

Washington State Aquatic Nuisance Species Committee Report to the 2008 Legislature



by the
Aquatic Nuisance Species Committee

Prepared by
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Washington Department of Fish & Wildlife



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ACKNOWLEDGEMENTS

The ANS Committee would like to extend our appreciation and recognize the contributions made by Joan Cabreza of the US Environmental Protection Agency for her 4-year tenure as Co-chair. The ANS Committee recognizes her many contributions, hard work and dedication to fulfill this role.

The ANS Committee would also like to extend our appreciation and recognize the contributions made by Kevin Anderson of the Puget Sound Action Team (now the Puget Sound Partnership). Kevin has been a driving force in the committee, playing a strong leadership role at both the local and regional level. In his position as ANS Coordinator for the Action Team, Kevin has played an important role in obtaining funding for aquatic invasive species and ballast water management.

Cover Photos

Clockwise from upper left: Dydimio (“rock snot”); New Zealand Mudsnaill; Rusty crayfish; *Styela clava* tunicate; Bullfrog; Nutria; Mitten crab; Purple loostrife; (center) Hydrilla; and Quagga Mussel.

LEGISLATIVE INTENT
RCW 77.60.130

Aquatic Nuisance Species Committee

Purpose

(1) The aquatic nuisance species committee is created for the purpose of fostering state, federal, tribal, and private cooperation on aquatic nuisance species issues. The mission of the committee is to minimize the unauthorized or accidental introduction of nonnative aquatic species and give special emphasis to preventing the introduction and spread of aquatic nuisance species.

The term "aquatic nuisance species" means a nonnative aquatic plant or animal species that threatens the diversity or abundance of native species, the ecological stability of infested waters, or commercial, agricultural, or recreational activities dependent on such waters.

The committee shall accomplish its duties through the authority and cooperation of its member agencies. Implementation of all plans and programs developed by the committee shall be through the member agencies and other cooperating organizations.

ANS Committee Members

(2) The committee consists of representatives from each of the following state agencies:

Department of Fish and Wildlife

Department of Ecology

Department of Agriculture

Department of Health

Department of Natural Resources

Puget Sound Partnership

State Patrol

State Noxious Weed Control Board

Washington Sea Grant Program

The committee shall encourage and solicit participation by:

Federally recognized tribes of Washington

Federal agencies

Conservation organizations

Environmental groups

Representatives from industries that may either
be affected by the introduction of an aquatic nuisance species or
that may serve as a pathway for their introduction.

Report

Prepare a biennial report to the legislature with the first report due by December 1, 2001, making recommendations for better accomplishing the purposes of this chapter, and listing the accomplishments of this chapter to date. [RCW 77.60.130 (4)]

EXECUTIVE SUMMARY

This report is submitted to the 2008 Legislature to meet the biennial reporting directive of Chapter 77.60.130 RCW. This is the Aquatic Nuisance Species (ANS) Committee's fourth biennial report to the legislature since its establishment under SSB 6294 (2000 c 149).

The ANS Committee was formed for two main purposes. The first was to foster state, federal, tribal, and private cooperation on ANS issues. The second was to use this forum to identify and implement tools and management practices that minimize the unauthorized or accidental introduction, or spread of nonnative aquatic species such as *Spartina*, milfoil, tunicates, European green crab, and zebra and quagga mussels. This report summarizes the ANS Committee's accomplishments and provides recommendations to the Legislature for better accomplishing the purposes of statute directives.

Primary accomplishments for the 2005-2007 biennium are summarized below for the ANS Committee as a whole, by state and federal agency, tribal government, and NGO participants.

ANS Committee

- Continuing development and implementation of an Early Detection/Rapid Response (EDRR) plan.
- Developed an ANS watch list that provides a reference tool to assist prevention and control activities.
- Assisted in the development of the Columbia River Basin Interagency Invasive Species Rapid Response plan for zebra and quagga mussels.
- Working closely with the Washington Invasive Species Council with two ANS Committee members holding seats on the council.

Washington Department of Fish and Wildlife

- Continued development and implementation of a state ballast water management program-
 - Implementing E2SSB 5923, established emergency rules and working on permanent rules with Ballast Water Work Group.
 - Hired a second ballast water inspector for ports on the Columbia River, South Puget Sound and Grays Harbor. In the 2006-2007 biennium 278 vessels were inspected.
- Continued development and implementation of a state aquatic invasive species prevention and enforcement program (separate report to legislature available)-
 - Inspected 5,236 recreational watercraft and educated boaters on how to prevent the introduction and spread of ANS via their activities.
 - Conducted enforcement emphasis patrols this summer, contacting 4720 individuals and inspecting 1,397 additional watercraft.
 - Coordinated with the Washington State Patrol who inspected over 200 boats and intercepted ten vessels contaminated with zebra mussels.
 - Monitored 180 sites for zebra and quagga mussels.
- Continued development and implementation of a state tunicate management program-

- Surveyed 30 marinas to date for the presence of invasive tunicates, and removed tunicates from boats in five infested marinas to prevent their spread.
- The Noxious Weed Division conducted management activities on over 12,500 acres of agency lands, treating the equivalent of 1,219 solid acres of weeds including *Spartina*, *Phragmites*, purple loosestrife, yellow flag iris, and reed canarygrass.

Washington Department of Ecology

- Monitored about 450 lakes, ponds and rivers for the presence of aquatic noxious weeds. Milfoil was present in 150 of the sites surveyed.
- Conducted research projects to evaluate various control methods, including biological control agents.
- Conducted research to determine the impacts of herbicide exposure on juvenile salmon.
- Offered competitive grants to local and state governments to help manage nonnative aquatic weeds.
- Partnered with King County and others on successful efforts to eradicate hydrilla in Pipe and Lucerne lakes.
- Eradicated milfoil in seven lakes and only minimal populations remain in 45 lakes where eradication is the goal.
- Developing a general permit for the control of nonnative invasive aquatic animals and marine algae.

Washington Noxious Weed Control Board

- Added two new aquatic and riparian plants to the Class A Noxious Weed List (Variable-leaf milfoil and ricefield bulrush).
- Changed the status of *Spartina angelica* from a Class B noxious weed to a Class A noxious weed.
- Changed a nonnative common reed (*Phragmites australis*) from a Class C to a Class B noxious weed.

Washington Department of Agriculture

- Continued to administer the Noxious Weed Control Board and Plant Quarantine programs.
- Conducted surveys and inspections of nurseries, agricultural sites, ports, pet stores and other sites to enforce agricultural quarantines and ensure that plant materials entering the state are pest and disease free.
- Carried out projects to eradicate pests and invasive species such as *Spartina*, knotweed, and purple loosestrife.
- *Spartina* statewide eradication effort has reduced the overall infestation by over 70% with expectation for full eradication as early as the end of 2010.
- Provided resources since 2004 for knotweed control projects in 21 counties, focusing on areas with early infestations.
- Provided comprehensive annual reports to the Legislature for the *Spartina* and knotweed programs.

Washington Department of Natural Resources

- Worked with WSDA on *Spartina* control operations.
- Worked with Thurston County on efforts to control *Brazilian elodea* in the Chehalis River.
- Worked with WDFW to treat *Phragmites australis* in the Winchester Wasteway in Eastern Washington.
- Contracted for a research study to assess the impacts of the invasive tunicate *Ciona savignyi* on geoduck populations.

Puget Sound Partnership (formerly the Puget Sound Action Team)

- Chaired and staffed the state's Ballast Water Work Group.
- Secured funding from the Governor and Legislature and contracted with WDFW to contain and eradicate tunicates from boat hulls.
- Prepared an Interagency Invasive Tunicate Response Plan, prepared educational information, and funded a project to educate recreational divers about invasive tunicates.
- The ANS elements in the 2007-2009 Puget Sound Conservation and Recovery Plan included-
 - \$116,000 to Ecology to develop a permit for aquatic herbicide and pesticide use, funding and management strategies for noxious, invasive freshwater weeds;
 - \$364,000 to help implement the WDFW Ballast Water Management Program; and
 - \$500,000 to continue invasive tunicate control and eradication work, carry out tunicate surveys and conduct a 'clean your hull' education campaign.

Washington Department of Health

- Protected citizens from eating shellfish that were contaminated by pathogens.
- Monitored water quality and biotoxins in marine shellfish areas.
- Contract with Ecology for the development of statewide Cyanobacterial management guidelines.
- Developing a website focusing on the human health aspects of Cyanobacteria toxins.
- Participated in the ANS Committee, Ballast Water Work Group, and in the development of the Early Detection and Rapid Response Plan.

U.S. EPA Regions 9 and 10

- Developing a DNA-based molecular probe for detecting and monitoring AIS in ballast water.
- Studying the implications of climate and land use change on AIS, and the economic impacts of AIS.
- Awarded a number of grants with an invasive species focus under a number of programs.
- Made numerous outreach and education presentations to a wide variety of audiences.
- Co-chaired the ANS Committee for four years, and holds a seat on the Washington Invasive Species Council.

U.S. Fish and Wildlife Service

- Provided funding for monitoring and control efforts.
- Provided funding to the WDFW Aquatic Nuisance Species Program for the implementation of the Washington State ANS Management Plan for ten years.
- Participated in the Olympic Knotweed Working Group, Tunicate Response Advisory Committee, Columbia River Basin 100th Meridian Group, and the Washington Invasive Species Council.

Federally-Recognized Tribes

- The Quileute, Jamestown S’Klallam, and Swinomish Tribes have been involved in numerous invasive species monitoring and eradication efforts of *Spartina*, knotweed, and other invasive plants in riparian habitats.
- The Tulalip and Stillaguamish Tribes are growing native plants to replace invasive species that are removed from riparian areas.
- Divers from the Skokomish Tribe were active in tunicate surveys and control efforts in Hood Canal.

Washington Sea Grant

- Coordinated outreach and education projects to educate harbormasters, recreational divers and dive related industries about ANS and how they are spread.
- Provided assistance to the University of Washington’s Ballast Water Research Team on a project to determine the efficacies of potential ballast water treatment systems.
- Funded research projects related to ANS, which produced a number of published and gray literature articles.

RECOMMENDATIONS

The ANS Committee is one of the critical partners working with the Washington Invasive Species Council (ISC) to prevent the introduction and spread of aquatic invasive species. In consideration of the Legislature's intent to improve policy level direction, planning, and coordination, the ANS Committee's recommendations are addressed to the ISC for consideration. The five recommendations are high priority issues that the committee respectfully requests be addressed through budget and policy proposals in the 2009 Legislature either by the ISC or by a state agency sponsor.

1. Support Puget Sound Partnership Maintaining Role in ANS Issues

ANS Committee recommends that the ISC work closely with the new Puget Sound Partnership (PSP), especially during their transition from the Puget Sound Action Team, to prepare relevant goals, objectives, and budgets for managing aquatic invasive species. Nonnative aquatic plants and animals are a growing threat to a healthy Puget Sound ecosystem and the biodiversity of the region. The committee recommends that the PSP's environmental agenda to restore Puget Sound by 2020 include strong efforts to prevent the introduction of invasive species and to control, manage and eradicate those species already found in the basin.

2. Adopt and Fund the Columbia River Basin Interagency Invasive Species Rapid Response Plan for Zebra Mussels and other Dreissena Species

The ANS Committee recommends that the ISC adopt and support funding for the Columbia River Basin (CRB) Interagency Invasive Species Rapid Response Plan for zebra/quagga mussels. The CRB Team is part of the 100th Meridian Initiative. Most state agencies within the basin are members on this team and have assisted in the plan's development. The response plan process was recently tested in a regional tabletop exercise with all relevant state, federal, and tribal partners. The process highlighted the fact that there will be need for additional resources to respond to a zebra/quagga mussel invasion. Other ANS early detection and rapid response plans are also under development and may be presented to the ISC in the next biennium. Funding for the plan may be incorporated into a larger state emergency response fund for any invasive species

3. Dedicated ANS Education Outreach Specialist

The ANS Committee recommends that the ISC address the need for a dedicated ANS educational outreach specialist. Committee members lack the expertise and existing agency resources are insufficient to provide this service. We need a media expert who can help us target the right audiences and organize a comprehensive ANS education campaign that will encourage the public to assist in discovering new invaders and discourage them from releasing any live organisms where they do not belong.

4. Budget Expansion for Other ANS Issues

The ANS Committee recommends that the ISC support consistent funding to develop management plans and to conduct management activities for other priority ANS including nutria, New Zealand mudsnails, didymo (“Rock Snot”), and bullfrogs (which are host to a fungal disease known to wipe out entire populations of other frog species). The funding would also be used to address other pathways of introduction, including live bait, pet/aquarium trade, and hull fouling.

5. Clarify Aquatic Invasive Species Legislation for Consistency and Intent

The ANS Committee recommends that the ISC support enhancement of Aquatic Nuisance Species animal laws under the Department of Fish & Wildlife. The ANS laws need to be updated to reflect many of the same legal and policy structures available for aquatic plants, noxious weeds and plant pests found under the Washington Departments of Ecology and Agriculture, and the Noxious Weed Control Board.

**Aquatic Nuisance Species Committee
Report to the 2008 Washington State Legislature**

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Washington State Aquatic Nuisance Species Committee Report to the 2008 Legislature

1. INTRODUCTION

The Aquatic Nuisance Species (ANS) Committee organizes the management efforts of many state and federal agencies through the Washington State ANS Management Plan. More than one hundred representatives from various state and federal agencies, local governments, tribes, conservation and environmental interests, and industries are invited to participate in open public meetings (Appendix A). In the past the full ANSC met twice a year, and the executive committee met monthly to address issues requiring immediate attention and to prepare items for review by the full committee. At the last meeting of the full committee, all committee were encouraged to participate in monthly meetings.

