

A Change is in the Wind for Antifouling Strategies And It's Blowing Your Way!

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Recreational boaters in Shelter Island Yacht Basin of northern San Diego Bay must reduce the amount of copper that leaches into the water from the hulls of their boats by 76% during 2008-2023. This change is required under a Total Maximum Daily Load (TMDL) regulatory program proposed by the Regional Water Quality Control Board in San Diego and approved by the California State Water Resources Control Board. The requirements were created to mitigate their finding that the amount of dissolved copper in the yacht basin's water exceeds the federal and state standard of 3.1 parts per billion (micrograms per liter). This level of dissolved copper causes abnormal development in the young stages of marine life.

Copper also finds its way into marina sediments, where it harms creatures that live in or on the mud. When such contaminated mud is dredged, it must be disposed as hazardous waste, raising the cost of maintaining harbor depth. These costs could be passed on to marinas and boaters through leases and slip fees. Copper removed from boats during haul-out and repainting raises the environmental compliance costs paid by boatyards under their National Pollutant Discharge Elimination System (NPDES) permits.

California's Nonpoint Source Pollution Control Program (Vol. I, pp. 139-141) requires the underwater hull cleaning industry to train and certify divers in the use of best management practices. The state will step in if 75% of boat cleanings are not done by certified divers within four years. The plan also mandates a phase-out of toxic hull paints on state and local agency-owned vessels. Finally, it recommends legislation to ban toxic hull paints, if necessary, after a thorough analysis of the situation.

One way to reduce copper emissions from boat hulls is for boat owners to use nontoxic antifouling strategies. However, using a nontoxic strategy successfully requires a new approach.

The traditional approach is to add a toxicant, such as cuprous oxide, to the bottom paint. The toxicant gradually leaches to the surface of the paint, where it slows fouling growth and is ultimately lost to the water. In San Diego the hull must be cleaned in the water about once a month to prevent fouling growth from becoming established. Hull cleaning accelerates copper loss and best management practices are used to keep it to a minimum. Eventually, most of the cuprous oxide has been lost, the paint is no longer effective, and the boat must be hauled and repainted.

The nontoxic approach does not slow fouling growth. Different products use different strategies and each has its pros and cons. In general, nontoxic coatings

are more expensive than traditional coatings, require special hull preparation and application procedures and the hull must be cleaned in the water about twice a month. This makes them sound very unattractive to boaters. On the other hand, the life of the paint is not dependent on the life of the toxicant. So, it's possible that a durable, nontoxic hull coating could greatly extend the time between haul-outs and make up the cost difference.

In order to educate boaters and to track the performance and costs of using nontoxic antifouling coatings, the University of California Sea Grant Extension Program (with state/federal funding under the 319h Nonpoint Source Pollution Program) conducted demonstrations of nontoxic hull coatings and two field days during 2002-2003. Since then, they have produced several reports, fact sheets and seminars. Click on the Publications links on the Home Page of our website at <http://ucanr.org/sites/coast> and then scroll to the Nontoxic Antifouling Strategies section to find our reports and fact sheets. We also conducted a concurrent project to compare the economic costs and benefits of nontoxic and traditional antifouling coatings for recreational boats; reports and fact sheets on the economic project can also be found in the Nontoxic Antifouling Strategies section of our Publications page. Fact sheets in Spanish on the field demonstration and economic study can be found via the Publicaciones link on the website's home page.

Note that we are now the University of California Cooperative Extension Coastal Resources Program.

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