

Copper reference list

November 9, 2006

Bioavailability and effects

Abalde, J., A. Cid, et al. (1995). "Response of the Marine Microalga *Dunaliella tertiolecta* (Chlorophyceae) to Copper Toxicity in Short Time Experiments." Bulletin of Environmental Contaminant Toxicology **54**: 317-324.

Ahner, B. A. and F. M. M. Morel (1995). "Phytochelatin production in marine algae: II. Induction by various metals." Limnology and Oceanography **40**: 658-665.

Ahner, B. A., S. Kong, et al. (1995). "Phytochelatin production in marine algae: I. An intraspecies comparison." Limnology and Oceanography **40**.

Arnold, W. R., J. S. Cotsifas, et al. (2006). "Validation and update of a model used to predict copper toxicity to the marine bivalve *Mytilus* sp." Environmental Toxicology **21**(1): 65-70.

Arnold, W. R., R. C. Santore, et al. (2005). "Predicting copper toxicity in estuarine and marine waters using the Biotic Ligand Model." Marine Pollution Bulletin **50**(12): 1634-1640.

Borgmann, U., W. P. Norwood, et al. (1993). "Accumulation, regulation and toxicity of copper, zinc, lead and mercury in *Hyaella azteca*." Hydrobiologia **259**(2): 79-89.

Brand, L. E., W. G. Sunda, et al. (1986). "Reduction of marine phytoplankton reproduction rates by copper and cadmium." Journal of experimental marine biology and ecology **96**: 225-250.

Bruland, K. W., E. L. Rue, et al. (2000). "An intercomparison of voltametric approaches to determine the chemical speciation of dissolved copper in a coastal seawater sample." Analytica Chimica Acta **405**: 99-113.

Bruland, K. W., J. R. Donat, et al. (1991). "Interactive influences of bioactive trace metals on biological production in oceanic waters." Limnology and Oceanography **36**: 1555-1577.

Cid, A., C. Herrero, et al. (1995). "Copper toxicity on the marine microalga *Phaeodactylum tricornutum*: effects on photosynthesis and related parameters." Aquatic Toxicology **31**: 165-174.

Cloern, J. E., B. E. Cole, et al. (1985). "Temporal dynamics of estuarine phytoplankton, A case study of San Francisco Bay." Hydrobiologia **129**: 153-176.

Coale, K. H. (1991). "Effects of iron, manganese, copper, and zinc enrichments on productivity and biomass in the subarctic Pacific." Limnology and Oceanography **36**(8): 1851-1864.

Diamond, J. M., C. Gerardi, et al. (1997). "Using a water effect ratio approach to determine effects of copper on the fathead minnow in an effluent-dominated stream." Environmental Toxicology and Chemistry **16**(7): 1480-1487.

Di Toro, D. M., J. A. McGrath, et al. (2005). "Predicting sediment metal toxicity using a sediment biotic ligand model: Methodology and initial application." Environmental Toxicology and Chemistry **24**(10): 2410-2427.

Florence, T. M., H. K. J. Powell, et al. (1992). "Toxicity of lipid-soluble copper (II) complexes to the marine diatom nitzschia closterium: amelioration by humic substances." Wat. Res. **26**(9): 1187-1193.

Gledhill, M., M. Nimmo, et al. (1997). "The Toxicity of Copper (II) Species to Marine Algae, with Particular Reference to Macroalgae." Journal of Physiology **33**: 2-11.

Gordon, A. S., J. R. Donat, et al. (2000). "Dissolved copper-complexing ligands in cultures of marine bacteria and estuarine water." Marine Chemistry **70**: 149-160.

Hornberger, M. I., S. N. Luoma, et al. (2000). "Linkage of Bioaccumulation and Biological Effects to Changes in Pollutant Loads in South San Francisco Bay." Environmental Science & Technology **34**(12): 2401-2409.

Knauer, K., R. Behra, et al. (1997). "Adsorption and uptake of copper by the green alga *Scenedesmus subspicatus* (Chlorophyta)." Journal of phycology **33**: 596-601.

Lu, X. Q., I. Werner, et al. (2005). "Geochemistry and bioavailability of metals in sediments from northern San Francisco Bay." Environment International **31**(4): 593-602.

Luoma, S. N., A. v. Geen, et al. (1998). "Metal uptake by phytoplankton during a bloom in South San Francisco Bay: Implications for metal cycling in estuaries." Limnology and Oceanography **45**(5): 1007-1016.

McKnight, D. M. and F. M. M. Morel (1979). "Release of weak and strong copper-complexing agents by algae." Limnology and Oceanography **24**: 823.

