

Ballast Water Exchange plus Ballast Water Treatment

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Topics of Discussion

- Implementing CA Performance Standards
- BWE + BWT
- Existing BWE + BWT Requirements
- BWE + BWT in California
- Next Steps



California Interim Ballast Water Discharge Performance Standards

Organism Size Class	California	USCG/EPA
Organisms greater than 50 µm in minimum dimension	No detectable living organisms	< 10 living organisms per cubic meter
Organisms 10 – 50 µm in minimum dimension	< 0.01 living organisms per ml	< 10 living organisms per ml
Living organisms less than 10 µm in minimum dimension	< 10 ³ bacteria/100 ml < 10 ⁴ viruses/100 ml	
<i>Escherichia coli</i>	< 126 cfu/100 ml	< 250 cfu/100 ml
Intestinal enterococci	< 33 cfu/100 ml	< 100 cfu/100 ml
Toxicogenic <i>Vibrio cholerae</i> (O1 & O139)	< 1cfu/100 ml or < 1cfu/gram wet weight zoological samples	< 1 cfu/100 ml or < 1 cfu/gram wet weight zooplankton samples

BW Technology Assessment Report

- 18 months prior to implementation of California performance standards
- Review technology
 - Efficacy
 - Availability
 - Environmental impacts of ballast water treatment technologies



California Interim Ballast Water Discharge Performance Standards

History of Implementation

2007 Assessment of technologies to meet California standards

- No technologies available

2008 Senate Bill 1781

- Delay implementation by one year

2009 Assessment of technologies to meet California standards

- Systems show “potential” to meet standards



California Ballast Water Discharge Performance Standards

History of Implementation

2010 California performance standards implemented

- Briefly

2010 Assessment of technologies to meet California standards

- Systems show “potential” to meet standards

2013 Assessment of technologies to meet California standards

- No technologies available



California's Ballast Water Discharge Performance Standards

History of Implementation

2013 Senate Bill 814

- Delay implementation by two years

2014 Assessment of technologies to meet California standards

- No technologies available

2015 Senate Bill 1312

- Delayed to current implementation schedule



California Ballast Water Discharge Performance Standards Implementation Schedule

Interim standards

- Newly built vessels - construction on or after January 1, 2020
- Existing vessels – first regularly scheduled dry dock on or after January 1, 2020

Final standards – No living organisms in all size classes

- January 1, 2030

Date to apply to install experimental BW treatment technologies

- January 1, 2020



2018 BW Technology Report

- No ballast water treatment technologies available to meet interim California Performance Standards
- Shipboard ballast water management systems
 - Systems did not meet the interim standards
- Shore-based reception and treatment facilities
 - None available in U.S.
 - Shore-based feasibility study
- **Ballast water exchange plus treatment**
 - **Not enough data**



BWE + BWT

What is Ballast Water Exchange + Ballast Water Treatment?

How effective is BWE + BWT?

