Multi-Instrument Stream Surveys with Continuous Data for Better Groundwater/Surface Water Understanding in Wisconsin

Catherine Christenson (UW-Madison), Dave Hart (WGNHS), Mike Cardiff (UW-Madison), & Sue Swanson (Beloit College)

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Acknowledgments

WISCONSIN
DEPT. OF NATURAL RESOURCES

WISCONSIN
Geological & Natural History Survey

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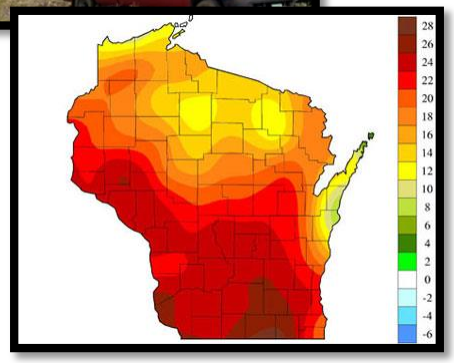
Beloit
College

Presentation Outline

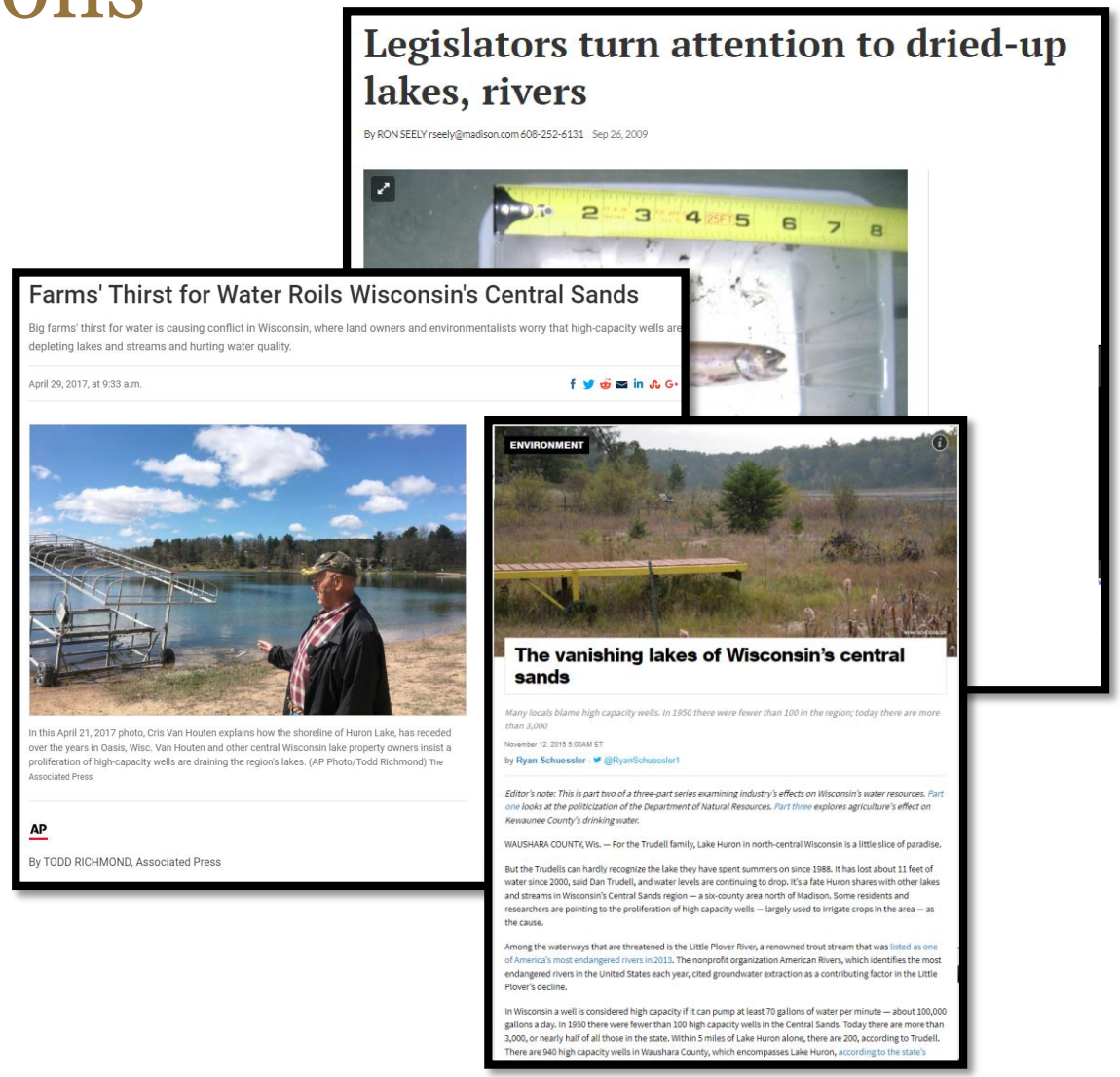
- **Project Motivations and Objectives**
- Study Area and Field Plan
- Data Collection Methods
- Preliminary Results, Waubesa Wetlands
- Future Work/Conclusions



Projected Change in the Frequency of 90°F Days Per Year from 1980 to 2055

Project Motivations

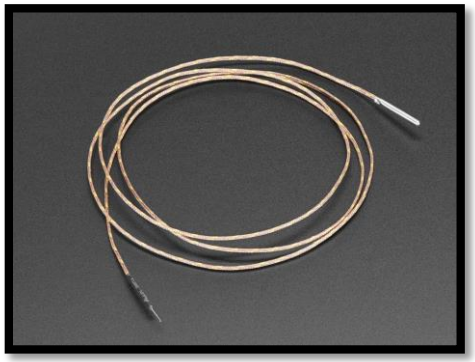
- Models are of increasing demand for natural resource decision makers
- Data must support these models and is often expensive and time and labor intensive



