

Transportation Research Board Special Report 291

GREAT LAKES SHIPPING, TRADE, AND AQUATIC INVASIVE SPECIES

**Do Institutional Mechanisms Exist to Set and Enforce Standards  
for the Great Lakes That Exceed the Ballast Water Performance  
and Exchange Standards Established  
by the International Maritime Organization?**

Prepared for  
Committee on the St. Lawrence Seaway:  
Options to Eliminate Introduction of Nonindigenous Species into the Great Lakes, Phase 2  
Transportation Research Board and Division on Earth and Life Studies

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## I. INTRODUCTION

The purpose of this paper is to examine the options available to regulators and administrative agencies in the United States and Canada at both Federal and state, or provincial levels to establish more stringent standards for ballast water and/or ballast tank residuals. The ballast water discharged by ships entering the Great Lakes from offshore, or from other coastal areas is identified as a source (vector) for Exotic Species or Pathogens that could establish a colony within the Great Lakes ecosystem. This paper is not a legal brief as such, will not attempt to analyze the legal standing of existing or proposed legislation.

Invasive species, also known as “introduced”, “alien,” “aquatic nuisance species”, or “nonindigenous species”, found in marine, estuarine and freshwater environments such as rivers or lakes may be transported to new regions through numerous human activities. Mechanisms, or vectors, by which organisms are introduced into U.S. waters can include: intentional and unintentional introductions of fish and shellfish, aquaculture, illegal releases from the aquarium and pet industries, floating marine debris, bait shipments, and accidental release through research institutions.(1) These species can also include viral and bacteriological organisms.

The Transportation Research Board Committee on the St. Lawrence Seaway’s (TRBSC) sponsor, The Great Lakes Protection Fund, established the following two goals that would, in effect, form the bookends that all legal remedies need to stay within:

- Enhance potential for global trade, and
- Eliminate further introductions of nonindigenous aquatic species by vessels transiting the Seaway

From a simplistic viewpoint, the quickest solution to stopping the spread of exotic species into the Great Lakes would be to eliminate ocean shipping into the Great Lakes. The first goal of the sponsor does not preclude that option, however in the opinion of the author, there are many drawbacks. 1. While vessel ballast water is a significant vector for the introduction of invasive species in the Great Lakes it is not the only vector.(2) The elimination of shipping would not stop the spread of invasive species into the Great Lakes. 2. Stopping all foreign shipping into the Great Lakes is directly opposed to the first goal set by the TRBSC’s sponsor as marine transportation may provide financial and environmental cost benefits over other modes of transportation.(3) 3. All modes of transportation introduce exotic species and a policy of stopping a specific mode because it is an invasive species vector would raise the issue of uniform application to all modes.(4) 4. Stopping shipping on the Great Lakes does not address the movement of invasive species by other vessels around the world and does not correct the ballast water problem for the rest of the United States or the world. Non-Great Lakes states have cited Federal ballast water regulations which impose regulations on vessels entering the Great Lakes and not other US waters as ineffective.(5)

There are several key questions imbedded in the work statement for this paper that need to be addressed in order to help frame the complex issue of establishing more stringent Ballast Water control laws.

The paper in question does not define “Institutional Mechanisms” and they can consist of three distinct types: legal institutions that are by Federal, state or provincial agencies; social institutions such as academia or non-governmental agencies that provide cooperative input and

direction; and the markets that can provide incentives and disincentives. These three institutional mechanisms working in collaboration become a powerful change agent.

While not clearly stated, the word “set” in the question refers to setting mandatory, not voluntary, regulations and further necessitates establishing standards that exceed current IMO standards. There are two elements in the IMO standards that can be exceeded. The first part is the timeframe to implement the IMO standards. This assumes the IMO standards are acceptable but the timetable for implantation is unacceptable. The second is to exceed the specific standards or identified thresholds of acceptance. Both the time frame for implementation and the standards can be exceeded together however, the degree to which either of these will be exceeded is not known.

Why are the current and proposed IMO standards not considered rigorous enough? It may be that scientists have determined that the IMO standards, even if fully enacted and enforced, cannot eliminate the spread of all invasive species by vessels. (If this is the case, then the next issue raised is: If standards are set for zero invasive species in ballast water discharged, is this technologically feasible on an operational vessel?) If the new legal requirement set is not technologically feasible the regulations may be untenable and unenforceable.

Are the current and proposed ballast standards adequate, but due to a high degree of Non-compliance are the standards ineffectual? Current law requires the exchange of ballast water for some vessels, which is a proven method of mitigating the spread of invasive species. However, if the law is not obeyed the goal is not achieved. The underlying reasons for non-compliance may be inadequate qualified resources for enforcing regulations. Passing additional or more stringent laws that are not complied with will not achieve the first goal of the TRBSC sponsor.

In reviewing the literature on the introduction of invasive species by ballast water there is no agreed upon definition of ballast in terms of quantity that should be regulated. All commercial and recreational vessels may carry ballast with larger vessels typically carrying greater quantities. However there are no scientific studies that provide a quantity cut off point where a certain amount of ballast will no longer be a viable medium for invasive species.

One of the vectors for invasive species is ships that do not engage in Ballast Water exchange because they declare that they have No Ballast Onboard (NOBOB). While the vessel may be in a NOBOB status that does not mean that they are free of un-pumpable ballast water or sediment. These residuals may harbor invasive species and if discharged into a receptive ecosystem may propagate.(6) Vessels declaring the NOBOB status, account for 90% of vessels entering the Great Lakes from foreign waters.(7) In a study published in 2005, 32% of 39 ships sampled were found to harbor resting stages of known NIS in their ballast sediments(8), although in a different study by some of the same researchers, only 0.05 % of collected resting eggs from these sediments were able to hatch.(9) Nonetheless, NOBOBs should be considered a potential vector for invasive species entering the Great Lakes.

Without a scientifically backed quantity standard that defines the minimum amount of water needed to carry an invasive species, one may assume that any volume of ballast water could be a potential vector. An analysis of existing ballast water regulations show that there is application to recreational and commercial vessels and that the quantity of ballast on board the vessel that triggers BWM varies by jurisdiction.

Marine Trade patterns on the Great Lakes can be divided into eight distinct regions (See [Figure 1](#)). Invasive species could feasibly be introduced into the lakes through the first three routes as well as from other vectors.(10)

- **Seaway traffic – Foreign**
  - Antwerp to Hamilton, Cleveland, Windsor and Burns Harbor
- **Seaway traffic – US/Canada to US/Canada**
  - Sept Isles, Quebec to Hamilton , Ontario
  - Portland, Maine to Buffalo, NY
- **Connecting inland waterway routes:**
  - Milwaukee, WI to Dubuque, IA via the Illinois waterway
- **Interlake – US / Canada**
  - Superior, WI (Lake Superior) to Nanticoke, Ontario Lake Erie
- **Interlake – US / US**
  - Superior, WI (Lake Superior) to Detroit, MI, (Lake St. Clair)
- **Interlake – Canada / Canada**
  - Thunder Bay, Ontario (Lake Superior) to Hamilton, Ontario (Lake Ontario)
- **Intralake – Canada / Canada**
  - Goderich, Ontario Lake Huron to Parry Sound, Ontario (Lake Huron)
- **Intralake – US / US**
  - Muskegon, MI, Lake Michigan to Milwaukee, WI , Lake Michigan

**FIGURE 1 Areas of operation:  
The current eight Great Lakes shipping patterns with examples.**

### **International Maritime Organization: Ballast Water**

The problem of harmful aquatic organisms in ballast water was first raised at IMO in 1988 and since then the Marine Environment Protection Committee (MEPC), together with the Marine Safety Committee (MSC) and technical sub-committees, has been dealing with the issue. In order to help developing countries understand the problem and monitor the situation, IMO is implementing the GEF/UNDP/IMO Global Ballast Water Management Program (GloBallast) and has provided technical support and expertise.

The International Convention for the Control and Management of Ships Ballast Water & Sediments was adopted by consensus at a Diplomatic Conference at IMO in London on Friday 13 February 2004. The Conference was attended by representatives of 74 States, one Associate Member of IMO; and observers from two intergovernmental organizations and 18 non-governmental international organizations. The Convention will enter into force 12 months after ratification by 30 States, representing 35% of world merchant shipping tonnage. (Article 18 *Entry into force*).

The *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, established standards for ballast water management. Regulations for both a Ballast Water Exchange Standard and a Ballast Water Performance Standard together with a regulation requiring Review of Standards by the Organization are the cornerstones of the Convention. The document also provides for the imposition on ships of additional measures to prevent, reduce or eliminate aquatic organisms or pathogens by an individual Party or jointly with other Parties and recognizes that there is still significant work to be undertaken in the

development of effective technologies and means of measuring whether the Standards are being achieved.

Under Article 2 *General Obligations* Parties undertake to give full and complete effect to the provisions of the Convention and the Annex in order to prevent, reduce and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments.

Parties are given the right to take, individually or jointly with other Parties, more stringent measures [with respect to the prevention, reduction or elimination of the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments], consistent with international law. Parties should ensure that ballast water management practices do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.

Under Article 5 *Sediment Reception Facilities*, Parties undertake to ensure that ports and terminals, where cleaning or repair of ballast tanks occur, have adequate reception facilities for the reception of sediments.

At its 53rd session in July 2005 and the 55<sup>th</sup> session in October 2006, IMO's (MEPC) adopted *Guidelines for uniform implementation of the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention)*. The guidelines adopted cover ballast water management equivalent compliance; approval of ballast water management systems; ballast water management and development of ballast water management plans; ballast water exchange and the procedure for approval of ballast water management systems that make use of active substances.