- Briski and Paolucci studies
- EPA study

Practicability and Safety Concerns



BWE + BWT

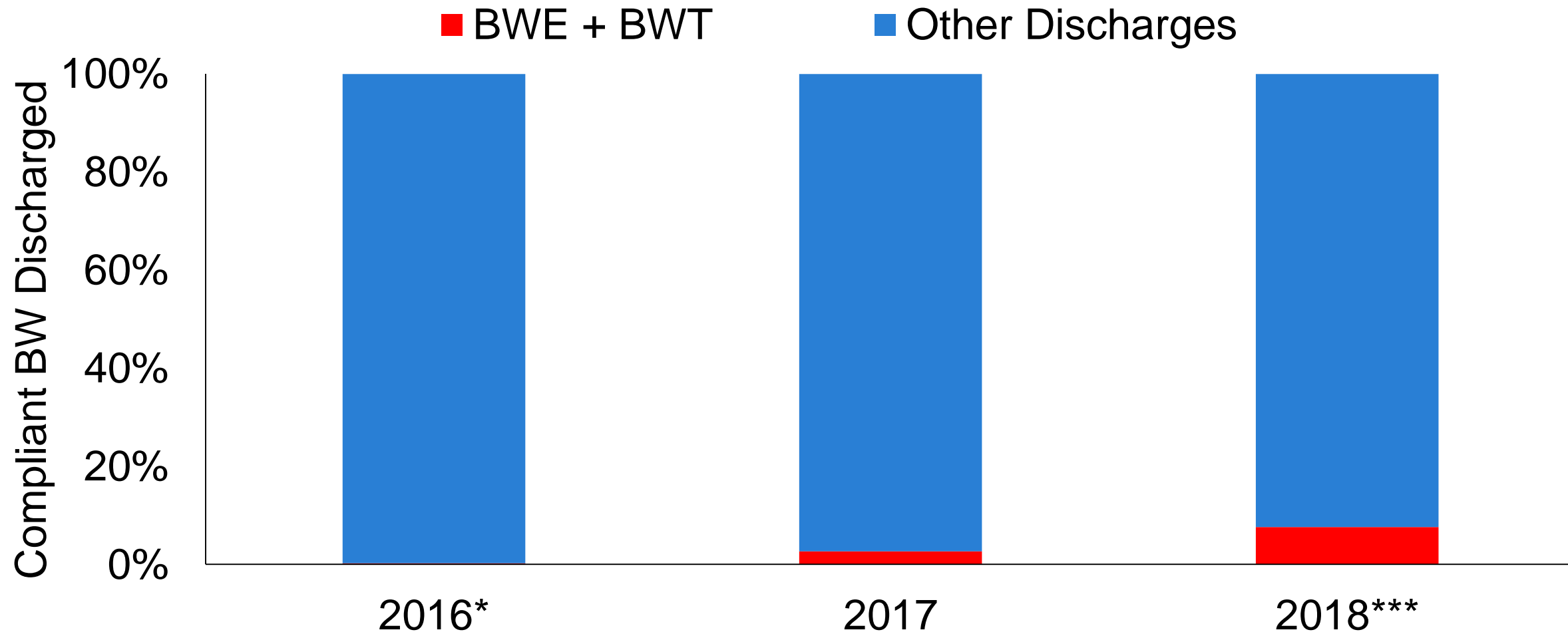
Current Requirements

- Oregon
- Great Lakes
- VIDA



BWE + BWT in California

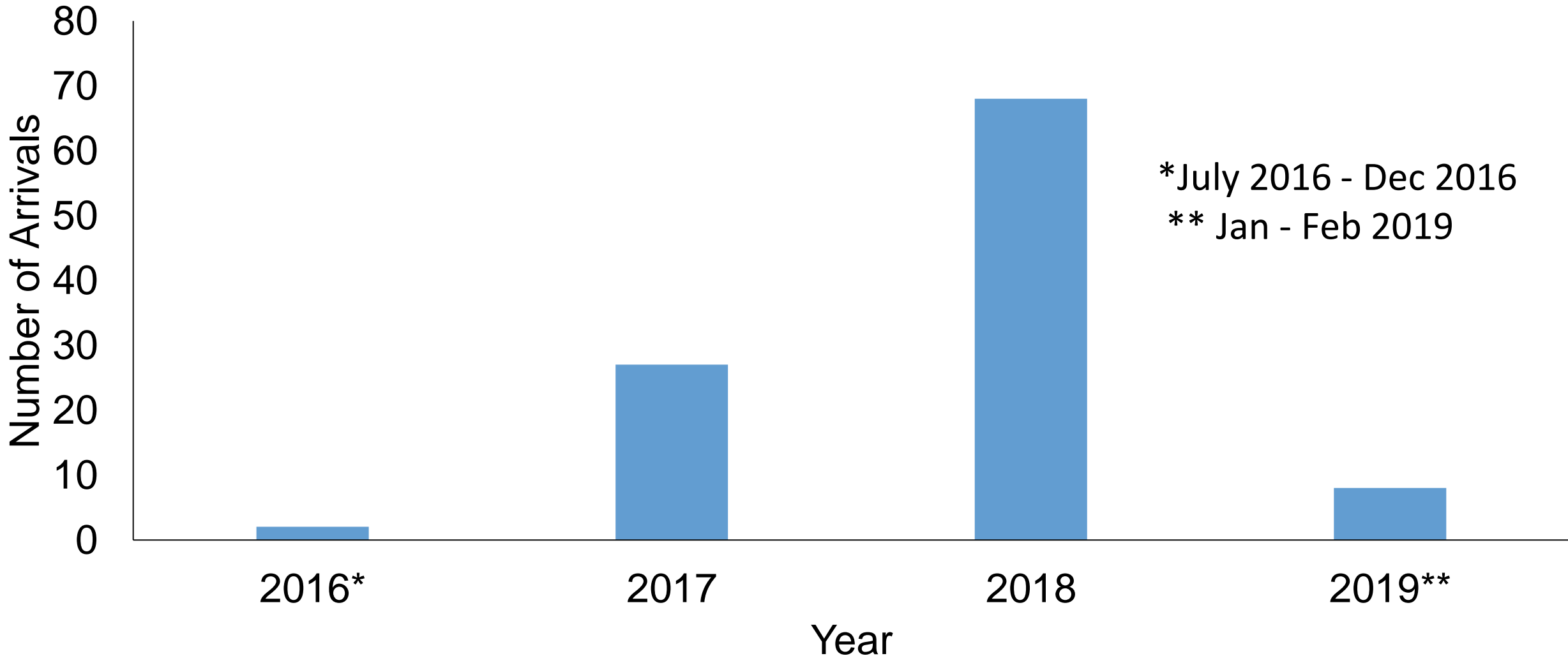
BWE + BWT as a Percent of Total Compliant BW Discharged



