



2015 REPORT TO THE LEGISLATURE

Washington State Aquatic Invasive Species Prevention and Enforcement Program

January 2015



Washington
Department of
**FISH and
WILDLIFE**



Table of Contents

Introduction	1
Highlights of 2011-13 biennium.	1
Priority species: Zebra and quagga mussels	2
Program overview: 2011-13 biennium	3
Regional partners work together to combat AIS	5
Watercraft inspections	6
Mandatory watercraft AIS checkstations	6
Integrated boater safety/AIS inspections.	7
State Patrol ports of entry inspections	7
Requested inspections	7
Boater surveys.	8
General law enforcement watercraft patrol.	8
WDFW ‘emphasis’ patrols	8
Watercraft analysis	9
Rapid response	10
Infested site management	12
Zebra/quagga mussel early detection monitoring	13
Education and outreach	14
Recommendations	15

Mission Statement

The Washington Department of Fish and Wildlife’s Aquatic Invasive Species Prevention and Enforcement Program (AIS program) serves Washington’s citizens by protecting, restoring and enhancing fish and wildlife and their habitats, while providing sustainable and wildlife-related recreational and commercial opportunities. The AIS program supports this goal by working to prevent the introduction of new AIS and controlling or eradicating established AIS populations.



**STOP AQUATIC
HITCHHIKERS!™**
www.protectyourwaters.net

Introduction

In recent decades, the spread of aquatic invasive species (AIS) has become a growing concern in Washington state, the nation, and throughout the world. Many of these AIS – notably zebra and quagga mussels – can inflict serious damage on native fish populations, the aquatic environment, and public infrastructure such as dams and irrigation systems.

A 2010 report by the Independent Economic Analysis Board prepared at the request of the Northwest Power and Conservation Council concluded that an infestation of zebra or quagga mussels in the Columbia River drainage system could cost hundreds of millions of dollars a year in damages and mitigation.

In 2005, state lawmakers established the Aquatic Invasive Species Prevention and Enforcement Program (AIS program) to “prevent the introduction or spread of these aquatic invasive species into our state waters.” This report describes the actions taken – and challenges faced – by the state’s AIS program to meet that mandate during the 2011-13 biennium.

The AIS program is administered through a cooperative agreement between the Washington Department of Fish and Wildlife (WDFW) and the Washington State Patrol. Creation of the AIS program consolidated and formalized the AIS work the department had been conducting since 1998, and is now codified under Chapter 77.135 RCW. The current program is funded primarily through a \$2 fee on annual recreational watercraft registrations. Of that amount, \$1.50 supports prevention actions and \$0.50 supports enforcement actions under the AIS program.

To meet its legislative mandate, the program partners with a number of state and regional AIS-prevention organizations, including the Washington Invasive Species Council, the national Aquatic Nuisance Species Task Force’s Western Regional Panel, the 100th Meridian Initiative’s Columbia River Basin Team, and the Pacific Northwest Economic Region alliance.

Since 2007, WDFW has reported to the Legislature on the status of the AIS program every biennium, as historically required under RCW 43.43.400(4) and RCW 77.12.879(4). This report for the 2011-13 biennium, is posted on the department’s website at <http://wdfw.wa.gov/ais/>.



Quagga mussels encrust a pipe after three months’ growth.

Highlights of 2011-13 biennium

- Watercraft inspections:** The AIS team inspected more than 27,373 watercraft for aquatic invasive species during the biennium. Of that number, 83 were found to be carrying aquatic invasive species – including 19 with zebra and quagga mussels. All those watercraft were decontaminated. As in previous years, no zebra or quagga mussels were detected in Washington waters during the 2011-13 biennium.
- Tsunami debris:** On June 15, 2012, members of WDFW’s AIS team responded to reports of a boat at Long Beach that was ultimately found to have 30 non-native marine species aboard. The 21-foot skiff was the first of dozens of pieces of debris – ranging from barnacle-encrusted floats to a 65-foot dock – to reach the Washington coast after a 9.0-magnitude earthquake and resulting tsunami devastated the eastern coast of Japan in March 2011. Under the multi-agency Washington State Marine Debris Response Plan, the AIS team had the primary responsibility for assessing and controlling risks from invasive species that washed ashore with the tsunami debris.
- New Zealand mudsnails:** The AIS team investigated and documented six new infestations of these invasive mudsnails – five in King County and one in Clark County. In each case, the team organized stakeholder meetings with agencies, tribes, and other concerned parties to determine how best to contain – and potentially eradicate – those infestations. Previously the only confirmed infestations in Washington state were at the mouth of the Columbia River and in Olympia’s Capitol Lake.

Priority species: Zebra and quagga mussels

While the AIS program addresses a variety of invasive aquatic animal species, none have received more attention in recent years than zebra mussels (*Dreissena polymorpha*) and quagga mussels (*D. rostriformis bugensis*). These related species – jointly referenced in this report as zebra/quagga mussels – have not yet been detected in Washington state, but currently pose the greatest risks for the state’s aquatic resources and economy.

That was the conclusion of a risk assessment conducted in 2009 by the Washington Invasive Species Council (WISC), which rated the invasive risks posed by 50 terrestrial and aquatic invasive species and the chance of stopping them from becoming established in state waters. New Zealand mudsnails, European green crabs, marine tunicates, and several other AIS also ranked high in that equation. (See WISC priority ratings at (<http://www.invasivespecies.wa.gov/priorities.shtml>.)

Zebra/quagga mussels are small freshwater shellfish, native to the Black, Caspian and Azov seas of Eurasia. Both species are extraordinarily resilient, adaptable, and prolific colonizers, which have spread throughout Europe and Great Britain since the mid-18th century. In 1988, they were discovered in the Great Lakes and quickly spread to most states east of the Mississippi River. In 2007, zebra/quagga mussels expanded west and north, infesting the waters of five western states and the Canadian provinces of Quebec, Ontario, and Manitoba.

Although no colonies have yet been detected in the Columbia River Basin or other waters of the Pacific Northwest, the incursion of zebra/quagga mussels into other western states greatly increases the risk they will be introduced into state waters. Once established, these aquatic invaders multiply quickly, making eradication next to impossible if the infestation is not controlled rapidly and aggressively.

Ecological impacts

As filter feeders, zebra/quagga mussels remove food and nutrients from the water column, eventually leaving little or no food sources for other native aquatic mollusc, insect, food fish, or juvenile fish species. Higher water quality allows more aquatic plant production at deeper levels and selective plankton feeding has created huge toxic algae blooms. This can have devastating consequences for fish, wildlife and entire ecosystems. In the Great Lakes, colonization of these mussels has led to catastrophic shifts in water quality and the aquatic food chain that have decimated many native species

and resulted in the collapse of historic commercial and recreational fisheries.

