COAST Ballast Water Internship

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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

[Image of a bridge and a coastal scene]
Work Assignments

- Data Entry
  - Realm & Province
  - Latitude & Longitude

- Ballast Water Data Analysis
  - No Exchange Data

- ROV Testing
Data Entry

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

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

Vessel Arrivals in CA

Year

2013: 9014
2014: 8953
2015: 8701

0.7% decrease from 2013 to 2014
2.8% decrease from 2014 to 2015
Volume Discharge Vs Arrivals

**Annual Volume of No Exchange**

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>250000</td>
</tr>
<tr>
<td>2014</td>
<td>200000</td>
</tr>
<tr>
<td>2015</td>
<td>100000</td>
</tr>
</tbody>
</table>

**Vessel Arrivals in CA**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Arrivals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>9014</td>
</tr>
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<td>2014</td>
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<tr>
<td>2015</td>
<td>8701</td>
</tr>
</tbody>
</table>
## No Exchange Discharge Ports

<table>
<thead>
<tr>
<th>Top 5 Ports Receiving Non-Exchanged Ballast</th>
<th>Avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Los Angeles – Long Beach</td>
<td>70,416 MT/ Year</td>
</tr>
<tr>
<td>2. Carquinez</td>
<td>46,784 MT/ Year</td>
</tr>
<tr>
<td>3. Stockton</td>
<td>39,967 MT/ Year</td>
</tr>
<tr>
<td>4. Richmond</td>
<td>30,446 MT/ Year</td>
</tr>
<tr>
<td>5. Oakland</td>
<td>14,107 MT/ Year</td>
</tr>
</tbody>
</table>
Port Trends

![Port Trends Diagram](image)
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: 71%
- Warm Temperate Northeast Pacific: 14%
- Tropical East Pacific: 9%
- Cold Temperate Northwest Pacific: 4%
- Eastern Indo-Pacific: 2%
No Exchange Source

2014 Source Realm

- Cold Temperate Northeast Pacific: 60%
- Warm Temperate Northeast Pacific: 28%
- Tropical East Pacific: 11%
- Cold Temperate Northwest Pacific: 1%
No Exchange Source

2015 Source Realm

- Cold Temperate Northeast Pacific: 89%
- Warm Temperate Northeast Pacific: 10%
- Tropical East Pacific: 1%
- Cold Temperate Northeast Pacific growing
- Warm Temperate Northeast Pacific & Tropical East Pacific decreasing
2014

2015

Legend
- 50nm PCR
- 200nm PCR

Legend
- 50nm PCR
- 200nm PCR
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?