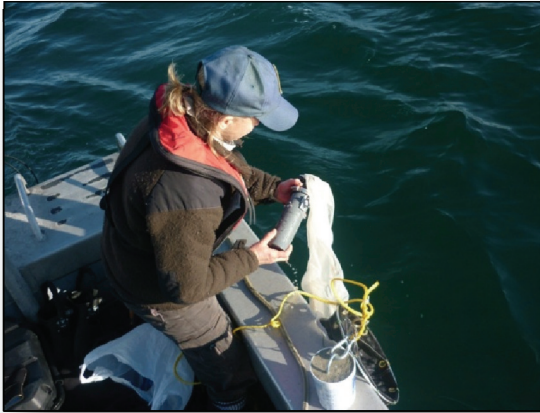


# Washington State Aquatic Invasive Species Prevention and Enforcement Program

## Report to the Legislature



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October 2010



*Formal Citation:*

Pleus, A., E. Anderson, J. Schultz, L. LeClair, and B. Balcom. 2010. Washington State Aquatic Invasive Species Prevention and Enforcement Program: Report to the Legislature. Washington Department of Fish and Wildlife and Washington State Patrol. Olympia. October 2010.

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*Cover: Clockwise from upper left – Scientific Technician Susan Reszczyński collecting plankton samples to look for zebra/quagga mussel veligers as part of early detection management (Photo Jesse Schultz); AIS Enforcement and biological staff conducting watercraft inspections at a check station (Photo Eric Anderson); Sgt Eric Anderson and Scientific Technician Michael Wilkinson decontaminating a watercraft in Spokane during media event (Photo Allen Pleus); Scientific Technician Michael Wilkinson inspecting a substrate settlement plate as part of early detection management.*

## EXECUTIVE SUMMARY

“The *Dreissena* [zebra and quagga mussels] is perhaps better fitted for dissemination by man and subsequent establishment than any other freshwater shell; the tenacity of life, unusually rapid propagation, the faculty of becoming attached by string byssus to extraneous substances and the power of adapting itself to strange and altogether artificial surroundings have combined to make it one of the most successful molluscan colonists in the world.”

(Kew, H.W. 1893)

The Washington Department of Fish and Wildlife (department) and the Washington State Patrol (WSP) continue to implement the legislative invasive species directives established since 1998. This report is submitted to the legislature for meeting the requirements of both Chapter 43.43.400(4) and 77.12.879(4) RCW and describes the challenges found and actions taken to implement the program. The program is primarily funded through dedicated fees on resident recreational watercraft as provided through ESSB 5699 (2005 c 464). The legislation established the Aquatic Invasive Species (AIS) Prevention and Enforcement Programs, which are managed by co-AIS coordinators in the department Fish and Enforcement divisions and in collaboration with the WSP enforcement liaison in the Commercial Vehicles Division. Although the AIS Prevention and Enforcement programs address many priority aquatic invasive species, the greatest focus has been on Zebra (*Dreissena polymorpha*) and Quagga (*Dreissena bugensis*) mussels.

The environmental, economic, and social/human health risks of zebra and quagga mussels can be catastrophic. Zebra and Quagga mussels are ecosystem changers that are continuing to completely alter the aquatic communities in the Great Lakes and other watersheds where they have become established. Health risks include contamination of water supplies, increased occurrences of blue-green and other toxic algae blooms, ability to concentrate contaminated sediments up to 300,000 times ambient levels and then disperse these into the food chain through direct consumption or through fecal matter, which has then killed wildlife and could sicken humans. They are also a freshwater bio-fouler that can quickly reduce or stop flows in hydro and water supply systems, plug water cooling systems in watercraft motors, and create physical hazards to fish and humans as their shells are capable of cutting skin.

A recently released report by the Independent Economic Advisory Board at the request of the Northwest Power and Conservation Council found that it is likely zebra and quagga mussels will eventually colonize some of the large rivers of the Columbia Basin, and that there is much value in delaying this result for as long as possible. Furthermore, there is a substantial economic risk in the hundreds of millions of dollars annually if these mussels become established in the Columbia Basin and that costs to mitigate for zebra or quagga mussels at hydropower facilities within this basin would be significantly greater than those incurred at other infested sites around the country due to their comprehensive fish passage facilities. They concluded that it would be a good economic investment to improve prevention programs to delay an infestation.

It is important to note that the Columbia River basin and the Pacific Northwest in general, are among the last large river or regional drainage basins in the continental United States that

remain free of zebra or quagga mussels. This is due to a combination of increasing prevention measures and luck. Within this area, the highest risk for introductions of zebra and quagga mussels and other aquatic invasive species is by hitchhiking on recreational and commercial watercraft that are being transported from other infested parts of the United States and Canada. There is also a growing threat of interstate transportation through ballast water if freshwater ports in California become infested and are transported to Columbia River ports.

Unfortunately, while the threat of zebra and quagga mussels and other aquatic invasive species increases, the resources to fight this threat have decreased over the past two years due to budget cuts and reductions in other revenue sources used to supplement this work. In addition, it has been recognized that limited regulatory authorities would not be sufficient to contain or eradicate a zebra or quagga mussel infestation if it happened today. Recommendations are provided for establishing the resources needed to address this critical threat.

The following is a brief summary of some AIS Prevention and Enforcement accomplishments that have occurred since the department's last report to the 2008 legislature.

Early detection actions: High-risk water bodies were annually surveyed statewide for juvenile and adult zebra and quagga mussels. During 2008-2009 alone, a total of 662 plankton tows (looking for free-floating juvenile stage of mussels) were conducted and 177 artificial substrates (looking for adult settling) were deployed at 234 sites throughout Washington. The sites were distributed over 108 different water bodies. To date, no zebra or quagga mussels have been detected. Projections for the number of water bodies that can be surveyed during the 2011-13 season will depend mostly on volunteer efforts as funding reductions will direct most actions to rapid response and watercraft inspections.

Rapid response actions: Twenty-two recreational watercraft have been intercepted in the state since 2006 with zebra, quagga, or other *Dreissena* mussels attached – all were decontaminated. Ten of these watercraft were carrying live mussels, eight were carrying mussels where it was not possible to determine if they were alive or dead, and four were carrying just the attached shells. An important lesson learned was that shells alone could trigger a rapid response watercraft decontamination or could trigger a large scale rapid response action if they were to drop off at a boat launch. Unfortunately, the ability to fully remove all shells from an infested watercraft is still problematic.

Watercraft inspection actions: Over 12,500 watercraft have been inspected since 2007 through boater surveys, integrated AIS/boater safety inspections, WSP Port of Entry weigh station inspections, and at mandatory AIS check stations. Of these, 22 were found to have zebra or quagga mussels (see above) and 200 watercraft were found to be infested with aquatic plants. Mandatory AIS check stations are staff-intensive, but provide very high direct and indirect value in watercraft owner appreciation for our state's efforts to prevent AIS introductions. Projections for the number of watercraft that can be inspected during the 2011-



13 season is likely to be reduced due to budget cuts. As a comparison, Idaho has a budget of \$1.3 million and was able to inspect 44,000 boats in 2010.

Nonresident watercraft analysis: Approximately 10% of all inspected watercraft were registered distributed over 24 other states and two provinces of Canada. Overall, Idaho contributed by far the largest proportion of nonresident registered watercraft (378), followed by Oregon (233), California (74), Arizona (36), British Columbia (22), Utah (13), and Montana (12). Of these, California, Arizona, and Utah have known established populations of zebra or quagga mussels. When nonresident watercraft owners were asked what water body they last used, the result was 85 different water bodies distributed over 13 states and two Canadian provinces. The ten most frequently visited were Coeur d' Alene Lake, ID (42); Willamette River, OR (18); Dworshak Reservoir, ID (18); Lake Mead, AZ/NV (16); Clear Lake, CA (15); Pend Oreille Lake, ID (12); California Delta, CA (11); Shasta Lake, CA (9); Lake Havasu, AZ/CA (9), and Clearwater River, ID (9). Of those ten water bodies, lakes Mead and Havasu are known to be contaminated with zebra and/or quagga mussels. The remaining 75 water bodies are distributed over eight states and two provinces of which seven of the states are known to harbor infestations of zebra and/or quagga mussels.

State and regional coordination: The department closely coordinates with the Washington Invasive Species Council, the Aquatic Nuisance Species Committee, the Columbia River Basin Team, and the Aquatic Nuisance Species Western Regional Panel to address state and regional issues. For example, a hypothetical detection of zebra mussels at the Two River's Marina at the mouth of the Spokane River was this year's annual table-top exercise for the Columbia River Basin Team's Interagency Invasive Species Rapid Response Plan. Participants on site included department planning and enforcement staff, the U.S. Fish and Wildlife Service, the Pacific States Marine Fisheries Commission, the U.S. Bureau of Reclamation, the Lake Roosevelt National Park Service, the U.S. Army Corps of Engineers, the Spokane Tribe of Indians, the Confederated Tribes of the Colville Reservation, the Upper Columbia United Tribes, the Columbia River Inter-Tribal Commission, the Washington Invasive Species Council, and representatives from the states of Idaho, Oregon, and Montana. The Washington Departments of Ecology and Agriculture provided real-time responses to chemical permit and use questions.



## RECOMMENDATIONS

Suggestions on how to better fulfill the intent of chapter 464, Laws of 2005 are provided herein as requested under RCW 77.12.879(4). These recommendations have been developed by the department in response to the information provided in this report and in consultation with the Washington Invasive Species Council and the Aquatic Nuisance Species Committee. Specific recommendations include:

### **1. Extend and fund the Invasive Species Council for at least an additional five years.**

The Washington State Invasive Species Council provides a critical policy forum for multi-agency coordination, strategic planning, and development of comprehensive actions to bring the full power of all agencies to bear on the challenge of invasive species. This work is not completed yet and needs more time to mature. One of the key roles the council is already positioned to accomplish is for ensuring cohesive and integrated management actions during a rapid response emergency.

### **2. Repeal the sunset date for the AIS Prevention and Enforcement resident watercraft registration fees.**

On June 30, 2012, the fee will sunset and with it the prevention and enforcement actions to keep zebra and quagga mussels out of the state. Continuation of the AIS Prevention and Enforcement Programs are essential for the prevention, early detection, and rapid response to the threats of zebra and quagga mussels and other AIS. The management of invasive species requires permanent funding sources or it will leave the state highly vulnerable to invasion. Therefore we recommend that the June 30, 2012 sunset date (2005 c 464 § 7) for the AIS Prevention and Enforcement accounts be removed from RCW 88.05.050 “Notes: Expiration date -- 2005 c 464 § 2.”

### **3. Enhance the Aquatic Invasive Species (AIS) Prevention and Enforcement Program role and authorities to meet the needs of the next 15 years.**

Almost fifteen years ago, the legislature passed the “Prevention and Control of Spread of Zebra Mussels and European Green Crab” ACT (1998 c 153). Since then, important new AIS legislation has been added, but in a piecemeal fashion that has been difficult to effectively implement. These statutes need to be consolidated into a comprehensive single chapter under Title 77 RCW and expanded to include invasive terrestrial animal species, anticipate new invasive species risks, and strengthened with authorities similar to those provided to other state natural resource agencies to combat invasive pests and noxious weeds.

### **4. Increase the AIS Prevention and Enforcement Account fees for resident watercraft registration.**

An increase in vessel registration fees is necessary to improve the level of protection necessary to prevent or rapidly respond to a zebra/quagga mussel or other AIS invasion such as the invasive tunicates found in the Puget Sound. As estimated by the Northwest Power and

Conservation Council's Independent Economic Advisory Board in July of this year, a zebra or quagga mussel invasion could cost hundreds of millions annually to manage and mitigate and that current efforts to prevent this threat are underfunded (see page 12 in the report). The current AIS fee of \$2 provides \$560,000 in annual funding (\$461,600 direct), whereas the total annual budget for an adequate prevention and enforcement program would require a substantial increase. Watercraft are one of the primary know pathways for the introduction and spread of aquatic invasive species and should bear a commensurate proportion of the funding. Cooperative funding agreements with the Washington State Patrol would be maintained.

**5. Add new AIS Prevention and Enforcement Program revenue sources based on other invasive species pathways.**

Additional new revenue sources are being investigated to help fund the department's invasive species programs to reach full rapid response and management capabilities. Review of options includes ensuring that fees reflect a fair share based on invasive risks and that fees are integrated into comprehensive one-stop or single-pay user fee groupings where possible.

**6. Establish a rapid response emergency fund.**

New revenue sources need to be identified to create a rapid response fund. Prevention can never be absolute and new species will become established or spread to new sites over time. Rapid response is the next most cost-effective management tool after prevention, is often talked about, but rarely funded and usually not very "rapid." As noted in this report, rapid response actions for addressing zebra or quagga mussels at an infested site would quickly require hundreds of thousands of dollars and could easily reach into the millions of dollars. Providing a ready reserve ensures that actions on the ground hit new infestations hard and fast, giving the best opportunity for containment and eradication.

**Washington State  
Aquatic Invasive Species  
Prevention and Enforcement Program  
Report to the Legislature**

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# **Washington State Aquatic Invasive Species Prevention and Enforcement Program**

## **Report to the Legislature**

### **1.0 Introduction**

This report is submitted to the legislature for meeting the requirements of both Chapter 43.43.400(4) and 77.12.879(4) RCW and describes the challenges found and actions taken to implement the program. The Aquatic Invasive Species (AIS) Prevention and Enforcement Programs are managed by co-AIS coordinators in the Washington Department of Fish and Wildlife's (department) Fish and Enforcement divisions and in collaboration with the Washington State Patrol's (WSP) enforcement liaison in the Commercial Vehicles Division. These efforts build on the priority legislative directives passed since 1998 (Appendix A).

The department and WSP serve 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 Prevention and Enforcement Program helps to meet this goal through the strategic objectives of preventing the introduction of new AIS and controlling or eradicating established AIS populations. The primary focus of this program has been management of zebra and quagga mussel species, with an emphasis on the risk posed by introduction and spread through recreational and commercial watercraft.

The report highlights how the department and WSP are evolving to meet this threat with the continued support of the state legislature. It provides the background, context, and accomplishments of the program in the past biennium and where we hope to take it in the next. Recommendations are provided in the front of the report on how to better fulfill the intent of this legislation.

### **1.1 Statewide Results and Key Indicators of Success**

The department and WSP recently incorporated the Governor's Priorities of Government (POG) system to determine AIS Prevention and Enforcement Program objectives and strategies to meet those objectives, and a results-based prioritization of all program activities. The program will be working over the next biennium to fully implement this approach.

In general, the program functions fit under the statewide result to "improve the quality of Washington's natural resources" and our two key indicators of success are:

- A. Prevent introduction of new aquatic invasive species; and
- B. Control or eradicate established populations of aquatic invasive species.

To achieve success, the program utilizes the POG five-strategy framework as a guide for its core missions including:

- Provide good science, data and monitoring.
- Establish safeguards and standards.
- Improve individual practices and choices.
- Preserve, maintain and restore natural systems and landscapes.
- Achieve sustainable use of public resources.

Over the next biennium, the program will use this process to identify gaps and to clearly link performance measures to the strategies and key indicators of success.

## **1.2 Current Status**

The AIS Prevention and Enforcement Program uses the Washington State Invasive Species Council’s invasive species management priorities list of the 50 “worst of the worst” to evaluate the effectiveness of our efforts in prevention and eradication (Appendix B). There are 14 aquatic animal invasive species on this list that the department is tasked with regulating.

### *1.2.1 Prevent the introduction of new AIS*

There are six priority animal AIS that do not have known established populations including: Zebra and Quagga mussels; VHS type IVb fish virus; Mitten crab; Asian marine clam; Asian carp (3 species); and snakehead fish (multiple species).

To date, no established populations of Zebra or Quagga mussels have been found in the state or entire Columbia River basin that incorporates the states of Oregon, Idaho, and Montana, and Canada; and, no new introductions were detected for the other five classifications/species.

### *1.2.2 Control or eradicate established populations of AIS*

There are eight listed priority species that have known established populations including: Nutria; tunicates (3 species); New Zealand Mudsnailed; European green crab; crayfish (2 species); bullfrog; VHS type IVa fish virus; and Atlantic salmon.

To date, control efforts on one species of tunicate (*Styela clava*) and for VHS Type IVa virus have been successful in keeping populations contained. There are no European green crab control or eradication projects currently in place, but populations appear to be stable and are not spreading. A long-term study of Atlantic salmon did not show any success for escaped hatchery or farm-raised species to cross-breed with native salmon or become established in the wild. There are also no nutria, New Zealand mud snail, crayfish, or bullfrog management projects currently in place and it is assumed they are increasing in population where established and spreading into new areas through natural and human pathways. More information on these activities can be found in the biennial Aquatic Nuisance Species Committee report to the 2010 legislature.

## 2.0 AIS Prevention and Enforcement Program Overview

Washington State's AIS Prevention and Enforcement Program is unique among western states in its integrated management and enforcement elements. Having dedicated and cross-trained department AIS enforcement staffing and coordination with the WSP have been critical to our success. The key statute directing the program is found in RCW 77.12.879 (Appendix C).

The department is tasked with targeting primarily AIS animals. All aquatic plants are regulated by the department when being transported over land because of their ability to contain AIS animals and to prevent further spread of AIS plants such as hydrilla (*Hydrilla verticillata*), milfoil (*Myriophyllum heterophyllum*), Brazilian elodea (*Egeria densa*), common reed (*Phragmites australis*), spartina (*Spartina sp.*) and caulerpa (*Caulerpa taxifolia*). AIS animals with the highest risk, such as zebra and quagga mussels, are classified by the department as "Deleterious Exotic Wildlife." "Prohibited Aquatic Animal Species" are the next level of classification and there are currently 34 taxonomic family levels and over 280 species on this list within amphibian, reptile, crustacean, fish, mammal, and mollusc classification categories.

The AIS Unit coordinates with other state and federal agencies, tribes, NGOs, and public and private stakeholders in the overall management of AIS. Three of the primary entities include the state's Aquatic Nuisance Species Committee<sup>1</sup>, the Invasive Species Council<sup>2</sup>, and the Columbia River Basin Team which is part of the national 100<sup>th</sup> Meridian Initiative.

### 2.1 AIS Budget

In 2005, the legislature passed ESSB 5699 that provided consistent funding to implement the AIS Prevention and Enforcement Program. This bill provided the department and WSP revenue through a \$2 fee (\$1.50 for a prevention account and \$0.50 for an enforcement account) on recreational watercraft registrations. FY07-09 biennium allocations were based on an expected 281,000 recreational watercraft registrations per year.

The budget reflects a very small percentage of the costs the state would incur if zebra or quagga mussels became established. Estimates of costs to mitigate for such an invasion are in the hundreds of millions of dollars annually, which would place additional burdens on state citizens in such forms as higher utility rates, higher food and water costs, loss of recreational opportunities, and the loss of our cherished natural resources. The tables below provide budget information for the past four fiscal years by appropriation fund and agency.

#### 2.1.1 WDFW AIS prevention account: Fund 09N

The AIS prevention account was established for use by the department to accomplish the legislative directives outlined in both ESSB 5699 and E2SSB 5923. Due to an error in the

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<sup>1</sup> RCW 77.60.130 [2000 c 149]

<sup>2</sup> ESSB 5385 [2006 c 152]

budget bill, access to the account was not available until ten months into FY06. Allocation for the remaining portion of FY06 and FY07 was set at \$528,000 (Table 1).

