Environmental Protection

Setting a Course for Ballast Water Management

Reducing the global spread of aquatic nuisance species.

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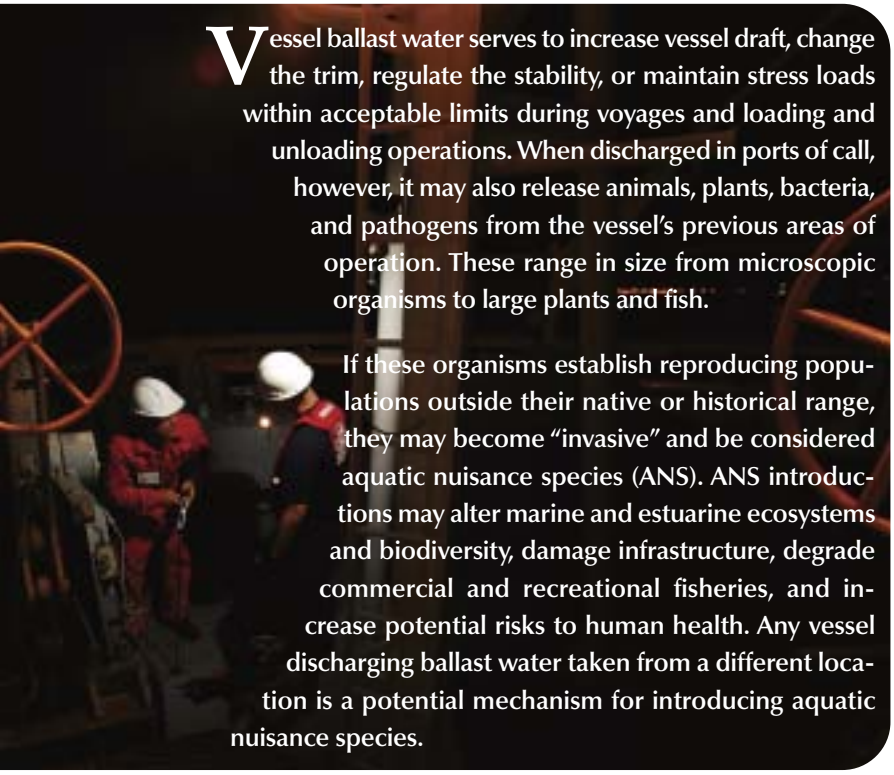

Vessel ballast water serves to increase vessel draft, change the trim, regulate the stability, or maintain stress loads within acceptable limits during voyages and loading and unloading operations. When discharged in ports of call, however, it may also release animals, plants, bacteria, and pathogens from the vessel's previous areas of operation. These range in size from microscopic organisms to large plants and fish.

If these organisms establish reproducing populations outside their native or historical range, they may become "invasive" and be considered aquatic nuisance species (ANS). ANS introductions may alter marine and estuarine ecosystems and biodiversity, damage infrastructure, degrade commercial and recreational fisheries, and increase potential risks to human health. Any vessel discharging ballast water taken from a different location is a potential mechanism for introducing aquatic nuisance species.

In our Great Lakes, more than 160 non-native species have been introduced since the 1800s—one-third of which have appeared in the past 30 years. The zebra mussel alone is estimated to have cost $750 million to $1 billion in damages or control measures between 1989 and 2000.[1] The Chesapeake and San Francisco Bays, Puget Sound, and other waters of the U.S. have been similarly affected by aquatic nuisance species.

Their spread is a threat to the global marine environment, not just to U.S. waters. The North American comb jellyfish has decimated Black Sea anchovy fisheries, Chinese mitten crabs burrow into German riverbanks, and "red tides" caused by Japanese toxic dinoflagellates impact Australian shellfish beds.

U.S. Efforts

In response to concerns regarding aquatic nuisance species in the Great Lakes in the mid-1980s, the federal government enacted the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA). It was reauthorized and expanded to cover all U.S. waters with the National Invasive Species Act of 1996 (NISA).

