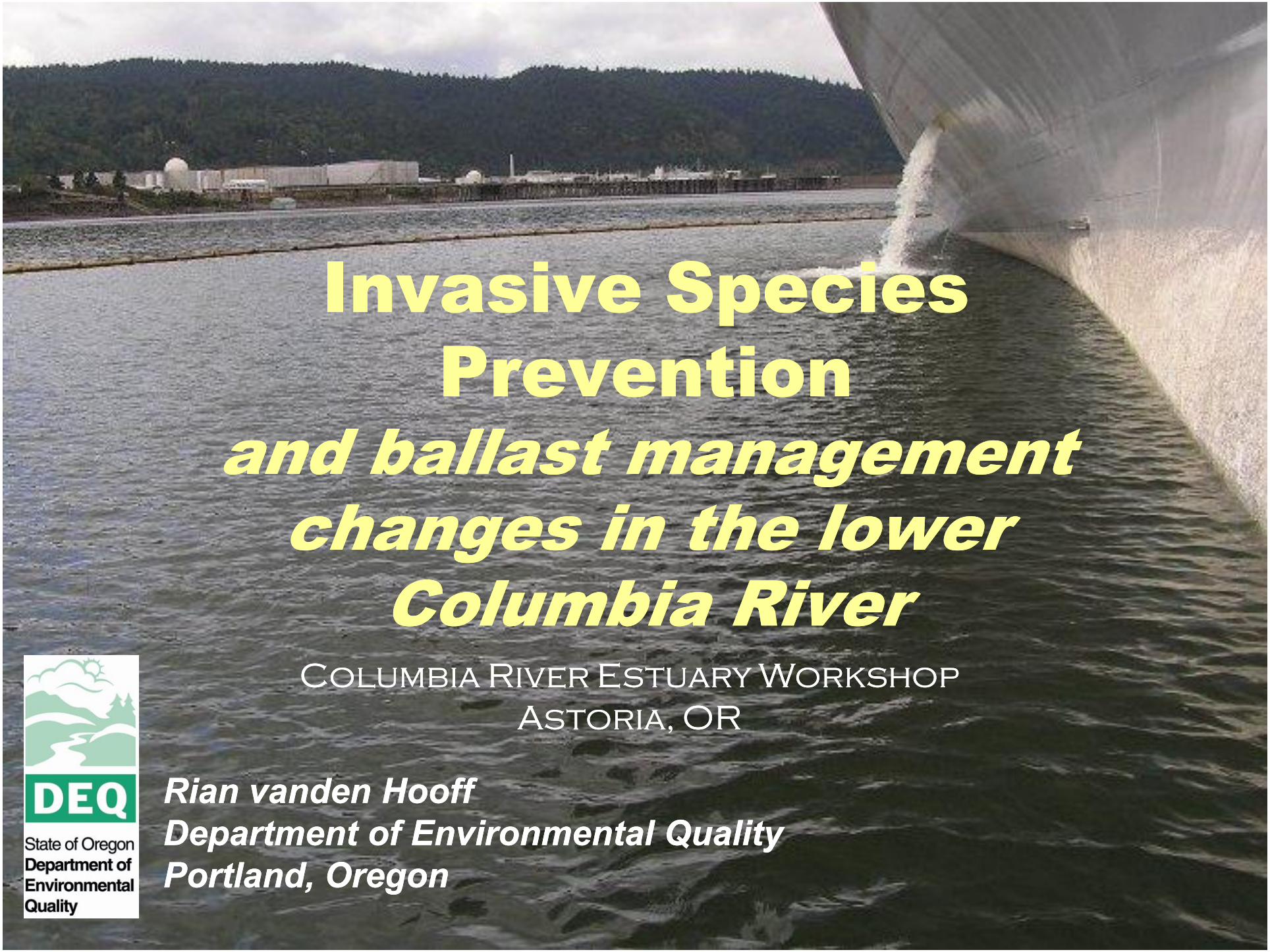


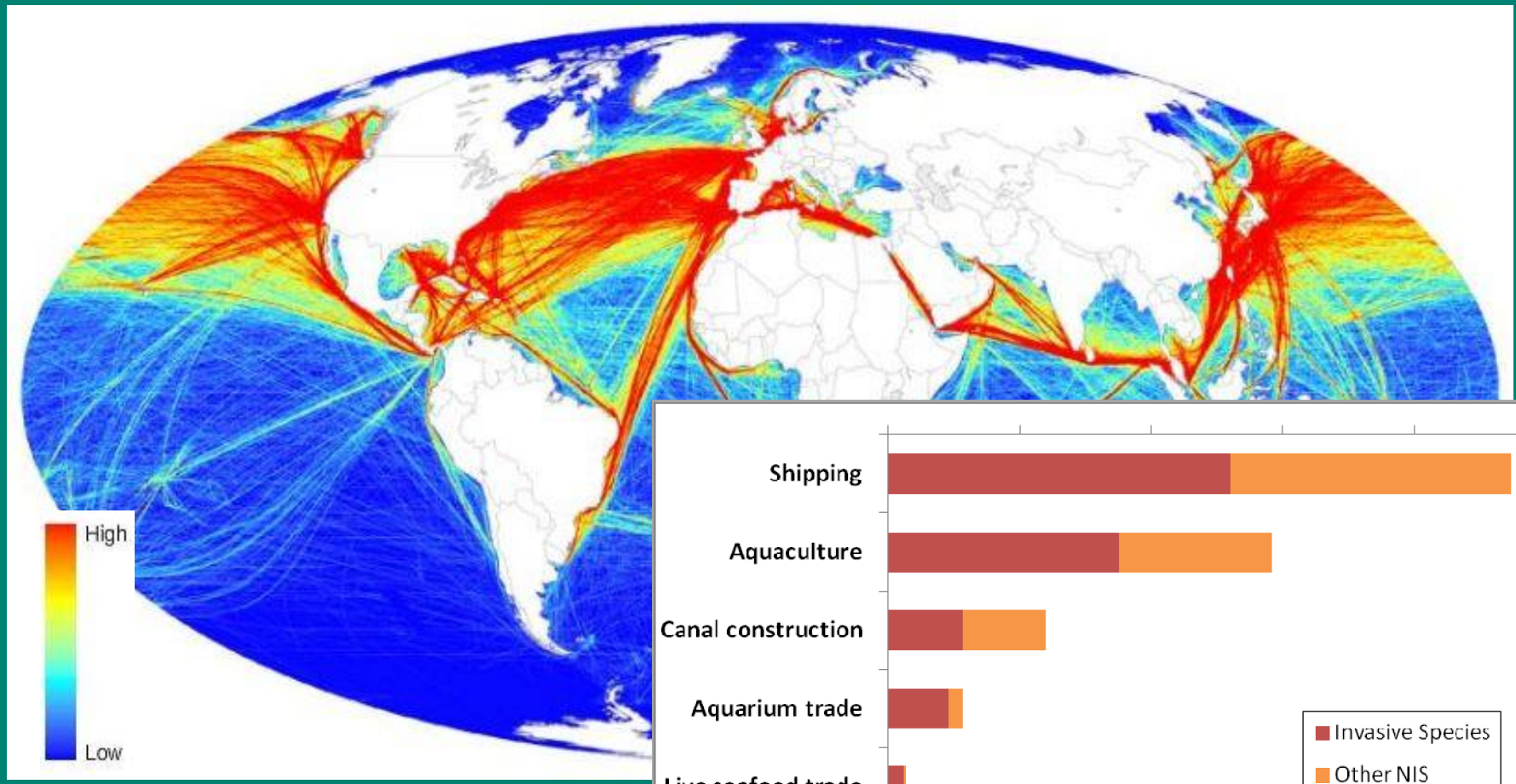
Invasive Species Prevention *and ballast management changes in the lower Columbia River*

Columbia River Estuary Workshop
Astoria, OR

