REGULATING BALLAST WATER

The United Nations International Maritime Organization (IMO) developed voluntary guidelines for ballast water management in 1997, and adopted an international mandatory ballast management regime in February 2004: The International Convention for the Control and Management of Ship's Ballast Water and Sediments. The convention will enter into force 12 months after it is ratified by 30 States, representing 35 percent of world shipping tonnage.

The principal U.S. legislation controlling the discharge of ballast water is the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) as revised and reauthorized by the National Invasive Species Act of 1996 (NISA). Under NISA, all vessels carrying ballast water in U.S. waters are required to keep records and provide written information to the U.S. Coast Guard. The law also requires all vessels that enter U.S. territorial waters (with certain exceptions) to manage ballast water according to prescribed measures. Additional requirements are in place for the Great Lakes.

Three states on the West Coast of the U.S. (California, Oregon and Washington) have passed mandatory ballast water exchange and management laws, which are similar to the federal law, but also include additional requirements for coastwise traffic. Failure to comply can result in fines and other penalties.

BALLAST WATER MANAGEMENT

	International Maritime Organization Convention	U.S. National Program (NISA)	State Programs (CA, OR, WA)
Provisions			
Requires mandatory open ocean exchange	•	•	CA, OR, WA
Contains safety and other exemptions	•	•	CA, OR, WA
Applies to domestic coastal voyages			CA, OR, WA
Allows alternative treatment methods, if approved	•	•	CA, OR, WA
Requires ballast management plan	•	•	CA
Includes fees to support program			CA
Offers incentives for alternative treatment	•	•	CA
Reporting			
Required at each port of call		•	CA, OR, WA
Electronic submission of form		•	CA, OR, WA
Verification and Enforcement			
Boarding of vessels to verify management compliance		•	CA, OR, WA
Includes penalty for non-reporting and non-compliance		•	CA, OR, WA

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Sea Grant Nonindigenous Species Site
http://www.sgnis.org

Aquatic Nuisance Species (ANS) Task Force
http://www.anstaskforce.gov

Smithsonian Environmental Research Center
National Ballast Information Clearinghouse
http://invasions.si.edu/nbic/

Global Ballast Water Management Programme
Programme Coordination Unit
International Maritime Organization
4 Albert Embankment
London SE1 7SR United Kingdom
http://globallast.imo.org

Reporting Forms, Instructions, Regulations and Additional Educational Materials are available from:

U.S. Coast Guard Ballast Water Management Program
http://www.uscg.mil/hq/g-m/mso/estandards.htm

Commandant, Environmental Standards Division (G-PSO-4)
2100 Second Street, SW
Washington, DC 20593
(202) 267-2716

California State Lands Commission
http://www.slc.ca.gov
(562) 499-6312

Oregon Department of Environmental Quality
http://www.deq.state.or.us
(503) 229-5716

Washington Department of Fish and Wildlife
http://www.wdfw.wa.gov
(360) 902-2724

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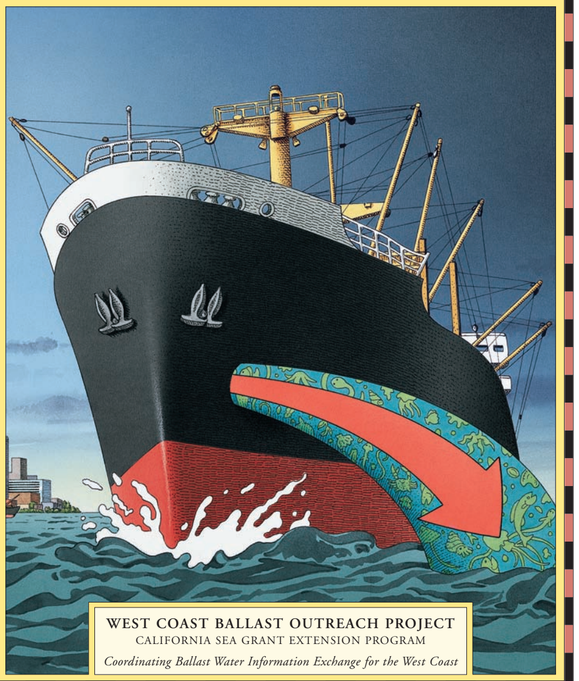
STOP BALLAST WATER INVASIONS