Members of the ANS Committee also participate on the following groups to improve coordination, collaboration, and communication efforts: the Washington Invasive Species Council, State Noxious Weed Control Board, WDFW Ballast Water Work Group, Pacific Ballast Water Group, Tunicate Response Advisory Committee, Western Regional Panel on Aquatic Nuisance Species, National Aquatic Nuisance Species Task Force, Puget Sound/ Georgia Basin International Task Force, Lower Columbia River Estuary Partnership, and the Columbia River Basin 100th Meridian Team.

This report is organized into three main parts including the introduction, state and federal agency accomplishments, and recommendations. The remainder of the introduction provides a brief summary of the past seven years, expected actions in the next two years, and the current status of ANS issues in the state.

1.1 Current Status

The States of Washington and Oregon are currently considered to have the least infested streams and rivers among 12 western states according to a new joint report from Oregon State University and the U.S. Environmental Protection Agency¹. Based on a sample of 51 sites, the authors estimate that only 20% of Washington stream and river miles have nonnative fish and amphibian species. Arizona, Colorado, and Montana had the highest with greater than 80% of stream miles having nonnative species. Although the study includes intentionally introduced nonnative game fish and is limited to fish and amphibian species, it may be one of the few relative indicators of non-beneficial aquatic invasive species on a regional scale. The report noted that many of the recent introductions are aquarium fish species.

¹ Lomnický et al., 2007

This does not mean that Washington is trouble free. Although our geography has provided some protection with many of our waters being located in high mountain lakes and streams, we have growing populations of nonnative species in both Eastern and Western Washington interfering with native species and damaging habitat. Aquarium species such as Chinese mystery snails and goldfish are well established in several lakes, and reports of anglers catching other aquarium species such as pacu, piranha, and arrowana are increasing. Algal blooms that produce deadly toxins are on the rise, along with other microscopic diatoms, pathogens, fungi, and viruses that have deadly impacts on native species. Although most of these are considered to be water quality, shellfish and fish health, or public health concerns, many of them are introduced and spread via the introduction of ANS.

1.2 Summary of Legislative Acts and Reports

The need for coordinated state response to invasive aquatic nuisance species was first recognized in 1998, with the arrival of European green crab on the Washington coast. Although the Department of Agriculture and the State Noxious Weed Control Board had a coordinated, well-funded program for invasive terrestrial plant species, work and funding for aquatic plants and animal species was significantly lagging. Since that time, the Legislature and the ANS Committee members have led the efforts to develop and implement a coordinated and funded program. Appendix B provides a summary of legislation and reports provided between 1998 and 2005. Legislation and reports created during the 2006-2007 biennium are summarized below.

The ANS Committee submitted a biennial report to the 2006 Legislature providing six recommendations and a summary of accomplishments. Recommendations included: 1) provide funding to WDFW for continued ballast water compliance inspections and addition of new staff to cover the Columbia River; 2) establish a fee on pet and aquarium suppliers to fund a WDFW inspection and enforcement program; 3) provide support for ANS Committee's early detection and rapid response plan; 4) collect needed baseline animal and plant data to assist risk assessments and management programs; 5) revise law and increase boater registration fees to support Ecology funding of aquatic weed control work in all water bodies instead of just a few; and 6) support the creation of a statewide Invasive Species Council.

The ANS Committee wishes to thank the 2006 and 2007 Legislature for acting on recommendations made in that report. The 2007-2009 biennium budget included funding for the salaries and expenses of two ballast water inspectors. One inspector works at ports from Seattle northward, the other works at ports on the Columbia River and Grays Harbor and the Port of Tacoma. ESSB 5385 (2006 c 152), sponsored by Senators Jacobsen, Oke, Fraser, Swecker and Kline created the Invasive Species Council for the purpose of developing a policy-level strategic plan to meet all invasive species threats. E2SSB 5923 (2007 c 350), sponsored by Senators Swecker, Jacobsen and Sheldon enhanced WDFW AIS Prevention and Enforcement Program authority for inspection and check stations for recreational and commercial watercraft, expanded training and education, required ANS signage for state road entry points and updated signage at boat launches. The bill also modified the state ballast

water act by closing reporting gaps, assessing a fee on vessels requesting “safety exemptions,” increasing penalties to correspond with federal law, and creating an account to allow WDFW use of assessed fees and penalties. The Governor vetoed a section extending the Ballast Water Work Group, but made provisions to re-establish it under WDFW.

The Ballast Water Work Group’s 2007 report to the Legislature provided a summary of Ballast Water Management Program findings over the previous four years, and made nine recommendations to the Legislature, including: working with Oregon to manage ballast water on the Columbia River; aligning state ballast water laws with regional, national and international requirements; improving the approval process for treatment technologies; developing strategies to encourage the shipping industry to use treatment technologies; and identifying essential research questions to improve the program and policies. Other recommendations were met by the passage of E2SSB 5923 by the 2007 Legislature. Accomplishments WDFW has made toward some of the above objectives are included in this report.

1.3 Expectations for the 2007-2009 Biennium

The discovery of quagga mussels in Lake Mead and the rapid spread throughout the Colorado River Basin presents a serious threat to the ecology and economy of Washington State. The mussels, which reproduce an average of twice a year in the Great Lakes, may be reproducing ten times a year in the Colorado River Basin. The ANS Committee will encourage the Washington Invasive Species Council to adopt and support funding for the Columbia River Basin Interagency Invasive Species Rapid Response Plan. They will also develop an Early Detection/Rapid Response (EDRR) plan for state waters outside the Columbia River Basin and expand monitoring efforts for zebra & quagga mussels.

The ANS Committee will finish developing a Memorandum of Understanding (MOU) to be circulated to agency heads along with the EDRR plan structure they have developed for coordinated response to aquatic invasive species in Washington State. They will request the Director of the Department of Fish and Wildlife to take the lead in distributing the MOU. The committee will also request the Washington Invasive Species Council (ISC) to encourage agency heads to agree to the coordinated cooperative response plan and support funding for rapid response activities.

The climate is becoming warmer. Species which were prevented from becoming established, or were kept in check by our colder waters, and cold water species such as didymo, a freshwater algae, are adapting to warmer temperatures and are increasing their range. The ANS Committee will work on developing management plans for species already present, and EDRR plans for other primary species of concern. They will also support the work of member agencies in preventing the introduction and spread of harmful viruses and pathogens by including them in public education efforts. The committee will also focus efforts on managing pathways such as the live bait industry, pet and aquarium releases, and hull fouling on commercial and recreational boats. There is a need for comprehensive educational materials to be developed, concentrating more on pathways than on individual species.

Updating and reorganizing the State ANS Management Plan by pathway would serve as a guide for developing and implementing species-specific management plans and development of educational materials.

The ANS Committee will continue to develop their working relationship with, and support of, the Washington Invasive Species Council.

2. ACCOMPLISHMENTS BY LEGISLATIVE DIRECTIVE

This section provides a summary of accomplishments by legislative directive for quick reference.

RCW 77.60.130(3)(a)

Requires the ANS Committee to periodically revise the state of Washington aquatic nuisance species management plan, which was originally published in June 1998.

The “Washington State Aquatic Nuisance Species (ANS) Management Plan” serves as a both a strategic and work plan and qualifies the state for National Invasive Species Act (NISA) funding through the U.S. Fish and Wildlife Service. The first ANS Management Plan was published in June of 1998 and was considered a “model” plan by the National ANS Task Force. The plan was revised in 2001 and is still used by many states as their template for making a statewide ANS management plan. WDFW received \$29,482 in FY 1998 and subsequent years saw an annual increase to a funding highpoint of \$130,036 in FY 2001 to implement the state plan. Since then, annual funding has decreased to \$51,000 for FY 2007.

In 2006, the ANS Committee chartered a subcommittee to scope and revise the next version of the State ANS Management Plan. A scoping paper was produced and approved by the full ANS Committee at their April 2007 meeting. The charter and scoping paper provide the framework and recommended approach for developing the new management plan (Appendix C). The subcommittee decided to postpone further work until January to best coordinate with completion of the Washington Invasive Species Council’s strategic plan.

RCW 77.60.130(3)(b)

Requires the ANS Committee to make recommendations to the legislature on statutory provisions for classifying and regulating aquatic nuisance species.

The ANS Committee does not currently recommend any changes to the provisions for classifying ANS under Chapter 77.12.020 RCW. We expect to make a recommendation on this issue to the 2009 Legislature.

RCW 77.60.130(3)(c)

Requires the ANS Committee to recommend to the State Noxious Weed Control Board that a plant be classified under the process designated by RCW 17.10.080 as an aquatic noxious weed.

ANS Committee membership includes the Executive Secretary of the State Noxious Weed Control Board (hereafter referred to as the board), and a member of the board. Other members also participate in board meetings and provide input when the board is making

decisions about listing or reclassifying weeds. Recommendations by these participants have recently resulted in several revisions to invasive aquatic plant species classifications.

RCW 77.60.130(3)(d)

Requires the ANS Committee to coordinate education, research, regulatory authorities, monitoring and control programs, and participate in regional and national efforts regarding aquatic nuisance species.

The ANS Committee works with Universities in Washington and Oregon, ANS coordinators and researchers in neighboring states, and coordinates with other organizations including: the Washington Invasive Species Council, State Noxious Weed Control Board, WDFW Ballast Water Work Group, Pacific Ballast Water Group, Tunicate Response Advisory Committee, Western Regional Panel on Aquatic Nuisance Species, National Aquatic Nuisance Species Task Force, Puget Sound/Georgia Basin International Task Force, Lower Columbia River Estuary Partnership, the Columbia River Basin 100th Meridian Team, The Nature Conservatory, the Washington Invasive Species Coalition, and other representatives from industrial and recreational water users.

The ANS Committee has completed an EDRR strategy designed to formally coordinate the activities of state and federal agencies and assign which agency should be lead on the response based upon state authorities. A memorandum of agreement should be circulated to agency heads early in 2008.

RCW 77.60.130(3)(e)

Requires the ANS Committee to consult with representatives from industries and other activities that may serve as a pathway for the introduction of aquatic nuisance species to develop practical strategies that will minimize the risk of new introductions.

The ANS Committee, in addition to state and federal agencies, includes representatives from commercial and Tribal aquaculture, shipping industries, and other stakeholder representatives such as the Marine Trade Association, as well as recreational boating and diving groups. All of whom coordinate with one another, and their peers in other states, to develop educational materials and strategies to prevent new introductions via a number of pathways, including: shellfish and finfish aquaculture, pet or aquarium releases and disposal of material from educational kits used by schools, live bait, ballast water, and hull fouling on both commercial and recreational watercraft.

3. ACCOMPLISHMENTS BY STATE AGENCY

3.1. The Aquatic Nuisance Species Committee

The ANS Committee has previously developed an Early Detection/ Rapid Response (EDRR) structure. This will be used to determine the lead agency, depending upon the class of species involved and the legislative mandates of each agency, and sets up a notification system and cooperative response. Species-specific response plans will be developed for primary species of concern. Many committee members are also active on the Columbia River Basin Team, a subgroup of the 100th Meridian Initiative, and have helped this group develop a regional zebra/ quagga mussel rapid response plan. The team recently conducted a tabletop exercise to see how well cooperating agencies could coordinate a rapid response on a regional scale. The committee will be reviewing the structure of the rapid response plan they have developed in light of the findings of that exercise. As rapid response plans are generated, WDFW will take the lead in developing a memorandum of agreement and will then circulate it among agencies for signatures.

The ANS Committee is close to finalizing a “Watch List” of invasive species that are considered to pose, or potentially pose, a threat to aquatic ecosystems in Washington. The list will contain both species that are present and others in which we wish to prevent their introduction into state waters. Species are categorized by invasive concern as either primary or secondary through a committee assessment of potential environmental, economic, and social/health risks. The list is intended to provide a reference tool to assist agency and public prevention, monitoring, and management decision making in conjunction with the EDRR structure and the State ANS Management Plan. The list also helps focus monitoring efforts and promotes general education and awareness of ANS and their impacts.

The ANS Committee is continuing to develop and has started implementing their 2008 work plan (Appendix D). Key elements of the work plan include: enhanced coordination with the Washington Invasive Species Council; restructuring the ANS Committee; continuing development of the watch list; continuing development of specific rapid response plans; and enhancing agency websites, especially WDFW, to improve public outreach.

3.2. Washington State Department of Fish & Wildlife

Work on ANS began in 1996 with the formation of a Zebra Mussel/Green Crab Task Force. The members of the task force played a major role in the development of a State ANS Management Plan (1998), which was approved by the Governor and the National ANS Task Force. A grant from USEPA helped fund an ANS Coordinator position in 1997. The Aquatic Nuisance Species (ANS) program formally began in 1998 with the passage of the Zebra mussel and European Green Crab Prevention Act [1998 c 153 § 2] directing WDFW to develop draft rules for legislative consideration that would complement programs authorized by the federal Aquatic Nuisance Species (ANS) Task Force. The goal was to prevent the

introduction and dispersal of zebra mussels and European green crabs and to allow eradication of infestations that may occur. The program rapidly expanded to include ballast water management and a variety of monitoring and control projects. In 2005, the Legislature passed a bill (2005 c 464) clarifying the roles of the different state agencies involved in invasive species issues. This legislation also provided funding to WDFW to develop and implement an education and inspection program for recreational boaters, hire an enforcement officer dedicated to ANS, and to develop an early detection and rapid response plan. For more information, visit <http://wdfw.wa.gov/fish/ans/>.

