



# USCG Ballast Water Discharge Standard

## Overview of Notice of Proposed Rulemaking





# Why are we proposing a ballast water discharge standard?



- Non-native organisms introduced into U.S. waters with discharged ballast water can invade U.S. aquatic ecosystems.
- Invaders can have adverse effects:
  - Native organisms
  - Human infrastructure
  - Human health



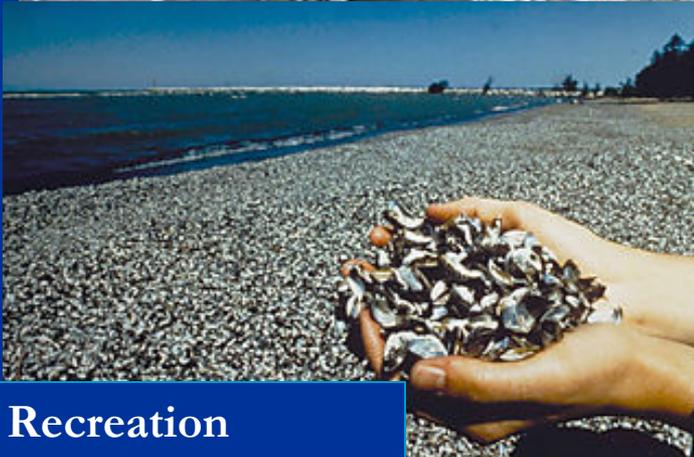
# Impacts of Nonindigenous Species, Zebra Mussel, as Example



