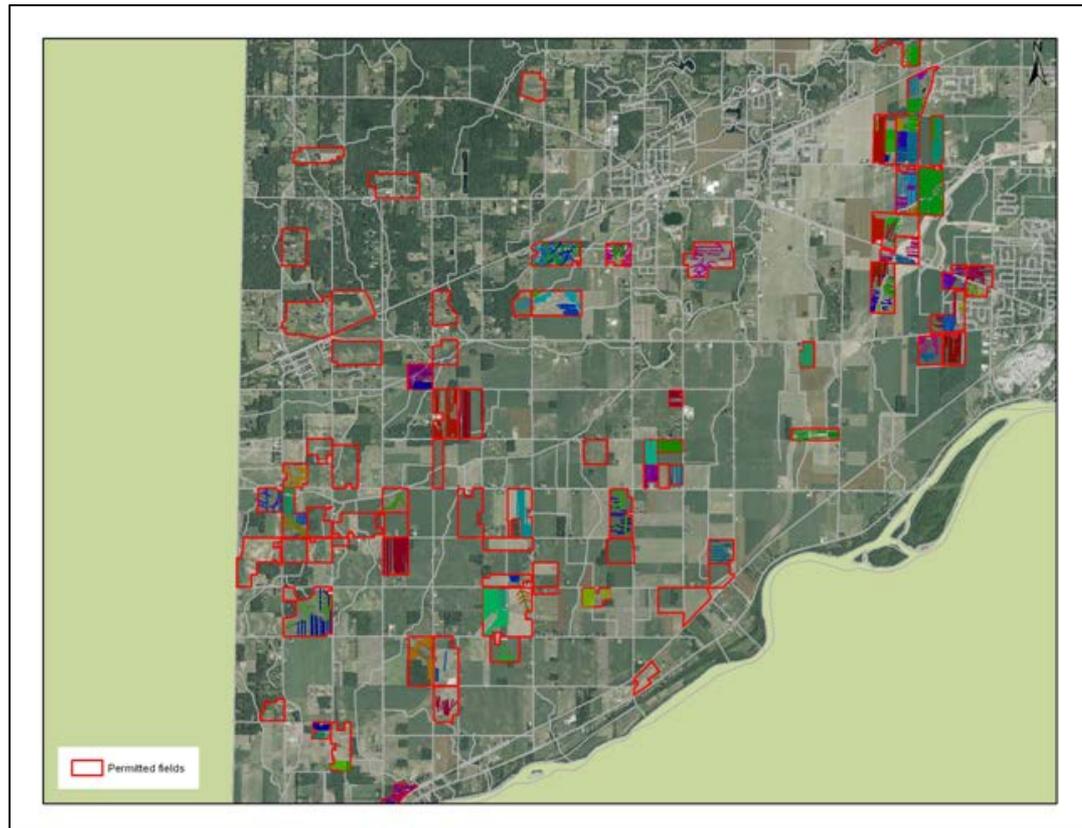


GLRI Project: Prevention of Surface Water Contamination from Biosolids Application

University of Toledo



November 29, 2011

Summary

- Start date: September 30, 2010
- End date: June 30, 2013
- Total Project Funding: \$550,228
- University of Toledo, Department of Geography & Planning
 - Kevin Czajkowski, Elaine Reynolds, April Ames (tile & biosolids mapping)
- University of Toledo, Department of Environmental Sciences
 - Alison Spongberg, Jason Witter (PPCPs)
 - Daryl Dwyer, Kris Barnswell (pathogens)
 - Von Sigler (pathogens)

