

Marine Pollution Studies Laboratory at Granite Canyon -Research and Publications-

The Marine Pollution Studies Laboratory (MPSL) publishes research findings both in agency reports and peer reviewed journals. Most projects are grant-funded. Major projects are listed below, along with the resulting publications.

Central Coast Watershed Projects

Watershed Publications

Hunt JW, Anderson BS, Phillips BM, Tjeerdema RS, Largay B, Hanson E, Beretti M, Bern A. 2008. Use of toxicity identification evaluations in determining the pesticide mitigation effectiveness of on-farm vegetated treatment systems. *Environ Poll.* 156: 348-358.

Phillips BM, Anderson BS, Hunt JW, Huntley SA, Tjeerdema RS, Richard N, Worcester K. 2006. Solid-phase Sediment Toxicity Identification Evaluation in an Agricultural Stream. *Environ Toxicol Chem.* 25: 1671-1676.

Hunt, JW, Anderson, BS, Phillips, BM, Tjeerdema, RS, Richard, N, Connor, N, Worcester, K, Angelo, M, Bern, A, Fulfroost, B, Mulvaney, D. 2006. Spatial relationships between water quality and pesticide applications in agricultural watersheds. *Environ Monit Assess.* 121:245-262.

Anderson BA, Phillips BM, Hunt JW, Connor V, Richard N, Tjeerdema RS. 2006. Identifying primary stressors impacting macroinvertebrates in the Salinas River (California, USA): relative effects of pesticides and suspended particles. *Environ Poll.* 141: 402-208.

Anderson BS, Phillips BM, Hunt JW, Huntley SA, Worcester K, Richard N, Tjeerdema RS. 2006. Evidence of pesticide impacts in the Santa Maria River watershed (California, USA). *Environ Toxicol Chem* 25: 1160-1170.

Phillips BM, Anderson BS, Hunt JW, Nicely PA, Kosaka RA, Tjeerdema R. 2004. In situ water and sediment toxicity in an agricultural watershed. *Environ Toxicol Chem* 23: 435-442.

Anderson BS, Hunt JW, Phillips BM, Nicely PA, de Vlaming V, Connor V, Richard N, Tjeerdema RS. 2003. Integrated assessment of the impacts of agricultural drainwater in the Salinas River (California, USA). *Environ. Pollution* 124: 523-532.

Anderson BS, Hunt JW, Phillips BM, Nicely PA, Gilbert KD, de Vlaming V, Connor V, Richard N, Tjeerdema RS. 2003. Ecotoxicologic impacts of agriculture drainwater in the Salinas River (California, USA). *Environ. Toxicol. Chem.* 22: 2375-2384.

Hunt JW, Anderson BS, Phillips BM, Nicely PA, Tjeerdema RS, Puckett HM, Stephenson M, Worcester K, deVlaming V. 2003. Ambient toxicity due to chlorpyrifos and diazinon in a Central California Watershed. *Environ Monit Assess.* 82: 83-112.

Anderson BS, de Vlaming V, Larsen K, Deanovic L, Birosik S, Smith DJ, Hunt JW, Tjeerdema RS. 2002. Causes of toxicity in the Calleguas Creek watershed of southern California. *Environ Monit Assess.* 78: 131-151.

Hunt JW, Anderson BS, Phillips BM, Tjeerdema RS, Puckett HM, deVlaming V. 1999. Patterns of aquatic toxicity in an agriculturally dominated coastal watershed in California. *Agricul. Ecosyst. Environ.* 75: 75-91.

Watershed Reports

Anderson BS, Phillips BM, Hunt JW, Largay B, Shihadeh R., Berretti, M. 2008. Pesticide and toxicity reduction using vegetated treatment systems and Landguard OP-A. Data Summary and Final Report. Central Coast Regional Water Quality Control Board, San Luis Obispo, CA. 70pp.

Hunt J, Anderson B, Phillips BM, Largay B. 2007. Effectiveness of Agricultural Management Practices in Reducing Concentrations of Pesticides Associated with Toxicity to Aquatic Organisms; Data Summary and Final Report. California Water Quality Control Board, Central Coast Region.

Anderson BS, Phillips BM, Hunt JW, Tjeerdema RS. 2006. Water and sediment quality in four central coast watersheds: Chualar Creek, Watsonville Slough, Pacheco Creek, and Uvas Creek. Final report. California State Water Resources Control Board and Central Coast Regional Water Quality Control Board.

Hunt JW, Anderson BS, Phillips BM, Tjeerdema RS. 2005. Salinas River Sediment Toxicity Survey. California State Water Resources Control Board and Central Coast Regional Water Quality Control Board.

Hunt, J.W., Anderson, B.S., Phillips, B.M., Piekarski, W.J., Englund, M., Tjeerdema, R.S. and deVlaming, V. 1998. Aquatic toxicity in the Pajaro River watershed: tributary sources and chemicals of concern. State Water Resources Control Board, Sacramento, California.

