

UEBL Projects

Project: Evaluation of ecosystem impacts associated with fate, bioavailability and accumulation of highway infrastructure derived materials

Summary: Stormwater ponds are an increasingly common feature in urban landscapes. These structures are designed to store runoff from impervious surfaces, promote infiltration and retain sediments. Several classes of contaminants such as trace metals, pesticides, polycyclic aromatic hydrocarbons and nutrients tend to sorb to particle surfaces and can be transported along with suspended solids into retention ponds. Impervious surfaces often contribute to nonpoint source trace metal loading in urbanized landscapes. Several studies have implicated road runoff, and particularly tire wear debris, as a source of Zn while break wear debris can be a significant source of Cu. Stormwater retention ponds also serve as wildlife habitat even though this is not always a criterion of their design. Because these ponds are designed to retain stormwater and particulates originating from impervious surfaces, organisms inhabiting stormwater ponds may be exposed to elevated levels of trace metals. Research in the UEBL has evaluated the chemical composition of stormwater and stormwater pond sediments and investigated the influence of contaminants on the health, diversity and abundance of organisms utilizing stormwater infrastructure as habitat.

Products:

Casey, R.E., A.N. Shaw, L.R. Massal, J.W. Snodgrass. 2005. Multimedia evaluation of trace metal distribution within stormwater retention ponds in suburban Maryland, USA. *Bull. Environ. Contam. Toxicol.* 74:273-280. [Link to Full Article](#)

Casey, R.E., J.A. Simon, S. Atueyi, J.W. Snodgrass, N. Karouna-Renier, D.W. Sparling. 2007. Temporal trends of trace metals in sediment and invertebrates from stormwater management ponds. *Water Air Soil Pollut.* 178:69-77. [Link to Full Article](#)

Massal, L.R., J.W. Snodgrass, R.E. Casey. 2007. Nitrogen pollution of stormwater ponds and amphibian habitat value. *Applied Herpetology.* 4:19-29. [Link to Full Article](#)

Lev, SM, E.R. Landa, K. Szlavecz, RE Casey, and J. Snodgrass, 2008. Application of synchrotron methods to assess the uptake of roadway-derived Zn by earthworms in an urban soil. *Mineralogical Magazine.* 72:191-195. [Link to Full Article](#)

Camponelli KM, Casey RE, Snodgrass JW, Lev SM, Landa ER. 2009. Impacts of weathered tire debris on the development of *Rana sylvatica* larvae. *Chemosphere.* 74:717-722. [Link to Full Article](#)

Brand, AB, JW Snodgrass, MT Gallagher, RE Casey, R Van Meter. 2010. Lethal and sublethal effects of embryonic and larval exposure of *Hyla versicolor* to stormwater pond sediments. *Arch Env Contam Toxicol.* 58:325-331. [Link to Full Article](#)

Brand, A. B., and J. W. Snodgrass. 2010. Value of artificial habitats for amphibian reproduction in altered landscapes. *Conservation Biology* 24:295-301. [Link to Full Article](#)

Camponelli, KM, JW Snodgrass, SM Lev, ER Landa, RE Casey. 2010. Chemical fractionation of Cu and Zn in stormwater, roadway dust and stormwater pond sediments. *Environmental Pollution*. 158:2143-2149. [Link to Full Article](#)

Lev, S.M., N. Matthies, J.W. Snodgrass, R.E. Casey, D.R. Ownby. 2010. Effects of zinc exposure on earthworms, *Lumbricus terrestris*, in an artificial soil. *Bulletin of Environmental Contamination and Toxicology*. 84:687-691. [Link to Full Article](#)

Gallagher, M.T., J.W. Snodgrass, D.R. Ownby, A.B. Brand, R.E. Casey, S.M. Lev. 2011. Watershed-scale analysis of pollutant distribution in stormwater management ponds. *Urban Ecosystems*. 14(3):469-484. [Link to Full Article](#)