

Antifouling coatings used on vessels arriving at California ports

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Biofouling

- Well known for quite sometime, but not until recently studied as a vector for nonindigenous species (NIS) introductions
- Responsible for up to 60% of currently established NIS in California's coastal and estuarine waters (Ruiz et al. 2011)

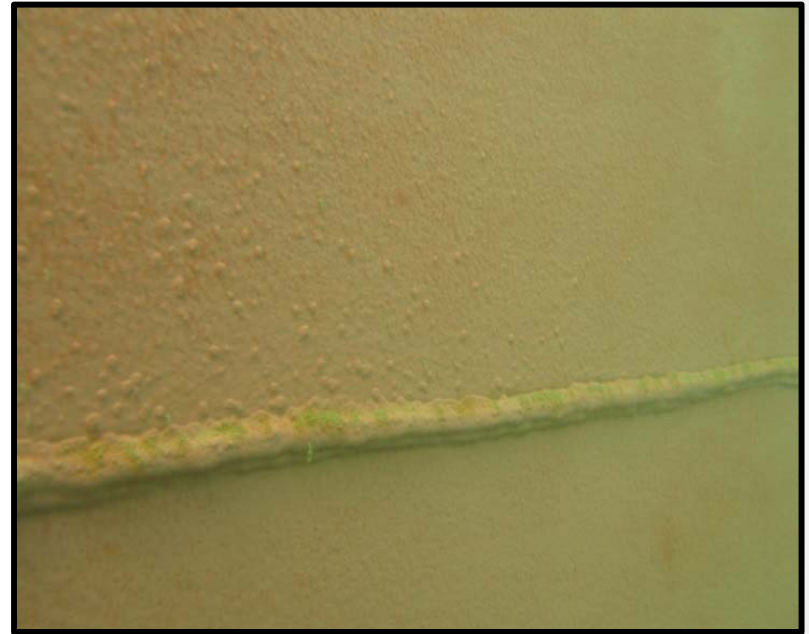


Economic Incentive

Fouled Hull



Clean Hull



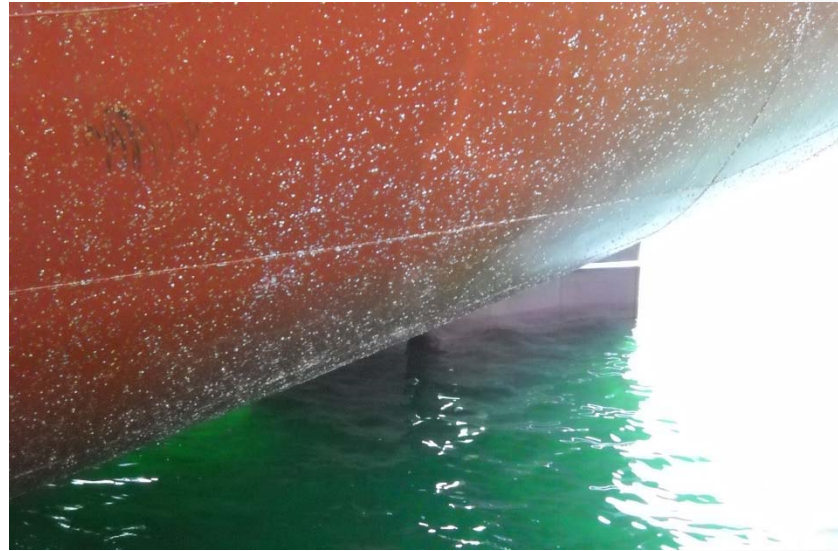
Vessel Biofouling → Drag → \$\$\$

Through Antifouling Coatings

Treatment Technologies



- 56 Alternate Management Systems



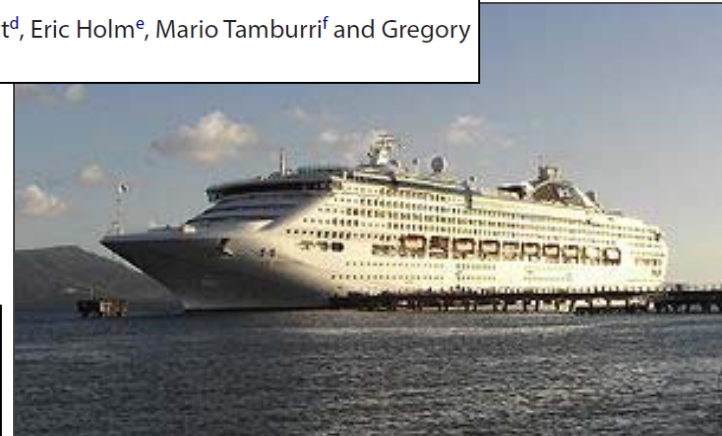
- About 320 different antifouling coatings on ships arriving since 2008

Why so many coatings?

