

Copper Subgroup Presentation January 12, 2006 Overview of Alternative Antifouling Strategies¹

1. Based on our research we have found the following:

a. New boats and boats that need to have old copper paint stripped are the best candidates to have nontoxic coatings applied. (Nontoxic coatings can not adhere to copper paint).

b. If there is a ban on copper-based paints, the value of boats with nontoxic coatings will increase. This will help those who don't keep them very long to recapture their cost to strip old paint and to clean fouling growth more often. (Those who are involved in this issue have commented that a ban on copper paints is necessary to make the economics of transitioning to alternatives feasible.) In addition, the Port of San Diego contends that a ban on copper-based paints will help to encourage development of more products. They are right that demand is important to stimulate product development.

c. If people keep their boats, they will make up the costs of conversion and frequent cleaning by not having to replace the antifouling paint every 2-3 years. Some nontoxic coatings last up to 10 years.

d. Shelter Island Yacht Basin TMDL takes these points into account for their timeline of phasing out copper.

- Since most nontoxic coatings can not adhere to copper paint, boaters have to strip the old copper paint from their hulls, which is an expensive process. On average, boaters strip the old copper paint every 15 years. The 17 year timeline in the TMDL takes this and boatyard capacity into account.
- This timeline also gives coating companies time to research and develop new coatings and time for independent parties to evaluate the coatings in different geographic conditions and under different circumstances:
 - One of the most important things will be to have independent evaluation of new products over a period of time and in different locations to account for variations in climate and fouling species.
 - Many products have not been around long enough to determine their long-term performance which is vital to the economics of switching to nontoxic coatings.
 - some boats are more active than others
 - sailing vs cruising vessels
 - commercial fishing and commercial passenger fishing boats

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- A number of scientists use panels to test coatings but this does not capture performance of the coatings on the vessels which is important to boaters

2. Nontoxic coatings in San Diego Bay:

- Epoxy coatings applied to 4 boats in 2002
 - 1 boat has had coating for 8 years and the others for more than 3 years
 - all coatings are in good condition.
 - 3 of the boats are cleaned every 2 weeks while one of them uses a slip liner to reduce the hull cleaning costs.
 - 8 year-old coating has become smoother over time and after 5 years the owner had the paint long enough to make up for the extra costs to convert and the twice as frequent hull cleaning
 - The boat owned by a sailing club performs well after the bottom is cleaned. Eventually they will make up the cost of the initial expense of switching to the nontoxic coating and the extra cleaning
- Silicone coating applied to 2 boats in 2002
 - durability an issue: must be replaced every year
 - racers who have good financial resources may want to invest in these higher cost, slick coatings
- Boatyards in San Diego Bay
 - Switching to low copper paints and combining this with haul outs for cleaning every 3 months
 - SCCWRP research demonstrated that passive leaching is the main (95%) contributor to copper discharges from antifouling paints, not hull cleaning
 - our research surveying paint manufacturers showed that low copper paints must be replaced more often and more layers must be applied, so net discharges are likely similar to those from high copper paints

3. Available alternatives:

- Based on our findings and evaluations, we believe that durability/longevity is key to the economic feasibility of nontoxic coatings for the typical boater. Easy cleaning is highly desirable.
- Some alternatives are on the market and more are under development.
 - Phytochemicals, ablative nontoxic coatings, and variations of foul-release coatings and siloxanes are examples of coating types that are under development. San Diego company developing nontoxic coating that they claim adheres to copper paint. Independent testing is needed.
- Are alternatives feasible?
 - Different products and companion strategies will be needed for different situations: racing, mostly staying at the dock, cruising to distant locales, preventing invasive species transport.
 - Different products will also work better in different geographic areas due to water temperature variations and types of fouling species.
 - For example, a product that has done very well in northern Europe was tested in San Diego and was rapidly fouled by invasive tubeworms. This demonstrates the importance of testing products in the areas they will be

used, in particular through all seasons and on boats with various operational profiles.

- Many new products and improved versions of old products coming onto the market
 - Companies always looking for people to test their products but it takes time to demonstrate the product's long term viability (as you have heard, the longevity of the nontoxic coatings is key in terms of the economics of switching to them, success in different locations, and for different types of boat operations). As long as the boating industry realizes that nontoxic coatings require a change in practice in terms of application and maintenance, the long term economic benefits may also be realized.

4. Comments of people attending our seminars, emailing us and speaking in public meetings suggest they continue to believe that a bottom paint must be a strong antifoulant to be effective. Nontoxic coatings plus companion strategies represent a new paradigm and education will be needed to assist people in making the paradigm shift.