

# COAST Ballast Water Internship

AUGUST 17<sup>TH</sup> 2016

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MARINE INVASIVE SPECIES PROGRAM

CALIFORNIA STATE LANDS COMMISSION



# About Me

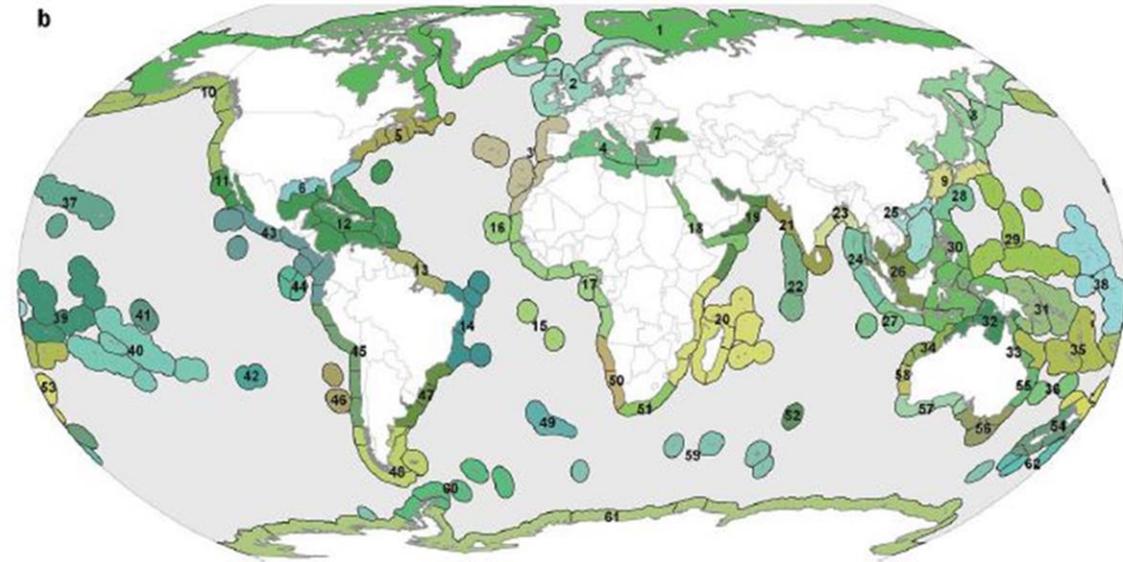
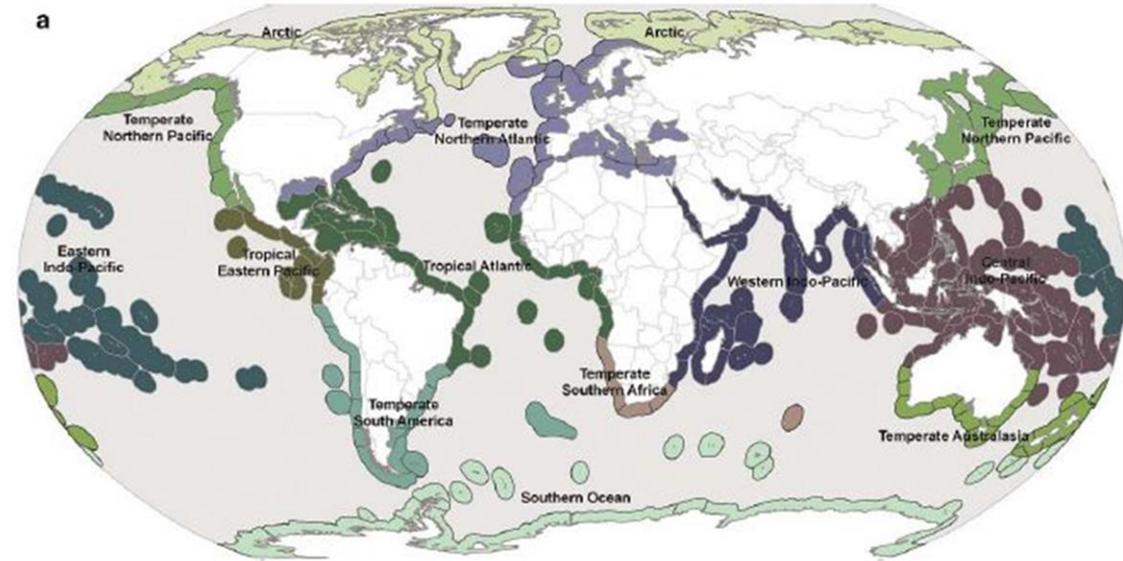
- School
  - CSU Maritime Academy 2017'
  - Maritime Policy and Management
    - Marine Science
- COAST
  - Marine Invasive Species Program
  - Ballast Water Internship





# Data Entry

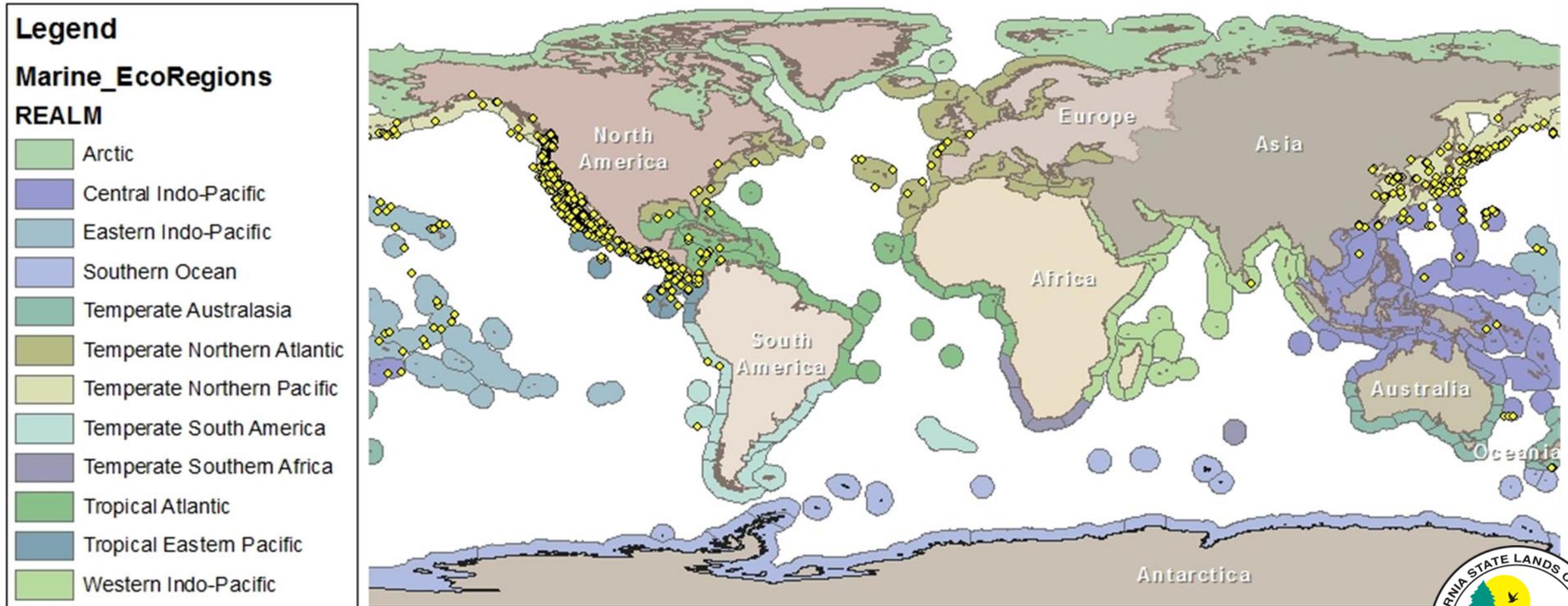
- Marine Ecoregions
  - Need for Classification
- Latitude & Longitude
- General Salinity Levels
  - Marine
  - Brackish
  - Fresh
- Other Characteristics
  - Marine Oil Terminals



