Antifouling Coatings Used on Vessels Arriving at California Ports

Raya Nedelcheva
Marine Invasive Species Program
California State Lands Commission

Prevention First, Session 1E
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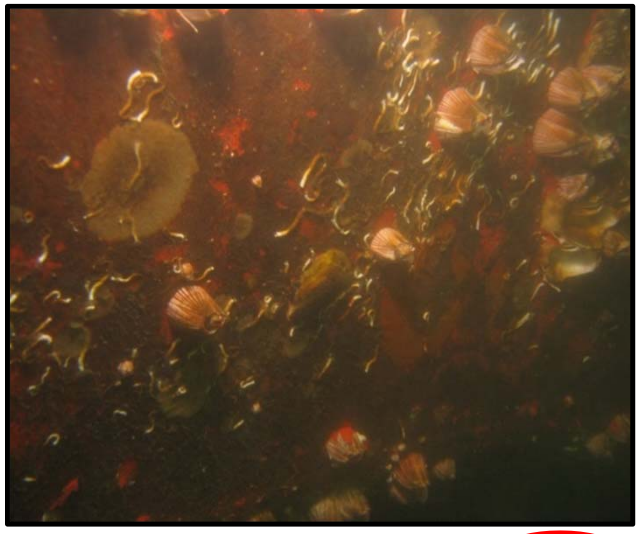
Biofouling

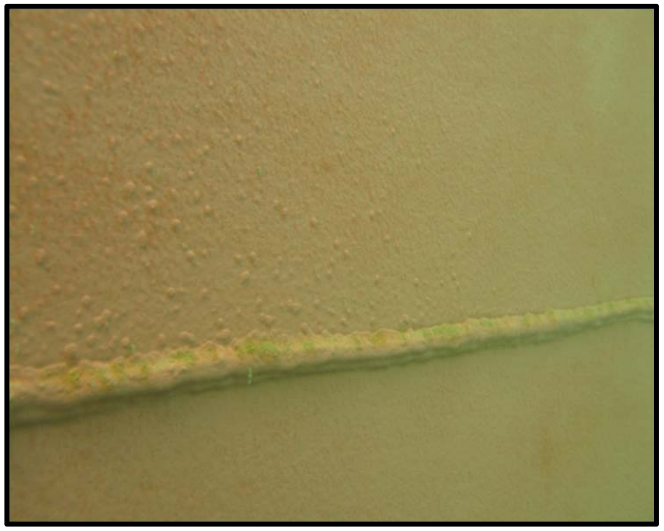
- Well known as a vector for nonindigenous species (NIS) introductions
- Responsible for up to **60%** of currently established NIS in California's coastal and estuarine waters (Ruiz et al. 2011)