Ballast Water Management

In April of 2004, WDFW hired a Ballast Water Inspector to board commercial vessels, entering Washington ports, that are carrying ballast considered to pose a risk to state waters either because of the source, lack of appropriate management action, or failure to file a ballast water report. Prior to the current biennium, the inspector was funded by grants from U.S. Fish and Wildlife Service, The Department of Ecology, and Pacific States Marine Fisheries Commission. The 2007-2009 budget included proviso funding for the salaries and expenses of two inspectors. In September 2007, a second inspector was hired to focus on ports on the Columbia River, South Puget Sound, and Grays Harbor. Both inspectors are highly qualified as they are U.S. Coast Guard licensed vessel Captains, have biological science education, and have many years of vessel engineering and operations experience.

A ballast water inspection boarding includes meeting with the master or officer of the deck and informing them about Washington's law, answering questions they may have, inspecting the vessel's log books (master log, engine room logs, pump logs, and product logs on tankers) and verifying them against the ballast water report filed for that voyage to assure compliance with reporting and ballast water management regulations. The inspectors also obtain and preserve ballast water samples for analysis by the University of Washington for the presence of potentially invasive coastal species (Figure 1). Results are shared with vessel operators on subsequent voyages so they are able to evaluate the efficacy of their ballast water management efforts. These inspections have dramatically improved compliance with state laws and reduced the threat of invasive species introductions via the discharge of ballast that has not been adequately exchanged for open seawater or treated to eliminate coastal species.



Figure 1. WDFW inspector Capt. Strieck taking ballast sample.

The department has also created a new Ballast Water Work Group (BWWG) that has a science panel subgroup. The focus of the BWWG is primarily to assist in the development of state standards for the treatment of ballast water that are consistent with regional, national, or international standards. The science panel is responsible for providing recommendations to the BWWG and WDFW on a prioritized scientific and technical work plan to meet the

regulatory and management needs of both the ballast water and hull fouling programs. In the interest of promoting technology development, the state Ballast Water Act grants WDFW the authority to approve treatment technologies for full-scale testing on vessels that call on Washington ports.

As part of grant requirements from the Department of Ecology, WDFW has contracted with Glosten Associates, Inc. to conduct an engineering survey of a vessel that has difficulty conducting adequate open ocean exchange in some of their ballast tanks. Crowley Maritime graciously agreed to participate in this study, and absorbed the costs of keeping the vessel in port for longer than usual and for having the tank(s) approved safe for entry by a chemical engineer. Glosten's report and recommendations for WDFW and Crowley Maritime will be completed early in 2008.

Zebra and Quagga Mussels

Zebra (*Dreissena Polymorpha*) and quagga (*Dreissena rostriformis bugensis*) mussels are both members of the same family and usually display similar striped designs, but differ slightly in size, shape, and habitat preferences (Figure 2). Quagga mussels were discovered in January 2007 at Lake Mead and Lake Havasu in the Colorado River Basin. Since then, the mussel has been found in twelve water bodies in San Diego County. Quagga mussels develop more rapidly in these warm water lakes than they do in the Great Lakes, and they are able to reproduce nearly year round. These two species have cost the Great Lakes region billions of dollars in damage and control efforts. The ecological damage they have done by altering the ecosystem and crowding out native species cannot be quantified, but is on a catastrophic scale.

The department has conducted zebra mussel monitoring since 1997. Biologists from WDFW, Public Utility Districts, Tribes, and water resource staff from the Department of Ecology use plankton nets to collect samples from various sites along the Columbia River and in high use lakes to be tested for the presence of free floating juvenile zebra or quagga mussels. In the 2007 monitoring season, 131 plankton samples were collected at 92 sites. To date, all sample analyses results have been negative. WDFW will increase monitoring and sampling efforts in the 2008 season.



Figure 2. Basic differences between zebra and quagga mussels.

In addition to veliger monitoring, substrates and settling plates are distributed and monitored in approximately 90 sites throughout the state. The substrate monitoring program is overseen

by Portland State University. WDFW also does outreach and education to recreational boaters and inspects boats for the presence of invasive animal or plant species.

Invasive Tunicates

Three invasive tunicate (sea squirt) species are present in Puget Sound and Georgia Basin. The colonial tunicate *Didemnum* was first discovered at the Edmonds Underwater Park in 2004. That population was eradicated using chlorine tablets under an emergency FIFRA waiver. Since then, small infestations of *Didemnum* have been found at several other sites, mostly in south Puget Sound. Some hand removal has been done, and WDFW is working on obtaining permits to test a variety of eradication methods for *Didemnum* at Dockton Park Marina adjacent to Vashon Island (Figure 3).

Styela clava, a solitary leathery tunicate commonly called the ‘club’ tunicate, has been found at Blaine and Semiahmoo Marinas in Drayton Harbor, and at Pleasant Harbor and Home Port Marinas in Pleasant Harbor (Figure 4). In 2006, the Legislature and the Governor provided \$250,000 in emergency funding to contain the infestations to those areas.

To accomplish this, WDFW worked with DNR, the Skokomish Tribe, and commercial dive companies to survey all of the docks and boats at the infested marinas. Infested boats at all of the marinas were cleaned to prevent the spread to other areas. In addition, all of the tunicates were removed from dock structures at Semiahmoo Marina, and approximately 50% of the tunicates were removed at Pleasant Harbor docks. Hand removal focused on removing the largest tunicates in an attempt to reduce reproduction. Pleasant Harbor Marina is in the process of changing hands, and WDFW has been working with the potential buyers to replace their old wooden docks with cement docks, and to clean the remaining previously installed concrete docks. All of the boats at infested marinas will be cleaned again prior to the 2008 and 2009 boating seasons.



Figure 3. *Didemnum* under the dock at Dockton



Figure 4. *Styela clava* and *Botryllus* on the bottom of a sailboat at Pleasant Harbor Marina on Hood Canal. Photo Courtesy of Georgia Arrow.

Ciona savignyi, a transparent solitary tunicate, was found in geoduck beds in lower Hood Canal in 2005 (Figure 5). In 2006, the Department of Natural Resources contracted with WDFW to hire divers to re-survey the area. They reported dense populations throughout the

lower Hood Canal east of Tahuya. Surveys by DNR contract divers and subsequent WDFW dive staff have found that the dense populations in lower Hood Canal have died off. Surveys by volunteer divers this year indicate that they have not returned in large numbers.

Recreational divers discovered populations of *Ciona* at Sund Rock. The Advanced Assessment Team from Reef Environmental Education Foundation (REEF) obtained a Scientific Collection Permit from WDFW which enables them to remove tunicate species for scientific investigation, and several dive groups have had work parties to hand remove the tunicates. The REEF team has also conducted comprehensive base-line surveys of several areas of Hood Canal.



Figure 5. *Ciona savignyi* in lower Hood Canal. Photo courtesy of Janna Nichols

Gretchen Lambert, who has studied tunicates all over the world, told us that these outbreaks and disappearances of some tunicate species are not uncommon. *Ciona* has been present in large numbers at Des Moines Marina and Edmonds Marina (mostly under docks of covered floats) for a number of years, but had not seemed to spread. In 2006 and 2007, recreational divers found small populations at other sites in Puget Sound and removed them. WDFW is researching possible eradication methods for *Styela clava*, *Didemnum* and *Ciona savignyi*.

The 2007 Legislature provided funding to the Puget Sound Partnership (formerly the Puget Sound Action Team) for tunicate management. The Partnership has entered into a \$300,000 contract with WDFW to determine the extent of tunicate infestation in Puget Sound, to develop a tunicate management plan, and to research eradication methods. WDFW has developed a standard survey technique for marinas and has used commercial and agency divers and drop cameras to survey 25 marinas so far.

Atlantic Salmon

In 1999, the Pacific States Marine Fisheries Commission (PSMFC) established a program with the mission to prevent the negative impacts associated with aquatic invasive species. Species addressed by the program include mitten crab, zebra mussel, green crab, Atlantic salmon, New Zealand mudsnails, sea squirts, Asian carp, and *Spartina*. To accomplish their goals, PSMFC cooperates and contracts with numerous entities including the Washington Department of Fish and Wildlife.

In 2003, with funding from the PSMFC and National Oceanic and Atmospheric Administration (NOAA) Fisheries, WDFW began conducting snorkel surveys in freshwater streams to look for the presence of Atlantic salmon juveniles and adults throughout Western Washington. In 2003 several hundred juvenile Atlantic salmon were discovered in Scatter Creek below a commercial hatchery outflow (Figure 6). Initial analyses of the 109 juveniles

captured indicated the fish were probably hatchery escapees. To date over 635 surveys have been conducted in 150 rivers and streams. This has resulted in the capture of 149 juvenile Atlantic salmon, with all but three from Scatter Creek. Young Atlantic salmon are also caught in fish traps on the Chehalis River each year and a small number of adult Atlantic salmon are caught by recreational anglers in rivers near the net pens in north Puget Sound. There is a processing plant on Harbor Island near the mouth of the Duwamish River and some adult salmon escape from there. Tribal fishers have reported catching adult Atlantic salmon in the Green River.



Figure 6. Atlantic salmon juvenile in Scatter Creek. Photo by Roger Tabor USFWS.

European Green Crab

Monitoring for the presence of European green crab in Puget Sound has continued from 1998 to present. Nahkeeta Northwest is under contract with WDFW to recruit, train, and oversee an extensive network of ANS monitoring volunteers. These volunteers have monitored between 90 and 100 sites throughout Puget Sound since the beginning of the program. In addition to individual volunteers, the program also interfaces with organizations and government entities for site specific monitoring. This year WDFW has worked with Nahkeeta to expand the program into a multi-species monitoring program. A list of target species was developed, sampling methods researched, educational and training materials developed, and volunteer training begun. At present, 83 volunteers are actively monitoring for green crab while the multi-species program is being developed. The program should be fully implemented by next spring. To date, no green crab have been detected within Puget Sound, but a very small population has persisted in Willapa Bay with little change, and there has not been reports of concern from the aquaculture businesses in that region. However, the threat of an invasion is still high with significant population of green crab along the outer coasts of California, Oregon, and British Columbia.

Other Species of Concern

Nonnative crayfish of the genus *Orconectes* have been found in many Eastern Washington lakes. WDFW biologists are trying to reduce their populations by trapping them. In Western Washington, at least two lakes are infested with red swamp crayfish *Procambarus clarkii*. The crayfish may have been introduced via aquarium dumping or by anglers using them as live bait. Although most crayfish species are prohibited in Washington, companies that distribute educational kits to schools and some pet stores still distribute these species. Efforts are underway to educate schools about using prohibited species, and the proper disposal of any species used in science programs.

New Zealand Mudsnaails have been found in lakes and canals on the Longbeach Peninsula and in the lower Columbia River. Due to their tiny size, they are easily spread by human activities. WDFW educates boaters and anglers about the importance of decontaminating their boots and gear to avoid spreading them.

Amur Gobies are a species of small fish that have been found in the Lewis River and the lower Columbia River. The species, which originates in Asia, migrates out to sea, but does not necessarily return to where it was spawned. The fish are small, and very similar to native sculpin species, so it may be difficult to assess the numbers present, or their impacts.

Aquarium Species. There are large populations of Chinese mystery snails, and possibly others, present in many lakes. Aquarium dumping is the most likely vector for them. WDFW receives several reports each year of Piranha, Pacu, plecostomus and other aquarium fish species being caught by anglers. Goldfish have become established in many lakes, where they compete with desirable species and destroy habitat. A new joint report from the Oregon State University and the U.S. Environmental Protection Agency² reported that a growing number of the nonnative species found in rivers and streams in 12 western states are aquarium species.

Nutria have become problematic in several areas in Western Washington. WDFW, U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS) and The Nature Conservancy have worked with landowners and the local dike and farming associations to eradicate nutria populations in Skagit County. In some areas, such as Clark County, the populations are very large and are causing property damage. National refuges in SW Washington and NW Oregon are working with APHIS to manage nutria on their lands. There have been regional meetings to discuss nutria issues, and Portland State University is taking the lead on developing a Regional Nutria Management Plan. Nutria have been reported in Eastern Washington, in the Yakima Valley, where they could have tremendous impact on agricultural crops and damage irrigation dikes.

Education and Prevention

The 2005 Legislature passed ESSB 5699, which clarified the roles of the state agencies involved in ANS issues and provided a dedicated funding source to carry out ANS education and prevention activities. The bill also enhanced enforcement efforts and provided funding for a WDFW Enforcement officer dedicated to ANS.

WDFW hires technical staff from April through September to inspect personal watercraft and to distribute educational material and information at both freshwater and marine launches throughout the state. The staff conduct boater surveys, where they disseminate information about the role recreational boaters and anglers play in the introduction and spread of invasive aquatic plants and animals and inspect their watercraft for AIS. In 2006, two technical staff conducted boater surveys and inspected 1,449 boaters at freshwater launches and 363 at marine launches. In 2007, three technical staff conducted boater surveys and inspected 2,849 boaters at freshwater launches and 575 at marine launches. Staff members also made educational presentations and inspected boats at pre-event meetings of fishing tournaments and distributed educational materials at fairs and boat shows providing outreach to several thousand more people.

² Lomnický et al., 2007

In 2006 the Legislature passed ESSB 5923, which provided statutory authority for WDFW to operate random check stations for the sole purpose of preventing the introduction and spread of ANS plants and animals. The bill also required WDFW to work with the Department of Transportation to develop signs to be posted at high risk roadway points of entry into Washington. New signage for boat launches and marinas, with a strong enforcement message, have been purchased and are ready to be distributed to replace ANS signs posted at boat launches through out the state prior to 2005.

The WDFW Enforcement Division also conducted its first ANS specific emphasis patrols to educate boaters about ANS regulations in 2007. On May 12, 32 officers contacted 723 people and inspected 245 boats at launches in Eastern Washington. On June 30, 72 officers contacted 3,752 people and inspected 1,152 boats at launches in both Eastern and Western Washington.