Rian vanden Hooff
Department of Environmental Quality
Portland, Oregon

DEQ
State of Oregon Department of Environmental Quality

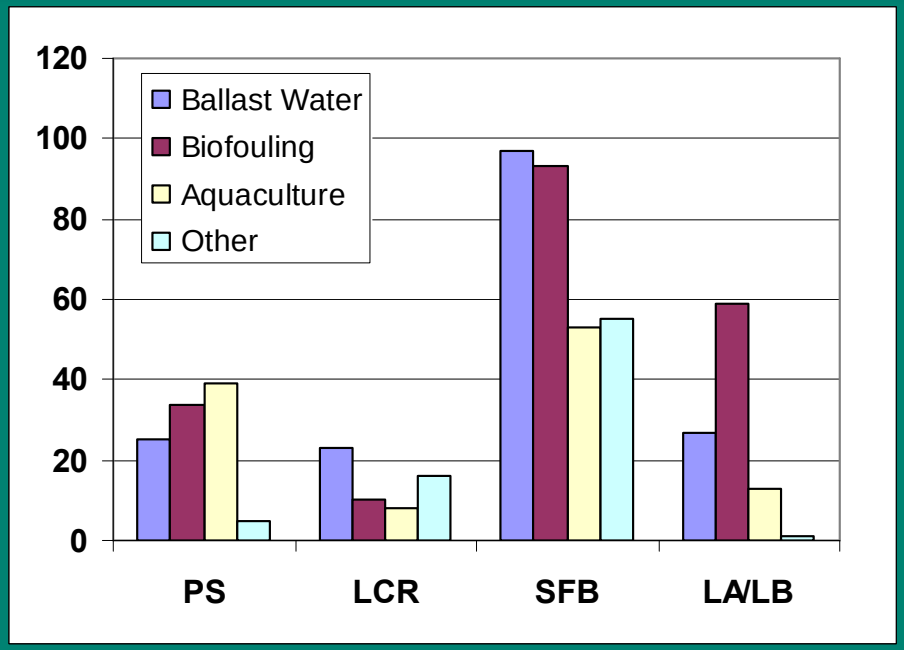
Global Pathways for coastal AIS



(Halpern et al., 2008)