Surface Water Ambient Monitoring Program (SWAMP)

SWAMP Publications

Phillips BM, Anderson BS, Hunt JW, Tjeerdema RS, Carpio-Obeso M, Connor V. 2007. Causes of Water Column Toxicity to *Hyalella azteca* in the New River, California (USA). *Environ Toxicol Chem* 26: 1074-1079.

Holmes RW, Anderson BS, Phillips BM, Hunt JW, Crane DB, Mekebri A, Blondina G, Nguyen L, Connor V. 2008. Statewide Investigation of the Role of Pyrethroid Pesticides in Sediment Toxicity in California's Urban Waterways. *Environ Sci Technol.* 42(18): 7003-7009.

Toxicity Identification Evaluations Research

Phillips BM, Anderson BS, Hunt JW, Clark SL, Voorhees JP, Tjeerdema RS, Casteline J, Stewart M. 2008. Evaluation of phase II toxicity identification evaluation methods for freshwater whole sediment and interstitial water. *Chemosphere* 74: 648-653.

Anderson BS, Phillips BM, Hunt JW, Voorhees J, Clark S, Tjeerdema RS. 2008. Recent advances in sediment toxicity identification evaluation methods emphasizing pyrethroid pesticides. In: Gan J-G, Hendley P, Spurlock F, Weston D. (eds), *Synthetic Pyrethroids: Occurrence and Behavior in Aquatic Environments*. American Chemical Society Books, Washington, DC.

Wheelock CE, Phillips BM, Anderson BS, Miller JL, Miller M, Hammock BD. 2008. Applications of carboxylesterase activity in environmental monitoring and Toxicity Identification Evaluations (TIEs). *Reviews of Environmental Contamination and Toxicology.* 195: 117-78.

Wheelock CE, Miller JL, Miller MJ, Phillips BM, Gee SJ, Hammock BD. 2005. Influence of container adsorption upon observed pyrethroid toxicity to *Ceriodaphnia dubia* and *Hyalella azteca*. *Aquatic Toxicol* 74: 47-55.

Hunt JW, Anderson BS, Phillips BM. 2005. Agricultural drain water toxicity mitigated by pH adjustment. Chapter 6.28. In: (Norberg-King T, Ausley L, Burton D, Goodfellow W, Miller J, Waller WT (eds.) *Toxicity Reduction Evaluations and Toxicity Identification Evaluation (TIE) for Effluent, Ambient Waters and Other Aqueous Media*. SETAC Press, Pensacola, FL.

Hunt JW, Anderson BS, Phillips BM. 2005. Toxicity identification evaluation of solid-phase sediment from San Francisco Bay, California, USA. Chapter 6.27. In: (Norberg-King T, Ausley L, Burton D, Goodfellow W, Miller J, Waller WT (eds.) *Toxicity Reduction Evaluations and Toxicity Identification Evaluation (TIE) for Effluent, Ambient Waters and Other Aqueous Media*. SETAC Press, Pensacola, FL.

Goodfellow WL, Downey P, Norberg-King TJ, Brils J, Burgess R, Phillips BM, Doi J, Matthews M. 2005. Wastewater Toxicity Identification Evaluations. In: Norberg-King TJ, Ausley LW, Burton DT, Goodfellow WL, Miller JL, Waller WT (Eds.) *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. Society of Environmental Toxicology and Chemistry (SETAC). Pensacola FL, USA 496 p.

Pesticide Research and Investigation of Source and Mitigation (PRISM)

PRISM Publications

Anderson BS, Lowe S, Phillips BM, Hunt JW, Voorhees JP, Clark SL, Tjeerdema RS. 2007. Relative sensitivities of toxicity test protocols with the amphipods *Eohaustorius estuarius* and *Ampelisca abdita*. *Ecotoxicol Environ Safety* 69: 24-31.

Wheelock C, Miller JL, Miller MJ, Phillips BM, Huntley SA, Gee SJ, Tjeerdema RS, Hammock BD. 2006. Use of carboxylesterase activity to remove pyrethroid-associated toxicity to *Ceriodaphnia dubia* and *Hyalella azteca* in toxicity identification evaluations (TIEs). *Environ Toxicol Chem*.

PRISM Reports

Holmes RW, Anderson BS, Phillips BM, Hunt JW, Crane DB, Mekebri A, Blondina G, Nguyen L, Connor V. 2008. Statewide Investigation of the Role of Pyrethroid Pesticides in Sediment Toxicity in California's Urban Waterways

Lowe S, Anderson BS, Phillips BM. 2007. Final Project Report: Investigations of Sources and Effects of Pyrethroid Pesticides in Watersheds of the San Francisco Bay Estuary. Proposition 13 PRISM Grant # 041355520. SFEI Contribution #523. San Francisco Estuary Institute, Oakland, CA

Navigating the TMDL Process: Sediment Toxicity

TMDL Publications

Phillips BM, Anderson BS, Hunt JW, Clark SL, Voorhees JP, Tjeerdema RS, Casteline J, Stewart M. 2008. Evaluation of phase II toxicity identification evaluation methods for freshwater whole sediment and interstitial water. *Chemosphere* 74: 648-653.