Habitat



Infrastructure



Recreation

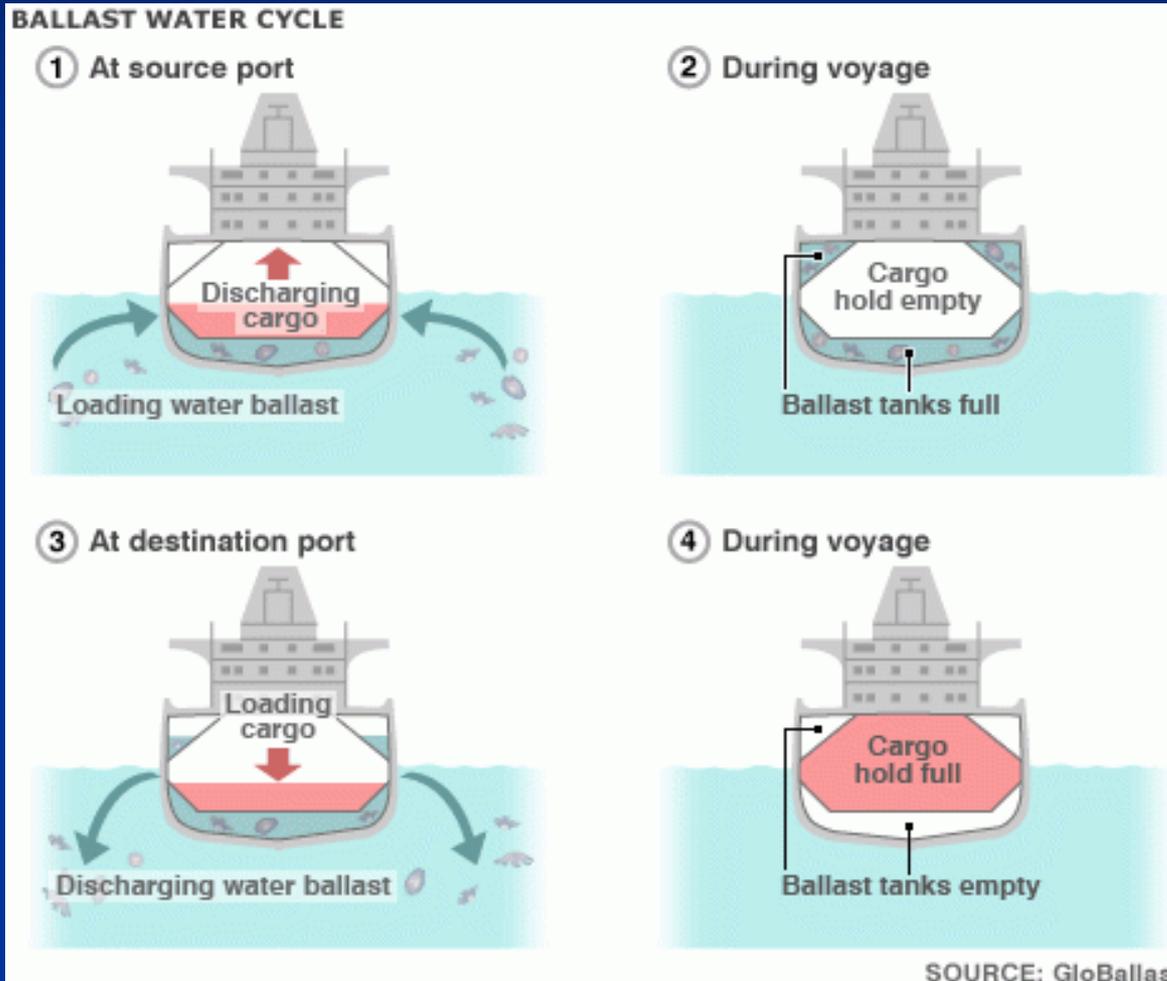


Native species

Ontario Ministry of Natural Resources



# Why is ballast water used?





# Ballast Water is Critical for Safe Operation of Ships



Ballast used to control and maintain:

