Ecosystem Restoration Efforts on Private Lands: The Role of Farm-scale Planning and Delivery

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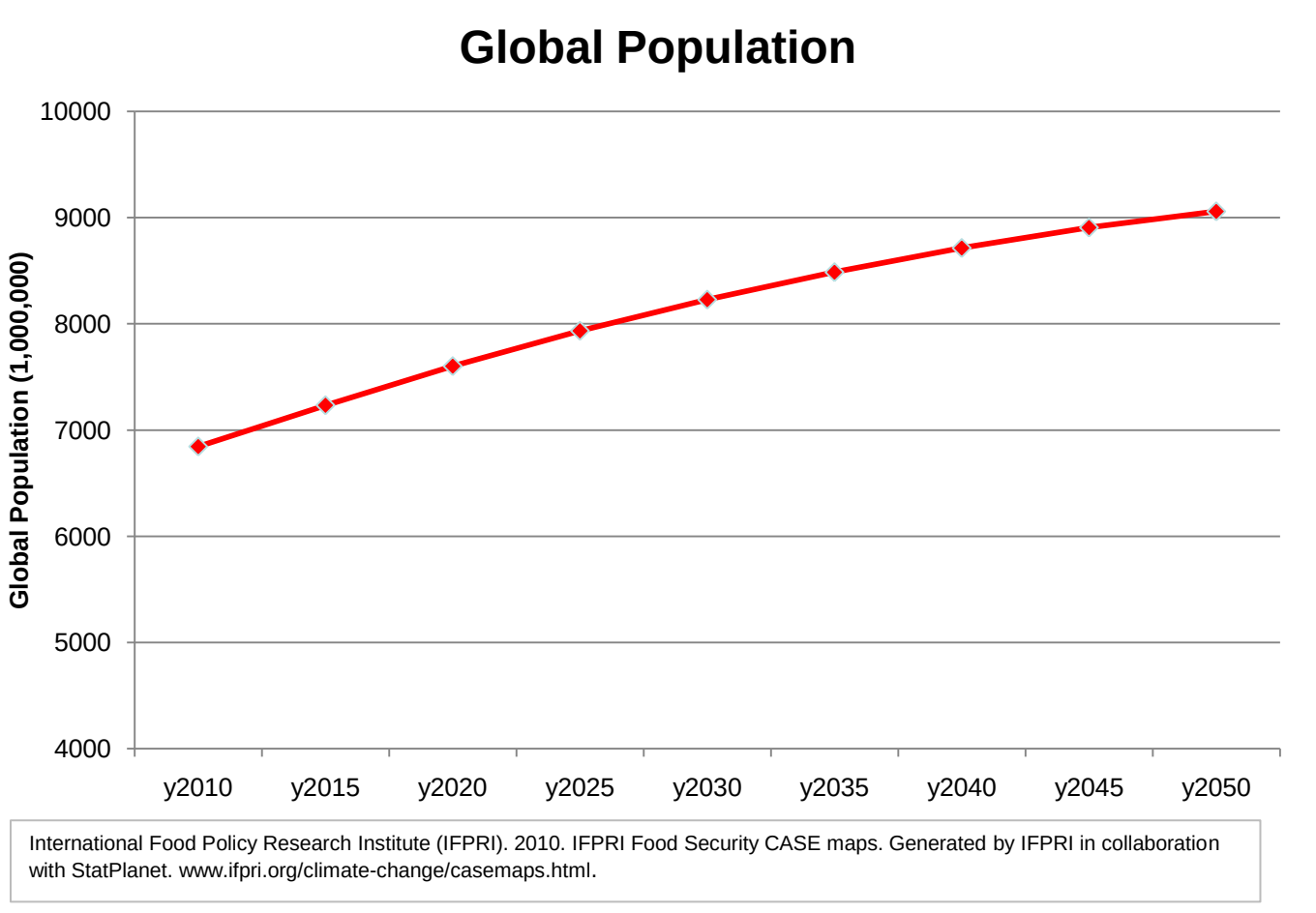
College of Forest Resources
Forest and Wildlife Research Center

Challenges



International Food Policy Research Institute (IFPRI). 2010. IFPRI Food Security CASE maps. Generated by IFPRI in collaboration with StatPlanet. www.ifpri.org/climate-change/casemaps.html.

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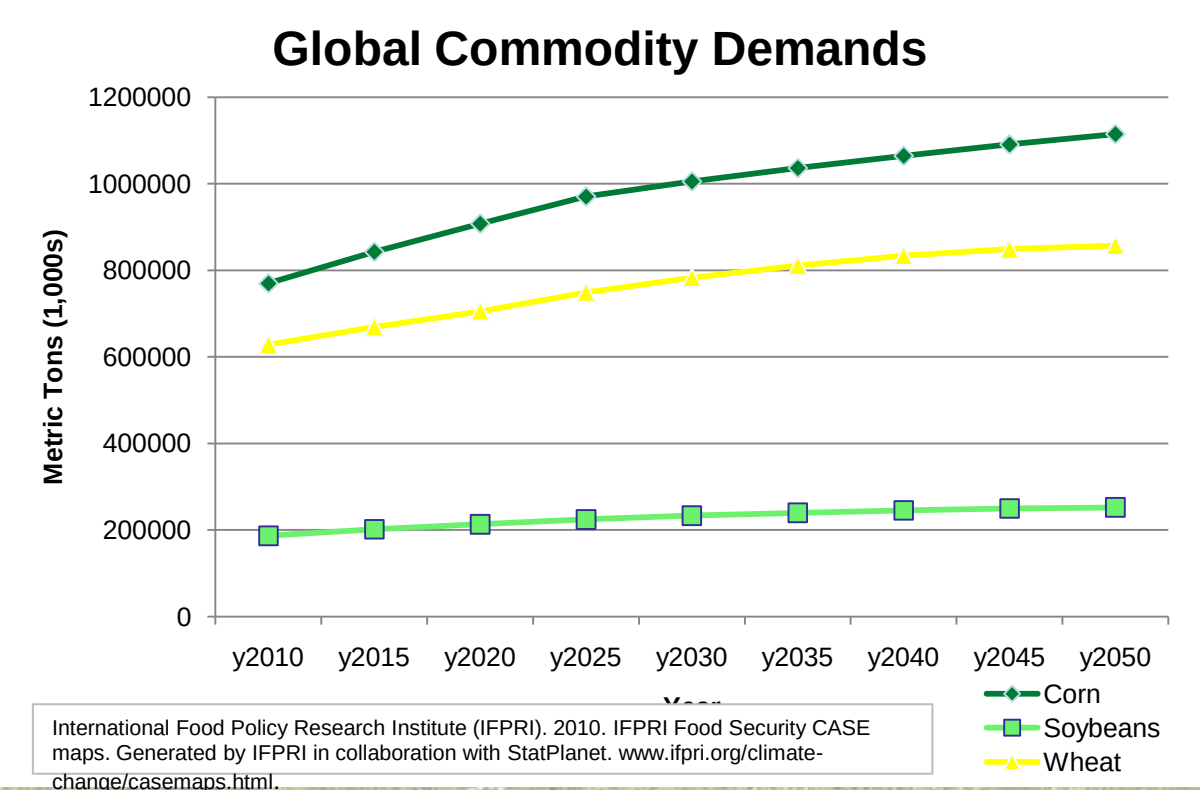

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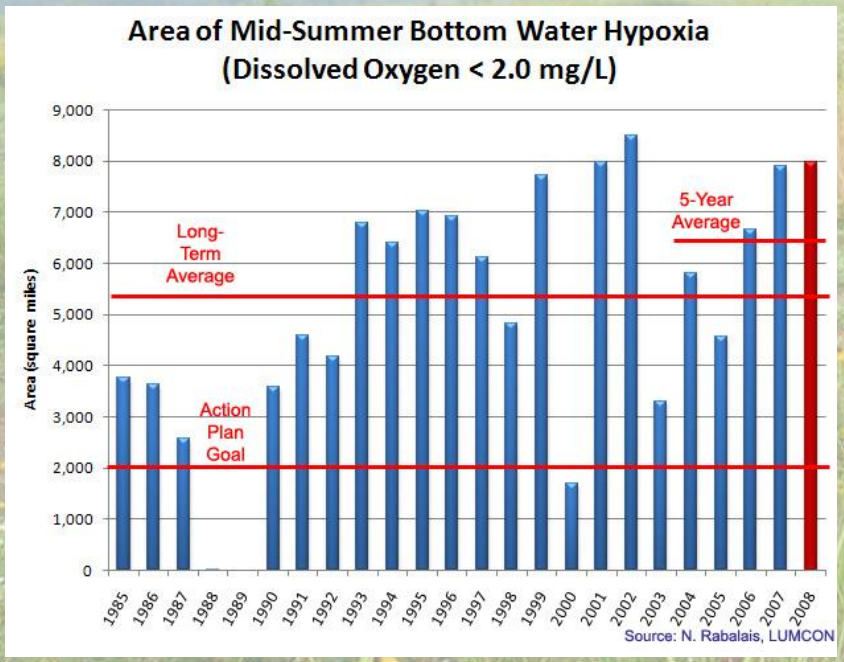
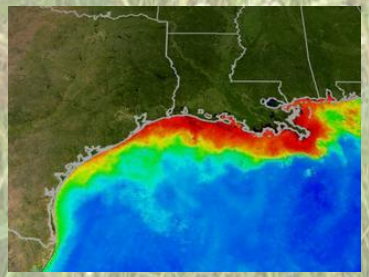
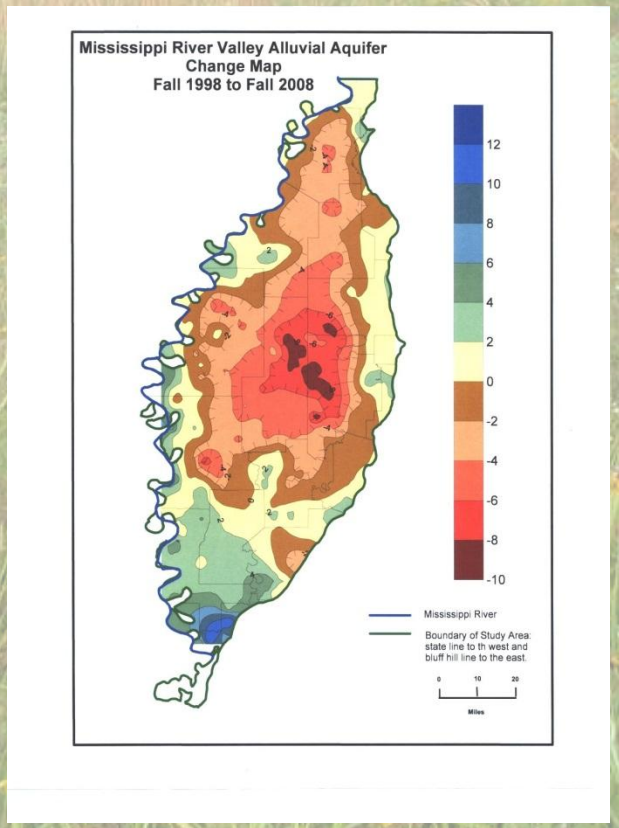
- Global food demands expected to increase by 50-100% over next 40 years.
- Rate of growth in demand will exceed growth in yield/production.
- Demand will be met through a combination of technology, intensification, and extensification.