TMDL Reports

Anderson BS, Hunt JW, Phillips BM, Tjeerdema RS. 2006. Navigating the TMDL Process: Sediment Toxicity. Final Report- 02-WSM-2. Water Environment Research Foundation, Alexandria, VA. 198 pp.

Oil Dispersant Toxicity Evaluation

Oil Dispersant Publications

Anderson BS, Arenella-Parkerson D, Phillips BM, Tjeerdema RS, Crane D. 2009. Effects of dispersed and un-dispersed oil on developing topmelt embryos. *Environmental Pollution*.157: 1058-1061.

Lin CY, Anderson BS, Phillips BM, Peng AC, Clark SL, Voorhees JP, Hsieh F, Crane D, Viant MR, Tjeerdema RS. In Review. Metabolic Effects of Crude and Dispersed oil on Chinook Salmon Smolts (*Oncorhynchus tshawytscha*). *Aquat. Toxicol.*

Singer MM, Aurand D, Bragin GE, Clark JR, Coehlo GM, Sowby ML, Tjeerdema RS. 2000. Standardization of preparation and quantitation of water-accommodated fractions of oil and their use in aquatic toxicity testing. *Mar. Pollut. Bull.* 40, 1007–1016.

Blondina GJ, Singer MM, Lee I, Ouano T, Hodgins M, Tjeerdema RS, Sowby ML. 1999. Influence of salinity on petroleum accommodation by dispersants. *Spill Sci Tech Bull.* 5, 127–134.

Singer MM, George S, Jacobson S, Lee I, Weetman LL, Blondina GJ, Tjeerdema RS, Aurand D, Sowby ML. 1998. Effects of dispersant treatment on the acute aquatic toxicity of petroleum hydrocarbons. *Arch. Environ. Contam. Toxicol.* 34, 177–187.

Singer MM, George S, Jacobson S, Lee I, Weetman LL, Tjeerdema RS, Sowby ML. 1996. Comparison of acute aquatic effects of the oil dispersant Corexit 9500 with those of other Corexit series dispersants. *Ecotoxicol. Environ. Saf.* 35, 183–189.

Singer MM, Aurand D, Clark J, Sergy G, Sowby ML, Tjeerdema RS. 1995. CROSERF: Toward a standardization of oil spill cleanup agent ecological effects research. In: *Eighteenth Arctic Marine Oilspill Program*. Environment Canada, Ottawa, Ontario, pp. 1263–1270.

Singer MM, George S, Jacobson S, Lee I, Weetman LL, Tjeerdema RS, Sowby ML. 1995. Acute toxicity of the oil dispersant Corexit 9554 to marine organisms. *Ecotoxicol. Environ. Saf.* 32, 81–86.

Singer MM, George S, Jacobson S, Lee I, Tjeerdema RS, Sowby ML. 1994. Comparative effects of oil dispersants to the early life stages of topmelt (*Atherinops affinis*) and kelp (*Macrocystis pyrifera*). *Environ. Toxicol. Chem.* 13, 649–655.

Singer MM, George S, Benner D, Jacobson S, Tjeerdema RS, Sowby RL. 1993. Comparative toxicity of two oil dispersants to the early life stages of two marine species. *Environ. Toxicol. Chem.* 12, 1855–1863.

Tjeerdema RS, Singer MM, Smalheer DL. 1991. Continuous-flow toxicity tests using the microscopic life stages of various marine organisms. *Can. Tech. Rep. Fish. Aquat. Sci.* 1774, 348–354.

Singer MM, Smalheer DL, Tjeerdema RS. 1990. A simple continuous-flow toxicity test system for microscopic life stages of aquatic organisms. *Wat. Res.* 24, 899–903.

Oil Dispersant Reports

Tjeerdema, RS, VanScoy, A, Anderson, BS, Phillips, BM, Crane, D, McCall, J. 2008. Acute and chronic effects of dispersed oil on Chinook Salmon pre-smolts (*O. tshawytscha*). Final Report. California Department of Fish and Game – Office of Spill Prevention and Response. Sacramento, CA. 79 pp.

Tjeerdema, RS, Lin, C-Y, Anderson, BS. 2006. Acute and chronic effects of dispersed oil on Chinook Salmon smolts (*O. tshawytscha*). Final Report. California Department of Fish and Game – Office of Spill Prevention and Response. Sacramento, CA. 52 pp.