NANPCA/NISA directed the Coast Guard, in association with the Smithsonian Institution, to establish the National Ballast Information Clearinghouse (NBIC). The Smithsonian Environmental Research Center in Edgewater, Md., created and maintains the NBIC's electronic database to track and analyze changes in patterns of ballast water discharge and management in U.S. waters. More than 100,000 ballast water management reports are entered annually, the majority of which are now submitted by vessels as e-mail attachments or via direct web-based entries.[2]

The statute also established the ANS Task Force as an intergovernmental organization to implement the NANPCA/NISA mandates. The task force is comprised of 10 federal agency representatives and 12 ex-officio members, and is co-chaired by the Fish and Wildlife Service and National Oceanic and Atmospheric Administration.

The Coast Guard has promulgated several regulations under 33 CFR 151 Parts C and D, and continues to develop regulations to address this issue. Under NANPCA, the Coast Guard developed mandatory ballast water management (BWM) regulations for vessels in the Great Lakes in 1993, and extended them to the Hudson River north of the George Washington Bridge in 1994.

In 1996, NISA established a national ballast water management program for all U.S. waters. The Coast Guard issued voluntary guidelines in 1999 and mandatory regulations in 2004. These regulations require each vessel to maintain a BWM plan and assign responsibility to the master or appropriate official to understand and execute the ballast water management strategy. All vessels arriving in U.S. ports or places must submit BWM reports to the National Ballast Information Clearinghouse and follow a suite of management requirements.

All vessels inbound from outside the exclusive economic zone must conduct mid-ocean exchange, retain ballast water, or use a Coast Guard-approved alternative method. Vessels unable to exchange are not allowed to discharge ballast water while in the Great Lakes. Mid-ocean exchange or retention will remain the only available options until the Coast Guard develops a ballast water management system type approval process.

The Coast Guard has also developed the Navigation and Vessel Inspection Circular 07-04, Change-1, "Ballast Water Management for the Control of Aquatic Nuisance Species in the Waters of the United States." This provides guidance for Coast Guard personnel, vessel owners and operators, masters, shipping agents, and persons-in-charge. concerning compliance with and enforcement of the BWM program.

The Coast Guard and the NBIC have initiated the equivalent reporting program, a simplified reporting program for vessels that operate exclusively in the U.S. exclusive economic zone or the Canadian equivalent. This program offers an alternative to allow submission of required BWM reports in a single batch once a month, instead of on a port-to-port, pre-arrival schedule. The program is not available to vessels the Coast Guard has listed on a "lookout list" for failing to submit a BWM report or that have been found to have submitted incomplete or inaccurate reports.

In 2005 the Coast Guard established a policy on best management practices for vessels declaring "no ballast on board," or NOBOB. These NOBOB vessels may carry unpumpable ballast water and/or sediments in their ballast tanks. The policy encourages NOBOB vessels to conduct mid-ocean exchange on all ballast-laden voyages or, if unable to do so, conduct saltwater flushing of their "empty" ballast tanks prior to entering the Great Lakes.

International Efforts

The international community is developing BWM agreements and guidelines to reduce the economic, ecological, and health threats from aquatic nuisance species in ballast water. The International Maritime Organization (IMO) adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments in 2004. However, it will not enter into force until it has been ratified by at least 30 countries representing 35 percent of world merchant shipping tonnage. Only 16 countries representing 14.24 percent have ratified the convention to date.[3]

The Coast Guard coordinates the U.S. government's participation on the IMO's Marine Environment Protection Committee (MEPC). The MEPC serves as the IMO's coordinating body on marine pollution issues, and develops agreements and technical and administrative guidelines necessary for effective implementation of conventions.

The MEPC has adopted the original 15 guidelines needed to implement the convention's objectives. However, concern over the availability of type-approved ballast water management systems is a major obstacle that must be resolved before enough member states agree to ratify the convention. Member states and industry organizations have questioned whether it will be feasible to maintain the first implementation date of the convention's ballast water performance standard in 2009, since only a limited number of ballast water management system technologies have received final IMO type approval and will be available for ship owners.

The 25th IMO assembly adopted a resolution in response to these concerns, specifically that ships constructed in 2009 with a ballast water capacity of less than 5,000 cubic meters will not be required to comply with the convention's ballast water performance standard until its second annual survey, but no later than December 31, 2011.

