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New Scientific Work Raises Questions on Copper Rules

Sacramento [January 4] - a scientific presentation given in November of this year by the University of San Diego [USD] and Space and Naval Warfare Systems Command [SPAWARS] at The Society of Environmental Toxicology and Chemistry [SETAC] in Boston raises serious questions about the facts upon which regional and statewide actions are being taken that restrict the use of copper-based anti-fouling surfaces on boat hulls.

This work comprises a thorough and robust study of toxicity of water column samples, the US Environmental Protection Agency's Water Effect Ratio [WER SSOs], and Biotic Ligand Model BLM-derived water quality standards. The study dovetails with the seminar in affirming the validity of using the BLM water quality standard.

The conclusions of the presentation [attached] clearly rebuke much of the popular dialogue regarding copper and its toxicity. The findings are notable because: [a] toxicity to mytilus could not be demonstrated in the 60 plus samples tested, [b] the BLM derived standard of 8.5 ug/L seemed protective as a water quality standard.

San Diego-based boaters and organizations are approaching the San Diego Regional Water Quality Control Board [Regional Board] with the suggestion of reopening the Total Maximum Daily Load [TMDL] for copper in Shelter Island Yacht Basin. One possible action would be a Memorandum of Understanding [MOU] between the Port of San Diego, Regional Board and the Port Tenants Association to accomplish that objective. The BLM water quality standard could be a topic for adoption.

The work titled "Copper Bioavailability and Toxicity to *Mytilus galloprovincialis* in Shelter Island Yacht Basin, San Diego, CA" is public but is yet to be published. Its conclusions:

- Two gradients are apparent in surface water total and dissolved [Cu] in SIYB, an increase from the mouth to the head, and an increase from the main channel towards the boats
- The elevated [Cu] at stations 3 and 8 (wet season) and stations 3 and 11 (dry season) appear to be related to proximity and density of boats surrounding the area
- Although [Cu] in SIYB are elevated in comparison to the main body of San Diego Bay, the ambient water is generally not toxic to mussel embryos (1 out of 62 samples somewhat toxic)
- Dissolved [Cu] as high as 8.8 $\mu\text{g L}^{-1}$ were not toxic to mussel embryos
- The BLM estimated chronic limit (ECL) for Cu (mean of 8.6 $\mu\text{g L}^{-1}$ for wet season and 8.5 $\mu\text{g L}^{-1}$ for dry season) is protective of *M. galloprovincialis* based on the ambient toxicity data
- Traditional water effects ration calculation (SSC_{WER}) for Cu is overly conservative based on EPA's intended level of protection. EPA suggested WQC (3.1 $\mu\text{g L}^{-1}$ dissolved Cu) is over conservative as well
- Lack of ambient toxicity and verified protection by BLM suggest that SIYB is not impaired due to copper

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