Economic Incentive

Fouled Hull



Clean Hull

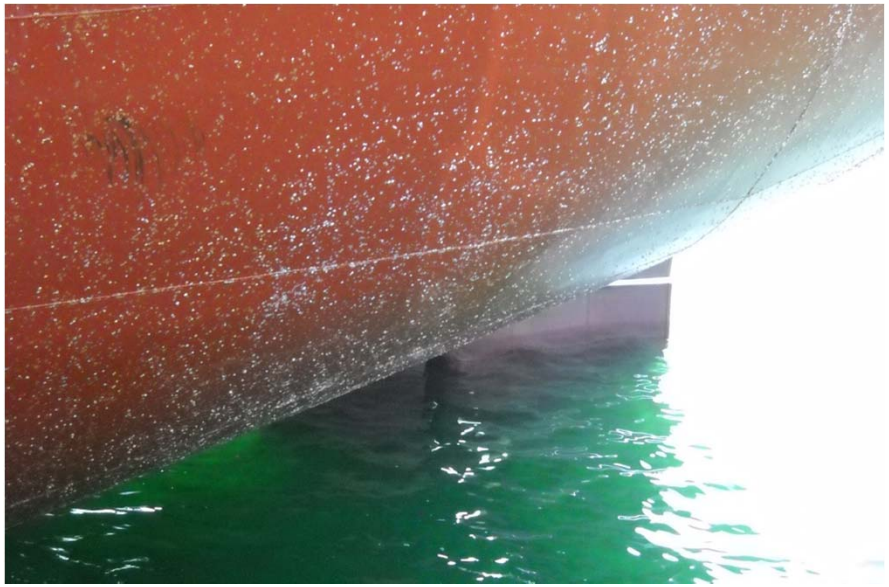


Vessel Biofouling ➔ Drag ➔ $$$

Through Antifouling Coatings

Treatment Technologies

- About 57 IMO Type Approved Ballast Water Treatment Systems



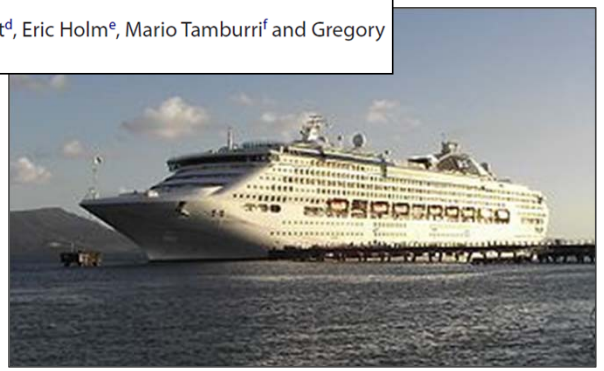
- About 377 different antifouling coating (products) on ships arriving since 2008

Why so many coatings?

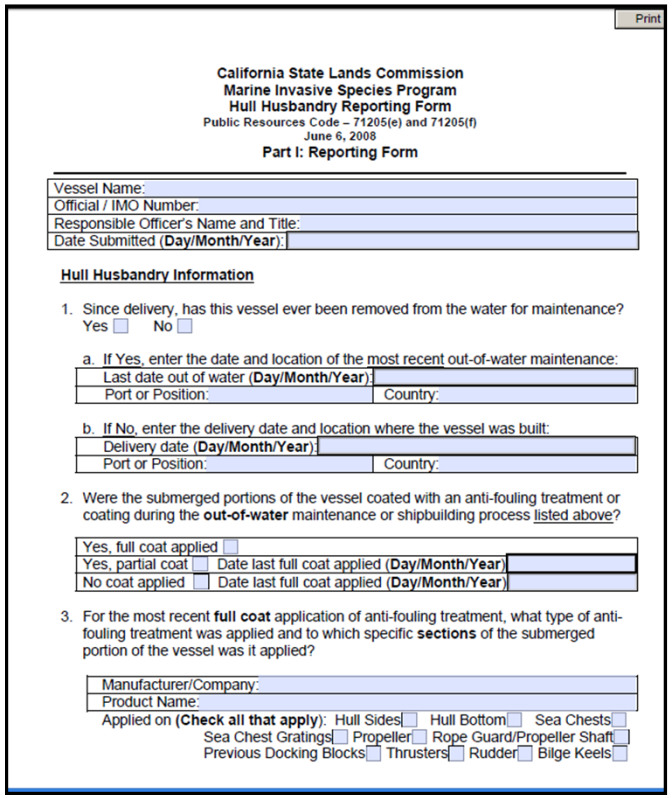
REVIEW

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 ☐	Date last full coat applied (**Day/Month/Year**):
No coat applied ☐	Date last full coat applied (**Day/Month/Year**):