REVIEW

Mini-review: Assessing the drivers of ship biofouling management – aligning industry and biosecurity goals

Ian Davidson^a, Christopher Scianni^b, Chad Hewitt^c, Richard Everett^d, Eric Holm^e, Mario Tamburri^f and Gregory Ruiz^a



California Hull Husbandry Reporting Form (HHRF)

Print

**California State Lands Commission
Marine Invasive Species Program
Hull Husbandry Reporting Form**
Public Resources Code – 71205(e) and 71205(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 ☐

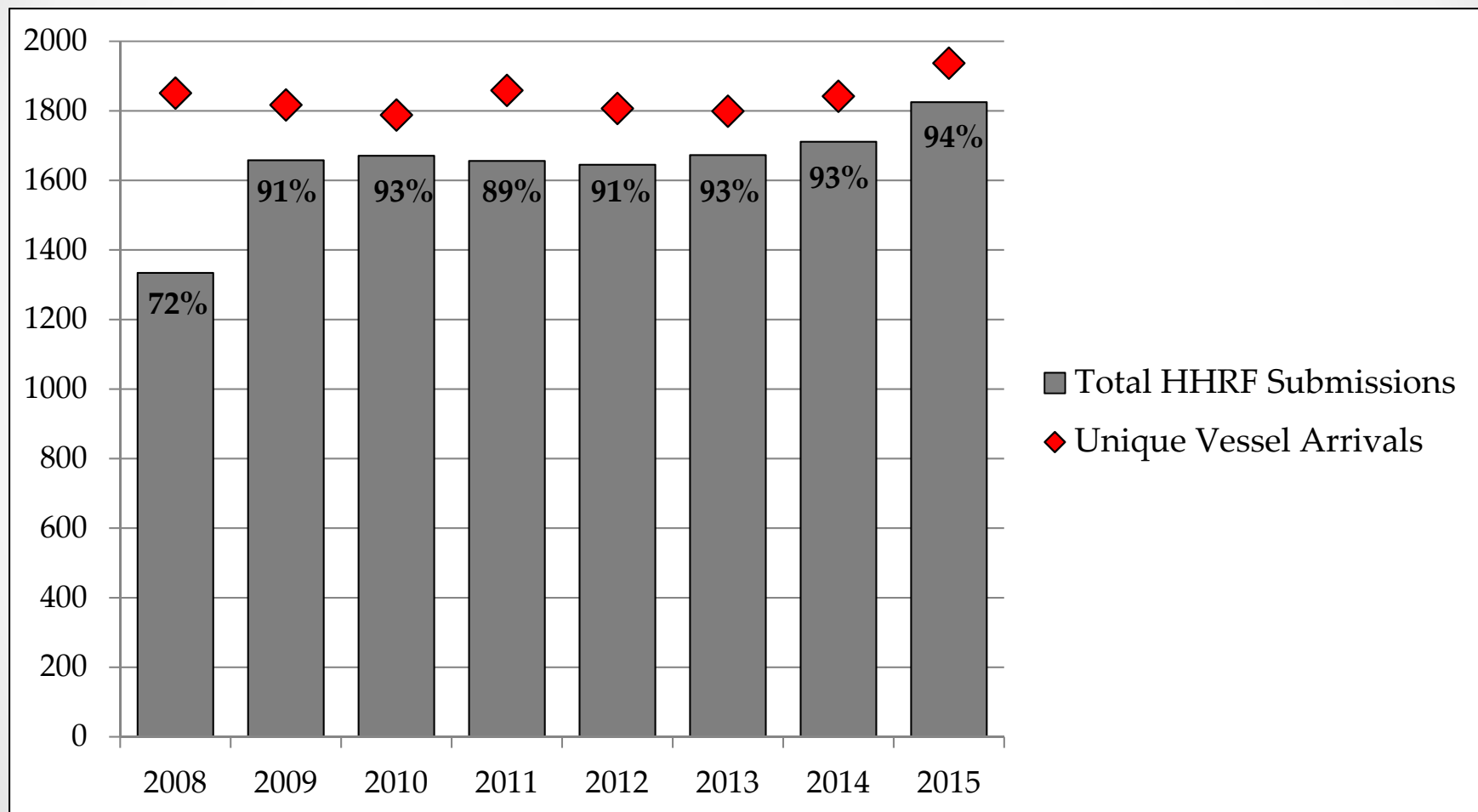
Yes, partial coat <input type="checkbox"/>	Date last full coat applied (Day/Month/Year):
No coat applied <input type="checkbox"/>	Date last full coat applied (Day/Month/Year):