Goals

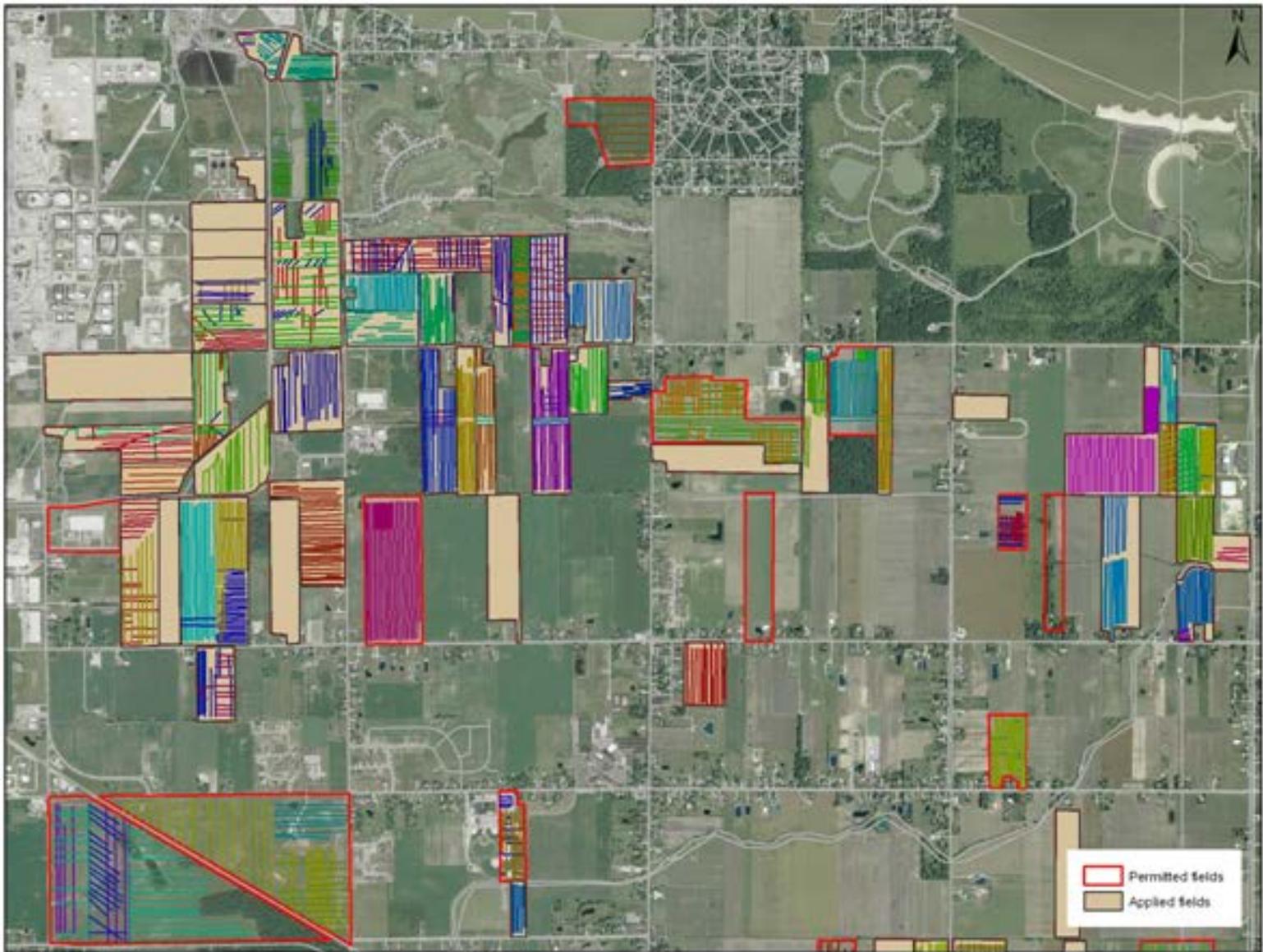
- Quantify the contamination to Lake Erie from biosolids applied to fields with tile drains.
- Determine whether a temporary cap on the tile outlet or an in-line water control device will reduce that contamination.

Accomplishments

- Mapped tiles in fields permitted for biosolids application in Lucas, Erie, Ottawa and Sandusky Counties.
- Created a database of available biosolids application data for the counties.



