

**Mississippi / Gulf Hypoxia Initiative
Precision Conservation Blueprint v1.0
*Integrating Basin-Wide Challenges from
Grassland Birds to Gulf Shrimp***



Dozens of agencies & organizations
in the 7 [Landscape Conservation Cooperatives](#) &
3 [Climate Science Centers](#) of the Mississippi River Basin
Host LCC Contacts: Glen Salmon, Jorgen Rose & Gwen White
Michael Schwartz, The Conservation Fund

A crisis is brewing on the prairie ...

High commodity prices are great for row crop farmers...

Not so great for cattle, grassland birds, and pollinators.

From 2008-2012, 7.2 million grassland acres were plowed under.

These are the highest rates of loss since the Dust Bowl.



Copyright Chris Helzer/The Nature Conservancy



...all connected to water quality, recreation and fishery losses upstream and downstream...



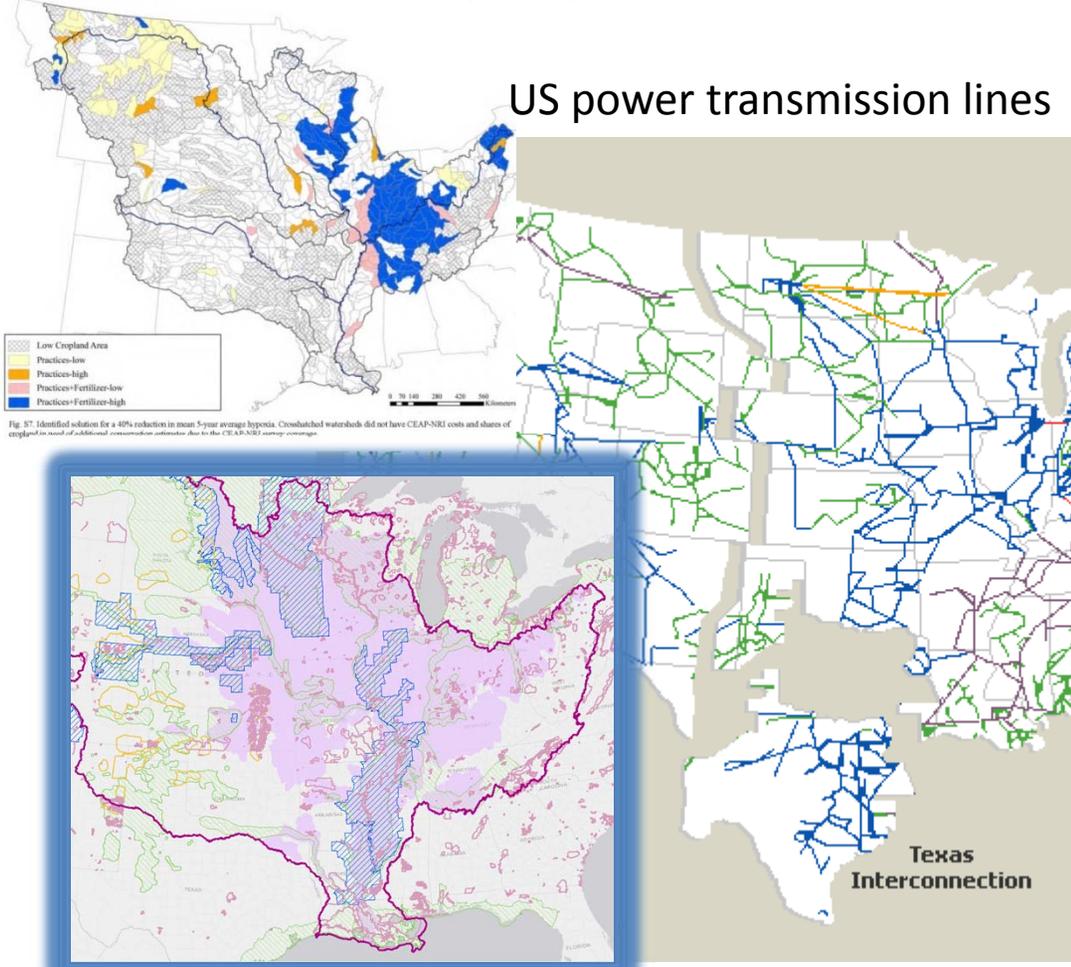
We are making great strides in development and adoption of conservation practices.



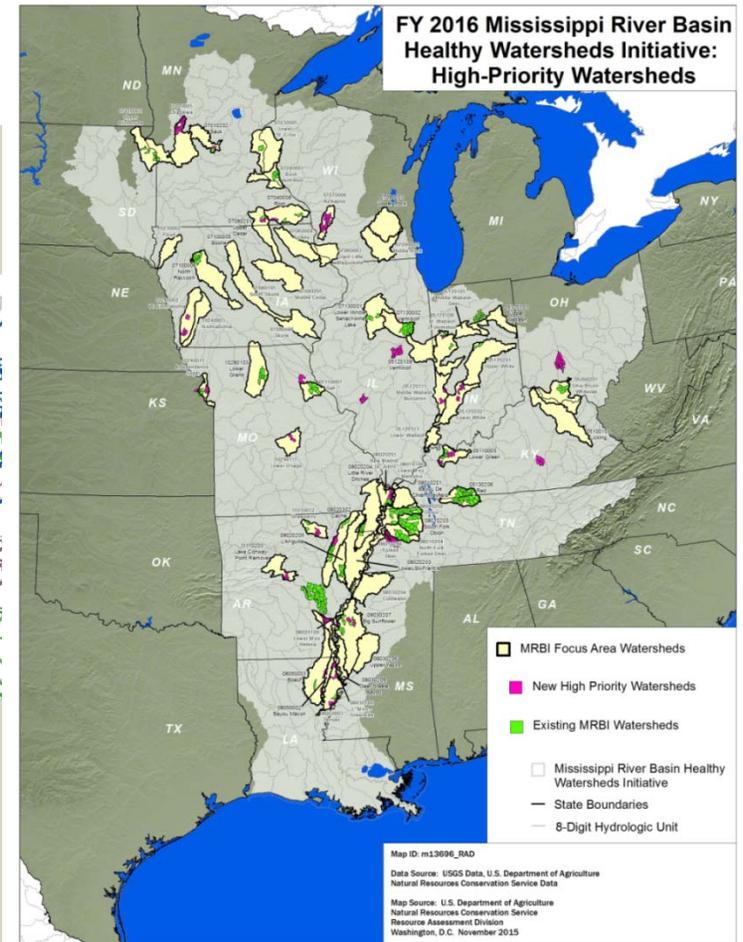
How can we make every dollar count?

Each Sector prioritizes separately – wildlife, water quality, agriculture, transportation, drinking water, recreation, energy, health...

Key locations for water quality



Key locations for migratory birds



Key locations for agricultural practices

What if a “think tank” of natural resource researchers and managers came together to align their actions?



