Agricultural Conservation Planning Framework: Database, Concept, and Toolbox to Facilitate Watershed Analysis and Landowner Engagement (an introduction)

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USDA-ARS

Background on the ACPF

- Initiated as part of a NRCS Conservation Innovation Grant awarded to Environmental Defense Fund (EDF) in 2011.
- EDF contracted development of land use field boundary database for part of the UMRB (2011).
- Concept paper published in JSWC in 2013.
- Four training workshops have been held, two in Ames IA (Aug. 2014, Mar. 2016) and two in Mankato MN (during 2015), with nearly 100 trainees total.
- Journal of Environmental Quality papers published mid 2015.
- Release of ACPF toolbox Ver 1. and Users Manual: October 2015 (http://northcentralwater.org/acpf/).
- Support agreement with from NRCS for database expansion (Red River valley, western Erie basin), new practices (saturated buffers, bioreactors, others), and training/evaluation (funding shared with 3 LGUs).

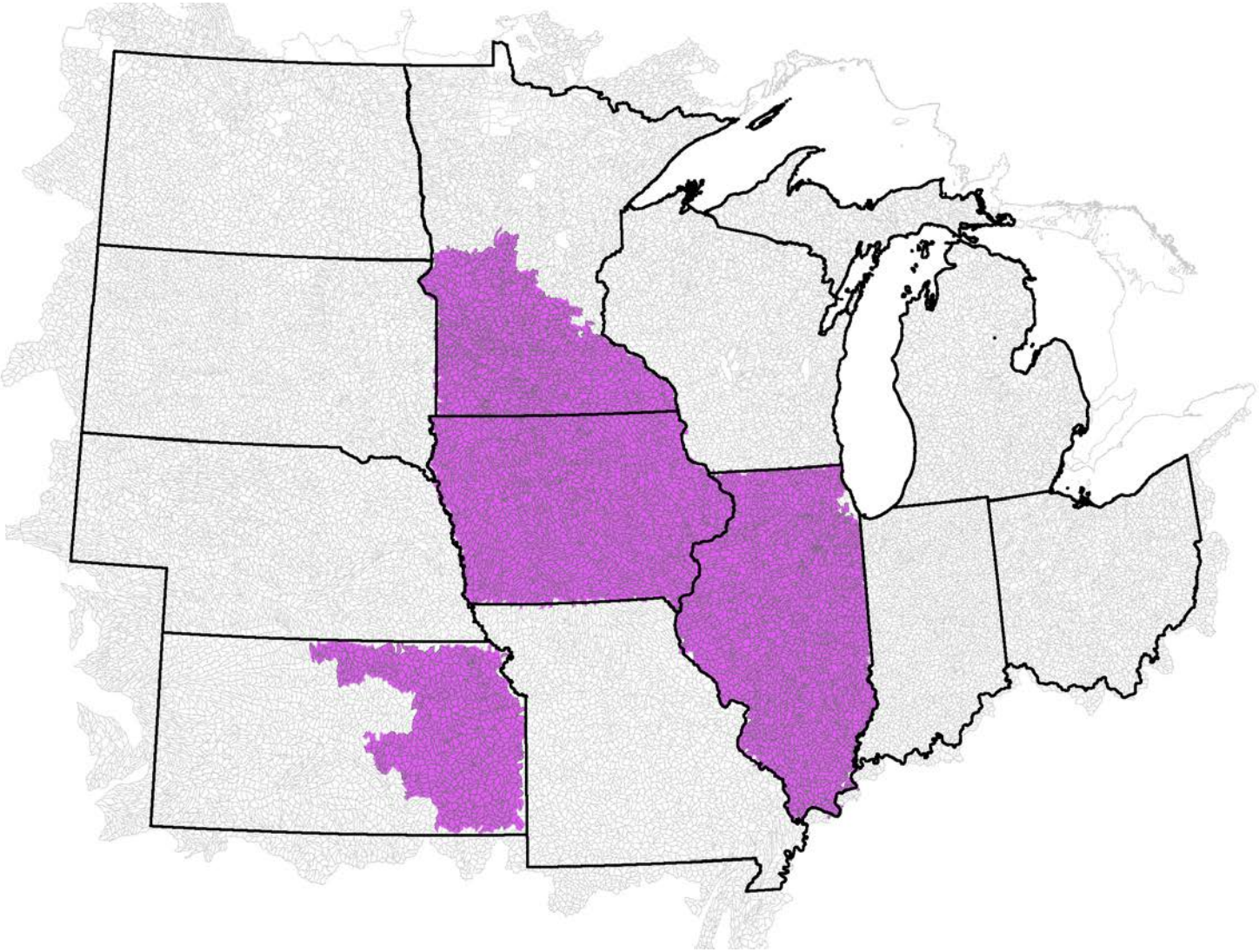
What does the ACPF do?