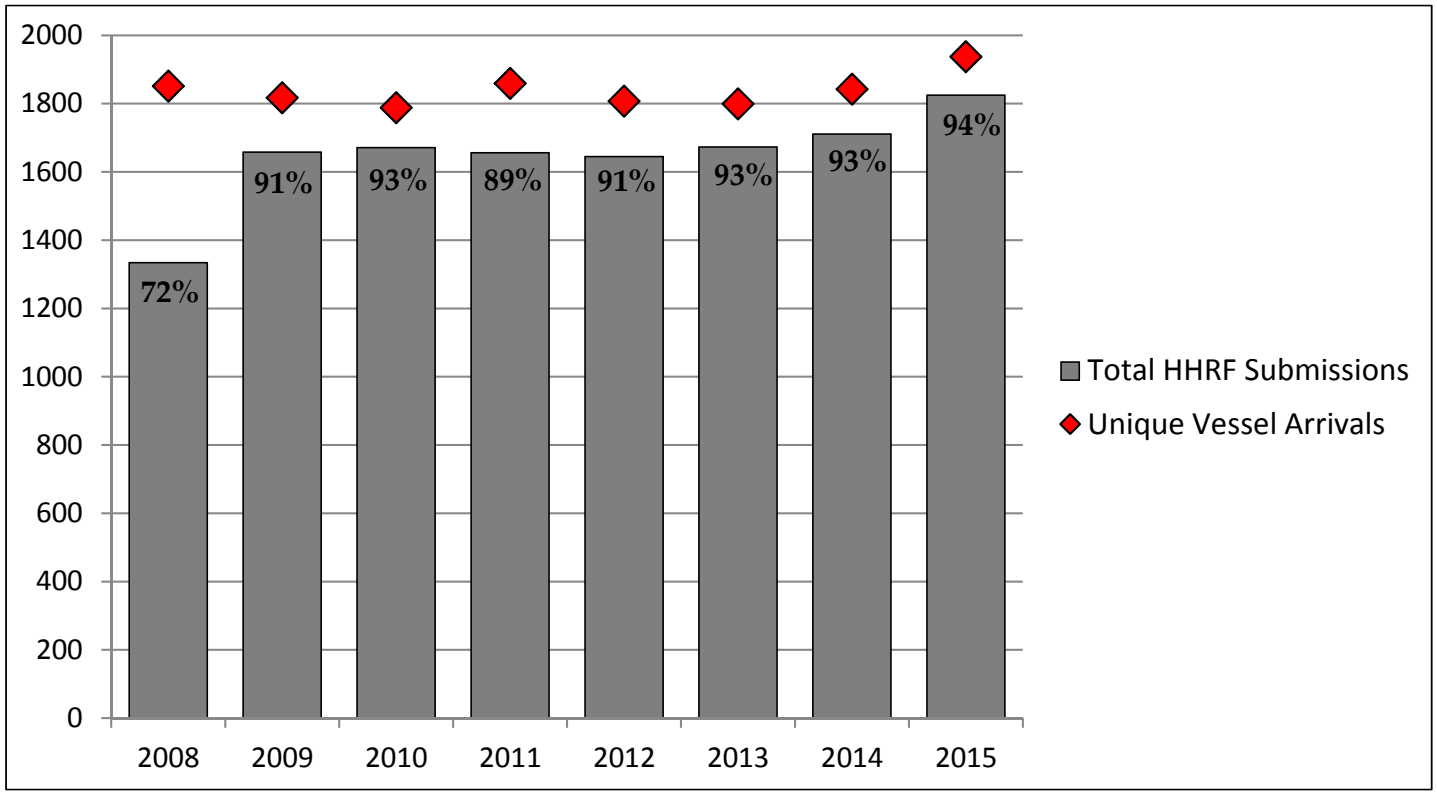
3. For the most recent **full coat** application of anti-fouling treatment, what type of anti-fouling treatment was applied and to which specific **sections** of the submerged portion of the vessel was it applied?