**TASK I. EXAMINE THE PROCESS OF ADOPTION OF A CONVENTION IN GENERAL BY INDIVIDUAL COUNTRIES, AND SPECIFICALLY BY BOTH THE UNITED STATES AND CANADA, CONFIRMING THE CURRENT STATUS OF THE IMPLEMENTATION PROCESS IN EACH COUNTRY.**

The process used in the IMO to develop a convention is a collaborative process with input from a wide range of government agencies, non-government agencies, companies and private individuals. The process, especially in contentious issues, can be very long, with some recommendations taking years to formulate and to create a convention that is binding worldwide. The steps that take a recommendation from committee to convention are as follows:

- Special Committees report recommendations to IMO General Assembly;
- General Assembly debates and votes;
- Member States become signatories under respective state processes;
- When sufficient states ratify the Convention it goes into effect world wide;(11)
- Member states enforce through flag state and port state control.

The United States and to a lesser degree, Canada, have considerable input to the process as Port States. However their small, by world standards, commercial fleets reduce their impact in speaking as flag states. There are generally two major enforcement systems responsible for ensuring commercial vessel compliance with applicable regulations, laws and conventions. These systems are Flag State Control and Port State Control, which are defined in the body of the

Paris Memorandum of Understanding on Port State Control 1982. The flag state refers to the government of the flag under which the vessel operates, and it exercises control to ensure compliance. This control can extend to anywhere in the world the vessel operates. When the vessel operates internationally, an additional control in the form of Port State Control is added where the government of the foreign port in which the vessel is operating exercises control in order to ensure compliance with applicable domestic and international requirements (including IMO) to ensure safety of the port, environment and personnel.

### **The Process of Implementing an IMO Convention in the United States**

A Government's acceptance of a convention places on it the obligation to take the measures required by the convention. In the case of the US and Canada, national law has to be enacted or changed to enforce the provisions of the convention. In some cases, special facilities may have to be provided, an inspectorate may have to be appointed or trained to carry out functions under the convention, and adequate notice must be given to shipowners, shipbuilders and other interested parties so they make take account of the provisions of the convention in their future acts and plans.

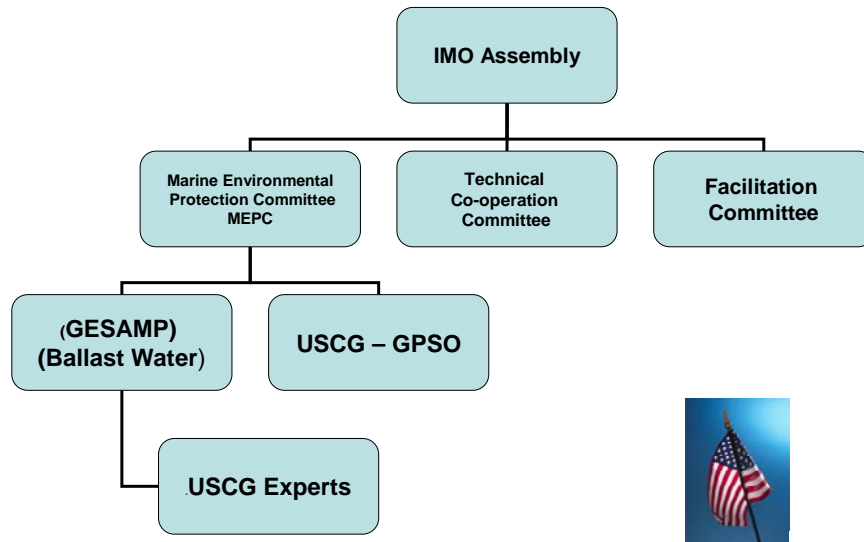
In the United States the IMO Convention Implementation Process follows the legal steps as outlined below: (12)

- US Constitution delegates leadership of process to Executive branch;
- IMO interaction under direction of State Department;
- Expert input by USCG during process;
- State Department responsible for treaty agreement by the Executive branch;
- Ratification by US Senate of IMO Conventions is required;
- Signed and ratified treaty is law of the land and preempts most domestic laws.

During the development phase of the convention the US has input through the US Coast Guard (USCG). The USCG provides official input to the convention making process under the direction of the US State Department; they provide expert advice on maritime issues. The USCG is authorized to vote on behalf of the US on relevant maritime conventions at various points in the process.

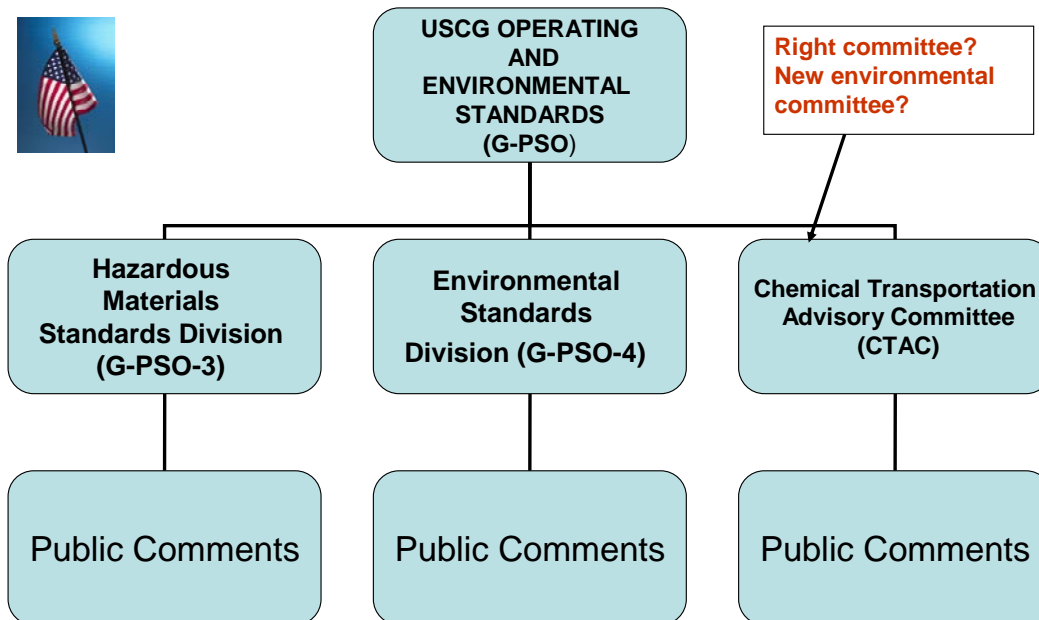
The USCG provides expert advice to the convention development process through several avenues. The USCG Office of Operating and Environmental Standards (CG-3PSO) is in charge of the ballast water regulations. They in turn receive input from Hazardous Materials Standards Division (CG-3PSO-3), the Environmental Standards Division (CG-3PSO-4), the Chemical Transportation Advisory Committee (CTAC), experts and public input. Because of the growing importance and consequence of BWM and other marine environmental issues it may be worthwhile for the USCG to consider the creation of a marine environmental public advisory committee.

## Sample Input into IMO Conventions and Codes



**FIGURE 2** Sample input into IMO conventions and codes.

## US Authorized Representative USCG



**FIGURE 3** U.S. authorized representative USCG.



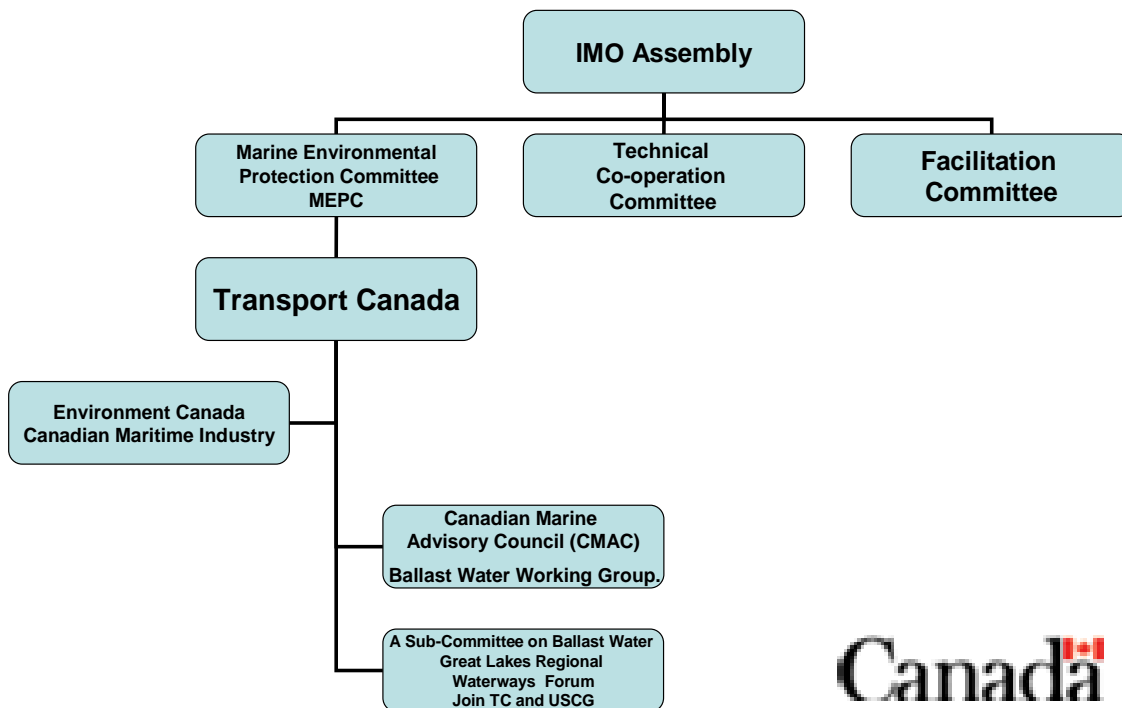
## The Process of Implementing an IMO Convention in Canada (13)

Transport Canada (TC) is the lead department with respect to IMO matters. A Transport Canada representative is the head of the Canadian delegation to the IMO Marine Environment Protection Committee (MEPC). The Canadian delegation to MEPC meetings normally consists of representatives from

- **Transport Canada;**
- **Environment Canada;**
- **Fisheries and Oceans Canada (Canadian Coast Guard);**
- **Canadian maritime industry.**

Transport Canada has sought input from the Canadian Marine Advisory Council (CMAC) Ballast Water Working Group and a Sub-Committee on Ballast Water that was formed under the Great Lakes Regional Waterways Management Forum in December 2000. This Sub-Committee is co-chaired by TC and the USCG and has a primary function to make recommendations towards harmonizing Canadian and U.S. ballast water management regulations on the Great Lakes. It was inactive for several years and reformed in January 2006 as the Great Lakes Ballast Water Working Group.