Example of multiple tile systems

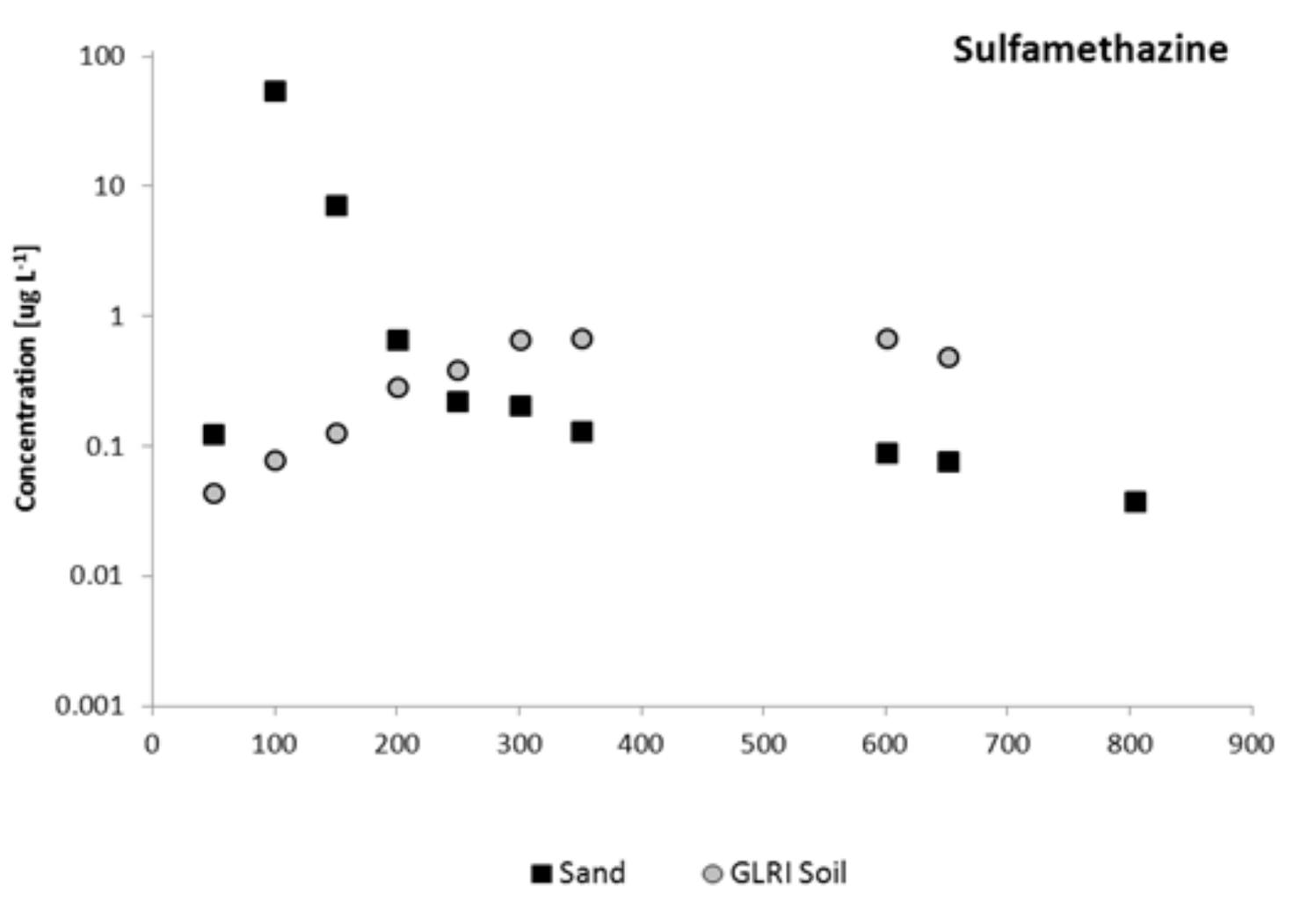


Fields permitted for biosolids application (outlined), applied fields (tan fill) and mapped tiles (colored lines) in eastern Lucas County.

- Constructed large agricultural test cells that mimic actual field conditions and utilized in field experiments.
- Biosolids application and incorporation. (A) Furrows to depth. (B) Biosolids addition. (C) Initial mixing. (D) Incorporation by tilling. (E) Final tilled.
- PPCP analysis and data compilation and interpretation currently being performed on mesocosms experiments.