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 <input type="checkbox"/>	Hull Bottom <input type="checkbox"/>	Sea Chests <input type="checkbox"/>	
Sea Chest Gratings <input type="checkbox"/>	Propeller <input type="checkbox"/>	Rope Guard/Propeller Shaft <input type="checkbox"/>	
Previous Docking Blocks <input type="checkbox"/>	Thrusters <input type="checkbox"/>	Rudder <input type="checkbox"/>	Bilge Keels <input type="checkbox"/>

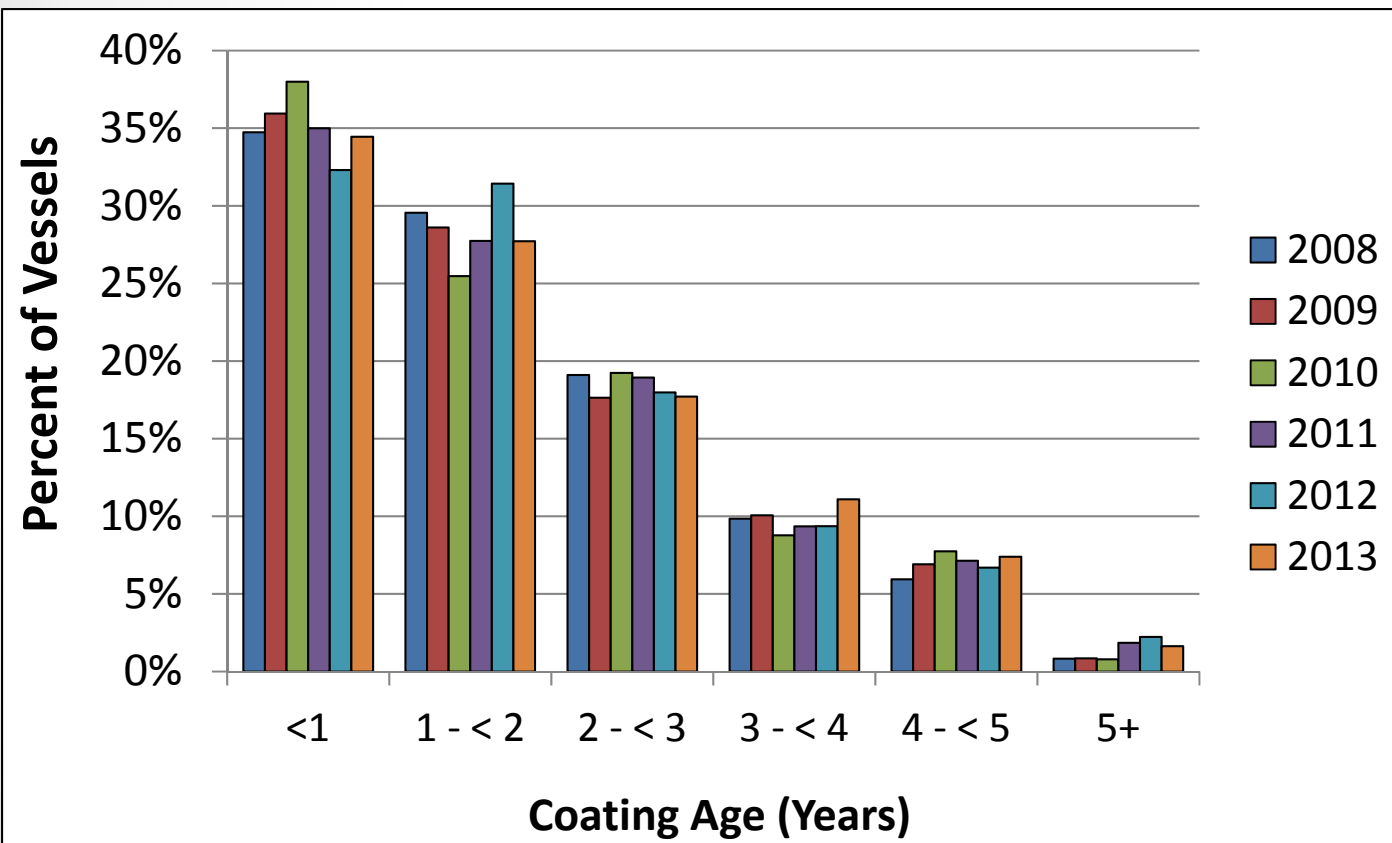
- Eleven question form on overall hull husbandry practices
- Questions specific to the type of coating used, date of application and area of application
- Submitted Annually
- Form currently due 60 days after Commission's request that is triggered by the vessel's first arrival

