

Agricultural Water Pollution: Some Policy Considerations

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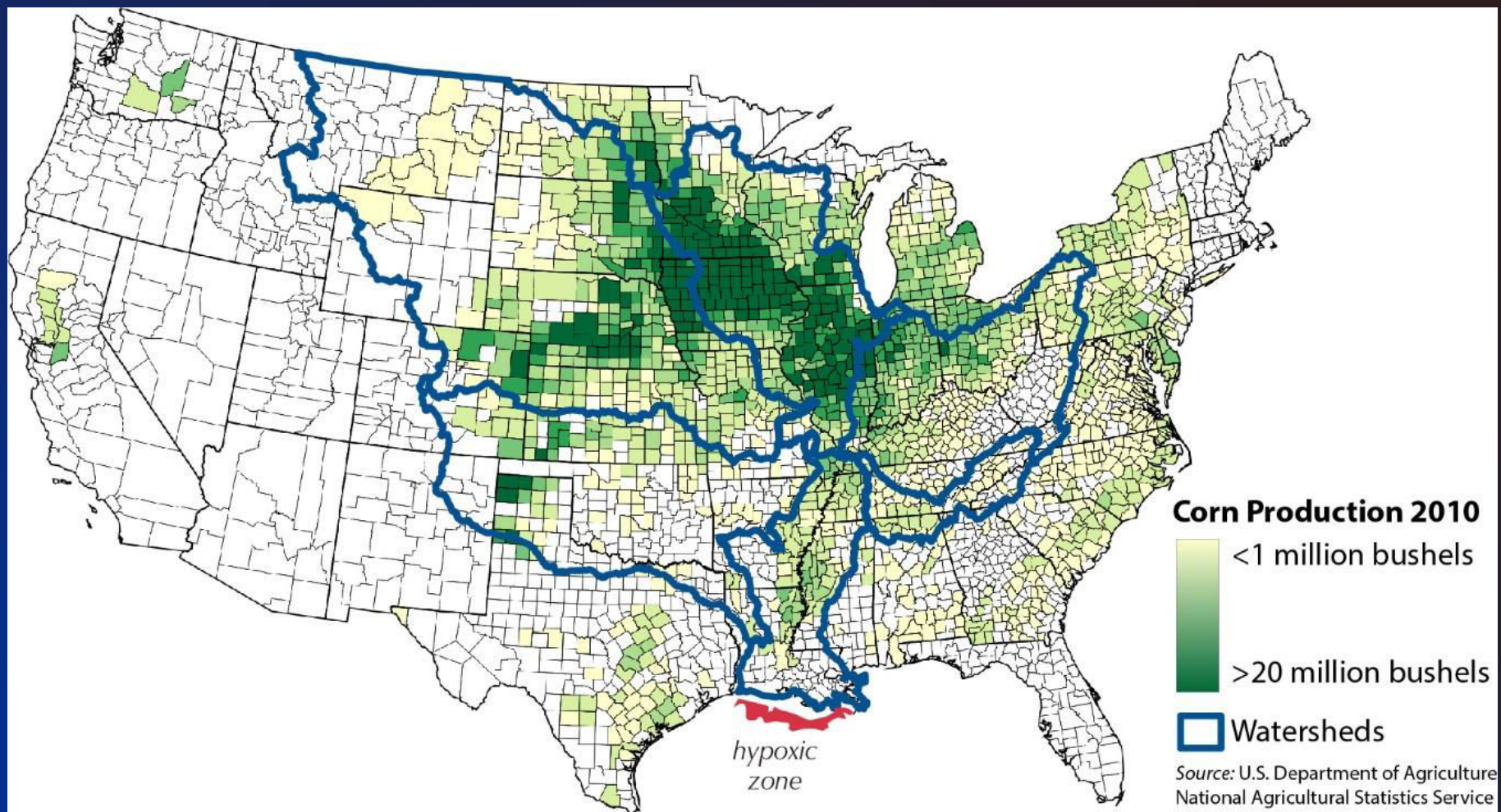
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**Iowa Environmental Council Annual Meeting
October 11, 2013**

This research was supported by the National Science Foundation, Dynamics of Coupled Natural and Human Systems Program, award number DEB-1010258, as well as two regional collaborative projects supported by the USDA-NIFA, award numbers 2011-68002-30190 and 2011-68005-30411.





What abatement options exist?

