

ENVIRONMENTAL QUALITY

Chair: H. FRED SIEWERT

Department of Natural Resources

Ball State University, Muncie, Indiana 47306 (317) 285-5790

Chair-Elect: PETER HIPPENSTEEL

Department of Biology

Tri-State University, Angola, Indiana 46703 (219) 665-3141 Ext 276

ABSTRACTS

The Technical Basis of an Indiana Groundwater Quality Policy: The Marion County Experience. WILLIAM BERANEK, JR. AND ELIZABETH DUSOLD, Indianapolis Center for Advanced Research, Indianapolis, Indiana 46204.——Indiana groundwater has a wide variety of uses, including drinking, irrigation and industrial. Sources of groundwater contamination include transportation, agriculture, business, industry and residences. Controlling the level of contamination—by protection or regeneration—at concentrations which do not produce environmental stress or affect public health or other end uses is a complex policy problem. Actual Marion County data will be presented as a case study for understanding the technical basis of an adequate Indiana groundwater policy. Issues discussed will include the quality of technical information about groundwater and the toxicity and environmental fate of chemicals as they relate to policy development.

Survey of Indiana Streams for Sensitivity to Acid Deposition. BRAD H. CARTER, MARY LOU FOX, RICHARD W. MILLER, ROBERT A. PRIBUSH, MICHAEL J. STEVENSON AND MARK WESTFALL, Butler University, Indianapolis, Indiana 46208.——The purpose of this study is to determine what effects, if any, acidic deposition has on stream chemistry in Indiana. Twelve streams in southern Indiana (six south of Lake Monroe, three south of St. Croix and three north of New Albany) were chosen for this purpose. The selection criteria consisted of soil characteristics (e.g., non-calcareous soil), land usage of the watershed (no agriculture, grazing, feedlots or urbanization) and accessibility of the headwaters.

From mid-July to mid-August six samples were taken from each stream. Measurements included alkalinity, flow, temperature, pH, and conductivity.

The concentration of a number of anions and cations, including sulfate, nitrate, calcium, and magnesium, were determined by ion chromatography and atomic absorption spectroscopy.

All of these variables were then analyzed for correlation with rainfall events and emissions inventory.

Evaporation Rates of Organic Liquids at Wind Speeds and Liquid Temperatures. H. E. DUNN, B.P. MILLER, G.P. LUTZ AND J.M. LITTLE, Departments of Chemistry and Physics, University of Southern Indiana, Evansville, Indiana 47712.——The evaporation rates of organic liquids at various air speeds and temperatures are necessary for determining downwind concentrations after chemical spills. Through the use of a wind tunnel which regulates air speeds and temperatures, the rates of evaporation of organic solvents were measured. An extrapolation to zero wall height of the evaporation dish was employed to represent the equivalent rate for a surface pool of liquid. The results

were correlated by an empirical relation between the evaporation rates, wind speeds, and temperatures using a power curve fitting computer program.

Acid Effects on Mortality, Light Sensitivity and Regeneration of Fresh Water Planaria. LARISSA GODISH AND THAD GODISH, Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—Organisms such as planaria which inhabit fresh water environments of low-buffering capacity may be affected adversely by pH changes associated with acid enhancement and with acid deposition processes. Planaria were selected to study the effects of acid enhancement on mortality over the pH range of 3 - 6.6. In addition to mortality the effects of pH on photosensitivity and regeneration also were studied. At pH three, mortality was 100%; increases in mortality also were observed at a pH level of 4 and 5. Increased light sensitivity was observed at pH levels of 4 and 5. These levels were observed also to both inhibit generation and to observe regeneration.

Metabolically-enhanced CO₂ Levels in Classroom Environments in a Variable Air Volume Climate Controlled Building. THAD GODISH, JEROME ROUCH AND DAVID MCCLURE. Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—Carbon dioxide, at levels above background values, are common in indoor environments because of metabolic generation and subsequent release of CO₂. Levels are indicated of both indoor population density and ventilation effectiveness. These studies were designed to measure CO₂ levels in high population density environments (university classrooms) and to relate measured levels to the effectiveness of the building's ventilation system, which in a major portion of these studies was a variable air volume HVAC system installed in a new classroom building. Depending on class size, frequency of use, time of day, and individual days, CO₂ levels ranged from just above background (circa 330 ppm) to 240 ppm. Highest reported values were close to exceeding the 2500 ppm ASHRAE standard for indoor air. CO₂ levels peaked in mid to late afternoon and declined in early evening.

Gas Chromatography as a Screening Tool for Total Volatile Organics in Groundwater and Surface Water Samples. ROBERT MORSE AND JERRY PAPANMEIR, Marion County Health Department, Indianapolis, Indiana, and JACK E. LEONARD AND WILLIAM BERANEK, JR., Indianapolis Center for Advanced Research, Indianapolis, Indiana 46204.—Volatile organic compounds (VOCs) are an important class of water contaminants. The total identification of the full range of VOCs in a sample is a difficult and expensive procedure. However, a valuable screening tool can be derived using well-established gas chromatographic techniques to determine the quantitative difference in the levels of contamination of water samples. The use of this tool will be illustrated with groundwater and surface water data from a recent Marion County survey.

Chemical Analysis of Two Lakes in Vigo County, Indiana for Specific Components. JOSEPH R. SIEFKER AND ANTHONY P. NEIDLINGER, Department of Chemistry, Indiana State University, Terre Haute, Indiana 47809.—The surface waters of Isaac Walton Lake and Green Valley Pond were sampled weekly for twelve weeks. The concentrations of ammonium, aluminum, copper, iron, barium, manganese, chloride, fluoride, phosphate, bromide, cyanide, sulfate, and sulfite ions were determined. Also the color, turbidity, and pH were measured. In addition, the water level of the lakes was determined along with the precipitation amounts on a weekly basis. Maximum, minimum, and average values were calculated.