McPherson, C. A. and P. M. Chapman (2000). "Copper Effects on Potential Sediment Test Organisms: the Importance of Appropriate Sensitivity." Marine Pollution Bulletin **40**(8): 656-665.

Miao, A.-J., W.-X. Wang, et al. (2005). "Comparison of Cd, Cu, and Zn toxic effects on four marine phytoplankton by pulse-amplitude-modulated fluorometry." Environmental Toxicology and Chemistry **24**(10): 2603-2611.

Metaxas, A. and A. G. Lewis (1991). "Copper tolerance of *Skeletonema costatum* and *Nitzschia thermalis*." Aquatic Toxicology **19**: 265-280.

- Metaxas, A. and A. G. Lewis (1991). "Interactions between two species of marine diatoms: effects on their individual copper tolerance." Marine Biology **109**: 407-415.
- Moffett, J. W. and L. E. Brand (1996). "Production of strong, extracellular Cu chelators by marine cyanobacteria in response to Cu stress." Limnology and Oceanography **41**(3): 388-395.
- Moffett, J. W., L. E. Brand, et al. (1997). "Cu speciation and cyanobacterial distribution in harbors subject to anthropogenic Cu inputs." Limnology and Oceanography **42**(5): 789-799.
- Palenik, B. and A. R. Flegal (1999). Cyanobacterial Populations in San Francisco Bay, San Francisco Estuary Institute: 3.
- Phillips, B., B. Anderson, et al. (2003). "Causes of sediment toxicity to *Mytilus galloprovincialis* in San Francisco Bay, California." Arch Environ Contam Toxicol. **45**(4): 492-7.
- Rijstenbil, J. W. and J. A. Wunholds (1991). "Copper Toxicity and Adaptation in the Marine Diatom *Ditylum Brightwellii*." Comparative biochemistry and physiology **100**(1/2): 147-150.
- Rivera-Duarte, I., G. Rosen, et al. (2005). "Copper toxicity to larval stages of three marine invertebrates and copper complexation capacity in San Diego Bay, California." Environmental Science & Technology **39**(6): 1542-1546.
- SAIC (1993). Toxicity testing to support the New York/New Jersey site-specific copper criteria study. Final Report. EPA Contract # 68-C8-0066. Narragansett, RI., Science Applications International Corporation.
- Slauenwhite, D. E., P. J. Wangersky, et al. (1991). "Effect of a spring phytoplankton bloom on dissolved copper speciation in bedford basin." Marine Pollution Bulletin **23**: 137-144.
- Sunda, W. G. and R. L. Guillard (1976). "The relationship between cupric ion activity and the toxicity of copper to phytoplankton." Journal of Marine Research **34**(4): 511-529.
- Sunda, W. G. and S. A. Huntsman (1995). "Regulation of copper concentrations in the oceanic nutricline by phytoplankton uptake and regeneration cycles." Limnology and Oceanography **40**: 135-137.
- Sunda, W. G. and S. A. Huntsman (1998). "Processes regulating cellular metal accumulation and physiological effects: Phytoplankton as model systems." Science of The Total Environment **219**: 165-181.
- Xiuren, N., E. C. James, et al. (2000). "Spatial and temporal variability of picocyanobacteria *Synechococcus* sp. in San Francisco Bay." Limnology and Oceanography **45**(3): 695-702.
- USEPA (2003). The Biotic Ligand Model: Technical Support Document for Its Application to the Evaluation of Water Quality Criteria for Copper, U.S. Environmental Protection Agency. **2004**.

USEPA (2003). Withdrawal of Aquatic Life Water Quality Criteria for Copper and Nickel Applicable to South San Francisco Bay, California, US Environmental Protection Agency. **2004**.

Winch, S. and D. Lean (2005). "Comparison of changes in metal toxicity following exposure of water with high dissolved organic carbon content to solar, UV-B and UV-A radiation." Photochemistry and Photobiology **81**(6): 1469-1480.

Chemical speciation and processes

Arnold, W. R., R. C. Santore, et al. (2005). "Predicting copper toxicity in estuarine and marine waters using the Biotic Ligand Model." Marine Pollution Bulletin **50**(12): 1634-1640.

Beck, N. G., R. P. Franks, et al. (2002). "Analysis for Cd, Cu, Ni, Zn and Mn in estuarine water by inductively coupled plasma mass spectrometry coupled with an automated flow injection system." Analytica Chimica Acta **455**: 11-22.

