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Ballast Water Management in Washington State:

A Report of the State Ballast Water Work Group to the
2007 Regular Session of the Washington State Legislature



PUGET SOUND ACTION TEAM

Office of the Governor, State of Washington

Prepared by the Washington State Ballast Water Work Group

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1. EXECUTIVE SUMMARY

1.1. Background

The Ballast Water Management Act created the Ballast Water Work Group (work group) to study and recommend ways to improve Washington state's program for managing ballast water. In February 2006, the work group submitted an interim report to the legislature documenting the status and progress of the work group and ballast water management practices in the state.

Ships use ballast water to increase the stability, efficiency and safety of the vessel. Vessel operators take on ballast water by pumping water into special tanks on the ship. Ballasting occurs while the ship is at port or soon after leaving port. De-ballasting, or discharging of ballast, occurs when the ship enters protected waters or while at port when the vessel is loaded with cargo.

The preamble to S363, a congressional bill introduced in 2006, declares that ballast water from ships is one of the largest pathways for the introduction and spread of aquatic invasive species. The preamble estimates that some 10,000 non-indigenous aquatic species travel around the globe each day in the ballast water of cargo ships.

The U.S. Coast Guard (USCG) manages ballast water at the national level. Under this program, operators of vessels that arrive at American ports from outside the U.S. Exclusive Economic Zone (EEZ) or 200 nautical miles offshore must report ballast water management practices to the National Ballast Water Information Clearinghouse (NBIC), and implement on-board plans for managing ballast water. Operators must also conduct a mid-ocean exchange before entering the EEZ; or retain ballast water on board, use alternative environmentally sound methods of managing ballast approved by the USCG or discharge to an approved reception facility.

The USCG does not regulate ballast water for vessels engaged in commerce inside the EEZ the same way as it does for vessels that arrive from outside the EEZ. The national regulations allow vessel operators to discharge only the amount of ballast water operationally necessary to maintain the safety of the vessels and to document the reasons for this necessity.

The state's program for managing ballast water, administered by the Washington Department of Fish and Wildlife (WDFW), fills a critical gap in the national program. WDFW regulates vessels that arrive at Washington ports. Vessels originating from ports on the Columbia River or from ports south of 50 degrees north (50°N) are exempt

from these requirements. Masters of vessels are required to exchange ballast water at least 50 nautical miles offshore or use treatment systems approved by the state before they discharge ballast water to state waters. All vessel operators must report ballast management practices to WDFW and the NBIC.

Vessel masters or owners/operators may claim exemptions from these requirements if the safety of the ship, its crew or passengers is at risk. State inspectors can board vessels to collect samples and review logs and other documents to confirm reported ballast practices.

Shipping is an important and vital economic engine in the state. Washington's trading partners include Pacific Rim countries and the states of California, Oregon and Alaska. The U.S. Maritime Administration (MARAD) reported that more than 62 million metric tons of imported and exported goods passed through Washington ports in 2005 compared to about 45 million metric tons in 2000.

WDFW tracks vessel arrivals to Washington ports. In 2005, the department reported that more than 4,000 vessels called on state ports—including 3,330 vessel arrivals at Puget Sound and coastal estuary ports and 625 vessels called on Washington ports on the Columbia River. In 2003, the department recorded over 3,300 vessel arrivals to Washington ports.

Data from WDFW's vessel reporting system shows that vessels discharged an annual average of about 9.5 million cubic meters (more than 2.4 billion gallons) of ballast water to state waters between 2003 and 2005—or about nine times the volume of the Tacoma Dome. Vessels discharged about two thirds of this volume to Puget Sound ports and the rest to Washington ports on the Columbia River. Operators exchanged or partially exchanged almost 90 percent of ballast water discharged to waters of the state.

Ballast water that is un-exchanged or untreated is a high risk for introducing invasive species. WDFW reported that between 2003 and 2006, ships discharged an annual average of 44,000 cubic meters (12 million gallons) of un-exchanged high-risk ballast water to Washington ports on the Columbia River. The annual volume of high-risk ballast water discharged to Puget Sound ports dropped significantly between 2003 and 2006—from 230,000 cubic meters to about 30,000 cubic meters (about 8 million gallons).

Almost all of the high risk un-exchanged ballast water discharged to state waters is from vessels arriving from California ports.

1.2. Conclusions and recommendations

Several significant challenges remain for the state's program for managing ballast water. The following are the Ballast Water Work Group's recommendations to the Washington State Legislature that address these challenges.

1.2.1. Provide stable and adequate funds to effectively administer and enforce the state's program for managing ballast water

The ballast water management program is administered by WDFW. The program is currently funded largely by grants and diminishing support from federal sources. The department has requested \$364,000 in new state general funds for the 2007-2009 biennium to support two ballast water inspectors, their travel and vehicle leases. By comparison, the Oregon state ballast water program is unfunded. The Oregon Ballast Water Task Force recommended that the Oregon Legislature provide \$504,000 per biennium to implement the state program.

Recommendations

The Ballast Water Work Group agreed that:

1. The state ballast water management program needs stable funding and should move away from grants and other soft money.
2. WDFW should continue to seek grants, accept gifts and donations, and use penalties and fees, when appropriate, to carry out additional work.
3. The Washington State Legislature should authorize the creation of a ballast water management account to accommodate the use of these funding sources.
4. The program elements for the state ballast water program identified in Chapter 7: *Ballast Water Program Costs and Funding* in this report are appropriate. The elements include program administration, tracking of vessel reports, inspections of vessels, research and sample analysis, enforcement, approval of treatment technologies, environmental and program effectiveness monitoring, technical support, and support for the ongoing work of the Ballast Water Work Group.
5. The state's program will continue to evolve and change with time and experience.

6. WDFW should continue to complement, seek consistency and attempt to integrate their data on vessel ballast practices reports with those of the NBIC, neighbor states and Canada.
7. WDFW should conduct a thorough statistical analysis of the database to identify patterns, profile high-risk vessels and assess risks. Additional contract funds are needed to harmonize data and carry out the statistical assessment.
8. WDFW should work with the USCG, and the Department of Ecology to improve coordination to minimize apparent duplication of effort related to the boarding of vessels, work more effectively with vessel masters and crew, and to recommend changes to state law to streamline the program, while maintaining the goals and objectives of the state program.

Concerns with recommendations

The work group did not reach full consensus on how much funding is necessary for the state program. Staff to the work group estimates that an effective state program costs about \$1.4 million every two years. Roughly half this amount is for salaries and personnel support including inspectors, data entry, sample analysis and administration personnel. The remainder is for contracts to conduct environmental monitoring to evaluate the effectiveness of the state management program and to process environmental samples taken during vessel inspections.

Although members agreed with personnel and administration costs associated with the program, several members had concerns related to the costs for carrying out environmental and program effectiveness monitoring. The biggest difference revolved around the rationale, scope and purpose for conducting scientifically challenging environmental assessment for invasive species introduction from ballast water. Some members believe that such an assessment should be linked to a statewide assessment and not focused exclusively on ballast water. These members also had concerns about the scientific challenges in identifying a baseline and specifically on the difficulty of identifying invasive species introduced in ballast water. Chapter 7: *Ballast Water Program Costs and Funding* summarizes other differences.

1.2.2. Develop the capacity in Washington and Oregon to effectively coordinate and manage ballast water on the Columbia River

Portland State University (PSU) supports Oregon's ballast water program through research. The Department of Environmental Quality (ODEQ) regulates ballast water discharges for the state, but the department has not received funds to administer the program. In October 2006,

the Oregon Ballast Water Task Force recommended that the Oregon Legislature fund a full-time position at ODEQ for this purpose.

In 2006, the Ballast Water Work Group contracted with PSU to develop alternative strategies for managing ballast water on the Columbia River. PSU suggested that although the differences in management approaches and regulations between Oregon and Washington are currently minor, they could conflict particularly over setting standards for the discharge of treated ballast water and in how WDFW handles safety exemptions. PSU further recommended that Washington State, in cooperation with Oregon, create a Columbia River Joint Commission or similar entity to coordinate and resolve actual and potential management conflicts on the river.

Consensus Recommendations

The Washington State Legislature should:

1. Direct the Ballast Water Work Group to advise WDFW and facilitate interstate cooperation to resolve and integrate Washington and Oregon ballast water programs, policies, regulations and activities.
2. Specify that the Ballast Water Work Group, when considering Columbia River issues, shall engage with and include staff from the ODEQ, from the Oregon Ballast Water Task Force and from PSU.
3. Specify that both states designate co-chairs to host cooperation meetings related to the Columbia River ballast water management.
4. Provide adequate funds to support Washington's participation in this work.
5. Direct the Ballast Water Work Group to lead a process, in cooperation with WDFW, to develop an agreement between the governors of each state for cooperation and joint management of ballast water on the Columbia River.
6. Specify that the Ballast Water Work Group review a 2001 Memorandum of Agreement between Governor Locke and the USCG as a model for cooperation and joint management of ballast water with the federal government and in shared waters on the Columbia River.

1.2.3. Align state law and regulations with regional, national and international ballast water requirements

The work group recommendations consist of four parts:

- 1.2.3.1. Update the state's ballast water exchange and treatment standards.
- 1.2.3.2. Adopt a treatment-only management approach.
- 1.2.3.3. Update the state's ballast water penalty and enforcement structure.
- 1.2.3.4. Require monitoring to evaluate the effectiveness of the program.

1.2.3.1. Update the state's rules on exchange and treatment standards

The work group agreed that current state standards should align with current or proposed national and international standards. The current state standards relate to the performance of treatment technology and not on the quality of the discharge. The work group understands that these technology standards (WAC 220-77-095) will remain in place until WDFW develops rules for the quality of discharged ballast water.

The work group agreed that there is considerable uncertainty about national and international policy related to treatment and discharge standards, and that stakeholders have divergent positions regarding standards.

Chapter 3: *Overview of Ballast Water Regulatory Program* describes international, national and state standards.

Consensus recommendations

WDFW should:

1. Develop numeric exchange and treatment standards through the agency's rule revision process, taking into account each member's position on performance standards and the breadth of issues raised in this report.
2. Use the work group to vet language, concepts and performance standards.

1.2.3.2. Clarify treatment requirements for ballast water discharges in regulation

Current state law allows exchange as a viable management approach. After July 2007, if a vessel operator cannot exchange ballast water, the operator must either treat it prior to discharge or retain it onboard.

The International Maritime Organization (IMO) convention and current California law move towards requiring treatment only as the preferred approach for managing ballast water. Treatment only refers to the phase out of exchange as a management practice, requiring instead that operators treat ballast water to meet certain discharge quality standards.

Both IMO and the state of California plan to phase in these requirements on the same schedule based on the size and date of construction of vessels. Full implementation of treatment-only requirements would occur by 2016. California law requires that the State Lands Commission review the status of treatment technology prior to the implementation dates to determine whether technology is available to meet target dates or if the state should amend the standards and/or implementation dates.

Several congressional bills that address this issue would also move the nation toward treatment only as the preferred approach for managing ballast water.

Current Canadian law for managing ballast water essentially adopts the IMO approach. It also has some similarities to Washington's approach. Canada defines ballast water management to include: a) exchange to meet specific standards; b) treatment to meet discharge quality standards; c) discharge to approved reception facilities; or d) retain ballast on board.

Research conducted by the University of Washington (UW) and WDFW from 2001 through 2005 has found that the effectiveness of ballast exchange to minimize non-native species in the discharge is highly variable. The UW studied exchanged ballast water from almost 250 vessels of various types. They concluded that exchange as currently practiced probably has little effect in reducing the introduction of planktonic non-indigenous species to Puget Sound.

The UW found that the density and percentage of non-indigenous species in samples of exchanged ballast were consistently and significantly higher from domestic trips dominated by tank ships carrying ballast from California, and lower in samples from transpacific ships from Pacific Rim countries. This and other findings are in an article

under review by the Canadian Journal of Fishery and Aquatic Sciences, by Jeffery Cordell, University of Washington, and coauthors.

The effectiveness of ballast water exchange depends on a number of issues including how the exchange is conducted, the design and construction of the ballast tanks on different classes of ships, the location of where the exchange is conducted and whether the vessel operator has sufficient time to carry out a complete exchange to meet prescribed standards.

Consensus recommendations

The work group agreed that the July 1, 2007 deadline in Chapter 77.120.030 RCW requiring vessel operators to exchange, treat or hold ballast water onboard must remain in place.

The work group also recognized that the state must allow vessel masters to claim safety exemptions when the safety of a vessel, its passengers and crew are at risk. The group agreed that if a vessel operator discharges un-exchanged or untreated ballast water following a request for a safety exemption, the owner/operator should pay a fee for doing so or pay a penalty if the operator inappropriately used the exemption.

WDFW, in consultation with the Ballast Water Work Group, should adopt rules, guidance or other means that:

1. Target high-risk vessels for alternative management when the department determines that exchange is ineffective. Alternative management could include better treatment technologies, more effective exchange, or better ways to hold ballast on board, etc.
2. Align, to the extent possible, state discharge standards with those proposed and adopted by international, national and regional programs.
3. Define a system to advance the development of ballast water treatment technologies and testing in conjunction with state, regional and national efforts. The system should include incentives and disincentives. Incentives could include such things as: a) securing agreements with neighboring states and the USCG; b) providing legal assurances to protect vessel operator/owners should the technology fail; and c) encouraging vessel owners/operators that repeatedly discharge high-risk ballast water to test treatment technologies and make operational adjustments. Disincentives could include increased fines or prohibiting high-risk vessels from discharging ballast water.

4. The work group also recommends that the Washington State Legislature amend the Ballast Water Management Act to give WDFW authority to develop and implement sliding-scale fees and penalties based on the severity of discharge and/or practice.

1.2.3.3. Update the state's ballast water penalty and enforcement structure

Ship owners and operators want fair, equitable and consistent handling and treatment by the state in all matters related to shipping and ballast water management and enforcement. Several stakeholders on the Ballast Water Work Group do not consider Washington penalties to be an adequate disincentive to promote compliance with state laws. Under current Washington law, WDFW may assess penalties up to \$5,000 per violation for discharging un-exchanged ballast water, \$500 per violation of the reporting requirements and up to \$5,000 per violation for falsifying records. Violators pay penalties into the state general fund. These funds are not available to support the state ballast water management program.

The USCG can assess penalties of up to \$27,500 for violations of the national ballast water program. California has identical civil penalties (i.e., up to \$27,500 per occurrence with each day of a continuing violation a separate violation). The California law also states that a vessel cannot be fined more than the maximum amount for any violation (i.e., operators cannot be fined \$27,500 from multiple agencies).

Recommendations

The Washington State Legislature should:

1. Increase Washington's penalties in Chapter 77.120.070 RCW to \$27,500 per occurrence with each day of a continuing violation considered a separate violation. This amendment would make Washington's penalty structure comparable to California and the USCG penalties. WDFW will consult with the work group to define "each day of a continuing violation."
 2. Establish a ballast water account in the state treasury administered by WDFW.
 3. Specify that ballast water account can be capitalized by legislative appropriations, gifts, grants, donations, penalties and fees and specify that:
 - a. Expenditures from the account may be used only to carry out the purposes of the Act or to support it through research and monitoring; and that funds cannot be used to support salaries of permanent department employees.
- b. The account is subject to allotment procedures under RCW 43.88 RCW and the approval of the director or the director's designee.
 - c. Penalties deposited into the account may be used only to support basic and applied research and carry out education and outreach related to state's ballast water management.
 - d. WDFW must consult with the Ballast Water Work Group when making expenditures of penalties funds.

The Department of Fish and Wildlife should:

1. Adopt rules to implement a schedule for penalties and for penalty amounts that is consistent with those adopted by the USCG.
2. Define in rule the meaning of "each day of a continuing violation."

Concerns with recommendations

Under this recommendation, some members expressed concern that vessel owner/operators could be fined for more than the maximum amount for a violation. They specifically want to clarify that an owner/operator cannot receive multiple fines from multiple agencies per violation.