Spalding, M. D., et al. (2007, July/August). Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. *Bio Science*, 57(7). doi:10.1641/B570707

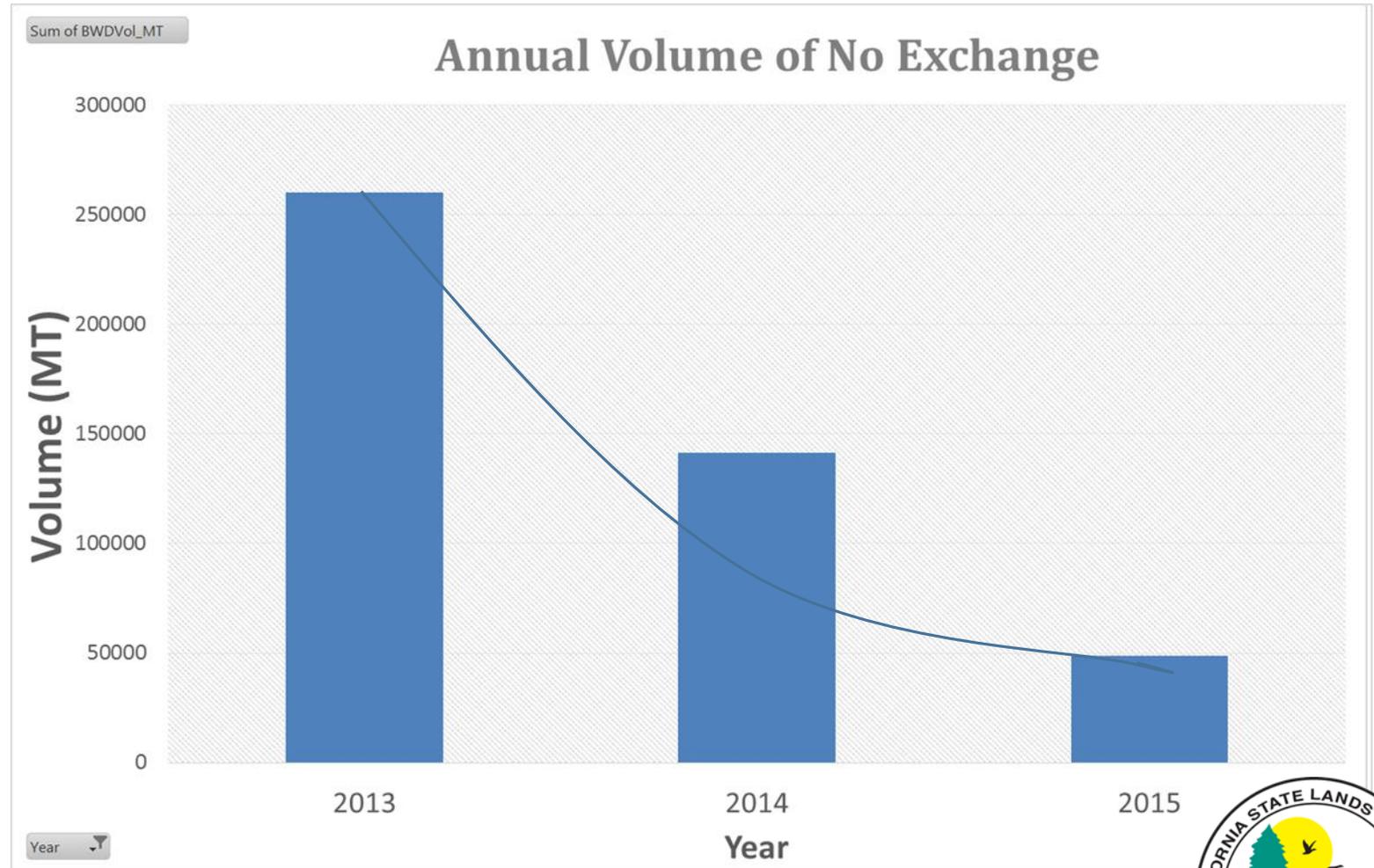


# Ballast Water Analysis

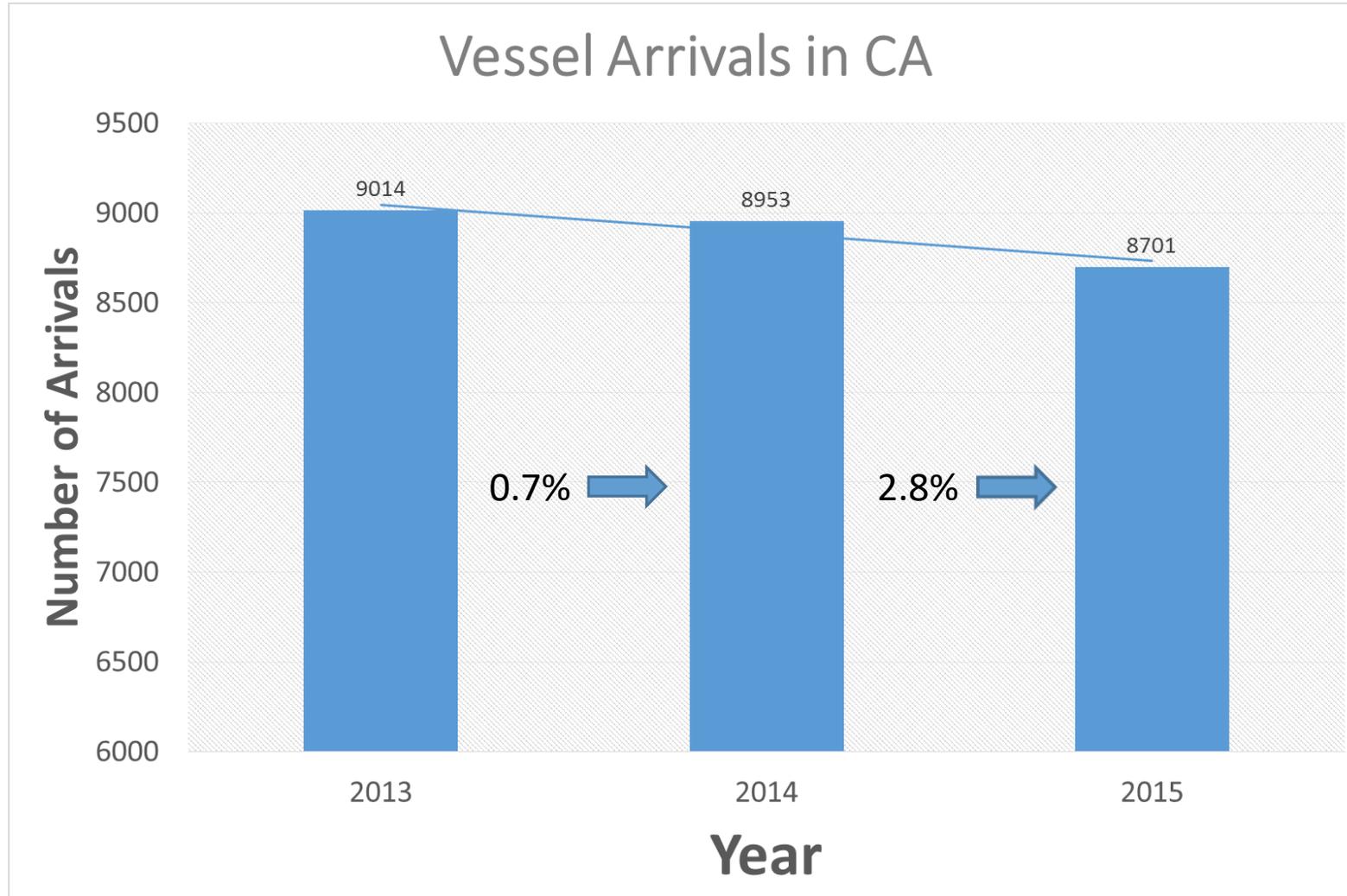


# No Exchange Trends

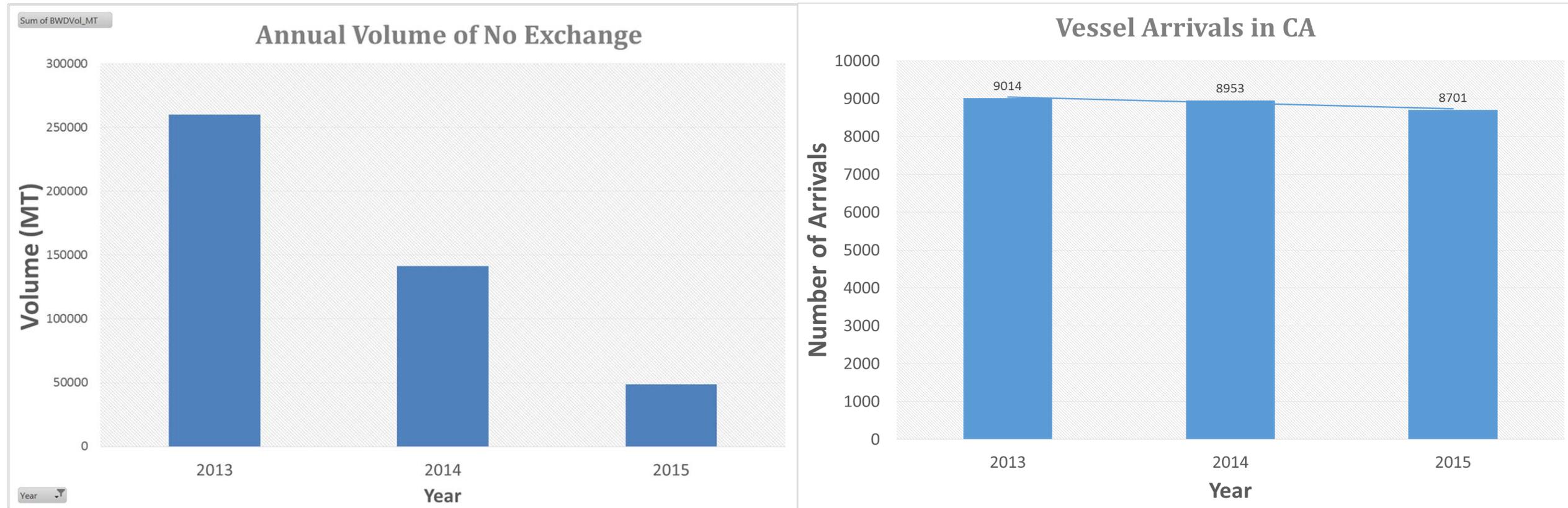