**Table 1.** AIS prevention account by fiscal year and spending authority, revenue, expenditure, and closing balance.

<b>Budget Item</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY05-09 Totals</b>
Spending Authority	528,000		842,000		<b>\$1,370,000</b>
Revenue	313,412	399,655	414,769	410,826	<b>\$1,538,662</b>
Expenditure	48,686	325,058	380,188	461,768	<b>\$1,215,700</b>
FY Close Balance	264,727	74,597	34,581	(50,942)	<b>\$322,963</b>

Positive variances in closing balances across the four year period are based on the late start in spending authority, normal start-up lag for a new program, and the need to keep a minimum reserve to cover low revenue months usually occurring during February and March. Based on the past four years of revenue experience, the department recommends that the legislature provide a one-year spending authority increase of \$150,000 for FY10 that will be used to enhance the program’s rapid response capacity while leaving a sufficient account reserve to cover the low revenue months.

*2.1.2 WDFW AIS enforcement account: Fund 09M*

The department formed an interagency contract in April of 2007 with WSP to establish the AIS Enforcement part of the program. The department total contract expenditure was \$100,469 and this is captured in the WSP AIS Enforcement account fund in the next section. In 2008, the legislature divided the AIS Enforcement accounts with the department receiving approximately 80 percent of the total revenue resulting in a spending allocation of \$204,000 for the FY2007-09 biennium (Table 2).

**Table 2.** AIS enforcement account for WDFW by fiscal year and spending authority, revenue, expenditure, and closing balance.

<b>Budget Item</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY06-09 Totals</b>
Spending Authority	0		\$204,000		<b>\$204,000</b>
Revenue	0	0	\$102,494	\$78,840	<b>\$181,334</b>
Expenditure	0	0	\$32,216	\$81,446	<b>\$113,681</b>
FY Close Balance	0	0	\$70,279	(\$2,626)	<b>\$67,653</b>

The positive variance in the FY08 closing balance is maintained to provide an account reserve to cover expenditures during the low revenue months.



2.1.3 WSP AIS enforcement account: Fund AQU8

The AIS Enforcement Account was originally established solely under WSP to accomplish the legislative directives outlined in RCW 43.43.400. In FY07, WSP determined they would not be able to spend their authority amount and contracted with the department to assist in meeting legislative tasks (Table 3).

**Table 3.** AIS enforcement account for WSP by fiscal year and spending authority, revenue, expenditure, and closing balance.

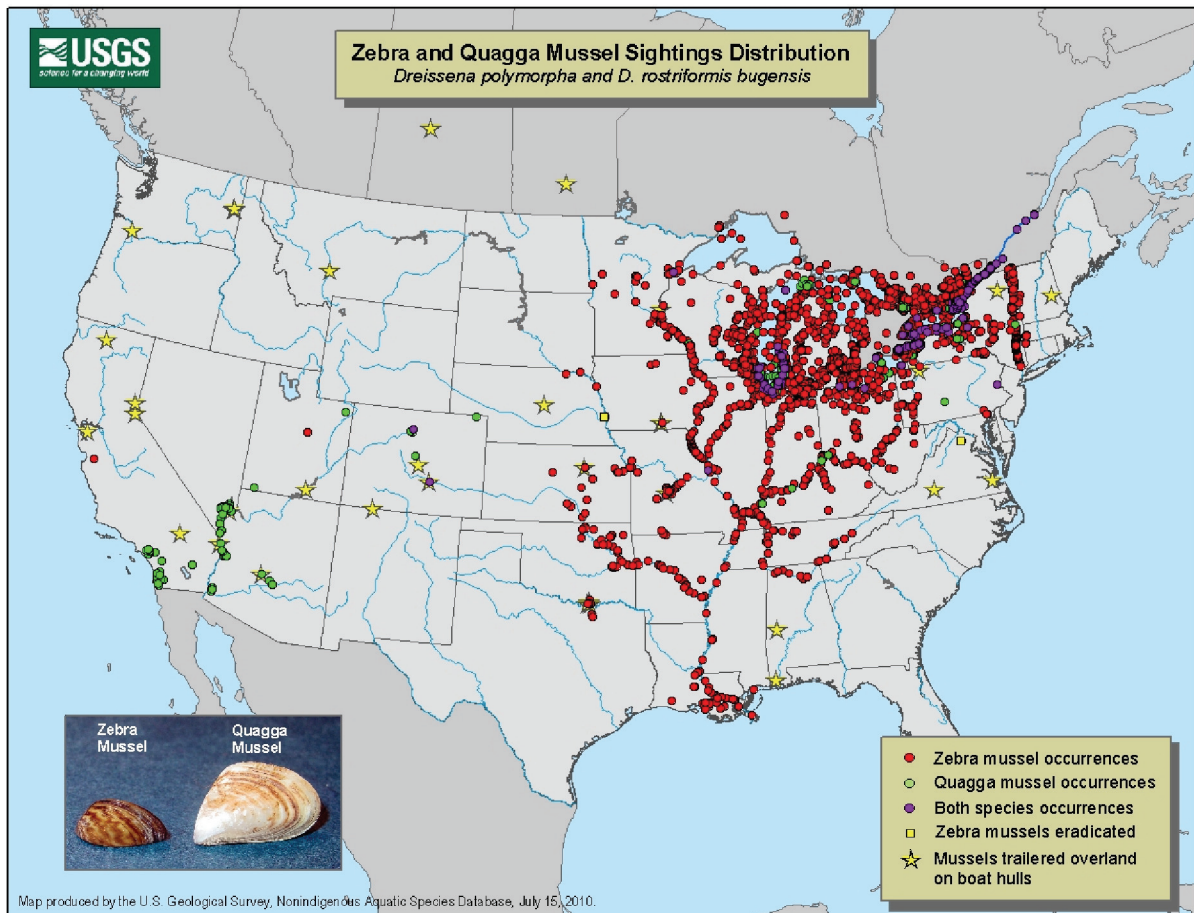
<b>Budget Item</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY06-09 Totals</b>
Spending Authority	\$145,000		\$54,000		<b>\$199,000</b>
Revenue	\$104,457	\$133,227	\$27,651	\$27,388	<b>\$292,724</b>
Expenditure	\$0	\$112,322	\$0	\$3,186	<b>\$115,508</b>
FY Close Balance	\$104,457	\$20,905	\$27,651	\$24,202	<b>\$177,215</b>

WSP expenditures in FY07 included \$11,753 for salaries and benefits for Port-of-Entry personnel and \$100,469 in a contract with the department. Expenditures in FY08 and FY09 totaled \$3,186.00 for salaries and benefits for Port of Entry personnel. In reviewing expenditures, it was determined that officers miscoded activity reports and Port of Entry staffing was below normal operating levels due to transfers and attrition. Combined, these two factors resulted in lower than anticipated expenses for this biennium.

## 2.2 Zebra and Quagga Mussel Invasive Risks

The Washington Invasive Species Council and the department's Aquatic Nuisance Species Committee consider Zebra (*Dreissena polymorpha*) and Quagga (*Dreissena bugensis*) mussels to be the highest risk invasive species threatening Washington State, both environmentally and economically. Significantly, the Columbia River Basin remains one of the last major watersheds in the continental United States that does not have a known established population.

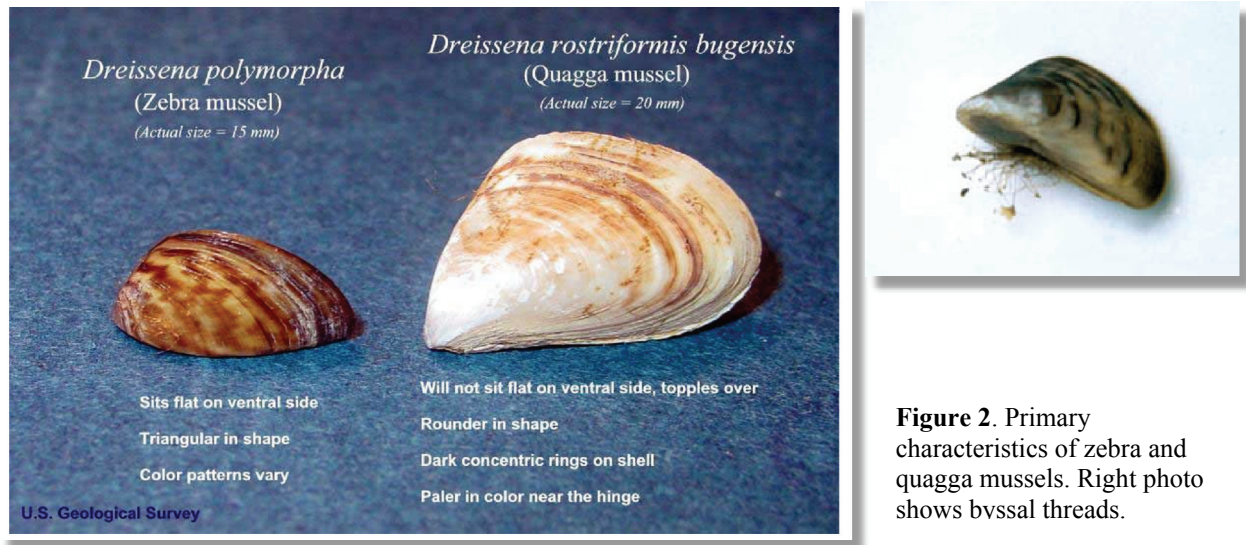
Zebra and quagga mussels are native to the Black, Caspian, and Azov Seas of Eurasia and records of this species date back to 1769. Since that time, zebra and quagga mussels have spread prolifically throughout Europe and Great Britain. In 1988, they were first discovered in the Great Lakes and have quickly spread to most states in the Eastern US. In 2007, the Western US began seeing an invasion that continues today and currently covers five states. This and subsequent invasion events have significantly increased the risk of these species being introduced into our waters as they now have established populations in 31 states. The invasion into Western states marks a significant jump that puts the mussels within a day's drive of our state (Figure 1).



**Figure 1.** Map of currently known established populations of zebra and quagga mussels. (Map courtesy of the U.S. Geological Services nonindigenous aquatic species database)

*Zebra and quagga mussel biology*

Zebra and quagga mussels are small shellfish named for the striped pattern of their shells (Figure 2). Color patterns can vary to the point of having only dark or light colored shells and no stripes. They are typically found attached to objects, surfaces, or each other by byssal threads underneath the shells. Although similar in appearance, the two species can usually be easily distinguished. When placed on a surface zebra mussels are stable on their flattened underside while quagga mussels, lacking a flat underside, will fall over.



Zebra and quagga mussels are an extraordinarily resilient, adaptable, and prolific species. The basic environmental characteristics of zebra and quagga mussels are provided in Table 4.

**Table 4.** General biological factors of zebra and quagga mussels and their optimum/common and range parameters.

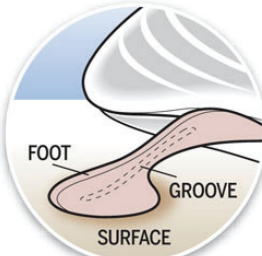
Factor <sup>3</sup>	Optimum/Common	Range
Mature size (cm)	2 - 3	<1 - 5
Longevity (years)	N/a	Up to 5
Density/m <sup>3</sup> surface area	40,000 - 100,000	1 - >750,000
Density/layer depth (cm)	N/a	1 - 30
Pipe dia clogging (m)	N/a	> 0.5
Sexually mature age (yrs)	2	> 0.5
Fecundity/year	N/a	0 - 1 million+ eggs
Reproductive process	-	Planktonic dispersal
Veliger stage (weeks)	2	1 - 5
Salinity tolerance (ppt)	0 - 5	0 - 35
Filter capacity (liters/day)	Varies by size	0 - 1
Temperature range (°C)	8 - 12	1 - 30
Depth (m)	2 - 7 (z)	0 - >70
Live out of water (weeks)	Varies by temp/humidity	2 - 3

<sup>3</sup> O’Neil and MacNeill 1991; Miller et al., 1992; Neumann et al, 1993; O’Neil 1996; Athearn 1999

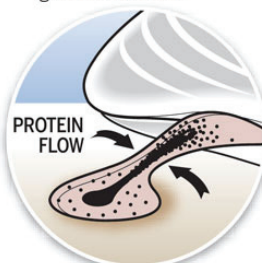
## The tough grip of a mussel

A mussel uses chemistry to produce an adhesive so strong it can cling to wet and slippery surfaces. Here's how the process works:

- 1 A mussel uses its foot to find a surface to stick to.



- 2 The mussel injects liquid protein along a groove in the foot.



- 3 When the protein reaches the surface, it hardens and becomes a link, known as a byssal thread, that will serve as an anchor.



- 4 The foot releases the thread and retreats. A mussel will repeat the process many times to reinforce its grip.



Sources: Phillip B. Messersmith, professor of biomedical engineering, materials science and engineering, and chemical and biological engineering, Northwestern University

DAVID ARBANAS/darbanas@journalsentinel.com

These include the information on mature size, longevity, density, age of sexual maturity, fecundity, veliger stage, salinity tolerance, temperature tolerance, and depths at which found. A little-known fact to most of the public is that juvenile and adult mussels can detach from one location, move at speeds of several cm/hr and reattach in a new location with better habitat.

The track record of zebra and quagga mussels in those infested states would equate it to a slow-motion economic/environmental Category 5 hurricane, with the damage below the water surface. The environmental characteristics of this species make its eradication unlikely if it is not aggressively dealt with at an early stage. Control and containment actions will cost billions over time and are usually not very effective on larger water bodies such as the Columbia River system.

### Ecological impacts

- As filter feeders, these species remove food and nutrients from the water column very efficiently, leaving less or nothing for native aquatic species – this could be a fatal blow for ESA listed aquatic species such as salmonids (Figure 3).
- They have the potential of collapsing entire food webs – they eat the zooplankton and phytoplankton at the bottom of the food chain.
- They can host pathogens and parasites that affect native species – see VHS virus below and a fungus *Batrachochytrium dendrobatidis* (“Chytrid” fungus) that can decimate amphibian populations.
- Shells in fish ladders and juvenile bypass facilities can de-scale or abrade fish that lead to lethal infections or permanent injury.

### Economic impacts

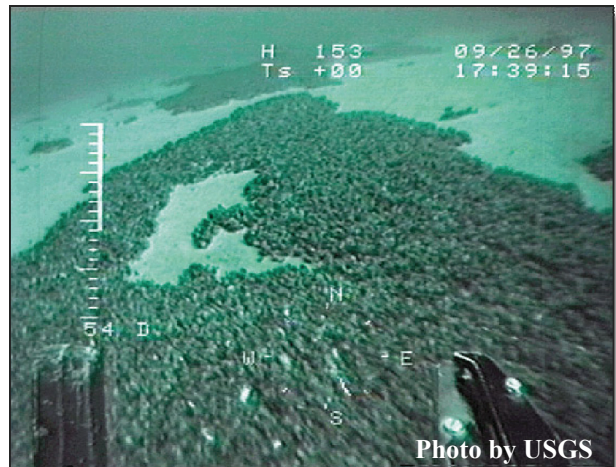
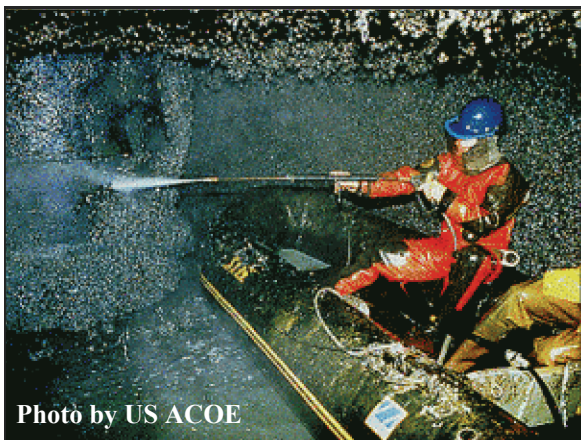
- Management costs are enormous, particularly for many industrial raw water users in Washington State like hydroelectric dams, irrigation districts, and water supply agencies (Figure 4 and case studies).
- These species clog pipes, ruin boat motors, and damage aquatic recreational equipment.
- Once established in a water body, expensive routine maintenance is necessary and perpetual.

### Social/human health impacts

- Cause interruptions and contamination of water supplies.
- Increases public costs for electricity, water, food, and recreation.

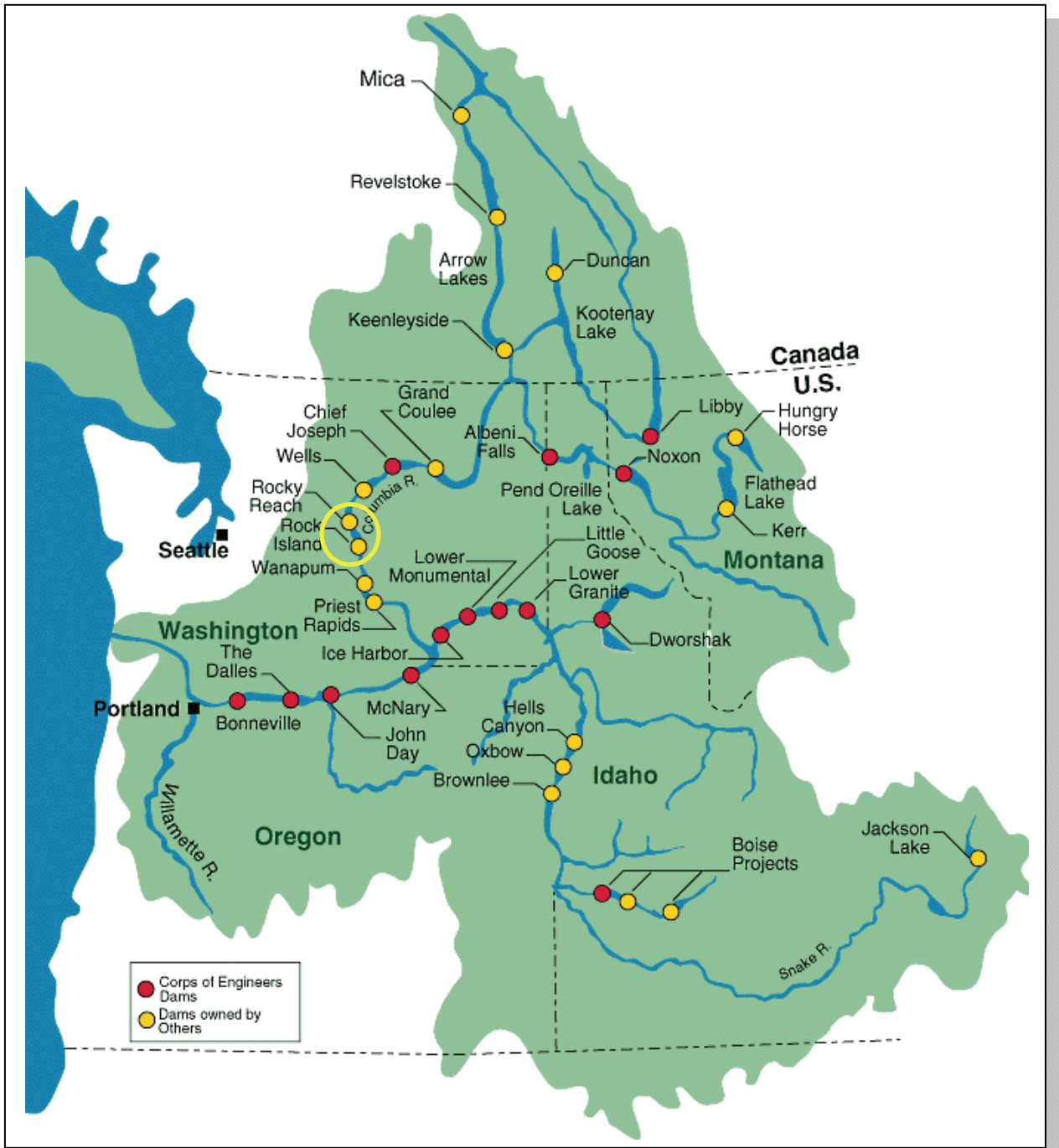


- Increase occurrences of blue-green and other toxic algae blooms.
- Concentrate contaminated sediments up to 300,000 times ambient levels and then disperse these into the food chain through direct consumption or through fecal matter.
- Shells in water and on beaches can cut feet and require closures.
- Die-offs can foul water and smell bad.
- Causes significant changes in recreational activities.