1.2.3.4. Amend the Ballast Water Management Act to require environmental monitoring to evaluate the effectiveness of the state's program

IMO guidelines encourage member countries to conduct biological surveys to assess the presence and distribution of non-native species, and to evaluate the effectiveness of ballast management programs.

California ballast water laws also require the state fish and wildlife agency to conduct biological surveys for non-native species introduced by ships. These surveys help the state identify alternative discharge zones, identify environmentally sensitive areas, and potential risk zones for uptake or discharge of ballast water, and evaluate the long-term effectiveness of the management program.

Consensus recommendations

The Washington State Legislature should direct the Ballast Water Work Group to:

1. Advise WDFW in developing a program to establish and maintain an inventory of introduced non-indigenous plants and animals in and adjacent to ports, harbors, oil transfer facilities, grain elevators and other ship berthing facilities in Puget Sound, the Columbia River and in the state's coastal estuaries.
2. Assist WDFW in evaluating the effectiveness of the state's program through ecological surveys that determine the extent and distribution of non-native species introduced via ballast water in Puget Sound, the Columbia River and the state's coastal estuaries.
3. Advise WDFW in establishing and maintaining, in consultation with the state of Oregon, a monitoring program to evaluate the effectiveness of the state's program on the Columbia River.

1.2.4. Improve the ballast water reporting process and reporting compliance

In addition to federal reporting requirements, Washington law requires ship operators to report ballast water practices to WDFW.

On average, about 55 percent of the ship operators submitted reports that were in full compliance with state law. Of the 45 percent of the operators not in compliance, about 16 percent did not submit reports; 24 percent provided inaccurate but timely reports; and about 4 percent submitted accurate reports that were late. Inaccurate submissions range from minor typos and missing data fields to much more significant errors.

Vessel operators and the state can improve compliance with reporting requirements. The compliance rate will improve as the both federal and state programs automate reporting requirements.

Under the federal program, vessel operators must report ballast management practices to the NBIC. Opportunities exist to minimize duplication of effort in reporting between the national and state reporting requirements.

Consensus recommendations

The Department of Fish and Wildlife shall:

1. Work with vessel operators to improve reporting practices by continuing to inspect vessels in coordination with the USCG and by assertively following up with those who do not comply with reporting requirements. Follow-up should include a full range of tools from education to enforcement.
2. Continue to do outreach to vessel operators and agents to educate them about ballast water reporting requirements and the reporting process.
3. Consider, in consultation with the work group, ways to minimize duplication of effort by Washington State, the state of Oregon, NBIC and Canada regarding ballast water reporting.

1.2.5. Improve the process and procedures for approving ballast water treatment technologies in Washington

The state must evaluate the effectiveness and toxicity of any treatment technology proposed for use in Washington State. To minimize confusion, WDFW must improve the review process, including standardization of both effectiveness and toxicity testing procedures. If the state does this, vendors will have certainty about information that the state requires and about how WDFW evaluates technologies.

Consensus recommendations

The Department of Fish and Wildlife shall:

1. Consult with departments of Ecology and Agriculture and the Ballast Water Work Group, to develop consistent procedures and protocols for evaluating the efficacy of exchange and treatment technologies. These procedures should align, to an extent practicable, with procedures used by the USCG Shipboard Technology Evaluation Program (STEP); as well as those under development or developed at the international and regional levels.
2. Coordinate with departments of Ecology and Agriculture, and consult with the Ballast Water Work Group, to develop consistent procedures and protocols for evaluating the environmental impacts of discharged treated ballast water. These procedures should consider the environmental fate of any chemicals used in treatment and the results of toxicity testing conducted in accordance with *Establishing the Environmental Safety of Ballast Water Biocides*, Ecology Publication WQ-R-95-80.

3. Modify state rules (Chapter 220.77.095(2)(b) WAC) to combine WDFW's science and marine advisory panels into one science advisory panel. The department will consult with this science panel to establish procedures and protocols for reviewing and recommending technology for use in waters of the state. The rules should task the science advisory panel with advising WDFW on the implementation of study plans, monitoring results, etc. The panel may establish technical groups to aid and advise it in the performance of its functions.
4. Consult with the Ballast Water Work Group and coordinate with the USCG, to develop standards and protocols for ballast water sampling for compliance and enforcement purposes.

The Washington State Legislature should fund the functions of the science advisory panel.

1.2.6. Demonstrate ballast water treatment as an environmentally friendly and cost-effective management approach

WDFW, in consultation with the department's science advisory panel, has approved or conditionally approved three technologies that use non-chemical or a combination of non-chemical and chemical methods to treat ballast water discharges.

In October 2006, IMO also approved several technologies that use active substances for use to treat ballast water. Several of these technologies are now commercially available around the world. Some are installed on vessels to demonstrate effectiveness, safety and practicality.

Several companies with ships that call on Washington ports are testing technologies. Testing of new treatment technology is moving forward. Currently, there is no mix of treatment options that are both feasible and proven for all vessel types. This is especially true since standards are still under development at the regional, national and international levels.

For various reasons, the state has difficulty encouraging ship owners and operators to invest time and resources to install only state of Washington-approved ballast water treatment technologies for further testing and eventual approval for long-term use.

The work group identified the following barriers that prevent owner operators from demonstrating treatment technology. They include:

- Lack of funds to test systems.
- Lack of a defined process for approving technologies.
- Lack of definite deadlines for compliance.
- Lack of uniform standards.
- Lack of liability protection for introducing invasive species when testing a treatment option.
- Concerns about interstate liability for using Washington-approved technologies in other states or vice versa.

Consensus recommendations

The Washington State Legislature should:

1. Direct WDFW, in consultation with the Ballast Water Work Group, to recommend programs and incentives to encourage further testing of treatment technologies. In making these recommendations, WDFW must consider other testing programs at the international, federal, regional or state level including small- and large-scale onboard and shore based testing.

1.2.7. Identify essential research and key research questions to inform and improve the state's ballast water management program and policy

WDFW, as well as researchers at UW and PSU, have identified a number of key research needs to improve how the state manages risks associated with coastal traffic, and to effectively target vessel inspections. Research needs include:

- Clarifying the risk of the movement of water between ports with similar physical and chemical characteristics.
- Assessing the risk that hull fouling poses as a vector for introducing non-native species to both the Columbia River and Puget Sound.
- Assessing the efficacy of coastal ballast water exchange in reducing risk of introducing non-indigenous species.

Consensus recommendations

WDFW, in consultation with the work group, shall:

1. Seek state funds, grants and other funds to support research.
2. Prioritize research to answer essential questions that inform and help develop reasonable policy and improve the state's program for managing ballast water.
3. Coordinate with other efforts to avoid duplication.

1.2.8. Extend the work and refine the role of the Ballast Water Work Group

The Ballast Water Work Group is a stakeholder group to advise and provide policy and technical insight into the appropriate management of ballast water to adequately protect waters of the state. The group will sunset in June 30, 2007. The language in Senate Bill 6329 (Chapter 227, Laws of 2004, 58th Legislature) that created the work group was not codified.

The group has met almost monthly since January 2004 and has developed a level of trust that is unusual among stakeholder groups. The group serves as an unbiased forum to discuss and debate normally contentious issues related to this subject.

Several of the next steps that WDFW were to undertake to improve Washington's ballast water program require stakeholder discussion, input and advice.

Consensus recommendations

The Washington State Legislature should extend the work of the Ballast Water Work Group and define specific tasks for the group, including:

1. Work with the state of Oregon to develop a consistent, coordinated and enforceable program for managing ballast water on the Columbia River.
2. Advise WDFW as it develops and evaluates the effectiveness of the program.
3. Help WDFW develop and align the state program with national and regional programs for managing ballast water.
4. Assist WDFW by developing a workable technical and possibly financial assistance program to support the shipping industry to comply with state ballast water laws and regulations.

5. Work with the USCG and the departments of Ecology, Agriculture and WDFW to improve coordination and integration of vessel inspection procedures among agencies that board and inspect vessels and identify ways to minimize apparent duplication of effort, work more effectively with vessel masters and crew, and to recommend changes to state law to streamline the program, if needed.
6. Outline funding, policy and program recommendations to support the state's ballast water management program.
7. Expand the scope of the Ballast Water Work Group to include review and recommend a management approach for ship hull fouling as a vector for introducing invasive species.
8. Review and provide comment on proposed federal legislation, international and regional programs and other policy arenas.
9. Coordinate and integrate the state program with western coastal states, British Columbia and Canada.
10. Develop a research plan and estimated costs to answer key research and management questions.
11. Other responsibilities, as necessary.
12. Report to the legislature on this work by December 30, 2009.

2. INTRODUCTION, PROBLEM STATEMENT AND GENERAL RISK ASSESSMENT

2.1 Introduction

The Ballast Water Management Act (Chapter 77.120 RCW) declares that introduced non-native marine plants and animals will damage the state's economy and environment, and current efforts to stop the introduction of non-indigenous species from ships are not adequate.

The law also recognizes the international ramifications and the rapidly changing dimensions of this issue, the lack of currently available treatment technologies, and the difficulty that any one state has in legally or practically managing this issue.

The Act declares its support for IMO and USCG efforts, and that the state intends to complement, to the extent its powers allow it, the USCG's program for managing ballast water.

In 2002 and 2004, the Washington State Legislature amended the Ballast Water Management Act originally enacted in 2000. In 2000, the Act allowed vessel operators after July 1, 2002 to discharge ballast water to waters of the state only if the operator had conducted an open sea exchange or treated the ballast to meet state standards. The Act also allowed the operator to retain ballast water onboard or delay compliance.

In subsequent amendments to the Act, this implementation date was extended to July 1, 2004 and then to July 1, 2007, due in part to the fact that feasible and proven treatment options were not available. In addition, the Act created the Ballast Water Work Group, staffed by WDFW, to study and report to the legislature on status of implementation, the costs to implement treatment requirements, and coordination with the state of Oregon on the Columbia River.

In 2004, the legislature amended the Act to change the management structure of the Ballast Water Work Group and expand its membership. The amendments removed WDFW as staff to the work group and made the agency a full participating member, gave the staff role to the Puget Sound Action Team and added new members including the tribes and shellfish industry.

2.2. What is ballast water and why is it a problem?

Ships use ballast water to increase the stability, efficiency and safety of the vessel. Ballast aids in the ship's propulsion and maneuverability. Vessel operators take on ballast water by pumping water into special tanks on the ship. Ballasting occurs while the ship is at port or soon after leaving port. De-ballasting, or discharging of ballast, occurs when the ship enters protected waters or while at port when the vessel is loading cargo. Water taken on as ballast in one location and any viruses, bacteria, plants and animals in it, can be carried and discharged at another if the ballast water is not properly exchanged or treated.

Studies show that many species of non-native bacteria, plants, animals and disease organisms can survive in ballast water and sediment at the bottom of ballast tanks carried on ships. The discharge of ballast water is a major pathway for the transfer of potentially harmful aquatic organisms and pathogens around the world.

Non-native organisms and pathogens introduced this way can significantly alter an ecosystem by competing with, preying upon and displacing native or commercial species. They also invade and destroy habitat that is critical to native species.

In 2002, the federal Government Accountability Office (GAO) reported that "at least 160 non-native aquatic species had become established in the Great Lakes since the 1800s—one-third of which were introduced in the past 30 years by ballast water. The effects of such species are not trivial; the zebra mussel alone is estimated to have caused \$750 million to \$1 billion in costs between 1989 and 2000. Species introductions via ballast water are not confined to the Great Lakes, however. The environment and economy of the Chesapeake Bay, San Francisco Bay, Puget Sound, and other U.S. waters have also been adversely affected."

The preamble to S363, a congressional bill introduced in 2006, declares that ballast water from ships is one of the largest pathways for the introduction and spread of aquatic invasive species, and estimates that some 10,000 non-indigenous aquatic species travel around the globe each day in the ballast water of cargo ships.

In 2005, the National Invasive Species Council prepared a *National Invasive Species Management Plan*. This plan includes a description of the invasion history in the San Francisco Bay/Delta Estuary to highlight how invasions can change an entire ecosystem.

More than 234 non-native plants and animals are established in the San Francisco Bay/Delta. Up to 97 percent of all organisms and 99 percent of all the biomass in the bay are foreign species. They dominate many estuarine habitats, accounting for 40 to 100 percent of the common species at many sites in the estuary.

According Dr. Andy Cohen at the San Francisco Estuary Institute, a new species was established in the San Francisco Bay estuary every 14 weeks from 1961 to 1995—most probably introduced in discharged ballast water from large ships.

No one can estimate the environmental costs of these invasions. The small Asian clam *Potamocorbula amurensis*, for example, is the most abundant clam in the northern part of the San Francisco Bay, reaching densities of nearly 50,000 clams per square meter. The animal has displaced native species. It is also a highly efficient filter feeder. Researchers estimate that clams in the northern portion of the bay can filter the entire water column at least once and possibly more than twice in a single day—virtually eliminating the annual phytoplankton blooms. Phytoplankton are at the base of the food chain in the bay.

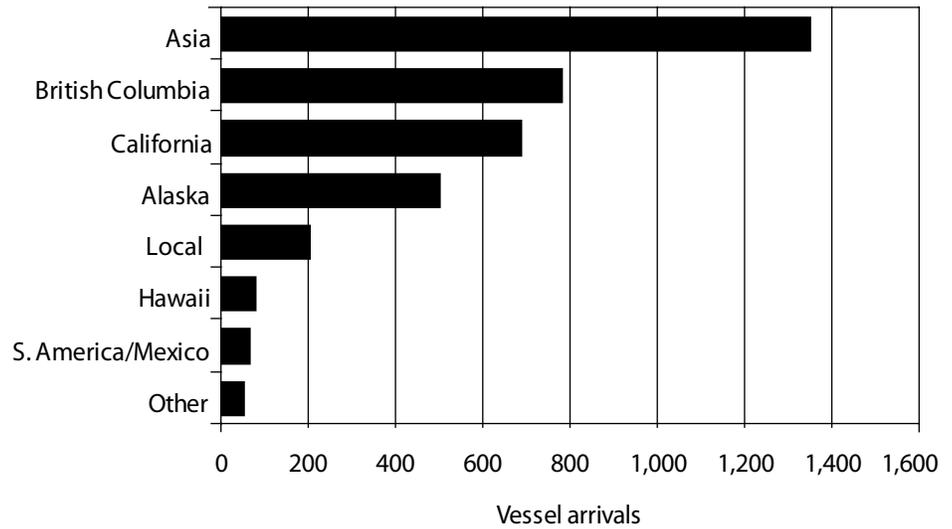
2.3. Shipping Patterns in Washington

Shipping is an important and vital economic engine in the state. Washington’s primary trading partners include Pacific Rim countries and the states of California, Oregon and Alaska. While the USCG has jurisdiction over all arrivals, current USCG regulations do not require vessels to exchange ballast water when traveling coastal routes within the 200 nautical mile EEZ.

Washington, Oregon and California laws require that these vessels exchange their ballast at least 50 miles offshore to prevent the spread of invasive species from one coastal port to another.

MARAD reported that more than 62 million metric tons of imported and exported goods passed through

FIGURE 1: Last Port of Call for Arrivals at Washington Ports in 2005 (n=3,728)



SOURCE: Department of Fish and Wildlife

Table 1: Reported Vessel Arrivals

	2003	2004	2005
Puget Sound	2,806	2,935	3,330
Columbia River	534	630	704
TOTAL	3,340	3,565	4,034

Washington ports in 2005 compared to about 45 million metric tons in 2000.

WDFW reported that vessel arrivals increased between 2003 and 2005 to both Puget Sound ports and Washington ports on the Columbia (Table 1: *Reported Vessel Arrivals*). These include tankers, cargo carriers, vehicle carriers and passenger vessels on scheduled routes that arrive frequently, as well as infrequent and one-time callers such as bulk, wood product or grain carriers.

In 2005, for 3,728 of the vessel arrivals at Washington ports, the last ports of call for about 40 percent were from U.S. ports, more than 30 percent were from Asian countries and more than 20 percent were from British Columbia ports (Figure 1: *Last Port of Call For Arrivals at Washington Ports*). Under federal law, vessels arriving from Asian countries are required to exchange ballast water prior to entering U.S. waters.