Trim  
Stability  
Draft  
Stress

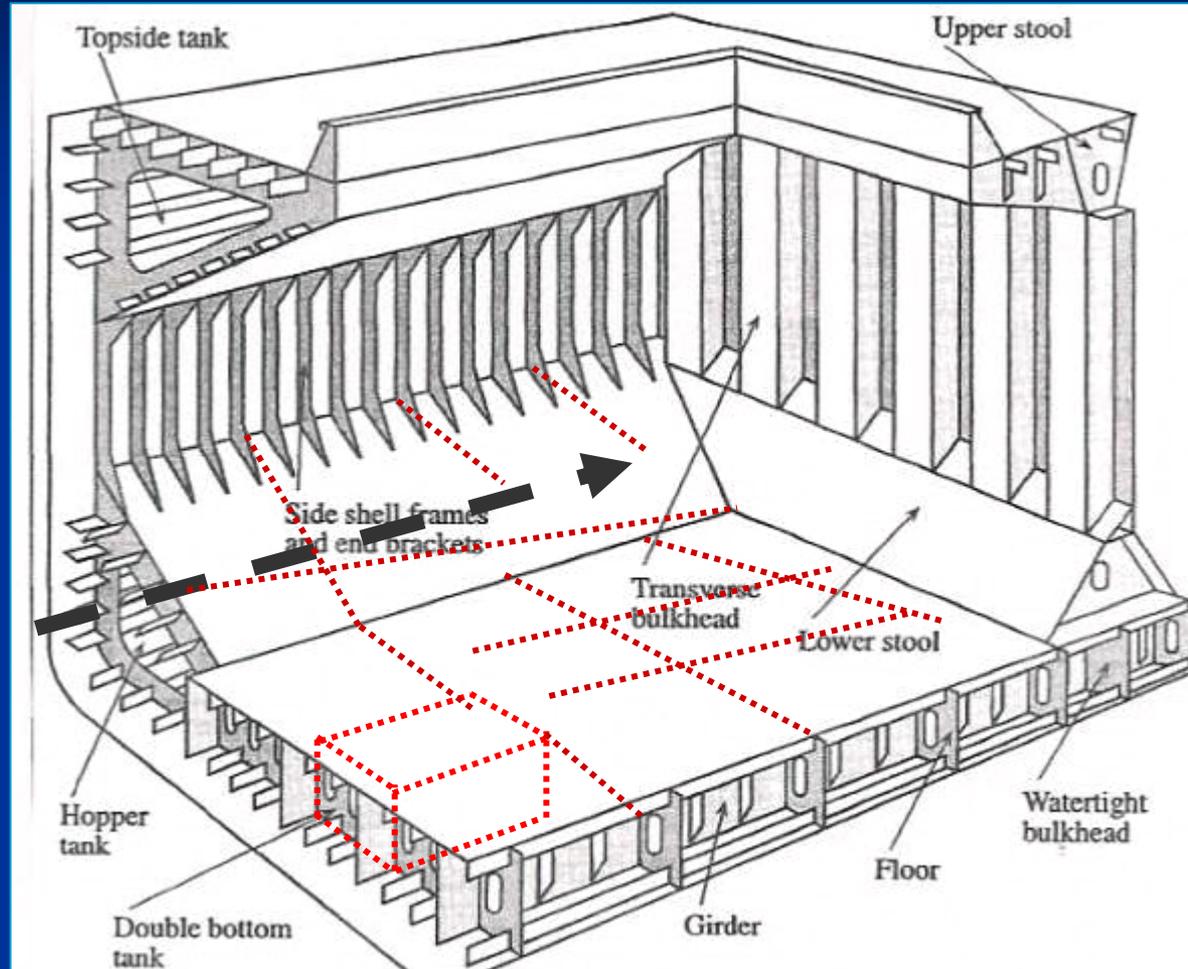




# What are ballast tanks like?



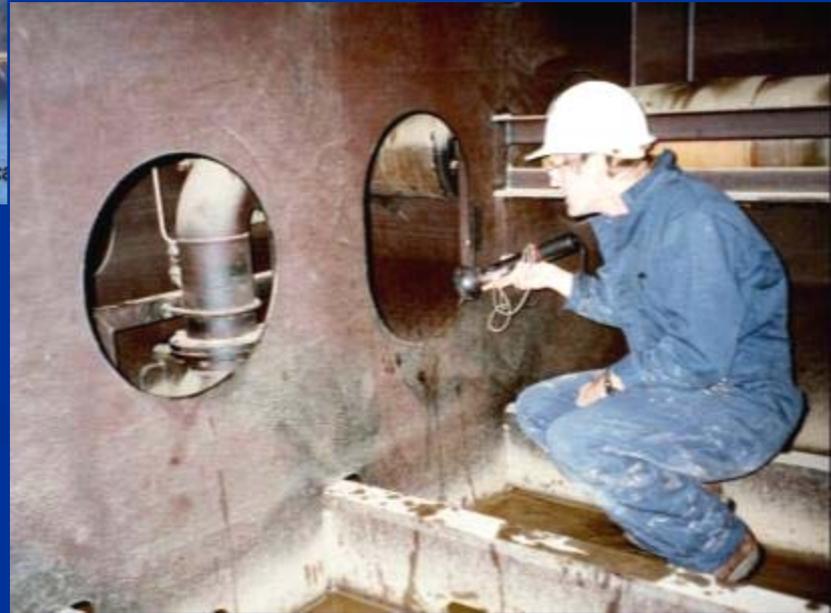
