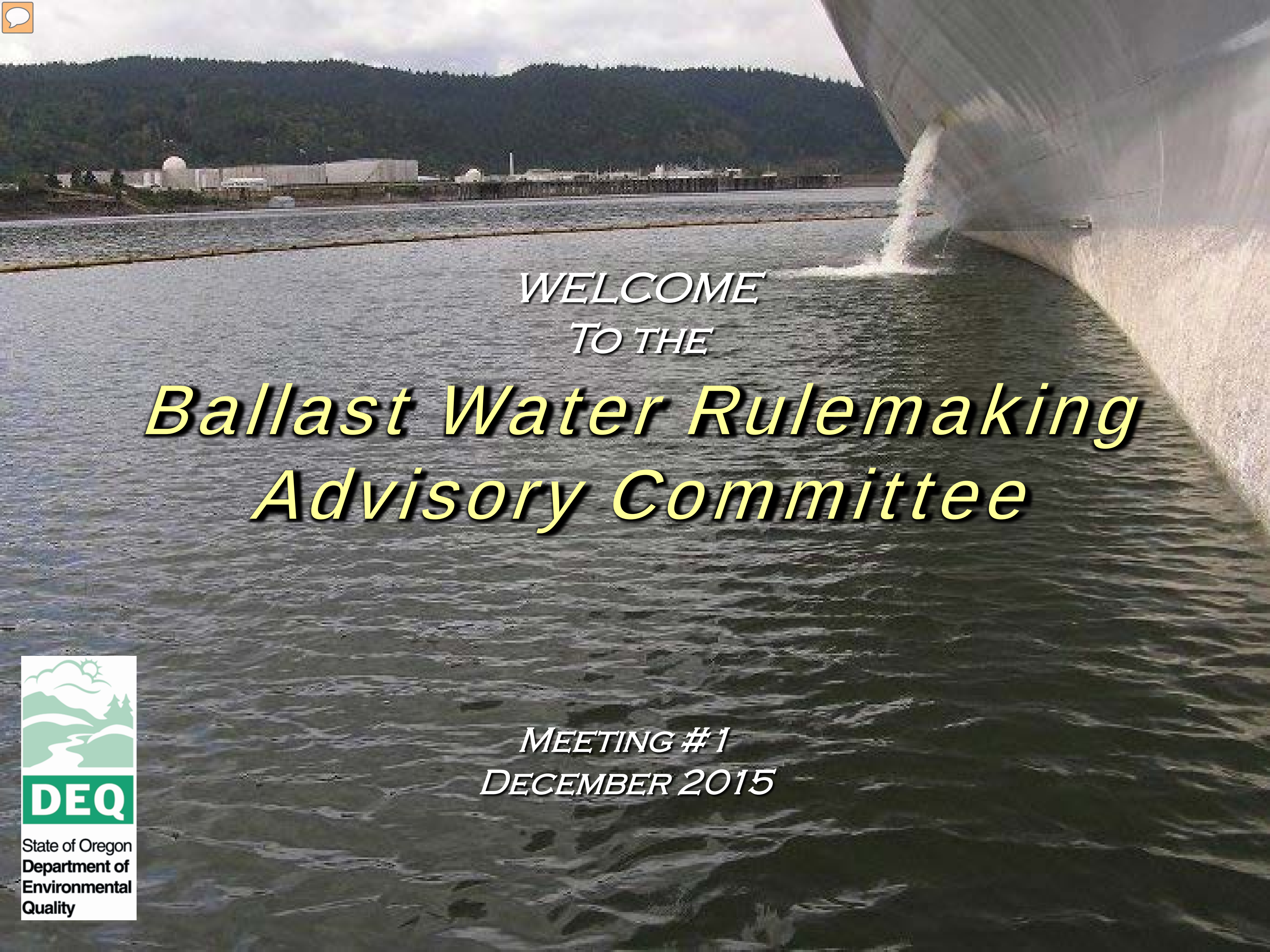

WELCOME
TO THE
Ballast Water Rulemaking
Advisory Committee
MEETING #1
DECEMBER 2015
DEQ
State of Oregon
Department of
Environmental
Quality

BWM Regulatory Landscape Updates

- International (IMO BWM Convention)
- Federal
  - USCG NPRM
  - EPA Vessel General Permit
  - VIDA (Federal legislative proposals)
- West Coast Regional

Oregon BWP Update

- **2015 Legislative Recap**
  - **SB 261 – Fee Increase**
  - **HB 2207**
    1. **Penalty distributions**
    2. **NOBOB**
    3. **BWE + BWT**
- **Status of BW inspector position**
- **Coastal Port Proposals**

DEQ's Rulemaking Objectives:

1. *Prevent discharge of **high-risk** ballast water.*
2. *Enhance ballast management strategies for Oregon to ensure reduction in risk of introducing AIS.*
3. *Support implementation of federal BWDS*
4. *Develop adaptive management options with adequate risk-reduction efficacy to allow for ballast discharge originally sourced from high-risk locations.*
5. *Develop outreach and enforcement practices that elevates awareness and averts disruption to business operations.*

Two areas of high-risk concern for ballast discharge to Oregon waters

1. ***'NOBOB' vessels that have not adequately managed the risk from residual water and sediment in 'empty' ballast tanks by properly implementing elements of EPA VGP 2.2.3.6.***

2. ***Federal adoption of weak ballast discharge standards and implementation of rules that effectively replace mid-ocean ballast water exchange (BWE) with first generation shipboard treatment systems (BWT).***

Salt-water flushing for ‘NOBOB’s

Summary: Amend ORS 783.630-635 to adopt EPA Vessel General Permit requirements for salt-water flushing of ‘empty’ ballast tanks (VGP 2.2.3.6.3). In essence, adopt federal requirement into state regulations in order to allow state to inspect and enforce.

Supporting rationale:

- Residual ballast and sediments in ‘NOBOB’ vessels are known vectors for wide variety of aquatic invasive species.
- Salt-water flushing is particularly effective at removing FW or brackish water organism.