The Coast Guard works with other federal agencies, including the Environmental Protection Agency, Fish and Wildlife Service, Maritime Administration, Navy Department, National Oceanic and Atmospheric Administration, and State Department, to coordinate U.S.

government positions and analyses on technical and administrative issues for IMO MEPC meetings. These agencies will ultimately make recommendations to the president and Senate on U.S. ratification of the BWM convention.

At a regional level, the United States, Canada, the U.S. St. Lawrence Seaway Development Corporation, and the Canadian St. Lawrence Seaway Management Corporation cooperate to inspect ocean-going vessels entering the Great Lakes. The Coast Guard and Transport Canada signed an agreement in 2004 to share resources and track results.

In response to concerns regarding the differences between the Coast Guard's no ballast on board policy and Transport Canada's mandatory ballast water regulations, the four jurisdictions created the Great Lakes ballast water working group in 2006. This group developed the joint BWM exam program for targeting and inspecting foreign vessels entering the Great Lakes.

Petty Officer 3rd Class Travis Kelly, Marine Safety Detachment Massena, looks through a refractometer at a sample of ballast water from a motor vessel in Montreal. USCG photo by Petty Officer 3rd Class William B. Mitchell.

This program has reduced duplication of inspections for mariners and provided broader program oversight. The working group recorded a 96 percent compliance rate for ballast tanks tested during the 2007 Great Lakes shipping season, with 100 percent of the water in non-compliant tanks either retained onboard or treated with salt or brine to raise salinity prior to discharge.[4]

Ballast Water Management Systems

The use of ballast water exchange as an option is intended to be an interim step toward the goal of managing ballast water to prevent the introduction and spread of ANS. Companies are exploring various ballast water management system technologies to overcome the challenges of developing large-capacity water treatment systems for shipboard use. The Coast Guard is developing a program for type approval of BWMS, and coordinating with the EPA regarding ballast water management systems that use active substances. These technologies may include:

- mechanical means of removal such as filtration or separation;
- physical means of killing or disabling organisms such as ultraviolet light, de-oxygenation, ultrasound, or cavitation;
- chemical biocides added to ballast water or generated onboard, such as ozone or hypochlorite generators.[5]

The Coast Guard initiated the Shipboard Technology Evaluation Program (STEP) to provide incentive for ship owners and operators to participate in the experimental testing of prototype BWMS. Ships with installed experimental ballast water management systems accepted to participate in STEP may receive a designation of equivalency to future ballast water discharge standard regulations. This may last throughout the life of the vessel or the system, so long as the prototype system operates satisfactorily. (For more information on this program, see the following article by LCDR Brian Moore.)

The Way Forward

Because the effectiveness of ballast water exchange varies from vessel to vessel, the Coast Guard believes that setting a performance standard will be the most effective way to approve methods that are environmentally protective and scientifically sound.

The Coast Guard is preparing the way for fundamental changes in how the U.S. and its partners will regulate ballast water discharges. The results of STEP prototype evaluations, the ballast water discharge standard rulemaking, and the various proposals for legislation to manage vessel discharges are milestones that the shipping industry should monitor. Together, these initiatives will provide the maritime community with powerful tools to enhance its ability to protect the global marine environment.

About the author:

Mr. John Morris is an environmental protection specialist at Coast Guard headquarters. His previous positions include a director at the American Chemistry Council trade association and an environmental protection specialist for the U.S. Department of Energy. Mr. Morris has a master's in environmental policy and management from the University of Denver.

Endnotes:

1. U.S. Government Accountability Office, "Progress and Challenges in Preventing Introduction into U.S. Waters via the Ballast Water in Ships."
2. National Ballast Information Clearinghouse (NBIC), Smithsonian Environmental Research Center.
3. International Maritime Organization (IMO), http://www.imo.org.
4. USCG Ninth District, http://www.piersystem.com/go/doc/443/204139/.
5. Chemical biocides intended for use in BWMS may require registration by EPA under the Federal Insecticide, Fungicide, and Rodenticide Act. Developers considering the use of chemicals to treat ballast water should contact the EPA Office of Pesticide Programs for a determination at http://www.epa.gov/pesticides/.