US Army Corps
of Engineers®



Chicago
Wilderness



The Nature
Conservancy

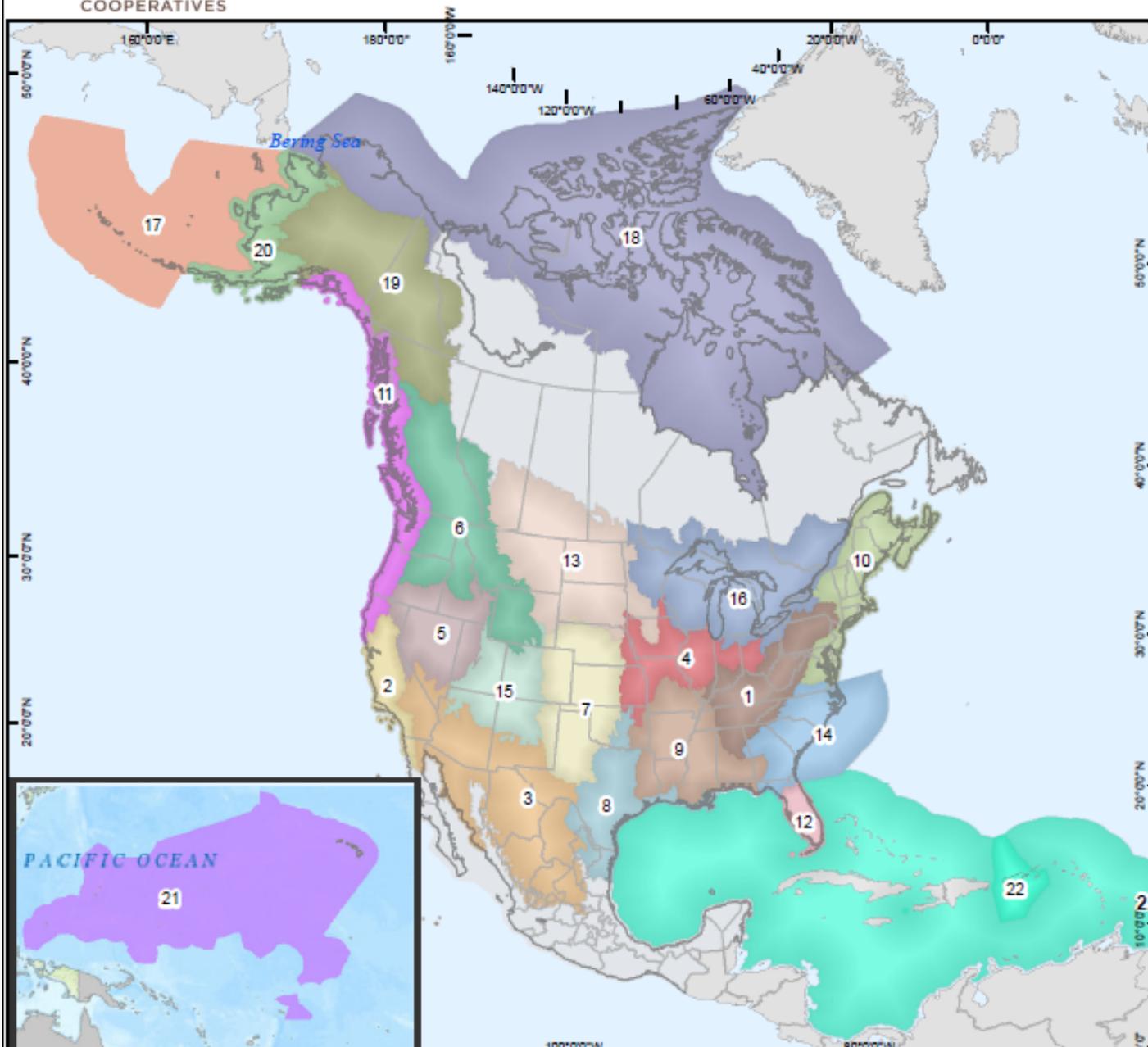




Landscape Conservation Cooperatives (LCC) Network Map

LANDSCAPE CONSERVATION
COOPERATIVES

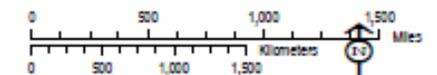
Working across boundaries for landscape scale conservation



LCC Names

- 1. Appalachian
- 2. California
- 3. Desert
- 4. Eastern Tallgrass Prairie & Big Rivers
- 5. Great Basin
- 6. Great Northern
- 7. Great Plains
- 8. Gulf Coast Prairie
- 9. Gulf Coastal Plains & Ozarks
- 10. North Atlantic
- 11. North Pacific
- 12. Peninsular Florida
- 13. Plains and Prairie Potholes
- 14. South Atlantic
- 15. Southern Rookies
- 16. Upper Midwest and Great Lakes
- 17. Aleutian and Bering Sea Islands
- 18. Arctic
- 19. Northwest Boreal
- 20. Western Alaska
- 21. Pacific Islands
- 22. Caribbean
- Unclassified
- Caribbean area of Interest

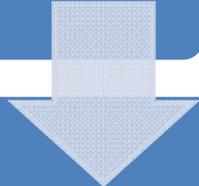
Scale 1:50,000,000



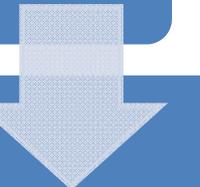
Map prepared by FWS July 2015
Datum: WGS 84
Projection: Albers Equal Area Conic
The USFWS makes no warranty for use of this map and cannot be held liable for actions or decisions based on map content.
Background: Esri basemap

Landscape Design in the Conservation Community

What shared outcomes do we want?
How will we know when we get there?



What physical & social conditions are driving the system?



What actions will we emphasize?
Where is the greatest opportunity for conservation investment?

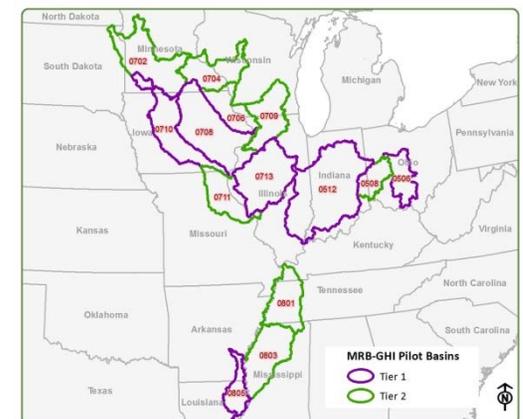
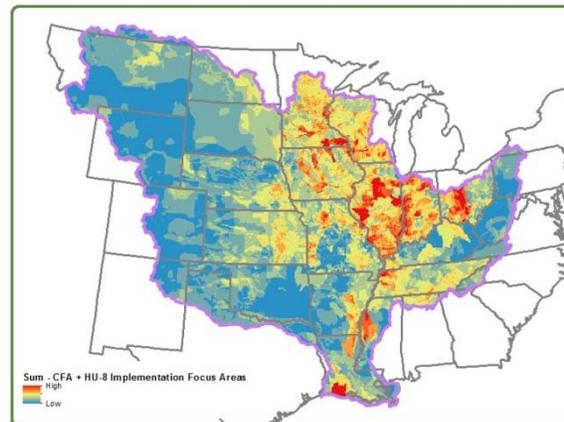
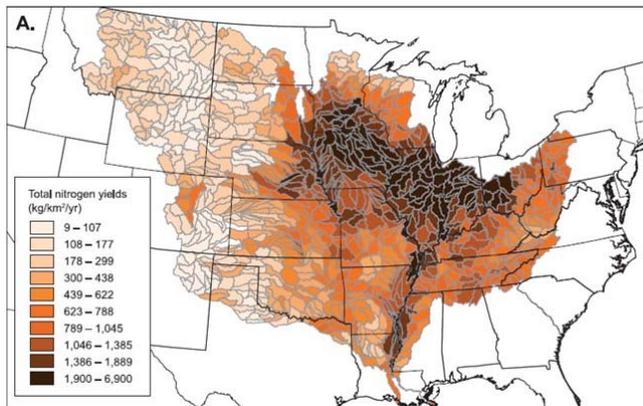
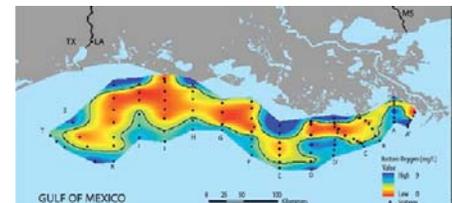
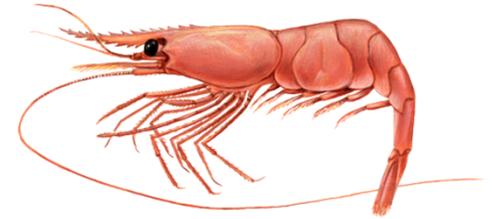