EPA Vessel General Permit

- 2.2.3.6.4.1 Nearshore Saltwater Flushing Requirements
- For those tanks which are empty or contain unpumpable residual water, you must either seal the tank so that there is no discharge or uptake and subsequent discharge of ballast water within waters subject to this permit or conduct saltwater flushing of such tanks in an area 50 nm from any shore and in waters at least 200 meters deep prior to the discharge or uptake and subsequent discharge of any ballast water to or from any waters subject to this permit. For purposes of Part 2.2.3.6.4, saltwater flushing means the addition of water from the "coastal exchange zone" to empty ballast water tanks; the mixing of the flush water with residual water and sediment through the motion of the vessel; and the discharge of the mixed water, such that the resulting residual water remaining in the tank has either a salinity greater than or equal to 30 parts per thousand or a salinity concentration equal to the ambient salinity of the location where the uptake of the added water took place. In order to conduct saltwater flushing, the vessel should take on as much coastal exchange zone water into each tank as is safe (for the vessel and crew).
- Vessels engaged in voyages that take them further than 200 nm from any shore and who will remain outside 200 nm for a sufficient period to flush ballast water, are not allowed to exchange ballast water between 50 and 200 nm from shore to meet the requirements of Part 2.2.3.6.3 (unless the master determines that flushing farther than 200 nm from shore would interfere with essential vessel operations or safety of the vessel but the master determines that the vessel is able to safely flush more than 50 nm from shore) and instead, must conduct flushing more than 200 nm from shore in accordance with Part 2.2.3.6.3 of this permit. Vessels engaged in the coastwise trade who are not outside 200 nm for a sufficient period to conduct flushing may flush outside 50 nm (even if they voyage beyond 200 nm) to meet the requirements of this permit.
- For all vessel owner/operators subject to this part that contain some empty ballast water tanks and some full ballast water tanks, if you elect to seal those empty tanks, you must not allow water from the full tanks to commingle with waters from the empty tanks if it will subsequently be discharged into waters subject to this permit.

Salt-water flushing for 'NOBOB's

Rule Elements:

- For ballast tanks that are empty upon arrival to state waters to be used for ballasting and subsequently de-ballasting while in state waters, salt-water flushing of tanks must be performed:
  - At least 200 nm from shore if vessel , or
  - At least 50 nm from shore if tanks were last filled.

- Oceanic salt-water flushing of tanks must achieve residual ballast water salinity of at least 30 ppt.
- Safety exemptions apply.

‘NOBOB’ ORS Amendment

(as originally proposed under HB 2207 2015)

(1) (a) The owner or operator of a vessel with empty ballast tanks that will enter the waters of this state must, prior to entering the waters of this state, conduct a saltwater flushing of the empty ballast tanks in an area no less than 200 nautical miles from any shore.

(b) The residual ballast water remaining in the ballast tanks after saltwater flushing must have a salinity greater than or equal to 30 parts per thousand or a salinity concentration equal to the ambient salinity of the location where the vessel took on the added ocean

water. In order to conduct saltwater flushing, a vessel should take on as much ocean water into each ballast tank as is safe for the vessel and crew.

(2) This section does not apply to empty ballast tanks that underwent a complete open sea exchange prior to discharging ballast water from a voyage at another port and are empty for arrival in the waters of this state if the vessel’s ballast water log or record book contains sufficient detail to show that the unpumpable residual ballast water in the empty ballast tanks has a salinity greater than or equal to 30 parts per thousand.

Ballast Management Management: Paradigm Shift > BWT

Oceanic Ballast Water Exchange (BWE)

Ballast Water Discharge Standards

via Shipboard Treatment (BWT)

