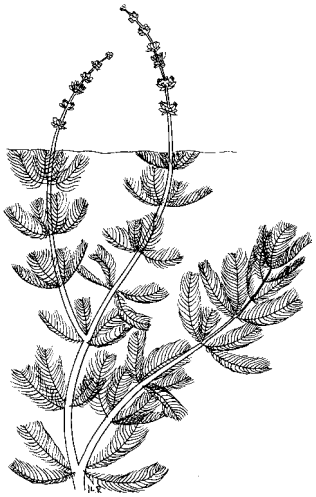
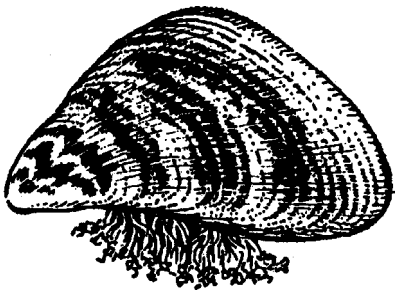
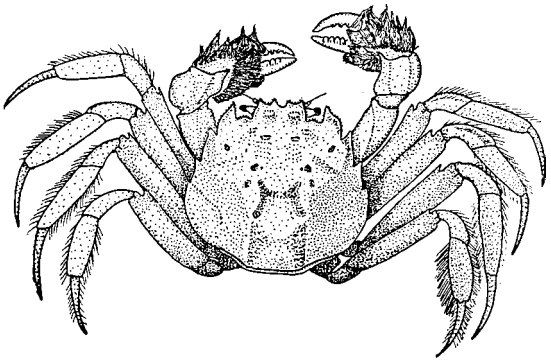
# Oregon Aquatic Nuisance Species Management Plan



Eurasian watermilfoil



Zebra mussel



Mitten crab

Hydrilla

# Oregon Aquatic Nuisance Species Management Plan

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# Acknowledgements

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# Executive Summary

Aquatic Nuisance Species (ANS) are a serious problem in Oregon. There are currently over 134 nonindigenous aquatic species reported in Oregon. More species are expected to arrive. Current state activities and authorities address some ANS, their prevention, and control. Yet, the activities are not coordinated or comprehensively managing the impacts of ANS. The importance of Oregon's aquatic resources requires a coherent response to the threat posed by ANS. This management plan is the initial step in establishing a program in Oregon to specifically address ANS issues.

The federal Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 amended by the National Invasive Species Act of 1996 calls for the development of state and regional management plans to control aquatic nuisance species. With approval of a state plan by the national ANS Task Force, matching funds for activities detailed in the management plan may be available. Using guidance from the ANS Task Force and state agencies, a plan was developed that comprehensively addresses specific aquatic nuisance species, provides a management framework, and sets objectives and actions to prevent and reduce the impact of aquatic nuisance species in Oregon. The Oregon ANS Management plan was produced with the support of the OWEB, Portland State University's Center for Lakes and Reservoirs and the coordination of a steering committee composed of members from federal and state agencies, interest groups, researchers and industry representatives.

The goal of the Oregon Aquatic Nuisance Species Management Plan is to: Minimize the harmful ecological, economic, and social impact of ANS through prevention and management of introduction, population growth, and dispersal of ANS into, within, and from Oregon.

The Plan includes a system to classify all nonindigenous species in Oregon, identifies the proper management for each class, details current authorities and programs, and sets objectives that will lead to the accomplishment of the Plan goal. These objectives include the establishment of a management structure that coordinates ANS activities, a strong prevention program, a monitoring program that allows for the early detection and eradication of pioneering ANS, a control program aimed at established species, education, and research. Specific actions under these objectives include establishment of an invasive species council, support of regional efforts, provisions for dedicated funding for ANS management activities, development of a ballast water management program, an annual survey of high-risk waters, a citizen monitoring network, emergency response plans, technical assistance to watershed councils, public education, and research on management options.

Oregon currently has many programs that contain ANS management components. Since these programs are imbedded in larger efforts, such as nursery inspections, it is difficult to establish a present level of effort on ANS management in Oregon. The cost of an effective, coordinated management program for ANS is substantial. Total estimated costs are nearly $3 million per year, which is less than the estimated economic impact of one invasive aquatic plant, according to an economic assessment of weeds in Oregon recently completed by the Oregon Department of Agriculture. Detailed information on the budget can be found in the implementation table. The Plan is structured for phased or

incremental implementation, with high priority on establishment of an Invasive Species Council and a coordinator position.

# Introduction

Aquatic nuisance species are a serious problem in the United States. The increasing recognition of the threat posed by ANS led the federal government to initiate a program of action. The Nonindigenous Aquatic Nuisance Prevention and Control Act (NANCPA) was passed on November 29, 1990, and subsequently amended by the National Invasive Species Act of 1996.

The purposes of the Nonindigenous Aquatic Nuisance Prevention and Control Act are to:

- prevent unintentional introduction and dispersal of nonindigenous species into waters of the United States,
- to coordinate federally conducted, funded or authorized research, prevention, control, information dissemination and other activities,
- to develop and carry out environmentally sound control methods to prevent, monitor and control unintentional introductions of nonindigenous species,
- to understand and minimize economic and ecological impacts of nonindigenous aquatic nuisance species that become established, and
- to establish a program of research and technology development and assistance to States in the management and removal of zebra mussels.

Under section 1204 of NISA, states are authorized to present a comprehensive management plan to the Federal ANS Task Force for approval. These state plans must identify those areas or activities within the state, for which technical, enforcement, or financial assistance (or any combination thereof) is needed to eliminate or reduce the environmental, public health, and safety risks associated with aquatic nuisance species. Plan approval allows the state to receive up to a 75 percent federal cost share to implement a plan.

This state plan was developed to meet the requirements of NISA, with guidance from the federal ANS Taskforce and reliance upon other state plans. Washington already has a plan in place and is receiving federal assistance to manage ANS. California, Idaho and Montana are developing state plans, which will facilitate a regional approach to ANS management and complement Oregon's state plan.

Oregon's water resources are an outstanding asset to the state. This state plan recognizes the value of Oregon's waters and seeks to protect them from the threat posed by ANS. There are over 100,000 miles of rivers, over 6,200 lakes (including many pristine lakes in the High Cascade Mountain region), nine major estuaries, and over 360 coastal miles in Oregon (ODEQ, 2000). These aquatic resources provide habitat for salmonids and other native species, fisheries, aesthetic enjoyment, hydropower, irrigation, municipal and industrial water supplies, and recreational opportunities. To

best meet these multiple uses, Oregon's water resources must be managed as whole, functioning ecosystems.

Many of the threats to aquatic systems have been recognized and addressed in Oregon. Habitat loss, over-exploitation of resources, and pollution have been the focus of intense conservation efforts. One major threat that has not been comprehensively addressed is introduced species. There are currently 134 reported nonindigenous aquatic species in Oregon (USGS, 2000). It is likely that other nonindigenous species are present that have not been reported or detected.

Introduced aquatic species are nonindigenous species that are transported and released, intentionally or unintentionally, outside of their historic range. Nonindigenous aquatic species that degrade ecosystem function and benefits are referred to as aquatic nuisance species (ANS). ANS can completely alter aquatic systems by displacing native species, degrading water quality, altering trophic dynamics, and restricting beneficial uses. These impacts are currently occurring in Oregon and are likely to increase as more nonindigenous species are introduced.

The costs and impacts of these "biological pollutants" in Oregon have not been determined precisely; however, costs are incurred in two main categories. First, is the loss in potential economic output, such as the reduction in aquaculture, fisheries, and crop production. Second is the direct cost of combating and mitigating the impacts of invasions, including all forms of quarantine, control, and eradication (Mack, R. et. al. 2000). Profitability of agriculture, for example, is reduced by the costs incurred to control nonindigenous aquatic plants that clog irrigation canals. The zebra mussel (*Dreissena polymorpha*) has the potential to invade Oregon and create substantial costs for the maintenance of industrial, hydropower, irrigation, and water supply systems. Impacts of the zebra mussel in the Midwest and eastern U.S. has been estimated at $1 billion annually (Khalanski, 1997). The potential impact of ANS in Oregon is reflected in the current value of fisheries to the economy of the state. Sport fishing in Oregon is enjoyed by over 655,000 anglers annually that spend nearly 8 million angler-days afield and generate over one billion dollars for the Oregon economy (American Sportfishing Association, 1996). The direct economic impact of one aquatic weed in Oregon, Egeria "Brazilian elodea" (*Egeria densa)*, is $3.5 million according to a recent study completed for the Oregon Department of Agriculture. (The Research Group, 2000) The potential impact of another aquatic weed, Spartina *(Spartina alterniflora)*, is estimated at $8.5 million.

The economic effects of nonindigenous species may be calculable, but often the ecological consequences of introduced species are difficult for humans to perceive or quantify; though, in fact, all introductions have some ecological impact. Long time lags between an introduction and an observation of impact, confounded with a poor understanding of the natural history characteristics of many aquatic systems, contribute to our inability to detect problems early in the invasion when control is most likely to be effective. Furthermore, we have a poor understanding of the basic biology and ecology of most introduced, as well as many native, species. Impacts of introduced species may also be masked by other changes in aquatic systems, such as habitat loss or alteration.

While all of the impacts of aquatic nonindigenous species may be difficult to decipher, some of the impacts are easily observed. Invasive aquatic plants have degraded habitat in many lakes and streams (ODEQ, 2000). Introduced predatory fish have been implicated in the decline of native species (ODFW, 1999). Nationwide, nonindigenous species have contributed to 68% of the fish extinctions in the past 100 years, and the decline of 70% of the fish species listed in the Endangered Species Act. (Lassuy, 1994).

The health of all organisms, including humans, can suffer when new species are introduced. The mitten crab (*Eriocheir sp.)* is an intermediate host of a lung fluke that infects humans. Other species, such as toxic algae, can create health risks. Native species can be affected when new diseases or parasites are introduced along with a nonindigenous species. The same pathways that bring nonindigenous species to Oregon can also serve as vectors of disease. Cholera (*Vibrio cholerae*), for example, has been found in several studies of ballast water, though the public health implication is unclear (McCarthy, 1994).

There is an increasing recognition of the threat presented by ANS in Oregon. Still, newly introduced species are often not recognized for their invasive potential and are not dealt with until they reach a nuisance level. Most infestations are ignored, while a few are managed on a case-by-case basis. Some taxa receive much attention while others, possibly more damaging, receive little. Prevention is practiced by several agencies, but usually in an uncoordinated manner and seldom in collaboration with neighboring states. A unified and comprehensive management effort is needed to help maintain the biological integrity of Oregon's waters, restore native populations, and prevent new introductions. This plan provides a framework for coordinating a response to ANS in Oregon, and addresses specific nonindigenous species that require immediate management action.

## Process and Participation

Addressing ANS in Oregon requires participation by many agencies and interest groups. This plan was produced by the Center for Lakes and Reservoirs at Portland State University in collaboration with a steering committee that included the following agencies, organizations, and individuals.

Lindsay Ball, Oregon State Police (OSP)

Larry Cooper, Oregon Department of Fish and Wildlife (ODFW)

Jason Daughn, Senator Wyden's Office

Sebastian Degens, Port of Portland (PORT)

Russell Harding, Oregon Department of Environmental Quality (ODEQ)

Jesse Hayes, Hayes Oysters

Paul Heimowitz, Oregon State University Sea Grant (OSU)

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Jeff Kroft, Oregon Division of State Lands (ODSL)

Charles Lang, Oregon B.A.S.S.

Denny Lassuy, US Fish and Wildlife Service (USFWS)

Jan Lee, Oregon Water Resources Congress (WRC)

Jim Myron, Oregon Trout

Blaine Parker, Columbia River Intertribal Fisheries Commission (CRITFC)

Stephen Phillips, Pacific States Marine Fisheries Commission (PSMFC)

Ray Rainbolt, Oregon Department of Fish and Wildlife (ODFW)

Wayne Shuyler, Oregon State Marine Board (OSMB)

Vivienne Torgeson, Oregon Watershed Enhancement Board (OWEB)

James Townely, Columbia River Steamship Operators

Sylvia Yamada, Oregon State University, Zoology Department (OSU)

# ANS Management Classes

All nonindigenous species impact native species and habitat in some manner, but not all of them pose a significant threat, and some provide an economic and recreational benefit, such as the pacific oyster (*Crassostrea gigas*) and the largemouth bass (*Micropterus salmoides*). While it is hard to elucidate the effects that species will have once they are introduced, there are species whose current or potential impacts on native species and habitats and economic and recreational activity in Oregon are known to be significant (ODA 2001). These ANS are a priority for management actions. At the same time, the ability to manage each species varies greatly, and the resources available are limited. Management efforts must, therefore, be focused on species where actions can produce the greatest benefit. In recognition of the known threats, impacts, and potential problems of certain ANS and the state's current management capabilities, a system to classify species was developed that recommends management activities for each classification. Yet, because impacts either do not occur immediately or may not be apparent until well after establishment, effort must also be devoted to assessing the overall impacts of nonindigenous species, regardless of their classification. The following are examples of species to be addressed by the Oregon ANS management plan. This listing is not comprehensive, but is provided to illustrate species in each management class.

## Management Class 1

Management Class 1 species are currently not known to be present in Oregon, but with a high potential to invade **OR** reported in Oregon with limited populations. Appropriate management for this class includes prevention of introductions and eradication of pioneering populations. Examples of species that need to be addressed under this management class are:

### Asian Clam (*Potamocorbula amurensis*)

The Asian clam was introduced into the San Francisco Bay by ballast water discharge and first collected in 1986. This species has become the most abundant clam in the northern part of the Bay, ultimately reaching densities of nearly 50,000 clams per square meter (Peterson, 1996). The Asian clam consumes bacterioplankton, phytoplankton, and zooplankton (copepods), and may substantially impact copepod populations through the consumption of the copepods' phytoplankton food source and by direct predation. The Asian clam can completely alter food-web dynamics through its filter feeding capabilities. It has been estimated that clams in the northern portion of the Bay have the capacity to filter the entire water column at least once and possibly more than twice in a single day (Thompson and Luoma, 1999). Its ability to tolerate salinities from less than 1 ppt to 33 ppt, and temperatures ranging from 0-28° C suggest that it will be able to thrive in Oregon, though it currently has not been found here.

**Caulerpa (*Caulerpa taxifolia*)**

Caulerpa is a green alga native to tropical waters that typically grows in small, isolated patches. In areas where the species becomes well established, it causes ecological and economic devastation by overgrowing and eliminating native seaweeds, seagrasses, reefs, and other communities. In the late 1970s this species attracted attention as a fast growing and decorative aquarium species that became popular in the aquarium trade. A clone of the species was cultured for display at the Stuttgart Aquarium in Germany and provided to aquariums in France and Monaco. Around 1984 this species apparently escaped or was released from the Oceanographic Museum of Monaco and rapidly spread from an initial patch of about one square yard to over two acres by 1989, and many thousands of acres today. The alga has since spread to France and Spain and is now widespread through much of the northwestern Mediterranean. In June 2000, a small population was found in a lagoon near Carlsbad, California where extensive and expensive management actions are currently being conducted. A second population was recently discovered at Huntington Harbor, in California. Coastal water temperatures may limit the spread of Caulerpa into areas south of Stonewall Bank, Oregon (near Yaquina Bay) (Keppner, S. and Caplen, R., 1999).

**Giant Salvinia (*Salvinia molesta*)**

Giant salvinia is a free-floating aquatic fern with submerged leaves that function as modified roots. It is considered to be one of the world's worst aquatic pests, and in favorable environments, plants may be expected to double in volume within a week. Giant salvinia forms extensive mats that can completely cover water surfaces resulting in the degradation of natural habitats by shading native plants, reducing available dissolved oxygen, and creating large amounts of decaying plant material. The mats are reported to be up to three feet thick, which hinders management by chemical control, and giant salvinia reproduces so rapidly that infestations quickly become impossible to eradicate. Giant salvinia can clog water intakes, which interferes with irrigation, drainage, and electrical generation.

Giant salvinia is native to Southeastern Brazil, but it has spread to many areas of the world. In the United States it has been observed in Arizona, South Carolina, North Carolina, Texas, Louisiana, Mississippi, and California. Its expected range includes USDA hardiness zone 8, which includes areas of western Oregon (USGS, 2000). Within a year of its 1998 discovery in the United States, giant salvinia was found in six states and over a dozen local watersheds. Its arrival in the United States has been linked to commercial nurseries around the country. Human transport will spread giant salvinia locally, with plants adhering to and carried overland on anything entering infested waters, including boats, trailers, vehicular wheels, intakes and gear.

**Hydrilla (*Hydrilla verticillata*)**

Hydrilla was imported into the United States from Asia in the early 1950s for use in aquariums, and was likely introduced into the wild near Tampa and Miami, Florida. Hydrilla is currently the most abundant aquatic plant in Florida, where it grows in thick surface mats and displaces native vegetation. Distribution in the United States now

ranges from Connecticut southward along the coast to Texas. The plant is also present in California and Washington. Several inland states (Pennsylvania, Tennessee and Arizona) also have populations. Established populations of hydrilla are not known to occur in Oregon, although surveillance efforts have been limited. Hydrilla is most likely to spread when plant fragments are carried along with recreational boats into new habitat.

Hydrilla causes major problems with water use. In drainage and irrigation canals, it greatly reduces flow and causes clogging, which can result in flooding and damage to canal banks, structures, and pumps. In utility cooling reservoirs, hydrilla can disrupt flows necessary for adequate water-cooling. Hydrilla can interfere with recreational and commercial vessel navigation. In addition to interfering with boating by fisherman and water skiers, hydrilla hampers swimming, displaces native vegetation communities, and can damage sportfish populations. The economic consequences of aquatic weed infestations can be staggering. Annual expenditures to control aquatic weeds in the United States (most of them nonnatives, such as hydrilla) are reported to be $100 million (OTA, 1993).

**Japanese Oyster Drill (*Ceratostoma inornatum*)**

The Japanese oyster drill was introduced when pacific oysters were imported from Japan during the early 1900s. The Japanese oyster drill is among the most damaging of pests found in oyster beds. In drill infested areas of Washington, up to 25% mortality occurs in outplanted oyster seed, production costs increase by nearly 20%, and net profits decrease by as much as 55% due to drill predation (Elston, R., 1997). ODFW has addressed the potential for the Japanese oyster drill to be transferred from Washington through oyster importation procedures.

**Mitten Crab (*Eriocheir spp.)***

This native of mainland China, Japan, and coastal areas along the Yellow Sea was first collected in South San Francisco Bay by a shrimper during the winter of 1993. Although mitten crabs had previously been found elsewhere in the United States, San Francisco Bay was the first that resulted in the establishment of an extensive population. Mitten crabs are catadromous: the majority of its life cycle occurs in freshwater, with a migration to saltwater to reproduce and die. Burrows excavated by these crabs result in bank erosion and levee damage. In the summer of 1998, as many as 30,000 adult mitten crabs a day migrated downstream and clogged the fish filtering and trash screens at the USBR Tracy (CA) pump stations, which provide water for Southern California (NCSE, 1999). Similar impacts can be anticipated in the Columbia River system if mitten crabs become established. In 1997, one adult mitten crab was found in the lower Columbia River. Recently, another likely mitten crab siting was reported to the Oregon Invasive Species Hotline. Movement of this crab from San Francisco Bay or across the Pacific from its native range without human assistance is highly unlikely.

**New Zealand Mud Snail (*Potamopyrgus antipodarum*)**

Native to New Zealand but long established in Australia and Europe, this species was discovered in North America in 1987 in the Snake River. Population levels can

exceed 100,000 snails per square meter. (NCSE, 1999). New Zealand mud snails have recently become established in the lower Columbia River near Astoria. Ballast water transfer is the suspected source of this species. However, birds and sport anglers may be spreading this pest to additional drainages. Although no effects on native species have yet been observed in Oregon, these snails compete with native mollusks for resources and degrade habitat due to their high reproductive capacity.