These mussels can also host pathogens and parasites known to harm native species. One example is viral hemorrhagic septicemia-IVb (VHS), a virulent pathogen known to affect at least 42 species of freshwater fish, including salmonids. The sharp shells of zebra/quagga mussels could pose a risk to threatened salmon stocks if they had to migrate through infested fish ladders and juvenile fish bypass facilities. De-scaling and abrasions can lead to lethal infections, the spread of harmful contagions and non-lethal injuries to large numbers of fish, affecting long-term survival and reproductive potential.

Economic impacts

Management costs have soared in states with zebra/quagga mussel infestations, particularly for industrial and municipal water users. These species can clog pipes and equipment, impairing water diversion, distribution, and hydropower operations. Industry mitigation costs to keep pipes and waterways open would then be passed on to consumers in higher electrical and food costs. According to some estimates, efforts to contain and control an infestation in Washington could cost hundreds of millions of dollars a year.

The Columbia River Basin remains one of the last major watersheds in the continental United States without known populations of either mussel species. Given the number of hydroelectric facilities within the basin, managers are extremely concerned that a zebra/quagga mussel infestation could obstruct their ability to supply relatively low-cost energy to the region. Farmers, irrigators, and water suppliers are equally concerned about infestations clogging water pipes and interrupting the flow of low-cost water in the region.

Social/human health impacts

Zebra/quagga mussels also take a toll on water quality, public recreation and property values in infested areas. Their sharp shells can create a safety risk on beaches, and can damage recreational watercraft and add to the maintenance costs for marinas, parks, and aids to navigation.

Large infestations have also caused die-offs of other species, fouling the water, causing noxious odors and creating massive accumulations of shells on beaches. They can also contribute to toxic algae blooms by concentrating contaminants, then dispersing them into the environment at elevated levels through their waste.



Zebra mussel

Program overview: 2011-13 biennium

By the start of the 2011-2013 biennium, Washington state’s AIS program had made steady progress in developing a proactive system to keep aquatic invasive species out of state waters. Since 2005, when the state Legislature approved comprehensive new laws targeting zebra/quagga mussels, the program had aligned its resources to intercept those species on the land and on the water. As a first line of defense, the program had progressively increased watercraft inspections – including mandatory check stations – to prevent zebra/quagga and other AIS from reaching state waters. The program also made public education a top priority, spreading the national messages of “Stop Aquatic Hitchhikers” and “Clean, Drain, and Dry” to a growing audience of boaters, law enforcement agencies and others around the state.

New management challenges

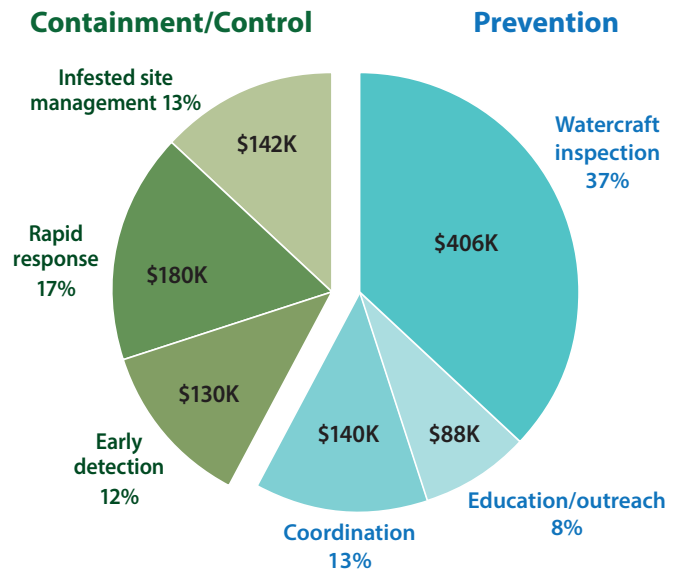
Moving into the 2011-13 biennium, program managers were determined to maintain the previous years’ momentum in all these areas, but encountered several new challenges:

- **Tsunami debris:** The devastating earthquake and tsunami that struck Japan on March 11, 2011, set into motion an unanticipated new threat to Washington state from AIS attached to tsunami debris. As the state’s primary responder for aquatic invasive species, the AIS program made dozens of trips to the coast to assess, decontaminate, and help remove tsunami-related debris that started washing up on the Washington coast in June 2012. This responsibility, established in the Washington State Marine Debris Response Plan, consumed more than \$100,000 of the program’s budget and hundreds of hours of staff time during the 2011-13 biennium.
- **New Zealand mudsnails:** New infestations in six creeks in western Washington signaled a significant new expansion of the species’ range since 2009, when mudsnails were found in Olympia’s Capitol Lake. While mudsnails pose different risks than zebra/quagga mussels, they can significantly degrade the aquatic environment, crowd out other freshwater species and threaten salmon recovery. Responding to these new infestations required additional commitments of program staff and funding.
- **Decline in funding:** As the program faced these new challenges, funding for AIS activities declined to the lowest level since the 2003-05 biennium. In fiscal year 2010, revenues from watercraft registrations dropped by more than \$130,000 from the previous year due to the lingering effects of the state’s economic recession, high fuel costs,

AIS Budget Distribution in 2011-13 Biennium

(WDFW and State Patrol)

\$1.086 million all funds



“Prevention” includes management activities designed to keep AIS out of Washington state. “Containment/Control” activities are designed to address current or potential AIS risks in-state.

and cost-cutting measures made in license-renewal notifications. Although revenue projections improved somewhat the following year, program allotments for the 2011-13 biennium were set \$130,000 below those in the previous biennium. Supplemental funding approved during the 2013 legislative session helped to address this shortfall, but not before AIS operations were reduced in fiscal year 2012 to compensate for the decline in revenues.

The economic recession also brought an end to a grant from the Puget Sound Partnership to address invasive marine tunicates after providing approximately \$150,000 each year since 2007. An annual AIS grant from the U.S. Fish and Wildlife Service also declined to \$27,500 per year, less than a quarter of the amount provided in the 2001-03 biennium.

Together, these developments put a strain on the AIS program’s basic operations during the 2011-13 biennium, requiring the program’s 2.25 permanent staff members to balance new and ongoing priorities. The result was a drop in mandatory watercraft inspections in 2012, constraints on AIS public outreach efforts, and the withdrawal of plans to address known tunicate infestations in Puget Sound. Long-

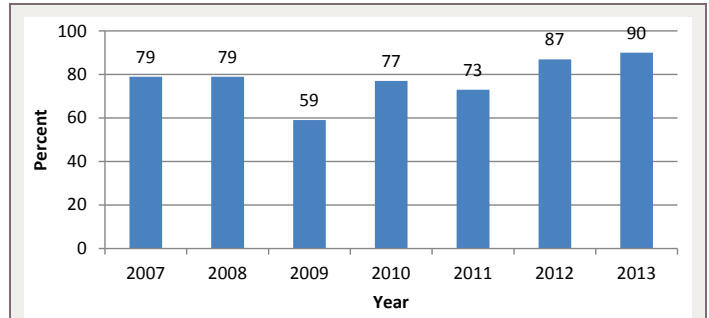
term monitoring of tsunami-debris sites and other high-risk AIS sites was also deferred, pending additional funding.