AIS Status in Oregon

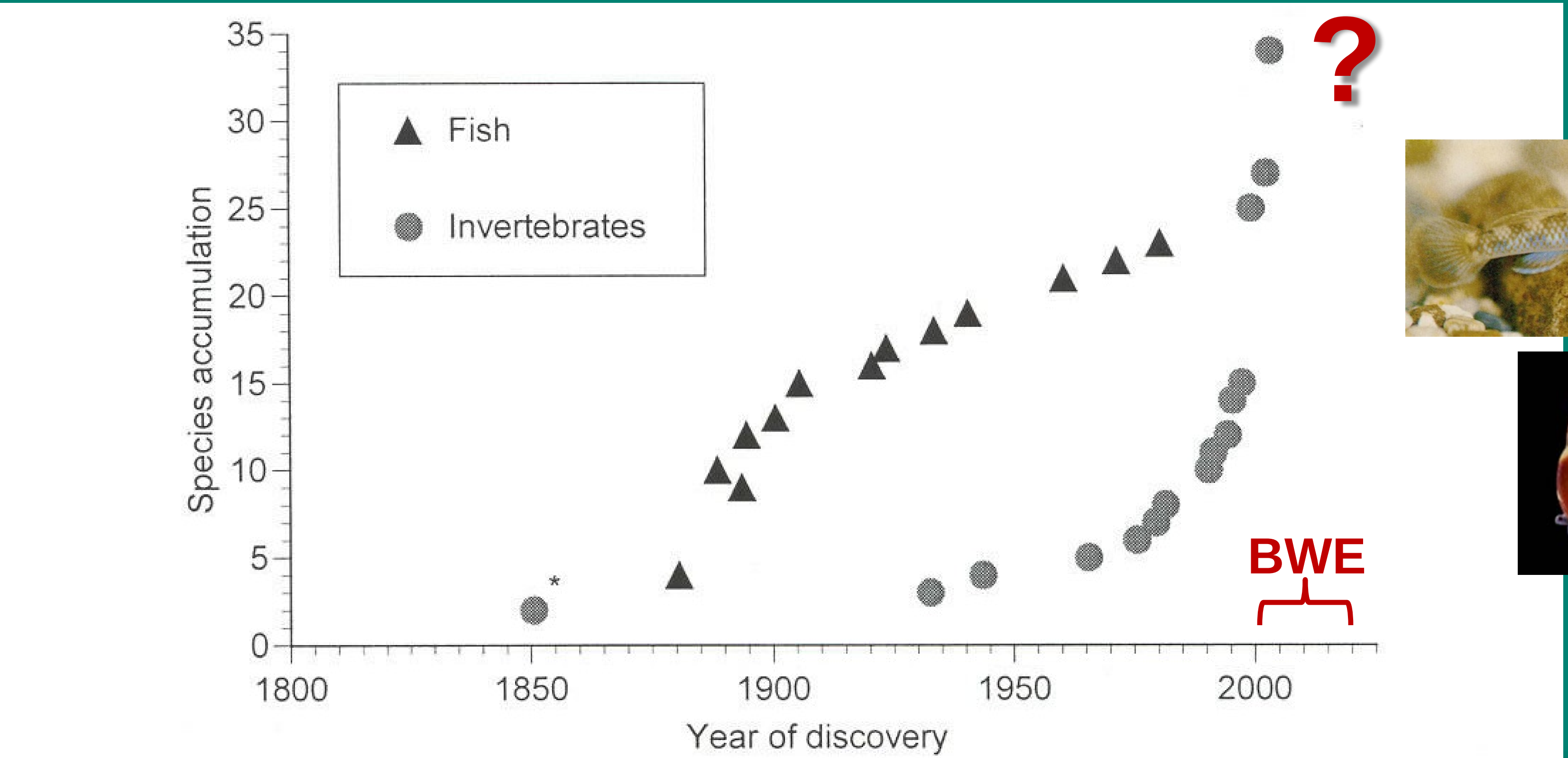


Figure 10. Accumulation of non-indigenous species in the lower Columbia by year of discovery.

New BWM Paradigm: Discharge Standards

Organism Size Class	International / U.S. Federal Discharge Standard (D-2)	California Ballast Discharge Performance Standard[1]
> 50 µm in minimum dimension	< 10 viable organisms per cubic meter	No detectable living organisms
10 – 50 µm in minimum dimension	< 10 viable organisms per ml	< 0.01 living organisms per ml
< 10 µm in minimum dimension		< 10^3 bacteria/100 ml < 10^4 viruses/100 ml
Escherichia coli	< 250 cfu[2]/100 ml[4]	< 126 cfu[2]/100 ml[4]
Intestinal enterococci	< 100 cfu[2]/100 ml[4]	< 33 cfu[2]/100 ml[4]
Toxicogenic *Vibrio cholerae* (01 & 0139)	< 1 cfu[2]/100 ml or < 1 cfu[2]/gram wet weight zooplankton samples	< 1 cfu[2]/100 ml or < 1 cfu[2]/gram wet weight zoological samples

[1] Final discharge standard for California, beginning January 1, 2020, is zero detectable living organisms for all organism size classes

[2] Colony-forming-unit – a measure of viable bacterial numbers

Federal implementation <u>timeline:</u>

Effective 2014 for new build vessels;

For existing vessels, effective January 2016 (following 1st drydock)

BWE+BWT Proposal

(as discussed by 2014/15 STAIS Task Force)

Vessels utilizing an approved ballast water treatment system must also conduct ballast water exchange or saltwater flushing (as applicable) in addition to treating their ballast water if:

- The ballast tanks were sourced from a coastal, estuarine, or freshwater ecosystem that has a salinity of less than 18 parts per thousand, and
- The approved BWTS is certified to meet IMO D-2 discharge standards but not a discharge standard at least 100 times more stringent, and
- Ballast tank(s) were sourced from outside the state of Oregon common waters zone before the vessel enters state waters.

A vessel operator affected by these requirements may request – and the Department may approve – an exemption to the BWE provision if the vessel is using a BWT system has minimum holding times or other operational constraints that would make BWE infeasible due to short voyage times or engineering limitations.

State of Oregon Department of Environmental Quality

BWE + BWT

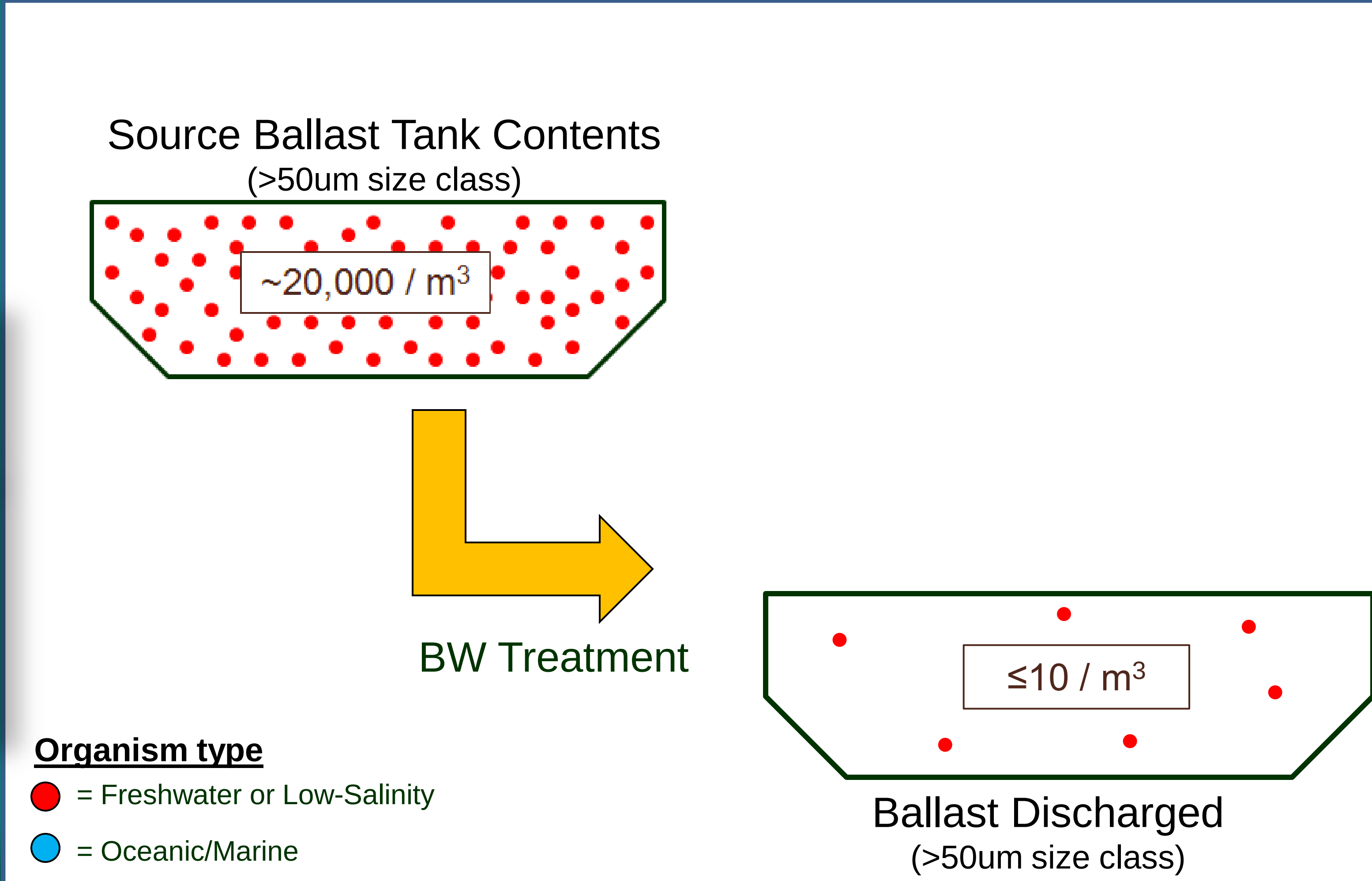
Why?

