<table>
<thead>
<tr>
<th>Location</th>
<th>% of NIS Associated with Biofouling</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>42.6 %</td>
<td>Hewitt and Campbell 2010</td>
</tr>
<tr>
<td>California</td>
<td>up to 60%</td>
<td>Ruiz et al. 2011</td>
</tr>
<tr>
<td>Hawaii</td>
<td>74%</td>
<td>Eldredge &amp; Carlton, 2002</td>
</tr>
<tr>
<td>North America (USA)</td>
<td>70%</td>
<td>Fofonoff et al., 2003</td>
</tr>
<tr>
<td>Japan</td>
<td>42%</td>
<td>Otani 2006</td>
</tr>
<tr>
<td>Brazil</td>
<td>90%</td>
<td>Farrapeira et al., 2011</td>
</tr>
<tr>
<td>New Zealand</td>
<td>69%</td>
<td>Cranfield et al., 1998</td>
</tr>
<tr>
<td>Port Phillip Bay, Australia</td>
<td>78%</td>
<td>Hewitt, et al., 1999, 2004</td>
</tr>
<tr>
<td>Australia (national port surveys)</td>
<td>59%–69%</td>
<td>Hewitt and Campbell 2010</td>
</tr>
<tr>
<td>North Sea</td>
<td>&gt; 50%</td>
<td>Gollasch, 2002</td>
</tr>
<tr>
<td>Scotland</td>
<td>59%</td>
<td>Ashton et al. 2006</td>
</tr>
</tbody>
</table>
Hull biofouling = Drag = Fuel consumption = $$$$
Solution: Biofouling Management

Proactive Management

Reactive Management
Hull Husbandry Reporting Form

California State Lands Commission
Marine Invasive Species Program
Hull Husbandry Reporting Form
Public Resources Code – 71265(e) and 71265(f)
June 6, 2008
Part I: Reporting Form

Vessel Name:
Official / IMO Number:
Responsible Officer’s Name and Title:
Date Submitted (Day/Month/Year):

Hull Husbandry Information

1. Since delivery, has this vessel ever been removed from the water for maintenance?
   Yes [ ] No [ ]
   a. If Yes, enter the date and location of the most recent out-of-water maintenance:
      Last date out of water (Day/Month/Year):
      Port or Position: __________________________ Country: __________________________
   b. If No, enter the delivery date and location where the vessel was built:
      Delivery date (Day/Month/Year):
      Port or Position: __________________________ Country: __________________________

2. Were the submerged portions of the vessel coated with an anti-fouling treatment or coating during the out-of-water maintenance or shipbuilding process listed above?
   Yes, full coat applied [ ]
   Yes, partial coat [ ] Date last full coat applied (Day/Month/Year):
   No coat applied [ ] Date last full coat applied (Day/Month/Year):

3. For the most recent full coat application of anti-fouling treatment, what type of anti-fouling treatment was applied and to which specific sections of the submerged portion of the vessel was it applied?
   Manufacturer/Company:
   Product Name:
   Applied on (Check all that apply): Hull Sides Hull Bottom Sea Chests
   Sea Chest Gratings Propeller Rope Guard/Propeller Shaft
   Previous Docking Blocks Thrusters Rudders Bilge Keels

Florrl and Coutts (2009)
Antifouling System Strategy

Disclaimer: No Endorsement Implied
Antifouling System Strategy

![Graph showing the percentage of vessels employing AFSS strategies from 2008 to 2013.](image)

The graph displays the percentage of vessels employing AFSS strategies from 2008 to 2013. Key strategies include:

- **Unknown**
- **Other Strategies**
- **FR and Biocidal**
- **Foul Release Only**
- **Biocidal Coating Only**

The data indicates a consistent high percentage of vessels using **Biocidal Coating Only** from 2008 to 2013, with a slight variation in other strategies over the years.
In-Water Cleaning
In-Water Cleaning In and Around LA-LB

![Graph showing the number of vessels undergoing in-water cleaning in LA-LB each year from 2007 to 2012. The graph uses different colors to represent different cleaning strategies: Unknown, Other Strategies, FR and Biocidal, Foul Release Only, and Biocidal Coating Only. The data shows a decline in the number of vessels undergoing cleaning over the years.]
Biofouling Research
2007 Amendments to CA Marine Invasive Species Act (AB 740)

- Statutory mandate to develop biofouling management regulations
- Fill information gaps
  - Hull husbandry practices of vessels operating in California
  - Patterns of biofouling among ships and ship types
  - Patterns of biofouling among different surfaces of a ship
Regulation Development Process
Draft Regulations – Main Components

- Biofouling Management Plan
- Biofouling Record Book
- Hull and Niche Area Management – Technology-based, best practices
- Provision for excessive biofouling
- Extended Residency Periods
In-Water Cleaning

Benefits

$ Drag $
Come Back After Lunch

11:30 - 1:00  BUFFET LUNCH
1:00 - 3:00  AFTERNOON BREAKOUT SESSIONS

A Collaborative Panel Discussion on
The Present and Future of Regulating In-Water Hull Cleaning in California
Moderator: Chris Scianni, California State Lands Commission
Paul Hann, California State Water Resources Control Board
Jenny Newman, Los Angeles Regional Water Quality Control Board
David Elias, San Francisco Bay Regional Water Quality Control Board
Dylan Porter, Port of Long Beach
Richard Barta, Muldoon Marine Services
Kathryn Kelley, U.S. Environmental Protection Agency
Eugene Georgiades, Ph.D., New Zealand Ministry for Primary Industries

3:00 - 4:00  DOOR PRIZE DRAWING IN TECHNOLOGY EXHIBITION
Thank You

chris.scianni@slc.ca.gov

California’s Marine Invasive Species Program
Website:
www.slc.ca.gov
Click “Divisions” Tab,
“Marine Facilities Division” link, and
“Marine Invasive Species Program” link