How do we learn & adapt to future conditions?

MISSISSIPPI / GULF HYPOXIA INITIATIVE

Goal (draft):

Provide tools for targeting conservation investments (*what, how much, & where*) that benefit fish and wildlife in a resilient, multifunctional landscape while also addressing agriculture, local water quality, and Gulf hypoxia.



What to do? – Design and configure 12 high impact conservation practices to enhance multi-sector benefits.

#1 Cover Crops

#2 Drainage Water Management

#3 Two-Stage Ditches

#4 Lower Floodplain Vegetative Diversity

#5 Buffer Strips

#6 Wetlands

#7 Upper Floodplain Hydrologic Restoration

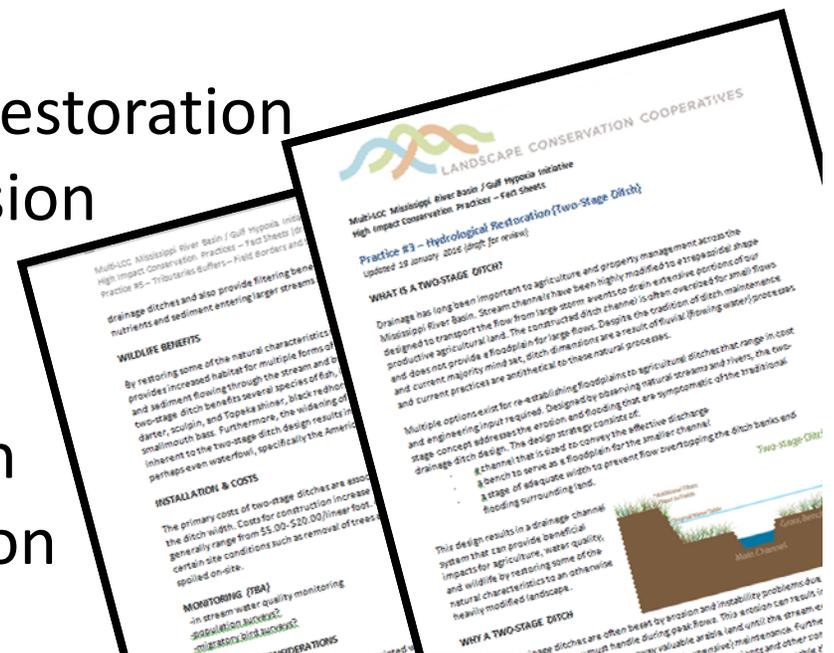
#8 Lower Floodplain Water Diversion

#9 Uplands Prescribed Fire

#10 Uplands Grazing

#11 Perennial Biomass Production

#12 Lower Floodplain Reforestation



Prairie STRIPS ...
reduce nutrient loading,
protect soil under intense rainfall &
provide pollinator and bird habitat



Drainage Water Management ... mitigates drought, keeps nutrients in place & provides shorebird habitat

American Golden-Plover
Pluvialis dominica

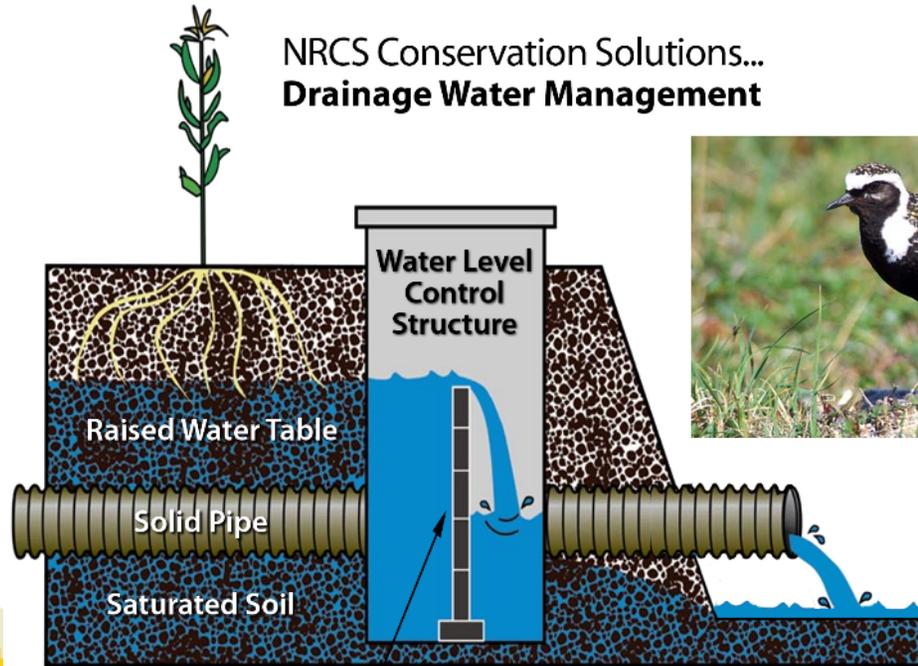


LEGEND

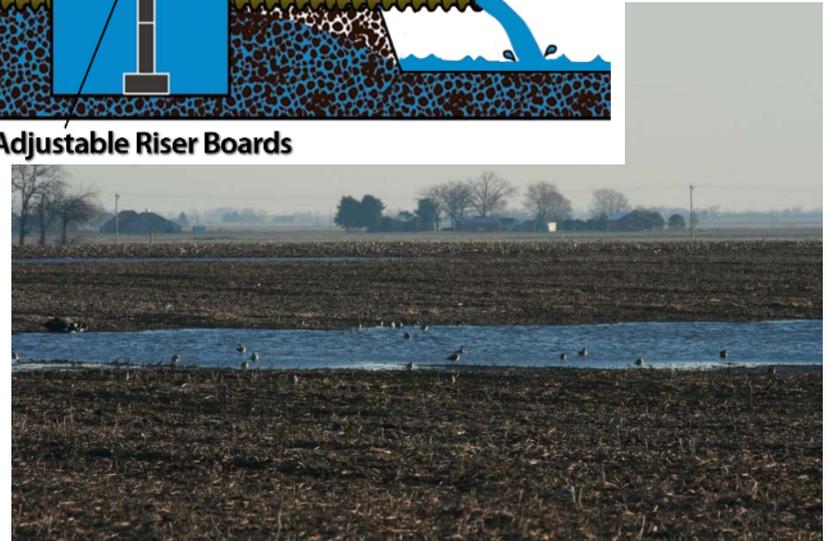
- Year Round
- Summer (breeding)
- Winter (non-breeding)
- Migration