- Mitigates concerns over low-efficacy of federally adopted BW discharge standards;
    - BWE is highly protective for low-salinity harbors;
    - BWE improves efficacy of treatment systems.
- Provides safeguard during management practice transition;
- Does not require anything ‘new’ of vessel operators; and
- Can be used to strategically target only those vessels that are considered to be high-risk.

BW Exchange + BW Treatment

(especially valuable for protecting low-salinity ports)

Federal BWDS allow for release of up to 10 (high-risk) organisms per m3

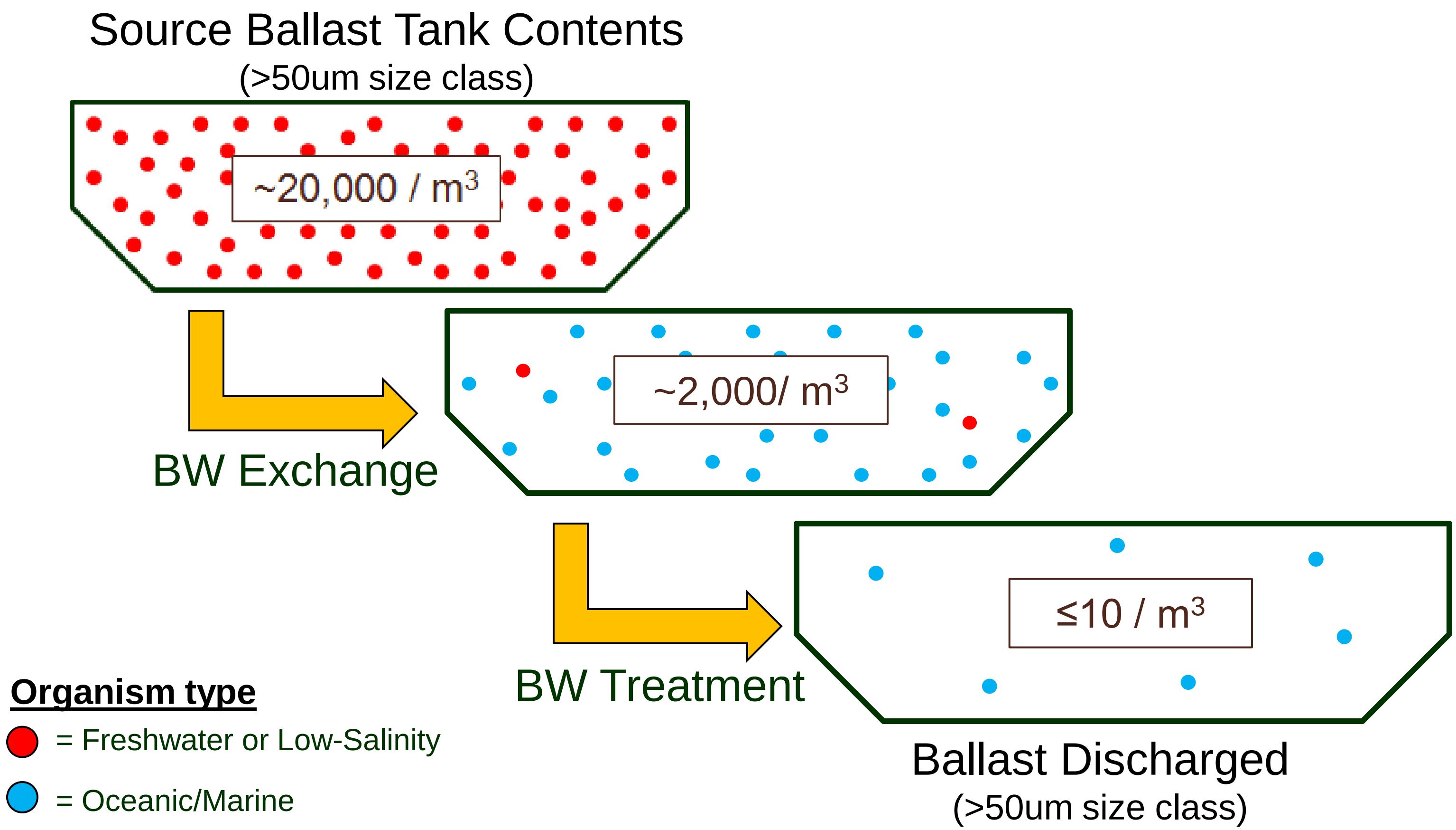


Note: Density values are for descriptive purposes only and not proportionately represented in drawings)