- Post PCR Establishment
- Negative Growth Trend
- 2014 Reduction
  - Almost Half of 2013
- 2015 Very Low
  - A third of 2014
- Growing Enforcement



# Commercial Activity



# Volume Discharge Vs Arrivals



# No Exchange Discharge Ports

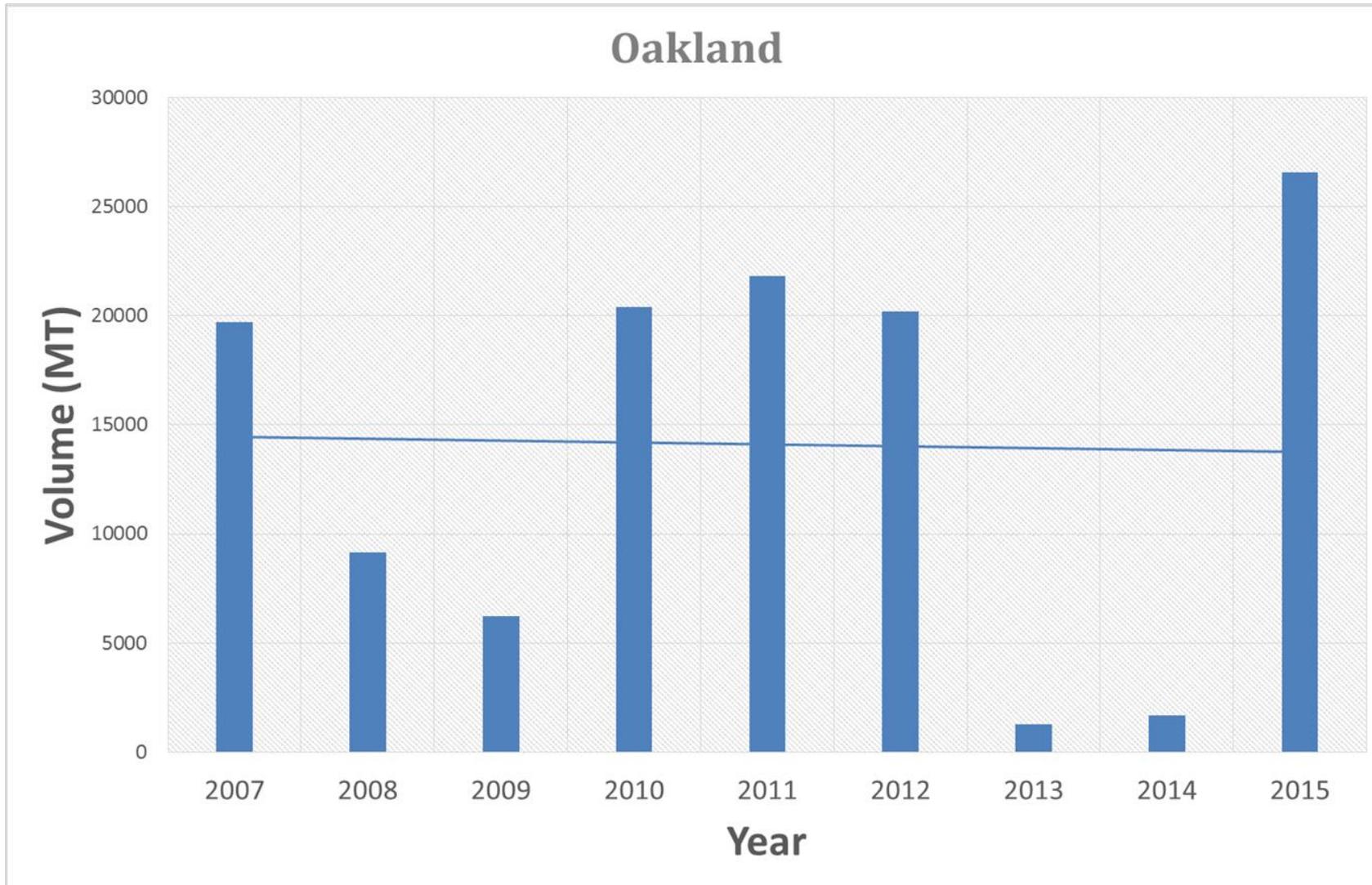
## Top 5 Ports Receiving Non-Exchanged Ballast

Avg.

