March 2006

NBSAC Prevention Through People Subcommittee Meeting

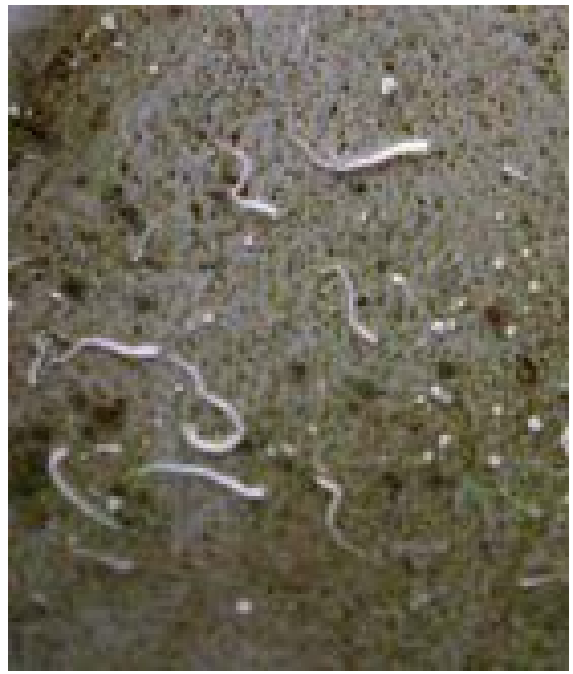
Raynor Tsuneyoshi

State of California
Department of Boating and Waterways

Aquatic Alien Invasive Species and Elimination of Copper-based Boat Bottom Paints

Invasive Aquatic Species

- Plants and animals – both native and non-native to California – adhere to the bottom of a vessel.
- They are easily transported from port to port along the coast.
- They can infest a harbor when the boat bottom is cleaned in water or when they release larvae.



Copper Boat Bottom Paint

- Copper was the original anti-fouling agent because it is an effective growth inhibitor.
- Tributyltin (TBT) became popular in the 70s, but was banned for most recreational vessels in California in 1988.
- Boaters returned to copper-based compounds soon after the ban.

Shelter Island Yacht Harbor
State Water Resources Control Board

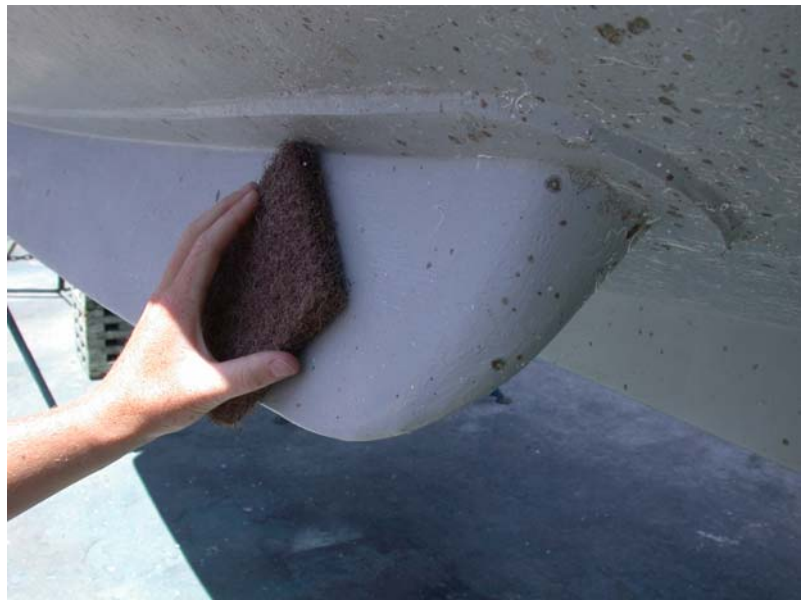
- In 2005, the SWRCB passed a total maximum daily load for copper anti-fouling paint in the Shelter Island Yacht Basin in San Diego.
- Requires a 17-year phase-out of copper in that area.
- Gave the Dept. of Pesticide Regulation two years to address the problem of copper anti-fouling paints statewide.
- If DPR and U.S. EPA don't take action in two years, the State Water Board may ban copper boat bottom paints statewide.

Department of Pesticide Regulation

- In early 2006, DPR began its two-year study to determine whether copper is a problem in harbors and to craft an appropriate solution.
- DPR will sample water quality at about 24 marinas.
- DPR is working closely with the boating community on this issue.

Non-toxic Boat Bottom Treatments

- Durable Epoxy
- Silicone
- Polymers
- Water-based Urethane
- Bottom Wax



None of these products are growth inhibiting for marine life.