HHRF Submission Compliance



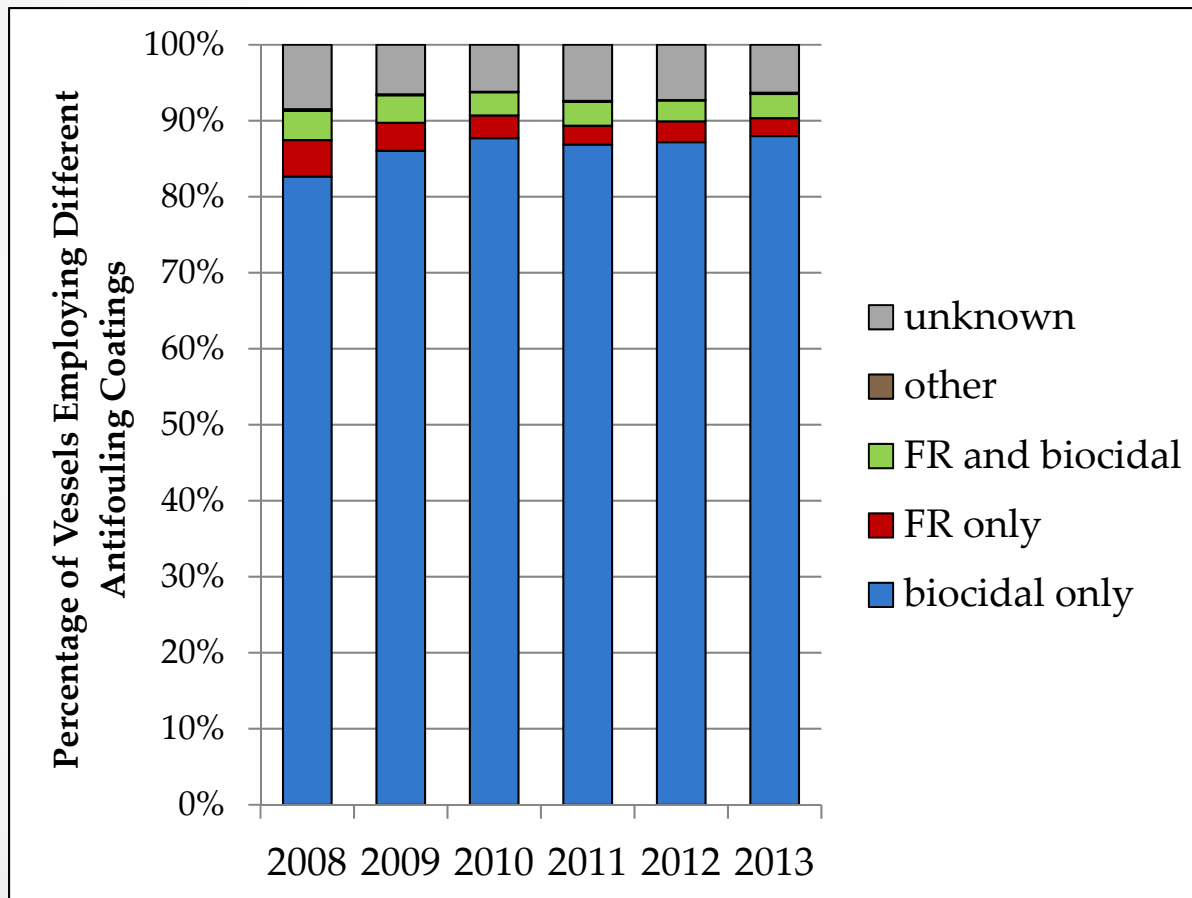
- The percentages indicate total HHRF Submission compliance

Coating Age



- On average 35% of vessels have coatings that are less than a year old
- About 63% of the vessel in CA have coatings that are less than 2 years old.

