

Oregon's proposed strategy to prevent AIS transfer between low-salinity ports



Prevention First

*September 2016
Long Beach, CA*

Aquatic Invasive Species Prevention



Oregon Ballast Water Program

(regulations established 2001; program activities in 2008)



Operations:
**Pre-Arrival Screening, Vessel
Inspections & Enforcement**



Outreach & Coordination:
**with Industry, other
Stakeholders and Regional
Partners**

Policy Analysis & Development:
**Data Analysis, Scientific
Collaboration, and Regulatory
Solutions**

AIS Risk Factors from Ballast Transfer



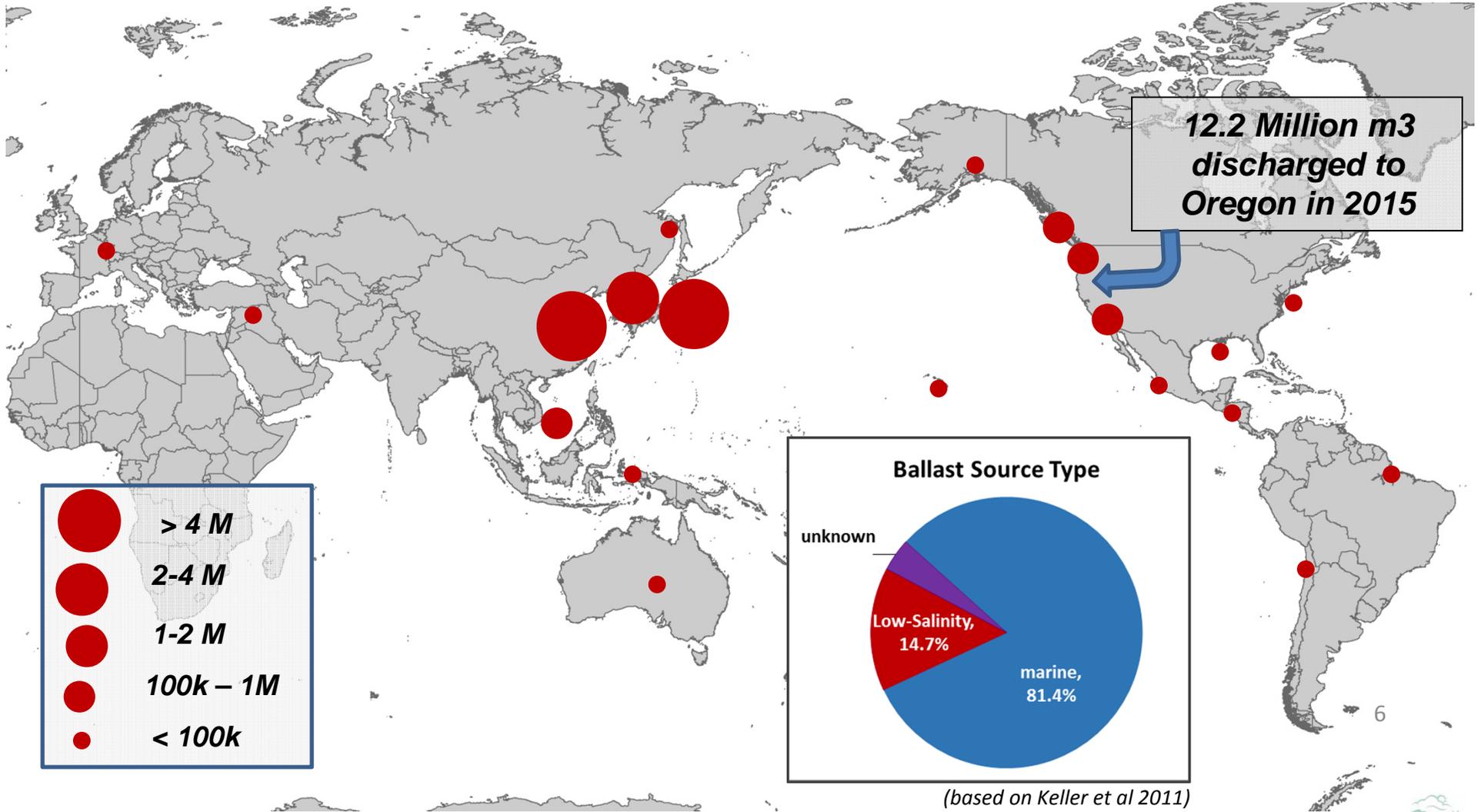
Risk Factors:

