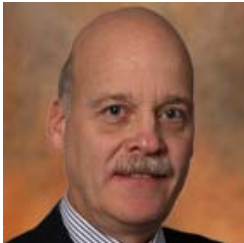




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D. Scott Becker, Ph.D.
Managing Scientist

PROFESSIONAL PROFILE

Dr. Scott Becker is an ecotoxicologist specializing in sediment quality evaluations, sediment toxicity testing, benthic ecology, fish ecology, and fish pathology. He has directed a wide variety of projects related to the ecological effects of toxic chemicals in freshwater, estuarine, and marine sediments throughout the United States. Dr. Becker has conducted numerous ecological risk assessments (ERAs) and natural resource damage assessments (NRDAs) to evaluate potential injuries to benthic macroinvertebrates, fishes, and aquatic-dependent wildlife at a variety of Superfund, RCRA, and other kinds of sediment sites. He is a co-developer of the apparent effects threshold (AET) approach for establishing sediment quality guidelines (SQGs), and he used that approach to help develop the sediment management standards for Washington State. Dr. Becker has used the most recent advances in sediment science to evaluate chemical toxicity at various sediment sites, including development of site-specific SQGs, use of the SQG quotient approach, use of toxicity identification evaluations (TIEs), and evaluation of metals bioavailability using acid volatile sulfide (AVS), simultaneously extracted metals (SEM), chemical speciation and electron microprobe analysis.

Dr. Becker has also evaluated the effects of sewage disposal, pulp mill effluents, and dredge-spoil dumping on sedimentary environments. He has authored a variety of journal publications and technical reports, and has chaired regional workshops to develop standardized environmental sampling protocols for Puget Sound. Dr. Becker has given technical presentations to numerous state and federal agencies, and he has participated in negotiations of remedial actions with multiple stakeholder groups. He has helped design remediation plans that included dredging, containment capping, thin layer placement, and monitored natural recovery (MNR). He has also helped design remedial plans that optimize habitat, including enhancements of macrophyte beds, soft-bottom benthic habitat, fish spawning and nursery areas, wetlands, and shoreline stabilization.

CREDENTIALS AND PROFESSIONAL HONORS

Ph.D., Fisheries, University of Washington, Seattle, Washington, 1984

M.S., Marine Environmental Science, State University of New York, Stony Brook,
New York, 1978

B.S., Biology, State University of New York, Brockport, New York, 1973

CONTINUING EDUCATION AND TRAINING

Hazardous Waste Operations Management and Supervisor 8-hour Certification (2005)
Hazardous Waste Operations and Emergency Response 40-hour Certification (1984)
SCUBA Certification, Professional Association of Diving Instructors (1976)
New York State Teaching Certification, Secondary Science (1973)

PROFESSIONAL AFFILIATIONS

Society of Environmental Toxicology and Chemistry (SETAC)
American Fisheries Society (AFS)
American Institute of Fishery Research Biologists (AIFRB)
North American Benthological Society (NABS)

RELEVANT EXPERIENCE

Ecological Risk Assessment

Upper Columbia River (UCR) Ecological Risk Assessment, Washington—Played a lead role in developing the RI/FS and ERA work plans to evaluate potential effects of metals on the UCR ecosystem. Made numerous stakeholder presentations on historical information and plans for future studies.

Onondaga Lake Baseline Ecological Risk Assessment, New York—Led ERA to determine the effects of metals (especially mercury) and organic compounds (i.e., polycyclic aromatic hydrocarbons [PAHs], polychlorinated biphenyls [PCBs], chlorinated benzenes) on phytoplankton, zooplankton, macrophytes, benthic macroinvertebrates, fishes, and aquatic-dependent wildlife in Onondaga Lake. Developed site-specific SQGs and used them in a quotient approach to identify sediments that warranted remediation.

Acid Brook Delta Ecological Evaluation, New Jersey—Directed an ERA on the effects of metals (especially mercury) on benthic macroinvertebrates, fishes and aquatic-dependent wildlife in Pompton Lake. Demonstrated that actual risks were less than those predicted using generic SQGs.

Ward Cove Sediment Investigation, Alaska—Led ERA on the effects of ammonia, sulfide, and 4-methylphenol on benthic macroinvertebrate communities near a pulp mill in Ward Cove. Used TIEs to demonstrate that sediment toxicity was the result of natural degradation products of organic matter and that thin layer placement, rather than containment capping, was an appropriate remedy.