Tjeerdema, RS, Lin, C-Y, Anderson, BS, Sowby, M. 2006. Acute and chronic effects of dispersed oil on Chinook Salmon smolts (*O. tshawytscha*). Coastal Response Research Center, UNH. 52 pp.

Marine Bioassay Project (MBP)

MBP Publications

Phillips BM, Nicely PA, Anderson BS, Hunt JW, Tjeerdema RS, Palmer FH. 2005. Tolerance of Five West Coast Marine Toxicity Test Organisms to Ammonia. *Bull Environ Toxicol Contam* 75: 23-27.

Phillips BM, Nicely PA, Hunt JW, Anderson BS, Tjeerdema RS, Palmer SE, Palmer FH, Puckett HM. 2003. Toxicity of cadmium-copper-nickel-zinc mixtures to larval purple sea urchins (*Strongylocentrotus purpuratus*) and bay mussels (*Mytilus galloprovincialis*). *Bull. Environ Contam. Toxicol.* 70: 592-599.

Phillips BM, Anderson BS, Hunt JW. 1998. Spatial and temporal variation in results of purple urchin (*Strongylocentrotus purpuratus*) toxicity tests with zinc. *Environ. Toxicol. Chem.* 17(3): 453-459.

Anderson BS, Hunt JW, Piekarski WJ. 1997. Recent advances in toxicity test methods using kelp gametophytes. In: Wells, P.G., Lee, K., and Blaise, C. (eds.) *Microscale Aquatic Toxicology – Advances, Techniques and Practice*. Lewis Publishers, Boca Raton, FL. pp 255-268.

Hunt JW, Anderson BS, Phillips BM. 1997. Recent advances in microscale toxicity testing with marine mollusks. In: Wells, P.G., Lee, K., and Blaise, C. (eds.) *Microscale Aquatic Toxicology – Advances, Techniques and Practice*. Lewis Publishers, Boca Raton, FL. pp 423-436.

Hunt JW, Anderson BS, Turpen SL, Englund MA, Piekarski WJ. 1997. Precision and sensitivity of a seven-day growth and survival toxicity test using the West Coast marine mysid crustacean *Holmesimysis costata*. *Environ. Toxicol. Chem.* 16, 824-834.

Chapman GA, Anderson BS, Bailer AJ, Baird RB, Berger RB, Burton DT, Denton DL, Goodfellow WL, Hebel MA, McDonald LL, Norberg-King TJ, Ruffier PJ. 1996. Methods and Appropriate Endpoints. In: *Whole Effluent Toxicity Testing: An Evaluation of Methods and Prediction of Receiving System Impacts*. (Eds) Grothe, D.R., Dickson, K.L., Reed-Judkins, D.K. SETAC Press, Pensacola, FL. p 41-78.

Conroy PT, Hunt JW, Anderson BS. 1996. Validation of a short-term toxicity test endpoint by comparison with longer-term effects on larval red abalone *Haliotis rufescens*. *Environ. Toxicol. Chem.* 15 (7), 1245-1250.

Anderson BS, Hunt JW, Piekarski WJ, Phillips BM, Englund MA, Tjeerdema RS, Goetzl JD. 1995. Influence of salinity on copper and azide toxicity to larval topsmelt *Atherinops affinis* (Ayres). *Arch. Environ. Contam. Toxicol.* 29: 366-372.

Turpen SL, Hunt JW, Anderson BS, Pearse JS. 1994. Population structure, growth, and fecundity of the kelp forest mysid *Holmesimysis costata* in Monterey Bay, California. *J. Crustac. Biol.* 14(4), 657-664.

Anderson BS, Hunt JW, McNulty HR, Turpen SL, Martin M. 1994. Off-season spawning and factors influencing toxicity test development with topsmelt *Atherinops affinis*. *Environ. Toxicol. Chem.* 13(3), 479-485.

McNulty HR, Anderson BS, Hunt JW, Turpen SL, Singer MM. 1994. Age-specific toxicity of copper to larval topsmelt *Atherinops affinis*. *Environ. Toxicol. Chem.* 13(3), 487-492.

Middaugh DP, Anderson BS. 1993. Utilization of topsmelt, *Atherinops affinis*, in environmental toxicology studies along the Pacific coast of the United States. *Rev. Environ. Toxicol.* 5, 1-49.

Thursby GB, Anderson BS, Walsh GE, Steele RL. 1993. A review of the current status of marine algal toxicity testing in the United States. *Environmental Toxicology and Risk Assessment*, ASTM STP 1179, Wayne G. Landis, Jane S. Hughes, and Michael A. Lewis, Eds, American Society for Testing and Materials, Philadelphia, pp 362-377.

Hunt JW, Anderson BS. 1993. From research to routine: A review of toxicity testing with marine molluscs. *Environmental Toxicology and Risk Assessment*, ASTM STP 1179, Wayne G. Landis, Jane S. Hughes, and Michael A. Lewis, Eds, American Society for Testing and Materials, Philadelphia, pp 320-339.