**Figure 3.** Clockwise from top: Infested lake in Kansas; Display showing 3-month growth of quagga mussels from Lake Mead in 2007. (Display by Wen Baldwin); USGS benthic survey in Great Lakes; Davis Dam water intake; and power wash removal to remove mussels.



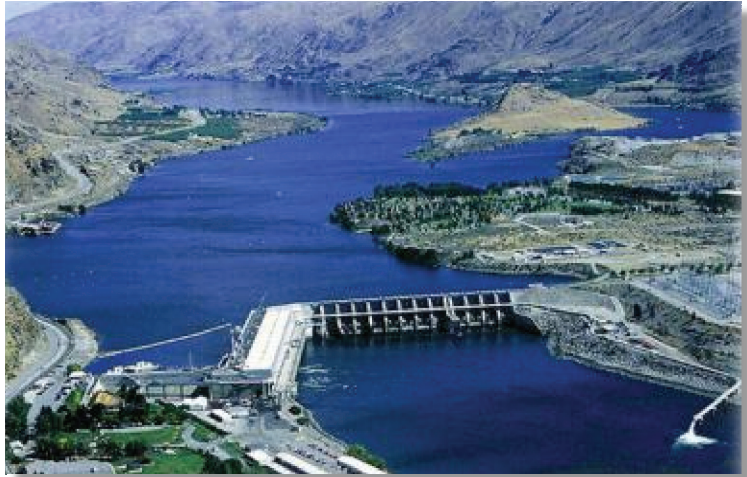


**Figure 4.** Map of the Columbia River Basin and associated hydro facilities that could be impacted by AIS. The Columbia River and its tributaries form the dominant water system in the Pacific Northwest Region. The main stem of the Columbia begins in Columbia Lake on the west slope of the Rocky Mountain Range in Canada. After flowing a circuitous path for about 1200 miles, 415 miles of which are in Canada, it joins the Pacific Ocean near Astoria, Oregon. The river drains an area of approximately 219,000 square miles in the States of Washington, Oregon, Idaho, Montana, Wyoming, Nevada, and Utah. An additional 39,500 square mile portion of the basin, or about 15%, is within Canada. Its largest tributary, the Snake, travels 1,038 miles from its source in Yellowstone National Park in Wyoming before joining the Columbia.

### **Case Study: Chelan County Public Utility District**

The Chelan County Public Utility District (PUD) operates three hydro projects that deliver clean, renewable, low-cost energy to local residents and to other utilities that serve 7 million residents of the Pacific Northwest. The projects include the Chelan Lake project, the Rock Island Project, the Rocky Reach Project, and hatcheries that support six species of salmon and steelhead.

To describe the potential impacts of zebra or quagga mussels to this system, Chelan PUD Hydro Engineering Manager Bill Christman focuses on the Rocky Reach project. He states that Rocky Reach is an “average-sized” hydro plant on the Columbia River (out of 6 PUDs and 9 federal facilities) that produces about 5.8 million megawatt hours of power per year. At an average \$35 per megawatt, this brings-in approximately \$203 million in annual regional value (i.e. power sold at cost to customers and utilities). Rocky Reach also has invested



in a state-of-the-art downstream juvenile fish bypass system and environmentally enhanced turbines. The enhanced turbines have increased both power generation and fish survival. Together with the bypass system, habitat improvements, and wild stock hatchery system, Chelan PUD has accomplished a “no net loss” status to fish.

A zebra or quagga mussel invasion would result in both reduced power production and increased fish injury and potential mortality. Costs to the Chelan PUD would be through loss of efficient power production (flow restrictions and increased turbulence), increased maintenance to remove or prevent encrustations, and loss of power production through spill mitigation to prevent fish injury and mortality. Assuming 3% efficiency loss, Mr. Christman estimated the average economic loss at Rocky Reach from reduced efficiency at \$6 million annually. Assuming a 1% fish survival loss, mitigation through spill could cost an additional \$22-42 million annually.



These are costs that would have to be passed on to consumers in increased rates.

In summary, Mr. Christman notes that the potential impact of invasive mussels on all the Pacific Northwest hydroelectric system is considerable. A simple extrapolation based on assumptions to the larger hydro plants would result in annual costs between \$420-720 million. He underscores that most hydroelectric project owners are now starting to proactively respond to this threat, but that the response for preventing introduction or stemming their proliferation once they have arrived must be stakeholder-wide to be effective.

## ***Case Study: Independent Economic Advisory Board Report***

At the request of the Northwest Power and Conservation Council, the Independent Economic Advisory Board completed a report titled “Economic Risk Associated with the Potential Establishment of Zebra and Quagga Mussels in the Columbia River Basin” on July 14 of 2010. Major findings of the report include:

1. It is likely that zebra and quagga mussels will eventually colonize some of the large rivers of the Columbia Basin and there is much value in delaying this result for as long as possible;
2. There is a substantial economic risk in the hundreds of millions of dollars annually if these mussels become established in the Columbia Basin;
3. Risks assessed in the report are only related to the Columbia River Power System and the Fish and Wildlife Program – it does not include potential economic effects on water supply systems for irrigation and drinking water, reductions in recreational opportunities, or effects on other statewide resources;
4. Costs to mitigate for zebra or quagga mussels at hydropower facilities would be significantly greater than those incurred at other infested sites around the country such as Ontario and Lake Mead due to our comprehensive fish passage facilities;
5. There would be significant mitigation costs and likely significant mortalities to both adult and juvenile salmonids from infestations in fish passages, juvenile fish screens and bypass systems, and hatchery monitoring and cleaning costs;
6. It appears that existing prevention programs are underfunded and it would be a good economic investment to improve prevention programs to delay an infestation; and
7. Prevention efforts should focus on watercraft pathways, but not exclude other possible pathways such as contaminated equipment, small boats that are not trailered, fishing equipment, or hobby aquariums.



Fish ladder at John Day dam. USACE photo

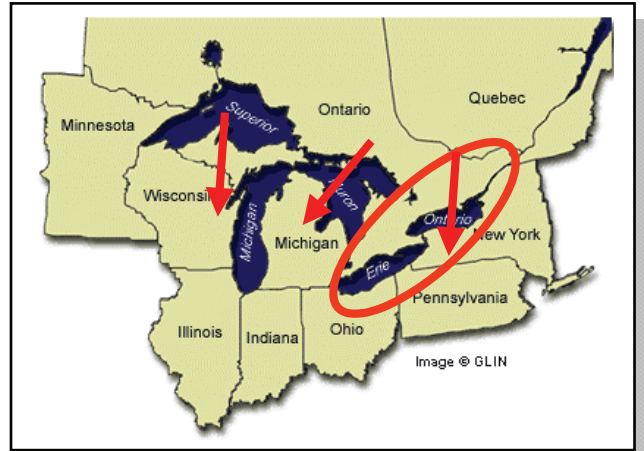


Juvenile fish bypass system at Rocky Reach dam. Chelan PUD photo



## 2.3 VHS Type IVb Virus Invasive Risks

The *viral hemorrhagic septicemia-IVb* (VHS) virus is a very potent fish pathogen and is known to affect at least 42 species of freshwater fish, including salmonids, causing massive fish die-offs. It is a different strain from the west coast version (VHS-IVa) that seems to prefer marine water species of fish. This strain also appears more virulent to wildstock fish as identified in 2006<sup>4</sup> when it started to cause widespread fish kills in Lake Erie and Lake Saint Claire of the Great Lakes. It appears to be spreading rapidly



through multiple pathways, although it is currently limited to the Great Lakes and a few associated lakes (Figure 5).

Figure 5. Map of current known distribution of VHS IVb virus. (Image courtesy of Winton, USGS.)

This is a new strain and more research is being conducted. There are no known treatments. It has been reported that *Dreissena* and frozen or live bait may be host pathways for the spread of VHS. It has the ability to survive freezing and can survive up to 49 days in cold (4<sup>0</sup>C) freshwater and 14 days in cold (4<sup>0</sup>C) saltwater. This makes it likely to survive a trip in the undrained bait well or other cavity of a recreational boat coming from that region. Establishment of this new VHS virus strain in Washington waters could devastate recreational and commercial fisheries.

## 2.4 AIS Pathway Management

Invasive species are opportunistic and may be introduced by one pathway, then continue to be spread by other pathways. Zebra and quagga mussels were first introduced into the Great Lakes in the early 1980's from ballast water on trans-oceanic vessels conducting trade in the Black Sea. In the Great Lakes region, ballast water continues to be a significant threat for spreading these mussels, but their spread to inland lakes and streams has primarily been from infested recreational and commercial watercraft. This section provides an overview of known and suspected pathways for the spread of AIS.

### 2.4.1 Overland transportation of recreational and commercial watercraft

The overland transportation of recreational and commercial watercraft into and within Washington State poses the highest risk for AIS introduction and spread as documented in the scientific literature and as managed by every state working to prevent the further spread of zebra and quagga mussels (Appendix D). This risk continues to grow with an increasingly mobile boating public, a growing fish tournament industry, availability of inexpensive used

<sup>4</sup> Elsayed et al. 2006

watercraft that are being sold from infested states and transported into or through our state, the ability of AIS to remain viable for weeks out of their original habitat, and new invasions being identified in Western states. Types of AIS capable of hitching a ride on watercraft transported overland include:

- AIS - animals: Animal AIS other than zebra and quagga mussels that may be transported on watercraft include the spiny water flea, fish hook water flea, New Zealand Mudsnail, crayfish, and other crustaceans or molluscs at any life stage.
- AIS - plants: All aquatic plants are prohibited on transported recreational and commercial watercraft. It is difficult to identify animal AIS or plant seeds/spores/rhizomes that may be hitchhiking in native vegetation. We also want to prevent the transportation of native species outside their local Washington State range.
- AIS - protista: It is suspected that watercraft are pathways for marine and freshwater algae, and diatoms such as *Didymosphenia geminata* (a.k.a., “Rock Snot”). These could be contained in fish wells and other water holding areas on the watercraft or on attached aquatic vegetation.
- AIS - pathogens and parasites: These could be contained in raw water bodies on the watercraft, in or on AIS or native species, or on attached aquatic vegetation. *Batracholchytrium dendrobatidis* (“Chytrid”) is a fungus that is known to cause extermination of amphibian species worldwide and has recently been detected in Trout Lake and Conboy National Wildlife Refuge<sup>5</sup>. The spores on this fungus can swim and live at least 12 weeks in water.

#### 2.4.2 *Waterway transportation of recreational and commercial watercraft*

This pathway is an issue where established populations are found in state waters or if an infested boat were launched and transported along a river system. If a water body did become infested, zebra and quagga mussels can attach to the watercraft in less than a single day, veligers can be taken up into holds, bait buckets, anchors with mud or aquatic vegetation attached, or other wet gear and transported to the next activity point or marina. This facilitates upstream spread on large rivers or lake systems, introductions from marine watercraft visiting from other states or countries, or between marine ports in the Puget Sound and coast. Within Puget Sound, for example, numerous invasive tunicates have been found attached to watercraft hulls in all marinas that have established populations.

#### 2.4.3 *Overland transportation of aquatic equipment and materials*

Overland AIS introduction pathways that are less common include, but are not limited to:

- Fire fighting activities where water trucks that have previously pumped water from AIS infested lakes or rivers pump water from an uninfected area. This risk can be reduced using educational materials that encourage fire-fighting crews, especially those that come from out of state, to clean their hoses and pumps prior to use on a fire.

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<sup>5</sup> Marc Hayes, WDFW. Personal communication, November 2007.

- Installing previously used equipment that has been in an AIS infested area that has not been properly cleaned.
- Crane certification weight testing using water bags has been identified by the US Bureau of Reclamation (BOR) as a potential pathway for the introduction of AIS.

#### 2.4.4 *Floatplane transportation*

There is a significant movement of commercial and private floatplane traffic in the state. These aircraft fly between and within fresh and marine waters on a routine basis. The department is working with the ANS Task Force's Western Regional Panel on developing regional best management practices, inspection, and decontamination protocols. To date, no confirmed infestations have been caused by this pathway in Washington State.

#### 2.4.5 *Transportation in ballast water or hull fouling of shipping vessels*

Transoceanic shipping is considered a likely pathway for freshwater or brackish water AIS for ports on the Columbia River and where a port is located in an estuarine environment such as the Ports of Olympia and Tacoma. If the California zebra and quagga mussel infestation reaches their port waters such as the Port of Stockton on the Sacramento River, we will need to be more vigilant about vessels departing from those ports and classifying them as having high-risk ballast water. Ballast water movement by barges and larger vessels up the Columbia River would also become a significant upstream pathway if zebra and quagga mussels became established in the lower part of the river.

#### 2.4.6 *Other pathways*

Several other pathways have been identified as capable of transporting AIS into or within state waters. These vary in risk and are generally managed through secondary projects as time, capacity, and priorities allow. Taken as a whole, it identifies a significant gap in AIS management capacity:

- Aquaculture and hatchery stock: The Lake Mead fish hatchery inadvertently distributed fish and potentially zebra and quagga mussels-infested water to multiple sites in Nevada prior to its discovery. This led to a potential inoculation of Wild Horse Reservoir on the southern edges of the Columbia River basin. Luckily, this has not caused any new reported populations outside the Colorado River system.
- Research: Most researchers would likely know the threat these species pose and have facilities to contain them, but may inadvertently release larva or veligers through poor quality control. There have been a few cases where zebra and quagga mussels have been brought into the state for research purposes. In general, these are adequately controlled through the department's Scientific Collection Permit process.
- Academic: Similar to the research pathway, but may include less informed educational communities without adequate control facilities. More likely to bring in AIS without permits including species such as crayfish, butterflies, reptiles, etc. Most would not qualify for a scientific collection permit. Enforcement is difficult and education outreach

low. The national Habitattitude<sup>6</sup> campaign is reaching more people as it continues to develop.

- Field Survey Gear: There are a large number of state and federal agencies, tribal governments, industries, and private contractors that conduct surveys associated with water bodies. These might be for activities such as fish snorkel, stream typing, and geographic surveying.
- Pet/aquarium: There has been a surge of public acquisition of exotic pets through store and internet sales. This includes most families of the animal kingdom including vertebrates, invertebrates, fish, shellfish, jellyfish, reptiles, amphibians, etc. There have been no known sales of zebra and quagga mussels using this pathway, but all others are fairly common. Enforcement is difficult and education outreach low. The national Habitattitude campaign is reaching more people as it continues to develop.
- Garden Ponds: The garden pond industry has also dramatically increased, and many businesses are carrying aquatic vegetation from multiple local, national, and international suppliers. In one case, two zebra and quagga mussels were found in aquatic iris plants from Holland.
- Hunting/Fishing: zebra and quagga mussels may be transported into or within the state in water-carrying equipment such as bait buckets and live fish containers, in mud-encrusted boots and wet felts on waders, or on wet snorkel or dive gear. These pathways are generally a higher risk for other AIS such as New Zealand mudsnails.
- Live or Frozen Bait: Washington State does not allow the use of live aquatic animal species such as fish, crayfish, or leeches as bait for game fish in lakes and rivers<sup>7</sup>. Frozen bait may come from a large variety of national and international sources. The VHS virus may be transported through either of these pathways.

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<sup>6</sup> [www.habitattitude.net](http://www.habitattitude.net)

<sup>7</sup> WAC 232-56-122(6)

### 3.0 Program Accomplishments

Key accomplishments from fiscal years 2008 and 2009 are noted below and they highlight how the AIS Prevention and Enforcement Program is implementing legislative directives to prevent the introduction of new AIS and control or eradicate established AIS.

#### 3.1 Priority Species Determined

The ability to track and manage other AIS introductions and spread within waters of the state and their overall trend is slowly being realized. The development of a priority species list was a key accomplishment and is helping to focus limited department resources.

The department helped develop and has adopted the Washington Invasive Species Council (WISC) priority species list that was recently developed through a statewide risk assessment of 50 “worst of the worst” invasive species, of which 14 were animal AIS that are regulated by the department ( see Appendix B). Species of the same genus (e.g., zebra and quagga mussels, tunicates, etc.) were counted as a single unit. Not surprisingly, zebra and quagga mussels were found to be the state’s number one risk when prioritized using a science-based process that looked at both invasive risk and management potential. Table 5 identifies the four highest priority animal AIS of statewide concern and whether they have known established populations at some level in the state (Here), have established populations in our region (Near), or have established populations outside our region (Far).

**Table 5.** WISC highest priority animal AIS by common name, scientific name, and location of the closest known established populations.

Common Name	Scientific Name	Here/Near/Far
Quagga and zebra mussels	<i>Dreissena polymorpha and bugensis</i>	Near
Tunicates (3 species)	<i>Didemnum vexillum, Styella clava, and Ciona Savignyi</i>	Here
VHS Type IVb (freshwater)	<i>Viral hemorrhagic septicemia</i>	Far
Nutria	<i>Myocastor coypus</i>	Here

All four of the highest priority and 10 of the remaining priority aquatic animal species are incorporated into the AIS Prevention and Enforcement Program at various management levels depending upon legislative direction and intent as is described in this report. Table 6 identifies the other 10 priority animal AIS of statewide concern and whether established populations are here, near, or far.

**Table 6.** Other WISC priority animal AIS by common name, scientific name, and location of the closest known established populations.

Common Name	Scientific Name	Here/Near/Far
Mitten crab	<i>Eriocheir sinensis</i>	Near
Marine clam	<i>Potamocorbula amurensis</i>	Near
New Zealand Mudsnail	<i>Potamopyrgus antipodarum</i>	Here
European green crab	<i>Carcinus maenus</i>	Here



Asian carp (Bighead, Silver, Largescale and Black)	<i>Hypthalmichthys nobilis, harmandi, and molitrix, and Mylopharyngodon piceus,</i>	Far
Crayfish (Red swamp and Rusty)	<i>Procambarus clarkii and Orconectes rusticus</i>	Here/Near
Bullfrog	<i>Rana Catesbeiana</i>	Here
VHS Type IVa (marine)	<i>Viral hemorrhagic septicemia</i>	Here
Snakehead fish (several species)	<i>Channa sp.</i>	Far
Atlantic Salmon	<i>Salmo salar</i>	Here <sup>8</sup>

The primary species of concern in this program are the zebra mussel (*Dreissena polymorpha*) and its relative the quagga mussel (*Dreissena bugensis*). The management actions for preventing the introduction and spread of these highest risk species effectively address other priority AIS such as the *Viral hemorrhagic septicemia* (VHS) *Type IVb* virus and non-listed AIS such as aquatic invasive plants, other fish pathogens like Whirling disease, and amphibian pathogens like Chytrid fungus. Management of invasive tunicate species and a multitude of listed and unlisted nonindigenous species found in ballast water are reported separately.

### 3.2 Watercraft Surveys, Integrated Inspections, and AIS Check Stations

The Department uses three types of watercraft management actions for the early detection and prevention of AIS introductions. These include boater surveys, integrated watercraft safety/AIS inspections, and mandatory watercraft check stations. The purpose of these actions includes: direct prevention of AIS introductions and spread; education and outreach to the boating public on the threats of AIS and what they can do to prevent their introduction and spread; analysis of watercraft movement pathways to determine the highest risk transportation corridors between in-state water bodies and from out-of-state high risk water bodies; and analyze the risk of non-resident boaters introducing species from out of state. Non-resident boaters are those using watercraft registered in another state, whether or not the owner or operator is a Washington resident. In general, the total number of boater contacts by year is: 4,077 in 2007; 6,091 in 2008; and 1,534 in 2009. Reductions in boater contacts in 2009 are a result of fewer seasonal staff and refocusing on early detection monitoring.