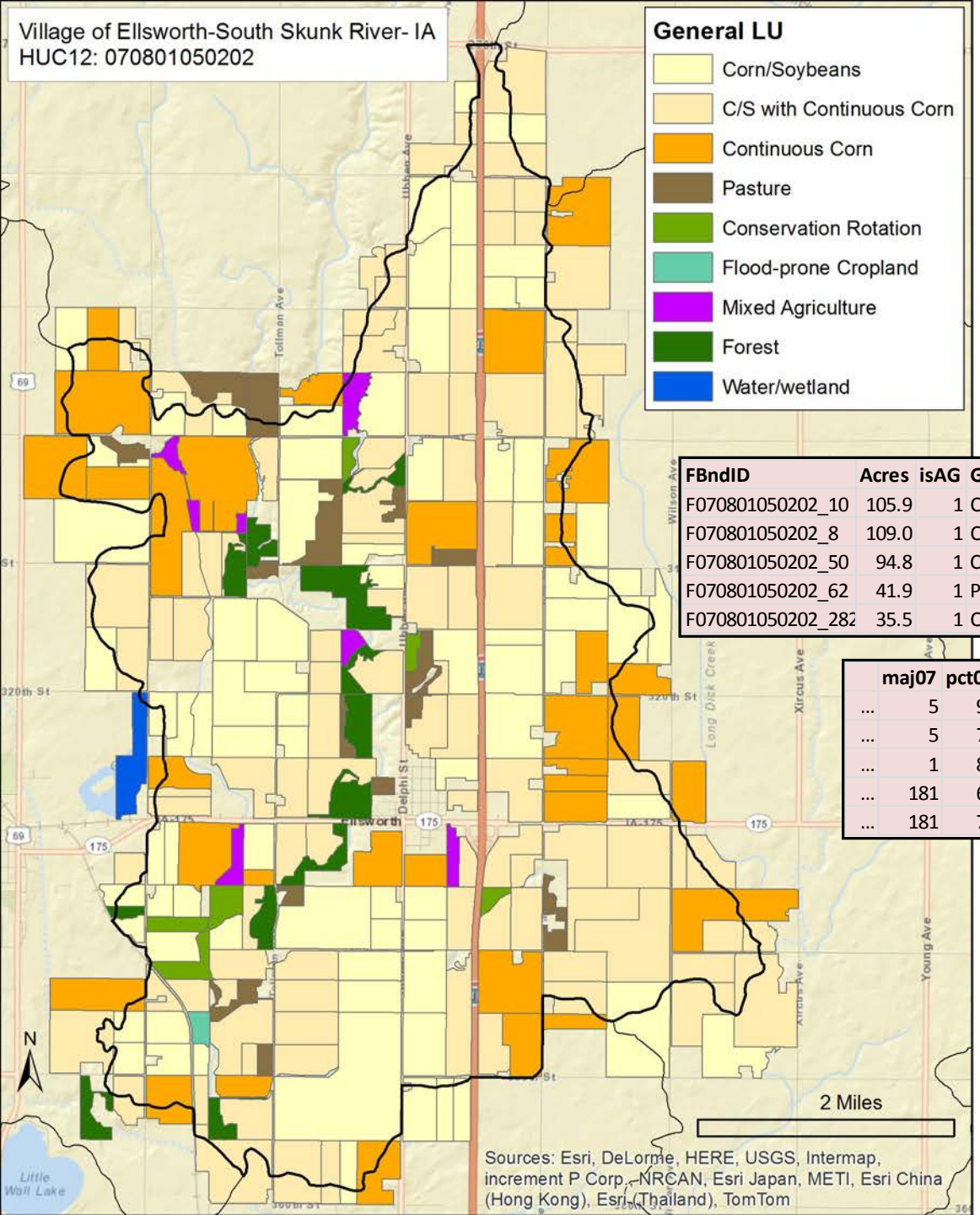
- Provides/facilitates consistent input data to enable consistency of planning analyses in different regions (states/MLRAs).
- Proposes a unifying concept for water quality management in agricultural watersheds (conservation pyramid).
- ArcGIS toolbox identifies a full suite of possible locations for conservation practice installations.
- Approach is intended to facilitate landowner involvement in planning by providing choices for implementation with spatial precision.
- HUC-12 watershed intended unit of analysis, but some tools have been run at full HUC-8 scale.