With help from a federal grant, mandatory watercraft inspections were restored to previous levels in 2013, but many other AIS priorities remained unfunded as the biennium came to a close.

Accomplishments

Despite these challenges, the AIS program intercepted 83 watercraft carrying aquatic invasive species, including 19 with zebra/quagga mussels. By the end of the biennium, there were still no known infestations of those species in the state. In addition, the program:

- Documented a steady increase in the number of boaters participating in watercraft inspections who reported cleaning their vessels between uses.
- Examined, disinfected and removed dozens of pieces of tsunami debris, including a massive dock and 15 boats.
- Established “infested site” management actions for six new sites where New Zealand mudsnails were detected.
- For the first time, included AIS watercraft inspections conducted by WDFW Enforcement officers during their regular course of duties in annual reports.
- Provided AIS training to a variety of new groups and organizations, including the U.S.-Canada Border Patrol.

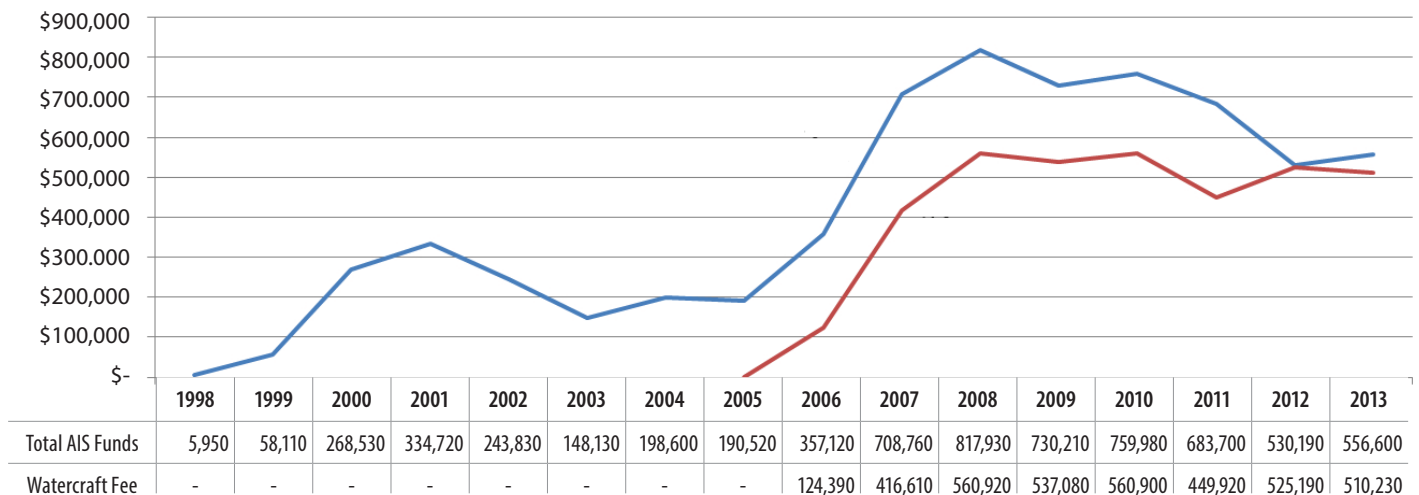


Boaters Clean Their Watercraft Between Uses

A top priority of the AIS program is to impress on boaters the critical importance of cleaning their watercraft between uses. In 2012, approximately 87% of all boaters involved in watercraft inspections said they follow this practice. In 2013, the number increased to 90%, continuing the favorable trend in previous years. To verify the validity of this data, the program plans to initiate a system of cross-checking boaters’ responses to the condition of their watercraft.

In 2013, the AIS program also welcomed legislative approval of a new requirement, now under RCW 77.135.100, that requires anyone entering Washington by road and transporting a boat or other aquatic conveyance that has been used outside state to have documentation that it is free of aquatic invasive species. The Legislature and Governor also approved penalties for anyone who does not comply with this requirement, along with a \$10,000 budget proviso to fund a new “Watercraft Passport” stamp booklet as one potential method of providing proof of required watercraft inspections.

AIS Prevention and Enforcement Funding: Fiscal Years 1998-2013



The chart shows the total AIS funding (blue line) since the AIS program began and the proportion of the total provided by the watercraft fee (red line).



AIS staff work with members of the Quinault Indian Nation to decontaminate and remove a boat that washed up as tsunami debris.

Regional partners work together to combat AIS

Regional planning has played an essential role in Washington's strategy to combat AIS since 1998, when the Legislature established the Zebra Mussel and European Green Crab Task Force. Recognizing that aquatic invasive species know no boundaries, the AIS program has been a partner in many regional partnerships dedicated to building a system of cooperative management and regulatory consistency.

Key partners include the national Aquatic Nuisance Species Task Force's Western Regional Panel (WRP), the 100th Meridian Initiative's Columbia River Basin (CRB) Team, and most recently, the Pacific Northwest Economic Region (PNWER) alliance.

These partnerships bring together regional state and federal regulators, tribes and local governments, as well as affected economic and environmental interests.

Working together, these partners have created an information network and developed protocols to prepare for a joint response to a major AIS infestation. In October 2011 and April 2013, AIS representatives from WDFW helped to organize and participated in table-top training exercises on zebra/quagga mussel detection conducted by the interagency group.

These exercises focused on testing the incident command system, refining rapid-response protocols, and developing strategies to incorporate the resources and concerns of stakeholder groups in the event of an infestation.

Milestones in regional planning efforts in recent years include:

- **2008** – The CRB Team's "Columbia River Basin Interagency Invasive Species Rapid Response Plan" signed by the governors of Washington, Oregon, Idaho, Montana; U.S. Fish and Wildlife Service; the Columbia River Inter-Tribal Fish Commission; and the Premier of British Columbia.
- **2009** – WRP's "Quagga-Zebra Mussel Action Plan" identifying \$30 million in high priority actions recommended for federal funding.
- **2010** – The "Economic Risk Associated with the Potential Establishment of Zebra and Quagga Mussels in the Columbia River Basin" report produced by the state Independent Economic Advisory Board at the request of CRB Team partners at the NW Power and Conservation Council.
- **2013** – The CRB Team's "Northwest Defense Against Mussels Declaration of Cooperation" letter signed by 26 state, federal, international, tribal and local agencies, as well as representatives of industry (hydro, irrigation, utility) and academic institutions.
- **2014** – WRP's "Preventing the Spread of Aquatic Invasive Species by Recreational Boats: Model Legislative Provisions & Guidance to Promote Reciprocity among State Watercraft Inspection and Decontamination Programs" report.
- **2014** – PNWER's "Zebra/Quagga Perimeter Defense Initiative" that includes legislative representatives, economic interests, and regional AIS regulators from Washington, Oregon, Idaho, Montana, Alaska, and the Canadian provinces of British Columbia, Saskatchewan, and Alberta.

