish  <i>Economic:</i> Possible reduction in game fish, such as trout  <i>Health:</i> Unknown	Discourage introduction by anglers; enforcement of invasive species introduction laws and guidelines; Wildlife Integrity Rules	Boaters; anglers; natural resource personnel
Round goby ( <i>Neogobius melanostomas</i> )	Fish	Introduced to the Great Lakes via ballast water prior to 1990	Has spread through river systems in the Great Lakes Region	Ballast water; bait waters	<i>Environmental:</i> Feeds on native fish; displaces native species from optimal habitat  <i>Economic:</i> Possible loss of prized game fish  <i>Health:</i> Unknown	Ballast water exchange; appropriate use of bait and bait water; dispersal barriers; Wildlife Integrity Rules	Commercial shipping industry; boaters; anglers; natural resource personnel



Species	Category	Description	Risk	Pathways of Introduction	Impacts	Means of prevention/control	Target Audiences
Ruffe ( <i>Gymnocephalus cernuus</i> )	Fish	Eurasian species introduced into Lake Superior in the mid-1980s via ballast water	Populations expanding rapidly	Ballast water; bait and bait water	<i>Environmental:</i> Threat to native fish; correlated with eutrophication  <i>Economic:</i> Serious threat to commercial and sport fishing  <i>Health:</i> Unknown	Ballast water exchange; legislation against using Ruffe as bait	Commercial shipping industry; anglers; boaters; natural resource personnel
Shimofuri goby ( <i>Tridentiger bifasciatus</i> )	Fish	Asian species, introduced to California in 1985, probably via ballast water	Present in California	Ballast water	<i>Environmental:</i> Competes with native species in estuaries  <i>Economic:</i> Unknown  <i>Health:</i> Unknown	Ballast water exchange	Commercial shipping industry; anglers; boaters; natural resource personnel
Snakehead ( <i>Channa spp.</i> )	Fish	Asian fish sold live in some Asian fish markets; discovered in Maryland pond in 2002; can live for days out of water	Live specimens have been confiscated in California and Washington	Human introduction from live seafood market; released aquarium fish; overland migration	<i>Environmental:</i> Predatory species capable of impacting native fish populations and disrupting natural ecosystems  <i>Economic:</i> Unknown  <i>Health:</i> Unknown	Enforce laws against sales of any kind	Live seafood market; consumers; aquarium trade; aquarium hobbyists; boaters; anglers; natural resource personnel

**Table 4. Established aquatic invasive species in Oregon that the OISC would like to prevent from spreading (OISC 2003)**

Crustaceans

<i>Carcinus meanas</i> All <i>Cambaridae</i> family	European green crab Crayfish	Commercial shipping; anglers; boaters Anglers; aquaculture; aquarium trade; boaters; anglers
--	---------------------------------	--

Fish

<i>Archoplites interruptus</i>	Sacramento perch	Commercial shipping; boaters; anglers;
<i>Misgurnus anguillicaudatus</i>	Oriental weatherfish	aquaculture; policy makers
<i>Ctenopharyngodon idella</i>	Grass carp	
<i>Notamigonus crysoleucas</i>	Golden shiner	
<i>Pimephales promelas</i>	Fathead minnow	
<i>Tinca tinca</i>	Tench	
<i>Fundulus diaphanous</i>	Banded killifish	
<i>Lucania parva</i>	Rainwater killifish	
<i>Noturus gyrinus</i>	Tadpole madtom	
<i>Polodictis olivaris</i>	Flathead catfish	
<i>Gambusia affinis</i>	Mosquitofish	

Mollusk

<i>Potamopyrgus antipodarum</i>	New Zealand mud snail	Anglers; boaters
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Plants

<i>Spartina alterniflora</i>	Smooth cordgrass	Aquarium trade; aquarium owners;
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	water gardeners; landscapers;
<i>Lythrum salicaria</i>	Purple loosestrife	boaters; anglers; commercial shippers
<i>Egeria densa</i>	South American waterweed	
<i>Nasturtium officinale</i>	Watercress	
<i>Callitriche stagnalis</i>	Pond water-starwort	
<i>Myriophyllum aquaticum</i>	Parrotfeather	
<i>Potamogeton crispus</i>	Curly pondweed	
<i>Zostera japonica</i>	Dwarf eelgrass	

Reptiles

<i>Chelydra serpentina</i>	Snapping turtle	Aquarium trade; educational
<i>Trachemys scripta elegans</i>	Red eared-slider	institutions; laboratories

## CHAPTER 8. CATALOGUING MATERIALS

### INVENTORY OF AIS PRODUCTS & ACTIVITIES

As described in Chapter 1, numerous agencies and organizations have developed materials and activities that target aquatic invasive species (AIS). Although the OISC education and outreach (E/O) strategy and implementation plan lists a variety of possible activities to combat invasive species, obviously we only need to develop those that do not already exist, either in Oregon or elsewhere. Before we could identify gaps, we needed to become familiar with as many AIS materials relevant to Oregon and the Western states as possible. The inventory of AIS products and activities provides a repository for these materials and a means for accessing items by topic, target audience, format, and geographic coverage.

The inventory is valuable for several reasons. First, given the limited resources available for environmental E/O, we wanted to help coordinate not just our own AIS E/O efforts, but others as well. Many brochures, displays, and other E/O materials have been produced and, undoubtedly, many more will be created in the future. An inventory of existing E/O on AIS helps communicators wisely use limited resources, avoid duplication of efforts, and enhance exchange of readily available information. By cataloging and evaluating existing materials, we hoped to identify gaps in messaging and to develop new initiatives that would reach target audiences more effectively.

To conduct the inventory, we developed an inventory form, which was adapted from the Great Lakes Panel on Aquatic Nuisance Species (1997). (See **Figure 1**.) We then sent an e-mail describing the project to the `aliens-l` and `pnw_ans-l` listservs and attached the inventory form with a project description.

Response was underwhelming. We sent the original e-mails in early May 2003 and set a deadline of 2 June 2003, but later extended the deadline to mid-June in the hope of receiving more materials. When that tactic also proved less than successful, I wrote e-mails to individuals in the Western states who were known to be producing E/O materials on AIS. By the end of summer 2003, a much wider assortment of materials awaited inclusion in the inventory.

One drawback, however, was that many of the materials arrived without accompanying inventory forms. Unlike the Great Lakes inventory, for which the inventory forms contained most required information, many of the materials submitted for the Western states inventory arrived without information about the developers, data of publication, cost, target audience, and other requested data.

Nevertheless, more than 120 separate items were catalogued in a Microsoft Access database set up for that purpose. The database does not include materials on AIS generally not found in the Western states, but it does list products produced outside the region that relate to a species present in the region. As completely as possible, the database provides information on the producer, source, date, cost, topic, audience, format, length, and geographic coverage for each item, plus a brief description.

In general, I found many materials available for boaters and anglers, but far fewer for many other target audiences important in Oregon. Many products and activities focused on zebra mussels and hydrilla, in particular. Many products and activities appeared to have a species focus rather than an audience focus; for example, a number of messages contained phrases such as “Stop New Zealand Mudsnails,” “Stop Hydrilla,” “Zap the Zebra,” and so forth, with no clue in the headline as to what audience should care or take on this responsibility. If one of the keys to successful E/O campaigns is to make key messages personal, real, and vivid, many of these materials may fail to impact the audience from the outset; members of the audience for whom the message is intended must recognize immediately that they are the intended recipient.

To make it easier for interested individuals to review the catalogued materials and add to the information content, a proposal was submitted to the Western Regional Panel of the Aquatic Nuisance Species Task Force for funds to publish a searchable online version of the database, which will reside on a Portland State University server. In addition to the information available in the Access database, the online version will include a digital image of each item.

Further information will also be available online about the development and distribution of the inventory form; development of the database and categorization of materials; and results of the inventory in terms of topic, audience, format, and geographic coverage.

**Figure 1. Inventory form for gathering information on E/O materials and activities on AIS**

**Oregon Education/Outreach Committee on Invasive Species**

**Background Information**  
 Date: \_\_\_\_\_  
 Name of organization/program: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City, State: \_\_\_\_\_ Zip code: \_\_\_\_\_  
 Contact: \_\_\_\_\_ Title: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ e-mail: \_\_\_\_\_

**Information/Education Materials/Program Description**  
Only report on materials or programs that you or your organization created. Please use a separate copy of this form to describe each product.

**Product Background**  
 Title: \_\_\_\_\_  
 Author: \_\_\_\_\_ Publication date: \_\_\_\_\_ Cost: \_\_\_\_\_ No. of pages: \_\_\_\_\_  
 Source: \_\_\_\_\_ Contact & phone number: \_\_\_\_\_

*For the following questions, please check all applicable answers.*

**Topic:**  
 zebra mussel    New Zealand mudsnail    mitten crab    Asian clam (*Corbicula*)  
 Atlantic salmon    purple loosestrife    hydrilla    Eurasian watermilfoil  
 egeria    parrotfeather milfoil    other AIS: \_\_\_\_\_  
 AIS control strategies    AIS prevention strategies    AIS monitoring    AIS economic impacts  
 AIS & aquaculture operations    AIS general    ballast water    local/state/federal regulations  
 Other: \_\_\_\_\_

**Target audience:**  
 general public    youth    recreational boaters    anglers    bait shops  
 aquarium shops    educators    elected officials    commercial vessels/maritime interests  
 marinas & boat launches    local governments/agencies    state/federal agencies  
 Other: \_\_\_\_\_

**Format:**  
 brochure/pamphlet    newsletter    sign/poster    presentation/slide show    report  
 white paper    video    public service announcement    classroom/curriculum material  
 Web site (URL: \_\_\_\_\_)  
 Other: \_\_\_\_\_

**Geographic coverage:**  
 Oregon    Washington    California    Montana    Idaho    Utah  
 Arizona    Nevada    Colorado    North Dakota    South Dakota  
 Pacific Northwest    National    International    Other: \_\_\_\_\_

**Brief description:** \_\_\_\_\_

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**Please submit this form and a copy of each ANS information/education product to:**

Diane Kightlinger  
 Center for Lakes & Reservoirs/ESR  
 Portland State University  
 PO Box 751  
 Portland, OR 97207-0751

Can the product be downloaded from the Web?    Yes  
 URL: \_\_\_\_\_

**For further information contact Diane Kightlinger at  
 503-288-2095 or [dianek@pdx.edu](mailto:dianek@pdx.edu)**

## CHAPTER 9. STRATEGY

### AUDIENCES, MESSAGES, AND CHANNELS

The purpose of this strategy is to provide a starting point for education/outreach (E/O) efforts on aquatic invasive species (AIS) among stakeholders in Oregon. The strategy outlines the following:

- Goals (presented to the Oregon Invasive Species Council at the 25 September 2003 meeting)
- Target audiences (identified in Chapter 7)
- Pathways of introduction: The description of pathways relies heavily on *Pathways of Aquatic Introductions* (Washington Sea Grant 2001).
- Actions desired: The hoped-for result, from raising awareness to maintaining behavior (see Table 1)
- Current status of audience and E/O activities targeted at them: The current status listed here is my judgment of where the audience stands on the continuum from awareness to action for AIS issues based on discussions with audience members, experts on the group, and available E/O activities and materials. My preliminary assessment of the audience should in no way substitute for further efforts to define the audience using secondary research, informal information gathering, in-depth interviews, observations, focus groups, knowledge, attitude, and practice surveys, intercept surveys, and databases.
- Proposed activities: Activities listed here may have worked in other locations or for other projects, may be planned by agencies and organizations working in Oregon, or may be recognized as needed to fill a void in E/O materials or activities for a specific audience. Listing of an activity in this section does not eliminate the need for further assessment of its effectiveness using the implementation form presented in Chapter 11.

Note that in some cases, the activities listed are not specifically E/O activities but considered necessary nonetheless if E/O activities are to be successful. One example is the development of more uniform ballast water exchange and reporting requirements among West Coast states and British Columbia.

In other cases, activities listed are needed to prepare for E/O activities, if needed. An example is an evaluation of the impact of dredging operations on invasive species introduction and spread to determine if E/O activities to raise awareness of AIS impacts and preventive measures are necessary.

- Contacts who provided information on the target audience or who are among those who should be consulted before activities are implemented.

**Goal 1: To prevent the unintentional introduction and spread of AIS into, within, and from Oregon's waters by implementing E/O activities targeted at a variety of audiences.**

**Problem:** *The unintentional introduction and spread of AIS from a variety of sources cause major environmental, economic, and social and health impacts to Oregon and the region.*

## COMMERCIAL SHIPPERS AND DREDGERS

**Pathway:** The discharge of ballast water represents a major pathway for introduction of AIS because of the huge volume of water carried and the plants, animals, and pathogens that it may contain. Fouling of vessel hulls by encrusting organisms also provides a mechanism for invasive species transfer. In addition, dredging operations can result in movement on invasive species to new locations. Ballast water exchange can limit the risk of AIS introduction from commercial vessels.

### **Actions desired:**

- All commercial vessels entering Oregon water comply with the U.S. Coast Guard voluntary exchange program and Oregon state regulations to prevent the introduction and spread of AIS.
- All vessels effectively manage hull fouling to reduce invasion risk.
- All commercial and government dredge operators practice measures to prevent the introduction and spread of AIS.

### **Current status:**

- The U.S. Coast Guard currently provides ballast water management guidelines and requires the reporting of ballast water management data for all vessels entering U.S. waters from outside the Exclusive Economic Zone. Along the West Coast of the United States, compliance is voluntary, but the U.S. Coast Guard is developing mandatory rules.
- Most commercial shippers are probably aware of Oregon ballast water regulations and many comply with them. Dredgers are probably either unaware of AIS problems or of the preventive measures they can take.
- A report on the Oregon Ballast Water Management Program for the first 10 months of 2002 showed that 95 percent of transoceanic vessels complied with mid-ocean exchange requirements but only 60 percent of coastal vessels complied with coastal exchange requirements (Vinograd and Sytsma 2002). A more uniform policy among West Coast states and British Columbia would support compliance with coastal exchange requirements.
- The West Coast Ballast Outreach Project sponsored by California Sea Grant has produced the "Stop Ballast Water Invasions" poster and brochure aimed at informing shippers about the AIS problem on the West Coast, its causes, risks for introducing and spreading AIS, ballast water practices to reduce the risk, regulations on ballast water exchange in Oregon, Washington, and California, and consequences of noncompliance. The brochure and poster will be reprinted in 2004 but without information on ballast water regulations in each state.
- Oregon DEQ has developed fact sheets on Oregon ballast water management and reporting that provide specific instructions to owners, operators, and agents.
- The state of Washington has issued a ballast water brochure that explains how to comply with Washington ballast water laws, including management and control, reporting and sampling requirements, and contacts for further information.
- The U.S. Coast Guard has developed a brochure on ballast water management that applies to the West Coast as well as a video that can be used for outreach to the commercial vessel industry.
- In California, State Lands Commission inspectors board about 25 percent of vessels, and some ports provide materials to all of their tenants.

### **Activity:**

1. Develop an insert for the "Stop Ballast Water Invasions" brochure to inform commercial shipping operators and agents of relevant regulations in Oregon, Washington, and California, and penalties for noncompliance. Contact: Karen Hart McDowell.

*Note:* The "Stop Ballast Water Invasions" brochure was to be reprinted by late 2003 without these regulations, because numerous changes were expected over the next few years. A mechanism is therefore needed for informing commercial shipping operators and agents of current regulations.

2. Work with the shipping industry and port management staff to develop a distribution plan that ensures materials on ballast water management and reporting reach those who can take action, in a language

that they can understand, to increase compliance with transoceanic and, especially, coastal exchange requirements.

*Note:* In California, State Lands Commission inspectors board commercial vessels and provide operators with information on ballast water exchange and reporting requirements. Although at the same time they provide information on Oregon ballast water regulations, an effort should also be made to ensure commercial vessel operators and agents understand that the state of Oregon considers compliance of paramount importance. Also, Oregon and Washington need to work together to address Columbia River operators.

3. Offer a workshop for shipping agents and port personnel (perhaps in conjunction with a commercial shipping industry trade show on the West Coast) to explain ballast water exchange requirements on the West Coast, and to recruit help in distributing information to operators of commercial vessels and encouraging compliance.

*Note:* One key to encouraging compliance with ballast water exchange and reporting requirements is working with the industry on E/O. A united effort to provide industry representatives with information on ballast water requirements in California, Oregon, Washington, Alaska, and British Columbia could provide a powerful incentive for operators and agents, but policies to support the compliance message must be in place first.

4. Evaluate the impact of dredging operations on invasive species introduction and spread, and consider E/O activities for this audience.

*Note:* Further research is needed on dredging as a pathway for AIS introduction and spread. Although a generic message on AIS might be effective in raising awareness among commercial dredgers, more work needs to be done to define specific preventive actions that commercial dredgers can take. Again, Oregon and Washington need to work together to address Columbia River dredge operators.

**Recommended activity to support education/outreach:**

1. Support development of more uniform ballast water exchange and reporting requirements among West Coast states and British Columbia. Consider supporting EPA regulation of ballast water discharges.

*Note:* At present, the lack of uniformity in ballast water exchange and reporting requirements presents a barrier for commercial vessel operators in complying with coastal exchange requirements. In this instance, the policy needs to align more closely with the action desired.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	-	-
2	√	√	√	-	-
3	√	√	√	-	-
4	NA	NA	NA	NA	NA

**Contacts:**

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Karen Hart McDowell  
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[wylie.jack@deq.state.or.us](mailto:wylie.jack@deq.state.or.us)



## **AQUACULTURE OPERATORS, COMMERCIAL FISHERS, BAIT HARVESTERS**

**Pathway:** Species raised in aquaculture can lead to introduction of invasive plants, fish, invertebrates, parasites, and pathogens. At the same time, aquatic invasive species (AIS) can harm the aquaculture, commercial fishing, and bait harvesting industries.

### **Actions desired:**

- All aquaculture operators, commercial fishers, and live bait harvesters are aware of the potential harm to the environment from intentional and unintentional release of AIS and the potential economic impact on their operations from AIS in the environment.
- All aquaculture operators act to prevent the release of non-native animals (including cultured organisms), plants, parasites, and pathogens into Oregon waters.
- All aquaculture operators, commercial fishers, and bait harvesters monitor for AIS in Oregon waters.

### **Current status:**

- Aquaculture operators in Oregon are sensitive to the fact that most species they culture are non-native. Regulations governing aquaculture in Oregon are fairly strict, and aquaculture operators generally recognize their financial stake in preventing the introduction or spread of AIS. Aquaculture operators do not need to be trained in Hazard Analysis and Critical Control Points (HACCP), unless they are also involved in operations that affect food safety.
- Commercial fishers and live bait harvesters may be less aware than aquaculture operators of how AIS can interfere with the capture of their target species.
- Aquaculture operators, commercial fishers, and live bait harvesters must meet professional licensing and recertification requirements.
- The Pacific Coast Shellfish Growers Association (PCSGA), the primary industry organization for West Coast aquaculture operators, holds an annual conference; at the October 2003 conference, one session was devoted to invasive species issues, including ballast water, Spartina, European green crabs, and Japanese oyster drills. Other key aquaculture organizations include the Pacific Aquaculture Caucus ([www.pacaqua.org](http://www.pacaqua.org)); Washington Fish Growers Association ([www.wfga.net](http://www.wfga.net)); and California Aquaculture Association ([www.caa-aqua.org/home.htm](http://www.caa-aqua.org/home.htm)).

### **Activities:**

1. Include information on the impacts of AIS and the need for monitoring in the professional licensing and recertification processes for aquaculture operators, commercial fishers, and live bait harvesters.

*Note:* For aquaculture operators, this should serve as a reminder of the need to be vigilant about preventive measures for AIS (an Action or Maintenance step on the continuum). For commercial fishers and bait harvesters, this should serve as an awareness-building mechanism on AIS (a boost from Precontemplation or Contemplation on the continuum).

2. Work with the PCSGA to develop monitoring materials targeted for aquaculture operators and others who make their living in Oregon's waters. Contact: Robin Downey.

*Note:* The PCSGA is already engaged in invasive species education/outreach and will serve as an excellent industry resource for further activities; however, not all aquaculture operators belong to the PCSGA, so consideration must be given to channels for reaching other aquaculture operators.

3. Work with the Pacific Marine Conservation Council to develop activities on AIS specifically targeted for commercial fishers and bait harvesters.

*Note:* Working through industry organizations should provide one effective channel for reaching this audience given the impact that AIS could have on their livelihood. These organizations may not yet be engaged in AIS E/O, but they could play a role as protectors of the fisheries resource.

4. Offer a workshop or HACCP training for aquaculture operators, commercial fishers, and bait harvesters to familiarize them with AIS in Oregon coastal waters and educate them on monitoring and prevention.

*Note:* Involving government agencies, industry associations, and private organizations in developing workshops or HACCP training for these groups should move them beyond awareness and encourage monitoring activities.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	-	-
2	-	-	√	√	√
3	√	√	√		
4	√	√	√	√	-

**Contacts:**

**Primary Contact:**

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John Faudskar  
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## LIVE SEAFOOD RETAILERS, BAIT DEALERS, CONSUMERS

**Pathway:** Packing materials for live seafood and bait, such as seaweed and seawater, contain living organisms that can be introduced when unused product, packing materials, and shipping containers are disposed of improperly. Live organisms in or on live seafood or bait also pose a threat, as does release of the animal itself, either intentionally or accidentally.

### **Actions desired:**

- All live seafood retailers and bait dealers monitor product, packing materials, and shipping containers for AIS.
- All live seafood retailers and bait dealers act to prevent the release of live organisms into the ecosystem caused by improper disposal of unused product, packing materials, and shipping containers.
- All consumers of live seafood or bait are aware of the potential harm to the environment from intentional and unintentional release of live organisms and never release animals into the environment.

### **Current status:**

- The risks of introductions through the live seafood and bait trades remains poorly resolved, but a number of species have been released worldwide and have colonized new areas (Chapman, Miller, and Coan 2003).
- Live seafood retailers and bait dealers may not be aware of 1) which species can and cannot legally be sold in Oregon; 2) how the species they sell, as well as accompanying plants, parasites, and pathogens, can impact the environment; and 3) how they can prevent their introduction and spread.
- Consumers may not be aware of 1) which species they can legally buy in Oregon; and 2) the potential harm to the environment from the release of non-native species.
- Many live seafood retailers and consumers in Oregon are ethnic Asians who would like to obtain the species they consumed in their native countries, have difficulty reading English, and do not understand the potential legal, financial, environmental, or health impacts of importing invasive species.
- The Washington Department of Fish & Wildlife (WDFW) and the Puget Sound Water Quality Action Team (PSWQAT) have created brochures in several languages to inform live seafood retailers of four species prohibited for live import: snakehead fish, Chinese mitten crab, Asian carp, and Chinese water chestnut. They have contracted with Asian service centers to distribute the brochure and inform live seafood retailers of its contents.

### **Activities:**

1. Develop a brochure for live seafood dealers and consumers in several languages that covers species prohibited for live import in Oregon, especially those that may be invasive; penalties for importing prohibited species; potential environmental, economic, and health impacts; and procedures if these species are found. Carefully consider how best to distribute the brochure to maximize understanding of and compliance with the contents.

**Note:** Building on the previous work of the WDFW and PSWQAT should facilitate development of brochures for live seafood retailers and consumers in Oregon. I believe the key is distribution: Asian retailers and consumers will more likely respond to an AIS prevention message if it is presented by a trusted and credible source, such as an Asian service center.

2. Develop articles for Asian-language or Asian-focus publications (such as *The Asian Reporter* in Oregon) with information similar to that contained in the brochures above.

**Note:** Reaching out to Asian consumers in publications targeted for them and considered an informative and reliable source will lend credibility to the AIS message.

3. Provide information to live seafood retailers and bait dealers on proper disposal of products, packing materials, and shipping containers; alternatives to seaweed and seawater as packing materials; and other measures that prevent the introduction and spread of AIS.

*Note:* Research shows that improper disposal of products or packaging can result in introduction and spread of live seafood or bait. Live seafood retailers and bait dealers may not be aware of AIS or preventive measures, such as using alternative packing materials (e.g., shredded newspaper instead of seaweed). These actions should make a major difference in the AIS risk associated with live seafood and bait.

4. Offer a workshop or HACCP training for live seafood retailers and bait dealers to familiarize them with AIS issues and educate them on monitoring and prevention.

*Note:* Involving government agencies, industry associations, and Asian service centers (as appropriate) in develop HACCP training should prove most effective in reaching this audience.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	-	-
2	√	√	√	-	-
3	-	-	√	√	√
4	-	√	√	√	-

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## **AQUARIUM TRADE, AQUARIUM HOBBYISTS, LABORATORIES, AND EDUCATIONAL FACILITIES**

**Pathway:** Wholesale importers, culture facilities, and retail aquarium and pet stores transport and sell non-native fresh and saltwater fish, invertebrates, and plants. When specimens escape or are released into the natural system by industry members or consumers, they can become invasive species in their new ecosystem. Laboratory and educational facilities work with live specimens that could be released into the natural system without proper handling.