Bessinger, B., T. Cooke, et al. (2006) "A kinetic model of copper cycling in San Francisco Bay." San Francisco Estuary & Watershed Science **4**(1), Article 4.

Buck, K. N. and K. W. Bruland (2005). "Copper speciation in San Francisco Bay: A novel approach using multiple analytical windows." Marine Chemistry **96**(1-2): 185-198.

Coale, K. H. and K. W. Bruland (1988). "Copper complexation in the Northeast Pacific." Limnology and Oceanography **33**(5): 1084-1101.

Di Toro, D. M., J. A. McGrath, et al. (2005). "Predicting sediment metal toxicity using a sediment biotic ligand model: Methodology and initial application." Environmental Toxicology and Chemistry **24**(10): 2410-2427.

Donat, J. R., K. A. Lao, et al. (1994). "Speciation of dissolved copper and nickel in South San Francisco Bay: a multi-method approach." Analytica Chimica Acta **284**: 547-571.

Flegal, A. R., C. H. Conaway, et al. (2005). "A review of factors influencing measurements of decadal variations in metal contamination in San Francisco Bay, California." Ecotoxicology **14**(6): 645-660.

Gee, A. K. and K. W. Bruland (2002). "Tracing Ni, Cu, and Zn kinetics and equilibrium partitioning between dissolved and particulate phases in South San Francisco Bay, California, using stable isotopes and high-resolution inductively coupled plasma mass spectrometry." Geochimica et Cosmochimica Acta **66**(17): 3063-3083.

James, S. K., R. T. Brent, et al. (1999). Processes Affecting the Benthic Flux of Trace Metals into the Water Column of San Francisco Bay, U.S. Geological Survey Toxic Substances Hydrology Program.

Kozelka, P. B. and K. W. Bruland (1998). "Chemical speciation of dissolved Cu, Zn, Cd, Pb in Narragansett Bay, Rhode Island." Marine Chemistry **60**: 267-282.

Kuwabara, J. S., B. R. Topping, et al. (1999). Processes Affecting the Benthic Flux of Trace Metals into the Water Column of San Francisco Bay. U.S. Geological Survey Toxic Substances Hydrology Program--Proceedings of the Technical Meeting, Charleston, South Carolina, March 8-12, 1999, U.S. Geological Survey.

Lu, X. Q., I. Werner, et al. (2005). "Geochemistry and bioavailability of metals in sediments from northern San Francisco Bay." Environment International **31**(4): 593-602.

Murray-Gulde, C. L., J. Berr, et al. (2005). "Evaluation of a constructed wetland treatment system specifically designed to decrease bioavailable copper in a wastestream." Ecotoxicology and Environmental Safety **61**(1): 60-73.

Ndung'u, K., M. P. Hurst, et al. (2005). "Comparison of copper speciation in estuarine water measured using analytical voltammetry and supported liquid membrane techniques." Environmental Science & Technology **39**(9): 3166-3175.

Ndung'u, K., R. P. Franks, et al. (2003). "Organic complexation and total dissolved trace metal analysis in estuarine waters: comparison of solvent-extraction graphite furnace atomic absorption spectrometric and chelating resin flow injection inductively coupled plasma-mass spectrometric analysis." Analytica Chimica Acta **481**: 127-138.

Phinney, J. T. and K. W. Bruland (1997). "Effects of dithiocarbamate and 8-hydroxyquinoline additions on algal uptake of ambient copper and nickel in South San Francisco Bay water." Estuaries **20**(1): 66-67.

Reuter, J. G. (1981). "Effects of copper toxicity on silicic acid uptake and growth in *Thalassiosira pseudonana*." Journal of Physiology: 270 - 278.

Rijstenbil, J. W. and J. A. Wunholds (1991). "Copper Toxicity and Adaptation in the Marine Diatom *Ditylum Brightwellii*." Comparative biochemistry and physiology **100**(1/2): 147-150.

Sarathy, V. and H. E. Allen (2005). "Copper complexation by dissolved organic matter from surface water and wastewater effluent." Ecotoxicology and Environmental Safety **61**(3): 337-344.

Sedlak, D. L., J. T. Phinney, et al. (1997). "Strongly complexed Cu and Ni in wastewater effluents and surface runoff." Environmental Science & Technology **31**(10): 3010-3016.

Simpson, S. L. (2005). "Exposure-effect model for calculating copper effect concentrations in Sediments with varying copper binding properties: A synthesis." Environmental Science & Technology **39**(18): 7087-7082.