Input data – Soils, Land use, Terrain

- Soils and land use input data available for IL, IA, southern MN, and (soon) eastern KS.
- High resolution terrain data required; must be hydro-enforced.
- Tools for hydro-enforcement included in the ACPF toolbox
- Where data are available, local GIS analyst with modest expertise, two days of training, and knowledge of the watershed can conduct ACPF analyses.
- Many user options are built into the ACPF tools. Results can be optimized with experience and with local knowledge of the watershed.

New update includes 2015 crop cover data, eastern KS (4,991 HUC12s)



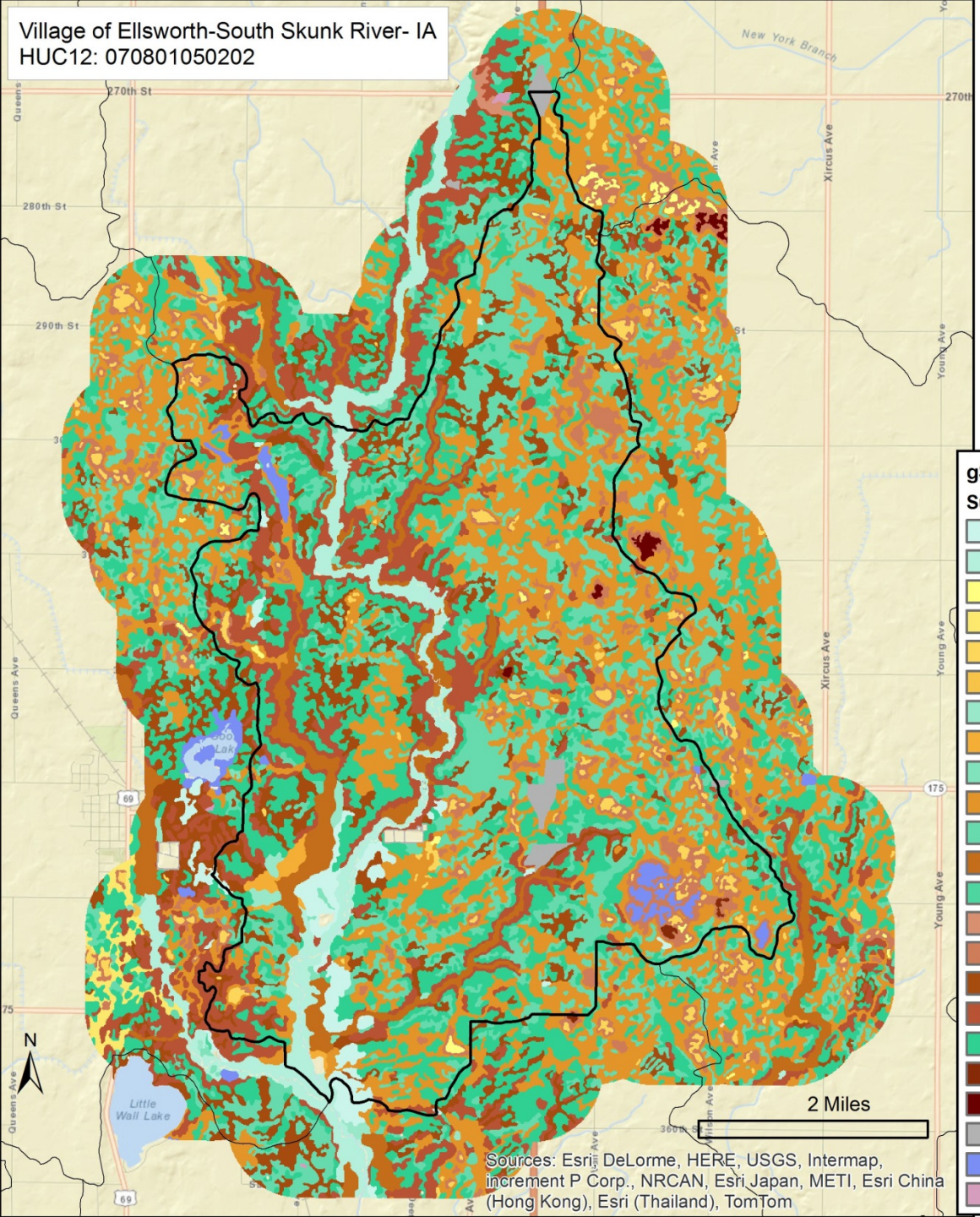


Land Use Data

- 2007-2012 NASS CDL
- Sequence of major crops
- Individual-field dominant crop
- Dominant crop percent of field
- Rule-based crop rotation
- Continuous corn count

FBndID	Acres	isAG	GenLU	CropRotatn	CropSumry	CCCount	MixCount
F070801050202_10	105.9	1	Corn/Soybeans	BCBCBC	C3B3	0:6	0:6
F070801050202_8	109.0	1	C/S with Continuous Corn	BCBCCC	C4B2	2:6	2:6
F070801050202_50	94.8	1	Continuous Corn	CCCCCC	C6	5:6	0:6
F070801050202_62	41.9	1	Pasture	PPPPPP	P6	0:6	6:6
F070801050202_282	35.5	1	Conservation Rotation	PPPCBC	C2B1P3	0:6	3:6

	maj07	pct07	maj08	pct08	maj09	pct09	maj10	pct10	maj11	pct11	maj12	pct12
...	5	94	1	93	5	92	1	94	5	93	1	99
...	5	74	1	82	5	74	1	91	1	82	1	91
...	1	84	1	93	1	84	1	96	1	97	1	99
...	181	68	181	66	181	45	181	51	171	43	171	74
...	181	74	181	32	181	46	1	76	5	80	1	87