### **Actions desired:**

- All members of the aquarium and pet trade, laboratories, and educational facilities act to prevent the release of specimens into the ecosystem.
- All members of the aquarium and pet trade inform the public about the potential for invasiveness associated with aquarium specimens and proper means of disposal.
- All aquarium hobbyists are aware of the potential harm to the environment from intentional and unintentional release of specimens and properly dispose of specimens.

### **Current status:**

- Worldwide many species have been introduced through this pathway and have colonized new areas.
- Aquarium and pet retailers may not be aware of which species can and cannot legally be sold in Oregon, and which have the potential to be invasive if released in Oregon.
- Consumers may not be aware of which species they can legally buy in Oregon, and the potential harm to the environment from the release of non-native species. In addition, illegal species may be entering Oregon via Internet sales to aquarium hobbyists.
- A Washington Sea Grant pet store card and Massachusetts Bays Program brochure both explain problems associated with dumping live aquarium animals and offer alternatives. The Washington Sea Grant booklet "Handling and disposal of non-native aquatic species and their packaging" helps educational, research, and testing facilities prevent unintentional introductions.
- A key to any effort to encourage proper disposal of aquarium specimens is developing non-lethal means, such as returns to retailers and placement through animal shelters.
- The Pet Industry Joint Advisory Committee (PIJAC, a pet industry lobbying group), U.S. Fish & Wildlife Service, and Sea Grant collaborated on a grant to fund a campaign targeting the aquarium trade. Marshall Meyers, longtime lobbyist for PIJAC, agreed to support a campaign similar to the "Stop Aquatic Hitchhikers" campaign. The goal is to develop a branded public awareness campaign that targets aquarium hobbyists primarily and also aquarium trade retailers. The program will be stepped down to four states (unfortunately not Oregon) for evaluation. Resources will be made available on the Web.
- The Hatfield Marine Science Center began offering an Aquarium Science Program in Fall 2003.

### **Activities:**

1. Compile a "Prohibited Species List" based on the ODFW Wildlife Integrity Rules and ODA Noxious Weed List that identifies AIS not legal for sale in Oregon in preparation for activity #4.

**Note:** Although existing lists identify prohibited species, they require knowledge that many retailers and hobbyists simply do not have. Prohibited species information needs to be presented in a way that will be effective as an educational and reference tool.

2. Work with the aquarium and pet trade, aquarium hobbyist groups, and animal control/rights organizations to develop methods that allow non-lethal disposal of unwanted aquarium specimens (similar to the humane society for dogs and cats) or ethically acceptable euthanasia.

**Note:** As mentioned above, one of the major barriers for individuals who want to dispose of aquarium specimens properly is a non-lethal means for doing so.

3. Work with OSG to provide information on proper disposal of unwanted aquarium specimens.

*Note:* OSG veterinarian Tim Miller-Morgan provides information for aquarium retailers and hobbyists, but little or no mention is made of proper disposal of aquarium specimens. As a credible source for information, Miller-Morgan could be instrumental in getting out the message on AIS preventive measures that aquarium retailers and hobbyists can take.

4. Leverage the national effort being developed by U.S. Fish & Wildlife Service, National Sea Grant, and PIJAC to address the aquarium and pet trade in Oregon. This campaign will include strategies to encourage aquarium and pet retailers to use point-of-sale materials to educate consumers about the importance of keeping AIS out of the natural system. Contact: Joe Starinchak.

*Note:* The group working on the branded campaign for pet retailers and hobbyists has enlisted the help of professional marketers to develop and evaluate the campaign elements in a variety of settings. The OISC should take advantage of the industry and agency support and resources devoted to this branded campaign and align Oregon’s efforts with the national activity.

5. Develop materials or activities with a theme such as “Oregon Friendly” to encourage purchases only of aquarium specimens that are legal and not damaging to ecosystems in Oregon.

*Note:* Any effort to encourage pet owners and aquarium hobbyists to scrutinize their purchases must be conducted with the support of the pet industry. Given the nature of the Internet, a national effort may be needed to effectively combat Internet sales of prohibited species.

6. Distribute the Washington Sea Grant booklet “Handling and disposal of non-native aquatic species and their packaging” to educational, research, and testing facilities in Oregon.

*Note:* This booklet provides excellent information and resources on AIS, their introduction and impacts, assessing facilities and operations, and effective preventive measures. With an appropriate cover letter, it should be an effective piece to build awareness of AIS issues, encourage action, and promote preventive measures.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	NA	NA	NA	NA	NA
2	NA	NA	NA	NA	NA
3	√	√	√	-	-
4	√	√	√	-	-
5	√	√	√	-	-
6	√	√	√	-	-

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## **PLANT WHOLESALERS, NURSERIES, LANDSCAPERS, WATER GARDENERS, SHORELINE RESTORERS**

**Pathway:** Non-native plants sold through nurseries, garden centers, and mail-order catalogs for aquatic gardens, ponds, and shoreline restoration can be introduced into public waterways when improperly discarded or when accidentally attached to other horticultural species.

### **Actions desired:**

- All plant wholesalers and nurseries act to prevent horticultural species from being discarded improperly or included accidentally in consumer and other purchases.
- All plant wholesalers and nurseries inform the public about potential for invasiveness associated with garden species and the importance of keeping them out of the natural system.
- All plant wholesalers and nurseries work to develop suitable noninvasive alternatives for the gardening public to purchase and use, and to phase out existing stock of agreed-upon invasive species.
- All landscapers consider potential for invasiveness when recommending species for installations; all shoreline restorers use only native and/or noninvasive exotic plants for installations.
- All water gardeners understand the potential harm to the environment from intentional and unintentional release of nursery specimens and control non-native species on their property.

### **Current Status:**

- A national effort is under way to encourage nurseries to implement a code of conduct in which they introduce cultivars in a manner that would limit harm; work toward national standards to prevent and manage plant invasions; foster research; and inform the public about risks associated with species.
- In Minnesota, Michigan, and Wisconsin, state agency staff, nursery and landscaping industry representatives, water gardening enthusiasts, and shoreline property owners are working together to develop an education model to prevent the spread of invasive aquatic plants.
- Several publications on invasive aquatic plants are available, including a four-page brochure developed by Illinois-Indiana Sea Grant for plant enthusiasts and two fact sheets from Minnesota Department of Natural Resources, one for water gardeners and shoreline restorers, another for plant sellers.
- The Oklahoma Department of Wildlife Conservation has developed a foldable, two-sided poster that provides descriptions, habitat, reproduction, problems, and photos for 22 species of noxious weeds and also recommends native species that can be used instead for landscaping.
- OktoberPest, weekly workshops coordinated by Robin Rosetta of the North Willamette Research & Extension Center, included a session that focused on invasive species in 2003.
- Nursery operators may not be aware of which species can and cannot legally be sold in Oregon, and which species have the potential to be invasive if released in Oregon.
- Nursery operators, landscapers, and shoreline restorers must meet professional licensing and recertification requirements.
- Consumers may not be aware of which species they can legally buy in Oregon, and the potential harm to the environment from the release of plants, because they could potentially be invasive. Note: The nursery industry is understandably sensitive about negative messages about non-native plants, in particular, which could be invasive but are not yet known to be. Unfortunately, the invasibility of an organism is often not recognized until environmental damage has occurred – in other words, until it's too late to prevent the invasion. My position is that consumers need to take precautions to avoid releasing any plant into the environment, whether native or non-native, and whether known to be invasive or not.

### **Activities:**

1. Compile a "Prohibited Species List" based on the ODA Noxious Weed List and ODFW Wildlife Integrity Rules that identifies AIS not legal for sale in Oregon AIS that may be part of the nursery, landscaping, and shoreline restoration trade in Oregon in preparation for activity #6.

**Note:** Although existing lists identify prohibited species, they require knowledge that many wholesalers, retailers, landscapers, restorers, and gardeners do not have. Prohibited species information needs to be presented in a way that will be effective as an educational and reference tool.

One possibility is a CD compendium of all plants that are known to be invasive somewhere but that are often sold in the nursery industry. Mandy Tu of TNC of Oregon has discussed this idea with a representative of the Oregon Association of Nurseries (OAN). Such a publication would require significant work and funding to produce.

2. Work to coordinate prohibited species lists among Western states.

Given the ease of transferring plants across state borders, coordinating prohibited species lists among Western states could prevent invasive species introductions.

3. Include information on AIS as part of the professional licensing and re-certification materials for nursery operators, landscapers, and shoreline restorers.

*Note:* This activity can serve as a basic awareness-building mechanism, on which other activities can build. Almost all plant wholesalers, retailers, landscapers, and shoreline restorers need to be licensed or certified, so this provides a streamlined way to reach individuals who do not participate in industry associations or attend trade shows.

4. Provide information on native or non-invasive exotic alternatives to invasive plants for nursery operators, landscapers, shoreline restorers, and water gardeners.

*Note:* As mentioned above, the Oklahoma Department of Wildlife Conservation has developed an excellent poster that discusses aspects of 22 species of prohibited aquatic plants, aids in identification, and suggests alternatives. The nursery industry will be more likely to support E/O efforts that encourage sales of noninvasive alternatives with “Oregon friendly” labeling in addition to discouraging sales of potentially invasive plants.

5. Encourage compliance with the voluntary code of conduct for nurseries and botanical gardens.

*Note:* Mandy Tu of TNC of Oregon is spearheading the drive to encourage adoption of the code of conduct in Oregon. A key element addresses preventing and managing plant invasions.

6. Leverage the educational effort being developed in Minnesota, Michigan, and Wisconsin to prevent new introductions of invasive aquatic plants from water gardening and shoreline restoration.

*Note:* The group working on the campaign for aquatic invasive plants hopes to leverage the professional marketing work done for the aquarium species campaign. (See more information on that campaign in the preceding section addressing aquarium hobbyists and retailers.) The OISC should take advantage of the industry and agency support and resources devoted to the campaign in Minnesota, Michigan, and Wisconsin, and align Oregon’s efforts with this multi-state activity.

7. Develop displays, presentations, and supporting materials for nurseries, landscapers, and shoreline restorers that inform them about the spread of invasive aquatic plants and their role in prevention.

*Note:* a potentially effective venue for reaching these audiences is at professional trade shows, both on the floor and in educational seminars.

8. Develop displays, presentations, and supporting materials for water gardeners, naturoscapers, master gardeners, and garden clubs that informs them about the spread of invasive aquatic plants and their role in prevention.

*Note:* A potentially effective venue for reaching these audiences is at home and garden trade shows, both on the floor and in educational seminars.



**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	NA	NA	NA	NA	NA
2	NA	NA	NA	NA	NA
3	√	√	√	-	-
4	-	-	√	√	√
5	-	√	√	√	√
6	√	√	√	-	-
7	√	√	√	-	-
8	√	√	√	-	-

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## **BOATERS, MARINA AND BOAT LAUNCH OPERATORS**

**Pathway:** Boaters and anglers transport AIS in bait buckets or boat wells, boat propellers, trailers, and fishing gear. Marina and boat launch operators may spread AIS through careless actions.

### **Actions desired:**

- All of the 197,000 registered boat owners in Oregon inspect their boats for animals, plants, and other organisms before they launch and before they leave.
- All of the 500,000 canoe, kayak, raft, drift boat, and owners of unregistered watercraft inspect their craft for animals, plants, and other organisms before they launch and before they leave.
- All watercraft users monitor for AIS in Oregon waters.
- All public boat ramps in Oregon have signs posted on AIS and preventive measures.
- Marina and boat launch operators monitor for AIS, act to prevent introduction and spread of AIS, and communicate with the public about actions to prevent the introduction and spread of AIS.

### **Current Status:**

- Although many boaters and marina and boat launch operators may be aware of AIS, they may not 1) realize that they can take preventive measures, or 2) know how to protect their property and the ecosystem.
- Numerous states and the “Protect Your Waters” campaign ([www.protectyourwaters.net](http://www.protectyourwaters.net)) provide information to water recreationists on the importance of inspecting their boats and equipment before launching and before leaving a waterway to prevent introduction or spread of AIS into other waterways.
- The Oregon State Marine Board (OSMB) provides information on boat inspections and AIS in information cards, newsletters, a before/after brochure, and a Web site. OSMB also planned to issue an RFP in 2003 to develop a Safe & Sustainable boating campaign, which includes educating boaters on AIS and clean boating practices to help prevent their spread.
- Few boat launches in Oregon have signs warning recreationists that they can introduce and spread AIS if they do not take proper precautions before launching in or leaving a waterway.
- The Center for Lakes and Reservoirs at Portland State University, in conjunction with the Minnesota Center for Survey Research and the states of Wisconsin and Michigan, conducted a mail survey of 800 boaters in 2003 to 1) establish a baseline for knowledge, attitudes, and practices about AIS among Oregon boaters, and 2) allow for future evaluation of the effectiveness of boater education in changing awareness of AIS and boating practices. (Chapter 10 provides further information.)
- The 100<sup>th</sup> Meridian Initiative has developed traveler information system (TIS) advertisements on AIS and clean boating targeted at tourists following the Missouri, Snake, and Columbia Rivers as part of the bicentennial of the Lewis & Clark Expedition in 2004-2006.

### **Activities:**

1. Analyze results of the Oregon boater survey on knowledge, attitudes, and practices related to AIS.  
Contact: Rossana Armson.

*Note:* The survey results should provide insight into the boating audience, effective messages, and channels, and serve as the basis for further AIS E/O activities targeted for boaters.

2. Coordinate with the OSMB’s “Safe and Sustainable” campaign to educate boaters about AIS and practices that will prevent their introduction and spread in Oregon waters. Contact: Randy Henry.

*Note:* OSMB is the premier source of information on boaters in Oregon and effective messages and channels to use when communicating with them. AIS E/O activities geared for boaters should complement OSMB’s efforts and be part of a cohesive effort to inform boaters about AIS and preventive measures.

3. Include information on AIS, monitoring, and preventive measures in safe boating courses, boater registration materials, watercraft examinations, boat owner manuals, boat and sport show displays, fishing regulations, and fishing contests.

*Note:* Numerous channels exist for communicating with operators of all kinds of watercraft about AIS and preventive measures. Communications should use a clear, concise, consistent message that raises awareness, encourages action, and identifies a few simple actions that boaters can perform.

4. Evaluate the effectiveness of providing information on AIS and clean boating practices through TIS.

*Note:* Although the 100<sup>th</sup> Meridian Initiative has used TIS to inform boaters about AIS and preventive measures, little information is available on the effectiveness of this channel.

5. Increase awareness of AIS, monitoring, and clean boating practices through signs at marinas and boat launches.

*Note:* Signs at boat launches on AIS and preventive measures serve as a reminder for watercraft owners, but signs alone are not enough. A key is to also use other means to build awareness of AIS, negative impacts, and the need for boaters to take action. In states that have conducted KAP surveys over the past decade, boaters cited the best sources for informing them about AIS as newspaper and magazine articles and TV spots; boating and fishing regulations; signs at boat launches; and watercraft inspection/education programs. More information on the channels boaters in Oregon think will be most effective will be available after the Oregon boater survey results are analyzed.

6. Conduct boat inspection demonstrations on weekends during the boating season to show boaters how to inspect their craft for AIS and effectively remove them. Demonstrators could also seek a commitment from boaters to inspect their boats every time they launch in or leave a water body.

*Note:* Social marketing research shows that personal contact with individuals providing information, hands-on activities, and oral and written commitments to take action all usually prove more effective than written materials in prompting people to change their behavior (McKenzie-Mohr and Smith 1999).

7. Provide AIS information to marine dealers, marina and boat launch operators, and tourism operators for their own use and their customers.

*Note:* Bill Zook, a consultant with Pacific States Marine Fisheries Commission, found these groups quite interested in AIS, impacts, and preventive measures when he visited marina and boating facilities along the Missouri River (Zook 2002). Again, personal contact proved effective, but these groups should also be recruited to communicate the message about AIS and preventive measures along to their customers.

***Classification of activities according to stages from precontemplation to maintenance:***

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	NA	NA	NA	NA	NA
2	√	√	√	-	-
3	√	√	√	-	-
4	NA	NA	NA	NA	NA
5	-	√	√	√	√
6	-	√	√	√	√
7	√	√	√	-	-

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## ANGLERS AND HUNTERS (NOT USING BOATS)

**Pathway:** Anglers transport AIS in nets, fishing rods, reels, and lines, lures, creels, buckets, boots/shoes/waders, props, wading sticks, and other items used in and around the water. Hunters transport AIS via waders, dogs, decoys, and other equipment used in and around the water.

### **Actions desired:**

- All anglers and hunters are aware that they can carry AIS from one water body to another and take proper precautions to ensure that they do not introduce or spread AIS.
- All anglers and hunters monitor for AIS in Oregon waters.
- Fishing and hunting outfitters monitor for AIS, act to prevent introduction and spread of AIS, and communicate with their clients about actions to prevent the introduction and spread of AIS.
- All hunting and fishing clubs and Web sites inform members and users about AIS and preventive measures.

### **Current Status:**

- The “Protect Your Waters” campaign ([www.protectyourwaters.net](http://www.protectyourwaters.net)) provides information to water recreationists on preventive steps they can take to ensure they do not introduce or spread AIS.
- Most information on transport of AIS focuses on boat owners, with little targeted at anglers, hunters, or other recreationists who do not use boats.
- Few boat launches in Oregon have signs warning recreationists that they can introduce and spread AIS if they do not take proper precautions.
- Although many anglers and hunters may be aware of AIS, they may not 1) realize that they can take preventive measures, or 2) know how to protect their property and the ecosystem.

### **Activities:**

1. Include information on AIS and preventive measures in fishing and hunting regulations, licensing materials, sport show displays, sporting good stores, contests, magazines, newsletters, Web sites, forecasts, and presentations to organizations such as Trout Unlimited and Ducks Unlimited.

*Note:* Numerous channels exist for communicating with anglers and hunters about AIS and preventive measures. Communications should use a clear, concise, consistent message that raises awareness, encourages action, and identifies a few simple actions that anglers and hunters can perform.

2. Post signs at water access points to encourage anglers and hunters to take measures to prevent the transport of AIS.

*Note:* For more information on posting signs at water access points, see the previous section on E/O activities for boaters.

3. Provide AIS information to fishing and hunting outfitters and tourism operators for their own use and their customers.

*Note:* As groups whose livelihood depends on Oregon’s natural resources, all should be interested in preventing AIS invasions and their negative impacts. Effective channels for communicating with these groups could include face-to-face contact, industry trade shows, workshops, and publications.

### **Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	-	-
2	-	-	√	√	√
3	√	√	√	-	-

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## WATER AND POWER FACILITY OPERATORS

**Pathway:** Water and power facility personnel may spread AIS through careless actions.

### **Actions desired:**

- All water and power facility personnel are aware of AIS impacts, can identify AIS both in their region and outside it that are likely to infiltrate their facility, monitor for AIS, recognize the need to call the Invasive Species Hotline about species they cannot identify, take action to prevent introduction and spread of AIS, and communicate with their customers about the negative impacts of AIS and the actions they can take to prevent their introduction and spread.

### **Current Status:**

- In areas where water and power facilities spend enormous sums to prevent and control AIS, training and educating personnel is crucial. In Oregon, where dams, irrigation facilities, power plants, and water providers have suffered few damages from AIS thus far, personnel may not be aware of the potential impacts of AIS or the need for constant monitoring.

### **Activities:**

1. Work with water and power industry groups to develop activities on AIS specifically targeted for water and power facility personnel.

*Note:* Working through industry organizations should provide an effective channel for reaching these audiences given the potentially devastating financial impact of AIS such as zebra mussels.

2. Develop a presentation and supporting materials on AIS for water and power facility personnel in Oregon that informs them of AIS impacts and the preventive measures they can take, helps them identify local species of concern, and encourages them to monitor for AIS.

*Note:* The outreach activity for water and power facility personnel can borrow heavily from material provided to nature resource personnel and environmental organization staff. This should include an emphasis on monitoring for AIS and calling the Invasive Species Hotline when an unidentified species is found.

### **Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	-	-
2	√	√	√	√	-

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## NATURAL RESOURCE PERSONNEL AND ENVIRONMENTAL ORGANIZATION STAFF

**Pathway:** Natural resource personnel and environmental organization staff can be significant vectors of AIS introduction and spread through routine conservation activities.

### **Actions desired:**

- All natural resource personnel and environmental organization staff are aware of AIS impacts, can identify AIS both in their region and outside it that pose a risk to Oregon, routinely monitor for AIS, recognize the need to call the Invasive Species Hotline about species they cannot identify, and take actions to prevent the introduction and spread of AIS.
- All natural resource personnel and environmental organization staff regularly communicate with Oregonians about the negative impacts of AIS and the actions citizens can take to prevent their introduction and spread.

### **Current Status:**

- Many natural resource personnel and environmental organization staff are aware of AIS and their impacts but may not be able to identify species threatening Oregon, monitor for them on a routine basis, or engage in practices to prevent their introduction and spread.
- The US Fish and Wildlife Service is vigorously promoting HACCP training. They are developing a regional priority plan that will require every national fish hatchery within the region to have a HACCP plan within the next three years. States and tribes may also be encouraged to develop HACCP plans for their hatcheries.
- The videotape “You Ought To Tell Somebody” was designed specifically for this target audience and is available to train this audience and encourage monitoring activities.
- Work is under way on an identification guide for mussels.

### **Activities:**

1. Support legislation, a governor’s proclamation, or executive order in Oregon similar to Executive Order 13112, which directs federal agencies to prevent the spread of invasive species in their work. Include access to management tools to help implement the directive.

*Note:* Implementing this activity will require considerable cooperation of state agencies, especially DEQ, ODA, and ODFW. City and county agencies should also be encouraged to prevent the spread of invasive species in their work.

2. Provide a workshop or HACCP training for natural resource personnel and environmental organization staff to help them understand pathways of AIS introduction and pathway management planning as a tool to prevent the spread of AIS.

*Note:* Workshops and training for these audiences should also stress monitoring, calling the Invasive Species hotline when an unidentified species is found, and communicating with the public about AIS and preventive measures.

3. Provide an identification guide on AIS that natural resource personnel and environmental organization staff can use to identify species in the field; include information on risks and preventive measures.

*Note:* Various guides to weeds and pests in Oregon already exist, so careful consideration should be given to what type of product would prove most useful. The product would most likely need to cover aquatic and terrestrial species, and plants, animals, and microorganisms all in one easy-to-use package.

4. Provide a monthly online newsletter (with e-mail notification of new issues) targeted for natural resource personnel and environmental organization staff that provides updates on AIS (and other invasive species) in Oregon, profiles threatening species, offers tips on preventing the introduction



and spread of invasive species in their work, and gives information on helping the public understand AIS issues and their role in prevention.

*Note:* A regular publication should help maintain the focus of these audiences on AIS and preventive measures. Producing the newsletter could be a combined effort of various state agencies and environmental organizations. A good starting point would be information on invasive species incidents and major occurrences elsewhere (similar to that contained in the Invasive Species in Oregon Report Card 2003), a “dirty dozen” list for each year that would profile invasive species of particular concern, and information on successful efforts to manage AIS and other invasive species through various activities, including E/O.

5. Develop and deliver training to natural resource and law enforcement personnel to increase their capacity for detecting illegal transport of AIS.

*Note:* This program could replicate similar training that has been conducted in Washington. The U.S. Fish and Wildlife Service will be able to fund this activity in 2004.

***Classification of activities according to stages from precontemplation to maintenance:***

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	NA	NA	NA	NA	NA
2	√	√	√	-	-
3	-	-	√	√	√
4	-	√	√	√	√
5	-	-	√	√	√

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## EDUCATORS

### **Actions desired:**

- All K-12 educators in Oregon schools raise awareness of AIS among school children by incorporating information about AIS in aquatic and environmental science curricula and associated state benchmarks.
- All environmental, science, and natural resource educators in Oregon raise awareness of AIS by incorporating information into materials and programs.

### **Current Status:**

- Few educators in Oregon, whether in schools or other settings, currently incorporate information about AIS in their materials and programs. Although Project WET (Water Education for Teachers) and other aquatic education curricula provides a variety of science-based, interdisciplinary activities and lesson plans on water for K-12 students, almost none deal with AIS.
- Regional educators currently lack a comprehensive tool for AIS education geared for both youth and adult audiences. Oregon Sea Grant's "The Case of the Wet Invaders" traveling trunk was designed to fill that need but has not yet been implemented.
- The Hatfield Marine Science Center (HMSC) will open an AIS exhibit called "Invasion of the Habitat Snatchers!" in Fall 2004. The goal is to increase understanding of how invasive species enter and affect new environments, the factors that influence an invader's success, and how people can help prevent future invasions. Meetings have been held with Sue McWilliams, education director for the High Desert Museum (HDM), about a possible display on AIS at that facility.
- A traveling display version of the HMSC exhibit may also be available for loan to other facilities. In addition, U.S. Fish & Wildlife Service is developing an ANS panel display focused on the West Coast.
- Aquatic Plant Management Society (APMS) has developed curriculum on invasive aquatic plants designed for grades 4 through 7.

### **Activities:**

1. Encourage and support implementation of the plans for "The Case of the Wet Invaders" traveling trunk and help educational institutions in Oregon incorporate the trunk in their programs.