WEST COAST BALLAST OUTREACH PROJECT
CALIFORNIA SEA GRANT EXTENSION PROGRAM
Coordinating Ballast Water Information Exchange for the West Coast

Water bodies worldwide are being invaded by non-native aquatic species. Ballast water is a major vector for aquatic species invasions. Most vessels carry ballast water for stability when they are without cargo, but loaded ships can also carry ballast water.

Although many species seem too large to be transported by ballast water, the majority of marine organisms have a small larval stage (designed for dispersal), that is an ideal size to be drawn into a ballast tank and transported to the next port of call. Under the right conditions, and without natural predators and parasites, non-native populations can increase dramatically, threatening or displacing native species and radically changing the natural ecosystem. Once established, invasive species are difficult to manage and nearly impossible to eliminate.

The economic impacts can be staggering. Municipal and industrial water users in the U.S. spent an estimated $2–$3 billion during the closing decades of the 1900s cleaning clogged water intakes infested with zebra mussels. Commercial and recreational fisheries throughout the world have sustained economic losses due to the depletion of native species. Action to prevent and control future invasions is essential.

DID YOU KNOW?

- San Francisco Bay is the most invaded aquatic ecosystem in North America, with over 250 introduced species. Between 1961–1995, an average of one new species arrived every 14 weeks.
- Every hour, an average of more than 2 million gallons of ballast water is released into U.S. waters.
- It is estimated that on any one day more than 5,000 species of freshwater, brackish and marine organisms may be transported in ballast water in ocean-going vessels around the world.
- Water users in the Great Lakes basin alone spent approximately $1 billion for control of the zebra mussel from 1989–2002.
- In addition to ballast water, hull fouling is a major vector for the introduction of aquatic invasive species. In 2000, New Zealand spent $3.5 million to remove a species of invasive seaweed, *Undaria pinnatifida*, from the fouled hull of a single vessel that sank offshore.

AQUATIC INVASIVE SPECIES

Aquatic invasive species include a variety of organisms — fish, invertebrates, algae, plants and even pathogens such as cholera. Some species arrive attached to ship hulls, and others are released into foreign ports via ballast water. Most species do not survive in the new environment, but some organisms are hardy, aggressive, prolific — and successful invaders. They disperse rapidly and dominate native species.

ASIAN CLAM

(Potamocorbula amurensis)

This fast-spreading, hungry filter feeder arrived in California from Asia in the mid-1980s. Since 1988, it has maintained average densities of over 2,000 clams per square meter in the San Francisco Estuary, displacing other bivalve species. The Asian clam population has become so abundant that it can filter the entire water column in the northern reaches of the Estuary each day, severely depleting the phytoplankton population. Depletion of this link in the food web has had serious impacts on some marine organisms that rely on phytoplankton as their primary food source.

NORTHERN PACIFIC SEASTAR

(Asterias amurensis)

Larvae of this well-known native of Japanese waters were introduced to southeastern Australian and Tasmanian waters via ballast water in the 1980s. The seastar is one of the most predatory nearshore invertebrate species and is a voracious feeder, preferring mussels, scallops and clams. The seastar has severely threatened Tasmania's shellfish industry.

CHOLERA BACTERIA

(Vibrio cholerae)

Ship's ballast brought this deadly, waterborne disease from South America to the Gulf of Mexico in the early 1990s. A cholera epidemic, starting in Indonesia in 1961, circled the globe, aided by the transport of ballast water. Human health and Alabama's shellfish industry were threatened when the bacteria reached the U.S.

TOXIC DINOFLAGELLATES

Microscopic dinoflagellates can be transported with other plankton in both ballast water and sediments. Blooms of dinoflagellates can produce water discoloration known as "red tides." In some instances, dinoflagellates produce potent toxins that are transferred through the food web, harming or killing many marine organisms or even humans that feed directly or indirectly on them. An Australian invasion of toxic, Japanese dinoflagellates (*Gymnodinium catenatum*) caused incidents of paralytic shellfish poisoning and closure of shellfish beds in 1986 and subsequent years.