2.4. Volume of ballast water discharged to Washington waters

The shipping industry, the state and the USCG continue to make significant progress to minimize the risks associated with ballast water discharges.

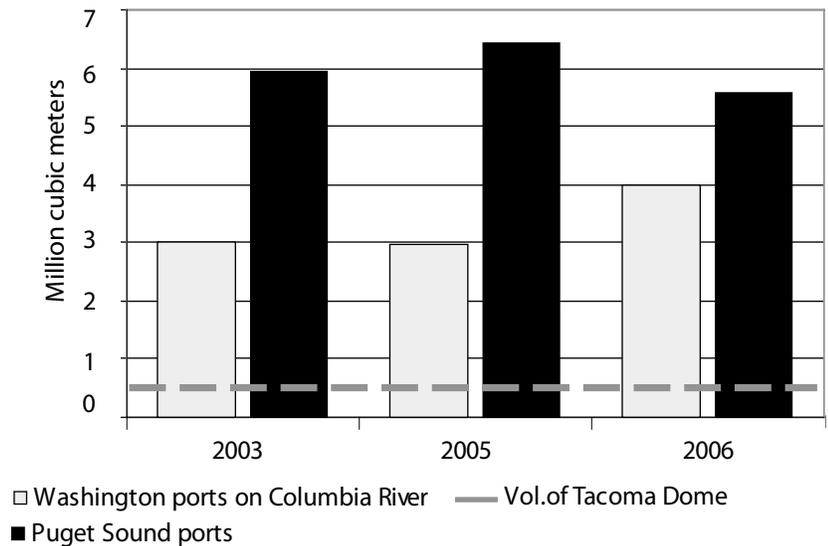
Ship operators reported that they discharged an annual average of about 9.5 million cubic meters or 2.4 billion gallons of ballast water to state waters or about nine times the volume of the Tacoma Dome. Ships discharge about two-thirds of this volume to Puget Sound ports. Total volume includes exchanged, partially exchanged and un-exchanged ballast water discharged to our waters (Figure 2: *Total Volume of Ballast Water Discharged to State Waters*).

2.5. Total volume of high-risk ballast water discharged to Washington waters

All ballast water discharged to state waters presents a risk for introducing non-native organisms that could cause harm to the ecosystem and the commercial and recreational activities that depend on these waters. However, only ballast water discharged to state waters that have not followed or effectively conducted the prescribed protocols is considered high risk.

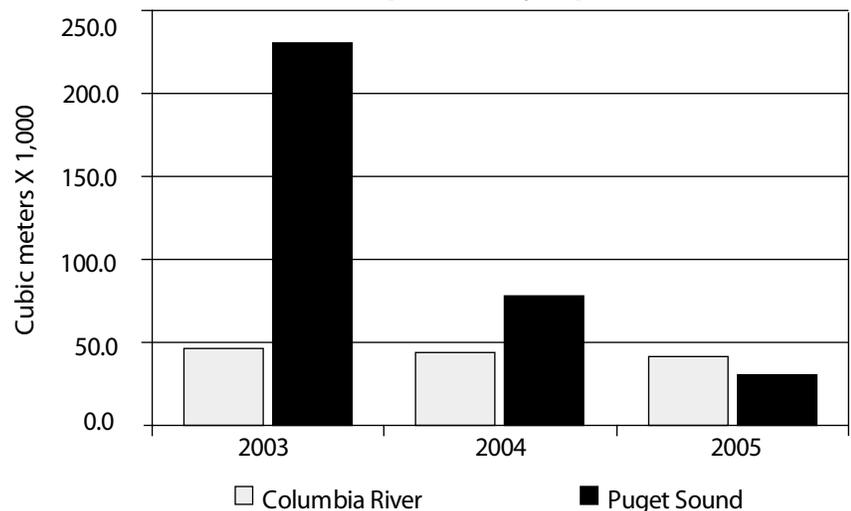
Ships that discharge ballast water without conducting an effective mid-ocean ballast water exchange increase the likelihood of introducing non-native species to state waters. Vessels that discharge effectively exchanged or partially exchanged ballast water pose a moderate risk, and those that do not discharge ballast water are a minimal risk. Ballast water treated to meet approved state standards is a minimal risk.

FIGURE 2: Total Volume of Ballast Water Discharged to State Waters



SOURCE: Department of Fish and Wildlife

FIGURE 3: Total Unexchanged Ballast Water Discharged to State Waters Reported by Operators



SOURCE: Department of Fish and Wildlife

WDFW reported that between 2003 and 2006, ships discharged an annual average of 44,000 cubic meters (about 12 million gallons) of high-risk un-exchanged ballast water to Washington ports on the Columbia River.

The annual volume of high-risk un-exchanged ballast water discharged to Puget Sound ports dropped significantly from 2003 to 2005 from approximately 230,000 cubic meters to about 30,000 cubic meters (Figure 3: *Total Un-exchanged Ballast Water Discharged to State Waters Reported by Operators*). USCG and state inspections

of vessels, coupled with mandatory state and federal reporting, and a greater awareness by the shipping industry of federal and state requirements, are the most likely reasons for this improvement.

In 2004, WDFW hired a vessel inspector to board vessels, educate the crews about ballast water issues and regulations, carry out vessel audits and take samples of ballast water. In 2004, the inspector boarded more than 204 vessels primarily at Puget Sound ports. In 2004, the USCG added ballast water compliance as part of their vessel inspection program which screens and targets high-risk vessels for boarding. Environmental compliance is one of many factors leading to a boarding decision for the USCG. See the description in Chapter 3: *Overview of Ballast Water Regulatory Programs* for more details.

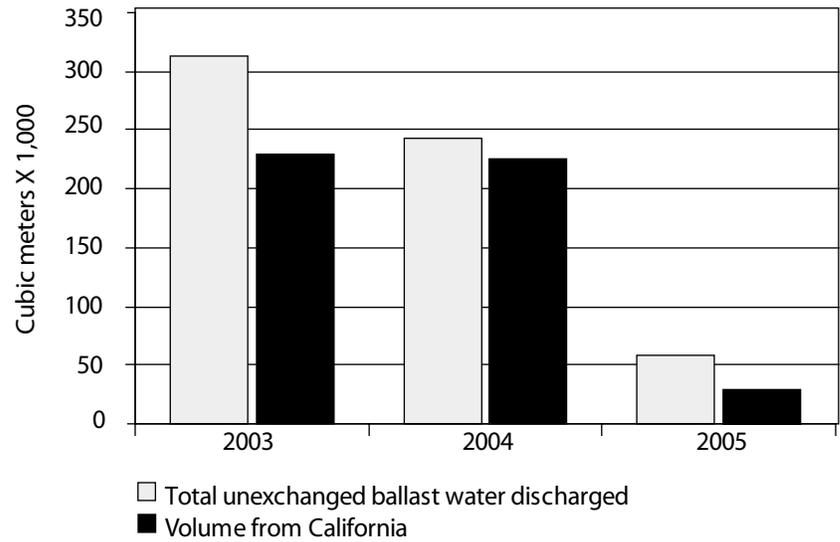
2.6. Source of high-risk ballast water

Based on data from vessel ballast water reports, almost all of the high-risk ballast water discharged to Washington ports originates from vessels arriving from California (Figure 4: *Source of High-risk Un-exchanged Ballast Water Discharged to Washington Ports on the Columbia River* and Figure 5: *Source of High-risk Un-exchanged Ballast Water Discharged to Puget Sound Ports*).

The national program does not require these vessels to exchange ballast water as they operate within the 200 nautical mile EEZ.

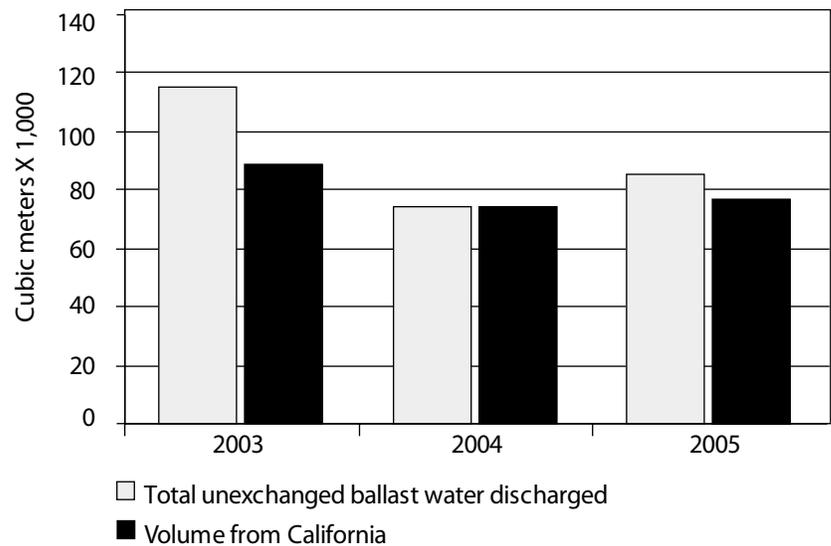
San Francisco Bay, for example, is extensively contaminated with alien species and is the source of much of this ballast water. In some areas of the bay, an estimated 97 percent of the biomass is of Asian origin. It is paramount that Washington's program aggressively works to eliminate the introduction of alien species from these areas through stringent ballast

FIGURE 4: Source of High-risk Unexchanged Ballast Water Discharged to Puget Sound Ports



SOURCE: Department of Fish and Wildlife

FIGURE 5: Source of High-risk Unexchanged Ballast Water Discharged to Washington Ports on the Columbia River



SOURCE: Department of Fish and Wildlife

water regulations. Ballast water stakeholders including state representatives, industry, Canadian, federal and environmental stakeholders successfully pushed for west coast consistency in setting standards for coastal traffic ballast water exchange requirements.

2.7. Reporting compliance

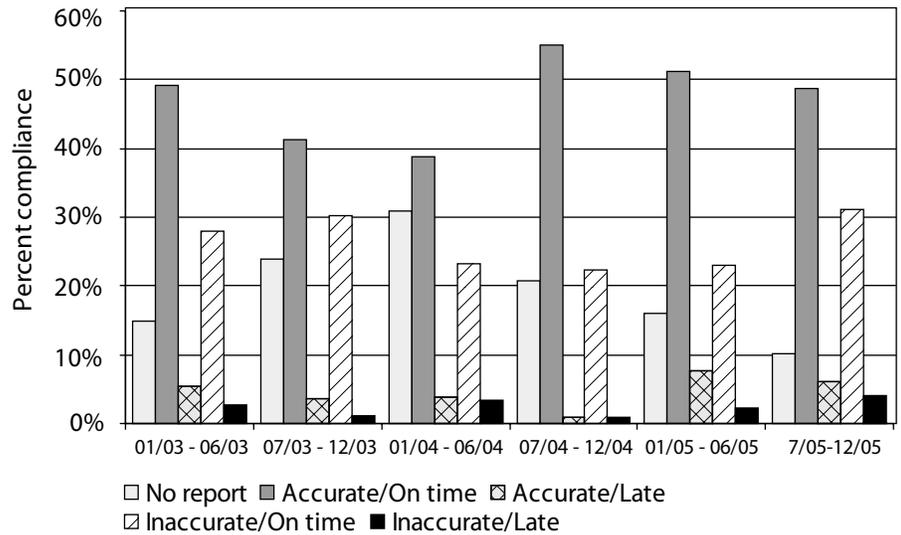
National and state laws require vessel operators to report ballast water management practices to the NBIC and WDFW, respectively.

WDFW reported that from January 2004 to June 2006, less than 50 percent of the vessel operators arriving at Washington ports on the Columbia River fully complied with state reporting requirements (Figure 6: *Reporting Compliance for Vessels Arriving at Washington Ports on the Columbia River*). The percentage of operators who submitted timely and accurate reports was over 60 percent for vessels arriving at Puget Sound ports (Figure 7: *Reporting Compliance for Vessels Arriving at Puget Sound Ports*).

Operators who submit inaccurate reports, do not submit reports or submit accurate reports late are not in compliance. The most prevalent form of noncompliance are vessel operators who submit inaccurate information on a timely basis, the second most prevalent is not reporting at all.

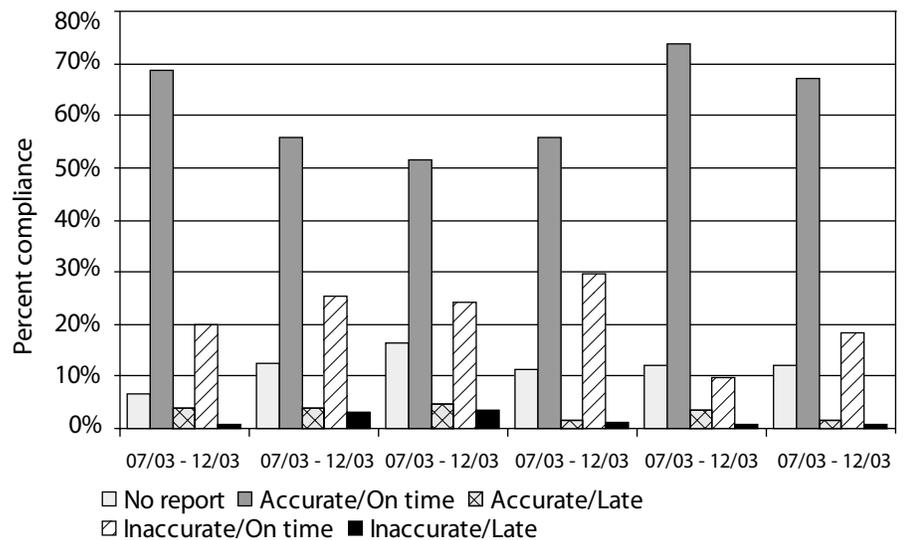
Inaccurate submissions range from missing data fields to much more significant errors such as reports of the same ballast being discharged on several different voyages and conflicting information between different sections of the reports. This report does not provide a detailed breakdown of these kinds of noncompliance errors.

FIGURE 6: Reporting Compliance for Vessels Arriving at Washington Ports on the Columbia River



SOURCE: Department of Fish and Wildlife

FIGURE 7: Reporting Compliance for Vessels Arriving at Puget Sound Ports



SOURCE: Department of Fish and Wildlife

3. OVERVIEW OF BALLAST WATER REGULATORY PROGRAMS

Ballast water on the west coast is managed through a complex combination of international, national and state management regimes. Map 1: *International, National and Regional Ballast Water Jurisdictions* shows the area of jurisdiction of these programs.

These programs are described in Table 2: *IMO Guidelines* and in Table 3: *Ballast Water Programs on the West Coast of North America, excluding Mexico*.

3.1 International programs

3.1.1. International Maritime Organization (IMO) Ballast Water Convention

The IMO will play a major role in the ballast water management. In February 2004, IMO and member

countries adopted the *International Convention on Ballast Water Management for Ships' Ballast Water and Sediments Management Plan*. This convention identifies standards for treatment and exchange effectiveness; and defines a compliance schedule. It becomes effective when 30 countries that represent 35 percent to the world's shipping tonnage ratify the treaty. So far, only six countries have ratified the convention. These signatories represent less than one percent of the total world tonnage.

The Marine Environment Protection Committee (MEPC) of the IMO has adopted guidelines for the uniform implementation of the International Ballast Water Convention. Table 2: *IMO Guidelines* shows the status of these guidelines.

