What the Hull is Going On?

A Preliminary Look at the Fouling-Related Practices of Vessels in California

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Shipping-Related Nonindigenous Species (NIS) Vectors

• Ballast Water
Shipping-Related NIS Vectors

- Vessel Fouling
Shipping-Related NIS Vectors

• Vessel Fouling
  – Commonly referred to as “Hull Fouling”
    • Niche areas – Sea chests, rudder, propeller, propeller shaft, thrusters, dry dock support strips (DDSS)
Vessel Fouling as NIS Vector

• > 70% of all established NIS introductions to coastal N. America may have been fouling-mediated (Fofonoff et al. 2003)

• 26.8% of established NIS in SF Bay have been associated with fouling (Cohen and Carlton 1995)
Vessel Fouling and Industry

- Unlike ballast water organisms, fouling organisms are expensive.

- Fouling = Drag = Fuel Consumption = $$
Vessel Fouling in CA

- Limited baseline information on vessel fouling across vessel types that regularly operate in CA
- Limited information on effects of voyage characteristics on accumulation of fouling organisms
- Limited information on husbandry practices regarding niche areas
Hull Husbandry Reporting Form

- 10 Question Survey
- Separated into 2 sections:
  - Husbandry Practices
    - Last Dry Dock (Delivery)
    - Type and age of AF treatment
    - In-water cleaning
  - Voyage Characteristics
    - Port residency time
    - Traveling speed
    - Freshwater ports (including Panama Canal)
The Vessel Population Evaluated:

- Container: 36.0%
- Tank: 24.5%
- Passenger: 4.1%
- Other: 1.0%
- General: 2.6%
- Auto: 19.4%
- Unmanned Barge: 3.6%
- Bulk: 8.9%

n = 400 vessels
Husbandry Practices
• 99 % within past 5 years
• 86.3 % within past 3 years
- 7 of 8 vessel types average 2 years or less
• Biocide-free coatings limited to 3 vessel types
  • Passenger (28%), Container (22%), and Tank (8%)
- 24.4% have conducted propeller polishing only
- 8.6% have undergone IW cleaning to hull or niche areas
Over 85% of vessels cleaned within USA have been cleaned in California.

Nearly all in LA-LB.
Husbandry Practices

• Almost all vessels (99%) have been cleaned of fouling organisms and treated with AF coatings within the past 5 years
  – Most within 3 years
  – Majority (>85%) of AF coatings contain at least 1 biocide
  – Vessel types conducting IW cleaning also have longest average time since delivery/dry dock

• Measures are being taken to prevent accumulation of fouling organisms

• In line with economic interests of industry
Voyage Characteristics
• Auto (0.87 d), Container (0.87 d), Passenger (0.46 d) vessels each averaged less than 1 day in port

• Bulk (3.9 d), Unmanned Barge (3.3 d), Other (3.5 d) vessel types each averaged over 3 days in port
- Container (21.0), Auto (17.4), and Passenger (17.3) vessels travel at speeds greater than 17 knots.

- Slowest = Unmanned Barges (8.1 knots)
• 67% of all vessels have visited at least 1 FW port since last cleaning
Voyage Patterns

• Auto, Container, and Passenger vessels tend to have voyage characteristics thought to result in lower risk of NIS introductions
  – Short port residency times (< 1 day)
  – Elevated traveling speeds (> 17 knots)
    • Container and Passenger vessels also tend to use biocide-free AF coatings
  – Freshwater port calls
Voyage Patterns

• Barges, Bulk, and ‘Other’ vessels tend to have voyage characteristics thought to result in greater risk of NIS introductions
  – Long average port residency times (> 3 days)
  – Slower traveling speeds
  – Barges also 1 of 2 vessel types (also General) that report no IW cleaning
Summary

• Preliminary evaluation
• Husbandry practices are being conducted regularly in an attempt to remove and prevent fouling organisms fleet-wide
• Voyage characteristics suggest the potential for reduced risk for some vessel types and increased risk for others
• Will be fully analyzed in conjunction with currently funded research to develop regulations to be adopted by January 2012
Thank You

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