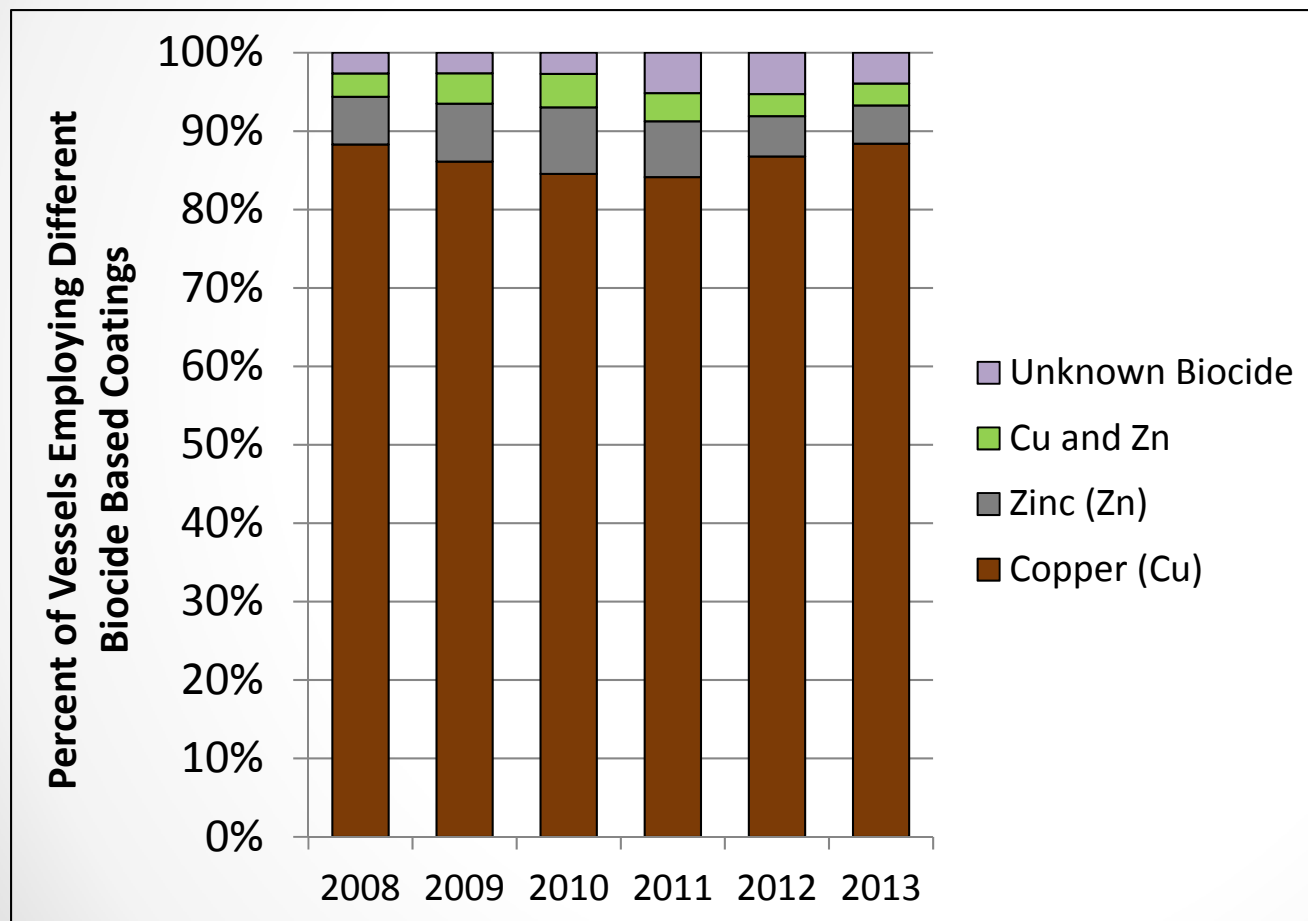
Different Antifouling Coatings



Note: FR = Fouling Release

- About 87% of vessels use biocidal coatings
- About 3% use both biocidal and Fouling Release

Biocides



- On Average 90% of the vessels that use biocidal coatings are using Cu as a biocide
(■ Cu only + ■ Cu and Zn)

Risk Assessment

- Vessels with expired coatings
 - In 2012, 284 arrivals
 - In 2013, 211 arrivals



Next Steps

- Analyzing the antifouling coatings data for 2014 and 2015
- Completing the data set for the effective speeds and effective ages
- Begin assessing risk ahead of the vessel's arrival and prioritizing inspections based on the level of risk.
- More outreach

Thank you!



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