BW Exchange + BW Treatment

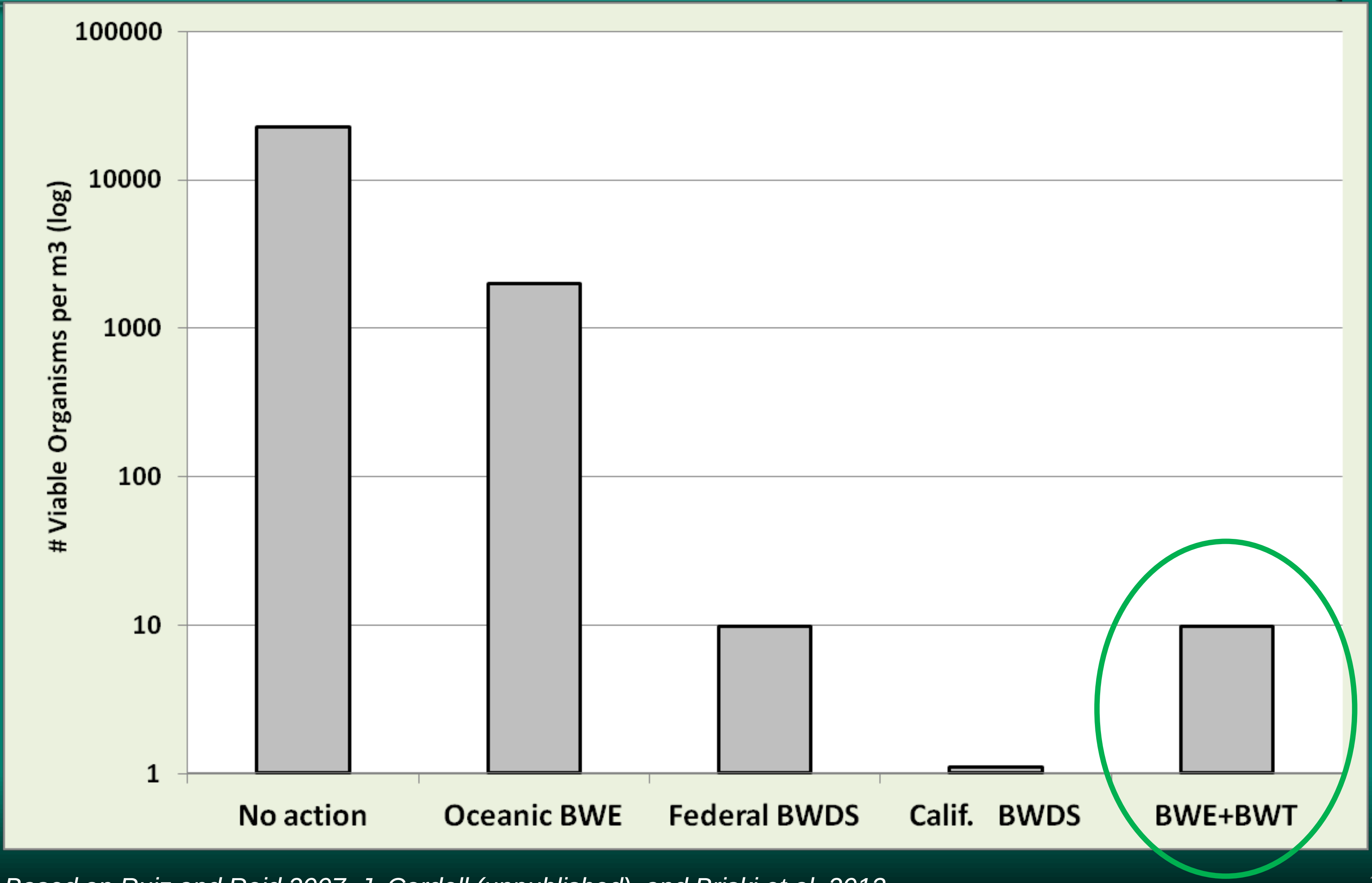
(especially valuable for protecting low-salinity ports)

With BWE+BWT, the discharged 'up to 10 organisms per m3' are low-risk.