Topping, B. R. and J. S. Kuwabara (1999). Flow-injection - ICP-MS method applied to benthic flux studies of San Francisco Bay, U.S. Geological Survey Toxic Substances Hydrology Program: 131-134.

USEPA (2003). The Biotic Ligand Model: Technical Support Document for Its Application to the Evaluation of Water Quality Criteria for Copper, U.S. Environmental Protection Agency. **2004.**

USEPA (2003). Withdrawal of Aquatic Life Water Quality Criteria for Copper and Nickel Applicable to South San Francisco Bay, California, US Environmental Protection Agency. **2004.**

Wood, T. M., A. M. Baptista, et al. (1995). "Diagnostic modeling of trace metal partitioning in South San Francisco Bay." Limnology and Oceanography **40**(2): 345-358.

Comprehensive studies

(2004). City of Palo Alto - Environmental Compliance - Copper (website). D. A. Cacchione, City of Palo Alto. **2004.** <http://www.city.palo-alto.ca.us/public-works/cb-copper.html>

(2004). Copper And The Environment (website), CDA. <http://www.copper.org/environment/homepage.html>

Davidson, N. A. (1995). Evaluation of Copper and Tributyltin-containing Compounds. Sacramento, CA, Dept of Pesticide Regulation, California EPA: 77.

Hornberger, M., S. Luoma, et al. (1999). Bioaccumulation of metals by the bivalve *Macoma balthica* at a site in South San Francisco Bay between 1977 and 1997: Long-term trends and associated biological effects with changing pollutant loadings. Menlo Park, California., U.S. Geological Survey: Open File Report, 99-55.

Luoma, S. N. and D. J. H. Phillips (1988). "Distribution, variability, and impacts of trace elements in San Francisco Bay." Marine Pollution Bulletin **19**(9): 413-425.

Moon, E., C. P. C. David, et al. (2003). Near Field Receiving Water Monitoring Of Trace Metals In Clams (*Macoma Balthica*) And Sediments Near The Palo Alto Water Quality Control Plant In South San Francisco Bay, California 2002. Menlo Park, CA, U.S. Geological Survey: Open-File Report 03-339.

SFBRWQCB (2002). Staff Report On Proposed Site-Specific Water Quality Objectives And Water Quality Attainment Strategy For Copper And Nickel For San Francisco Bay South Of The Dumbarton Bridge. Oakland, CA, San Francisco Bay Regional Water Quality Control Board: 95.

Tetra Tech (1999). Conceptual Model Report For Copper And Nickel In Lower South San Francisco Bay, Prepared for City of San Jose: 145 pp.

Tetra Tech, et al. (2000). Impairment Assessment Report For Copper And Nickel In Lower South San Francisco Bay. Prepared for City of San Jose: 186.

Tetra Tech, I, R. Associates, et al. (2001). Copper Action Plan, Prepared for City of San Jose and Copper Development Association Inc: 93.

Thompson, J. K., F. Parchaso, et al. (2002). Near Field Receiving Water Monitoring Of Benthic Community Near The Palo Alto Water Quality Control Plant In South San Francisco Bay: February 1974 Through December 2000. Menlo Park, CA, U.S. Geological Survey: Open-File Report 02-394.

Environmental distribution

Flegal, A. R., C. H. Conaway, et al. (2005). "A review of factors influencing measurements of decadal variations in metal contamination in San Francisco Bay, California." *Ecotoxicology* **14**(6): 645-660.

Hornberger, M. I., S. N. Luoma, et al. (1999). "Historical trends of metals in the sediments of San Francisco Bay, California." *Marine Chemistry* **64**(1-2): 39-55.

SFEI (1993). Annual Reports: San Francisco Estuary Institute Regional Monitoring Program for Trace Substances. Richmond, CA., San Francisco Estuary Institute.

Sañudo-Wilhelmy, S. A., I. Rivera-Duarte, et al. (1996). "Distribution of colloidal trace metals in the San Francisco Bay estuary." *Geochimica et Cosmochimica Acta* **60**: 4933-4944.

USGS (2004). Water Quality of San Francisco Bay: A Long-term Program of the U.S. Geological Survey, U.S. Geological Survey.

Watson, D., L. Weetman, et al. (1998). Spatial and Temporal Trace Level Monitoring Study of South San Francisco Bay, National Water Quality Monitoring Council. **2004**.

Sources and loadings

(2004). Brake Pad Partnership (website). Dec 2004. <http://www.suscon.org/brakepad/>

(2004). Environmental Services: Publications and Research (website), City of San Jose. **2004**. http://www.sanjoseca.gov/esd/pub_res.asp

(2003). Clean Bay Strategy: South Bay Watershed Activities Status Report July 2003. San Jose, CA, San Jose Environmental Services Department: 37.