- |                                  |                 |
|----------------------------------|-----------------|
| 1. Los Angeles – Long Beach..... | 70,416 MT/ Year |
| 2. Carquinez.....                | 46,784 MT/ Year |
| 3. Stockton.....                 | 39,967 MT/ Year |
| 4. Richmond.....                 | 30,446 MT/ Year |
| 5. Oakland.....                  | 14,107 MT/ Year |

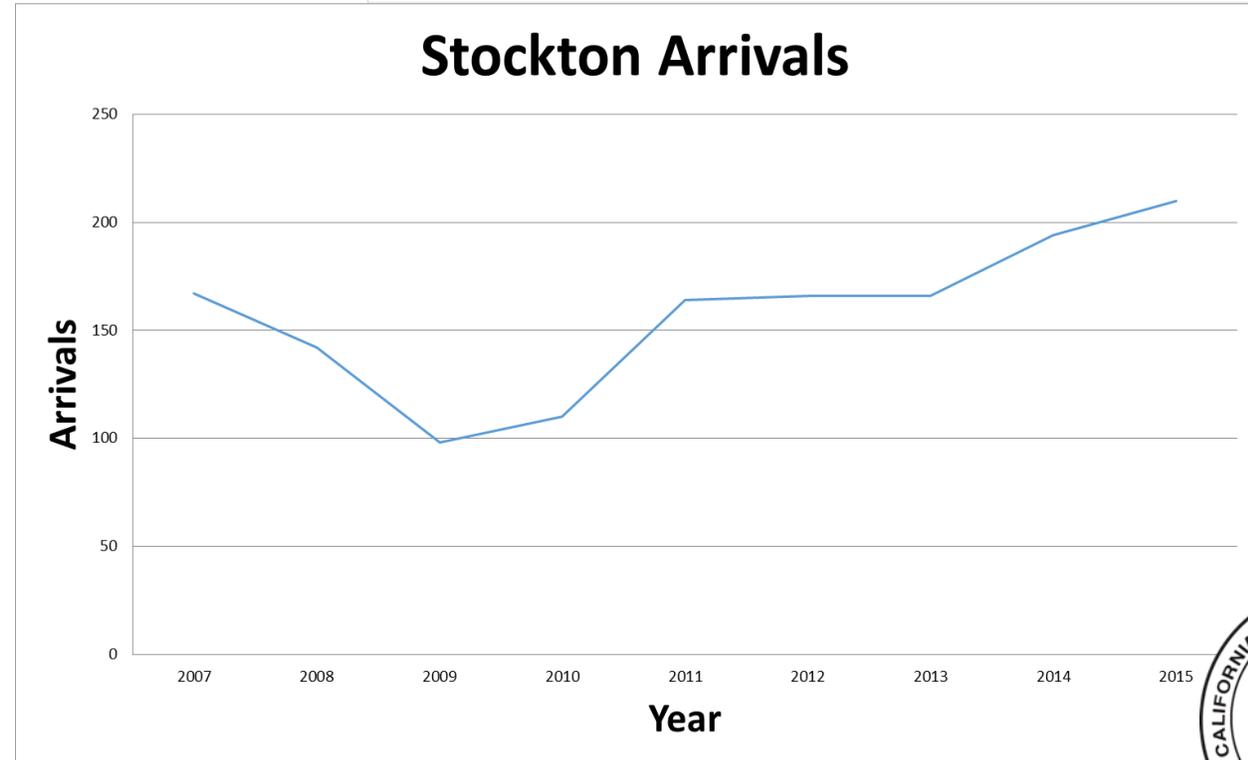
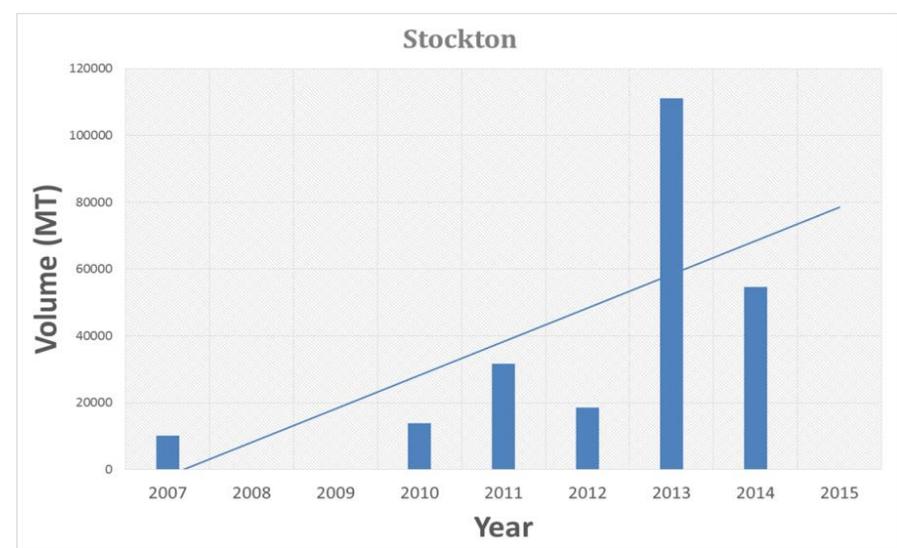


# Port Trends



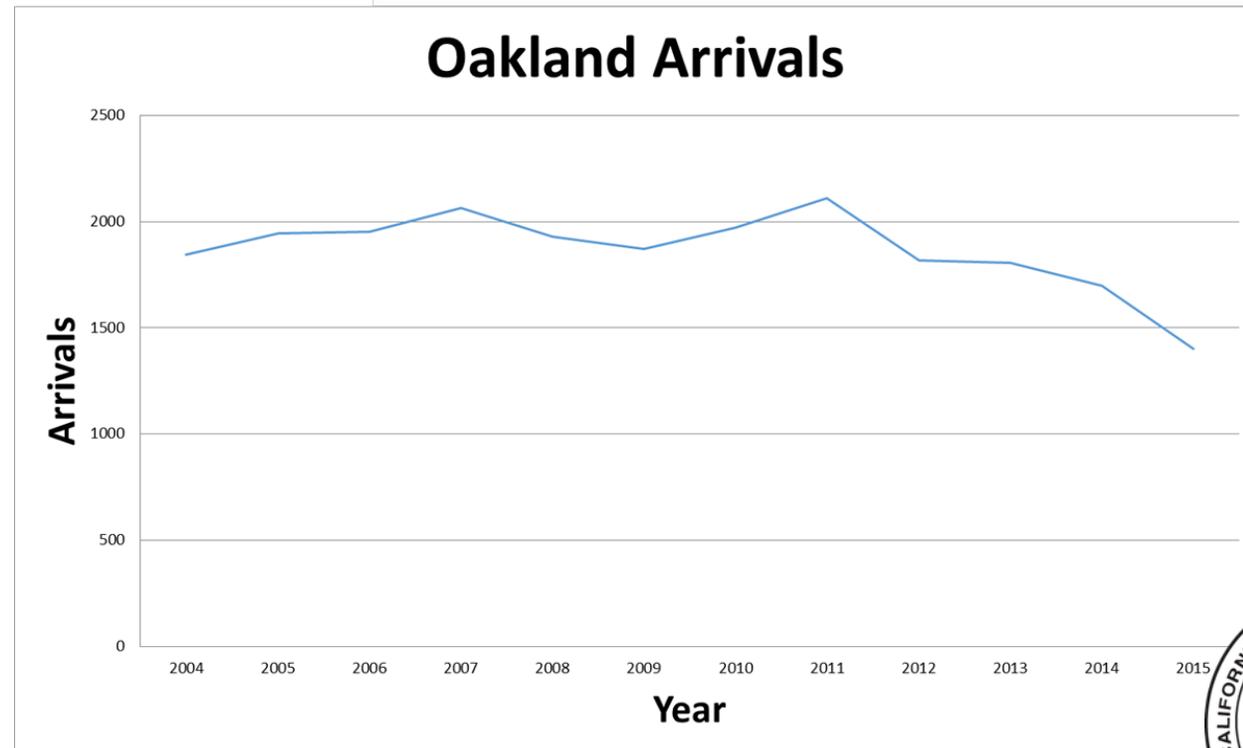
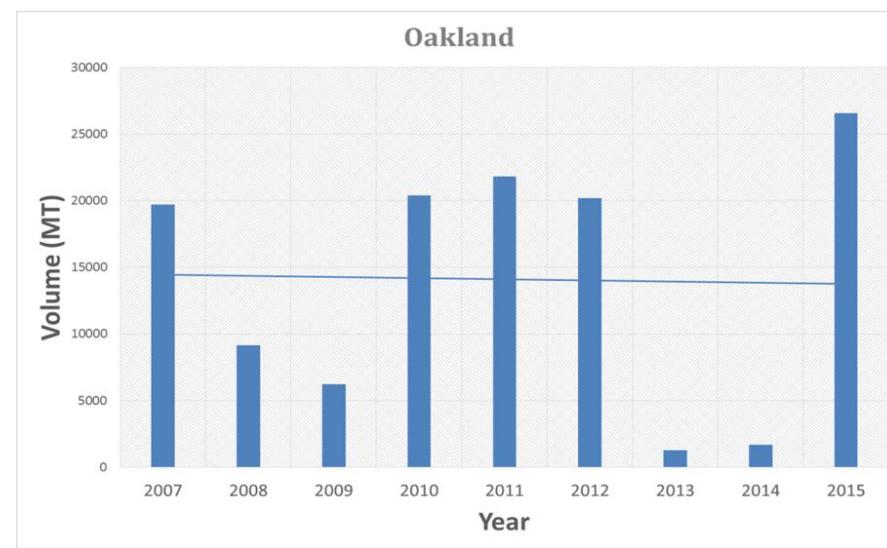
# Stockton