- Science Assessment (Nutrient Reduction Strategy)
- In field Management Practices
 - Reduced tillage (P)
 - Fertilizer timing, rate, and source (N and P)
 - Cover crops, rotation changes (N and P)
- Edge-of-Field
 - Buffers (mainly P)
 - bioreactors, controlled drainage (N)
 - Wetlands restoration (N and P)
- Land Use
 - Energy crops
 - Land retirement (perennials)

Practices



Photos courtesy of USDA NRCS





Practices new to Iowa

Photo: Bob Nichols, NRCS

<http://cornandsoybeandigest.com/conservation/4-tips-cover-crop-success>



Bioreactor under construction

http://www.iasoybeans.com/environment/sites/default/files/17Ham_sprd-chips.jpg?1316034072



Land Retirement

Perennial grass ---blue stem planting

http://www.fsa.usda.gov/Internet/FSA_Image/ia_767_15.jpg

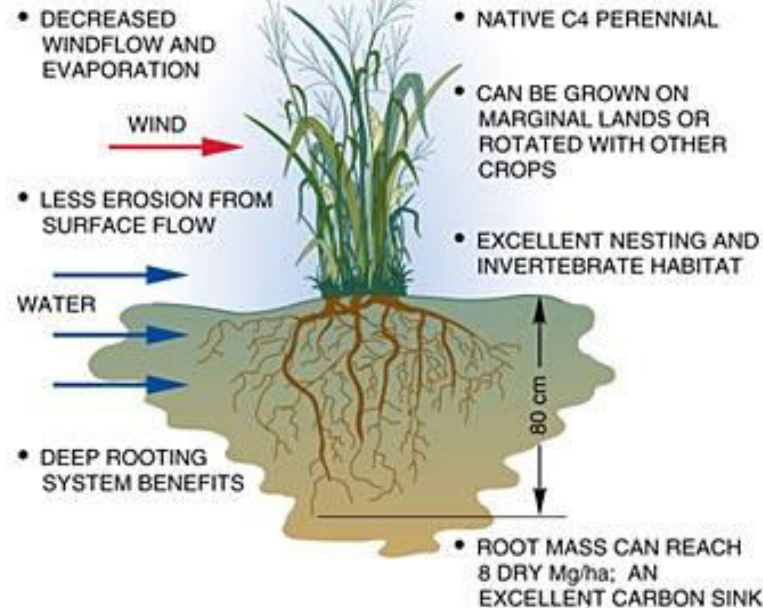


Switchgrass

<http://scienceprogress.org/2008/02/the-path-to-better-biofuels/>



SWITCHGRASS



Wetlands



Photo courtesy Missouri NRCS



Efficacy and Cost of Practices

- Vary by
 - Nitrogen or Phosphorus
 - Field characteristics
 - Land use in watershed
 - Provision of other ecosystem services, greenhouse gas storage
- Ideally, all of these factors considered in efficient policy design

What is needed? Iowa Science Assessment

- Developed scenarios of practice coverage across Iowa's 21 million acres of corn/beans to achieve goals of 40% N and 30% P reduction
- Example Scenario (NCS1)
 1. MRTN rate on all acreage
 2. 60% of acreage with cover crop
 3. 27% treated with wetland
 4. 60% drained land has bioreactor
- Estimated Cost of this scenario, \$750 mill/year (this is full cost, annualized, they note large initial investment)



My Take Homes for Policy Relevance

1. Low-cost options alone will not be enough. Scenarios with reduced fertilizer, movement of fall fertilizer application to spring, and cover crops on no-till acres achieve at best only 9% reduction.
2. Reliance on common BMPs will not be enough. Scenarios indicate that practices new to Iowa, such as bioreactors, cover crops, perennials crops, and more targeted wetlands will be needed.
3. Most of Iowa's extensive agricultural land must be treated. Important to target the most effective practices to the land they are most suitable for, but 80/20 rule of thumb doesn't apply.
4. This will be costly. The scenarios identified by the Science Team have initial price tags ranging from \$77 million to over \$1.4 billion annually. (Average over all scenarios: \$36/acre/year)



Voluntary Approach

- **“Property rights” with producers/landowners**
- Cost share programs
 - Conservation Reserve Program,
 - Environmental Quality Improvement Program,
 - CSP, WRP , etc.
 - State dollars, cost share
- Other possibilities
 - Labeling, certification programs
- Conservation compliance, link agricultural subsidies to environmental action

Regulatory Approach

- “Property rights” with society
- Technology Requirements required to adopt specific production method (ex: Maryland, must incorporate organic nutrients with 48 hours; North Carolina, mandatory BMPS in Neuse River Basin)
- Bans: Outright banning of actions (ex: Minnesota, buffer requires of 50’ from streams in some areas; Penn, 100 foot setbacks; several states winter ban on fertilizer application)
- Permit requirements: required to hold permit to (ex: Florida, permits certifying BMP adoption required to farm Everglades Ag Area; several states permits for fertilizer application in urban areas)



Comments and Questions Welcome

