

Introduction

This research attempts to elucidate the efficacy of combining Best Management Practices to ensure water quality. WASCoBs are designed for erosion control and previous research on WASCoBs primarily focused on management of drainage-water. There is limited research on WASCoBs potential for the combined benefit of improving water quality, minimizing erosion, and managing flood water. The hypothesis is that agricultural fields with WASCoBs and cover crops planted, will result in desired water quality effects due to having the benefits of multiple BMPs. The research will examine the influence, of cereal rye as cover crop and WASCoBs, on water quality, focusing on nutrient content, soil health and crop yield.



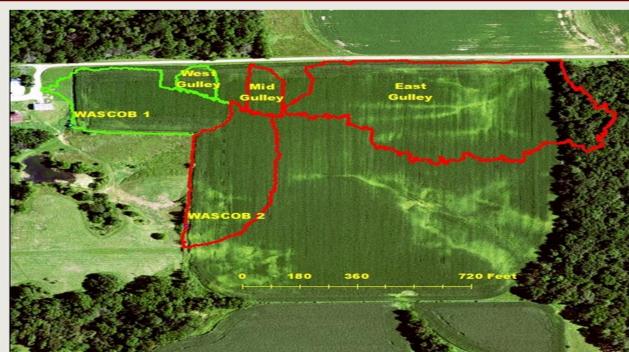
Objectives

- Evaluate the influence of cereal rye cover crop in a corn-soybean rotation on nutrient losses, water quality, soil health, and crop yields in fields with and without WASCoBs.
- Evaluate WASCoBs with and without cover crops over time for hydrologic modification, soil retention, and impacts on crop yields.
- Disseminate results to farmers and stakeholders.

Methodology

- Cover crops were planted on the Mid gully and WASCoB 1.
- 2 Agri-drain control structures for 6" tile were installed to measure outflows using v-notch weirs from the WASCoB basins.
- 4 ISCO 24-bottle stream samplers with pressure transducers were installed. One for each Agri-drain control structure on the WASCoBs and on each flume. These are powered by 80 Watt solar panels.
- All water samples collected are being analyzed for pH, Conductivity, $\text{NO}_3\text{-N}$, Dissolved Reactive Phosphorus (DRP), NH_4^+ , Chloride and Dissolved organic Carbon.
- Grid soil sampling on each acre of the field, plus samples from the WASCoB basins were collected.

Research Site



- Location: Near Atterberry Illinois
- Mid Gully- 0.6 acres with cover crop
- West Gully- 9.48 acres without cover crop
- WASCoB1- 3.35 acres with cover crop
- WASCoB2- 3.77 acres without cover crop

Results

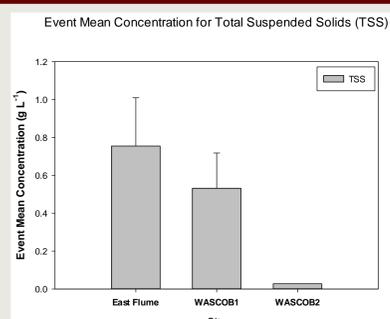


Figure 1. Flow weighted average TSS concentration at the of the Atterberry research site.

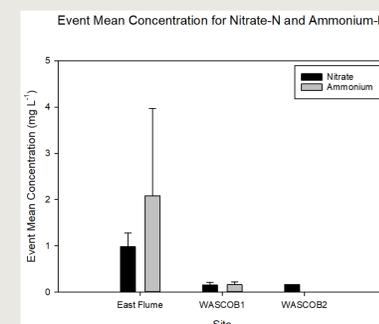


Figure 2. Flow weighted average concentration of Nitrogen from Nitrate and Ammonium at the Atterberry research site.

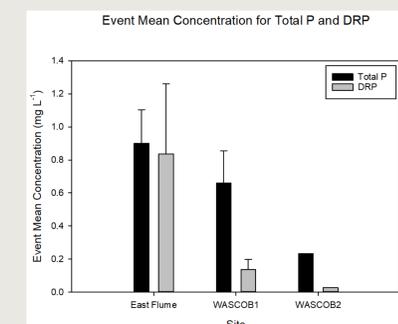
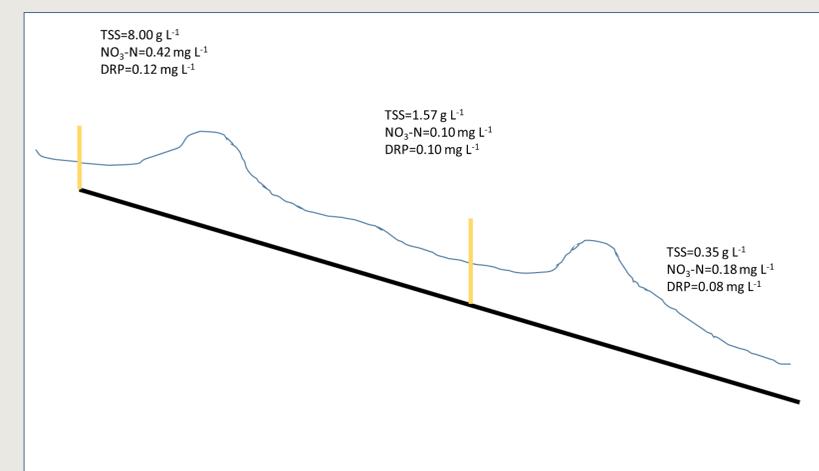


Figure 3. Flow weighted average DRP and Total P concentrations at the Atterberry research site.



- WASCoBs showed lower concentrations for DRP, Total P, $\text{NO}_3\text{-N}$, $\text{NH}_3\text{-N}$, and TSS.
- The upper basin showed on average lower concentrations than the lower basin of the WASCoB with no cover crop
- Over a small sampling window, ephemeral gullies without WASCoBs/Dry Dams are contributing more TSS, nitrate, and phosphorus to receiving waters than those with the BMP.

Acknowledgements

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