Project Objectives

1. Develop methodology for rapid and accurate data collection on streams
    - Data processing and quality assurance

2. Better represent groundwater/surface water interaction through groundwater model improvement



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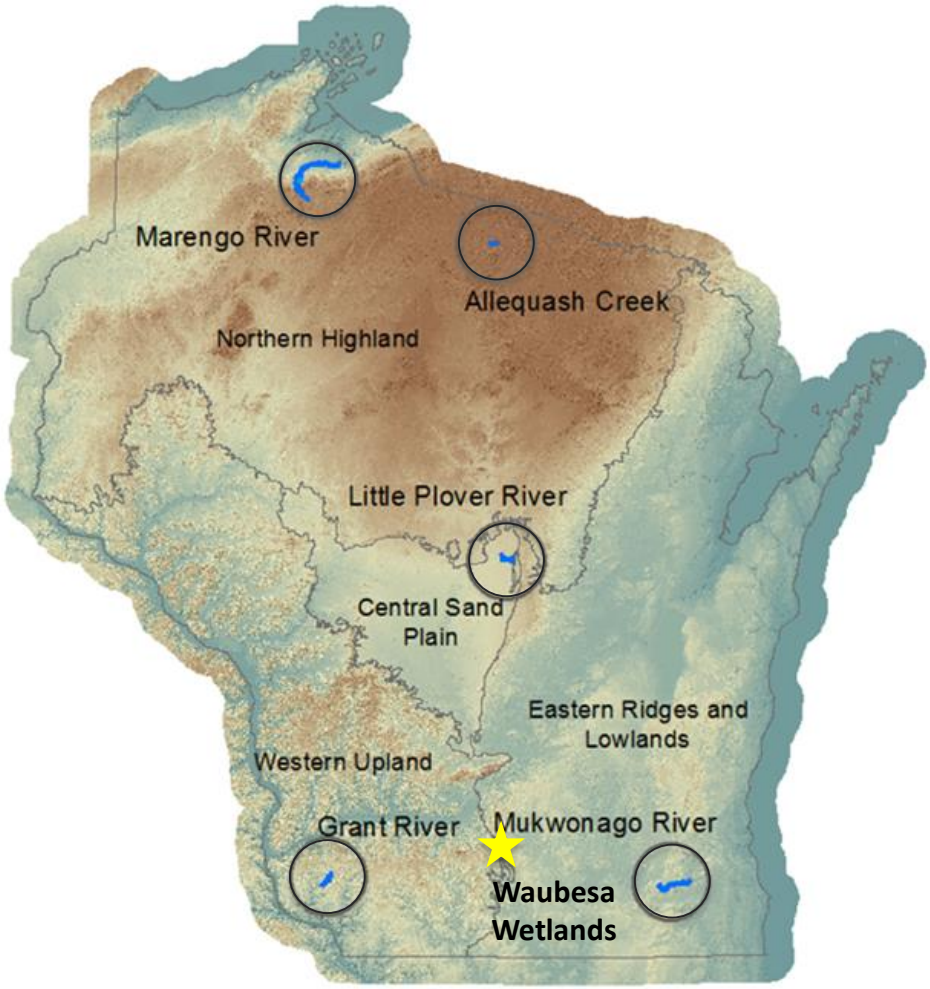
Study Areas & Field Plan



- Study areas represent different physiographic regions of WI
- Low order streams selected
- Data will be collected at spring and late summer flow conditions