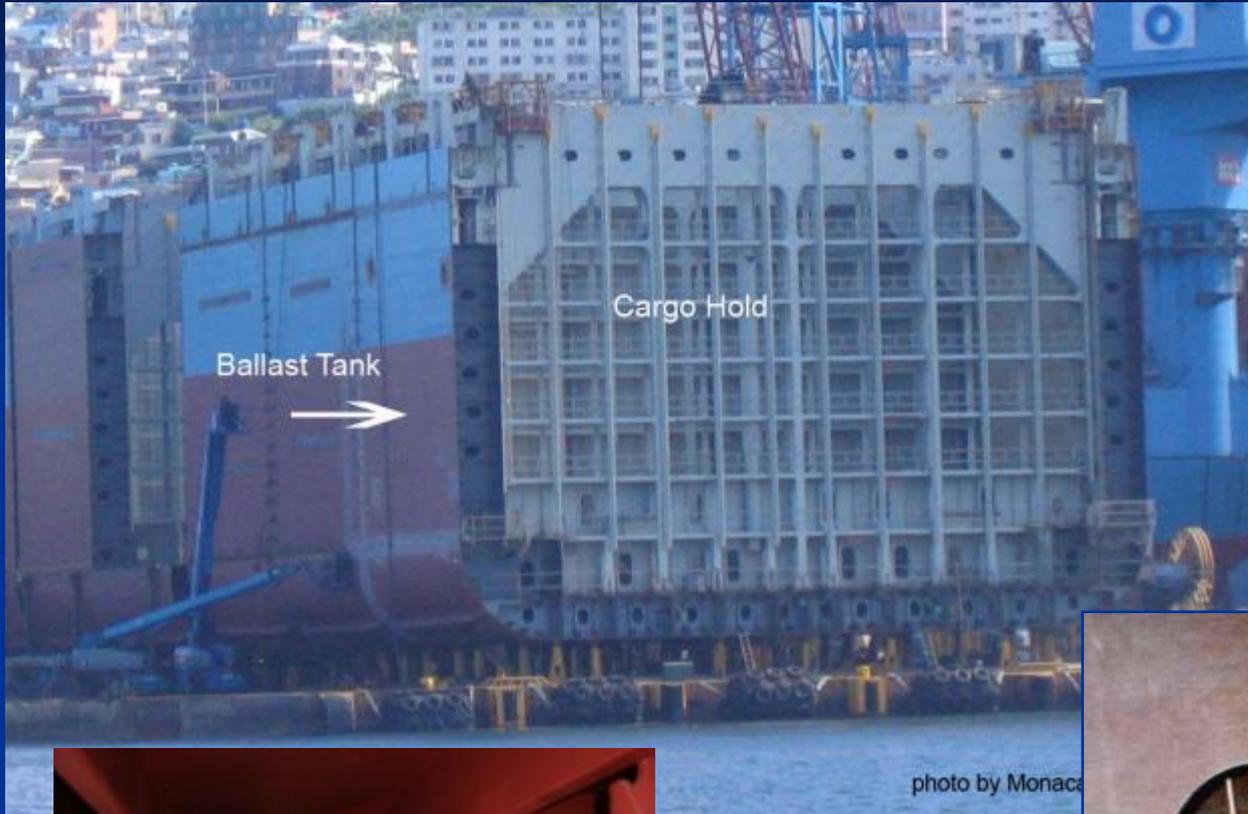
Ballast tanks are a honeycomb of individual bays or cells with lots of places to trap sediment and restrict water flow velocity