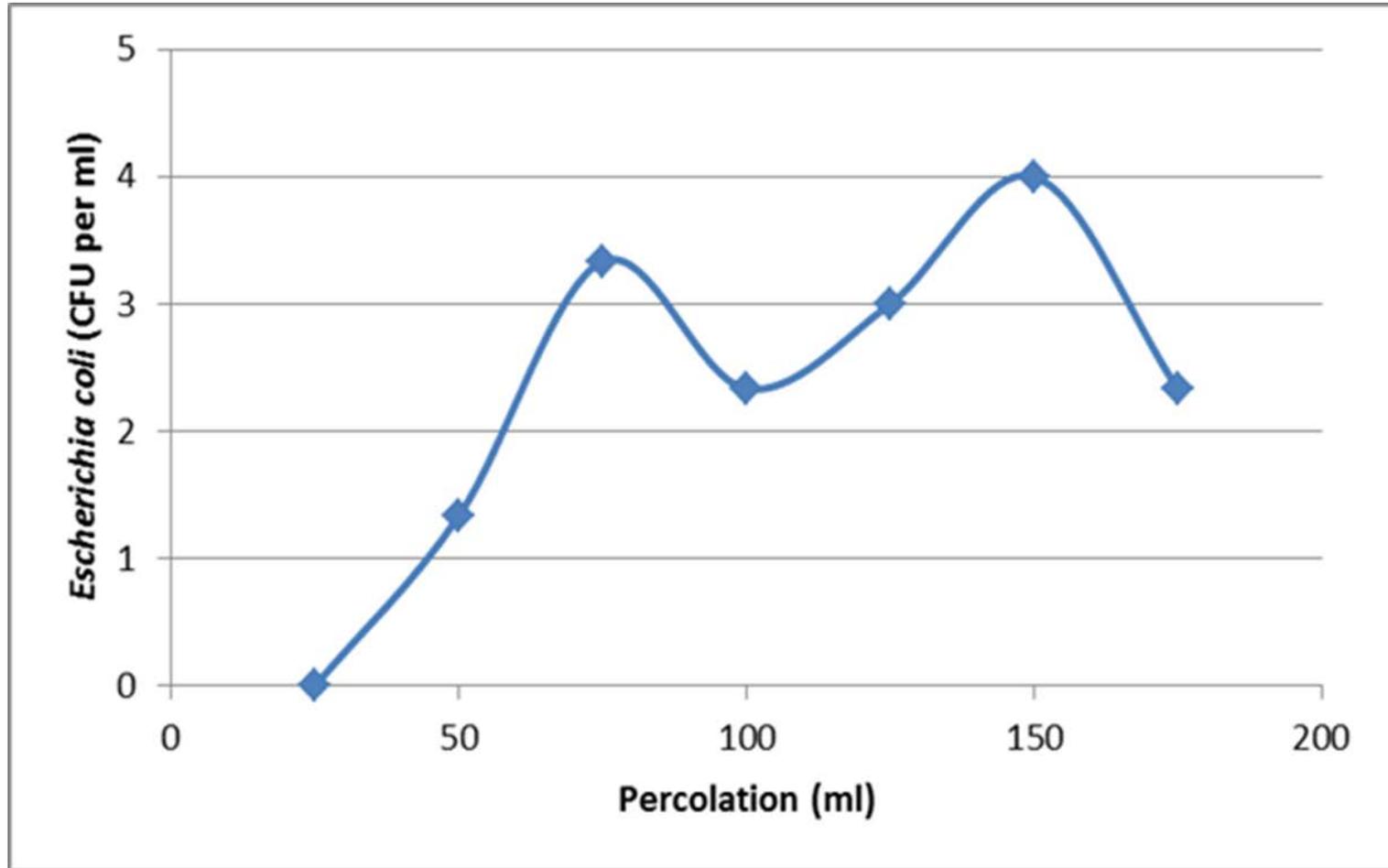


PPCP column experiments



Mean concentration of Sulfamethazine in different leachate fractions collected from two columns packed with sand and the GLRI soil (applied layer 10 cm, total length 30 cm).

Pathogen column experiments



Densities of *Escherichia coli* in preliminary column experiment

Regional Value

- Understand the potential impacts of biosolids application to fields in this region.

Ecosystem and management improvements

- It is anticipated that the project will:
 - Develop an estimation of the impact caused by application of biosolids on tilled agricultural fields surrounding the western basin of Lake Erie.
 - Pilot test the feasibility of an in line water control as a way to mitigate contamination of the environment after biosolids application.
- 2011 was primarily focused on design and data collection.



Public benefits from project

- Based on the results we can determine if an in-line water control is a feasible method to facilitate the degradation of pathogens and/or PPCPs, and thus provide an option for the reduction of potential contaminants entering the environment from field tile.