Middaugh DP, Anderson BS, Hemmer M. 1992. Laboratory spawning of topsmelt *Atherinops affinis* with notes on culture and growth of larvae. *Environ. Tox. and Chem.* 1 (3), 393-400.

Anderson BS, Middaugh DP, Hunt JW, Turpen SL. 1991. Copper toxicity to sperm, embryos, and larvae of topsmelt *Atherinops affinis*, with notes on induced spawning. *Mar. Environ. Res.* 31, 17-35.

Anderson BS, Hunt JW, Turpen SL, Coulon AR, Martin M. 1990. Copper toxicity to microscopic stages of *Macrocystis pyrifera*: interpopulation comparisons and temporal variability. *Mar. Ecol. Prog. Ser.* 68 (1-2), 147-156.

Martin M, Hunt JW, Anderson BS, Turpen SL, Palmer FH. 1989. Experimental evaluation of the mysid *Holmesimysis costata* as a test organism for effluent toxicity testing. *Environ. Tox. and Chem.* 8: 1003-1012.

Hunt JW, Anderson BS. 1989. Sublethal effects of zinc and municipal sewage effluents on larvae of the red abalone *Haliotis rufescens*. *Mar. Biol.* 101 (4): 545-552.

Anderson BS, Hunt JW. 1988. Bioassay methods for evaluating the toxicity of heavy metals, biocides, and sewage effluent using microscopic stages of giant kelp *Macrocystis pyrifera* (Agardh): A preliminary report. *Mar. Environ. Res* 26: 113-134.

MBP Reports

Phillips BM, Anderson BS, Hunt JW, Tjeerdema RS, Beegan C, Palmer FH. 2004. Marine Bioassay Project, Twelfth Report. California State Water Resources Control Board and California Environmental Protection Agency.

Phillips BM, Nicely PA, Hunt JW, Anderson BS, Tjeerdema RS, Palmer SE, Palmer FH. 2003. Marine Bioassay Project, Eleventh Report. California State Water Resources Control Board and California Environmental Protection Agency.

Phillips BM, Nicely PA, Hunt JW, Anderson BS, Tjeerdema RS, Palmer SE, Palmer FH. 2000. Marine Bioassay Project Tenth Report: Metal, Ammonia, Sediment, and Artificial Salt Toxicity Evaluations on Marine Test Organisms. Final Report to the State Water Resources Control Board, Sacramento, CA. pp 127.

Anderson BS, Phillips BM, Hunt JW, Stephenson M, Puckett HM, Reeve M, Palmer FH. 1998. Marine Bioassay Project, Ninth Report: Investigations of Receiving Water Toxicity in Coastal Waters. State Water Resources Control Board and California Environmental Protection Agency.

Hunt, J.W., B.S. Anderson, S.L. Tudor, M.D. Stephenson, H.M. Puckett, F.H. Palmer, and M. Reeve. 1996. Marine Bioassay Project Eighth Report: Refinement and implementation of four effluent toxicity testing methods using indigenous marine species. California State Water Resources Control Board Report Number 96-4WQ. Sacramento, CA. 109 pp.

Anderson, B.S., J.W. Hunt, H.R. McNulty, M. Stephenson, F.H. Palmer, M. Reeve, and D.L. Denton. 1993. Marine Bioassay Project Seventh Report: Refinement of effluent toxicity testing protocols for four marine species. Water Resources Control Board Report No. 94-2WQ. Sacramento, CA. 124 pp.

Hunt, J.W., B.S. Anderson, S.L. Turpen, H.R. Barber, M. Martin, D.L. McKeown, F.H. Palmer. 1991. Marine Bioassay Project Sixth Report: Interlaboratory comparisons and protocol development with four marine species. California State Water Resources Control Board Report Number 91-6WQ. Sacramento, CA. 204 pp.

Anderson, B.S., J.W. Hunt, S.L. Turpen, A.R. Coulon, M. Martin, D.L. McKeown and F.H. Palmer. 1990. Procedures manual for conducting toxicity tests developed by the Marine Bioassay Project. California State Water Resources Control Board 90 - 10WQ. Sacramento, California. 113 p.

Anderson, B.S., J.W. Hunt, S.L. Turpen, A.R. Coulon, M. Martin, and F.H. Palmer. 1990. Marine Bioassay Project - Fifth Report - Protocol development and interlaboratory testing with complex effluents. California State Water Resources Control Board. Sacramento, California. 183 p.

Hunt, J.W., B.S. Anderson, S.L. Turpen, A.R. Coulon, M. Martin, J.J. Janik, and F.H. Palmer. 1989. Marine Bioassay Project - Fourth Report - Experimental evaluation of effluent toxicity testing protocols with giant kelp, mysids, red abalone, and topsmelt. California State Water Resources Control Board. Sacramento, California. 143 p.