*Note:* OSG is still working to fill the position vacated by Paul Heimowitz in 2003. Once that position is filled, the OISC should encourage OSG to make implementing "The Case of the Wet Invaders" a priority.

2. Work with HMSC to ensure unveiling of the "Invasion of the Habitat Snatchers!" exhibit gets the highest possible visibility among the public, press, and educators. Help develop traveling display versions of the HMSC exhibit for use at other facilities. Contact: Jon Luke.

*Note:* HMSC probably plans an unveiling of the exhibit, complete with attendance by public officials, press, and educators. The OISC should assist in any way necessary to raise visibility of this exhibit during the opening and afterward.

3. Consider developing a tabloid or other materials for K-12 students (similar to a tabloid developed by the Arizona Department of Game & Fish) that tie in with the HMSC exhibit and can be distributed to all schools throughout the state. Contact: Jon Luke.

*Note:* The Arizona Department of Game & Fish tabloid contained six panels, with two each devoted to K-4, 5-8, and 9-12 students. Unfortunately, many students in Oregon will not be able to visit the HMSC exhibit, but the same concepts presented in the exhibit could be communicated to them through words and games in a tabloid or other publication. Also the curriculum developed by the APMS could be put to use to target this audience.

4. Encourage continued incorporation of information on invasive species at the High Desert Museum and the possibility of a stronger focus on invasive species in revamped or new exhibits. Contact: Sue McWilliams.

*Note:* Thousands of people visit the HDM every year, making it a prime venue for informing Oregonians and others about AIS and preventive measures. Ideally the HDM would provide the same function in terms of invasive species for eastern Oregon that the HMSC does for western Oregon.

5. Encourage development of Project WET, Project Aquatic WILD, and other aquatic curricula related to AIS. Contact: Sue McWilliams.

*Note:* Project WET is one well-respected source for water education activities. More educators would have a tested plan available for teaching about AIS if the Project WET manual contained suitable activities.

6. Work with the Environmental Education Association of Oregon, Northwest Aquatic and Marine Educators, and Oregon Science Teachers Association to encourage members to incorporate information and materials on AIS in their programs. Deliver AIS-related presentations and trainings at annual conferences of these organizations. Develop a short program on AIS that can be used by environmental, science, and natural resource educators in Oregon to raise awareness of AIS issues, impacts, and prevention.

*Note:* In general, incorporating information and materials on AIS into existing programs will probably be most effective. For example, Oregon State Parks already conducts a program on the Snowy Plover that contains information on the invasive nature of European Beach Grass and its role in the decline of the Snowy Plover in Oregon. However, also developing a short program on AIS that can be adapted for various uses will make it easier for environmental, science, and natural resource educators to include AIS information in their programs.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	-	-	-
2	√	√	-	-	-
3	√	√	√	-	-
4	√	√	-	-	-
5	√	√	√		
6	√	√	√	√	√

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## NEWS MEDIA

### **Action desired:**

- Newspaper, magazine, radio, and television reporters responsible for covering relevant issues in the state of Oregon (e.g., environment, water quality, science, economy, health, gardening, pets) regularly report on AIS.
- The OISC is established as the credible, preferred source for information on AIS in Oregon and elsewhere.
- The OISC places at least one story or opinion piece on AIS each month and places stories in all major media markets, including newspapers, radio, and TV, each year.

### **Current status:**

- Media outlets in Oregon run stories on AIS for newsworthy events (e.g., information on New Zealand mud snails in *The Oregonian* "Science" section or on Diamond Lake on the front page) but fail to incorporate AIS into everyday features, such as lifestyle, pet, or gardening stories, or to include preventive measures in the information provided.
- Some media outlets, such as Oregon Field Guide, produce stories on a single aspect of AIS but generally do not include preventive actions that individuals can take.
- The OISC has not yet established itself as the preferred source for credible information on AIS in Oregon.
- The Pacific States Marine Fisheries Commission has developed a media kit on zebra mussels.

### **Activities:**

1. Develop a media list for newspaper, magazine, radio, and television outlets in Oregon and establish a mutually beneficial relationship with targeted individuals.

*Note:* Such a list could be developed with the help of ODA and TNC, among others. Contacts: Bruce Pokarney and Stephen Anderson.

2. Develop a media kit for the OISC featuring AIS issues. The kit should contain the information a media professional needs to put together a story, including a current press release, fact sheet with statistics and information on the AIS problem, background explaining progress to date, literature about the OISC, graphics or photographs that help tell the story, copies of past newspaper articles, list of experts or individuals affected by AIS, and biographies of key spokespersons.

*Note:* OISC members and associates can use the media kit as collateral material when meeting new media contacts or at briefings and as a way to enhance credibility for the OISC as a respected source for information on AIS.

3. Identify several spokespeople within the OISC, the OISC E/O subcommittee, and other organizations who can speak with the media on key AIS issues.

*Note:* Consider professional coaching or training for individuals who will be speaking regularly with the media on AIS to enhance credibility and promote a positive message about managing AIS.

4. Develop a campaign of press releases/story leads and photo opportunities on AIS that include the statewide paid and earned media campaign, trends in Oregon AIS, research findings at Oregon universities, local spins on national AIS news, AIS disasters waiting to happen, individuals working to combat AIS, AIS of local and regional concern, AIS impacts on humans and animals, and the OISC report card and awards. Also suggest AIS as discussion topics for radio talk shows and television programs. Work to ensure that preventive actions are included in each story.

*Note:* A planned campaign of press release and photo opportunities should be coordinated among major state and local agencies (e.g., ODA, OSMB, ODFW, DEQ) and environmental organizations (e.g., TNC, SOLV). Implementing this activity will require some delicacy to avoid running roughshod over the public

information officers and communication directors for these groups; however, a campaign that incorporates releases from a variety of sources that all focus on a different aspect of the same issue would provide a powerful message in and of itself and spread the burden of generating press releases and story ideas. This campaign of targeted releases should be coordinated with the statewide campaign on AIS, which uses both earned and paid media (see Chapter 5).

5. Develop a regular series of public service announcements on AIS that can be run by media outlets.

*Note:* Many media outlets will help nonprofit and government organizations publicize information about their issues in public service announcements (PSAs). Radio stations are most likely to use PSAs, followed by television stations, magazines, and newspapers. Other venues include grocery bags, movie theaters, company elevators, and billboards. PSAs can be revised regularly to focus on topics of current interest (e.g., choosing native plants or noninvasive exotics in spring, encouraging clean boating practices in summer).

Also, Oregon's creative community should be encouraged to get involved in message or PSA development and challenged to come up with compelling messages and spots that have an impact.

6. Give responsibility to OISC and OISC E/O subcommittee members to develop story ideas and place at least two stories per year on invasive species with media outlets. Members should also assist in media events, provide interviews for media as well as informational material, and develop relationships with local reporters.

*Note:* The OISC needs to be involved in media activities to generate a greater impact on media outlets across the state. Consider professional coaching or training for OISC members who will be speaking regularly with the media on AIS to enhance credibility and promote a positive message about managing AIS.

7. Develop a clipping file of stories run in media outlets.

*Note:* A clipping file can help to determine how well stories have "sold," to generate story ideas, and to identify new angles and markets for old stories.

8. Create a hierarchy of core messages to help guide all the disparate organizations involved in developing press releases, pitching stories to reporters, and serving as spokespersons to the media.

*Note:* Messages will have a greater impact the more consistent they are across stories and media. The stories that will appeal to this wide array of audiences will be extremely varied, but the basic messages need only be general, stressing the seriousness of the threat, the potential for harm, and the need for everyone to take action to make a difference.

9. Include a Press Room in the OISC Web site where media personnel can access press releases, fact sheets, news clips, photos, contacts, and other material that will help them develop stories.

*Note:* Media personnel should have immediate access to all the information needed to develop a story. The Web location of the Press Room should be listed on all materials intended for the media, including press kits and releases.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	-	-	-
2	√	√	√	-	-
3	NA	NA	NA	NA	NA
4	√	√	√	√	√
5	√	√	√	√	√
6	√	√	√	-	-
7	NA	NA	NA	NA	NA
8	√	√	√	-	-
9	-	-	-	√	√

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## WATERSHED COUNCILS

### **Actions desired:**

- All watershed councils understand AIS issues and impacts and can identify and monitor for local species of concern, incorporate AIS management into watershed restoration activities, and carry out effective strategies for long-term AIS control.
- All watershed councils raise public awareness of AIS by communicating about AIS impacts and preventive measures and incorporating AIS into events and programs.

### **Current Status:**

- Vanessa Howard of Portland State University and Laurel Hillman of Oregon State University have given presentations and packets of materials on AIS to coastal watershed councils. Other watershed councils may not be as familiar with AIS issues and impacts, or the role they can play in monitoring for AIS and raising public awareness.
- Almost all watershed councils are aware of invasive species and the problems they cause; however, they may not be aware of AIS specifically. Some watershed councils sponsor habitat restoration or weed-pull projects for volunteers but may not communicate about the broad range of invasive species, including AIS, and the actions people can take to prevent their introduction and spread.
- The Tenmile Lake Watershed Council has developed a proposal for a boat washing station at the lake. The station would be used prior to launching boats.
- Oregon Sea Grant is in the final stages of conducting a needs assessment for West Coast watershed groups that will document gaps in existing guidance materials and evaluate the existing capacity of these groups to detect, monitor, prevent, and/or control AIS. Oregon Sea Grant also recently received funding to implement recommendations resulting from the needs assessment via workshops, guidance materials, and other tools during 2004 and 2005.
- The Oregon Plan for Salmon and Watersheds and related Oregon Watershed Enhancement Board guidance documents and funding programs give little mention or emphasis to invasive species management outside of riparian/upland weed control.

### **Activities:**

1. Adapt the previous presentation and supporting materials to inform all watershed councils about AIS issues and impacts and the role watershed councils can play in monitoring and increasing public awareness.

*Note:* Presentations to watershed councils throughout Oregon should elevate the importance of the AIS issue and encourage the councils to take action to protect local watersheds.

2. Develop suggested AIS-related activities and supporting materials for water festivals and Watershed Weeks events.

*Note:* Watershed councils can have a significant effect on raising awareness of AIS through activities conducted in communities throughout Oregon.

3. Prepare press packets and guidance for watershed councils to use for local media contacts. Encourage councils to contact the media concerning AIS efforts.

*Note:* Watershed councils could be particularly effective in prompting local media to run stories on AIS, but this task will be made easier with the appropriate tools.

4. During 2004 and 2005, implement recommendations resulting from the watershed council needs assessment conducted by Oregon Sea Grant.

*Note:* The needs assessment and availability of funding to implement recommendations provides a tremendous opportunity for informing and training watershed councils to prevent and control AIS.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	√	√
2	-	-	√	√	√
3	-	-	√	√	√
4	-	√	√	√	√

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**Goal 2: Educate policy makers on the environmental, economic, and social impacts resulting from AIS infestation in Oregon and the need for regulations and funding to mitigate these impacts.**

***Problem:** Policy makers may not be aware of the negative impacts to the environment, economy, and health of Oregon that could result from the introduction and spread of AIS. As a result, the AIS issue may not be a priority with policy makers and they may not understand the need for regulations and funds to mitigate AIS impacts.*

## **POLICY MAKERS**

**Actions desired:**

- All policy makers in Oregon are aware of the negative impacts to the environment, economy, and health of Oregon that could result if the introduction and spread of AIS are not prevented.
- All policy makers in Oregon understand the need for changes in policy and sufficient funds for AIS management and E/O products and activities.

**Current Status:**

- In 2001, the Oregon legislature established the OISC and charged the council with a number of tasks related to invasive species in the state.
- The Oregon legislature established the Oregon Ballast Water Management Program in 2001 to address the introduction of AIS in ballast water from commercial vessels.
- Oregon legislators often serve limited terms, so turnover makes educating policy makers particularly challenging.
- State funding for AIS management and E/O efforts has historically been poor or nonexistent.
- The Oregon Aquatic Nuisance Species Management Plan (Hanson and Sytsma 2001) stated that “it is hard to elucidate the effects that species will have once they are introduced.” However, information on the impacts of AIS on the state of Oregon is crucial to focus policy makers’ attention on the issue.
- The Oregon Department of Agriculture has developed a report on the economic impact of invasive plants.

**Activities:**

1. Develop and provide best-information estimates of economic, environmental, and social and health impacts of all AIS of concern in Oregon.

*Note:* Information about the effects of AIS, particularly economic impacts, is critical to capture policy makers’ attention about this issue and encourage them to allocate resources.

2. Develop an informational brochure and/or fact sheets using concise, uncomplicated language and appropriate graphics to introduce policymakers to the magnitude and urgency of the AIS problem; the economic, environmental, social, and health aspects; current programs for prevention; and contacts.

*Note:* The states of Hawaii, Michigan, and Washington have all worked on similar projects to raise awareness among policy makers, media personnel, and educators. Providing solid information is, again, critical to help policy makers understand the import of the AIS issue.

3. Work with federal, state, and local agencies, educational institutions, environmental organizations, tribes, and others in Oregon to organize AIS Prevention Day in Salem in 2005. Provide legislators and staff with firsthand insight into AIS, the risks they pose, and preventive actions. Also develop a package of legislation supporting policy and regulatory changes re AIS to present at AIS Prevention Day.

*Note:* The state of Michigan held an ANS Prevention Day in 2002. Although successful, they also have noted problems that they would remedy if they held another similar event. For example, the legislature was not in session when ANS Prevention Day was held. We can certainly learn from their experience when planning AIS Prevention Day in Salem. Contact: Emily Finnell.

4. Identify key policy makers with special interest in AIS and invasive species in general, and with constituents who may suffer particular hardship due to AIS invasions.

*Note:* This activity will help identify allies and people sympathetic to the cause of raising awareness and providing resources to manage AIS. Constituents should be encouraged to contact the policy makers in their districts about AIS problems in their area, particularly if AIS impact their livelihood.

5. Consider offering a tour for selected legislators and staff to see impacts of invasive species in both Eastern and Western Oregon.

*Note:* The state of Washington ANS Management Plan includes a task in which Washington Sea Grant organizes a biennial field day for legislators and staff. The field day involved a trip to one or more infested sites, highlighting the problems caused by AIS and the actions required to eliminate or minimize the problem. A key part of the task is to present potential legislative solutions.

6. Conduct an invasive species assessment that expands on the summary in Table 3 and delineates Oregon's ability to address these species; funds being allocated to invasive species management and E/O; and future needs.

*Note:* Again, providing solid, well-researched information on AIS is critical to explaining the magnitude of the AIS problem to policy makers and others, and to encourage allocation of resources to deal with it.

**Classification of activities according to stages from precontemplation to maintenance:**

<b>Activity</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
1	√	√	√	-	-
2	√	√	√	-	-
3	√	√	√	√	-
4	NA	NA	NA	NA	NA
5	NA	NA	NA	NA	NA
6	NA	NA	NA	NA	NA

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### **Goal 3: Coordinate invasive species outreach and education efforts among agencies, institutions, and organizations in Oregon and the Western states.**

***Problem:** Agencies, institutions, and organizations involved with AIS education and outreach in Oregon may not be aware of each others' roles, responsibilities, activities, and plans, decreasing the effectiveness of the overall effort.*

## **COORDINATION AMONG STAKEHOLDERS**

### **Objective:**

- The OISC leads the E/O effort in Oregon. The OISC E/O Subcommittee informs the council of its activities through agenda items at meetings and minutes of its meetings with summaries attached.
- Individuals at federal, state, and local agencies, educational institutions, environmental organizations, tribes, and elsewhere who are interested in AIS management and E/O 1) are familiar with colleagues and their activities throughout Oregon, and 2) have a forum to propose strategies, discuss projects, receive feedback, find partners, and identify resources.
- Individuals in the Western states interested in E/O on AIS can easily access an inventory of existing products and activities relevant to Oregon and the Western states to avoid duplicating efforts, identify gaps in messaging, and develop new initiatives that will reach target audiences more effectively.

### **Current status:**

- The OISC held a meeting in Salem, Oregon, on 16 October 2003 which brought together 23 individuals from a variety of federal, state, and local agencies, educational institutions, environmental organizations, and elsewhere. The group formed the OISC E/O Subcommittee and expressed support for a statewide campaign on invasive species. A core group met on 18 December 2003 to discuss the statewide campaign and plans to present a proposal to the OISC. (See Chapter 5 and Appendix 2 for further information.)
- I carried out an inventory of E/O products and activities relevant to AIS in Oregon and the Western states in 2003 and developed a library and Microsoft Access database of approximately 120 products. (See **Error! Reference source not found.** for more information.)
- Mark Sytsma submitted a proposal to the Western Regional Panel of the ANS Task Force to make the database available online.
- One goal of the Western Regional Panel of the ANS Task Force is to coordinate ANS research in the Western states.

### **Activities:**

- Modify the OISC Web site to include a section for those interested in invasive species E/O. Provide a database of invasive species contacts for E/O and their roles, and a forum for exchanging information on invasive species E/O. Consider developing a monthly newsletter with updated information on invasive species E/O products and activities in Oregon.
- Publish a searchable online version of the AIS E/O inventory on the Portland State University server. Allow searches by topic, audience, format, and geographic coverage and include a digital image or Web address for each item.
- Host an Oregon AIS Symposium to discuss research, management, and E/O activities at least biannually.

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**Goal 4: Identify and acquire adequate resources to implement the OISC's education and outreach strategy for AIS.**

*Problem: The Oregon legislature has not provided funding for implementation of the E/O strategy for AIS.*

## **FUNDING**

**Objective:**

- Agencies, institutions, and organizations with responsibility to minimize AIS impacts in Oregon allocate financial resources and/or in-kind contributions for the OISC education and outreach strategy for AIS.

**Current Status:**

- The Center for Lakes & Reservoirs received funding through contracts and grants to implement the Oregon ANS Management Plan.
- The Oregon Department of Fish and Wildlife plans to hire an invasive species coordinator.
- The Oregon Department of Agriculture plans to hire an education/outreach coordinator for invasive species.
- U.S. Fish and Wildlife Service provides funding for implementation of the Oregon ANS plan, and also has limited funds available for specific outreach programs, such as the 100<sup>th</sup> Meridian Initiative.

**Activities:**

- Identify prospective collaborators for each E/O strategy element among federal, state, and local agencies, academic institutions, nongovernmental organizations, and tribes. Consult with potential collaborators and develop a scope of work for each activity that maximizes access to available financial resources and/or in-kind contributions.
- Identify prospects for grants, matching funds, and in-kind contributions for AIS management projects, including E/O.
- Coordinate arrangements for implementation of the E/O strategy among relevant agencies, organizations, and institutions.
- Use prepared materials and briefings to inform policy makers of the importance of education and outreach to successful AIS prevention and control and the requirement for funding to implement these activities.

**Contacts:**

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## CHAPTER 10. SURVEYING BOATERS

### OREGON BOATER KNOWLEDGE, ATTITUDE AND PRACTICES

Overland transport of recreational boats poses significant risks for introducing and spreading aquatic invasive species (AIS), because boats and associated equipment carry AIS from one water body to another. With some 150,000 registered boats in Oregon, plus an additional 500,000 unregistered watercraft, this represents a major pathway for AIS to become established in the state. Fortunately, boaters can take action to prevent the introduction and spread of AIS, including inspecting their boat and equipment before leaving or launching in a water body and removing all organisms and mud. But clearly boater education is a key element of any education/outreach (E/O) campaign to prevent and slow the spread of AIS.

#### **Survey process**

The Center for Lakes and Reservoirs (CLR) at Portland State University conducted a mail survey in fall 2003 to 1) establish a baseline for knowledge, attitudes, and practices about AIS among Oregon boaters, and 2) allow for future evaluation of the effectiveness of boater education in changing awareness of AIS and boating practices.

The survey tool was developed by Minnesota Sea Grant in the early 1990s and has been revised several times since then for use in states across the country. Similar surveys were conducted previously in Minnesota, Wisconsin, and Ohio (1993), California (1996), and Minnesota, Ohio, Kansas, California, and Vermont (2000). In 2003, Oregon, Wisconsin, and Michigan all conducted boater surveys.

The subject population for the Oregon survey included some 150,000 registered boat owners in Oregon. The Oregon State Marine Board (OSMB) sent a database containing the names and addresses of these individuals to the researchers. From this database, the researchers randomly chose 1600 potential participants; later the Minnesota Center for Survey Research (MCSR) narrowed the group to 800 participants. A letter guaranteeing the confidentiality of the information used was sent to Wayne Shuyler, deputy director of the OSMB. (See confidentiality letter in Appendix 3.)

Once parameters for the survey were determined, I requested a waiver of the full review for use of human subjects in a Human Subjects Research and Review Committee (HSRRC) application, as required by Portland State University. The waiver was granted within two weeks. (See the HSRRC application proposal in Appendix 3.)

The cost for MCSR to administer the survey amounted to \$8000 for each state. (See the budget in.) The MCSR sent out an initial letter with the eight-page survey and follow-up mailings, using an identification number on the survey only to determine to whom follow-up mailings should be sent. (See survey, letters, and postcards in Appendix 3.) Once the survey was completed, the raw data were compiled in a flat file that could be used with statistical analysis packages.

#### **Response rate**

Rossana Armson, director of the MCSR, provided final response rates for each state as follows: Oregon (39 percent), Michigan (56 percent), and Wisconsin (60 percent). The lower response rate from Oregon may stem from two main factors.

First, the Oregon survey was sent from the MCSR, not from an agency or organization within the state. Wayne Shuyler of the OSMB expressed concern that the OSMB staff would have to answer numerous inquiries if the survey could be identified as originating in Oregon, so a decision was made to send it from a more neutral location. In addition, the researchers developed a question-and-answer sheet for OSMB staff, which answered questions about the survey that they might receive. (See the Q&A in Appendix 3.)

Survey research has shown that response rates are generally higher when the recipient of the survey is familiar with the sender. The surveys for Michigan and Wisconsin, for example, were sent from within the

respective states. Doug Jensen, Aquatic Invasive Species Information Center coordinator at Minnesota Sea Grant and a developer of the survey tool, said:

“Administering the survey from a credible in-state entity is important for survey response rate. I hope that this wasn't a mistake, but I would tend to believe that it's a contributing factor.” (Jensen, e-mail 23 December 2003)

Clearly, every effort should be made to send follow-up surveys from an agency or organization within the state of Oregon.

Second, the states of Michigan and Wisconsin have been actively engaged in boater education for the past decade as part of the Great Lakes Panel on Aquatic Nuisance Species. The greater awareness in these states could have translated into a greater willingness to respond to the survey.

## **Results**

Once the survey was completed, the raw data were to be edited and compiled in a file that could be analyzed using a statistical package. As of this report, the researchers are awaiting the raw data to begin analysis of the results.

## **Expected benefits**

The results of this study will provide the Oregon Invasive Species Council (OISC) with a baseline of knowledge, attitudes, and practices about AIS among recreational boaters. Armed with that information, the OISC will be able to work with the OSMB to develop an effective education and outreach campaign to encourage boating practices that prevent the introduction and spread of AIS. In the future, similar surveys will help evaluate the effectiveness of the initial campaign and implement changes that will produce an even greater impact.

## CHAPTER 11. IMPLEMENTING THE STRATEGY

### GOING INTO ACTION

The Education/Outreach (E/O) strategy presented in Chapter 9 for aquatic invasive species (AIS) contains activities that represent the best thinking of a number of individuals and groups on how to begin moving target audiences from awareness of AIS to consistent performance of preventive actions. (See list of reviewers in Table 5.) One point to emphasize is that the strategy is only a starting point: The OISC should re-evaluate the plan at least yearly to ensure these activities represent the best means for preventing the introduction and spread of AIS in Oregon. The E/O strategy and plan should reflect information on AIS presence in Oregon and elsewhere, risk resulting from AIS introduction and spread, resource availability, and advances in knowledges.

The question that naturally arises at this point is: How do we prioritize audiences and activities? By species posing the greatest risk, audience responsible for the greatest number of introductions, program with the most groundwork completed or resources allotted, or simply the easiest task to tackle? All of these methods could be valid depending on the circumstances, but as I noted in Chapter 3 the purpose of the Oregon Invasive Species Council (OISC) is

“to conduct a coordinated and comprehensive effort to keep invasive species out of Oregon and to eliminate, reduce, or mitigate the impacts of invasive species already [sic] established in Oregon.”

Clearly the E/O activities that the OISC should pursue must be those that provide the greatest impact in terms of preventing the introduction and spread of AIS in Oregon. A “no regrets” plan would implement a small number of activities that can be pursued immediately to produce the greatest impact. If I use the Idaho Weed Awareness Campaign (IWAC) as an example (see Chapter 4), it’s clear that campaign began with a single awareness message targeted at the Boise market only. As the campaign became more visible, so did the demand for projects, but the IWAC pursues those that move them closest to their desired outcomes. The focus of the campaign is currently more on depth than on breadth; in other words, the intent is for all Idahoans to become aware of invasive weeds and the problems they can cause rather than on targeting specific groups and the actions they can take.