Map by Cornell Lab of Ornithology
Range data by NatureServe

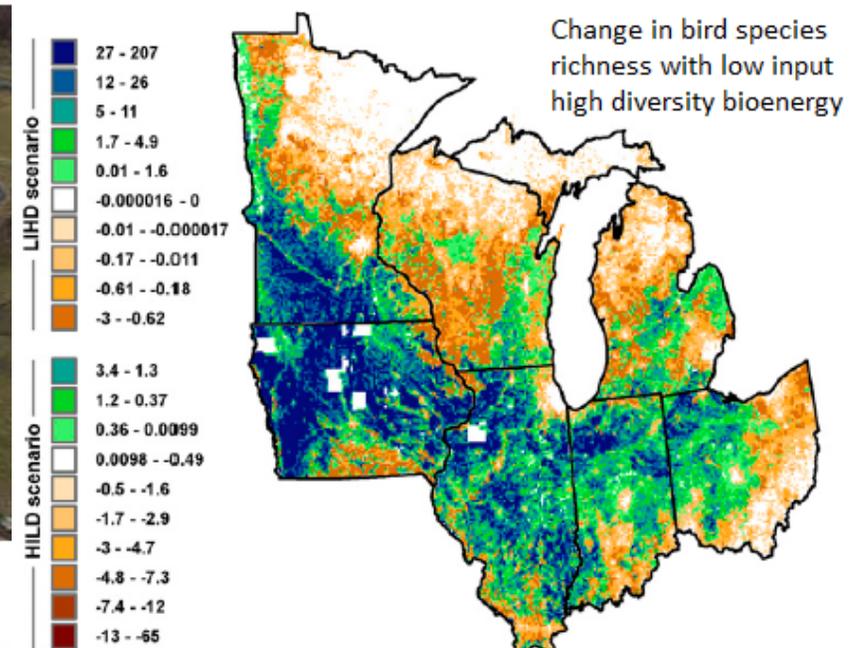
NRCS Conservation Solutions...
Drainage Water Management



Adjustable Riser Boards



Perennial Biomass Feedstock for ...
 produce renewable fuel,
 require fewer nutrient inputs,
 retain soil & water, sequester carbon,
 utilize livestock waste, and improve prairie habitat.



Meehan et al. 2010 www.pnas.org/cgi/doi/10.1073/pnas.1008475107

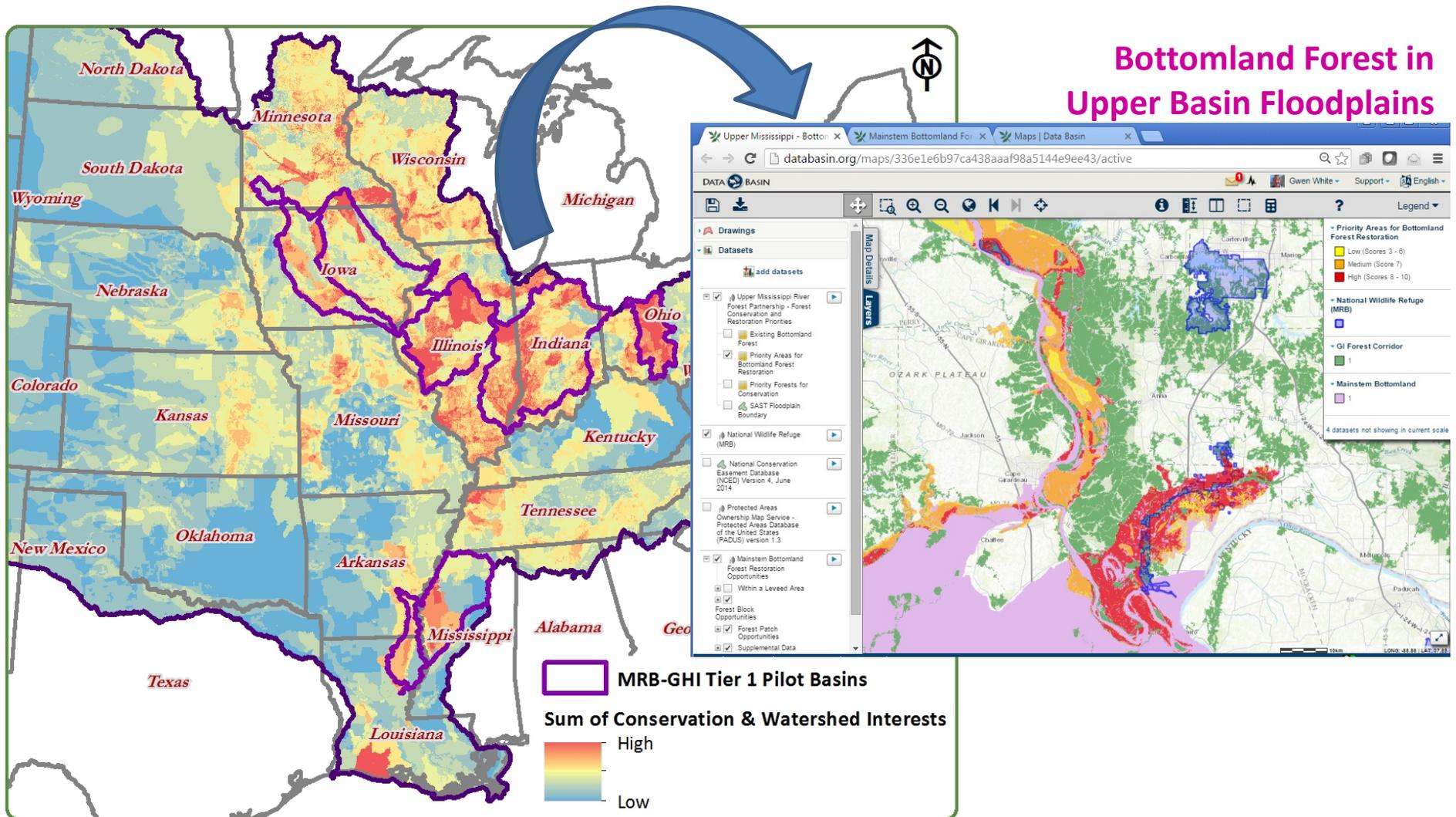
From Pig to Pump – Smithfield Tackles Sustainability

What happens when you bring an alternative energy company and pig farms together? Well if the farm owner is Smithfield Foods Hog Production in northern Missouri, which finishes two million pigs a year, and the energy company is Roeslein Alternative...