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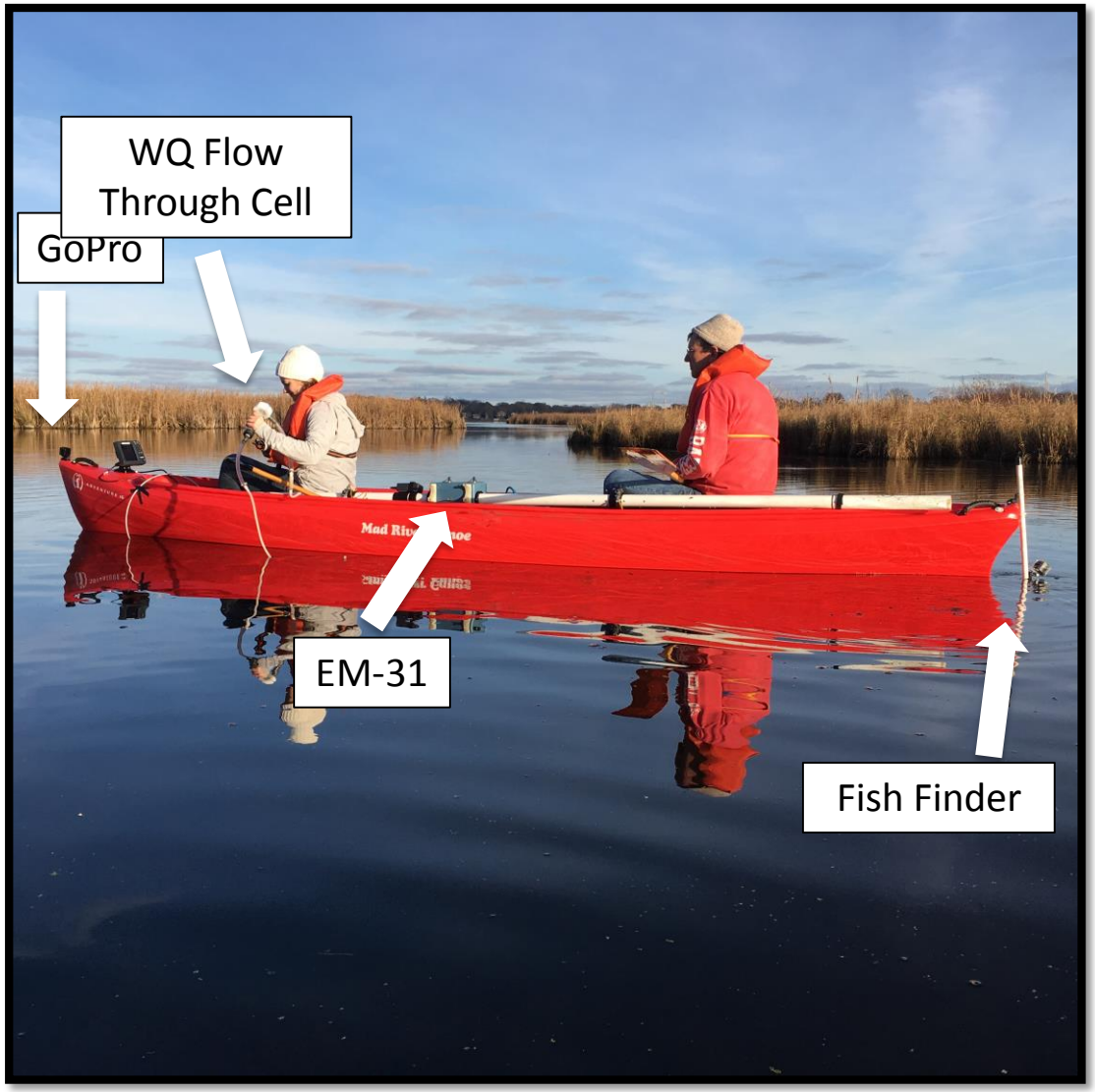
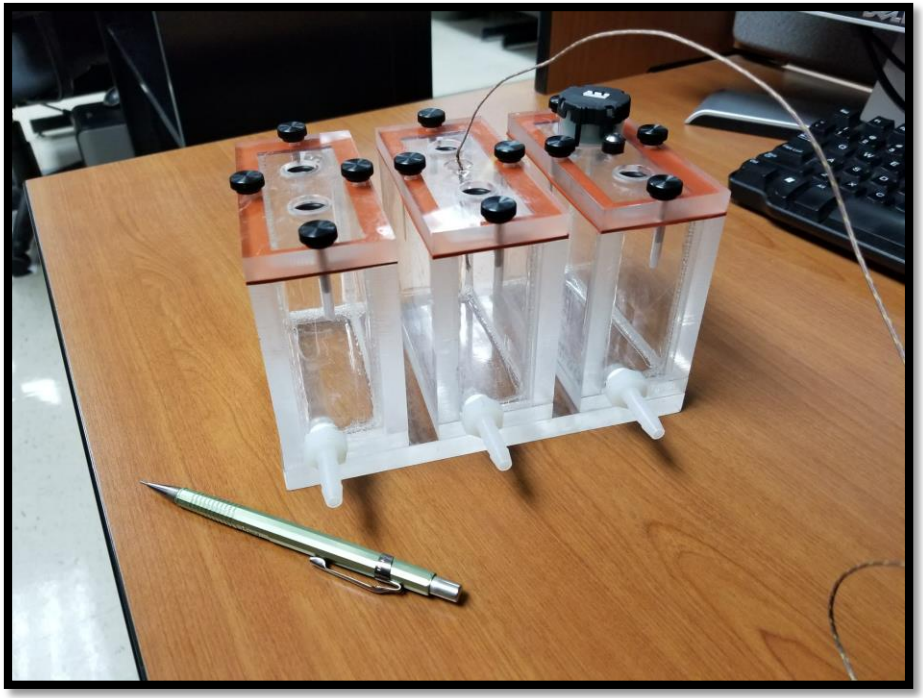
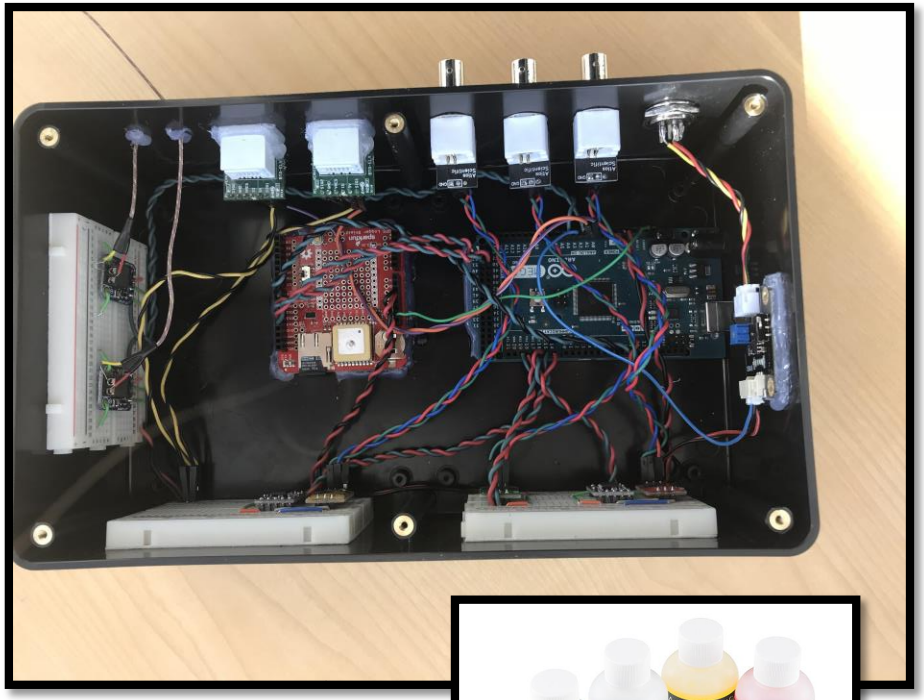
Data Collection Methodology



- Geophysical (ground conductivity, ground penetrating radar, depth)
- Water Quality (temperature, pH, specific conductance, nitrate, chloride, turbidity, dissolved oxygen)
- Ecological (video)
- Location and Elevation (Real Time Kinetic GPS)

