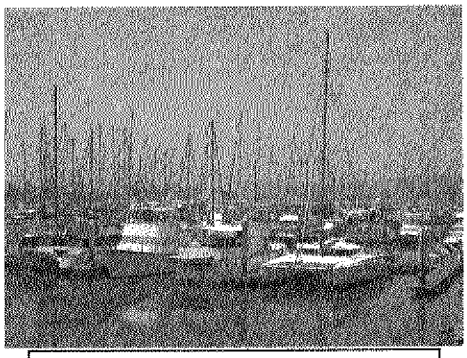
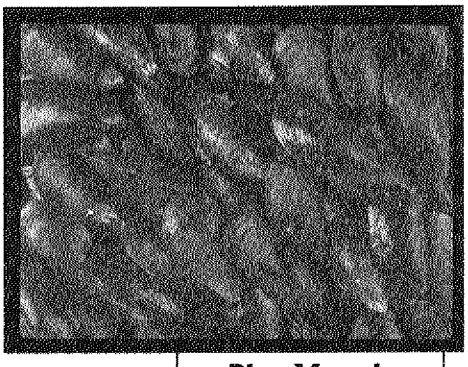
CASG-G-03-003

Nontoxic Antifouling Strategies Project

Harmful levels of dissolved copper have been detected in boat basins in San Diego Bay, Newport Bay, and Marina Del Rey. Oceanside Harbor also has elevated levels of dissolved copper. According to the Southern California Coastal Water Research Project and to the Total Maximum Daily Load (TMDL) studies by the San Diego Regional Water Quality Control Board and the US EPA, high copper levels are primarily due to antifouling paints on boats. Regulations to reduce dissolved copper levels are being planned. They will probably include nontoxic antifouling strategies for reducing copper pollution from boats.



Shelter Island Yacht Basin, San Diego California

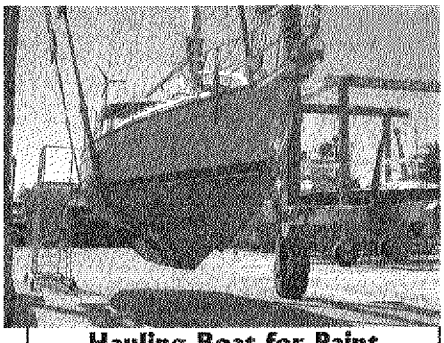


Blue Mussels

Copper-based bottom paints are designed to release copper into surface waters to prevent fouling organisms from growing on boat bottoms. Recreational boats spend much time at the slip so most of the copper in the bottom paint is released there. It builds up in the water column and sediments and may reach toxic levels. Scientific studies show that dissolved copper at higher concentrations affect growth, development, and reproduction of marine life such as mussels, oysters, scallops, sea urchins, and crustaceans.

The booklet "What You Need to Know About Nontoxic Antifouling Strategies for Boats" summarizes technical, environmental, and regulatory factors of the issue. To request a copy, please contact the authors.

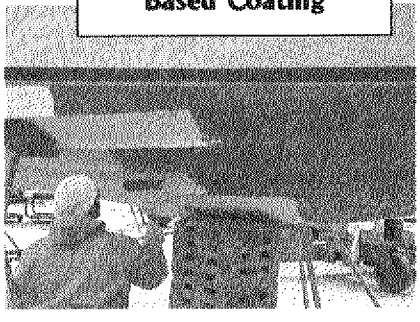
Nontoxic Bottom Paint Field Demonstration



Hauling Boat for Paint Application

To help boat owners make decisions about nontoxic antifouling strategies, the University of California Sea Grant Extension Program (UCSGEP) has conducted a field demonstration of nontoxic boat bottom paints. The demonstration is funded in part by the US EPA and the California State Water Resources Control Board 319(h) program.

Application of Epoxy Based Coating



The UCSGEP tracked the performance of one silicone- and two epoxy-based coatings on six recreational boats in San Diego Bay during 2002-2003. Underwater hull cleaners reported on coating condition, fouling growth level, cleaning tool, and diver effort each time the vessels were cleaned. These reports are being analyzed. Results of the demonstration project will provide boaters with vital information for choosing the best nontoxic antifouling strategy for their vessels. A booklet on the results of the demonstration project will be published in 2004.

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UCSGEP-SD FACT SHEET 03-1 November 2003

Nontoxic Bottom Paint Demonstration Project Results After One Year

Ceramic Epoxy Coating (sailboat and diesel-electric boat):

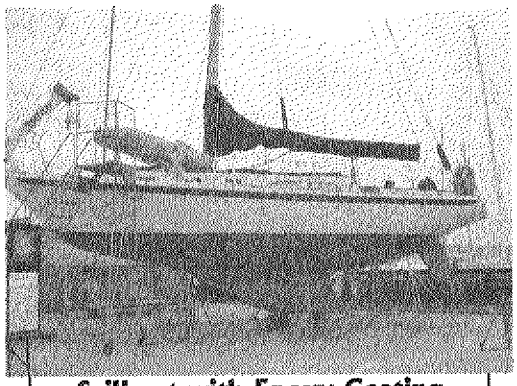
- Nearly new condition
- Minor scarring from calcareous fouling growth
- Coating has sheen but no shine

Epoxy Coating (powerboat):

- Nearly new condition
- Some wearing on edges
- Surface lightly etched from cleaning

Epoxy coating (sailboat):

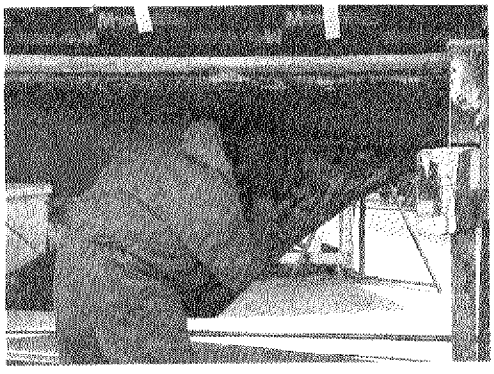
- Coating is almost 5 years old and coating condition rated at level 3 out of 5 (some blemishes or defects in coating on up to 20% of boat bottom)
- Expected to last at least 2 more years
- Coating has become smoother as a result of cleaning



Sailboat with Epoxy Coating (Coating Almost 5 Years Old)

"Making Dollars and Sense of Nontoxic Antifouling Strategies for Boats"

The University of California Sea Grant Extension Program (UCSGEP) will publish a booklet in early 2004 on the economics of switching to nontoxic bottom paints. The booklet is based on a study funded by California Department of Boating and Waterways under Senate Bill 315 and by UC Davis Center for Pest Management, Research, and Education. It was a collaborative effort with the University of California, San Diego Department of Economics. The study found that:



Stripping Old Copper-Based Bottom Paint

- The most effective candidates for nontoxic paint are new boats and boats that need to be stripped of old copper paint
- Durable nontoxic paint may last enough years to make up the higher application costs and twice-as-frequent hull cleaning needed for nontoxic paints
- Independent long-term testing is needed to verify durability and longevity of nontoxic paints.
- Due to boatyard capacity in San Diego Bay:
  Quickest time to phase out copper paint is 7 years at a cost of $20 million; Least cost policy to phase out copper paint is 15 years at a cost of $1 million

Acknowledgements

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