**Round Goby (*Neogobius melanostomus*)**

The round goby was introduced, via ballast water, into the St. Clair River and vicinity on the Michigan-Ontario border where several collections were made in 1990. The numbers of native fish species have declined in areas where this goby has become abundant. The round goby has been found to prey on darters, other small fish, and lake trout eggs and fry in laboratory experiments (Marsden, J. E., and D. J. Jude, 1995). The round goby's potential range includes Oregon. Under ODFW's Wildlife Integrity Rules, it is illegal to import, possess, buy, sell, or transport round goby in Oregon.

**Smooth Cordgrass (*Spartina alterniflora*)**

Smooth cordgrass is a plant of the intertidal zone, where it colonizes mud or sandflats in saline or brackish water. It was first introduced into Willapa Bay, Washington in 1894 in a shipment of eastern oyster spat originating from the East Coast of North America. Due to its higher seed production and germination rate, smooth cordgrass establishes new colonies faster than the native cordgrass. Once established, it outcompetes the native species, growing 6 to 7 times faster. In 1999, state and federal agencies estimated that Spartina had infested about 15,000 to 25,000 acres of Willapa Bay. Large-scale loss of mudflat habitat may be expected to result in major ecosystem changes that will impact important natural resources. Juvenile chum salmon and English sole depend on mud-flat habitat as prey rich nurseries. Populations of Dungeness crab will also be affected. Currently commercial oyster production is threatened as mudflat culture beds are invaded in Willapa Bay.

**Zebra Mussel (*Dreissena polymorpha*)**

In the late-1980s, the zebra mussel was discovered in Lake St. Clair, between Lake Huron and Lake Erie. Zebra mussels were introduced from Eastern Europe via ballast water discharge from European freighters. This species spread rapidly to 20 states in the Mississippi River drainage. Nationwide expenditures to control zebra mussels in water intake pipes, water filtration equipment, and electric generating plants are estimated at $3.1 billion over 10 years (OTA, 1993).

Zebra mussels can easily survive overland transport from the Midwest to Oregon while attached to boat hulls or in live wells, engine cooling systems, or bait buckets. Live zebra mussels have been found at California agricultural stations on boats from the Midwest, and in Washington on boats destined for British.Columbia. The zebra mussel is a prolific fouling organism with great potential to disrupt fish passage facilities and cause ecological and economic damage in the Pacific Northwest.

## Management Class 2

Management Class 2 species are present and established in Oregon with impacts that may be mitigated or controlled with appropriate management. These species can be managed through actions that involve mitigation of impact, control of population size, and prevention of dispersal to other waterbodies. Examples of species addressed under this management class are:

**Egeria (*Egeria densa*)**

Egeria is from South America and was presumably imported for the aquarium trade. It has few natural predators to keep its growth in check, and when introduced to a lake, it often forms dense mats that displace native aquatic plants. These mats are unsightly, interfere with recreation, and degrade fish habitat. Egeria is primarily responsible for the listing of many coastal Oregon lakes as water quality limited under section 303d of the Clean Water Act.

**Parrotfeather milfoil (*Myriophyllum aquaticum*), Eurasian watermilfoil (*Myriophyllum spicatum*), Yellow Iris (*Iris pseudacorus*) and other aquatic nonindigenous plants.**

These species have been introduced through their use in aquariums and water gardens. Once they become established in a natural waterbody, they quickly grow into dense mats that shade out native plants and algae, reduce fish habitat and recreational use. These plants reproduce rapidly with plant fragments capable of establishing new colonies when disturbed by recreational activity, and are easily transported to new waterbodies through fouling of boat props and trailers. These plants infest many coastal lakes in Oregon.

**Purple Loosestrife (*Lythrum salicaria*)**

Purple loosestrife is a wetland invader that was imported from Europe in the early 1800s for its medicinal value and for the beautiful purple spikes of the blooming plant. Unsuspecting visitors to an infested wetland often admire the beauty of the marsh when purple loosestrife is in bloom, unaware that it has displaced native plants and animals. Its vegetative dominance may increase the likelihood of listing additional native species under the ESA. Purple loosestrife is still sold as an ornamental in nurseries in some states, though 24 states, including Oregon, have listed it as a noxious weed and prohibit its sale. It is found in 42 of the contiguous states, and could invade the remaining six. The plant is extremely difficult to eradicate although recently a suite of biological control agents have proven effective in controlling the plant. Estimated losses are $45 million per year in control costs and forage loss (ATTRA, 1997).

## Management Class 3

Management Class 3 species are established throughout Oregon with impacts but with no available or appropriate management techniques. These species warrant further

evaluation and research to ascertain the potential control, and to prevent establishment in new waterbodies.

**European Green Crab (*Carcinus maenas*)**

The green crab feeds on clams, oysters, mussels and smaller crabs, including young Dungeness crabs. Native to the Atlantic coasts of Europe and northern Africa, the crab occupies protected rocky shores, sandflats and tidal marshes. The green crab has invaded both coasts of the United States. It has spread from San Francisco Bay north to Vancouver Island, including Oregon. Clam and native shore crab populations in California have dropped significantly since the 1993 arrival of green crabs (SeaGrant, 1998). Laboratory studies show that green crab prey on Dungeness crab of equal or smaller size.

**Nonindigenous fish (rainbow, brook, and brown trout (*Oncorhynchus mykiss, Salvelinus fontinalis, & Salmo trutta*)), American shad (*Alosa sapidissima*), common carp (*Cyprinus carpio*), bass (*Micropterus sp.*), walleye (*Stizostedion vitreum*), and other warmwater species) amphibians (bullfrogs (*Rana catesbeiana*)), and other vertebrates (nutria (*Myocastor coypus*)).**

These species have been introduced, intentionally and unintentionally, into Oregon and are well established in some areas. Warmwater fish and bullfrogs have been implicated in the decline of native salmonids and amphibians (ODFW, 1999). Stocking of nonnative trout in high mountain lakes has also resulted in declines of native amphibian species. Impacts of introduced fishes on native fish species include predation, introduction of diseases and parasites, competition for food and space, and hybridization. Some species, *e.g.* largemouth bass and rainbow trout, are the basis of popular fisheries that provide recreational benefit to many Oregonians. In addition, recreational angling can provide substantial economic benefits to local economies. While these species have established populations, there are areas of the state where they do not occur, and management should be directed at limiting their spread.

**Whirling Disease (*Myxobolus cerebralis*)**

Whirling disease is a protozoan parasite that affects the nervous system of salmonids. This parasite has a two-host life cycle: salmonids and a common aquatic worm. A free-swimming stage enters young trout and attacks the cartilage, eventually crippling the fish. The whirling disease parasite was first introduced to the United States from Europe in the 1950s, probably in infected trout. The disease spread as these infected trout were distributed among hatcheries or were stocked in open waters. The disease now occurs in the wild in 11 states. Whirling disease is a major problem in some western states, and has decimated trout populations. The rainbow trout population in the Madison River (MT) has declined by 90% since the introduction of whirling disease. Damage has been primarily to wild rainbow trout, although other salmonid species can also become infected (The Whirling Disease Foundation 1998). Whirling disease exists in several watersheds in Oregon.

## Management Class 4

Management Class 4 species are currently considered to have a low potential to invade and establish in Oregon because of phyiological or dispersal limits. These species warrant further research to evaluate their invasive potential.

### Water chestnut (*Trapa natans*)

While established in the northeastern United States since the late 1800's, the range of water chestnut continues to advance into New England and the Mid-Atlantic States. The water chestnut is a robust floating aquatic plant that re-establishes each year from dangerously sharp-spined nuts. One acre of water chestnut can produce enough seeds to cover 100 acres the following year. With four, hard half-inch spines that are sharp enough to penetrate shoe leather and large enough to keep people off beaches, these seeds are major hazards to water contact recreation. Additionally, water chestnut can wipe out native bay grasses from some areas, prevent nearly all water use where it occurs, create breeding grounds for mosquitoes, and provide only marginal habitat to native fish and birds (Vermont Agency of Natural Resources, 1998). Water chestnut has not been found in Oregon.

### Water Hyacinth (*Eichornia crassipes*)

Water hyacinth is present in California and in several southern states. Its presence has caused massive problems with navigation, water based recreation, canal systems, and pumping stations as it can completely cover lakes with floating mats that become dislodged and stuck in water intakes.

Although the risk of water hyacinth overwintering in Oregon is considered small due to cold winter air temperatures, its presence in California and its continued use in aquatic gardens in Oregon pose a threat that it will adapt to colder temperatures, or become established in a thermal refugia in Oregon. Water hyacinth is often found in the Columbia River sloughs near Longview; the source of these plants is unknown. Natural reproduction is possible, as recently, a robust stand of water hyacinth was found in a cooling-water pond in Vancouver, Washington, which raises concern about its invasiveness.

# Federal and Regional Authorities and Activities

## Federal

No single federal agency has clear authority over all aspects of ANS management, but many agencies have programs and responsibilities that address aspects of the problem, such as importation, interstate transport, exclusion, control, and eradication. Federal activities on ANS management are coordinated through the National Aquatic Nuisance Species Task Force. In February 1999, President Clinton signed Executive Order 13112, which requires all federal agencies to collaborate in developing a national invasive species management plan that will include terrestrial and aquatic species. A brief description of the President's Executive Order, the Nonindigenous Aquatic Nuisance Prevention and Control Act, and the National Invasive Species Act (NISA) is provided below. Detailed information on NISA, E.O. 13112, and other federal programs are provided in Appendix C, D, and E.

### Executive Order 13112

President Clinton signed Executive Order 13112 on Invasive Species (64 Fed. Reg. 6183, Feb. 8, 1999), on February 3, 1999. The Executive Order seeks to prevent the introduction of invasive species, provide for their control, and minimize their impacts through better coordination of federal agency efforts under a National Invasive Species Management Plan to be developed by an interagency Invasive Species Council. The Order directs all federal agencies to address invasive species concerns as well as refrain from actions likely to increase invasive species problems. A draft version of the National Management Plan was produced on October 2, 2000.

### Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA; Title I of P. No.101-646, 16 U.S.C. 4701 et seq.)

This Act established a federal program to prevent the introduction of, and to control the spread of, introduced aquatic nuisance species and the brown tree snake.

The U.S. Fish and Wildlife Service, the U.S. Coast Guard, the Environmental Protection Agency, the Army Corps of Engineers, and the National Oceanic and Atmospheric Administration share responsibilities for the implementing this effort. They act cooperatively as members of an Aquatic Nuisance Species Task Force to develop a program for protection, monitoring, control, and research. The Task Force conducts studies and reports to Congress:

- to identify areas where ballast water exchange does not pose an environmental threat;

- to assess whether aquatic nuisance species threaten the ecological characteristics and economic uses of U.S. waters other than the Great Lakes;

- to determine the need for controls on vessels entering U.S. waters other than the Great Lakes; and

- to identify and evaluate approaches for reducing the risk of adverse consequences associated with intentional introduction of aquatic organisms.

Under NANPCA, state governors are authorized to submit comprehensive management plans to the Task Force for approval that identify areas or activities for which technical and financial assistance is needed.

Grants are authorized to states for implementing approved management plans, with a maximum federal share of 75% of the cost of each comprehensive management plan.

**National Invasive Species Act (NISA; P. No.104-332)**

In 1996, NISA amended NANPCA to mandate regulations to prevent the introduction and spread of aquatic nuisance species into the Great Lakes through ballast water and other vessel operations.

This Act required a U.S. Coast Guard study and report to the Congress on the effectiveness of existing shoreside ballast water facilities used by crude oil tankers in the coastwise trade off Maska as well as studies of Lake Champlain, the Chesapeake Bay, San Francisco Bay, Honolulu Harbor, the Columbia River system, other estuaries of national significance, and other waters.

It authorized funding for research on aquatic nuisance species prevention and control in the Chesapeake Bay, the Gulf of Mexico, the Pacific Coast, the Atlantic Coast, and the San Francisco Bay-Delta Estuary.

In addition, NISA required a ballast water management program to demonstrate technologies and practices to prevent aquatic nonindigenous species from being introduced into and spread through ballast water in U.S. waters. It modified: (1) the composition and research priorities of the Aquatic Nuisance Species Task Force; and (2) zebra mussel demonstration program requirements.

## Regional

**Columbia River Aquatic Nuisance Species Initiative**

The Columbia River Aquatic Nuisance Species Initiative (CRANSI) was formed to address the issues of nonindigenous species in the Columbia River. CRANSI is a joint effort of the Ports of Portland and Astoria, and Senator Ron Wyden. CRANSI was formed in recognition of the need for a comprehensive approach to nonindigenous species in the lower Columbia River and an examination of how shipping traffic could transport nonindigenous species throughout the Columbia River Basin.

**Oregon and Washington Sea Grant**

Oregon and Washington have set up the Marine Invasive Species Team (MIST). MIST is a collaborative, region-wide effort to provide natural resource managers, industry, local government, and the public with access to the broadest possible pool of university research and expertise on this subject. The project has produced educational materials including "Aquatic Invasive Species (Guide to the Least Wanted in the PNW)". MIST is also producing an educational video on mitten crab, which will be released in early 2001.

**Pacific Ballast Water Group**

The Pacific Ballast Water Group (PBWG) was formed by representatives from the shipping industry, state and federal agencies, environmental organizations, and others who recognized the need for a cooperative and coordinated regional approach to ballast water management for prevention of invasive species introduction on the West Coast. The discharge of ballast water is a major pathway for the transfer of potentially harmful aquatic organisms and pathogens around the world. The PBWG meets regularly and is currently addressing ballast water discharge standards development and interjurisdictional issues related to ballast water management on the West Coast.

**Pacific States Marine Fisheries Commission/Bonneville Power Administration Aquatic Nuisance Species Program for the Columbia River Basin**

In 1999, the Bonneville Power Administration (BPA), recognizing the potential impact to its operations, funded the Pacific States Marine Fisheries Commission (PSMFC) to carry out an ANS prevention program for the Columbia River Basin (CRB). Zebra mussels pose a serious economic and ecological threat to the CRB's multiple uses, such as agricultural, navigation, boating, fishing, industrial, and hydroelectric operations. The program also addresses mitten crabs, which have caused problems in the San Francisco Bay Delta.

One of the goals of this regional program is to develop an ANS plan for the Columbia River Basin. Other actions undertaken in collaboration with PSU's Center for Lakes and Reservoirs (CLR) include ANS outreach and inspection in Oregon, Washington, Idaho, and Wyoming, and mitten crab outreach in the lower Columbia River.

**The Western Regional Panel**

The Western Regional Panel (WRP) on Aquatic Nuisance Species was formed under a provision in NISA. The initial, organizational meeting of the WRP was held at Portland State University in 1997. The WRP was formed to help limit the introduction, spread, and impacts of aquatic nuisance species into western North America. This panel includes representatives from Federal, State and local agencies and from private environmental and commercial interests.

The purposes of the WRP, as described in NISA are to:

- Identify Western Region priorities for responding to aquatic nuisance species;

- make recommendations to the Task Force regarding an education, monitoring (including inspection), prevention, and control program to prevent the spread of the zebra mussel west of the l00th Meridian;

- coordinate, where possible, other aquatic nuisance species program activities in the West not conducted pursuant to the Act;

- develop an emergency response strategy for Federal, State, and local entities for stemming new invasions of aquatic nuisance species in the region;

- provide advice to public and private individuals and entities concerning methods of preventing and controlling aquatic nuisance species infestations; and

- submit an annual report to the Task Force describing activities within the western region related to aquatic nuisance species prevention, research and control.

**Western Governors Association**

The Western Governors' Association (WGA) is developing a new program to address undesirable nonindigenous aquatic and terrestrial species in the West because of the significant economic and ecological harm they cause. On June 30, 1998, the Western Governors passed Resolution 98-018, Undesirable Aquatic and Terrestrial Species, to develop and coordinate Western strategies and to support management actions to control and prevent the spread and introduction of undesirable species; to support the use of Integrated Pest Management concepts; to encourage broad-based partnerships; and to urge adequate support for the U.S. Department of Agriculture - Animal and Plant Health Inspection Service. WGA has formed a working group of state and federal agencies, industry, non-governmental organizations and academia to develop Western strategies to limit the spread of these species. The invasive species coordinator position in the WGA is not currently funded.

**U.S. Army Corps of Engineers, Columbia River Basin, Northwestern Division (Portland, Seattle and Walla Walla Districts):**

The U.S. Army Corps of Engineers holds quarterly meetings in their North Pacific Division office. These meetings act as a coordination forum for state and federal agencies, tribes (Columbia River Intertribal Fish Commission), and other interested parties in the Columbia River Basin. Additionally, the Corps has erected zebra mussel signs at Columbia Basin hydroelectric projects access points at its lower Columbia River and lower Snake River dams, and at Willamette Valley projects.

**U.S. Fish and Wildlife Service**

The U.S. Fish and Wildlife Service is the federal agency that provides federal funding for implementation of state and regional ANS management plans which have been approved by the ANS Task Force.

One of the major USFWS efforts on ANS is the 100th Meridian Initiative. The goals of this Initiative are to 1) prevent the spread of zebra mussels and other ANS in the 100th meridian jurisdictions and west and 2) monitor and control zebra mussels and other ANS if detected in these areas. These goals will be attained through the implementation of the following six components: 1) information and education, 2) voluntary boat inspections and boater surveys, 3) involvement of those who haul boats for commercial purposes, 4) monitoring, 5) rapid response, and 6) evaluation.

This Initiative represents the first large-scale concerted effort, working with Federal, State, Provincial and Tribal entities, potentially affected industries, and other interested parties to begin addressing the pathway to prevent the spread of zebra mussels. The success of this Initiative depends on the commitment of these groups to combat the spread of this destructive invader.

The USFWS has also implemented a mitten crab management effort and is currently developing a mitten crab management plan in cooperation with the ANS Task Force. The plan includes public outreach, detection, and prevention. The PSU Center for Lakes and Reservoirs is currently implementing the plan in the Lower Columbia River.

# Current Oregon ANS Authorities

In Oregon, many state agencies have authority over and regulatory roles in managing natural resources. While many agencies have some authority to regulate ANS, no centralized authority or management structure exists to coordinate ANS activities in Oregon. This section describes the existing authorities related to ANS that various state agencies have for managing ANS.

## Oregon Plan for Salmon and Watersheds

### The Oregon Plan (ORS 541.405 to 541.415)

Oregon's conservation plan is designed to restore salmon and steelhead to a level at which they can once again be a part of people's lives. While the Plan focuses on the needs of salmon, it will conserve and restore crucial elements of natural systems that support fish, wildlife and people. A recognized gap in the Oregon Plan is its failure to address the negative impacts that nonindigenous aquatic species have on salmon and habitat.

The Oregon Plan has three basic principles:

- Restoration of salmon must address natural and cultural systems.
- Salmon require complex and interconnected habitats that are created, altered and maintained by natural physical processes.
- Life history diversity, genetic diversity, and metapopulation organization (patterns of populations) are ways salmon adapt to their complex and interconnected habitats.

The Oregon Plan emphasizes the importance of local participation in restoration of salmon and the watersheds crucial to sustainable populations. Local watershed councils develop and implement action plans that guide restoration and management of watersheds. Effective implementation of this ANS Management Plan requires participation of local watershed councils. Still, many ANS management activities and the prevention of introductions can best be accomplished at scales larger than the watershed. Therefore, coordination among watersheds within Oregon, and among states at a regional scale is also important.

## Oregon Watershed Enhancement Board

### Oregon Watershed Enhancement Board (ORS 541.351 to 541.403)

The Oregon Watershed Enhancement Board is a new, independent state agency with cabinet status that is integrally tied to the implementation of the Oregon Plan. OWEB receives and administers grants in the Parks and Natural Resources Fund for the

restoration and protection of native salmonid populations, watersheds, fish and wildlife habitat and water quality.

## Center for Lakes and Reservoirs

### 2001 Legislative Session: House Bill 2198

The purpose of the Center for Lakes and Reservoirs is to assist state and federal agencies in researching and mitigating nonindigenous invasive aquatic species in this state and to work with communities in developing effective management of lakes and reservoirs.