Before OISC produces a brochure or public service announcement or deck of cards, it’s imperative to determine what we hope to achieve by pursuing this activity: which audience will we reach, with what message, through which channel, by when, and with what effect? In *A Social Marketing Handbook for Engaging Communities in Invasive Species Management*, Holt (1999) stressed the importance of setting SMART objectives: specific, measurable, ambitious, realistic, and time-bound. The Implementation Planning Form shown in Figure 2 will help the OISC set SMART objectives, justify the activities selected, and prioritize those activities; in other words, it provides a means for accountability as the council plans the activities that comprise the E/O campaign on AIS. The OISC should require that the form be completed for any project it funds and strongly encourage its use among other organizations and agencies conducting invasive species education/outreach activities. (Figure 3 shows a completed form for posting boater education signs at water access points; and Chapter 6 provides more questions and excellent resources that provoke thought on various campaign elements.)

We can certainly look to other campaigns to learn which products and activities have proven successful, but the failure to measure outcomes (except anecdotally) is a weakness of many efforts. Why should the OISC adopt a different standard for evaluation? After all, spending \$2000 here or \$3500 there for E/O activities falls well within the realm of many agency budgets. But the process of implementing campaign activities takes on new meaning if the money spent is tied directly to the results it must achieve. And in the end, the OISC wants to point not to the number of brochures distributed or dollars spent, but to the awareness raised, the actions taken, and the AIS invasions halted through these efforts.



**Table 5. Reviewers of the OISC Education/Outreach Plan on Aquatic Invasive Species**

<b>AIS E/O Plan section</b>	<b>Reviewers</b>
Entire plan	Mark Sytsma, PSU CLR Robyn Draheim-Waldeck, PSU CLR Paul Heimowitz, USFWS Bob Malouf, OSG
Commercial shippers and dredgers	Mark Sytsma, PSU CLR Paul Heimowitz, USFWS
Aquaculture operators, commercial fishers, bait harvesters	Sue Cudd, Whiskey Creek Shellfish Hatchery John Faudskar, Specialty Oyster Company
Live seafood retailers, bait dealers, consumers	Bob Malouf, OSG
Aquarium trade, pet trade, aquarium hobbyists	Paul Heimowitz, USFWS Bob Malouf, OSG
Plant wholesalers, nurseries, landscapers, water gardeners, shoreline restorers	Keith Warren, J. Frank Schmidt & Sons Nursery Mandy Tu, TNC Risa Demasi, Grassland Oregon
Boaters, marina and boat launch operators	Randy Henry, OSMB Blaine Parker, CRITFC and PSU CLR
Anglers and hunters	Blaine Parker, CRITFC and PSU CLR
Water and power facility operators	Blaine Parker, CRITFC and PSU CLR
Natural resource personnel/ environmental organization staff	Mandy Tu, TNC Blaine Parker, CRITFC and PSU CLR
Educators	Paul Heimowitz, USFWS
News media	Stephen Anderson, TNC
Watershed councils	Paul Heimowitz, USFWS Bob Malouf, OSG
Policy makers	Mark Sytsma, PSU CLR Paul Heimowitz, USFWS
Stakeholders	Mark Sytsma, PSU CLR Paul Heimowitz, USFWS
Funding	Mark Sytsma, PSU CLR Paul Heimowitz, USFWS

CRITFC – Columbia River Inter-tribal Fisheries Commission

OSG – Oregon Sea Grant

OSMB – Oregon State Marine Board

PSU CLR – Portland State University Center for Lakes & Reservoirs

TNC – The Nature Conservancy of Oregon

USFWS – U.S. Fish & Wildlife Service

## **TOP PRIORITIES**

The top priorities include activities designed to reach three audiences known to be the cause of numerous AIS introductions and to raise visibility of AIS in the news media and among policy makers.

### **Commercial shippers, dredgers, shipping agents, ports**

In just the first 10 months of 2002, approximately 800 million gallons of ballast water were discharged in Oregon waters (Vinograd and Sytsma 2002). If commercial shippers complied 100 percent with ballast water exchange requirements, fewer species should be introduced; however, despite high compliance with mid-ocean exchange requirements (95 percent), compliance with coastal exchange requirements was only 60 percent. That's particularly troubling when such vessels may be sailing from the most invaded water body in the world: the San Francisco Bay.

Products available to raise compliance with ballast water exchange regulations should be sufficient, especially with the addition with an insert on states' regulations, but distribution should be examined. Although distribution of materials by California Division of State Lands' inspectors and ports certainly helps, we need to ensure that materials that set forth regulations in the state of Oregon get into the hands of those who can act or encourage action: vessel operators, shipping agents, and port authorities. The emphasis of future activities needs to fall on distribution rather than further development of activities, unless materials in a different format or language prove necessary.

### **Boaters, marina and boat launch operators**

Oregon counts approximately 197,000 registered boats and 500,000 canoes, kayaks, rafts, drift boats, and other unregistered craft. To prevent the introduction and spread of AIS, the owners of all these vessels need to practice preventive measures. Given the limited E/O efforts on AIS that have been addressed to this audience to date, they represent a prime candidate for immediate and extensive E/O efforts.

Moreover, the groundwork for these activities has already been laid with campaigns conducted in other states, the 2003 Oregon boater survey, and the Oregon State Marine Board (OSMB) plans to include education on AIS in the upcoming "Safe and Sustainable" campaign. Other activities should complement the OSMB effort: for example, for \$3 to \$10 per sign, the actions boaters need to take to prevent the introduction and spread of AIS could be present at every marina and boat launch in Oregon – exactly where boaters need to be prompted to take action.

### **Anglers and hunters**

Although targeting boaters may not reach the entire population of anglers and hunters, 60 to 70 percent of boaters are also anglers (OISC E/O Subcommittee minutes, 16 October 2003); and most hunters who can take preventive measures to combat AIS probably use boats as well (e.g., duck hunters). In addition, anglers and hunters are likely to see signs educating the public about AIS and the preventive measures they can take at water access points. Although targeting boaters does not cover all the activities that could increase awareness among anglers and hunters and move them to take preventive actions, some progress could be expected.

### **News media**

Efforts to increase awareness of AIS among Oregon's 3.4 million people would mesh well with the earned-media portion of a statewide campaign on invasive species. Press releases could combine newsworthy information or events – new research on live seafood markets as a vector, the start of boating season, the OISC report card – with action messages for various audience segments: boaters, water gardeners, aquarium hobbyists, and so forth. The key might simply be awareness: Boaters probably won't carry newspaper clippings that explain preventive measures they can take to combat AIS, but they may be more likely to notice and follow instructions on a sign at a boat launch if they're primed to receive that message first. The same applies to other target audiences. In addition, building up a constituency concerned about AIS in Oregon will probably prove to be the best way to reach the target audience below.

### **Policy makers**

Although reaching policy makers should be part of the overall statewide invasive species campaign, targeted information should also be provided on AIS economic, environmental, social and health impacts, along with a package of supporting legislation. Such an approach will require conducting an assessment of invasive species in the state. Another key will be identifying policy makers likely to be sympathetic to requests for funding and policies for AIS prevention or to powerful members of their constituency who may suffer negative impacts from AIS introductions. If an AIS Prevention Day for policy makers is targeted for 2005, laying the groundwork now is imperative.

## **SPREADING THE WORD**

All three target audiences below can be instrumental in spreading the word about AIS prevention, but increasing awareness and knowledge is an important first step. Although in the short term targeting these groups may have less impact on AIS introductions and spread than other activities, in the long term these groups can have a huge impact. Especially among youth, conservation information sticks – and they represent the future decision makers.

### **Educators**

Educators in Oregon currently lack a curriculum or comprehensive tools for AIS education, although both have been developed in other states and could be implemented here. An excellent start would be to implement plans for “The Case of the Wet Invaders” and for traveling versions of the Hatfield Marine Science Center (HMSC) exhibit “Invasion of the Habitat Snatchers!” In addition, activities could be built around unveiling the HMSC exhibit, particularly if traveling exhibits are made available. The greatest impact will be achieved if information on AIS prevention can be incorporated into all aquatic education curricula, related continuing education training, and environmental, science, and natural resource education programs in Oregon.

### **Watershed councils**

Many watershed councils are only too aware of the problems associated with invasive species and have programs in place to manage them, to educate the public about prevention, and to sponsor activities that involve ridding habitat of invasive terrestrial plants. To ensure the focus includes AIS, activities already used to inform coastal watershed councils should be expanded to include all of Oregon. Councils should also be given the tools to develop AIS prevention, detection, monitoring, and control activities as part of their work and to encourage press coverage of these events. AIS should be emphasized as a priority issue in guidance materials and funding programs administered by the Oregon Watershed Enhancement Board.

### **Natural resource personnel and environmental organization staff**

Natural resource personnel and environmental organization staff are of some concern as a pathway for AIS introduction and spread. To mitigate that possibility, HACCP training and plan development for this group should be mandatory. In addition, natural resource personnel and environmental organization staff can also contribute to AIS prevention by serving as a source of information for the public on AIS issues. What makes these groups particularly valuable is that they often work in the field, where they can interact with the public exactly where AIS information is most needed. Focusing on inter-organization education to help natural resource personnel and environmental organization staff avoid introducing or spreading AIS in their work could provide the additional benefit of increasing public education as well. Developing a mechanism to offer news on AIS and other invasive species, profile threatening species, and provide tips on preventing the introduction and spread of AIS would serve this group as well as many others.

## **GEARING UP**

Efforts nationally or in several states are under way to address these two target audiences, although work should begin now to prepare for later activities and help ensure their success.

### **Aquarium trade, pet trade, aquarium hobbyists**

The Pet Industry Joint Advisory Committee (PEJAC), U.S. Fish & Wildlife Service, and Sea Grant are collaborating to develop a branded public awareness campaign that targets aquarium hobbyists primarily and also aquarium trade retailers. In the interim, work can begin to develop and distribute a prohibited species list. More importantly, the almost complete lack of nonlethal means for disposal of aquarium specimens remains a critical barrier. Work with aquarium retailers, hobbyist groups, and animal organizations in Oregon should begin to determine if this barrier can be overcome.

### **Plant wholesalers, nurseries, landscapers, water gardeners, shoreline restorers**

Efforts are under way in Minnesota, Michigan, and Wisconsin to develop an educational model for this target audience. In the interim, work can begin to compile a user-friendly prohibited species list; piggyback invasive aquatic plants onto messages already developed for terrestrial plants; encourage adoption of the industry code of conduct; and incorporate information on AIS as part of the professional licensing and re-certification materials for nursery operators, landscapers, and shoreline restorers.

## **MONITORING**

Although the audiences below may sometimes be a pathway for AIS introduction and spread, they can also play a critical role in monitoring.

### **Aquaculture operators, commercial fishers, bait harvesters**

Monitoring is not a new role for the aquaculture industry, as operators have worked for years to prevent predators, parasites, and pathogens from decimating their harvests. But these groups need encouragement to look beyond pests and plants that can impact their target species and focus also on new species that could pose a threat to the aquatic environment as a whole. Efforts should begin to work with the Pacific Coast Shellfish Growers Association and with commercial fishing organizations to increase AIS awareness and promote monitoring.

### **Water and power facility personnel**

Similar to aquaculture operators, most water and power facility personnel are probably familiar with AIS or at least with the severe economic and environmental impacts of zebra mussels and Eurasian watermilfoil. Inter-facility education to help personnel avoid introducing or spreading AIS in their work could provide the added benefit of increasing awareness of AIS impacts and local species of concern. Recruiting personnel to monitor for zebra mussels could also help provide advance warning of other AIS.

## **INTERRUPTING A POTENTIAL PATHWAY**

### **Live seafood trade, bait dealers, consumers**

Although little is known about the risk of introductions through the live seafood and bait trade, research has shown that such introductions are possible. A brochure is already available that warns of the impact of four prohibited species, but the key is distribution. Working with ethnic Asian organizations to reach the live seafood trade and ensure retailers and consumers receive the message through individuals they trust – and can understand – must be the first step.

Based on the priorities defined above, Table 6 provides a list of activities proposed for 2004.

**Figure 2. The two-page Implementation Planning Form should be completed for every activity considered as part of the education and outreach campaign on aquatic invasive species.**

**Oregon Invasive Species Council Education and Outreach Campaign  
Implementation Planning Form**

**Date:**

**Prepared by:**

**Project name:**

**Brief description:**

**Desired outcome (quantifiable):**

**Audience (target group and current knowledge, attitudes, or practices related to AIS):**

**Desired response (knowledge gained or action performed):**

**What evidence provides support that this activity will be successful in achieving the desired outcome?**

**Messages:**

**Channels:**

**Plan for distribution:**

**Budget:**

**Partners:**

**Funding sources:**

**Plan for pre-testing:**

**Projected completion/delivery date:**

**Projected “shelf life”:**

**Plan and measures for evaluation:**

**Why does this activity warrant the highest priority relative to others of similar scale?**

**Contact for further information:**

**Name:**

**Organization:**

**Address:**

**Phone:**

**Fax:**

**e-mail:**

**Contact for media inquiries:**

**Name:**

**Organization:**

**Phone:**

**Fax:**

**e-mail:**

**Figure 3. Below is an example of how the Implementation Planning Form might be completed for a project to put up signs educating boaters at water access points.**

**Oregon Invasive Species Council Education and Outreach Campaign  
Implementation Planning Form**

**Date:** 6 January 2004

**Prepared by:** Diane Kightlinger

**Project name:** Boater signs at water access points

**Brief description:** Signs at water access points will inform boaters and other recreationists of AIS impacts, species present, preventive measures, and contacts for further information

**Desired outcome (quantifiable):** The percentage of boaters and other recreationists who follow clean boating/equipment practices increases from current levels to 70 percent or higher by 2010.

**Audience (target group and current knowledge, attitudes, or practices related to AIS):** Boaters and other recreationists; boater survey will provide information on KAP for boaters; observation can provide information on boaters and other target groups

**Desired response (knowledge gained or action performed):** Boaters and other recreationists become aware of AIS present in their favorite water bodies and potential impacts, and follow clean boating/equipment practices.

**What evidence provides support that this activity will be successful in achieving the desired outcome?** In boater surveys conducted in a variety of states (see Chapter 4) boaters said the best ways to reach them about AIS and preventive measures were newspaper and magazine articles and TV spots; boating and fishing regulations; signs at boat launches; and watercraft inspection/education programs. In addition, when asked where they had already received information about AIS, boaters in many states cited signs at boat launches among the top three (Jensen, January 2003).

**Messages:** This water body contains AIS, including the one or two pictured here; AIS cause serious impacts; you can make a difference by following clean boating/equipment practices.

**Channels:** Signs posted at water access points

**Plan for distribution:** Work with OSMB and ODFW to develop a distribution plan, including:

- Lead organization/OSMB sends letter to managers of boat launches and marinas from OSMB encouraging installation of signs at water access points
- Lead organization/ODFW work to coordinate installation of signs with posting of regulatory messages
- Seek permission to post signs at water access points and also teach boaters how to follow clean boating practices
- Meet with marina and boat launch operators to discuss problems and preventive measures for AIS (as Bill Zook did along the Missouri River) and encourage posting of signs
- Lead organization/OSMB works with county sheriffs to post signs and train law enforcement agencies on AIS and preventive measures

**Budget:** \$3 to \$10 per sign; begin with 500 signs at most-used water access points

**Partners:** Oregon State Marine Board, Oregon Department of Fish & Wildlife, PSU Center for Lakes & Reservoirs, Pacific States Marine Fisheries Commission, 100<sup>th</sup> Meridian Initiative

**Funding sources:** Oregon State Marine Board, Oregon Department of Fish & Wildlife, Pacific States Marine Fisheries Commission, USFWS

**Plan for pre-testing:** Lead organization works with OSMB and ODFW to develop messages that will resonate with boaters and recreationists, and to develop pre-testing plan that includes intercept surveys, focus groups, or other means of obtaining boater input on signs

**Projected completion/delivery date:** Develop signs in spring 2004; post signs in summer 2004; finish by fall 2004

**Projected “shelf life”:** 10 years

**Plan and measures for evaluation:** Boater survey conducted in 2007; observations conducted at 10 busiest water access points on several weekends each summer.

**Why does this activity warrant the highest priority relative to others of similar scale?** As noted above, boaters have cited signs at boat launches as both a prime source for information that they have already received or a good way to reach them with information in the future. Moreover, signs at boat launches represent a prompt, a tool that social marketers cite for use in helping to change human behavior. Signs at boat launches meet all the requirements of a prompt: they are noticeable and self-explanatory if they explain step-by-step how a boat inspection should be done; they are presented as close as possible to where the preventive measures should take place; and they encourage boaters to engage in positive behaviors.

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**Table 6. Proposed activities for education/outreach on aquatic invasive species in Oregon (March 2004 – February 2005)**

<b>Activity</b>	<b>Responsible agency</b>	<b>Proposed partners</b>	<b>Cost (\$)</b>	<b>Labor (Hours per year)</b>	<b>Schedule</b>
<b>TOP PRIORITIES</b>					
<b>Commercial shippers and dredgers</b>					
Develop insert for “Stop Ballast Water Invasions” brochure	OR Ballast Water Task Force	West Coast Ballast Outreach Project, Port of Portland, DEQ	800	40	Mar 04
Develop a distribution plan for “Stop Ballast Water Invasions” brochure, poster, other educational materials	OR Ballast Water Task Force	West Coast Ballast Outreach Project, Port of Portland, DEQ	-	40	Apr 04
<b>Boaters, marina and boat launch operators</b>					
Analyze results of the OR boater KAP survey	PSU CLR	OSMB, ODFW, OSG	-	80	Mar 04
Conduct “Safe and Sustainable” campaign to educate boaters on AIS and preventive measures	OSMB		-	OSMB	Ongoing
Include information on AIS and preventive measures in all relevant OSMB and ODFW regulations and other publications and at events	OSMB, ODFW, PSU CLR	USFWS	-	80	Ongoing
Post signs on AIS and preventive measures at water access points	PSU CLR	OSMB, ODFW, PSMFC, USFWS	7500	400	Spr-Sum 04
Conduct boat inspection demos during the boating season	PSU CLR	OSMB, ODFW	-	160	Sum 04
Evaluate effectiveness of providing information on AIS and preventive measures through TIS	PSU CLR	100 <sup>th</sup> Meridian Initiative, OSMB, ODFW	-	40	Fall 04
<b>Anglers and hunters (not using boats)</b>					
Include information on AIS and preventive measures in all relevant ODFW regulations and other publications and at events	ODFW	OSMB, PSU CLR, USFWS	See above under Boaters		
<b>News media</b>					
Develop a media list	PSU CLR, OISC, OSG	TNC	-	20	Mar 04
Develop a press kit for the OISC featuring AIS issues	PSU CLR, OISC, OSG	TNC	3000	60	Mar 04
Identify spokespeople who can speak with the media on AIS and other invasive species issues	PSU CLR, OISC, OSG	TNC	-	20	Mar 04
Develop a campaign of press releases/story leads and	PSU CLR, OISC,	TNC	1000	120	Mar 04

Activity	Responsible agency	Proposed partners	Cost (\$)	Labor (Hours per year)	Schedule
photo opportunities	OSG				
Assign responsibility to OISC and OISC E/O members to develop story ideas and place stories	PSU CLR, OISC, OSG	TNC	-	40	June 04
<b>Policy makers</b>					
Identify key policy makers with special interest in AIS and invasive species in general	PSU CLR, OISC, OSG	TNC, ODA, ODFW, OSMB, OSP, USFWS	-	40	Apr 04
Conduct an assessment of AIS (or invasive species in general) in Oregon	PSU CLR, OISC, OSG	TNC, ODA, ODFW, USFWS	-	120	Spr 04
Develop an informational brochure/fact sheets to describe AIS and key impacts	PSU CLR, OISC, OSG	TNC, ODA, ODFW, OSMB, OSP, USFWS	5000	120	Sum 04
Lay groundwork for AIS Prevention Day in 2005	PSU CLR, OISC, OSG	TNC, ODA, ODFW, OSMB, OSP, USFWS	-	80	Fall 04
<b>SPREADING THE WORD</b>					
<b>Educators</b>					
Support implementation of "Case of the Wet Invaders"	OSG, PSU CLR	USFWS	-	60	Fall 04
Ensure unveiling of "Invasion of the Habitat Snatchers!" gets high visibility; develop traveling display	HMSC, OSG, PSU CLR	USFWS	-	120	Spr-Sum-Fall 04
Encourage incorporation of AIS education at High Desert Museum and Project WET activities	PSU CLR, OISC	USFWS, HDM, Project WET, OSG	-	120	Spr 04
<b>Watershed councils</b>					
Adapt previous presentation and supporting materials to inform all watershed councils about AIS	OSG/PSU CLR	USFWS	-	40	Fall 04
Implement recommendations from OSG watershed council needs assessment	OSG	PSU CLR	-	OSG	Fall 04
<b>Natural resource personnel and environmental organization staff</b>					
Provide a workshop or HACCP training on AIS issues and preventive measures	PSU CLR	ODFW, USFWS, OSG, TNC, CRITFC	-	400	Ongoing
Provide a monthly online newsletter on invasive species, including preventive measures	ODA, ODFW	USFWS, PSU CLR, TNC, CRITFC, OSG	-	150	Apr 04
<b>GEARING UP</b>					
<b>Aquarium trade, pet trade, aquarium hobbyists</b>					
Compile a user-friendly "Prohibited Species List"	ODFW, ODA, PSU CLR	OSG, USFWS	2000	60	Winter 05
Work to develop non-lethal means to dispose of unwanted organisms	OSG, PSU CLR	ODFW, USFWS	-	80	Winter 05

<b>Activity</b>	<b>Responsible agency</b>	<b>Proposed partners</b>	<b>Cost (\$)</b>	<b>Labor (Hours per year)</b>	<b>Schedule</b>
Distribute handling and disposal brochures to educational and testing institutions and laboratories	OSG	ODFW, USFWS, PSU CLR	-	OSG	Ongoing
<b>Plant wholesalers, nurseries, landscapers, water gardeners, shoreline restorers</b>					
Compile a user-friendly "Prohibited Species List"	ODA, ODFW	PSU CLR, TNC, USFWS, OSG	See above		
Encourage compliance with the voluntary code of conduct for nurseries and botanical gardens	TNC	PSU CLR, ODA	-	TNC	Ongoing
Develop information on native or non-native exotic alternatives to invasive plants	TNC	PSU CLR, ODA	-	TNC	Ongoing
Include information on AIS as part of licensing and re-certification materials	ODA	TNC, PSU CLR	-	ODA	Ongoing
<b>MONITORING</b>					
<b>Aquaculture operators, commercial fishers, bait harvesters</b>					
Work with PCSGA to develop monitoring materials	OSG, PSU CLR	PCSGA, ODFW	-	60	Fall 04
Include information on AIS and monitoring in licensing and recertification materials	ODFW	OSG	-	40	Sum 04
<b>Water and power facility operators</b>					
Develop a presentation and supporting materials on AIS	BPA	PSU CLR, USACE, USFWS	-	40	Win 05
<b>INTERRUPTING A POTENTIAL PATHWAY</b>					
<b>Live seafood retailers, bait dealers, consumers</b>					
Lay the groundwork for distributing a brochure on AIS for live seafood dealers and consumers	OSG	ODA, PSU CLR, USFWS	-	40	Win 05
<b>COORDINATING STAKEHOLDERS</b>					
<b>Federal, state, and local agencies, educational institutions, environmental organizations, others</b>					
Include E/O section and listserv on OISC Web site	PSU CLR	OISC, USFWS, TNC, SSNERR	-	80	Sum 05
Publish searchable online version of AIS E/O inventory	PSU CLR	WRPANS, OSG	-	80	Spr 04
<b>FUNDING</b>					
Identify grants and matching funds that could be used to support AIS E/O activities	PSU CLR, OSG, USFWS	All	-	60	Ongoing
<b>TOTAL</b>			<b>\$19,300</b>	<b>2790</b>	<b>Mar 04 – Feb 05</b>

## CHAPTER 12. RECOMMENDATIONS

In the course of developing the strategy and implementation plan for education/outreach (E/O) on aquatic invasive species (AIS), I recognized that a number of actions would probably improve implementation of the plan and application of the template to other invasive species. Below are my recommendations:

1. **Implement the activities proposed for March 2004 – February 2005.** Oregon currently lags behind many other states in its E/O efforts on invasive species. Implementing the activities listed in Table 6 will provide a solid start for efforts to move Oregonians from awareness to action on AIS prevention and control. Although ignoring research and evaluation – and instead focusing on “action” items – may be tempting, it’s imperative to understand each target audience and the effective messages and channels to reach them, and then to measure the impact of activities that have been conducted.
2. **Hire a coordinator to conduct and oversee the E/O activities on AIS.** The ideal coordinator would have experience in communications, marketing, education, and media, plus an interest in or affinity for science, and the patience to carry out a plan that could take years to see results.
3. **Pursue funding to conduct E/O activities on AIS.** Implementing the strategy just for the first year requires approximately \$60,000 for labor and \$20,000 for printing and other costs for a total of \$80,000, probably a modest estimate. Identifying funding sources will be critical for the statewide campaign on invasive species and to conduct E/O activities on AIS.
4. **Develop a steering committee to oversee implementation of the E/O strategy on AIS.** I was fortunate to have individuals representing a variety of organizations and industries review the E/O strategy and implementation plan on AIS. (See Table 5 for the list of reviewers.) To ensure that the E/O on AIS continues to benefit from the input of a range of stakeholders, individuals representing appropriate organizations and industries should be encouraged to guide activities and to provide overall direction.
5. **Continue coordinating stakeholders in Oregon and beyond.** In 2004, the OISC made a major leap forward by founding the Invasive Species Education/Outreach Subcommittee (ISEOS) and proposing to develop a statewide campaign on invasive species. To maintain the level of interest, enthusiasm, and commitment seen at the 16 October 2003 meeting, the group needs to continue to meet at least several times each year, preferably with an agenda that will contribute to each organization’s success in planning and implementing E/O activities. In addition, the OISC Web site should contain information designed to help stakeholders with E/O activities, perhaps in conjunction with updates for natural resource personnel.
6. **Apply the template described in Chapter 6 to develop an E/O strategy and implementation plan for terrestrial invasive species.** Obviously the initial efforts to develop an E/O strategy and implementation plan are only half-finished. Once activities addressing AIS are under way, the OISC should begin work on a similar plan for terrestrial invasive species in conjunction with the Oregon Department of Agriculture and The Nature Conservancy.