## Canada Input into IMO Conventions and Codes



Canada

FIGURE 4 Canada input into IMO conventions and codes.

## **TASK II. IDENTIFY THE AUTHORITY IN EACH COUNTRY FOR IMPLEMENTATION AND ENFORCEMENT OF REGULATIONS PERTAINING TO BALLAST WATER AND SEDIMENT MANAGEMENT ON FOREIGN SHIPS IN DOMESTIC WATERS.**

### **United States**

For issues like BWM, the United States Congress enacts legislation that empowers the executive branch to develop and enforce regulations. The regulations are found in the Titles of the US Code of Federal Regulations (CFR). Treaties and Conventions become legislation and regulations under this process.

The Federal Administrative Procedure Act (APA) of 1946 governs the way in which administrative agencies of the United States Federal government may propose and establish regulations. The APA also sets up a process for Federal courts to directly review an agency.<sup>(14)</sup> As such, it is an important source of authority within Federal American administrative law. The APA applies to both independent agencies and executive department agencies, and their subdivisions. The basic purposes of the APA are:

- To require agencies to keep the public informed of their organization, procedures and rules;
- To provide for public participation in the rulemaking process;
- To establish uniform standards for the conduct of formal rulemaking and adjudication;
- To define the scope of judicial review.

For example, a typical U.S. Federal rulemaking would contain these steps: <sup>(15)</sup>

- **Legislation.** The U.S. Congress passes a law and assigns an agency to promulgate additional regulations.
- **Advance Notice of Proposed Rulemaking.** This optional step entails publishing the agency's initial analysis of the subject matter, often asking for early public input on key issue. Any data or communications regarding the upcoming rule would be made available to the public for review either on-line at the USCG website or in the US Federal Register.
- **Public comment.** Once a proposed rule is published, a public comment period begins, allowing the public to submit written comments to the agency. The agency is required to respond to each issue raised in the comments. Depending on the complexity of the rule, comment periods may last for 30 to even 180 days.
- **Proposed Rule.** In this step, the agency publishes the actual proposed regulatory language, a full discussion of the justification and analysis behind the rule, and the agency's response to any public comment on the advance notice.
- **Final Rule.** Usually, the proposed rule becomes the final rule with some minor modifications. In this step, the agency publishes a full response to issues raised by public comments and an updated analysis and justification for the rule, including an analysis of any new data submitted by the public. In some cases, the agency may publish a second draft proposed rule, especially if the new draft is so different from the proposed rule that it raises new issues that have not been submitted to public comment.

- Judicial review. In some cases, members of the public or regulated parties file a lawsuit alleging that the rulemaking is improper. While courts generally offer significant deference to the agency's technical expertise, they do review closely whether the regulation exceeds the rulemaking authority granted by the authorizing legislation and whether the agency properly followed the process for public notice and comment.
- Effective date. Except in extraordinary circumstances, the rule does not become effective for some time after its initial publication to allow regulated parties to come into compliance. Some rules provide several years for compliance.

The rule making process may incorporate interim rules and several Public Comment periods before a final rule is adopted. An example of the Ballast Water Management System (BWMS) rulemaking process by the USCG can be found at <http://www.uscg.mil/hq/g-m/regs/2006.html>.

Agencies must also comply with several other overlapping requirements in developing regulations. For example since September 2003, the USCG has been conducting essential environmental impact analyses to support BWMS rulemaking, as required by the National Environmental Policy Act, the Endangered Species Act, and various other environmental statutes. Public workshops have been held across the nation to engage interested stakeholders. The Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service are assisting the USCG as cooperating agencies. In addition to considering a “no action” alternative that would avoid using a Ballast Water Discharge (BWD) standard to evaluate BWMS, the environmental analysis will also assess the impact of establishing a stringent “virtual sterilization” standard that would require the elimination of all living organisms larger than 0.1 micron. Also, the USCG is considering adoption of the less stringent IMO standards that would establish maximum acceptable discharge concentrations for various types of potential invasive species

The results of these analyses will be published in a Draft Programmatic Environmental Impact Statement (DPEIS), which the Coast Guard is developing in conjunction with the Notice of Proposed Rule Making (NPRM). The Coast Guard is working to publish these documents as soon as possible, possibly as early as the summer of 2007.

In addition to conducting environmental analyses for implementing a BWD standard, the USCG must also conduct economic analyses. Under Executive Order 12866, any Federal agency engaged in a significant rulemaking action must conduct an assessment of potential costs and benefits, including an explanation of how the rulemaking is consistent with the statutory mandate and Presidential policies. This assessment is called a Regulatory Impact Analysis (RIA). The RIA, along with a Federalism analysis, generally would also explain how the rulemaking avoids undue interference with the functions of state, local, and tribal governments.

### **The Ballast Water Rule Making Process**

In 1899, the Rivers and Harbors Act directed the Army Corps of Engineers to control aquatic invasive plants. Currently, more than twenty Federal agencies have some role in efforts to prevent, control or eradicate invasive species and their impacts. The roles of these agencies include control and prevention, early detection and response, management and restoration, research and monitoring, coordination with international efforts, and information and education. The plethora of agencies involved in this issue presents significant coordination and funding

challenges that have resulted in slow progress on the National Management Plan for addressing exotic species.(16)

In the United States, the Department of Homeland Security, through the U.S. Coast Guard, is the Federal agency authorized by Congress to develop a national regulatory program to prevent the introduction and spread of aquatic nonindigenous species (NIS) into U.S. waters via ballast water discharges from vessels. By direction of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) and the National Invasive species Act of 1996 (NISA), the Coast Guard has promulgated several regulations and continues to develop future regulations to address this issue.

The lead USCG entity in this process is the U. S. Coast Guard Environmental Standards Division (CG-3PSO-4) which develops national regulations and policies on marine environmental protection and represents U. S. interests in the development of global marine environmental protection agreements to integrate U.S. and international environmental standards and public policy. The Division develops and maintains standards, regulations, and guidelines for industry, the states, and the public, to implement laws and treaties on marine environmental protection. The main elements of this work involve developing the regulations and non-regulatory compliance policy for the prevention of ship mediated introductions of aquatic nuisance species.

In 1999, President William Clinton issued Executive Order 13112 establishing the National Invasive Species Council, which is co-chaired by the Secretaries of Commerce, Agriculture and the Interior. Also represented on the Council are the Secretaries of State, Treasury, Defense and Transportation as well as the Administrator of the Environmental Protection Agency. The Council was directed to form a non-Federal Invasive Species Advisory Committee to advise the Council in implementing the Order. The Council is required to ensure that:

- Federal initiatives are coordinated and non-duplicative;
- A mechanism exists for U.S. coordination with international efforts;
- A network is established to document and monitor invasive species;
- A web-based information network is created; and
- A National Invasive Species Management Plan is prepared.

This Plan contains priority elements needed to address invasive species. These include:

- Leadership and Coordination;
- Prevention;
- Early Detection and Rapid Response;
- Control and Management;
- Restoration;
- International Cooperation;
- Research;
- Information Management; and
- Education and Public Awareness.

## **The Primary Federal Rulemaking to Address Invasive Species**

The Nonindigenous Aquatic Nuisance Prevention and Control (NANPCA) Act of 1990 (16 U.S.C. 4701- 4741) was a response to the impacts of invasive species, in particular the Eurasian Ruffe and the zebra mussel. The Act mandated the creation of the Aquatic Nuisance Species Task Force to coordinate actions related to invasive species. Another element of the Act is a call for research in the three major areas: assessing the environmental effects of ballast water exchange in the receiving waters of the U.S. and to identify areas, if any, where such exchanges will not introduce or spread nuisance species; studying whether aquatic nuisance species threaten the ecological characteristics and economic uses of other water bodies than the Great Lakes; and analyzing current shipping practices as vectors of introduced species transmissions and to assess the need for controls on vessels entering waters other than the Great Lakes to reduce the risk of unintentional introductions. NANPCA authorized the Coast Guard to develop regulations for a mandatory ballast water management (BWM) program for the Great Lakes and Hudson River. The USCG established these regulations in 1993 and 1994, respectively. These regulations appear in Title 33, Part 151, Subpart C of the Code of Federal Regulations (CFR).

A NANPCA Ballast Water and Shipping Committee was formed to work on solutions to species introduction via ballast water. Other purposes of NANPCA were the prevention of intentional introductions, development and implementation of environmentally sound control methods, and the minimization of economic and ecological impacts.

NANPCA was reauthorized in 1996 with a new name – the National Invasive Species Act (NISA) of 1996. This reauthorization extended the voluntary ballast water exchange and reporting Act to all U.S. coastal waters, and mandatory only for the Great Lakes and Hudson River. NISA required the Coast Guard to assess compliance with the voluntary guidelines with the stipulation to convert them into a mandatory BWM program if the Coast Guard determined that the voluntary guidelines were inadequate. In 2002, the Coast Guard submitted a report to Congress stating that compliance with the guidelines was too low to determine its adequacy, and therefore the Coast Guard intended to develop regulations to address these issues.

The USCG instituted a Ballast Technology Development Program to investigate more effective alternatives to ballast water exchange as a means of reducing risk of invasions as part of their tasking under NISA.