Anderson, B.A., J.W. Hunt, M. Martin, and F.H. Palmer. 1987. Marine Bioassay Project - Third Report - Protocol development: reference toxicant and initial complex effluent testing. California State Water Resources Control Board. Sacramento, California. 130 p.

Martin, M., J.W. Hunt, B.S. Anderson, L. Espinosa, and F.H. Palmer. 1986. Marine Bioassay Project - Second Report - Acute toxicity tests with red abalone, mysid shrimp, and giant kelp. California State Water Resources Control Board. Sacramento, California. 65 p.

Bay Protection and Toxic Cleanup Program (BPTCP)

BPTCP Publications

Fairey R, Long ER, Roberts CA, Anderson BS, Phillips BM, Hunt JW, Puckett HR, Wilson CJ. 2001. An evaluation of methods for calculating mean sediment quality guideline quotients as indicators of contamination and acute toxicity to amphipods by chemical mixtures. *Environ. Toxicol. Chem.* 20(10): 2276-2286

Hunt JW, Anderson BS, Phillips BM, Newman J, Tjeerdema R, Fairey R, Puckett HM, Stephenson M, Smith RW, Wilson CJ, Taberski KM. 2001. Evaluation and use of sediment toxicity reference sites for statistical comparisons in regional assessments. *Environ. Toxicol. Chem.* 20: 1266-1275.

Hunt JW, Anderson BS, Phillips BM, Tjeerdema R, Taberski KM, Wilson CJ, Puckett HM, Stephenson M, Fairey R, Oakden J. 2001. A large-scale categorization of sites in San Francisco Bay, USA, based on the sediment quality triad, toxicity identification evaluations, and gradient studies. *Environ. Toxicol. Chem.* 20 (6): 1252-1265.

Phillips BM, Hunt JW, Anderson BS, Puckett MH, Fairey R, Wilson CJ, Tjeerdema RS. 2001. Statistical significance of sediment toxicity test results: Threshold values derived by the detectable significance approach. *Environ. Toxicol. Chem.* 20: 371-373.

Anderson BS, Hunt JW, Phillips BM, Fairey RJ, Roberts CA, Oakden JM, Puckett HM, Stephenson M, Tjeerdema RS, Long ER, Wilson CJ, Lyons M. 2001. Sediment quality in Los Angeles Harbor, USA: A triad assessment. *Environ. Toxicol. Chem.* 20(2): 359-370.

Anderson BS, Hunt JW, Phillips BM, Fairey R, Puckett HM, Stephenson M, Taberski KT, Newman J, Tjeerdema RS. 2001. Influence of sample manipulation on contaminant flux and toxicity at the sediment-water interface. *Mar. Environ. Res.* 51: 191-211.

Fairey R, Roberts C, Jacobi M, Lamerdin S, Clark R, Downing J, Long E, Hunt J, Anderson B, Newman J, Tjeerdema RS, Stephenson M, Wilson CJ. 1998. Assessment of sediment toxicity and chemical concentrations in the San Diego Bay region, California, USA. *Environ. Toxicol. Chem.* 17(8): 1570-1581.

Anderson BS, Hunt JW, Phillips BM, Tudor S, Fairey R, Newman J, Puckett HM, Stephenson M, Long ER, Tjeerdema RS. 1998. Comparison of marine sediment toxicity test protocols for the amphipod *Rhepoxynius abronius* and the polychaete worm *Nereis (Neanthes) arenaceodentata*. *Environ. Toxicol. Chem.* 17(5): 859-866.

Chapman PM, Anderson BS, Carr RS, Engle V, Green R, Hameedi J, Harmon M, Haverland P, Hyland J, Ingersoll C, Long E, Rodgers J, Salazar M, Sibley S, Smith P, Swartz R, Thompson B, Windom H. 1997. General guidelines for using the Sediment Quality Triad. *Mar. Poll. Bull.* 34(6): 368-372.

Phillips BM, Anderson BS, Hunt JW. 1997. Measurement and distribution of interstitial and overlying water ammonia and hydrogen sulfide in sediment toxicity tests. *Mar. Environ. Res.* 44(2): 117-126.

Anderson BS, Hunt JW, Hester M, Phillips BM. 1996. Assessment of sediment toxicity at the sediment-water interface. In: G.K. Ostrander (ed.) *Techniques in Aquatic Toxicology*. Lewis Publishers, Ann Arbor, MI.

BPTCP Reports

Downing, J., Jacobi, M., Fairey, R.F., Roberts, C., Clark, R., Anderson, B.S., Hunt, J.W., Tjeerdema, R.S., Oakden, J., Wilson, C.J., Kapahi, G., Stephenson, M.D., Puckett, H.M. 1998. Chemistry, toxicity and benthic community conditions in selected sediments of the Central Coast Region. Final Report, State Water Resources Control Board, Sacramento California. pp 75.