### 2001 Legislative Session: Senate Bill 895

The Center for Lakes and Reservoirs may provide staff and coordination assistance to a ballast water task force created to study and recommend appropriate changes and additions to the Oregon ballast water management program.

## Department of Agriculture

### Department of Agriculture (ORS 561, 570, 571)

Various parts of these chapters give the Department of Agriculture the authority to implement quarantines, eradication/control projects, weed control districts and control area orders. ANS currently addressed by ODA are detailed in Appendix B. The Oregon Department of Agriculture's authorities are best summarized in ORS 570.305 and ORS 570.505:

### Department officials to prevent introduction of pests and diseases.

The Director of Agriculture, and the chief of the division of plant industry, are authorized and directed to use such methods as may be necessary to prevent the introduction into the state of dangerous insect pests and plant diseases, and to apply methods necessary to prevent the spread, and to establish control and accomplish the eradication of such pest and diseases, which may seriously endanger agricultural and horticultural interests of the state, which may be established or may be introduced, whenever in their opinion such control or eradication is possible and practicable.

### Necessity of eradication of weeds; cooperation in control and eradication.

Noxious weeds have become so thoroughly established and are spreading so rapidly on state, county and federally owned lands, as well as on property in individual ownership and in transition to county ownership through tax delinquency, that they hereby are declared a menace to the public welfare. While it is recognized that complete eradication may not be practicable, it hereby is established that steps leading to eradication and control are necessary and that responsibility rests not only on the individual landowner and operator but also on the county, state and federal government,

and that the county, state and federal government should cooperate with individual owners in the control and eradication of noxious weed pests.

### State Weed Strategy

The legislature required the ODA to develop a strategy for addressing weed problems in Oregon. This ANS Plan is being developed in conjunction with the State Weed Strategy.

### Invasive Species Council Legislation (HB 2181)

This legislation creates an Invasive Species Council (ISC) to coordinate and foster cooperation between existing programs dealing with invasive species, and help fill the gaps between programs. The council consists of 12 members and will; appoint a State Invasive Species Coordinator, establish advisory and technical committees, create and maintain means of communicating sightings of invasive species, produce educational materials, solicit proposals and review applications for grants to further projects providing education about invasive species, and provide grants or loans for the eradication of new invasions. The ISC addresses terrestrial and aquatic species.

## Department of Environmental Quality

### Biological Criteria (OAR 340-041-0027)

Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

### Water Quality Standards Not to be Exceeded (OAR 340-041-0205)

The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation, or industry shall not be allowed

Weeds or Algae. Documented reports of an abundance of invasive, nonnative macrophytes (those listed on the “A” or “B” Noxious Weed List maintained by the Department of Agriculture) that dominate the lake assemblage of plants and significantly reduces the surface area available for lake usage, or documented evidence that algae is causing other standard exceedences (e.g. pH or dissolved oxygen) or impairing a beneficial use.

### Ballast Water Management Program (SB 895)

Prohibits discharge of ballast water from certain vessels in waters of state, and provides exceptions. Requires vessels to report ballast water management information to the Department of Environmental Quality at least 24 hours prior to entering waters of the state. Directs the Director of Department of Environmental Quality to establish a task force within 60 days after the effective date of the Act to study and recommend to the Legislative Assembly methods and improvements to ballast water management.

## Department of Fish and Wildlife

### Wildlife Integrity Rules (OAR 635-056)

The Wildlife Integrity administrative rules govern the importation, possession, sale and transport of nonnative wildlife. The purpose of these rules is to regulate nonnative species to protect native wildlife while allowing flexibility for private ownership of nonnative species having no potential to be harmful to native species.

In these rules, nonnative wildlife species are classified into one of three groups: Prohibited, Controlled, or Noncontrolled, depending on their potential to harm native wildlife. Aquatic species addressed by the Wildlife Integrity Rules are detailed in Appendix B. The rules also allow the Director to appoint a Wildlife Integrity Review Panel to assist the Department in the species classification process. Panel members are responsible for recommending classification of species or groups of species. These recommendations are then brought before the Commission for final consideration.

### Fish Policies

ODFW has regulated the introduction, transport, and stocking of fishes through its administrative rule authority for many years. In addition, ODFW is bound by rules that regulate its decisions regarding the movement of fishes to new areas. The framework of protective rules is intended to restrict unauthorized establishment of any fishes, whether native, nonnative, hatchery, or wild. Transport permits are the primary basis for regulation of the movement of live fish and avoidance of stocking in areas where they may be detrimental. Permits are required to transport, hold, or release live fish. The basis for approval or disapproval of transport permits is in other rules that prescribe management safeguards for native fishes (such as the Wild Fish Management Policy). Rules that apply to the introduction of new species include the following:

### Fish Management Goals (OAR 635-007-0510)

The overriding goal of fish management is to prevent the serious depletion of any indigenous fish species through the protection of native ecological communities, the conservation of genetic resources, and control of consumptive uses such that fish production is sustainable over the long term.

### Operating Principles for Natural Production Management (OAR 635-007-0523)

Competition, predation and disease: Introductions of fishes of the same or different species as those already present may seriously reduce natural production through competition for food and space or through predation. Introduction of disease may also reduce natural production. The Department shall oppose any actions that allow competition, predation, or disease to prevent meeting natural production objectives of management plans.

**Wild Fish Management Policy (OAR 635-007-0525 through 635-007-0529)**

Gives the highest consideration to the protection and enhancement of wild fish stocks.

**Management Plans (OAR 635-007-0515)**

Resources of the state shall be managed according to plans, which set forth goals, objectives, and operating principles for management of species, waters, or areas. Such plans are a primary means of implementing Department policies regarding fish management.

The Warmwater Fish Plan adopted in 1987 under authority of OAR 635-07-515, gives first priority to the protection of endemic salmonids.

**Import or Transfer of Fish Restricted (OAR 635-007-0585)**

Transfer or import requests may be denied or conditioned on the basis of disease history of the shipping station or watershed, current disease inspection report, or disease known to occur in the watershed to which fish would be shipped

**Permit Required to Transport, Hold or Release Fish (OAR 635-007-0600)**

Any person shall have in possession a Fish Transport Permit in order to: (a) Transport live fish into, within or out of this state; (b) Hold any live fish in the waters of this state; or) Release or attempt to release any live fish into the waters of this state.

**Unlawful Import and Release (OAR 635-007-0615)**

Fish which are imported or released in violation of these rules or the laws of this state are subject to seizure or destruction by the Department at the expense of the person or company who imported or released those fish.

**Transport Release of Mosquito Fish **(Gambusia sp.)**(OAR 635-007-0620)**

Each county or vector control district (ORS Chapter 452) conducting a vector control program which includes *Gambusia* sp. shall obtain a Fish Transport Permit from the Department prior to transporting, holding or releasing any *Gambusia* into the waters of that county or district.

**Use of Fish for Bait (OAR 635-011-0140)**

It is unlawful to transport live fish between bodies of water. Live fish, or parts thereof, may not be used or held for use as bait in angling, except live nongame fish may be used in the ocean, bays, and tidewaters when taken from the waterbody in which they will be used; dead fish, preserved fish, shellfish, or parts thereof may be used as bait unless use of bait is prohibited.

## Division of State Lands

**Jurisdiction over submersible and submerged lands generally. (ORS 274.025)**

The title to the submersible and submerged lands of all navigable streams and lakes in this state now existing or which may have been in existence in 1859 when the state was admitted to the Union, or at any time since admission, and which has not become vested in any person, is vested in the State of Oregon. The State of Oregon is the owner of the submersible and submerged lands of such streams and lakes, and may use and dispose of the same as provided by law.

**Jurisdiction of division over tidal submerged lands; easements; leases for oil, gas and sulphur. (ORS 274.710)**

The Division of State Lands has exclusive jurisdiction over all ungranted tidal submerged lands owned by this state, whether within or beyond the boundaries of this state, heretofore or hereafter acquired by this state (a) by quitclaim, cession, grant, contract or otherwise from the United States or any agent thereof, or (b) by any other means. All jurisdiction and authority remaining in the state over tidal submerged lands as to which grants have been or may be made is vested in the division.

**Control of Introduced Plant Species (OAR 141-050-0972)**

Control of introduced plant species may be undertaken as provided in the management scheme. However, there shall be no attempt to eradicate introduced plants from a Natural Heritage Conservation Area unless this can be accomplished without undue disturbance of natural conditions.

**General Lease Terms and Conditions. (OAR 141-110-0060)**

As authorized in writing by the Division, a lessee shall control noxious weeds, plant pests, and diseases on the leased premises as directed by the local county weed control district, the Oregon Department of Agriculture and/or any other governmental authority which may now or in the future have authority with regard to the prevention and/or control of noxious weeds, plant pests and/or diseases, or as may be authorized or directed by the Division.

## Oregon Progress Board

The Oregon Progress Board is an independent state strategic planning agency. The Board is responsible for maintaining the state's 20 year strategic plan and for developing the Oregon Benchmarks, ninety indicators of economic, social and environmental health. Benchmarks that address issues relating to nonindigenous species are:

- Benchmark 90: Percentage of native fish and wildlife species that are healthy.

- Benchmark 91: Percentage of native plant species that are healthy

- Proposed Oregon Benchmark: Number of nuisance invasive species.

The Oregon Progress Board also publishes a State of the Environment Report. In this report, the number of nuisance invasive species is listed as one of 18 selected indicators of ecosystem health.

## Oregon State Police

**State police to enforce wildlife laws; payment of expenses from wildlife fund; appointment of federal agents. (ORS 496.610)**

The Department of State Police shall employ a sufficient number of state police to enforce the wildlife laws.

## Oregon ANS Management Plan

The goal of the Oregon ANS Management Plan is to:

***Minimize the harmful ecological, economic, and social impact of ANS through prevention and management of introduction, population growth, and dispersal of ANS into, within, and from Oregon.***

The goal will be achieved through implementation of a plan that:

- emphasizes prevention of introductions;
- requires an risk assessment and review for all aquatic nonindigenous species prior to their importation, transport, or use in Oregon;
- allows for early detection;
- includes development of contingency plans;
- permits appropriate and timely management response to new and existing populations;
- protects and restores native plant and animal communities;
- provides for easy access to accurate and up-to-date species distribution and management information;
- incorporates education and research elements;
- recommends funding levels adequate for effective implementation;
- produces agency collaboration through an invasive species council;
- facilitates interjurisdictional coordination with state, federal and tribal agencies; and
- seeks cooperative solutions with the private sector and user groups.

It is not possible to address all potential invaders, their impacts, and the constraints and contingencies that may develop. Consequently, this plan is intended to be adaptable to changing circumstances. The activities and priorities of the plan will be under constant review. An annual report will be produced by the Invasive Species Council, which will include recommendations for updating and modifying management activities and priorities.

## Objective 1: Coordinate and implement a comprehensive management plan.

**Problem Addressed:** There is no clear authority or agency charged with limiting and managing ANS. Most management activities are focused on isolated problems and not concerned with addressing the issue of ANS comprehensively. The lack of coordination, oversight, and funding has allowed many nuisance species to become established in Oregon, and permits new introductions.

Establishment of a management plan with appropriate implementation, authority and resources will permit effective prevention and management of ANS. Most importantly, native species can be protected from the competition, introduction of parasites and diseases, and predation caused by some ANS.

## Current Agency Activities

### Oregon Department of Fish and Wildlife (ODFW)

Fish Management Basin Plans. ODFW has regulated the use and development of warm water fisheries through basin plans that emphasize the protection of native species.

### Oregon Department of Agriculture (ODA)

State Weed Strategy. ODA has developed a strategy for addressing weed problems in Oregon. This ANS Plan is being developed in conjunction with the State Weed Strategy.

Technical Assistance. ODA through the Center for Lakes and Reservoirs provides technical assistance for the management of aquatic weeds.

## Gaps in State Management Programs and Authorities

- Authorities are unclear
- Activities are uncoordinated in the State and Region
- Staffing shortages and lack of funding

## Recommended Strategies and Actions

The lead agency for each action is indicated in parenthesis. Each task will require cooperation, collaborations, and participation of other state and federal agencies, private industry groups, and public interest groups. Explanations of agency abbreviations can be found in the implementation table.

**Strategy 1A: Coordinate all ANS management programs and activities within Oregon.**

1A1. Administer the Invasive Species Council. (ODA)

1A2. Create and fund an ANS coordinator position within the ISC. (Leg./Gov./ODA)

1A3. Create and fund ANS support staff positions within key state agencies. (ODFW/ODA/ODSL/ODEQ)

1A4. Establish and administer a permit program for ANS management efforts. (Leg./Gov./ISC/ODA)

1A5. Investigate the use of existing special district legislation to fund ANS management activities. (ISC/ODA)

1A6. Develop an ANS management class for agency personnel, watershed council coordinators, and others. (CLR)

1A7. Conduct an annual symposium focused on ANS in Oregon and potential management alternatives. (CLR)

1A8. Work with watershed councils to ensure that the ANS strategy is coherent and consistent throughout Oregon. (ISC/CLR

1A9. Coordinate with tribal governments regarding ANS management. (ISC/ODA/ODFW)

1A10. Develop ANS assessment guidelines for watershed councils and other local government or coordinating bodies. (SG/CLR)

1A11. Identify a state agency to be assigned jurisdiction over macroinvertebrates and microorganisms. (Leg./Gov.)

1A12. Assign a priority class to all established nonindigenous aquatic species present in Oregon. (ISC/CLR)

1A13. Develop a set of uniform definitions and terms to describe aquatic nuisance species. (ISC)

1A14. Administer and staff a ballast water management program. (ODEQ/CLR)

**Strategy 1B: Participate in and support regional, federal, and international efforts to control ANS.**

1B1. Participate in the Aquatic Nuisance Species Task Force's Western Regional Panel. (ISC/CLR)

1B2. Support the PSMFC regional coordination effort. (ISC/ODFW)

1B3. Support the 100th Meridian Project. (ISC/ODFW)

1B4. Participate in the Pacific Ballast Water Group. (ISC/CLR)

1B5. Support the Columbia River Aquatic Nonindigenous Species Initiative. (ISC/CLR)

**Strategy 1C: Increase existing funding and resources for ANS management and establish new funding and resources.**

1C1. Create stable funding sources for ANS management in Oregon, looking particularly at industries and users who contribute to the introduction and spread of ANS and/or will benefit from their control or eradication. (Leg./Gov.)

1C2. Develop partnerships with private industry groups to fund prevention and eradication efforts. (ISC/ODA/CLR/ODFW)

**Strategy 1D: Review and evaluate state efforts in addressing ANS.**

1D1. Conduct a periodic assessment of ANS species presence and abundance in Oregon. (CLR)

1D2. Support the development of a state benchmark on invasive species. (OPB/ODA)

1D3. Produce an annual update of the state ANS plan. (ISC/CLR)

## Objective 2: Prevent the introduction of ANS into Oregon.

**Problem Addressed**: There are many different pathways by which new species can, intentionally and unintentionally, arrive in Oregon. Species that provide sportfishing opportunities, erosion control, food, fur, and aesthetic enjoyment have been intentionally brought to Oregon and released into the wild or escaped from private ponds or holding facilities. Common carp, goldfish (*Carassius auratus*), bass, nutria, parrotfeather, and milfoil have become established through these pathways. Many human activities result in unintentional introductions. Species have been transported in ballast water from transoceanic and coastal shipping, by recreational boats and water based construction equipment, or mixed in with intentionally imported items or containers. Spartina and some zooplankton species likely arrived in this manner. ANS have also been introduced and established in neighboring states and Canada, then dispersed through natural means to Oregon, such as the tiger muskie (*Esox lucius x masquinongy*), green crab, and the Japanese varnish clam (*Nuttallia obscurata*).

Understanding how various pathways function as conduits for ANS into Oregon is critical for intercepting species and preventing introductions. Little is known about the species transported, their origins, and the potential for introduction associated with the various pathways. Yet, the most effective method to control ANS and their impacts is to prevent their introduction.

Implementation of a program that reviews and regulates which species are intentionally allowed into Oregon, and monitors the pathways by which species can be unintentionally transported into Oregon, is necessary to slow the rate at which new species become established.

## Current Agency Activities

### Port of Portland (PORTS)

Ballast Water Risk Assessment. The Port of Portland is conducting a survey of commercial vessel traffic on the Columbia River to identify current ballast water management practices, shipping patterns, and trade routes to evaluate those areas that may represent a high risk of introducing nonindigenous species through ballast water. Data from the risk assessment will be used to prioritize education, inspection, and research programs.

### Department of Agriculture (ODA)

Annual nursery inspection program. ODA maintains a program to inspect nurseries that includes surveying for noxious weeds.

Species review process. ODA maintains a list of plant species that are classified as noxious and therefore prohibited from importation, transport or sale within the state.

Invasive species hotline. Recently, the ODA has implemented a toll-free number for reporting the sightings of invasive species (1-866-INVADER).

**Department of Fish and Wildlife (ODFW)**

Wildlife Integrity Review Panel. ODFW has instituted a program that requires all species requested for importation to undergo a review process that will ensure that they do not pose a threat to native species and habitat.

**Center for Lakes and Reservoirs (CLR)**

Zebra mussel boat survey. PSMFC and CLR recently completed a survey to determine if recreational boaters were transporting zebra mussels and whether individuals were aware of the threat posed by zebra mussels.

## Gaps in State Prevention Programs and Authorities

- Limited authority and funding to quarantine species and points of origin
- Limited funding to enforce laws relating to ANS
- New plant species are not reviewed before importation
- No regulation of mail order or internet sales of organisms
- Limited inspection programs
- No regulation of ballast water discharge (outside of federal voluntary guidelines)

## Recommended Strategies and Actions

The lead agency for each action is indicated in parenthesis. Each task will require cooperation, collaborations, and participation of other state and federal agencies, private industry groups, and public interest groups.

**Strategy 2A: Research and address pathways of introduction.**

2A1. Complete the Port of Portland's shipping traffic risk assessment. (PORTS)

2A2. Describe other pathways and identify high-risk waterbodies. (CLR)

2A3. Participate in a regional boat monitoring program. (ODFW/PSMFC)

2A4. Investigate the development of an inspection program for trailered boats and water-based equipment entering Oregon. (OSP)

2A5. Work with importers to monitor the potential for importation practices to introduce ANS into uncontrolled environments. (ISC/ODA)

2A6. Explore the possibility of distributing free boat washing token or coupons with the purchase of an out-of-state fishing license or a new boat registration to be used at car washes. (see 1C2/4A1). (ODFW/OSMB)

2A7. Implement shellfish importation procedures in conjunction with the shellfish importation permit process. (ODFW)

**Strategy 2B: Increase enforcement and awareness of existing laws controlling the transport, propagation, sale, collection, possession, importation, purchase, cultivation, distribution, and introduction of ANS.**

2B1. Increase the priority of enforcing ANS laws. (OSP)

2B2. Train state police and sheriff's marine patrols on ANS identification and regulations. (CLR/OSMB)

2B3. Distribute information on ANS laws to businesses that import aquatic organisms. (ISC/ODA/ODFW)

2B4. Publicize existing penalties for the intentional introduction of any nonindigenous species to Oregon's waters. (ODA/ODFW)

**Strategy 2C: Prohibit, control, or permit the importation of nonindigenous aquatic species based upon their invasive potential.**

2C1. Add known ANS to excluded lists (see also 2D3). (ODA/ODFW)

2C2. Research invasiveness of aquatic plant species currently imported. (CLR)

2C3. Establish Aquatic Vegetation Integrity rules for imported aquatic plants similar to ODFW's Wildlife Integrity rules. (Leg./Gov./ODA)

**Strategy 2D: Promote legislation and regulatory rules that establishes or increases the state's authority to control the introduction of new species.**

2D1. Establish the authority to detain and require cleaning of any vehicle, vessel or water based equipment containing or infested with ANS that is traveling in Oregon. (Leg./Gov.)

2D2. Increase the ability of the State to regulate the importation of aquatic organisms (see 2C1). (Leg./Gov.)