In 2004, the USCG established regulations for penalty provisions for vessels bound for U.S. ports who fail to comply with the Great Lakes BWM Program and/or that fail to submit their ballast water reporting forms. These regulations also expanded the BWM reporting and recordkeeping requirements. Later in 2004, regulations were promulgated converting the national voluntary guidelines into a national mandatory BWM program. These regulations appear in CFR, Title 33, Part 151, Subpart D.

In 2005, the USCG established a policy of best management practices for NOBOB vessels entering the Great Lakes. This policy, which strongly encourages NOBOBS to conduct saltwater flushing, was established to reduce the introductions of aquatic NIS into the Great Lakes.

The USCG is currently engaged in a rulemaking that would set a performance standard for the quality of ballast water discharged in U.S. waters. This rulemaking is being carried out under NANPCA and NISA, which authorize the USCG to approve alternative BWMS that are found to be at least as effective as mid-ocean ballast water exchange (BWE) in preventing NIS introductions. Under both NANPCA and NISA, the US Coast Guard is required to issue

guidance and regulations for management of ballast water. The ANPRM states that any alternative ballast treatment must be “at least as effective” as deep water exchange in preventing introduced species. The Coast Guard indicated that the lack of a treatment standard is an impediment to the development of alternative treatment technologies. An alternative treatment would be considered effective if it:

- Produces predictable results;
- Removes or inactivates a high percentage of organisms;
- Functions effectively under most operating conditions; and
- Moves toward a goal that meets the congressional intent to eliminate ballast water discharge as a source of harmful invasive species

As the effectiveness of ballast water exchange varies from vessel to vessel, the Coast Guard believes that setting a performance standard would be the most effective way for approving BWMS that are environmentally protective and scientifically sound. The approval of BWMS requires procedures similar to those in CFR, Title 46, Subchapter Q, to ensure that the BWMS works not only in the laboratory but under shipboard conditions.

These would include: pre-approval requirements, application requirements, land-based/shipboard testing requirements, design and construction requirements, electrical requirements, engineering requirements, and piping requirements. As a necessary first step in approving BWMS, the Coast Guard has proposed defining a ballast water discharge (BWD) standard that would enable regulatory agencies to assess a BWMS’s ability to be environmentally protective.

This was done through an announcement of public rulemaking (ANPRM), published March 4, 2002, the rulemaking process began by asking for comments to help define a ballast water treatment goal and standard. The rulemaking is entitled “Standards for Living Organisms in Ships’ Ballast Water Discharged in U.S. Water” (17) and documents and public comments relating to the rulemaking can be found at [http://dms.dot.gov\\_under docket number USCG-2001-10486](http://dms.dot.gov_under docket number USCG-2001-10486).

## **Canada**

It is the responsibility of Transport Canada's Policy Group to advise how transportation policy issues fit within the broader government agenda. The Regulatory Services Section is responsible for the processing and tracking of all Transport Canada marine legislation; and is also home to the Canadian Marine Advisory Council (CMAC) and International Affairs.

The Canada Shipping Act (CSA) is the principal piece of legislation dealing with commercial and recreational vessel use in Canadian waters. The CSA is one of the oldest Acts in Canada and is attended by more than 100 regulations. Over the years, ad hoc amendments have been made to the Act with the result being a piece of legislation that is difficult to use and which hinders the economic performance of Canada’s marine industry. One of the 1998 amendments provided that; “The Governor in Council may make regulations respecting the control and management of ballast water.”(18) This was later revised and expanded by the Canada Shipping Act, 2001.

A breakthrough was achieved with the adoption of the Canada Shipping Act, 2001 (CSA 2001), which received Royal Assent on November 1, 2001.

This new Act is a streamlined and modernized version of the old one and will come into force when the regulations needed in support of it have been developed, which is expected to occur in early 2007.(19)

Transport Canada has developed national ballast water management guidelines that became effective on September 1, 2000; which incorporated and recognized existing Great Lakes, west coast, US and international standards. The guidelines were replaced by regulations under the statutory authority of the Canada Shipping Act, 2001.

On December 12, 2003 all marine safety policy and regulatory responsibilities were consolidated under Transport Canada (TC), allowing the Canadian Coast Guard (CCG) to maintain its focus on operations and service delivery. This transfer of responsibilities means that policy related to pleasure craft safety, navigable waters protection, marine navigation, and pollution prevention and invasive species response now rests with Transport Canada, Marine Safety.(20) This is a significant difference in these areas of responsibility between the USCG and the Canadian Coast Guard. The difference in responsibility reflects each nation's decision on what agencies will be responsible for regulation of laws. The selection of an agency should have no impact on the enforcement of ballast regulations as long as the assigned regulatory agency has necessary legal authority, a knowledge base in the relevant area, is properly staffed with trained competent personnel, and the entire process is adequately funded to carry out the assigned responsibility. There is an established process of bi-national cooperation not only between the US and Canada but also between each nation's governmental agencies.

### **Canadian Legislative Review Process**

The Canadian government has legislation called the "Statutory Instruments Act", it functions similar to the US Administrative Procedures Act. As legislation is being drafted it must conform to the Statutory Instruments Act S-22, an Act to provide for the examination, publication and scrutiny of regulations and other statutory instruments.(21)

The Canadian Regulatory Services Section is responsible for the processing and tracking of all Transport Canada marine legislation, which includes statutes, regulations, orders and procedures, pertaining to all aspects of marine matters. The section ensures that legislation and regulations are developed according to established standards, and also provides a reference check and editing function for submissions forwarded for approval. It also takes care of minor miscellaneous amendments as well as Standing Joint Committee representations.

All Canadian government agencies are supposed to follow general steps when enacting rules & regulations, as directed by the "Regulatory Process Management Standards" policy. The Policy does not operate in isolation, therefore departments and agencies are expected to apply the Policy in conjunction with other Cabinet directives and major policies of the Government. The policy objective is to ensure that use of the government's regulatory powers results in the greatest net benefit to Canadian society. Other directives from Cabinet concerning policy and law making are followed such as the Cabinet Directive on Law-making and the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals and the Cost Recovery and Charging Policy.

The regulatory process must also follow the Government of Canada Regulatory Policy as approved by Cabinet in November 1999. It replaces the 1995 version of this policy.

When implementing new regulations a procedure is implemented to address the following issues:

- **“General.** *Regulatory authorities proposing new regulatory requirements or regulatory changes must have evidence that a problem has arisen, that government intervention is required and that new regulatory requirements are necessary.*
- **The problem.** *The problem must be described and documented in clear, concise terms. The problem must be analyzed. Interested parties must be consulted on alternative ways to solve the problem.*
- **Alternative solutions.** *It must be demonstrated that new regulatory requirements will help solve the problem. Alternative regulatory solutions must also be analyzed to ensure the most effective and efficient is chosen.*
- **Benefit-cost analysis.** *It must be demonstrated that the benefits of regulatory requirements are greater than their costs. When regulations address health, social, economic or environmental risks, it must also be demonstrated that regulatory effort is being expended where it will do the most good. For all regulatory proposals, a benefit-cost analysis must be carried out to assess potential effects, such as impacts on the environment, workers, consumers and other sectors of society. The Business Impact Test, or equivalent analysis, must be undertaken to assess the effect that major regulatory proposals will have on Canadian businesses.*
- **Regulatory burden.** *It must be demonstrated that adverse impacts on Canada's sustainable development - this concerns the long run capacity of both the economy and the environment to generate well-being, wealth and employment for Canadians - are minimized and that no unnecessary regulatory burden has been imposed. Information and administrative requirements should be limited to what is absolutely necessary and impose the least possible cost on regulated parties. The impact of additional regulatory burden on small businesses in particular must be considered, and the least burdensome but effective alternative for their circumstances should be chosen.*
- **Flexibility.** *Positive consideration must be given to parties proposing equivalent means to conform with regulatory requirements. If proposals are not accepted, the rationale for doing so must be documented.*
- **Intergovernmental coordination.** *Regulatory authorities must determine what, if any, related regulatory requirements already exist and which other departments, agencies or governments are involved. New regulatory requirements must be coordinated with existing ones to avoid duplication and to take advantage of possible efficiencies. When standards are being considered, reference should be made, if appropriate, to existing standards developed within the National Standards System or internationally. Pertinent international and Federal-provincial agreements must be respected.*
- **Implementation.** *The regulatory program design must include program objectives, program delivery specifications and delivery control procedures. It will also include a simple and effective complaint resolution system embodying the principles set out in Guide XI, Effective Complaint Management published by the Treasury Board Secretariat.*
- **Consultation**
- *Regulatory authorities proposing new regulatory requirements, or changes to existing regulatory requirements, must carry out timely and thorough consultations with interested parties. The consultation effort should be proportional to the magnitude of the impact of the*



*proposed regulatory change. Notice of proposed regulations and amendments must be given so that there is time to make changes and to take comments from consultees into account.*

- *Regulatory authorities must clearly set out the processes they use to allow interested parties to express their opinions and provide input. In particular, authorities must be able to identify and contact interested stakeholders, including, where appropriate, representatives from public interest, labour and consumer groups. If stakeholder groups indicate a preference for a particular consultation mechanism, they should be accommodated, time and resources permitting. Consultation efforts should be coordinated between authorities to reduce duplication and burden on stakeholders.*

- *Regulatory authorities should consider using an iterative system to obtain feedback on the problem, on alternative solutions and, later, on the preferred solution.*

- *Consultations should begin as early as possible in order to get stakeholder input on the definition of the problem, as well as on proposed solutions.*

- ***Communications***

- *Regulatory authorities creating new regulatory requirements must tell stakeholders about the proposal in simple, clear, complete and concise language that the general public can easily understand.*

- *New regulations must be written in plain language that regulated parties can easily understand.*

- *New regulations and changes to existing regulations, as well as material incorporated by reference, must be well publicized and easily accessible to stakeholders.”(22)*

The public is advised through Transport Canada’s website and also the *Canada Gazette* the "official newspaper" of the Government of Canada. It is somewhat analogous to the US *Federal Register*. In it are published new statutes and regulations, proposed regulations, decisions of administrative boards and an assortment of government notices.