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# APPENDIX 1. SAMPLE INFORMATION/EDUCATION STRATEGY AND IMPLEMENTATION PLAN FOR THE GREAT LAKES PANEL ON ANS

**Figure 1. Information/Education Strategy for Aquatic Nuisance Prevention and Control, p. X (Great Lakes Panel on Aquatic Nuisance Species, May 2001)**

## *Information/Education Strategy for Aquatic Nuisance Prevention and Control*

**Prepared by: Information/Education Committee,  
Great Lakes Panel on Aquatic Nuisance Species**

**May 2001**

**Statement of Purpose:** The primary purpose of the Information/Education (I/E) Strategy is to provide regional direction, coordination and evaluation regarding I/E activities on aquatic nuisance species (ANS) among participating agencies, institutions, organizations and other appropriate authorities. The long-term objective of I/E activities is to safeguard the ecological and economic health of the Great Lakes-St. Lawrence region by preventing the introduction and spread of aquatic nuisance species. It is important to note that while some of these activities may be undertaken specifically by the Great Lakes Panel on Aquatic Nuisance Species and associated membership, many of the activities may be underway or taken on by other Great Lakes organizations.

**Goal I: The prevention of the introduction and dispersal of aquatic nuisance species into, within and from waters of the Great Lakes-St. Lawrence region through implementation of I/E activities.**

**Problem:** To effectively prevent the introduction and dispersal of aquatic nuisance species in the Great Lakes-St. Lawrence region, there is a need for a stronger awareness/understanding of the problem and/or increased motivation to take action among natural resource users, natural resource personnel and the general public. To cultivate stronger awareness and increased motivation, information on ANS issues must be available on a more accessible, wide-scale basis.

**Objective A:** Reduce ballast water introductions by facilitating compliance among commercial vessel operators entering the Great Lakes-St. Lawrence region through educational opportunities on voluntary and mandatory ANS preventative measures.

**Activity A.1: Commercial Shipping Informational Materials:** Maintain and disseminate updated informational materials in multiple languages for ship owners, captains, engineers, and other commercial shipping personnel with the primary purpose of compliance with appropriate ballast management practices. ANS issues to be included: 1) history of the ANS problem in the Great Lakes-St. Lawrence region; 2) sources of the ANS problem (i.e. ballast water discharge, attachment to hulls and anchors); 3) risks posed by the ANS problem; 4) shipping practices that reduce the risk of introducing and dispersing aquatic nuisance species (i.e. guidelines for ballast water discharge); 5) regulations on ballast water exchange and the consequences of noncompliance; 6) ballast water reporting requirements; and 7) updates on the most recent research and technology on ballast water management and control.

**Figure 2. Implementation Plan: Information/Education Strategy for Aquatic Nuisance Prevention and Control, p. 4 (Great Lakes Panel on Aquatic Nuisance Species, Spring 2001)**

Activity	Description	Lead Entities	Potential Cooperating Agencies/ Organizations	Potential Funding Source	Time Frame
<b>Goal 1: The prevention of the introduction and dispersal of aquatic nuisance species into, within and from waters of the Great Lakes-St. Lawrence region through implementation of I/E activities.</b>					
A.1	<u>Commercial Shipping Informational Materials:</u> Maintain and disseminate updated informational materials in multiple languages for ship owners, captains, engineers, and other commercial shipping personnel with the primary purpose of compliance with appropriate ballast management practices. ANS issues to be included: 1) history of the ANS problem in the Great Lakes- St. Lawrence region; 2) sources of the ANS problem (i.e. ballast water discharge, attachment to hulls and anchors); 3) risks posed by the ANS problem; 4) shipping practices that reduce the risk of introducing and dispersing aquatic nuisance species (i.e. guidelines for ballast water discharge); 5) regulations on ballast water exchange and the consequences of noncompliance; 6) ballast water reporting requirements; and 7) updates on the most recent research and technology on ballast water management.	U.S. Coast Guard (USCG), Canadian Coast Guard	Great Lakes Sea Grant Network (SGN), Great Lakes Panel (GLP)	USCG	ongoing
B.2	<u>Identify Pathways of Introduction and Dispersal:</u> Identify commercial businesses responsible for significant ANS introduction and dispersal, characterize associated risks for spread/release into the wild; assess how these pathways can be modified to minimize or eliminate risk for introduction/spread and impacts mitigated.	Great Lakes Panel (GLP)	Bait – SGN, Aquarium Trade, Nursery/Horticultural Trade, Internet - MN Sea Grant	National Sea Grant Office (NSGO), US Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (USEPA)	
B.3	<u>Outreach Program for Commercial Sector:</u> Develop and conduct outreach activities that target commercial businesses in efforts to interrupt pathways of ANS introduction and dispersal.				
B.3.a	<u>Workshop Series:</u> Develop a series of workshops with supporting materials, that can be conducted by local, state/provincial agencies, targeted at specific commercial groups associated with respective pathways of introduction and dispersal. Target audiences should be informed about their role in preventing and reducing their risk for introduction and dispersal of aquatic nuisance species. As part of workshop activities, the targeted audiences should be trained on how to deliver the “message” to their clientele aimed at prevention.	GLP	Sea Grant, state/provincial agencies, Great Lakes Fisheries Commission (GLFC), tribal authorities	NSGO USEPA	



## APPENDIX 2. OISC E/O SUBCOMMITTEE MINUTES

- **5 September 2003 summary**
- **16 October 2003 minutes**
- **18 December 2003 minutes**
- **Proposal presented to OISC on 21 January 2004**

### **Invasive Species Education/Outreach Committee Meeting Sponsored by Oregon Invasive Species Council 5 September 2003 • 2-3 pm**

#### **Participants**

(Contact information listed on attached spreadsheet)

Oregon Department of Agriculture	Tim Butler
Oregon Department of Fish & Wildlife	Martin Nugent
Oregon Department of Fish & Wildlife	Ann Snyder
Oregon State Marine Board	Randy Henry
Oregon State University Extension Sea Grant	Bob Malouf
Portland State University, Center for Lakes & Reservoirs	Diane Kightlinger
Portland State University, Center for Lakes & Reservoirs	Mark Sytsma
Pacific States Marine Fisheries Commission	Dennis Wise
The Nature Conservancy, Oregon	Steve Buttrick

#### **Suggested additional participants**

(Contact information listed on attached spreadsheet)

APHIS	Mitch Nelson
City of Portland, Bureau of Environmental Services	John Reed
Columbia River Intertribal Fisheries Commission	Blaine Parker
Columbia River Steamship Association	Jim Townley
Oregon Department of Environmental Quality	Nina DiConcini
Oregon Department of Forestry	Cary Greenwood
Oregon Department of Water Resources	Tom Byler
Oregon Department of Parks & Recreation	Gene Thomas
Oregon Department of Transportation	Will Lackey
Oregon Division of State Lands	Marty Turner
Oregon Watershed Enhancement Board	Jeff Huntington
Oregon Watershed Enhancement Board	Ken Beerly
Port of Portland	Rick Mishaga
The Nature Conservancy, Oregon	Stephen Anderson
US Bureau of Land Management	Miles Brown
US Fish & Wildlife Service	Paul Heimowitz
US Fish & Wildlife Service	Sam Johnson
US Forest Service	Gary Smith

#### **Purpose of Invasive Species Education/Outreach Committee**

1) Coordinate E/O efforts on invasive species in Oregon

The group agreed that establishing a committee that focused on invasive species E/O would not duplicate existing efforts. Talking with others involved in E/O would develop synergy, improve coordination, and increase program effectiveness. Each organization would still retain autonomy over its own programs.

2) Develop common messages/themes related to invasive species

The group could develop a common message that addresses all invasive species in Oregon, whether terrestrial, aquatic, marine, plant, animal, or pathogen. This should enhance efforts to reach specific audiences with messages and delivery channels targeted specifically for them. By building a matrix, the group could determine which audiences were being reached successfully and where the gaps lie.

### 3) Review E/O strategies and offer feedback

Sharing activities, samples, publications, and ideas can help avoid redundant efforts, coordinate similar projects, and improve end products. The group could also draw from existing strategies, including national and state level efforts. Keys to streamlining the review process could include a listserv for interested parties and a Web site where items could be posted for review.

### 4) Assist in program implementation

The group can help identify funding opportunities for program members and offer agency resources where appropriate.

### **Next meeting**

The group agreed to meet in person to determine if regular meetings would be useful. The meeting will be held in mid-October (but not on a Monday) at the ODF&W facility in Salem, Oregon. Ann Snyder will reserve a conference room once a more definite date and time is available.

### **Tasks**

- All: Provide contact information for suggested additional participants to Diane Kightlinger ([eclipse@gorge.net](mailto:eclipse@gorge.net); 503-288-2095)
- Diane Kightlinger: Contact prospective participants about the Invasive Species E/O Group and encourage them to attend the mid-October meeting

**Oregon Invasive Species Council Education/Outreach Subcommittee Meeting**  
**16 October 2003 • 9 am – Noon**  
**Oregon Department of Fish & Wildlife**  
**Salem, OR**

The Oregon Invasive Species Council (OISC) Education/Outreach Subcommittee meeting attracted 23 individuals representing a wide range of federal and state agencies, academic institutions, and environmental and educational organizations. Mark Sytsma, Portland State University, explained the purpose of the OISC and need for an Education/Outreach Subcommittee to develop an education/outreach strategy and implementation plan for invasive species in Oregon. During a conference call on 5 September 2003, a small initial group elected to hold a larger meeting in October and identified four main purposes for the Invasive Species Education/Outreach Group: 1) coordinate E/O efforts on invasive species in Oregon; 2) develop common messages/themes related to invasive species; 3) review E/O strategies and offer feedback; and 4) assist in program implementation. Sytsma asked the group to consider other purposes.

Paul Heimowitz, US Fish & Wildlife Service, led a round table discussion to identify audiences, messages, media, and geographic coverage for invasive species education/outreach activities in Oregon. Although many organizations had management activities in place for invasive species and were anxious to incorporate education/outreach components, few had developed a strategy that identified the messages and media best suited to reach their target audiences or were implementing a program with specific, measurable goals.

In a letter, John Bragg, Coastal Training Coordinator for South Slough National Estuarine Research Reserve, noted that in the 2003 General Accounting Office report "Perspectives on Invasive Species," education and outreach on invasive species was identified as the Number 2 need, with 60 percent of state officials describing the need for education and outreach as a "great" or "very great" gap in federal legislation related to terrestrial and aquatic invasive species. Heimowitz noted that many opportunities for pooling resources and working collaboratively on invasive species education/outreach were apparent from the discussion.

The group then discussed what the focus of the OISC Education/Outreach Subcommittee should be. Many individuals expressed support for a statewide campaign to raise awareness of invasive species issues and the actions that humans can take to prevent their introduction and spread. Other functions of the subcommittee might include 1) sharing information on new projects 2) evaluating tools and data; 3) cataloguing materials and activities; and 4) generating a common message hierarchy. The group agreed on the need for follow-up to determine how each agency and organization wants to participate in invasive species education/outreach.

## **MINUTES**

### **ATTENDANCE**

See attached sheet for participants and contact information.

### **INTRODUCTION**

Mark Sytsma, Chairman of the Oregon Invasive Species Council (OISC) and Director of the Center for Lakes & Reservoirs at Portland State University, provided a brief introduction to the OISC. The Oregon legislature formed the OISC during the 1999 session (ORS 561.685), and the Council held its first meeting in January 2001. The Council is charged with producing and maintaining a variety of mechanisms for informing Oregonians about invasive species, including

- publicizing the existence of Internet sites and toll-free numbers to report invasive species sightings
- producing educational materials and press releases concerning invasive species
- conducting educational meetings and conferences

- soliciting proposals and reviewing applications for grants or loans to further projects providing education about invasive species.

The Council includes four permanent members – the Oregon Department of Fish & Wildlife, Oregon Department of Agriculture, Oregon State University Extension Sea Grant, and Portland State University – plus a number of industry groups and other organizations. Current Council members represent The Nature Conservancy (environmental organizations) Columbia Inter-Tribal Fisheries Commission (native Americans), Crook County Weed Control (terrestrial plants), J. Frank Schmidt & Son Co. (nurseries), Port of Portland (ports), Grassland Oregon (grass seed industry), and Whiskey Creek Shellfish Hatchery (aquaculture).

## **PURPOSE**

Sytsma also discussed the purpose of the Invasive Species Education/Outreach Group. He explained that the OISC has developed an Education/Outreach Subcommittee to develop and education/outreach strategy and implementation plan for invasive species in Oregon. During an initial conference call on 5 September 2003, the group identified a number of individuals whose contributions would prove valuable for developing and education/outreach plan. The initial group agreed to invite these individuals to a meeting in Salem, Oregon, on 16 October 2003.

Also, the group identified four main purposes for the Invasive Species Education/Outreach Group:

- 1) Coordinate E/O efforts on invasive species in Oregon
- 2) Develop common messages/themes related to invasive species
- 3) Review E/O strategies and offer feedback
- 4) Assist in program implementation.

Sytsma asked the group to consider other purposes and activities and encouraged those present to participate in OISC business.

## **ROUND TABLE DISCUSSION**

Paul Heimowitz, Aquatic Nuisance Species Coordinator for the US Fish & Wildlife Service, led a round-table discussion designed to inventory invasive species education/outreach activities in Oregon. Heimowitz asked the group to use the format provided on the Program Information form, which asked for the focus of efforts (e.g., plant, animal, terrestrial, marine), the target audience (e.g., general public, youth, anglers/hunters), types of materials/activities (e.g., brochures, newsletters, reports, Web sites), primary education message, and geographic coverage (e.g., Oregon, Washington, Pacific Northwest).

John Reed, Portland Parks & Recreation: Reed said his group focused mainly on invasive plants in the tri-county area, including terrestrial, freshwater, and riparian species. Reed is working with a variety of individuals, including horticulturists and ecologists, on educational and outreach instruments. The first effort is a weed list that will help direct Portland's regulatory course with regard to invasive plants, e.g., the plants that nurseries and landscapers can use for public projects. Other efforts will focus on metro area entities, including the general public. Portland Parks & Recreation is planning more public outreach projects on invasive plant issues, focusing on urban invasive plants and targeting horticulturists, growers, gardeners, and homeowners.

Mark Sytsma, Center for Lakes & Reservoirs, Portland State University: The CLR focuses mainly on aquatic invasive species. His group developed the state aquatic nuisance species management plan (available at [www.clr.pdx.edu](http://www.clr.pdx.edu)), which was produced at the request of Governor Kitzhaber's natural resource office. The CLR is currently implementing the plan with funding from the US Fish and Wildlife Service and the Pacific States Marine Fisheries Commission, in cooperation with state agencies, including the Oregon Department of Agriculture and Oregon Department of Fish and Wildlife. The CLR is conducting research on mitten crab and *Egeria densa* biology and developing methods for verifying ballast water exchange with funding from the US Coast Guard. The group has developed management plans for aquatic weeds in several lakes and recently completed a *Spartina* response plan for Oregon. In addition, the CLR staffs the Oregon Ballast Water Task Force for the Department of Environmental Quality.

Education and outreach are important aspects of the aquatic nuisance species management plan, and several ongoing projects have an E/O element, including those on zebra mussels and mitten crabs. Mark's student, Diane Kightlinger, is currently leading the effort to develop an E/O strategy for the Oregon Invasive Species Council.

Robin Rosetta, North Willamette Research & Extension Center: Rosetta develops research and education resources that address integrated pest management in nurseries. Although her main focus is entomology, she also deals with animals, microorganisms, and diseases in both terrestrial and aquatic environments. Within the OSU Nursery Extension Program, Rosetta has developed a Web page (<http://oregonstate.edu/dept/nurspest/index.htm>) with links to resources and specific information on invasive species geared for the nursery industry. As part of the OktoberPest series, Rosetta has scheduled an invasive species workshop on 30 October 2003. Rosetta's group has also just begun research on *Buddleja* (Butterfly bush) and issues pest alerts for the nursery industry.

Jed Colquhoun, Oregon State University Crop and Soil Science: Colquhoun focuses mainly on weed management in agricultural crops as part of a research and extension effort. He is concerned mainly with providing control and prevention strategies, economic and ecological impacts, and general information to the public, farmers, educators, and local governments and agencies. He relays information to extension agents via presentations and publications, including the four-color book "Pacific Northwest's Least Wanted List: Invasive Weed Identification and Management," a response to a need for information on certain weed pests in Oregon. Colquhoun also offers a Web site at [www.css.orst.edu/weeds](http://www.css.orst.edu/weeds).

Henry Lee, US Environmental Protection Agency, Western Ecology Division: Lee's organization focuses on research, not regulations or outreach. With the US Geologic Survey, the EPA is developing a stand-alone database known as the Pacific Coast Estuarine Information System (PCEIS) that outputs both the native and nonnative fishes, benthic invertebrates, and estuarine plants reported for all Oregon, Washington, and California estuaries. PCEIS also summarizes landscape data on each estuary (e.g., size) and associated watershed (e.g., average slope, nutrient loadings). The tool is intended primarily for managers and researchers, with the beta version expected in early 2004 and the final version in 2005. Debbie Reusser of the US Geologic Survey is working on a national survey, called the national atlas (see [www.nationalatlas.gov](http://www.nationalatlas.gov)), to provide the general public with access to information on organisms, including some invasive species, and geospatial data.

Brad Knotts, Oregon Department of Forestry: Knotts began by explaining that his work focuses on four different areas: fire protection, forest practices, state forests, and forestry assistance. In terms of invasive species, he is concerned mainly with terrestrial plants and also with diseases, such as Sudden Oak Death. He works primarily with forest land owners, helping them to get trees to grow and remove invasive plant infestations, such as Scotch broom and Himalayan blackberry. Actual education/outreach activity is limited, but Knotts would like to see a coordinator "kick up the dust."

Andrea Thury and Andrew Zachary, Portland Metro: A major effort at Metro focuses on work with The Nature Conservancy on Japanese Knotweed control along the Sandy River. They produce posters, brochures, and postcards targeting anglers, boaters, and hunters and asking them to report Japanese Knotweed infestations. They are also working to increase public awareness of Japanese Knotweed's harmful effects, control strategies, monitoring and detection. Metro and its partners have taken a watershed approach to Japanese Knotweed control, with a focus mainly on landowners along the river and in the upper watershed. Metro is also engaged in education/outreach programs focused on invasive species other than Japanese Knotweed.

JessieMae Belcher and Steve Wise, Friends of Opal Creek: Belcher said the Friends of Opal Creek plan to incorporate education/outreach activities on invasive species into their educational programs at the 35,000-acre preserve in the Willamette National Forest. Their education focus is primarily K-12 and college students, along with 12,000 visitors to the preserve each year. Wise explained that basic education programs focus on the value of the forest, the watershed and the relationship of people and the ecosystem. Work parties to remove Scotch broom found in the preserve are used as an educational

opportunity, with emphasis on the need to remove invasive species, restore native plants, and monitor the ecosystem.

Martin Nugent and Kara Goldhamer, Oregon Department of Fish & Wildlife, explained the Wildlife Integrity Rules, which were adopted to protect Oregon's native species from the risk of disease, hybridization, competition, predation, and habitat loss posed by non-natives. ODF&W categorized 16,500 nonnative species according to these criteria, from those that were prohibited to those that required control to those posed little threat. Nugent described the program conducted in partnership with state parks, the forest service, and Bureau of Land Management to remove European beach grass (*Ammophila arenaria*) to protect the endangered Snowy Plover. ODF&W is also working with The Nature Conservancy to protect the Washington ground squirrel.

Goldhamer noted that the ODF&W Information/Education Division is currently in the process of rebuilding. In terms of invasive species, the focus is on Oregon's 100 Worst Invaders. A brochure on New Zealand Mudsnaills is currently being drafted, with anglers as the target audience. Types of outreach activities include placing information in the press; establishing Web sites; providing information in Outdoor Skills programs; interpretive materials, including a natureescaping book; and an effort to provide research information to the legislature. The Fishing Regulations contain information on AIS and the hunting regulations on feral swine.

Sam Johnson, US Fish and Wildlife Service, stressed that invasive species pose the single greatest threat to the National Wildlife Refuge System conservation mission. Unfortunately, although education/outreach is important as a part of an integrated pest management program, it's also a gap in the refuge program. Oregon refuges confront a variety of invasive species issues, including terrestrial, aquatic, marine, plants, animals, and diseases and microorganisms. West Nile Virus is currently a hot topic. The target audience is broad: general public, educators, elected officials, local agencies, and refuge staff. Prevention poses a real problem and rapid response measures need to be instated. Wildlife refuges use a variety of materials, mostly developed by others. Refuges can serve as a conduit to get invasive species messages to the public. Johnson sees significant gaps in materials and activities, particularly in terms of interpretive signs and programs.

Steve Buttrick and Stephen Anderson, The Nature Conservancy: Buttrick said that nationally TNC supports an Invasive Species Initiative (<http://nature.org/initiatives/invasivespecies/>) with multiple projects and programs, including a Web site on weeds for practitioners (<http://tncweeds.ucdavis.edu/>). In Oregon, efforts focus on Japanese Knotweed detection and control in the Sandy River Watershed and support and participation in various Weed Management Areas. Seven full-time staff members work on research programs to determine optimal ways to control Reed Canarygrass, *Spartina*, Japanese Knotweed, and cheatgrass, then pass this information along to practitioners at symposia and other speaking opportunities. In addition, volunteers put in 10,000 hours each year removing invasive species from TNC preserves.

Anderson noted that unlike many of the state agencies represented at the meeting, TNC can lobby at the national and state level and partner with other groups to support initiatives. Anderson works with media regularly to promote stores about invasive species and people making a difference for the Oregon environment.

Buttrick stated that weeds and invasive species pose the greatest threat to biological diversity on TNC preserves.

Michelle Michaud, Oregon Parks and Recreation Department: Michaud explained that Oregon has 250 parks statewide, mostly developed but some undeveloped. Most education/outreach efforts on invasive species focus on terrestrial plants. The effort is not coordinated across the state: different parks pursue different activities. Most parks major focus is on their visitors, with only a secondary emphasis on weeds. Parks do have integrated pest management plans and also cooperate with state agencies and the Northwest Oregon Invasive Weed Management Partnership. One invasive species of major concern is False Brome, and an information sheets has been distributed to the state parks to be on the lookout for

this plant. The agency has a Web site for natural resource issues and an internal advisory council on weeds. Friends of the park groups, e.g., Friends of Tryon Creek, often conduct education/outreach for the general public and sponsor work parties to remove invasive weeds like English ivy. Interpretive programs include information on invasive plants such as European Beach Grass in the context of Snowy Plover conservation. State parks are also willing to serve as a conduit for information on invasive species. Michaud described a book that she had seen at one park that contained laminated cards showing native and invasive plants.

Tim Butler, Oregon Department of Agriculture: Butler stated that the ODA does not have a formal program for education/outreach on invasive species, but does have a Web site ([www.oda.state.or.us/plant](http://www.oda.state.or.us/plant)), pamphlets, pest alerts, newsletters, and other documents to educate the public and industry on invasive weeds, insects, and diseases. ODA also distributes press releases as a way to disseminate information to the public. In addition, ODA hosts the Oregon Invasive Species Hotline (1-866-INVADER) and distributes pencils with the hotline numbers. Butler said that ODA is trying to hire an individual to conduct education/outreach activities as part of the weed program.