Jacobi, M., Fairey, R.F., Roberts, C., Clark, R., Downing, J., Anderson, B.S., Hunt, J.W., Tjeerdema, R.S., Oakden, J., Wilson, C.J., Kapahi, G., Stephenson, M.D., Puckett, H.M. 1998. Chemistry, toxicity and benthic community conditions in selected sediments of the North Coast Region. Final Report, State Water Resources Control Board, Sacramento California. pp 85.

Phillips BM, Hunt JW, Anderson BS, Newman J, Tjeerdema RS, Wilson CJ, Long ER, Stephenson M, Puckett HM, Fairey R, Oakden J, Dawson S, Smythe H. 1998. Sediment chemistry, toxicity, and benthic community conditions in selected water bodies of the Santa Ana region. Final Report for the Bay Protection and Toxic Cleanup Program. California State Water Resources Control Board.

Anderson BS, Hunt JW, Phillips BM, Newman J, Tjeerdema RS, Wilson CJ, Kapahi G, Stephenson M, Puckett HM, Fairey R, Oakden J, Lyons M, Birocik S. 1998. Chemistry, toxicity and benthic community conditions in selected sediments of the Los Angeles Region. Final Report for the Bay Protection and Toxic Cleanup Program. California State Water Resources Control Board.

Hunt JW, Anderson BS, Phillips BM, Newman J, Tjeerdema RS, Taberski KM, Wilson CJ, Stephenson M, Puckett HM, Fairey R, Oakden J. 1998. Sediment Quality and Biological Effects in San Francisco Bay. Final Report for the Bay Protection and Toxic Cleanup Program. California State Water Resources Control Board.

Hunt, JW, Anderson BS, Phillips BM, Newman J, Tjeerdema RS, Stephenson M, Puckett HM, Fairey R, Smith RW, Taberski KM. 1998. Evaluation and use of sediment reference sites and toxicity tests in San Francisco Bay. Final Report. California State Water Resources Control Board.

Hunt JW, Anderson BS, Phillips BM. 1998. Bay Protection and Toxic Cleanup Program: Studies to Identify Toxic Hot Spots in the San Francisco Bay Region. San Francisco Estuary Regional Monitoring Program for Trace Substances 1997 Annual Report. pp 132-139.

Anderson, B.S., Hunt, J.W., Tudor, S., Newman, J., Tjeerdema, R.S., Fairey, R., Oakden, J., Bretz, C., Wilson, C.J., LaCaro, F., Stephenson, M.D., Puckett, H.M., Long, E.R., Fleming, T., and K. Summers. 1997. Chemistry, toxicity and benthic community conditions in sediments of selected southern California bays and estuaries. Final Report, State Water Resources Control Board, Sacramento California. pp 140.

Fairey, R.S., Bretz, C., Lamerdin, S., Hunt, J.W., Anderson, B.S., Tudor, S., Wilson, C.J., LaCaro, F., Stephenson, M.D., Puckett, H.M., Long, E.R. 1996. Chemistry, toxicity, and benthic community conditions of selected sediments of the San Diego Bay region. Final Report. State Water Resources Control Board, Sacramento California. pp 162.

Sapudar, R.A., C.J. Wilson, M.L. Reid, E.R. Long, M. Stephenson, H.M. Puckett, R.A. Fairey, J.W. Hunt, B.S. Anderson, D.R. Holstad, J.W. Newman, and S. Birocik. 1994. Sediment chemistry and toxicity in the vicinity of the Los Angeles and Long Beach Harbors. Project report for the State Water Resources Control Board and the National Oceanic and Atmospheric Administration. 77 pp.

San Francisco Bay Regional Monitoring Program (RMP)

RMP Publications

Greenstein D, Bay S, Anderson BS, Chandler GT, Farrar JD, Keppler C, Phillips BM, Ringwood A, Young D. 2008. Comparison of Methods for Evaluating Acute and Chronic Toxicity in Marine Sediments. *Environ Toxicol Chem.* 27: 933-944.

Anderson BS, Hunt JW, Phillips BM, Thompson B, Lowe S, Taberski K, Carr RS. 2007. Patterns and trends in sediment toxicity in the San Francisco estuary. *Env Research.* 105 : 145-155.

Phillips BM, Anderson BS, Hunt JW, Thompson B, Lowe S, Hoenicke R, Tjeerdema RS. 2003. Causes of sediment toxicity to *Mytilus galloprovincialis* in San Francisco Bay, California. *Arch. Environ Contam. Toxicol.* 45: 486-491.

Thompson B, Anderson B, Hunt J, Taberski K, Phillips B. 1999. Relationships between sediment contamination and toxicity in San Francisco Bay. *Mar. Environ. Res.* 48: 285-309.