### **TASK III. IDENTIFY OTHER AGENCIES AND THE AUTHORITY UNDER WHICH THEY COULD EFFECT THE DETERMINATION OF SPECIFIC BALLAST MANAGEMENT STANDARDS FOR THE GREAT LAKES.**

#### **Other Federal Actions to Address Invasive Species**

The U.S. Navy, though not required to follow IMO guidelines, has adopted procedures designed to minimize the risk of introduced species. These measures are modeled after the IMO guidelines and include ballast exchange and ballast tank flushing outside of 12 miles offshore, logging of exchanges and adjustments to ballast, and cleaning of sediments and biomass from anchors, chains and appendages. In 1996, the US Congress amended section 312 of the Clean Water Act to authorize the Department of Defense and the EPA to set Uniform National Discharge Standards for incidental liquid discharges (except for sewage) from vessels of the Armed forces. The initial phase in the development of the regulations was to determine which liquid discharges would require a marine pollution control device (MPCD) which could be either a technology or management practice. It was determined that ballast water was one of the discharges that warranted some level of control

An unresolved issue for the Federal government is whether the U.S. Environmental Protection Agency should regulate ballast water discharges as point sources under the Clean Water Act National Pollution Discharge Elimination System.

The Clean Water Act (CWA) prohibits the discharge of pollutants from a point source into the navigable waters of the U.S. without a National Pollutant Discharge Elimination System (NPDES) permit. Although vessels are considered point sources, the EPA has, by regulation, exempted them from the NPDES permit requirement. This issue has been the subject of a legal battle resulting in a Federal district court's summary judgment to environmental organizations requiring the EPA to issue a decision on whether to regulate ballast water discharges under the Clean Water Act permitting program.

In January 1999, a number of environmental groups, including ones from the Great Lakes, petitioned to repeal the EPA rule on ballast water claiming it conflicts with the CWA, which does not exempt incidental discharges from vessels. The EPA denied the petition in September 2003, citing policy considerations and Congress's preference that the Coast Guard regulate routine, operational discharges, as evidenced by NANPCA and the Act to Prevent Pollution from Ships.(23) The EPA held that ballast discharges are exempt because they are "incidental to the normal operation of a vessel." (24)

The U.S. District Court for the Northern District of California in 2005 ruled that the EPA must regulate ballast water under the Clean Water Act (CWA). The court ordered the EPA to repeal their rule that exempted ballast from the CWA, finding that ballast water discharges constitute a "discharge" of "pollutants" (because it can contain biological materials) into the navigable waters of the U.S. from a "point source." The court found that although NANPCA/NISA directed the Coast Guard, not the EPA, to oversee the development of regulatory requirements for ballast water, NISA was not intended to limit the CWA with respect to ballast water discharges. The law (NISA) U.S.C. § 4711(b)(2)(C) clearly states that "the regulations issued under this subsection shall . . . not affect or supersede any requirements or prohibitions pertaining to the discharge of ballast water into waters of the United States under the Federal Water Pollution Control Act." The court also pointed out that NISA only addresses AIS and not other types of ballast water pollutants, such as sediment, rust, etc. and is therefore not comprehensive

In September 2006, the judge granted Northwest Environmental Advocates' motion for permanent injunctive relief and remanded the case to the EPA, (25) setting a two-year deadline for EPA action. The challenged regulation, 40 C.F.R. § 122.3(a), will be set aside in September 2008. The judge dismissed the shipping industry's concerns regarding the impact of the ruling on global shipping as "dramatically overstated," finding industry's concerns were based on the assumption that ballast water discharges would be absolutely and immediately prohibited. The judge recognized that a two-year time frame is "ambitious," but concluded that it would not impose an undue burden on the EPA because the agency is intimately familiar with the ballast water problem and the Coast Guard already requires several measures the EPA could adopt.

Proposed legislation, HR 1350, introduced into the US Congress on March 6, 2007, addresses in part ballast water management and appears to place the primary regulatory power for ballast water management on the EPA.(26) Other proposed legislation HR-801 also addresses ballast water.

The Lacey Act is the primary US Federal conservation statute applicable to exotics. This act, administered by the US Fish and Wildlife Service has general statutory authority to stop the

importation of exotics but no clear mandate to address ballast water which may carry invasive species.

### **State Legislation of Ballast Water Management**

Current Federal legislation allows for concurrent action by the states. States are not precluded by the CWA from adopting or enforcing “any standard or limitation respecting discharges of pollutants or any requirement respecting control or abatement of pollution” as long as those standards are no less stringent than the Federal standards.(27) States may consider using several existing statutes to address ballast water provided that invasive species is legally determined to be a pollutant, there is a clear mandate for the responsible agency to enforce regulations, there is funding for adequate enforcement, and the regulations can be complied with. States may also elect to regulate ballast water under the Clean Water Act, pollutant acts laws regarding biological agents, conservation statutes or under other laws, such as Minnesota’s statute 84D, that specifically address exotic species.

Potential obstacles to the development of state ballast water management laws are clauses of the US Constitution which raise the issue of Federal pre-emption of a state law. A thorough and well documented legal brief was prepared by National Sea Grant Legal Center that identifies three ways in which State laws addressing ballast water may be preempted by Federal law(s).(28)

### **Federal Preemption**

States have the authority under the Tenth Amendment of the US Constitution to regulate ballast water. However Federal law can preempt a validly enacted state law if it conflicts with Federal law or interferes with interstate commerce. State regulation of commercial shipping operations is constrained by three constitutional principles: the Commerce Clause, the Supremacy Clause, and the Foreign Affairs Clause.

### **Preemption by the Supremacy Clause**

The Supremacy Clause of Article VI of the US Constitution provides that the Constitution, including laws and treaties made pursuant to it, are the supreme law of the land. It is within the police power of states to regulate areas affecting the health and safety of its citizens; however, pursuant to the Supremacy Clause, state laws that conflict with Federal laws are generally preempted by Federal law. Even if state laws do not actually conflict with Federal law, states may be barred from regulating areas in which the Federal government has regulated.

### **Preemption by the Commerce Clause**

State laws must still comply with the requirements of the commerce clause of the U.S. Constitution, which provides that Congress has the authority “[t]o regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes.”(29) The negative implication of the commerce clause, sometimes called the “dormant commerce clause,” is that the power of state and local governments to regulate interstate commerce is limited. State laws that affect interstate commerce will be invalid if they discriminate against non-residents or unduly burden interstate commerce.

Under the Constitution, the power to regulate international commerce lies with Congress.

### **Preemption by the Foreign Affairs Clause**

The United States may enter treaties or conventions with other nations regarding maritime commerce. After Congress ratifies such treaties, they become the “supreme law of the land” under the Supremacy Clause. State laws that conflict with such conventions or treaties could be analyzed under the same principles used in the Federal preemption cases. Although the United States is not currently party to a convention or treaty regarding ballast water discharge, it may soon be. In 2004, the IMO, adopted the International Convention for the Control and Management of Ships’ Ballast Water and Sediments and it will go into effect 12 months after 30 countries have signed it. The IMO treaty mandates a ballast water discharge standard and would replace voluntary guidelines that recommend vessels exchange ballast water in mid-ocean. If the United States signs the IMO treaty, it would become the “supreme law of the land” and the state laws may be subject to preemption.

States interested in pursuing state action may be able to steer clear of the potential Federal pre-emption issues and stay within the scope of state powers if they focus ballast water legislation on natural resource protection, and avoid attempts to regulate design, equipment, and safety aspects of ship construction and operation.

In 2004, when it issued mandatory ballast water requirements for U.S. waters, the Coast Guard stated that: “Congress clearly intended for a Federal-State cooperative regime and not for Federal preemption of State requirements. Thus, each state is authorized under NISA to develop its own regulations, including its own research programs, if it believes that Federal regulations or programs are not stringent enough.”(30)

California has a long history of BWM legislations. An assessment of California’s BW legislative history can provide some insight into issues of a state’s regulation of vessel’s ballast water operations.

In 1994, the development of BWM regulations in California was initiated but halted when legal concerns arose over the constitutionality of state regulations over commerce, which could contravene Federal jurisdiction. In 1999, however, California passed a bill adopting IMO guidelines as state policy and passed the Ballast Water Management for Control of Nonindigenous Species Act of 1999, applying Federal guidelines though mandating ballast water management for all ships entering state waters. This legislation also narrowed the scope of the safety exemption by introducing remedial measures including : ballast pipe sealing, non-release, and exchange of ballast in a state-designated backup zone in the event a ship arrives without exchanging ballast due to safety concerns.

The California Marine Invasive Species Act (CMISA) of 2003 revised and expanded the Ballast Water Management for Control of Nonindigenous Species Act of 1999 to more effectively address the Invasive Species threat. CMISA charged the California State Lands Commission (CSLC) with oversight of the state’s program to prevent or minimize the introduction of NIS from commercial vessels. To advance this goal, CSLC utilizes a comprehensive, multi-pronged approach that includes: ballast water management tracking, compliance, and enforcement; sound policy development in consultation with a wide array of experts and stakeholders; applied research that advances the strategies for NIS prevention; and outreach and education to bridge the knowledge gaps between scientists, legislators, and stakeholders.

