An Overview of the Hull Husbandry Practices and Fouling-Related Voyage Characteristics of California’s Commercial Fleet

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Prevention First, October 20, 2010
Ship Biofouling in CA
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Assembly Bill 433
- Added PRC Section 71210.5
- Required CSLC to evaluate non-ballast water vessel vectors
  - Essentially fouling of vessel hulls, sea chests, gratings, propellers, etc.
  - In consultation with Technical Advisory Group
  - Prepare report on or before March 1, 2006
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Fouling Technical Advisory Group

Information Sharing | Recommendation Development

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Meeting #2</th>
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<th>Meeting #4</th>
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<td>May 11, 2005</td>
<td>August 3</td>
<td>October 13</td>
<td>December 19</td>
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- Presentations/Discussion
  - Information sharing inclusive of recreational fouling

- Discussion:
  - Focus on commercial vessels
  - Fouling risk factors
  - Commercial vessel maintenance frameworks

- Potential management frameworks for CA:
  - Research?
  - Regulations?
  - Best Management Practices?

- Potential Management Frameworks
  - Pros?
  - Cons?
  - Areas of Agreement
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2006 Legislative Report

- Lack of data, especially for U.S. Pacific coast
- Limited information on hull husbandry practices
- Requested authority to fill information gaps
Assembly Bill 740 (2007)

- Defined “regular removal” of fouling organisms
- In-water cleaning must use best available technology economically achievable
- Expanded CSLC authority
  - Fill information gaps
    - Fund targeted research
    - Collect hull husbandry data
  - Develop and adopt regulations
    - By January 1, 2012
    - In consultation with TAG
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Hull Husbandry Reporting Form

- Developed in consultation with TAG (Dec 2007)
- Distributed to industry Jan 2008
- Mandatory annual submission
- Eleven questions
- Two sections:
  - Hull husbandry information
  - Voyage characteristics
HHRF Submission Compliance

Percent Compliance

- Auto
- Bulk
- Container
- General
- Other
- Passenger
- Tank
- Unmanned barge

- 2008
California Vessel Population

### 2008
- Container: 32.8%
- Bulk: 15.4%
- Tank: 25.1%
- Auto: 14.1%
- General: 7.2%
- Passenger: 3.4%
- Unmanned: 1.2%
- Barge: 0.8%
- Other: 0.8%

### *2009*
- Container: 30.2%
- Bulk: 20.1%
- Tank: 23.8%
- Auto: 11.1%
- General: 9.1%
- Passenger: 2.8%
- Unmanned: 1.4%
- Barge: 1.5%
- Other: 1.5%
Hull Husbandry Information
Vessels dry docked or delivered within each of the past 5 years

- Less than 1 year: 37.5%
- 1 to less than 2 years: 29.0%
- 2 to less than 3 years: 17.0%
- 3 to less than 4 years: 9.4%
- 4 to less than 5 years: 6.3%
- 5 or more years: 0.6%
Per Ship Antifouling Coating Use

- 3.43%
- 3.02%
- 3.66%
- 3.83%

- 86.06%
Percent of Vessels within Class with MGPS Installed

Overall 50 – 65%
9.2% of entire fleet IWC since DD/Delivery
Hull Husbandry Practices Overview

• Majority dry docked or delivered within past 2 years

• 86% of vessels used strictly biocidal AF
  – 7.5% used biocide-free AF

• 50-65% of vessels utilizing MGPS

• 10% cleaned IW since DD/Delivery
  – Including 25% of Passenger vessels
  – 6.54% were cleaned in CA waters
Voyage Characteristics
Mean Traveling Speed (knots)

Overall = 16.1 knots
Mean Port Residency Time (days)
Traveling Speed and Port Residency

- Auto, Container, & Passenger vessels all exhibited characteristics thought to result in lower potential for fouling accumulation
  - Travel at elevated speeds (16.8 knots and greater)
  - Short port residency times (average 1.06 days or shorter)

- Bulkers, and ‘Other’ vessels all exhibited characteristics thought to result in greater potential for fouling accumulation
  - Travel at slower speeds (averaged 13.3 knots or slower)
  - Long port residency times (average 3.2 days or greater)
Total Number of Extended Layups by Duration

- 2008:
  - 500+ days: 300
  - 300-499 days: 100
  - 200-299 days: 100
  - 100-199 days: 80
  - 70-99 days: 60
  - 60-69 days: 50
  - 50-59 days: 40
  - 40-49 days: 30
  - 30-39 days: 20
  - 20-29 days: 10
  - 10-19 days: 5

- 2009:
  - 500+ days: 350
  - 300-499 days: 250
  - 200-299 days: 200
  - 100-199 days: 180
  - 70-99 days: 120
  - 60-69 days: 110
  - 50-59 days: 90
  - 40-49 days: 80
  - 30-39 days: 70
  - 20-29 days: 60
  - 10-19 days: 50
Percent Increase in Per Capita Extended (10+ day) Layups

Overall = 21.6%
Percent Increase in Per Capita Layups of Specific Durations Reported in 2008 and 2009
Extended Layups Overview

• Large increase in the total number of 10+ day layups
  – 21.6% on per capita basis
  – Most pronounced in Auto Carriers (360% increase), Unmanned Barges (150%), Container Vessels (84%)

• Large increase in layups of various durations
  – Most pronounced in 500+ day, 70-99 day, and 60-69 day layups
What the Hull is Going on With CA Fleet?

• Majority of fleet recently (2-3 years) dry docked or delivered (i.e. young AF coatings)

• Speeds and port residency times suggest potential gradient of perceived risk of fouling accumulation

• Large increases in number and duration of extended layups
  – Especially for Auto, Container vessels, Unmanned Barges
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- MISA
- TAG Report
- AB740 HHRF dev
- HHRF data collection/analysis
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Aquatic Bioinvasions Research and Policy Institute – Research
Ship Biofouling in CA


MISA  TAG  Report  AB740 HHRF dev  HHRF data collection/analysis

Aquatic Bioinvasions Research and Policy Institute – Research

Technical Advisory Group
Ship Biofouling in CA

- 2003: MISA
- 2004: TAG
- 2005: Report
- 2006: AB740
- 2007: HHRF dev
- 2008: HHRF data collection/analysis
- 2009: Aquatic Bioinvasions Research and Policy Institute – Research
- 2010: Technical Advisory Group
- 2011: OAL Rulemaking
- 2012: California Code of Regulations
Thank You

For more information:
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Niche areas on a commercial vessel where biofouling can accumulate.