Challenges

- Water Quantity
- Water Quality





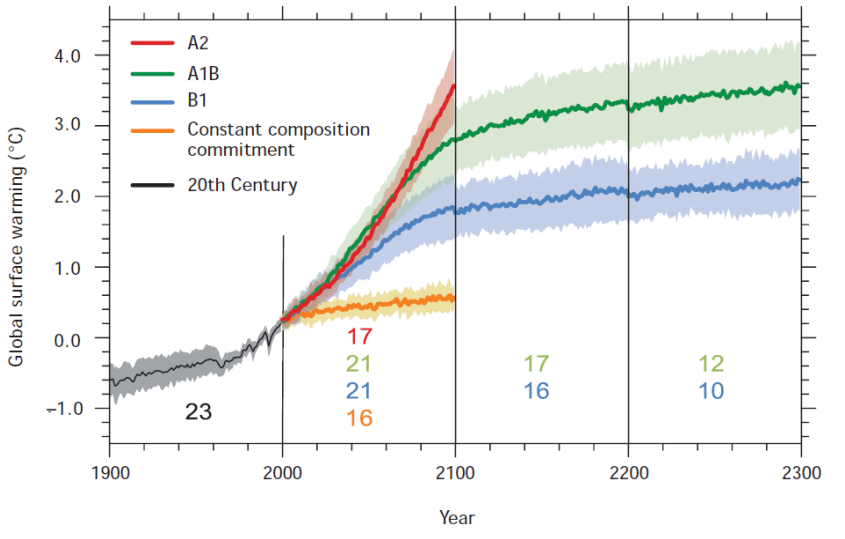


Challenges

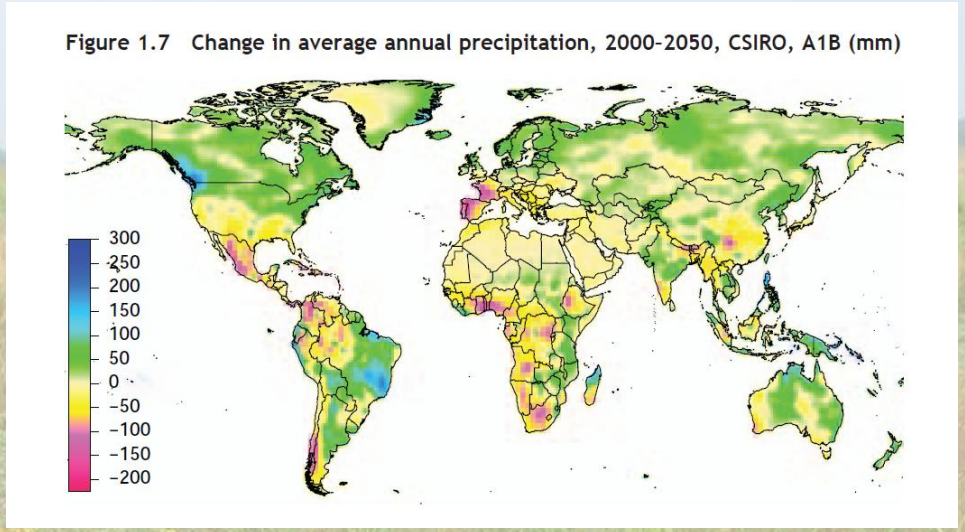
- Development
- Urban Sprawl

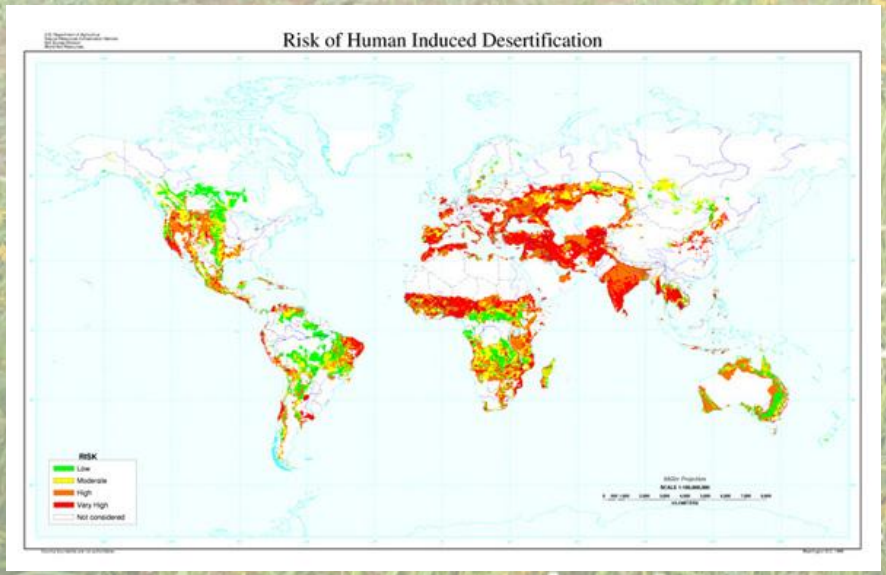
Challenges

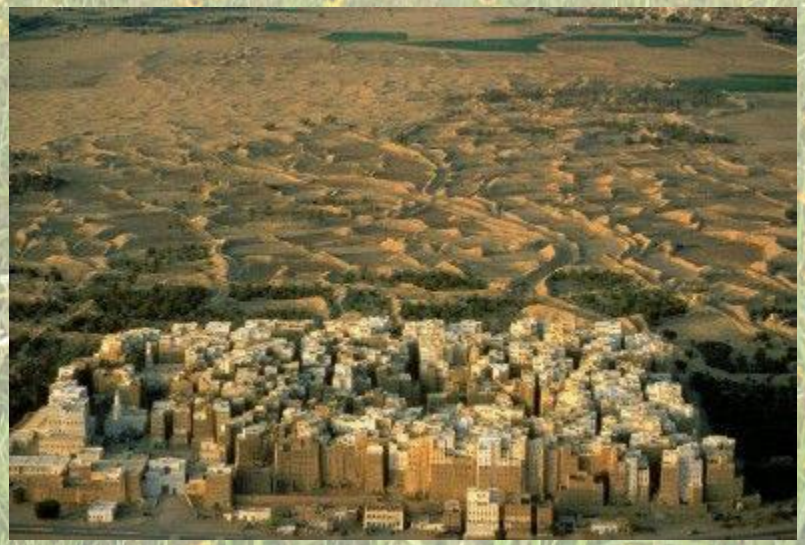
- Climate Change



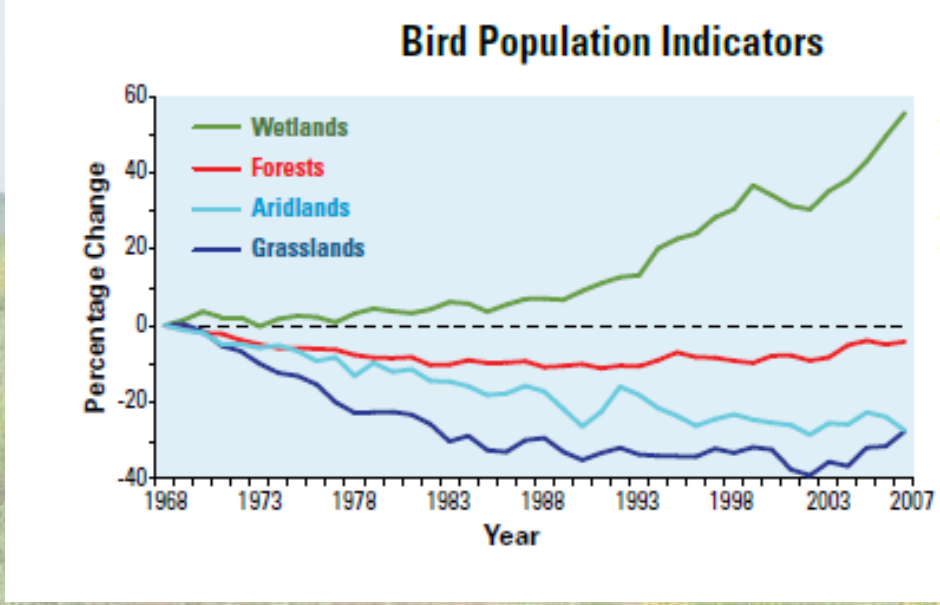
Source: Reprinted with permission from the Intergovernmental Panel on Climate Change (2007).