1. *Number of viable organisms released*
 - *Discharge volume (per area)*
 - *Discharge rate*
 - *Ballast Age*
2. *Environmental suitability*
 - *Salinity*
 - *Temperature*
 - *Habitat type*
 - *Receiving ecosystem health*

Regional Ballast Water Management Comparison

| | Annual Arrivals | Annual BWD Volume | Percent Discharging | BWD per arrival | Port Environ. Conditions |
|--|--------------------|------------------------------------|---------------------|------------------------------------|--------------------------|
| Gulf of Alaska | 785 | 9.7 M m ³ | 44% | 12,400 m ³ | Marine |
| Salish Sea (WA & BC) | 6489 | 22.1 M m ³ | 28% | 3,400 m ³ | Marine |
| <i>Columbia River (OR & WA)</i> | <i>1581</i> | <i>12.2 M m³</i> | <i>58%</i> | <i>7,700 m³</i> | <i>Freshwater</i> |
| <i>Coos Bay</i> | <i>65</i> | <i>0.9 M m³</i> | <i>69%</i> | <i>13,900 m³</i> | <i>Brackish</i> |
| San Francisco Estuary | 3495 | 7.5 M m ³ | 18% | 2,100 m ³ | Brackish |
| LA / Long Beach | 4265 | 4.6 M m ³ | 16% | 1,100 m ³ | Marine |
| Hawaii | 1026 | 0.7 M m ³ | 15% | 682 m ³ | Marine |

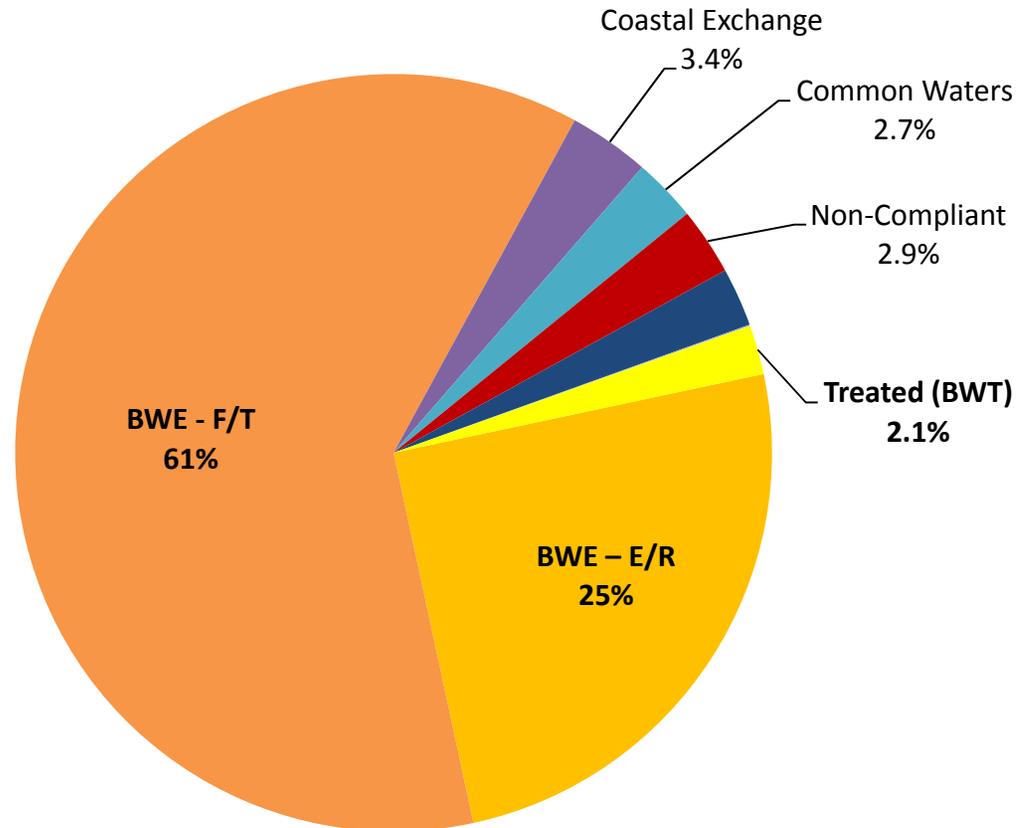
Source of Ballast Water Discharged to OR



Reported Ballast Management *of total volume discharged in 2015*

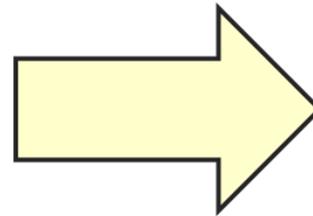
>90% currently managed with oceanic ballast water exchange (BWE)

7-fold increase in treated discharge (BWT) from 2014 to 2015.