The department also coordinates with the Washington State Patrol (WSP) Commercial Vehicle Division to inspect commercially hauled boats at the ports of entry. The Commercial Vehicle Division officers are trained by the ANS Enforcement Officer to identify zebra and quagga mussels and the critical inspection points on vessels. Through November 13th of this year, the WSP has inspected over 200 boats, 10 of which had zebra mussels. Three of the boats were carrying live zebra mussels, and WDFW fined those carriers \$500 for transporting prohibited species.

Aquatic Weed Control

WDFW manages aquatic weeds on their own property through a Noxious Weed Coordinator and also coordinates with other agencies, local governments and tribes on other projects. WDFW staff have been involved in many projects this last biennium. The agency provided in-kind support of \$74,000 in herbicide chemicals and assisted in the treatment of approximately 447.5 acres of *Spartina* in Willapa Bay (Table 1).

Table 1. Treated aquatic weed control acreage for 2007.

Area	Species	Acreage Treated	Acreage Covered
Willapa Bay	<i>Spartina alterniflora</i>	447.5	2,726
Grays Harbor	<i>S. alterniflora</i> & <i>S. densiflora</i>	2.6	~8,000
Puget Sound	<i>Spartina anglica</i>	143	1,850
Columbia Basin Complex	salt cedar	24.1	NA
Columbia Basin Complex	Phragmites	527.57	NA
Columbia Basin Complex	purple loosestrife	2	NA
Columbia Basin Complex	yellow flag iris	0.4	NA
Seattle	Phragmites	3.5	~5
Skagit Wildlife Complex	yellow flag iris	0.9	NA
Chinook	reed canarygrass	62.75	NA
Chehalis Wildlife Area	reed canarygrass & purple loosestrife	5	NA
Totals		1,219.32	12,581*

*NAs not included in total acreage covered

Staff in Grays Harbor participated in helicopter surveys along the coast, and assisted in treating 2.6 acres where there was re-growth. They also treated about 63 acres of reed canary grass in Pacific County. Staff have been very involved in treating 143 acres of *Spartina* in Skagit Bay, and in ecological studies and surveys after the control effort. They participated in a volunteer removal project on Swinomish Tribal Property and in surveys of the San Juans and the Nooksack River delta. They also released drift cards in South Skagit Bay as part of a US-Canadian cross boundary project to track the movement of *Spartina*. Staff also worked in the Skagit Wildlife Area, releasing *Gaueurecella* beetles for biocontrol of purple loosestrife and monitoring the effects, and clearing out an acre of yellow flag Iris. They also cleared 3.5 acres of *Phragmites* out of a wetland near Seattle.

Staff have been participating in the Chehalis River Basin group, and has been active in the development of the recently completed *Integrated Aquatic Plant Management Plan for the Chehalis River Basin*. Representatives from several state agencies, Thurston and Lewis County Noxious Weed Boards and Conservation Districts, the Chehalis Tribe, The Nature Conservancy, Chehalis River Council, and others have cooperated in developing and implementing the plan and securing funding for *Brazilian elodea* and knotweed control projects. WDFW coordinated with the Fish Program and the Quinault Indian Nation to submit a \$20,000 proposal to the Department of Agriculture to fund two stream survey crews to document knotweed on the Naselle and Humptulips Rivers. Staff also treated five acres of reed canarygrass and purple loosestrife in the Chehalis Wildlife Area.

Eastern Washington crews have participated in management activities for *Phragmites* in the Winchester Wasteway. Staff treated over 525 acres and conducted follow up surveys to evaluate the efficacy of treating the reed with glyphosate. They also treated 24 acres of salt cedar.

Staff participated in the Noxious Weed Board Listing Committee meeting to discuss whether *Spartina anglica* and *Spartina alterniflora* populations had been reduced in acreage to a point where it could be upgraded to Class A status. Staff are also working with DNR Aquatic Resources to develop a weed geo-database, which managers can use to input weed survey and control data into a central database via an internet connection. The database will be able to be used in mobile mapping devices and the information checked in and out via that interface.

3.3. Washington Department of Ecology

Aquatic Weeds Program

Invasive nonnative freshwater plants are a serious threat to the health of lakes, rivers, and streams throughout Washington State. Excessive weed growth impairs fish and wildlife habitat and restricts recreational activities. In 1991, the Washington State Legislature established the Aquatic Weeds Program to provide financial and technical support to deal with freshwater invasive plants on a statewide basis. This program provides funding for monitoring, technical assistance and education, research, and grants to help control state and

local governments control aquatic weeds. Revenue for the Aquatic Weeds Program comes from annual license fees for boat trailers. Approximately \$600,000 per year goes towards these activities.

Monitoring

Each year, Ecology surveys water bodies in the state for freshwater aquatic plants, assesses aquatic plant communities, develops a species list for each water body, and documents the presence of nonnative freshwater plants. About 450 lakes, rivers, and ponds throughout the state have been surveyed providing plant identification, subjective plant density, and some water quality data for each water body sampled. Ecology concentrates their efforts on the aquatic plants listed as noxious weeds by the Washington State Noxious Weed Control Board or plants listed on the Washington Department of Agriculture's quarantine list. However, Ecology monitors other species of concern for expansion and invasive tendencies. Information about plant species, their statewide distribution, and plants found in individual water bodies is available on-line in a searchable database at:

<http://www.ecy.wa.gov/programs/eap/lakes/aquaticplants/index.html#annualsurvey>

Research

Ecology has conducted and is continuing to conduct projects to evaluate various control methods for freshwater weeds, their effectiveness against target invasive plants, and their impact on native plant communities. Ecology has published some of these projects in peer-reviewed journals. Details about these projects can be seen on Ecology's website at the following link: <http://www.ecy.wa.gov/programs/eap/lakes/aquaticplants/index.html>.

Journal articles about freshwater weed management published by Ecology include:

- Parsons, J. K., Hamel, K. S. and R. Weirenga. *in press*. The Impact of Diquat on Macrophytes and Water Quality in Battle Ground Lake, Washington. *Aquat Plant Manage.*
- Parsons, J.K., Hamel, K.S., O'Neal, S.L. and A.W. Moore. 2004. The Impact of Endothall on the Aquatic Plant Community of Kress Lake, Washington. *J. Aquat Plant Manage.* 42: 109-114.
- Parsons, J.K., Hamel, K.S., Madson, J.D. and K.D. Getsinger. 2001. The Use of 2,4-D for Selective Control of an Early Infestation of Eurasian Watermilfoil in Loon Lake, Washington. *J. Aquat. Plant Manage.* 39: 117-125.

Through a grant program, Ecology funds universities to conduct research pertaining to aquatic plant management methods. Past research includes studies conducted to evaluate whether a native weevil could be an effective biocontrol agent for Eurasian watermilfoil management. Peer-reviewed journal articles for weevil research include:

- Tamayo, M., Grue, C.E. and K. Hamel. 2004. Densities of the Milfoil Weevil (*Euhrychiopsis lecontei*) on Native and Exotic Watermilfoils. *Journal of Freshwater Ecology*. 19: (2):203-211.
- Tamayo, M., Grue, C.E. and K. Hamel. 2000. Do Water Quality and Watermilfoil Frequency of Occurrence Influence the Distribution of the Aquatic Weevil *Euhrychiopsis lecontei* in Washington State? *J. Aquat. Plant Manage.* 38:112-116.
- Tamayo, M., O'Brien, C.W., Creed R.P, Grue, C.E, and K. Hamel. 1999. Distribution and Classification of Aquatic Weevils (Coleoptera: Curculionidae) in the Genus *Euhrychiopsis* in Washington State. *Entomological News* 110:103-112.

With Ecology funding, the University of Washington recently completed research to determine herbicide exposure impacts to juvenile coho and chinook salmon. They conducted studies using the herbicides 2,4-D, diquat, fluridone, and triclopyr at concentrations consistent with those seen in the environment after a typical herbicide treatment to control invasive plants. The University evaluated direct toxicity, sublethal impacts to salmon and rainbow trout (serving as salmon analogs), and determined whether salmon can detect and avoid these chemicals. Journal articles are not yet published, although researchers have presented results at scientific conferences.

Ecology funds Washington State University scientists to conduct research trials to determine the most effective methods to kill the invasive freshwater plants – parrotfeather, yellow flag iris, and hairy willow-herb.

Education and Technical Assistance

Ecology has produced many educational materials dealing with freshwater nonnative plants and/or the management of these plants, but now relies more on a comprehensive website about aquatic weeds and their management to disseminate this information. The site may be viewed at <http://www.ecy.wa.gov/programs/wq/links/plants.html>. Downloadable PDF files of most publications are available on Ecology's publication website. Some publications are available on request from the Water Quality Program at (360) 407-6562 or email kham461@ecy.wa.gov. Ecology also provides freshwater plant identification, conducts workshops and field tours, presents at conferences, and provides technical assistance to lake groups, nursery groups, pesticide applicators and the public about nonnative freshwater plants.

Financial Assistance

Ecology provides grants to state agencies and local governments to help manage nonnative aquatic weeds. Grant projects must address education, monitoring, or prevention and/or control of freshwater, invasive, nonnative aquatic plants. Ecology offers competitive grants annually. Generally, about \$300,000 is available during each funding cycle. An additional \$100,000 per year is available on a year-round basis for early invasions of invasive weeds. The purpose of these "early infestation" grants is to provide immediate financial assistance to local or state governments to eradicate or contain a pioneering invasion of a nonnative freshwater aquatic plant. In water bodies with well-established populations of nonnative,

freshwater invasive aquatic plants, the development of an integrated aquatic plant management plan is required before Ecology will consider funding control or eradication projects on that water body. Under the grant program, a number of eradication/ management projects for freshwater nonnative species have been funded. Since its inception, Ecology has awarded about 150 individual grants for invasive aquatic plant management activities. Annual funding lists and grant guidelines are available at the following web link: <http://www.ecy.wa.gov/programs/wq/links/plants.html#grants>.

Success: Hydrilla Eradication

Many consider hydrilla to be one of the worst aquatic weeds in the world. In 1995, King County staff discovered hydrilla in Pipe and Lucerne Lakes near Seattle. This is the only known infestation of hydrilla in the Pacific Northwest. Ecology funds a hydrilla eradication project in partnership with King County and the cities of Covington and Maple Valley. Management includes extensive survey and monitoring, hand removal, and herbicide treatment with fluridone. Eradication is within reach. King County has not discovered any hydrilla plants in Lucerne Lake since 2004 and in 2007 **no hydrilla plants were observed in either lake**. Eradication efforts will continue until hydrilla has not been detected for three years following the last treatment.

Success: Eurasian Watermilfoil Eradication

Eurasian watermilfoil (milfoil) is widespread within Washington water bodies (present in 150 of 470 locations surveyed) including major rivers like the Columbia River. Statewide eradication is not possible. However, helped by state funding, many local governments and lake groups are working toward milfoil eradication on individual water bodies. Of the 45 lakes where the goal is milfoil eradication, there are seven lakes with confirmed milfoil eradication successes. In the other lakes, management activities reduced milfoil to minimal populations. Ecology helped fund the successful milfoil eradication in Goss Lake (Figure 7). Milfoil was eliminated from Goss Lake after a whole lake fluridone treatment in 1995.



Figure 7. Goss Lake after eradication in 1995

Permitting

Ecology regulates the use of aquatic pesticides through a state general National Pollutant Discharge Elimination System (NPDES) permitting program. Ecology is proposing to develop a general permit for the control of nonnative invasive aquatic animals and marine algae. For further information go to <http://www.ecy.wa.gov/programs/wq/links/plants.html>.

3.4 Washington State Noxious Weed Control Board

The Washington State Noxious Weed Control Board (hereafter referred to as the Board) advises the Washington State Department of Agriculture (WSDA) about noxious weed control in Washington State. The Department of Agriculture provides support staff for the board. Alison Halpern is the current Executive Assistant for the Board.

Each year the Board adopts, by rule, the State Noxious weed list. This list determines which plants will be considered noxious weeds, and where control will be required in Washington State. This approach allows control activities of landowners - both public and private - to be prioritized towards the protection and enhancement of Washington's agriculture and natural areas in the most cost-effective manner.

The board classifies noxious weeds based upon their invasive potential or the distribution of plants already present. The goal is to prevent new introductions and the spread of plants already present. The board updates the Noxious Weed List annually, or more frequently if deemed necessary. There are three categories of noxious weeds:

- Class A weeds are nonnative weeds that are considered to pose a serious threat to Washington State that are either not present yet, or that have a limited distribution. The law requires these weeds to be eradicated.
- Class B weeds, in an area with established populations, the goal is to reduce or prevent the spread of the species. Control activities are not mandatory. In an area where the plant is not established control actions are mandatory.
- Class C weeds are nonnative weeds that are widely distributed in the state. Local counties or weed boards may enforce control efforts, or chose to educate the public on control methods.

At their November 2007 meeting the board added two new aquatic and riparian plants to the Class A Noxious Weed List (Variable-leaf milfoil and ricefield bulrush) and changed the status of *Spartina anglica* from a Class B noxious weed to a Class A noxious weed. They also changed a nonnative common reed (*Phragmites australis*) from a Class C to a Class B noxious weed.

The Board also serves as the state's noxious weed coordination center. Through its actions and policy decisions, it supports the activities of the 38 county noxious weed control boards and 11 weed districts of Washington and coordinates weed control activities between them and other state and federal land management agencies and tribes.

Local noxious weed boards began meeting with concerned local managers over 10 years ago to work together on aquatic weed problems in Washington's second largest river system. Together, they developed the "Integrated Aquatic Plant Management Plan for the Chehalis River Basin" which was released December 16, 2006. The intent is to coordinate the control activities for invasive species undertaken by landowners and land managers, including private, federal, tribal, state and county. This coordination in the Chehalis River Watershed will allow a sharing of expertise and resources across management jurisdictions, resulting in

more thorough control of invasive, aquatic weeds. The collaborators have successfully undertaken large-scale management and control projects for Brazilian elodea and knotweed.