2D3. Establish the authority to quarantine waterbodies to prevent ANS from spreading and to contain ANS for future eradication. (Leg./Gov.)

2D4. Require that any intentionally imported organism is free of diseases, parasites, and other unpermitted organisms. (ODA/ODFW)

2D5. Develop cooperative agreements with states that share common waters. (Leg./Gov./ISC)

## Objective 3: Detect, monitor and eradicate pioneering aquatic invasive species.

**Problem Addressed:** Once invasive species have arrived there is often a window of opportunity to eradicate small pioneering populations before they become a nuisance, yet often species are not detected until nuisance populations are formed. Usually it is too late or too expensive to eradicate a species once it has reached a nuisance level, and when management is conducted after a population is well-established, long-term routine activities will often be required to control the population and reduce environmental impacts.

By initiating a detection and monitoring program, the State will be able to discover and manage pioneering infestations at a point when the species can be eradicated in a cost effective manner.

## Current Agency Activities

**Department of Agriculture (ODA)**

Noxious Weed Surveys. ODA conducts a limited survey for noxious weeds.

**Department of Fish and Wildlife (ODFW)**

Fish Surveys. ODFW routinely surveys fish populations which includes nonnative warm water fish.

**Department of Environmental Quality (ODEQ)**

Habitat Surveys. ODEQ conducts surveys that include fish and macroinvertebrate sampling.

Lower Columbia River Estuary Program (LCREP) aerial survey. LCREP recently completed a survey of purple loosestrife populations in the lower Columbia River.

**Oregon State University (OSU)**

Green Crab Monitoring Program. OSU is conducting a survey to document green crab populations in Oregon.

**Center for Lakes and Reservoirs (CLR)**

Mitten Crab Monitoring Plan. CLR and PSMFC have developed a monitoring plan for mitten crab in the Lower Columbia River.

## Gaps in State Monitoring and Eradication Programs and Authorities

- No agency is actively and routinely monitoring or surveying for ANS.
- The authority and funding to quickly deal with new ANS is lacking.

- Agencies lack the authority to quarantine a specific water body once an ANS is introduced.

- Response time to an invasion is slow due to a lack of contingency plans and funding.

## Recommended Strategies and Actions

**Strategy 3A: Implement a surveillance and early detection program.**

3A1. Conduct an annual survey of high-risk waters (See 2A2). (ODFW/ODA)

3A2. Create and train a citizen-monitoring network to work in cooperation with state agencies. (CLR)

3A3. Work with watershed council to ensure ANS are included in ongoing monitoring programs (See 1A8). (CLR)

3A4. Distribute zebra mussel colonization substrates (bricks) for individuals to deploy and monitor. (CLR)

3A5. Support ANS monitoring by the Lower Columbia River Estuary Program (LCREP). (ODEQ)

3A6. Conduct periodic estuarine overflights to detect colonies of Spartina. (ODA)

3A7. Continue green crab monitoring efforts. (OSU/PSMFC)

3A8. Implement the mitten crab monitoring and outreach plan. (CLR/PSMFC)

**Strategy 3B: Develop an early response mechanism to deal with detected and potential invasive species.**

3B1. Develop an emergency response plan for all Management Class 1 species. (ISC/CLR)

3B2. Fund and manage an early response fund. (Leg./Gov./ISC)

**Strategy 3C: Eradicate pioneering populations of ANS.**

3C1. Continue the eradication of *Spartina patens*. (ODA)

## Objective 4: Where feasible, control established nonindigenous species that have significant impacts.

**Problem Addressed:** Established nonindigenous species often create the most noticeable impacts, yet they are often impossible to eradicate or control. Management activities are most effective when they are directed at limiting the impacts of a population or stopping that population from spreading to new waterbodies. Also, once established, new species often become a basis for new economic activity or a replacement for activities based on native species, such as fishing for bass, walleye, or other warmwater fish, which makes them difficult to remove later.

Management activities must be focused on populations of established species where there is a clear and significant impact on native species, and where the control or eradication of specific populations is feasible both economically and technically.

## Current Activities

**Center for Lakes and Reservoirs (CLR)**

Lake Lytle weed management. Lake Lytle is in the first year of a three year Eurasian watermilfoil control program funded by the Oregon State Weed Board.

**Oregon Department of Agriculture (ODA)**

Purple loosestrife control. ODA is conducting experiments on the efficacy of two biocontrol agents to control purple loosestrife.

**Port of Portland (PORTS)**

Purple loosestrife study. The Port of Portland is participating in a collaborative study overseen by the Columbia Slough Watershed Council. The purpose of the study is to investigate the use of biocontrol agents to prevent the spread of purple loosestrife in the Rivergate Industrial and the Smith and Bybee Lakes Wildlife Areas

## Gaps in State Control and Eradication Programs and Authorities

- No state agency has a clear program directed at controlling or eradicating ANS.
- Current efforts are directed at individual populations and not at controlling a species distribution and extent.

## Recommended Strategies and Actions

**Strategy 4A: Limit the dispersal of established ANS to new waterbodies or to new areas of a waterbody.**

4A1. Explore the development of boat washing stations at infested waterbodies. (ODEQ)

4A2. Try to limit the spread of existing ANS by boats, by reducing the disturbance of existing populations through the use of warning signs and buoys in infested areas. (OSMB/ODSL)

4A3. Investigate the inclusion of ANS information in kiosks at infested waterbodies. (ISC/CLR)

**Strategy 4B: Control known nuisance populations where economically and technically feasible.**

4B1. Continue the use of purple loosestrife biocontrol agents. (ODA)

4B2. Continue implementation of an integrated aquatic weed control program at Lake Lytle. (CLR/OSWB)

4B3. Continue the control of Japanese knotweed in the Sandy R. (ODA)

4B4. Develop and implement aquatic weed management plans for waterbodies on the 303-d list due of the presence of aquatic weeds. (CLR)

4B5. Provide technical assistance to watershed councils, irrigation districts and other local boards for development of management plans. (CLR)

4B6. Develop control programs for all category 2 species. (ISC/CLR)

## Objective 5: Inform the public, policy makers, natural resource workers, private industry, and user groups about the risks and impacts of ANS.

**Problem Addressed:** The lack of awareness concerning ANS impacts is one of the largest management obstacles. Few people understand the threat some nonindigenous species pose and how their actions might introduce them. Uninformed people through the dumping of an aquarium or a bait bucket, launching of a contaminated boat, or stocking of a private pond have introduced many ANS. The improper importation and holding of organisms have allowed species to escape, or caused the receipt of unwanted organisms mixed in with intentionally imported ones. Many policy makers, natural resource administrators, and private interest groups have facilitated the intentional introductions of species for certain economic or recreational purposes, without understanding the effects these species would have on native species. These intentional and unintentional methods of introduction can be eliminated or curtailed by educating people to their potential to transfer nonindigenous species to Oregon.

## Current Agency Activities

**Oregon State Marine Board (OSMB)**

ANS information. OSMB has incorporated information on ANS into the state boater's pamphlet, the boat operators class, their website and has developed a brochure for boaters on ANS.

**Oregon Department of Fish and Wildlife (ODFW)**

ANS information. ODFW has included information on ANS in the state fishing regulations.

**Center for Lakes and Reservoirs/ Oregon Lakes Association (CLR/OLA)**

ANS information. CLR has included ANS articles in the Lake Wise newsletter.

**Pacific States Marine Fisheries Commission / Center for Lakes and Reservoirs (PSMFC/CLR)**

ANS outreach. PSMFC and CLR have completed a mitten crab outreach and education program in the Lower Columbia River and have distributed ANS information at sport shows and boat ramps.

**Oregon Sea Grant (SG)**

ANS education and outreach. SG provides educational programs as a partner in the regional Marine Invasive Species Team.

**Oregon State University Extension Service (OSU)**

Information and education. OSU provides research-based information and informal education programs to individuals, businesses, and communities. A variety of extension programs include invasive species issues.

## Gaps in State Education Programs and Authorities

- ANS is not addressed as an issue.
- Inadequate information is disseminated to the public.
- Few natural resource workers have the training to identify ANS.

## Recommended Strategies and Actions

**Strategy 5A: Educate the public about ANS, how their actions can prevent the spread and introduction of ANS and how they can help reduce the impacts of existing ANS.**

5A1. Continue the incorporation of ANS information into boat operator classes. (OSMB)

5A2. Create an educational curriculum on ANS for K1-12 schools. (SG)

5A3. Produce press releases on specific ANS. (ISC/ODA/ODFW)

5A4. Create articles, videos and web-based media concerning ANS. (CLR/SG)

5A5. Distribute information on ANS at various conferences, shows, tournaments, and public gatherings. (ISC/CLR/SG)

5A6. Continue to include information on ANS in state hunting and fishing regulations. (ODFW)

5A7. Develop ANS identification cards to be distributed with hunting and fishing licenses. (ODFW)

5A8. Develop an "Oregon friendly" plant labeling system in conjunction with the nursery industry. (ODA/CLR)

**Strategy 5B: Inform policy makers on the extent, impact, and potential for harm of ANS.**

5B1. Conduct field trips for policymakers to demonstrate ANS impacts and controls. (ISC/CLR)

5B2. Produce a legislative manual outlining the threats of ANS, management alternatives, and the funds needed to address ANS in Oregon. (ISC/ODA/ODFW)

**Strategy 5C: Train natural resource workers in identifying ANS.**

5C1. Conduct identification seminars for field personal. (CLR/SG)

**Strategy 5D: Educate private industry on the laws regulating and effects of ANS.**

5D1. Create a pamphlet for the nursery industry identifying ANS, the laws regulating them, and their effects in natural systems. (ODA)

5D2. Distribute information on ANS to businesses selling aquatic organisms such as pet stores. (ODFW)

5D3. Provide information to fishing tournament organizers on ANS. (ODFW)

## Objective 6: Increase and disseminate knowledge of ANS in Oregon through the compilation of data and by conducting research.

**Problem Addressed:** Little is known about the extent and magnitude of the ANS problem in Oregon, in fact many more nonindigenous species may occur in Oregon than are recognized. Information and research is needed to quantify and clarify the effects that nonindigenous species are having on native species and habitat. Research can identify the threat posed by specific nonindigenous species and the mechanism responsible for transferring those organisms. By compiling available information and by providing quick access to information on taxonomy, management methods, and experts to contact the response to new ANS can be quick, and existing ANS can be readily recognized and managed.

## Current Agency Activities

**Center for Lakes and Reservoirs (CLR)**

Research. CLR has researched and developed aquatic weed management techniques and researched the basic biology of Egeria.

Web based ANS information. CLR developed a website for the Western Regional Panel.

**Oregon Department of Fish and Wildlife (ODFW)**

ANS impact research. ODFW has investigated the interactions and impacts of nonindigenous fish species on native species.

**Oregon State Marine Board (OSMB)**

Web based ANS information. OSMB has ANS information on their website.

## Gaps in State Programs and Authorities

- Poor understanding of basic biology and impacts of ANS.
- Limited management options.
- Little funding is available to conduct research.
- A comprehensive and current list of ANS in Oregon is not available.

## Recommended Strategies and Actions

**Strategy 6A: Research nonindigenous species for their impact on native biota.**

6A1. Conduct a stomach analysis study on bass in Tenmile Lake for predation on coho salmon juveniles. (ODFW/CLR/OSU)

6A2. Develop a better understanding of basic biology and impacts of introduced aquatic plants and animals. (CLR/OSU)

6A3. Evaluate the potential for aquarium and live food fish to serve as vectors of disease and parasites to native fish populations. (OSU)

6A4. Develop a better understanding of the biology and control of Egeria, the most abundant and problematic aquatic weed in Oregon. (CLR)

6A5. Compile published research on all nonindigenous species that are established in Oregon. (ISC/CLR)

6A6. Research the impacts of Mosquitofish on native species, and the potential to develop a native species for mosquito control. (ODFW)

**Strategy 6B: Research management alternatives for their effect on nonindigenous and native species.**

6B1. Support research on zebra mussel biocontrol. (OSU)

6B2. Investigate the relationship between human-induced disturbance of aquatic and riparian systems and ANS invasion, establishment, and impacts. (CLR/OSU)

6B3. Investigate and develop new and innovative methods of managing ANS. (CLR)

6B4. Evaluate the sublethal effects of aquatic herbicides, which are necessary for control of aquatic weeds, on salmonids. (CLR)

**Strategy 6C: Facilitate the collection and dispersal of information, research, and data on ANS in Oregon.**

6C1. Create a central repository of reference material on ANS. (CLR)

6C2. Create and coordinate a central database of information on ANS. (PSMFC)

6C3. Build and maintain a website on ANS in Oregon. (CLR/PSMFC)

6C4. Utilize existing field personnel to document the distribution and abundance of ANS. (ODA/ODFW)

6C5. Develop and maintain a list of taxonomic experts for ANS identification. (ISC)

## Implementation Table

The table that follows identifies the responsible agency or agencies and the new funding necessary to fully implement the Oregon ANS Plan. Funds for implementing the Plan will be administered by the proposed Invasive Species Council (ISC). Should the state legislature fail to approve legislation creating the ISC, funds will be administered by the Center for Lakes and Reservoirs at Portland State University. Indirect costs (5% of direct costs) associated with administration of the Plan are included in the budget for each task.

The proposed Plan and budget recommendations are submitted as a comprehensive approach to managing aquatic invasive species in Oregon. While all of the actions identified in the Plan are important, the formation of the ISC and funding to support an ANS coordinator are critical to effective ANS management in Oregon. The ANS coordinator could identify and seek additional funding to implement the many elements of the Plan. This model has proven effective in Washington State.

# Implementation Table

| Tasks/Actions | | Implementing Organization | Funding (in thousands) and Personnel requests | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FY 01 | | | | | | FY 02 | | | | | |
| | | | State and other Funds | | Federal Funds | | Totals | | State and other Funds | | Federal Funds | | Totals | |
| Num | Description | | Agency | $ | Agency | $ | $ | FTE | Agency | $ | Agency | $ | $ | FTE |
| **Objective 1: Coordinate and implement a comprehensive management plan.** | | | | | | | | | | | | | | |
| **Strategy 1A: Coordinate all ANS management programs and activities within Oregon** | | | | | | | | | | | | | | |
| 1A1 | Invasive Species Council | Leg/Gov/ODA | State | 12 | | | 12 | | State | 12 | | | 12 | |
| 1A2 | ANS coordinator | Leg/Gov/ISC/ODA | State | 50 | USFWS | 75 | 125 | 1 | State | 50 | USFWS | 75 | 125 | 1 |
| 1A3 | Support staff | ODA/ODFW/ODL/ ODEQ | State | 50 | USFWS | 75 | 125 | 4x0.25 | State | 50 | USFWS | 75 | 125 | 4x 0.25 |
| 1A4 | ANS permit program | Leg/Gov/ISC/ODA | State | 65 | | | 65 | 0.5 | state | 65 | | | 65 | 0.5 |
| 1A5 | Use special districts | ISC/ODA | See 1A2 | | | | 0 | | See 1A2 | | | | 0 | |
| 1A6 | ANS management class | CLR | State | 20 | | | 20 | | State | 20 | | | 20 | |
| 1A7 | Annual symposium | CLR | State | 30 | | | 30 | | State | 30 | | | 30 | |
| 1A8 | Watershed councils | ISC/CLR | OWEB | 30 | USFWS | 30 | 60 | | OWEB | 30 | USFWS | 30 | 60 | |
| 1A9 | Coordinate with tribes | ISC/ODA/ODFW | See 1A2 | | | | 0 | | See 1A2 | | | | 0 | |
| 1A10 | ANS assessment guideline | SG/CLR | OWEB | 30 | | | 30 | | | | | | 0 | |
| 1A11 | Identify jurisdiction | Leg/Gov | | | | | 0 | | | | | | 0 | |
| 1A12 | Assign priority class | ISC/CLR | See 1A2 | | | | 0 | | | | | | 0 | |
| 1A13 | Develop definitions | ISC | | | | | | | | | | | | |
| 1A14 | Ballast Water Program | ODEQ/CLR | State | 15 | USFWS | 38 | 53 | .75 | State | 15 | USFWS | 38 | 53 | .75 |
| **Strategy 1B: Participate in and support regional, federal, and international efforts to control ANS.** | | | | | | | | | | | | | | |
| 1B1 | Western Regional Panel | ISC/CLR | See 1A2 | | | | 0 | | See 1A2 | | | | 0 | |
| 1B2 | PSMFC coordination | ISC/ODFW | State | 5 | BPA | 150 | 155 | | State | 5 | BPA | 150 | 155 | |
| 1B3 | 100th Meridian Project | ISC/ODFW | State | 10 | | | 10 | | State | 10 | | | 10 | |
| 1B4 | PBWG | ISC/CLR | State | 10 | | | 10 | | State | 10 | | | 10 | |
| 1B5 | CRANSI | ISC/CLR | State | 0 | BPA | 10 | 10 | | State | 0 | BPA | 10 | 10 | |
| **Strategy 1C: Increase existing funding and resources for ANS management and establish new funding and resources.** | | | | | | | | | | | | | | |
| 1C1 | Create stable funding | Leg/Gov | | | | | 0 | | | | | | 0 | |
| 1C2 | Industry partnerships | ISC/ODA/CLR/ ODFW | See 1A1 & 1A2 | | | | 0 | | See 1A1 and 1A2 | | | | 0 | |

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# Implementation Table

| Tasks/Actions | | Implementing Organization | Funding (in thousands) and Personnel requests | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Num | Description | | FY 01 | | | | | | FY 02 | | | | | |
| | | | State and other Funds | | Federal Funds | | Totals | | State and other Funds | | Federal Funds | | Totals | |
| | | | Agency | $ | Agency | $ | $ | FTE | Agency | $ | Agency | $ | $ | FTE |
| **Strategy 1D: Review and evaluate state efforts in addressing ANS.** | | | | | | | | | | | | | | |
| 1D1 | Assess ANS presence | CLR | | | USFWS | 30 | 30 | | | | USFWS | 30 | 30 | |
| 1D2 | State benchmark | ODA/OPB | | | | | 0 | | | | | | 0 | |
| 1D3 | ANS plan update | ISC/CLR | See 1A1 and 1A2 | | | | 0 | | See 1A1 and 1A2 | | | | 0 | |
| **Objective 1: TOTALS** | | | | 327 | | 408 | 735 | 3.25 | | 297 | | 408 | 705 | 3.25 |
| **Objective 2: Prevent the introduction of ANS into Oregon** | | | | | | | | | | | | | | |
| **Strategy 2A: Research and address pathways of introduction** | | | | | | | | | | | | | | |
| 2A1 | Shipping risk assessment | PORTS | Port of Portland | 25 | | | 25 | | Port of Portland | 25 | | | 25 | |
| 2A2 | Identify pathway/high risk waters | CLR | | | USFWS | 30 | 30 | | | | USFWS | 30 | 30 | |
| 2A3 | Boat monitoring | ODFW | State | 65 | BPA | 65 | 130 | | State | 65 | BPA | 65 | 130 | |
| 2A4 | Inspection program | OSP | State | 25 | | | 25 | 0.25 | | | | | 0 | |
| 2A5 | Work with importers | ISC/ODA | See 1A1 and 1A2 | | | | 0 | | See 1A1 and 1A2 | 0 | | | 0 | |
| 2A6 | Boat washing coupons/tokens | ODFW/OSMB | State | 1 | | | 1 | | State | 1 | | | 1 | |
| 2A7 | Implement shellfish importation procedures. | ODFW | State | 25 | | | 25 | | State | 25 | | | 25 | |
| **Strategy 2B: Increase enforcement and awareness of existing laws controlling the transport, propagation, sale, collection, possession, importation, purchase, cultivation, distribution, and introduction of ANS.** | | | | | | | | | | | | | | |
| 2B1 | ANS enforcement priority | OSP | | | | | 0 | | | | | | 0 | |
| 2B2 | Train enforcement personnel | CLR/OSMB | | | USFWS | 20 | 20 | | | | USFWS | 20 | 20 | |
| 2B3 | Distribute info to importers | ISC/ODA/ODFW | | | USFWS | 20 | 20 | | | | USFWS | 20 | 20 | |
| 2B4 | Publicize penalties | ODA/ODFW | State | 2 | | | 2 | | State | 2 | | | 2 | |