A ship can have over 20 ballast tanks



# What are ballast tanks like?





# Authority for this Rulemaking

## Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990

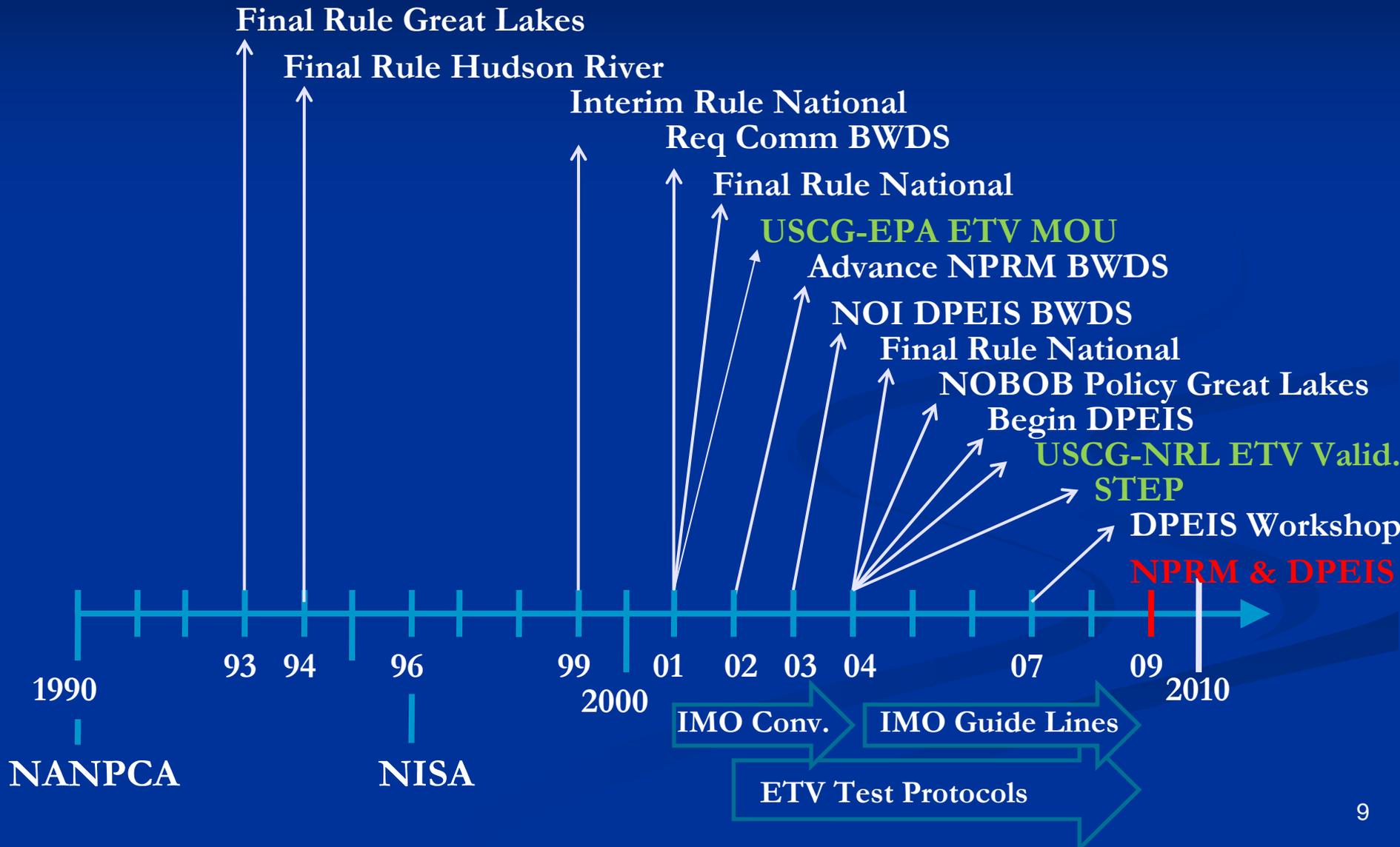
- USCG directed to develop a program of specific regulations and guidelines for the Great Lakes.
- Prevent or reduce the introduction and control the spread of NIS via the discharge of ballast water from those vessels entering U.S. waters of Great Lakes after operating outside the exclusive economic zone (EEZ).
- First voluntary, then mandatory.

## National Invasive Species Act 1996

- Extend Great Lakes regime to the nation.
- First voluntary for 2 years.
- Then mandatory if voluntary compliance insufficient.
  - Specific practices directed:
    - BWE Mid-ocean.
    - Retention.
    - Alternative BWE areas.
    - USCG-approved, environmentally sound alternatives.



# NANPCA and NISA USCG Implementation





# Why a discharge standard?



Photo courtesy of SERC.

- In U.S. waters, over 60% of vessels can not exchange appropriately due to their routes ( $< 200$  nm).
- Effectiveness of ballast water exchange varies.
- Provides a clearly defined benchmark for treatment technology development.
- Aids in verifying compliance with BWM requirements.



# Development of a BWDS Presents a Complex Challenge



- Technologies for removing organisms from ballast water are in the early stages of development;
- Approved technologies should be compatible with existing vessels as well as future vessel designs;
- Development of the standard and approval process requires close collaboration among multiple stakeholders (gov't agencies, scientific community, water treatment experts, shipping industry, etc.).
- The standard must be:
  - Biologically protective,
  - Scientifically sound, and
  - Enforceable.