(Modified from Molnar et al., 2008)

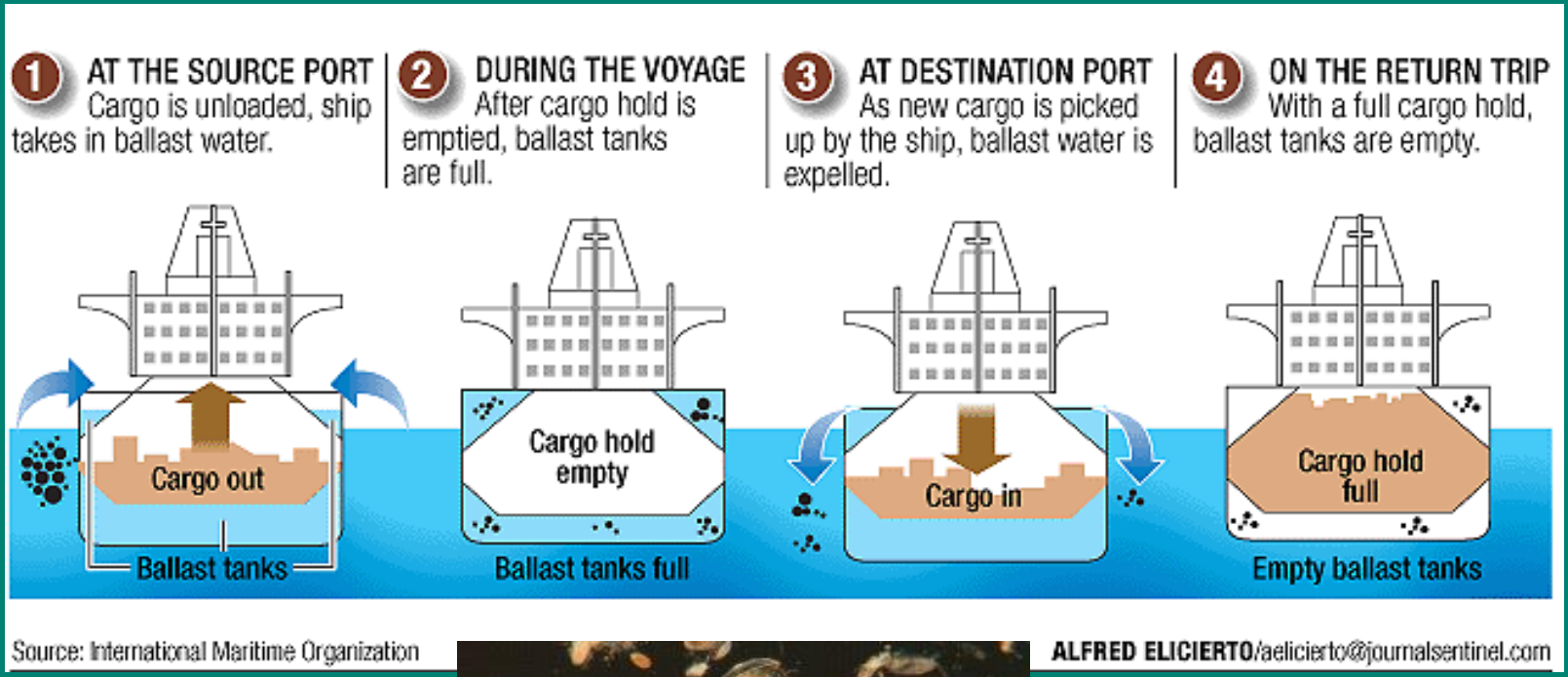
Non-indigenous species in the lower CR

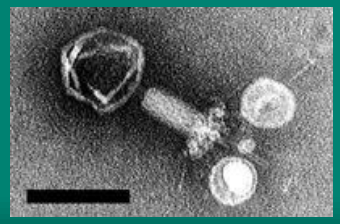


modified from Simkanin et al. 2010 (Mar.Poll. Bull.)

