NDSU

Crop Production and Wetland Restoration: Economic Trade-offs for Landowners

Problem Statement

Regional opportunities for wetlands in mitigating GHG emissions include:

- **Wetland restoration (land use change)**
  From a landowner's perspective, can wetland restoration be economically competitive with crop production? Would carbon sequestration associated with wetland restoration compete favorably with other terrestrial abatement options?

- **Greenhouse gas flux from existing wetlands (land management change)**
  Land management practices that mitigate wetland emissions of GHG also will need to make economic sense for producers and landowners. Unfortunately, current science is just beginning to quantify the relationships between land management and GHG fluxes in wetland ecosystems.

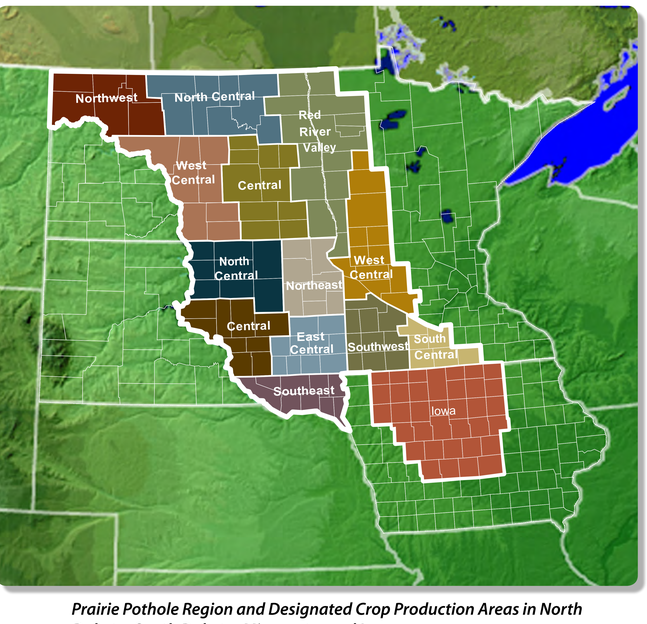
Approach

An econometric model examined the present value of revenue streams from crop production and wetland restoration on farmed crop land over a 20-year period using the following key inputs:

- Net returns from crop production differentiated by 3 levels of producer profitability based on 7-year Olympic average from 2002 through 2008 for 15 sub-regions
- Projected cash rents for rented farm land
- Carbon prices between $10/mt and $125/mt
- 80-acre restoration site with 3 variations in ratio of catchment to wetland size
- Restoration costs of $213 to $638 per site-acre
- Grass establishment costs of $117 per catchment-acre
- Carbon sequestration rates of 0.455 mt/yr/acre for wetlands and 0.3 mt/yr/acre for catchment
- Grass/hay rental income from wetland catchment areas
- Easement payments endogenously calculated to provide equal returns between land uses

Present Value of the Difference Between Revenues from Crop Production and Wetland Restoration for the Most Positive and Least Favorable Economic Situations

State/Region	Most Favorable Scenario	Least Favorable Scenario
NORTH DAKOTA	---------- $ per acre ----------	
Northwest	154	(1,877)
North Central	(77)	(2,033)
West Central	326	(1,790)
Central	74	(2,277)
Red River Valley	(54)	(2,650)
MINNESOTA		
Red River Valley	(246)	(2,612)
West Central	(266)	(3,026)
Southwest	(805)	(3,920)
South Central	(692)	(3,942)
SOUTH DAKOTA		
Northeast	(86)	(2,882)
North Central	81	(2,188)
Central	68	(2,235)
East Central	(167)	(3,236)
Southeast	(172)	(3,244)
IOWA		
North Central	(1,186)	(3,652)



Prairie Pothole Region and Designated Crop Production Areas in North Dakota, South Dakota, Minnesota, and Iowa

Results

- Wetland restoration, without easement payments, is not likely to compete favorably with returns from crop production even with carbon sequestration revenues.

- Project economics improved with decreases in land productivity, reductions in restoration costs, increases in grass rents, and high carbon prices.

- Differences between returns from crop production and wetland restoration ranged from -$300 to -$500/acre in NW North Dakota to -$3,500 to -$4,000 in parts of MN and Iowa.

- Easement payments that resulted in no change in landowner returns ranged from 40 percent to 300 percent of land values.

Discussion

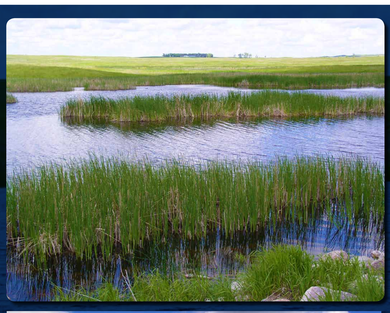
- Historically, most wetland restoration on farmed crop land has involved easement payments, which is consistent with this study's findings.

- Wetland restoration does not appear to be cost competitive with other terrestrial carbon sequestration options

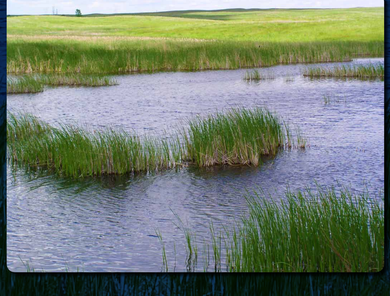
- Carbon sequestration more accurately represents a valuable co-product from wetland restoration, but landowners unlikely to widely convert crop land to wetland ecosystems as a result of carbon sequestration revenues.

- The management of land near and adjacent to existing wetlands perhaps offers greater opportunities in terrestrial GHG abatement options:
  - Potential economic synergies exist with carbon sequestration on agricultural lands and ability to capture revenue from changes in GHG fluxes in wetland ecosystems
  - Changes in land management pertaining to GHG flux in wetlands will need to make economic sense with respect to optimizing revenues from both adjacent lands and wetlands. Additional revenues from existing wetlands have the potential to influence management of adjacent lands. Historically, wetlands have had little opportunity to provide revenue streams regardless of existing land management. However, revenues from wetlands cannot be optimized without consideration of revenues from adjacent lands.

- Future research would benefit from quantification of how changes in land management affect GHG flux and carbon sequestration rates or volumes on both] adjacent crop land and wetlands.





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