3.5. Washington State Department of Agriculture

In addition to the Noxious Weed Control Board and Plant Quarantine programs, WSDA protects state resources by conducting surveys and inspections of nurseries, agricultural sites, ports, pet stores, and other sites to enforce agricultural quarantines and ensure that materials coming into the state are pest and disease free. They also carry out projects to eradicate pests and invasive species such as *Spartina*, Knotweed, and Purple Loosestrife.

***Spartina* Control**

In 2006 WSDA, partner agencies, tribal entities and local governments and landowners treated approximately 3,500 solid acres of *Spartina* in Puget Sound, Grays Harbor and Willapa Bay. This included 10 solid acres of newly discovered *Spartina* in Grays Harbor.

During the summer of 2006 WSDA, partner agencies and the aquaculture industry cooperatively treated 872 solid acres on the western shore of Willapa Bay from the northern tip of the Long Beach Peninsula to Tarlatt Slough at the southern end of the peninsula for the first time. WSDA obtained permission from 350 property owners to treat *Spartina* on their property. Only one property owner declined.

Spartina densities have been reduced in Willapa Bay to the point that *Spartina alterniflora* was designated as a Class B noxious weed in Pacific County in 2006. Prior to this the Pacific County and Padilla Bay in Puget Sound had been exempt from the listing because they were so heavily infested. The Class B listing required landowners to control *Spartina* on their property and keep it from spreading. WSDA is working with the US Fish & Wildlife Service to ensure that landowners can have their properties treated through a cost share program that alleviates the financial burden of treatment from the landowner. In November of 2007, *Spartina anglica* was reclassified to Class A noxious weed status, which mandates eradication of the species at all sites, most of which are in Puget Sound.

In 2007 WSDA along with partner agencies, tribal entities, local governments and landowners treated approximately 2,500 solid acres of *Spartina* in Puget Sound, Grays Harbor and Willapa Bay. During the summer of 2007 this coalition and the aquaculture industry cooperatively treated 2,310 solid acres of Willapa Bay.

The combined statewide effort to eradicate *Spartina* in the marine waters of the state over the past five years has reduced the overall infestation by over 70%. With continued funding and support WSDA predicts that eradication is attainable, possibly as early as the end of 2010.

With the largest infestations significantly reduced, the eradication effort is transitioning to the treatment of scattered infestations found throughout the state (Figure 8). This process will require additional labor on the ground to address the same areas that helicopters or large

machines were previously able to address in a relatively short amount of time. The amount of herbicide needed to treat the infestations will decline, bringing costs down; however, the number of personnel needed to re-treat these same areas will increase costs in salaries and benefits. As a result, in order to meet the program's goal of *Spartina* eradication, funding requirements will hold steady over the next three years. For more information see WSDA's annual Reports at - <http://www.agr.wa.gov/PlantsInsects/Weeds/Spartina/default.htm>.



Figure 8. Scattered *Spartina* clones that are typical as large meadows break up during eradication efforts.

Knotweed Control

Knotweed is a group of four herbaceous perennial plant species native to Asia that were introduced as garden ornamentals that has rapidly colonized the riparian areas along many river corridors in the state (Figure 9). Since 2004, the Washington State Department of Agriculture (WSDA) has provided resources to county noxious weed control boards, tribal governments, non-governmental organizations, and the Washington State Parks and Recreation Commission for landscape-scale knotweed control projects. In addition to direct funding, WSDA has provided training, outreach materials, and herbicide to program cooperators.



Figure 9. Knotweed growing along riparian corridors. Photos from "Controlling Knotweed in the Pacific Northwest"

WSDA has continued its support of projects initiated during the Southwest Washington pilot project of 2004, and has expanded the program to support projects throughout Washington State. Since the inception of the statewide knotweed control program, WSDA has produced required environmental review, provided public notification materials, provided technical training, published required notices, and coordinated with program cooperators and federal agencies to leverage state funding to secure additional resources.

The WSDA knotweed control program focused on the treatment of knotweed populations located in riparian areas, where knotweed exhibits the greatest rate of spread and has the most detrimental ecological, social, and economic effects. In river corridors, knotweed can reproduce from fragments and seeds that travel downstream during high-water events, affecting the gravel bars and riparian areas of entire river systems. Due to this dispersal method, control projects required coordination with multiple landowners and across jurisdictions.

In 2007, WSDA entered into agreements with 19 program cooperators including the Yakama Nation, two branches of The Nature Conservancy (TNC), the Stilly-Snohomish Fisheries Task Force, 10,000 Years Institute, and the noxious weed control boards of Clark, Skamania, Skagit, Pacific, Snohomish, Clallam, King, Island, Okanogan, Whitman, Asotin, Yakima, and Lewis counties. Most program partners elected to hire field crew members from the local communities of the project areas.

Work was performed in 21 Counties, including Asotin, Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, King, Klickitat, Lewis, Mason, Okanogan, Pacific, Skagit, Skamania, Snohomish, Thurston, Whatcom, Whitman, and Yakima. Based on stakeholder input, program cooperators were encouraged to identify projects that would address areas with low-level knotweed infestations, protect functional riparian habitats, or target project areas that are in the early stages of invasion.

Treatment methods were selected based on site characteristics according to integrated pest management (IPM) principles. Integrated pest management is a pest management concept that uses the most appropriate pest control method and strategy to meet management objectives in an environmentally and economically sound manner.

An important IPM consideration of the program was to treat all known knotweed populations in the river system, starting at the upstream extent of the infestation and working in a downstream direction. This strategy ensures that untreated knotweed plant material will not re-infest treatment sites as it moves downstream during high-water events, and requires the participation of all affected landowners in the stream corridor.

Five types of herbicide applications were used during the 2007 control season. These included injection of glyphosate formulations, foliar applications of triclopyr, imazapyr, or glyphosate formulations, or the application of a tank mixture of imazapyr and glyphosate formulations. The herbicide products used by the program cooperators at aquatic sites were registered for use in aquatic environments. WSDA required that all herbicide applications be made under the supervision of a licensed applicator. Treatment methods that were evaluated resulted in 90% control.

Foliar delivery of herbicide was the primary treatment method used by project cooperators. Manual methods, including digging and hand pulling, are not ecologically sensible in riparian habitats and are not effective methods of knotweed control.

The injection method was used by some cooperators to deliver undiluted glyphosate formulations directly into the hollow stems of the plant. The injection method is labor

intensive and inappropriate for large-scale treatments, treatments of Himalayan knotweed, and for situations when small stem size does not allow for this application method.

All known knotweed populations have been treated in Yakima and Whitman Counties and in the riparian corridors of 24 river systems throughout Washington State. Knotweed populations in the riparian areas of the Little White Salmon River basin of Skamania County exhibited no regrowth during the 2006 treatment season. Fifty-five percent and seventy-one percent of the known knotweed patches have been removed from the Skagit and Dungeness River Systems, respectively.

The knotweed populations that persist in project areas exhibit significantly reduced stem density, stem height, stem diameter, and overall vigor. This has allowed many native plants — including tree and shrub species — to colonize areas where they had previously been displaced by knotweed.

In addition to WSDA's program, there are other entities involved in knotweed control projects in a number of the state's watersheds including public utility districts, US Forest Service, National Park Service, county noxious weed control boards, municipalities, Tribal governments, non-governmental organizations, private landowners, fisheries enhancement groups, county conservation districts, and the state departments of Fish and Wildlife, Natural Resources and Transportation. WSDA will continue to disseminate current knotweed control information to those groups and coordinate control efforts with those projects.

In 2008, projects will capitalize on current success by funding ongoing projects that demonstrate significant gains as well as new projects that will protect high-value riparian habitats. Projects in areas with low-levels of knotweed invasion show high returns on modest investment. Treating these areas in the early stages of infestation prevents knotweed from spreading throughout a given riparian system. WSDA's knotweed program will continue to support cooperators working to protect key components of our watersheds that benefit all the inhabitants of Washington State. For more information go to - <http://www.agr.wa.gov/PlantsInsects/default.htm#PestProgram>

3.6. Washington State Department of Natural Resources

The Department of Natural Resources (DNR) worked with the Department of Agriculture and other partners on control/eradication projects in Willapa Bay. They also partnered with Thurston County in efforts to control Brazilian elodea in the Chehalis River, and with other Cooperative Weed Management Area groups including Stillaguamish, Skagit, Nisqually and Chehalis. In addition to weed control work in Natural Area Preserves, DNR worked with WDFW to treat *Phragmites australis* (an invasive nonnative reed) in the Winchester Wasteway. DNR also worked on developing an agency policy and guidance protocols for invasive species, and implementation of a noxious weed control database.

In addition to their nonnative weed management activities DNR, with funding through the Puget Sound Partnership, is contracting for a research study to assess the impacts of *Ciona Savignyi* on geoduck populations.

3.7. The Puget Sound Partnership

The legislature dissolved the Puget Sound Action Team on July 1, 2007 and recreated it as the Puget Sound Partnership. The Partnership will define the environmental agenda for Puget Sound to recover it by 2020. Protecting the basin's ecosystem includes preventing introductions of invasive species and managing those species already here.

Puget Sound Partnership Will Develop An Accountability System

The Puget Sound Partnership will oversee the work that will be outlined in the 2020 Action Agenda. The Partnership is required to hold all entities (federal, state, local, tribal, NGOs and others) that receive state funding accountable for producing results that are consistent with the Action Agenda.

The Partnership will:

- Adopt measures to ensure that state funds allocated to achieve intended results defined in the Action Agenda.
- Establish detailed performance agreements with entities receiving money.
- Sign performance agreements state agencies implementing the Action Agenda.
- Determine if an entity is in compliance or non-compliance with the Action Agenda.
- Work with entities in "substantial noncompliance" to remedy the problem.
- Recommend withholding funds until the "substantial noncompliance" situation is fixed.
- Hold management conferences with entities to assess progress and performance as it deems appropriate and useful.
- Report publicly to the governor every two years on progress made toward the Action Agenda.

Puget Sound Science

A Science Panel supports the Partnership by providing independent scientific advice. The Science Panel will:

- Assist in developing, preparing and revising the 2020 Action Agenda.
- Identify environmental indicators and recommend benchmarks to meet Action Agenda goals.
- Assist the Partnership in developing an ecosystem-level Strategic Science Program.
- Develop a Puget Sound Science Update and a Biennial Science Work Plan.
- Guide implementation and coordination of a Puget Sound assessment and monitoring program.

- Develop and provide oversight of a process for soliciting, assigning priorities and funding research and modeling projects.

Policy and Budget

Every two years, the Partnership prepares an interagency work plan and budget to protect and restore the Puget Sound. The ANS elements in the 2007-2009 Puget Sound Conservation and Recovery Plan were developed based on recommendations above and on the needs of the state Aquatic Nuisance Species Committee. The legislature provided \$974,000 for the following interagency aquatic nuisance species activities:

- **\$116,000** to develop a permit for aquatic herbicide and pesticide use, provide assistance and training, administer grants, develop educational materials, and develop management strategies for noxious, invasive freshwater weeds.
- **\$358,000** to implement and enforce the state's ballast water regulations in Puget Sound, to continue and expand monitoring, and to develop response strategies for nonnative animal invasions.
- **\$500,000** to continue invasive tunicate control and eradication work, carry out tunicate surveys and /conduct a 'clean your hull' education campaign.

The total 2007-2009 budget for Puget Sound is \$344 million. The Action Agenda could include more ANS work and a larger budget in the future.

New Partnership Web Site

Protecting and restoring habitats throughout Puget Sound basin are two of the eight key objectives established in law for the Puget Sound Partnership's 2020 Action Agenda. Preventing the introduction of aquatic nuisance species and managing those already here, are strategies to protect and restore fresh, marine, and estuarine habitats. Here's a link to aquatic nuisance species in Puget Sound. http://www.psp.wa.gov/our_work/protect_habitat/ans.htm.

Cross Border Work

In partnership with British Columbia, Ducks Unlimited Canada, the Washington Department of Agriculture, The Nature Conservancy and the Pacific Coast Joint Venture, the Partnership conducted a year long research project using drift cards to predict how invasive *Spartina* can spread from areas of heavy infestation in the shared marine waters between Washington and British Columbia. Partners released a total of 7,200 cards from 3 sites in British Columbia and 3 in Puget Sound. About 30% were recovered and reported. The next step is to produce a summary report of findings.

Ballast Water

The Action Team chaired and staffed the state Ballast Water Work Group. The group developed recommendations and draft legislation to improve the state's ballast water program. Delivered the report and proposed legislation to appropriate legislative committees

and the Governor's office. The legislature updated the state's ballast water law based on the Work Group's recommendations.

Invasive Marine Tunicate Response

In 2006, the Action Team secured \$250,000 from the Governor's emergency fund and from a supplemental appropriation to prevent invasive tunicates from spreading in Puget Sound. The Washington Department of Fish and Wildlife (WDFW) received funding to contain and eradicate club tunicates from boat hulls. The Puget Sound Partnership, in cooperation with a stakeholder advisory committee, prepared an Interagency Invasive Tunicate Response Plan. The Partnership also set up a toll free 1-800 number and web site for reporting newly discovered invasive tunicates. The Partnership also prepared and distributed identification cards and billing inserts for recreational boaters and marina operators. We also funded a project to educate divers about invasive tunicates. In cooperation with WDFW, we submitted an accomplishments report and recommendations for next steps to the Governor and the legislature.

3.8. Department of Health

The Department of Health, among many other duties, is responsible for protecting citizens from eating shellfish that are contaminated by pathogens, biotoxins produced by marine organisms, or toxic materials derived from human or natural sources. DOH classifies shellfish growing areas according to guidelines set by the National Shellfish Sanitation Program (NSSP). DOH monitors water quality and biotoxins in shellfish growing areas throughout Washington's marine waters. DOH has participated in the ANS Committee process and has been a routine participant in the Ballast Water Work group. DOH also actively participated in the ongoing development of the Early Detection and Rapid Response (EDRR) Plan.