California Aquatic Invasive Species

Star Sea Squirt

Colonial sea squirt that typically forms flat sheets 3-4 mm thick.

Thrives in polluted waters.

Can grow on nearly any surface from boat docks to sea grasses.

California Aquatic Invasive Species

Striped Barnacle

Breeds year around and can release anywhere between 24,000 and 240,000 eggs a year.

Attaches to ship hulls and other hard surfaces.

May affect boating speed by up to 40%.

California Aquatic Invasive Species

Sea Vase

Short-living, but grows rapidly.

Colonizes areas of abnormal temperature or salinity fluctuation rapidly.

Can live at any depth from the surface to 500 meters.

Grows to 15-25 cm in length.

California Aquatic Invasive Species

Asian Kelp

Average size per frond is one to three meters.

Generally found on the waterline.

First seen in Southern California in 2000. By 2001 was found as far north as Monterey Bay.

California Aquatic Invasive Species

Spaghetti Bryozoan

Found on hard substrates in bays and harbors.

In optimum temperature conditions, this animal forms large “bushes” which may become entangled in nets.

California Aquatic Invasive Species

Club Tunicate

Native to bays and harbors in Japan and Korea.

Common name is derived from its resemblance to a wooden club.

Extreme invasive problem due to a lack of natural predators in this part of the world.

Other Invasive Species

In addition to the species that attach themselves to hull of a vessel, the following plants and animals are non-native, invasive species which may be easily transported via recreational boating.

California Aquatic Invasive Species

Infestations throughout the Great Lakes Region.

10-50 mm in size.

They cover everything, smothering aquatic life and robbing habitat of nutrients.

Not in California yet, but spreading west.

Zebra Mussels

California Aquatic Invasive Species

Chinese Mitten Crab

Burrowing crab native to coastal rivers and estuaries of the Yellow Sea in Korea and China .

Potentially a vector for human lung fluke.

Banned in California, Oregon and Washington.

Damages commercial fisheries.

California Aquatic Invasive Species

Hydrilla

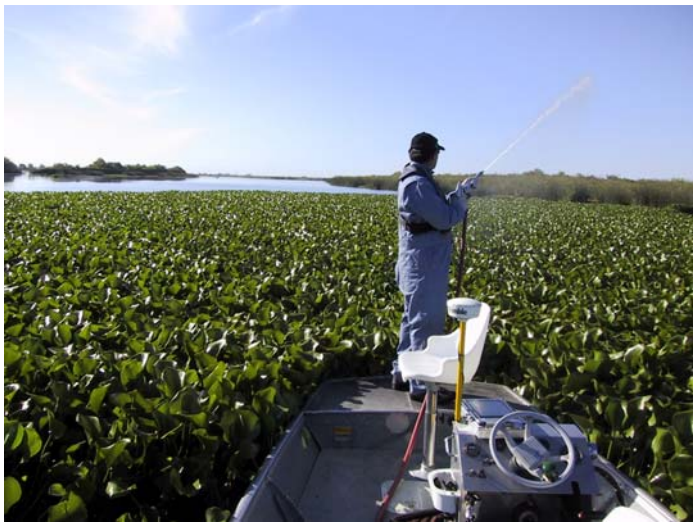
A submersed freshwater weed.

In California, infestations have been reported in Clear Lake and nine California counties.

Displaces native aquatic vegetation by forming dense stands or large sub-surface mats.

California Aquatic Invasive Species

Water Hyacinth



Floating freshwater plant from Brazil.

Major infestation in the Sacramento -San Joaquin Delta.

California spends approximately $6.8 million each year to control Water Hyacinth and egeria Densa.

California Aquatic Invasive Species

Egeria Densa

Submerged fresh water plant from South America.

Exhibits prolific growth.

Clogs irrigation pipes.

Hinders recreational boating and fishing.

California Aquatic Invasive Species

Eurasian Watermilfoil

Grows submerged.

Freshwater plant, but tolerates salinity.

Slender, feathery appearance.

Lake Tahoe is infested with Watermilfoil.

California Aquatic Invasive Species

Caulerpa taxifolia

Infestation in Huntington Harbor in San Diego – now eradicated.

Extremely invasive seaweed that is currently infesting tens of thousands of acres in the Mediterranean Sea.

Studying Copper-Based Paint

- Before copper anti-fouling paint is banned, careful study needs to be conducted to evaluate the environmental impacts of copper-based paints.
- CA Dept. of Boating & Waterways is funding a study to determine the actual impact of copper on fauna in San Diego.
- So far, tests have only been conducted in a laboratory setting, which does not include real world factors.