- No Exchange Discharge is rising
- Number of Arrivals Growing
- Mostly Bulk & Tank
- Year 2013
  - Only Three No Exchange Discharges
  - **Bulk Carrier: *Fu Kang***  
Discharged over 110,000 MT



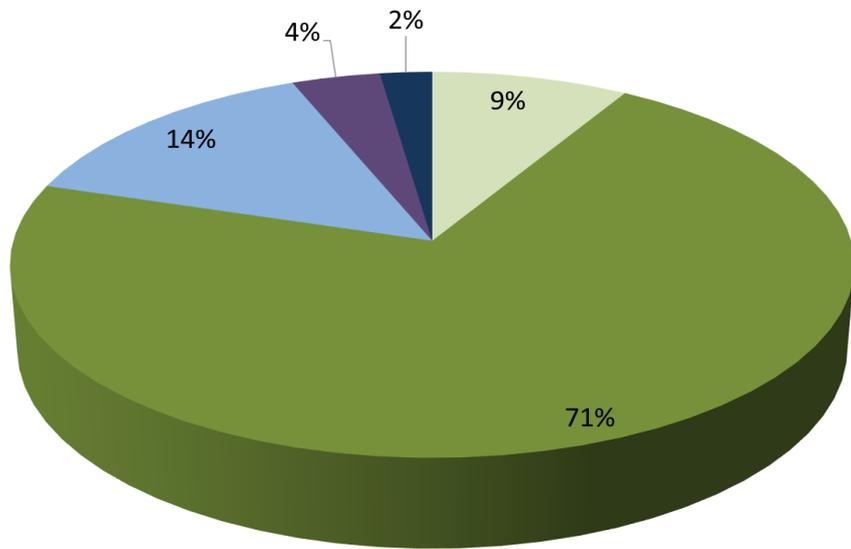
# Oakland

- No Exchange Discharge is varied
- Number of Arrivals Dropping
- Mostly Container
- Year 2015
  - Only Two No Exchange Discharges
    - **Bulk Carrier:** *Atlantic Maya* Discharged over 15,000 MT
    - **Container Ship:** *Hatsu Crystal* Discharged over 11,500 MT