Water Quality Data Collection





Susie Richmond and Prof. Dante Fratta, UW-Madison

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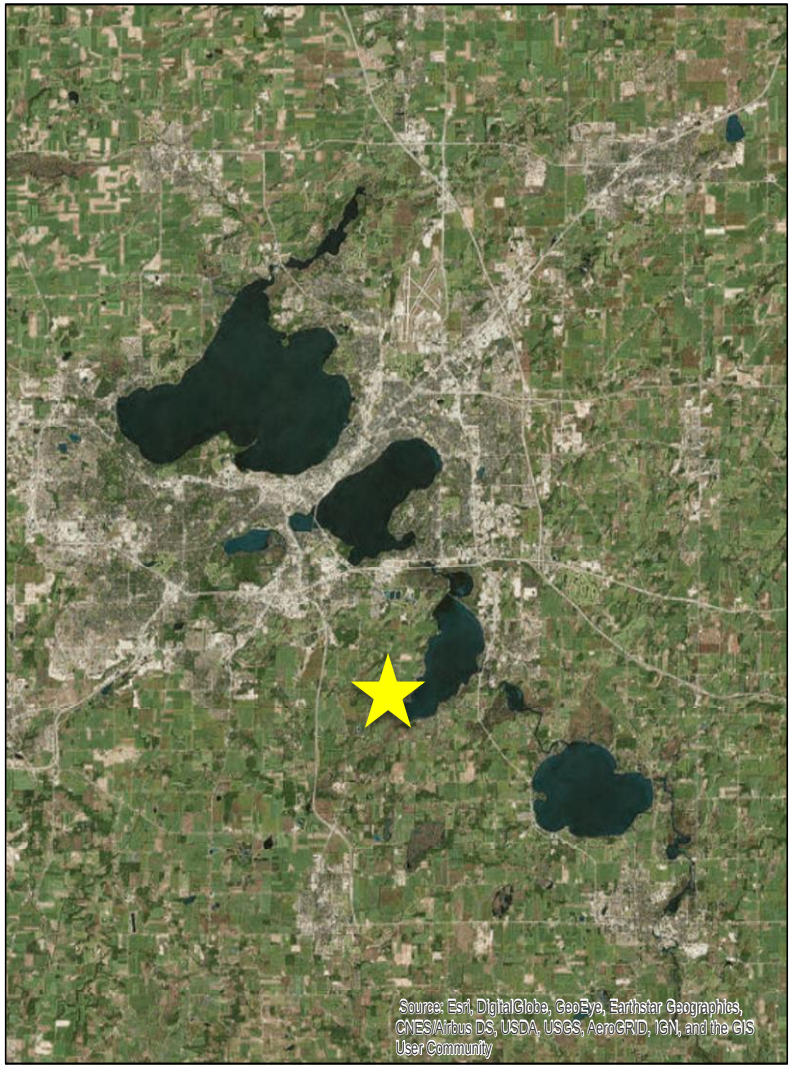
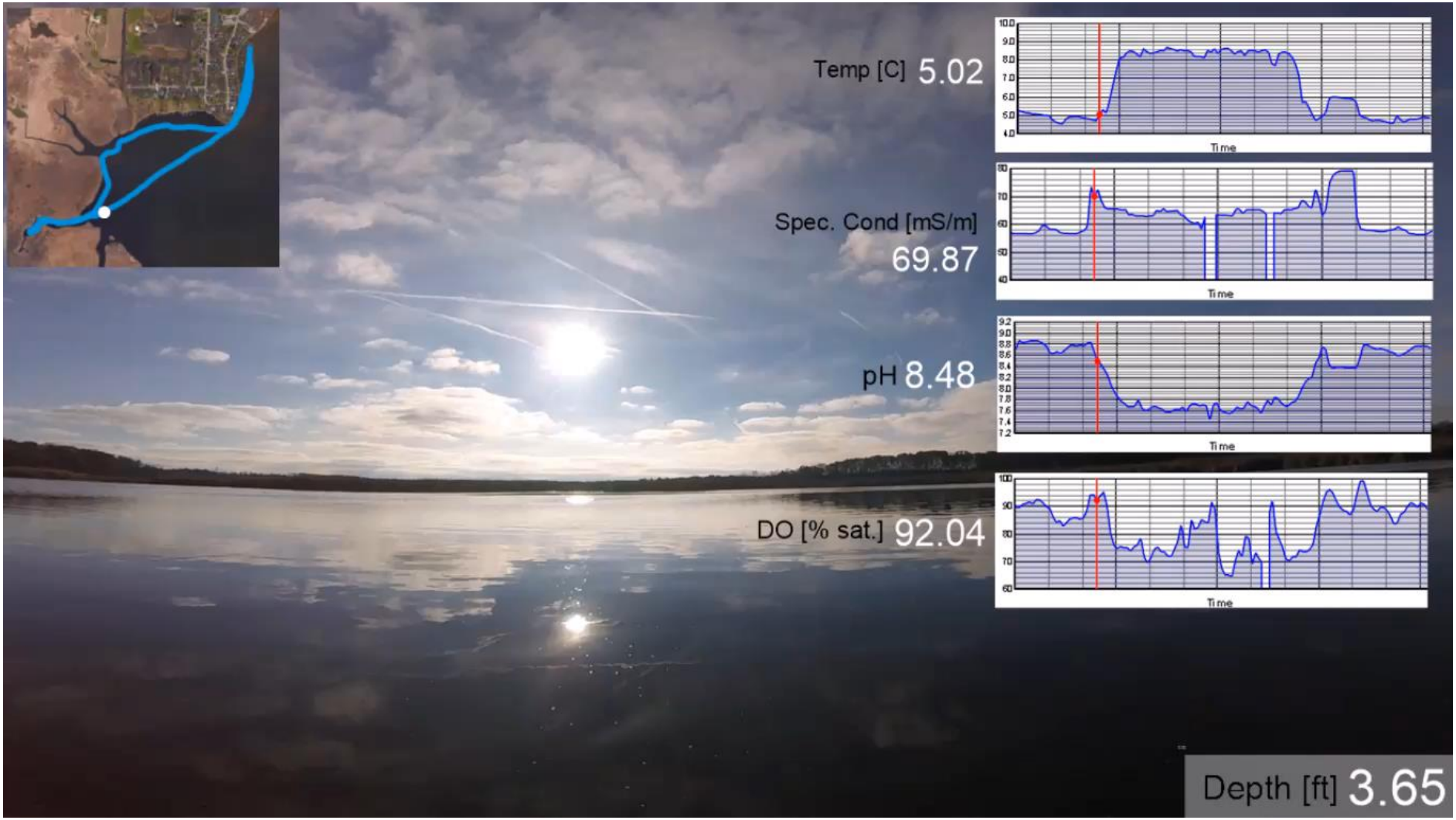
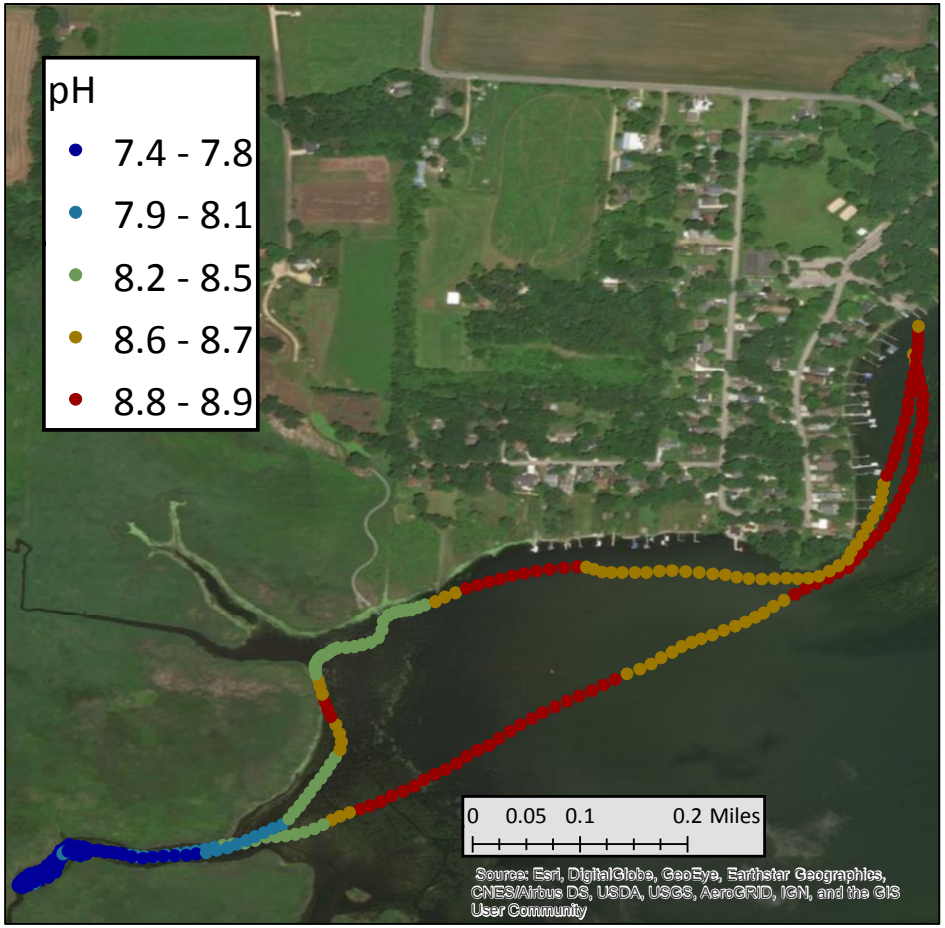
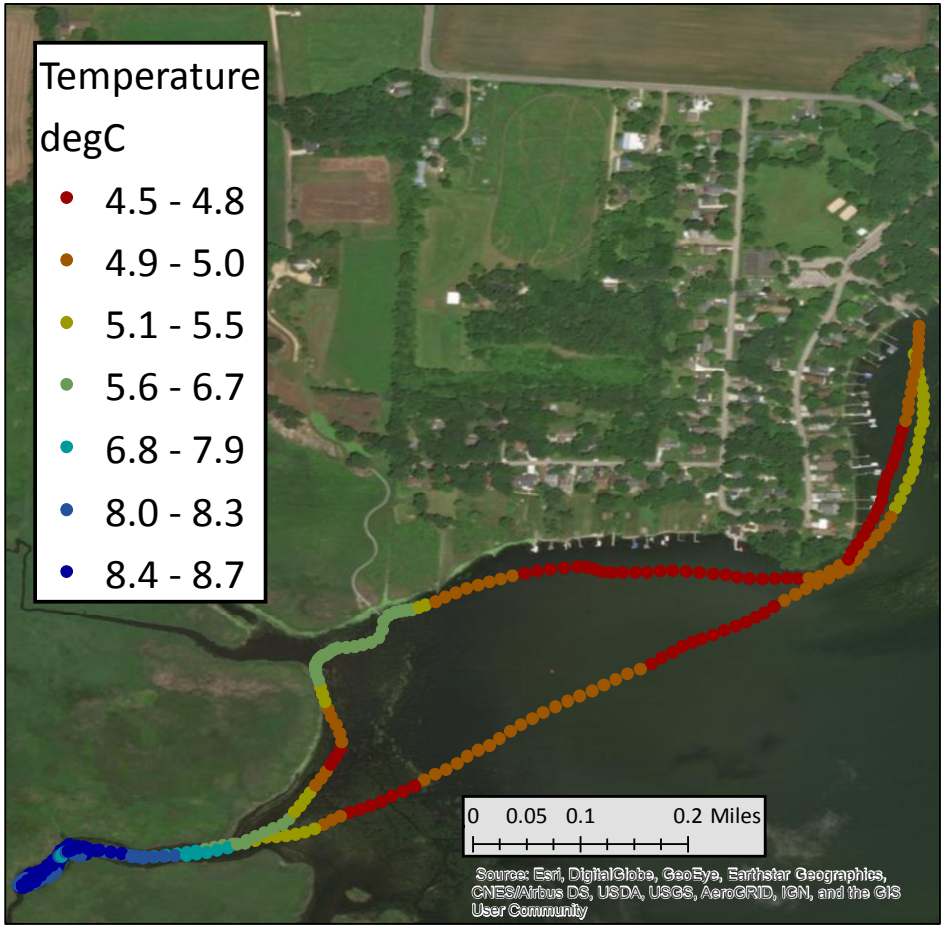