Watercraft inspections

Watercraft inspections are on the front line of Washington’s efforts to keep aquatic invasive species out of state waters. In calendar years 2012-13, AIS field staff inspected a total of 27,373 watercraft, including 83 found to be carrying AIS and decontaminated. Nineteen of those boats were carrying zebra/quagga mussels. Besides intercepting these aquatic invaders, check stations played a key role in raising boat owners’ awareness about the importance of cleaning their watercraft.

Prior to 2008, watercraft inspections were conducted by AIS program non-enforcement staff at boat launches during the high-use boating months in spring and summer. That changed with the Legislature’s adoption of ESSB 5699, which allowed the program to establish mandatory check stations and imposed a recreational boat registration fee to support expanded AIS watercraft inspections.

During the 2011-13 biennium, the AIS program conducted six different types of watercraft inspections, ranging from mandatory check stations to voluntary visual inspections conducted by WDFW Enforcement officers during their regular course of duty. Enforcement officers began reporting these visual inspections for the first time in 2012. Meanwhile, the number of mandatory inspections declined significantly that year, as discussed in the next section.

Inspections are documented by calendar year to avoid splitting data collected during the peak summer boating seasons between two fiscal years.



WDFW Enforcement officers inspect a watercraft at a mandatory check station at a Lake Washington boat ramp.

Mandatory watercraft AIS check stations

Mandatory watercraft AIS check stations are considered the cornerstone of the AIS program. Under state law (now RCW 77.135.120), anyone transporting watercraft must stop and allow the watercraft to be inspected for the presence of AIS whenever check stations are posted as open. In 2012-13, these inspections were generally conducted by WDFW Enforcement officers and one AIS program non-enforcement staff member at each check station.

During those two years, the AIS program conducted a total of 1,474 mandatory watercraft inspections. Of that number, 41 were found to have AIS aboard, including one with a possible infestation of zebra mussels. All were decontaminated.

After four years of steady growth in mandatory check stations, the program conducted just 411 mandatory watercraft inspections in 2012, the lowest number since 2008. This was primarily due to funding limitations noted in the previous section and a structural change in the management of the check stations. Starting in 2012, administration of the mandatory check stations was decentralized, requiring a new level of coordination among WDFW’s six regional offices.

In 2013, the number of mandatory inspections rebounded to 1,063, slightly surpassing the previous record of 1,040 in 2011. By then, the regional administrative system was in place and the program’s biennial funding levels – while still a concern – were better known. The increase in check stations was also supported by the U.S. Fish and Wildlife Service, which provided a one-time grant of \$20,000 to reduce the risk posed by vessels leaving Lake Mead and other infested waters in the Southwest.

Mandatory Watercraft Inspections

Type	2012	2013
Mandatory Check Station	411	1,063
WA State Patrol	43	11
<i>Total</i>	<i>454</i>	<i>1,074</i>

Voluntary Watercraft Inspections

Type	2012	2013
Boater Survey	64	17
Integrated Safety/AIS	533	541
Requested	9	17
WDFW General Law Enforcement	12,086	12,578
<i>Total</i>	<i>12,692</i>	<i>13,153</i>

Integrated boater safety/AIS inspections

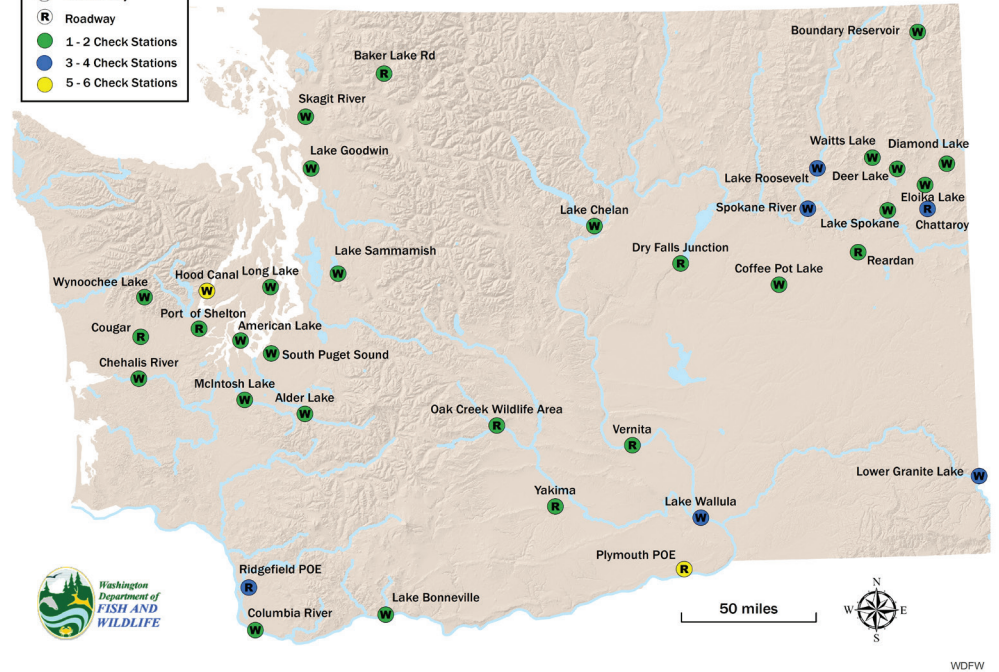
In 2008, WDFW Enforcement officers also started checking for AIS while conducting watercraft safety inspections at boat launches and on the water. Boater participation in the AIS portion of these inspections, which are conducted year-round, is voluntary. A combined boating safety and AIS watercraft inspection form allows officers to conduct both types of inspections simultaneously, documenting a watercraft’s residency, maintenance habits, and movements.

During integrated boater safety/AIS inspections conducted in calendar years 2012-13, WDFW officers inspected a total of 1,074 watercraft and detected AIS aboard 15 of them.

Legend

- W Water Body
- R Roadway
- 1 - 2 Check Stations
- 3 - 4 Check Stations
- 5 - 6 Check Stations

Mandatory Check Stations, 2012-13



State Patrol ports of entry inspections

The Washington State Patrol (WSP) inspects watercraft – primarily oversized commercially hauled vessels – at “port of entry” weigh stations year around. These weigh stations are located in Spokane, Cle Elum, Ridgefield, Blaine and Plymouth on key interstate highways – all likely entry points for AIS transported from out of state.

WSP inspected 54 watercraft in 2012-13 and found 16 carrying AIS, including 13 carrying zebra/quagga mussels. Because commercial haulers often lack knowledge of where the boats they are transporting on contract have last been used, data gathered on the boats’ residency, maintenance habits and movements was limited.