AK - <a href="#">Ballast Water Discharge</a> (AK Statutes, Title 46: Water, Air, Energy, and Environmental Conservation, Chapter 3: Environmental Conservation, Section 750)
CA - <a href="#">Ballast Water</a> (CA Codes; Harbors and Navigation Code; Section 132)
IL - <a href="#">Ballast Water Discharge</a> ( <i>Proposed house bill to amend the Environmental Protection Act 92_HB3009</i> )
MD - <a href="#">Ballast Water Regulations</a> - Implemented July 8, 2002
Mi – House Bill 4603 & Senate Bill 332
MN - <a href="#">Ballast Water Management</a> ( <i>Proposed House Bill 4189 - referred to committee</i> )
OR - <a href="#">Ballast Water Management</a> (OR Revised Statutes, Chapter 722)
RI - <a href="#">Ballast Water</a> (RI Statutes, Title 46 Waters & Navigation, Chapter 46-17.3)
VA - <a href="#">Ballast Water Management</a> (Code of VA, Title 28.2-109 - 28.2.111)
WA RCW 77.120.030
WI - <a href="#">Ballast Water Management &amp; Aquatic Nuisance Species Regulation</a> ( <i>2001 Assembly Bill 437</i> )

**FIGURE 5 Examples of State Ballast Water Legislation passed and proposed (note: introduced but not passed legislation is highlighted in yellow).**

### The Key Components of California’s Ballast Water Management Program

- Mandatory mid-ocean exchange or retention of all ballast water for all vessels, United States and foreign, carrying ballast water into the state waters after operating outside the EEZ;
- Mandatory completion and submission of ballast water report form by vessel master, owner, operator, agent or person in charge of vessel;
- Mandatory compliance with “good housekeeping” practices to include:
  - Avoiding uptake or discharge in or near marine sanctuaries, reserves, parks, or coral reefs;
  - Minimizing or avoiding uptake in areas of known infestations or pathogens, near sewage outfalls, near dredging operations, in areas with reduced tidal flushing, in darkness when bottom-dwelling organisms are active, or where propellers may stir up sediment;
  - Cleaning ballast tanks regularly to remove sediment and disposing of sediment in accordance with appropriate laws;
  - Minimizing discharge amounts;

- Rinsing anchors and anchor chains; and
- Removing fouling organisms from hulls, pipes, etc.
- Maintain a Ballast Water Management Plan prepared specifically for vessel;
- Training of vessel master, PIC and crew regarding the application of ballast water and sediment management and treatment procedures
  - Mandatory Fee Submission to California's Board of Equalization. (Each regulated vessel that enters a California port pays the board \$400.00 each voyage. This fee may rise in the near future to \$1000 per vessel. The enforcement process is quite extensive and the 2007 forecast budget is \$4.2 million annually).(31) (Authors note: The presumption is that the fees collected will be spent directly on the enforcement of ballast water regulations.)
  - Random sampling of vessels for compliance; and
  - Civil Penalties for failure to comply with any portion of the Law

### **Other States' Legislation**

Washington and Oregon, like California, have enacted state-mandated ballast exchange controls because they felt that there was an absence of Federal action to effectively regulate ballast water control.

Washington's law adopts and enforces the IMO ballast exchange requirements and also requires vessels engaged in coastal trade to exchange ballast at least 50 miles offshore.

Oregon's legislation, considers that IMO ballast exchange controls are considered interim measures until better methods and treatments can be put in place. Oregon law established a task force that studied and made recommendations to the 2003 Oregon Legislature regarding methods and improvements to ballast water management.

Virginia and Maryland have passed legislation that adopts the U.S. Coast Guard voluntary ballast exchange and reporting provisions, with the addition of state reporting requirements.

### **Great Lakes State Ballast Law Legislation (32)**

An extensive 1999 study commissioned for the Office of the Great Lakes Michigan Department of Environmental Quality recommended Michigan enact a comprehensive law regulating ballast water and create a ballast water reception facility in Detroit.(33) Michigan Senate Bill 332, enacted into law June 2, 2005, requires all ocean-going vessels engaging in port operations in Michigan after January 1, 2007, obtain a permit from the Michigan Department of Environmental Quality (MDEQ). In order to obtain a permit a vessel must show that it will not discharge Invasive Species into Michigan waters. A vessel must demonstrate that it uses "environmentally sound technology and methods" to prevent the discharge of Invasive Species into state waters if it intends to discharge ballast.

The MDEQ responded to Senate Bill 332 by developing a Ballast Water Control General Permit under the Michigan Natural Resources and Environmental Protection Act. The permit is applicable to ocean-going vessels that engage in port operations and do not discharge ballast water or discharge ballast water treated with a method approved by the MDEQ. The permitting process sets forth ballast water discharge limitations, reporting requirements, and other conditions.

As of May 2006, the MDEQ identified four treatment methods it views as adequate to prevent the discharge of Invasive Species:

- Hypochlorite;
- Chlorine dioxide;
- Ultraviolet (UV) light radiation; and
- Deoxygenation.

MDEQ has established discharge limitations and monitoring requirements for each treatment method. At present, the USCG has not established approved treatment requirements at the Federal level.

Another primary difference between Michigan's laws and the Federal laws is that the Coast Guard program does not require ships that claim NOBOB to comply with ballast discharge programs: although, the Coast Guard has taken preliminary steps to regulate these vessels. Currently NOBOBs must submit ballast water reporting forms. The Coast Guard recently established voluntary best management practices for NOBOB vessels, which include mid-ocean water exchange and saltwater flushing of empty tanks.<sup>(34)</sup> Though the Coast Guard may monitor NOBOB vessels, the requirements are not mandatory and cargo laden vessels may avoid ballast water requirements. By requiring all ocean-going ships to obtain permits, Michigan law addresses this legal loophole.

Other Great Lakes states may follow Michigan's lead. Although no other state has passed similar legislation, bills are pending or have been introduced in Indiana, Minnesota, and Wisconsin.

### **Canadian Provincial Ballast Water Regulation**

Researchers believe that US state legislative initiatives are ahead of Canada's, Provincial regulations especially for regulating ballast water in oceanic shipping. Canada lacks strong Provincial legislation to regulate ballast water in shipping and to prevent the secondary spread of exotic aquatic species through watersheds.<sup>(35)</sup> However Canada's Federal government has taken a stronger stance towards the treatment of NOBOB by requiring vessels to comply with the Code of Best Practices for Ballast Water Management" of the Shipping Federation of Canada. Ships declaring NOBOB should take particular care to conduct saltwater flushing on the transit to the Great Lakes so as to eliminate fresh and or brackish water residuals in ballast tanks. <sup>(36)</sup>

The principal legislation relating to ballast water regulation, other than the Canada Shipping Act, are the Canada Water Act (R.S., 1985, c. C-11) and the Fisheries Act (1985). Provinces have not been as proactive as US states in legislation relating to the introduction of invasive species. A 2004 study published by Fisheries and Oceans Canada found that no province has introduced legislation for ballast water that allows management of invasive species to proceed,<sup>(37)</sup> though there is a formal agreement between Ontario and the Federal government to address the ballast water issue. The Lakewide Management Annex to the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem is intended to cooperatively address the issues of reducing the entry and spread of non-native invasive species, research the impacts of non-native invasive species, and research new methods for treating ballast water residues.

The administration of the Agreement will be entrusted to a Management Committee, which will include a co-chair from Environment Canada and a co-chair from the Ontario

Ministry of the Environment, as well as Regional, Director General and Assistant Deputy Minister level representatives from all departments, ministries and agencies of the Parties who are participants in any one or more of the Annexes. Canada will consult with Ontario regarding any changes to the Canada-United States Great Lakes Water Quality Agreement or on any other international activities that may affect this Agreement. Similarly, Ontario will consult with Canada over the initiation of programs and agreements with other provinces or states that may affect this Agreement.

### **Bilateral Legislation and Agreements Pertaining to Ballast Water**

The 1909 Boundary Waters Treaty was created to provide the principles and mechanisms necessary to help prevent and resolve disputes concerning water quantity and water quality along the boundary between Canada and the United States.<sup>(38)</sup> The International Joint Commission (IJC), created as a result of the treaty, is the independent Bi-national organization responsible for carrying out these duties.

In 1972, Canada and the United States signed the Great Lakes Water Quality Agreement in recognition of the urgent need to improve water quality in the Great Lakes. In 1978, the agreement was amended to include toxic contamination. The agreement expresses the commitment of Canada and the United States to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin Ecosystem and includes a number of objectives and guidelines to achieve these goals. It reaffirms the rights and obligations of Canada and the United States under the Boundary Waters Treaty. The Agreement evolved into an ecosystem approach, recognizing the importance and interconnectedness of all components of the environment: water, air, and land. These agreements promote a uniform GLC approach to regulations for the Great Lakes Basin.

The Great Lakes Commission is a bi-national agency that promotes the orderly, integrated and comprehensive development, use and conservation of the water and related natural resources of the Great Lakes basin and St. Lawrence River. Its members include the eight Great Lakes states with associate member status for the Canadian provinces of Ontario and Québec. The Commission was established by joint legislative action of the Great Lakes states in 1955, and granted congressional consent in 1968. In 1999 a Declaration of Partnership established associate membership for the Ontario and Quebec provinces. The GLC is not a regulatory agency, but is a facilitator and coordinator for important issues that impact the Great Lakes and has three principal goals.

- **Communications among the membership and the entire Great Lakes-St. Lawrence community;**
- **Policy research,** development and coordination on issues of regional interest; and
- **Advocacy.**

Legal actions taken by the GLC includes convening The Great Lakes Panel on Aquatic Nuisance Species in late 1991 in response to section 1203 of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646). The Panel was directed to identify Great Lakes priorities; assist/make recommendations to a national Task Force on Aquatic Nuisance Species that was also established under P.L. 101-646; coordinate exotic species program activities in the region; advise public and private interests on control efforts; and submit



an annual report to the task force describing prevention, research and control activities in the Great Lakes Basin. The Panel membership was drawn from U.S. and Canadian Federal agencies, the eight Great Lakes states and the province of Ontario, regional agencies, user groups, local communities, tribal authorities, commercial interests, and the university/research community.