# Wide Range of Organisms Found in Ballast Water



- Viruses,
- Bacteria,
- Protists & Protozoans,
- Fungi,
- Molds,
- Plants,
- Animals .



# Proposed BWDS Essential Elements



- Two-phase ballast water discharge standard:
  - Phase one: IMO 2004.
  - Phase two: 1000X IMO.
- Practicability review prior to phase two implementation date:
  - Can phase two be implemented:
    - On schedule, or
    - Sooner?
  - If phase two is not practicable, but a *significant improvement* can be achieved:
    - Standard will be made more stringent to reflect this increase in capability.
    - Tightened over time as technology allows.
    - No waiting for “perfection”.
    - Changes made through rulemaking under APA with notice and comment.





# Applicability

- Vessels that operate in U.S. waters, are bound for ports or places in the U.S., and are equipped with ballast tanks, or are bound for offshore ports or places.
  - (Previously exempt vessels operating within 200 nautical miles (nm) of coasts would now be required to meet the BWDS).
- Statutory exemptions
  - Crude oil tankers engaged in coastwise trade.
  - Any vessel of the U.S. Armed Forces as defined in the Federal Water Pollution Control Act (33 U.S.C. 1322(a)) that is subject to the Uniformed National Discharge Standards for Vessels of the Armed Forces (33 U.S.C. 1322(n)). 16 U.S.C. 4711(c)(2)(J), (L).
- Administrative policy exemption
  - Vessels that operate exclusively in one Captain of the Port Zone (COTPZ),
  - *COTPZs defined in 33 CFR 3.*



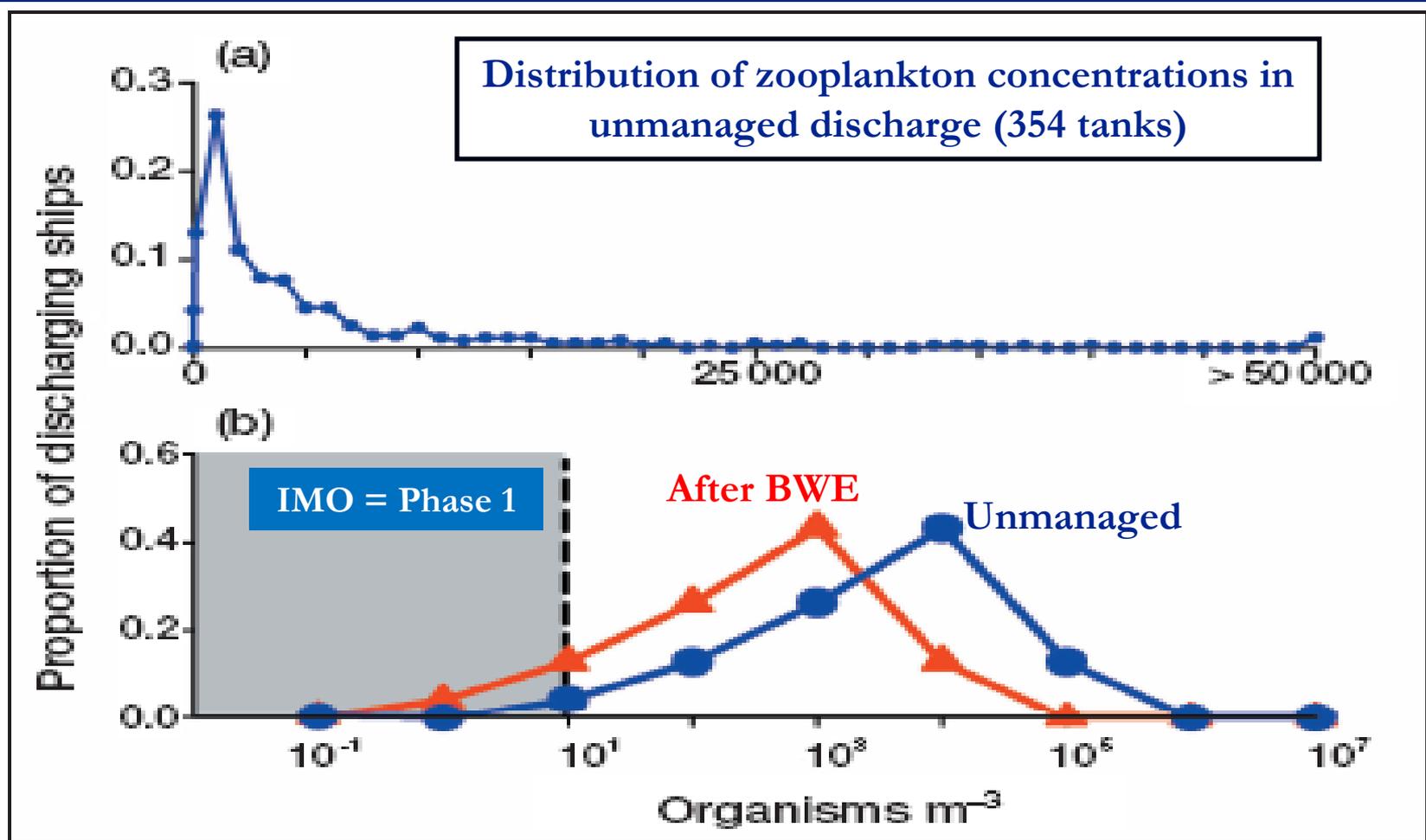
# Table 1. Comparison Between Phase One and Phase Two Discharge Standards



