

## 2004-04 Undergraduate Student Project Description

### Department of Bioresources Engineering

**Project Title:** Hydrogeomorphic Modeling for Functional Assessment of Piedmont Slope Wetlands – GIS project

**Faculty/Staff Sponsor:** Lenore Vasilas

**Area of Study:** Geographic Information Systems, Wetlands, Water Treatment

#### **Project Description:**

Background: The Hydrogeomorphic (HGM) Method for wetland functional analysis relies on rapid assessment techniques to collect data that can be used in a model that establishes how that wetland functions in comparison to reference standards developed using data from the same wetland HGM sub-class. In the Mid-Atlantic Piedmont we will be developing models for wetlands in the slope class. Long-term data has been collected on reference sites to be correlated to characteristics that can be sampled rapidly in a single visit. Those characteristics that can be rapidly assessed will be inserted in the HGM Model to establish functional indices for the functions of the sub-class. For this study 36 reference sites have been established throughout the Piedmont of Delaware, Pennsylvania, Maryland, and Virginia.

Proposed Research: Field data has been collected on the 36 reference sites for the past 4 years. A geographic information system (GIS) project is proposed to analyze surrounding landscape, sub-watershed characteristics, and land use of the watershed above and below each wetland. The Natural Resources Conservation Service is in the process of obtaining LIDAR data that can be used to create 3-dimensional models for each wetland's sub-watershed landscape. Surrounding landscape and land use characteristics have a large impact on wetland functional capacity.

Intended Benefits: The GIS information will be used to further refine rapid assessment parameters to be use in the HGM functional assessment model. The model will be used to assess natural wetland functions as well as to assist in the establishment of better criteria for the establishment of wetland mitigation and restoration sites.

Students can work for credit.

**Student Qualifications:** Course in Geographic Information Systems

## 2004-04 Undergraduate Student Project Description

### Department of Bioresources Engineering

**Project Title:** Nutrient Cycling in Wetlands

**Faculty/Staff Sponsor:** Lenore Vasilas

**Area of Study:** Wetlands, Water Treatment, Well Installation

#### **Project Description:**

Background: Wetlands provide many functions that provide environmental benefits. Some of those benefits are the result of transport, cycling, and retention of nutrients, heavy metals, and pollutants in wetlands. A study of wetland functions associated with these benefits is proposed. The study will look at the temporal impacts to nutrient functions in wetlands.

Proposed Research: Water sampling wells will be placed in the groundwater source for each wetland, in the wetland, and at the point where water discharges from the wetland to assess changes in nutrient, heavy metal and pollutant content as the water moves through the wetland. Sampling will be done at regular intervals to determine temporal effects of transport, cycling and retention of nutrients, heavy metals, and pollutants.

Project Benefits: Results of this study will be used to develop rapid assessment indicators of the functions that result in beneficial transport, cycling, and retentions of nutrients, heavy metals, and pollutants in wetlands. These indicators can be used to assess the importance of a wetland in a watershed or to help develop criteria for better establishment of wetland mitigation and restoration sites to benefit water quality in a watershed.

Assistance is needed over winter session to assist in the establishment of water sampling well placement and installation.

Student can work for credit or pay.

#### **Student Qualifications:**

## 2004-04 Undergraduate Student Project Description

### Department of Bioresources Engineering

**Project Title:** Federal Wetland Projects

**Faculty/Staff Sponsor:** Lenore Vasilas

**Area of Study:** Wetlands (regulation, construction, restoration)

#### **Project Description:**

Background: The federal government has many programs to promote the protection, mitigation, and restoration of wetlands and water quality. The Environmental Protection Agency (EPA) and the US Army Corps of Engineers administer wetland protection through requiring permits to fill wetlands. These permits often require mitigation to create wetlands to replace the functions of the wetlands being disturbed. The EPA also administers other programs under the Clean Water Act to protect water quality in our nation's waters including programs promoting storm water management. The USDA Natural Resources Conservation Service (NRCS) has programs that promote the creation and restoration of wetlands on farmland to promote erosion control and water quality. And, the US Fish and Wildlife Service (FWS) also has a program to promote the restoration of wetlands and streams to promote wildlife habitat.

Project Opportunities: Each federal agency has a volunteer program where students can volunteer to provide assistance to an agency in return for training. Some agencies also provide opportunities for students to be paid for their services to that agency. NRCS has an Earth Team volunteer program. More information on that program can be found at [www.nrcs.usda.gov/features/volunteers](http://www.nrcs.usda.gov/features/volunteers). Information on the US FWS Service can be found at [volunteers.fws.gov](http://volunteers.fws.gov). Information on EPA programs at [www.epa.gov/epapages/epahome/intern.htm](http://www.epa.gov/epapages/epahome/intern.htm). General information on federal opportunities and a listing of federal jobs for students can be found at [www.opm.gov/employ/students/intro.htm](http://www.opm.gov/employ/students/intro.htm) and [jobsearch.studentjobs.gov](http://jobsearch.studentjobs.gov). For assistance in setting up a contact in an office in your area contact Lenore Vasilas.

#### **Student Qualifications:**

## 2004-04 Undergraduate Student Project Description

### Department of Bioresources Engineering

**Project Title:** Federal Farm Planning and Erosion Control Project

**Faculty/Staff Sponsor:** Lenore Vasilas

**Area of Study:** Farm Planning (erosion and sediment control, nutrient management, agricultural waste systems)

#### **Project Description:**

Background: The United States Department of Agriculture, Natural Resources Conservation Service (NRCS), in conjunction with the state department of agricultural, provides assistance to farmers in design of best management practices for erosion and sediment control, nutrient management, and agricultural waste systems. In many cases, federal and state cost share money is then used to implement the construction of the designs. Conservation programs provided by NRCS include conservation reserve program, emergency watershed protection, environmental quality incentives program, resource conservation and development, soil survey, watershed protection and flood prevention, watershed rehabilitation, wetlands reserve program, and wildlife habitat incentives program. For information on all conservation programs go to [www.nrcs.usda.gov/programs/](http://www.nrcs.usda.gov/programs/).

Project Opportunities: The NRCS has field offices in most counties throughout the country. There is an Earth Team volunteer program where students can volunteer in an NRCS office to gain experience in NRCS programs. Information on that program can be found at [www.nrcs.usda.gov/features/volunteers](http://www.nrcs.usda.gov/features/volunteers). The NRCS also has limited positions for pay that can include hourly pay for services or admittance into the student educational employment program. Information on the student educational employment program can be found at [www.opm.gov/employ/students/intro.htm](http://www.opm.gov/employ/students/intro.htm) and [jobsearch.studentjobs.gov](http://jobsearch.studentjobs.gov). For assistance in contact information for an office in your area contact Lenore Vasilas.

#### **Student Qualifications:**