Dennis Wise, Bureau of Land Management: Wise provided information on a number of invasive species plans that contain an education/outreach element, including the *Oregon Noxious Weed Strategic Plan* from ODA; the *Partners Against Weeds Communication Plan* from USDA-BLM; *Stemming the Invasive Tide: Forest Service Strategy for Noxious & Nonnative Invasive Plant Management*; *Pulling Together; National Strategy for Invasive Plant Management*; *Eastern Oregon Noxious Weeds Public Relations Project – 2001 Action Plan*; Oregon Watershed Enhancement Board outreach plan; and *Oregon Plan for Salmon and Watersheds – Willamette Restoration Strategy*. Wise also provided a Noxious Weed Program Material Inventory and Invasive Weed Web Sites, from research sponsored by the Student Conservation Association and the Salem and Eugene BLM District Noxious Weed Education Project. The Northwest Oregon Invasive Weed Management Partnership has conducted an education/outreach needs assessment to support training workshops. Wise also provided the booklet “Selected Noxious Weeds of Oregon” and a bookmark on several noxious weeds, noting that a revised edition is being developed for Western and Eastern Oregon. Communication tools that are available include a listserv ([willamette-weed@oda.state.or.us](mailto:willamette-weed@oda.state.or.us)) and an outdated Website ([www.oregonweeds.org](http://www.oregonweeds.org)) that has potential to become an information clearinghouse for noxious weeds in Oregon. An effort funded through a NFWF grant will be developing and piloting a teachers’ activity toolkit for noxious weeds. Finally, Wise introduced the Oregon Watershed InfoLine, a phone line that interested individuals can call to receive packets of information on topics dealing with watersheds. An invasive species packet and marketing strategy could be developed to promote awareness and distribution of information through this Infoline.

Randy Henry, Oregon State Marine Board: Henry explained that OSMB is a 40-person agency focused on recreational boaters – those with motorized boats and sailboats 12 feet or longer. The agency’s emphasis is law enforcement, facilities development, safety, and mandatory boater education. In terms of ANS, OSMB concentrates on plants and animals that can be transported by boat parts – hulls, bilges, livewells, axles – or on boat equipment. The target audience is recreational boaters, 60 to 70 percent of whom are also anglers. Materials and activities include the “Before and After” pamphlet on zebra mussels, hydrilla, and mitten crabs; an annual newsletter, with information on these same species in the last issue; a Clean Boating page on the agency’s Web site at [www.boatoregon.com/clean/ANS.html](http://www.boatoregon.com/clean/ANS.html); information on ANS as part of the boater education program; and displays at boat and sport shows on zebra mussels and mitten crabs. The main message is that boaters should take action to prevent spreading ANS. A new initiative is the Clean Boating Campaign, which will center on encouraging boaters to switch to four-stroke motors instead of two-stroke; avoid littering; and avoid spreading AIS. OSMB is issuing an RFP for a professional group to develop the campaign.

Mark Sytsma noted that the OSMB also worked with the CLR on a boater survey that was to begin in mid-October. The survey of 800 randomly selected Oregon boaters should provide a good idea of their knowledge, attitudes and practices related to AIS. The information will help agencies and organizations develop education/outreach materials for boaters and serve as a benchmark for determining the effectiveness of AIS education/outreach efforts.

Bill Hastie, David Heil & Associates: Hastie said that his transition to David Heil & Associates had been too recent for him to speak about that group's efforts; however, he felt that his previous organization, the Northwest Aquatic and Marine Educators, was a group ripe for taking up a cause. The focus would primarily be K-12 education. Hastie noted that federal money is available for service learning, whereby students identify problems, make a plan to solve them, and engage community partners. This formal education effort can be complemented by information education at museums, aquaria, workshops, and tours.

Paul Heimowitz mentioned Hastie's work as part of the Oregon Plan Outreach Team (OPOT) and said that the Invasive Species Education/Outreach Group should consider how it can connect with OPOT.

John Bragg, South Slough National Estuarine Research Reserve: Bragg was unable to attend the meeting; instead he sent a letter stating that the South Slough NERR, the Coos Watershed Association, Coquille Soil and Water Conservation District, BLM, and private citizens have recently formed a working group to address invasive species, noxious weeds, and aquatic invasive species in Coos County. The group welcomes the opportunity to interact with the Oregon Invasive Species Council. The group has identified a need for education and outreach addressing invasive species across a wide range of environments and issues. The group recognizes that better outreach and education are vital if individuals, communities, and decision makers are to understand the cost to society and the damage to the environment and ecologic integrity resulting from the spread of non-native species. Bragg noted that in the General Accounting Offices 2003 report "Perspectives on Invasive Species," education and outreach on invasive species was identified as the Number 2 need, with 60 percent of state officials describing the need for education and outreach as a "great" or "very great" gap in federal legislation related to terrestrial and aquatic invasive species. Bragg stated that the South Slough NERR can facilitate invasive species workshops for decision makers and assist to develop educational or outreach projects.

Paul Heimowitz, US Fish & Wildlife Service: Heimowitz described the 100<sup>th</sup> Meridian Initiative and its focus to keep zebra mussels out of the waters west of the US 100<sup>th</sup> Meridian. Many activities are associated with the initiative, especially given the upcoming Lewis & Clark Bicentennial. The focus is on recreational boaters, particularly in the Missouri River Basin where visitors following the Lewis & Clark Trail will most likely begin their journeys. In addition to signs at boat launches, brochures, and ID cards, the 100<sup>th</sup> Meridian Initiative is using Traveler Information Systems, which are low-power radio broadcasts used to pass along messages related to invasive species. Other programs the USFWS supports are more species-oriented, such as the education/outreach program on the Mitten Crab. The USFWS was also the driving force behind the "Stop Aquatic Hitchhikers" campaign and associated Website, which can be viewed at [www.protectyourwaters.net](http://www.protectyourwaters.net).

Paul Heimowitz (on behalf of) Oregon Sea Grant: Having worked at OSG until earlier this year, Heimowitz also covered their activities. The Hatfield Marine Science Center is developing an exhibit on aquatic invasive species that will focus on a number of different species. The key is to help visitors understand how biological invasions work. The exhibit should open in Fall 2004. Also, Heimowitz has been involved in developing a learning kit for AIS, a traveling trunk that contains curriculum and materials primarily geared for K-12 students in informal education settings, including museums, aquaria, fairs, beaches, piers, and so forth. The kits focus on the West Coast: California, Oregon, and Washington. Heimowitz also helped develop a video called "You Ought To Tell Someone," geared for those likely to detect invasive species, such as aquaculturists and anglers. Nationally, Sea Grant has made a major effort in education and outreach on invasive species.

Diane Kightlinger, Center for Lakes & Reservoirs, Portland State University: Kightlinger described the process for developing the AIS Education/Outreach Strategy and Implementation Plan for the OISC. First, she identified the AIS among Oregon's 100 Most Dangerous Invaders plus AIS already existing in Oregon to determine which pathways were significant in introducing and spreading the species. Once the pathways were known, she could identify the humans who could take action to prevent their introduction and spread. For AIS, those included commercial shippers; aquaculture industry, commercial fishers, bait harvesters; aquarium trade, pet trade, aquarium hobbyists; plant wholesalers, nurseries, landscapers,



water gardeners; live seafood trade, bait dealers' boaters, anglers, marina/boat launch operators; and water and power utility personnel.

By assessing the knowledge of invasive species among these audiences, she can determine where they stand on the continuum from awareness to action and target the message to them accordingly. For example, the aquaculture industry cultivates nonnative species and has long been aware of the potential impacts of invasive species on their harvest; but recreational boaters may not know that inspecting and cleaning their boats would help prevent invasive species infestations. The survey now being conducted with the help of the Minnesota Center for Survey Research should provide more information on the knowledge, attitudes, and practices of Oregon boaters.

Kightlinger is also working on an inventory of education and outreach materials and activities dealing with AIS in the Western states. She has gathered information from many agencies and organizations throughout the West and is now creating a database that summarizes the information. When finished, the database should identify the target audiences, species, messages, and locations that are covered in materials and activities currently available. Her target date for completing this project is November 2003.

Once the audiences and messages are identified, the key will be to determine what channels will work best to reach them; how to fund materials and activities; which agencies and organizations should be approached to partner on the effort; and which measures should be used to evaluate effectiveness and provide feedback. The strategy and implementation plan is targeted for completion in January 2004.

#### **ROUND TABLE SUMMARY**

Heimowitz summed up the Round Table Discussion by noting that, although many organizations had management activities in place for invasive species and were anxious to incorporate education/outreach components, few had developed a strategy that identified the messages and media best suited to reach their target audiences or were implementing a program with specific, measurable goals. Many opportunities for pooling resources and working collaboratively on invasive species education/outreach were apparent from the previous discussion.

#### **COMMON MESSAGES AND BRANDS**

Paul Heimowitz said that during the most recent OISC meeting on 25 September 2003, the group discussed common messages that link all invasive species in Oregon. The OISC considered four messages:

- Oregon is a special place: Protect the state from invasive plants and animals
- Don't transport plants and animals out of their native environments
- Never release non-native plants and animals into the wild
- Everyone can make a difference

Heimowitz asked the group believed that an overarching brand or message was needed.

Dennis Wise said that the group should consider tying in with the Oregon Tourism Department campaign and the message "Things look different here." He noted that tourism promotes business but that invasive species can hurt business, which is something that the business community needs to be aware of.

Stephen Anderson noted that under Measure 66, lottery funds are available to the Oregon Watershed Enhance Board (OWEB). He thought that invasive species messages might also be incorporated.

Kara Goldhamer mentioned the problems of incorporating logos or messages with all the other items already required in ODF&W materials.

Stephen Anderson suggested a message hierarchy, a set of sentences that would build on each other and be adapted for various uses. The range would run from a slogan or brand to additional messages that would express more sophistication. Parts of the hierarchy could use a fill-in-the-blank format that would be applicable for a variety of different situations.

Michelle Michaud stressed the need to keep any message simple. The audience should see the words and know instantly that we're discussing invasive species.

Paul Heimowitz asked if the OISC should develop a statewide campaign on invasive species. For example, Oregon Watershed Weeks was a blanket campaign that wrapped everyone together to create statewide awareness of watershed issues.

Randy Henry said that he finds the packets available as part of National Clean Boating Week extremely useful. The packets contain press releases and other resources that all maintain a consistent message. Henry expressed concern that the different audiences addressed by the group might make a consistent message difficult, but that recommended elements might be appropriate.

Mark Sytsma pointed out that for AIS, Protect Your Waters provides a nationally branded campaign with materials that address a variety of issues.

Paul Heimowitz said that some key issues are similar for all biological invasions.

Jed Colquhoun said that the state of Montana put forth a strong campaign for invasive species education and outreach, and has evaluated its effectiveness.

Paul Heimowitz said that a campaign would depend on the willingness of individual partners to participate.

Michelle Michaud thought that a campaign would help elevate the invasive species issue to the general public and that the current disparate efforts wouldn't make as much of an impact.

Jed Colquhoun said that the marketing might be best done on a larger scale.

Sam Johnson said that imagery often captures his attention and cited the example of a closeup image of a long-horned beetle.

Paul Heimowitz said the group does focus on many specific audiences with specific messages, but should also focus on the general public and media. Alone it's more difficult to attract media attention, so we should work to get information out as a group.

Stephen Anderson emphasized that reaching the media must be part of a campaign; that it's important to get to editors and reporters to get out the message. The group needs to generate greater public awareness in general and needs to look at efforts in other states and at potential funding sources and partners. We should also prime legislators for lobbying efforts.

Anderson felt that the group should enlist professional help to put together a campaign and might even be able to find an agency willing to conduct pro bono research on what the public understands on the invasive species issue. Research could answer questions such as, What is the level of public awareness? What messages will resonate with the public?

Paul Heimowitz stressed that we will also need to conduct evaluations to determine the effectiveness of a campaign in reach target audiences.

Henry Lee said that the group shouldn't make the message state-oriented but instead consider materials that can be used on a regional basis.

Robin Rosetta said that she finds it difficult to determine the resources available and the particular information she needs to be aware of for her target audience. It would help her to centralize information and resources in a one-stop shop. Can various groups link out from the OISC? Rosetta wants the group to work together on a regional level to combat invasive species.

Dennis Wise said that activities need to increase the capacity to deliver invasive species messages on the ground.

Paul Heimowitz asked where the group should go from here. The focus of the subcommittee could be:

- To share new projects
- To evaluate tools and data
- To catalogue materials and activities available
- To generate a common message hierarchy
- To develop a statewide (and beyond) campaign

Mark Sytsma also noted the need for feedback on the AIS strategy and ways that it can be generalized to other species and areas.

Paul Heimowitz said the subcommittee will need to follow up with each agency and organization interested in invasive species education/outreach to get some sense of how they want to participate.

### Invasive Species Education/Outreach Group Meeting Attendees -- 16 October 2003

<b>Name</b>	<b>Organization</b>	<b>E-mail Address</b>	<b>Phone</b>
Stephen Anderson	TNC	<a href="mailto:standerson@tnc.org">standerson@tnc.org</a>	503-230-1221
JessieMae Belcher	Friends of Opal Creek		
John Bragg	South Slough National Estuarine Research Reserve	<a href="mailto:John.bragg@dsl.state.or.us">John.bragg@dsl.state.or.us</a>	541-888-5558 x29
Tim Butler	ODA	<a href="mailto:tbutler@oda.state.or.us">tbutler@oda.state.or.us</a>	503-986-4621
Steve Buttrick	TNC	<a href="mailto:sbuttrick@tnc.org">sbuttrick@tnc.org</a>	503-230-1221
Jed Colquhoun	OSU Crop and Soil Science	<a href="mailto:jed.colquhoun@oregonstate.edu">jed.colquhoun@oregonstate.edu</a>	541-737-8868
Cary Greenwood	ODF	<a href="mailto:cgreenwood@odf.state.or.us">cgreenwood@odf.state.or.us</a>	503-945-7420
Bill Hastie	David Heil & Associates	<a href="mailto:bhastie@davidheil.com">bhastie@davidheil.com</a>	503-245-2102
Paul Heimowitz	USFWS	<a href="mailto:paul_heimowitz@fws.gov">paul_heimowitz@fws.gov</a>	503-872-2763
Randy Henry	OSMB	<a href="mailto:randy.h.henry@state.or.us">randy.h.henry@state.or.us</a>	503-373-1405 x247
Sam Johnson	USFWS	<a href="mailto:sam.johnson@fws.gov">sam.johnson@fws.gov</a>	360-696-7621
Diane Kightlinger	PSU CLR	<a href="mailto:eclipse@gorge.net">eclipse@gorge.net</a>	503-288-2095
Brad Knotts	ODF	<a href="mailto:bknotts@odf.state.or.us">bknotts@odf.state.or.us</a>	503-945-7484
Henry Lee	EPA	<a href="mailto:lee.henry@epa.gov">lee.henry@epa.gov</a>	541-867-5001
Michelle Michaud	OPRD	<a href="mailto:michelle.michaud@state.or.us">michelle.michaud@state.or.us</a>	503-378-4168 x288
Martin Nugent	ODF&W	<a href="mailto:martin.nugent@state.or.us">martin.nugent@state.or.us</a>	503-947-6309
John Reed	Portland Parks & Recreation	<a href="mailto:pkjohnr@ci.portland.or.us">pkjohnr@ci.portland.or.us</a>	503-823-1636
Robin Rosetta	N Willamette Research & Ext Ctr	<a href="mailto:robin.rosetta@oregonstate.edu">robin.rosetta@oregonstate.edu</a>	503-678-1264 x33
Kara Goldhamer	ODF&W	<a href="mailto:kara.s.goldhamer@stae.or.us">kara.s.goldhamer@stae.or.us</a>	503-947-6013
Mark Sytsma	PSU CLR	<a href="mailto:sytsmam@pdx.edu">sytsmam@pdx.edu</a>	503-725-3833
Andrea Thury	Portland Metro	<a href="mailto:thury@metro.dst.or.us">thury@metro.dst.or.us</a>	503-813-7554
Dennis Wise	PSMFC	<a href="mailto:dennis_wise@or.blm.gov">dennis_wise@or.blm.gov</a>	503-375-5648
Steve Wise	Friends of Opal Creek	<a href="mailto:opalcreek@opalcreek.org">opalcreek@opalcreek.org</a>	503-897-2921
Andrew Zachary	Portland Metro	<a href="mailto:zacharya@metro.dst.or.us">zacharya@metro.dst.or.us</a>	503-797-1713

**Invasive Species Education/Outreach Subcommittee Meeting**  
**18 December 2003 • 9 – 11:30 am**  
**Oregon Department of Fish & Wildlife**  
**Salem, OR**

**SUMMARY**

The Invasive Species Education/Outreach Subcommittee meeting to discuss a statewide campaign brought together 10 individuals representing a variety of federal and state organizations and agencies. Mark Sytsma, Portland State University, briefly explained the purpose of the Oregon Invasive Species Council (OISC) and the Education/Outreach (E/O) Subcommittee. He noted that the subcommittee had gathered to discuss a possible statewide campaign on invasive species, an activity supported by many of the participants at the 16 October 2003 meeting.

Members of the subcommittee discussed public awareness/information campaigns in which they had been involved and identified a number of components that might be part of a statewide campaign on invasive species (Appendix C).

Stephen Anderson, The Nature Conservancy of Oregon, described the Idaho Weed Awareness Campaign (Appendix D). The campaign includes both paid and earned media, and began with a part-time coordinator and \$50K in seed money used to support activities in the Boise market. The group raised an additional \$175K and is now running a series of TV and radio spots statewide. In addition, the media in Idaho have run a number of stories on invasive weeds.

The E/O subcommittee also discussed next steps in conducting a statewide campaign on invasive species in Oregon. Discussion focused on the advantages of targeting specific audiences with tailored messages versus a generic campaign to raise awareness. Most members of the subcommittee felt that a generic campaign would enhance efforts to promote specific actions. In addition, a generic campaign could generate a political will and constituency to provide resources to address the invasive species problem.

Four members of the E/O subcommittee will prepare a draft proposal to be presented to the OISC at the committee's 21 January 2004 meeting. The proposal will recommend obtaining the expertise and funding to conduct a paid and earned media campaign to combat invasive species in Oregon.

**MINUTES**

**ATTENDANCE**

See Appendix A for participants and contact information.

**INTRODUCTION**

Mark Sytsma, Chairman of the Oregon Invasive Species Council (OISC) and Director of the Center for Lakes & Reservoirs at Portland State University, provided a brief introduction to the OISC and the Education/Outreach (E/O) Subcommittee. He discussed Diane Kightlinger's work on an E/O strategy and implementation plan for aquatic invasive species (AIS) and the importance of extending that work to terrestrial species and even further to all invasive species. Sytsma mentioned that at the 16 October meeting of the E/O Subcommittee, many participants expressed support for a statewide campaign that would cover all invasive species.

Sue Thomas, Portland Parks & Recreation: Thomas was unable to attend the 16 October meeting; she noted, however, that she collaborates on many of the projects that John Reed's group is pursuing. In particular, Thomas works to prevent the introduction and spread of AIS in rivers and streams; to support the No Ivy League, which is headed by Sandy Dietrich; and to address the invasive species component of the Urban Conservation Treaty for Migratory Birds. Thomas also questioned whether programs to rear and release juvenile salmon in streams provide a good lesson for school children.

## **ROUND TABLE DISCUSSION**

Paul Heimowitz, Aquatic Nuisance Species and Research Coordinator for the US Fish & Wildlife Service, and Stephen Anderson, Communications Director for The Nature Conservancy of Oregon, led a round-table discussion designed to 1) identify important components of public campaigns on environmental and natural resource issues; 2) discuss the Idaho Weed Awareness Campaign; and 3) identify the next steps for the OISC E/O Subcommittee in conducting a statewide campaign on invasive species.

### **1) Identify important components of public campaigns on environmental and natural resource issues**

Paul Heimowitz, US Fish & Wildlife Service: As part of his work for Oregon Sea Grant, Heimowitz directed the Watershed Weeks campaign. The campaign was conducted each fall and consisted of a variety of activities focused on promoting the health of Oregon watersheds. Heimowitz noted that a real benefit to a campaign is that it carries its own weight; a campaign gives an issue a greater chance for media attention, especially when a variety of people pull together to coordinate efforts.

Michelle Michaud, Oregon State Parks: Michaud discussed Oregon's beach safety campaign, which includes TV spots and billboards. OSP is also a sponsor of the SOLV beach clean-up campaign each spring and fall. Mark Sytsma said that Jack McGowan, SOLV executive director, had contacted him about the possibility of incorporating a weed-pulling component in the beach clean-up.

Ann Snyder, Oregon Department of Fish & Wildlife: Snyder noted that ODFW is developing a series of brochures, with invasive species as one of the topics. ODFW also conducted a campaign for Free Fishing Weekend, which included TV spots. Another campaign, focused on hunter safety, includes giveaways at sports shows and sporting goods stores. Snyder said that many sportsmen are ardent conservationists, and they can be reached with handouts and flyers at sports shows. From January to June 2004, ODFW will be conducting a print campaign focused on deer and seals that centers on the message "Don't pick up baby wildlife."

Mark Sytsma noted that the OISC E/O Subcommittee needs information on the costs for TV and print ads. Snyder said that ODFW has been working with KTTV Fox. ODFW identifies the target audience (in the case of the Free Fishing Weekend, women and minorities) and the station picks the shows to air ads. The whole package for Free Fishing Weekend, which included TV spots and print ads, ran \$20K, with 220 airings of the ad. For the hunter safety campaign, KTTV offered the best rates and coverage; in addition, the station offers a discount for public service campaigns.

Sue Thomas, Portland Parks & Recreation: Thomas described the city-wide campaign for "No Ivy Day," which identified actions that any person in the city could take to combat English ivy. Information was sent out through park and friends of the parks newsletters; a city ceremony honoring the day included the mayor. Some 2000 people were involved in ivy eradication activities on the morning of "No Ivy Day."

As part of her work for the Western Forestry Center (now the World Forestry Center), Thomas also worked with an organization that planned Arbor Week. The group asked the mayor of every city in Oregon to write a proclamation and also provided news articles to accompany the proclamation.

Dennis Wise asked about the effectiveness of movie theater ads that precede the main feature. Ann Snyder said that studies show these really irritate moviegoers; Sue Thomas said that theater chains often don't give a price break or choice of theater.

Dennis Wise also asked about engaging more public organizations and particularly the private sector (e.g., the nursery industry). Mark Sytsma noted that the OISC does include Keith Warren, a representative of the nursery industry. Wise talked about a previous campaign by the Oregon Association of Nurseries, which tagged every Oregon product sold in nurseries. He emphasized the need to engage the business community, not just public agencies. He also noted the important role that tourism plays in Oregon and the negative impacts that invasive species could have.

Snyder said that the individual charged with tourism communications is Natalie Barnes of the Oregon Tourism Commission. Sytsma and Snyder also briefly discussed the Oregon State Marine Board's upcoming clean boating campaign. Snyder noted that the Recreational Boating and Fishing Foundation is an untapped source of funds and expertise, but that the one-year process to develop campaigns is time- and work-intensive.

John Bragg, South Slough National Estuarine Research Reserve: Bragg noted that South Slough had only recently begun working on invasive species E/O efforts. He said his responsibility is to get information to decision makers to help them solve their problems; however, Bragg also felt it is important to proceed with caution. (Coastal decision makers are individuals who, through elected, professional, or volunteer duties, make decisions that affect coastal environments and resources.)

Before South Slough moves forward, they may conduct a needs assessment. Bragg mentioned a purple loosestrife "Wanted Dead or Alive" poster and information published in the form of issue papers.

Bragg also noted his concern over "invasive species" and the need to be sensitive to the fact that although landscapers, gardeners, and nurseries may be familiar with invasive species issues, individuals buying and stocking plants at drugstores and groceries may not.

Bragg also said that South Slough can provide some funding and the ability to partner with other organizations to conduct workshops and training sessions for information sharing. He also noted that funding was available to conduct a decision-maker needs assessment.

Diane Kightlinger, Center for Lakes & Reservoirs, Portland State University: Kightlinger noted that the discussion seemed to center on the three main components for marketing: audience, message, and channel. As part of the agenda, Kightlinger had included the steps from awareness to action that are part of Nedra Kline Weinreich's book "Hands-on social marketing" (Sage Publications 1999) (see Appendix B). Obviously the OISC E/O group needs to determine the audiences it wants to reach, the message that they should receive, and the best means for doing so.

Kightlinger noted that one component not yet mentioned was reaching the media through press releases and media events and tours. Finally, Kightlinger stressed the importance of getting to know the audience through market research and the need to evaluate the effectiveness of communication after the fact.

Ann Snyder said that it's important to find out what the public knows and what resonates with them. For example, with most Oregonians it's fine to provide information and let them decide what to do, but not to *tell* them what to do.

Arlene Whalen, Oregon Department of Forestry: Whalen expressed her concern over the potential scope of a statewide campaign. She said that to get people to act required specific messages. She felt it important for the group to remember that stressing the losses if they don't help often works better than stressing the gains if they do. Whalen asked what the focus of the campaign would be: Invasive species as a whole?

Whalen noted that ODF has an entomologist and pathologist on board but few additional resources on invasive species. Most education is done through one-on-one education with landowners and through stewardship forester training. She also noted that at Hinkle Creek Research Project, a collaborative effort with Oregon State University, researchers study riparian health including invasive species.

The Oregon Plan assessment project might also include tools that could be used. Whalen said ODF is working to validate the Oregon Plan. She also mentioned that gardening is a hot topic in Oregon and that reaching individuals through garden clubs might be an effective channel.