Requested inspections

The public can request a free watercraft inspection any time of the year by calling a toll-free AIS hotline access number (1-888-933-9247). These requests are often made by boat owners who want to make sure their watercraft are free of AIS before transporting them out of state. Neighboring states also call to alert the program of watercraft destined for Washington state that are suspected of being contaminated with AIS.

In 2012-13, AIS program staff inspected 26 watercraft by request and found that 11 had AIS aboard. Six of those vessels were contaminated with zebra/quagga mussels. Data gathered from the inspections include the watercraft’s residency, maintenance habits, and movements.

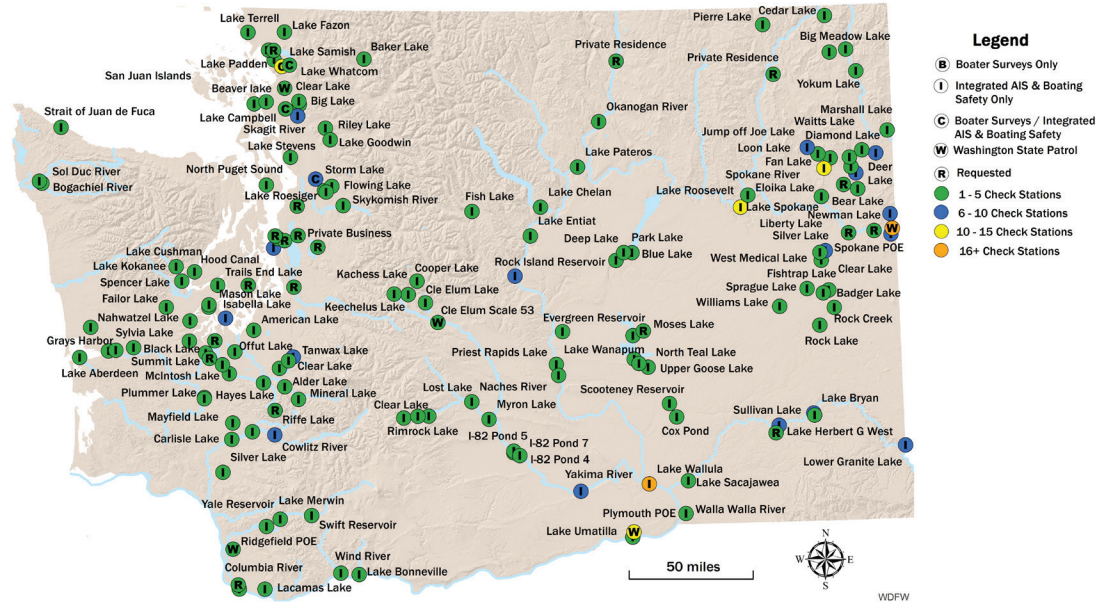


An AIS-infested boat is decontaminated in Spokane using a hot-water pressure washer.

Non-Mandatory Check Stations, 2012-13

Boater surveys

AIS program staff conduct voluntary boater surveys during the high-use watercraft season to assess the residency, maintenance habits, and movements of boats at recreational boat launches. During these surveys, boat owners are also asked to participate in a voluntary inspection of their watercraft. In 2012-13, staff inspected 81 boats, but detected no AIS aboard.



General law enforcement watercraft patrol

For nearly a decade, WDFW Enforcement officers have routinely checked watercraft they encounter for AIS during the course of their regular duties. In 2012, for the first time, officers began reporting those contacts as a component of the department’s overall AIS watercraft inspection program. In 2012-13, they performed 24,664 visual watercraft inspections, accounting for a majority of the total number of voluntary inspections conducted during those two years.

These visual inspections are conducted in the field, typically on low-risk vessels that have not recently been used outside the state. While less thorough than those conducted at mandatory check stations, they do provide a broad sampling of potential risks and a key opportunity to engage boaters on the importance of cleaning their watercraft.

When officers detect AIS aboard watercraft, they generally report their findings on watercraft inspection or integrated safety/AIS inspection forms.

WDFW ‘emphasis’ patrols

In addition to watercraft inspections, WDFW Enforcement officers periodically conduct “emphasis” patrols to target specific AIS risks. These patrols, under the direction of the Deputy Chief of Enforcement, serve to not only enforce the state’s AIS laws but also to educate the public about AIS and change illegal behavior.

In 2012, WDFW Enforcement conducted a year-long emphasis patrol designed to break up the illegal importation of crayfish in northwest Washington. After observing shipments of live crayfish banned under state law, the WDFW Marine Division organized emphasis patrols to investigate the importation of prohibited species by

food establishments. Multiple inspections were made of commercial shipping facilities as well as restaurants in Snohomish, King and Pierce counties.

Several restaurants and commercial shippers were found to be in violation of state law, and several shipments of crayfish were seized and either destroyed or returned to the state of origin. Business owners received warnings and information about how to come into compliance.

Officers followed up almost a year later and found compliance levels greatly improved, although one store was still importing prohibited crayfish and refused to cooperate



Illegal crayfish seized during a WDFW emphasis patrol.

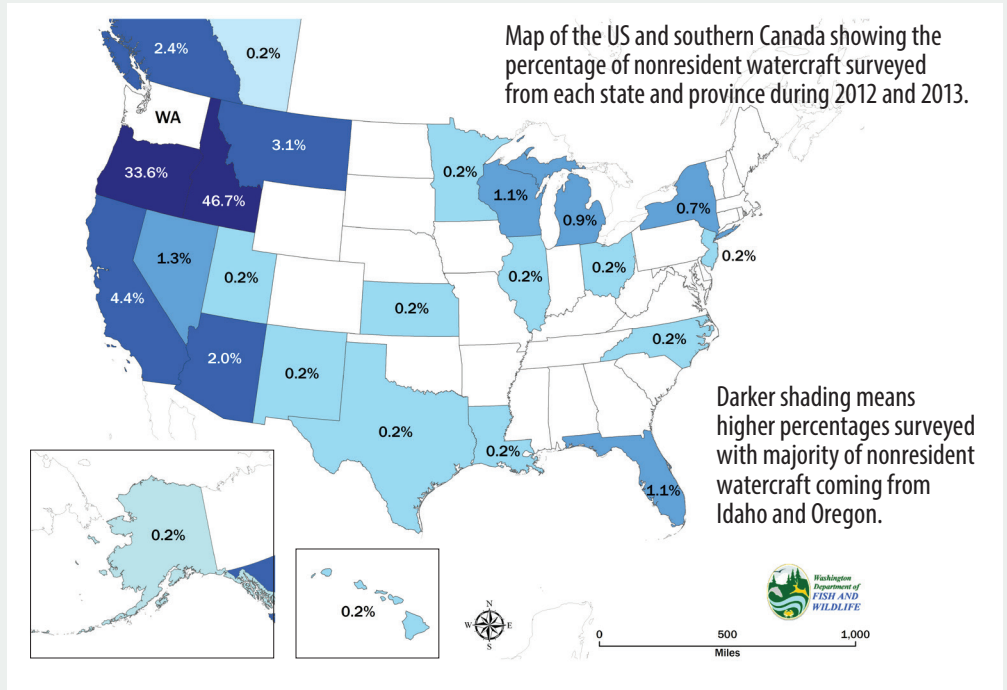
during the follow-up inspection. Felony charges were filed against the owner, who was convicted of violating state law, fined \$3,000, and sentenced to a day in jail.

