

## Presentation Information

Presenter	Heidi Asbjornsen
Title	Enhancing Biophysical and Socioeconomic Functions of Agroecosystems in the Midwestern U.S. Through Strategic Integration of Perennial Vegetation
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### Abstract:

Agro-ecosystems are among the most complex and intricately coupled sets of human and natural systems on Earth. In the Midwestern U.S., the almost complete replacement of perennial tall grass prairie by annual crops has been accompanied by dramatic alterations of hydrologic, nutrient, carbon cycles, diminished biodiversity, and reduced resilience of social systems. This research examines the central hypothesis that relatively small changes in the amount of perennial cover within landscapes dominated by annual crops will have disproportionately large, positive effects on key biophysical (e.g., water quality and flow, biodiversity) and socioeconomic (e.g., quality of life, revenue stability) factors at a relatively low cost. We further hypothesize that the location and extent of perennial cover will directly affect the balance between costs and benefits of these multiple ecosystem functions. We test these hypotheses using a replicated watershed-scale experiment involving different configurations of annual crops and perennial prairie plants. Complementary socioeconomic research assesses society's willingness to pay and farmers' willingness to accept conservation practices based on the use of perennial vegetation. Results thus far suggest that strategically located perennial habitat can significantly reduce sediment loss: during the extreme rainfall events of 2008 watersheds with 10% perennial cover at the bottom lost only 895 kg/ha, compared to 19,360 kg/ha lost from watersheds with only no-till corn. Additionally, we have recorded increasing levels of bird, insect, and plant diversity in watersheds supporting mixed annual-perennial vegetation. Socioeconomic analysis suggest that farmers are not readily willing to accept payment for conservation practices involving integration of perennial cover, while farmers' decisions in response to economic and environmental criteria are complex and highly variable. Current research focuses on further unraveling the interactions and drivers that determine economic, social, and environmental trade-offs associated with integrating perennial vegetation in agroecosystems dominated by annual crops in the Midwest.