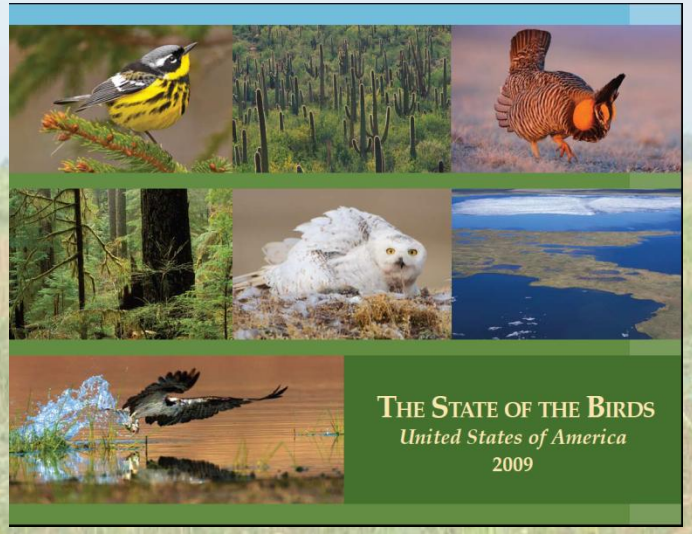


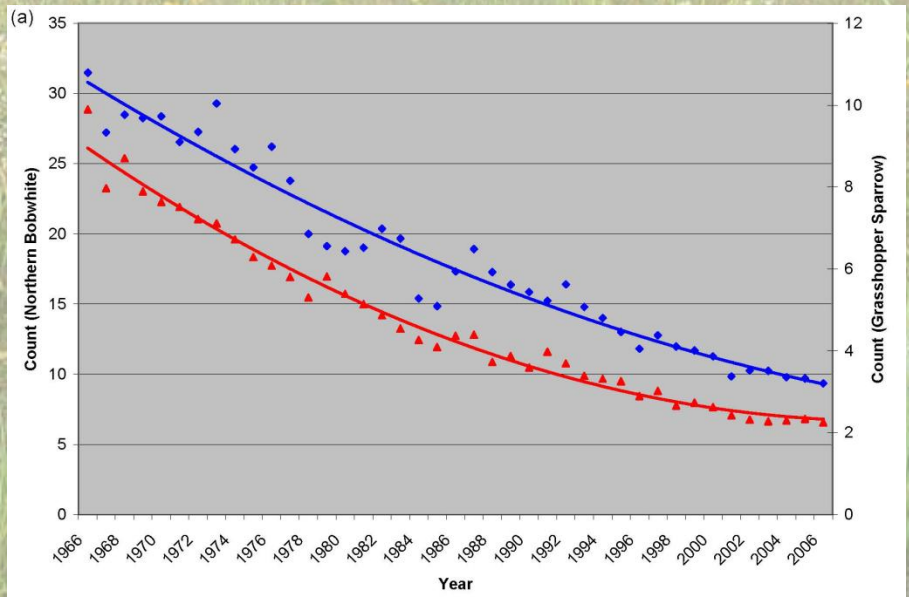




Ecosystem Health

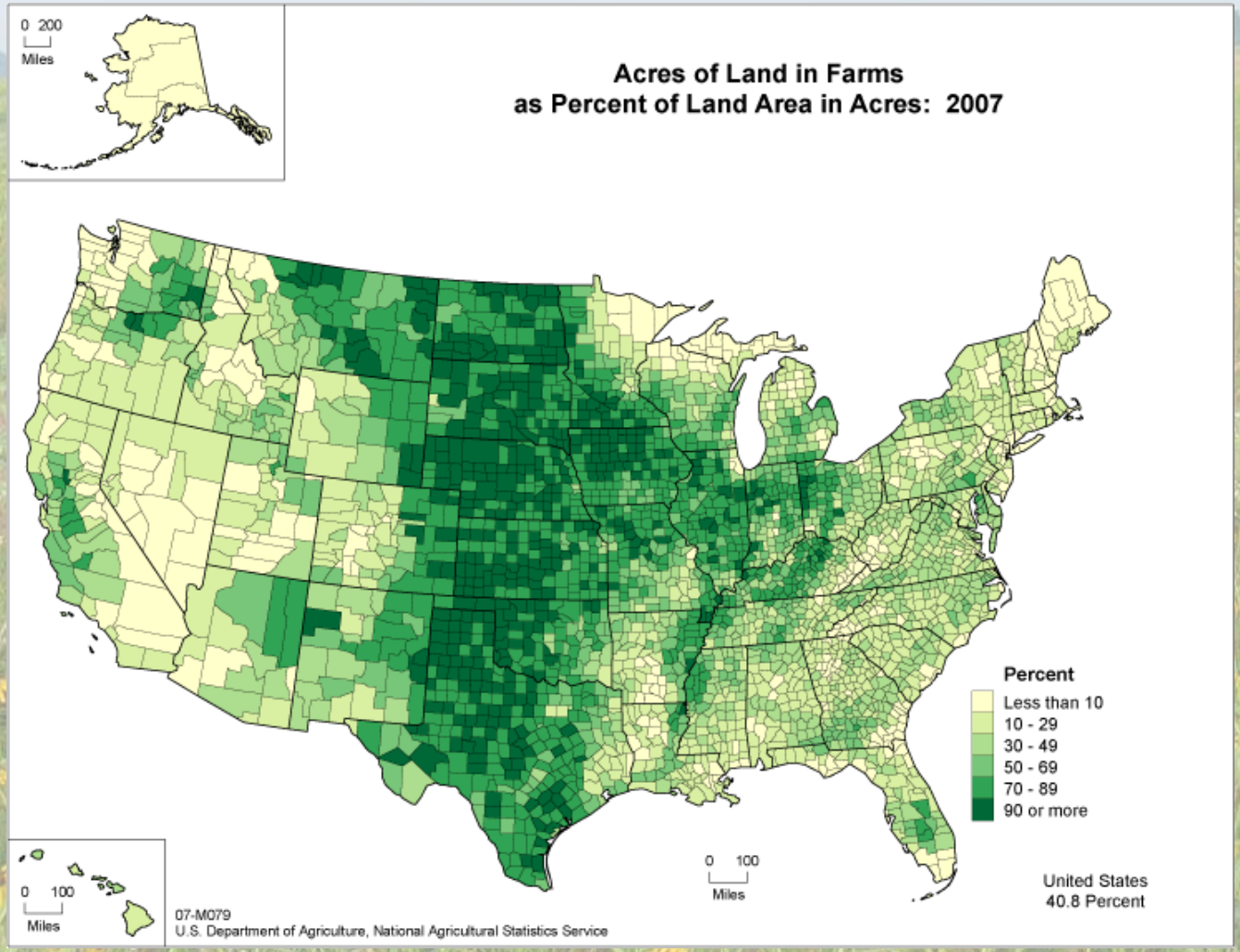






U. S. Land Use

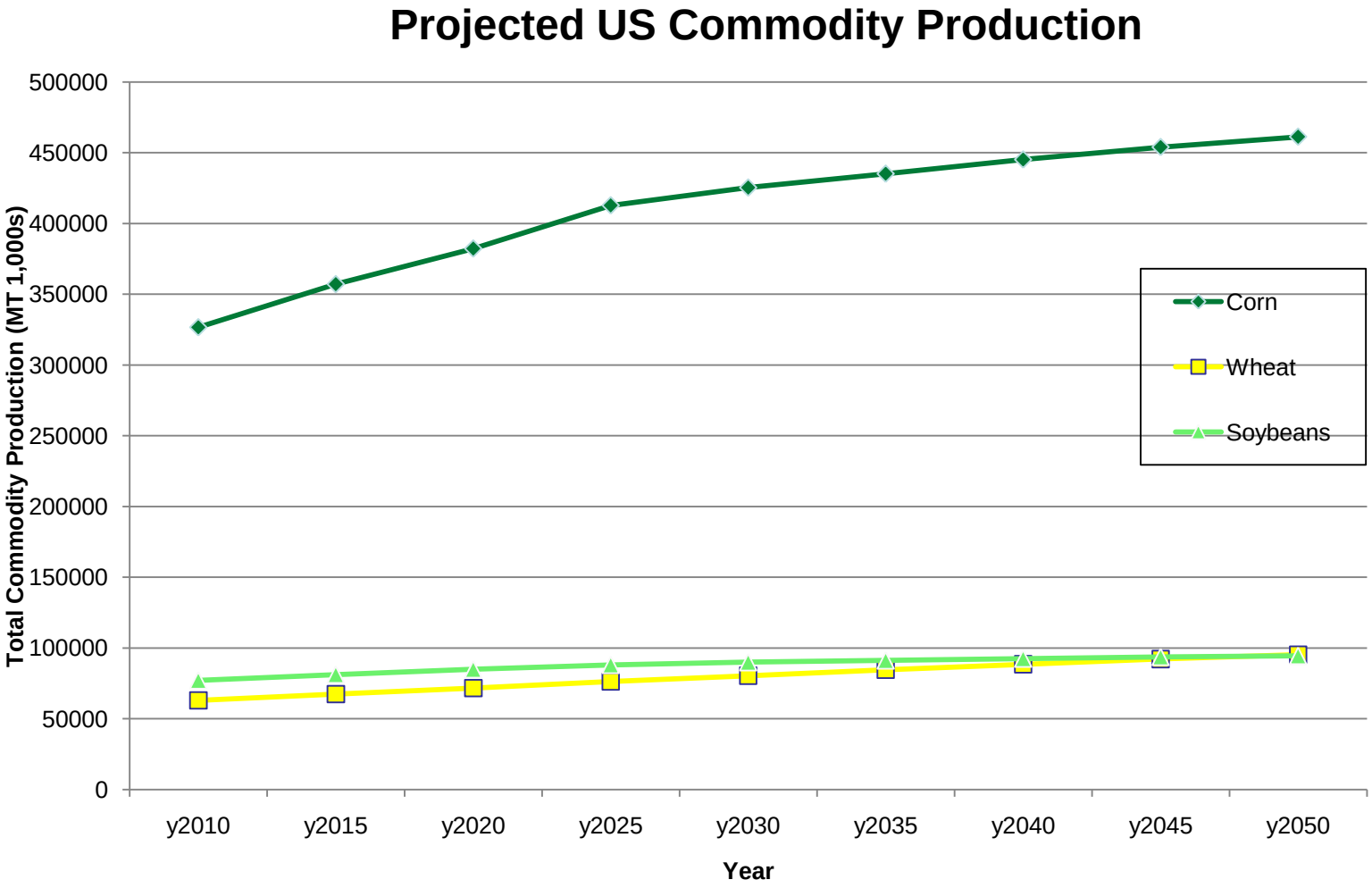
- 71 % of the lower 48 states in rural, non-federal ownership
- 50% devoted to cropping or grazing land uses (USDA 2003a).



Why Private Lands?

- Agricultural and forest systems produce food and fiber to meet global needs
  - Growing human population
  - Ever increasing rates of per capita consumption.
- The condition of these lands directly and indirectly influences the function and integrity of natural ecosystems.

Competing Demands



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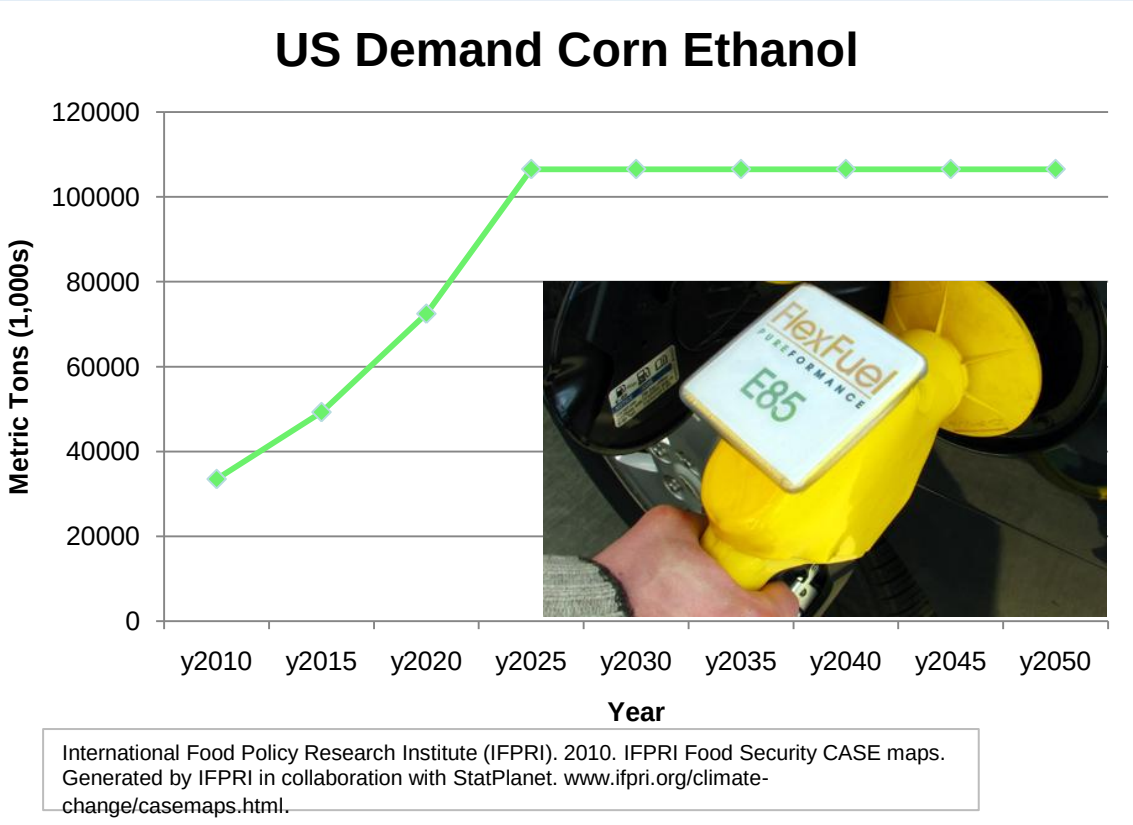
Competing Demands

- Commodity Prices

Competing Demands



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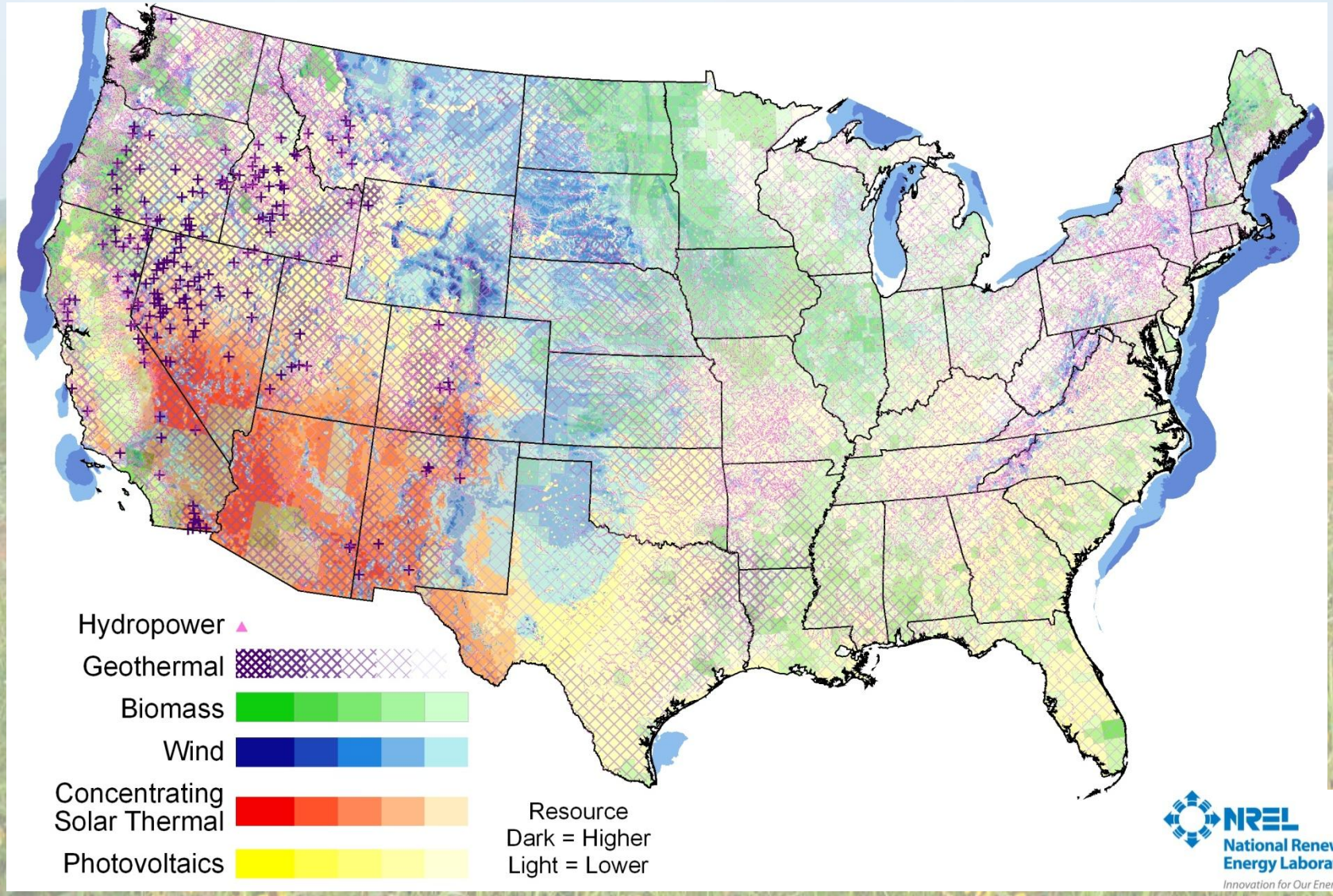
U.S. Renewable Resources



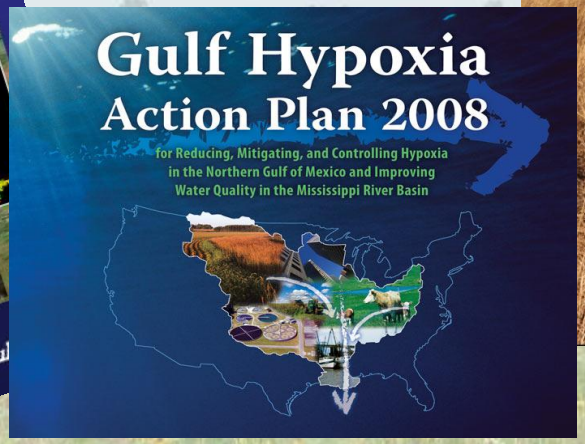
Effective Conservation

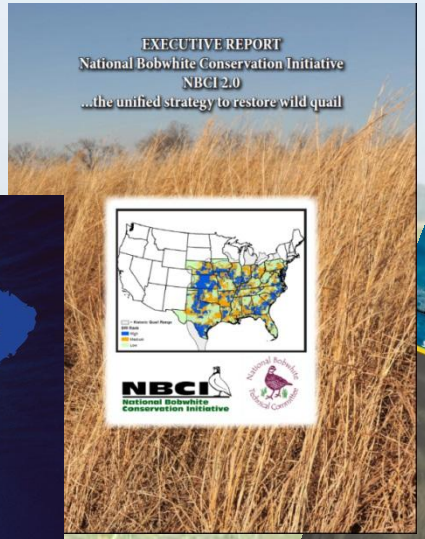
- Strategic
- Science-based
- Intentional
- Hierarchical
- Deliverable
- Measurable