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# Implementation Table

| Tasks/Actions | | Implementing Organization | Funding (in thousands) and Personnel requests | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Num | Description | | FY 01 | | | | | | FY 02 | | | | | |
| | | | State and other Funds | | Federal Funds | | Totals | | State and other Funds | | Federal Funds | | Total | |
| | | | Agency | $ | Agency | $ | $ | FTE | Agency | $ | Agency | $ | $ | FTE |
| **Strategy 2C: Prohibit, control, or permit the importation of nonindigenous aquatic species based upon their invasive potential.** | | | | | | | | | | | | | | |
| 2C1 | ANS to prohibited lists | ODA/ODFW | See 1A1 and 1A2 | | | | 0 | | See 1A1 and 1A2 | | | | 0 | |
| 2C2 | Research imported plants | CLR | | 0 | USFWS | 25 | 25 | | | 0 | USFWS | 25 | 25 | |
| 2C3 | Aquatic Vegetation Rules | Leg./Gov./ODA | State | 65 | | | 65 | 0.5 | State | 65 | | | 65 | 0.5 |
| **Strategy 2D: Promote legislation and regulatory rules that establishes or increases the state's authority to control the introduction of new species.** | | | | | | | | | | | | | | |
| 2D1 | Authority to detain | Leg/Gov | | | | | 0 | | | | | | 0 | |
| 2D2 | Regulate imports | Leg/Gov | | | | | 0 | | | | | | 0 | |
| 2D3 | Authority to quarantine | Leg/Gov | | | | | 0 | | | | | | 0 | |
| 2D4 | Imports to be pest free | ODA/ODFW | | | | | 0 | | | | | | 0 | |
| 2D5 | Cooperative agreement | Leg/Gov | | | | | 0 | | | | | | 0 | |
| **Objective 2: Totals** | | | | 208 | | 160 | 368 | .75 | | 183 | | 160 | 343 | .5 |
| **Objective 3: Detect, Monitor, and eradicate pioneering aquatic invasive species.** | | | | | | | | | | | | | | |
| **Strategy 3A: Implement a surveillance and early detection program.** | | | | | | | | | | | | | | |
| 3A1 | Survey high-risk waters | ODA/ODFW | | 0 | USFWS | 125 | 125 | | | 0 | USFWS | 125 | 125 | |
| 3A2 | Citizen monitoring | CLR | | 0 | USFWS | 30 | 30 | | | 0 | USFWS | 30 | 30 | |
| 3A3 | Watershed Councils | CLR | State | 30 | | | 30 | | State | 30 | | | 30 | |
| 3A4 | Zebra mussel monitors | CLR | see 3A2 | | | | 0 | | see 3A2 | | | | 0 | |
| 3A5 | LCREP ANS monitoring | ODEQ | State | 65 | | | 65 | | State | 65 | | | 65 | |
| 3A6 | Spartina estuarine flights | ODA | State | 20 | | | 20 | | State | 20 | | | 20 | |
| 3A7 | Green crab monitoring | OSU/PSMFC | | 0 | USFWS | 20 | 20 | | | 0 | USFWS | 20 | 20 | |
| 3A8 | Mitten crab monitoring | CLR/PSMFC | State | 20 | USFWS | 25 | 45 | | State | 20 | USFWS | 25 | 45 | |

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# Implementation Table

| Tasks/Actions | | Implementing Organization | Funding (in thousands) and Personnel requests | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FY 01 | | | | | | FY 02 | | | | | |
| | | | State and other Funds | | Federal Funds | | Totals | | State and other Funds | | Federal Funds | | Totals | |
| Num | Description | | Agency | $ | Agency | $ | $ | FTE | Agency | $ | Agency | $ | $ | FTE |
| **Strategy 3B: Develop an early response mechanism to deal with detected and potential invasive species.** | | | | | | | | | | | | | | |
| 3B1 | Emergency response plan | CLR | Leg/Gov | 65 | USFWS | 125 | 190 | | Leg/Gov | 65 | USFWS | 125 | 190 | |
| 3B2 | Early response fund | Leg./Gov./ISC | Leg/Gov | 125 | USFWS | 125 | 250 | | Leg/Gov | 125 | USFWS | 125 | 250 | |
| **Strategy 3C: Eradicate pioneering populations of ANS.** | | | | | | | | | | | | | | |
| 3C1 | Spartina patens | ODA | State | 30 | | | 30 | | State | 30 | | | 30 | |
| **Objective 3: TOTALS** | | | | 355 | | 450 | 805 | 0 | | 355 | | 450 | 805 | 0 |
| **Objective 4: Where feasible, control and eradicate established nonindigenous species that have significant impacts.** | | | | | | | | | | | | | | |
| **Strategy4A: Limit the dispersal of established ANS to new waterbodies or to new areas of a waterbody.** | | | | | | | | | | | | | | |
| 4A1 | Boat washing stations | ODEQ | State | 5 | | | 5 | | | 5 | | | 5 | |
| 4A2 | Limit ANS disturbance | OSMB/ODSL | State | 5 | | | 5 | | State | 5 | | | 5 | |
| 4A3 | Information kiosks | ISC/CLR | State | 20 | | | 20 | | State | 20 | | | 20 | |
| **Strategy4B: Eradicate or control known nuisance populations where economically and technically feasible.** | | | | | | | | | | | | | | |
| 4B1 | Loosestrife biocontrol | ODA | State | 20 | USFWS | 40 | 60 | | State | 20 | USFWS | 40 | 60 | |
| 4B2 | Lake Lytle weed control | CLR/OSWB | State | 20 | | | 20 | | State | 20 | | | 20 | |
| 4B3 | Japanese knotweed | ODA | State | 45 | | | 45 | | State | 45 | | | 45 | |
| 4B4 | Plans for 303-d waters | CLR | State | 65 | | | 65 | | State | 65 | | | 65 | |
| 4B5 | Assist watershed council | CLR | See 1A8 | | | | 0 | | See 1A8 | | | | 0 | |
| 4B6 | Develop control programs | ISC/CLR | State | 25 | | | 25 | | | 25 | | | 25 | |
| **Objective 4: TOTALS** | | | | 205 | | 40 | 245 | | | 205 | | 40 | 245 | |

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# Implementation Table

| Tasks/Actions | | Implementing Organization | Funding (in thousands) and Personnel requests | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Num | Description | | FY 01 | | | | | | FY 02 | | | | | |
| | | | State and other Funds | | Federal Funds | | Totals | | State and other Funds | | Federal Funds | | Totals | |
| | | | Agency | $ | Agency | $ | $ | FTE | Agency | $ | Agency | $ | $ | FTE |
| **Objective 5: Inform the public, policy makers, natural resource workers, private industry, and user groups about the risks and impacts of ANS.** | | | | | | | | | | | | | | |
| **Strategy5A: Educate the public about ANS, how their actions can prevent the spread and introduction of ANS and how they can help reduce the impacts of existing ANS.** | | | | | | | | | | | | | | |
| 5A1 | Boat operator classes | OSMB | State | 2 | | | 2 | | State | 2 | | | 2 | |
| 5A2 | Education curriculum | SG | State | 7 | | | 7 | | State | 7 | | | 7 | |
| 5A3 | Press releases | ISC/ODA/ODFW | see 1A2 | | | | 0 | | see 1A2 | | | | 0 | |
| 5A4 | Articles, videos, and web | CLR/SG | SG | 25 | | | 25 | | SG | 25 | | | 25 | |
| 5A5 | Info at conferences | ISC/CLR/SG | SG | 5 | USFWS | 10 | 15 | | SG | 5 | USFWS | 10 | 15 | |
| 5A6 | Info in hunt and fish regs | ODFW | State | 1 | | | 1 | | State | 1 | | | 1 | |
| 5A7 | ANS id cards | ODFW | SG | 5 | USFWS | 10 | 15 | | SG | 5 | USFWS | 10 | 15 | |
| 5A8 | Plant labeling | ODA | State | 7 | | | 7 | | State | 7 | | | 7 | |
| **Strategy5B: Inform policy makers on the extent, impact, and potential for harm of ANS.** | | | | | | | | | | | | | | |
| 5B1 | Field days | ISC/CLR | | 0 | USFWS | 5 | 5 | | | 0 | USFWS | 5 | 5 | |
| 5B2 | Legislative manual | ISC/ODA/ODFW | See 1A1 | | | | 0 | | See 1A1 | | | | 0 | |
| **Strategy5C: Train natural resource workers in identifying ANS.** | | | | | | | | | | | | | | |
| 5C1 | Identification seminars | CLR/SG | SG | 5 | USFWS | 10 | 15 | | SG | 5 | USFWS | 10 | 15 | |
| **Strategy5D: Educate private industry on the laws regulating and effects of ANS.** | | | | | | | | | | | | | | |
| 5D1 | Nursery pamphlet | ODA | State | 5 | | | 5 | | State | 5 | | | 5 | |
| 5D2 | Info to retailers | ODFW | State | 5 | | | 5 | | State | 5 | | | 5 | |
| 5D3 | Fishing tournaments | ODFW | State | 5 | | | 5 | | State | 5 | | | 5 | |
| **Objective 5:TOTALS** | | | | 72 | | 35 | 107 | 0 | | 72 | | 35 | 107 | 0 |

**Agency Abbreviations:** Bonneville Power Administration (BPA), Center for Lakes and Reservoirs(CLR), Invasive Species Council(ISC), Governor(Gov), Oregon Legislature(Leg), Oregon Department of Agriculture(ODA), Oregon Department of Environmental Quality(ODEQ), Oregon Department of Fish and Wildlife(ODFW), Oregon Division of State Lands(ODSL), Oregon Progress Board (OPB), Oregon State Marine Board(OSMB), Oregon State Police(OSP), Oregon State University(OSU), Oregon State Weed Board(OSWB), Port of Portland and Astoria(PORTS), Pacific States Marine Fisheries Commission(PSMFC), Sea Grant(SG), The budget making bodies of Oregon(State), U.S. Fish and Wildlife Service (USFWS)

# Implementation Table

| Tasks/Actions | | Implementing Organization | Funding (in thousands) and Personnel requests | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | FY 01 | | | | | | FY 02 | | | | | |
| | | | State and other Funds | | Federal Funds | | Totals | | State and other Funds | | Federal Funds | | Totals | |
| Num | Description | | Agency | $ | Agency | $ | $ | FTE | Agency | $ | Agency | $ | $ | FTE |
| **Objective 6: Increase and disseminate knowledge of ANS in Oregon through the compilation of data and by conducting research.** | | | | | | | | | | | | | | |
| **Strategy6A: Research nonindigenous species for their impact on native biota.** | | | | | | | | | | | | | | |
| 6A1 | Bass analysis Tenmile Lk | ODFW/CLR/OSU | State | 15 | USFWS | 30 | 45 | | State | 15 | USFWS | 30 | 45 | |
| 6A2 | Biology and impacts | CLR/OSU | State | 30 | USFWS | 95 | 125 | | State | 30 | USFWS | 95 | 125 | |
| 6A3 | Vectors of fish disease | OSU | State | 15 | USFWS | 50 | 65 | | State | 15 | USFWS | 50 | 65 | |
| 6A4 | *Egeria densa* research | CLR | Private/WDOE | 18 | USFWS | 30 | 48 | | Private/WDOE | 18 | USFWS | 30 | 48 | |
| 6A5 | Compile existing research | ISC/CLR | State | 15 | | | 15 | | State | 15 | | | 15 | |
| 6A6 | Gambusia research | ODFW | State | 15 | | | 15 | | State | 15 | | | 15 | |
| **Strategy6B: Research management alternatives for their effect on nonindigenous and native species.** | | | | | | | | | | | | | | |
| 6B1 | Zebra mussel biocontrol | OSU | SG | 15 | USFWS | 50 | 65 | | SG | 15 | USFWS | 50 | 65 | |
| 6B2 | disturbance and ANS | CLR/OSU | SG | 15 | USFWS | 20 | 35 | | SG | 15 | USFWS | 20 | 35 | |
| 6B3 | New management | CLR | | 0 | USFWS | 50 | 50 | | | 0 | USFWS | 50 | 50 | |
| 6B4 | Effects of herbicides | CLR | State/Private | 88 | | | 88 | | State/Private | 88 | | | 88 | |
| **Strategy6D: Facilitate the collection and dispersal of information, research, and data on ANS in Oregon.** | | | | | | | | | | | | | | |
| 6C1 | Central respository | CLR | | 0 | USFWS | 25 | 25 | | | 0 | USFWS | 25 | 25 | |
| 6C2 | Central database | PSMFC | State | 30 | | | 30 | | State | 30 | | | 30 | |
| 6C3 | ANS website | CLR/PSMFC | State | 20 | USFWS | 20 | 40 | | State | 20 | USFWS | 20 | 40 | |
| 6C4 | Use Existing personnel | ODA/ODFW | See 1A3 | | | | 0 | | See 1A3 | | | | 0 | |
| 6C5 | Taxonomic experts | ISC | See 1A3 | | | | 0 | | See 1A3 | | | | 0 | |
| Objective 6: TOTALS | | | | 276 | | 370 | 646 | 0 | | 276 | | 370 | 646 | 0 |

| **PLAN TOTALS:** | FY01 | | | | FY02 | | | |
|---|---|---|---|---|---|---|---|---|
| | State and other $ | Federal $ | Total $ | Total FTE | State and other $ | Federal $ | Total $ | Total FTE |
| | 1443 | 1463 | 2906 | 4.0 | 1388 | 1463 | 2851 | 3.75 |

**Agency Abbreviations:** Bonneville Power Administration (BPA), Center for Lakes and Reservoirs(CLR), Invasive Species Council(ISC), Governor(Gov), Oregon Legislature(Leg), Oregon Department of Agriculture(ODA), Oregon Department of Environmental Quality(ODEQ), Oregon Department of Fish and Wildlife(ODFW), Oregon Division of State Lands(ODSL), Oregon Progress Board (OPB), Oregon State Marine Board(OSMB), Oregon State Police(OSP), Oregon State University(OSU), Oregon State Weed Board(OSWB), Port of Portland and Astoria(PORTS), Pacific States Marine Fisheries Commission(PSMFC), Sea Grant(SG), The budget making bodies of Oregon(State), U.S. Fish and Wildlife Service (USFWS)

# Glossary

**Accidental introduction:** an introduction of nonindigenous aquatic species that occurs as the result of activities other than the purposeful or intentional introduction of the species involved, such as the transport of nonindigenous species in ballast water or in water used to transport fish, mollusks, or crustaceans for aquaculture or other purposes.

**Aquatic nuisance specie**s: a plant or animal species that threatens the diversity or abundance of native species, the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent on such waters. (Note: for the purposes of the State management plans, reference to an aquatic nuisance species will imply that the species is nonindigenous.)

**Biocontrol:** The use of living organisms, such as predators, parasites, and pathogens, to control pest insects, weeds, or diseases.

**Ballast water**: any water and associated sediments used to manipulate the trim and stability of a vessel.

**Control**: eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions.

**Ecological integrity**: the extent to which an ecosystem has been altered by human behavior; an ecosystem with minimal impact from human activity has a high level of integrity; an ecosystem that has been substantially altered by human activity has a low level of integrity.

**Eradicate**: the act or process of eliminating an aquatic nuisance species.

**Exotic**: (same as nonindigenous) any species or other variable biological material that enters an ecosystem beyond its historic range, including such organisms transferred from one country to another.

**Intentional introduction:** all or part of the process by which a nonindigenous species is purposefully introduced into a new area.

**Nonindigenous species:** any species or other variable biological material that enters an ecosystem beyond its historic range, including such organisms transferred from one country to another.

**Pioneer infestation**: A small ANS colony that has spread to a new area from an established colony.

**Priority species**: An ANS that is considered to be a significant threat to Oregon waters and is recommended for immediate or continued management action to minimize or eliminate their impact.

**Watershed**: an entire drainage basin including all living and nonliving components.

## Literature Cited

American Sportfishing Association. 1996. Fishing Statistics – 1996 Sport Fishing Participation and Economic Impact for Oregon. Alexandria, VA.

ATTRA. 1997. Purple Loosestrife: Public Enemy #1 on Federal Lands. ATTRA Interior Helper Internet. Washington, DC.

Elston, R. 1997. Pathways and Management of Marine Nonindigenous Species in the Shared Waters of British Columbia and Washington Prepared for Puget Sound Water Quality Authority. AquaTechnics, Inc. Carlsborg, WA.

Keppner, S. M. and Caplen, R.T. 1999. A Prevention Program for the Mediterranean Strain of Caulerpa taxifolia. Aquatic Nuisance Species Task Force.

Khalanski M. 1997. Industrial and ecological consequences of the introduction of new species in continental aquatic ecosystems: the zebra mussel and other invasive species. Bulletin Francais de la Peche et de la Pisciculture. (344-345): 385-404.

Lassuy, D.R. 1994. Aquatic nuisance organisms: setting national policy. Fisheries. 19(4): 14-17. Bethesda, MD.

Mack, R. et. al. 2000. Biotic Invasions: Causes, Epidemiology, Global Consequences and Control. Ecological Society of America. Washington, DC.

Marsden, J. E., and D. J. Jude. 1995. Round gobies invade North America. Fact sheet produced by Sea Grant at Ohio State University, Columbus, OH.

McCarthy, S.A., and F.M. Khambaty. 1994. International dissemination of epidemic *Vibrio cholerae* by cargo ship ballast and other nonpotable waters. Appl. Env. Microbiol. 60: 25972601.

ODA. 2001. Oregon Noxious Weed Strategic Plan. Salem, OR.

ODEQ. 2000. Oregon's 2000 Water Quality Status Assessment Report Section 305(b) Report. Portland, OR.

ODFW. 1999. Introduced Fishes Management Strategies. Portland, OR.

Peterson, H. 1996. *Potamocorbula amurensis* spatial distribution survey. IEP Newsletter Winter 1996:18-19. California Dept. of Water Resources, Sacramento, CA.

Sea Grant. 1998. Bio-invasions: Breaching Natural Barriers. Washington Sea Grant. University of Washington. Seattle, WA.

The National Council for Science and the Environment (NCSE) 1999. Harmful Nonnative Species: Issues for Congress VII. Washington, D.C.

The Research Group, 2000 Economic Analysis of Containment Programs, Damages, and Production Losses from Noxious Weeds in Oregon. Salem, OR.

The Whirling Disease Foundation. 1998. The third symposium on Whirling Disease. Fort Collins, Colorado.

Thompson, J.K. and S.N. Luoma. 1999. Food web and contaminant flow effects of an exotic bivalve in San Francisco Bay, California. The First National Conference on

Marine Bioinvasions. January 24-27, 1999. Massachusetts Institute of Technology Sea Grant. Cambridge, MA.

U.S. Congress, Office of Technology Assessment (OTA). 1993. Harmful Non-Indigenous Species in the United States, OTA-F-565. U.S. Government Printing Office. Washington, DC.

USGS. 2000. United States Geological Service Nonindigenous aquatic species database.

Vermont Agency of Natural Resources. 1998. Invasive Exotic Plant Fact Sheet: Water Chestnut. Waterbury, VT.