In March 2001, a policy statement on Ballast Water Management was adopted and published by the Great Lakes Panel on Aquatic Nuisance Species. The Panel made findings and recommendations in five areas.(39)

- Evaluation of Ballast Water Management Practices/Treatment Technologies
- Research Funding and Coordination
- Management of NOBOBs
- Estimation of Costs and Economic Impacts
- Assessment of Human, Fish and Wildlife Health Risks from Pathogens

These findings were made available to legislators and regulators for consideration in creating new ballast water requirements.

The Ecosystem Charter for the Great Lakes-St. Lawrence Basin, 1994, is a good faith agreement between Great Lakes organizations that promotes an ecosystem approach to management, recognizing that the goals for environmental protection and economic development within the basin are linked and interdependent. The Charter ties a common thread through the many policies, laws, and agreements in the basin, and explicitly defines objectives for an ecosystem approach to management.

The Convention on Great Lakes Fisheries was created to control and eradicate the invasive sea lamprey and established the Great Lakes Fisheries Commission. At this time, however, the mandate of the commission does not extend to other INVASIVE SPECIES.

In 2002, the St. Lawrence Seaway Management Corp. and the St. Lawrence Seaway Development Corp., amended their joint Practices and Procedures, to make compliance with best management practices a mandatory prerequisite for transit of the Seaway system. These government agencies have regulatory and operational authority over the locks, canals and related waterways of the St. Lawrence Seaway system.

### **The Right of Innocent Passage**

When a vessel moves through the waters of Canada while traveling to the US or visa versa the vessel may fall under section 3 of the International Law of the Sea in terms of regulations. The concept behind this law is that a vessel that is going to Canada and not stopping in the US should not have to meet the regulations of a vessel calling at a US port. This international law raises an issue in addressing Great Lakes ballast regulations. If the US passes stricter regulations than Canada would the US laws apply to a vessel going from Halifax to Hamilton that will not discharge ballast into US waters? Both Canada and the US allow vessels that meet IMO but neither USCG nor Transport Canada flag regulations to transit the locks. If the right of innocent passage were granted to vessels transiting the locks then a vessel moving from foreign to Canada could discharge ballast water into Canadian waters that did not meet US Federal or state standards. Marine organisms do not recognize the dotted boundary lines on maps and would spread across that boundary.

One nation or state passing stricter regulation will not result in a de-facto Great Lakes wide application of those standards unless the respective Federal governments will not let vessels enter the Great Lakes without meeting the other nation's standards. There "appears" to be legal authority for unilateral action in Article 19, Section 3 of the Law of the Sea Convention if one nation felt that the discharge of ballast water into another nation's water could result in "serious pollution."<sup>(40)</sup>

#### **"Article 19 Meaning of innocent passage**

1. Passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal State. Such passage shall take place in conformity with this Convention and with other rules of international law.

2. Passage of a foreign ship shall be considered to be prejudicial to the peace, good order or security of the coastal State if in the territorial sea it engages in any of the following activities:

- g. the loading or unloading of any commodity, currency or person contrary to the customs, fiscal, immigration or sanitary laws and regulations of the coastal State;
- h. any act of willful and serious pollution contrary to this Convention;"

Unilateral action by either nation to attempt to enforce their standards on another nation can create problems. The best solution is that the standards and application of the standards for the Great Lakes should be uniform at a Federal, state and provincial level.

#### **TASK IV. DESCRIBE THE PROCESS WHEREBY ACCEPTABLE STANDARDS SPECIFICALLY APPLICABLE TO THE GREAT LAKES AND ALL CONTIGUOUS WATERS FOR EFFLUENT FROM MARINE SANITATION DEVICES (MSD) AND OILY WATER SEPARATORS (OWS) ON BOARD SHIPS WERE ESTABLISHED IN CONSULTATION BETWEEN ALL RESPONSIBLE FEDERAL, STATE AND PROVINCIAL AGENCIES.**

The regulation of Marine Sanitation Devices (MSDs) is an example of the co-existence of state and Federal regulation. Congress authorized the EPA through the CWA, after consultation with US Coast Guard to promulgate Federal standards of performance for MSDs.<sup>(41)</sup> The US Coast Guard was directed to promulgate regulations governing the design, construction, installation, and operation of MSDs. After the effective date of the standards and regulations, no state may adopt or enforce a statute or regulation with respect to design, manufacture, installation or use. Nevertheless, if a state determines that the protection and enhancement of the quality of some or all of the waters within a state require greater environmental protection, a State may completely prohibit discharge from all vessels of any sewage, whether treated or not. However, the prohibition may not come into effect until the EPA determines that there are adequate facilities for safe and sanitary removal of sewage are available and reasonable.

International ships are also governed by IMO's MARPOL 73/78 Annex IV: Prevention of Pollution by Sewage from Ships which came into force 27 September 2003. A revised Annex IV was adopted in 2004 and allows member states to enforce stricter rules than in the original Annex.

The United States and Canada, driven in large part by pressures on the Great Lakes similar to what is occurring now with respect to ballast water, were developing their own standards as early as 1975, Canada's "Great Lakes Sewage Pollution Regulations, containing effluent standards for treatment plants and approval protocol came into effect in August 1978.

On the Great Lakes MSDs are also regulated by a combination of US and Canadian Federal law, and state and provincial laws.(42) These laws exceed the international standards and much of much of the bi-national activity was made possible by the Great Lakes Water Quality Agreement. There is a difference in regulation not only between the US and Canada but also between states. For example, in Canadian waters, commercial vessels are allowed to discharge treated sewage that meets Canadian Federal standards, However Ontario prohibits recreational vessels from discharging any sewage by Ontario regulations. In US waters, both recreational and commercial vessels may discharge properly treated sewage, except in Wisconsin (Lake Michigan) and Michigan waters, both states having prohibited such discharge.

A 2005 Congressional Research Service (CRS) report found that current MSD regulations have a number of deficiencies. The regulations do not require ship operators to sample, monitor, or report on their effluent discharges. Other sources governed by the National Pollutant Discharge Elimination System (NPDES) do comply with sampling, monitoring, recordkeeping and reporting requirements but MSDs are exempted. The history of compliance with the MSD regulations, even by well financed large companies operating foreign flag ships, has not been exemplary. The CRS cited a 2000 voluntary sampling of large cruise ships that found the MDS on most ships did not function well and discharges greatly exceeded USCG standards for Type II MSDs.(43) The 1999 Michigan report found that US and Canadian vessels had excellent systems but that a number of foreign vessels entering the Seaway had MSDs that ranged from the minimally adequate to non-functioning.(44)

The 2000 study prompted Alaska to enact legislation to further regulate MSDs by requiring sampling and standards not only for blackwater (sewage) but graywater. The law changed how cruise ships handled these waste streams with 56% of the large (over 250 overnight passengers) cruise ships operating in Alaskan waters installing advanced technology by 2003. Smaller vessels however, had a spotty record of compliance. Maine and California enacted similar bills in 2004 and other states have memorandums of agreement that require cruise ships to discharge only beyond 3 miles from the state borders.

Liquid pollution from all ships can include heavy metals, dissolved plastics, fecal coliform (in graywater), bacteria and other organisms. The US Commission on Ocean Policy issued a report in 2004 that advocated:(45) clear uniform requirements for controlling the discharge of wastewater from large passenger vessels and consistent interpretation and enforcement of those requirements.

Another problem cited in the CRS report was inadequate resources provided to the USCG for enforcing regulations for MSDs. The lack of sufficient enforcement resources, coupled with the fact that MARPOL Annex IV has not been ratified by the US, creates a situation where foreign ship owners are not compelled to fully comply with regulations.

Oily Water Separator (OWS) systems for bilge and cargo tanks have been standard shipboard equipment for over two decades. OWS are a requirement under MARPOL wherever vessels will be discharging water that may contain traces of oil. OWS must be approved by the flag state regulatory agency such as USCG. The failure of these systems is not solely related to technical equipment design issues, but reaches back into human factors, systems design, record keeping methodologies and inspection procedures.(46) Problems with these systems occur when

the Oil Content Monitor sensors become overloaded by a shot of pure oil, rust, or sediment and fail to work properly. In addition OWS do not address pollutants such as heavy metals or invasive species and even when working properly still allow oil discharges just short of 15 parts-per-million (ppm) of oil. With respect to oily water discharges from machinery spaces, while the international standard allows for an effluent of 15 ppm before the monitor alarm sounds and shutdown activates, Canada's Oil Pollution Prevention Regulations have a more stringent standard of 5 ppm - initially when published for the Great Lakes and now extended to the limit of Inland waters, to cover the St. Lawrence River as far east as Anticosti Island.

There is still a lack of adequate shore side reception facilities for oily water (slops). Without available shore side reception facilities, vessel operators may attempt to avoid using the OWS because they have no place to pump collected slops. The shipping community has made numerous management efforts to address issues, but is faced with complicated machines operating at high volumes in a harsh environment.<sup>(47)</sup> Again effective enforcement is hampered by a lack of resources and inconstant interpretation and enforcement by nations.

**TASK V. DISCUSS THE EXTENT TO WHICH THE PROCESSES DESCRIBED ARE ADEQUATE TO SET AND ENFORCE STANDARDS FOR THE GREAT LAKES THAT EXCEED THE BALLAST WATER PERFORMANCE AND EXCHANGE STANDARDS ESTABLISHED BY IMO.**

Halting the spread of exotic species is critical to the health of the Great Lakes ecosystem. Current ocean vessel technology and management systems are not sufficient to arrest the spread of INVASIVE SPECIES. This had been recognized and legal actions have been taken at several levels. While some parties may feel that the system is moving too slowly there are positive attributes of the current system and these procedures should be followed in establishing future laws and regulations.

- The existing processes for developing regulations have a history of success
- The existing processes for the development of regulations allow substantial public input and all parties want to have an opportunity for input to the process.
- There are examples of agencies successfully collaborating and working to expand collaboration in preventing pollution and these need to continue.
- A key issue for success is authority/enforcement sharing protocols by agencies.