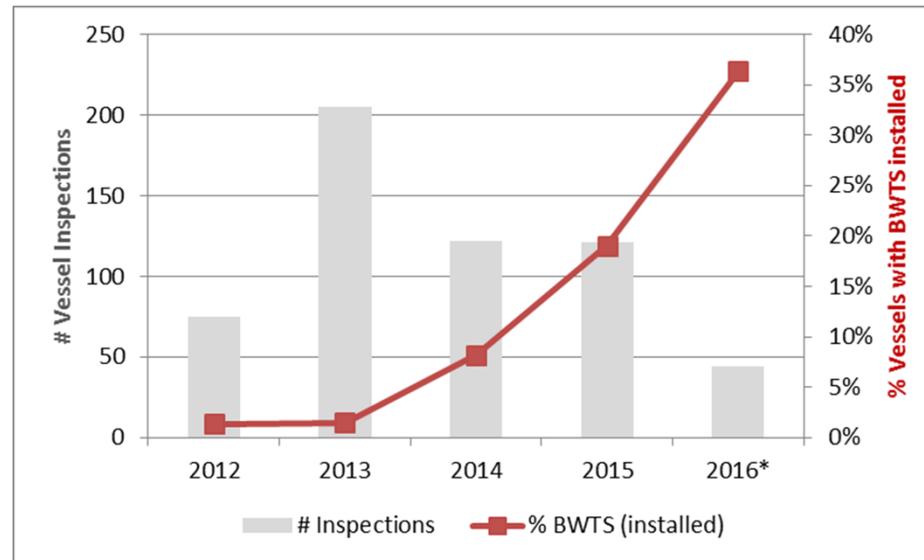


Management Paradigm Shift Underway

Oceanic Ballast Water Exchange (BWE)



Standards limiting the number of viable organisms per unit volume (BWT)



Management Concerns for Oregon

1. *'Empty' tanks with low-salinity residual ballast water and sediment that is ballasted and subsequently de-ballasted while in state waters.*



2. *Federal/Int'l policy to **replace ballast water exchange with IMO D-2 numeric discharge standards** that could result in increased AIS risks for freshwater ports under some circumstances.*

- *Specifically, vessels that have sourced ballast from low-salinity environmental conditions and will be discharging to a low-salinity port in Oregon.*



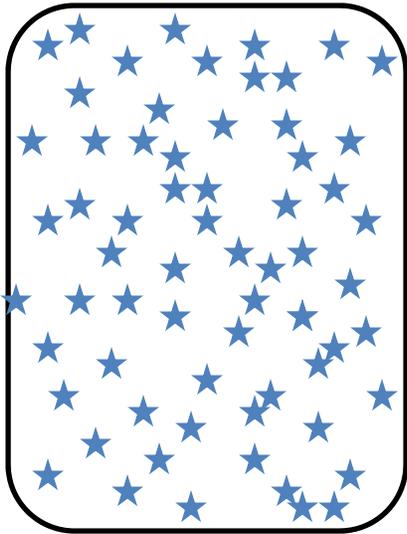
IMO D-2 standards could increase AIS risks for freshwater ports

Marine Source → Marine Port

(coastal marine organisms = high-risk)

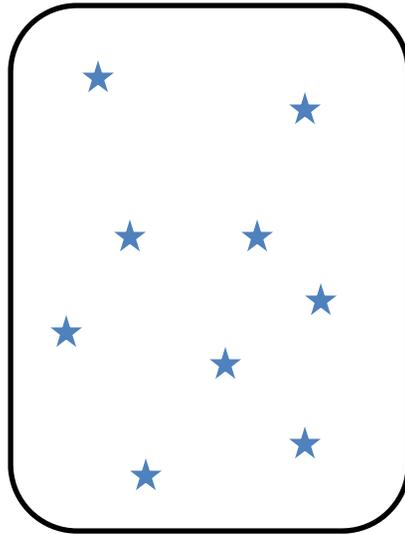
End-of-pipe discharge following:

BWE



1000's per m3

BWT



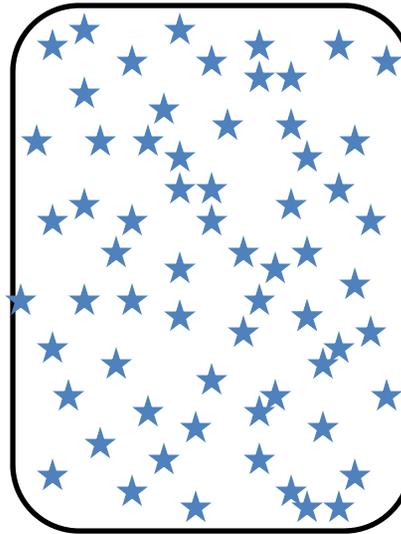
<10 per m3

FW Source → FW Port

(freshwater organisms = high-risk)

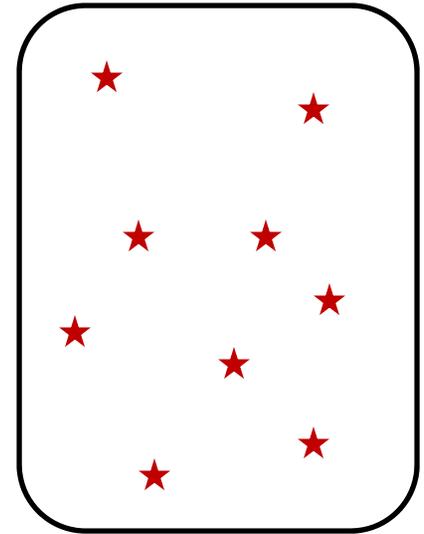
End-of-pipe discharge following:

BWE



1000's per m3

BWT



<10 per m3

(adapted from Briski et al 2015)

DEQ Rulemaking



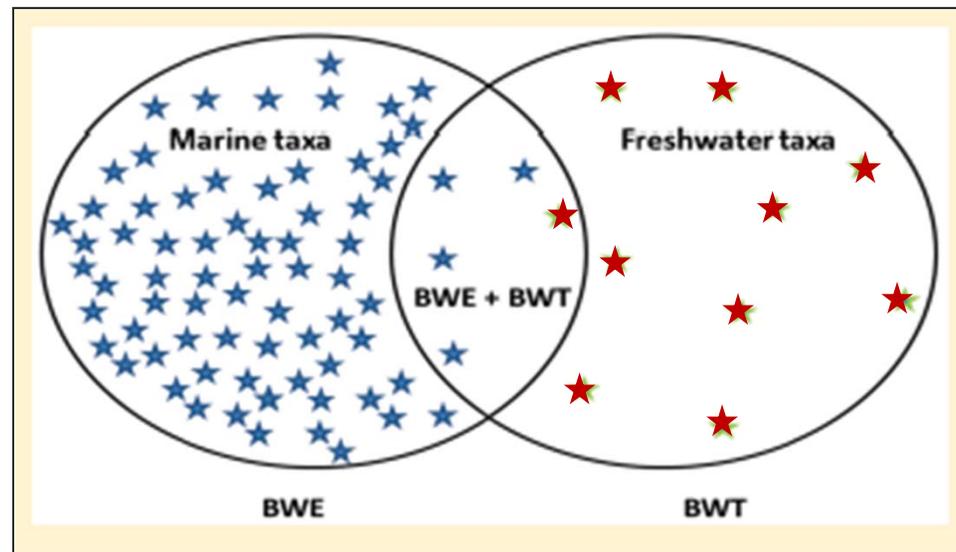
Objectives:

- *Ensure that new policies do not increase AIS risks for low-salinity ports in Oregon.*
- *Solicit stakeholder input to ensure that rules are both adequately protective and practicable for vessel operators.*
- *Support implementation of federal BWDS - but mitigate concerns with tailored strategies that may be implemented at local level AND are compatible within broader regulatory framework.*
- *Develop strategy that could facilitate consistency amongst freshwater ports.*

'Exchange plus Treatment' (BWE+BWT)

- Already established in other water-bodies/states.
- Targets two key factors of invasion probability:
 - propagule pressure (i.e. organism density), and
 - environmental tolerance (i.e. match between source and receiving environments).
- Does not require new equipment or investment by vessel owner.
- Can be strategically applied to target high-risk voyages.
- Ensures adequate prevention for FW ports during transition to new technology.