The Department of Ecology, which has received funding from the Legislature to develop a Freshwater Algae Control Program for Washington State, is contracting with the DOH for the development of statewide guidelines regarding Cyanobacterial blooms and to assist in the coordination of statewide workshops about the guidelines. DOH is also developing a website that focuses on Cyanobacteria toxins and the human health aspects of Cyanobacteria blooms. The primary toxins involved are *microcystins* and anatoxin-a. DOH is working with Ecology and local health jurisdictions to improve reporting and toxicity tests in connection with posting lakes with toxic blooms. *Cylindrospermopsis* is another genera present in Oregon and Idaho that also produces a harmful toxin, *cylindrospermopsin*. It has not yet been found in Washington waters.

3.9. Washington State Patrol

In 2005 the Legislature passed ESSB5699, which placed a fee on recreational boat licenses to fund ANS education and enforcement. A portion of that fee went to the Washington State Patrol (WSP) Commercial Vehicle Division for the purposes of inspecting watercraft being brought into Washington by commercial haulers at the ports of entry for the presence of zebra mussels. Over 200 boats have been inspected in 2007, and eight vessels intercepted that were contaminated with Zebra/Quagga Mussels. The other two vessels were detected and intercepted after alerts were sent to WDFW from the states of Oregon and California. In all cases, WDFW enforcement personnel responded and initiated enforcement and/or decontamination proceedings. Three of the cases resulted in criminal citations being issued by WDFW to trucking companies for the illegal transportation of prohibited aquatic invasive species.

3.10. Washington Sea Grant

Outreach

Washington Sea Grant staff arranged for a panel discussion for the Pacific Coast Congress of Harbormasters at their Friday Harbor conference in April 2007. There were many Washington State harbormasters and marina operators in attendance. The panel (Allen Pleus of Washington Department of Fish and Wildlife and Jon Houghton of Hart Crowser Engineering) discussed introduced harbormasters to the threats imposed by aquatic invasive species and the associated environmental, operational and economic costs. How invasive species spread and eradication techniques were also discussed.

Washington Sea Grant worked with scuba clubs, resource management agencies, dive shops, the dive charter industry and individual divers to recognize and report AIS. In particular, the program focused divers' attentions on two invasive tunicates, *Didemnum* sp. and *Styela clava*. Tracking their spread is a critical component of control and eradication efforts. Project partners included the Russell Family Foundation, Washington Department of Fish and Wildlife and Puget Sound Action Team. Washington Sea Grant personnel also staffed the organization's aquatic invasive species display at outreach events in Clallam and Kitsap counties.

Ballast Water

The University of Washington (UW) Ballast Water Research Team determined the composition and quantity of zooplankton in ballast water collected by a Washington Department of Fish and Wildlife inspector. Despite the requirement for mid-oceanic exchange, large numbers of non-indigenous and coastal organisms were discharged in Washington waters.

The UW Ballast Water Research Team worked with vendors to determine the efficacies of potential ballast water treatment systems. The team performed tests with a system that passes

an electrical current through seawater, generating sodium hypochlorite. The team found system to be very effective in eliminating the wide variety of taxa present in seawater. A two-state system, a filtration step followed by an ultraviolet light treatment step was also tested. The tests of this system were encouraging. Based on the findings, the vendor modified their prototype system to improve performance.

Washington Sea Grant staff provided technical assistance and was a stakeholder for the development of protocols to be used at test bed facilities for evaluating the performance of potential ballast water treatment equipment. In addition, members of the Ballast Water Research Team collaborated with investigators at other research and academic institutions to screen potential species of zooplankton and bacteria to serve as surrogate organisms for use at ballast water treatment test bed facilities.

Research Team staff collected and identified representative species of indigenous and non-indigenous zooplankton and other marine invertebrates on the West Coast for the EPA Molecular Ecology Laboratory. These specimens will serve as voucher specimens for the EPA to develop molecular methods that can be used to identify aquatic invertebrates.

With support from U.S. Fish and Wildlife Service, The Glosten Associates, Inc. (Seattle, Washington) and the UW Ballast Water Research Team conducted an engineering study of modifying the Cal Maritime training ship for use in testing potential ballast water treatment systems. Treatment tests could be conducted where the ship is berthed in eastern San Francisco Bay, a site having a large proportion of non-indigenous species. An engineering plan was developed and now funds must be secured to support modifications of the vessel.

Faculty and research scientists associated with the UW Ballast Water Research Team supported graduate and undergraduate student research projects.

Publications

- Contributed article on *Didemnum*, to the April 2006 issue of Rodale's Scuba Diving magazine.
- Designed and printed first edition, then provided design assistance for updated reprinting of scuba diver tunicate identification card.
- "Foreign Cargo: Sea Grant's ballast water specialists confronts a world of aquatic nuisance species" (Sea Star article).
- "Captain Copepod" coloring book.

Research Funding

Washington Sea Grant funded two research projects related to aquatic invasive species

- "Redesign and Testing of Water Intake Systems for the Control of Aquatic Nuisance Species using Ozone" Russell P. Herwig and Jeffrey Cordell, School of Aquatic and Fishery Sciences, University of Washington, and William T. Cooper, University of North Carolina at Wilmington.

- “Context-Dependent Impacts of an Invasive Predator on a Threatened Native Oyster” – Jennifer Ruesink, Department of Biology, University of Washington.
- “Optimizing the Effectiveness of a Biocontrol Agent against *Spartina* Species in Washington” – Fritzi S. Grevstad and Miranda S. Wecker, Olympic Natural Resources Center, University of Washington.
- “Biological Invasion of Marine Reserves by Aquatic Nuisance Species” – Terrie L. Klinger, School of Marine Affairs, University of Washington, and Dianna Padilla, Department of Ecology and Evolution, State University of New York Stony Brook.

4. ACCOMPLISHMENTS BY TRIBES AND FEDERAL AGENCIES

4.1 Federally Recognized Tribes of Washington State

The tribes have been involved in numerous invasive species monitoring and eradication efforts. The majority of the work has occurred in riparian habitat through salmon restoration projects. The Pacific Salmon Recovery Fund '2007 Report to Congress' estimated since FY 2000, the coastal tribes from Washington, Oregon, and California treated 6,703 acres of riparian habitat for invasive species. A number of Washington tribes such as **Tulalip** and **Stillaguamish** have established native plant nurseries utilized for plantings to replace the nonnative species removed. Other tribes have worked in concert with County Noxious Weed Control Boards to eradicate specific species infestations. **Quileute** has received two grants to eradicate knotweed in the Dickey River and working to assess Knotweed presence in other rivers of their usual and accustomed areas. The **Jamestown S'Klallam** Tribe is conducting a major invasive species project to monitor and eradicate Knotweed and Buddleia in the lower ten miles of the Dungeness River.

In 2006, the **Skokomish** Tribe was involved in two nonnative Tunicate projects in Hood Canal. Under contract with DNR tribal divers surveyed lower Hood Canal to measure the abundance and distribution of *Ciona savignyi* using geoduck transect methodology. The tribe also helped with the *Styela clava* removal effort at Pleasant Harbor Marina through a WDFW contract.

The **Swinomish** Tribe began efforts to control and eventually eradicate *Spartina* from the Swinomish Reservation more than 10 years ago. Because *Spartina*, takes over tidal mudflats and other estuarine habitats, converting them to meadow monocultures with little habitat for native species. It is a particular concern to the Swinomish Tribe where it threatens estuarine salmon habitat and subsistence shellfish beds. They have long had a seasonal crew, some years part-time, some years full -time during the summer, to combat this weed. A variety of sources have funded these efforts through the years including Tribal funds, BIA noxious weed program funds, grants from the National Wildlife Foundation and the Environmental Protection Agency, as well as continued funding over a number of years from the Washington State Agriculture Department.

For many years the Tribe resisted using pesticides in their eradication efforts because of concerns of risks to health of Tribal members with high shellfish consumption rates. Using manual removal methods instead, which proved too difficult to do for the entire reservation shoreline. They now use an integrated pest management approach. The tribe conducts annual surveys along the shoreline and individual clones are removed manually. Pesticides are used in other problems areas around the shoreline of the reservation. The Tribe has a cooperative agreement with Skagit County for one of their certified crews to do all pesticide applications. The Tribe relies on manual and mechanical methods in shellfish harvest areas. Most of the reservation shoreline is now in a monitoring and continued control phase, most major infestation areas having been eliminated. However, one major problem area remains. Turners Bay, which is a major subsistence shellfish harvest area, is also the site of the largest

remaining *Spartina* infestation in Skagit County. The tide is turning there as well. With a combination of use of the Marsh Master (provided at least 1 or 2 days a year by WDFW), covering some areas with black cloth and continued manual removal by digging, the infested area in the bay has been significantly reduced.

If current efforts and resource inputs are maintained, the Tribe believes they will be able to eradicate all major infestations of *Spartina* on the reservation tidelands within 5 years. Leaving only the need for annual monitoring and removal of any new clones.

4.2 U.S. Environmental Protection Agency (EPA)

Regional Invasion Pathways and Genetic Screening Tool

EPA Regions 9 and 10 have funded ORD studies on the European green crab invasion across the west coast. These have included the development of a DNA-based molecular probe for detecting and monitoring green crabs in ship ballast, done in conjunction with a broader study on the use of DNA-based techniques for monitoring aquatic invasive species. Genetic analysis of the US west coast green crabs indicate San Francisco is likely the sole source for all west coast populations. Genetic continuity between estuaries is relatively high, indicating high levels of propagule exchange. Data collection for the global green crab population is complete, and genetic analysis and manuscript preparation are nearly complete.

A second manuscript, describing the successful development of genetic probes for the detection of green crab larvae in mixed plankton samples also nears completion. The genetic approach is being adopted to screen approximately 300 ballast water samples collected on the west coast by EPA contractors, and will also provide a starting point for the development of "next generation" DNA-based tools for targeted screening ("lab on a chip" shipboard-accessible technology).

Collaborators at Moss Landing Marine Laboratory have now begun sampling another 10 or more species across CA, OR and WA for comparison to the work that has been completed on green crabs and *Spartina*. They are also collaborating with UW to develop a reference database for DNA bar coding of aquatic invasive species across CA, OR and WA.

Environmental Indicators

We have developed two non-indigenous species indicators for use in EPA's national "State of the Environment" report. This is the first time the report has contained an invasive species indicator. The indicator allows a comparison of invasiveness in various estuaries. The indicators are relatively simple: percent abundance of NIS individuals relative to total abundance individuals within a sample, and percent composition of NIS species as a percent of all species within a sample. The EPA-USGS PCEIS database was used to generate data for the indicator.

HQ Climate Change and Invasive Species Workshop

EPA convened a national workshop of about 30 people from EPA, academia, and state/federal agencies to discuss potential implications of climate and land use change on invasive species. The Pacific Northwest was well represented, with participants from EPA Seattle, Washington, Alaska and Wyoming. Results of the discussions fed into a contractor white paper. A follow-up meeting was held in September 2006.

EPA Economic Impacts Workshop

EPA convened a national workshop on "Economic Impacts of Aquatic Invasive Species in 2005, which included a number of agencies from then Pacific Northwest. Final proceedings are now available on EPA's National Center for Environmental Economics Website at <http://yosemite.epa.gov/ee/epa/erm.nsf/vwRepNumLookup/EE-0493?OpenDocument>

Economic Impact Study

As a result of the economic workshop, EPA funded an economic study, "Effects of the European green crab on ecosystem services on the East and West Coasts of the United States". The project goals are to (a) determine the current and historic ranges and densities of the European green crab on the US East and West Coasts; (b) estimate future ranges and densities (invasion scenarios) of the green crab on the West Coast, and discuss possible management options in response to invasion scenarios, (c) estimate the past and potential future effects on ecosystem services, including economic impacts to commercial and recreational fish and shellfish, (d) monetize effects on ecosystem services market and non-market values to the extent possible, (e) identify possible sources of error and estimate confidence limits on green crab ranges, densities, positive and negative impacts on ecosystem services, and the monetized economic impacts and social welfare changes; (f) provide a complete bibliography of information sources for data and models; and (g) provide an integrated model or modeling framework that EPA can later use on its own to estimate other AIS impacts.

EPA Authorities Document

To provide a regulatory tool to state agencies involved invasive species projects, the EPA published "Overview of EPA Authorities for Natural Resource Managers Developing Aquatic Invasive Species Rapid Response and Management Plans" (EPA Document #842-B-05-002). The document is available online at www.epa.gov/owow/invasive_species/invasives_management or hard copies can be ordered from the EPA Water Resource Center at (202) 566-1729.

Grants

EPA awards grants having an invasive species focus under a number of programs. Grants this biennium affecting Washington include:

- *WA Biodiversity Action Plan:* A grant to the Nature Mapping Foundation is developing a pilot community stewardship program for the Pierce County Biodiversity Network. The project is located in the important Lower White River ecoregion area of the Southwest Cascades. The Network is holding community workshops to educate the community on the results of a field inventory, identify stressors to the habitat and wildlife species, and outline stressor reduction strategies. Field data results, conservation targets, stressors, strategies, and action steps developed by the community will then be compiled into a biodiversity action plan, the primary outreach product of this project. This process will become a template for outreach in other jurisdictions within the Network and statewide under the Washington Biodiversity Council.
- *Jamestown S'Klallam Buddleja and Knotweed Removal Study:* A Regional Geographic Initiative grant to the Jamestown Tribe has targeted knotweed and butterfly bush removal. Over 8.5 miles of riparian area adjacent to the lower Dungeness River were heavily infested with these species. The tribe has been actively removing the plants and testing different control methods.
- *Pilot Rapid Response Plan:* A Regional Geographic Initiative grant to The Nature Conservancy is developing a three-region pilot Early Detection and Rapid Response Program in Oregon. The project uses existing group networks and volunteers to establish a long-term framework for public and private partners to address new invasions at a project scale (and eventually at the state level). We expect this will model be of use to neighboring states like WA as well.