#### 3.2.1 Boater surveys

Boater surveys were conducted by three AIS non-Enforcement staff during the high use season between April 1 and September 30 in both 2007 and 2008. In 2007, field efforts aimed at preventing AIS introductions were focused entirely on boater surveys. In 2008, resources were divided among all three types of watercraft management actions, but remained focused primarily on boater surveys while AIS Enforcement inspection protocols

<sup>8</sup> Only in regulated hatcheries or net pens - no established wild populations found to date.

were being developed and training requirements were being met. Directed boater surveys were not conducted in 2009 as management actions were being shifted toward early detection monitoring and aquatic invasive species check station inspections.

The boater survey protocol consisted of one or more staff attending pre-assigned recreational boat launch sites and interviewing boaters while launching or retrieving their watercraft. Surveyors used a questionnaire designed by the 100<sup>th</sup> Meridian Initiative that was designed to assess boater movements, maintenance habits, and public knowledge of AIS (Appendix E). In addition, boaters were asked to participate in a voluntary inspection of their watercraft and trailer for AIS presence. Boaters were provided with AIS Unit contact information and offered educational material highlighting the importance of AIS prevention including field identification keys for select AIS. Each surveyor was given a quota of 1,500 surveys each year.

Lacking knowledge of boater habits, survey sites were selected statewide based on one or more of the following AIS risk criteria: a) frequency of use; b) occurrence of periodic events such as fishing tournaments, local festivals, and holidays; c) proximity to industrial, agricultural, and municipal water intake facilities, and; d) watercourse connections with adjacent water bodies. More emphasis was placed on surveying boaters in western Washington, as anecdotal information suggested that record high fuel prices, particularly in 2007, were forcing resident boaters to remain closer to home, and the likelihood of AIS distribution was judged to be greatest in that region of the state with the most registered watercraft. Concentrating on western Washington also enabled surveyors to maximize the number of contacts per unit time as there are more launches spaced geographically less far apart than in eastern Washington, and there were two designated surveyors stationed in western Washington and only one in eastern Washington.

The lower Columbia River is considered to be at particularly high risk to AIS because of the high volume of commercial and recreational watercraft transiting the area that arrives from outside the Pacific Northwest, and because any AIS infestations up river are more likely to be transferred downstream. For this reason, special emphasis was placed on surveying more sites along the lower Columbia River, thus increasing the number of western Washington sites.

In eastern Washington, surveys were focused primarily on water bodies used by tournament fishers with special emphasis on those water bodies that are included in interstate tournament circuits. The tournaments are typically held on larger inland water bodies such as the upper Columbia River, Snake River, Potholes Reservoir, Banks Lake, and Moses Lake.

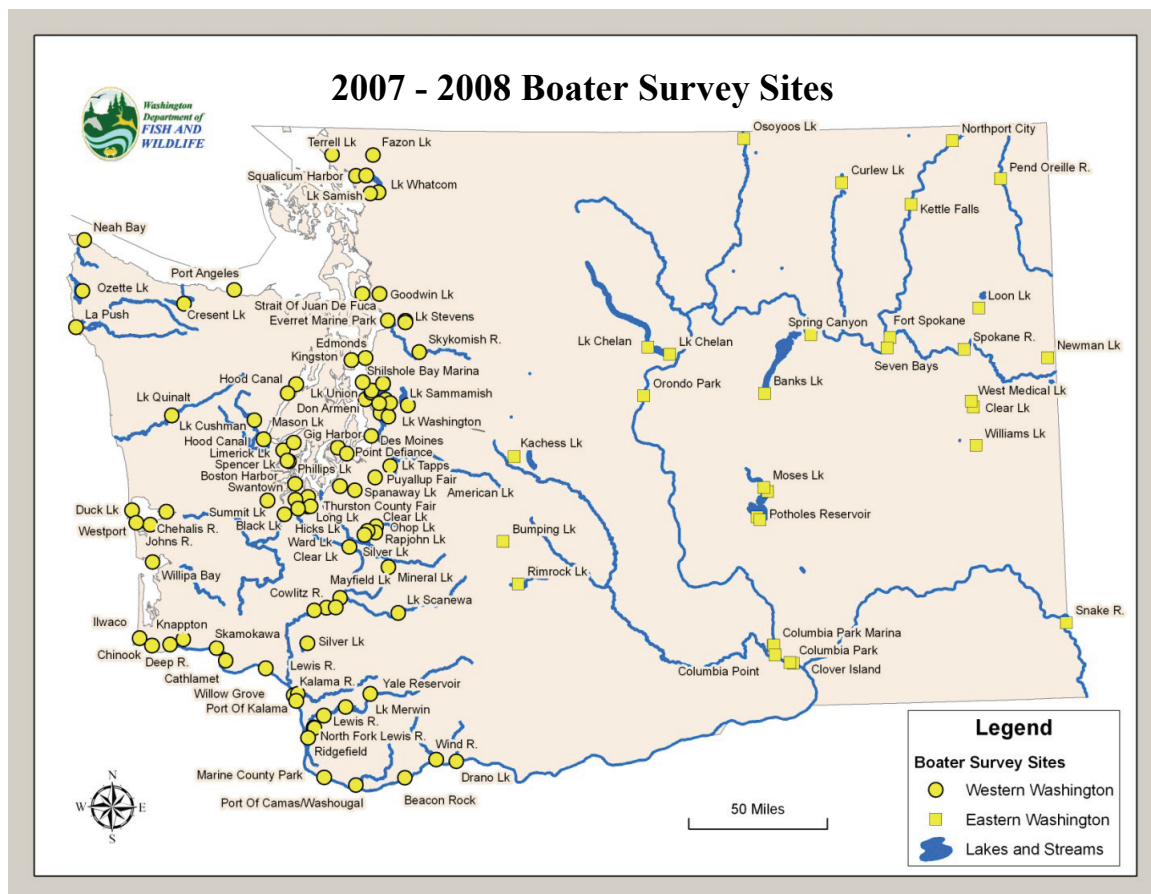
In 2007, a total of 4,107 boater surveys were conducted; 393 short of the 4,500 annual survey quota goal for all three surveyors combined (Table 7). In 2008, 4,970 boater surveys were conducted, surpassing the annual quota by 470. Survey effort, measured in total days during which one or more surveyors were in the field, was nearly the same in 2007 (110 days) as in 2008 (108 days); however, survey effort measured in the number of contacts per surveyor averaged over the total number of surveyor days was slightly lower in 2007 (12 per surveyor) than in 2008 (15 per surveyor). Over the two-year reporting period, 9,077 boater surveys

were conducted at 121 sites (30 in Eastern- and 91 in Western Washington) on 218 different days (Figure 6). One percent of the inspections resulted in the detection of AIS. The watercraft were decontaminated on-site by AIS Unit staff; and the AIS was contained and transferred to a suitable disposal site.

**Table 7.** Boater Surveys conducted by AIS Prevention staff during 2007 and 2008.

Year	# Surveys	# Sites	# Days	% Days (180/yr)	% Non-resident	% Clean	% Infested	% AIS knowledge
2007	4,107	79	110	61%	5%	79%	.32%	74%
2008	4,970	42	108	60%	5%	82%	1%	72%
<b>Total</b>	<b>9,077</b>	<b>121</b>	<b>218</b>	<b>61%</b>	<b>5%</b>	<b>80%</b>	<b>1%</b>	<b>72%</b>

Eighty percent of survey respondents indicated that they cleaned their boat and trailer after each use. Seventy-two percent of the survey respondents indicated that they had heard of AIS. Of those, 85 percent listed milfoil and 52 percent listed mussels as AIS they had heard about.



**Figure 6.** Map of statewide sites where boater surveys were conducted in 2007 and 2008. No boater surveys conducted in 2009 or 2010 due to budget limitations and change in emphasis to early detection and AIS check stations.

Overall, the recreational boating community appears to be informed on AIS, especially for milfoil. The surveys indicate that the majority of boat owners clean their boats and trailers; however, since respondents were not asked why, it is unclear whether or not outreach and

education (e.g. Clean Boat Clean Water campaign) impacted their decision to do so. Feedback from the surveyors suggested that boater surveys were an effective method of providing AIS outreach and education to a large targeted audience of recreational boaters; however, fewer than 5 percent of the respondents surveyed were launching or retrieving boats that were registered in other states, and interstate watercraft movement is considered to be among the highest risk vectors for AIS introductions. While the voluntary approach was generally met by a willing and cooperative public, there were several instances where boaters refused to complete the survey, or permit their watercraft to be inspected.

### *3.2.2 Integrated watercraft safety/AIS inspections*

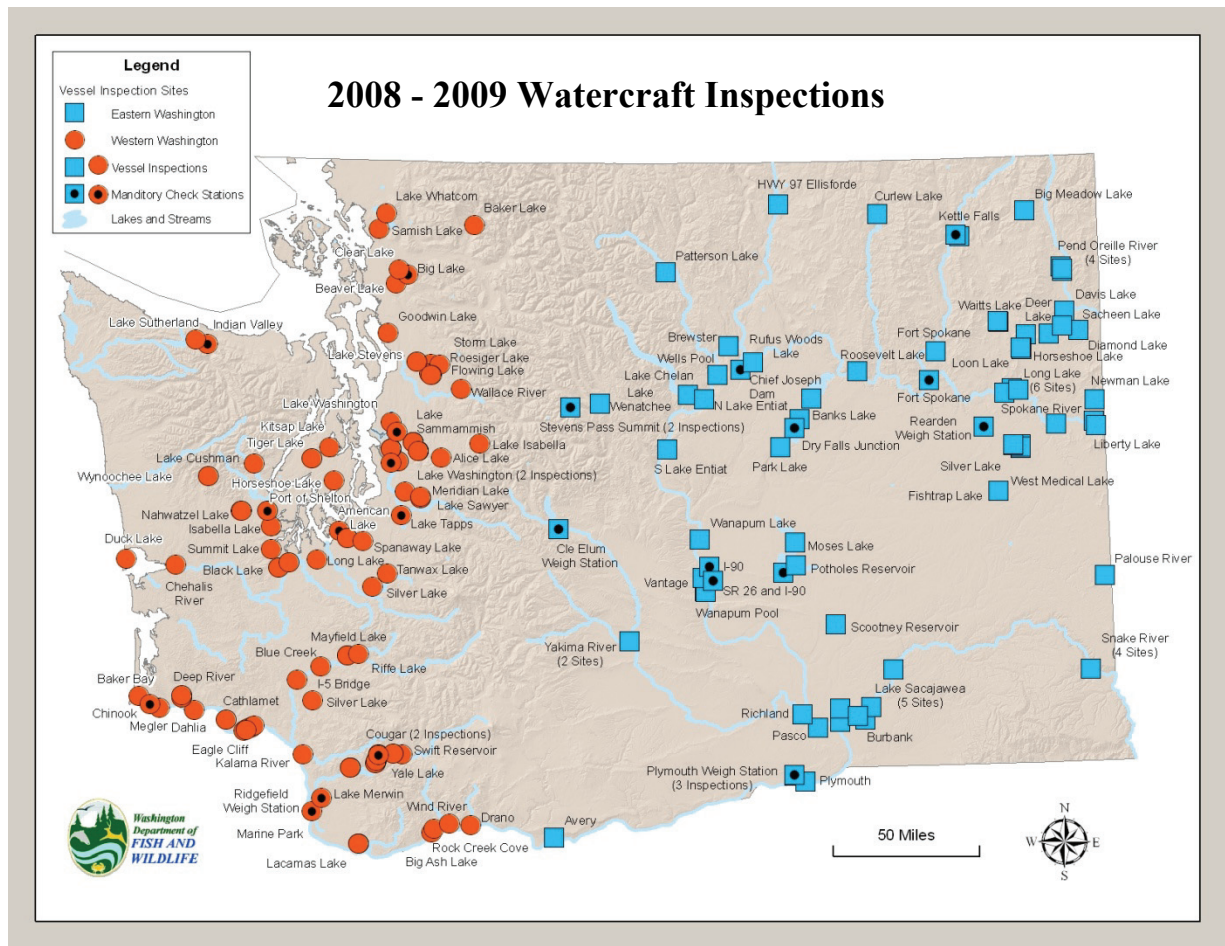
In 2007, Enforcement officers completed the training required to conduct watercraft safety inspections and have since conducted them routinely. Beginning in 2008, AIS inspections were integrated with watercraft safety inspections. This was facilitated by designing and implementing a combined boating safety and AIS watercraft inspection form that enabled WDFW Enforcement officers to conduct both types of inspections simultaneously. The new integrated form collects data similar to those of the 100<sup>th</sup> Meridian Initiative boater survey form, but prompts only for the presence or absence of AIS and does not prompt the surveyor to include the species or type (e.g. plant, animal) of any AIS encountered (Appendix F). However, Enforcement personnel have been thoroughly trained and briefed to immediately report the detection of any zebra or quagga mussels encountered. In addition, boaters were subjected to a mandatory AIS inspection of their watercraft and trailer.

Integrated inspections were conducted both opportunistically in conjunction with general enforcement patrols and during targeted integrated inspection emphasis patrols. The inaugural implementation of integrated inspections was conducted during an emphasis patrol, dubbed “Operation Basis”, which took place over the 2008, 4<sup>th</sup> of July weekend. The patrol was conducted statewide with teams from each of the six WDFW regions participating. The teams conducted inspections at launch ramps, marinas, and parks, both on and off the water. Each team was tasked with conducting as many surveys as was practical. The primary task of the AIS law enforcement was to provide AIS awareness through education and to issue verbal or written warnings to offenders. Subsequent to the inaugural implementation of the integrated inspections, AIS infractions were subject to citation at the discretion of the Enforcement officer.

Enforcement officers conducted a total of 710 integrated inspections in 2008, and 821 in 2009 (Table 8). Inspections were conducted at 135 different sites and because the officers were regionally distributed, the number of inspection sites was nearly the same in western Washington (64 sites) as in eastern Washington (71 sites) (Figure 7). Three percent (46 watercraft) of the inspections over both years resulted in the detection of AIS. All AIS contaminated watercraft were decontaminated either on-site or were directed to a nearby decontamination facility. Fifty-nine percent of survey respondents indicated that they cleaned their boat and trailer between launches – as opposed to 80 percent recorded from boater surveys. Fifty-two percent of the survey respondents indicated that they know what AIS are and 42 percent indicated that they know at least one Washington State AIS law.

**Table 8.** Integrated AIS/Boater Safety Inspections conducted by WDFW Fish and Wildlife Officers during 2008 and 2009.

Year	# Insp	# Sites	# Days	% Days (180/yr)	% Non-resident	% Clean	% Infested	% AIS knowledge
2008	710	64	38	21%	10%	61%	5%	49%
2009	821	71	63	28%	12%	57%	1%	55%
<b>Total</b>	<b>1,531</b>	<b>135</b>	<b>101</b>	<b>24%</b>	<b>11%</b>	<b>59%</b>	<b>3%</b>	<b>52%</b>



**Figure 7.** Map of statewide sites where integrated watercraft safety/AIS inspections and mandatory AIS watercraft check stations were conducted in 2008 and 2009.

### 3.2.3 Mandatory AIS watercraft check stations

In August 2008, WDFW implemented a mandatory AIS Watercraft Check Station Program, which is considered to be a cornerstone of the comprehensive AIS prevention and enforcement effort. In addition to interdicting potential inter- and intra-state AIS transport, check stations provide an important avenue for public outreach and education (Figure 8). The interaction between WDFW personnel and citizens when exchanging information about AIS and Washington AIS laws is a powerful tool in AIS prevention, and reaches those who might otherwise have not participated.

Prior to July 2007, AIS Enforcement staff did not have the statutory authority to conduct mandatory check stations. Once this authority was granted, AIS personnel spent the remainder of 2007 procuring signs and equipment, and developing the policies and protocols needed to implement the program. Thus, no mandatory check stations were conducted in 2007.

The new law (RCW 77.15.293) requires that anyone transporting watercraft must stop and allow the watercraft to be inspected by WDFW Enforcement or Washington State Patrol officers for the presence of AIS wherever AIS watercraft check stations are present and posted. The protocol requires at least one officer and, usually, one or more AIS non-enforcement personnel to be present during each inspection. A survey form similar to that used for the boater surveys and the integrated watercraft safety/AIS inspections was used (Appendix G) to assess boater movements and maintenance habits.

A test of the mandatory check station protocol was conducted on August 16, 2008 at a boat launch in Kettle Falls on the Columbia River. Forty-four inspections were conducted and no AIS were detected. The first mandatory check station along a major interstate highway was conducted in Plymouth at the Port of Entry weigh station on U.S. 395 during August 22 and 23, 2008, and was dubbed operation “Plymouth Rock”. Over the course of the operation, AIS were found on seven watercraft. As with the integrated watercraft safety/AIS inspections, the primary course of AIS law enforcement was to provide AIS awareness through education, thus offenders were issued verbal or written warnings at the check station and the watercraft were decontaminated on site.

The initial goal for each of the six WDFW management regions was to conduct six annual check stations, three along major roadways and three at high traffic water bodies, for a statewide total of 36; however, the goal was not achieved due to reduced staffing and budget constraints (Appendix H). In 2008 and 2009 combined, 26 check stations were conducted (11 in 2008 and 15 in 2009) (Table 9). No check stations were conducted during the winter seasons. The stations were conducted at 22 different sites and were evenly distributed between eastern and western Washington (see Figure 7). Check stations were conducted at some sites on multiple occasions. A total of 1,124 watercraft inspections were conducted during the two year period. Three percent (34 watercraft) of the inspections resulted in the detection of AIS. All AIS contaminated watercraft were decontaminated either on-site or were directed to a nearby decontamination facility. Only one infraction was issued. This was issued to a watercraft owner who bypassed the check station and thus failed to comply with the new law (RCW 77.15.293). Like the integrated watercraft safety/AIS inspections, the field form did not prompt inspectors to note the type of AIS encountered, thus there are no data on frequency of occurrence by species. The form has subsequently been revised to include a prompt for inspectors to note the type of AIS, and this will be implemented in 2010. Sixty-eight percent of survey respondents indicated that they cleaned their boat and trailer between uses.



**Table 9.** Mandatory Check Stations inspections conducted by WDFW Fish and Wildlife Officers during 2008, 2009, and 2010.

Year	# Insp	# Sites	# Days	% Days (180/yr)	% Non-resident	% Clean	% Infested
2008	411	10	8	4%	13%	80%	5%
2009	713	12	15	8%	7%	61%	2%
2010*	701	9	16	9%	20%	83%	4%
<b>Total</b>	<b>1,825</b>	<b>31</b>	<b>39</b>				

\* 2010 data not complete for season at time of publication.

### Case Study: "Operation Ridgefield"

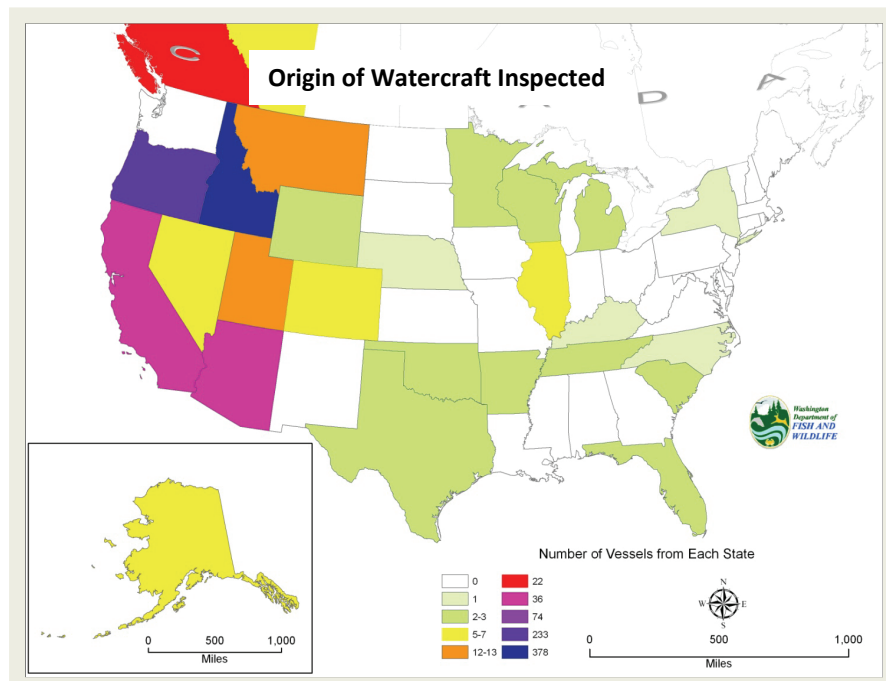
On Sept 25, 2009, the AIS Prevention and Enforcement Program conducted the first ever, mandatory AIS watercraft check station on Interstate 5. The check station was operated in coordination with the WSP "Ridgefield" Port of Entry weigh station located just north of the Oregon/Washington border. Motorists were informed of the check station by a press release, portable road signs, and a large electronic sign.

