

## TECHNICAL PROGRESS REPORT

Reporting Period: June 10, 2007 to December 9, 2007 (6 months)

EPA Agreement: EM-83329801-0 US EPA

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Project Title: Wilma H. Schiermeier Olentangy River Wetland Research Park: Teaching, research, and outreach initiative 2006

### **PROJECT OBJECTIVE:**

This project has 3 objectives:

1. Conduct a two-year hydrologic pulsing wetland experiment related to wetland biogeochemical and water quality functions;
2. Estimate carbon sequestration of created wetlands and compare these accumulation rates with natural wetlands; and
3. Extrapolate findings at the Olentangy River hydrologic experiment on nitrogen, carbon, and other nutrients to rivers of different hydrologic pulsing and water quality in Ohio with an Ohio-wide water quality network.

### **SUMMARY OF ACTIVITIES:**

#### **1. GENERAL**

No general activity this period; QAPP already approved.

#### **2. PULSING STUDY**

##### *a hydrology*

Average inflow was  $308 \pm 13$  gpm and  $299 \pm 15$  gpm for wetland 1 and wetland 2, respectively during the period. There were 44 days of pulsing daily inflow, ranging from 400 to 1000 gpm for each wetland. The pump was fully operating during the period.

##### *b. water quality*

Water quality samples were collected from the inflow of wetland 1 and both outflows on a daily basis for turbidity and general water quality. Weekly samples were also collected from inflow and two outflows in each of the wetlands and in the Olentangy River upstream and downstream of the wetlands for nutrients. The water quality laboratory is fully staffed and technicians are running current and backlogged (frozen) samples.

*c. denitrification*

A visiting scholar working on her doctorate from Ewha Woman University has been assigned the denitrification portion of this project, replacing the graduate student that resigned from the OSU program. Methods and field techniques are being developed.

*d. pathogens*

We tested several methods and identified an appropriate and efficient method (Colilert Quantitray) for quantifying pathogen indicator species in the wetlands. Samples were collected weekly from September through December.

*e. methane*

Methane samples were successfully collected twice during this period – in July and September – in both the Olentangy River Wetland Research Park wetlands and Old Woman Creek. All samples have been analyzed for methane concentrations on the Shimadzu GC-14A in the analytical laboratory.

*f. methane oxidation*

We finalized experimental procedures and sampling sites. A student technician was hired to work on project, and methodology was developed to measure rates of methane oxidation.

*g. macroinvertebrates*

Emergence traps and Hester-Dendy collectors were placed in the experimental wetlands and sampled regularly from May through September.

### **3. CARBON SEQUESTRATION**

Samples from Old Woman Creek wetland were analyzed for Cs<sup>137</sup> and Pb<sup>210</sup>.

### **4. WATER QUALITY NETWORK**

*a. Shawnee State University*

The monitoring station on Scioto Brush Creek was installed on 10 October 2007. The weather station/sending equipment (tower) was vandalized a few days later and we had to make repairs and attempt to better secure the equipment from further vandalism.

*b. Central State University*

The project funds enabled setting up a real-time water quality monitoring system at the Massies Creek near the Campus. The data is collected through a YSI radio-sonde which is transmitted to the weather station set up under the project. This system is connected to the computer in the Remote Sensing Laboratory of the ICWRM. The data collected through this system is used for water quality instruction in the ICWRM for the class titled Streams and Lakes – WRM 3310 and for conducting research.

*c. Kenyon College*

Working with Fondriest Environmental, S. Fennessy purchased and installed a NexSens water quality/river stage monitoring station and radio telemetry on the Kokosing River. This site is also suitable for collecting manual water samples for nutrient analysis. The station was designed to transmit radio signals that can be picked real-time by a dedicated computer (provided by Kenyon College) with iChart software at the Brown Family Environmental Center at Kenyon College for uploading to the web where data can be displayed, stored, and transmitted to the OCWRR and other interested parties. (See <http://www.wqdata.com/webdb/main.php?firstlogin=1>). S. Fennessy also purchased and installed a NexSens weather station with data logging equipment for uploading to the web where data can be displayed, stored, and transmitted to the OCWRR and other interested parties.

*d. Wright State University*

No data reported.

**5. ANTICIPATED ACTIVITIES:**

Denitrification readings are expected to begin the first of 2008. Methane production and oxidation studies will continue through 2008.