Where to Do It? – Spatial Analysis Tool

Precision Conservation Blueprint v.1.0

Michael Schwartz, The Conservation Fund

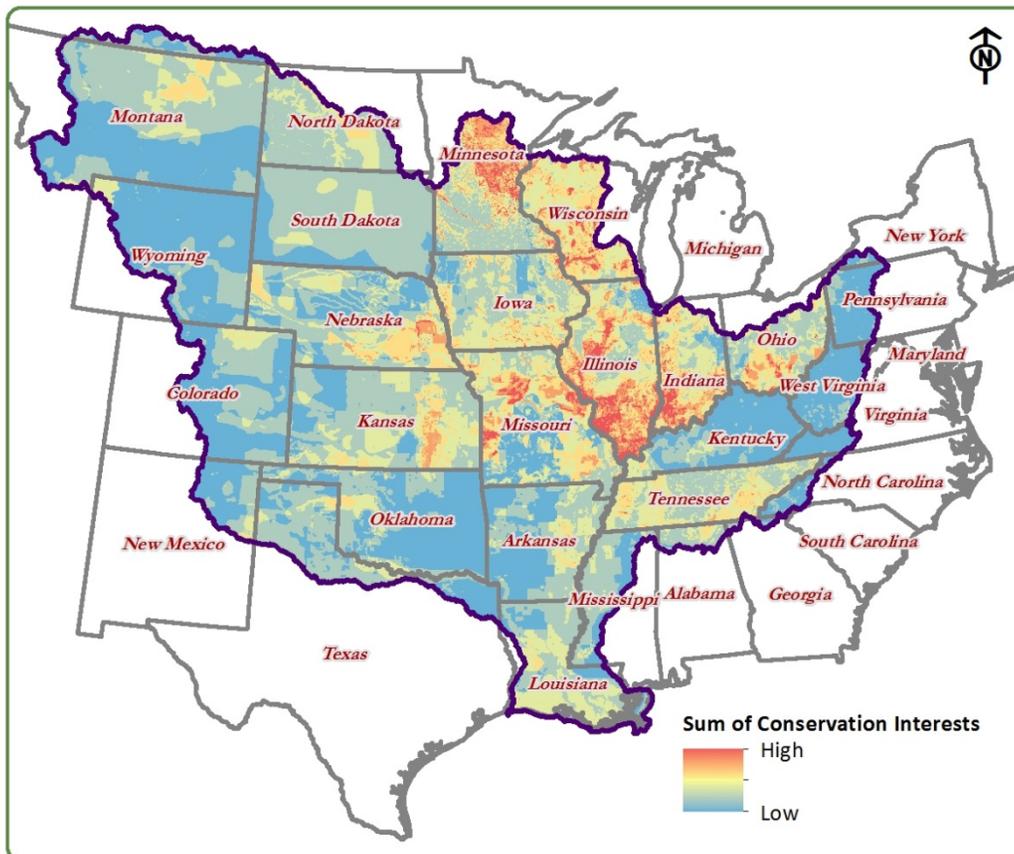


- ❖ Water Quality Priority Zone – narrower area with highest potential nutrient loads from agriculture using USGS SPARROW model updated for current cropland



Where are the Overlapping Conservation Interests?

- ❖ Regional Interests
- ❖ Conservation Opp. Areas
- ❖ Outstanding Natural Areas



Regional Focus Areas

Ducks Unlimited
 Audubon Important Bird Areas
 Grassland Priority Conservation Areas
 U.S. Forest Service
 Joint Venture Focus Areas
 Upper Mississippi Forest Partnership
 Bobwhite Conservation Initiative

State Wildlife Action Plans (SWAPs)

Conservation Opportunity Areas

Alabama	Nebraska
Illinois	North Dakota
Iowa	Ohio
Kentucky	Tennessee
Minnesota	Wisconsin
Missouri	

Where do existing Watershed Project Areas overlap?

❖ Watershed Interests

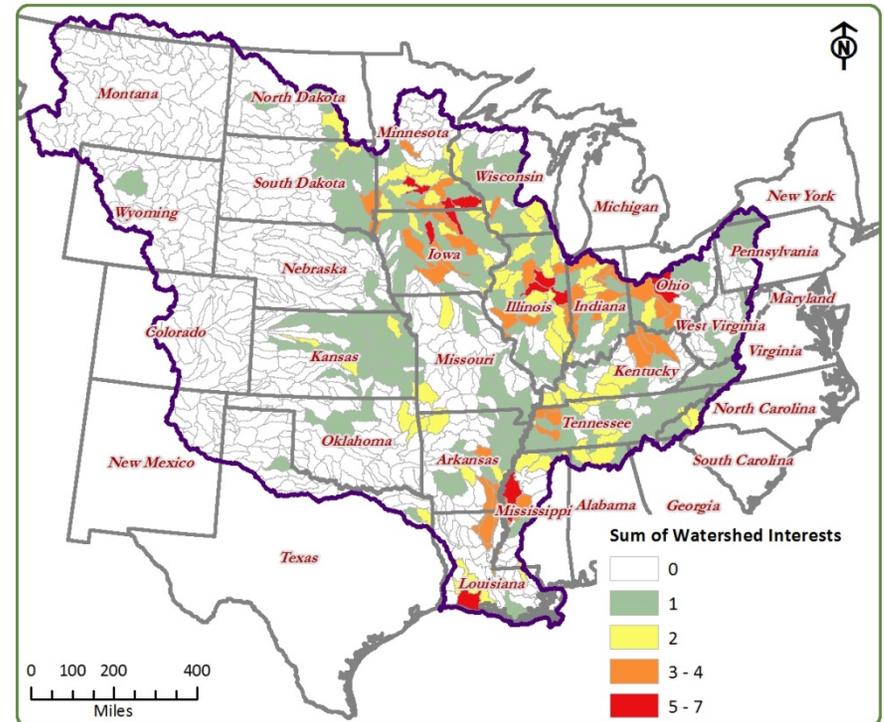
(includes over 500 projects)

Regional Examples

- Southeast Aquatic Resources Partnership
- The Nature Conservancy
- US EPA
- USDA-NRCS Mississippi River Basin Initiative
- USDA-NRCS National Water Quality Initiative
- Midwest Fish Habitat Partnership
- Gulf Hypoxia Task Force – State Nutrient Reduction Plan Priorities

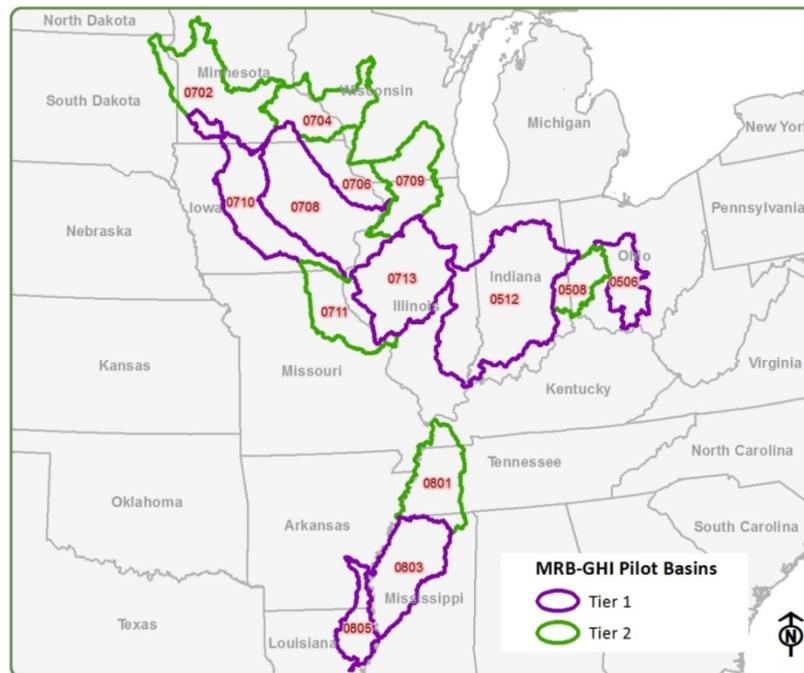
Local Examples

- Batture Lands Wetlands Reserve Enhancement Program Project
- Big Darby Watershed Initiative
- Boone River Watershed Initiative
- Cedar River Basin Initiative
- Ohio Watersheds in Distress



In which Pilot Basins should we focus Local Implementation?