Harris Lake Ecological Evaluation, Michigan—Managed ERA on the effects of metals on benthic macroinvertebrates, fishes, and aquatic-dependent wildlife in Harris Lake. Documented that remediation was warranted only in the littoral zone, because the profundal zone was adversely affected by hypoxia on an annual basis.

Ecological Risk Assessment, Texas—Directed an ERA on the effects of metals on benthic macroinvertebrates, fishes, and aquatic-dependent wildlife in a bayou system near Orange,

Texas. Documented that metals were not bioavailable in most parts of study area and that remediation was warranted only near the discharge point.

Baseline Ecological Evaluation, New Jersey—Managed ERA on the effects of metals, PAHs, and PCBs on benthic macroinvertebrates in Gold Run. Documented that only a small portion of the site required additional assessment.

Evaluation of Effects of Mine Releases, Alaska—Served as technical lead for ERA on the effects of mine discharges on benthic macroinvertebrate communities in Gold Creek.

Demonstrated that a previous fish kill was the result of stream drawdown by the City of Juneau rather than mine releases.

Natural Resource Damage Assessment

Injury Assessment for Freshwater Communities, New York—Led an NRDA to evaluate potential injuries to water, sediments, plankton, benthic macroinvertebrates, fishes, and aquatic-dependent wildlife in Onondaga Lake. Documented that the hypereutrophic conditions in the lake were more detrimental to most of the resident ecological communities than chemical releases.

Injury Assessment for Benthic Macroinvertebrates, New York—Directed an NRDA on the effects of PCBs on benthic macroinvertebrates in the Hudson River and prepared a critical evaluation of the sediment effect concentrations (SECs) for PCBs. Documented that adverse effects were not found at PCB concentrations that exceeded the SECs by a substantial margin.

Injury Assessment for Fishes, Montana—Served as technical lead for an NRDA on the effects of mining wastes on the trout fishery in the Clark Fork River. Documented that the services provided by the fishery were strongly limited by physical alterations of the river, rather than chemical releases.

Injury Assessment for Benthic Macroinvertebrates, Idaho—Directed an NRDA on the effects of metals and mine tailings on benthic macroinvertebrates in the Coeur d'Alene River. Documented that the physical effects of the mine tailings were more detrimental to the benthic communities than metals concentrations.

Injury Assessment for Benthic Macroinvertebrates, New York—Conducted NRDA evaluations on the effects of PCBs and PAHs on benthic macroinvertebrates in the St. Lawrence River. Conducted a detailed critical evaluation of the validity of the SECs for PCBs as part of this effort.

Injury Assessment for Marine Communities, California—Directed an NRDA on the effects of DDT and PCBs on benthic macroinvertebrates and demersal fishes offshore from Los Angeles for the National Oceanic and Atmospheric Administration (NOAA).

Other Kinds of Ecological Assessments

Evaluation of Chromium Bioavailability, New Jersey—Directed a focused field study to evaluate the toxicity and bioavailability of chromium associated with chromite ore processing

residue using a concentration-response approach in the Hackensack River. Developed a site-specific no-effect level for chromium that was more than three times greater than the sediment criterion used by the State of New Jersey.

Onondaga Lake Feasibility Study—Developed a SQG quotient approach using site-specific SQGs to integrate the potential effects of 44 chemical of concern and delineate areas for sediment remediation and MNR in Onondaga Lake. The approach was calibrated using site-specific toxicity data and broke a long-term stalemate with the State of New York as to how to effectively address the large number of chemicals of concern identified at the site.

Commencement Bay Remedial Investigation/Feasibility Study, Tacoma, Washington—Directed studies of benthic macroinvertebrates and fish ecology/pathology for the Commencement Bay RI/FS, codeveloped the AET approach for developing SQGs, and helped to develop the sediment management standards for the Washington State Department of Ecology.

Puget Sound Estuary Program Technical Support (EPA Region 10), Washington—Directed studies of benthic macroinvertebrates and fish ecology/pathology for the Urban Bay Action Programs for Elliott Bay and Everett Harbor. Directed development of the Puget Sound protocols, conducted field evaluations of candidate sediment toxicity tests for use in Puget Sound, developed reference area performance standards for Puget Sound, evaluated effects of sediment storage time on sediment toxicity tests, and directed a study of PCB bioaccumulation in Puget Sound harbor seals.