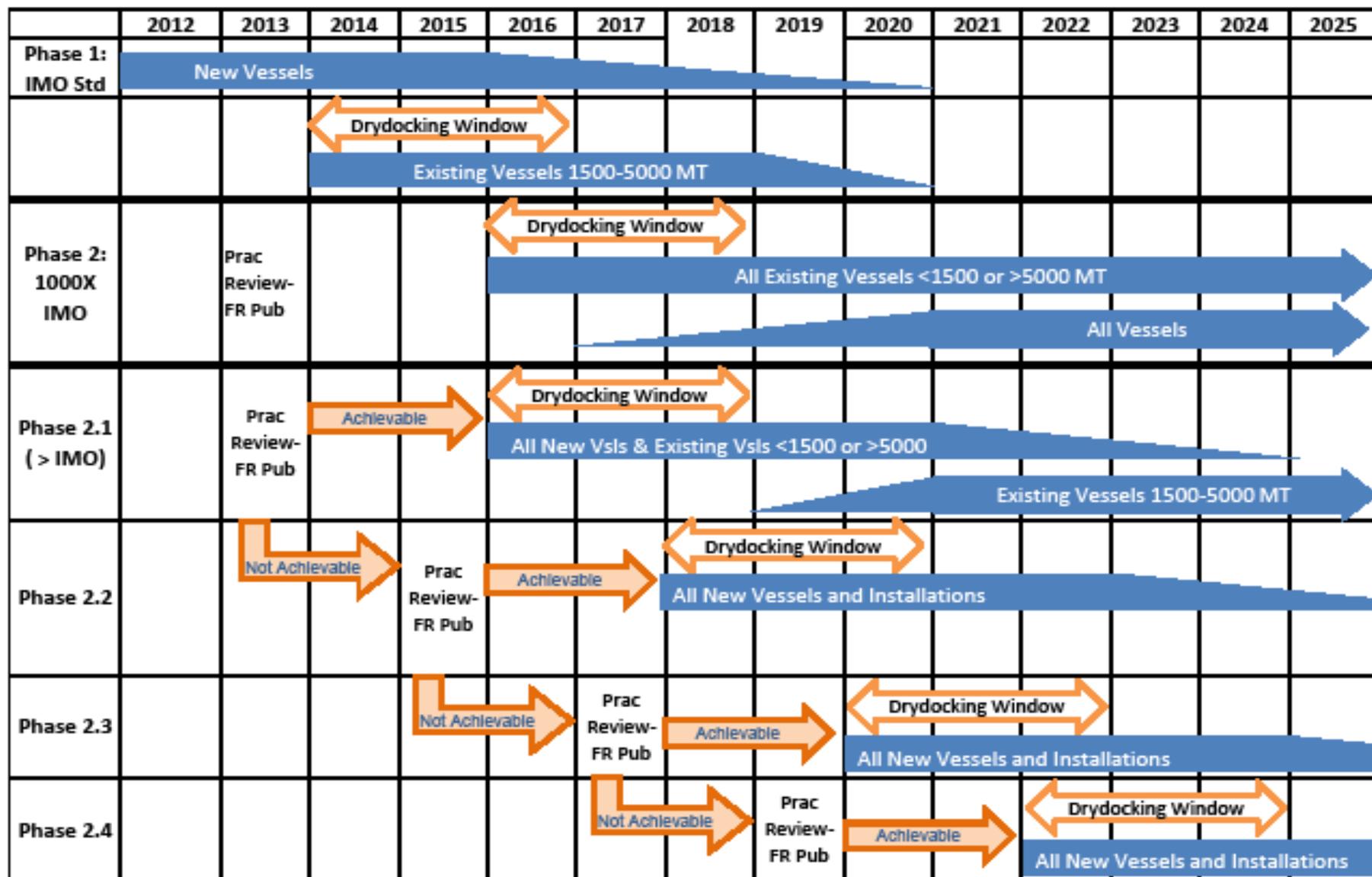
Technical description	Large Organisms (> 50µm)	Small Organisms (>10µ and ≤50 µm)	Very Small Organisms (≤ 10µm)	Bacteria		
				Toxigenic <i>Vibrio cholerae</i> (O1 & O139)	<i>Eschericia coli</i>	Intestinal enterococci
Phase One	< 10 per m <sup>3</sup>	< 10 per ml	N/A	<1 cfu per 100 ml	<250 cfu per 100 ml	<100 cfu per 100 ml
Phase Two	< 1 per 100 m <sup>3</sup>	< 1 per 100 ml	< 1000 bacterial cells AND < 10,000 viruses per 100 ml	<1 cfu per 100 ml	<126 cfu per 100 ml	<33 cfu per 100 ml