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 ☐ Rudder ☐ Bilge Keels ☐

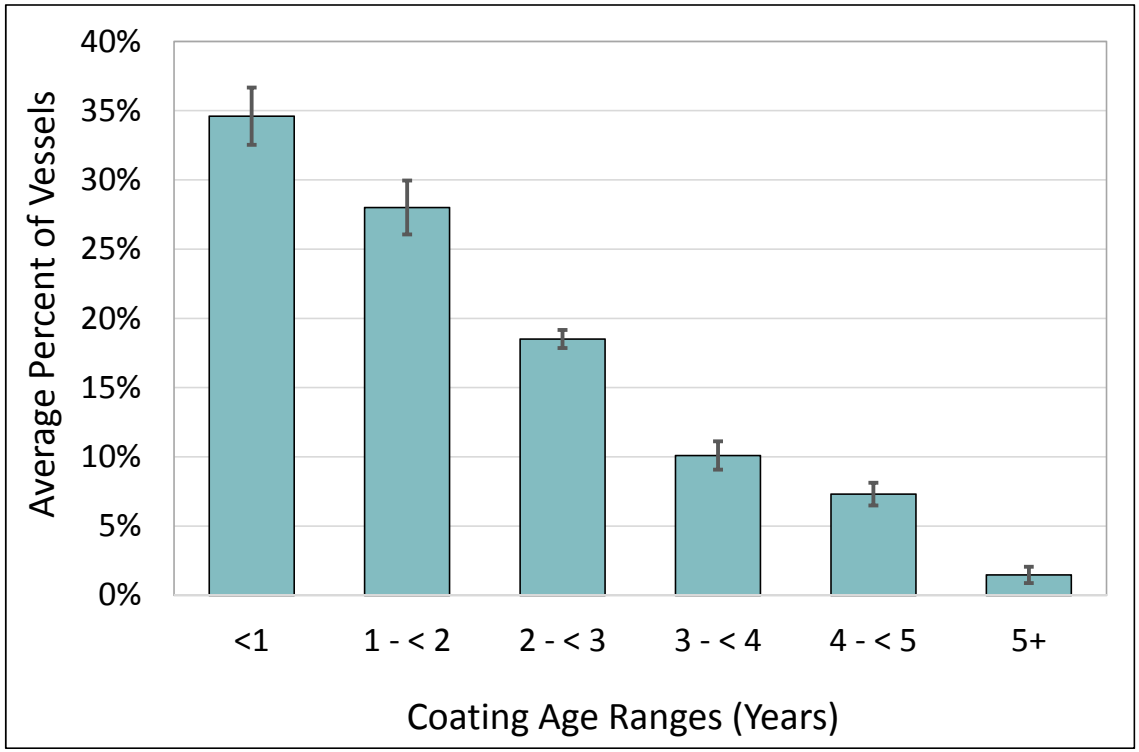
- Eleven question form on overall hull husbandry practices
- Questions specific to the type of coating used, date of application and area of application
- Submitted Annually
- Form currently due 60 days after Commission's request that is triggered by the vessel's first arrival

HHRF Submission Compliance



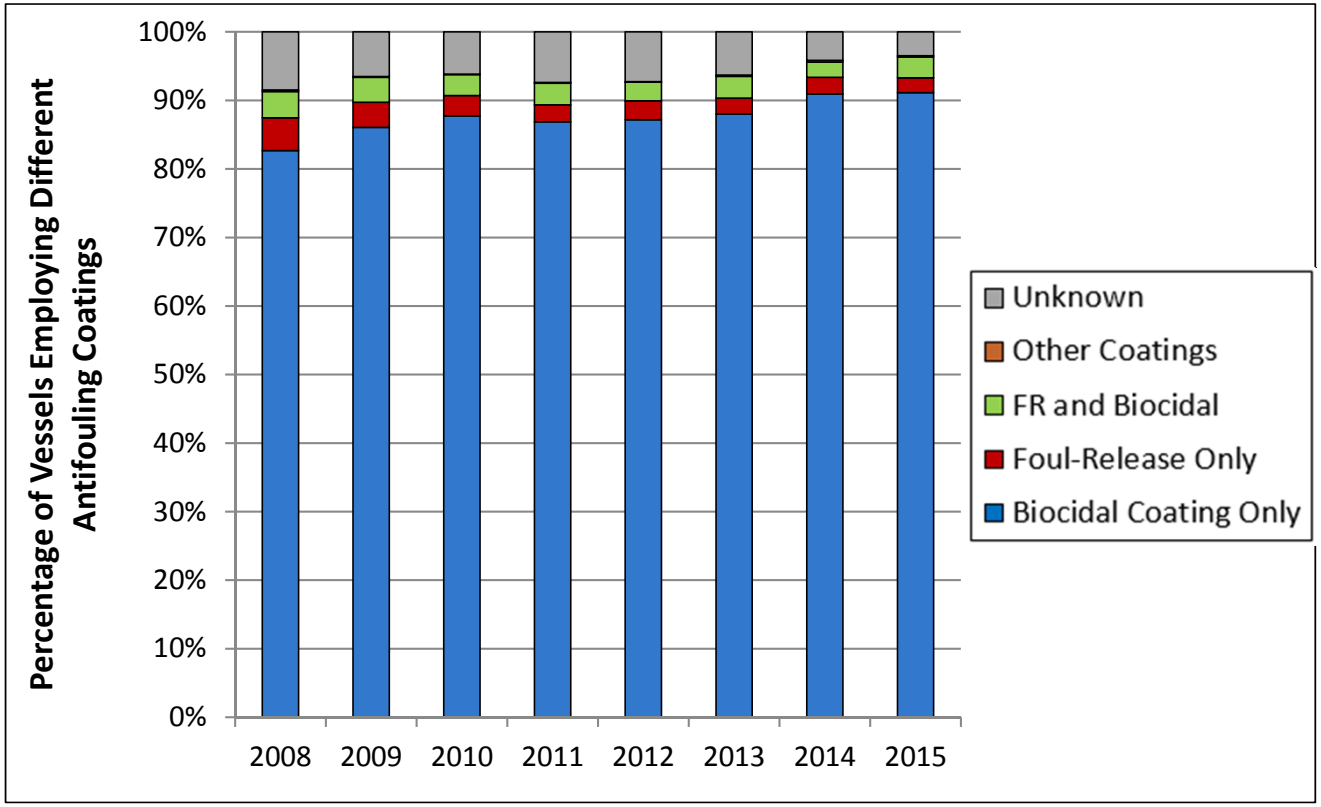
- The percentages indicate total HHRF Submission compliance

