Adoption of Conservation Initiatives on Midwest Farms: Farm Size Matters
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Introduction
This study examines the incentives of farm firms in the Matson Ditch Watershed to change tillage practices and adopt buffers on their farms. Matson Ditch, a 1,070-acre sub-catchment of the St. Joseph Watershed, is located in DeKalb County, Indiana. Farm level economic and environmental modeling was conducted to examine the trade-offs the farmer must make when changing tillage practices and establishing buffer areas.

Research Objectives
1) Determine how changing tillage systems and utilizing buffers affect the economics of the farm firm.
2) Examine how changes in tillage practices and buffer utilisation affect the amount of sediment reaching water resources.
3) Identify possible improvements in agricultural policy that would encourage producers to adopt conservation tillage systems and buffers.

Farm Firm Level Modeling
Nine different representative farms were modeled for the Matson Ditch Watershed. These three farms sizes: small (500 acres), medium (1000 acres), and large (2500 acres) were examined under three different tillage systems: conventional, reduced, and no-till. Production costs for corn and soybean rotations were established using local input prices and machinery complements. Three different buffer widths were established: 20, 35, and 120 feet, utilizing four different vegetative options: alfalfa, all grass, half grass and half trees, and two-thirds grass one-third trees.

Economic Model
Information was gathered from local producers, input dealers, and natural resource agencies to develop representative farms. These farms were then analyzed with the Purdue Crop and Livestock Linear Programming Model (PCLP) to better understand how scarce farm resources, such as labor and machinery, can be allocated in the most optimal way. The model estimates the expected returns to the farm when utilizing different production systems. Prices, yields, subsidies, machinery complements, and input costs are based on 2005 data for Matson Ditch.

Environmental Model
The Water Erosion Prediction Project (WEPP) model was utilized to better understand the environmental implications of changing land uses in the Matson Ditch watershed. The model was used to predict yearly sediment yields from the watershed, which is subdivided into 456 Hipsibes, based on DEM data. WEPP uses the same buffer systems and crop rotations as the economic model. Model output estimates annual sediment yields over a 30 year period based on rain fall amount and intensity, soil properties, slope, crop growth and decomposition, and production practices.

Conclusions
Different sized farms have different incentives when choosing to adopt conservation tillage or buffer areas. Large farms can produce profitably on marginal lands and may be less likely than smaller farms to take these lands out of production. Farm profitability is highly tied to production subsidies. Switching to a No-Till cropping system allows for greater returns per production hour as well as greater flexibility for future farm expansion.

Recommendations
Producers on smaller farms are more likely to see financial benefit in establishing buffer areas than larger producers. On larger farms changing to no-till can be a profitable alternative which greatly reduces sediment yields. This research highlights the importance of production subsidies to provide economic returns. Switching to conservation initiatives rather than traditional payment methods could greatly benefit environmental quality while maintaining farm income. Providing producers with incentives to establish 20` buffers near water resources should lead to large decreases in the amount of sediment entering water resources. Future studies should be extended to other CRP watersheds and should expand the environmental parameters by utilizing an AGNPS or SWAT model.