CHINESE MITTEN CRAB

(Eriocheir sinensis)

The Chinese mitten crab has caused the equivalent of millions of dollars in damage in European waterways. It was discovered in San Francisco Bay in 1992 and since then has increased in number and distribution. Migrating crabs have clogged California's water delivery facilities and disrupted fish salvage operations. The mitten crab is a potential human health hazard as it can be a host for the Oriental lung fluke, a parasite that causes tuberculosis-like symptoms in humans. To date, the fluke has not been found in California crabs.

NORTH AMERICAN COMB JELLY

(Mnemiopsis leidyi)

A voracious, plankton-eating, comb jelly common to the Atlantic Coast of North America was introduced into the Black Sea and Sea of Azov in the early 1980s. The comb jelly population expanded rapidly during the late 1980s causing severe economic and social impacts. The cost to Black Sea fisheries is estimated at $250 million, and anchovy fisheries in the Sea of Azov are nearly extinct.

STOP BALLAST WATER INVASIONS

BALLAST MANAGEMENT TIPS

Open ocean exchange or retention are currently the only approved methods for ballast water management and are required by state and/or federal law in all regions of the U.S. Although this technique is effective at reducing the risk of invasion, ballast water treatment technology is widely viewed as the ultimate solution. You can help control ballast water invasions by taking preventive action. The following measures are recommended to minimize the uptake and release of harmful aquatic organisms.

PERFORM OPEN OCEAN EXCHANGE IF SAFETY PERMITS

Most open ocean species cannot survive in the nearshore environment. With open ocean exchange, ballast water containing organisms from nearshore sites is replaced with open ocean water containing species not well adapted to the nearshore environment, therefore significantly reducing the risk of invasion.

KEEP RECORDS OF BALLASTING OPERATIONS

Vessels bound for ports or places in the U.S., regardless of whether a vessel operated outside the Exclusive Economic Zone (EEZ) and unless specifically exempted, are required to submit ballast water reporting forms to the Commandant, U.S. Coast Guard and maintain records onboard for a period of two years.

REDUCE INVASIONS VIA HULL AND ANCHOR FOULING

Invasive species can attach to hulls, piping and tanks and should be removed and disposed of properly on a regular basis. Anchors and anchor chains can be rinsed during all retrievals to prevent transport of invasive species from their point of origin.

PARTICIPATE IN BALLAST WATER TREATMENT TECHNOLOGY R&D

International, federal, and state management programs are moving towards treatment technologies as a solution to reducing ballast water invasions. Successful ballast water treatment research and development (R&D) projects require collaboration with regulatory agencies, researchers, equipment vendors, and the maritime industry during all stages of development. Many regulatory programs offer incentives for vessels participating in approved R&D projects.

MINIMIZE BALLASTING IN PORTS AND COASTAL AREAS

Ballast water is one of the major transport mechanisms for introducing aquatic invasive species to North America's coastal waters. Although most vessels require ballast water for stability, minimizing the amount of ballast water taken in from ports and coastal areas will reduce the number of potential invaders transported to the next port. Preventing new invasions is key to maintaining healthy harbors and coastal areas.

AVOID BALLAST UPTAKE AT NIGHT

Some organisms that live on the bottom or low in the water column during the day, rise in the water column at night to feed or reproduce, making them more available for uptake. The chance of bottom-dwelling organisms and sediments being entrained with the ballast water also increases when ballasting in shallow ports where sediments are disturbed by propeller wash.

AVOID BALLAST UPTAKE IN "HOT SPOTS"

"Hot spots" are water bodies that are particularly infested with invasive species, have toxic algal blooms or "red tides," are contaminated by sewage outfalls, or carry a waterborne disease such as cholera. Scientists and managers are working to identify global hot spots. Ballast uptake from hot spots has a greater potential of spreading harmful organisms.