Table 2: IMO Guidelines

	Adoption date
Guideline for sediments reception facilities (G1)	October 2006
Guidelines for ballast water sampling (G2)	Under Development
Guidelines for equivalent compliance (G3)	July 2005
Guidelines for ballast water management and development of ballast water management plans (G4)	July 2005
Guidelines for ballast water reception facilities (G5)	October 2006
Guidelines for ballast water exchange (G6)	July 2005
Guidelines for risk assessments (G7)	Under Development
Guidelines for approval of ballast water management systems (G8)	July 2005
Procedure for approval of ballast water management systems that make use of active substances (G9)	July 2005
Guidelines for approval and oversight of prototype ballast water management treatment technology programmes (G10)	March 2006
Guidelines for ballast water exchange design and construction standards (G11)	October 2006
Guidelines for sediment control on ships (G12)	October 2006
Guidelines for additional measures including emergency situations (G13)	Under development
Guidelines for designation of areas for ballast water exchange (G14)	October 2006
Guidelines for Survey and Certification (G15)	October 2006

Map 1: International, National and Regional Ballast Water Jurisdictions

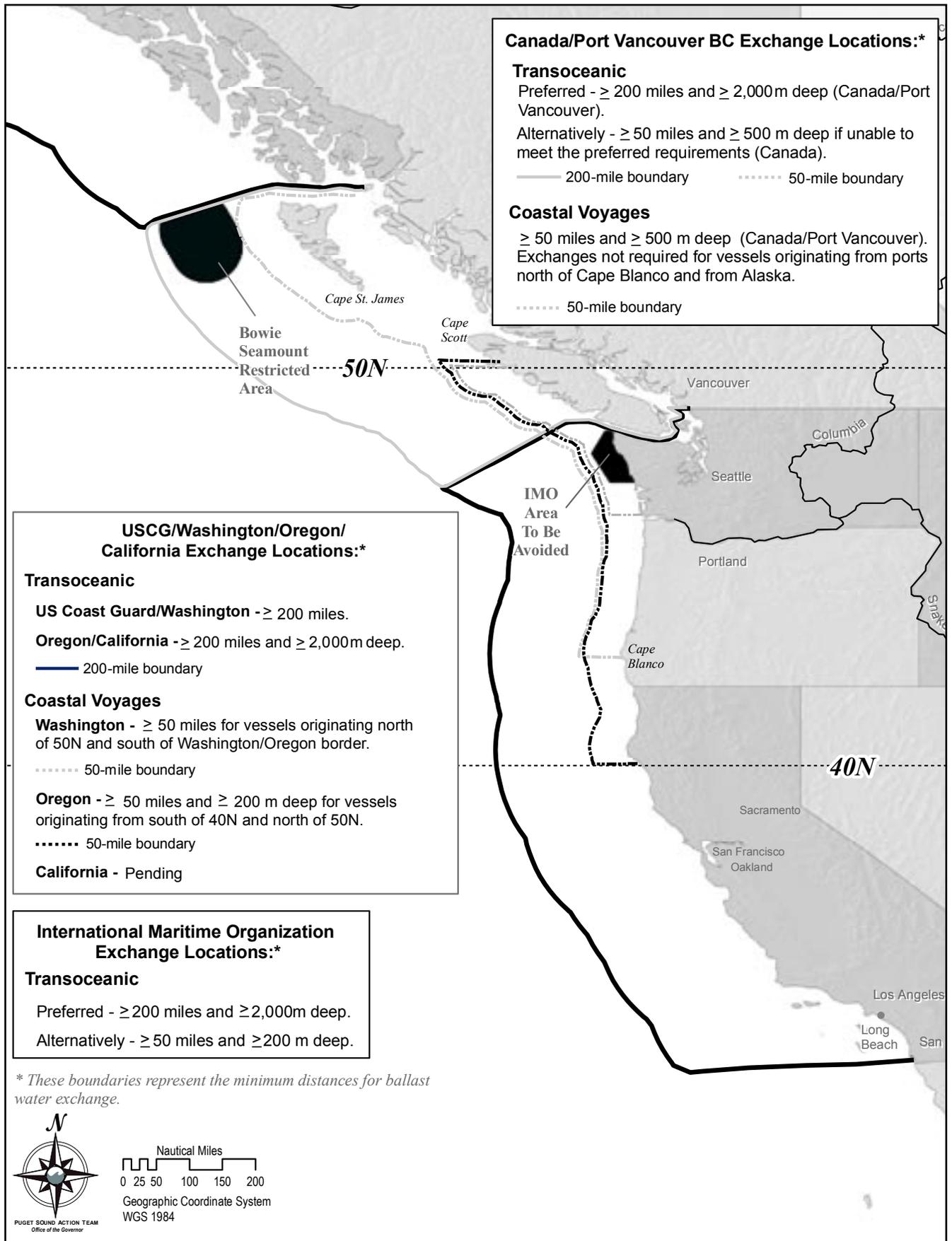


Table 3: Ballast Water Programs on the West Coast of North America, excluding Mexico

Program Elements	U.S. Coast Guard	Washington ²	Oregon ³	California ⁴	Alaska	Canada ⁵
Enabling legislation	NISA 1990, 1996	RCW 77.120.030 WAC 220.77.090 and 095	ORS Chapter 783.620-992	PRC71204, 71207, 71211, 71216, 71271, 72421, 72423, 72440	AS 46.03.750.	Canada Shipping Act 2006
Implementation—effective date of legislation	July 2004	2001—exchange July 1, 2007—treat if not exchanged	January 2002	1999, reauthorized 2003, 2006 rules for coastal traffic and treatment standards	Unknown	June 8, 2006
General application	All vessels entering US waters from outside EEZ	Vessels ≥300 tons entering WA water	Vessels ≥300 tons entering OR waters	Vessels ≥300 tons entering CA waters	All vessels	All vessels entering Canadian waters
Provides for safety exemptions	Yes	Yes	Yes	Yes	Yes	Yes
Preempts state or provincial programs	No	NA	NA	NA	NA	No
Requires consistency with IMO and USCG	NA	Yes	No	No	No	Yes
Requires that operators use best management practices ⁶	Yes	No	No	Yes	No	Yes
Requires operators to develop and use vessel specific ballast management plans ⁷	Yes	Yes	No	Yes	No	Yes
Requires that operators maintain logs and report ballast operations ⁸	Yes—all vessels entering US ports.	Yes	Yes	Yes	No	Yes
Requires owner/operators to submit interim report that describes steps that they will take to meet treatment or exchange standards	No	Yes	No	No	No	No
Requires assessment of non-ballast water vectors and management recommendations	No	No	No	Yes	No	No
Requires an evaluation of the program's effectiveness	No	No	No	Yes	No	No
Jurisdiction's approach to managing ballast water	Exchange, retain on board or use approved treatment alternatives.	Exchange or treat.	Exchange.	Exchange, retain on board, treat or use shore side treatment	Prohibits discharge of ballast water from a cargo tank of a tank vessel only	Exchange, retain ballast on board, discharge to reception facilities or treat
Exchange standard	Flow-through = 3 times tank volume. 100% empty/refill	Flow-through = 3 times tank volume. 100% empty/refill	Flow-through = 3 times tank volume. 100% empty/refill	Flow-through = 3 times tank volume. 100% empty/refill	None	≥ 95% volumetric exchange and ≥30 parts per thousand salinity if exchanged ≥50 miles offshore Flow through = 3 X tank volume.
Exchange location	Transoceanic voyages: ≥200 nautical miles offshore	Transoceanic voyages: ≥200 miles offshore. Coastal voyages: ≥50 nautical miles offshore	Coastal voyages: For vessels originating from S of 40° and N of 50° on US west coast, ≥50 nautical miles offshore	Transoceanic voyages: ≥200 miles offshore in water ≥ 2000 m. > 50 nautical miles offshore in ≥ 200 m. deep	None	Transoceanic voyages: ≥200 miles offshore in water ≥ 2000 m. deep. If unable to exchange as above, ≥ 50 miles offshore and in water ≥ 500 m. deep. Coastal voyages: >50 miles offshore in >500 m. depth

Program Elements	U.S. Coast Guard	Washington ²	Oregon ³	California ⁴	Alaska	Canada ⁵
Treatment standard	Three alternatives under consideration.	Technology standard: Inactivate/ remove 95% zooplankton and 99% bacteria & phytoplankton in ballast water.	Allows discharge of ballast water that has been treated to remove organisms in a manner that is approved by the USCG ⁷	Interim—zero detectable standard for the largest organism size class (>50µm). Final—zero detectable for all organism size classes by 2020.	None	Same as IMO - Discharge ≤10 org/m ³ greater than 50 microns; ≤10 org/ ml between 10 to 50 microns; Human health standards, ⁹
Exemption from ballast management requirements ¹⁰		Ballast water or sediments that originate in WA waters, Columbia system, or internal waters of British Columbia south of 50°N, including straits of Georgia and Juan de Fuca.	Exempts vessels originating from north of 40° and south of 50°	Vessels operating within 'common water' zones are not required to manage ballast water but must when operating between zones. Zones include: 1) ports within San Francisco Bay and delta region. 2) LA/Long Beach port complex	None	Exchange not required for vessels originating from ports north of Cape Blanco (42°-50°N)
Requires jurisdiction to approve treatment systems	Proposed	Yes	No	Yes—for systems that are environmentally safe and as effective as exchange. Also, CA approves systems approved by USCG HQ	No	Yes (flag state)
Allows use of approved experimental treatment systems	Yes ¹¹	Yes	No	Yes	No	Yes
Requires early compliance for new ships	Unknown	No	No	No	No	No
Requires operators to manage ballast tank sediments ¹²	Proposed	No	No	Yes	No	Yes
Requires facilities that clean or repair ballast tanks to provide sediment disposal options	No	No—facilities—defined as point source polluters—are subject to state clean water regulations.	No	No—but facilities—defined as point source polluters—are subject to state rules	No	Yes
Requires jurisdictions to designate no-ballast uptake areas	Yes	No	No	No—state has authority to designate areas to be avoided.	No	No
Requires jurisdictions to compensate operators for delays	No	No	No	No	No	No
Allows jurisdictions to inspect logs and sample ballast water	Yes	Yes	Yes	Yes Sample/cause to inspect a minimum of 25% of arriving vessels	No	Yes
Penalties for non-compliance	Civil penalties up to \$27,500/day and criminal	\$500 to \$5,000 per violation	\$500 to \$5,000 per violation	Up to \$27,500 per violation for civil penalties as defined. Each day constitutes a separate violation	None	Unknown—same as current enforcement and compliance in Canada Shipping Act
Allows jurisdictions to assess fees to support program	No	No	No	Currently, \$400 at first CA port per visit.	No	No

¹ cfu = colony forming units
² Washington state law: Chapter 17.120 RCW and state regulations WAC 220.77.090
³ Oregon state law: ORS 783.625, 783.630, 783.635, 783.640 and 783.992 – amended in March 2005.
⁴ California Coastal Ecosystem Protection Act 2006
⁵ Ballast Water Control and Management Regulations established by SOL 2006-129 effective June 8, 2006.
⁶ Avoid uptake or discharge in certain areas, clean ballast tanks, clear anchors and chains, clean hull fouling organisms, etc.
⁷ Plans detail actions to implement BW requirements, how sediment must be managed, designates an office in charge and defines reporting requirements
⁸ Ballast record book can be electronic, integrated into other record systems, etc. It must be available for inspection anytime. Logs detail ballast practices undertaken.
⁹ Discharge less than 250 colony-forming units per 100 ml of E. coli; less than 100 cfu per 100 ml of intestinal enterococci and less than 1 living organisms per 100 ml of Cholera
¹⁰ Exchange, treatment, retention or discharge to approved facilities.
¹¹ Shipboard Technology Evaluation Program (STEP) January 2004. Approved systems must be environmentally safe and as effective as exchange.
¹² Remove and dispose of sediments according to the ship's ballast water management plan

3.1.2. Canada Shipping Act

Transport Canada administers and enforces Canada's program for managing ballast water.

Recent amendments to the Canada Shipping Act became effective in June 2006. The Act requires all vessels entering Canadian waters from outside the Canadian EEZ to exchange ballast water at least 200 nautical miles offshore in waters 2,000-meters deep. Vessels entering Canadian waters from within the 200 mile EEZ must exchange ballast water at least 50 miles offshore in water 500-meters deep. Vessels taking on ballast north of latitude 42° 50' (north of Cape Blanco, OR) are exempt from exchange requirements. Vessel masters may claim safety exemptions.

The Canada Shipping Act adopts ballast water discharge standards proposed by IMO. With the exception of this standard, the provisions in the Act are consistent with other west coast state programs. Canada fully participated in discussions to align ballast water programs along the west coast.

3.2. National program

3.2.1. U.S. Coast Guard

The USCG administers the national ballast water program. The National Invasive Species Act of 1998 (Public Law 104-332) gives the USCG this authority. Current national regulations require vessels arriving from outside the United States EEZ or 200 nautical miles offshore to report ballast management practices to the NBIC.

Operators must also conduct mid-ocean ballast water exchanges in waters 2,000-feet deep before entering the EEZ. Vessel operators may also retain ballast water on board, use an alternative environmentally sound method of managing ballast, or discharge to an approved reception facility.

Under USCG regulations, vessels engaged in coastal voyages inside of 200 nautical miles offshore must discharge only the amount of ballast water operationally necessary and document in ballast water records the reasons involved.

Operators must report their management practices to the NBIC operated jointly by the USCG and the Smithsonian Environmental Research Center.

The USCG conducts vessel inspections to determine if operational logs support the reported practices. In addition to extensive regulatory oversight of domestic commercial vessels, foreign vessels are subject to state port control. Vessels are screened based on such things as safety, security, environmental performance, age of vessel, vessel type and its history, last inspection date and location, vessel

owners and operators, classification societies and flag state. The USCG targets high-risk vessels and may deny entry of these vessels to port, may impose additional operational restrictions or may board the vessel to conduct inspection.

The USCG Sector Seattle office has jurisdiction that covers the greater Puget Sound area, and USCG Sector Portland office has jurisdiction over vessels calling on ports in the Columbia River and Grays Harbor. The USCG Sector Seattle office conducted nearly 1,700 foreign vessel safety and security examinations in 2005. These examinations include an assessment of the vessel's compliance with ballast water requirements.

USCG inspectors review ballast water reporting forms to ensure that they were properly filled out, submitted and accurately reflects the vessel's ballast configuration. Boarding officers examine ballast water pumps to ensure pumps are operational and capable of exchanging ballast water in the way the master described and they will review the vessel's logs in conjunction with the other documentation.

The USCG inspectors may take a salinity sample. At the national level, the USCG is testing a sampling device to see if it will help the boarding office determine whether the ship operator conducted an effective ballast water exchange.

During the six months before the ballast water regulations went into effect, the USCG conducted an educational campaign with mariners at every inspection. The USCG continues to provide educational brochures to vessels on their first visit.

The USCG encourages vendors to test treatment technologies through STEP. Under STEP, foreign or domestic vessel operators can use experimental ballast water treatment systems on board their vessels. The USCG approves systems enrolled in STEP for a period of five years. As of October 2007, three technology providers have applied to the STEP for acceptance into the program including EcoChlor's chlorine dioxide system, Hyde Marine's ultraviolet and filtration system, and NEI Treatment Systems deoxygenating system.

Under the national program, the USCG can assess civil penalties up to \$27,500 per violation as well as criminal penalties.

The USCG expects to release proposed ballast water treatment options and an implementation schedule sometime this year.

3.2.2. Proposed national policy

Congress has proposed several bills to improve ballast water management around the nation and provide regulators and the shipping industry with consistent and predictable requirements. However, passage of these bills is uncertain.

3.2.2.1 Senate Bill 363

This bill proposes the Ballast Water Management Act of 2005 that would require foreign and coastal vessel operators to manage and report ballast water practices. The bill defines treatment standards that are more stringent than those proposed by the IMO. The bill would require operators to exchange ballast water between all coastal ports until the USCG adopts treatment standards. The bill would preempt state management programs.

3.2.2.2. Senate Bill 770

This bill proposes to amend the National Aquatic Invasive Species Act to require foreign and coastal vessel operators to manage and report ballast water practices. The bill does not define treatment standards but directs the USCG to adopt regulations for discharge standards. The bill would not preempt state management programs.

3.2.2.3. Senate Bill 1224

This bill proposes the National Oceans Protection Act of 2005. Ballast water language in this bill duplicates that found in Senate Bill 363.

3.2.2.4. House of Representatives Bill 5030

This bill proposes the Prevention of Aquatic Invasive Species Act of 2006. The ballast water requirements in this bill are identical to Senate Bill 363, although this bill would not preempt state programs.