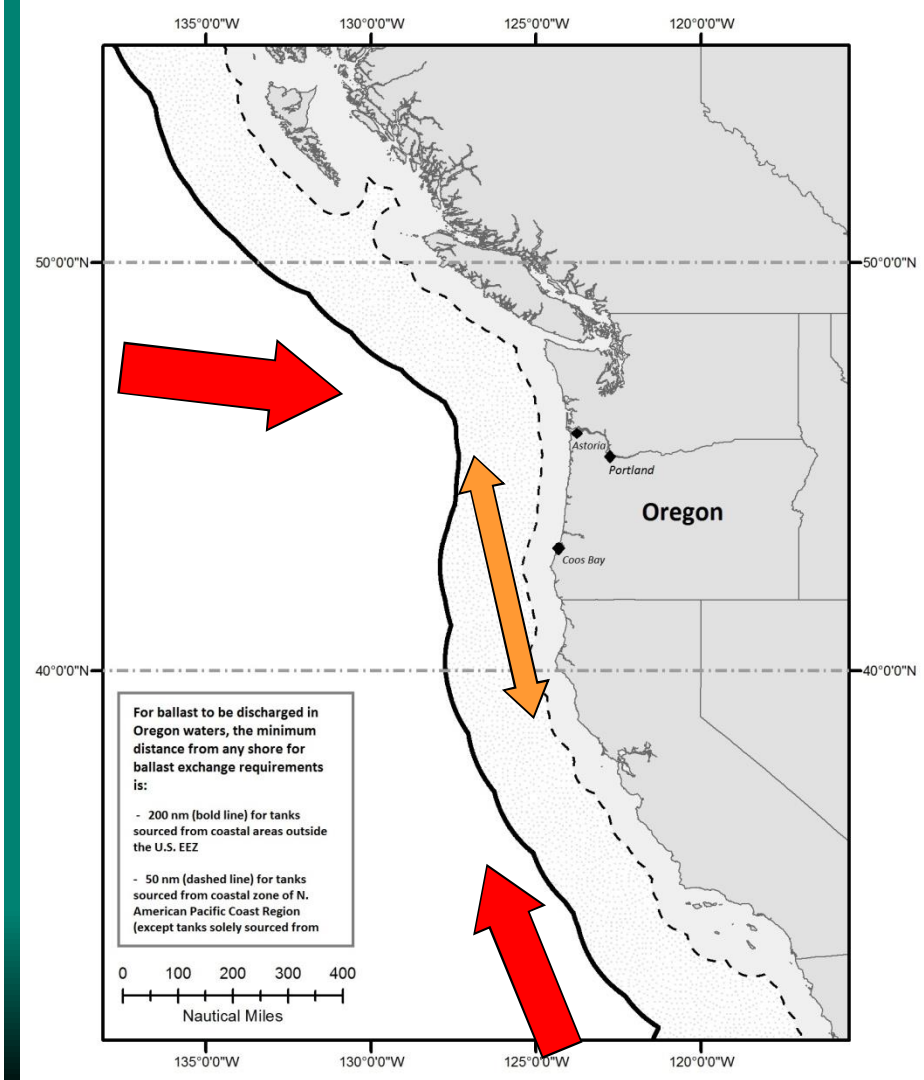
- At least 55 aquatic NIS established in lower CRE (Sytsma et al. 2004).
- Targeted studies reveal NIS presence and potential ecological affects, but more research is needed (Cordell et al. 2007, Bollens et al. 2012, Breckenridge et al. 2014).

Ballast Water





Current Management Status

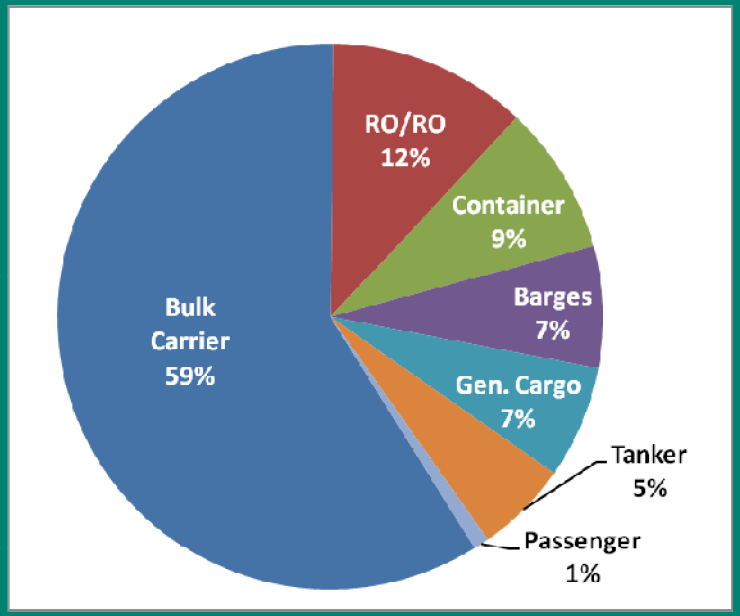


Oceanic Ballast Water Exchange (BWE)