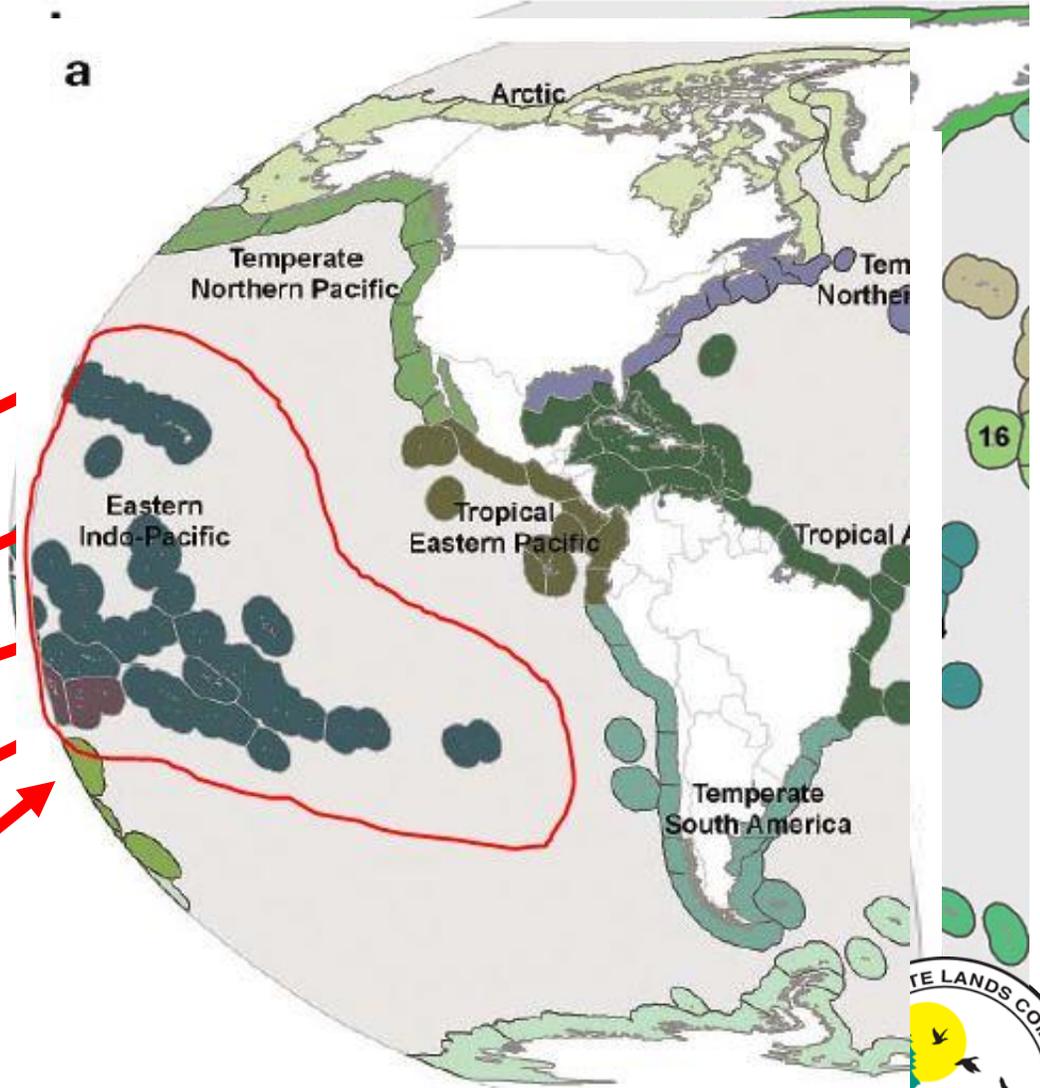


# No Exchange Source

## 2013 Source Realm

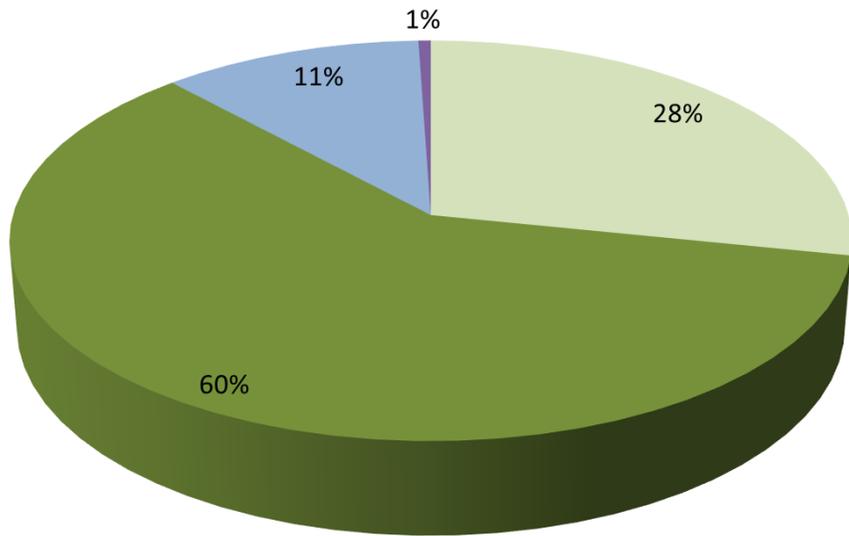


- Cold Temperate Northeast Pacific
- Warm Temperate Northeast Pacific
- Tropical East Pacific
- Cold Temperate Northwest Pacific
- Eastern Indo-Pacific