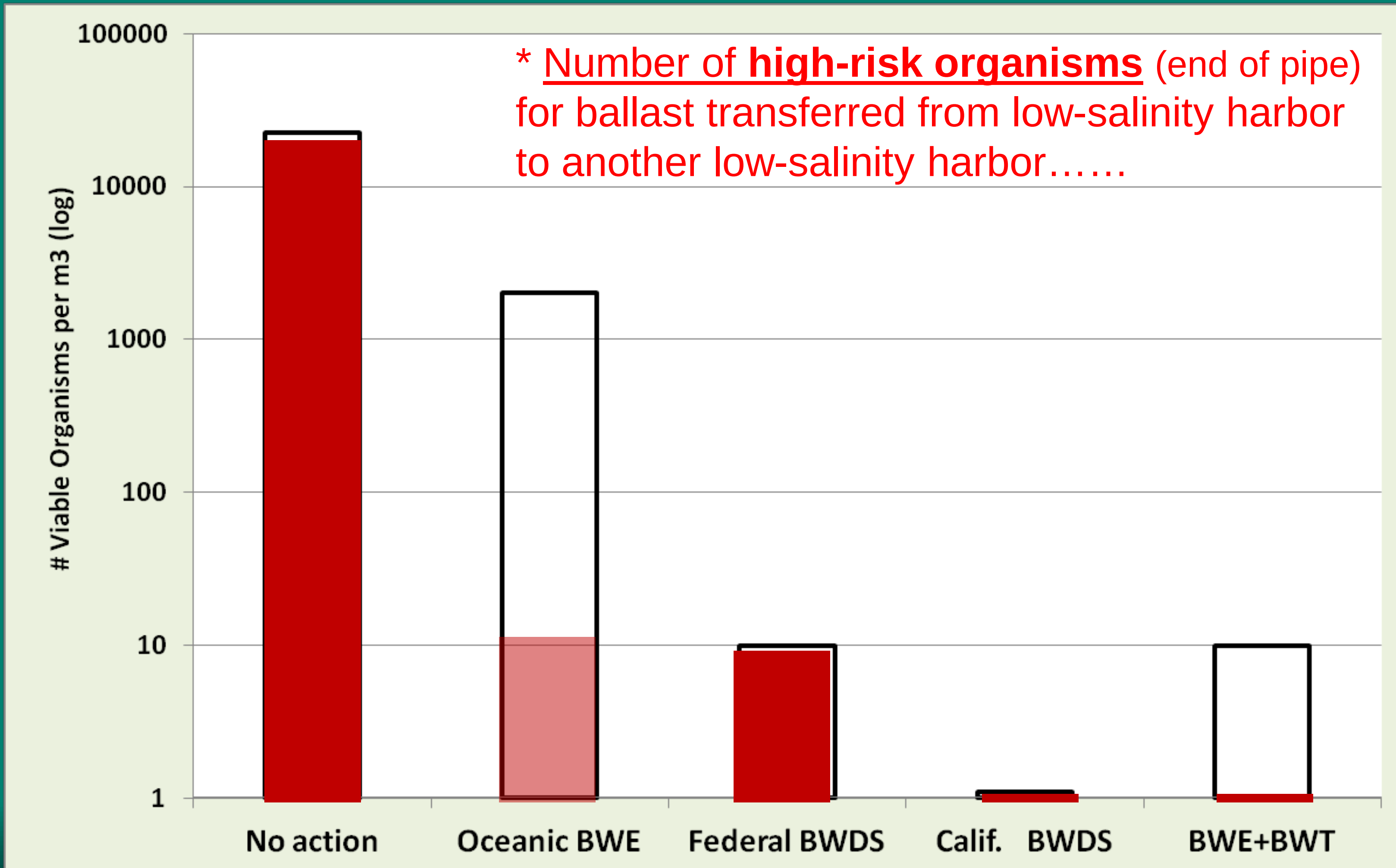
Note: Density values are for descriptive purposes only and not proportionately represented in drawings)

Benefits of BWE+BWT



Based on Ruiz and Reid 2007, J. Cordell (unpublished), and Briski et al. 2013

Benefits of BWE+BWT



Based on Ruiz and Reid 2007, J. Cordell (unpublished), and Briski et al. 2013

BWE + BWT

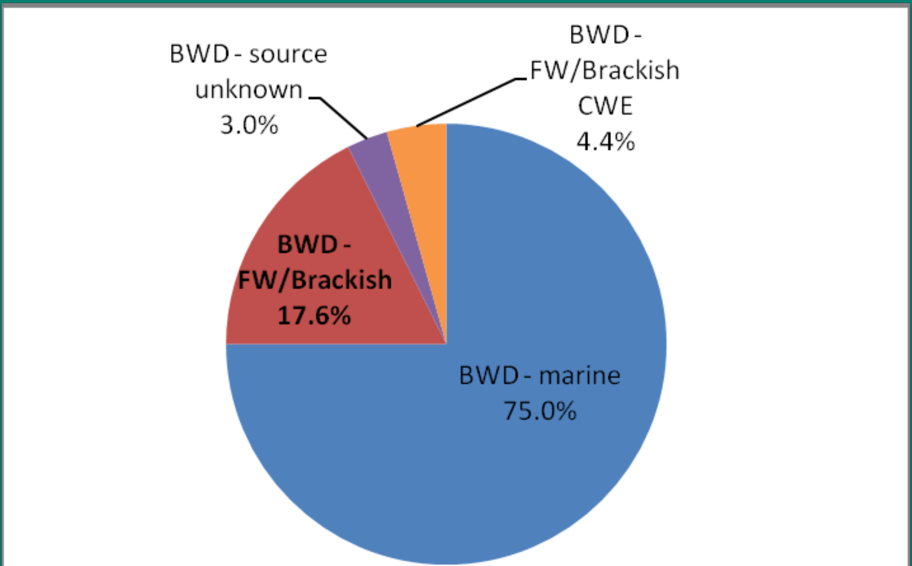
Supporting rationale:

- Preliminary evidence suggests that many BWTS have been designed and verified for saltwater conditions but may be less effective when used in low salinity or high turbidity environments.
- EPA determined that 'Exchange + Treatment' was necessary to protect Great Lakes from AIS threats (also via state 401 certifications).
- Interim strategy to bridge the transition in BWM strategies while new technologies are being adopted, tested and verified.
- Represents a more widely available approach toward achieving highly protective BWM strategy than higher BWTS standard.
- As proposed, would affect a relatively small subset of vessels entering Oregon waters.

BWE + BWT – Implications for Oregon Vessel Arrivals

Oregon BWD (volume) – Source Environment

(12.9 Million m^3 per year)

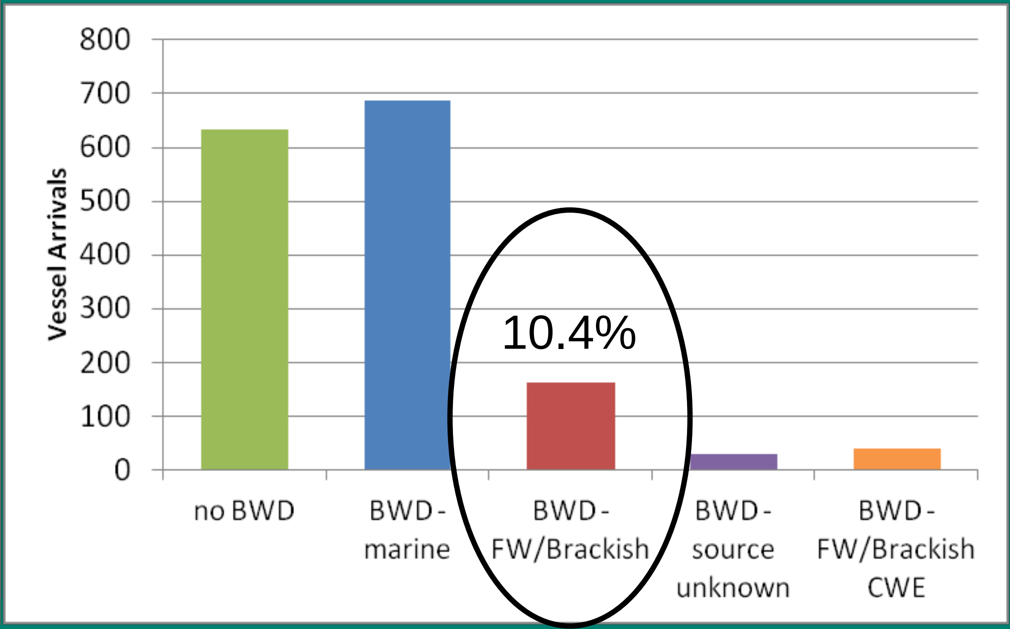


(Adapted from Noble 2007)