3.3. Northern District Court of California decision

In September 2006, the Northern District Court of California ruled that U.S. Environmental Protection Agency (EPA) must regulate discharges incidental to the operation of vessels under the federal Clean Water Act and regulate ballast water as a pollutant.

Under the Court's direction, EPA must have a National Pollutant Discharge Elimination System (NPDES) permit program in place by September 30, 2008 to regulate ballast water discharges. The court suggested that EPA issue a general NPDES permit that includes ballast water exchange, good ballasting practices and ballast water retention as "best available technology economically achievable." Under this decision, EPA is not required to develop new technologies.

This decision would provide uniform and consistent management of ballast water discharges nation-wide and would close gaps in the USCG program and effectively regulate vessels that operate within the EEZ.

The Solicitor General of the Justice Department has filed a notice of appeal on behalf of EPA to overturn this decision.

3.4. State programs on the west coast

The states of Washington, Oregon and California created management programs to protect state waters and manage ballast not regulated by the USCG. In general, these programs require that ship operators report ballast water practices and exchange ballast at least 50 nautical miles offshore before entering state waters. The state of Alaska does not have a specific ballast water law in place.

3.4.1. Washington State Ballast Water Management Act (Chapter 77.120 RCW)

WDFW administers and enforces the state's program for managing ballast water.

This program fills a critical gap in the national program. The USCG administered program does not regulate ballast water discharges of vessels engaged in coastal commerce the same as it does for vessels arriving from outside 200 nautical miles. The state program addresses the risks associated with these vessels that originate from California, southern Oregon, northern British Columbia and Alaska.

Under state law, vessel operators can discharge ballast water to waters of the state only if the vessel operator or master has conducted an open sea exchange at least 50 miles offshore, treated the ballast water with a system approved by WDFW, or declares an exemption from these requirements for safety reasons.

These requirements do not apply to vessels that discharge ballast water that originate solely within the waters of Washington State, the Columbia River system, or the internal waters of British Columbia south of latitude 50°N, including the waters of the straits of Georgia and Juan de Fuca.

After July 1, 2007, the state will not require vessel operators to exchange ballast when it is unsafe, but will expect operators to have an alternative plan in such events. Operators may retain ballast on board or treat it prior to discharge.

WDFW will use weather data and other pertinent information to review the validity of safety exemptions for vessels discharging unexchanged or untreated ballast. If valid, WDFW will issue a warning reminding the operator

to develop an alternative plan. If WDFW determines that the requested exemption is invalid, the department may fine the operator for discharging, as well as for falsification of a report.

Operators must also report their ballast management practices to WDFW. State inspectors can board vessels to collect samples and review logs and other documents to confirm reported exchange practices.

WDFW has aggressively pursued a program to review, evaluate, and approve ballast water treatment systems for use in Washington, and to date has conditionally approved three technologies for further evaluation on board vessels.

Under current Washington law, the state can assess penalties up to \$5,000 per violation for discharging unexchanged ballast water, \$500 per violation of the reporting requirements and \$5,000 per violation for falsifying records.

3.4.2. The California Marine Invasive Species Act

The California State Lands Commission administers and enforces the state’s program for managing ballast water.

California law defines common water zones. Vessel operators are exempt from state requirements if they operate within these zones. However, vessels that move between zones must exchange or otherwise appropriately manage ballast water. Common zones include a) ports within the San Francisco Bay including Stockton and Sacramento and b) the Long Beach/Los Angeles port complex.

Operators must also report their ballast management practices to the Lands Commission and the NBIC. State inspectors can board vessels to collect samples and

review logs and other documents to confirm reported ballast practices.

In September 2006, the California Legislature amended state law. Under these revisions, the Lands Commission must:

- Recommend performance standards for the discharge of ballast water into the waters of the state by January 31, 2006.
- Adopt regulations to implement interim and final performance standards by January 1, 2008.
- Disseminate information regarding experimental systems for treating ballast water.
- Review the efficacy, availability and environmental impacts of currently available technologies.

The California Department of Fish and Game must:

- Consult with the Land Commission and the USCG, and establish and maintain an inventory of non-indigenous species in specified waters.
- Make the inventory available to the legislature and public by January 1, 2007.
- Assess the effectiveness of the ballast water controls and report to the Legislature and the public on or before January 1, 2009.

The law directs the Californian Lands Commission to adopt rules to implement interim and final discharge standards.

The interim standards for new built vessels must meet the following discharge quality. Vessels must meet these standards based on the IMO schedule noted in the following chart.

Interim Standard	
Organism Size Class (Units)	Discharge Standard
Larger than 50 µm per cubic meter	No detectable living organisms
Between 10 and 50 µm per milliliter	10 ⁻² organisms
Smaller than 10 µm per 100 milliliter	Bacteria 10 ³ Viruses 10 ⁴ Public health protection limits [1]
Final Standard	
Organism Size Class (Units)	
All organisms	No detectable living organisms

[1] 126 colony-forming-units per 100 milliliters of *Escherichia coli*, 33 colony-forming-units per 100 milliliters of Intestinal enterococci, 1 colony-forming-unit per 100 milliliters or 1 colony-forming-unit per gram of wet zoological samples for Toxicogenic *Vibrio cholerae* (serotypes O1 and O139)

The state must implement these requirements on a schedule consistent with the IMO Convention as shown in the following chart:

Ballast capacity of vessel	Applies to vessels in this class if constructed in or after:	Applies to all other vessels in this class starting in:
<1,500 metric tons	2009	2016
1,500-5,000 metric tons	2009	2014
>5,000 metric tons	2012	2016

In addition, the California program is the only state on the west coast to collect a vessel arrival fee to support the state’s program.

Prior to September 2006, California penalties were identical to those of Washington, (i.e., up to \$5,000 per violation for discharging unexchanged ballast water, \$500 per violation of the reporting requirements and \$5,000 per violation for falsifying records). In September 2006, the California Legislature increased all civil penalties up to \$27,500 per occurrence, and made each day of a continuing violation a separate violation.

3.4.3 Oregon State Ballast Water Management Act (ORS Chapter 783.620-.992)

ODEQ administers and enforces the state ballast water management program, although the agency has received no funding for this program.

All foreign and coastal vessel operators are required to exchange ballast water and report their management practices to both the NBIC and to the ODEQ.

Since January 2006, vessels operators engaged in coastal trade must exchange ballast water at least 50 nautical miles from shore. Vessels that discharge ballast water that originated solely from the waters located between the parallel 40°N and parallel 50°N on the west coast of North America are exempt from ballast water exchange requirements. Vessels that originate from Canadian ports south of 50°N are also exempt.

All other foreign arrivals are required to exchange their ballast at least 200 nautical miles from shore.

Oregon allows discharge of ballast water “that has been treated to remove organisms in a manner that is approved by the Coast Guard.”

Oregon’s penalties for violations are identical to Washington’s. The state can assess penalties up to \$5,000 per violation for discharging unexchanged ballast water, \$500 per violation of the reporting requirements and \$5,000 per violation for falsifying records.

3.5. Michigan State program

In October 2006, the state of Michigan issued a state general permit that covers ballast water discharges to state waters. The permit became effective on January 1, 2007 and expires on January 1, 2012. The general permit authorizes oceangoing vessels to engage in port operations such as fueling, loading and off-loading cargo and loading and unloading passengers. The permit also authorizes ballast water discharges provided the discharge complies with one or more of the ballast water treatment conditions and all other requirements contained in the permit.

The permit covers effluent limitations, monitoring and reporting requirements and penalties.

The permit describes effluent limitations for treatment systems that use 1) hypochlorite; 2) chlorine dioxide; 3) ultraviolet light (UV) and filtration; 4) de-oxygenation and 5) other ballast water additives.

4. REGIONAL BALLAST WATER MANAGEMENT

The Pacific Ballast Water Group coordinates programs on west coast for managing ballast water. The Pacific States Marine Fisheries Commission hosts this group. Forming the group are representatives from the shipping industry, state and federal agencies, environmental organizations, and others who recognized the need for a cooperative and coordinated regional approach to solving the problem.

The group has done much to pave the way for a consistent regional program on the west coast, yet much needs to be done. For example, to improve consistency, the group needs to focus on differences related to performance standards for treatment and exchange, align common waters definitions, and address differences in technology testing and approvals by states until alignment of state programs with IMO and the national program standards is achieved.

5. COLUMBIA RIVER BALLAST WATER MANAGEMENT

In 2006, the Washington State Ballast Water Work Group contracted with PSU to recommend alternative strategies for managing ballast water on the Columbia River. The group asked the university to use a risk minimization approach in evaluating alternative strategies since the Columbia River is predominantly a freshwater system. In addition, the group asked them to consider the complex nature of the river when developing their recommendations.

Although the differences in approach and regulations in Oregon and Washington are relatively minor, they could conflict, particularly over discharge of treated ballast water. Oregon law defers to federal standards and for the approval of systems to treat ballast water. Washington, on the other hand, has developed state standards for ballast water discharge and a process to approve treatment systems.

The shared waters of the Columbia River require special consideration in Washington and Oregon ballast water management strategies. Currently, both state regulations are similar and allow an exemption from exchange or treatment for safety reasons. In July 2007, however, Washington will require treatment or other action if exchange is not performed, effectively eliminating a safety exemption for exchange. Additionally, ships often make multiple port calls on the river, moving from one state's jurisdiction to the others. These issues require a coordinated approach to ballast management on the Columbia River.

Recommendation

Based on PSU's report, the Ballast Water Work Group recommends that the Washington State Legislature authorize the work group to foster interstate cooperation and to resolve and integrate Washington and Oregon ballast water activities.

The legislature should also expand the membership of the work group to include representatives from ODEQ, the Oregon Ballast Water Task Force and PSU; and specify that cooperation meetings about the shared waters be co-chaired by governor's representatives from both Washington and Oregon.

The Ballast Water Work Group further recommends that the legislature direct the work group to lead a process, in cooperation with WDFW, to secure a memorandum of agreement between the governors of Washington and Oregon regarding cooperation and joint management of ballast water on the Columbia River. The legislature should provide adequate funds to support the state's participation in this work.

6. FEDERAL AND INTERNATIONAL STANDARDS

In 2004, member countries of the IMO adopted the International Ballast Water Convention. The convention proposes ballast water discharge standards. Various bills in congress do the same. At this time, neither congress nor the USCG has adopted national standards and the IMO Convention is not currently in force.

Table 4: *Proposed and Existing Ballast Water Treatment Performance Standards for the West Coast* compares proposed and existing international and state ballast water treatment standards and implementation schedules.

Washington state treatment standards are based on the performance of technology and not on the quality of the discharged ballast. On the west coast, the state of California and Canada have each adopted effluent discharge standards. Both have schedules to implement these standards that are consistent with the IMO Convention. The proposed IMO standards and those adopted by Canada are identical. California standards are based on the precautionary principle and are more restrictive.

Oregon supports adoption of federal standards. Oregon's ballast water task force also recommends that if federal standards are not in place by 2009, that the Oregon State Legislature direct ODEQ to develop state standards that complement those in neighboring states.

Stakeholders on the Ballast Water Work Group have divergent opinions about how best to align state performance standards with those adopted or proposed at the international, national or regional level.

Recommendation

The Ballast Water Work Group recognizes that current state standards for the performance of treatment technologies do not align with adopted or proposed international, national and regional standards.

The work group agreed that the current performance standards for technology (Chapter 220-77-090 WAC) must remain in place until such time as these standards are changed by rule after appropriate input from stakeholders and the public.

In addition, the work group recognizes that the state does not have effluent standards for ballast water discharges, and that such standards are needed to approve technology for use on vessels calling at Washington ports, for compliance purposes and for consistency with federal and regional entities.

The work group recommends that because of the divergent views regarding performance standards, WDFW should lead a rule review process, in consultation with the Ballast Water Work Group, to revise current regulations related to ballast water performance standards and the overall management of the program. The work group also recommends that the department must consider the breadth of issues raised and positions of stakeholder on performance standards during the rule revision process. And WDFW must use the work group as the primary stakeholder group for vetting language, concepts and numeric performance standards. The department will have other obligations to notify and involve the public in the rule revision process.

Table 4: Proposed and Existing Ballast Water Treatment Performance Standards for the West Coast

	IMO Regulation D-2	Transport Canada	Washington Administrative Code 222-170	California PRC 71200, 71271	National Invasive Species Act (US Coast Guard)
Management approach	Exchange moving towards treatment only	Exchange or treatment	Exchange or treatment	Exchange moving towards treatment only	Exchange moving towards treatment only
Standard:	Proposed	Adopted	Adopted Interim	Adopted	Adopted
	Discharge standard	Discharge standard	Technology standard	Discharge standard	Relies exclusively on exchange:
1) Organisms greater than 50 microns in dimension	<10 viable organisms per cubic meter	<10 viable organisms per cubic meter	Kill or inactive 95% zooplankton	No detectable living organisms	USCG will propose numeric discharge treatment standards in 2006
2) Organisms 10-50 microns in minimum dimension	<10 viable organisms per ml	<10 viable organisms per ml	Kill or inactive 99% bacteria & phytoplankton	<10 ² living organisms per ml	
3) Organisms less than 10 microns in dimension	No standards	No standards		< 10 ³ cfu bacteria/100 ml	
4) <i>Escherichia coli</i>	<250 cfu/100 ml	<250 cfu/100 ml		<126 cfu/100 ml	
5) Intestinal Enterococci	<100 cfu/100 ml	<100 cfu/100 ml		<33 cfu/100 ml	
6) Toxicogenic <i>Vibrio cholerae</i> (O1&O139)	<1 cfu/100 ml <1 cfu/gram of wet zooplankton samples	<1 cfu/100 ml <1 cfu/gram of wet zooplankton samples		<1 cfu/100 ml <1 cfu/gram of wet zoological samples <10 ⁴ viruses/100 ml Final standards —no discharge of living organisms	

Implementation schedules proposed by International Maritime Organization and adopted by California and Canada:

Ballast capacity of vessel	Applies to vessels in this class if constructed in or after:	Applies to all other vessels in this class starting in:
<1,500 metric tons	2009	2016
1,500-5000 metric tons	2009	2014
>5,000 metric tons	2012	2016

7. BALLAST WATER PROGRAM COSTS AND FUNDING

7.1. Program elements

The following are key elements and activities of a state program for managing ballast water.

a. Program administration: WDFW oversees the administration of the program and administers grants and contracts related to ballast water management.

b. Vessel report tracking: Under state law, vessel operators report their ballast management practices to WDFW. The department tracks these reports for compliance with state requirements for managing ballast water. WDFW will coordinate and align the state system with the NBIC and regional ballast water reporting databases; and carry out an extensive statistical analysis of the data to identify and profile high-risk vessels and identify other relevant shipping and ballast water discharge patterns.

c. Vessel inspections: WDFW targets and boards vessels, inspects log books and other documents, as well as the vessel's ballast pump capacity and Geographic Information System (GIS) position records to verify compliance with exchange and treatment requirements. Inspectors educate ship operators about the state ballast water program and take samples to help determine the effectiveness of exchange at removing undesirable plants and animals. Field inspectors conduct compliance monitoring and enforcement efforts at ports on Puget Sound, those along the Straits of Juan de Fuca and coastal estuaries, as well as ports on the Columbia River region. Inspectors coordinate closely with the USCG efforts to enforce the national ballast management program.

d. Research and sample analysis: WDFW contracts with UW to analyze samples taken during vessel inspections to help determine the effectiveness of reported exchanges, and may contract additional research as needed to develop data to inform decision-making and to refine program policy.

e. Enforcement: WDFW enforces non-compliance with state ballast water laws and regulations. WDFW also conducts outreach and education to ensure that vessel owners, ship agents and the public understand the state requirements for managing ballast water. WDFW prints and distributes education materials.

f. Technology approval: WDFW, in consultation with the Environmental Soundness Committee, reviews and approves ballast water treatment technologies for use on vessels that call on Washington ports, and may contract additional research related to the evaluation of such technology. WDFW will establish and oversee a scientific advisory panel to conduct formal reviews on new technology based on prescribed protocols and charge the panel with overseeing the implementation of study plans and monitoring results.

g. Environmental and effectiveness monitoring: WDFW or another appropriate entity may contract to carry out biological surveys at ports, grain terminals and oil transfer facilities. The surveys will build a baseline database from which the state can determine the effectiveness of the state program at reducing the introduction of new invasive species.

h. Toxicity evaluations and permits: The Department of Ecology reviews and recommends action based on whole effluent toxicity for those ballast water technologies that use active substances. Depending on the outcome of an appeal, EPA may be required to manage ballast water discharges under the federal Clean Water Act (CWA). If this is the case, Department of Ecology, as the state delegated CWA authority, may be required to develop general NPDES permits for this purpose.

i. Ballast Water Work Group: The Puget Sound Action Team continues to support the Governor's Office by chairing and staffing the Ballast Water Work Group. The work group advises WDFW on all aspects of the state ballast water management program, on coordination with other entities, during rule revisions, prepares various reports to the legislature and supports efforts to coordinate ballast water management on the Columbia River.