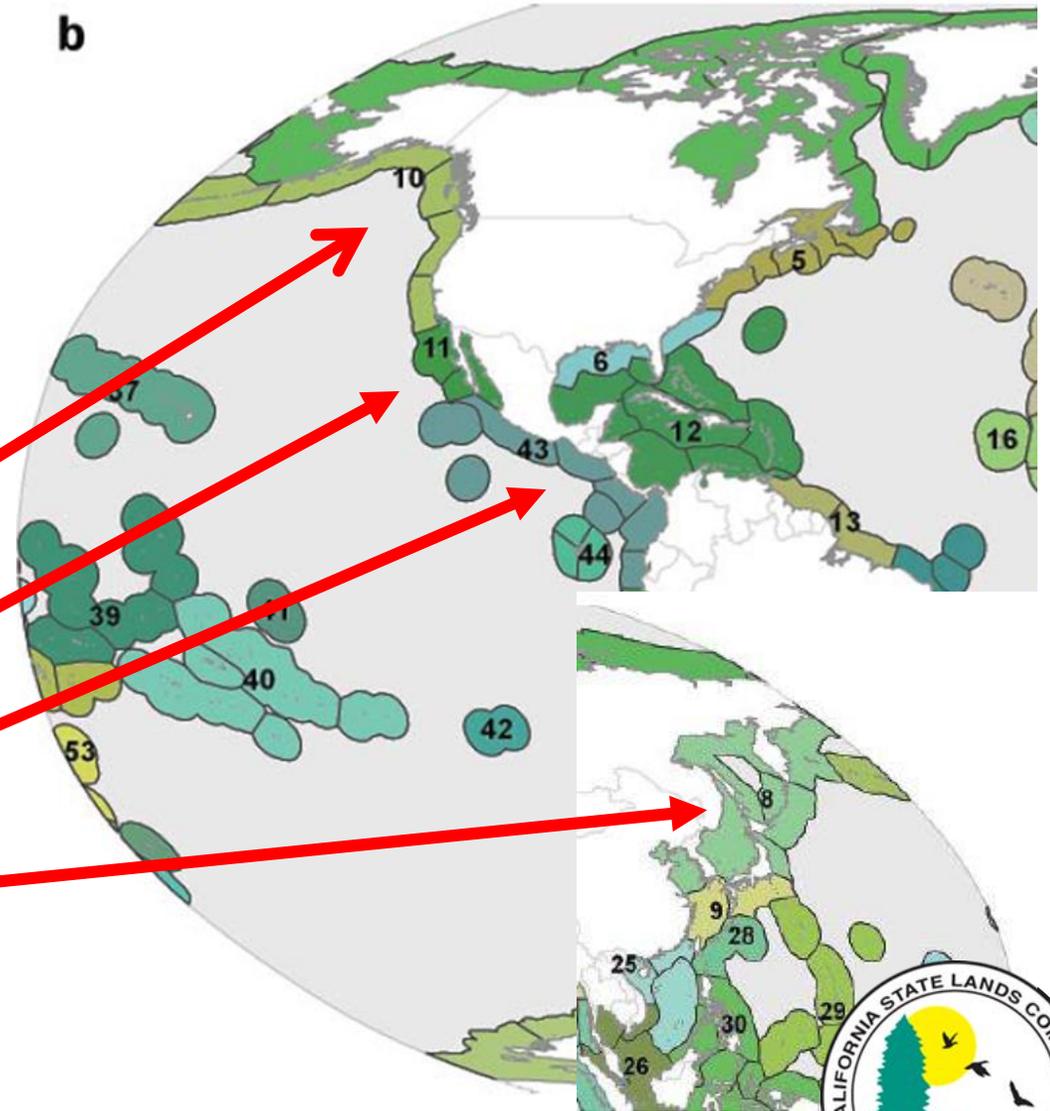
# No Exchange Source

## 2014 Source Realm

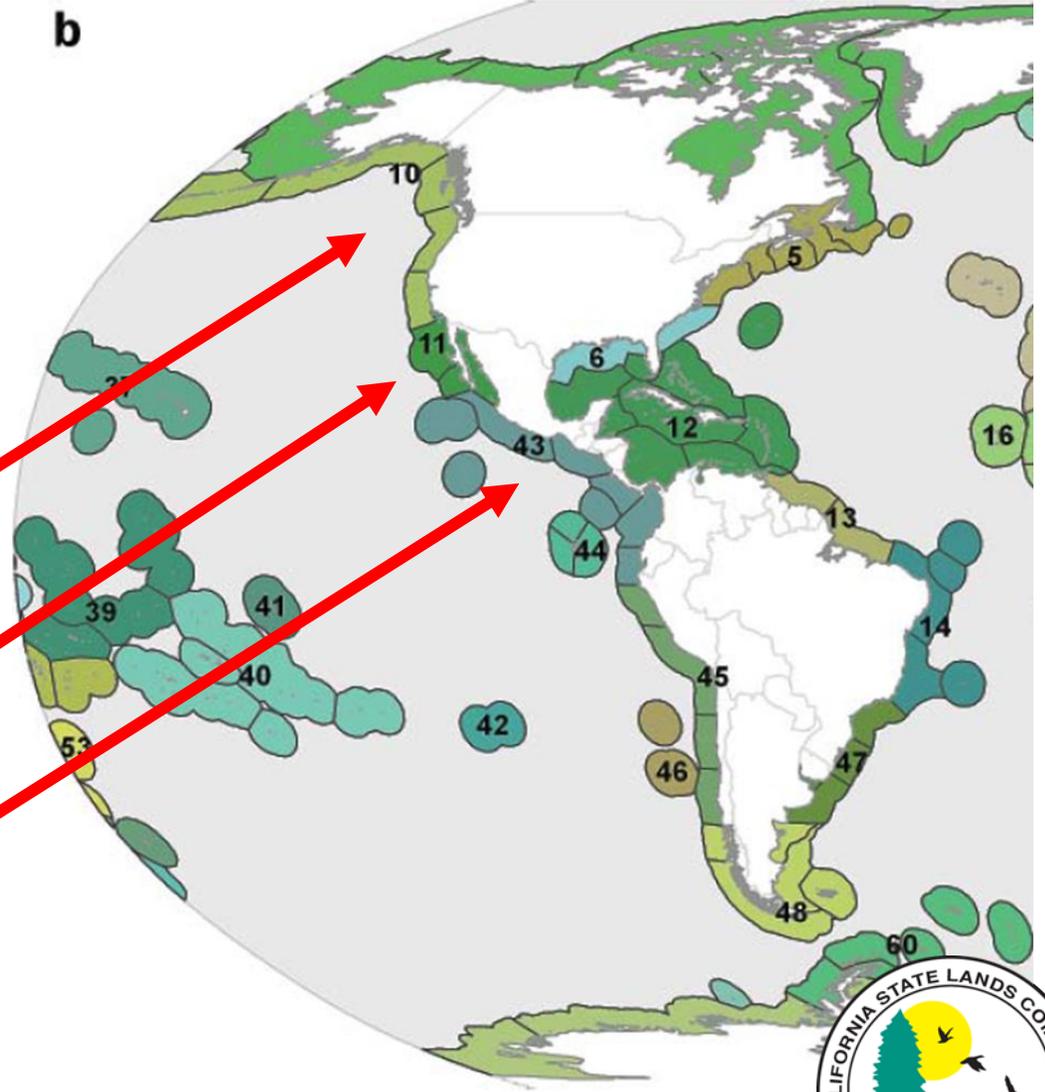
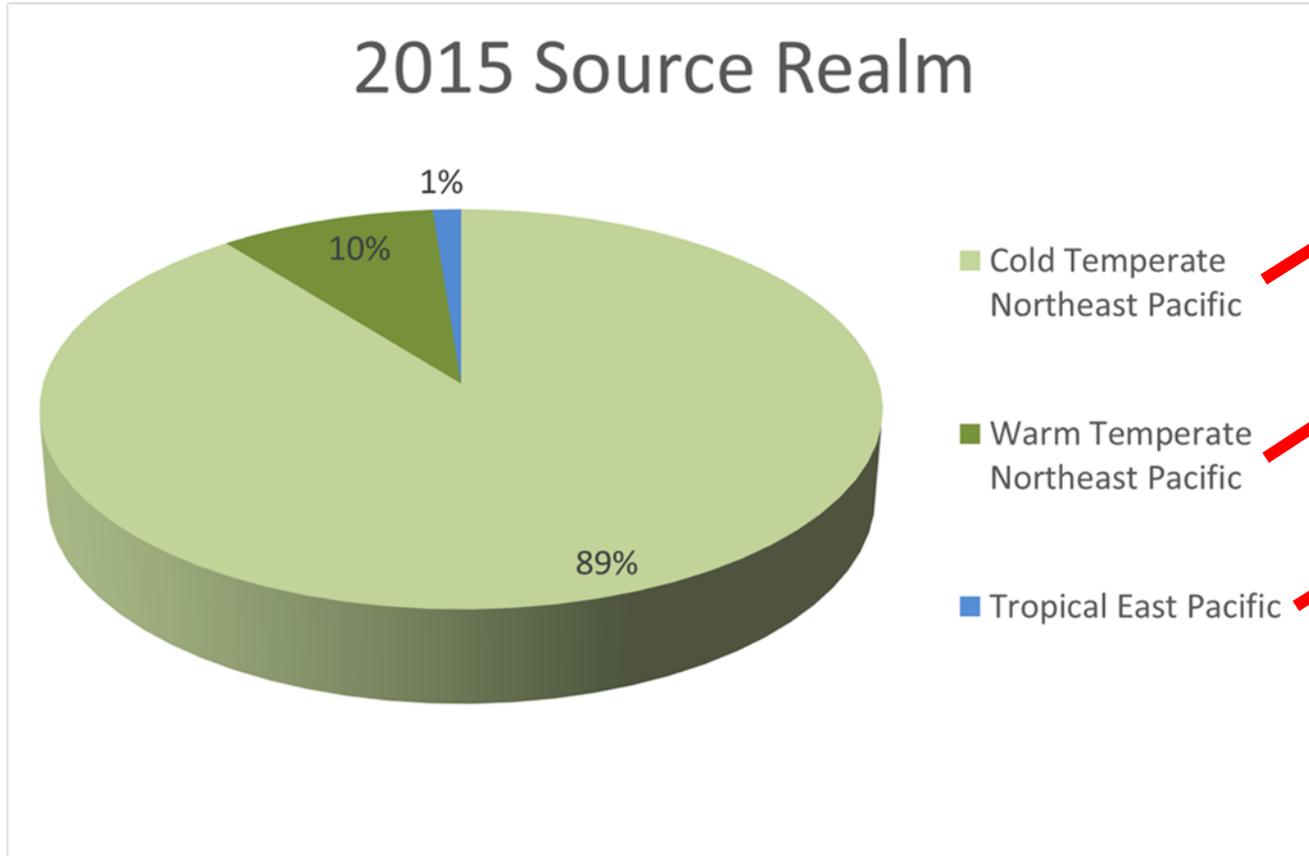


- Cold Temperate Northeast Pacific
- Warm Temperate Northeast Pacific
- Tropical East Pacific
- Cold Temperate Northwest Pacific

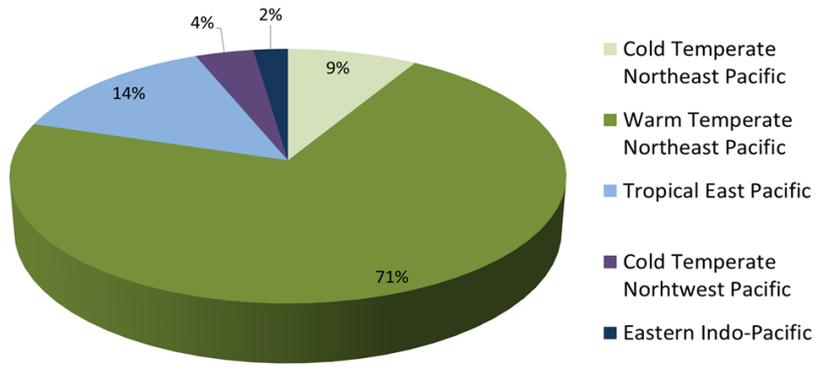
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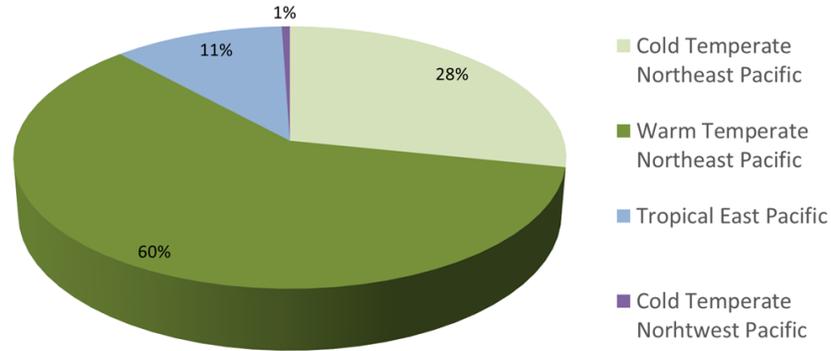
# No Exchange Source