Outreach Tools Funded With Discretionary Money

- *Boat Inspection Video.* A contract to the Pacific States Marine Fisheries Commission (PSMFC) produces a boat inspection training video, as part of the 100th meridian zebra mussel prevention efforts. The 42 minute video has been distributed to the 500 + boating enforcement agencies in a 5 state region (California, Nevada, Washington, Oregon, and Idaho).
- *Spartina Brochure and Field Identification Card.* EPA contributed funding to print the brochure, *Invasive Spartina in Puget Sound*, and a companion laminated beach card, *Identifying Spartina in Puget Sound: a Field Guide*, that shows the four invasive species and five additional species that are often confused with *Spartina*. The brochure was developed by People for Puget Sound, and may be found online at: <http://www.pugetsound.org/index/pub>
- *WA Mudsnail and School Brochures.* We funded a revised printing of two brochures for the WA ANS Committee: a New Zealand mudsnail brochure, and a brochure for schools, on the use of nonnative species in the classroom. Both brochures were originally developed by Sea Grant for use in OR, but they have been modified for use in WA.

- *Zebra Mussel Pamphlets and Boat Launch Signs.* We provided funding to the Pacific States Marine Fisheries Commission to print Zap the Zebra brochures and related signs on zebra mussels for posting at boat launches and marinas.

National Lakes Survey

The National Lakes Survey will estimate the percent of the Nation's lakes in good, fair, and poor condition, based on key indicators of ecological health and human activities. Approximately 1000 lakes will be selected at random to represent the condition of all lakes in regions that share similar ecological characteristics. The parameters measured will be used to evaluate the ecological condition, determine the extent that lake resources support human activities, and identify the relative importance of key stressors such as nutrients and pathogens. EPA Region 10 has urged inclusion of invasive species in the survey, and provided a list of species; we hope that at least some will be selected. Training and field sampling will be conducted in 2007, and sample processing and data analysis will be completed and a report published in 2008.

Outreach and Education

The regional office made approximately 50 speeches and outreach presentations to the wetland and gardening communities on invasive species in 2005-06. The audiences included everything from national conferences for such diverse groups as the National Society of Wetland Scientists, the Puget Sound Georgia Basin, the National Society for Ecological Restoration, to local groups such as teacher's workshops at the Woodland Park zoo, the lecture series at the UW Center for Urban Horticulture, and a joint EPA -Corps of Engineers in-house wetland conference. We also developed and provided a training module on invasive species for incorporation into the WSU Master Gardener's training program, which trains about 100 volunteers each year.

A regular column on invasive species has also been included in the Agency's Water Talk newsletter, to increase visibility of the invasive species issue.

Incorporation Of Invasive Species Into Other Environmental Programs

A new section on invasive species was developed for inclusion into the 2006 joint Ecology / EPA / Corps of Engineers Washington Wetland Mitigation Guidance. We have also insured that invasive species performance standards are now routinely included into wetland mitigation banks and monitoring programs. We have also been working with the NEPA and superfund programs to insure invasive species considerations are incorporated into their reviews and cleanups.

State Committees

EPA also co-chairs the State Aquatic Nuisance Species Committee, and participates as a member of the new WA Invasive Species Council.

4.3 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is actively involved with addressing invasive species issues in Washington. They work with federal, state, tribal, NGOs, and local partners by providing funding and technical assistance on efforts to control invasive species. The USFWS has provided funding to the WDFW Aquatic Nuisance Species (ANS) Program for implementation of the Washington State ANS Management Plan for the past ten years.

The FWS provides funding and technical assistance for management, monitoring, and control efforts for species such as zebra mussels, New Zealand mud snails, and nutria throughout the Pacific Northwest. For example, they are helping lead rapid response planning for zebra and quagga mussels in the entire Columbia River basin, including organization of a table-top response exercise. USFWS has also initiated risk evaluation for the potential introduction of Asian carp species into the Columbia Basin, and is coordinating efforts to monitor populations of the recently introduced Amur goby in western Washington and the lower Columbia River. The USFWS also completed New Zealand mudsnail surveys of National Wildlife Refuges and National Fish Hatcheries located in western Washington; no New Zealand mudsnails were found.

The USFWS works with and provides funding to a variety of partners for the survey and control of invasive species. Current efforts include *Spartina* control in Grays Harbor, Willapa Bay, and North Puget Sound; knotweed control in Clallam, Grays Harbor, King, Skagit, and Snohomish counties; and control of Brazilian elodea in Thurston County. In addition to their participation in the ANS Committee Executive Committee they participate in the Olympic Knotweed Working Group, Tunicate Response Advisory Committee, Columbia River Basin 100th Meridian Group, and the Washington Invasive Species Council.

Invasive species managers for the USFWS's Pacific Region also make educational presentations at many events that address Washington audiences, such as the Pacific Marine Expo (Seattle, WA), Pacific Northwest Sportsman's Show (Portland, OR), and the Evergreen Sportsman's Show (Monroe, WA). They also distribute many types of ANS outreach materials to Washington groups, and continue to support "Stop Aquatic Hitchhiker" boater displays through a commercial marina signage project in Lake Washington and Puget Sound.

APPENDIXES

Appendix A

ANS Committee Members

Appendix B

Summary of ANS Legislative Acts and Reports 1998-2005

Appendix C

ANS Charter and Scoping Paper

Appendix D

2008 Work Plan

APPENDIX A

WA AQUATIC NUISANCE SPECIES (ANS) COMMITTEE

EXECUTIVED COMMITTEE (EXCOM) MEMBERS

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APPENDIX B

Summary of ANS Legislative Acts and Reports 1998-2005

SSB 6114 (1998 c 153)

Emergency legislation relating to the prevention and control of nonindigenous aquatic species sponsored by Senators Jacobsen, Oke, Spanel, Kline, Snyder and Haugen. This legislation established the Zebra Mussel and European Green Crab Task Force led by WDFW. This legislation was prompted by the discovery of the first European green crab in Willapa Bay in June of 1998.

June 1998: State of Washington Aquatic Nuisance Species Management Plan

Purpose to coordinate all ANS management actions currently in progress within the state along seven objectives, bring more recognition to ANS animal species, identify science and management gaps and overlaps, and access federal ANS Task Force funding, and request for \$1.75 million in addition funding.

December 1998: State of Washington ZM & EGC Task Force Report and Recommendations

Highest priorities were to: 1) establish and support an ANS Coordinating Committee; 2) develop a zebra mussel containment and early response program; and 3) develop a monitoring and control program for the European green crab. Full implementation of all tasks estimated at \$2.9 million.

SSB 6294 (2000 c 149)

An ACT relating to aquatic nuisance species sponsored by Senators Jacobsen, Haugen and Oke. This legislation formally established the ANS Committee under the Washington Department of Fish and Wildlife (WDFW) and set the basic duties as still required today.

SHB 2466 (2000 c 108)

An ACT relating to ballast water management sponsored by Representatives Regala, Ericksen, Buck, Linville, Anderson, Barlean and Mitchell. This legislation set up the basic framework of the state Ballast Water Management Program under WDFW including coastal exchange, inspecting, enforcement, sampling and treatment technology approval elements.

February 2000: Ballast Water and Shipping Patterns in Puget Sound

Report from the Puget Sound Water Quality Action Team on evaluating the risk posed by ballast water by evaluating the regional shipping patterns and identify considerations for siting of alternative ballast water exchange zones.

SSHB 1499 (2001 c 86)

An Act relating to the regulation of marine fin fish aquaculture by WDFW sponsored by Representatives Jackley, Buck, Rockefeller, Eickmeyer, Sump, Doumit, Pennington, and Dunn. This legislation made provisions for the development of an Atlantic Salmon watch program to monitor escapements from aquaculture facilities and for occurrences of natural production.

SSB 5961 (2001 c 253)

An Act relating to making technical corrections to fish and wildlife statutes sponsored by Senators Jacobsen and Oke by request of WDFW. This legislation made it illegal to release, plant or place deleterious exotic wildlife – zebra mussels and European green crab – or any aquatic plant within the state.

December 2001: ANS Committee Report to the 2002 Legislature

Report to the 2002 legislature providing seven recommendations including: 1) stable, long-term source of state ANS funding; 2) improve recreational boater pathway prevention program; 3) develop rapid response plan for new introduced ANS; 4) enhance existing and create new monitoring and control programs; 5) improve ballast water management; 6) create consistent science-based screening and classification system; and 7) enhance and develop public education outreach programs.

SB 6538 (2002 c 282)

Emergency legislation relating to ballast water sponsored by Senators Regala, Jacobsen and Oke. This legislation established the Ballast Water Work Group under WDFW and chaired by the governor's executive policy staff. Special emphasis was placed on amending the current statute to promote cooperation and coordination with the State of Oregon and the US Coast Guard.

SSB 6553 (2002 c 281)

An ACT relating to invasive aquatic species sponsored by Senators Poulsen, Oke and Regala, by request of then Governor Locke. This legislation: gave WDFW the authority to classify nonnative aquatic animal species as prohibited, regulated, unregulated or unlisted; prohibited the possession, import, purchase sale, propagation, transportation, or release of prohibited ANS; designation of infested state waters for either animal or plant ANS; develop a rapid response plan in cooperation with the ANS Committee; prohibited the transportation of any aquatic plant species on state roads; and directed WDFW and the Washington State Patrol, in consultation with the ANS Committee, to develop a plan to inspect watercraft entering the state for ANS.

December 2003: ANS Committee Report to the 2004 Legislature

Report to the 2004 legislature providing six recommendations and a summary of member accomplishments over the past two years. Recommendations included: 1) long-term dedicated state funding; 2) new recreational watercraft inspection program; 3) enhanced and new monitoring and control programs; 4) support of Ballast Water Management Program; 5) develop an ANS risk assessment program; and 6) develop/enhance public education outreach programs.

SSB 6329 (2004 c 227)

An ACT relating to extending the date for ballast water discharge implementation sponsored by Senator Oke. This legislation added new member categories and tasks to the Ballast Water Work Group, extended the treatment technology implementation timeline, and added an interim ballast water management report requirement.

ESSB 5699 (2005 c 464)

An ACT relating to preventing and controlling aquatic invasive species (AIS) and algae sponsored by Senators Oke, Jacobsen, Spanel, Doumit, Kline, Rockefeller and Rasmussen. This legislation provided a consistent state funding source through the AIS Prevention, Enforcement, and Freshwater Aquatic Algae Control accounts. Funding was appropriated by additional fees on recreational boater registration applications and directed to the development and implementation of an AIS Prevention Program through WDFW, an AIS Enforcement Program through the WSP and WDFW, and an Aquatic Algae Control Program through the Washington Department of Ecology.

APPENDIX C

DRAFT Aquatic Nuisance Species Committee Charter

Date: November 14, 2007

Lead Contacts:	Randy Marshall, Chair; Allen Pleus, Vice-Chair
Funding:	In-Kind State and Volunteer Participation

Oversight:	Committee Chair and Vice-Chair
Membership:	<p>The committee consists of representatives from each of the following state agencies or other entities:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Department of Fish and Wildlife <input type="checkbox"/> Department of Ecology <input type="checkbox"/> Department of Natural Resources <input type="checkbox"/> Department of Agriculture <input type="checkbox"/> Department of Parks and Recreation (invited) <input type="checkbox"/> Noxious Weed Control Board <input type="checkbox"/> Department of Health <input type="checkbox"/> Puget Sound Partnership <input type="checkbox"/> State Patrol <input type="checkbox"/> Washington Sea Grant <input type="checkbox"/> Tribes <input type="checkbox"/> Federal agencies including PSMFC, USFWS, USEPA, NOAA/NMFS, USCG, USGS, USDA, USFS, NPS and USACE. <input type="checkbox"/> Conservation Groups <input type="checkbox"/> Environmental Groups <input type="checkbox"/> Academic Institutions (invited) <input type="checkbox"/> Representatives from industries that may either be affected by the introduction of an aquatic nuisance species or that may serve as a pathway for their introduction
Points of Contact:	<ul style="list-style-type: none"> <input type="checkbox"/> WA Governor's Office <input type="checkbox"/> WA Senate NROR Committee Staff <input type="checkbox"/> WA House A&R Committee Staff <input type="checkbox"/> Western Governor's Association <input type="checkbox"/> State of Oregon <input type="checkbox"/> State of Idaho <input type="checkbox"/> State of California <input type="checkbox"/> State of Alaska <input type="checkbox"/> State of Hawaii <input type="checkbox"/> Western Regional Panel <input type="checkbox"/> British Columbia, Canada <input type="checkbox"/> Alberta, Canada

<p><i>Objectives & Deliverables:</i></p>	<ul style="list-style-type: none"> • Objectives include: <ul style="list-style-type: none"> ○ Coordinate with the Washington Invasive Species Council; ○ Foster state, federal, tribal, and private cooperation on ANS issues; ○ Minimize the unauthorized or accidental introduction of nonnative aquatic species and give special emphasis to preventing the introduction and spread of ANS; ○ Coordinate education, research, regulatory authorities, monitoring and control programs; ○ Participate in regional and national ANS efforts; and ○ Consult with ANS pathway industries. • Minimum deliverables include: <ul style="list-style-type: none"> ○ Periodically revise state ANS Management Plan; ○ Make recommendations for classifying ANS; ○ Make recommendations for classifying aquatic noxious weeds; ○ Develop practical strategies to minimize ANS pathway risks; and ○ Biennial reports to legislature by December 1 (odd years) with accomplishments and recommendations.
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<p><i>Process & Reporting:</i></p>	<ol style="list-style-type: none"> a) The committee shall accomplish its duties through the authority and cooperation of its member agencies. Implementation of all plans and programs developed by the committee shall be through the member agencies and other cooperating organizations. b) The committee will meet on a monthly or at least a bimonthly basis as needed to address work plan needs, and may meet more frequently to address emergency issues. c) The committee members will strive for consensus on recommendations and reports. Where consensus cannot be reached after reasonable debate, the majority recommendation will prevail and a minority recommendation will be recognized and recorded. d) The committee will adopt a set of protocols and standards by which it will establish an organizational framework, guidance and instructions for committee members to provide consistency and transparency in its actions. e) The committee will be composed of lead participants for each identified membership group. Lead members may designate an alternate. f) The committee will select a Chair and a Vice-Chair. The Chair and Vice-Chair will strive to serve alternating two-year terms. g) Technical work groups may be formed by charter and they will provide draft deliverables or recommendations for consideration by the full ANS Committee. h) Members will participate without compensation or per diem.
<p><i>End Date:</i></p>	<ul style="list-style-type: none"> • No sunset requirement.