Temp [C] 5.02
Time
Spec. Cond [mS/m]
69.87
Time
pH 8.48
Time
DO [% sat.] 92.04
Time
Depth [ft] 3.65

Mapped Data, Waubesa Wetlands, Nov. 2017





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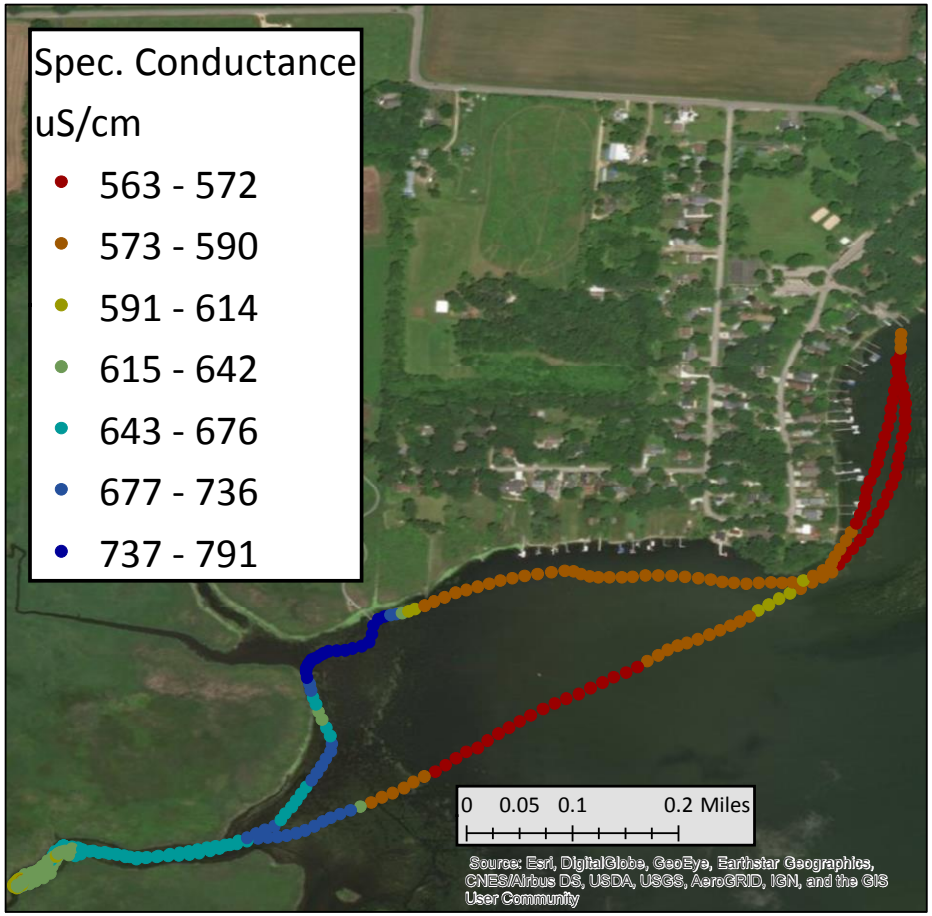