Strategic Conservation

- Biological planning with measurable landscape level outcomes
- Conservation design that integrates biological objectives
- Conservation delivery on the ground
- *“Putting the right stuff in the right places”*

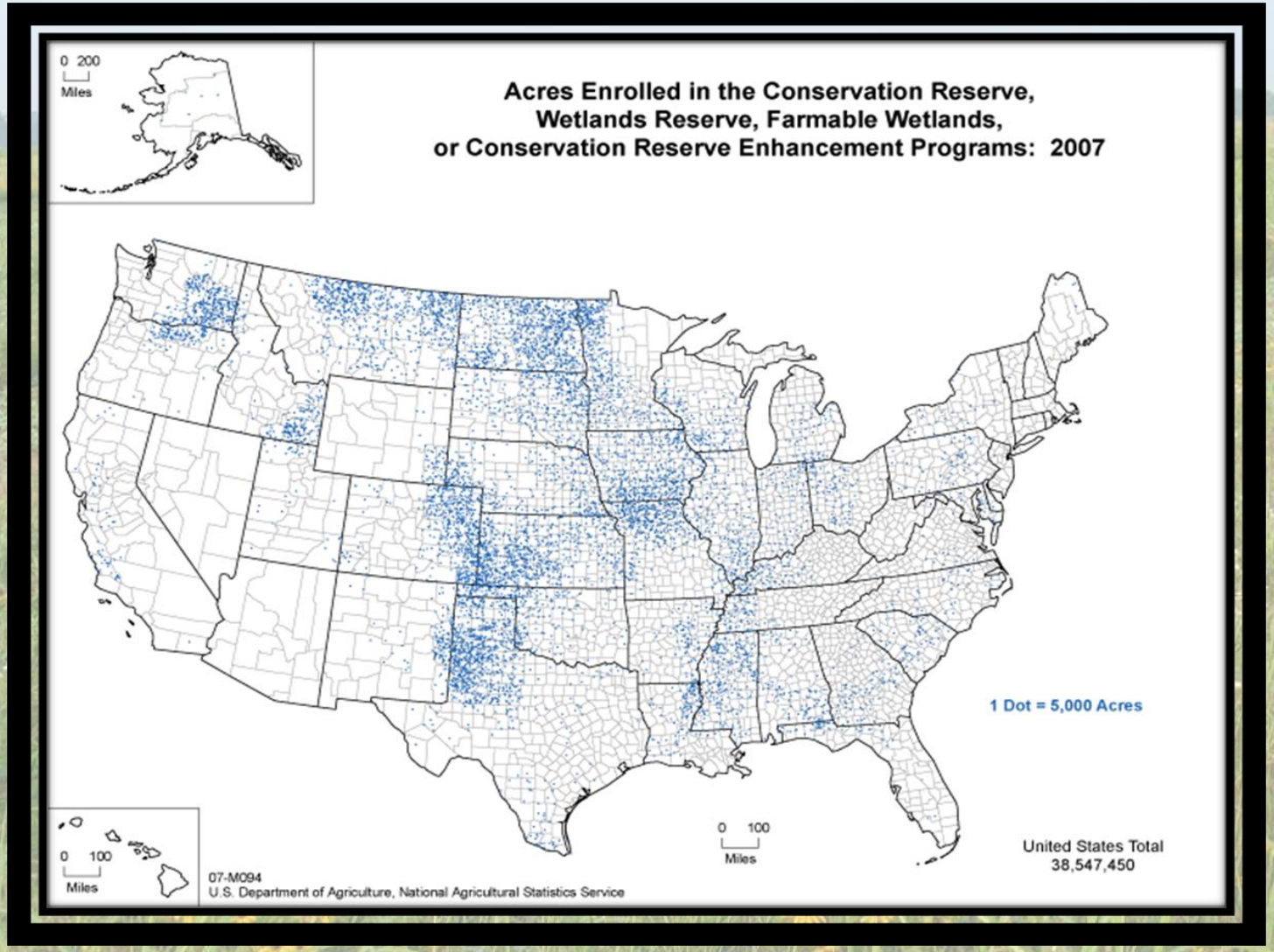
Science-Based





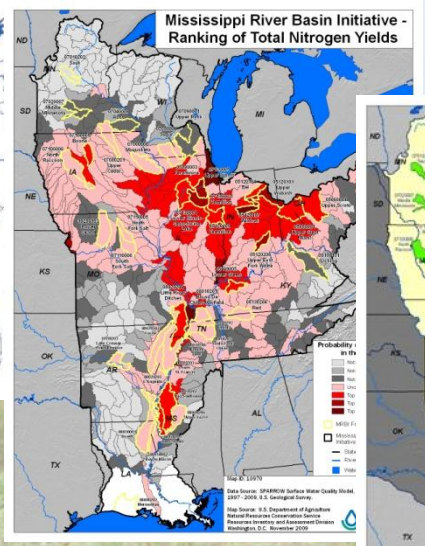
- Priority systems, assemblages, species
- Population objectives
- Biological foundation
- Process-based, data driven models of ecological function
- Spatially explicit objectives
- Targeted delivery
- Measurable outcomes

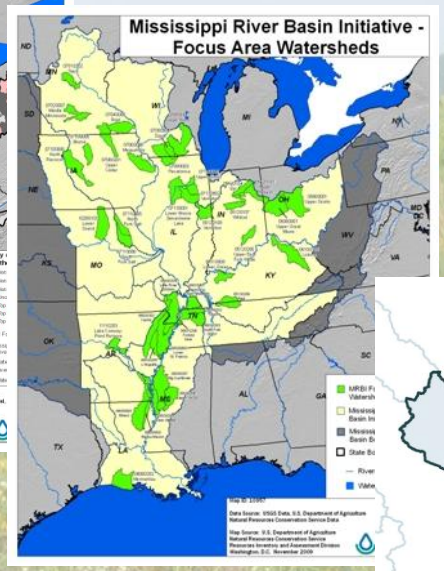
Intentional - Targeted



Conservation Must be Intentional

Hierarchical





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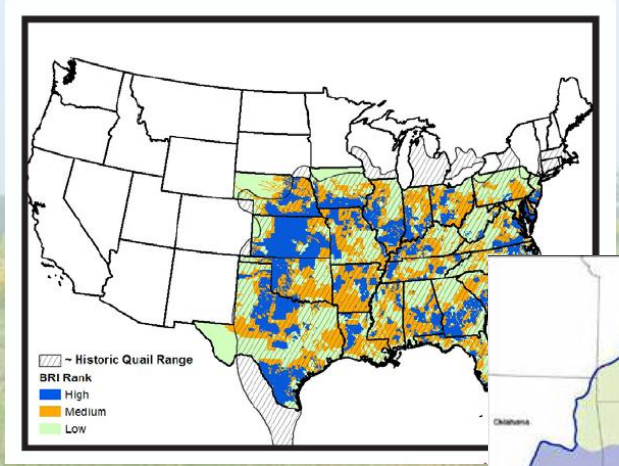
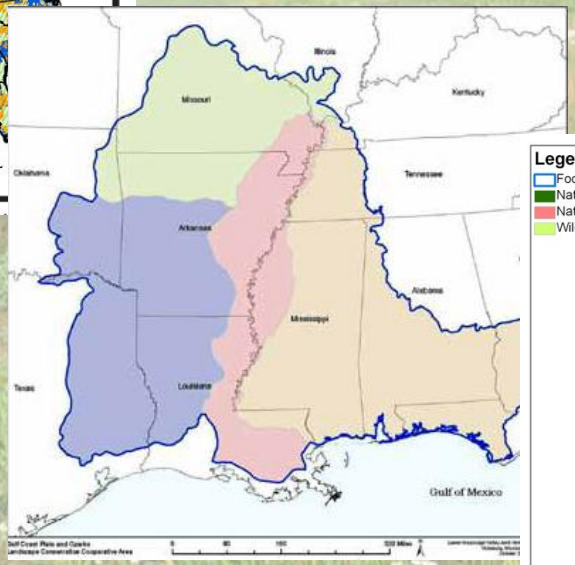
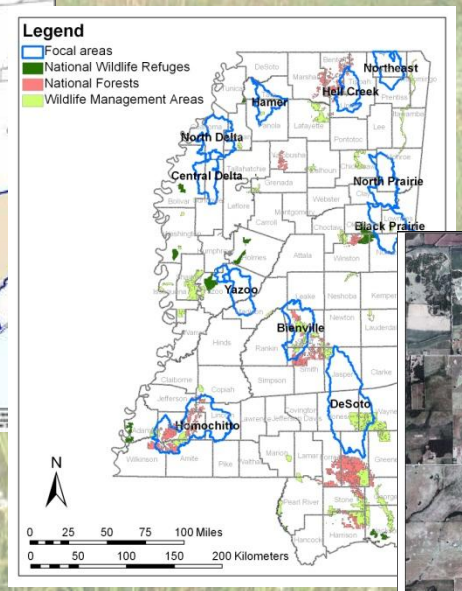
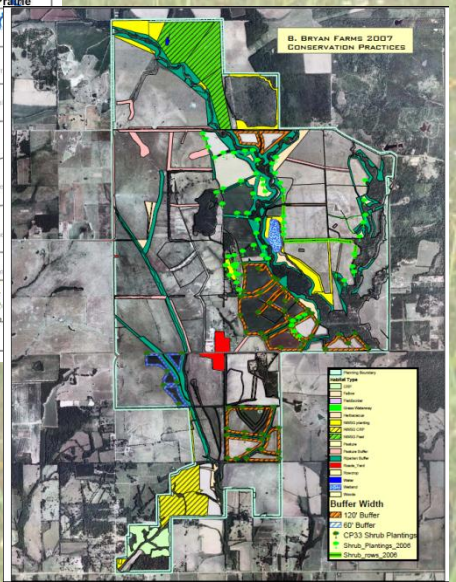








Deliverable

Realistic Expectations

- It is not realistic to expect a reversion to less intensive agricultural practices across North America
- "Effective conservation of farmland birds will require innovative solutions based on current agricultural practices that benefit the greatest number of farmland birds." Peterjohn (2003:17)

Opportunity Costs

- Allocation of land to uses that protect or enhance wildlife resources involves economic tradeoffs.
- Producers incur the costs of conservation but may find it difficult to garner profits from these actions that benefit the larger society
- *Economic asymmetr*

Policy Tools

- Economic assistance that rewards environmental stewardship is ***key*** to securing the participation of the farming and ranching sectors.
- Agricultural producers ***will*** alter land management practices and shift land from commodity production into conservation, provided economic costs are addressed with just compensation (USDA 2003b).

Conservation Strategies

- *"Farmland conservation programs provide the best hope for (grassland) birds and other wildlife. Agricultural practices can become more compatible with birds, and land can be managed inexpensively for birds with funding from conservation programs."*

  (The State of the Birds: United States of America, 2009)

Programmatic Opportunities Farm Bill

USDA

NRCS

Farm Service Agency

WHIP EQIP CSP GSP CRP CREP

Conservation Practices

How Conservation Programs Fail

Conservation Delivery Partnerships

- Growing demand, exceeds capacity of USDA Service centers to deliver
  - More programs
  - More specialized
  - Greater conservation planning required
- State budgets tight, agencies cannot meet the need
- Achieved through creative partnerships:
  - USDA-NRCS
  - State Agencies
  - Joint Ventures
  - NGO Conservation organizations
- Creates a “Conservation Delivery Network”

Resource Planners
(with the right skills)

- People skills
  - Listen
  - Ability to relate to the layman
  - Salesmanship
- Communication
  - Written and Oral Skills
- Agriculture
  - Agronomy
  - Soils
  - Animal Science
- Farm Bill Programs
  - Conservation Planning
- Wildlife/Ecological knowledge
  - Habitat Management
- Working lands knowledge
  - Turn row Credibility!!!

