

STUDENT POSTER PRESENTATIONS



May 18, 2006
Ramada Inn and Conference Center
State College, PA

PPCPs in the Water: The Effects of Fluoxetine on Fish Behavior

**Brian P. Mangan¹, Jess G. Kohlert², Holly Simpson¹, Emily Long¹,
¹Environmental Program, ²Neuroscience Program
King's College
Wilkes-Barre, PA 18711**

There is growing concern that sewage effluents containing pharmaceutical and personal care products are affecting aquatic organisms. We investigated the effects of fluoxetine, the active ingredient in a commonly used antidepressant, on fish behavior. Aggressive and locomotor behaviors of 200 male *Betta splendens* in aqueous solutions of fluoxetine at concentrations of 350, 175, 87, 44 $\mu\text{g/l}$, plus controls, were observed and analyzed (N=40 per group). Compared with controls, fish in all treatment groups demonstrated significant decreases in locomotion, number of aggressive attacks, and movement with an intruder present ($P < 0.05$). There was also an increase in aggression-response time for treated fish ($P < 0.05$). Furthermore, the changes in locomotion and aggression were clearly dose-dependent. Aggressive and locomotor behaviors began to resemble those of the control group within four weeks following drug removal.

**Source Water Protection:
Roamingwood Sewer and Water Association**

**Joshua Shoff
Department of Environmental Engineering & Earth Sciences
Wilkes University
Wilkes-Barre, PA 18766**

The Roamingwood Sewer & Water Association was awarded a “PA Growing Greener Grant” to aid in the development of a Source Water Protection Program for the Roamingwood Sewer & Water Association (PWS ID # 2640025). The Roamingwood Sewer & Water Association provides drinking water from five groundwater sources to over 2,979 private homes and 24 community buildings within the planned residential development known as The Hideout in Salem and Lake Township in Wayne County. The primary objective of the overall project was to develop the Source Water Protection Plan which would aid in the identification of actual and potential sources of contamination, allow for public education, provide an initial step towards the implementation of sustainable planning, aid in developing a comprehensive action plan, and developing long-term management plans to protect the quantity, quality, and reliability of the groundwater system. The primary goal of this portion of the project was to compile and update available data, conduct a more rigorous delineation of the capture zones for the well field, and develop a series of recommendations related to best management practices or engineering controls to provide for the long-term protection and reliability of the groundwater aquifer.

Positioning Wind Farms in Luzerne County, Pennsylvania

**Mary Baron
Department of Environmental Engineering & Earth Sciences
Wilkes University
Wilkes-Barre, PA 18766**

Wind power has become more popular throughout the years. With an increase in population, increasing cost of oil, and the desire for more energy sources, wind power has been gaining attention as a potentially viable and efficient renewable source of energy. The primary focus of this project was to identify sites within Luzerne County, Pennsylvania that would be considered potentially suitable for a wind farm. The selection of the sites was based on multiple siting criteria that related to the suitability of the location from an engineering perspective, but a number of environmental variables were also considered. Based on the analysis of the regional data, it appears that there are three primary areas suitable for the development of wind farms in Luzerne County. These potential sites are located in Bear Creek, along Red Rock Mountain, and in portions of the Conyngham/Hazleton Region.

GIS Surface Water Runoff Analysis of Toby's Creek Sub-watersheds

Fred Gerloff

Department of Environmental Engineering & Earth Sciences

Wilkes University

Wilkes-Barre, PA 18766

The Toby's Creek Watershed was the main focus in the investigation of the relationship between land-use and surface water runoff quantity and quality. The watershed was divided into three distinct sub-watersheds, i.e., forested/rural, low-density residential, high-density residential/commercial. To complete this project, it was necessary to use Arc-GIS and the L-THIA runoff models. The combination of these tools permitted an evaluation of current land-use conditions and evaluation of multiple scenarios related to potential or proposed land-use and development in the corridors. The evaluation was able to demonstrate the relationship between changes in land-use and projected in-stream hydraulic and mass loadings and provide a unique visual tool that could be used for planning and educating the public.

Stormwater Management Study for Wilkes University Utilizing Best Management Practices

**Rebecca A. Calimer and Joshua P. Shoff
Department of Environmental Engineering & Earth Sciences
Wilkes University
Wilkes-Barre, PA 18766**

The purpose of this project was to demonstrate how implementing stormwater Best Management Practices (BMP) in an urban environment will influence the runoff volume and peak flow for an area. The project utilized Pond Pack 9.0 of Bentley Systems, Inc, to model the stormwater runoff conditions for the main block of Wilkes University Campus in Wilkes-Barre, Pennsylvania. A current condition model and a proposed BMP Network model were generated. Comparison of the two models indicated that runoff could be completely eliminated for a 2-year, 24-hour storm event with the proposed BMP Network model. For a larger storm event, the 10-year, 24-hour storm, the peak flow was reduced from 19 cfs to 2.4 cfs and the runoff volume was reduced by more than half, from 65,000 ft³ to 26,000 ft³. This project concluded that the use of BMPs in an urban environment for small rain events can eliminate runoff and will reduce both runoff volume and peak flow for larger storm events.

Determination of the Headloss through a Manhole Lid

Brandon Kelly, Mike Leaman, and Daniel Loughran
Department of Environmental Engineering & Earth Sciences
Wilkes University
Wilkes-Barre, PA 18766

Current sewer system modeling programs use an estimation for the calculation of the head produced by a manhole lid in surcharge conditions. The current models use approximations such as the weir and orifice equations for manholes and the accuracy of these estimations are unknown. The purpose of this study was to more precisely measure the actual head loss from a full scale manhole assembly. This study was conducted under an array of manhole lid conditions, by varying weight and presence of pick holes. It was expected that a manhole lid will, at lower flow rates, will act as an orifice. The size of the orifice was determined by the height of the lid relative to the assembly. As the flow increased, and the minimum amount of head needed to lift the manhole lid was obtained, the manhole cover entered into a transitional flow regime. The equation that represents the head to flow ratio for this flow condition is $Q=Ah^B$. The values for the coefficients of A and B vary with the weight of the lid, however, the magnitude of B is such that any slight change in head causes an enormous change in flow rate. The transitional flow regime is maintained until the head reaches weir head. At this stage the head is so great that the lid is lifted to a point where it acts as a weir flowing over the manhole assembly. This flow condition was not obtained in this study and is unlikely to happen in a typical stormwater collection system.

**Fracture Analysis of the Elk Mountain Sandstone of the Catskill Formation,
South Abington and Scott Township, PA**

**Joel Antolik
Department of Environmental Engineering & Earth Sciences
Wilkes University
Wilkes-Barre, PA 18766**

Bedrock geology peripheral to the Wyoming Valley, near Waverly, PA is highly fractured and contains many joints. These joints were the result of stress imposed on the rocks during the Acadian and Allegheny orogenies and also de-glaciation of the region.

This study set out to define joint trends of preferred orientation. The study included:

- 1) measurements of joint attitudes using Brunton compass and GPS;
- 2) characterization of the jointed bedrock geology and;
- 3) statistical analysis of the measured trends.

The sites were under investigation from October 2005 to March 2006. One hundred and twenty seven trend measurements were taken at three rock quarries and one set of outcroppings along Interstate 81 northbound. The results of the study indicated that there was a prominent trend traversing almost due north.

KING'S

COLLEGE
WILKES-BARRE, PENNSYLVANIA



**133 North River Street
Wilkes-Barre, PA 18711
1-888-KINGS-PA**



**84 West South Street
Wilkes-Barre, PA 18766
1-800-WILKES-U**