# The Phase One Standard will be a Significant Increase in Protection Over BWE



## Phase 1 and Phase 2 Standards Implementation Schedule (5 year grandfathering)



If Practicability Review determines Phase 2 Standard is not achievable, but a standard which is more stringent than existing (IMO) is achievable, then that standard will be phased in 3 years following FR publication. Practicability reviews will be conducted every 2 years until full Phase 2 is achieved.

# Ballast Water Treatment



## Hypochlorite Generator

- $\text{OHCl}^-$  dosed into BW on uptake,
- Residual  $\text{Cl}^-$  neutralized prior to discharge.



## Filters and UV

- Filter + UV on uptake,
- UV on discharge.



## Venturi De-oxygenation

- De-oxygenation on uptake.



# Procedures to Approve BWMS



- **Biological efficacy tests:**
  - Land-based & shipboard;
  - Largely based on EPA-ETV BWTS verification protocols;
  - “In accordance” with IMO G8 type approval guidelines.
- **Engineering and operational requirements:**
  - Electrical,
  - Engineering,
  - Piping,
  - Construction.
- **Criteria for certification of independent laboratories:**
  - Ind. labs conduct tests.
- **Acceptance of BWMS approved by other countries:**
  - Case-by-case basis.



# No Pre-emption of States or Clean Water Act



- States retain their authority to "adopt or enforce control measures for aquatic nuisance species."
- Vessels are still required to comply with EPA's Vessel General Permit (VGP) program.
  - USCG and EPA are working to harmonize vessel owners' compliance with both regimes.