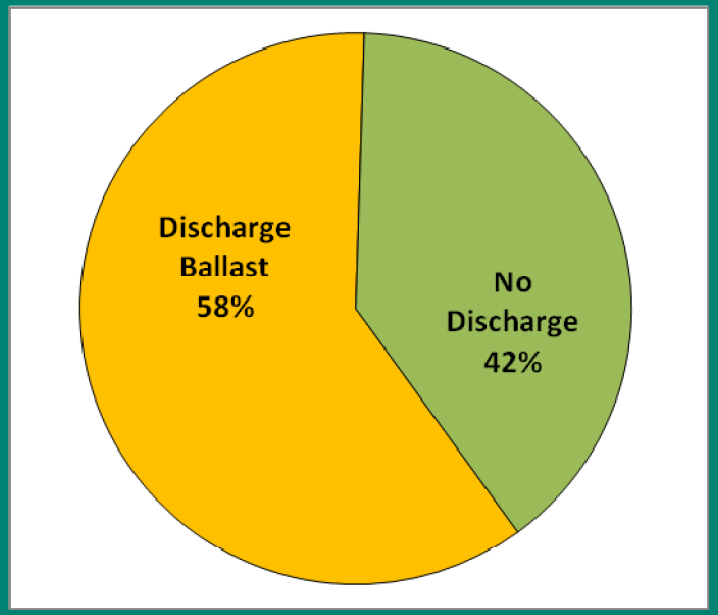
Vessel Characteristics - CR

1522 Qualifying Voyages (2013)

Vessel Type

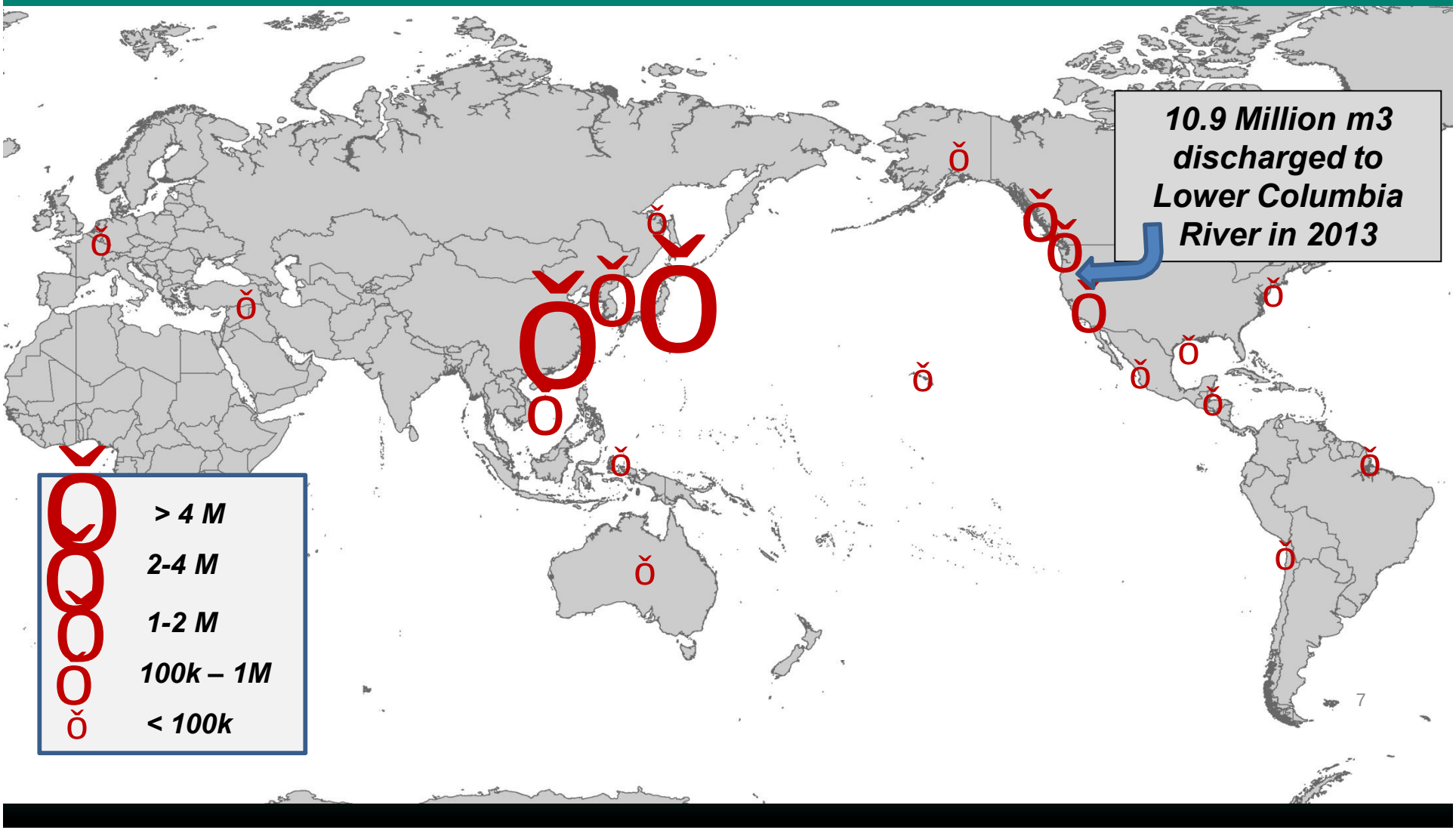


Ballasting Behavior



Annual Ballast Discharge ~11 Million m^3

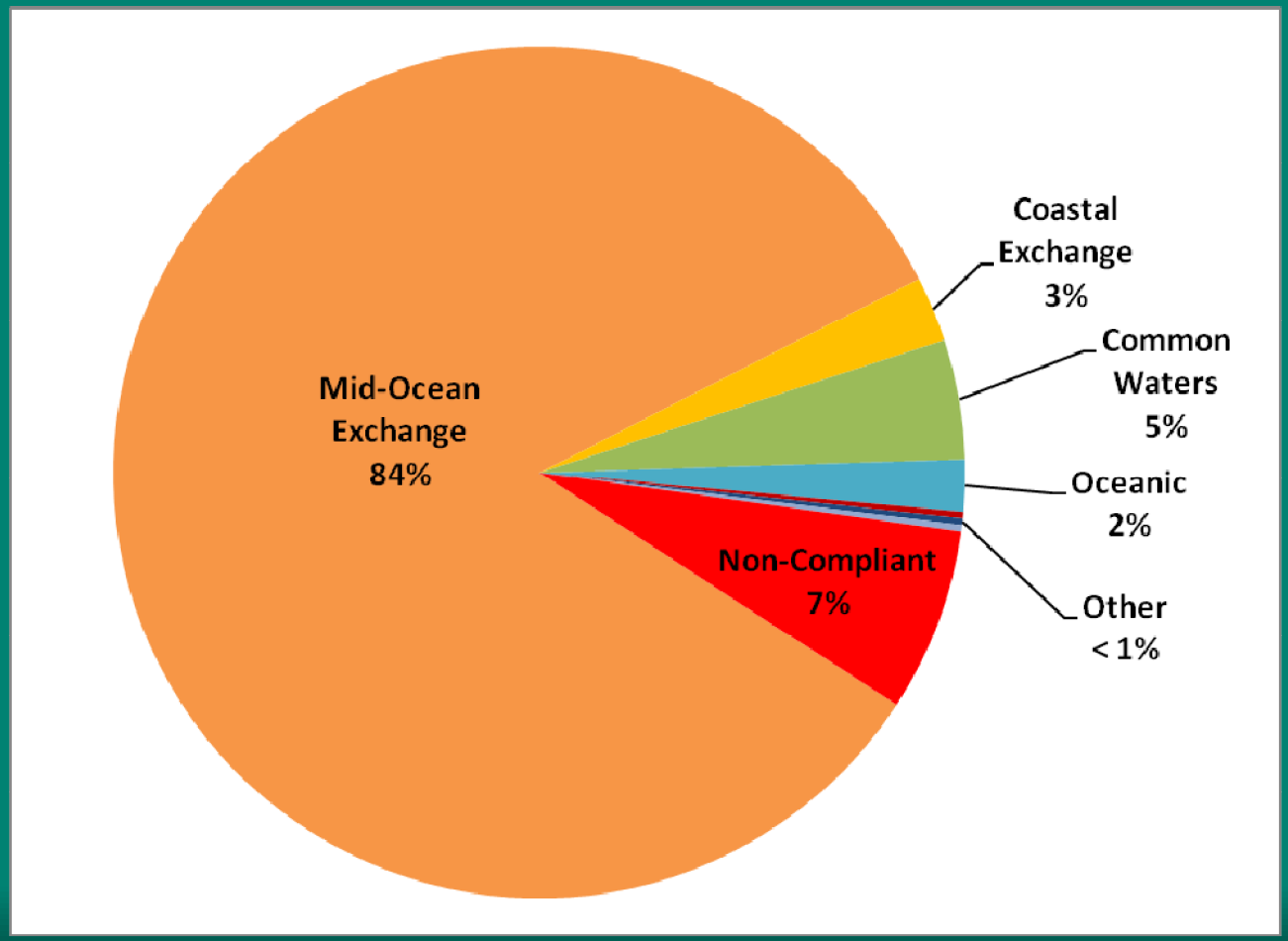
Original Source of Ballast Water Discharged to Columbia River