Whalen asked if the E/O subcommittee includes an OSU extension agent. (Jed Colquhoun, associate professor at Oregon State University Crop and Soil Science, is a member of the subcommittee but was in

California presenting scientific background for the Washington Toxics Coalition lawsuit versus EPA concerning pesticide use near salmon habitat.)

Whalen said ODF also offers “Thanks for asking” question-and-answer papers that address topics of interest to Oregon citizens.

Mark Sytsma, Center for Lakes & Reservoirs, Portland State University: Sytsma explained that his group is working on many AIS issues with E/O components, including the *Spartina* management plan. He mentioned that PSU just finished conducting a boater survey with University of Minnesota. Kightlinger mentioned that the response rate was approximately 37percent, but the response rate for Michigan and Wisconsin was over 50 percent for each state. Sytsma mentioned the national “Stop Aquatic Hitchhiker” campaign and the efforts to develop a branded invasive species campaign for the aquarium industry, both of which are extremely structured efforts.

The 100<sup>th</sup> Meridian Initiative to keep zebra mussels and other invasive species out of the waters west of the 100<sup>th</sup> meridian is a less structured effort and has a broad geographic scope. 100<sup>th</sup> Meridian has developed two messages for Traveler Information Systems (TIS), with actors portraying Lewis & Clark. The messages can also be used for public service announcements. Sytsma played both messages, which were well-received by the subcommittee.

Dennis Wise, Bureau of Land Management: Wise discussed the public relations campaign on terrestrial weeds conducted by the Blue Mountain Resource Conservation District (RCD), which included an evaluation component. More information is available on the Web at [www.oregonweeds.org](http://www.oregonweeds.org). RCDs in Oregon include the Northwest Oregon, Cascade Pacific, and Columbia RCDs, and are supported by the National Resource Conservation Service.

The OISC E/O Subcommittee identified a number of possible components for a statewide campaign, which are listed in Appendix C.

## **2) Discuss the Idaho Weed Awareness Campaign**

Stephen Anderson, The Nature Conservancy: Anderson shared his knowledge of the Idaho Weed Awareness Campaign (IWAC). (Appendix D provides a summary developed by IWAC.) The Communications Director for The Nature Conservancy of Idaho was a co-chairman of IWAC. The campaign began with the Idaho counterpart of OISC, which decided to conduct a weed awareness campaign. Seed money came from the Idaho Department of Agriculture to hire a part-time coordinator and jumpstart the campaign. IWAC did not contain a polling or assessment component, so success has been measured anecdotally.

IWAC focused on two main elements: paid media and earned media. The goal was not to replace other efforts, but rather to enhance those efforts by raising awareness of weed issues in general. The initial effort raised \$50K to produce and run a TV ad in the Boise market only. At the same time, the group launched an earned media campaign. The media paid attention and created a spate of stories.

The Invasive Species Council saw the campaign as effective and decided to broaden the campaign beyond Boise. The part-time coordinator was hired on a full-time basis and the campaign went statewide. The group raised \$175K and began running ads statewide beginning in September 2003.

In terms of earned media, coordinator Roger Batt has been extremely involved, but the campaign also depends on committee members to instigate stories. The last page of the campaign summary contains a strategic brief used to insure that the projects proposed will meet the campaign goals. Thus there is a symbiotic relationship between the statewide campaign and individual efforts.

One piece that appears to be missing is research into the audience and message and an evaluation component.



Paul Heimowitz asked why the campaign focused on weeds only. Anderson said he didn't know, but that elected officials provided lots of support for the weed effort. In fact, the governor of Idaho made the initial announcement about the campaign ... but no reporters were present. One ad featured Senator Larry Craig, a leader in Congress in weed legislation.

Anderson noted that the IWAC group did not put a plan in place until after the initial ad. The seed money was raised from the Department of Agriculture, U.S. Forest Service, National Resource Conservation Service, Bureau of Land Management, and Idaho Rangeland Association. In many cases, the group used resources from the partnership; for example, graphic artists for the various agencies worked on the campaign and a TV station provided initial help.

John Bragg noted that selecting a message for weeds is critical, because in some cases pulling weeds can actually exacerbate the problem. Audiences need to be told specifically what they should and should not do.

### **3) Identify the next steps for the OISC E/O Subcommittee in conducting a statewide campaign on invasive species.**

Paul Heimowitz suggested that the group turn to the questions provided as part of the agenda (Appendix E). Mark Sytsma asked if a general message would work and said he thought it would be effective.

Heimowitz asked what the purpose of a campaign would be. John Bragg noted that invasive species encompass aquatic and terrestrial organisms, animals and plants. This can be very confusing to the public. What is the commonality? Bragg suggested that how things spread might provide one touchpoint. How do people act in ways that spread invasive species? Disturbance, for example, seems to provide habitats conducive to invasion by nonindigenous species.

Arlene Whalen said that her agency was working on a tri-fold forestland conversion brochure and that one of the problems discussed is what ODF can realistically expect people to do. Her group decided that it would be best to request that people contact ODF to help make optimal decisions.

Sytsma reread the Idaho Weed Awareness Campaign mission and suggested that it might be applicable in Oregon by changing the language from "weeds" to "species."

"The overall Mission or Goal of the IWAC is:

- 1) To create a strong public awareness foundation with the citizens of Idaho about the overall problem of invasive weeds and their direct effect on Idaho.
- 2) To enlist the support of Idaho citizens by providing a visual frame of reference so they can better identify particularly critical invasive weeds; know what actions they should take when they locate invasive weed infestations; and how they personally can help in the prevention of further infestations of invasive weeds."

Heimowitz said that individual campaigns fit under the umbrella of a generic campaign on invasive species, which would inform people that they need to think about invasive species. He also suggested that an initial Oregon campaign should focus on an awareness-based goal similar to the first Idaho objective, and not adopt a goal similar to the second Idaho objective that aims for increasing capacity by the public to identify specific invasive weeds and related control methods.

Sytsma said that information on pathways would help people understand how they can avoid being part of the problem.

Dennis Wise asked if people would pay attention to a generic invasive species message. He cited the example of West Nile Virus and SARS as two topics that definitely grab people's attention. Sytsma said it was important to know what buttons to push to get people to react.

Whalen noted that sometimes you have to shock people. The key is to present information in a way that people can relate to. Wise said that we definitely need to work on invasive species awareness, but asked what would trigger people to act.

Sytsma said that's why he feels that the group needs to engage professional help. John Bragg said there might be people who could help do that. He added that people, such as oyster growers and ranchers, understand specific facets of the problem, because invasive species affect their pocketbooks.

Heimowitz asked what we want the audience to do: to care enough to learn more? Ann Snyder noted that with the attention span of people today, TV, radio, and print ads all engage their attention for a very limited amount of time.

Bragg mentioned the "Got milk?" campaign, which gets the public thinking about the product and where it comes from. Before the subcommittee can develop a mission, Bragg felt the group needed a vision. Why would the group bother to develop a statewide campaign? What is the overarching vision?

Heimowitz noted that for the OISC, the benchmark is how successful the committee is in keeping out the 100 Least Wanted Species in Oregon. So the message is mainly prevention and, to a lesser extent, monitoring.

Whalen noted that both the economic and environmental health of Oregon are important. So why do we want to keep invasive species out of Oregon? Obviously it's part of the work of natural resource agencies.

Wise said it comes down to being a good steward of the land. This is also a key element of the tourism campaign and the Coho assessment. Wise also cited the example of the pastoral letter.

Sue Thomas thought that working from the ground up might be more effective, instead of going to the public with such a diverse message. Sytsma said the subcommittee needed a message that would tie everything together and that might be difficult. The group would also need specific messages for each group.

Wise said, however, that in some cases the same message would reach different groups (e.g., recreationists, hunters, and timber cutters). All these groups might potentially move seeds from one place to the next, and invasive weeds mean less forage available for grazing animals. The overall theme is for people to be better stewards of the land.

Thomas said that there is no word like "weed" that works for animals. She felt that perhaps the OISC should not pursue an overall general public campaign, but instead develop more specific educational programs targeting specific audiences like boaters or gardeners.

Heimowitz suggested "pest" for animals as a counterpart for "weed" for plants. He said he thought that both a generic campaign and a focus on individual audiences are needed, because invasive species are so widespread and are introduced by so many pathways. He added that he thinks invasive species are similar to nonpoint-source pollution, where in addition to a general "don't pollute" message, messages must also focus on farmers, timber cutters, and every other individual who can contribute to the problem and its solution. The same is true for invasive species, because so many people move items from one place to another, including anglers, hunters, boaters, gardeners, and so forth.

Heimowitz said he felt the embryonic issue needs the "oomph" of an overall campaign. Although the subcommittee may not have evidence of that yet, the group needs to scope out the possibilities.

Stephen Anderson said that invasive species are a complex, diffuse problem with many different facets. Not only is the group trying to change individual behavior, but also to change political culture. Politicians will respond to what people perceive as a problem. We need more funding to solve the problems of

invasive species and to build a political constituency and will. So the vision might be for everyone to be more aware of the problems of invasive species.

Wise said that the Oregon Plan takes a similar tack: that everyone should be involved at work, play, or home. The Oregon Plan is an overarching way to get everyone involved in watersheds, and invasive species are undermining watersheds. Yet the Oregon Plan isn't getting the invasive species message out.

Heimowitz asked what would resonate with Oregon audiences. He noted that although much of the concern by those present centered on ecological impacts of invasive species, perhaps the primary campaign focus should be on the economic and social impacts, given that they've been shown to be substantial and may resonate more with the public.

Bragg said that the vision statement should coordinate with the Oregon Plan. The current tourism campaign is focused on the message "We love dreamers." Bragg noted that police wear their motto on their uniform: "To protect and serve." It gets right to the heart of what police do, even though the job is extremely complex and dangerous. So an overall campaign on invasive species would be one that not only is effective, but would also tie into what's most important to the people involved.

Heimowitz asked if the subcommittee could end the meeting by determining how to proceed. He said he thought the subcommittee needs to continue to meet, but how should we investigate resources? Cost? Expertise? Much groundwork needs to be done.

Sytsma noted that the OISC has very little money to contribute. Wise asked exactly what the group needs. Sytsma wondered if the group needs an expert who can move the campaign forward.

Anderson said he knows a number of people who work on marketing campaigns. He said that, in his opinion, the subcommittee is talking about a paid media campaign that would probably cost several hundred thousand dollars and be carried out primarily through TV spots. Anderson said he thought the group needed to be clear on the scope, then asked at what point we would be ready to go to the OISC. The next step should be an assessment and campaign plan.

Whalen asked if the group was envisioning going to stakeholders, including private industry, for money. Anderson said that he hoped everyone could carve off part of their budget to support a generic campaign and hire someone to pull the campaign together.

Heimowitz suggested the group put together a proposal for the OISC that describes how we would go about the campaign. The proposal would explain the need for a person or group to pull together a marketing plan, get resources, and implement the plan. Heimowitz, Sytsma, Anderson, and Bragg agreed to work together to produce a draft.

Bragg noted that the national estuarine research reserve program has an individual in Washington, D.C., who focuses on marketing issues. He agreed to contact the individual to get specific ideas. He also suggested that the group shared their thoughts on invasive species campaign messages.

Whalen said her duties working on the Oregon Plan assessment precluded her helping with the draft, but that she could act as a bridge between the OISC E/O Subcommittee and the Oregon Plan.

Sytsma said that the next OISC meeting would be in late January 2004. He suggested the E/O subcommittee go to the council meeting and discuss the proposal. He asked if the group might be able to pull together \$20K and to structure the proposal to seek foundation support.

Anderson asked if we could present a proposal to the OISC on 21 January and Sytsma agreed. Bragg cautioned that it would be important to have an overarching vision before asking for money. People must recognize that they'll benefit from an invasive species campaign and will want recognition for the money they spend.

Heimowitz said the message he wanted to take to the OISC is that the E/O subcommittee would like to conduct a professional media-based campaign, which would focus on the invasive species problem. The E/O subcommittee needs to obtain professional marketing expertise to proceed. Sytsma asked if it would be possible to obtain pro bono help and thought that someone might help put together a plan if they thought they might be first in line to implement a campaign.

It was agreed that Heimowitz, Sytsma, Anderson, and Bragg would prepare a draft proposal, share it with the group, and present it to the OISC at the 21 January 2004 meeting.

**Appendix A. Participants in 18 December 2003 OISC E/O Subcommittee meeting and contact information**

**Oregon Invasive Species Council Education/Outreach Subcommittee Meeting – 18 December 2003**

<b>Name</b>	<b>Organization</b>	<b>E-mail Address</b>	<b>Phone</b>
Stephen Anderson	TNC	<a href="mailto:standerson@tnc.org">standerson@tnc.org</a>	503-230-1221
John Bragg	South Slough National Estuarine Research Reserve	<a href="mailto:John.bragg@dsl.state.or.us">John.bragg@dsl.state.or.us</a>	541-888-5558 x29
Paul Heimowitz	USFWS	<a href="mailto:paul_heimowitz@fws.gov">paul_heimowitz@fws.gov</a>	503-872-2763
Diane Kightlinger	PSU CLR	<a href="mailto:eclipse@gorge.net">eclipse@gorge.net</a>	503-288-2095
Michelle Michaud	OPRD	<a href="mailto:michelle.michaud@state.or.us">michelle.michaud@state.or.us</a>	503-378-4168 x288
Ann Snyder	ODFW	<a href="mailto:Ann.snyder@state.or.us">Ann.snyder@state.or.us</a>	503-947-6010
Mark Sytsma	PSU CLR	<a href="mailto:sytsmam@pdx.edu">sytsmam@pdx.edu</a>	503-725-3833
Sue Thomas	Portland Parks	<a href="mailto:enviroed@ci.portland.or.us">enviroed@ci.portland.or.us</a>	503-823-3601
Arlene Whalen	ODF	<a href="mailto:awhalen@odf.state.or.us">awhalen@odf.state.or.us</a>	503-945-7427
Dennis Wise	PSMFC	<a href="mailto:dennis_wise@or.blm.gov">dennis_wise@or.blm.gov</a>	503-375-5648

## Appendix B. Steps from Awareness to Action

Stage	Awareness/Action	Message
Precontemplation	Unaware, no action	Raise awareness
Contemplation	Aware, considering action	Emphasize benefits, social pressure
Preparation	Decide to take action, must learn behavior	Motivate action, minimize barriers, convey skills
Action	Perform behavior once, consider benefit	Provide positive reinforcement
Maintenance	Perform behavior when appropriate	Provide reinforcement and tips for maintaining behavior

From Weinreich, N.K. 1999. *Hands-on social marketing: A step-by-step guide*. Sage Publications.

## Appendix C. Possible components for a statewide campaign on invasive species in Oregon

- Radio spots, including public service announcements and low-power radio stations (traveler information systems)
- Television spots
- Print materials (brochures, newsletters, etc.)
- Hands-on citizen participation events
- Elected official proclamations
- Theater advertising
- Billboards and posters
- Information provided via retail sales, e.g., tags, cards
- Press releases, media events and tours
- Web site information
- Townhall meetings
- Giveaways (pencils, key chains, bumper stickers, buttons, etc.)
- Standard “branded” logos and messages
- Mascots (costumes)

## **Appendix E. Questions to consider for the proposed statewide campaign**

### **Mission:**

- What is our overall purpose?

### **Goal:**

- What do we want to achieve with a statewide marketing campaign?

### **Audience:**

- Who do we want to reach?
- Where are they on the continuum from awareness to action? (See attached chart)

### **Message:**

- What do we want to tell the audience?
- Should we develop a theme for each year of the campaign?
- What themes resonate in Oregon?
- What is our main message? Key specific messages?

### **Channels:**

- How can we best reach our audience(s)?

### **Expertise:**

- What are our options for professional assistance in developing a statewide marketing campaign?

### **Funds:**

- How can we pay for a statewide marketing campaign?

### **Partners:**

- What additional agencies/organizations should we partner with to increase the effectiveness of a statewide marketing campaign?

### **Schedule:**

- What should our timeline be for implementing a statewide marketing campaign?

### **Effectiveness:**

- How can we evaluate the results of a statewide marketing campaign?

**Proposal presented to OISC on 21 January 2004**  
**Developing a Statewide Public Outreach Campaign**  
**on Invasive Species**

A proposal from the Invasive Species Education/Outreach Subcommittee  
to the Oregon Invasive Species Council  
January 21, 2004

**Background**

Since forming in September 2003, the Invasive Species Education/Outreach Subcommittee (ISEOS) of the Oregon Invasive Species Council (OISC) has held two meetings. A primary recommendation emerging from discussions at those meetings is for the OISC to lead development and implementation of a public outreach campaign on invasive species.

**Purpose**

The campaign would serve three primary purposes:

- 1) To build awareness among all Oregonians of the invasive species problem at a basic level; for example
  - What are invasive species?
  - How do they harm Oregon?
  - What are simple things that everyone can do to help?
- 2) To serve as an “umbrella” that encompasses other audience-specific or taxa-specific outreach.
- 3) To help build the political will and constituency to encourage policy makers to address the invasive species problem.

**Scope/focus**

The major components of the campaign would involve earned media (public relations to prompt media coverage) and paid media (print and broadcast advertising). The campaign would also include a variety of other components, including written materials and events. Similar to private marketing campaigns, the OISC campaign would involve a “branded identity” that could include a logo and slogan (for example, “Got Milk?”).

**Need for professional services**

Based on experience with similar campaigns, the ISEOS recommends that the OISC secure professional services to conduct market research, develop campaign messages and materials, and implement the campaign. Although ISEOS members and their organizations can provide invasive species expertise and in-kind resources to support campaign development and delivery, professional services will help ensure quality control and expedite the timeline. Although we may be able to secure professional services at a reduced rate or even *pro bono*, these services will likely require a significant investment by the OISC and its partners. (See Projected costs below.)



## Process

To proceed with the approach outlined above, the ISEOS recommends that the OISC (via the ISEOS):

- 1) Conduct informal interviews with several regional marketing companies to assess the likely cost range for developing and implementing a campaign. The assessment will focus on the initial costs of developing basic campaign components:
  - Brand identity, including polling and other research, logo, slogan, and general messages
  - Delivery strategy, including where/when to use specific outreach methods and a projected ballpark cost for print and broadcast media.*Projected timeline: February 1-15, 2004.*
- 2) Create a campaign development budget based on the cost assessment effort.  
*Projected timeline: February 15-29, 2004.*
- 3) Begin pursuing partnership and grant funds that fulfill the campaign development budget, using a portion of OISC funds as seed money or match.  
*Projected timeline: March 2004?*
- 4) As soon as funds are available (or anticipated) to develop the campaign, prepare and disseminate a Request for Quotes and Qualifications to solicit candidates for developing the campaign. Produce an associated draft scope of work and develop an evaluation process to select the finalist(s).  
*Projected timeline: Summer 2004?*
- 5) Work with the selected contractor(s) and other partners/stakeholders to begin developing the campaign (e.g., initial market research) and raising funds to finance its implementation.  
*Projected timeline: Fall/Winter 2004?*

## Projected costs

<u>Activity</u>	<u>Projected Cost</u>	<u>Funding Source</u>
Developing brand identity and delivery strategy	\$10K to \$100K	OISC and partners
Implementing campaign components	\$500K to multi-million	OISC and partners

The cost of professional services to develop and implement public outreach campaigns can often seem overwhelming, especially for the initial development stage. . However, given the significant resources that will be devoted to implementing a major campaign that includes earned and paid media – and the ultimately enormous management costs if Oregon fails to reduce the threats of invasive species – we see the cost of professional services as a wise investment.

## APPENDIX 3. OREGON 2003 BOATER SURVEY INFORMATION

- **Budget**
- **Confidentiality letter to the Oregon State Marine Board**
- **HSRRC Application Proposal**
- **Survey instrument**
- **Initial letter and follow-up mailings**

**Question-and-answer for Oregon State Marine Board staff**

**FISCAL YEAR 2003-2004 ESTIMATED BILLING RATES**  
**AQUATIC NUISANCE SPECIES SURVEY OF BOATERS IN ONE STATE**  
**8 PAGE MAIL SURVEY SENT TO 800 BOAT OWNERS**

**DIRECT COSTS** (Billing Rates submitted to U of MN)

**PERSONNEL** (Object 7301)

	<u>Hourly Rate</u>	<u>Est. Hours</u>	<u>Total Cost</u>
Executive management	\$57.25	23	1,317
Project management	\$42.25	33	1,394
Data processing	\$42.50	27	1,148
Student workers	\$13.75	84	1,155
TOTAL PERSONNEL			5,014

**SUPPLIES AND OTHER EXPENSES**

Object 7310	Printing/duplicating	870
Object 7301	Sample (provided by client)	0
Object 7340	Courier	7
Object 7341	Postage	1,177
Object 7301	Data entry (Northwest Key punch)	912
Object 7351	Long distance telephone	15
Object 7300	Local travel	5
TOTAL SUPPLIES/OTHER EXPENSES <u>2,986</u>		

TOTAL COSTS **\$8,000**

ASSUMPTIONS: 8 page small booklet survey form for mailing  
 Minor revisions of previous ANS survey  
 First mailing and postcard reminder sent to entire sample  
 Third mailing sent to 65% of initial sample  
 1 oz to mail out, 1 oz return mail  
 Up to 480 completed surveys for editing and data entry  
 4 minutes editing for each completed survey  
 Supplies and other expenses will be reimbursed for actual costs incurred

16 September 2003

Wayne Shuyler  
Deputy Director  
Oregon Marine Board  
PO Box 14145  
Salem, OR 97309

Dear Wayne:

The Center for Lakes & Reservoirs at Portland State University would like to conduct a survey of boaters to determine their knowledge and attitudes about aquatic invasive species. The University of Minnesota Center for Survey Research (MCSR) will administer the survey and plans to send out the initial mailing in early October 2003. (You can contact MCSR Director Rossana Armson at 612-627-4282 or [arms001@umn.edu](mailto:arms001@umn.edu).)

To conduct the survey, we require recent information on registered boaters in Oregon. We will use that information to randomly select 1600 participants for the survey. You generously agreed to send us an Excel file of the mainframe database of registered boats; however, some of the fields contain sensitive information that must be protected.

We agree to use the information in the database only to generate a list of 1600 random participants for the survey and to ensure the confidentiality of all participants. Once we have transmitted the names and addresses of the selected participants to the MCSR, we will delete all OSMB database information from our files.

The MCSR will assign an identification number to each survey for mailing purposes only. When participants return their surveys, their names will be checked off the mailing list. The participant's name is never written on the survey itself, nor is it used for any other purpose.

If using the database of registered boats in this manner is acceptable to you, please send a CD of the database to the following address:

Diane Kightlinger  
1644 SE Ladd Avenue  
Portland, OR 97214

Thanks very much for your help.

Sincerely,

Mark Sytsma  
Director, Center for Lakes & Reservoirs

## HSRRC Application Proposal

### I. Project Title & Prospectus

#### Survey of Oregon Boaters' Knowledge and Attitudes Regarding Aquatic Invasive Species

Aquatic invasive species (AIS) are plants or animals that enter waters where they are not native. They can cause enormous damage to the environment, the economy, and human and animal health. Overland transport of recreational boats poses significant risks for introducing and spreading AIS, because boats and associated equipment carry AIS from one water body to another. With some 200,000 registered boats in Oregon, this represents a major pathway for AIS to become established in the state.

Fortunately, boaters can take action to prevent the introduction and spread of AIS, including inspecting their boat and equipment before leaving or launching in a water body and removing all organisms and mud. Boater education therefore is one key to success in preventing and slowing the spread of AIS.

The Center for Lakes and Reservoirs is developing an education/outreach strategy targeted at recreational boaters as an element of the Oregon Aquatic Nuisance Species Management Plan. We are working with the Oregon Invasive Species Council (OISC) to develop the strategy. As part of that effort, we plan to conduct a mail survey that will 1) establish a baseline for knowledge and attitudes about AIS among Oregon boaters, and 2) allow for future evaluation of the effectiveness of boater education in changing awareness of AIS and boating practices.

The survey tool was developed by Minnesota Sea Grant in the early 1990s and has been revised several times since then for use in states across the country. The eight-page survey will be sent to 800 Oregon boaters, who will be randomly chosen from a database provided by the Oregon State Marine Board (OSMB). The University of Minnesota Center for Survey Research (MCSR) will send out the survey and follow-up mailings, using an identification number on the survey only to determine to whom follow-up mailings should be sent. Once the survey is complete, the data will be compiled in a file that can be analyzed using a statistical package.

### II. Exemption Claim for Waiver of Review

Our study falls into the second of the "Waived Review" categories, which refers to survey procedures in which 1) human subjects cannot be identified, and 2) disclosure of the responses could place the subjects at risk. For the purposes of our study, the researchers will not know the respondents' names. We will use the OSMB database only to randomly select 1600 potential participants; following the random selection, all OSMB database information will be deleted from our files. (See attached letter to Wayne Shuyler, OSMB, dated 16 September 2003.)

The survey will be sent to 800 participants. Each survey will be assigned an identification number for mailing purposes only. When participants return their surveys, their names will be checked off the mailing list. The participant's name will never be written on the survey itself, nor will it be used for any other purpose. No information about the respondents will be included in the data compiled for analysis.