7.2. Estimated program costs

Table 5: *Estimated Total Biennial Costs for Administering the State Ballast Water Program* estimates the cost for operating an effective state program. Staff to the work group prepared these estimates.

The total cost of the program is about \$1.4 million every two years. Roughly half this amount is for salaries and personnel support. The remaining amount supports contracts to carry out environmental monitoring and

Table 5: Estimated Total Biennial Costs for Administering the State Ballast Water Program

Activities	FY 2007 X \$1,000	FY 2008 X \$1,000	Biennium X \$1,000
Department of Fish and Wildlife			
Program management—0.8 FTE @ \$65,000	52	52	\$104
Vessel inspectors—2.0 FTE @ \$70,000 each	140	140	\$280
Data entry and statistical analysis 1.0 FTE @ \$35,000 data entry	35	35	\$70
Travel (4 trips per year @ \$1,000 each)	2	2	\$4
Vehicles—2 leased @\$210/vehicle/month	5	5	\$10
Mileage—3,000 miles/month X 2 vehicles @ \$0.26/mile	19	19	\$38
Computers, phones and service providers	2.5	2.5	\$5
Office supplies	1	1	\$2
Sampling equipment (gear, coolers, preservative, gloves, etc)	2.5	2.5	\$5
Contracts			
Harmonize database with the national Ballast Water Information Clearinghouse and neighbor states	75	75	\$150
Ballast sample analyses (15 samples/month @\$700/sample)	126	126	\$252
Environmental and effectiveness monitoring	162	208	\$370
Department of Ecology			
NPDES permit—0.4 FTE @ \$65,000	26	26	\$52
Technology residual toxicity assessments—0.4 FTE @ \$65,000	26	26	\$52
Puget Sound Action Team			
Support for the state Ballast Water Work Group, prepare reports, and work to solve Columbia River conflicts.	13	12	\$25
Total Program Cost	\$687	\$732	\$1,419

develop a baseline of invasive species in Puget Sound and the Columbia River ports; and to assess the effectiveness of the state management program. These estimates include costs for writing discharge permits that may be required under the federal CWA and costs associated with carrying out toxicity evaluations of new technologies.

7.3. Estimated costs of an environmental monitoring program

Table 6: *Program Elements and Estimated Costs for an Environmental Monitoring Program* provides estimates for an environmental monitoring program to help evaluate the effectiveness of the program for managing ballast water.

The purpose of the program is to: 1) develop a baseline of existing non-native aquatic invasive organisms and 2) evaluate the effectiveness of the state’s program for managing ballast water in detecting new or expanding population of aquatic invasive species.

Key activities:

- a. Conduct literature reviews to develop a baseline database of aquatic invasive plants and animals found in Puget Sound, coastal estuaries and the Columbia River.

Table 6: Program Elements and Estimated Costs for an Environmental Monitoring Program

Objective	FY 2007	FY 2008	FY 2009	FY 2010	Total
1: Baseline database	\$55,125				\$55,125
2: Supplemental biological surveys	\$107,150	\$107,150			\$214,300
3: Ongoing monitoring program		\$100,000	\$100,000	\$100,000	\$300,000
4: Evaluate program effectiveness			\$15,000		\$15,000
Total	\$162,275	\$207,150	\$115,000	\$100,000	\$584,425

- b. Conduct rapid assessments for aquatic invasive species to fill gaps and supplement literature reviews.
- c. Develop and implement an ongoing monitoring program to detect non-native plants and animals in focus areas such as ports, harbors, oil transfer facilities, grain elevators and other vessel berthing facilities.
- d. Review the effectiveness of the state ballast water program at preventing the introduction of non-native plants and animals.
- e. Report to the legislature and the public.

The program will focus environmental investigations in areas most likely to be affected by ballast introductions—specifically port and transfer facilities at Port Angeles, March Point, Cherry Point, Seattle, Tacoma, Olympia, Bremerton, Everett, Bellingham, Grays Harbor, Kalama, Longview and Vancouver.

WDFW or other appropriate entity will use design criteria developed by Dr. Andrew N. Cohen, San Francisco Estuary Institute, for the Puget Sound Action Team to develop the program and will build on existing long-term monitoring programs where possible.

7.4. Department of Fish and Wildlife 2007-2009 budget request for the Ballast Water Program

The Ballast Water Work Group asked the Puget Sound Action Team, WDFW and Washington Sea Grant programs to seek state funding to support the state management plan.

Table 7: *Washington State Department of Fish and Wildlife 2007-2009 Budget Request for the State Ballast Water Management Program* is a budget request for new state general funds that WDFW submitted to the Office of Financial Management for the 2007-2009 biennium.

This request does not include all estimated costs for i) analyzing ballast water samples; ii) carrying out environmental monitoring to evaluate the effectiveness of the state’s management program; iii) harmonizing databases on ballast practices; and iv) continuation of the state Ballast Water Work Group.

In addition, this budget does not include costs needed to test and evaluate potential treatment technologies. These costs are normally borne by the technology vendor seeking state approval of the technology for use on vessels calling on Washington ports, however there may be incidental costs that both WDFW and Washington Department of Ecology may bear to review and approve technologies.

7.5. Supplement funding

The Fish and Wildlife Commission and WDFW have independent authority to seek legislation and adopt rules to supplement state funding of the program. Options that the department could pursue include:

7.5.1. Fees for service

WDFW could assess fees to recover costs for inspections, data analysis and ballast water report tracking. Legislation would be required to give the agency authority to do this, and the department would need to write regulations to implement the program.

7.5.2. Vessel arrival fees

The department could assess vessel arrival fees similar to those assessed by the California land management agency for vessels arriving at California ports. The fees could be placed in a dedicated account to foster technology

Table 7: Washington State Department of Fish and Wildlife 2007-2009 Budget Request for the State Ballast Water Management Program

State Ballast Water Management Program	2007/2009
Salaries and benefits—2.0 FTE @ \$69,725 per FTE per year	\$278,900
Mileage 3,000 miles/month X 2 vehicles @ \$0.34/mile	\$48,960
Equipment: Computers, phone service and cell phones	\$8,070
Per diem and lodging	\$7,200
Office supplies and sampling equipment	\$1,200
Contracts: Ballast water sample analyses	\$19,910
GRAND TOTAL	\$364,240

development and research; provide technical assistance to the shipping industry; allow the state to monitor ports, harbors and waterways for invasive species introduction; and provide funding for responding to new ballast-caused invasions. Legislation would be required to create this fee system, and the state would need to codify the system through state regulations.

7.5.3. Permit fees for delegated general NPDES permits

The District Court of Northern California ruled that the EPA must manage ballast water discharges through the CWA specifically through the NPDES starting in October 2008. The federal Solicitor General, on behalf of the EPA, appealed this decision. Until the outcome of this appeal is known, the state will probably not implement the court’s decision.

The state has authority to assess fees to cover the staff resources to develop and administer NPDES permits. However, WDFW is not the administrator of NPDES permits in this state. EPA Region 10, Ecology and WDFW would need to enter into an agreement to lay out roles and responsibilities for administering the NPDES permit program for ballast water.

7.6. Recommendation

Consensus recommendation

The work group agreed that the program elements listed above adequately describe an effective state program but could not agree on the total cost of the program.

Concerns

Some members believe that elements of this budget need further development to justify funding. For example, they believe that the state should further define the scope and methodology for environmental monitoring and link it to a larger system-wide assessment. Some members felt that the state should develop a credible methodology

and feedback loop to inform ballast water management policies. These members also believed that part of the environmental monitoring program should include ballast water exchange efficacy metrics to help the administrators make effective decisions to enforce the program requirements. In addition, these members recommend that a state program should not duplicate federal programs now or in the future, and that state efforts should assess whether the program and funding levels are appropriate and cost-effective at mitigating the threats associated with ballast water.

A number of members also believe that the funding of NPDES permit processing is premature since legal challenges have not resolved whether or not EPA should manage ship discharges under the federal CWA.

Some members recommend that the legislature fund WDFW to develop a scientifically sound methodology for targeting vessels for sampling. Such a methodology should help the state better determine the number of samples that should be taken over time so that the information collected is acceptable and statistically significant.

Some members fully support the need to harmonize data and reporting process with the federal government and with Oregon but feel that the work group did not adequately assess costs for this activity, especially with the potential for automated ballast water report processes at the federal level that would make the NBIC database available to state program managers.

8. BALLAST WATER EXCHANGE TECHNOLOGY

8.1. Overview

A current internationally accepted method to manage the spread of aquatic nuisance species in ballast water is to exchange water in a ballast tank with open ocean water. As defined in USCG regulations (33 CFR 151.2025) *Exchange* means to replace the water in a ballast tank using one of the following methods:

(1) **Flow through exchange** means to flush out ballast water by pumping in mid-ocean water at the bottom of the tank and continuously overflowing the tank from the top until three full volumes of water has been changed—to minimize the number of original organisms remaining in the tank.

(2) **Empty/refill exchange** means to pump out the ballast water taken on in ports, estuarine or territorial waters until the tank is empty, then refilling it with mid-ocean water; masters/operators should pump out as close to 100 percent of the ballast water as is safe to do so.

IMO adds to this definition by requiring ballast exchange methods to obtain 95 percent efficiency, or 95 percent of the ballast water volume should be replaced. IMO further states that a three-time exchange can be assumed to meet the 95 percent efficiency for existing ships.

While at first glance it appears that ballast water exchange is a good solution to the aquatic nuisance species problem, this practice has drawbacks and challenges in the areas of:

- Safety
- Operations
- Effectiveness
- Compliance monitoring

For these reasons, the current trend internationally and regionally is to phase out exchange practices in favor of ballast water treatment. It is important to note however, that until treatment technology is proven and available, exchange is still one of the more effective management techniques available.

8.2. State of flow-through exchange technology—safety, operations and efficiency

The flow-through exchange method requires a simple volumetric exchange of three times the tank capacity. Clean ocean ballast water is pumped in and the tank is allowed to

overflow through tank vents, until the three-times volume has been discharged. This is an efficient method, when the tank and ballast system is designed to circulate fresh ballast throughout the tank volume. Most existing ships do not support the flow-through ballast exchange method.

Researchers at the Marine Hydrodynamics Laboratory at the University of Michigan have carried out full-scale tests using dye tracers as well as computer simulations using Computational Fluid Dynamics (CFD) models (Michael G. Parsons, University of Michigan, 2003). Both types of studies show that actual volumetric efficiency falls far short of the required 95 percent in typical ballast tanks. Efficiencies more like 60 to 80 percent are probably the typical result.

Efficiency can also be different for every ballast tank on a ship. Efficiency depends on tank shape, aspect ratios, location of tank fill line and vents, internal structural arrangements and other parameters. Also, it is very difficult to quantify the efficiency of the tank. New Alaska Tanker Company ships, for example, have exchange systems designed to be efficient.

This method is also complicated by the long period that the ship at sea must operate their ballast system and pumps. This requires focus and attention from the ship's engineers. There have also been reports of deck structure failures because rough water slamming loads on the bottom shell can transfer directly through the solid block of water in the tank.

8.3. State of empty-refill exchange technology—safety, operations and efficiency

Empty-refill exchange can be more effective than flow-through exchange; however, it has more severe impact on the ship's stability and strength. Ballast is carried on ships to provide stability and reduce stresses on the hull girder. And most existing ships rely on ballast water to provide adequate intact stability (resistance to capsize) and to control hull structural stresses. Empty ballast tanks compromise the safety and strength of ships. Operators must carefully manage the empty-refill sequence to protect the ship. Some ships cannot use this method at all.

Researchers and regulators are concerned that the empty-refill method cannot attain the 95 percent efficiency, as empty-refill pump systems often are unable to strip the

tank, and ballast lines can lose suction with still more than 5 percent volume remaining in the tank. In this case, sediments that cannot be pumped out accumulate in ballast tanks and harbor aquatic nuisance species.

8.4. Exchange volumetric efficiency vs. efficacy

Ballast water exchange requirements focus on volumetric exchange efficiency. There are no requirements for the efficacy of the method or the quantity of aquatic nuisance species remaining in the ballast water after the exchange.

In tanks with few aquatic nuisance species to start with, a 95 percent volumetric exchange would result in fewer species after exchange than in tanks originating with high concentrations. This variability may be linked to the work done by researchers at UW found a lack of correlation between concentrations of nonnative species with reported exchanges.

8.5. Compliance monitoring

Currently, there is no effective method to record and report ballast water exchanges. Regulators and ship operators cannot accurately monitor the discharge of exchanged or un-exchanged ballast water.

8.6. Conclusions

Given the many issues and problems associated with ballast water exchange, IMO has proposed regulations to phase out exchange starting as early as 2009 and replace it with treatment as the method for managing ballast water.

In 2007, however, the work group finds no reason for Washington state to exclude ballast exchange as a ballast water management practice. Conducting effective ballast exchange offers significant reduction in the risk of spreading aquatic nuisance species compared to not performing exchange. However, ballast exchange does not have near the biological efficacy of the various ballast treatment system standards.

Ballast water exchange today is a practical method of management; however, as soon as proven treatment systems become available, the state should move towards treatment as the preferred management method.

9. BALLAST WATER TREATMENT TECHNOLOGY

9.1. Overview

Various water treatment technologies can either kill or remove organisms from ballast water before it is discharged in a port. This approach involves installing equipment in the ship, and is an alternative to ballast exchange methods. Ballast exchange normally does not need additional, new equipment. Figure 8 shows the options available to the ship owner, with the treatment technology types as defined in the *IMO 2003 Treatment Symposium Proceedings*.

Treatment systems are also categorized by capability. Capability is measured by the ballast water flow rate that the particular system is capable of treating. Different ship types typically have different flow rates for ballast treatment systems. Tankers having high rates of about 12,000 gallons per minute (gpm) or 2,800 cubic meters per hour (m³/hour). Passenger vessels have low rates (~1,500 gpm or 350 m³/hour). Systems are evaluated for flow rate capability which leads to an assessment of ship-type suitability.

The table below shows how the different capacities relate to different ship types.

Worldwide manufacturers with background in water treatment technology, and some in other industries, have devoted significant efforts in recent years to developing technologies to serve this potential large market. IMO has listed the following treatment system review guidelines:

- Safety considerations relating to the ship and the crew.
- Environmental acceptability, i.e., not causing more or greater environmental impacts than it solves.
- Practicability, (i.e., compatibility with ship design and operations).

- Cost effectiveness, (i.e., economical).
- Biological effectiveness in terms of removing, or otherwise rendering inactive harmful aquatic organisms and pathogens in ballast water.