- ❖ Pilot Basins - Maximum Alignment
 - ❖ Water Quality Priority Zone
 - ❖ Conservation Interests
 - ❖ Watershed Interests
 - ❖ Production Systems

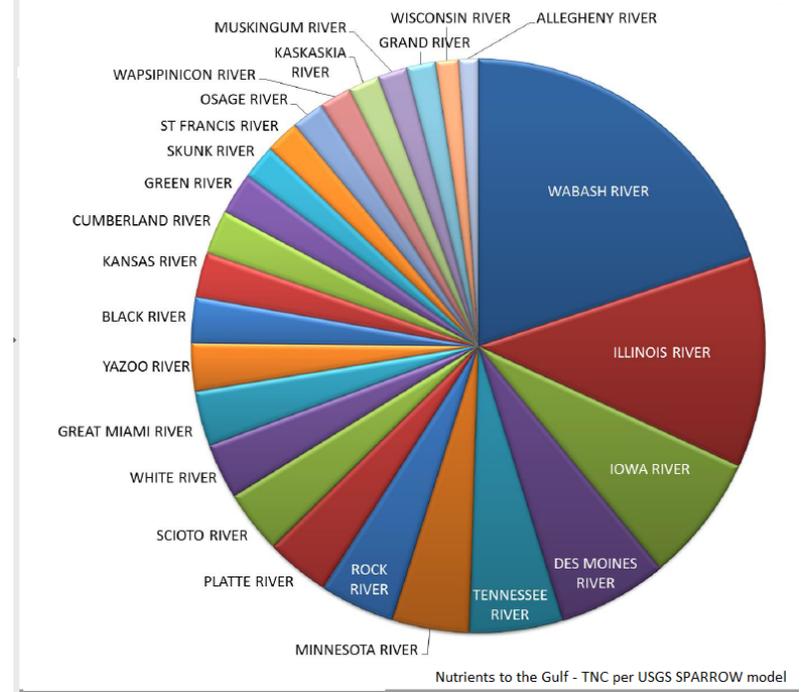


Tier 1 (purple): Highest nutrient load potential and implementation interest

Tier 2 (green): Creates a corridor with high priority

6 Midwest watersheds contribute **over a quarter** of the Gulf nutrient load:

- Wabash River
- Tennessee River
- Illinois River
- Iowa River
- Minnesota River
- Des Moines River



Planning for Site-Scale Opportunities in Pilot Basins (30m)

- ❖ Where Are the Site-Scale Opportunities?
 - ❖ Where are the least profitable agricultural lands?
 - ❖ Which sites are most conducive to wetland restoration?
 - ❖ Which sites can provide highest benefit for water quality?
- ❖ Where Are the Opportunities to Enhance Habitat?
 - ❖ Which of these sites are contiguous to existing habitat or a habitat corridor?

❖ Data Used in Analyses

- ❖ Land Cover
- ❖ Geophysical Data
- ❖ Tile Drainage Areas
- ❖ Landscape Context



Down-scaled Local Pilots

Lower Wabash Floodplain Conservation

Participants:



Hosts: US FWS Patoka Natl Wildlife Refuge, Indiana University
The Nature Conservancy - Indiana

Habitats:

Floodplains – forest, wetlands, cane brakes
Headwaters – prairie, row crop & grazing lands

Goals (draft):

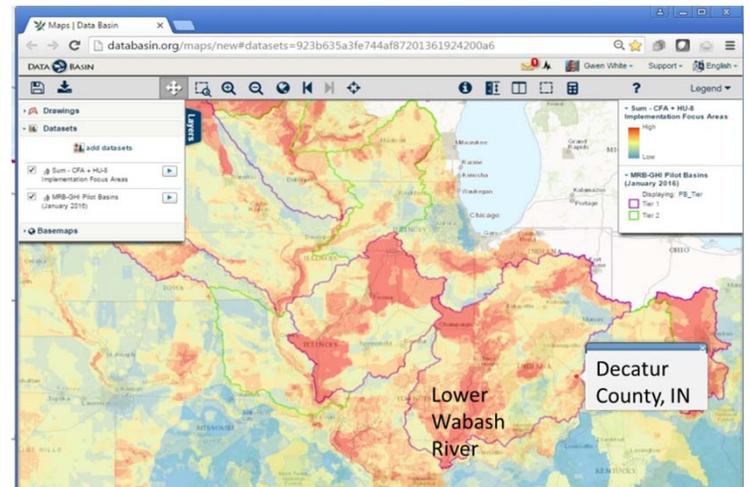
- 1) Wildlife conservation
- 2) Nutrient stewardship & soil health
- 3) Promote connection to nature
- 4) Adapt to future changes