Any watercraft failing to enter the check station were pursued, stopped, inspected, and issued written warnings. During check station operations over a six hour period, 55 watercraft were inspected of which 12 had failed to stop. Due to this being the first AIS check station on I-5, only warnings were issued for failing to stop, however one of watercraft owners that failed to stop was issued a citation for illegally transporting aquatic vegetation (invasive *Eurasian milfoil*) on the boat and trailer.



### 3.2.4 Nonresident watercraft analysis

Data from the three recreational watercraft management actions were combined and analyzed to more effectively determine the origin of nonresident boaters. A risk assessment revealed that zebra and quagga mussels pose the greatest invasive risk to Washington (Section 3.1). Since these species do not thrive in saltwater, we did not include data acquired from boater surveys or integrated watercraft safety/AIS inspections that were conducted at saltwater sites; however, when respondents indicated on the survey that the last water body visited was a saltwater site, those data were included in the summary of last water bodies visited. Out of 246 non-saltwater sites, 814 watercraft were registered outside the state of Washington (Figure 10).



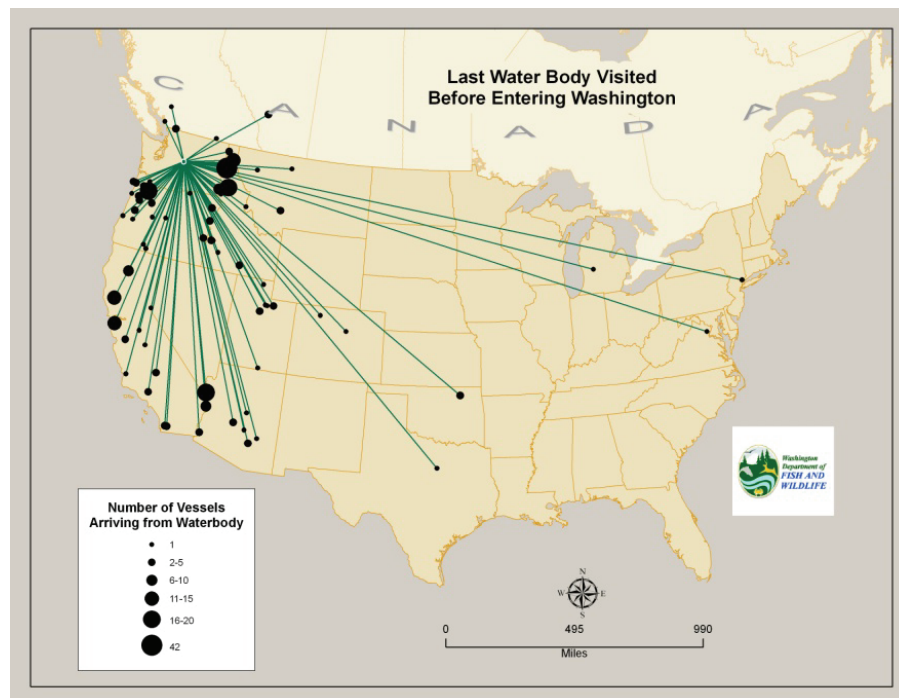
**Figure 10.** Map of the United States and southern Canada showing the origin of nonresident registered boats surveyed from each state or province.

Nonresident watercraft were registered in 24 states and two provinces of Canada, 16 of which are known to be contaminated with zebra and/or quagga mussels. Of those 24 states and provinces, nearly half are west of the continental divide. Although more than half were registered in states east of the continental divide, they contributed only 10% of the inspected non-resident watercraft surveyed. Overall, Idaho contributed by far the largest proportion of nonresident registered watercraft (378), followed by Oregon (233), California (74), Arizona (36), British Columbia (22), Utah (13), and Montana (12). The remaining states and province, most of which are considered low to moderately high risk sources, contributed fewer than seven watercraft each (46 total). Watercraft registered in Arizona and California are considered to be particularly high risk sources due to known infestations of water bodies in those states and their proximity to Washington. Seventy of the watercraft with California



or Arizona registrations were encountered at launches or on roadways close to the Columbia River in eastern Washington.

The data were also analyzed to determine the last water bodies visited by boaters before entering Washington independent from state where registered (Figure 11). Of the 814 surveyed watercraft that were registered outside the state, only 288 provided information on the last water body visited before entering the state. Out of 85 different water bodies distributed over 13 states and two Canadian provinces, the ten most frequently visited were, in descending order: Coeur d' Alene Lake, ID (42); Willamette River, OR (18); Dworshak Reservoir, ID (18); Lake Mead, AZ/NV (16); Clear Lake, CA (15); Pend Oreille Lake, ID (12); California Delta, CA (11); Shasta Lake, CA (9); Lake Havasu, AZ/CA (9), and; Clearwater River, ID (9). Of those ten, lakes Mead and Havasu are the only ones known to be contaminated with zebra and/or quagga mussel. The remaining 75 water bodies are distributed over eight states and two provinces. Seven of the states are known to harbor infestations of zebra and/or quagga mussels.



**Figure 11.** Map of the United States and southern Canada showing the last water body visited by nonresident registered boats before entering the state.

In summary, the number of non-Washington registered watercraft that arrived from east of the Continental Divide was greater than the number of eastern states water bodies that were last visited. This suggests that watercraft registered in eastern states visited water bodies west of the Continental Divide prior to entering Washington State. The combined boater origin and movement data will be used to assist the department in identifying the highest risk travel vectors into Washington State, and enable future interdiction and enforcement efforts to be focused on those vectors. It will also assist with determining the optimum placement of *in situ* monitoring sites.

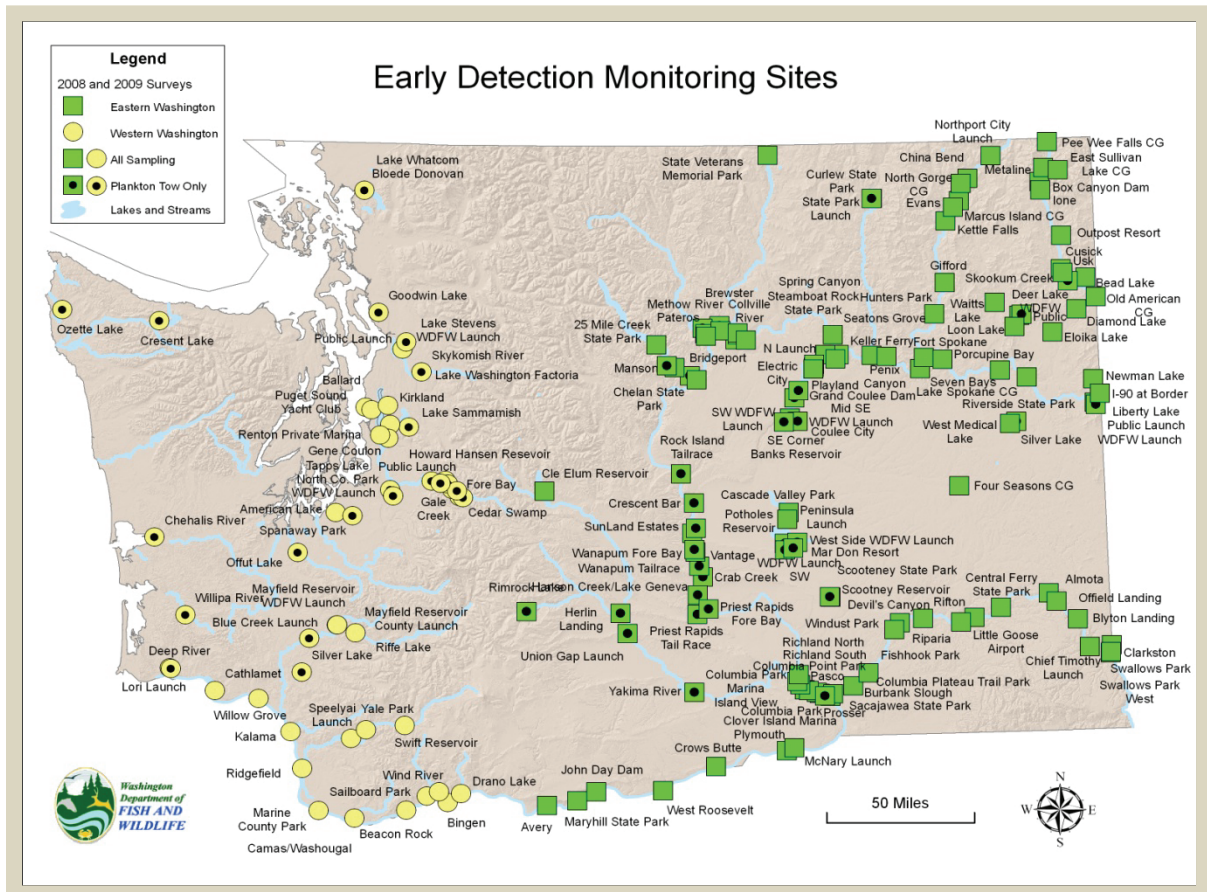
### 3.3 Zebra and Quagga Mussel Early Detection Monitoring

As a first level rapid response trigger, *in situ* early detection monitoring for zebra and quagga mussels has been conducted statewide on high-risk lakes and rivers since 2001; primarily by volunteers with some guidance and assistance from WDFW. Beginning in 2007, the monitoring program expanded to include dedicated funding for WDFW staff to work alongside the volunteers in the field; the kinds of data being collected were increased to include water quality parameters and artificial substrate sampling for the detection of post-settlement larvae; geographic coverage of the state was expanded, and; the numbers of volunteers increased. In addition, two Indian tribes (Spokane and Kalispel), one university (Portland State), and three public utilities (Grant and Douglas Counties, and City of Tacoma) joined the monitoring effort.

Initially, monitoring consisted of plankton tows intended to capture zebra and quagga mussels during the earliest free swimming life history stage (veliger), and was conducted primarily by volunteers. Plankton tow samples consisted of hand-pulling a 64 micron mesh, conical plankton net through the water either horizontally for a distance of approximately 100 feet, vertically as determined by depth, or both. The captured material was preserved in sealed containers and shipped to a private consultant for analysis. In the spring of 2009, in partnership with Portland State University (PSU), some sampling sites were augmented with the placement of artificial substrates similar to those used by the California Fish and Game Department. The substrates are comprised of four six-inch PVC squares affixed to a  $\frac{3}{4}$  inch line through a hole in the center of each square and spaced one inch apart. Each substrate was hung vertically to a depth of approximately 1 meter from the lake or river bottom. Deployment sites were chosen based on one or more of the following criteria: a) water quality conducive to mussel settlement and survival; b) accessibility; c) proximity to industrial, agricultural, and municipal water intake facilities; e) watercourse connections with adjacent water bodies, and; d) occurrence of periodic events such as fishing tournaments, local festivals, and holidays. Most of the substrates were inspected at least once prior to the end of the reporting period. Due to the remoteness of some of the artificial substrate sampling locations and the limited resources available to monitor them, a few of the sites have not yet been revisited. Monitoring the artificial substrate consisted of visual and tactile inspection of the PVC squares and all associated material. Suspect substrates were recovered for microscopic examination and replaced with a new artificial substrate, others were redeployed.

From 2008-2009, a total of 662 plankton tows were conducted (476 in eastern- and 186 in western Washington) and 177 artificial substrates were deployed (106 in eastern- and 71 in western Washington) at 234 sites throughout Washington (142 in eastern Washington and 92 in western Washington). The sites were distributed over 108 different water bodies (54 in eastern- and 54 in western Washington) (Figure 12). Portland State University administered the sampling and monitoring activities at 77 of the sites; however, the geographic coordinates for those sites have not yet been received and they are not depicted in Figure 12. Sixty-four of the 234 sites were located along the main stem of the Columbia River, and this includes six sites that were sampled or monitored by PSU. Replicate sampling by both WDFW and

PSU was conducted at 19 sites. The Columbia River main stem was the most intensively sampled water body as it is considered to be at greatest risk of infestation.



**Figure 12.** Map of statewide early detection sampling sites for zebra and quagga mussels using plankton tows and artificial substrates in 2008 - 2009. Number of sites monitored dropped in 2010 due to budget adjustments. Seeking more volunteer partnerships for 2011.

Grant County, Douglas County, and the City of Tacoma public utilities monitored Wanapum Reservoir (Columbia River), Pateros Reservoir (Columbia River), and Howard Hanson Reservoir (Green River), respectively. In 2009 they did not have the resources or intra-agency administrative approval to deploy artificial substrates in the reservoirs. However, they were able to conduct plankton tows.

To date there have been no indications from the early detection monitoring that zebra or quagga mussels are present in any of the water bodies thus far sampled. The information generated from the monitoring would enable the implementation of a localized rapid response in the event that invasive mussels are detected, thus increasing the likelihood of controlling or eradicating them. Further, it will help facilitate mitigation should harm occur to the environment, local economic interests, or human health, as a result of an invasion. Increasing funding constraints since 2009 have reduced the number of early detection monitoring sites from those on Figure 12 and have also reduced the frequency of visits to each site per season. Further reductions are expected for the 2011 monitoring season.

### 3.5 Rapid Response Actions

The purpose of rapid response is to hit a newly discovered infested site hard and fast to quickly eliminate or minimize potential damage from invasive species. Washington State is at the forefront in developing and promoting the active implementation of this prevention strategy in the West. Rapid response actions can range from decontamination of transported watercraft to full scale multi-agency containment and eradication actions using an incident command management structure.

The department's AIS Prevention and Enforcement Program has developed basic rapid response capabilities for AIS contaminated watercraft (specifically zebra and quagga mussel contamination). Since 2006, the department has responded to over 20 incidents of watercraft entering Washington that were contaminated with zebra or quagga mussels (Appendix I). Many of these were found during routine inspections by the Washington State Patrol at one of their five Port of Entry Weigh Stations. In most situations, commercial boat haulers and watercraft owners have been very cooperative, but there have been a few difficult and even dangerous events that underscore the importance of having a well-trained AIS Enforcement program.

The department is also working with regional partners to develop and test a comprehensive rapid response plan. In October of 2008, Governor Gregoire signed a non-binding agreement to implement the regional Columbia River Basin Interagency Invasive Species Rapid Response Plan (CRB plan). Additional signatories to the plan include governors from the states of Idaho, Oregon, and Montana, the United States Department of the Interior, the Columbia River Inter-Tribal Fish Commission, and the Premier of British Columbia, Canada.

The purpose of the CRB plan is to coordinate a rapid, effective, and efficient interagency response in order to delineate, contain, and when feasible, eradicate zebra and quagga mussels or other high-risk aquatic invasive species. The CRB plan is based on an incident command structure and is heavily dependent on the preparedness and resources available within each state. It is anticipated that the Washington Invasive Species Council would provide the key interagency coordination forum if an infestation were found in this state. Annual training exercises have been held around the region to test the plan using varying scenarios such as: an infested barge found in Portland, Oregon; a positive detection of a veliger on the Snake River in Idaho; and the finding mussels in Lake Roosevelt (see case study).

Increasing the preparedness of the department and establishing agreements for coordination and cooperation with other state and federal agencies, tribal governments, and regional governments, will be critical to any future success.

#### *Decontamination equipment*

The department has procured decontamination equipment to use in AIS rapid response incidents. Regional decontamination kits and hot water power wash units are stationed at each of the department's regional offices and a self contained "portable" hot water power



wash unit is stationed at department headquarters in Olympia (Figure 13). The kits contain equipment and personal protective gear required to safely conduct decontaminations. The kits and hot water power wash units meet all 100<sup>th</sup> Meridian Initiative standards for Zebra and Quagga mussel decontamination procedures for watercraft. All department enforcement officers and field staff who have attended the regional trainings have also been taught the proper use of the equipment.



**Figure 13.** Regional (left) and trailerable (center) hot water pressure washers and personal safety equipment (right) used by WDFW personnel to decontaminate watercraft and other equipment.

### ***Case Study: “Hello” Boat Rapid Response Incident***

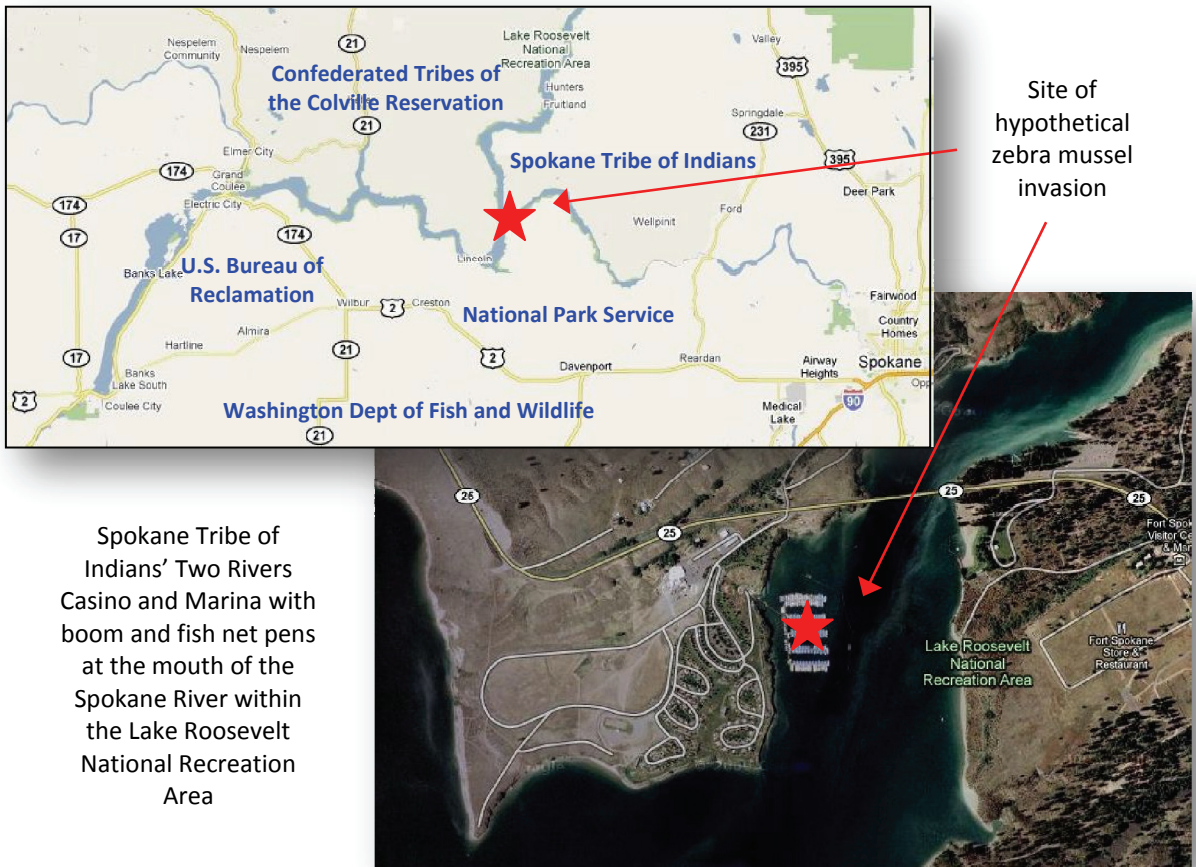
On May 18, 2009, a citizen in the state of Utah spotted what appeared to be either zebra or quagga mussels on a trailered boat with the name “Hello” on its transom. The boat was being towed north on Interstate 15 for an unknown destination. The citizen knew the dangers of this species and quickly reported it to the Utah Division of Wildlife Resources (UDWR). UDWR quickly sent out an alert to all of the western states AIS coordinators on the boat. The Idaho State Department of Agriculture (ISDA) began posting the incident on its website and asked people to be on the lookout for the boat. On May 19<sup>th</sup>, a Spokane resident who had seen the ISDA website, spotted the boat and reported it. ISDA quickly alerted the department and fish and wildlife enforcement officers were dispatched. The officers found the boat and confirmed that it was infested with live quagga mussels that were pulled from Lake Mead, Nevada, only a few days earlier. The owner of the boat was contacted and advised that the boat would be seized and decontaminated. Due to the multi-state alert and coordination of the incident, a press conference on the incident and the decontamination was held to publicize the event. The boat was returned to the owner after the decontamination and quarantine period. The owner of the boat was cited for transporting prohibited AIS.