PUBLICATIONS AND PRESENTATIONS

Becker, D.S., J.E. Sexton, and L.A. Jacobs. (In prep.). Use of thin layer placement for sediment remediation in Ward Cove, AK (USA): Results after seven years of ecological recovery. *Environ. Toxicol. Chem.*

Becker, D.S., J.E. Sexton, L.A. Jacobs, B. Hogarty, and K. Keeley. 2009. Biological responses to sediment remediation based on thin layer placement near a former pulp mill in Ward Cove, AK (USA). *Environ. Monitor. Assess.* 154:427-438.

Becker, D.S., and P.R. Paquin. 2009. Sediment toxicity in the Upper Columbia River, Washington in relation to acid volatile sulfide and simultaneously extracted metals. Platform presentation at the 2009 Society for Environmental Toxicology and Chemistry Conference in New Orleans, Louisiana. Integral Consulting Inc., Mercer Island, WA.

Becker, D.S., and T.C. Ginn. 2008. Critical evaluation of the sediment effect concentrations for polychlorinated biphenyls. *IEAM* 4(2):156-170.

Becker, D.S., J.E. Sexton, and L.A. Jacobs. 2008. Use of thin layer placement for sediment remediation in Ward Cove, AK (USA): Results after seven years of ecological recovery. Platform presentation at the Fifth International Conference on Remediation of Contaminated Sediments, Jacksonville, Florida. Integral Consulting Inc., Mercer Island, WA.

- Becker, D.S., L.A. Jacobs J.E. Sexton, B. Hogarty, and K. Keeley. 2007. Biological responses to thin layer capping of organically enriched sediments near a former pulp mill in Ward Cove, Alaska. Platform presentation at the Fourth International Conference on Remediation of Contaminated Sediments, Savannah, Georgia. Integral Consulting Inc., Mercer Island, WA.
- Becker, D.S., E.R. Long, D.A. Proctor, and T.C. Ginn. 2006. Evaluation of toxicity and bioavailability of chromium in sediments associated with chromite ore processing residue. *Environ. Toxicol. Chem.* 25(10):2576-2583.
- Becker, D.S. 2005. Evaluation of the toxicity of chromium in sediments of the Hackensack River, New Jersey. Presentation at the Eighth International *In Situ* and Onsite Bioremediation Symposium, Baltimore, MD. Exponent, Inc., Bellevue, WA.
- Becker, D.S., and G.N. Bigham. 1995. Distribution of mercury in the aquatic food web of Onondaga Lake. *Water Air Soil Pollut.* 80:563–571.
- Becker, D.S., and T.C. Ginn. 1995. Effects of storage time on toxicity of sediments from Puget Sound, Washington. *Environ. Toxicol. Chem.* 14(5):829–835.
- Becker, D.S., C.D. Rose, and G.N. Bigham. 1995. Comparison of the 10-day freshwater sediment toxicity tests using *Hyaella azteca* and *Chironomus tentans*. *Environ. Toxicol. Chem.* 14(12):2089–2094.
- Becker, D.S., T.C. Ginn, and G.R. Bilyard. 1990. Comparisons between sediment bioassays and alterations of benthic macroinvertebrate assemblages at a marine Superfund site: Commencement Bay, Washington. *Environ. Toxicol. Chem.* 9:669–685.
- Pastorok, R.A., and D.S. Becker. 1990. Comparative sensitivity of sediment toxicity bioassays at three Superfund sites in Puget Sound. pp. 123–139. In: *Aquatic Toxicology and Risk Assessment: Thirteenth Volume*, ASTM STP 1096. W.G. Landis and W.H. van der Schalie (eds.). American Society for Testing and Materials, Philadelphia, PA.
- Barrack, R.C., H.R. Beller, D.S. Becker, and T.C. Ginn. 1989. Use of the apparent effects threshold (AET) approach in classifying contaminated sediments. In: *Contaminated Marine Sediments – Assessment and Remediation*, National Academy Press, Washington, DC.
- Becker, D.S. 1988. Relationships between sediment character and sex segregation in English sole, *Parophrys vetulus*. *Fish. Bull.* 86:471–479.
- Becker, D.S., and J.W. Armstrong. 1988. Development of regionally standardized protocols for marine environmental studies. *Mar. Pollut. Bull.* 19:310–313.
- Becker, D.S., and K.K. Chew. 1987. Predation on *Capitella* spp. by small-mouthed pleuronectids in Puget Sound, Washington. *Fish. Bull.* 85:471–479.
- Becker, D.S., T.C. Ginn, M.L. Landolt, and D.B. Powell. 1987. Hepatic lesions in English sole (*Parophrys vetulus*) from Commencement Bay, Washington (USA). *Mar. Environ. Res.* 23:153–173.