U.S. Fish & Wildlife Service

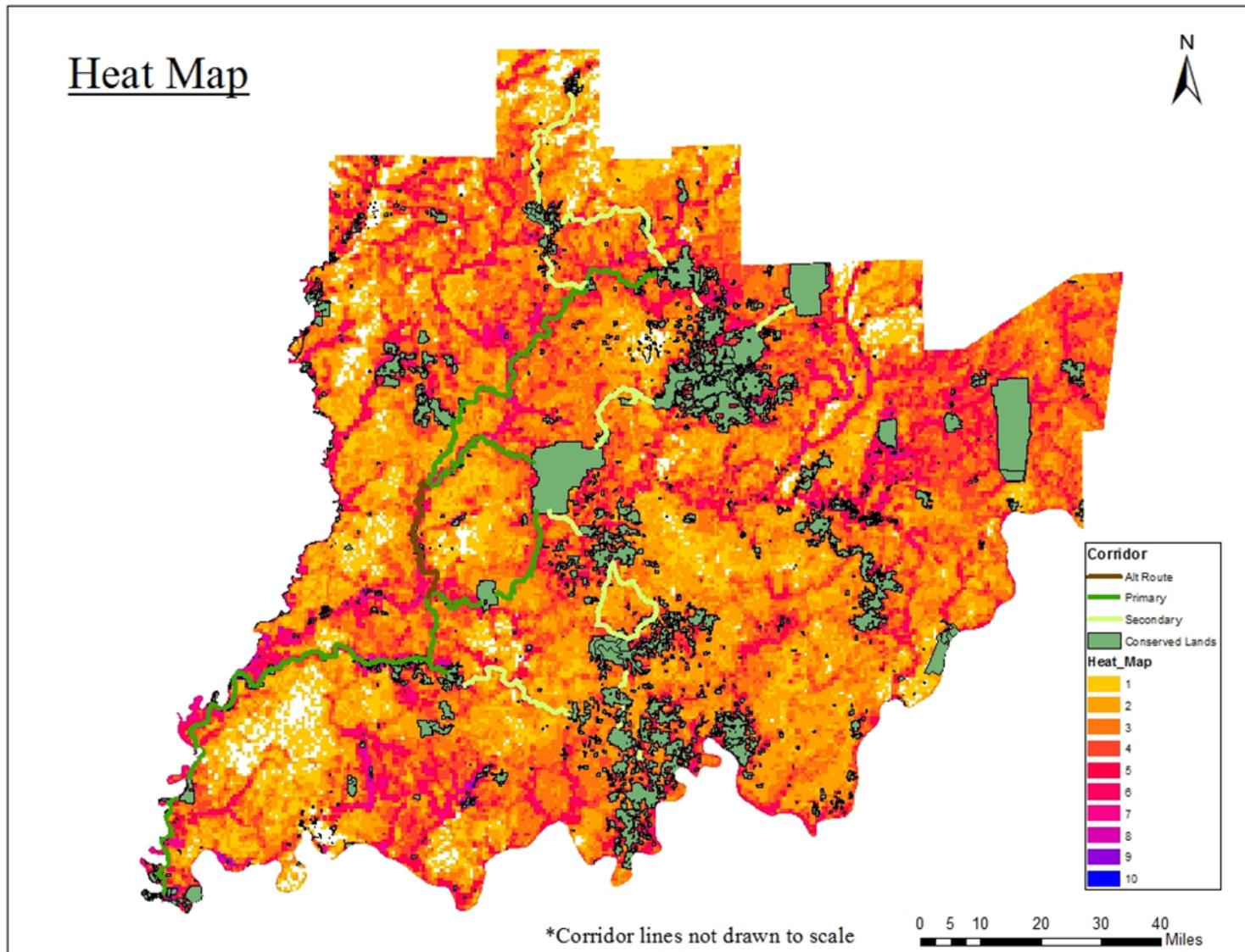
Patoka River

National Wildlife Refuge | Indiana



Down-Scaled Local Pilots

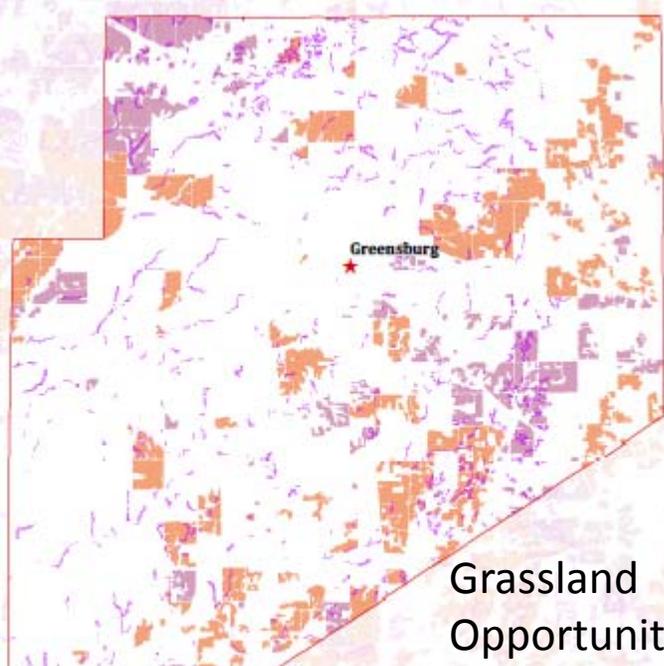
Sycamore Land Trust – Wetland Corridor Acquisition