## Case Study: Spokane River Rapid Response Table-Top Exercise

A hypothetical detection of zebra mussels at the Two River's Marina at the mouth of the Spokane River was this year's annual table-top exercise for the Columbia River Basin Interagency Invasive Species Rapid Response Plan (CRB plan). Participants on site included department planning and enforcement staff, the U.S. Fish and Wildlife Service, the Pacific States Marine Fisheries Commission, the U.S. Bureau of Reclamation, the Lake Roosevelt National Park Service, the U.S. Army Corps of Engineers, the Spokane Tribe of Indians, the Confederated Tribes of the Colville Reservation, the Upper Columbia United Tribes, the Columbia River Inter-Tribal Commission, the Washington Invasive Species Council, and representatives from the states of Idaho, Oregon, and Montana. The Washington Departments of Ecology and Agriculture provided real-time responses to chemical permit and use questions.

As part of the incident command structure, an Incident Management Team under a Unified Command, a Coordination Support Staff, and a Multi-agency Committee were formed. Together, we were able to construct a rapid response plan that contained the site, removed and decontaminated 160 boats and dock infrastructure, secured permits and chemicals to treat habitat in the immediate area and infrastructure that could not be removed, set a strategy to develop long-term monitoring. As this was occurring at the end of summer and rainfall has been above normal, we believed there was only a short window of opportunity that required a more aggressive chemical treatment option. In the first two weeks of the plan, we estimated it would cost approximately \$500,000.





### 3.6 Enforcement Emphasis Patrols

In addition to standardized patrol duties, the department utilizes enforcement “emphasis” patrols as a means to target specific AIS issues. These patrols serve to not only enforce Washington AIS laws, but also act as outreach opportunities to emphasize the importance of AIS issues and to help change public behavior (Figure 13). The emphasis patrols are coordinated by the department’s AIS Sergeant through the regional Captains with operational approval from the Chief and Deputy Chief.

#### *Case Study: “Operation Weed-Wacker”*

During August and September 2008, the Enforcement Division conducted an emphasis patrol that targeted aquatic plants/ vegetation being illegally transported by watercraft. The operation consisted of a series of patrols occurring in department Regions 1, 3, and 4. The priority of these patrols would be the interdiction of watercraft transporting aquatic plants/ vegetation and issuing citations for violations. Prior to these patrols, a press release was issued advising the public that the department was stepping up enforcement of these regulations. Officers were stationed near well known vegetation infested launch ramps and targeted boaters who made no effort to remove vegetation from their boats or trailers before leaving the area. During the emphasis, 166 boats were observed with 2 citations and 5 written/verbal warnings issued. Warnings were issued when an effort to remove the vegetation was made, but not all vegetation was removed. A subsequent televised report by King 5 news also occurred.



### 3.7 AIS Marketplace Enforcement/Investigations

The department has expanded its Commercial/Marketplace enforcement patrols to include AIS. There are many pathways that AIS can enter Washington State. The pet trade, commercial aquaculture, and live sea food importation are all areas that the department must be vigilant in enforcing AIS laws. Department officers are trained to be actively looking for AIS and enforcement of applicable laws when doing market place inspections. During 2008 and 2009, in addition to standard marketplace inspections, there were some notable cases made concerning AIS entering Washington State.

### ***Case Study: “Vancouver Pet Stores”***

On January 17, 2008, Detachment 5, supervised by Sergeant Rick Webb and lead by Officer Thomas Moats, executed an AIS market place emphasis patrol. The primary objective of the patrol was to inspect pet shops in the Clark County area including major retailers of aquarium fish and reptile species to determine if any of the businesses were attempting to sell any listed prohibited AIS. Three teams of officers conducted inspections at 13 businesses during the emphasis.

Several major retailers including Walmart, Petco, and Petsmart were checked during the patrol. Many of the managers of the businesses contacted were well educated on Washington law. The managers advised that in previous years, several species had been carried and sold by the businesses that were prohibited by law (bullfrogs and elodea) but when they discovered the prohibition, the stores discontinued carrying those species. No state violations were detected.



### ***Case Study: “Florida Soft Shell Turtles”***

On April 4, 2008, Officer Erik Olson received information on a shipment of Florida Soft Shell Turtles that were inbound to the state from Florida. The information named the company receiving the turtles. Florida Soft Shell Turtles are classified as prohibited aquatic animal species in Washington State and under RCW 77.15.253 they are illegal to possess, import, purchase, sell, propagate, transport, or release. Officer Olson was able to intercept the shipment which contained 421 pounds (16 boxes) of “live” Florida Soft Shell turtles. Upon further investigation it was discovered that this was not an isolated incident and previous shipments had already been entering Washington. Officer Olson seized the entire shipment and contacted the owner of the company. The owner was issued a citation and the turtles were euthanized and placed into evidence for the pending criminal court proceedings.



### 3.8 Prevention and Enforcement Training

Washington State has many federal, state, municipal, and private stakeholders who are all affected when an AIS becomes introduced and/or established. These stakeholders are valuable allies in the fight against AIS and the department has it as a priority to seek out these stakeholder groups and provide AIS enforcement and prevention training programs. This training is an effort to educate these groups so they can be utilized in AIS enforcement and prevention activities.

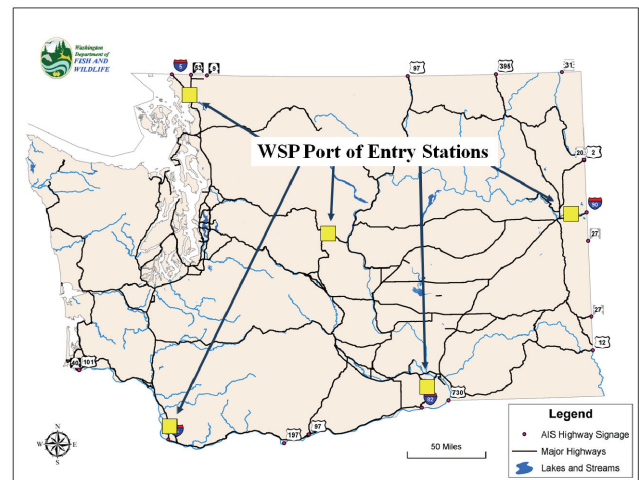
#### 3.8.1 Internal agency training

During 2008 & 2009, department staff conducted four training sessions for department field staff. The training sessions were conducted out of the Region 5 office in Vancouver and the Region 4 office in Mill Creek. The trainings were conducted during spring (May and June) before the employees began the “high-season” field work time which they would be encountering large numbers of watercraft. Approximately 150 department employees attended the training sessions which were four hours in length. The training covered AIS legislation, introduction to AIS, basic AIS identification, identification & life history of zebra and quagga mussels, impacts to the Pacific Northwest, watercraft inspection techniques, documenting inspections on AIS certification forms, and protocols if AIS are detected during an inspection.

#### 3.8.2 WSP CVEO training & port of entry inspections

The Washington State Patrol (WSP) is a key player with regard to zebra and quagga mussel interdiction efforts in Washington State and actively inspects commercially hauled watercraft that are required to stop at one of their five Port of Entry (POE) weigh stations (Figure 14).

The department’s Enforcement Division is specifically directed by RCW 77.12.879, to provide training to WSP employees working at POE weigh stations on how to inspect watercraft for the presence of AIS. Since 2008, the department has conducted four training sessions for Commercial Vehicle Enforcement Officers (CVEOs) at the Shelton WSP academy. Approximately 65 CVEOs attended the four-hour training sessions. The training covers; Washington State AIS legislation, introduction to AIS, identification & life history of zebra and quagga mussels, impacts to the Pacific Northwest, inspection methods/ techniques, documentation of inspections on certification forms, and protocols if AIS are detected.



**Figure 14.** Map showing locations of the five WSP Port of Entry weigh stations.

### *3.8.3 County and municipality law enforcement agency training*

During 2009, department staff conducted two training sessions for County and Municipal Law Enforcement agencies. The first session occurred at the Washington State Marine Law Enforcement Conference department field staff. At this training there were deputies and officers from the following counties and agencies; Clark County, Gray Harbor County, Yakima County, Whitman County, Skamania County, Pend Oreille County, Grant County, Klickitat County, Benton County, Okanogan County, King County, Skagit County, Clallam County, Whatcom County, Kittitas County, Bonny lake Police Department, Everett Police Department, Lakewood Police Department, Lake Stevens Police Department, Port Orchard Police Department, and Seattle Police Department. The second session was exclusively for the King County Sherriff's Department marine patrol unit. The training sessions were four hours in length and covered AIS legislation, introduction to AIS, basic AIS identification, identification & life history of zebra and quagga mussels, impacts to the Pacific Northwest, watercraft inspection techniques, documenting inspections on Washington State AIS Certification forms, Washington State AIS laws and enforcement, and protocols to follow if AIS are detected during an inspection.

### *3.8.4 Federal agency training*

The department has conducted several AIS trainings for federal agency employees. One of the trainings was for 27 US Army Corps of Engineers and it was conducted at "Ice Harbor" hydro-electric dam located on the Snake River just above the Tri-Cities. The trainings covered Washington State AIS legislation, introduction to AIS, basic identification of specific AIS, in-depth identification & life history of zebra and quagga mussels, impacts to the Pacific Northwest, watercraft inspections, and protocols to follow if they encounter AIS. The department also conducted two additional training sessions which covered the same material for the Federal Bureau of Reclamation. The first was for employees of the Columbia Basin Regional office in Ephrata and had 21 in attendance. The second training session was at the NW Regional Dam Operators training in Yakima with 84 personnel in attendance from the states of Washington, Oregon, Idaho, Nevada, Colorado, and Utah.

## **3.9 Local, State, and Regional Coordination**

Since 2006, the department's AIS Prevention and Enforcement Program has been considered one of the leading programs with regards to AIS management protocols throughout the western United States. However, the department cannot protect the Columbia and Snake Rivers without help as these rivers are shared by several states and the Canadian province of British Columbia. Therefore, AIS interdiction work must be coordinated on all levels to include local, state, and regional governmental, public and private entities.

### *3.9.1 State and local coordination*

One of the most important weapons in the battle against AIS is the creation of working partnerships among the various federal, state and local agencies doing work in this field. To foster working relationships, the department AIS Coordinator and AIS Sergeant act as the

primary liaisons in AIS Prevention and Enforcement Program matters between the department and other state and federal agencies. The department has created effective working relationships with the following agencies: Washington State Department of Ecology; Washington State Department of Natural Resources; Washington State Department of Parks and Recreation; Washington State Department of Agriculture; Puget Sound Partnership; Washington State Patrol, the Northwest Indian Fisheries Commission; US Fish & Wildlife Service; National Marine Fisheries Service; and the Pacific

States Marine Fisheries Commission's 100th Meridian Initiative Columbia River Basin Team (CRBT).

### 3.9.2 Regional coordination

During 2009, in addition to working with the agencies listed in the section above, the department's enforcement and prevention programs forged a significant working relationship with the State of Idaho that will have substantial, beneficial regional impacts. The State of Idaho passed very significant legislation that created the foundation for its own AIS enforcement and prevention programs. The legislation placed the programs under the Idaho State Department of Agriculture (ISDA) which is responsible for the design and implementation of the programs. Several times during 2009, department personnel were requested to provide assistance to ISDA during the design and implementation phase of the new program. This assistance included several trips to Idaho, where, department personnel provided hands on training and/or input at planning meetings (Figure 15). The input was based upon department's existing programs and the reputation that the department has as a leader with regards to AIS interdiction efforts. This relationship with ISDA will be a cornerstone from which many joint regional AIS efforts will arise. Appendix J contains a letter of appreciation to the department for the assistance that was provided.



Figure 15. WDFW featured in Idaho information spot.



### 3.10 Education and Outreach

Public outreach is considered the number one tool that can be used for AIS prevention and the department actively seeks out opportunities for this effort.

#### 3.10.1 AIS educational outreach presentations/display booth

The department has conducted numerous AIS educational outreach presentations to various stakeholder groups since 2008. Some of the groups included: Yakima Fly Fisher club; Puget Sound Anglers; Evergreen Bass club; Moses Lake Bass & Walleye club, the “Atomic Ducks” recreational scuba diver club, Quincy School District “Water Festival”, and the Tri-Cities Irrigators Water Conservation District. The department also operated an AIS display booth at the 2008 and 2009 “Go Play Outside” youth expositions (Figure 16). The booth included the AIS enforcement vehicle as part of the display. It is estimated 6,000 students attended the two expositions.



**Figure 16.** Aquatic invasive species information booth at the 2009 “Go Play Outside” youth exposition.

#### 3.10.2 AIS “Toll Free” information line

##### **1-888-WDFW-AIS (933-9247)**

The department has implemented a “Toll Free” AIS Information Line number, which will serve as the primary contact system for the public. This line is available for the public to access information about the Boat Inspection Program, report AIS sightings, or find out additional information about AIS. The system has an automated menu and provides navigation through the information system. The caller receives in-depth information about the Boat Inspection Program that allows them able to determine whether there is need for an inspection which minimizes unnecessary inspections. If the caller is reporting a sighting or trying to find out general AIS information, the system will immediately route to live department AIS Prevention and Enforcement Program staff.

#### 3.10.3 AIS web pages

The department is continually updating its AIS web pages to reflect the development and expansion of the overall program. We anticipate many new changes and additions in the following years. The page provides AIS information to the general public concerning the threat of AIS, the penalties associated with introduction of AIS, the proper contact information for obtaining vessel inspections, and preventative measures. The AIS home page address is: <http://wdfw.wa.gov/ais/>.

### 3.10.4 Fishing pamphlet

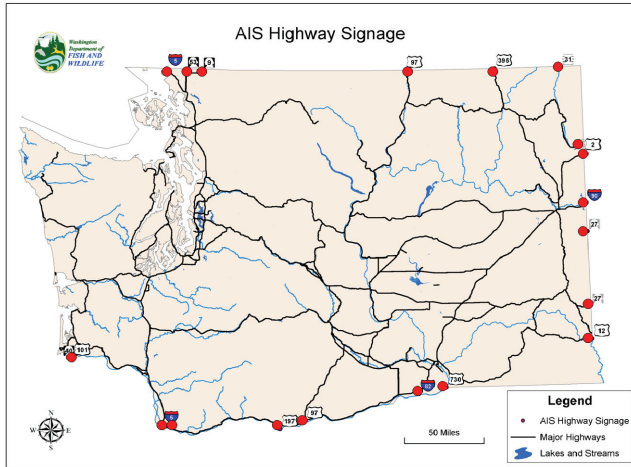
Over 600,000 people purchase a department recreational fishing license each year. Most of these recreational fishing license holders receive/take a copy of the department's Sport Fishing Rules pamphlet when they purchase the license. The pamphlet provides an opportunity to convey information about AIS to a large number of Washington citizens through the use of this medium. The department has displayed multiple full page ads in both 2008 and 2009 that are dedicated to AIS information and we have received many calls from concerned citizens as a result (Figure 17).



**Figure 17.** Examples of full page aquatic invasive species informational ads in the 2009/2010 WDFW Sport Fishing Rules pamphlet.

### 3.10.5 Highway signage

In 2008, the department contracted with the Washington State Department of Transportation (WA DOT) to fabricate and install 20 mandated AIS highway signs. The requirements for the signs are outlined in RCW 77.12.882. These signs warn watercraft owners about AIS, the penalties associated with transportation of AIS, and the contact information for obtaining a free inspection. The signs come in two sizes, 12' x 8' for multi-lane highways and 8' x 6' for two lane highways and were placed at strategic border crossings around the state (Figure 18).



**Figure 18.** Map of the 20 large highway sign locations along the Washington State border and a picture of the sign.



## **4.0 Appendixes**

Appendix A	Summary of Washington State AIS Legislation
Appendix B	Washington Invasive Species Council Management Priority Species
Appendix C	WDFW AIS Prevention and Enforcement Legislative Mandates
Appendix D	Watercraft AIS Pathway Literature and State Program References
Appendix E	100 <sup>th</sup> Meridian Boater Survey Forms
Appendix F	Integrated AIS/Boater Safety Inspection Forms
Appendix G	AIS Check Station Inspection Forms
Appendix H	List of 2008-2009 AIS Check Station Locations
Appendix I	Rapid Response Incident Summaries
Appendix J	Letter of Appreciation from Idaho Department of Agriculture





## **Appendix A**

### **Summary of AIS Legislative History**

*1998*

SSB 6114 c 153. The Zebra Mussel and European Green Crab Task Force is established to develop a report with recommendations for management. The Task Force presented a report to the legislature in December of 1998 in which they recommended creation of the Aquatic Nuisance Species Committee (ANSC), a statewide Aquatic Nuisance Species Management Plan, hire an Aquatic Nuisance Species Coordinator and Assistant Coordinator, and develop a containment and early response program for zebra mussels and several other actions with a total biennium budget of \$2,886,788.

*1999*

HJM 4008. Legislature passes a joint memorial to the President of the United States and members of congress to support the Nonindigenous Aquatic Nuisance Species Act (NANPCA) Section 1204(b) appropriation of \$4 million to fund state aquatic nuisance species management plans. Funding was subsequently allocated by congress at approximately \$1 million per year.

*2000*

SSB 6294 c 149. The Aquatic Nuisance Species Committee is established under the department to foster state, federal, tribal, and private cooperation on AIS issues.

*2002*

SSB 6553 c 281. The term “invasive species” is defined and a classification system for aquatic animal species includes “prohibited”, “regulated”, “unregulated”, and “unclassified”, and enforcement authorities are defined and penalties are prescribed. Requirement for the department and WSP develop a cooperative plan for inspecting watercraft entering the state to prevent the introduction of invasive aquatic species. This resulted in the “Cooperative Boat Inspection Plan” that was provided in a report to the legislature in December of 2003.

*2005*

ESSB 5923 c 464. The AIS Prevention and Enforcement Program was created with funding into two accounts from new fees on annual recreational watercraft registration. Directives for implementing the program are provided. This funding was instrumental in creating a new department Statewide AIS Enforcement Coordinator position and rehiring the statewide AIS Coordinator position in 2006. This funding has also been critical in hiring multiple department field staff to conduct program actions. WSP uses a portion of this funding to implement inspection actions on commercially hauled watercraft at their Port of Entry weigh stations. Funding for the program will sunset in 2011 unless reauthorized.

*2007*

E2SSB 5923 c 350. The terms “aquatic invasive species” and “recreational and commercial watercraft” are defined, authority to implement random check stations improved, the department is provided authority to access the AIS Enforcement Account previously managed solely by WSP, and cooperative responsibilities between the department and WSP are clarified.