# Appendices

## Appendix A1: List of Aquatic Nonindigenous species in Oregon from USGS Database.

| Common Name | Scientific Name |
|---|---|
| **Algae** | |
| Japanese brown alga | *Sargassum muticum* |
| **Amphibians** | |
| bullfrog | *Rana catesbeiana* |
| **Annelids** | |
| a capitellid threat worm | *Heteromastus filiformis* |
| a mud worm | *Polydora cornuta* |
| a mud worm | *Pseudopolydora kempi* |
| a mud worm | *Streblospio benedicti* |
| a pile worm | *Nereis succinea* |
| a sabellid worm | *Manayunkia speciosa* |
| a spionid worm | *Pseudopolydora* |
| a tubificid worm | *Tubificoides brownae* |
| **Bryozoans** | |
| a bryozoan | *Cryptosula pallasiana* |
| a bryozoan | *Watersipora subtorquata* |
| an entoproct | *Barentsia benedeni* |
| bugula bryozoan | *Bugula spp* |
| creeping bryozoan | *Bowerbankia gracilis* |
| lacy crust bryozoan | *Conopeum tenuissimum* |
| single horn bryozoan | *Schizoporella unicornis* |

| Common Name | Scientific Name |
|---|---|
| **Coelenterates** | |
| Hydroid | *Gonothyraea clarki* |
| Japanese orangestriped anemone | *Diadumene lineata* |
| tubularian hydroid | *Ectopleura crocea* |
| **Crustaceans** | |
| amphipod | *Corophium acherusicum* |
| amphipod | *Eobrolgus spinosus* |
| amphipod | *Grandidierella japonica* |
| amphipod | *Melita nitida* |
| amphipod | *Parapleustes derzhavini* |
| Asian calanoid copepod | *Pseudodiaptomus inopinus* |
| Asian copepod | *Limnoithona sinensis* |
| Asian cumacean | *Nippoleucon hinumensis* |
| Asian freshwater shrimp | *Exopalaemon modestus* |
| Bay barnacle | *Balanus improvisus* |
| crayfish | *Orconectes neglectus neglectus* |
| green crab | *Carcinus maenas* |
| Harris mud crab | *Rhithropanopeus harrisii* |
| isopod | *Iais californica* |
| isopod | *Sphaeroma quoyanum* |
| Oriental shrimp | *Palaemon macrodactylus* |
| red swamp crayfish | *Procambarus clarkii* |
| skeleton shrimp | *Caprella mutica* |
| tube amphipod | *Ampithoe valida* |
| tube amphipod | *Jassa marmorata* |
| wood boring gribble | *Limnoria tripunctata* |

## Appendix A1 Aquatic Nonindigenous Species in Oregon Continued

| Common Name | Scientific Name |
|---|---|
| **Fish** | |
| American shad | *Alosa sapidissima* |
| Arctic grayling | *Thymallus arcticus* |
| Atlantic salmon | *Salmo salar* |
| banded killifish | *Fundulus diaphanus* |
| black bullhead | *Ameiurus melas* |
| black crappie | *Pomoxis nigromaculatus* |
| blue catfish | *Ictalurus furcatus* |
| Bluegill | *Lepomis macrochirus* |
| brook trout | *Salvelinus fontinalis* |
| brown bullhead | *Ameiurus nebulosus* |
| brown trout | *Salmo trutta* |
| California roach | *Hesperoleucus symmetricus* |
| channel catfish | *Ictalurus punctatus* |
| Chinese fine-scaled loach | *Misgurnus mizolepis* |
| common carp | *Cyprinus carpio* |
| unidentified eel | *Anguilla sp.* |
| fathead minnow | *Pimephales promelas* |
| flathead catfish | *Pylodictis olivaris* |
| Gar | *Lepisosteus sp.* |
| golden shiner | *Notemigonus crysoleucas* |
| golden trout | *Oncorhynchus aguabonita* |
| Goldfish | *Carassius auratus* |
| grass carp | *Ctenopharyngodon idella* |
| grass pickerel | *Esox americanus* |
| green sunfish | *Lepomis cyanellus* |
| lake trout | *Salvelinus namaycush* |
| largemouth bass | *Micropterus salmoides* |

| Common Name | Scientific Name |
|---|---|
| Mosquitofish | *Gambusia affinis* |
| Northern pike | *Esox lucius* |
| oriental weatherfish | *Misgurnus anguillicaudatus* |
| Pacu sp. | *Colossoma or Piaractus sp* |
| Pirapatinga | *Piaractus brachypomus* |
| Pumpkinseed | *Lepomis gibbosus* |
| rainwater killifish | *Lucania parva* |
| redear sunfish | *Lepomis microlophus* |
| rock bass | *Ambloplites rupestris* |
| Sacramento perch | *Archoplites interruptus* |
| shortnose sucker | *Chasmistes brevirostris* |
| smallmouth bass | *Micropterus dolomieu* |
| small-scaled pacu | *Piaractus mesopotamicus* |
| striped bass | *Morone saxatilis* |
| sturgeon (eastern species) | *Acipenser Scaphirhynchus sp* |
| tadpole madtom | *Noturus gyrinus* |
| Tench | *Tinca tinca* |
| threadfin shad | *Dorosoma petenense* |
| tiger muskellunge | *Esox lucius x masquinongy* |
| Utah chub | *Gila atraria* |
| Walleye | *Stizostedion vitreum* |
| Warmouth | *Chaenobryttus gulosus* |
| Wiper | *Morone chrysops x saxatilis* |
| white catfish | *Ameiurus catus* |
| white crappie | *Pomoxis annularis* |
| yellow bullhead | *Ameiurus natalis* |
| yellow perch | *Perca flavescens* |

## Appendix A1 Aquatic Nonindigenous Species in Oregon Continued

| Common Name | Scientific Name |
|---|---|
| **Mammals** | |
| Nutria | *Myocastor coypus* |
| **Mollusks** | |
| | *Laternula limicola* |
| aquatic snail | *Catriona rickettsi* |
| Asian clam | *Corbicula fluminea* |
| Chinese jingle | *Anomia chinensis* |
| false angelwing | *Petricola pholadiformis* |
| Japanese littleneck clam | *Tapes philippinarum* |
| Japanese oyster drill | *Ceratostoma inornatum* |
| marsh snail | *Myosotella myosotis* |
| Mediterranean mussel | *Mytilus galloprovincialis* |
| miniature aeolis | *Tenellia adspersa* |
| naval shipworm | *Teredo navalis* |
| New Zealand mudsnail | *Potamopyrgus antipodarum* |
| Pacific oyster | *Crassostrea gigas* |
| red-rim melania | *Melanoides tuberculatus* |
| softshell clam | *Mya arenaria* |
| **Reptiles** | |
| red-eared slider | *Trachemys scripta elegans* |
| snapping turtle | *Chelydra serpentina* |
| **Sponges** | |
| Bowerbank's Halichondria | *Halichondria bowerbanki* |
| **Tunicates** | |
| an ascidian | *Molgula manhattensis* |
| an ascidian | *Styela clava* |

| Common Name | Scientific Name |
|---|---|
| **Plants** | |
| Brassbuttons | *Cotula coronopifolia* |
| Brazilian waterweed | *Egeria densa* |
| Carolina fanwort | *Cabomba caroliniana* |
| curly pondweed | *Potamogeton crispus* |
| dwarf eelgrass | *Zostera japonica* |
| Eurasian water-milfoil | *Myriophyllum spicatum* |
| Fragrant water lilies | *Nymphaea odorata* |
| Japanese knotweed | *Polygonum cuspidatum* |
| marsh dewflower | *Murdannia keisak* |
| parrot-feather | *Myriophyllum aquaticum* |
| pond water-starwort | *Callitriche stagnalis* |
| purple loosestrife | *Lythrum salicaria* |
| saltmarsh cordgrass | *Spartina alterniflora* |
| saltmeadow cordgrass | *Spartina patens* |
| Uruguay seedbox | *Ludwigia hexapetala* |
| water-cress | *Nasturtium officinale* |
| yellow iris | *Iris pseudacorus* |

## Appendix A2: Aquatic Oregon species introduced outside of their historic range from USGS Database.

| Common Name | Scientific Name |
|---|---|
| **Fish** | |
| blue chub | *Gila coerulea* |
| coho salmon | *Oncorhynchus kisutch* |
| cutbow | *Oncorhynchus clarki x mykiss* |
| kokanee | *Oncorhynchus nerka* |
| Klamath speckled dace | *Rhinichthys osculus* |
| Lahontan cutthroat trout | *Oncorhynchus clarki* |
| lake whitefish | *Coregonus clupeaformis* |
| northern pikeminnow | *Ptychocheilus oregonensis* |
| rainbow trout | *Oncorhynchus mykiss* |
| Tui chub | *Gila bicolor* |
| Umpqua pikeminnow | *Ptychocheilus umpquae* |
| white sturgeon | *Acipenser transmontanus* |

## Appendix B: Aquatic Nonindigenous Species Prohibited by State Programs.

| Common Name | Scientific Name |
|---|---|
| **Mammals** | |
| Nutria | Myocastor coypus |
| **Fish** | |
| Bowfin | Amiidae Amia calva |
| Gar | Lepisosteidae – All species and hybrids |
| Ide | Leuciscus idus |
| Oriental weatherfish | Misgurnus anguillicaudatus |
| Pikes, Pickerel | Esocidae – All species and hybrids |
| Piranha or Caribe | Characidae subfamily Serrasalminae – All species and hybrids except Serrasalmus, Pygocentrus and Pristobrycon |
| Round Goby | Neogobius melanostemus |
| Rudd | Scardinius erythropthalmus |
| Ruffe | Gymnocephalus cernuus |
| Snakehead | Channa- All species and hybrids |
| Walking catfish | Clariidae – All species and hybrids |
| **Mollusks** | |
| Asian clam | Corbulidae – All species |
| Japanese oyster drill | Ceratostoma inornatum |
| Zebra mussel | Dreissenidae – All species |

| Common Name | Scientific Name |
|---|---|
| **Crustaceans** | |
| Blue crab | Callinectes sapidus |
| Chinese mitten crab | Eriocheir – All species |
| Crayfish | Cambaridae – All species |
| **Reptiles** | |
| African soft shell | Trionyx triunguis |
| Asian pond turtle | Mauremys All species and hybrids |
| Blanding's turtle | Emydoidea blandingii |
| Chinese pond turtle | Chinemys All species and hybrids |
| Common mud turtle | Kinosternon subrubrum |
| Common musk turtle | Kinosternon odoratum |
| European pond turtle | Emys orbicularis |
| Map turtle | Graptemys All species and hybrids |
| North American soft shell | Apalone All species and hybrids |
| Painted turtle | Chrysemys All nonnative sub-species |
| Pond slider | Pseudemys and Trachemys All species and hybrids |
| Pond turtle | Clemmys All nonnative species |
| Snapping turtle | Chelydridae – All species and hybrids |

## Appendix B Aquatic Nonidigenous Species Prohibited in Oregon Continued

| Common Name | Scientific Name |
|---|---|
| **Amphibians** | |
| African bull frog | Pyxicephalus All species and hybrids |
| African clawed frog | Xenopus all species and hybrids |
| Agile frog | Rana japonica |
| Alpine newts | Triturus all species and hybrids |
| American giant salamanders | Dicamptodontidae – All nonnative species and hybrids |
| American toad | Bufo americanus |
| Amphiumas | All species and hybrids |
| Asian frog | Rana asiatica |
| Brusa frog | Rana macrocnemis |
| Carpenter frog | Rana virgatipes |
| Caucasus frog | Rana camerani |
| Common European toad | Bufo bufo |
| Crawfish frog | Rana areolata |
| Cricket frog | Acris All species |
| Dybowski's frog | Rana dybowskii |
| Eastern newt | Notophthalmus viridescens |
| European frog | Rana temporaria |
| Fire-bellied toads | Bombina All species and hybrids |
| Giant salamanders and Hellbenders | Cryptobranchidae – All species and hybrids |
| Green frog | Rana clamitans |
| Khabarovsk frog | Rana amurensis |
| Iberian frog | Rana iberica |

| Common Name | Scientific Name |
|---|---|
| **Amphibians** | |
| Inkiapo frog | Rana chensinensis |
| Italian agile frog | Rana latastei |
| Mink frog | Rana septentrionalis |
| Mink frog | Rana heckscheri |
| Nikko frog | Rana ornativentris |
| Pickeral frog | Rana palustris |
| Pig frog | Rana grylio |
| Plains leopard frog | Rana blairi |
| Rio Grande leopard frog | Rana berlandieri |
| Roughskin newts | Taricha rivularis and T. torosa |
| Shovel-nosed salamander | Leurognathus marmoratus |
| Siberian frog | Rana altaica |
| Sirens | Sirenidae – All species and hybrids |
| Spadefoot toads | Pelobatidae – All nonnative species and hybrids |
| Spring frog | Rana dalmatina |
| Stream frog | Rana graeca |
| Tago frog | Rana tagoe |
| Taipa frog | Rana longicrus |
| Tiger salamander | Ambystoma tigrinum All nonnative sub-species |
| Toudaohe frog | Rana chevronta |
| Tsushima frog | Rana tsushimensis |
| Turkish frog | Rana holtzi |
| Waterdogs | Necturus All species and hybrids |
| Wood frog | Rana sylvatica |

## Appendix B Aquatic Nonidigenous Species Prohibited in Oregon Continued

| Common Name | Scientific Name |
|---|---|
| **Plants** | |
| Eurasian watermilfoil | Myriophyllum spicatum |
| Giant hogweed | Heracleum mantegazzianum |
| Giant knotweed | Polygonum sachalinense |
| Hydrilla | Hydrilla verticillata |
| Himalayan knotweed | Polygonum polystachyum |
| Japanese knotweed | Polygonum cuspidatum |
| Purple loosestrife | Lythrum salicaria |
| Smooth cordgrass | Spartina alterniflora |
| South American waterweed(Elodea) | Egeria densa |
| Spartina | Spartina densiflora |
| Spartina | Spartina anglica |
| Spartina | Spartina patens |
| Tamarix | Tamarix ramosissima |

## Appendix C: Executive Order 13112

Executive Order 13112 of February 3, 1999

Invasive Species

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa et seq.), Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 et seq.), Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), and other pertinent statutes, to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause, it is ordered as follows:

**Section 1.** *Definitions.*

(a)"Alien species" means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

(b) "Control" means, as appropriate, eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions. "

(c) "Ecosystem" means the complex of a community of organisms and its environment.

(d) "Federal agency" means an executive department or agency, but does not include independent establishments as defined by 5 U.S.C. 104.

(e) "Introduction" means the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.

(f) "Invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

(g) "Native species" means, with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

(h) "Species" means a group of organisms all of which have a high degree of physical and genetic similarity, generally interbreed only among themselves, and show persistent differences from members of allied groups of organisms.

(i ) "Stakeholders" means, but is not limited to, State, tribal, and local government agencies, academic institutions, the scientific community, nongovernmental entities including environmental, agricultural, and conservation organizations, trade groups, commercial interests, and private landowners.

(j) "United States" means the 50 States, the District of Columbia, Puerto Rico, Guam, and all possessions, territories, and the territorial sea of the United States.

**Sec. 2.** *Federal Agency Duties*. (a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law.

1) identify such actions;

2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them; and

3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

(b) Federal agencies shall pursue the duties set forth in this section in consultation with the Invasive Species Council, consistent with the Invasive Species Management Plan and in cooperation with stakeholders, as appropriate, and, as approved by the Department of State, when Federal agencies are working with international organizations and foreign nations.

**Sec. 3.** *Invasive Species Council*. (a) An Invasive Species Council (Council) is hereby established whose members shall include the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Transportation, and the Administrator of the Environmental Protection Agency. The Council shall be Co-Chaired by the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of Commerce. The Council may invite additional Federal agency representatives to be members, including representatives from subcabinet bureaus or offices with significant responsibilities concerning invasive species, and may prescribe special procedures for their participation. The Secretary of the Interior shall, with concurrence of the Co-Chairs, appoint an Executive Director of the Council and shall provide the staff and administrative support for the Council.

(b) The Secretary of the Interior shall establish an advisory committee under the Federal Advisory Committee Act, 5 U.S.C. App., to provide information and advice for consideration by the Council, and shall, after consultation with other members of the Council, appoint members of the advisory committee representing stakeholders. Among other things, the advisory committee shall recommend plans and actions at local, tribal, State, regional, and ecosystem-based levels to achieve the goals and objectives of the

Management Plan in section 5 of this order. The advisory committee shall act in cooperation with stakeholders and existing organizations addressing invasive species. The Department of the Interior shall provide the administrative and financial support for the advisory committee.

**Sec. 4**. *Duties of the Invasive Species Council*. The Invasive Species Council shall provide national leadership regarding invasive species, and shall:

(a) oversee the implementation of this order and see that the Federal agency activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, relying to the extent feasible and appropriate on existing organizations addressing invasive species, such as the Aquatic Nuisance Species Task Force, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, and the Committee on Environment and Natural Resources;

(b) encourage planning and action at local, tribal, State, regional, and ecosystem-based levels to achieve the goals and objectives of the Management Plan in section 5 of this order, in cooperation with stakeholders and existing organizations addressing invasive species;

(c) develop recommendations for international cooperation in addressing invasive species; develop, in consultation with the Council on Environmental Quality, guidance to Federal agencies pursuant to the National Environmental Policy Act on prevention and control of invasive species, including the procurement, use, and maintenance of native species as they affect invasive species;

(d) facilitate development of a coordinated network among Federal agencies to document, evaluate, and monitor impacts from invasive species on the economy, the environment, and human health;

(e) facilitate establishment of a coordinated, up-to-date information-sharing system that utilizes, to the greatest extent practicable, the Internet; this system shall facilitate access to and exchange of information concerning invasive species, including, but not limited to, information on distribution and abundance of invasive species; life histories of such species and invasive characteristics; economic, environmental, and human health impacts; management techniques, and laws and programs for management, research, and public education; and

(f) prepare and issue a national Invasive Species Management Plan asset forth in section 5 of this order.

**Sec. 5.** *Invasive Species Management Plan*.

(a) Within 18 months after issuance of this order, the Council shall prepare and issue the first edition of a National Invasive Species Management Plan (Management Plan), which shall detail and recommend performance-oriented goals and objectives and specific measures of success for Federal agency efforts concerning invasive species. The Management Plan shall recommend specific objectives and measures for carrying out each of the Federal agency duties established in section 2(a) of this order and shall set forth steps to be taken by the Council to carry out the duties assigned to it under section 4

of this order. The Management Plan shall be developed through a public process and in consultation with Federal agencies and stakeholders.

(b) The first edition of the Management Plan shall include a review of existing and prospective approaches and authorities for preventing the introduction and spread of invasive species, including those for identifying pathways by which invasive species are introduced and for minimizing the risk of introductions via those pathways, and shall identify research needs and recommend measures to minimize the risk that introductions will occur. Such recommended measures shall provide for a science-based process to evaluate risks associated with introduction and spread of invasive species and a coordinated and systematic risk-based process to identify, monitor, and interdict pathways that may be involved in the introduction of invasive species. If recommended measures are not authorized by current law, the Council shall develop and recommend to the President through its Co-Chairs legislative proposals for necessary changes in authority.

(c) The Council shall update the Management Plan biennially and shall concurrently evaluate and report on success in achieving the goals and objectives set forth in the Management Plan. The Management Plan shall identify the personnel, other resources, and additional levels of coordination needed to achieve the Management Plan's identified goals and objectives, and the Council shall provide each edition of the Management Plan and each report on it to the Office of Management and Budget. Within 18 months after measures have been recommended by the Council in any edition of the Management Plan, each Federal agency whose action is required to implement such measures shall either take the action recommended or shall provide the Council with an explanation of why the action is not feasible. The Council shall assess the effectiveness of this order no less than once each 5 years after the order is issued and shall report to the Office of Management and Budget on whether the order should be revised.

**Sec. 6.** Judicial Review and Administration.

(a) This order is intended only to improve the internal management of the executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any other person.

(b) Executive Order 11987 of May 24, 1977, is hereby revoked.

(c) The requirements of this order do not affect the obligations of Federal agencies under 16 U.S.C. 4713 with respect to ballast water programs.

(d) The requirements of section 2(a)(3) of this order shall not apply to any action of the Department of State or Department of Defense if the Secretary of State or the Secretary of Defense finds that exemption from such requirements is necessary for foreign policy or national security reasons.

WILLIAM J. CLINTON

THE WHITE HOUSE,

*Febru*ary 3, 1999.