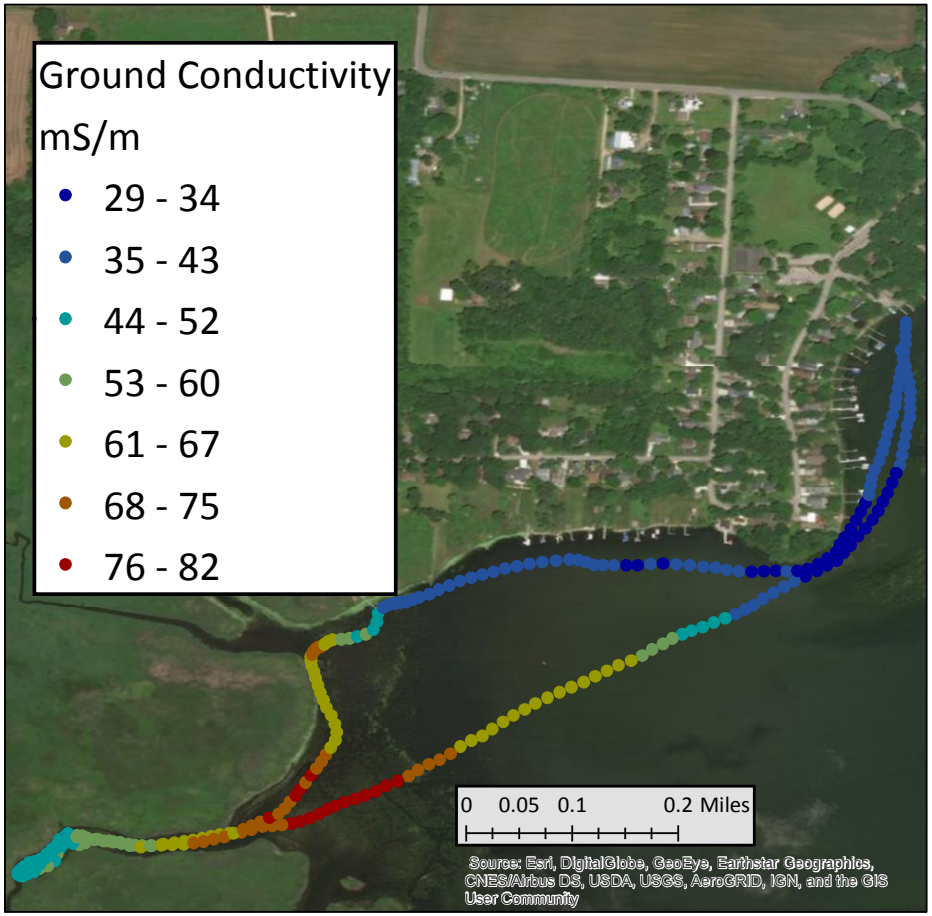

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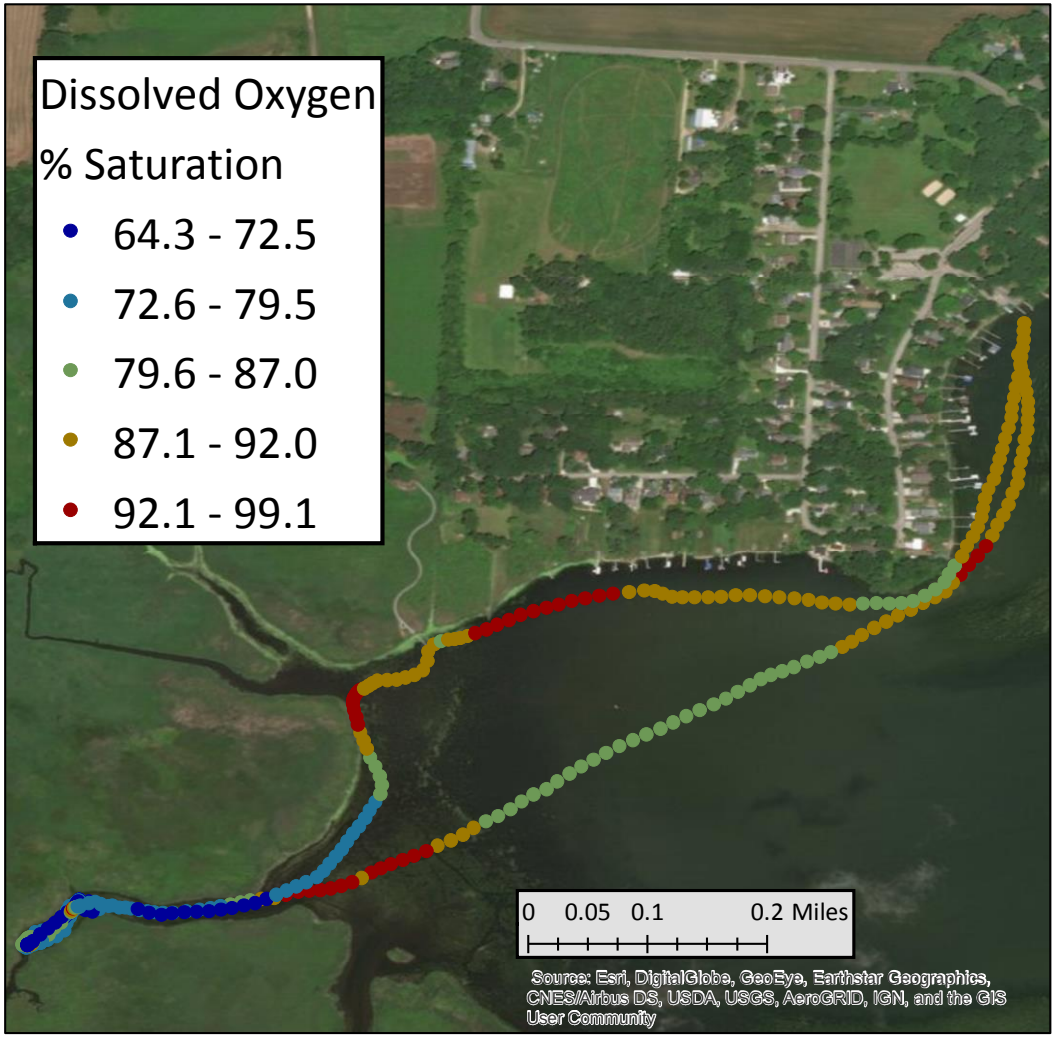

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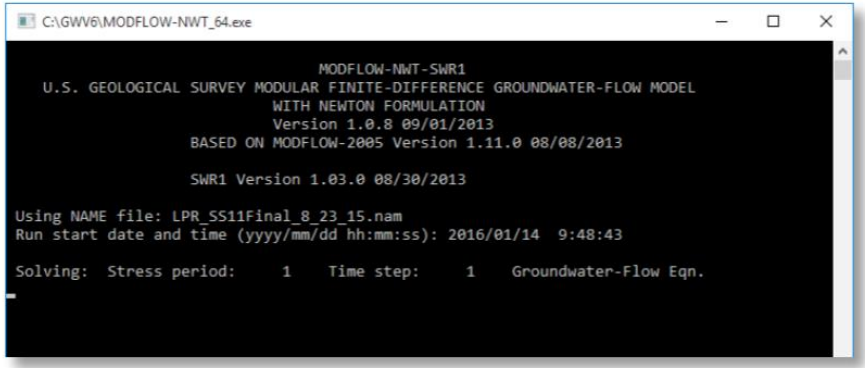
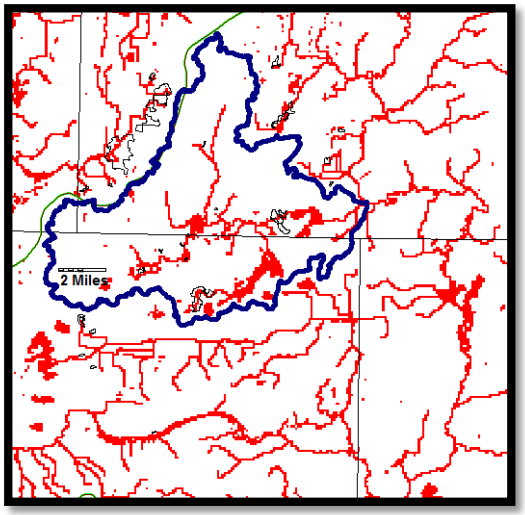
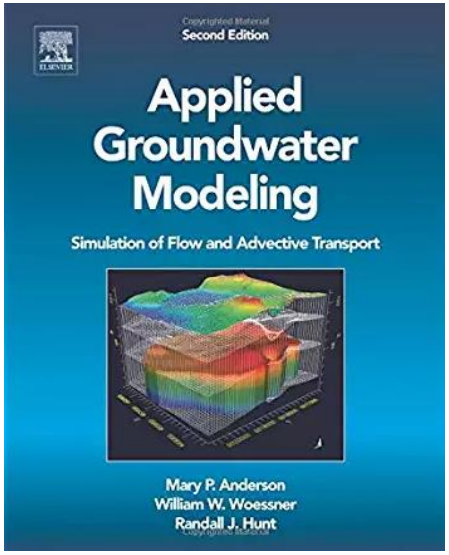
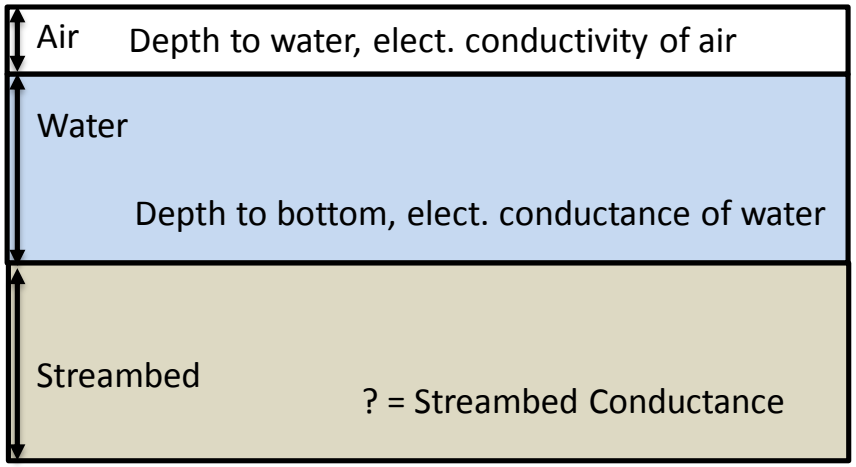