Coating Age



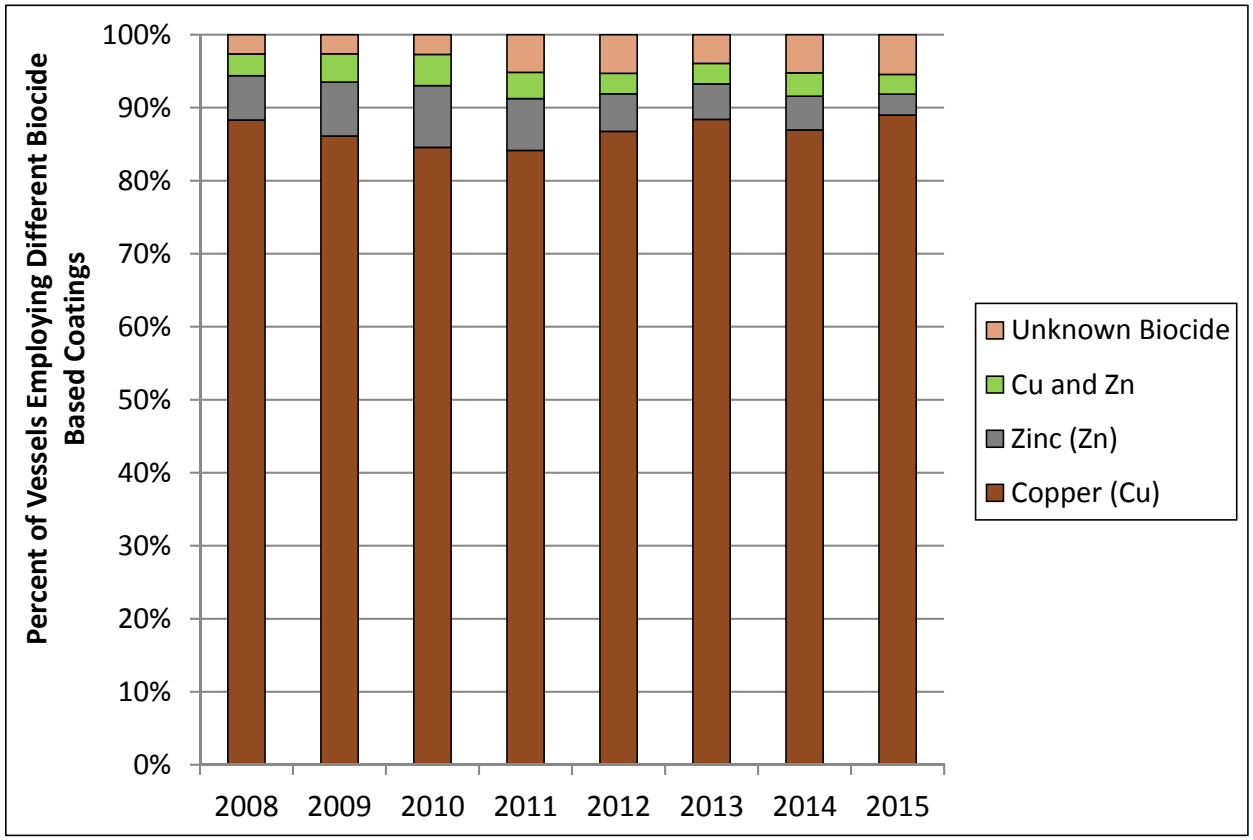
- On average 35% of vessels have coatings that are less than a year old between 2008 and 2015
- About 63% of the vessel in CA have coatings that are less than 2 years old.