## Appendix D: Section 1204 of the National Invasive Species Act of 1996

**SEC. 1204. STATE AQUATIC NUISANCE SPECIES MANAGEMENT PLANS**.

(1) IN GENERAL.-- After providing notice and opportunity for public comment, the Governor of each State may prepare and submit, or the Governors of the States and the governments of Indian Tribes involved in an interstate organization, may jointly prepare and submit—

(A) a comprehensive management plan to the Task Force for approval which identifies those areas or activities within the State or within the interstate region involved, other than those related to public facilities, for which technical, enforcement, or financial assistance (or any combination thereof) is needed to eliminate or reduce the environmental, public health, and safety risk associated with aquatic nuisance species, particularly the zebra mussel; and

(B) a public facility management plan to the Assistant Secretary for approval which is limited solely to identifying those public facilities within the State or within the interstate region involved for which technical and financial assistance is needed to reduce infestations of zebra mussels.

(2) CONTENT.-- Each plan shall, to the extent possible, identify the management practices and measures that will be undertaken to reduce infestations of aquatic nuisance species. Each plan shall—

(A) identify and describe State and local programs for environmentally sound prevention and control of the target aquatic nuisance species;

(B) identify Federal activities that may be needed for environmentally sound prevention and control of aquatic nuisance species and a description of the manner in which those activities should be coordinated with State and local government activities;

(C) identify any authority that the State (or any State or Indian Tribe involved in the interstate organization) does not have at the time of the development of the plan that may be necessary for the State (or any State or Indian Tribe involved in the interstate organization) protect public health, property, and the environment from harm by aquatic nuisance species; and

(D) a schedule of implementing the plan, including a schedule of annual objectives, and enabling legislation.

(3) CONSULTATION.—

(A)In developing and implementing a management plan, the State or interstate organization should, to the maximum extent practicable, involve local governments and regional entities, Indian Tribes, and public and private organizations that have expertise in the control of aquatic nuisance species.

(B) Upon the request of a State or the appropriate official of an interstate organization, the Task Force or the Assistant Secretary, as appropriate under paragraph (1), may provide technical assistance in developing and implementing a management plan.

(4) PLAN APPROVAL.-- Within 90 days after the submission of a management plan, the Task Force or the Assistant Secretary in consultation with the Task Force, as appropriate under paragraph (1), shall review the proposed plan and approve it if it meets the requirements of this subsection or return the plan to the Governor or the interstate organization with recommended modifications.

(a) GRANT PROGRAM.—

(1) STATE GRANTS.-- The Director may, at the recommendation of the Task Force, make grants to States with management plans approved under subsection (a) for the implementation of those plans.

(2) APPLICATION.-- An application for a grant under this subsection shall include an identification and description of the best management practices and measures which the State proposes to utilize in implementing an approved management plan with any Federal assistance to be provided under the grant.

(3) FEDERAL SHARE.—

(A) The Federal share of the cost of each comprehensive management plan implemented with Federal assistance under this section in any fiscal year shall not exceed 75 percent of the cost incurred by the State in implementing such management program and the non–Federal share of such costs shall be provided from non–Federal sources.

(B) The Federal share of the cost of each public facility management plan implemented with Federal assistance under this section in any fiscal year shall not exceed 50 percent of the cost incurred by the State in implementing such management program and the non–Federal share of such costs shall be provided from non–Federal sources.

(4) ADMINISTRATIVE COSTS.-- For the purposes of this section, administrative costs for activities and programs carried out with a grant in any fiscal year shall not exceed 5 percent of the amount of the grant in that year.

(5) IN–KIND CONTRIBUTIONS.-- In addition to cash outlays and payments, in–kind contributions of property or personnel services by non–Federal interests for activities under this section may be used for the non–Federal share of the cost of those activities.

(c) ENFORCEMENT ASSISTANCE.-- Upon request of a State or Indian Tribe, the Director or Under Secretary, to the extent allowable by law and in a manner consistent with section 141 of title 14, United States Code, may provide assistance to a State or Indian Tribe in enforcing an approved State or interstate invasive species management plan.

# Appendix E: Oregon Ballast Water Management and Invasive Species Council Legislation

**House Bill 2181**

AN ACT

Relating to pests; creating new provisions; amending ORS 634.665; repealing ORS 634.670; and appropriating money.

Be It Enacted by the People of the State of Oregon:

SECTION 1. { + (1) There is established the Invasive Species Council. Except as provided in section 4 (1) of this 2001 Act, the council shall consist of 12 members. The following persons are ex officio members of the council:

(a) The Director of Agriculture or a designated representative.

(b) The president of Portland State University or a designated representative.

(c) The State Fish and Wildlife Director or a designated representative.

(d) The administrative head of the Sea Grant College of Oregon State University or a designated representative.

(2) Each of the ex officio members described in subsection (1) of this section shall appoint two members to the council.

(3) The term of office of each appointed member is two years, but an appointed member serves at the pleasure of the appointing authority. Before the expiration of a term, the appointing authority shall appoint a successor whose term begins on January 1 next following. An appointed member may not serve more than two successive terms on the council. If there is a vacancy in an appointed member position for any cause, the appointing authority shall make an appointment to become immediately effective for the unexpired term.

(4) In making appointments to the council, the appointing authorities shall endeavor to appoint persons representative of the geographic, cultural and economic diversity of this state. The appointing authorities may give consideration to nominations submitted by federal and state agencies, local governments, universities, industry and other groups having an interest in invasive species.

(5) An appointed member of the council is not entitled to compensation under ORS 292.495. A member of the council is not entitled to reimbursement for expenses. At the discretion of the council, council members may be reimbursed from funds available to the council for actual and necessary travel and other expenses incurred by members of the council in the performance of their official duties, subject to the limits described in ORS 292.495. + }

SECTION 2. { + Notwithstanding the term of office specified by section 1 of this 2001 Act, of the eight members first appointed to the Invasive Species Council:

(1) Four shall serve for terms ending January 1, 2003.

(2) Four shall serve for terms ending January 1, 2004. + }

SECTION 3. { + (1) The Invasive Species Council shall select a voting ex officio member of the council as chairperson and another voting ex officio member as vice chairperson. Each voting ex officio member of the council shall serve one year as chairperson and one year as vice chairperson during any four-year period. The chairperson and vice chairperson shall have duties and powers necessary for the performance of the functions of those offices as a majority of the voting ex officio members determines.

(2) A majority of the voting members of the council constitutes a quorum for the transaction of business.

(3) The council shall meet at times and places specified by the call of the chairperson or of a majority of the voting members of the council. + }

SECTION 4. { + (1) Subject to available funding, the Invasive Species Council may appoint a State Invasive Species Coordinator to serve at the pleasure of the voting members of the council. The appointment of the coordinator must be by written order, filed with the Secretary of State. If the council appoints a coordinator, the coordinator shall serve as a nonvoting ex officio member of the council.

(2) The State Department of Agriculture is responsible for ensuring payment of the administrative expenses of the council. The State Department of Agriculture may enter into interagency agreements under ORS 190.110 with the State Department of Fish and Wildlife, Portland State University and Oregon State University for sharing the administrative expenses of the council. + }

SECTION 5. { + (1) The Invasive Species Council may establish advisory and technical committees that it considers necessary to aid and advise the council in the performance of its functions. The committees may be continuing or temporary committees. The council shall determine the representation, membership, terms and organization of the committees and appoint their members.

(2) Members of the committees are not entitled to compensation, but at the discretion of the council may be reimbursed from funds available to the council for actual and necessary travel and other expenses incurred by members of the committees in the performance of their official duties, subject to ORS 292.495. + }

SECTION 6. { + (1) As used in this section, 'invasive species ' means nonnative organisms that cause economic or environmental harm and are capable of spreading to new areas of the state. ' Invasive species' does not include humans, domestic livestock or nonharmful exotic organisms.

(2) The Invasive Species Council shall:

(a) Create and maintain appropriate Internet sites, toll-free telephone numbers or other means of communication for statewide use in reporting sightings of invasive species.

(b) Encourage the reporting of invasive species sightings by publicizing means of communication made available by the council under paragraph (a) of this subsection.

(c) Forward reports of invasive species sightings to appropriate agencies.

(d) Produce educational materials and press releases concerning invasive species.

(e) Conduct educational meetings and conferences.

(f) Develop a statewide plan for dealing with invasive species. The plan should include, but need not be limited to, a review of state authority to prevent the introduction of invasive species and to eradicate, contain or manage existing invasive species.

(g) Solicit proposals and review applications for grants or loans to further projects providing education about invasive species.

(h) Provide grants or loans to agencies, organizations or individuals for eradicating new invasions.

(3) The council may approve the expenditure of funds by the council, or any member thereof, for the production of educational materials or the presentation of educational materials. + }

SECTION 7. { + (1) The Invasive Species Council Account is established in the General Fund of the State Treasury. Except as provided under subsection (2) of this section, all moneys received by the Invasive Species Council shall be paid into the

State Treasury and credited to the account. All moneys in the account are continuously appropriated to the council and may be used by the council for purposes authorized by law, including but not limited to providing grants or loans as described under section 6 of this 2001 Act.

(2) The Invasive Species Council may accept moneys through gifts, grants and donations from public and private sources. The council shall deposit the gifts, grants and donations with the State Treasurer for credit to a trust account separate and distinct from the General Fund. Interest earned by the trust account shall be credited to the trust account. Except as otherwise provided by the donor, the council may use trust account moneys for any purpose described in section 6 of this 2001 Act. + }

SECTION 8. { + The Interagency Integrated Pest Management Coordinating Committee is abolished. On the effective date of this 2001 Act, the tenure of the members of the Interagency Integrated Pest Management Coordinating Committee shall cease. + }

SECTION 9. { + (1) This 2001 Act does not relieve a person of any obligation with respect to a fee or other charge or other liability, duty or obligation owing to the Interagency Integrated Pest Management Coordinating Committee. The Invasive Species

Council may undertake the collection or enforcement of any such fee, charge or other liability, duty or obligation.

(2) The rights and obligations of the committee legally incurred under contracts, leases and business transactions executed, entered into or begun before the effective date of this

2001 Act are transferred to the council. For the purpose of succession to these rights and obligations, the council is considered to be a continuation of the committee and not a new authority, and the council shall exercise such rights and fulfill such obligations as if they had not been transferred. + }

SECTION 10. { + There are transferred to the Invasive Species Council:

(1) All the supplies, materials, equipment, records, books, papers and facilities of the Interagency Integrated Pest Management Coordinating Committee.

(2) In addition to and not in lieu of any other appropriation, the unexpended balances of any appropriations or other amounts authorized to be expended by the Interagency Integrated Pest Management Coordinating Committee for the purposes of any duties, functions or powers of the committee are appropriated and transferred to the State Department of Agriculture for expenditure on behalf of the Invasive Species Council. The expenditure classifications, if any, established by Acts authorizing or limiting expenditures by the committee remain applicable to expenditures by the department under this subsection. + }

SECTION 11. ORS 634.665 is amended to read:

634.665. (1) Each state agency or institution listed under ORS 634.660 shall provide integrated pest management training for employees responsible for pest management. {- The training programs shall be developed in cooperation with the Interagency

Integrated Pest Management Coordinating Committee created under ORS 634.670. - }

(2) Each state agency or institution listed under ORS 634.660 shall designate an integrated pest management coordinator. The integrated pest management coordinator shall { - : - }

{ - (a) - } manage the integrated pest management program of the agency or institution { + . + } { - ; and - }

{ - (b) Report at least annually to the Interagency Integrated Pest Management Coordinating Committee about the implementation of the agency or institution program. The report shall: - }

{ - (A) Identify current pest management practices; - }

{ - (B) Evaluate the effectiveness of current programs, including integrated pest management programs; and - }

{ - (C) Identify areas where integrated pest management is scheduled to be implemented during the ensuing year. - }

SECTION 12. { + ORS 634.670 is repealed. + }

SECTION 13. { + Notwithstanding section 3 of this 2001 Act, for purposes of sections 9 and 10 of this 2001 Act, the Director of Agriculture or a designee shall act as temporary chairperson of the Invasive Species Council and exercise council authority until the selection of a chairperson under section 3 of this 2001 Act. + }

**Senate Bill 895**

AN ACT

Relating to ballast water management; creating new provisions; and amending ORS 783.600.

Whereas the Legislative Assembly finds that aquatic nuisance species have the potential to cause economic and environmental damage to this state and that current national efforts to stop the introduction of aquatic nuisance species through ballast water from shipping vessels do not adequately reduce the risk of new introductions into the waters of this state; and

Whereas the Legislative Assembly finds that no treatment technology currently exists to adequately address the issue of ballast water management and that research into treatment technologies and consistent federal standards must be developed in order to fully address this issue; and

Whereas the Legislative Assembly finds that deep ocean exchange of ballast water is an interim partial solution that is available to ocean-going vessels and has yet to be fully implemented by industry; and

Whereas the Legislative Assembly recognizes the international ramifications and rapidly changing dimensions of this issue and the difficulty that any one state has in legally, cost effectively or practically managing this issue; and

Whereas recognizing the possible limits of state jurisdiction over international issues, the Legislative Assembly declares its support for the efforts of the United Nations International Maritime Organization and the United States Coast Guard; and

Whereas the State of Oregon intends to complement, to the extent practical and cost effective, the United States Coast Guard's ballast water management program and recommend necessary changes and improvements to the United States Coast Guard in the program; and

Whereas the Legislative Assembly recognizes that the State of Oregon and the State of Washington face certain special legal issues arising from the shared waters of the Columbia River; and

Whereas the Legislative Assembly intends that, when practical and cost effective, implementation of sections 1 to 5 of this 2001 Act shall be coordinated with related rules and regulations adopted by the State of Washington and the State of California; and

Whereas the Legislative Assembly recognizes that ballast water should be managed from the federal level and urges the United States Congress to strengthen the federal ballast water program and, with regional input, apply consistent rules and standards for all waters of the United States; and

Whereas the Legislative Assembly fully intends for this 2001 Act to conform to future federal laws on ballast water management; now, therefore,

Be It Enacted by the People of the State of Oregon:

SECTION 1. { + As used in sections 1 to 5 of this 2001 Act, unless the context requires otherwise:

(1) 'Aquatic nuisance species' means any species or other viable biological material that enters an ecosystem beyond its historic range.

(2) 'Ballast water' means any water and associated sediment used to manipulate the trim and stability of a vessel.

(3) 'Cargo vessel' means a self-propelled ship in commerce, other than a tank vessel or a vessel used solely for commercial fish harvesting, of 300 gross tons or more.

(4) 'Coastal exchange' means replacing the ballast water taken onboard at a North American coastal port in one of the following manners:

(a) For vessels departing from a North American coastal port located south of the parallel 40 degrees north latitude, and traveling northward into the waters of this state, the replacement of ballast water at sea south of the parallel 40 degrees north latitude; or

(b) For vessels departing from a North American coastal port located north of the parallel 50 degrees north latitude, and traveling southward into the waters of this state, the replacement of ballast water at sea north of the parallel 50 degrees north latitude.

(5) 'Department' means the Department of Environmental Quality.

(6) 'Oil' means oil, gasoline, crude oil, fuel oil, diesel oil, lubricating oil, oil sludge, oil refuse and any other petroleum related product.

(7) 'Open sea exchange' means a replacement of ballast water that occurs in an area no less than 200 nautical miles from any shore and where the water depth exceeds 2,000 meters.

(8) 'Passenger vessel' means a ship of 300 gross tons or more carrying passengers for compensation.

(9) 'Sediment' means any matter that settles out of ballast water.

(10) 'Ship' means any boat, ship, vessel, barge or other floating craft of any kind.

(11) 'Tank vessel' means a ship that is constructed or adapted to carry oil in bulk as cargo or cargo residue other than:

(a) A vessel carrying oil in drums, barrels or other packages;

(b) A vessel carrying oil as fuel or stores for that vessel; or

(c) An oil spill response barge or vessel.

(12) 'Vessel' means a tank vessel, cargo vessel or passenger vessel.

(13) 'Voyage' means any transit by a vessel destined for any Oregon port.

(14) 'Waters of this state' means natural waterways including all tidal and nontidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and nonnavigable, including that portion of the Pacific Ocean that is in the boundaries of Oregon. + }

SECTION 2. { + (1) This section and section 3 of this 2001 Act apply to all vessels carrying ballast water into the waters of this state from a voyage, except a vessel that:

(a) Discharges ballast water or sediment only at the location where the ballast water or sediment originated, if the ballast water or sediment are not mixed with ballast water or sediment from areas other than open sea waters;

(b) Does not discharge ballast water in waters of this state;

(c) Traverses only the internal waters of this state;

(d) Traverses only the territorial sea of the United States and does not enter or depart an Oregon port or navigate the waters of this state; or

(e) Discharges ballast water or sediment that originated solely from waters located between the parallel 40 degrees north latitude and the parallel 50 degrees north latitude.

(2) Sections 2 to 4 of this 2001 Act do not authorize the discharge of oil or noxious liquid substances in a manner prohibited by state, federal or international laws or regulations. Ballast water containing oil or noxious liquid substances shall be discharged in accordance with the applicable requirements.

(3) Nothing in this section:

(a) Requires an open sea exchange or coastal exchange if the owner or operator in charge of a vessel determines that performing an open sea exchange or coastal exchange would threaten the safety or stability of the vessel or the safety of the vessel's crew or passengers because of any extraordinary condition, including but not limited to adverse weather, vessel design limitations or equipment failure.

(b) Exempts the owner or operator in charge of a vessel from the reporting requirements under section 4 of this 2001 Act, whether or not ballast water is carried or discharged in the waters of this state. + }

SECTION 3. { + (1) Except as authorized by this section, the discharge of ballast water in the waters of this state is prohibited.

(2) An owner or operator of a vessel may discharge ballast water in the waters of this state:

(a) If the owner or operator has conducted an open sea exchange, or a coastal exchange, if applicable, of ballast water prior to entering the waters of this state; or

(b) Without performing an open sea exchange or a coastal exchange of ballast water if the owner or operator reasonably believes that an exchange would threaten the safety of the vessel or if the exchange is not feasible due to vessel design limitations or equipment failure.

(3) An owner or operator who discharges ballast water in the waters of this state under subsection (2)(b) of this section is subject to the reporting requirements under section 4 of this 2001 Act. + }

SECTION 4. { + (1) Owners or operators of vessels regulated under sections 2 to 4 of this 2001 Act must report ballast water management information to the Department of Environmental Quality at least 24 hours prior to entering the waters of this state. The department may work with maritime associations to establish the manner and form of such reporting.

(2) The department may verify compliance with sections 2 to 4 of this 2001 Act by relying on tests conducted by the United States Coast Guard or on other tests determined to be appropriate by the department. + }

SECTION 5. { + (1) The Director of the Department of Environmental Quality shall establish a task force to study and recommend appropriate changes and additions to sections 2 to 4 of this 2001 Act, including but not limited to changes based upon the following considerations:

(a) Shipping industry compliance with sections 2 to 4 of this 2001 Act;

(b) Practical and cost-effective ballast water treatment technologies;

(c) Appropriate standards for discharge of treated ballast water in waters of this state;

(d) The degree to which open sea exchange and coastal exchange of ballast water decreases the risk of transporting aquatic nuisance species into the waters of Oregon;

(e) The compatibility of sections 2 to 4 of this 2001 Act with new laws enacted by the United States Congress, regulations promulgated by the United States Coast Guard and ballast water management programs established by the States of Washington and

California and the Province of British Columbia;

(f) Research requirements for ballast water treatment technology and other areas of concern related to the possible introduction of aquatic nuisance species;

(g) Amendments to the National Invasive Species Act of 1996 (P.L. 104-332) for a single national system of regulation; and

(h) How ballast water management is consistent with and made a part of efforts to eradicate invasive species throughout Oregon.

(2) Subject to available funding from gifts, grants or donations, Portland State University may, from the appropriate department, provide staff and coordination assistance to the task force.

(3) The director shall consider appointing persons to the task force who represent federal, state, State of Washington, maritime, environmental and academic interests.

(4) Two members of the Legislative Assembly appointed jointly by the President of the Senate and the Speaker of the House of Representatives shall act in an advisory capacity to the task force.