A ship owner also has the following system selection considerations:

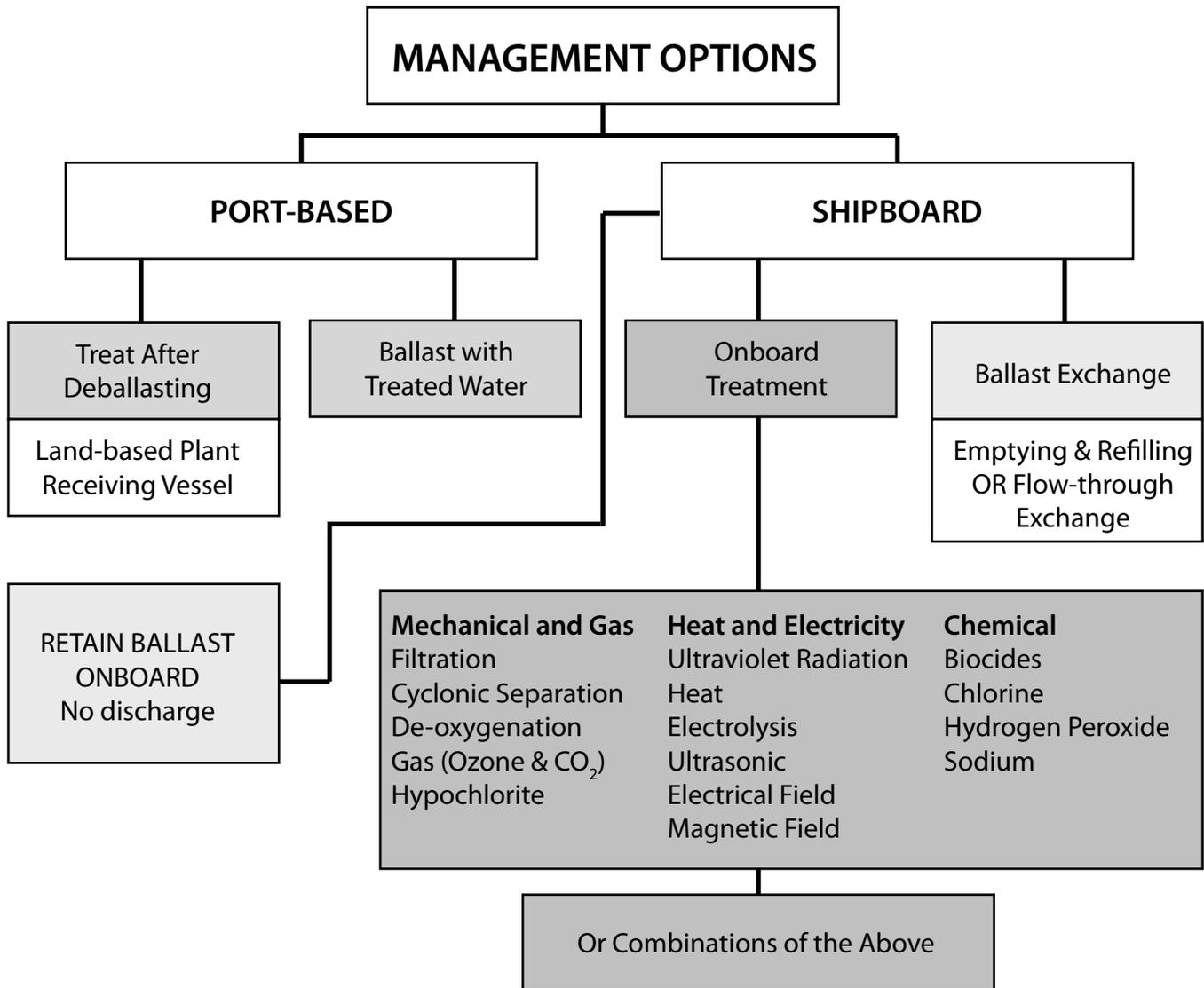
- Minimizes operational changes to the vessel's existing ballast management processes.
- Fits within the normal and existing operational procedures of the shipboard personnel.
- Imposes minimal additional workload on shipboard personnel.
- Minimizes extent and physical impact of modification to the vessel.
- Minimizes initial capital as well as life cycle / long-term operational costs.

The primary and current goal of the treatment system manufacturers has been to install their system on a ship for demonstration and verification purposes, as this has the most significant exposure for their product. These efforts are usually in partnership with a ship owner or operator. However, there are major impediments to the progress of technology. They include:

1. An uncertainty and lack of consistent standards for treatment at the international, national and regional levels. Without a universally adopted efficacy standard, the manufacturers do not know what their performance targets are, or how they compare to their competitors.
2. The regulators are not providing the shipping industry with adequate approval assurances.

Class	Capacity	Applications
Class I	Low Capacity	Car Carriers, Cruise Ships
Class II	Medium Capacity	Container Ships
Class III	High Capacity	Tankers and Bulkers

Figure 8: Options for Managing Ballast Water



Without a formal approval, the ship owner is uncertain about the long-term viability of his system selection and liability exposure.

3. Environmental soundness requirements restrict on-board testing of biocide-type treatments and other treatments that have some potentially harmful chemical in the discharge water, as a result of the treatment system.
4. Cost—treatment systems are not inexpensive, making the decision more difficult for a ship owner operating on low margins.

There is recent progress in the first two of these areas:

1. IMO has published efficacy criteria, which are fairly stringent, but as previously discussed are not final and subject to change until the IMO guidelines become regulations.
2. U.S. Navy in cooperation with the USCG has established an Evaluation and Test (EVT) center in Key West, Florida, to perform bench testing and verification of treatment systems, and there are other test centers being planned around the country.
3. Additionally, the USCG has developed the STEP—per NVIC 01-04 program, where they review and approve a system for a specific installation on a ship, and are granted equivalency to future ballast discharge standard regulations for the life of the

ship or the system. However, getting a treatment system through this process has proven arduous and despite a number of submittals. The USCG has not approved any systems for further testing.

WDFW has proactively developed paths around these impediments to the manufacturers, in the interest of promoting technology development. Under state ballast water management regulations, WDFW can approve treatment technology for use on vessels that call on Washington ports. The department has approved two technologies to date:

- A filtration and ultraviolet light treatment system is installed on a Princess Cruise Line vessel.
- All ships in the Norwegian Cruise Lines fleet use treated sewage as ballast. The operator must treat the sewage to meet water quality standards at discharge.

The department is currently reviewing or will review applications from:

- Severn Trent DeNora: The Bal Pure system uses electricity to generate hypochlorite from seawater at levels sufficient to kill organisms in the ballast tanks. The system also neutralizes the hypochlorite before the treated water is discharged to surface waters.
- Eco-Chlor: This system uses chlorine dioxide to treat ballast water. The company has installed an experimental system on a Matson vessel for testing operating between California and Hawaii.

- Marengo: This mobile system uses filtration and UV light to treat ballast water. The vendor plans to conduct shipboard testing in conjunction with WDFW.

9.2. Current installations

Table 8: *Currently Installed Treatment Systems* lists treatment system installations on board ships that typically call in Washington State. A number of other vessels not calling on ports in Washington State but involving companies that have vessels calling on Washington State ports are also pilot testing treatment options. The results from these tests will be very relevant to Washington State.

9.3. State of treatment technology

The Ballast Water Work Group, with the support of Puget Sound Action Team, enlisted The Glosten Associates, Inc. to conduct a survey of the most promising treatment technologies (Glosten report, "Ballast Water Treatment Systems," Rev A, September 2006).

Glosten conducted interviews with companies engaged in development and testing of such systems. They discussed the current state of development, particulars of each application, and cost data with several vendors of ballast water treatment systems. The vendors were selected from a world-wide search using the IMO listing of treatment systems. Glosten selected six vendors to interview based on their prominence in the field and state of development. Staff asked each vendor a standard set of questions.

Table 8: Currently Installed Treatment Systems

a. Mechanical and Gas-based Systems:

Filtration (Arkal and others)	Class I	Installed on 4 or 5 Princess Cruises Ships
Ozone Injection (Nutech)	Class III	Installed on new BP ships, ATC is experimenting with installations on: <i>S/T Tonsina</i> and <i>S/T Prince William Sound</i>
Venturi Oxygen Stripping (NEI)	Class III	Won INTERTANKO Environmental Challenge Award By late 2006 will have installations on: <i>APL Japan</i> , a container ship, and <i>Mary Ann Hudson</i> , a Teco Ocean Shipping bulk carrier

b. Heat and Electro-based Systems:

U/V Radiation	Class I-II	Used in conjunction with Filtration on Princess Ships
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c. Chemical-based Systems

BalPure (Severn Trent DeNora)	Class 1-III "Scalable"	Installation on SeaRiver Tanker is in process
Seakleen	Class I-III "Scalable"	Working with Seabulk to carry out full scale testing in Puget Sound

Table 9: *Status of Prominent Ballast Water Treatment Technologies* summarizes:

- The state of development and timeline (laboratory, mesocosm, pilot scale, full scale, commercial sales).
- The cost range (equipment, installation, testing and protocols, training, operations, maintenance, support).
- Efficacy testing efforts.
- Mechanical interfaces (electrical power, pressure drop, footprint, capacity, etc.).
- Operating profile of each technology.

9.4. Treatment efficacy standards

The treatment system efficacy is the efficiency of the process to kill or remove organisms. The determination of a minimum required efficacy for treatment systems has been a complex process and although today there is a published IMO Guideline, there is still debate, and this guideline is not necessarily final. The USCG is conducting a study to evaluate if a more stringent guideline is practical to achieve.

A comparison of treatment standards and implementation schedules for international, national and state programs on the west coast are listed in Table 1: *Proposed and Existing Ballast Water Treatment Performance Standards for the West Coast*.

9.5. Conclusions

The research and development effort in ballast water treatment has matured to the point where there are several technologies suitable for most vessel types and configurations that are capable of meeting the intention of the ballast treatment laws, with reasonably low risk to environment on effluent discharge (i.e. good efficacy and low levels of toxic discharge).

There is a lack of shipboard trials and prototype installations that are required to consider these treatment systems to be commercially ready. One could estimate that the systems that have or will have prototype installations (Severn Trent, Echochlor, AlphaLaval, TechCross, Nutech, NEI) will need two to three years to bring the system from prototype to fully proven and functional. The Hyde system is an exception, which has a history of installations suitable for lower capacity ballast systems such as container ships and cruise ships.

Manufacturers do not currently appear ready to deliver multiple systems and support such installations. These systems are complex and generally expensive. All suppliers will require a ramp-up time of two to three years to build the needed support personnel, spare supply lines, manufacturing capability. In the first year of commercial demand for treatment systems, most suppliers would likely not be able to provide more than 10 systems (six suppliers = 60 ships outfitted in first year).

The approval process for treatment systems is confused on the federal and international levels, with no clear path to acceptance for systems. For example, the Naval Research Laboratory, Key West, has spent millions of dollars and years of effort with not a single ballast treatment system tested. Also, the science community is still meeting to discuss and determine protocols for verifying that treatment standards have been met.

Treatment system installation date requirements need to consider practical vessel construction and shipyard maintenance schedules.

- a. New Construction Vessels.** One could consider two years the minimum time for a new construction vessel to incorporate a new requirement (i.e., ballast treatment) into vessel design, construction and delivery. This assumes that there are commercially available ballast treatment systems.
- b. Existing Vessels.** One could consider one to four years a reasonable time for an existing vessel to install a newly required ballast treatment system. One year assumes perfectly timed shipyard maintenance period with engineering and equipment procurement leading by nine months. Four years assumes that a vessel that has just completed a shipyard maintenance period with plans to defer next shipyard maintenance period to three years instead of the standard two.
- c. Treatment System Lead Times.** It is difficult to predict how a significant demand for treatment systems will affect equipment lead times. For example, certain models of diesel engines are currently under high demand resulting in lead times of greater than two years. Ballast treatment systems are less complex than diesel engines; however, such delays are possible given that these are new products to market with undeveloped production capacity.

Table 9: Status of Prominent Ballast Water Treatment Technologies

Manufacturer, Name and type of system	State of development	Regulatory certification	Vessel type served	Seawater treated per hour and power usage	Cost: Initial equipment	Cost: Installation	Cost: Operating	Service availability	Required lead time
Severn Trent De Nora BalPure™ Electro-chlorination	Commercially available Pending full-scale trials Pending certification	<ul style="list-style-type: none"> ETV (NRL) in progress ABS Type approval pending 	Ships requiring large flow rates	500 m ³ /hour at 35 kW	Small capacity Cost not reported	\$150,000 for retrofit \$70,000 for new build	\$0.03 / m ³	Worldwide	18-22 weeks
				1,000 m ³ /hour at 52 kW	Medium capacity \$400,000				
				3,000 m ³ /hour at 165 kW	Large capacity Cost not reported				
Hyde Marine Ballast Water U/V plus Filtration	Commercially available Pending full-scale trials Pending certification	<ul style="list-style-type: none"> STEP application pending California state testing in process Washington state approved 	Any	250 m ³ /hour at 24 kW	Small capacity \$164,000	\$15,000 for retrofit \$5000 for new build	Replacement U/V bulbs, \$400 each every 2 to 3 years Internal parts, \$550 per lamp every 5 to 6 years	Worldwide	8 weeks
				500 m ³ /hour at 48 kW	Medium capacity \$249,000				
				1,000 m ³ /hour at 96 kW	Large capacity \$463,100				

Continued on next page

Table 9 continued

Manufacturer, Name and type of system	State of development	Regulatory certification	Vessel type served	Seawater treated per hour and power usage	Cost: Initial equipment	Cost: Installation	Cost: Operating	Service availability	Required lead time
NEI Treatment Systems De-oxygenation via Venturi Oxygen Stripping	Commercially available Pending full-scale trials Pending certification	<ul style="list-style-type: none"> STEP application pending 	Large ships serving transoceanic routes	500 m ³ /hour Power usage not reported 3,000 m ³ /hour at 90 kW 10,000 m ³ /hour at 220 kW	Small capacity \$200,000 Medium capacity \$350,000 Large capacity \$1,000,000	\$60,000 for retrofit Cost for new build not reported	Cost of diesel fuel	Worldwide	12 to 24 weeks
Techcross Inc. Electro-Clean Electrolysis	Have completed pilot testing Pending onboard testing	<ul style="list-style-type: none"> Have received IMO basic approval Awaiting IMO final approval, expected July 2007 	Any vessel or water type	200 m ³ /hour at 7 kW 500 m ³ /hour at 26 kW	Under development	\$50 per ton	Cost not reported	Under development	8 weeks
Nutech O3 Venturi Ozone	Commercially available by Sept. 2006 Pending full-scale trials Pending certification	<ul style="list-style-type: none"> ABS installation approval 	25,000 ton cargo ships to largest tankers	15,000 gpm Power usage not reported	\$600,000 to \$700,000 for large capacity system	Cost not reported	\$16,000 to \$80,000 service period Cost of diesel fuel	Under development	8 weeks
Degussa AG PERACLEAN® Ocean	Commercially available Pending shipboard and land-based testing	<ul style="list-style-type: none"> Have received Basic Approval by IMO for application as Active Substance Application for EPA registration submitted in May 2006 	Any vessel type	250 m ³ /h at 4 kW 1,500 m ³ /h at 10 kW	Small capacity \$50,000 High capacity \$100,000	\$5,000 to \$10,000	0.20 to 0.30 dollars per cubic meter	Worldwide / under development	12 to 16 weeks

10. COMPLIANCE STRATEGIES

10.1. Complying with the state ballast water management requirements after July 1, 2007

Chapter 77.120.030 RCW required vessel owners, masters, operators or persons-in-charge to submit an interim report to WDFW by June 30, 2006.

These reports describe actions needed by the ship operators to meet RCW 77.120.030 (2). This section of law states “After July 1, 2007, discharge of ballast water into waters of the state is authorized only if there has been an open-sea exchange or if the vessel has treated its ballast water to meet standards set by the department consistent with applicable state and federal laws. When weather or extraordinary circumstances make access to treatment unsafe to the vessel or crew, the master of a vessel may delay compliance with any treatment required under this subsection until it is safe to complete the treatment.”

The law further directs the Ballast Water Work Group to review these reports and develop recommendations for the interim ballast water management report. The recommendations must include, but are not limited to:

- a. Actions that the vessel owner or operator will take to implement the July 1, 2007 ballast water requirements, including treatment methods applicable to the class of the vessel.
- b. Necessary plan elements when there are no treatment methods applicable to the vessel for which the report is being submitted, or which would meet the requirements of this chapter.