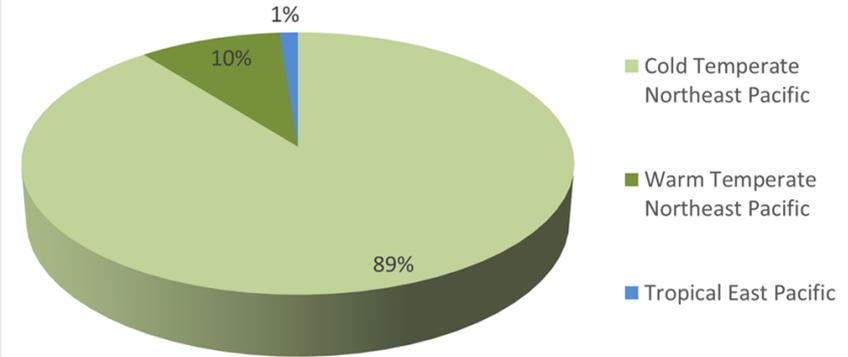
2013 Source Realm



2014 Source Realm



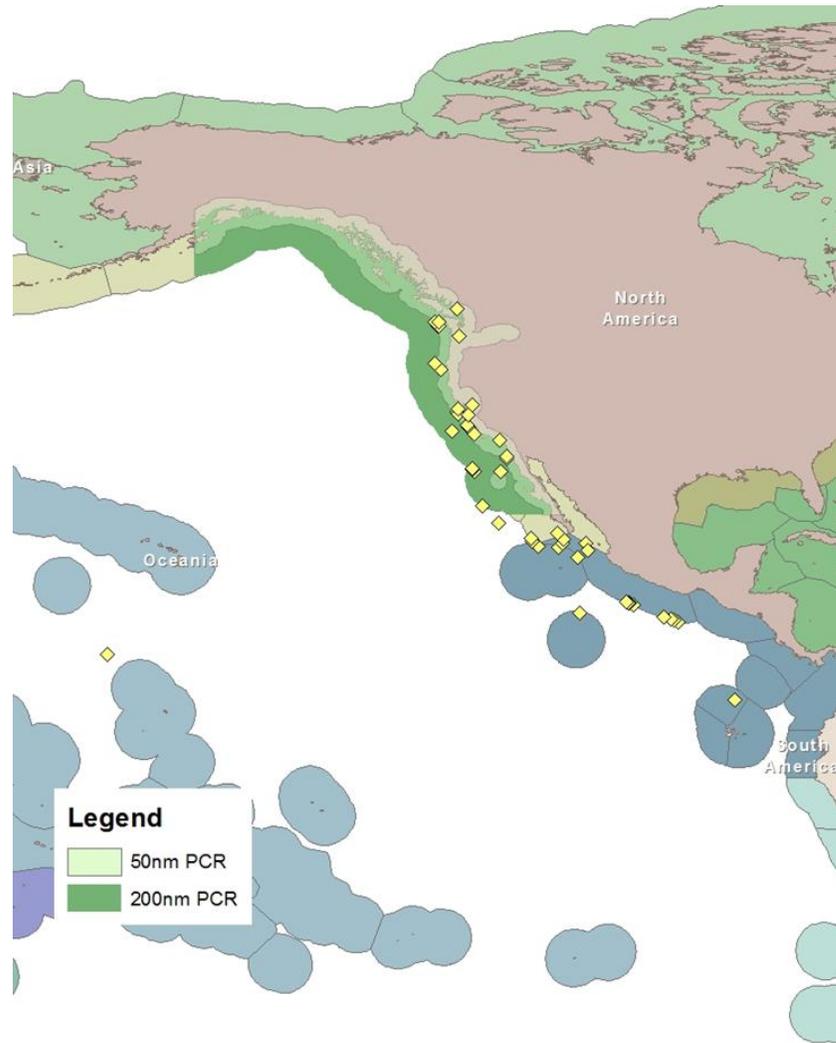
2015 Source Realm



- Cold Temperate Northeast Pacific growing
- Warm Temperate Northeast Pacific & Tropical East Pacific decreasing



2014

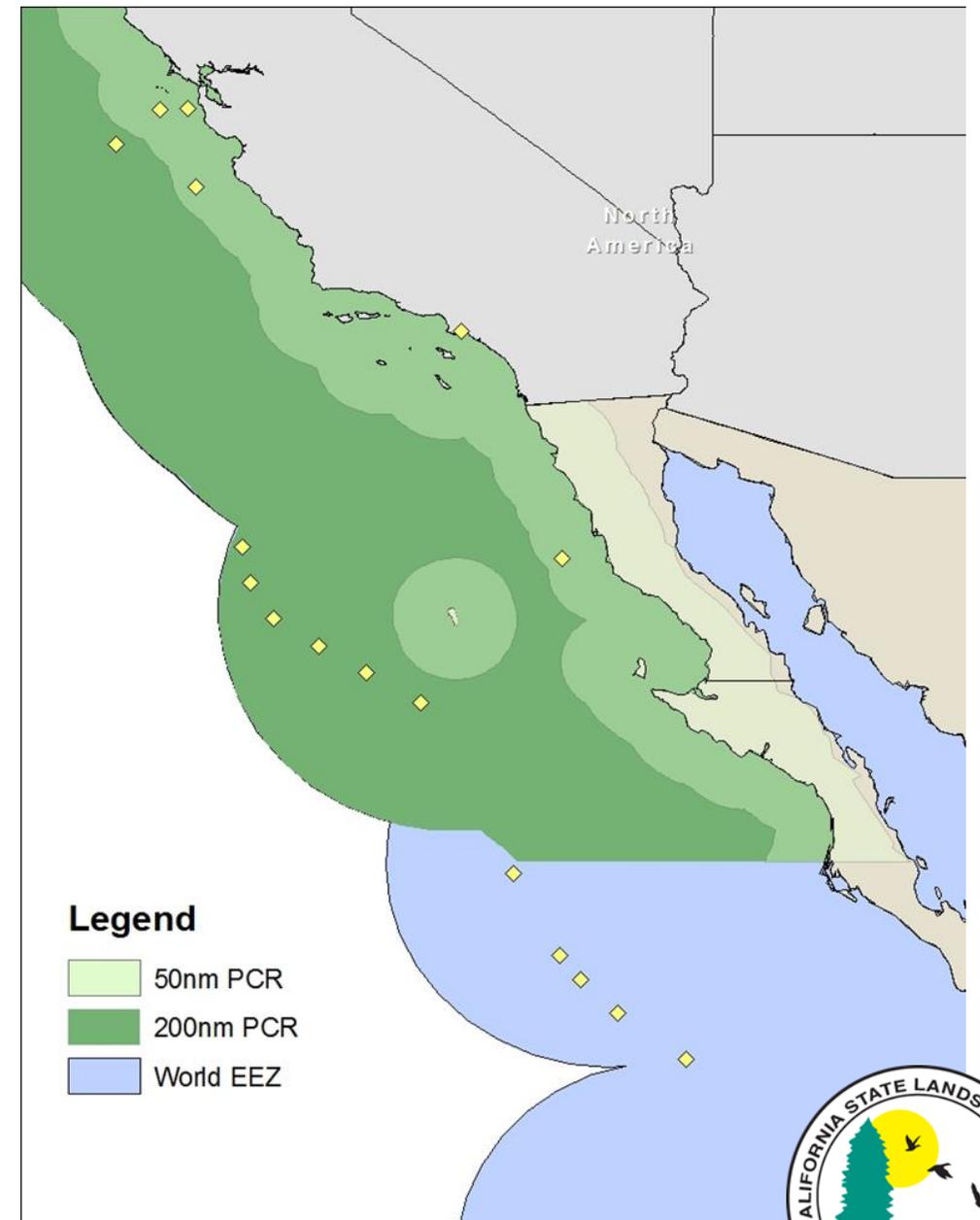


2015



# Ballast Water Findings

- Exponential decline of “No Exchange”
  - Growing levels of enforcement
- Significant amount sourced from PCR
  - Vessels unfamiliar with the rules?
  - Not considering islands?
- What’s Next?
  - Connecting BWD Location with BWS Location



# ROV Testing

## Test Sites

- 1) HSU Aquatic Center
- 2) Eureka Chevron Terminal
- 3) Trinidad Harbor



# Conclusions

- Greater enforcement → Greater compliance
  - ROV as a tool for enforcement
- Program effectiveness is growing
- The need for outreach remains
  - Small mistakes from one vessel can cause big problems



# Thank You

Any Questions?