### III. Subject Recruitment

The subject population for this study includes some 200,000 registered boat owners in Oregon. The OSMB will make a database containing the names and addresses of these individuals available to the researchers. (See attached e-mail from Wayne Shuyler, OSMB, dated 10 September 2003.) From this

database, we will randomly choose 1600 potential participants; MCSR will randomly narrow the group to 800 participants. The population will be sorted only by random choice.

#### **IV. Informed Consent**

Not applicable.

#### **V. First-Person Scenario**

I received a letter and survey form from the Center for Lakes & Reservoirs at Portland State University in the mail. The letter discusses some of the impacts of AIS and asks me to participate in a survey about boaters' knowledge and attitudes toward AIS. (See attached sample letter to survey participants.) After receiving an additional postcard and letter encouraging me to fill out the survey, I decided to respond. I filled out an eight-page form that asked about my knowledge of various AIS, the importance of boating practices to prevent their spread, the sources of my knowledge about AIS, the effectiveness of various methods to prompt me to take actions to prevent the introduction and spread of AIS, and my boat usage during the last season. (See attached survey conducted in Minnesota in 2000.) I finished filling out the survey and returned it to the MCSR in a pre-paid envelope. Later, I saw a notice in the Marine Board newsletter stating that the survey results were available online or by contacting PSU. I requested the results and read the summary of survey responses.

#### **VI. Potential Risks and Safeguards**

Not applicable.

#### **VII. Potential Benefits**

The results of this study will provide the OISC with a baseline of knowledge and attitudes about AIS among recreational boaters. Armed with that information, the OISC will be able to develop an effective education and outreach campaign to encourage boating practices that prevent the introduction and spread of AIS. In the future, similar surveys will help the OISC evaluate the effectiveness of the initial campaign and implement changes that will produce an even greater impact.

Recreational boaters will benefit from lakes, rivers, and streams where AIS do not degrade fish and wildlife habitat, spoil beaches, tangle propellers, foul boat hulls, ruin engines, clog pipes, or poison waters to the extent that they cannot be used for boating or swimming. The ultimate goal is for every boater in Oregon to be aware of AIS and to take actions to protect Oregon from the environmental, economic, and health damage they cause.

#### **VIII. Records & Distribution**

Subjects will be anonymous. Following completion of the survey, all contact information will be deleted from our files.

#### **IX. Appendices**

E-mail from Wayne Shuyler, OSMB, dated 10 September 2003  
Letter to Wayne Shuyler, OSMB, dated 16 September 2003  
Letter to survey participants  
Survey conducted in Minnesota in 2000

## OREGON AQUATIC NUISANCE SPECIES AND BOATING SURVEY

Please circle the number that corresponds to the answer closest to your opinion or situation.  
**ALL INDIVIDUAL RESPONSES WILL BE KEPT CONFIDENTIAL.** For the purpose of this survey,  
BOATS are defined as canoes, kayaks, duck boats, sailboats, personal watercraft, fishing boats,  
and recreational watercraft.

- Q1. AQUATIC NUISANCE SPECIES are plants or animals that enter places where they have NOT always lived. They can be harmful to fish and wildlife, and to commercial and recreational water uses. How much information have you heard or read about each of the AQUATIC NUISANCE SPECIES listed below? (Circle one answer for each item.)

**How much information have you heard/read about .**

<u>Aquatic Nuisance Species</u>	<u>A Large Amount</u>	<u>A Moderate Amount</u>	<u>A Small Amount</u>	<u>None</u>
a. Zebra mussels	1	2	3	4
b. Eurasian watermilfoil	1	2	3	4
c. Asian carp	1	2	3	4
d. New Zealand mudsnail	1	2	3	4
e. Northern pike	1	2	3	4
f. Snakehead	1	2	3	4
g. Hydrilla	1	2	3	4
h. Other (please specify) _____	1	2	3	4

- Q2. In your opinion, how important is it that boaters and anglers take precautions to prevent the spread of each of the following aquatic nuisance species from one body of water to another? (Circle one answer for each item.)

**Taking precautions to prevent the spread is . . .**

<u>Aquatic Nuisance Species</u>	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Very Important</u>	<u>Not at All Important</u>	<u>Don't Know</u>
a. Zebra mussels	1	2	3	4	5
b. Eurasian watermilfoil	1	2	3	4	5
c. Asian carp	1	2	3	4	5
d. New Zealand mudsnail	1	2	3	4	5
e. Northern pike	1	2	3	4	5
f. Snakehead	1	2	3	4	5
g. Hydrilla	1	2	3	4	5
h. Other (please specify) _____	1	2	3	4	5

- Q3. Have you heard of or read about aquatic nuisance species from any of the following sources? (Circle one answer for each source.)

<u>MEDIA SOURCES</u>	<u>Yes</u>	<u>No</u>	<u>Don't Know</u>
A. Newspaper articles	1	2	3
B. Magazine or newsletter articles	1	2	3
C. Television news or programs	1	2	3
D. Radio news or programs	1	2	3

E.	Television public service announcements	1	2	3
F.	Radio public service announcements	1	2	3
G.	Billboards	1	2	3
H.	Internet web sites	1	2	3
<b>EVENTS</b>				
I.	Conferences, presentations, or meetings	1	2	3
J.	An educational exhibit or display	1	2	3
K.	Fishing contests, fishing derbies, or sailboat regattas	1	2	3
L.	A booth at a sport show, fishing show, or similar event	1	2	3
<b>FISHING OR BOATING SOURCES</b>				
M.	Fishing or boating regulation pamphlets	1	2	3
N.	Boat registration materials	1	2	3
O.	Boating safety education course	1	2	3
P.	Creel surveys or inspection-education programs on roads or at boat launches	1	2	3
Q.	Signs or information provided at a <u>marina</u> or <u>boat launch</u>	1	2	3
R.	Signs or information provided at a <u>bait shop</u>	1	2	3
S.	A fishing, boating, sporting, or environmental organization	1	2	3
<b>OTHER SOURCES</b>				
T.	Brochures, species identification cards, fact sheets, or other printed materials	1	2	3
U.	Books	1	2	3
V.	Educational videos	1	2	3
W.	Hotline or information clearinghouse	1	2	3
X.	Other (please specify) _____	1	2	3

Q4. Of the sources of information that you circled in Question 3, which four were your BEST sources of information about aquatic nuisance species? (*Write the letter for each item you select in the spaces provided below.*)

Q5. \_\_\_\_\_ How effective would each of the following be in getting YOU to take steps to prevent the spread of aquatic nuisance species? (*Circle one number for each item.*) In the last column, please tell us which ones ALREADY led you to take action. (*Circle Yes or No for each item.*)

HOW EFFECTIVE WOULD THIS BE IN GETTING YOU TO TAKE ACTION . . .	Would be very effective	Would be somewhat effective	Would NOT be very effective	This already led me to take action
A. Talking with friends or acquaintances	1	2	3	Yes No
B. A sense of personal responsibility	1	2	3	Yes No
C. A desire to keep aquatic nuisance species out of our lakes or streams	1	2	3	Yes No
D. A desire to prevent damage to my boat or equipment	1	2	3	Yes No
E. Laws or regulations to prevent the transport of aquatic nuisance species	1	2	3	Yes No
F. Enforcement checks on the road or at boat launches to catch violators	1	2	3	Yes No



G.	Fines that must be paid by violators	1	2	3	Yes	No
H.	Media sources (newspapers and radio and TV news/programs)	1	2	3	Yes	No
I.	Radio public service announcements	1	2	3	Yes	No
J.	TV public service announcements	1	2	3	Yes	No
K.	Billboards	1	2	3	Yes	No
L.	Magazine or newsletter articles	1	2	3	Yes	No
M.	Internet web sites	1	2	3	Yes	No
N.	Fishing or boating regulation pamphlets	1	2	3	Yes	No
O.	Conferences or workshops for boaters and anglers	1	2	3	Yes	No
P.	Brochures, species identification cards, fact sheets, or other printed materials	1	2	3	Yes	No
Q.	Signs at marinas or boat launches	1	2	3	Yes	No
R.	Creel surveys or inspection-education programs on roads or at boat launches	1	2	3	Yes	No
S.	Videos or other presentations to boating, lake, and sporting associations	1	2	3	Yes	No
T.	100th Meridian Initiative to prevent Western spread of aquatic nuisance species	1	2	3	Yes	No

Q6. Of the items that you said "would be VERY EFFECTIVE" in Question 5, which would be MOST effective in getting you to take steps to prevent the spread of aquatic nuisance species? *(Write the letter for each item you select in the spaces provided below.)*

\_\_\_\_\_

Q7. Did you USE a boat or boats during the 2003 boating season? *(Circle one.)*

1. YES
2. NO **(IF NO, SKIP TO QUESTION 19 ON PAGE 7)**

Q8. What type of boat(s) did you use during 2003? *(Circle all that apply.)*

- A. Small sailboat (less than 20 feet)
- B. Large sailboat (20 feet or longer)
- C. Personal watercraft (jet ski)
- D. Duckboat
- E. Small powerboat (less than 20 feet)
- F. Large powerboat (20 feet or longer)

- G. Canoe or kayak
- H. Pontoon boat
- I. Other type of boat (please specify) \_\_\_\_\_

Q9. Which ONE of these boats did you use MOST during 2003? *(Write the letter below.)*

\_\_\_\_\_

Q10. Thinking about the boat you used MOST during the 2003 boating season, about how long was the boat IN the water before being moved to a different waterbody? Do NOT include time on a boat lift. *(Fill in the number of times during the 2003 boating season for each time period.)*

- a. I never moved this boat to a different waterbody
- b. One day or less \_\_\_\_\_ times
- c. 2 to 4 days \_\_\_\_\_ times
- d. 5 to 14 days \_\_\_\_\_ times
- e. 15 to 30 days \_\_\_\_\_ times
- f. More than 30 days \_\_\_\_\_ times

Remember to write in the number of times

Q11. About how long was this boat OUT of the water before you put it in a DIFFERENT waterbody than it was PREVIOUSLY used in? Include the amount of time on a trailer, on a boat lift, on a rack, or transported on a road. *(Fill in the number of times during the 2003 boating season for each time period.)*

- a. I never moved this boat to a different waterbody
- b. One day or less \_\_\_\_\_ times
- c. 2 to 4 days \_\_\_\_\_ times
- d. 5 to 14 days \_\_\_\_\_ times
- e. 15 to 30 days \_\_\_\_\_ times
- f. More than 30 days \_\_\_\_\_ times

Remember to write in the number of times

Q12. If you moved this boat to a different waterbody than it was previously used in, how far apart were the different bodies of water? *(Fill in the number of times during the 2003 boating season for each distance category.)*

- a. I never moved this boat to a different waterbody
- b. 10 miles or less \_\_\_\_\_ times
- c. 11 to 50 miles \_\_\_\_\_ times
- d. 51 to 150 miles \_\_\_\_\_ times
- e. 151 to 500 miles \_\_\_\_\_ times

Remember to write in the number of times

f. More than 500 miles \_\_\_\_\_ times \_\_\_\_\_

Q13. During the 2003 boating season, did you *TRANSPORT* (by truck, trailer, car top, etc.) this boat to waters *OUTSIDE* the state where the boat is registered? (*Circle one.*)

1. YES ==>

a. How many different times did you transport this boat to another state/province in 2003? \_\_\_\_\_ times

2. NO

b. Please list each state or province that you transported this boat to in 2003. \_\_\_\_\_  
\_\_\_\_\_

Q14. During the 2003 boating season, did you move this boat along connected waterways (such as rivers or canals) or along the coast FROM waters that you knew were infested with any of the aquatic nuisance species listed in Question 1 INTO uninfested waters? (*Circle one.*)

1. YES ==>>

a. Please list the names of the waterways that you went to and from in this boat:

2. NO

WENT TO (uninfested waters):  
\_\_\_\_\_

3. DON'T KNOW

WENT FROM (infested waters):  
\_\_\_\_\_

WHICH AQUATIC NUISANCE SPECIES:  
\_\_\_\_\_

Q15. Before you transport boats, do you take any special steps to prevent the transport of water or aquatic nuisance species from one body of water to another? (*Circle one.*)

1. YES

**(IF NO)** If you do not take any special precautions, why not?  
(*Circle all that apply.*)

2. NO ==>>

a. I don't believe it will prevent the eventual spread of aquatic nuisance species

3. I never moved this boat to a different waterbody

b. It's inconvenient, I don't have time to take precautions

c. I don't know exactly what I'm supposed to do

d. I didn't boat on infested waters

e. I don't believe aquatic nuisance species are a problem

f. Boat washing equipment is not readily available

g. Other (please specify) \_\_\_\_\_

Q16. During 2003, did you boat on waters that you knew were infested with ANY of the aquatic nuisance species listed in Question 1 on the front page? (*Circle one.*)

1. YES ==>
2. NO
3. DON'T KNOW

- (IF YES)** How did you know that the waters you boated on were infested with an aquatic nuisance species? *(Circle all that apply.)*
- a. Sign or poster at boat launch or marina
  - b. Brochure, fact sheet, or flyer
  - c. Fishing, boating, or waterfowl regulation pamphlet
  - d. Internet web site
  - e. Watercraft educator/inspector
  - f. Media sources (newspaper, radio, TV)
  - g. Hotline or information clearinghouse
  - h. Heard about it from a friend or relative
  - i. Other (please specify) \_\_\_\_\_

Q17. If you do boat on infested waters, how likely is it that YOU will take precautions in the future to prevent the spread of aquatic nuisance species between bodies of water? *(Circle one.)*

1. Very likely
2. Somewhat likely
3. Not very likely
4. Not at all likely
5. I never boat on infested waters

Q18. After removing boats from the water, how often do you do the following? *(Circle one answer for each item.)*

<u>Steps Taken:</u>	<u>Almost Always</u>	<u>Some- times</u>	<u>Never</u>	<u>Does Not Apply</u>
a. Conduct visual inspection of boats and equipment for aquatic plants and animals	1	2	3	4
b. Drain water from boats, including live wells, bilge, and bait buckets	1	2	3	4
c. Avoid release of unwanted live bait into the water	1	2	3	4
d. Remove aquatic plants and animals from boats and equipment	1	2	3	4
e. Flush motor's cooling system with tap water	1	2	3	4
f. Rinse boat with high pressure and/or hot water	1	2	3	4
g. Allow boat to dry for at least five days	1	2	3	4
h. Other (please specify) _____	1	2	3	4

Q19. Have aquatic nuisance species caused problems for you or affected your recreational experience during the 2003 boating season? (*Circle one.*)

1. YES ==>
2. NO
3. DON'T KNOW

a. Please list all impacts, the aquatic nuisance species that were involved, and any associated costs you have experienced.

Q20. How much MORE would you be willing to spend for a boat registration if the additional money was used to fund activities to prevent the spread of aquatic nuisance species and to reduce their harmful effects? (*Circle one.*)

1. \$1
2. \$2

3. \$3
4. \$4 to \$5
5. \$6 to \$10
6. More than \$10
7. Would NOT be willing to spend more

*Please answer the following questions about yourself. This information will be used only to compare people's answers. It will not be used to identify you in any way.*

Q21. What types of radio stations do you usually listen to? *(Circle all that apply.)*

- a. Classical music
- b. Country music
- c. Public radio
- d. New/alternative rock music
- e. Oldies/classic rock music
- f. Talk radio
- g. Other (please specify) \_\_\_\_\_

Q22. Are you male or female? *(Circle one.)*

1. Male
2. Female

Q23. In what state or province is your primary residence located? \_\_\_\_\_

Q24. What is your zip code or postal code? \_\_\_\_\_

Q25. In what year were you born? \_\_\_\_\_

Q26. What recommendations or other comments would you like to make about the spread of aquatic nuisance species in your state's or province's waters?

**Thank you for your time and cooperation.**

Please return this questionnaire in the enclosed postage-paid envelope to:

Minnesota Center for Survey Research, University of Minnesota  
2331 University Avenue SE, Suite 141  
Minneapolis, Minnesota 55414-3067  
(612) 627-4282

October 17, 2003

Dear Oregon Boater,

Lakes, rivers, and streams in Oregon provide some of the best recreational opportunities available in the region. However, many natural resources, including water quality, game fish, and wildlife habitat, are affected by pollution and other environmental changes.

One particular change – the increase in aquatic nuisance species in both fresh and saltwater – has become more of a problem in recent years. Aquatic nuisance species are plants or animals that enter habitats where they are not native. These species are introduced and spread in many different ways: in the ballast water of ocean-going vessels; through the aquaculture, aquarium, bait, and live seafood industries; on recreational boats and equipment; and from nurseries that specialize in water plants. They cause enormous damage to the environment, to the economy, and to human and animal health.

Fortunately, people can take actions to stop the introduction and spread of aquatic nuisance species in Oregon. With that in mind, the Center for Lakes and Reservoirs at Portland State University has asked us to conduct a survey of boaters to learn about their knowledge, attitudes, and practices related to aquatic nuisance species. The results of this survey will be used to determine how well various public and private organizations are educating the public about aquatic nuisance species and to help these organizations design educational programs and materials.

You are one of a small number of boaters who are being asked to complete this survey. Your name was drawn in a random sample of Oregon's registered boat owners. For the results to truly represent the thinking of all boaters, it is important that each questionnaire be completed and returned. Any adult in your household can fill out the questionnaire.

Your answers are completely confidential. The questionnaire has an identification number for mailing purposes only. When you return your completed questionnaire, your name will be deleted from the mailing list and never connected to your answers in any way.

I would be happy to answer any questions you have about this study. Please write or call me collect at (612) 627-4282 on weekdays between 9 am and 5 pm Central time (between 7 am and 3 pm Pacific time). Thank you very much for helping with this important study.

Sincerely,

Rossana Armson  
Director

P. S. Three states are participating in this effort: Oregon, Michigan, and Wisconsin. You will be returning your questionnaire directly to the University of Minnesota because we are coordinating the mailings.

Last week a questionnaire asking for your views on aquatic nuisance species and boating practices was mailed to you. We're very interested in your opinions about the impact of aquatic nuisance species on your state's waters. Your name was drawn in a random sample of boaters in your state.

If you have already completed and returned the questionnaire, please accept our sincere thanks! If not, please answer the questions and return it today. Because the survey has been sent to only a small sample of boaters, it is extremely important that your answers be included. That way, the results will accurately represent the opinions of boaters in your state.

If you did not receive the survey, or you misplaced it, please call me collect at (612) 627-4282 between 9 am and 4 pm Central time. I'll send you another one right away.

Thanks for your help with this study,

Rossana Armson, MCSR Director  
University of Minnesota  
2331 University Avenue SE, Suite 141  
Minneapolis, Minnesota 55414-3067



7 November, 2003

Dear Oregon Boater,

As a boater in Oregon, we know you're concerned about the quality of the state's lakes, rivers, and streams. Unfortunately, the increase in aquatic nuisance species in both fresh and saltwater could cause enormous damage to the state's water bodies. You may already have heard about some of these species: the poisonous blue-green algae that closed Diamond Lake to boating and swimming this summer; the aquatic weed *Egeria densa*, which forms dense mats that tangle propellers and interfere with swimming, boating, and fishing; and the Chinese mitten crab, a predator on salmon and sturgeon eggs, and a thief of baits ranging from ghost shrimp to shad.

Fortunately, humans can take action to prevent the introduction and spread of aquatic nuisance species. First, however, we need your help to better understand boaters' knowledge and practices related to these species. That's why we sent you a survey about three weeks ago asking for your opinion about aquatic nuisance species and boating practices. As of today, we have not received your completed questionnaire.

This boater survey was undertaken to evaluate how well public and private organizations are informing boaters about aquatic nuisance species and to help these organizations improve their educational programs and materials.

Each questionnaire has a significant impact on the usefulness of this study. Your name was drawn using a random sampling process in which the owner of every boat registered in Oregon had an equal chance of being selected. For the results of this study to truly represent the opinions of all Oregon boat owners, it is important that each questionnaire be completed and returned. As mentioned in our earlier letter, any adult in your household can complete the survey.

We've enclosed a replacement, in case your survey has been misplaced. If you have any questions about the survey, please write or call me collect at (612) 627-4282 on weekdays between 9 a.m. and 4 p.m. Central Time (7 a.m. and 2 p.m. Pacific Time).

Thanks very much for your help.

Sincerely,

Rossana Armson  
Director

**PLEASE SEND US YOUR COMPLETED SURVEY!**

I am writing to you about the boating survey that was sent to you about one month ago. You are one of the boat owners selected to participate, but we have not yet received your completed survey.

Because the survey was sent to only a few boat owners, it is extremely important that your opinions be included in the results. We really want to hear from you, even if you didn't boat in 2003. **Your input is important!**

If you have not yet returned your completed survey, please do it as soon as possible.

If your survey has been misplaced, please call me collect at (612) 627-4282 between 9 a.m. and 4 p.m. Central Time. I will send you another one right away. We will delete your name and address from our mailing list when we receive your survey.

Thank you for your participation.

Sincerely,

Rossana Armson, MCSR Director  
University of Minnesota  
2331 Univ Avenue SE, Suite 141, Mpls MN 55414

## **Oregon 2003 Aquatic Nuisance Species and Boating Survey**

### **Q: What are aquatic nuisance species (ANS)?**

A: ANS are plants or animals that enter waters where they are not native. They can cause enormous damage to the environment, the economy, and human and animal health.

### **Q: What kind of damage can ANS do?**

A: ANS can degrade fish and wildlife habitat, spoil beaches, tangle propellers, foul boat hulls, ruin engines, clog pipes, and poison waters to the extent that they cannot be used for boating or swimming.

### **Q: Why is the Center for Lakes & Reservoirs (CLR) at Portland State University conducting a survey of boaters' knowledge, attitudes, and practices related to ANS?**

A: The CLR is developing an education/outreach strategy targeted at recreational boaters as part of the Oregon ANS Management Plan. The mail survey will 1) establish a baseline for knowledge and attitudes about ANS among Oregon boaters, and 2) allow for future evaluation of the effectiveness of boater education in changing awareness of ANS and boating practices.

### **Q: Why is the survey focused on boaters?**

A: Transporting boats overland poses significant risks for introducing and spreading ANS, because boats and associated equipment can carry ANS from one water body to another. With almost 150,000 registered boats in Oregon – along with an estimated 500,000 canoes, kayaks, rafts, drift boats, and other unregistered boats – this represents a major pathway for ANS to become established in the state.

### **Q: Are ANS introduced and spread in other ways?**

A: Yes. ANS are introduced and spread in many different ways, including: in the ballast water of ocean-going vessels; through the aquaculture, aquarium, bait, and live seafood industries; and from nurseries that specialize in water plants.

### **Q: Why was I chosen to complete the survey?**

A: The CLR randomly selected 1600 registered Oregon boaters from an Oregon State Marine Board database and sent their contact information to the University of Minnesota Center for Survey Research (MCSR). The MCSR sent surveys to 800 Oregon boaters.

### **Q: How can I be certain that my responses will be kept confidential?**

A: The CLR deleted all boater database information from their files after sending contact information to the MCSR. The MCSR assigned an identification number to each survey for mailing purposes only. When participants return their surveys, their names are checked off the mailing list. Participants' names are never written on the survey, nor are they used for any other purpose.

### **Q: Why am I sending my finished survey to Minnesota?**

A: The MCSR is administering the survey. The MCSR developed the original questionnaire and has administered boater surveys in a number of states over the past decade.

### **Q: What other states have conducted boater surveys?**

A: Among the other states that have conducted boater surveys are Minnesota, Wisconsin, and Ohio (1993); California (1996); and Minnesota, Ohio, Kansas, California, and Vermont (2000).

### **Q: Are other states conducting boater surveys in 2003?**

A: Yes, Oregon is sharing expenses with the states of Wisconsin and Michigan.

### **Q: How much will the survey cost?**

A: The survey will cost \$8000, which will be funded by the US Fish & Wildlife Service.

### **Q: When will the survey be finished?**

A: The MCSR hopes to receive all completed by questionnaires by early December. Once the survey is complete, the data will be compiled in a file that can be analyzed using a statistical package.

**Q: When will the survey results be known?**

A: The CLR will analyze the results using a statistical package and report the results on their Web site ([www.clr.pdx.edu](http://www.clr.pdx.edu)) in early 2004.

**Q: What will the CLR do with the results?**

A: The CLR and other organizations, including the OSMB, will use the results to develop education programs on ANS for boaters in Oregon.

**Q: Will the OSMB be raising registration fees to pay for education programs or the damage that ANS cause?**

A: The OSMB has no plans to raise registration fees to pay for ANS prevention and control efforts. The OSMB will, however, focus on practices that can prevent the introduction and spread of ANS as part of a new "Safe & Sustainable" boating campaign.

**Q: How can I learn more about the survey?**

A: If you have questions about the survey, call Rossana Armson at the MCSR at (612) 627-4282 on weekdays between 9 am and 5 pm Central time (7 am and 3 pm Pacific time).

**Q: How can I find out more about ANS and boating practices that will prevent their introduction and spread?**

A: A good place to start is the Oregon State Marine Board Web site at <http://www.boatoregon.com/Clean/ANS.html> . You'll find information on ANS in Oregon and on boating practices that will help ensure you don't spread ANS from one water body to another.