Field Studies in support of Tittabawassee River Ecological Risk Assessment

General Introduction:

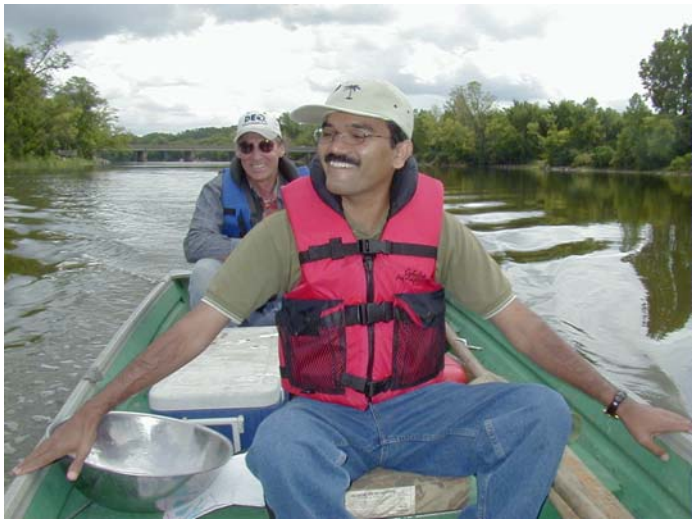
The Michigan State University – Environmental Toxicology Laboratory (MSU-ETL) is conducting a site-specific, multi-year, multi-line of evidence study examining wildlife health as it pertains to exposures and effects of Polychlorinated dibenzo-p-dioxins (PCDDs) and Polychlorinated dibenzo-p-furans (PCDFs) within the Tittabawassee River basin (TRB). The study serves both the public interest by providing real, site-specific data for effective science-based decision-making as well as the advancement of science pertaining to environmental exposures and effects of PCDDs and PCDFs on wildlife. The October 2003 release of the Aquatic Ecological Risk Assessment (AERA) conducted by the Michigan Department of Environmental Quality (MDEQ) concludes that (PCDDs) and (PCDFs) in sediments of the Tittabawassee River basin (TRB) may constitute a risk to some aquatic-based wildlife receptors. No such risk calculations or biological data are available for terrestrial TRB wildlife receptors at this time. In general, the present lack of site-specific biological data makes it difficult to predict risks to any TRB wildlife. Even the present MDEQ Aquatic ERA is based on extremely limited data, conservative assumptions and predicted exposures not generally considered adequate for decision-making. The present data and associated predicted (modeled) exposure calculations are generally considered useful only to rebut the presumption of risk, identified by EPA as a screening level assessment. Failure to rebut the presumption of risk does not indicate the actual presence of risk, but rather the possibility that risk may exist and the need for a more refined

investigation, such as the one being proposed here. As recognized by the EPA site-specific field studies are nearly always required for sound decision making. This is especially true for complex systems such as the Tittabawassee River. Included in this document are a series of proposed site-specific studies to be preformed by the MSU-ATL. These studies will determine the actual exposures and population level responses of wildlife receptors. The data will be made available to conduct a Tier II risk assessment as well as ground truth predictions of population level wildlife health effects.

The studies will elucidate site-specific and congener-specific stressor exposure and population health for those ecological receptors presently being identified as being of greatest priority. Receptor selection will be refined in March of 2004 utilizing data from preliminary studies completed in the fall of 2003 by the MSU-ETL. The proposed studies are of two types; exposure studies and effects studies. Exposure studies will gather site-specific data on the concentrations of individual PCDD and PCDF congeners in food web items. This combined with site-specific dietary data will directly define PCDD and PCDF exposures, thereby minimizing the need for conservative exposure assumptions. Effects studies will examine site-specific receptor health and fecundity at both the individual and population levels. It is our experience that even Tier II environmental risk assessment (ERA) procedures may fail to rebut the presumption of risk for certain receptors even when risks are essentially non-existent. Regulators therefore recognize the necessity of population health measurements in these instances. As a result, we have identified site-specific population health studies designed to provide the appropriate data for such assessments.

A paper describing the results of the first phase of this study have been published:

Hilscherova, K., K. Kannan, H. Nakata, N. Yamashita, P. L. Bradley, J. M. McCabe, A. B. Taylor, J. P. Giesy. 2003. Polychlorinated Dibenzo-p-dioxin and Dibenzofuran Concentration Profiles in Sediments and Flood Plain Soils of the Tittabawassee River, Michigan Environ. Sci. Technol. 37:468-474.



Prof. K. Kannan collecting sediments smples with MDEQ personnel

Tittabawassee River, near Midland, Michigan.

Tittabawassee River, Michigan.

Presentations:

TB-SS-PRELIM-01.pdf

TB-SS-PROP-01.pdf