**Washington State
Aquatic Nuisance Species Management Plan
2007 Revision**

Scoping Paper

Introduction

The Executive Committee (Excom), of the Washington State Aquatic Nuisance Species (ANS) Committee, seeks approval from the full ANS Committee on an approach for revising the 2001 Washington State ANS Management Plan (MP). A charter has been drafted (Appendix A) and a work group was formed to accomplish this task. This scoping paper provides the recommendations by the Excom for revising the ANS MP this year. If approved, it is the intent of the Excom to have a final draft for your review by the fall 2007 ANS Committee meeting.

The purpose of the scoping paper is to facilitate the ANS MP revision by clarifying the issues or problems that need to be addressed, and to provide rationale for a recommended approach to completing the plan. The scoping paper elements include: mission; context; issue/problem statement; purpose and scope of the plan; management plan goals; options considered; a recommended approach; and policy interactions necessary to complete the plan.

Mission

Protect and restore Washington's native aquatic resources and the commercial, agricultural and recreational activities that depend on them by preventing the introduction and spread of invasive aquatic animal and plant species, and eradicating populations where feasible.

Context

The ANS Committee was created to foster state, federal, tribal, and private cooperation on aquatic nuisance species issues. The ANS MP serves as a strategic plan, a work plan, and a mechanism that allows the state to qualify for National Invasive Species Act (NISA) funding through the U.S. Fish and Wildlife Service (USFWS). Washington statute RCW 77.60.130(3)(a) provides the authority and direction to periodically revise the ANS MP. The current version of the ANS MP is October 2001.

The ANS MP is an important tool for guiding statewide activities and coordinating ANS information and actions between other states and internationally. The information is used to inform the legislature and public of ANS management priorities and fulfills our obligation for a state management plan by the national ANS Task Force. This plan provides the USFWS with an outline of prioritized action items that address both Washington State and Pacific Northwest aquatic invasive species issues.

Excom initiated the action to revise the ANS MP in November of 2006. The ANS MP work group was formed and an interim charter approved in December. WDFW is leading the work

group efforts and provides progress reports to Excom on a monthly basis. Regular work group members and points of contact for all stakeholders are provided in the charter. This scoping paper should be considered a fully expanded version of the interim charter.

Issue/Problem

The world of aquatic invasive species has evolved significantly in the last six years with new invasive species being found and spreading, and new laws, rules, science, and processes being developed to address them. The 2006 ANS Committee report to the legislature also provides many recommendations that must be incorporated into the plan. Updating the management plan is critical to assist the state’s new Invasive Species Council (ISC) and other resource managers, to identify gaps and issues for ANS Committee actions, and to meet federal and state legislative and funding requirements.

Purpose and Scope

The ANS MP work group will address how best to revise and update the statewide plan based on a review of Louisiana, Hawaii, and California (draft) state management plans, ISC strategic planning needs, and the compilation of new science, data, and other information. The scope of the plan will cover six years. Preliminary assessment shows strong support for following the Louisiana plan that addresses ANS by pathways rather than by individual species. The plan will be formatted to place issues that are likely to change in the appendixes for easy updating as needed.

Management Plan Goals

The new ANS MP will provide six goals rather than the one goal as defined in the 2001 version. Many of the former “objectives” are now stated as goals to which new objectives will be attached as the plan develops. Specific tasks to accomplish agendas would be put in the appendixes.

Goal 1: Prevent introduction and spread of ANS

Preventing the introduction of ANS into non-infested Washington waters is the first and least costly line of defense. Prevention actions address species that have not yet established populations or species that have small isolated populations in the state. Prevention by introduction pathway is usually the most cost effective and least environmentally disruptive method of addressing ANS. Assessment of risk and identification of external management opportunities, such as applied in the ballast water management program, is very important for success. This requires timely and strong coordination and cooperation on early detection and rapid response plans within and between states and countries.

- | ANS MP Goals |
|--|
| 1. Prevent introduction and spread of ANS |
| 2. Control, contain, or eradicate established ANS populations |
| 3. Predict and detect new or recurring ANS threats and risks through research and monitoring |
| 4. Coordinate/cooperate in state, regional, national, and international ANS processes |
| 5. Promote public ANS education & volunteer opportunities |
| 6. Promote biodiversity and restoration |

Goal 2: Control, contain, or eradicate established ANS

ANS that have established large or multiple populations in Washington waters are addressed through control, containment, and/or eradication actions. Small populations of newly introduced ANS are most vulnerable to eradication. However, in most cases, control and containment actions precede eradication efforts as information is needed to assess the spread and most effective methods for elimination. Any action considered must also take into consideration the effects on local native species, endangered species, and regional biodiversity. Strong coordination and cooperation on response plans within and between states and other nations is critical to timely and effective management.

Goal 3: Predict and detect new or recurring ANS threats and risks through research and monitoring

Research must be conducted to help resource managers predict and assess high-risk ANS threats, identify their likely introduction or spread pathways, and identify or develop tools for managing them. An early detection network for new or recurring ANS must be established and monitoring must be conducted to identify trends in population or spread dynamics, and to validate research findings.

Most ANS come from other countries so their interactions with our native species are poorly understood. ANS have been, and continue to be, intentionally introduced to Washington for agriculture, aquaculture, live seafood trade, ornamentals and pet trade, recreational fisheries, and other purposes. Other ANS arrive by “hitchhiking” pathways on recreational and commercial watercraft or in ballast water. The study and management of ANS as a science continues to evolve. New introduction pathways are identified regularly as the world transports more goods, more quickly, and from more remote locations. The ability to find and purchase nonnative species over the internet and have them mailed overnight across the country is a prime example of this evolving threat.

Goal 4: Coordinate & cooperate in state, regional, national, and international ANS processes

Coordination and cooperation among all stakeholders is critical for effective and timely ANS management. Agreements to implement ANS response plans are most effective when in place before ANS are detected or have a chance to spread to new areas. ANS law is a new and rapidly evolving field. Washington State laws must adapt as we improve our knowledge of ANS issues. The regulatory authority and financial support afforded by integrated state and federal legislation can enable our society to avoid or minimize environmental and economic damage from ANS.

Goal 5: Promote public ANS education & volunteer opportunities

Many ANS introductions occur through general public, industry, and academic pathways such as the release of nonnative pets, bait, and aquarium plants and animals into state waters. The cost of ANS management can be staggering and costs can be reduced by the use of volunteers in all phases of ANS management. A strong educational process can provide one of the best ANS prevention tools as more people are taught to identify ANS, appreciate their risks, and help close off those pathways. Public and legislative awareness also helps the

regulatory agencies develop effective policies, ANS management programs, and acquire funds to carry out these activities.

Goal 6: Promote biodiversity and restoration

ANS management will integrate the elements of reclamation and restoration of native species following control or eradication of ANS (ISC strategic plan requirement). This is important to support the state's commitment to biodiversity and avoid further degradation of the state's environment and natural resources.

MP Format Options

Four options are considered in revising the ANS MP. These include revising the plan using either: a) the 2001 format; b) a format based on newly published Louisiana, Hawaii, or California (draft) ANS management plans; c) a new format; or d) determine that the 2001 plan is still sufficient for current use. The pros and cons for each option are provided below.

Revise using 2001 format -

Pros: The format is familiar; outdated information may be revised relatively easily; new information can be added; would require least effort for a revision; unlikely to require re-approval by governor's office and national ANS Task Force.

Cons: The format is poorly structured for efficient use and poorly illustrated; most emphasis is on species rather than pathways; restructuring format would require extensive editing.

Revised based on another state ANS management plan format –

Pros: The formats have been recently accepted and recommended by the national ANS Task Force; provides good examples of more effective formats; provides good examples for graphics and illustrations; identifies newer science and legislations.

Cons: No standard format; some modification necessary to address Washington issues; requires extensive revisions/time; more likely to require re-approval.

Revise using a new format -

Pros: Uniqueness of Washington State ANS management may require alternative new format.

Cons: Most likely to require re-approval; no alternatives identified as appropriate or necessary.

Do not revise -

Pros: No effort to revise or question of re-approval; revision for ANS Committee purposes only – 2001 version fulfills state requirements; could probably use for another year or two with creativity.

Cons: 2001 version does not identify many current ANS Committee tasks/actions; difficult to use as work plan; most information outdated or misleading; poor reflection on Washington State ANS management status and leadership; poor reflection on ANS Committee legislative duties to periodically revise plan; not effective for coordination with ISC and their development of a strategic plan.

Recommended Approach

The ANS Management Plan Work Group recommends using the Louisiana plan approach as the foundation with some Hawaii and California plan elements added as appropriate. The Louisiana plan was preferred as it provided a good overview of how ANS affect that state due to its unique geography and economy. It also focuses on ANS pathway management by multiple species rather than by individual species. It has useful graphics and is effectively illustrated. Modifications may be made to reduce the detail in the main body of the plan and rely on appendixes more for dated material.

Policy Interaction

The revision of the ANS MP requires policy action at several levels. The first level is Excom that meets monthly and directly oversees the ANS MP work group. The ANS Committee Excom also coordinates with the ISC to be consistent with their strategic plan development. The next level is the full ANS Committee that meets biannually and provides review and approval of the plan. Once approved, the national ANS Task Force must review the document to determine if it is a substantial revision, in which case it may need to be re-approved. Re-approval by the ANS Task Force may also trigger the need for re-approval by the Washington State Governor's Office.

-- END --

APPENDIX D

2008 ANS Committee DRAFT Work Plan

Hold monthly half-day meetings and semi-annual all-day meetings

- Monthly half-day meetings for regular business should include those members on the old “Executive Committee” plus any other ANS Committee members willing to further the goals of the committee by sharing in discussions, decisions, and action items.
- All-day semi-annual meetings for educating the full membership on ANS issues, especially those issues which were worked on in monthly meetings. The all day meetings may also be an opportunity to poll the full membership on an issue or get an endorsement of a work product from the monthly meetings.
- Further develop an ANS Committee charter, which establishes the purpose and goals of the committee and defines the relationship between monthly meetings of the working membership and semi-annual meetings of the full membership.
- Consider changing the committee name and documents to the term “aquatic invasive species” because it is more specific and less confusing than “nuisance.” This must first be discussed with the National ANS Task Force to determine what impact, if any, it would have on funding provided to the state under NISA for ANS management and control.

Further Develop our Working Relationship with the Invasive Species Council

- Issue papers to be developed in 2008 for presentation to the WISC:
 - Boat hulls. We need to control the introduction of aquatic invasive species on boat and ship hulls. Boats being brought into WA State by commercial haulers get inspected and cleaned if necessary but recreational boats being tailored or entering the state by water are nearly totally uncontrolled. A description is needed for the circumstances when boat or ship hulls can be safely cleaned in the water and the implementing agencies (WDFW, WDNR, and Ecology) need to be informed.
 - Public Awareness Campaign. Propose supporting and integrating the efforts by the WISC subcommittee on public education, the USFWS initiative, and WDFW efforts funded by boat fees. Public awareness and support is needed for getting resources for prevention and control, early detection of new introductions, and changing behaviors that introduce or spread AIS.

Aquatic Invasive Species Watch List

- Establish criteria for inclusion of a species on the list and evaluate the need for species risk assessments.
- Develop revision procedures and use them to resolve shellfish industry concerns with commercial nonnative species.
- Introduce the watch list to the WISC, state agencies, and public.

Advance the EDRR plan

- Restructure the plan to be a general framework for interagency coordination and lead agency designation, based upon their legal authority, for detecting and responding to new introductions.
- Create a new name for the plan and rewrite the memorandum of understanding (MOU) as an organizational agreement.
- Request the WDFW Director to review the EDRR and MOU and determine whether the agency is willing to take responsibility to circulate them to the other agencies.
- Present the plan to the WISC and request they recommend that state agencies sign and implement the provisions of the MOU.
- Strongly recommend ongoing participation and support from the state for the Columbia River Basin Rapid Response Plan for the introduction of zebra or quagga mussels into the Columbia River system.
- Ask for resources to design and implement response plan for those water bodies in the state not covered by the Columbia River Basin Rapid Response Plan for the introduction of zebra or quagga mussels.
- Continue to encourage the expansion of existing monitoring efforts, such as green crab monitoring, to include other species of concern.

Establish/upgrade agency websites

- Jeff Adams of UW Washington Sea Grant has offered to create and host a website for ANS Committee business.
- The ANS Committee website should contain links to other important websites, especially those of state agencies.
- While compiling a list of agency websites, the ANS Committee should offer suggestions to the agencies of website improvements or additions.

Copies of this report are available from:



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