Soils Data

- gSSURGO 10m rasters
- MUAggAtt
- VALU1
- Horizon
- Texture
- Parent Material

gSSURGO

SurfHrz070801050202.TaxCls

- Coarse-loamy, mixed, superactive, mesic Typic Hapludolls
- CUMULIC HAPLUDOLLS, FINE-LOAMY, MIXED, MESIC
- Fine, smectitic, calcareous, mesic Cumulic Vertic Endoaquolls
- Fine, smectitic, calcareous, mesic Vertic Endoaquolls
- Fine, smectitic, mesic Cumulic Vertic Endoaquolls
- Fine-loamy over sandy or sandy-skeletal, mixed (calcareous), mesic Typic Endoaquolls
- Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Aquic Hapludolls
- Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Endoaquolls
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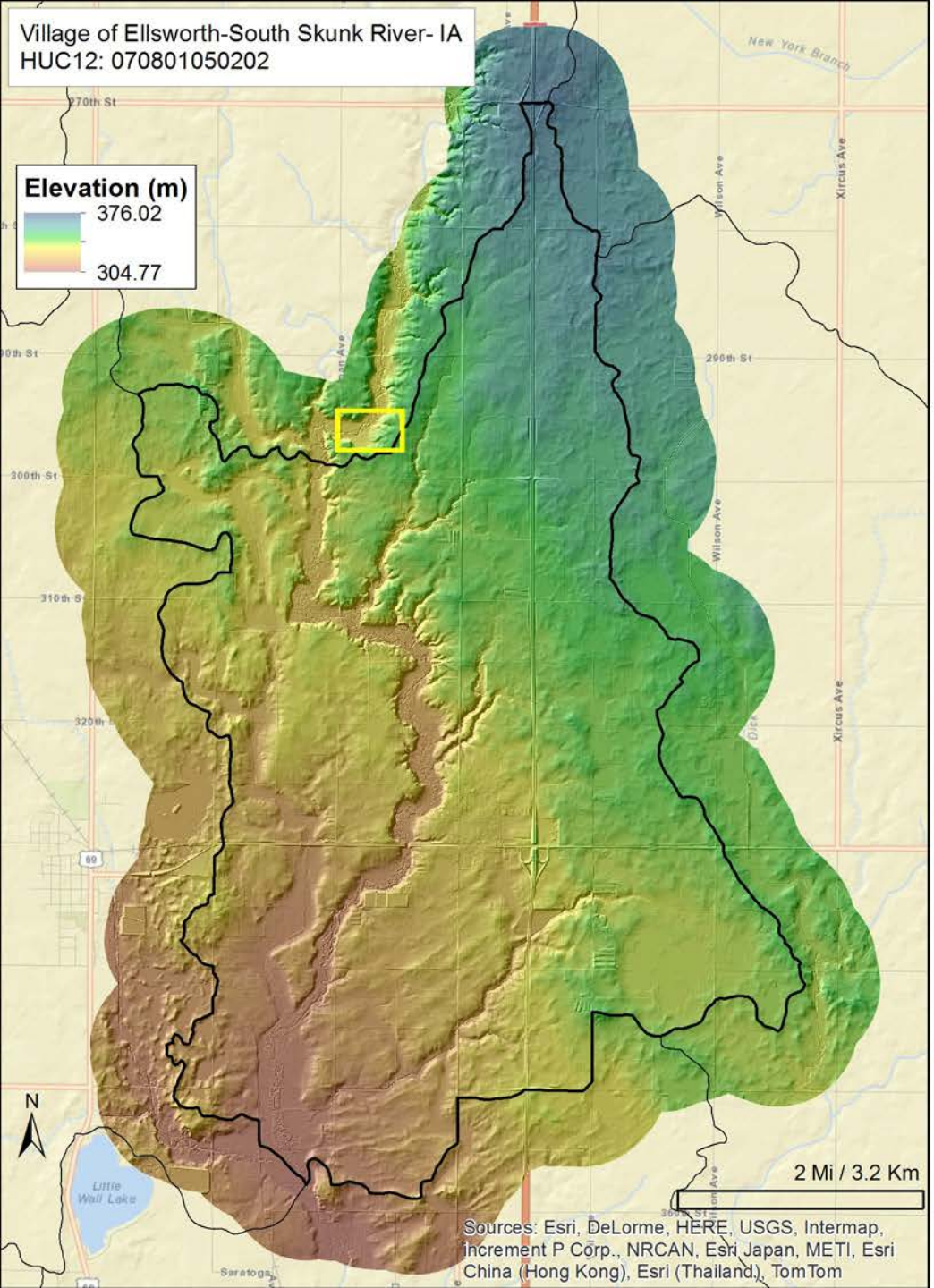
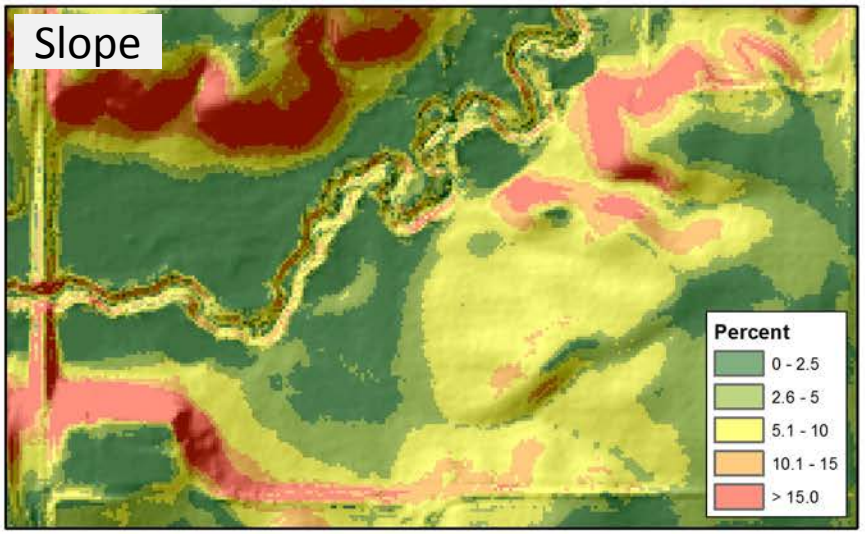