*2009*

SHB 1778 c 333. Requires watercraft owners coming into the state after having used the watercraft in a designated AIS states or foreign countries to possess valid documentation of inspection certifying it is free of AIS. Authority to adopt rules provided for designating AIS states or foreign countries subject to this law.



## APPENDIX B

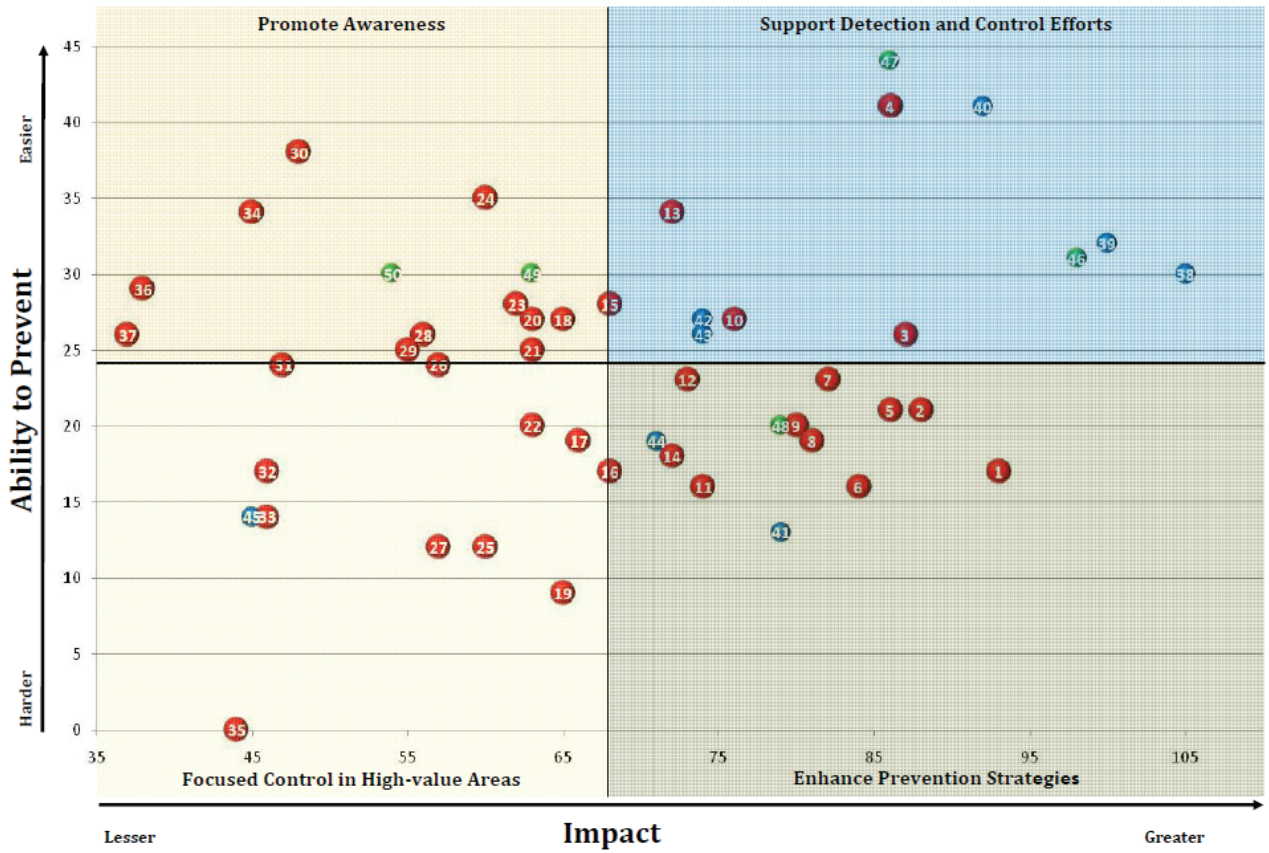
### Washington Invasive Species Council Management Priority Species

<http://www.invasivespecies.wa.gov/>

<b>Here</b>	<b>Near</b>	<b>Far</b>
1. Feral swine 2. Variable leaf milfoil 3. Brazilian elodea 4. Hydrilla 5. Knapweeds 6. <b>Nutria*</b> 7. Yellow starthistle 8. Common reed – non native genotypes 9. Leafy spurge 10. Eurasian watermilfoil 11. <b>Tunicates</b> 12. Parrotfeather 13. Spartina 14. Tamarix 15. Purple loosestrife 16. Dalmation toadflax 17. <b>New Zealand mud snail</b> 18. Himalayan blackberry 19. Knotweeds 20. <b>Green crab</b> 21. Rush skeletonweed 22. Scotch thistle 23. <b>Red swamp/rusty crayfish</b> 24. <b>Bullfrog</b> 25. Garlic mustard 26. Kochia 27. <b>VHS type IVa</b> 28. Exotic apple fruit pests 29. Mediterranean snail 30. Common crupina 31. Hawkweeds 32. Butterfly bush 33. Scotch broom 34. Tansy ragwort 35. Exotic leafrollers 36. Giant hogweed 37. <b>Atlantic salmon</b>	38. <b>Zebra/quagga mussel</b> 39. Lymantriids 40. Kudzu 41. Caulerpa 42. SVCV/IHNV 43. <b>Mitten crab</b> 44. <b>Marine clams</b> 45. Bark-boring moths	46. Wood-boring beetles 47. <b>VHS type IVb</b> 48. <b>Water chestnut</b> 49. <b>Asian carp</b> 50. <b>Northern snakehead fish</b>

\*Yellow highlighted species are regulated by WDFW as aquatic animal invasive species.

# Invasive Species Management Priorities





## Appendix C

### WDFW AIS Prevention and Enforcement Legislative Mandates

#### RCW 77.12.879

#### **Aquatic invasive species prevention account — Aquatic invasive species prevention program for recreational and commercial watercraft — Enforcement program — Check stations — Training — Report to the legislature.**

(1) The aquatic invasive species prevention account is created in the state treasury. Moneys directed to the account from RCW 88.02.050 must be deposited in the account. Expenditures from the account may only be used as provided in this section. Moneys in the account may be spent only after appropriation.

(2) Funds in the aquatic invasive species prevention account may be appropriated to the department to develop an aquatic invasive species prevention program for recreational and commercial watercraft. Funds must be expended as follows:

- (a) To inspect recreational and commercial watercraft;
- (b) To educate general law enforcement officers on how to enforce state laws relating to preventing the spread of aquatic invasive species;
- (c) To evaluate and survey the risk posed by recreational and commercial watercraft in spreading aquatic invasive species into Washington state waters;
- (d) To evaluate the risk posed by float planes in spreading aquatic invasive species into Washington state waters; and
- (e) To implement an aquatic invasive species early detection and rapid response plan. The plan must address the treatment and immediate response to the introduction to Washington waters of aquatic invasive species. Agency and public review of the plan must be conducted under chapter 43.21C RCW, the state environmental policy act. If the implementation measures or actions would have a probable significant adverse environmental impact, a detailed statement under chapter 43.21C RCW must be prepared on the plan.

(3) Funds in the aquatic invasive species enforcement account created in RCW 43.43.400 may be appropriated to the department and Washington state patrol to develop an aquatic invasive species enforcement program for recreational and commercial watercraft. The department shall provide training to Washington state patrol employees working at port of entry weigh stations on how to inspect recreational and commercial watercraft for the presence of aquatic invasive species. The department is authorized to require persons transporting recreational and commercial watercraft to stop at check stations. Check stations must be plainly marked by signs, operated by at least one uniformed fish and wildlife officer, and operated in a safe manner. Any person stopped at a check station who possesses a recreational or commercial watercraft that is contaminated with aquatic invasive species is exempt from the criminal penalties found in RCW 77.15.253 and 77.15.290, and forfeiture under RCW 77.15.070, if that person complies with all department directives for the proper decontamination of the watercraft and equipment.

(4) The department shall submit a biennial report to the appropriate legislative committees describing the actions taken to implement this section along with suggestions on how to better fulfill the intent of chapter 464, Laws of 2005. The first report is due December 1, 2007.

#### RCW 77.12.882

#### **Aquatic invasive species — Inspection of recreational and commercial watercraft — Rules — Signage.**

(1) The department shall adopt rules governing how and when the owners of recreational and commercial watercraft may request an inspection of the watercraft for the presence of aquatic invasive species. The department may coordinate with other states on inspection requirements and may determine when other state inspections meet Washington standards.

(2) The department shall develop and post signs warning vessel owners of the threat of aquatic invasive species, the penalties associated with introduction of an aquatic invasive species, and the contact information for obtaining a free inspection. The signs should provide enough information for the public to discern whether the vessel has been operated in an area that would warrant the need for an inspection. The department shall consult with the state patrol and the department of transportation regarding proper placement and authorization for sign posting.

(3) All port districts, privately or publicly owned marinas, state parks, and all state agencies or political subdivisions that own or lease a boat launch must display a sign provided by the department as described under subsection (2) of this section. Signs must be posted in a location near the boat launch to provide maximum visibility to the public.

(4) The department must coordinate with the Washington state parks and recreation commission to include such information in all boating publications provided to the public. The department shall also include the information on the department's internet site.

## Appendix D

### Watercraft AIS Pathway Risk Literature

Buchan, L. A. J., and D. K. Padilla. 1999. Estimating the probability of long-distance overland dispersal of invading aquatic species. *Ecological Applications* 9:254–265.

Carlton, J. T. 1993. Dispersal mechanisms of the zebra mussel *Dreissena polymorpha*. Pages 677–697 in T. F. Nalepa and D. W., Schloesser, editors. *Zebra mussels: biology, impact, and control*. CRC, Ann Arbor, Michigan, USA.

Griffiths, R. W., D. W. Schloesser, J. H. Leach, and W. P. Kovalak. 1991. Distribution and dispersal of the zebra mussel (*Dreissena polymorpha*) in the Great Lakes region. *Canadian Journal of Fisheries and Aquatic Sciences* 48: 1381–1388.

Gunderson, J. L. 1994. Three-state exotic species boater survey: what do boaters know and do they care? Minnesota Sea Grant, Duluth, Minnesota, USA.

Horvath, T. G., G. A. Lamberti, D. M. Lodge, and W. L. Perry. 1996. Zebra mussel dispersal in lake-stream systems: source-sink dynamics. *Journal of the North American Benthological Society* 15:564–575.

Johnson, L.E., A. Ricciardi, and J.T. Carlton. 2001. Overland dispersal of aquatic invasive species: A risk assessment of transient recreational boating. *Ecological Applications*, 11(6) pp. 1789-1799.

Johnson, L. E., and J. T. Carlton. 1996. Post-establishment spread in large-scale invasions: dispersal mechanisms of the zebra mussel *Dreissena polymorpha*. *Ecology* 77:1686– 1690.

Johnstone, I. M., B. T. Coffey, and C. Howard-Williams. 1985. The role of recreational boat traffic in interlake dispersal of macrophytes: a New Zealand case study. *Journal of Environmental Management* 20:263–279.

Keevin, T. M., R. E. Yarbrough, and A. C. Miller. 1992. Longdistance dispersal of zebra mussels (*Dreissena polymorpha*) attached to hulls of commercial vessels. *Journal of Freshwater Ecology* 7:437.

Leung, B, M. Jonathan, Bossenbroek, and D.M. Lodge. 2006. Boats, pathways, and aquatic biological invasions: estimating dispersal potential with gravity models. *Biological Invasions* 8: 241-254. DOI 10.1007/s10530-004-5573-8.

Neary, B. P., and J. H. Leach. 1992. Mapping the potential spread of the zebra mussel (*Dreissena polymorpha*) in Ontario. *Canadian Journal of Fisheries and Aquatic Sciences* 49:406–415.

Padilla, D. K., M. A. Chotkowski, and L. A. J. Buchan. 1996. Predicting the spread of zebra mussels (*Dreissena polymorpha*) to inland watersheds: consequences of boater movement patterns. *Global Ecology and Biogeography Letters* 5:353–359.

Schneider, D. W., C. D. Ellis, and K. S. Cummings. 1998. A transportation model assessment of the risk to native mussel communities from zebra mussel spread. *Conservation Biology* 12:788–800.

Tyrus, H. P., P. Dwyer, and S. Whitmore. 1994. Feasibility of preventing further invasion of the zebra mussel to the western United States. U.S. Fish and Wildlife Service, U.S. Government Printing Office 1994-576-764/05146, Washington, D.C., USA.

UWSGI (University of Wisconsin Sea Grant Institute). 1993. Astounding numbers of zebra mussels found on aquatic weeds. *Zebra Mussel Update* 21, UWSGI, Madison, Wisconsin, USA.

## Western States with watercraft pathway prevention plans

(With some Great Lakes states included)

<b>Arizona</b>	<a href="http://www.azgfd.gov/h_f/zebra_mussels.shtml">http://www.azgfd.gov/h_f/zebra_mussels.shtml</a>
<b>California</b>	<a href="http://www.dfg.ca.gov/invasives/quaggamusel/">http://www.dfg.ca.gov/invasives/quaggamusel/</a>
<b>Colorado</b>	<a href="http://www.wildlife.state.co.us/WildlifeSpecies/Profiles/InvasiveSpecies/ZebraandQuaggaMussels.htm">http://www.wildlife.state.co.us/WildlifeSpecies/Profiles/InvasiveSpecies/ZebraandQuaggaMussels.htm</a>
<b>Idaho</b>	<a href="http://www.youtube.com/watch?v=J4EVAy8adMk">http://www.youtube.com/watch?v=J4EVAy8adMk</a>
<b>Iowa</b>	<a href="http://www.iowadnr.gov/fish/news/exotics/exotics.html">http://www.iowadnr.gov/fish/news/exotics/exotics.html</a>
<b>Kansas</b>	<a href="http://kdwp.state.ks.us/Fishing/Aquatic-Nuisance-Species">http://kdwp.state.ks.us/Fishing/Aquatic-Nuisance-Species</a>
<b>Maine</b>	<a href="http://www.state.me.us/dep/blwq/topic/invasives/">http://www.state.me.us/dep/blwq/topic/invasives/</a>
<b>Michigan</b>	<a href="http://www.michigan.gov/deq/0,1607,7-135-3313_3677_8314---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3313_3677_8314---,00.html</a>
<b>Minnesota</b>	<a href="http://www.dnr.state.mn.us/eco/invasives/index.html">http://www.dnr.state.mn.us/eco/invasives/index.html</a>
<b>Missouri</b>	<a href="http://mdc.mo.gov/landwater-care/animal-management/invasive-animal-management/zebra-mussels-missouris-most-unwanted">http://mdc.mo.gov/landwater-care/animal-management/invasive-animal-management/zebra-mussels-missouris-most-unwanted</a>
<b>Montana</b>	<a href="http://fwp.mt.gov/fishing/guide/ANS/default.html">http://fwp.mt.gov/fishing/guide/ANS/default.html</a>
<b>Nevada</b>	<a href="http://www.ndow.org/fish/exotic/">http://www.ndow.org/fish/exotic/</a>
<b>New Mexico</b>	<a href="http://www.wildlife.state.nm.us/publications/press_releases/documents/2009/040609ais.html">http://www.wildlife.state.nm.us/publications/press_releases/documents/2009/040609ais.html</a>
<b>New York</b>	<a href="http://www.dec.ny.gov/animals/50121.html">http://www.dec.ny.gov/animals/50121.html</a>
<b>N. Dakota</b>	<a href="http://gf.nd.gov/fishing/ans-equipcleaning.html">http://gf.nd.gov/fishing/ans-equipcleaning.html</a>
<b>Ohio</b>	<a href="http://www.dnr.state.oh.us/Home/wild_resourcessubhomepage/dealing_with_wildlifeplaceholder/InvasiveNuisanceSpecieslandingpage/terrestrialnuisancewildlife/fishingnuisancenuisance/tabid/5827/Default.aspx">http://www.dnr.state.oh.us/Home/wild_resourcessubhomepage/dealing_with_wildlifeplaceholder/InvasiveNuisanceSpecieslandingpage/terrestrialnuisancewildlife/fishingnuisancenuisance/tabid/5827/Default.aspx</a>
<b>Oklahoma</b>	<a href="http://www.wildlifedepartment.com/nuisancespecies.htm">http://www.wildlifedepartment.com/nuisancespecies.htm</a>
<b>Oregon</b>	<a href="http://www.boatoregon.com/OSMB/Clean/ANS.shtml">http://www.boatoregon.com/OSMB/Clean/ANS.shtml</a>
<b>S. Dakota</b>	<a href="http://www.boat-ed.com/sd/handbook/nuisancespecies.htm">http://www.boat-ed.com/sd/handbook/nuisancespecies.htm</a>
<b>Texas</b>	<a href="http://www.texasinvasives.org/">http://www.texasinvasives.org/</a>
<b>Utah</b>	<a href="http://wildlife.utah.gov/habitat/ans/">http://wildlife.utah.gov/habitat/ans/</a>
<b>Wisconsin</b>	<a href="http://dnr.wi.gov/invasives/aquatic/laws/">http://dnr.wi.gov/invasives/aquatic/laws/</a>
<b>Wyoming</b>	<a href="http://gf.state.wy.us/fish/AIS/">http://gf.state.wy.us/fish/AIS/</a>

## Appendix E

### WDFW Courtesy Boat Inspection Questionnaire

Inspector Name: \_\_\_\_\_ Date : \_\_\_\_\_ Time: \_\_\_\_\_

Lake Name: \_\_\_\_\_ Launch Site: \_\_\_\_\_

**Survey Type:** Contact  Observation  **Type of transport:** Personal  Commercial  other

Inspections conducted on boat going into the lake or out? IN  OUT

Is the boat : Motorized  Non-motorized

Type of boat: Angling  Pleasure  Jet Ski  Canoe  Other

Boat registered in: \_\_\_\_\_ Boat Identification number \_\_\_\_\_

1) Have you ever heard of invasive plants or animals? YES  NO

2) If so, what species have you heard about? \_\_\_\_\_

3) Educational information viewed  read  both  boater asked questions

4) What is your home state? \_\_\_\_\_ zip code? \_\_\_\_\_

5) Approximately how many times have you launched in the past year? \_\_\_\_\_

6) Do you always launch in the same water body? YES  NO

7) Where else have you launched recently?

Waterbody: \_\_\_\_\_ State/Country: \_\_\_\_\_ Date: \_\_\_\_\_

Waterbody: \_\_\_\_\_ State/Country: \_\_\_\_\_ Date: \_\_\_\_\_

Waterbody: \_\_\_\_\_ State/Country: \_\_\_\_\_ Date: \_\_\_\_\_

8) Where will you launch next?

