

## Marc Beutel

### *Sustainable Control of Dilute Pollutants in the Environment*

Dr. Beutel is interested in evaluating how aquatic ecosystems can be mimicked and optimized in engineered “natural treatment systems” to treat various types of dilute wastewaters while enhancing the needs of aquatic biota. Compared to traditional treatment systems, natural treatment systems have a number of advantages including low energy use, low chemical demands, ability to treat dilute non-point source pollution, enhanced sustainability of treatment processes, and significant ancillary benefits to wildlife.

Dr. Beutel is currently studying two classes of contaminants of critical importance to the sustainability of human populations and the environment they inhabit: organic pollutants and mercury. Constructed wetlands show promise in controlling many organic pollutants, however there is a lack of knowledge on detailed removal pathways and the effect of wetland plant species on removal of specific pollutants. Dr. Beutel is examining how common wetland plants with varying carbon quality and peat formation characteristics affect the removal of pervasive pesticides. He is also interested in developing semi-natural “unit processes” (e.g., the addition of benign oxidants, reductants, or co-metabolites) as well as specific management strategies (e.g., wet/dry cycles) to optimize the removal of organic pollutants in natural treatment systems.

An additional focus of Dr. Beutel’s research program is mercury contamina-



tion in aquatic ecosystems. Mercury is transported in the atmosphere over long distances, thereby contaminating aquatic ecosystems far from direct sources and complicating source control efforts. Dr. Beutel is currently examining the effects of dissolved oxygen levels at the sediment-water interface on the production and release of methylmercury from lake sediments. Increased oxygen at the sediment-water interface is hypoth-

esized to decrease the release of this potent toxin by inhibiting the activity of microorganisms that methylate mercury. Lake oxygenation, the use of engineered systems to add dissolved oxygen to natural waters through the controlled release of pure oxygen gas, is a technology that Dr. Beutel has studied extensively for nutrient and metals control. His research will help evaluate if this technology can also be used to control mercury contamination in lakes and reservoirs.

**Contact Information:**  
**Marc Beutel, Ph.D.**  
 Assistant Professor  
 Department of Civil and Environmental Engineering  
 Washington State University  
 Pullman, WA 99164-2910  
 Telephone: 509-335-3721  
 E-mail: [mbeutel@wsu.edu](mailto:mbeutel@wsu.edu)

#### MARC BEUTEL

Dr. Marc Beutel has been assistant professor at Washington State University since fall of 2004. He grew up on the California coast in Santa Barbara, where he developed a keen interest and respect for the natural environment. After earning a B.S. at UCLA, he worked for a large water utility. He then earned a M.S. and Ph.D. in Environmental Engineering from UC Berkeley. His doctoral research focused on nutrient, metal, and dissolved oxygen fluxes at the sediment-water interface of lakes. After a nine-month fellowship at the Kastanienbaum Limnological Institute on Lake Lucerne, Switzerland, he joined Brown and Caldwell, a national environmental engineering consulting firm. He is an active member of the North American Lake Management Society, and he chairs a session on lake management each year at the society’s annual conference.