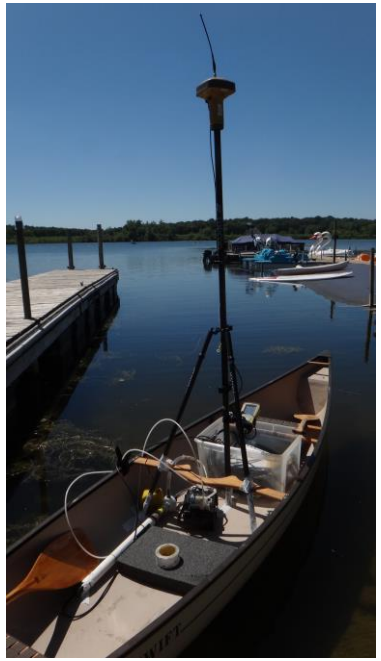




Data Applications: Qualitative Methods

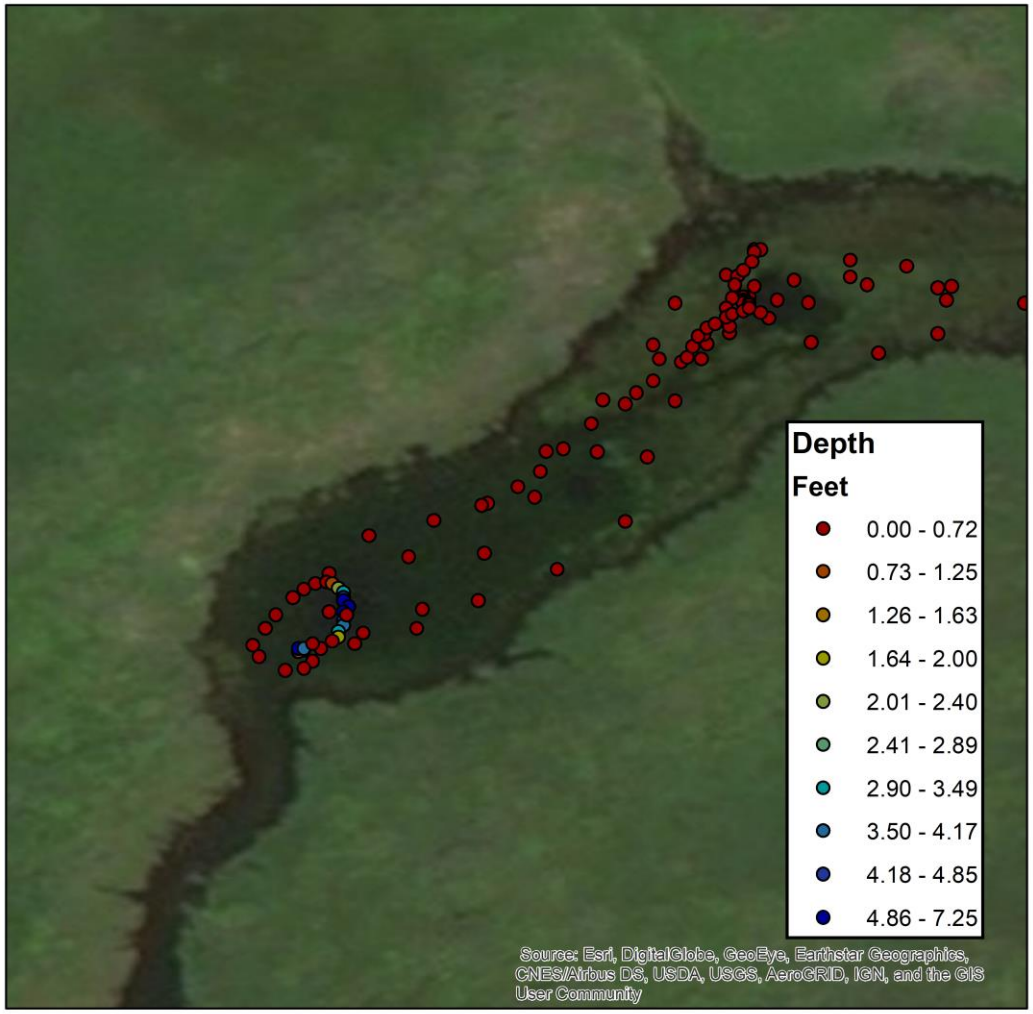
- Incorporate data directly into groundwater models
  - Streambed conductance from 3-layer system (McNeill, 1980)





  - Stream location and elevation from RTK GPS

Data Application: Quantitative Methods



- Model Validation
  - Locations of groundwater recharge and discharge
- Overall improved understanding of anthropogenic influence


Questions?