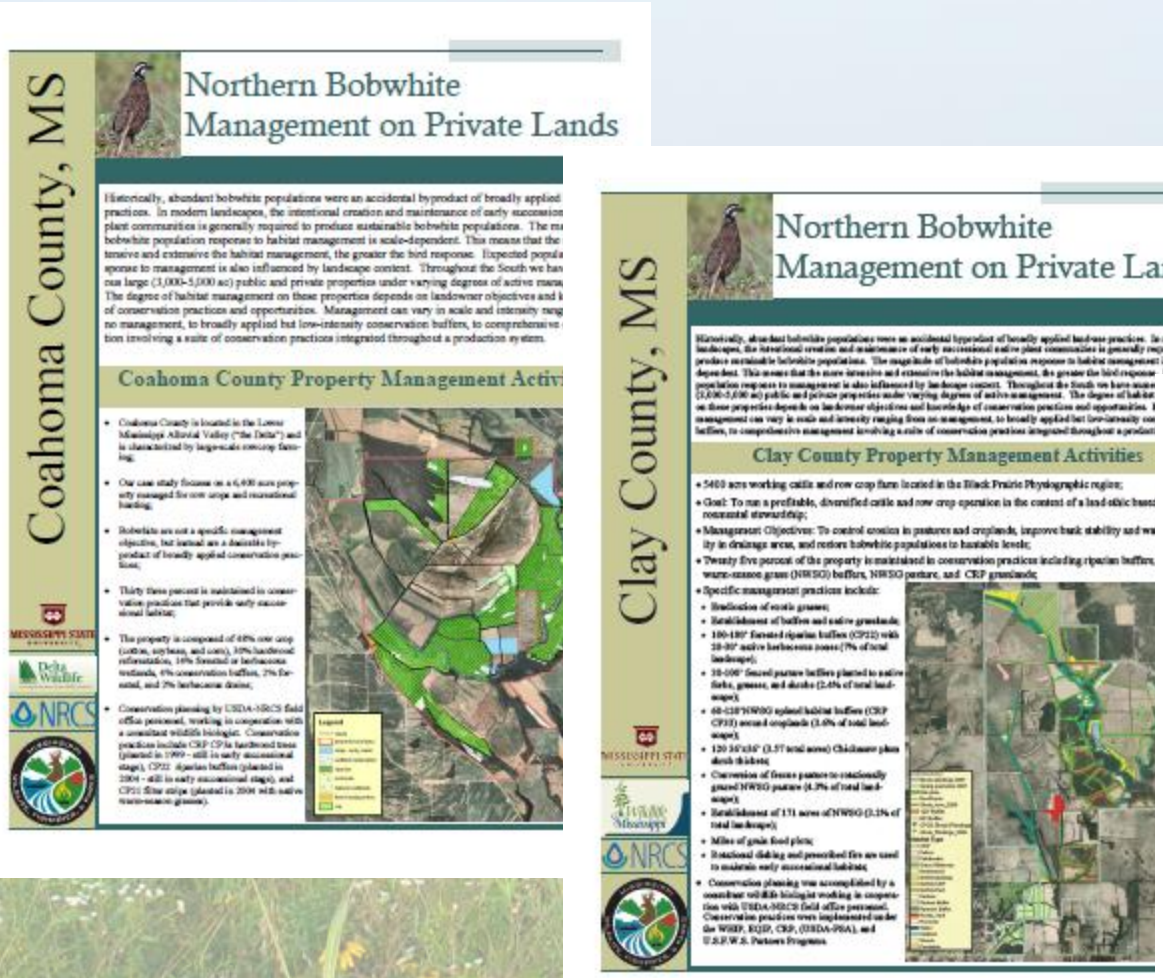
Objective-Driven Approach

Landowner Objectives

Objective Driven

- Desired resource outcomes drive practice selection
- Practice selection leads to programmatic options
- Intentional implementation
  - The right conservation practice
  - In the right location
  - To achieve a specific resource outcome

Objective-Driven Planning

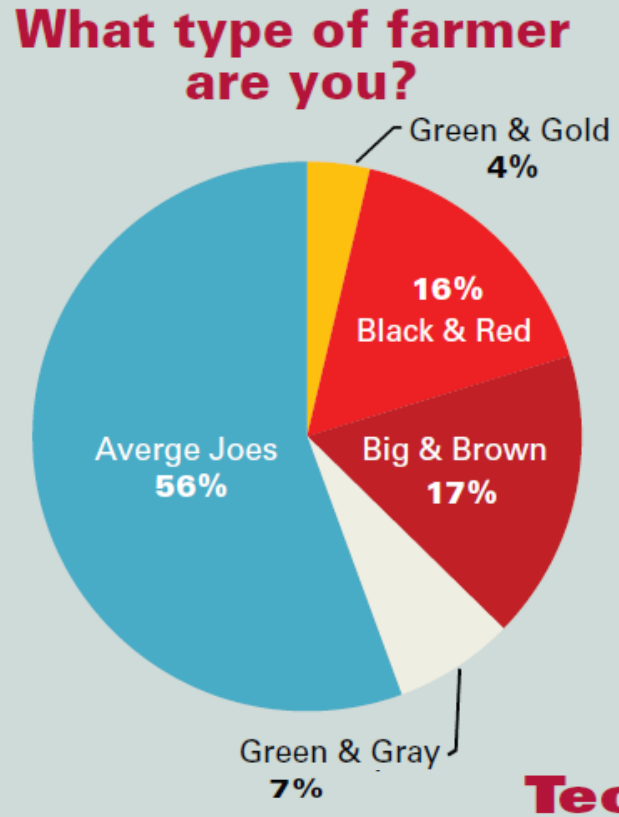


Hindrances to Conservation Adoption

- Landowners do not understand conservation eligibility
- Landowners do not know the economic outcomes of conservation adoption
- Landowners may not understand the conservation outcomes of practice adoption

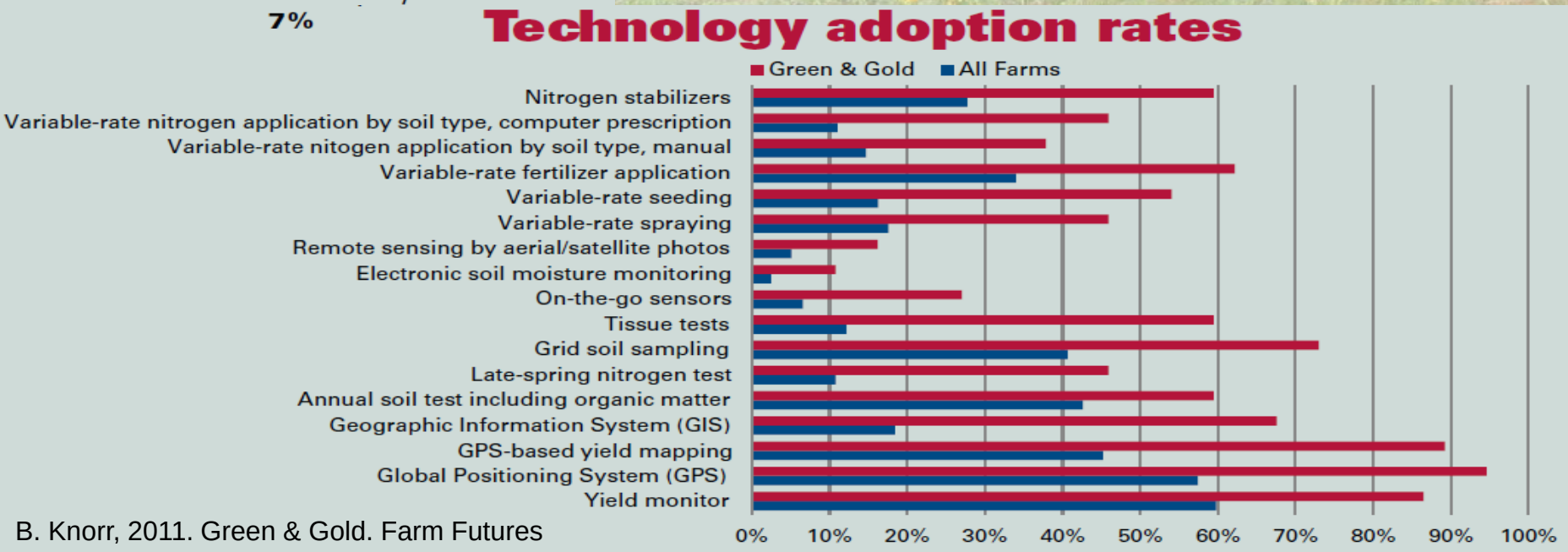
Conservation Plan

- Must provide compelling *conservation* and *economic* justification.
- To have credibility the conservation planner must understand the *business* of farming or forestry.

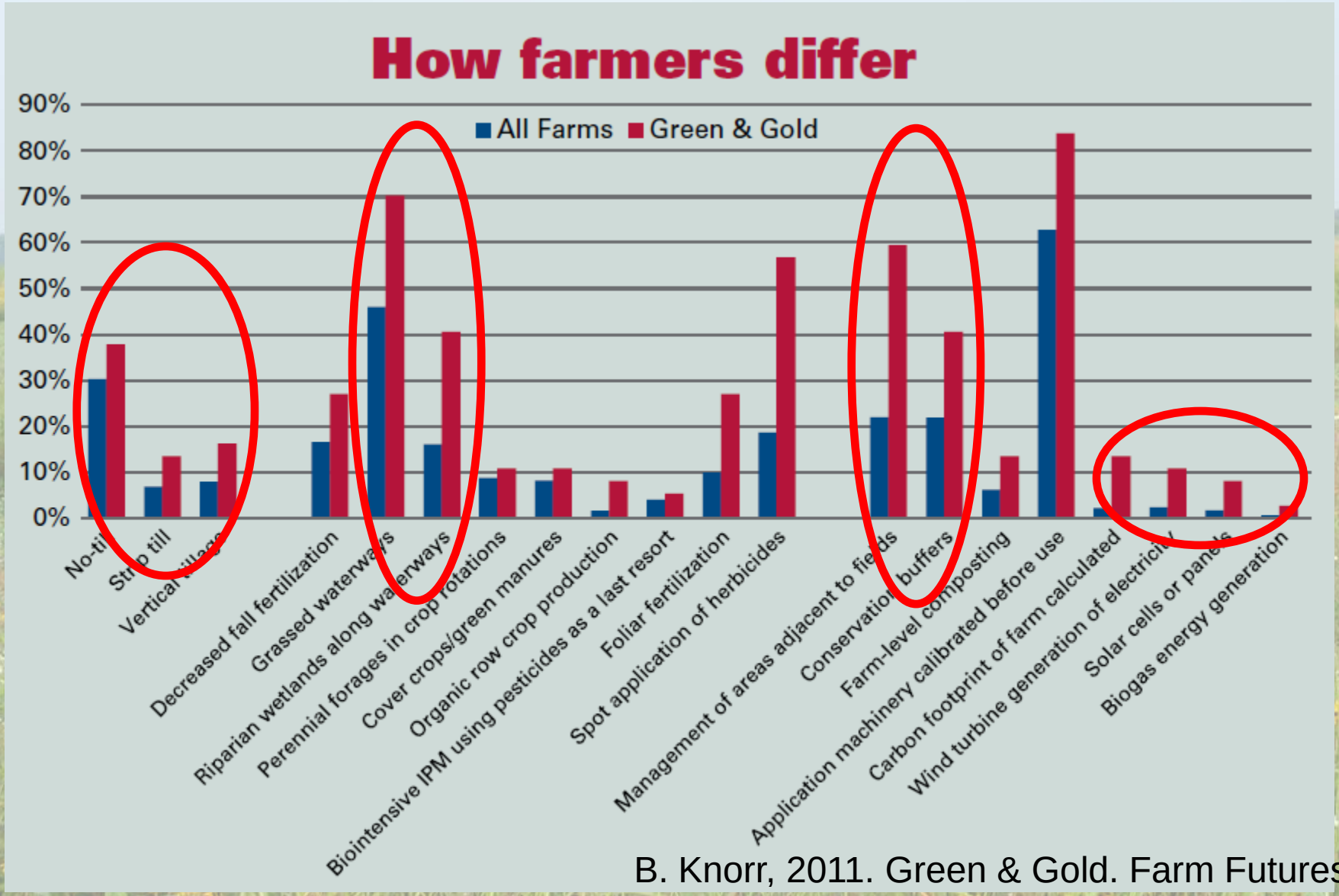


Green & Gold Farmers

- Younger
- Larger operation
- More likely to adopt technology
- More likely to adopt conservation
- More profitable



