

KY River Authority Grant
Montessori Middle School of Kentucky/Community Montessori School
Final Report – June 2009

Grant Activity Beginning Date: May 15, 2008

Background Information:

Students were exposed to fundamental concepts through lessons on Watershed & Water Cycle, Matter & Atoms, Elements/Period Table/Compounds, Water Chemistry & Pollutants, Classification of Living Organisms, Introduction to Stream Ecology, Surveying Techniques, and Characteristics of a Healthy Stream. These lessons were in conjunction with hands-on labs. Some of which required multiple observations over one or more weeks. In addition, students were trained on use of GIS hand-held devices to map the topography of a geographic area by experts from the University of Kentucky.

Upon completion of the lessons and introductory materials, students were placed in groups of 1-3 for project work on the stream at 727 Stone Road. The topics included Water Quality Testing (pH, D.O., hardness, conductivity, and CO₂), Aquatic Life/Aquaculture, Surveying, Bed Material Classification, Water Pollution (focus on phosphates, nitrates, and fecal coli form), Urbanization, Water Level/Velocity/Discharge, Plant Life (in Riparian Zone), and Stream Restoration. At the completion of the project, all students developed a PowerPoint presentation as well as a teaching outline. They presented to their peers at the Montessori Middle School and developed two editions of a stream-related newsletter that was shared within the school and with the Montessori Elementary schools in the area (Community Montessori, Providence Montessori, and Versailles Montessori).

Agencies/Groups Involved:

- Lexington-Fayette Urban County Government & KY River Watch Primary Contact, Dave Gabbard
- University of Kentucky, Geographic Information Systems, Dr. Michael Kennedy
- University of Kentucky, Biosystems & Agricultural Engineering Faculty, Dr. Carmen Agouridis
- University of Kentucky, Environmental Research Training Laboratories, Tricia Coakley
- KY River Water Watch Volunteer, Don Dampier
- Ridgewater, LLC, Professional Engineer, Eric Dawalt
- Stantec Consulting, Project Engineer, Oakes Routt
- Floracliff Nature Preserve, Preserve Manager, Beverly James
- Forestry Expert, Volunteer, Julie McDaniel

Accomplishments:

Comparative data has been collected for pH, Dissolved Oxygen, Velocity, Bed Material, and Macroinvertebrates. DNA testing on fecal coli form was performed by the University of Kentucky and determined that 90% of the e-coli found is of animal, not human origin. A new teacher at MMSK was trained to be a sampler for the KY River Water Watch in June of 2008. The Access Database has been expanded to include more of the data collected for on-going long-term analysis. Using the previously recorded data, students were able to determine impacts of the current construction on the site as well as note any measurements that had remained constant.

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Mulch and landscape cloth socks were assembled by students and placed in all 5 major drains from storm sewer or school construction to filter pollutants prior to entering the stream. Shumard Oak, Bald Cypress, Swamp White Oak, Tulip Poplar, Red Maple, Ash, and Redbud trees were planted in the riparian zone in an on-going effort to replace invasive honeysuckle with native plants (April/May 2007). One stand of native river cane was also planted in a low-lying area in an attempt to prevent erosion and incorporate a historic species into the property. In addition, native trees and shrubs were identified along one side of the stream bank and markers have been ordered to document these species on a permanent basis. Approximately 50-75 ft of honeysuckle has been removed as a part of these efforts.

A simple manual stream gauge has been installed as well as a wireless electronic gauge for comparative data of rainfall in the watershed. Students used the Kentucky Geo Net Site with GIS data to determine the % of impervious surface in our watershed.

In addition, students surveyed the number and types of fish found in the stream. Based upon research into the various species, they were able to determine the pollution tolerance of the species and whether or not they were indicators of stream health.

Approximately 175 to 200 students and teachers were educated on a variety of topics from urbanization impacts to native plants and animals and their importance via the “Stream Sense” newsletter published twice in the spring of 2009. It is hoped that some of these articles will be published on einkentucky.org as well.

Samples of Products (provided with this document at part of final report):

- Teaching Outlines (printed documents)
- PowerPoint Presentations (electronic files on compact discs)
- Issues of “Stream Sense” Newsletter (2)
- Photographs of Project Work and Presentations
- Financial Summary (excel file)

Completion Date: May 15, 2009