

# PROTECTING YOUR LAKES

## Detroit Lake Watershed Area Rice Lake Wetland/ Ditch 13 Studies

Erin Berryman, and Brandy Elf, University of MN Graduate students, studied the relationship between water level and the phosphorus release rates of the Rice Lake Wetland. Ms. Berryman measured phosphorus release of intact soil column cores collected from the wetland and also measured phosphorus release within the wetland soil porewater. Ms. Elf studied the groundwater influences, flow rates, phosphorus, pH, dissolved oxygen, and temperature of the surface waters.

### Field Activities:

1. Automated sampling of Ditch 13 water and flow measurements at the North and South locations of the Wetland
2. Monitoring of the Hydraulic gradients and waterlevels on the wetland fringes
3. Use porewater equilibrators (Peepers) to conduct water column profile sampling at 2-week intervals at the north, south, east and west ends. Pore water phosphorus concentrations were measured as a function of depth (vertical concentration gradients and importance of diffusion as a transport process for P within the wetland).

### Lab Activities:

1. Intact soil column experiments

### Wetland Study Conclusions:

- ◆ The north end of Rice Wetland showed much higher ( 7 to 200 times) phosphorus release than the other areas.
- ◆ Over 60% of the annual phosphorus load out of the wetland complex occurs during the July-August "hot release" period of time.
- ◆ North to South changes in dissolved oxygen and temperature indicate a strong groundwater discharge component
- ◆ Estimated water travel time through the wetland is 44 days.

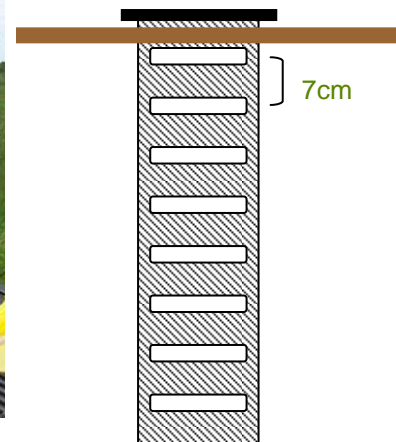


Upper Photo: Matt Lill collecting peeper water samples

Below Photo: Kevin Teig preparing a peeper for deployment



Peeper Design



Left: Collecting soil cores from the Rice Lake Wetland

Right: Intact Soil Column Experiment using the collected cores

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Natural Resource Conservation Service (NRCS) surveying Rice Wetland in the winter.



Brandy Elf conducting a water "time of travel" study using an inert dye which is put upstream of the wetland and then measured downstream in timed increments as the dyed water flows through the wetland.

## Campbell Creek Water and Soil Sampling

Water and Soil samples were collected on April 7, 2005 along a one mile stretch of the creek north of Floyd Lake between County Rd 149 and 230th street

Results from the one-day event sampling concluded:

- ◆ Suspended sediment increased from 5mg/L from 230th street to 45 mg/L at Cty Rd 149.
- ◆ Ortho phosphorus concentrations remained constant throughout the reach ( 12-15 ppb).
- ◆ Total phosphorus concentrations increased 29% between 230th Street and Cty Road 149.
- ◆ Cropland soil samples have a higher phosphorus level (81 ppm Olsen soil test value) than the flood plain and raw streambank soils (<10 ppm Olson soil test value).



Above Photo: PRWD Manager Orrin Okeson is collecting water and soil samples along Campbell Creek.

Left Photo: Soil samples from Campbell Creek