B. Knorr, 2011. Green & Gold. Farm Futures



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Information Needs

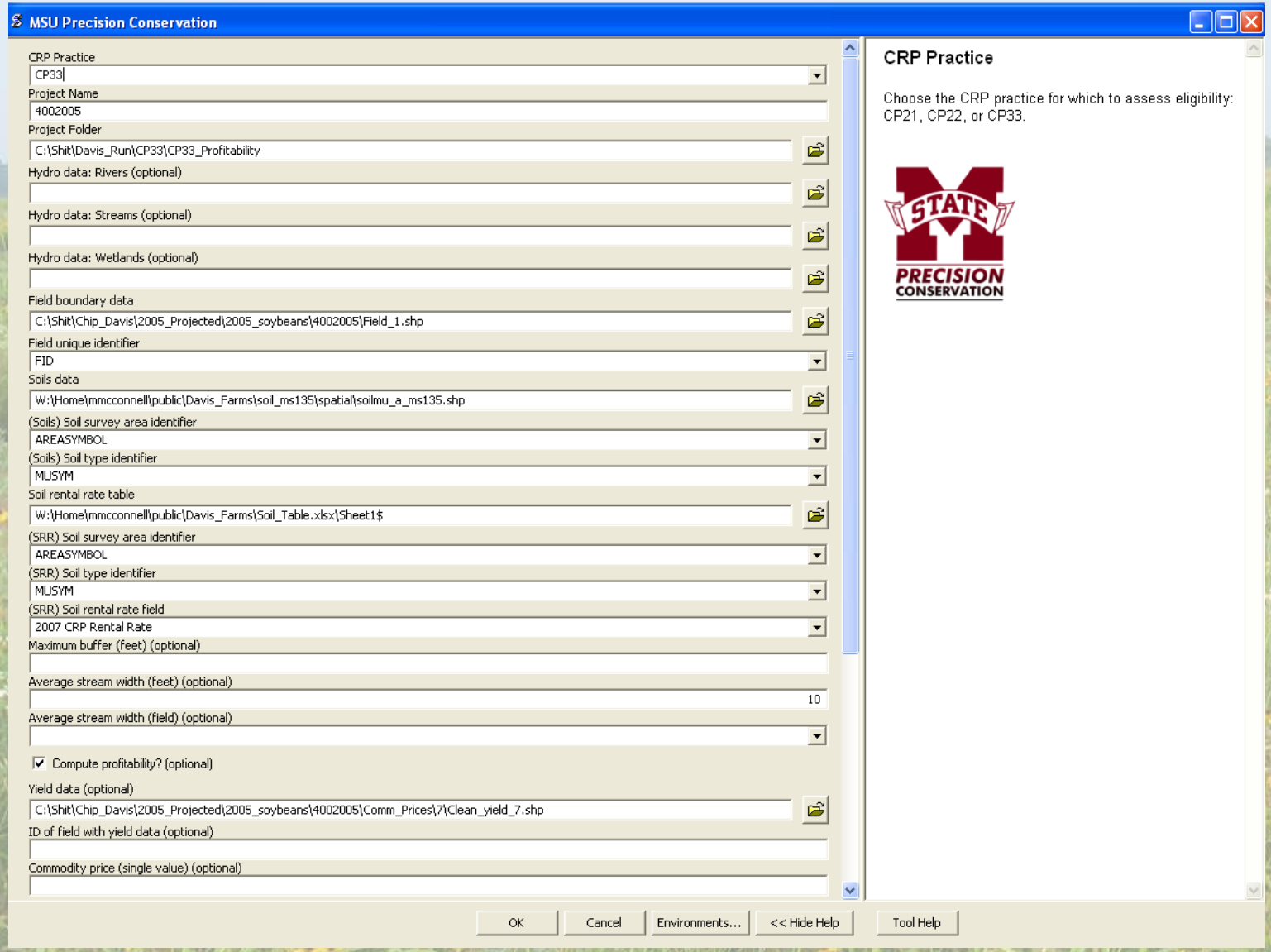
- Where on a given farm are different conservation practices eligible?
- What are the opportunity costs?
- What are the differences in net revenues with and without conservation practice?
- What are the conservation outcomes?
- How does the producer value the conservation outcomes relative to costs?

Precision Conservation

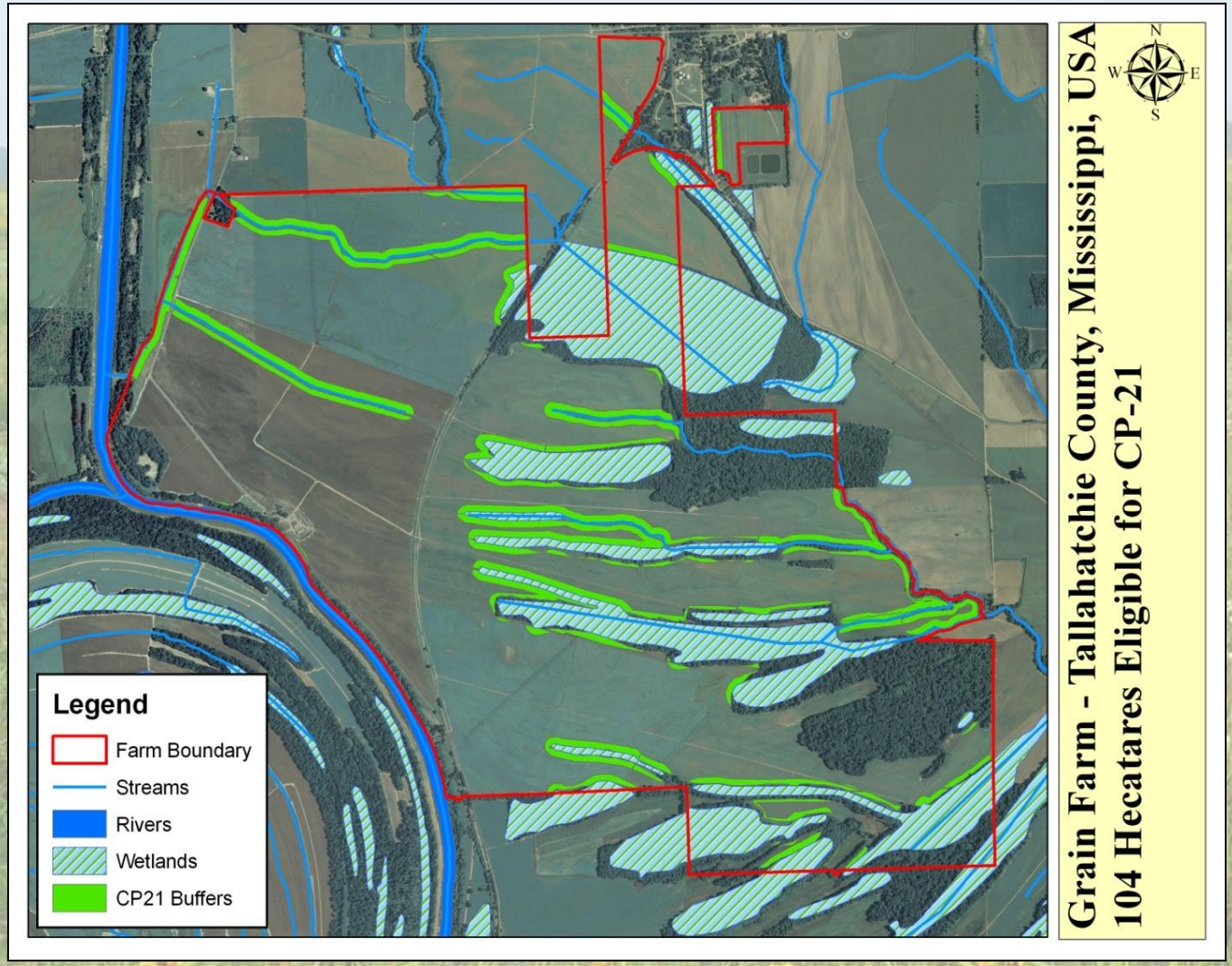
A Geospatial Decision Support Tool that:

- Identifies spatially explicit conservation opportunities
- Characterizes economic tradeoffs of conservation enrollment vs. agricultural production

ArcGIS-based Interface



Illustrating Eligibility



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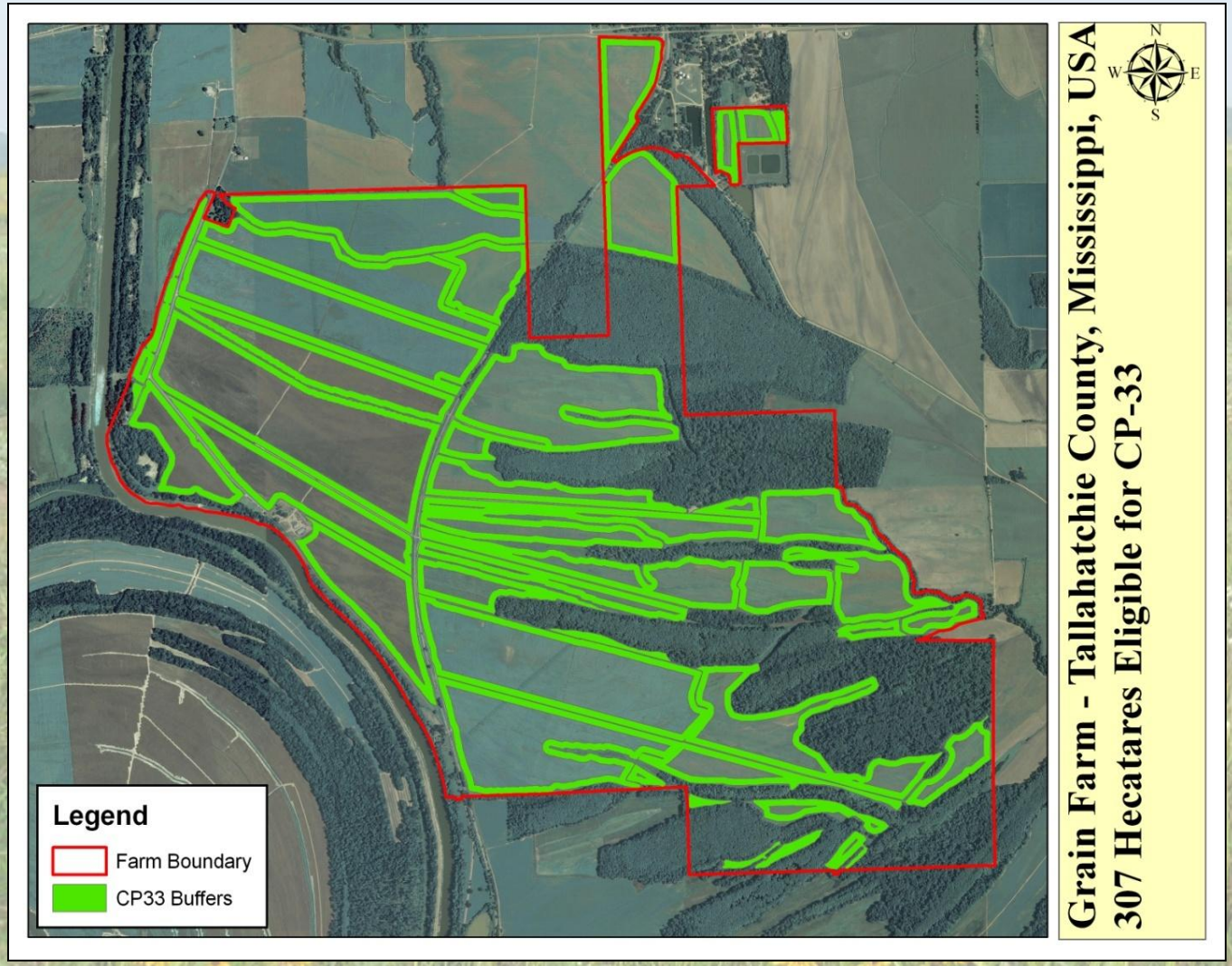

Characterizing Economic Tradeoffs of Conservation Enrollment vs. Agriculture Production