Waterbody: \_\_\_\_\_ State/Country: \_\_\_\_\_ Date: \_\_\_\_\_

Waterbody: \_\_\_\_\_ State/Country: \_\_\_\_\_ Date: \_\_\_\_\_

9) Do you clean your boat and trailer between launchings? YES  NO

10) Is your boat kept on land or in water when not in use? On land  In water

11) If in water, where is it kept? Waterbody: \_\_\_\_\_ State: \_\_\_\_\_

**Washington has a law prohibiting the transport of aquatic plants on a boat or trailer on the roads.**

**Inspection done?** YES  NO  If so, done by interviewer  boater  both

**INSPECTION POINTS:** Deck  Hull  Bilge/bait wells  Motor  Trailer  Fishing equipment   
anchor/rope  other : \_\_\_\_\_

**SPECIES FOUND:** None  Milfoil  Zebra Mussels  New Zealand mud snails

Other \_\_\_\_\_ GPS \_\_\_\_\_

**COMMENTS/QUESTIONS:** \_\_\_\_\_





# Appendix F

## Integrated Boating Safety and AIS Vessel Inspection Form

**Washington Department of Fish & Wildlife**  
**Washington State**  
**VESSEL INSPECTION**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Reason for Contact: \_\_\_\_\_  
 Assist  Courtesy Inspect.  Violation  Other

Body of water: \_\_\_\_\_ Location: \_\_\_\_\_  
 On water  Ramp  Other: \_\_\_\_\_

**Operator**  
 Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_ M.I.: \_\_\_\_\_ D.O.B.: \_\_\_\_\_  
 Street Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone #: \_\_\_\_\_ ( ) \_\_\_\_\_

**Owner**  
 Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_ M.I.: \_\_\_\_\_ D.O.B.: \_\_\_\_\_  
 Street Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone #: \_\_\_\_\_ ( ) \_\_\_\_\_

**Vessel**  
 Registration & Decal Control # or Documentation #: \_\_\_\_\_ Hull I.D. #: \_\_\_\_\_  
 Vessel Name: \_\_\_\_\_ Make: \_\_\_\_\_ Model: \_\_\_\_\_ Year: \_\_\_\_\_ Length: \_\_\_\_\_  
 HP: \_\_\_\_\_ Color: \_\_\_\_\_ Weight Capacity: \_\_\_\_\_  
 Outboard  Man  # Persons on Board  
 Inboard  Sail  
 I.O.  Jet

Yes	No	N/A	Required	Yes	No	N/A	Required
			<b>Numbers</b> (Properly displayed)				<b>Muffler</b> (Adequate Condition)
			<b>Current Decal</b> (Properly displayed)				<b>Navigation Lights</b> (Properly displayed)
			<b>Certificate of Numbers</b> (On board)				<b>Distress Signals</b> (Adequate # & Condition)
			<b>Boater Education Card</b> (Mandatory)				<b>Flame Arrestor</b> (Adequate)
			<b>Motor Vessel Checklist</b> (Rentals)				<b>Sound Device</b> (Horn/Whistle/Bell)
			<b>PFDF</b> (USCG Approval)				<b>Ventilation</b> (Engine)
			<b>PFDF</b> (Adequate # & Condition)				<b>Ski Flag</b> (Proper use & display)
			<b>PFDF</b> (Type IV on 16' & over)				<b>Carbon Monoxide Sticker</b> (Displayed)
			<b>PFDF - Child</b> (Worn-age 12 & Under)				<b>PWC</b> (Lanyard used)
			<b>Fire Extinguisher</b> (Approved & Charged)				<b>PWC</b> (Operator Age 14 & older)

Comments: \_\_\_\_\_

No Violation  Warning  Citation # \_\_\_\_\_

Officer Signature: \_\_\_\_\_ RCW/WAC \_\_\_\_\_

**Washington Department of Fish & Wildlife**  
**Aquatic Invasive Species**  
**VESSEL INSPECTION**

State / County / City (Agency): \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Reason for Contact: \_\_\_\_\_  
 Assist  Courtesy Inspect.  Violation  Other

Body of water: \_\_\_\_\_ Location: \_\_\_\_\_  
 On water  Ramp  Other: \_\_\_\_\_

**Operator**  
 Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_ M.I.: \_\_\_\_\_ D.O.B.: \_\_\_\_\_  
 Street Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone #: \_\_\_\_\_ ( ) \_\_\_\_\_

**Owner**  
 Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_ M.I.: \_\_\_\_\_ D.O.B.: \_\_\_\_\_  
 Street Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone #: \_\_\_\_\_ ( ) \_\_\_\_\_

**Vessel**  
 Registration & Decal Control # or Documentation #: \_\_\_\_\_ Hull I.D. #: \_\_\_\_\_  
 Vessel Name: \_\_\_\_\_ Make: \_\_\_\_\_ Model: \_\_\_\_\_ Year: \_\_\_\_\_ Length: \_\_\_\_\_  
 HP: \_\_\_\_\_ Color: \_\_\_\_\_ Weight Capacity: \_\_\_\_\_  
 Outboard  Man  # Persons on Board  
 Inboard  Sail  
 I.O.  Jet

1) Vessel type:  Fishing  Pleasure  PWC  Other \_\_\_\_\_  
 2) Do you always launch on the same body of water?  Yes  No  
 3) Has the vessel been used within the last 30 days?  Yes  No  Unknown  
 4) Last two places you have launched the vessel:

State	County	Body of Water	Date

5) Is the vessel "Moored" or "Trailer" between uses?  Moored  Trailer  
 6) Do you clean your vessel and trailer between launches?  Yes  No  
 7) Do you know what "Aquatic Invasive Species" (AIS) are?  Yes  No  
 8) Do you know any Washington State AIS Laws?  Yes  No


Yes	No	N/A	Inspected	Yes	No	N/A	Inspected
			Hull				Speed Indicator(s)
			Outboard/Outdrive				Zinc(s)
			Propellers				Swim Step(s)
			Drive Shaft(s)				Thru Hulls
			Exhaust Port(s)				Bilge(s)
			Rudder(s)				Fish Well(s)
			Trim Tabs				Other:
			Transducer(s)				Trailer

Contamination?  No  Yes AIS educational materials given?  Yes  No  
 Action taken: \_\_\_\_\_

Officer: \_\_\_\_\_ Badge Number: \_\_\_\_\_



Appendix G



Washington  
Department of  
**FISH and  
WILDLIFE**

### Washington State AIS Watercraft Inspection Certification

Washington Dept. of Fish & Wildlife  
Aquatic Invasive Species Program  
600 Capitol Way N, Olympia WA, 98501  
(360) 902-2200

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*To be filled out by the inspecting Officer (Check or fill out all that apply)*

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Inspection Location: \_\_\_\_\_  
(Latitude, Longitude & Common Name)

Inspecting Agency: WDFW:  WSP:  Other: \_\_\_\_\_  
Registered Owner: \_\_\_\_\_ Address: \_\_\_\_\_  
State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Vessel Make: \_\_\_\_\_ Length: \_\_\_\_\_  
Color(s): \_\_\_\_\_ HIN #: \_\_\_\_\_  
State Registration #: \_\_\_\_\_ (Hull Identification Number)

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*This section to be filled out ONLY when inspection is conducted at check station*

Type of Haul: Private  Commercial

Driver: \_\_\_\_\_ Address: \_\_\_\_\_ State: \_\_\_\_\_  
Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Company: \_\_\_\_\_ Phone: \_\_\_\_\_  
Address: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Marina/Destination vessel is from: Name \_\_\_\_\_ State \_\_\_\_\_ City \_\_\_\_\_  
(Attach copy of Bill of Lading) Address \_\_\_\_\_ Phone \_\_\_\_\_

Marina/Destination vessel is going to: Name \_\_\_\_\_ State \_\_\_\_\_ City \_\_\_\_\_  
(Attach copy of Bill of Lading) Address \_\_\_\_\_ Phone \_\_\_\_\_

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1) Has the vessel been in the water within the last 30 days? Yes  No  Unknown   
If yes, what State(s) & Bodies of Water: \_\_\_\_\_

2) Do you clean the vessel and trailer between uses? Yes  No

Parts of Vessel Inspected: *(check/ answer all that apply)*

Trim Tabs  Outdrive/Outboard  Exhaust Ports  # of: \_\_\_\_\_ Thru Hulls  # of: \_\_\_\_\_

Bilge  Live/Fish well(s)  # of: \_\_\_\_\_ Hold(s)  # of: \_\_\_\_\_ Transducer(s)  # of: \_\_\_\_\_

Swim Step(s)  Propeller(s)  Drive Shaft(s)  Rudder(s)  Keel  Hull

Other Equipment/ Areas Inspected  (describe): \_\_\_\_\_

Is watercraft on a launching type trailer? Yes  No

Parts of Trailer Inspected: *(check all that apply)*

Cross members (& tube openings)  Wheels & backing plates  Bunks/Rollers  Light(s)/License Brackets

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**Inspection Finding:**

Contamination: No  Yes  \*If yes continue below

**Action Taken:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Inspecting Officer \_\_\_\_\_ Owner/Driver Signature: \_\_\_\_\_



If applicable - Attach a copy of the Bill Of Lading to Inspection form and forward both to WDFW (address at top of form)

**RCW 77.15.253: Unlawful use of prohibited aquatic animal species — Penalty.**

- (1) A person is guilty of unlawful use of a prohibited aquatic animal species if he or she possesses, imports, purchases, sells, propagates, transports, or releases a prohibited aquatic animal species within the state, except as provided in this section.
- (2) Unless otherwise prohibited by law, a person may:
  - (a) Transport prohibited aquatic animal species to the department, or to another destination designated by the director, in a manner designated by the director, for purposes of identifying a species or reporting the presence of a species;
  - (b) Possess a prohibited aquatic animal species if he or she is in the process of removing it from watercraft or equipment in a manner specified by the department.
  - (c) Release a prohibited aquatic animal species if the species was caught while fishing and it is being immediately returned to the water from which it came; or
  - (d) Possess, transport, or release a prohibited aquatic animal species as the commission may otherwise prescribe.
- (3) Unlawful use of a prohibited aquatic animal species is a gross misdemeanor. A subsequent violation of subsection (1) of this section within five years is a class C felony.
- (4) A person is guilty of unlawful release of a regulated aquatic animal species if he or she releases a regulated aquatic animal species into state waters, unless allowed by the commission.
- (5) Unlawful release of a regulated aquatic animal species is a gross misdemeanor.
- (6) A person is guilty of unlawful release of an unlisted aquatic animal species if he or she releases an unlisted aquatic animal species into state waters without requesting a commission designation under RCW 77.12.020.
- (7) Unlawful release of an unlisted aquatic animal species is a gross misdemeanor.
- (8) This section does not apply to:
  - (a) The transportation or release of organisms in ballast water;
  - (b) A person stopped at an aquatic invasive species check station who possesses a recreational or commercial watercraft that is contaminated with an aquatic invasive species, if that person complies with all department directives for the proper decontamination of the watercraft and equipment; or
  - (c) A person who has voluntarily submitted a recreational or commercial watercraft for inspection by the department and has received a receipt verifying that the watercraft has not been contaminated since its last use.

[2002 c 281 § 4.] Notes: Purpose — 2002 c 281: See note following RCW 77.08.010.

**RCW 77.15.290: Unlawful transportation of aquatic plants. (Edited version, sections 1-3 not included)**

- (4) A person is guilty of unlawful transport of aquatic plants if the person transports aquatic plants on any state or public road, including forest roads, except as provided in this section.
- (5) Unless otherwise prohibited by law, a person may transport aquatic plants:
  - (a) To the department, or to another destination designated by the director, in a manner designated by the department, for purposes of identifying a species or reporting the presence of a species;
  - (b) When legally obtained for aquarium use, wetland or lakeshore restoration, or ornamental purposes;
  - (c) When transporting a commercial aquatic plant harvester to a suitable location for purposes of removing aquatic plants;
  - (d) In a manner that prevents their unintentional dispersal, to a suitable location for disposal, research, or educational purposes; or
  - (e) As the commission may otherwise prescribe.
- (6) Unlawful transport of aquatic plants is a misdemeanor.
- (7) This section does not apply to:
  - (a) Any person stopped at an aquatic invasive species check station who possesses a recreational or commercial watercraft that is contaminated with an aquatic invasive species if that person complies with all department directives for the proper decontamination of the watercraft and equipment; or
  - (b) Any person who has voluntarily submitted a recreational or commercial watercraft for inspection by the department and has received a receipt verifying that the watercraft has not been contaminated since its last use.

[2002 c 281 § 7; 2001 c 253 § 35; 1998 c 190 § 48.] Notes: Purpose — 2002 c 281: See note following RCW 77.08.010.

**RCW 77.15.250: Unlawful release of fish, shellfish, or wildlife — Penalty — Unlawful release of deleterious exotic wildlife — Penalty.**

- (1) (a) A person is guilty of unlawfully releasing, planting, or placing fish, shellfish, or wildlife if the person knowingly releases, plants, or places live fish, shellfish, wildlife, or aquatic plants within the state, and the fish, shellfish, or wildlife have not been classified as deleterious wildlife. This subsection does not apply to a release of game fish into private waters for which a game fish stocking permit has been obtained, or the planting of fish or shellfish by permit of the commission.
  - (b) A violation of this subsection is a gross misdemeanor. In addition, the department shall order the person to pay all costs the department incurred in capturing, killing, or controlling the fish, shellfish, aquatic plants, or wildlife released or its progeny. This does not affect the existing authority of the department to bring a separate civil action to recover costs of capturing, killing, controlling the fish, shellfish, aquatic plants, or wildlife released or their progeny, or restoration of habitat necessitated by the unlawful release.
- (2) (a) A person is guilty of unlawful release of deleterious exotic wildlife if the person knowingly releases, plants, or places live fish, shellfish, or wildlife within the state and such fish, shellfish, or wildlife has been classified as deleterious exotic wildlife by rule of the commission.
  - (b) A violation of this subsection is a class C felony. In addition, the department shall also order the person to pay all costs the department incurred in capturing, killing, or controlling the fish, shellfish, or wildlife released or its progeny. This does not affect the existing authority of the department to bring a separate civil action to recover costs of capturing, killing, controlling the fish, shellfish, or wildlife released or their progeny, or restoration of habitat necessitated by the unlawful release.

[2001 c 253 § 32; 1998 c 190 § 31.]

**RCW 77.15. Unlawfully avoiding aquatic invasive species check station — Penalty.**

- (1) A person is guilty of unlawfully avoiding aquatic invasive species check stations if the person fails to:
  - (a) Obey check station signs; or
  - (b) Stop and report at a check station if directed to do so by a uniformed fish and wildlife officer.
- (2) Unlawfully avoiding aquatic invasive species check stations is a gross misdemeanor.



## Appendix H

### List of Enforcement Check Stations

2008 Check Station dates, locations, and number of watercraft inspected.

<b>Date</b>	<b>Location</b>	<b>Watercraft Inspections</b>
Aug. 16	Kettle Falls	44
Aug. 22/23	Plymouth POE	85
Aug. 23	Lake Washington	84
Aug. 23	Columbia River/Marine Park (Vancouver)	27
Aug. 31	Lake Roosevelt/Fort Spokane	53
Sept. 1	SR 101/Indian Valley weigh station	78
Sept. 1	Hwy 503	16
Sept. 9	Chief Joseph Dam/Lake Rufus Woods	7
Sept. 10	Columbia River/Chinook	5
Sept. 14	Lake/Skagit Co.	12
	<b>Total</b>	<b>411</b>

2009 Check Station dates, locations, and number of watercraft inspected.

<b>Date</b>	<b>Location</b>	<b>Watercraft Inspections</b>
May 9	Lake Washington	49
May 10	Stevens Pass/Hwy 12	35
June 20	Plymouth POE/Hwy 395	66
July, 11	Potholes Reservoir	55
July, 17	Port of Shelton	13
July 18	Lake Tapps	34
July 24	Cle Elum POE/I-90	52
July 25	Rearden/Hwy 2	144
Aug. 7	American Lake	15
Aug. 21	I-90/SR 26	19
Aug. 22	Columbia River/Wanapum	49
Aug. 23	Stevens Pass/Hwy 12	67
Sept. 7	SR 503/Cougar	12
Sept. 11	Dry Falls Junction	48
Sept. 25	Ridgefield POE/I-5	55
	<b>Total</b>	<b>713</b>



## Appendix I

### Rapid Response Incidents Involving Watercraft with Dreissena Species

Incident Report Date	Species Live/Dead	Location	Source	Destination	Size Watercraft	Private/Commercial	Citation
Dec. 10, 2006	Zebra/Live	Marysville, WA	Ohio	BC	24 ft pleasure	Private	Warning
Jan. 19, 2007	Zebra/Unk	Cle Elum POE	Wisconsin	La Conner, WA	39 ft pleasure	Commercial	Warning
May 7, 2007	Zebra/Unk	Ridgefield POE	Missouri	Victoria, BC	59 ft Houseboat	Commercial	Warning
May 9, 2007	Zebra/Dead	Cle Elum POE	Ohio	La Conner, WA	40 ft pleasure	Commercial	Warning
July 25, 2007	Quagga/Unk	Kennewick, WA	N/A	N/A	N/A	N/A	N/A
Sept. 2, 2007	Zebra/Live	Spokane POE	Lake Huron, Canada	Everett, WA	44 ft Sailboat	Commercial	Gross Misdemeanor
Sept. 10, 2007	Zebra/Dead	Cle Elum POE	Wisconsin	Alaska	N/A	N/A	N/A
Sept. 14, 2007	Zebra/Dead	Cle Elum POE	Michigan	WA	N/A	N/A	N/A
Sept. 28, 2007	Zebra/Unk	N/A	Michigan	WA	N/A	N/A	N/A
Oct. 11, 2007	Zebra/Unk	Spokane POE	Lake Michigan	Anacortes, WA	38 ft Sailboat	Commercial	Gross Misdemeanor
Oct. 15, 2007	Zebra/Live	Spokane POE	Minnesota	La Conner, WA	40 ft pleasure	Commercial	Gross Misdemeanor
Oct. 23, 2007	Zebra/Live	Spokane POE	Great Lakes	Seattle, WA	Unk ft. pleasure	Commercial	Gross Misdemeanor
Nov. 13, 2007	Zebra/Live	Spokane POE	"Midwest"	BC	31 ft pleasure	Commercial	Gross Misdemeanor
Feb. 5, 2008	Quagga/Live	Ridgefield POE	Lake Mead, NV	BC	24 ft pleasure	Private	Warning
Apr. 3, 2008	Conrads/Live	La Conner, WA	Louisiana	Puget Sound, WA	54 ft pleasure	Commercial	Warning
Aug. 29, 2008	Zebra/Unk	"Scale #64"	Cleveland, OH	Goldstream, BC	32 ft pleasure	Private	Warning
May 20, 2009	Quagga/Live	Spokane, WA	Lake Mead, NV	Spokane, WA	26 ft pleasure	Private	Gross Misdemeanor
June 29, 2010	Conrads/Unk	Cle Elum POE	Rockhall, MA	Whiterock, BC	Unk ft. pleasure	Commercial	Warning
Nov. 13, 2009	Zebra/Live	Cle Elum POE	Lake St. Clair, MI	BC	38ft pleasure	Commercial	Felony
May 6, 2010	Quagga/Unk	Plymouth POE	Lake Mead, NV	Oroville, WA	26 ft pleasure	Private	Warning
Sept. 22, 2010	Zebra/Live	Cle Elum POE	Michigan	Bellingham	50 ft pleasure	Commercial	Pending
Sept. 28, 2010	Zebra/Unk	Cle Elum POE	Lake Texoma, Texas	Anacortes	48 ft pleasure	Commercial	Pending



## Appendix J

### Letter of Appreciation from Idaho Department of Agriculture



GOULD  
IDAHO STATE DEPT OF AG

cc: Phil Anderson, Jim Scott, Bruce Bjork

C.L. "BUTCH" OTTER  
Governor  
CELIA R. GOULD  
Director

October 27, 2009

Mr. Phil Anderson, Director  
Washington Department of Fish and Wildlife  
600 Capitol Way, N  
Olympia, WA 98501-1091

Dear Mr. Anderson:

As Chair of the Idaho Invasive Species Council, I am writing this to thank you personally for your agency's support of Idaho's Invasive Species Program. My staff particularly appreciates the continued cooperation of Mr. Allen Pleus and Sgt. Eric Anderson.

We consider the Washington Department of Fish and Wildlife an important partner in this fight. In fact, we couldn't have succeeded this season without your assistance and continued dedication to protecting our region's precious water resources. The environmental and economic damage would be substantial and widespread if these invasive mussels became established in the Pacific Northwest.

The willingness of your staff to go the extra mile has made a significant difference to Idaho and our citizens. Once again, please accept my sincere thanks for your department's contribution to Idaho's Invasive Species Program.

Sincerely,

A handwritten signature in blue ink that reads "Celia R. Gould".

Celia R. Gould  
Director, Idaho State Department of Agriculture  
Chair, Idaho Invasive Species Council

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OFFICE OF THE DIRECTOR













State of Washington  
**DEPARTMENT OF FISH AND WILDLIFE**

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