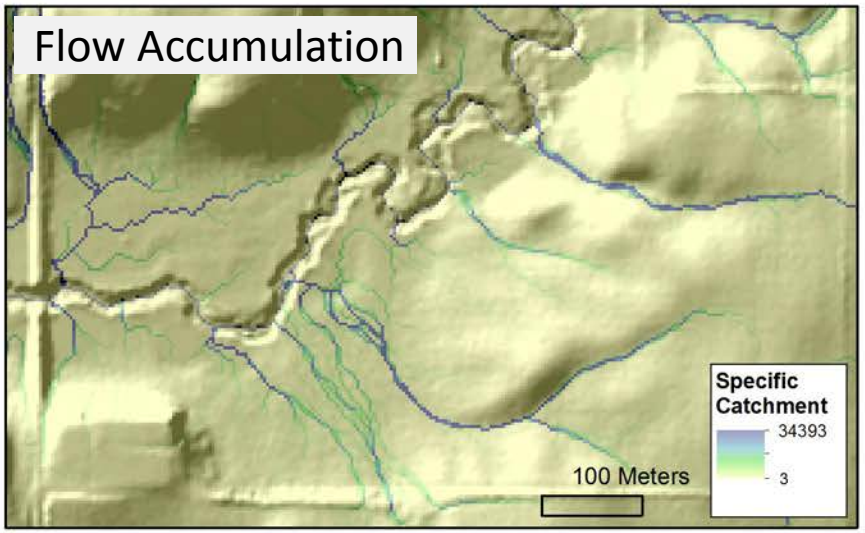
- Fine-loamy, mixed, superactive, mesic Aquic Hapludolls
- Fine-loamy, mixed, superactive, mesic Cumulic Endoaquolls
- Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
- Fine-loamy, mixed, superactive, mesic Glossic Hapludalfs
- Fine-loamy, mixed, superactive, mesic Typic Calciaquolls
- Fine-loamy, mixed, superactive, mesic Typic Endoaquolls
- Fine-loamy, mixed, superactive, mesic Typic Eutrudepts
- Fine-loamy, mixed, superactive, mesic Typic Hapludolls
- Fine-silty, mixed, superactive, calcareous, mesic Typic Endoaquolls
- Fine-silty, mixed, superactive, mesic Typic Endoaquolls
- Loamy Udorthents
- Loamy, mixed, euic, mesic Terric Haplosaprists
- TERRIC MEDISAPRISTS, LOAMY, MIXED, EUIC, MESIC