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Yield Reductions

Connecting Yield to Profitability

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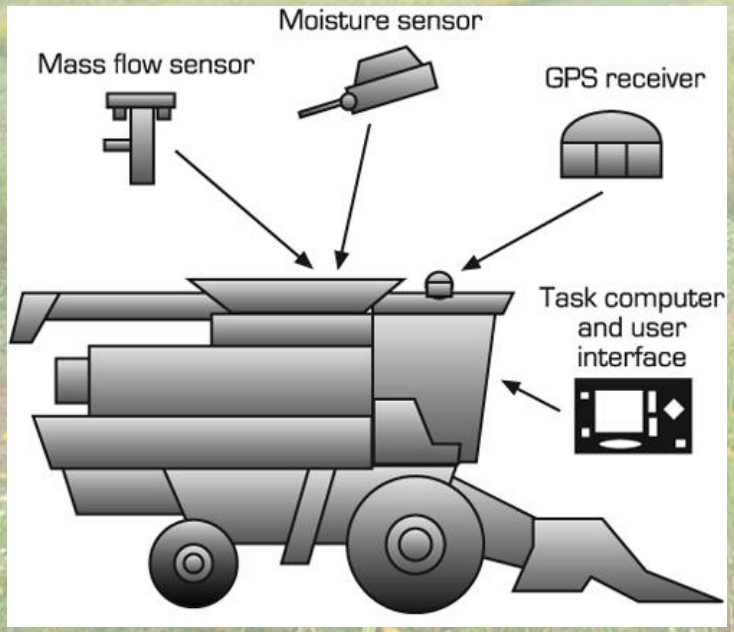
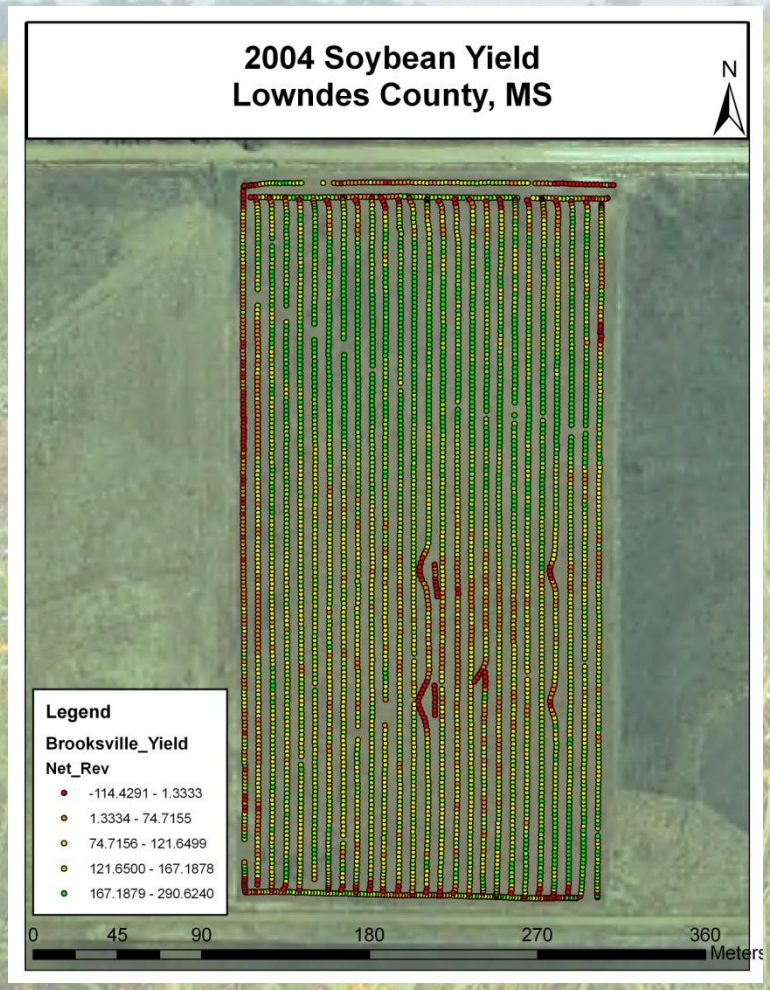
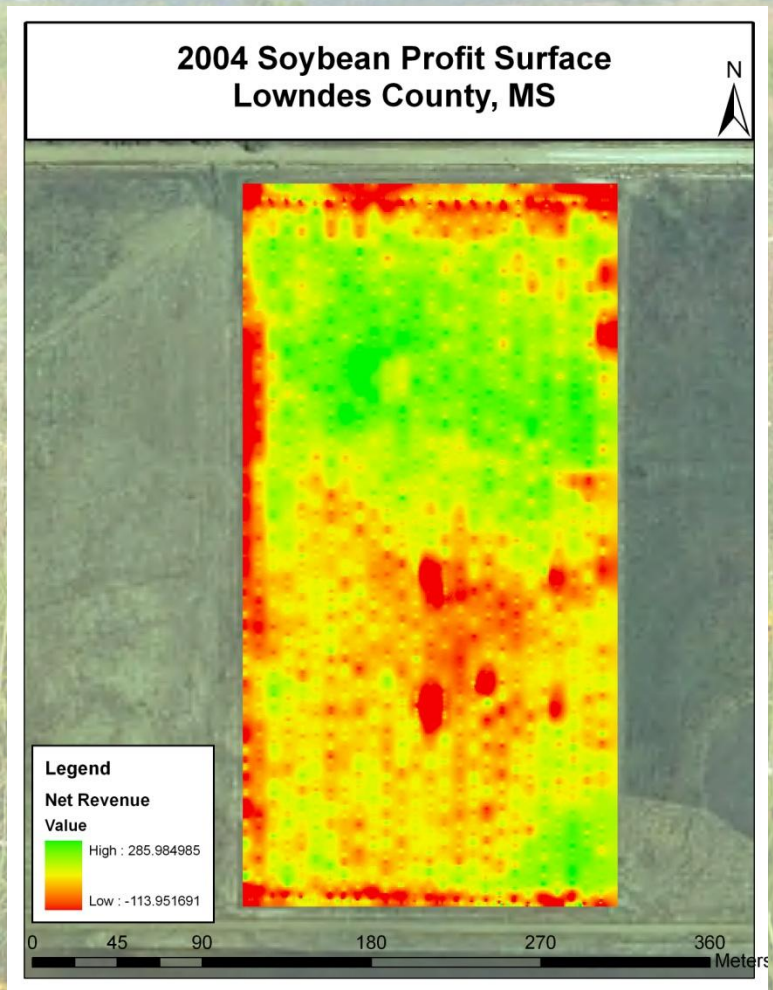
- Use Precision Agriculture Technology to Quantify Spatial Variability in Yield