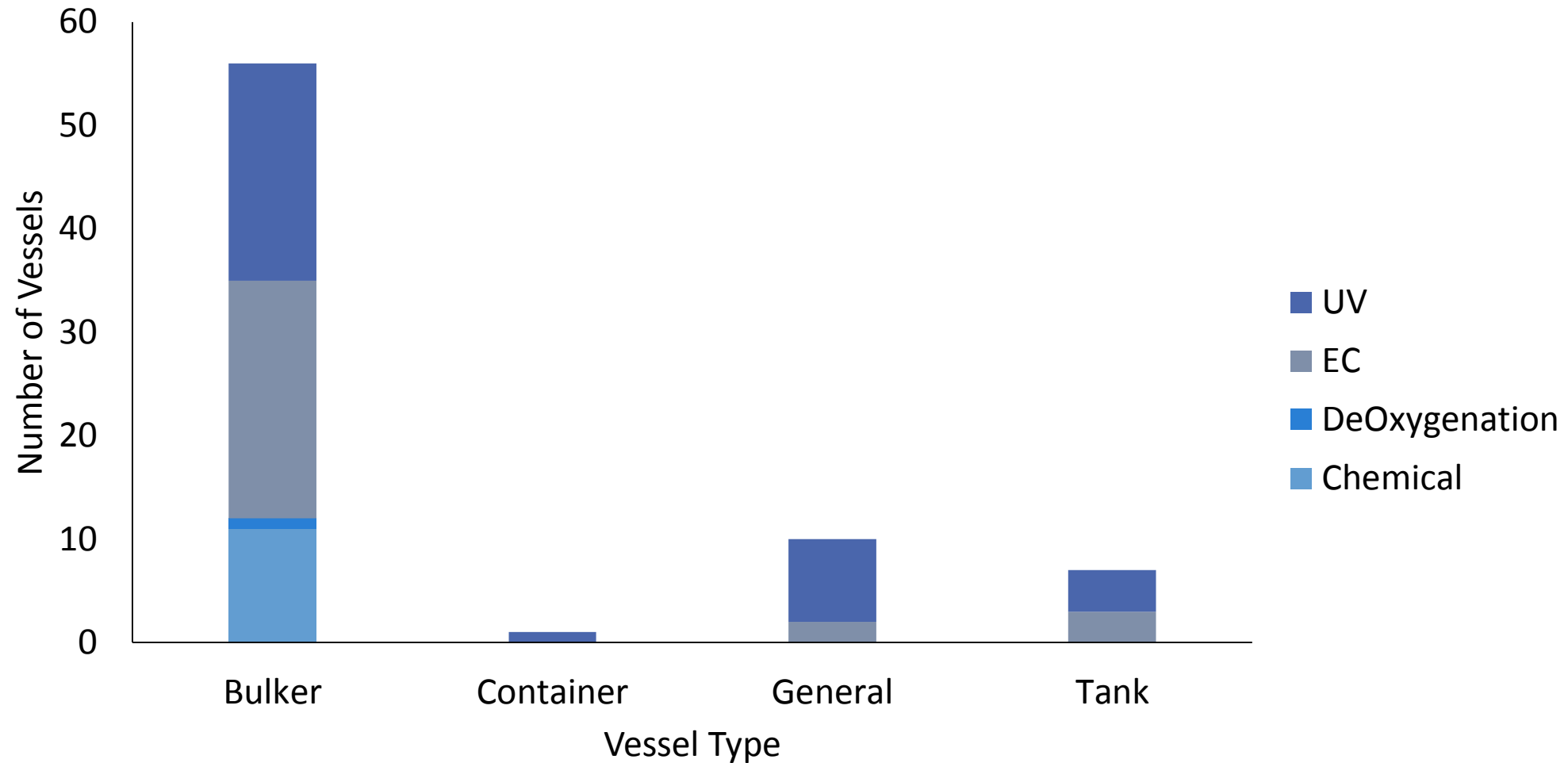
*July 2016 - Dec 2016 *** Jan - Feb 2018

BWE + BWT in California

Number of Vessel Arrivals that Reported Using BWE plus BWT



Number of Vessels that Used BWE + BWT in CA by Vessel Type and Treatment Type July 2016 thru Feb 2019



BWE + BWT in California

Why are vessels using BWE + BWT?

- Confusion about requirements
- Contingency measures



BWE + BWT

California

- Recommendations from the 2018 BW Technology Report
- Research



Thank you!

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