RMP Reports

Phillips BM, Anderson BS, Hunt JW. 2008. RMP Sediment TIE Study 2007-2008: Using Toxicity Identification Evaluation (TIE) Methods to Investigate Causes of Sediment Toxicity to Amphipods. Data Summary and Final Report. San Francisco Estuary Institute, Oakland, CA.

Anderson BS, Phillips BM, Hunt JW. 2001. Sediment Toxicity Identification Evaluations San Francisco Bay RMP for Trace Substances - Progress Report. San Francisco Estuary Institute, Richmond, CA.

Phillips BM, Anderson BS, Hunt JW. 2000. Investigations of Sediment Elutriate Toxicity at Three Estuarine Stations in San Francisco Bay, California. San Francisco Estuary Regional Monitoring Program for Trace Substances 1998 Annual Report.

Anderson BS, Hunt JW, Phillips BM, Sericano J. 2000. Investigations of Chemicals Associated with Amphipod Mortality at Two Regional Monitoring Program Stations. San Francisco Estuary Regional Monitoring Program for Trace Substances 1998 Annual Report.

Phillips BM, Anderson BS, Hunt JW. 1998. Further Investigations of Classes of Compounds Associated with Sediment Toxicity at Regional Monitoring Program River Stations. San Francisco Estuary Regional Monitoring Program for Trace Substances 1997 Annual Report. pp 148-156.

Phillips BM, Anderson BS, Hunt JW. 1997. Investigating classes of compounds associated with sediment toxicity at Regional Monitoring Program River Stations. San Francisco Estuary Regional Monitoring Program for Trace Substances 1996 Annual Report. pp 118-128.

Thompson B, Anderson BS, Hunt JW, Taberski KM, Phillips BM. 1997. Relationships between sediment toxicity and contamination in San Francisco Bay, Summary and Conclusions. San Francisco Estuary Regional Monitoring Program for Trace Substances 1996 Annual Report. pp 109-117.

Thompson, B., Hunt, J.W, Anderson, B.S. 1995. Patterns in sediment toxicity: 1991-1995. In: Regional Monitoring Program for trace substances - RMP 1995 annual report. San Francisco Estuary Institute. 324 pp.

Flegal, A.R., R.W. Riseborough, B.S. Anderson, J.W. Hunt, S. Anderson, J. Oliver, M. Stephenson, and R. Packard. 1994. San Francisco Estuary Pilot Regional Monitoring Program: Sediment Studies. Final Report to the San Francisco Regional Water Quality Control Board. July, 1994. 125 pp

Additional Projects, Reports, and Publications

NOAA Environmental Monitoring and Assessment

Phillips BM, Anderson BS. 2003. Measures of Biological Effects Associated with Sediment Contamination in San Francisco Bay: Toxicity to Amphipods. Final Report. National Oceanic and Atmospheric Administration.

Office of Environmental Health Hazard Assessment

Anderson BS, Nicely PA, Hunt JW, Phillips BM. 2001. Guidance on Application of Freshwater and Marine Aquatic Toxicity Tests for Hazard Assessment in California Waters. Technical Report to the Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. pp 165.

Lauritzen Channel Superfund

Anderson BS, Hunt JW, Phillips BM, Stoelting M, Becker J, Fairey RJ, Puckett HM, Stephenson M, Tjeerdema RS, Martin M. 2000. Ecotoxicological change at a remediated Superfund site in San Francisco, California, USA. *Environ. Toxicol. Chem.* 19(4): 879-887.

San Jose Sanitation District Nickel Project

Hunt JW, Anderson BS, Phillips BM, Tjeerdema RS, Puckett HM, Stephenson M, Tucker DW, Watson D. 2002. Acute and chronic toxicity of nickel to marine organisms: implications for water quality criteria. *Environ Toxicol Chem.* 21: 2423-2430.

Elkhorn Slough and Moss Landing Harbor

Phillips BM, Stephenson M, Jacobi M, Ichikawa G, Brown M, Silberstein M, Caffrey J. 2003. Land use and contaminants in Elkhorn Slough *in* Changes in a California Estuary: A Profile of Elkhorn Slough, Caffrey J, Brown M, Tyler WB, (eds.) Elkhorn Slough Foundation.

Anderson BS, Hunt JW, Phillips BM, Nicely PA, Martin M, Tjeerdema RS. 2004. Comparison of *in situ* and laboratory toxicity tests with the estuarine amphipod *Eohaustorius estuarius*. *Arch Environ Contam Toxicol.* 46: 52-60.

San Diego Bay Total Maximum Daily Load

Anderson BS, Nicely PA, Phillips BM, Hunt JW. 2004. Sediment quality assessment study at the B Street/Broadway Piers, Downtown Anchorage, and Switzer Creek, San Diego Bay, California. Technical report, Regional Water Quality Control Board, San Diego, CA. 142 pp with Appendices.