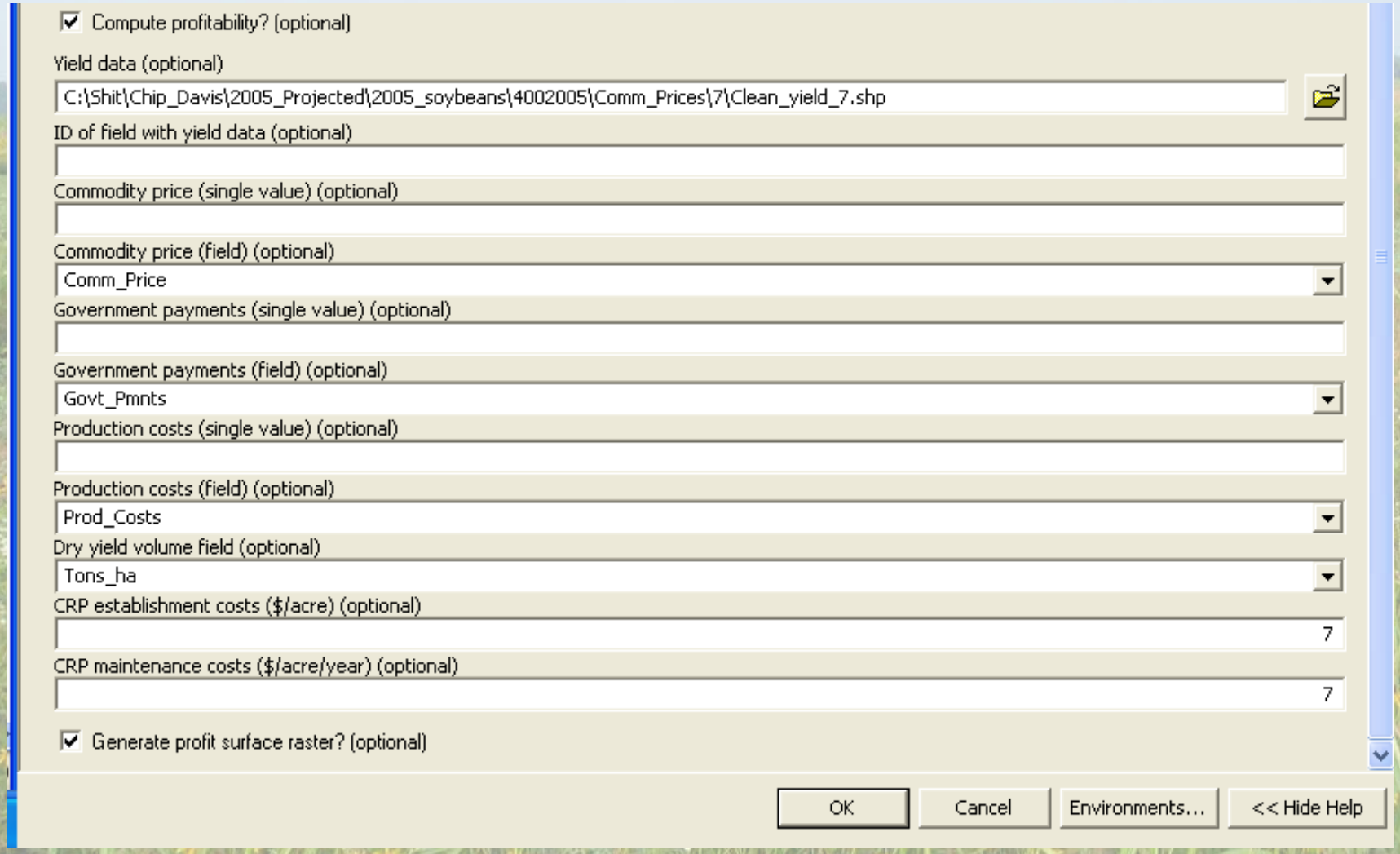


Translating Yield Reductions to Profit Reductions

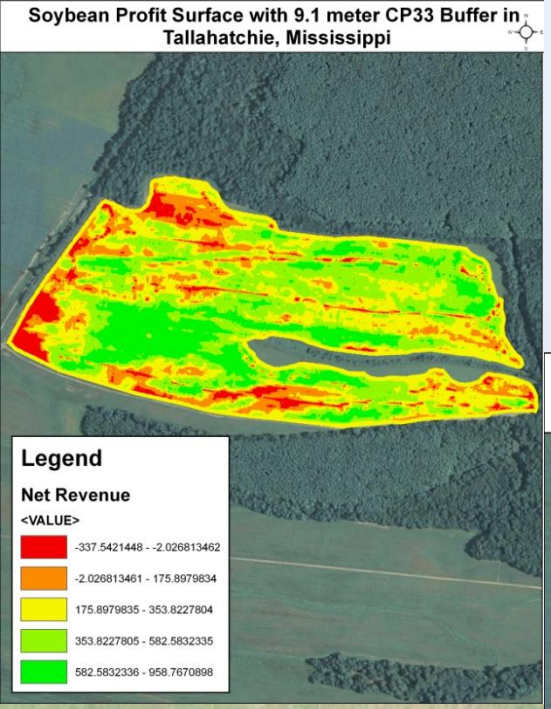


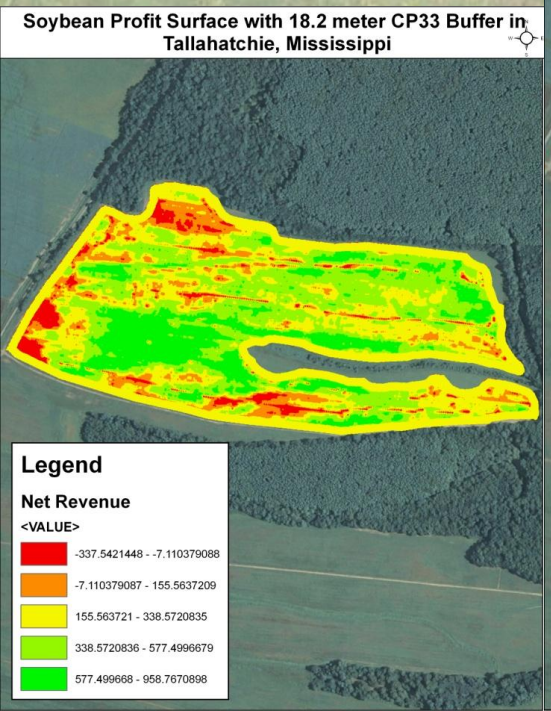


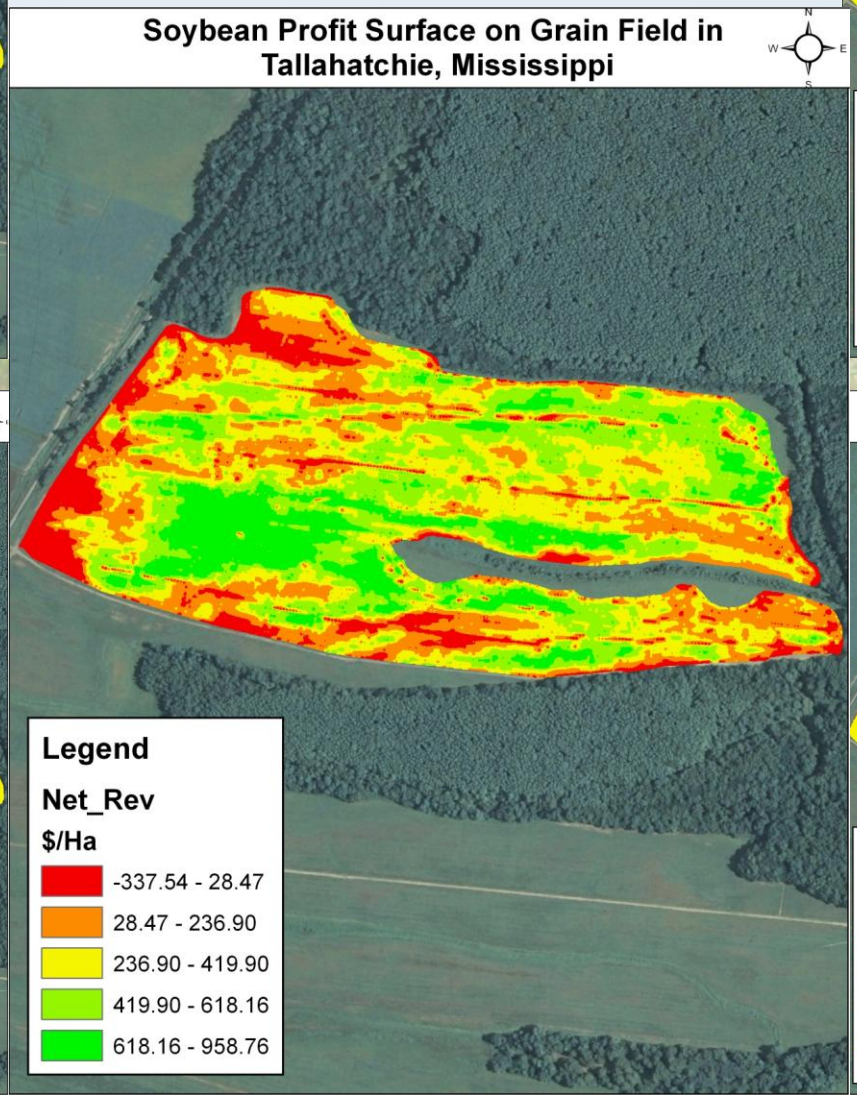
Profitability Process

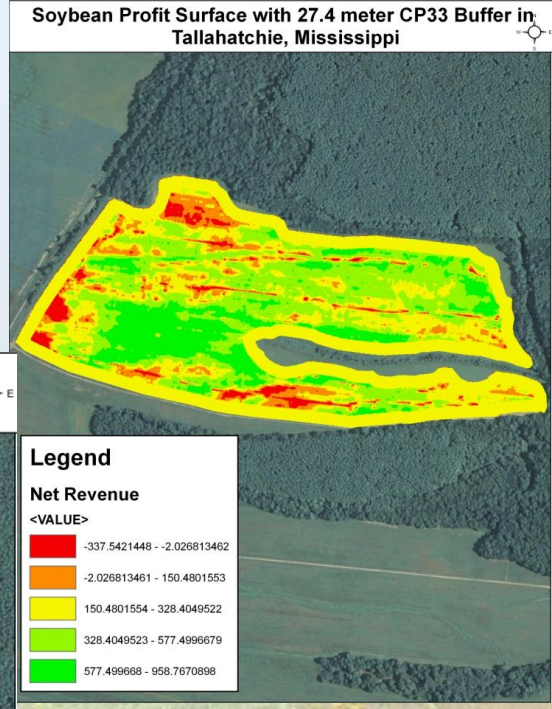


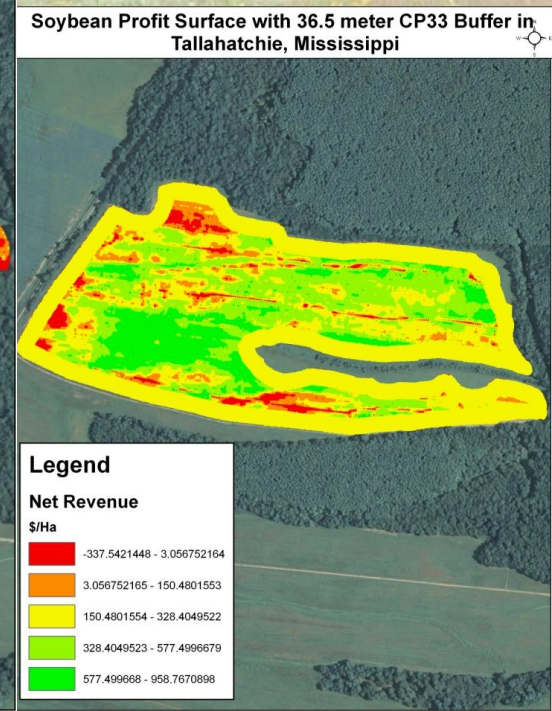
Compare Profitability of Buffer Scenarios vs. Ag. Production Alone



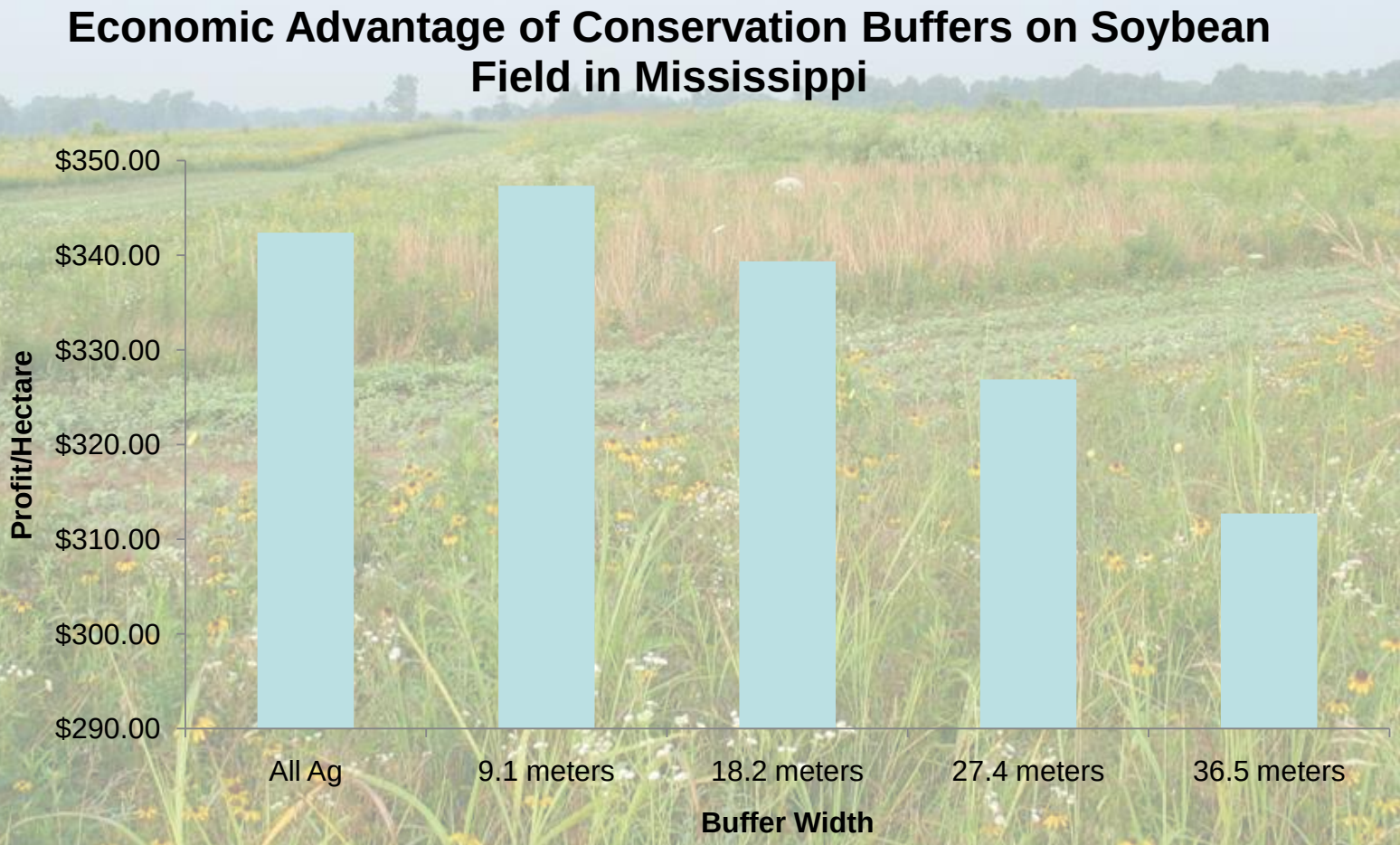








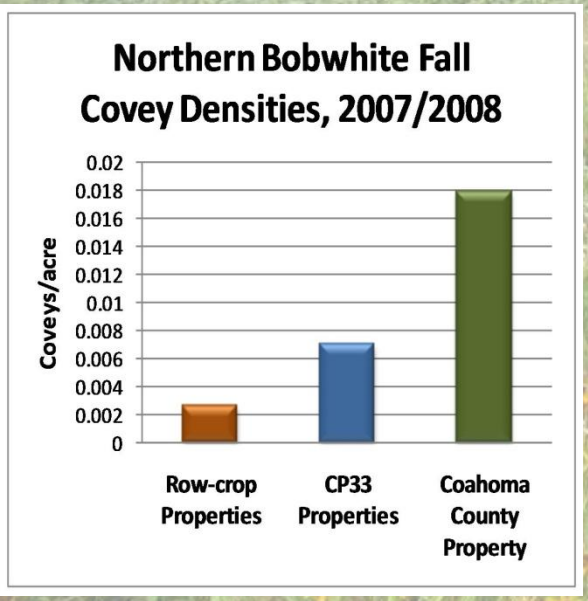
Profitability Output

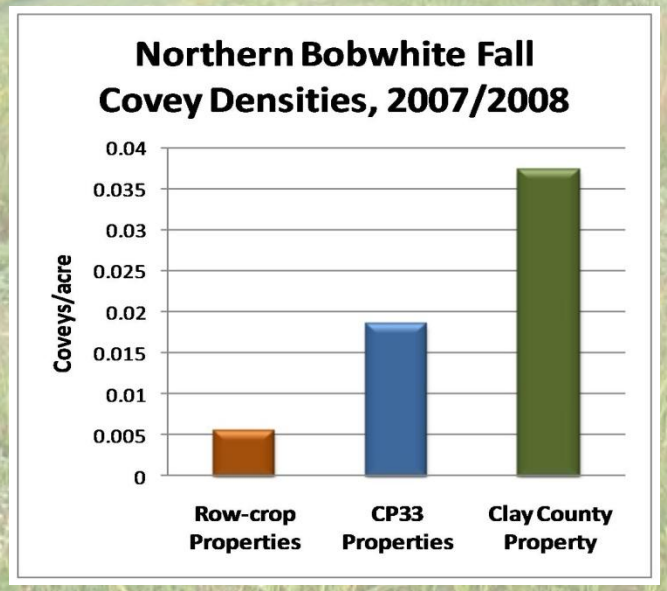


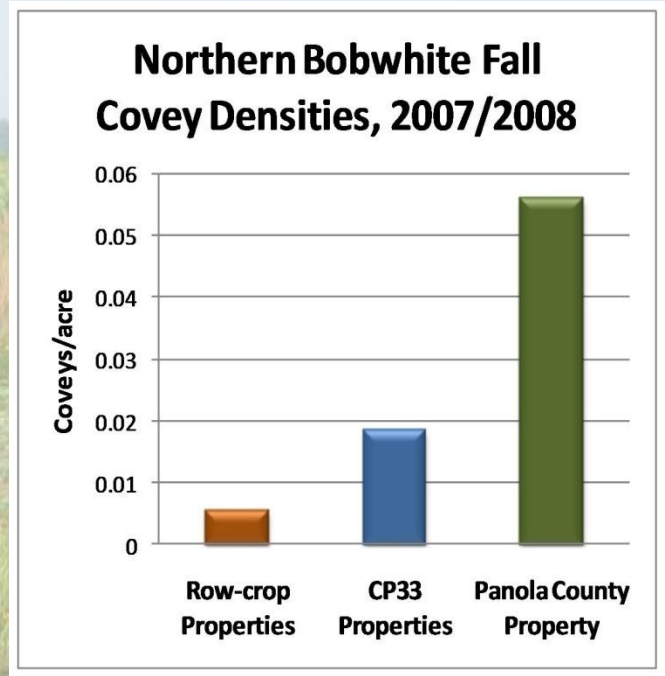
Delivering Precision Conservation

- To promote conservation *we* must address both ecological and economic demands.
- If landowners understand the economic and ecological tradeoffs they can make informed decisions.
- Technology tools can be the key to strategic conservation implementation by helping landowners visualize costs and opportunities.
- The “right” conservation practice is the one that delivers the landowners objectives, within the context of exemplary land stewardship.

Effective Conservation Measurable







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