Different Antifouling Coatings



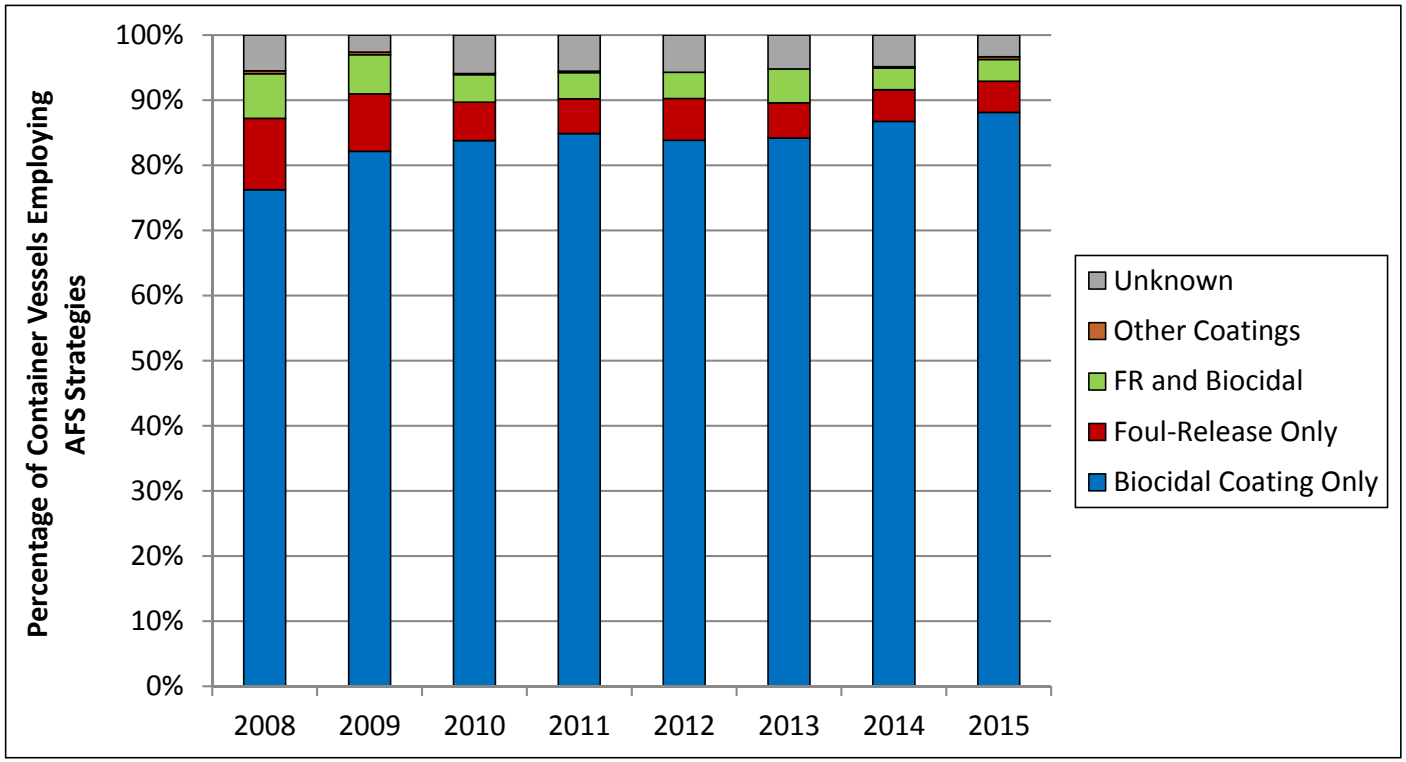
- About 87% of vessels use biocidal coatings
- About 3% use both biocidal and Fouling Release