~ 2 Million m^3 per year of ballast discharged to state waters would be subject to BWE + BWT provision

Oregon BWD (annual arrivals) – Source Environment

(n= 1550 per year)



~ 10.4% of vessel arrivals to state waters (~ 162 per year) may be subject to BWE + BWT requirement

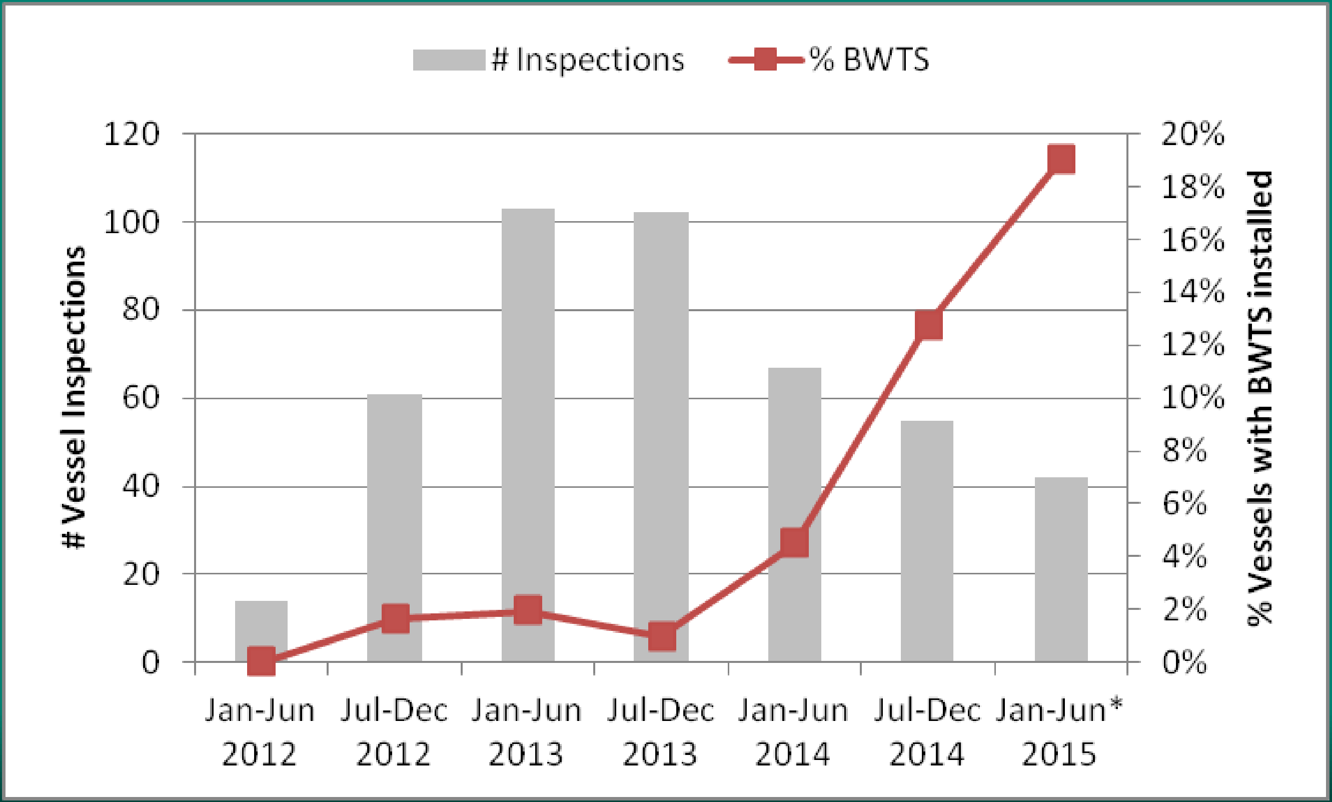
BWE + BWT

Supporting rationale (continued):

- Would ensure that paradigm shift in management strategies represents a significant reduction in AIS risks for all port conditions, not just marine ports.
- Land-based results show significant boost in efficacy for zooplankton, phytoplankton, and bacteria groups (Briski et al. 2013).
- Shipboard trial publications under review(Bailey, Gollasch, et al.).
- Canada intends to ratify IMO with 'Exchange + Treatment' requirement for all vessels entering all FW waterbodies (not just GL).
- Washington State DOE/DFW showed interest in adopting 'Exchange + Treatment' condition for Columbia River as part of VGP 401 certification – pending comparable policy development by Oregon.

What has changed since TF report?

1. Recent increases in number of vessel arrivals to Oregon with new BW treatment systems installed.



What has changed since TF report?

1. Recent increases in number of vessel arrivals to Oregon with new BW treatment systems installed.

2. Increased concerns regarding ballast treatment system engineering for use in freshwater.

3. Scientific results supporting momentum to implement BWE+BWT concept in additional jurisdictions.

4. DEQ drafted a 1-year enforcement guidance grace period aimed at addressing implementation concerns voiced by industry representatives.

5. HB 2207 clarified EQC rule authority.

BWE + BWT

For Discussion:

- Mirror EPA VGP regulations for GL?
  - Or, focus on West Coast coordination/consistency.
  - Affected voyages/tanks defined by:
    - Source port salinity?
    - Destination (receiving) port salinity?
- Exemptions for……?
  - BWT design that can't accommodate BWE
  - Voyages with duration that is shorter than BWE+BWT operational specifications can accommodate.
- Implementation schedule and enforcement grace-period options
- Other?