(5) The task force shall report its recommendations to the appropriate House of Representatives and Senate committees of the Seventy-second Legislative Assembly by January 2003. + }

SECTION 6. { + The Director of the Department of Environmental Quality shall establish the task force specified in section 5 of this 2001 Act no later than 60 days after the effective date of this 2001 Act. + }

SECTION 7. { + (1) Except as provided in subsection (2) of this section, the Director of the Department of Environmental Quality may impose a civil penalty on the owner or operator of a vessel for failure to comply with the requirements of sections 2 to 4 of this 2001 Act. The penalty imposed under this section may not exceed $5,000 for each violation. In determining the penalty imposed, the director shall consider whether the violation was intentional, negligent or without any fault and shall consider the quality and nature of risks created by the violation. The owner or operator of a vessel subject to such a penalty may contest the determination by requesting a hearing under ORS

183.413 to 183.470.

(2) The civil penalty for a violation of the reporting requirements of section 4 of this 2001 Act may not exceed $500 per violation. + }

SECTION 8. ORS 783.600 is amended to read:

783.600. { - No person, whether an officer of a vessel or not, shall - } { + Except as provided in section 3 of this 2001 Act, a person may not + } discharge the ballast of any vessel into the navigable portions or channels of any of the bays, harbors or rivers of this state, or within the jurisdiction of this state, so as to injuriously affect such portions or channels of such bays, harbors or rivers, or to obstruct navigation thereof.

## Appendix F: Federal Laws Addressing Aquatic Nuisance Species

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
|---|---|---|---|---|---|
| -Dept. of Interior/FWS<br>-Dept. of Transportation/Coast Guard<br>-EPA<br>-Dept. of Defense/Army Corps of Engineers<br>-Dept. of Commerce/NOAA | National Invasive Species Act (1996) | Reauthorized and amended NANPCA to mandate regulations to prevent introduction and spread of aquatic nuisance species into Great Lakes through ballast water.<br>Authorized funding for research on aquatic nuisance species prevention and control (Chesapeake Bay, Gulf of Mexico, Pacific Coast, Atlantic Coast, San Francisco Bay- Delta Estuary)<br><br>Required ballast water management program to demonstrate technologies and practices to prevent nonindigenous species from being introduced<br><br>Modified composition of Aquatic Nuisance Species Task Force<br>Required Task Force to develop and implement comprehensive program to control the brown tree snake in Guam | Aquatic nuisance species and brown tree snake | Unintentional introductions: ballast water | http://www.nemw.org/nisa.htm |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
|---|---|---|---|---|---|
| -Dept. of Interior/FWS<br>-Dept. of Transportation/Coast Guard<br>-EPA<br>-Dept. of Defense/Army Corps of Engineers<br>-Dept. of Commerce/NOAA | Non-indigenous Aquatic Nuisance Prevention and Control Act (1990) | Established Aquatic Nuisance Species Task Force to: identify areas where ballast water does not pose an environmental threat, assess whether aquatic nuisance species threaten the ecological characteristics and economic uses of US waters (other than the Great Lakes), determine the need for controls on vessels entering U.S. waters (other than Great Lakes), identify and evaluate approaches for reducing risk of adverse consequences associated with intentional introduction of aquatic species<br><br>Directs Coast Guard to issue regulations to prevent the introduction and spread of aquatic nuisance species into the Great Lakes through ballast water<br><br>Directs Corps of Engineers to develop a program of research and technology to control zebra mussels in and around public facilities and make available information on control methods | Aquatic nuisance species | Unintentional introductions: ballast water | http://www.anstaskforce.gov/toc.htm |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
|---|---|---|---|---|---|
| | Alien Species Prevention and Enforcement Act (1992) | Makes illegal the shipment of certain categories of plants and animals through U.S. mail | Plants and animals whose shipment is prohibited under 18 U.S.C. 42;43, or the Lacey Act<br><br>Plants or plant matter whose shipment is prohibited under the Federal Plant Pest Act or Plant Protection Act | Intentional introductions: U.S. Mail | |
| Dept. of Agriculture/APHIS | Plant Protection Act (2000) | Consolidates and modernizes several major statutes (Plant Quarantine Act, Federal Plant Pest Act, Federal Noxious Weed Act, Organic Act of 1944, and others), replacing them with one flexible statutory framework providing the ability to prohibit or restrict imports, exports, and interstate movement; assess higher civil penalties; issue subpoenas; conduct inspections without a warrant; cooperate with industry and others in "quality assurance" programs; recover costs related to disposal of abandoned shipments; and take emergency action. By expanding the definition of | Plants and plant material<br>Plant pests<br>Noxious weeds<br>Biological control agents | Unintentional and intentional introduction | |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
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| | | "noxios weed" the Act enables APHIS to address a broader range of weed problems. | | | |
| Dept. of Interior | Water Resources Development Act | Sec. 506(a)- "In conjunction with the Great Lakes Fishery Commission, the Secretary is authorized to undertake a program for the control of sea lampreys in and around waters of the Great Lakes. The program undertaken pursuant to this section may include projects which consist of either structural or nonstructural measures or a combination thereof." | Sea lamprey | Control of existing organisms in and around the Great Lakes | |
| Federal land management agencies | Federal Noxious Weed Act of 1974 | Although the Plant Protection Act superseded and repealed most of the Federal Noxious Weed Act, it left intact Section 15 (Management of undesirable plants on Federal lands). Requires Federal land management agencies to develop and establish a management program for control of undesirable plants on Federal lands under the agencies jurisdiction. Requires those agencies to coordinate management where similar programs are being implemented on State and | Noxious weeds Undesirable plant species | Control on Federal lands | http://refuges.fws.gov/FICMNEWFiles/FederalNoxiousWeedAct.html |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
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| | | private lands in the same area. | | | |
| -Dept. of Agriculture/APHIS | International Plant Protection Convention (1952) | Applies primarily to quarantine pests in international trade. Creates an international regime to prevent spread and introduction of plant and plant product pests premised on exchange of Phytosanitary certificates between importing and exporting countries' national plant protection offices. Parties have national plant protection organizations established according to the Convention with authority in relation to quarantine control, risk analysis and other measures required to prevent the establishment and spread of all invasive alien species that, directly or indirectly, are pests of plants. Parties agree to cooperate on information exchange and on the development of International Standards for Phytosanitary Measures. | Pests of plants or plant products: "any form of plant or animal life, or any pathogenic agent, injurious or potentially injurious to plants or plant products"<br><br>Quarantine pests involved with international trade: "pest of potential national economic importance to the country endangered thereby and not yet present there, or present but not widely distributed and being actively controlled" | "Storage places, conveyances, containers and any other object or material capable of harbouring or spreading plant pests, especially where international transportation is involved."<br>-Packing material or matter of any kind accompanying plant products<br>-Storage places<br>-Transportation facilities | http://www.fao.org/legal/treaties/004t-e.htm |
| -Dept. of Agriculture/FS | Hawaii Tropical Forest Recovery Act (1992) | Authorizes Sec. of Agriculture and USFS to provide assistance relating to invasive species to state officials, Federal agencies, and various private entities in States with | Non-native species: not specified further | Unintentional and intentional introductions | |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
|---|---|---|---|---|---|
| | | tropical forests, including Hawaii.<br>Establish biological control agents for non-native species<br><br>Creates task force to develop action plan to:<br>"promote public awareness of the harm caused by introduced species"<br>develop recommendations on "the benefits of fencing or other management activities for the protection of Hawaii's native plants and animals from non-native species, including the identification and priorities for the areas where these activities are appropriate" | | | |
| | Convention on Great Lakes Fisheries Between the United States and Canada (1955) | The Convention established the Great Lakes Fisheries Commission whose purpose is to control and eradicate the non-native, highly invasive Atlantic sea lamprey from the Great Lakes | Sea lamprey | Introduction through tributaries to the Great Lakes | http://www.glfc.org/pubs/conv.htm |
| Dept. of Interior | Coastal Zone Management Act (1972) | Invasive species issues could be incorporated into State Coastal Zone Management Plans and projects could be eligible for funding through cooperative agreements.<br>Establishes the National Estuarine Research Reserve | | | |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
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| | | System, under which invasive species monitoring and research could be sponsered. | | | |
| Dept. of Interior | Lacey Act (1900; amended in 1998) | Prohibits import of:<br>-A list of designated species<br>-Other vertebrates, mollusks, and crustacea that are "injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States"<br><br>Declares importation or transportation of any live wildlife as injurious and prohibited, except as provided for under the Act<br>BUT<br>Allows import of almost all species for scientific, medical, education, exhibition, or propagation purposes | Species injurious to human beings or resources | Intentional introduction<br>Trade | |
| -Dept. of Agriculture<br>-Dept. of Interior | Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) (1995) | A supplementary agreement to the World Trade Organisation Agreement. Provides a uniform interpretation of the measures governing safety and plant and animal health regulations. Applicable to all sanitary and Phytosanitary measures directly or indirectly affecting international trade. Sanitary and Phytosanitary | Pests, diseases, disease-carrying organisms, or disease-causing organisms | Importation | http://www.wto.org/goods/spsagr.htm |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
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| | | measures are defined as any measure applied a) to protect animal or plant life or health within (a Members' Territory) from entry, establishment or spread of pests, diseases, disease carrying organisms; e) to prevent or limit other damage within the (Members Territory) from the entry, establishment or spread of pests (annex A). | | | |
| Dept. of Defense | Convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction (Biological Weapons Convention) (1975) | Article I prohibits parties from developing, producing, stockpiling, acquiring or retaining microbial or other biological agents which are not justified by exclusively peaceful purpose.<br>Article II requires parties to destroy or divert to peaceful purpose all such agents within 9 months of entry into force of the Convention | "Microbial or other biological agents… whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes"<br><br>Allows for "international exchange of bacteriological Agents and toxins and equipment for the processing, use or production of bacteriological agents and toxins for peaceful | "Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes" | http://sun00781.dn.net/nuke/control/bwc/text/bwc.htm |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
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| | | | purposes." | | |
| Dept. of Agriculture/APHIS | Act of March 2, 1931, often referred to as the Animal Damage Control Act | Gives APHIS authority to control wildlife damage on federal, state, or private land<br><br>Protects: field crops, vegetables, fruits, nuts, horticultural crops, commercial forests; freshwater aquaculture ponds and marine species cultivation areas; livestock on public and private range and in feedlots; public and private buildings and facilities; civilian and military aircraft; public health | Damaging species (nutria, blackbirds, European starlings, monk parakeets) | Unintentional introductions | |
| | North American Agreement on Environmental Cooperation (1994) | Article 10 (2)(h): the Council of the Commission on Environmental Co-operation may develop recommendations regarding exotic species which may be harmful | "Exotic" species: not specified further | Not specified | http://www.cec.org |
| EPA | Federal Insecticide, Fungicide, and Rodenticide Act | Gives EPA authority to regulate importation and distribution of substances, including organisms, that are intended to function as pesticides | Biological control agents (In terms of biological control agents, EPA currently regulates only eukaryotic and prokaryotic microorganisms under FIFRA. Other biocontrol agents are exempt because | Intentional introduction | http://www.epa.gov/pesticides/fifra.htm |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
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| | | | they are "adequately regulated" by another agency, I.E. USDA-APHIS) | | |
| Dept. of Agriculture/APHIS and AMS | Federal Seed Act (1939) | Requires accurate labeling and purity standards for seeds in commerce<br><br>Prohibits importation and movement of adulterated or misbranded seeds | Seeds | Intentional introduction through trade | |
| All | National Environmental Policy Act (1970) | Requires federal government agencies to consider the environmental effects of their actions through preparation of environmental impact statements (or environmental assessments to determine whether a full EIS is required). Effects of non-native species, if harmful to the environment, must be included in the EIS | Non-native species posing harm to the environment | Intentional introductions related to major federal actions | http://es.epa.gov/oeca/ofa/nepa.html |
| Dept. of Interior | Convention on International Trade in Endangered Species (CITES) (1975) | Represents alternate model for regulating invasive species not already covered by the IPPC or other agreements. Convention intended to prevent harm in *exporting* country; however, can be applied when species is endangered in exporting country and considered an invasive in importing country. | Species of flora and fauna which are threatened or endangered in exporting countries (Appendices I, II and III) | Intentional introductions through trade: export, re-export, import and introduction from the sea | http://international.fws.gov/global/citestxt.html<br><br>(For appendices, see: http://international.fws.gov/global/cites.html) |

# Appendix F Federal Laws Addressing ANS

| Department/Agency | Authority | Provisions | Organisms Addressed | Pathways/Means of Transport Addressed | Web Site |
|---|---|---|---|---|---|
| Dept. of Interior | Wild Bird Conservation Act (1992) | Regulates importation of foreign wild birds | Birds<br>Non-native parasites and diseases transported by foreign birds | Importation | http://international.fws.gov/global/law102.html |
| -Dept. of Interior/FWS<br>-Dept. of Commerce/NMFS | Endangered Species Act | Protects endangered species<br><br>When non-native invasive species threaten endangered species, this act could be used as basis for their eradication | Non-native species posing a danger to local endangered species | Not specified | http://endangered.fws.gov/esa.html |
| All | Executive Order 13112 (Feb. 1999) | Defines invasive species ("any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem")<br><br>Directs all federal agencies to:<br>-Address invasive species concerns<br>-Refrain from actions likely to increase invasive species problems<br><br>Creates interagency Invasive Species Council<br><br>Calls for National Invasive Species Management Plan to better coordinate federal agency efforts | | Unintentional and intentional introductions: escape, release | www.Invasivespecies.gov |

## Appendix G: Public Comments

The Oregon Aquatic Nuisance Species Management Plan was available for public comment for a 60 day period which ended April 25th, 2001. A press release was issued to all local and regional news sources, followed by an email to all steering committee members that requested them to post information relating to the public comment period. The press release was posted on the PNW ANS Listserve, and the Oregon Chapter of the American Fisheries Society website following a presentation at the annual conference.

The press release led to a news piece on Oregon Public Broadcasting and an article in the Oregon State Marine Board's "Underway" newsletter that was mailed to 165,000 registered boaters.

The public comments that were received are included in this appendix. The response to the comments is incorporated with each individual public comment.

**Email received from Kevin Aitkin on 4/30/01**

Erik

Thank you for the opportunity to review the "Oregon Aquatic Nuisance Species Management Plan." The plan is well organized and very informative. Your development of an ANS Management Classification scheme to address the prioritization of exotic species impacts is a good alternative to a priority species list. I also found Appendix D: Federal Laws Addressing Aquatic Nuisance Species to be very informative and a much needed addition to all state plans, a similar table addressing state laws would also be useful. Below are additional comments on the plan.

Page 14 (Federal and Regional Authorities and Activities) and page 66 (Appendix D)- You may want to add Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR 3853, January 17, 2001) which was signed by President Clinton on January 10, 2001. Section 3 (e) states: Pursuant to its MOU, each agency shall, to the extent permitted by law and subject to the availability of appropriations and with Administration budgetary limits, and in harmony with agency missions: (10) within the scope of its statutorily-designated authorities, control the import, export, and establishment in the wild of live exotic animals and plants that may be harmful to migratory bird resources." A copy of the executive order can be found at (http://www.nara.gov/fedreg/eo2001c.html).

Page 18 (U.S. Fish and Wildlife Service) – Add the following: The U.S. Fish and Wildlife Service also provides federal funding for implementation of state and regional ANS management plans which have been approved by the ANS Task Force.

Page 43 (Implementation Table) – **U.S. Fish and Wildlife Service (USFWS)** needs to be added to the "Agency Abbreviations" section of the table.

Page 49 (Glossary) – You may want to consider some of the bioinvasion terms in Shafland and Lewis (1984) when completing the glossary.

(Shafland, P.L., and W.M. Lewis. 1984. Terminology associated with introduced organisms. Fisheries 9 (4): 17-18.)

Page 53 (appendix A1, A2, and B) – I would suggest listing animals and plants in taxonomic order rather than alphabetic order in all tables.

Nonnative and nonindigenous are spelled two different ways (one word or hyphenated) throughout the draft plan. I believe that the accepted spelling of those terms is as one word and the following references should support this. "Nonindigenous" is spelled as one word in the title and glossary of the *Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990*. It continues to be spelled as one word in the glossary of the *National Invasive Species Act of 1996*. The one word spelling of both terms is also used in *Nonindigenous Fishes Introduced into Inland Waters of the United States* by Fuller, Nico, and Williams (1999). Both terms are spelled as one word in the 2001 version of the *Merriam-Webster's Collegiate Dictionary* found as (http://www.mw.com/home.htm). The ninth edition of *The Gregg Reference Manual*

(2001), a writing and editing manual, states “In general, do not use a hyphen to set off a prefix at the beginning of a word or a suffix at the end of a word.”

**Response to Kevin Aitkin’s comments**:

The corrections and additions suggested were incorporated into the plan, except for the addition of more bioinvasion terms and the listing of species taxanomically. No new bioinvasion terms were added to the glossary due to inconsistency on how these terms are used and applied. Instead, a task was added to the plan that will have the Invasive Species Council develop a list of terms and definitions that can be used consistently in Oregon.

The species lists were left in alphabetical order to faciliate their use by the general public. While it would be proper to list species taxonomically, the plan was developed for a larger audience then the scientific community, and they are likely to find an alphabetical list, by common name, easier to use.

## Email received from Anne Jennings on 4/24/01

Erik Hanson and Mark Sytsma;
I had an opportunity to look over the ANS Management Plan as I am quite interested in the topic after working on an estuary management contract with the PNCERS program offices (and delving into invasive species in PNW estuaries).

I've attached a document with suggestions for a slightly different ANS management classification system (table) than what appears in the final draft. It would allow species classification by: (1) whether or not it is established in Oregon, (2) whether or not there are significant known impacts (ecological or economic) and (3) whether or not control/eradication methods are known. The definitions are clear and flexible - as the 'status' or classification changes so does the action.

Good luck.

Sincerely, Anne Jennings

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ANS Management Plan (Comments)
Management Classification
Anne Jennings

| Management Classification | Description | Management Action |
|---|---|---|
| **1** | ANS: Established, known significant impact/potential for impact | Priority |
| 1A | Management/control/eradication methods known | Control / eradication |
| 1B | Management/control/eradication methods not known or not proven | Intensive control / eradication research |
| **2** | ANS: Not established, known significant impact/potential for impact | Priority |
| 2A | Management/control/eradication methods known | Prevention, Intensive monitoring, eradication of pioneer populations |
| 2B | Management/control/eradication methods not known or not proven | Intensive monitoring, Control / eradication research |
| **3** | ANS: Established, no significant impacts/potential for impact known | - |
| 3A | Management/control/eradication methods known | Population control, Monitoring, Dispersal prevention |
| 3B | Management/control/eradication methods not known or not proven | Monitoring, research |
| **4** | ANS: Not established or reported in Oregon, no significant impacts/potential for impact known | - |
| 4A | Management/control/eradication methods known | Monitoring |
| 4B | Management/control/eradication methods not known or not proven | Monitoring |

Anne Jennings, ANS Classification (Comments)

Response to Anne Jenning's comments:

The proposed classification system led to the splitting of Management Class 3 into two classes. To be consistent with the Washington State ANS Plan classification system subdivision of management classes was not included. The management actions described are included in the description of the four management classes. A more detailed assessment of management actions for subclasses could be included when Task 1A12 is implemented.

Email received from Bill Wallace on 4/23/01

Erik

A few observations on your draft ANS management plan:

I like the way the mission statement recognizes the importance of not "exporting" ANS from Oregon.

In the management classification system, Class 3 includes species at opposite ends of the spectrum: those that are in OR, but which you can't do much about (at least so far); and those not in OR, but of uncertain or little threat. The need for and objectives of further research would seem to be different for these types. Should there be a Class 4?

Appendix D lists a number of USDA-APHIS authorities, several of which have been superseded by the Plant Protection Act, which is also listed. If you e-mail me your fax number, I'll fax you a marked up copy of the list.

Bill Wallace
ANS Task

**Response to Bill Wallace's comments:**

Corrections were made to Appendix D and Management Class 3 was split into two classes.