(2004). Clean Bay Strategy: South Bay Watershed Activities Status Report February 2004. San Jose, CA, San Jose Environmental Services Department: 22.

(2004). Copper Sources and Reduction (website), TDC Environmental. **2004**.
<http://www.tdcenvironmental.com/copperreduction.html>

Greiner, U. R. S., W. Clyde, et al. (2000). Source Characterization Report: Calculation Of Total Maximum Daily Loads For Copper And Nickel In South San Francisco Bay. Report prepared for the City of San Jose: 100 pp.

SCVURPPP (2004). SCVURPPP: Copper Control Measures (website), Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp-w2k.com/cu_control_measures.htm

Townsend, T., B. Dubey, et al. (2005). "Preservative leaching from weathered CCA-treated wood." Journal of Environmental Management **75**(2): 105-113.

Tsai, P., R. Hoenicke, et al. (2001). San Francisco Bay Atmospheric Deposition Pilot Study Part 2: Trace Metals. Oakland, CA, San Francisco Estuary Institute: 53.

Woodward-Clyde (1994). Contribution of Heavy Metals to Storm Water from Automotive Disc Brake Pad Wear. Oakland, CA, Santa Clara Valley Nonpoint Source Pollution Control Program: 38.

Transport processes

Bessinger, B., T. Cooke, et al. (2006) "A kinetic model of copper cycling in San Francisco Bay." San Francisco Estuary & Watershed Science **4**(1), Article 4.

Bricker, J., E. Gross, et al. (1999). Comparison of observed ambient copper and nickel concentrations in Lower South San Francisco Bay to conservative scalar results from the TRIM 3D numerical model. Stanford, CA., Environmental Fluid Mechanics Laboratory, Stanford University.

Chen, C. W., D. Leva, et al. (1996). "Modeling the Fate of Copper Discharged to San Francisco Bay." Journal of Environmental Engineering **122**(10): 924-934.

Cheng, R. T. and V. Casulli (1996). Modeling the Periodic Stratification and Gravitational Circulation in San Francisco Bay. Estuarine and Coastal Modeling. Spaulding and Cheng. San Diego, CA, ASCE: 240-254.

Cheng, R. T., V. Casulli, et al. (1993). "Tidal, residual, intertidal mudflat (TRIM) model and its applications to San Francisco Bay, California: JT Estuarine, Coastal, and Shelf Science." **36**: 235-280.

Cheng, R. T., J. W. Gartner, et al. (1998). Flow and suspended particulate transport in a tidal bottom layer, South San Francisco Bay, California. Proceedings from the 8th Int. Biennial Conf. on Physics of Estuaries and Coastal Seas. J. Dronkers and M. B. A. M. Scheffers. Rotterdam, Netherlands, A.A. Balkema: 3-12.

Conomos, T. J. (1979). Properties and circulation of San Francisco Bay water. San Francisco Bay: The Urbanized Estuary. e. T.J. Conomos. San Francisco, CA., Pacific Division, American Association for the Advancement of Science: 47-84.

Conomos, T. J. and D. H. Peterson (1977). Suspended particle transport and circulation in San Francisco Bay-An overview. Estuarine Processes. M. e. Wiley. New York, Academic Press: 82-97.

Gross, E. S. (1997). Numerical modeling of hydrodynamics and scalar transport in an estuary. (Ph.D. dissertation). Palo Alto, CA, Stanford University.

Lacy, J. R. and J. R. Burau (1996). Suspended-solids Flux at a Shallow-Water Site in South San Francisco Bay, California. North American Water and Environment Congress, 1996.

Monsen, N. E., J. E. Cloern, et al. (2002). "A comment on the use of flushing time, residence time, and age as transport time scales." Limnology and Oceanography **47**(5): 1545-1553.

Rivera-Duarte, I. and A. R. Flegal (1997). "Porewater gradients and diffusive benthic fluxes of Co, Ni, Cu, Zn, and Cd in San Francisco Bay." Croatia Chimica Acta **70**(1): 389-417.

Thomson-Becker, E. A. and S. N. Luoma (1985). "Temporal fluctuations in grain size, organic materials and iron concentrations in intertidal surface sediment of San Francisco Bay." Hydrobiologia **129**: 91-107.

Walters, R. A., R. T. Cheng, et al. (1985). "Time scales of circulation and mixing processes of San Francisco Bay waters." Hydrobiologia **129**: 13-36.