Watercraft analysis

Aquatic invasive species can enter Washington’s waters through a variety of pathways, hitchhiking on everything from seaplanes and ocean-going tankers to outdoor gear and pets’ fur. However, none of these vectors presents a greater risk than the overland transport of watercraft into – and within – the state.

To better understand those risks, the AIS program collected data on all watercraft inspected in 2012-13, except those checked during general law enforcement patrols. That data documents the residency, movements and maintenance habits of the 2,709 watercraft inspected at 180 unique sites. Findings include:

- 457 watercraft (17%) were registered outside the state of Washington.
- Nonresident watercraft were registered in 22 states, 14 of which have infestations of zebra/quagga mussels.
- 10 of those states – plus two Canadian provinces – are located west of the continental divide.
- While half of the nonresident watercraft came from states east of the continental divide, they comprised only 5% percent of the total number of those inspected.
- 8 percent of the total number of watercraft inspected was registered in Arizona, California, Nevada and Utah, all known to have infestations of quagga/zebra mussels.



Inspections link watercraft to waters with zebra/quagga mussels

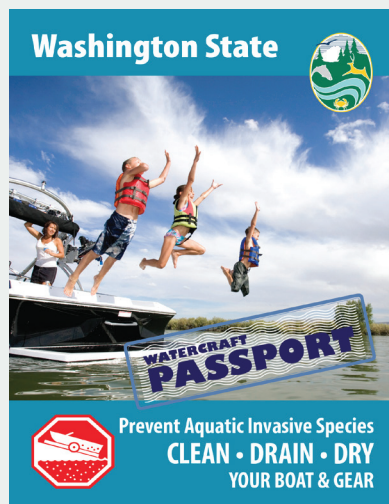
Of the 2,709 watercraft inspections, 253 provided information on the last water body visited outside of Washington state.

The top five were:

- Lake Coeur d’ Alene, ID (41)
- Priest Lake, ID (36)
- Willamette River OR (26)
- Lake Pend Oreille ID (14)
- Lake Mead, NV (10)

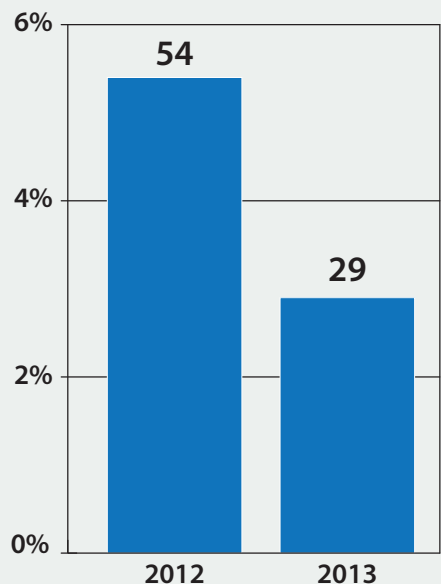
Nine of the 71 lakes last visited by the 253 watercraft for which data is available are known to have zebra/quagga mussels. They are:

- Lake Erie OH
- Lake Minnetonka, MN
- Lake Havasu AZ
- Lake Pleasant, AZ
- Lake of Ozarks, MO
- Lake Powell, AZ
- Lake Mead, NV
- Lake St. Claire, MI
- Lake Michigan, MI



Information about the new Watercraft Passport is available at <http://wdfw.wa.gov/ais/>

Watercraft contaminated by AIS (Number and % of boats per year)



Rapid response

When an inspection at a check station turns up aquatic invasive species on a boat or trailer, the AIS program implements a rapid-response action to assess and decontaminate infested waters or equipment used in those waters. During the 2011-13 biennium, the program also scrambled to contain dozens of pieces of infested tsunami debris, six new infestations of New Zealand mudsnails, and other AIS risks ranging from nutria to green crab.

The goal of rapid response is to hit a newly discovered infestation hard and fast to verify species identification, assess risk, and eliminate or minimize potential damage before AIS can be spread or become established. To support this effort, the AIS program has procured eight 140-degree power-wash units that meet regional scientific standards for zebra/quagga mussel decontamination. A hand-pushed decontamination kit is available at each of the department's six regional offices, and two larger self-contained trailered



Five striped beakfish were found alive aboard a 20-foot boat that drifted 4,000 miles from Japan to the Washington coast after the Tohoku earthquake in 2011.

units are stationed in both Spokane and Olympia.

Each unit contains equipment and personal protective gear required to safely conduct decontaminations. AIS program staff conduct regional training

to teach WDFW Enforcement officers and other personnel how to use the equipment properly.

The AIS program had plenty of opportunities to use power washers and other equipment during rapid-



Rapid-response workers inspect a 65-foot-dock, the largest piece of tsunami debris to reach the Washington coast in the 2011-13 biennium.

response actions in the 2011-13 biennium:

- **Tsunami debris:** Under the Washington State Marine Debris Response Plan, WDFW's AIS program has the primary responsibility for assessing and controlling risks posed by invasive species washing ashore on debris from the tsunami that struck the Japanese coast in March 2011. Starting in June 2012, AIS program staff made dozens of rapid-response trips to the Washington coast to investigate and dispose of debris ranging from fishing floats to a 65-foot concrete dock.

Weighing nearly 200 tons, the dock made landfall during a winter storm on a remote beach in the Olympic National Park wilderness area, where more than 95% of the organisms aboard were washed off and into surrounding waters. More than 400 pounds of non-native plants and animals – including shellfish, marine worms and seaweed, still aboard the dock were removed before the hulk was cut into pieces by a contractor and hauled away. WDFW is seeking funding for a long-term monitoring plan to determine whether any of the species became established in that area. The work of assessing and decontaminating tsunami debris was still an ongoing responsibility as the biennium came to an end in mid-2013.

- **New Zealand mudsnails:** Before 2011, the only confirmed infestations of New Zealand mudsnails in Washington state were at the mouth of the Columbia River and Capitol Lake in Olympia. Over the next two years, AIS program staff investigated new infestations in six creeks – five in King County and one in Clark County. In each case, the team worked with local governments and other stakeholders to evaluate rapid response options to control – and potentially



AIS species encountered during the biennium include nutria, red swamp crayfish and a flowerhorn cichlid.