Objectives (revisited)……

- *Support implementation of federal BWDS, but mitigate concerns of transition with locally tailored solutions to ensure AIS prevention.*
- *Develop ballast management strategy for freshwater ports that could facilitate west coast regional consistency.*
- *Develop outreach and enforcement practices that elevates awareness and averts disruption to business operations.*
- *Develop strategies that enable adaptive management over time.*

Discussion-Roundtable-Feedback

1. What works? What doesn't?
2. How can proposals be amended to be more acceptable?
3. Are there alternative management strategies that you can recommend in lieu of BWE+BWT?

http://www.oregon.gov/deq/RulesandRegulations/Pages/Advisory/ballast2016.aspx

Ten of the Most Unwanted

Marine plants, animals and microbes are being carried around the world attached to the hulls of ships and in ships' ballast water. When discharged into new environments, they may become invaders and seriously disrupt the native ecology and economy. Introduced pathogens may cause diseases and death in humans.

Cholera

Vibrio cholerae (various strains)

Native to: Various strains with broad ranges.

Introduced to: South America, Gulf of Mexico and other areas.

Impacts: Some cholera epidemics appear to be directly associated with ballast water. One example is an epidemic that began simultaneously at three separate ports in Peru in 1991, sweeping across South America, affecting more than a million people and killing more than ten thousand by 1994. This strain had previously been reported only in Bangladesh.

North American Comb Jelly

Mnemiopsis leidyi

Native to: Eastern Seaboard of the Americas

Introduced to: Black, Azov and Caspian Seas

Impacts: Reproduces rapidly (self fertilising hermaphrodite) under favourable conditions. Feeds excessively on zooplankton. Depletes zooplankton stocks; altering food web and ecosystem function. Contributed significantly to collapse of Black and Asov Sea fisheries in 1990s, with massive economic and social impact. Now threatens similar impact in Caspian Sea.

Cladoceran Water Flea

Cercopagis pengoi

Native to: Black and Caspian Seas

Introduced to: Baltic Sea

Impacts: Reproduces to form very large populations that dominate the zooplankton community and clog fishing nets and trawls, with associated economic impacts.

North Pacific Seastar

Asterias amurensis

Native to: Northern Pacific

Introduced to: Southern Australia

Impacts: Reproduces in large numbers, reaching 'plague' proportions rapidly in invaded environments. Feeds on shellfish, including commercially valuable scallop, oyster and clam species.

Mitten Crab

Eiocheir sinensis

Native to: Northern Asia

Introduced to: Western Europe, Baltic Sea and West Coast North America

Impacts: Undergoes mass migrations for reproductive purposes. Burrows into river banks and dykes causing erosion and siltation. Preys on native fish and invertebrate species, causing local extinctions during population outbreaks. Interferes with fishing activities.

Zebra Mussel

Dreissena polymorpha

Native to: Eastern Europe (Black Sea)

Introduced to: Western and northern Europe, including Ireland and Baltic Sea; eastern half of North America

Impacts: Fouls all available hard surfaces in mass numbers. Displaces native aquatic life. Alters habitat, ecosystem and food web. Causes severe fouling problems on infrastructure and vessels. Blocks water intake pipes, sluices and irrigation ditches. Economic costs to USA alone of around US$750 million to $1 billion between 1989 and 2000.

Toxic Algae (Red/Brown/Green Tides)

Various species

Native to: Various species with broad ranges.

Introduced to: Several species have been transferred to new areas in ships' ballast water.

Impacts: May form Harmful Algae Blooms. Depending on the species, can cause massive kills of marine life through oxygen depletion, release of toxins and/or mucus. Can foul beaches and impact on tourism and recreation. Some species may contaminate filter-feeding shellfish and cause fisheries to be closed. Consumption of contaminated shellfish by humans may cause severe illness and death.

Asian Kelp

Undaria pinnatifida

Native to: Northern Asia

Introduced to: Southern Australia, New Zealand, West Coast of USA, Europe and Argentina

Impacts: Grows and spreads rapidly, both vegetatively and through dispersal of spores. Displaces native algae and marine life. Alters habitat, ecosystem and food web. May affect commercial shellfish stocks through space competition and alteration of habitat.

Round Goby

Neogobius melanostomus

Native to: Black, Asov and Caspian Seas

Introduced to: Baltic Sea and North America

Impacts: Highly adaptable and invasive. Increases in numbers and spreads quickly. Competes for food and habitat with native fishes including commercially important species, and preys on their eggs and young. Spawns multiple times per season and survives in poor water quality.

European Green Crab

Carcinus maenus

Native to: European Atlantic Coast

Introduced to: Southern Australia, South Africa, USA and Japan

Impacts: Highly adaptable and invasive. Resistant to predation due to hard shell. Competes with and displaces native crabs and becomes a dominant species in invaded areas. Consumes and depletes wide range of prey species. Alters inter-tidal rocky shore ecosystem.

Further Information:

Global Ballast Water Management Programme
International Maritime Organization, London, UK
Fax +44 (0)20 7587 3261
Web http://globallast.imo.org

Photo credits: *Ship Discharging Ballast Water* – CRIMP, CSIRO Marine Research, Australia, *Zebra Mussel* – Sergei Olenin, *Cladoceran Water Flea* – Mirja Rosenberg, *Cholera* – Gloria Casale, *Comb Jelly* – Richard Harbison, *Asian Kelp & North Pacific Seastar* – CSIRO Australia, *European Green Crab* – T. Huspeni, *Toxic Algae* – D.A. Horstman, *Mitten Crab* – Stephan Gollasch, *Round Goby* – David Jude

Concept, content and design: Steve Raaymakers and Liz Gould (design@lizgould.plus.com)

The species presented here are for illustrative purposes only. Their introduced ranges may be greater than depicted. There are numerous other examples of serious marine bio-invasions around the world.

Global Ballast Water Management Programme

GEF

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