Management Status* of Discharged Ballast

(Columbia River - 2013)

** - as reported by vessel operator on required ballast water reporting form.*



Future: Ballast 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 ï a measure of viable bacterial numbers

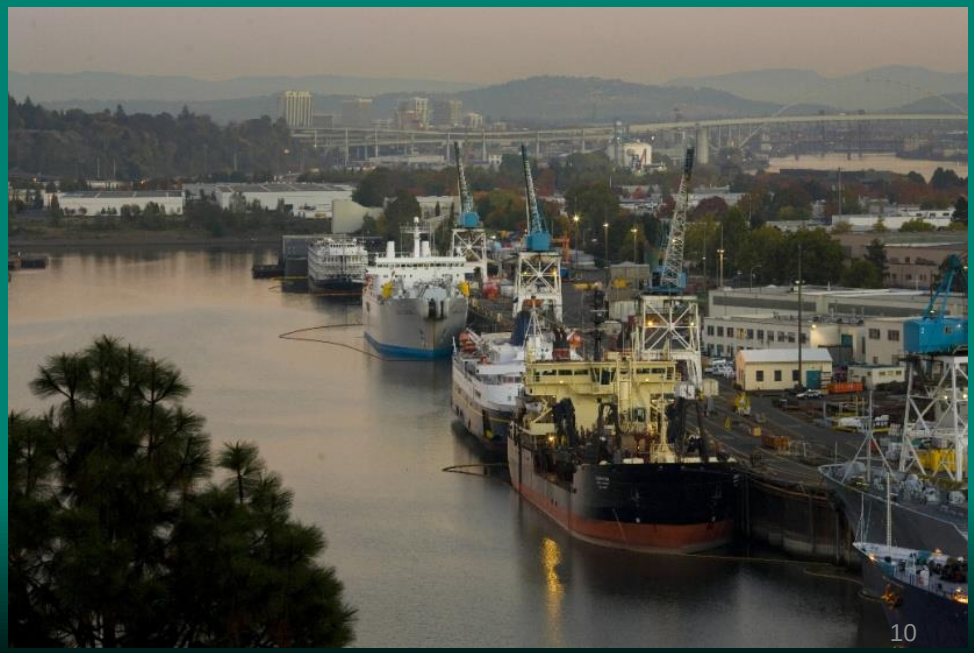
Federal implementation timeline:

Effective 2014 for new build vessels;

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

Oregon Task Force on Shipping Transport of Aquatic Invasive Species

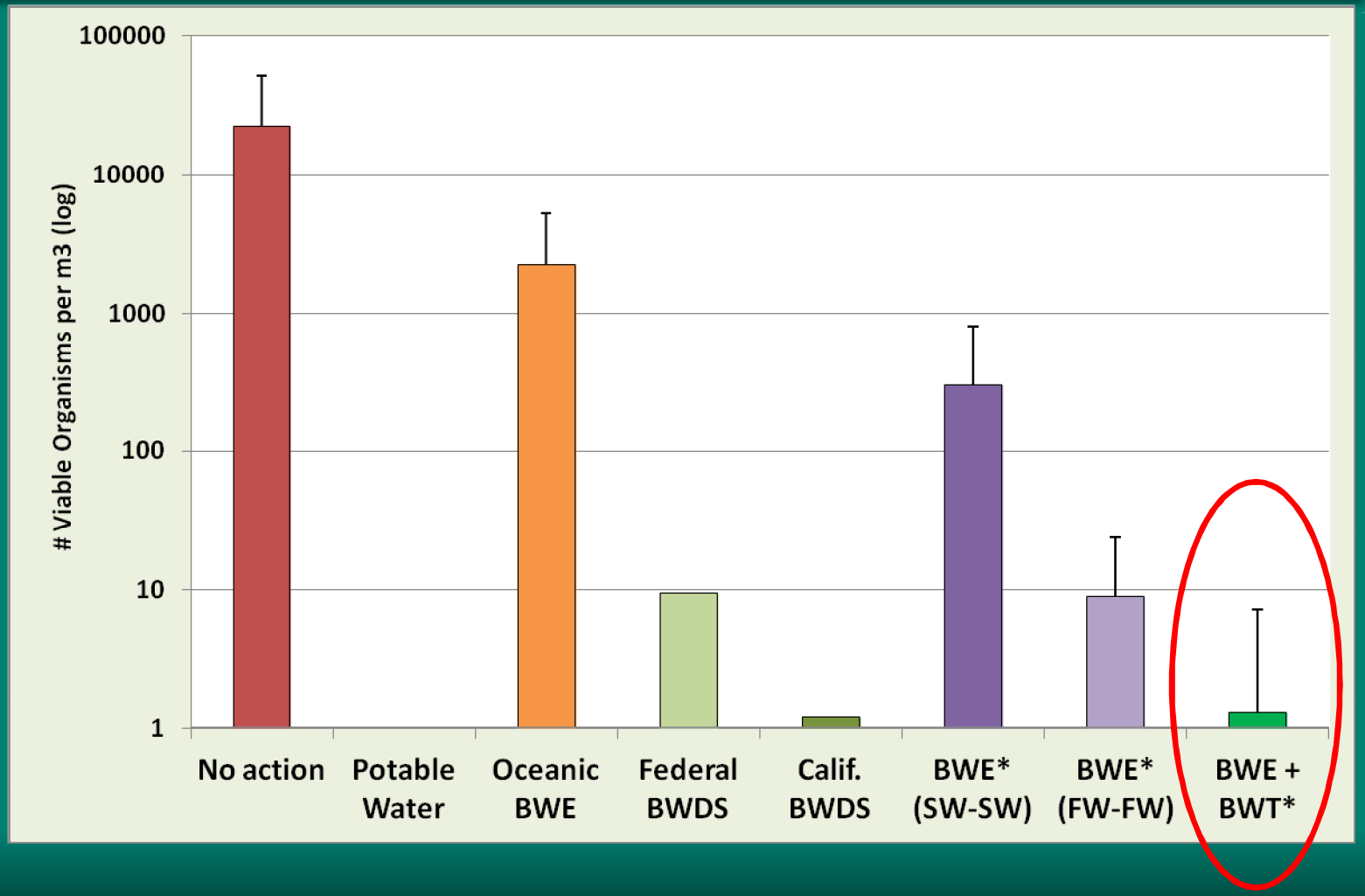
- Established by 2001 State Legislature; renewed in 2013.
- Purpose: *to study and make recommendations for combating the introduction of non-indigenous species associated with commercial shipping-related activities in Oregon.*
- Members: Represent a diversity of stakeholder interests.