To report aquatic invasive species and tsunami debris, call 1-888-933-9247 or visit WDFW's website at <http://wdfw.wa.gov/ais/reporting/>.

eradicate – those colonies. Mature mudsnails, averaging an eighth of an inch long, multiply quickly and can dominate aquatic ecosystems, displacing native species. Once established in a river or lake, mudsnails are difficult and costly to remove without damaging the aquatic habitat.

- **Responses to other AIS reports:** WDFW also responded to reports of various other types of aquatic invasive species. The department received 28 reports of nutria – the most of any species

– during the biennium. All of those reports were from western Washington. AIS staff determined that none of those cases posed a significant risk to transportation or agricultural infrastructure, and referred the reporting parties to WDFW's website (wdfw.wa.gov/living/nutria.html) for advice on managing nutria. AIS program staff also set traps for green crab after one was reportedly sighted at the Port Ludlow Marina, but none were detected. Several exotic fish, including a flowerhorn cichlid (*Amphilophus spp.*) and a pacu (*Colossoma spp.*) were found swimming in state waters and euthanized.

The public can report observations of aquatic invasive species and tsunami debris on WDFW's website (<http://wdfw.wa.gov/ais/reporting/>), or by calling toll-free at 1-888-933-9247.

Infested site management

When rapid-response actions fail to eradicate an AIS infestation, the program develops a long-term strategy to contain, control, and – ideally – eliminate it. This approach, called “infested site management,” typically involves monitoring the infestation and testing various treatments before pursuing the most effective action.

The AIS program employed this strategy at two sites during the 2011-13 biennium, while also adding several more infested sites to the list of those requiring long-term attention.

New Zealand mudsnails at Capitol Lake

Capitol Lake in Olympia has been closed to boating and other public recreation since 2009, when New Zealand mudsnails were first detected in the lower basin. In the winter of 2010, the AIS program made two efforts to end the infestation in coordination with lake managers at the Department of Enterprise Services and other stakeholders. The first involved lowering the water level during below freezing temperatures. The second approach involved back-flushing the lake with saltwater from Puget Sound.

The freeze experiment showed the best results, killing approximately 98% of the mudsnails wherever lake levels were low enough to expose them. Another freeze experiment was conducted in 2011 with similar results, and



New Zealand mudsnails on a gloved finger at Capitol Lake in Olympia.



A WDFW diver surfaces holding northern feather duster worms covered with tunicates (*Didemnum vexillum*).

has been repeated twice more since the close of the 2011-13 biennium.

However, new mudsnails infestations were found during that biennium in six creeks in other parts of western Washington. Five were in King County, including the northeast section of Lake Washington, and one was in Clark County. All six of those locations have been added to the program’s list of waters qualifying for infested site management.

Invasive tunicates at Dockton Park

In July 2007, a private citizen reported finding high densities of an invasive colonial tunicate *Didemnum vexillum* growing on the underside of the docks at Dockton Park on the west side of Maury Island in central Puget Sound. This species is one of three types of tunicates identified by the AIS program as highly invasive.

In January 2008, the program deployed SCUBA divers to physically remove the *D. vexillum* and dispose of them at an upland site. While this action was largely successful, annual surveys found small amounts of *D. vexillum* persisting at Dockton Park. Since then, the program has spent 1-2 days a year surveying and removing any *D. vexillum* present at Dockton Park. The program continued this annual maintenance in the 2011-13 biennium.

Dockton Park is one of 31 sites where the AIS program documented one or more invasive tunicate species of greatest concern in marine waters during the 2007-09 biennium. The AIS program did not actively pursue decontaminating those sites during the 2011-13 biennium, because funding from the Puget Sound Partnership for tunicate control ended in fiscal year 2011.

Zebra/quagga mussel early detection monitoring

A single female zebra or quagga mussel can produce 30,000 to 40,000 eggs in each reproductive cycle, and over one million each year. Since 2001, the AIS program has monitored high-risk lakes and rivers for free-swimming zebra/quagga larvae and recently settled juveniles for evidence of an infestation. To date, no sign of those species has been detected in state waters, although both juvenile and adult zebra/quagga mussels have been intercepted during watercraft inspections.

The two primary early detection monitoring methods used to detect zebra/quagga mussels are plankton tows and artificial substrates. Using these methods, AIS staff collected a total of 1,425 samples at 174 sites in 73 different water bodies during monitoring seasons (May to October) in 2012-13. Due to limited resources, most sites (110) were sampled only from one to five times during that period, with higher priority sites (53) sampled between 6 and 15 times, and highest priority sites (11) optimally sampled between 16 and 22 times.

Two other early detection monitoring methods used opportunistically during this period included scuba diving and shoreline surveys. Three seasonal AIS program staff were involved in those efforts, with assistance from the Spokane Tribe, Grant County PUD, Douglas County PUD, Chelan County PUD, the National Park Service, and the City of Everett.

Monitoring methods used during the biennium include:

- **Plankton net monitoring:** This method is designed to capture zebra/quagga mussels during their earliest life history stage as free-swimming larvae. Plankton are collected from the water column by towing a funnel-shaped net through the water horizontally for a distance of approximately 100 feet or vertically from the bottom to the surface. AIS program staff and partnering organizations collected 939 plankton samples over the two-year period. A private contractor analyzed plankton collected during 939 tows during this period.
- **Artificial substrate monitoring:** This method is designed to attract zebra/quagga mussels larvae as they search for a hard surface on which to settle. To lure them, four or more squares of gray-colored PVC are spaced horizontally on a weighted line to create a shelf-like artificial substrate, which is then suspended approximately one meter



A WDFW employee uses an artificial substrate to check for zebra/quagga mussels in Lake Washington.

from the bottom throughout the year. AIS program staff sampled artificial substrate sites 486 times during the two-year period, inspecting them visually and by touch for the presence of juvenile zebra/quagga mussels.

- **Scuba diving monitoring:** In 2012, two AIS program divers surveyed Lake Sammamish and Lake Whatcom in western Washington for adult zebra/quagga mussels. The divers made eight dives to a maximum depth of 105 feet in each of the two popular boating lakes.
- **Shoreline surveys:** AIS program staff examined two lakes in eastern Washington for zebra/quagga mussels during the 2011-13 biennium, taking advantage of low water levels that allowed them to conduct surveys along exposed shorelines. Banks Lake, a 27-mile long impoundment formed by Grand Coulee Dam, was surveyed during a planned draw-down. Curl Lake in Columbia County had been drained for maintenance dredging. When opportunities allow, shoreline surveys are a highly effective method of monitoring lakes for zebra/quagga mussels.

All of these early detection actions are designed to support a rapid response to any zebra/quagga mussels that find their way into state waters. They can greatly increase the likelihood of containing, controlling or eradicating an infestation, and can also help to facilitate mitigation if an infestation affects the environment, local economic interests, or human health.