Biocides

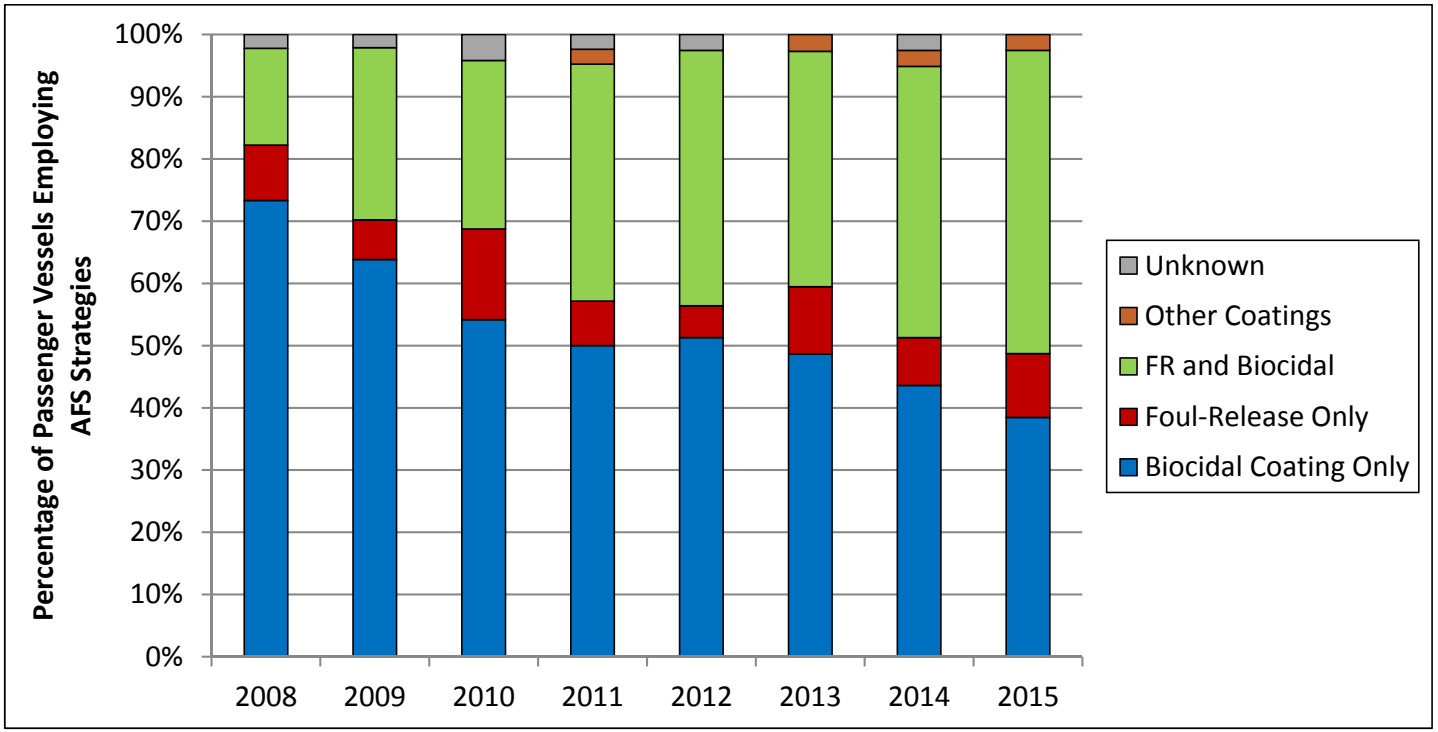


- On Average 90% of the vessels that use biocidal coatings are using Cu as a biocide
  (Cu only + Cu and Zn)

Antifouling Coatings by Vessel Type
Container Vessels



Antifouling Coatings by Vessel Type
Passenger Vessels



Risk Assessment

Expired coatings

- In 2012 there were 284 arrivals with expired coatings
- In 2013 there were 211 arrivals with expired coatings

Next Steps

- Complete the data set for the effective speeds and effective ages
- Start assessing risk ahead of the vessel's arrival and prioritizing inspections based on the level of risk.
- More outreach

Thank you!

Raya Nedelcheva
100 Howe Ave., Suite 100 South
Sacramento, CA 95825

Raya.Nedelcheva@slc.ca.gov