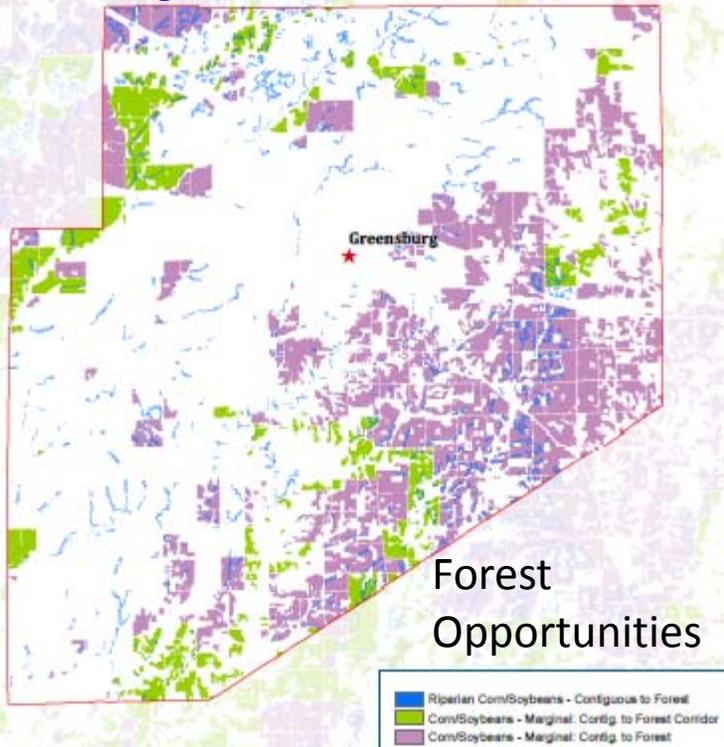
Down-scaled Local Pilots

Decatur County, IN

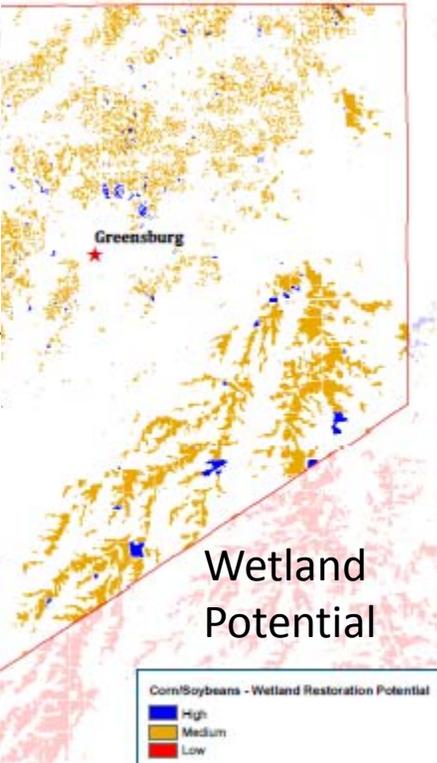
Comprehensive Plan Revision



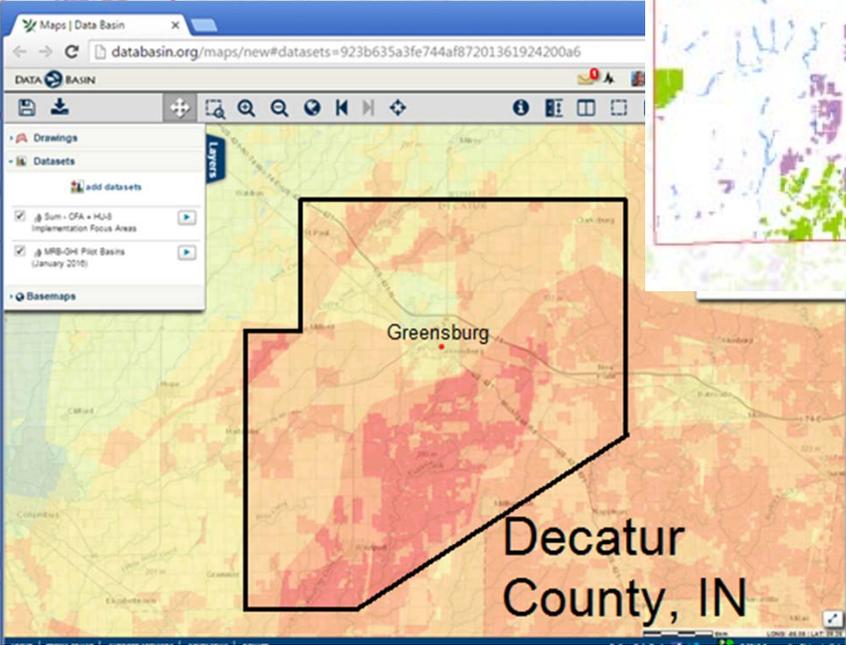
Grassland Opportunities



Forest Opportunities



Wetland Potential



Decatur County, IN

Legend for Forest Opportunities:

- Riparian Corn/Soybeans - Contiguous to Forest
- Corn/Soybeans - Marginal: Contig. to Forest Corridor
- Corn/Soybeans - Marginal: Contig. to Forest

Legend for Wetland Potential:

Corn/Soybeans - Wetland Restoration Potential

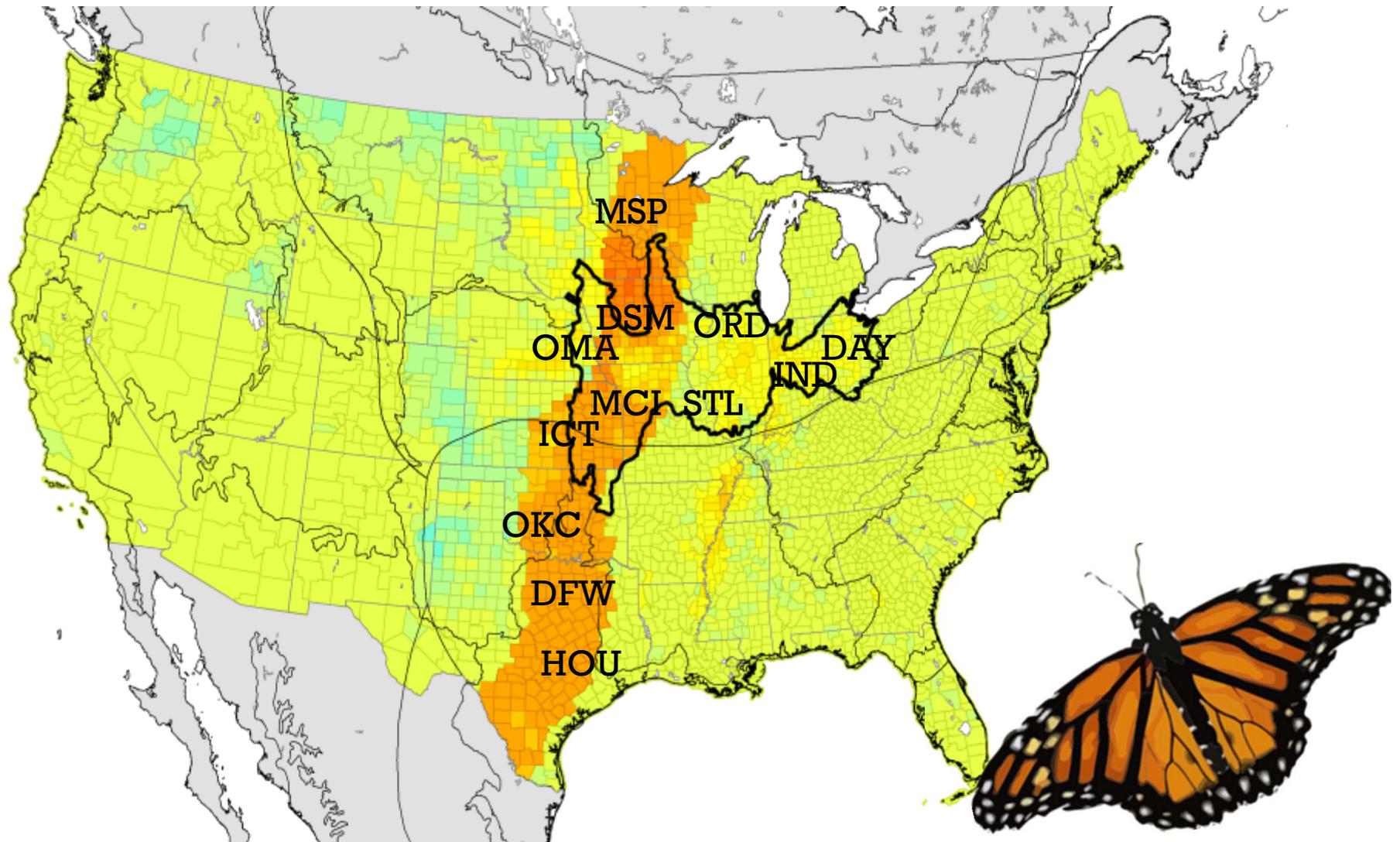
- High
- Medium
- Low

BETWEEN THE BUILDINGS

A Monarch's View of Urban Landscapes
**Developing a Multi-City
Landscape Conservation Design**



Monarch Butterfly Migratory Pathway Landscape Conservation Design (LCD) to achieve both biological & socioeconomic objectives



Urban Monarch Landscape Design

What can cities contribute to monarch corridors?



We need Nature. Nature needs us.

Ecological & Social Values of Monarch Habitat



SDM Steps	Monarch biology	Transportation	Stormwater Management	Urban Revitalization	Youth Education
Objectives	Migratory corridor across specific pathways	Mixed modal transportation to promote health	Filter runoff Retain peak flows	Beautification of empty lots	Job training
Metrics	Monarch population objectives	Health & Safety	Water quality	Attractiveness	Science comprehension
Alternatives	Prairies Wetlands	Plantings along bicycle & pedestrian greenways	Raingardens w/milkweed	Flowering plants for nectar	Training in planting, maintenance & monitoring
Consequences	Host plants for full life cycle, located along migratory flyway	Design (height), located along transportation network	Design (deep roots), located along waterways	Design (flowering), located in economic incentive districts	Highlight core science principles & job skills, located in schools
Tradeoffs & Optimization	Biological impact	Health & safety	Water quality	Aesthetics	Skills training

QUESTIONS?

- ❖ Gulf Hypoxia Initiative Site: www.tallgrassprairie.lcc.org/issue/gulf-hypoxia
- ❖ Data Basin Site: tinyurl.com/MRB-GHI-DataBasin
- ❖ ScienceBase Site: tinyurl.com/MRB-GHI-ScienceBase

Project coordinated by Tallgrass Prairie LCC:

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