“BWE + BWT proved to be more effective at reducing invasion risk to freshwater recipient systems than BWT alone”



'Exchange plus Treatment' (BWE+BWT)

Elements of proposed OR Rule (OAR 340-143-0050):



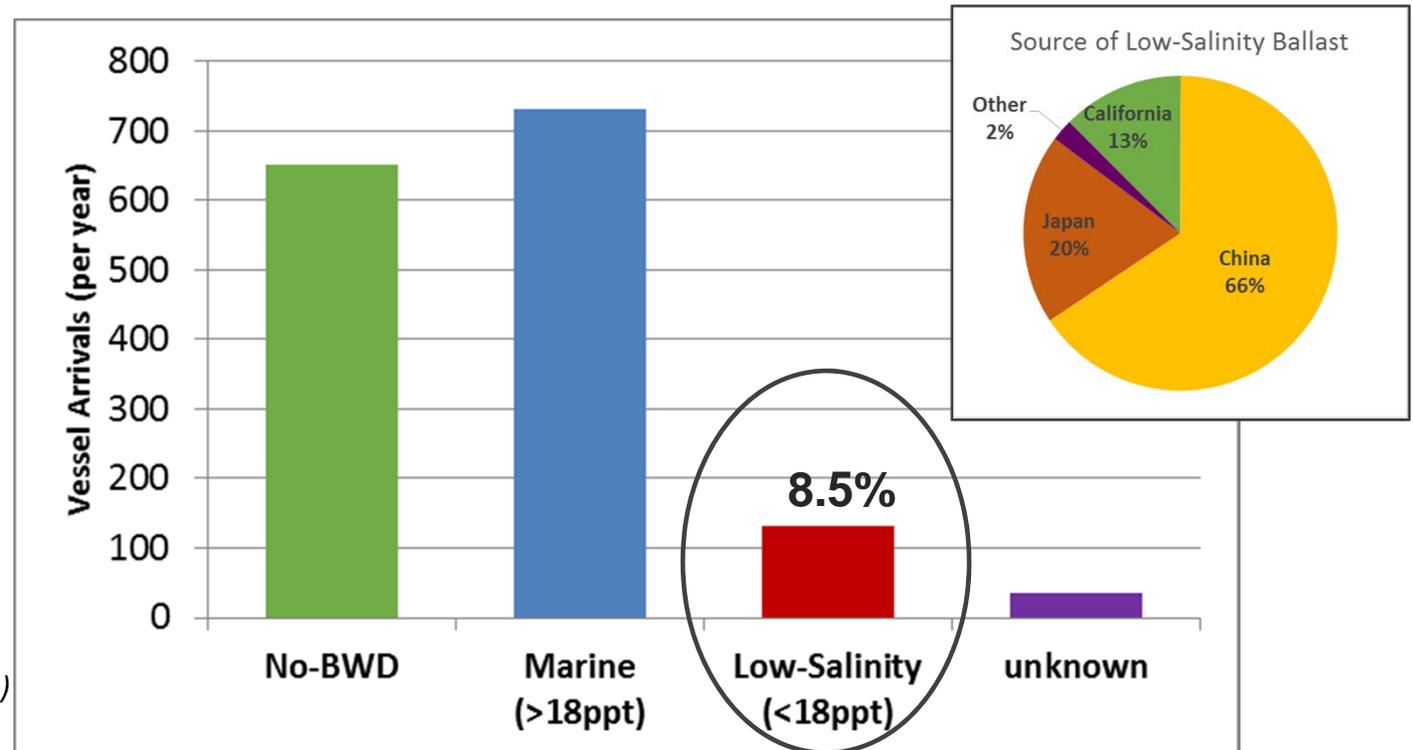
- Applies only to vessels discharging to low-salinity ports of Oregon.
- Applies only to ballast sourced from an area with salinity < 18 ppt.
- Exemptions for voyages and BWT system configurations that cannot accommodate BWE with BWT.
- Sunset date

'Exchange plus Treatment' (BWE+BWT)

Effect of proposed rule on Oregon vessel traffic:

~15% of BWD (volume) to Oregon sourced from low-salinity ports*

(* derived from Keller et al 2011)



< 9% of vessel arrivals to state waters
(~ 135 per year) may be subject to BWE + BWT rule proposal

In Conclusion....



1. *BWE+BWT provides a significant AIS risk reduction for low-salinity ports.*
2. *BWE+BWT ensures adequate protection of environment while supporting implementation of Federal/IMO numeric BWDS.*
3. *Targeted strategy effects only high-risk voyages.*
4. *Next Steps...*

Oregon Ballast Management and Invasive Species Prevention

Questions or Comments?



DEQ BW Program webpage:

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