The problem of ballast water discharges has not been ignored by the Federal agencies responsible for managing vessel pollution. The US Administrative Procedures act and similar Canadian acts require due diligence in developing regulations and this is time consuming. Ballast water management and standards development is highly complex process, with new scientific evidence, and even conflicting scientific viewpoints. Although progress has been slow, there has been progress. However, progress is hindered by litigation. Each lawsuit filed against the EPA and the Coast Guard distracts the agencies and ties up limited resources.

Creating multiple enforcement agencies with the same objective is wasteful and can result in mixed messages that inhibit the adoption of technology and management standards because carriers do not know if the system/process will be the “right” one for all enforcement agencies.

Achieving the goals set forth by the sponsor requires adequate standards, equipment, and enforcement. In order for standards to be enforceable they need to be grounded in science, technologically feasible, uniformly applied, and cost effective, with adequate funding for enforcement.

The best solution is to stop the spread of Invasive Species world wide, with uniform standards applied to vessels not only entering the Great Lakes but ports throughout the world. Targeting only Great Lakes vessels will result in the trade moving through other corridors and bringing those waters Invasive Species problems from the vessels that would have called at the Great Lakes ports. This action will not solve the global ballast water issue or encourage carriers to install the latest systems.

The literature reviewed in this paper clearly indicates that current resources are insufficient to fully address ballast water management issues in regards to research, establishing standards, and enforcement. This is true not only at the state and provincial levels but at the national levels, as well.

Without adequate resources, the sponsor's goals will not be reached and the following will not occur:

- Standards will not be developed in a timely fashion;
- There will be wasteful fighting over scarce resources;
- Industry will be slow to develop and install systems; and
- Existing and future enforcement will likely be marginal in effectiveness.

To help provide the necessary resources, funding in the US can come from general revenue, tax on carriers, or through the Harbor Maintenance Tax (HMT), an ad valorem tax paid by shippers on cargo moving into the US. At present, there is a \$3 billion surplus in the HMT.

Currently, owners who are not compliant with environmental regulations are actually rewarded by shippers. The non-compliant carriers can afford to operate with less expensive costs that are translated into lower freight rates that attract more shippers.<sup>(48)</sup> Ships with low freight rates and tight operating budgets will be tempted, especially if the discovery rate is low, to reduce costs by marginal or even illegal ballast water compliance in one of four broad areas.

- The costs associated with ship's equipment for processing ballast water
- The costs of maintaining ballast water equipment
- The cost of transferring ballast sediments to shore facilities
- The costs of staffing, training, and education of ship's crews to fully comply with ballast water regulations.

Types of ballast water treatment equipment will change as technology and science improve. Carriers and shippers can be mandated to use this technology, but as noted earlier in the paper there is frequently a lag between the technological improvement and the legislative action requiring the improvements. This delay can be extensive and inhibit adoption of the best solution to a problem. Carriers should be rewarded for moving beyond compliance when installing, maintaining, and operating equipment.

Shippers should be rewarded for using carriers that are compliant and further rewarded for using those carriers that move beyond compliance. Ideally there should be a positive reinforcement for carriers and shippers that want to move beyond compliance. The EPA's

Smartway Transportation Program is an example of positive reinforcement but it does not include marine transportation. The capital cost of installing ballast water treatment systems will be considerable and carriers currently have little economic incentive to install them. Grants, low interest loans, and tax incentives have a history of promoting early adoption of anti pollution technology and should be considered as possible positive reinforcement to promote Ballast Water Management.

The Clean Cargo Working Group is a business to business forum of carriers and shippers of cargo who are taking a leadership role in developing methodologies to support a better understanding of the effects of transportation in global supply chains. (49)

There are many regional and local award and recognition programs for businesses that conserve water or protect water resources. Including for example: American Water Works Association (AWWA) Award of Merit, Clean Water Act Recognition Awards, The Stockholm Industry Water Award: However the author has been unable to find any awards given to or designated for shippers or carriers who proactively address the issue of invasive species. Global Environmental Management Initiative (GEMI) in its section on “Ecosystem needs for freshwater are broadly affected by human activities” does make mention of the introduction of invasive species. However none of their business case studies that companies use to model corporate culture on address invasive species.(50) Awards and other forms of formal recognition by environmental groups, governmental and non-governmental agencies of shippers who use vessels that proactively address the spread of Invasive Species would be very helpful in moving the adoption of ballast treatment processes forward.

Regulators are looking at regulations applying to commercial vessels with a “minimum” amount of ballast carrying capacity. Science has not established a minimum amount of ballast that does not carry invasive species. In fact the NOBOB studies indicate that virtually any ballast or residue has the capacity to transport invasive species. Bilge water that is not treated may also have the capability to transport invasive species. All commercial and recreational vessels transporting any amount of ballast or bilge water need to be regulated.

While the IMO regulations apply to commercial vessels, the fact remains that recreational vessels that carry ballast or bilge water from one body of water to another are capable of spreading invasive species. Recreational vessels entering the Great Lakes watershed (including tributaries) from waters located outside of the Great Lakes watershed will need to be as rigorously regulated as commercial vessels if the spread of invasive species is to be totally stopped.

## **Recommendations**

1. All vessels calling at US and Canadian ports should engage in approved mid-ocean ballast water exchange even in a NOBOB status.
  - A shoreside based facility at the entrance to the St. Lawrence Seaway system should be established to assist in flushing and/or treating the ballast tanks of any vessel that was unable to engage in mid-ocean ballast water exchange due to safety considerations or broken equipment. This facility may utilize tank trucks or barges as well as, or in place of, fixed piping systems.
  - Require all vessels to have secure metering systems on the intake and outflow of their ballast tanks and to log/record the meter readings prior to departure and arrival in all

territorial waters. The meter systems should clearly show an inspector if a vessel had exchanged ballast water and the quantity exchanged.

- Require all officers of vessels and shoreside managers to take an approved training program in the issues concerning the spread of invasive species, proper ballast exchange methods and regulations that apply to stopping the spread of invasive species.

2. Both the US and Canada should ratify the appropriate IMO conventions and if necessary, then, as provided for in the conventions, adopt stricter national regulations.

- If the IMO regulations cannot be adopted or are deemed to be inadequate then uniform Canadian and US regulations should be adopted for all vessels operating in any North American waters

- If (b) is not feasible then the Canadian and US regulations adopted for the Great Lakes should be uniform for all vessels calling in the Great Lakes

- While the IMO regulations apply to larger commercial vessels, the fact remains that smaller commercial vessels and recreational vessels that carry ballast or bilge water from one body of water to another are capable of spreading invasive species and a failure to regulate these vessels will leave open the probability of the continued spread of invasive species.

3. Adequate funding should be provided for:

- Active involvement by all concerned agencies in developing standards
- Establishing scientifically based standards
- Developing, testing, and approving treatment equipment
- Enforcement of regulations; authorizing legislation that does not have adequate appropriation creates an unworkable situation. Ideally authorizing legislation will include appropriations tied to a perpetual funding stream for the enforcement agency. This may take the form of tapping into existing taxes such as the Harbor Maintenance Tax or creating a new tax/fee.

- Establishing a ballast water exchange/treatment facility at the entrance to the St. Lawrence Seaway for vessels that have been unable to engage in mid-ocean ballast water exchange.

4. Incentives should be provided for carriers and shippers to “early adopt” treatment and equipment. The objective of incentive and penalties is to put a market value on environmental costs and benefits. These incentives could take the form of:

- Tax or loan incentives for carriers that install the equipment.
- Tax incentives and awards for shippers who use vessels that have early adopted equipment
- If the ballast treatment/exchange requirements only apply to Great Lakes vessels then incentives should be established for vessels and their users calling at the Great Lakes to equalize the cost differential and reflect environmental benefits in the market place.
- Heavy fines and/or prohibiting port entry for non-compliant vessels.

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## GLOSSARY

**Ballast Water:** Ballast water is fresh or salt water “placed in a ship to increase the draft, change the trim, regulate the stability, or maintain stress loads within acceptable limits, including sediments which accumulate in ballast tanks and holds.” (National Research Council, 1996).

**Ballast Water Exchange:** The primary standard for ballast water treatment has been the exchange of ballast water. This involves pumping out existing ballast and taking on “fresh” ballast. It takes place in an open ocean environment so that discharged species taken on in bays and estuaries (where ports are located) would find it more difficult to survive because of the increased salinity and lack of suitable habitat. Federal law provides a safety exemption if a vessel's captain judges that completing a ballast exchange at sea would jeopardize the safety of his crew and ship. While ships and crews need to operate safely, this also means that there will be many instances when ballast cannot be exchanged.

**Carrier:** A transportation provider such as a trucking company, Steamship company, or railroad that carries product for a shipper.

**Ecosystem:** The relationship of air, land, water and all living beings; a community of organisms and its environment

**Introduced Species:** Nonindigenous (non-native) species that are defined as any species or other viable biological material that, due to human activity, enters an ecosystem beyond its historic range, including any such organism transferred from one country into another, (National Research Council, 1996).

**Invasive species:** These are a subset of introduced species that have the ability to aggressively establish a presence and are “likely to cause economic or environmental harm or harm to human health” (National Invasive species Council, 1990)

**No Ballast on Board (NOBOB):** A category of shipping vessel that is considered to have little or no pumpable ballast onboard.

**Shipper:** A company or individual who contracts a carrier to transport products.



**Vector:** A variety of human activities that cause species transport, including intentional and unintentional introduction via aquaculture (movement of commercial oysters) or aquaria discharge, use of non-native species as bait, attachment to anchor chains, and transport in sea chests (below-the-waterline ship compartments used for intake of water for cooling and sanitary purposes). All of these pathways are termed “vectors” for introduced species.

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