Task Force Recommendations to 2015 Oregon Legislature

1. Increase vessel arrival fee and General Fund support to sustain current level of ballast program activity efforts by DEQ.
2. Distribute penalty collections to the statewide Invasive Species Control Account (rather than General Fund).
3. Establish prevention requirements for vessels entering Oregon waters with ćemptyô ballast tanks.
4. Support efforts to fund non-indigenous species survey and monitoring efforts in Oregon waters.
5. Consider vessel biofouling management regulations based on policy developments in neighboring states.
6. **Continue to require BWE (in addition to BWT) for a subset of high-risk vessel arrivals to Oregon waters.**

Comparing Management Strategies



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

In conclusion…..

1. Ballast management regulatory landscape will continue to be highly dynamic for next 5+ years.
2. One size fits all strategy is a noble goal; but not always a good fit.
3. Biology matters.
4. Adaptive Management dependent upon best-available science and best-available technology.
5. Enforcement and compliance verification is critical.
6. Status of NIS in CRE? ï need periodic surveys and greater understanding of ecological impacts.

Oregon Ballast Water Management Program

Questions or Comments?

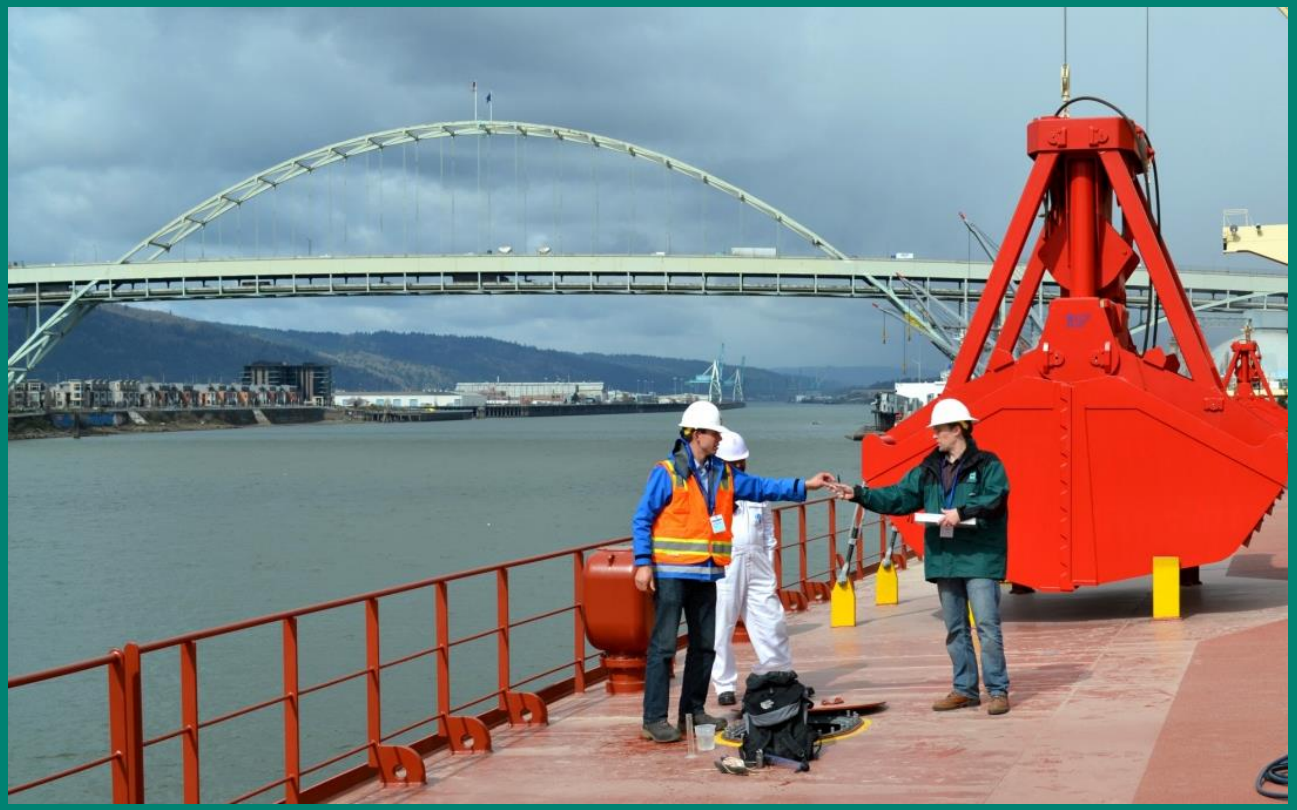


Photo credit: B. Bjorndal

Contact Info:
(503) 229-6865
rian.hooff@state.or.us

webpage: http://www.deq.state.or.us/lq/cu/emergency/ballast.htm