The table below and discussion summarizes data submitted by ship operators regarding their compliance with the July 1, 2007 deadline.

Six hundred and fourteen (614) owner/operators representing 2,826 vessels submitted reports. The first section of the report asking how vessels will

comply when the law changes in 2007, consisted of check boxes. Most operators checked more than one box.

WDFW also asked owner/operators to list optional actions that they would take to comply with the law after July 1, 2007.

Operators provided written responses. These responses were difficult to categorize. Several vessels operators listed three or four options. The majority did not respond.

Of those who did respond:

- 363 said that they would “discharge at drydock or other facility ashore.”
- 234 said they would “contact port authority for instruction.”
- 118 owner/operators—“report to USCG and follow instructions of PSCO.”
- 118 owner/operators—“use approved treatment facility.”
- 69 owner/operators—“will use an alternate exchange area.”
- 65 owner/operators—“discharge at USCG facility.”
- 35 owner/operators—“will change port rotation to where it is safe to exchange.”
- 33 owner/operators—“USCG CH10 Sect 8.”
- 17 owner/operators—“will discharge according to vessel’s needs.”
- 13 owner/operators—“use potable water for ballast.”
- 7 owner/operators—“discharge to another fleet vessel.”
- 5 owner/operators—“conform to state and/or federal regulations.”

10.2. Safety exemptions requests

Between January 2005 and June 2006, very few vessels requested safety exemptions.

Eleven owner/operators of a total 6,299 vessels arriving at Washington ports asked for safety exemptions.

Management practice to meet requirements	Responses
1. Retain ballast on board	1,833
2. Exchange ballast	2,680
3. Considering treatment systems—including two technologies that are undergoing full-scale testing	33

Table 10: *Vessels That Have Listed Safety Exemptions Between 1/1/05 and 6/30/06* shows the types of vessels that requested safety exemptions, the reason for their discharge

and whether they actually discharged ballast water. Of these, only four actually discharged un-exchanged ballast water. These vessels are listed in **"bold"** font.

Table 10: Vessels that have listed safety exemptions between 1/1/05 and 6/30/06

Vessel name	Type	Date	Data from form	Discharge
Mol Endeavor	Container	1/4/05	Safety "unsafe conditions"	NO DISCHARGE
Ken Blossom	General Cargo	2/2/05	Safety "local, short voyage, bad sea conditions"	11,344 m ³ unexchanged from Stockton into Vancouver, WA
Coastal Reliance	ITB	3/31/05	Safety "safety, heavy weather"	8,196 m ³ unexchanged from LA into March Point
Saga Beija flor	Bulk	5/11/05	Design limitation "stress/stability condition"	NO DISCHARGE
Oriental Phoenix	Freighter	7/9/05	Design limitation "insufficient stability if conducted"	NO DISCHARGE
Groton	ITB	7/29/05	Design limitation "#3 wt not exchanged due to stress"	6,796 m ³ unexchanged 1,718 m ³ Exchanged from Long Beach to March Pt.
Cape Scott	Bulk	12/30/05	Safety "heavy weather"	7,825 m ³ unexchanged from Stockton
Katsuragi	Container	2/6/06	Safety "stability, rough seas"	NO DISCHARGE
Hyundai Admiral	Container	2/20/06	Design limitation "7 swbt, heeling tanks p/s, not exchanged due to excessive torsion moments"	Discharged 6dbp and 3dbb, both tanks exchanged
Morning Saga	Car Carrier	3/7/06	Safety "bad weather, no intent to discharge"	NO DISCHARGE
Norwegian Sun	Passenger	6/17/06 7/8/06 8/5/06 8/12/06 8/19/06	Design limitation "safety exemption due to design limitations"	Discharged exchanged 1,473 m ³ 1,033 m ³ 1,049 m ³ 1,383 m ³ 0

10.3. Penalties and enforcement

Ship owners and operators want fair, equitable and consistent handling and treatment by the state in all matters related to shipping and ballast water management and enforcement. Almost all vessel operators will comply with the July 1, 2007 deadline by exchanging ballast water offshore or holding it onboard. Few vessel owner/operators request and use safety exemptions. Some members believe those few vessel operators that must discharge un-exchanged ballast water should be required to pay a mitigation fee for potential negative environmental effects created by these discharges while other members believe a legitimate safety exemption should be allowed with penalties levied for any misuse of the safety exemption as determined by WDFW.

Some members of the Ballast Water Work Group do not consider Washington penalties to be an adequate disincentive for promoting compliance with state laws. For example, prior to September 2006, California penalties were identical to Washington's (i.e., up to \$5,000 per violation for discharging un-exchanged ballast water, \$500 per violation of the reporting requirements and \$5,000 per violation for falsifying records). Other members expressed a need to see an analysis of the penalty processing history in Washington and including analysis as to the impact on compliance of education, outreach, vessel inspections, USCG efforts and penalty processing have had. WDFW reports a significant reduction in un-exchanged ballast water being discharged and there ought to be some analysis of what led to that reduction and the specifics of non-compliance as connected to penalty amounts prior to copying California's recent change.

In September 2006, California increased all civil penalties up to \$27,500 per occurrence, and made each day of a continuing violation a separate violation. California ballast water law is repealed after 2010. The USCG may also assess penalties of up to \$27,500 for violations of the national ballast water program.

In addition, Washington State penalties are currently paid into the state general fund and are not available to WDFW to support the state management program.

10.4. Recommendations

The Ballast Water Work Group recommends that the Washington Legislature amend the Ballast Water Management Act to:

1. Increase Washington's penalties to those comparable to those of California and the USCG, i.e., up to \$27,500 per occurrence with each day of a continuing violation considered a separate violation.

2. Establish a ballast water management account in the state treasury that is administered by WDFW.
3. Specify that the account can be capitalized by gifts, grants, donations, penalties and fees.
4. Specify that expenditures from the account may be used only to carry out the purposes of the Act (RCW 77.120) or to support it through research and monitoring.
5. Specify that funds cannot be used to support salaries of permanent department employees.
6. Specify that the account is subject to allotment procedures under RCW 43.88 RCW and the approval of the director or the director's designee.
7. Specify that penalties deposited into the account may be used only to support basic and applied research and carry out education and outreach related to state's ballast water management and that the department consult with the Ballast Water Work Group when making expenditures of penalties funds.

The Ballast Water Work Group recommends that WDFW should:

1. Develop a penalty schedule that is consistent with the USCG's.
2. Define in rule the meaning of "each day of a continuing violation."
3. Verify whether the penalty schedule should be adopted by rule or other mechanism.

11. RESEARCH NEEDS

Very little information is available to determine the effectiveness of ballast water exchange as a management measure to minimize the risk of introducing non-native plants and animals to Washington waters. In theory, ballast water that is replaced with open-ocean water is less likely to contain organisms that can survive in coast conditions when discharged.

However, the effectiveness of exchange depends on a number of variables including how the exchange is conducted, the design and construction of the ballast tanks on different classes of vessels and the location that the exchange occurred.

More research is necessary to provide decision-makers with adequate information so that they can make important decisions about the best ways to minimize the risks posed by vessels that discharge exchanged ballast water to Washington waters.

The state should support the University of Washington's Ballast Water Research Program to sample and analyze ballast water from ships that arrive at state ports. This program will provide information to improve the state's ability to manage the risks associated with the discharge of exchanged ballast water.

To improve how the state manages risks associated with coastal traffic, to improve and effectively target vessel inspections and for compliance follow-through, WDFW as well as researchers at UW and PSU have identified a number of key research needs, including:

- a. Clarifying the risk of movement of water between ports with similar physical and chemical characteristics.
- b. Assessing the relative risks of hull fouling as a vector for introducing non-native species in both the Columbia River and Puget Sound.
- c. Assessing the efficacy of coastal ballast water exchange in reducing risk especially on the Columbia River and Puget Sound.

11.1. Recommendation

The Ballast Water Work Group recommends that WDFW, in consultation with the Ballast Water Work Group, should:

1. Seek state funds, grants and other funds to support research.
2. Research that answers essential questions that informs and help develops reasonable policy and improves the state's ballast water management program should receive priority for research funding.

APPENDIX 1: SUBSTITUTE SENATE BILL 6329—BALLAST WATER WORK GROUP

CERTIFICATION OF ENROLLMENT

SUBSTITUTE SENATE BILL 6329
Chapter 227, Laws of 2004
58th Legislature
2004 Regular Session

BALLAST WATER WORK GROUP
EFFECTIVE DATE: 6/10/04

Passed by the Senate March 8, 2004
YEAS 47 NAYS 0

BRAD OWEN
President of the Senate

Passed by the House March 3, 2004
YEAS 96 NAYS 0

FRANK CHOPP
Speaker of the House of Representatives

CERTIFICATE

I, Milton H. Doumit, Jr., Secretary of the Senate of the State of Washington, do hereby certify that the attached is SUBSTITUTE SENATE BILL 6329 as passed by the Senate and the House of Representatives on the dates hereon set forth.

MILTON H. DOUMIT JR.

Secretary

Approved March 31, 2004.

GARY F. LOCKE

Governor of the State of Washington

FILED

March 31, 2004 - 10:39 a.m.

SUBSTITUTE SENATE BILL 6329

AS AMENDED BY THE HOUSE
Passed Legislature - 2004 Regular Session

State of Washington 58th Legislature 2004 Regular Session

By Senate Committee on Parks, Fish & Wildlife (originally sponsored by Senator Oke)

READ FIRST TIME 02/05/04.

AN ACT Relating to extending the date for ballast water discharge implementation; amending RCW 77.120.005 and 77.120.030; amending 2002 c 282 s1 (uncodified); and providing an expiration date.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

Sec. 1. RCW 77.120.005 and 2000 c 108 s 1 are each amended to read as follows:

The legislature finds that some non-indigenous species have the potential to cause economic and environmental damage to the state and that current efforts to stop the introduction of non-indigenous species from shipping vessels do not adequately reduce the risk of new introductions into Washington waters.

The legislature recognizes the international ramifications and the rapidly changing dimensions of this issue, {+ the lack of currently available treatment technologies, +} and the difficulty that any one state has in either legally or practically managing this issue. Recognizing the possible limits of state jurisdiction over international issues, the state declares its support for the international maritime organization and United States coast guard efforts, and the state intends to complement, to the extent its powers allow it, the United States coast guard's ballast water management program.

Sec. 2. 2002 c 282 s 1 (uncodified) is amended to read as follows:

- (1) The director of the department of fish and wildlife must establish the ballast water work group.
- (2) The ballast water work group consists of the following individuals:
 - (a) One staff person from the governor's executive policy office. This person must act as chair of the ballast water work group;
 - (b) Two representatives from the Puget Sound steamship operators;
 - (c) Two representatives from the Columbia river steamship operators;
 - (d) Three representatives from the Washington public ports, one of whom must be a marine engineer;
 - (e) Two representatives from the petroleum transportation industry;
 - (f) One representative from the Puget Sound water quality action team; ((- and -))
 - (g) Two representatives from the environmental community{+ ;
 - (h) One representative of the shellfish industry;
 - (i) One representative of the tribes;
 - (j) One representative of maritime labor; and
 - (k) One representative from the department of fish and wildlife +}.

(3) The ballast water work group must study, and provide a report to the legislature by December 15, ((- 2003 -)) {+ 2006 +}, the following issues:

- (a) All issues relating to ballast water technology, including exchange and treatment methods ((- and -)) {+ , management plans, +} the associated costs{+ , and the availability of feasible and proven ballast water treatment technologies that could be cost-effectively installed on vessels that typically call on Washington ports +};
- (b) The services needed by the industry and the state to protect the marine environment{+ , including penalties and enforcement +}; ((- and -))
- (c) The costs associated with, and possible funding methods for, implementing the ballast water program{+ ;
- (d) Consistency with federal and international standards, and identification of gaps between those standards, and the need for additional measures, if any, to meet the goals of this chapter;
- (e) Describe how the costs of treatment required as of July 1, 2007, will be substantially equivalent among ports where treatment is required;

- (f) Describe how the states of Washington and Oregon are coordinating their efforts for ballast water management in the Columbia river system; and
- (g) Describe how the states of Washington, Oregon, and California and the province of British Columbia are coordinating their efforts for ballast water management on the west coast +}.

(4) The ballast water work group must begin operation immediately upon the effective date of this section. The ((- department of fish and wildlife -)) {+ Puget Sound water quality action team +} must provide staff for the ballast water work group. The staff must come from existing personnel within the ((- department of fish and wildlife -)) {+ team +}.

(5) The director must also monitor the activities of the task force created by the state of Oregon in 2001 Or. Laws 722, concerning ballast water management. The director shall provide the ballast water work group with periodic updates of the Oregon task force's efforts at developing a ballast water management system.

- (6) (a) The ballast water work group expires June 30, ((- 2004 -)) {+ 2007 +}.
- (b) This section expires June 30, ((- 2004 -)) {+ 2007 +}.

Sec. 3. RCW 77.120.030 and 2002 c 282 s 2 are each amended to read as follows:

The owner or operator in charge of any vessel covered by this chapter is required to ensure that the vessel under their ownership or control does not discharge ballast water into the waters of the state except as authorized by this section.

(1) Discharge into waters of the state is authorized if the vessel has conducted an open sea exchange of ballast water. A vessel is exempt from this requirement if the vessel's master reasonably determines that such a ballast water exchange operation will threaten the safety of the vessel or the vessel's crew, or is not feasible due to vessel design limitations or equipment failure. If a vessel relies on this exemption, then it may discharge ballast water into waters of the state, subject to any requirements of treatment under subsection (2) of this section and subject to RCW 77.120.040.

(2) After July 1, ((- 2004 -)) {+ 2007 +}, discharge of ballast water into waters of the state is authorized only if there has been an open sea exchange or if the vessel has treated its ballast water to meet standards set by the department {+ consistent with applicable state and federal laws +}. When weather or extraordinary circumstances make access to treatment unsafe to the

vessel or crew, the master of a vessel may delay compliance with any treatment required under this subsection until it is safe to complete the treatment.

(3) {+ Masters, owners, operators, or persons-in-charge shall submit to the department an interim ballast water management report by July 1, 2006, in the form and manner prescribed by the department. The report shall describe actions needed to implement the ballast water requirements in subsection (2) of this section, including treatment methods applicable to the class of the vessel.

Reports may include a statement that there are no treatment methods applicable to the vessel for which the report is being submitted.

(4) The ballast water work group created in section 1, chapter 282, Laws of 2002 shall develop recommendations for the interim ballast water management report. The recommendations must include, but are not limited to:

- (a) Actions that the vessel owner or operator will take to implement the ballast water requirements in subsection (2) of this section, including treatment methods applicable to the class of the vessel;
- (b) Necessary plan elements when there are not treatment methods applicable to the vessel for which the report is being submitted, or which would meet the requirements of this chapter; and
- (c) The method, form, and content of reporting to be used for such reports.

(5) For treatment technologies requiring shipyard modification that cannot reasonably be performed prior to July 1, 2007, the department shall provide the vessel owner or operator with an extension to the first scheduled drydock or shipyard period following July 1, 2007.

(6) The department shall make every effort to align ballast water standards with adopted international and federal standards while ensuring that the goals of this chapter are met.

(7) +} The requirements of this section do not apply to a vessel discharging ballast water or sediments that originated solely within the waters of Washington state, the Columbia river system, or the internal waters of British Columbia south of latitude fifty degrees north, including the waters of the Straits of Georgia and Juan de Fuca.

(({- (4) -}) {+ (8) +} Open sea exchange is an exchange that occurs fifty or more nautical miles offshore. If the

United States coast guard requires a vessel to conduct an exchange further offshore, then that distance is the required distance for purposes of compliance with this chapter.

Passed by the Senate March 8, 2004.

Passed by the House March 3, 2004.

Approved by the Governor March 31, 2004.

Filed in Office of Secretary of State March 31, 2004.



PUGET SOUND ACTION TEAM

Office of the Governor, State of Washington