Education and outreach

Public education and outreach play a central role in the program's efforts to prevent the introduction and spread of aquatic invasive species in Washington. As demonstrated elsewhere, success in achieving this goal will ultimately depend on public awareness of AIS and the precautionary actions boaters and others take to keep them out of state waters.

The primary objective of the program during the 2011-13 biennium was to spread the national messages "Stop Aquatic Hitchhikers" and "Clean, Drain, and Dry" to thousands of boaters through watercraft inspections, public presentations and online publications. AIS inspection and decontamination training is also an important program objective. Hundreds of officers from the Washington State Patrol and other law enforcement agencies received AIS training through the program during the course of the biennium.

Unfortunately, plans to further expand public outreach efforts during the 2011-13 biennium were restricted by funding constraints and other emergent responsibilities in the field, particularly tsunami debris. Despite those constraints, the program did reach out to many new groups and organizations, and hopes to do more during the next biennium.

Presentations and shows

AIS program staff gave dozens of educational presentations on AIS to various stakeholder groups, including federal, state, county and city agencies; public utility departments; marine trade associations; homeowner associations; fishing clubs; and schools. The program also staffed booths at various outdoor shows, including:

- Bighorn Outdoor Adventure Show
- Cabela's Captain's Weekend Great Outdoor Days
- Pacific Marine Expo
- Puyallup Sport Show
- Spokane Boat Show

Training for law enforcement officers

Law enforcement agencies are key partners in the state's fight against AIS, especially those with direct contact with the boating community. One WDFW Enforcement sergeant, who devotes half time to the AIS program, provides AIS training to officers from his own department, the Washington State Patrol's commercial vehicle division, and other jurisdictions.

Training sessions include information about federal and state AIS laws, basic AIS identification, the life history of zebra and quagga mussels, inspection techniques, and protocols to follow if AIS are detected during an inspection.



A WDFW Enforcement sergeant shows U.S. Customs and Border Protection officers where to look for AIS on watercraft.

During the 2011-13 biennium, the AIS program responded to a request to provide training for the U.S. Customs and Border Protection officers stationed at the Washington/British Columbia border crossing. AIS training was also included in the Basic Marine Law Enforcement Training for local police officers, including those representing city, county and tribal enforcement.

It is a long-term goal of the AIS program to form partnerships with other law enforcement agencies for enhanced and consistent statewide AIS protections.

Other outreach tools

The program also uses several other tools to involve the public in the effort to fight AIS through education and sharing of information.

- **AIS Hotline:** WDFW maintains a toll-free number (1-888-933-9247), which serves as the primary contact system for the public. By calling this number, the public can report AIS sightings, access information about the Boat Inspection Program and find out more information about AIS.
- **WDFW website:** The department's website (<http://wdfw.wa.gov/ais/>) also provides an AIS reporting portal, along with information about the AIS program, AIS identification, applicable laws, contact information for obtaining vessel inspections, and measures to reduce the spread of AIS. Both the website and the hotline receive regular traffic from citizens wishing to report AIS sightings or attain information on AIS including watercraft inspections.
- **Fishing pamphlet:** More than 600,000 people purchase a state recreational fishing license each year, and most receive a copy of WDFW's Sport Fishing Rules pamphlet. The pamphlet routinely includes ads displaying AIS information (including the hotline and website address) to a large segment of the recreational fishing population.

Recommendations

In 2005, state lawmakers enacted ESSB 5699, creating the most progressive state program for combatting aquatic invasive species in the western United States. That legislation established the state’s AIS program, the first mandatory watercraft inspections, and the first permanent source of revenue for AIS management west of the Mississippi River.

Citing the risks posed by zebra/quagga mussels and other AIS, the landmark legislation found that “preventing new introductions [of AIS] is significantly less expensive and causes far less ecological damage than trying to control new infestations.”

Consistent with those findings, the state AIS program has worked to expand prevention and enforcement efforts, such as watercraft inspections and public education, to keep aquatic invasive species from reaching state waters. It has also developed a multi-pronged response to AIS that do breach the state’s first line of defense.

In recent years, these efforts were bolstered by the approval of SSB 5702 in 2013 and ESSB 6040 in 2014, which granted the program strong and broad authority with regard to watercraft inspections, rapid response capabilities and infested site management. These provisions have since been incorporated into Chapter 77.135 RCW.

Unfortunately, state funding has not kept pace with the basic needs of the program, as was especially apparent during the 2011-13 biennium. Although Washington was the first western state to establish a permanent funding source to combat invasive species, other states have since committed far more to reducing their own risks and supporting regional prevention efforts.

WDFW estimates it would require a base budget of \$4 million per year to adequately support prevention, early detection, rapid response, infested site management, research, monitoring, and local management grant programs. While this would constitute a significant increase in the program’s current appropriation, it would be far less than the hundreds of millions of dollars it would cost the state and public each year if zebra/quagga mussels became infested in the Columbia River system.

The two recommendations that follow provide options for helping the state regain its leadership in the western United States on AIS issues:

AIS Budgets for Western States
(in millions)

State	FY 12 Budget
California	\$7.9
Colorado	\$3.9
Utah	\$1.7
Montana	\$1.5
Idaho	\$1.3
Wyoming	\$1.2
Nevada	\$0.8
Oregon	\$0.7
Washington	\$0.5

1. Support establishment of an aquatic invasive species funding task force under the Invasive Species Council in the Recreation and Conservation Office to provide funding recommendations to the 2017 Legislature.

A funding task force established by the Legislature is needed to address the complex political and logistical issues involved in finding new permanent funding for the program. The Invasive Species Council has the required experience and independence to coordinate the task force. The department believes that a task force can succeed where past efforts have failed over the last several biennia. The primary challenge is to develop a funding package that is supported by stakeholders as representing a fair share between those most likely to bring AIS into the state and water users who benefit from unfouled water supplies for outdoor recreation, power generation, irrigation and salmon recovery.

2. Support short-term funding for the 2015-17 biennium to improve education and outreach and increase the number of mandatory watercraft check stations; support the task force recommended above; and help guide the department on future AIS management strategies.

The department recommends a funding increase of at least \$800,000 in the 2015-17 biennium to address funding gaps, reduce current AIS risks, and set the program up for success in the future.

Mussel Beach



Zebra mussels encrust the shoreline of the El Dorado Reservoir, the first of more than a dozen waters in Kansas to become infested since 2003. Preventing this kind of infestation is the top priority of Washington state's Aquatic Invasive Species Prevention and Enforcement Program.

Photo by Jason Geockler

To request this information in an alternative format, please call
360-902-2349 or 360-902-2207 (TDD),
or submit a request through the WDFW website at:

wdfw.wa.gov/accessibility/reasonable_request.html



State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, 6th Floor • Olympia, WA 98501-1091
Main Office Location: Natural Resources Building • Olympia, WA