Terrain Data

- LiDAR-derived digital elevation model
- 3m horizontal resolution
- Hydrologically enforced







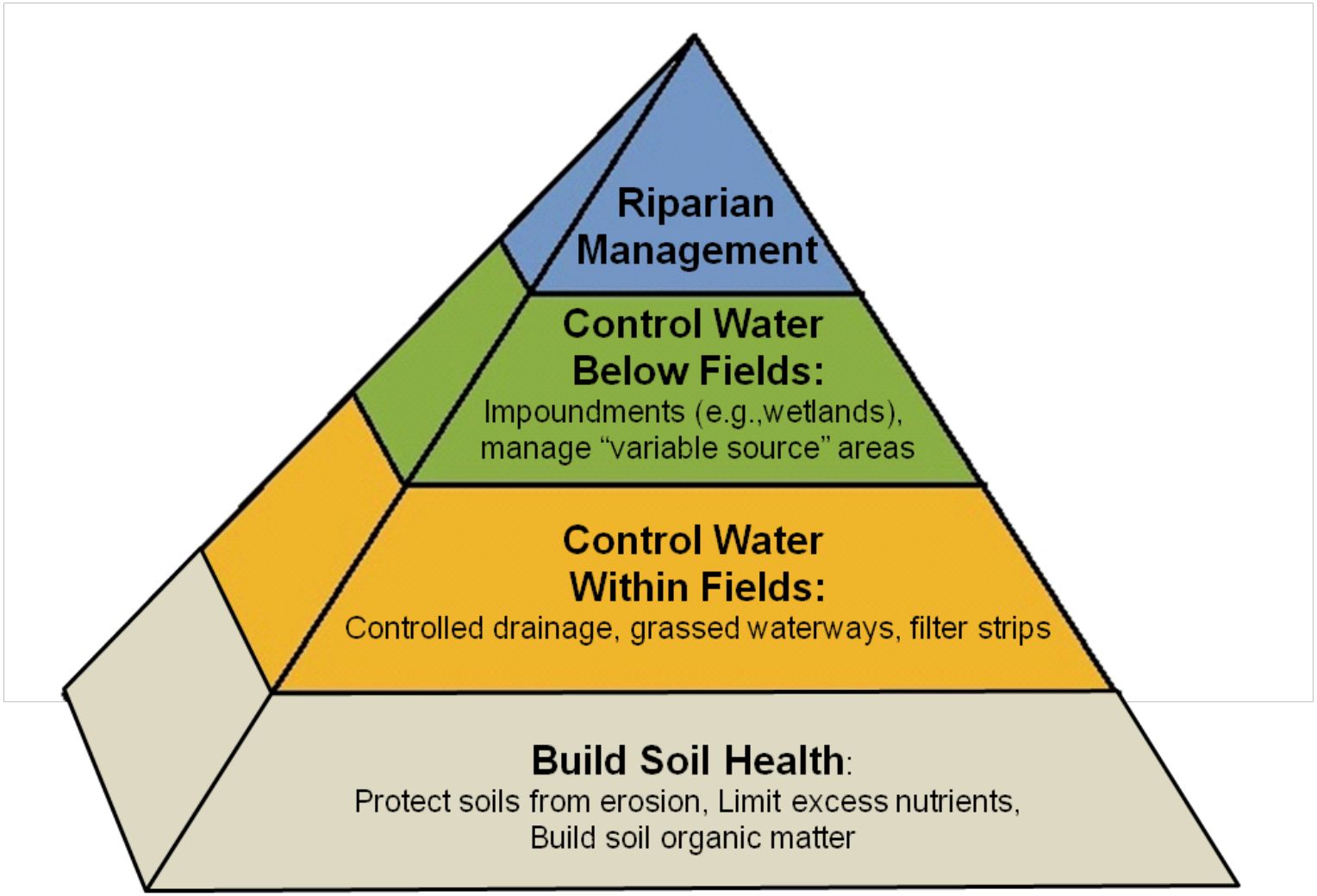
Any broad based approach to watershed planning must consider four needs:

- The need to recognize the uniqueness of each watershed;
- The need to recognize the entrepreneurial independence of individual farmers and include them as equal partners in the planning process;
- The need to include a mix of practices placed within fields and below field edges in order to meet nutrient reduction goals; and,
- The need to protect and improve our soil resource to increase crop productivity and provide other ecosystem functions critical for climate-change adaptation.

Concept for Conservation Planning Framework:

A CONSERVATION PYRAMID

FOR AGRICULTURAL WATERSHEDS



Process for conservation planning to improve water quality in agricultural watersheds using precision technologies

DATA REQUIRED: LiDAR-based digital elevation model, Soil survey, Field boundaries, Land use

AVOID and CONTROL : Improve soil health within cropped fields to avoid and control pollutant losses by-
Protecting soils from erosion with zero or minimum tillage;
Limiting excess nutrients through rates and timing of fertilizer and manure applications;
Building soil organic matter and rejuvenating compacted soils with intensified crop rotations

CONTROL, TRAP, and/or TREAT

IN FIELDS:
Place water control / filter practices

BELOW FIELDS
Place water detention / nutrient removal practices

RIPARIAN ZONE
Place/design practices for ecosystem function and nutrient removal

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CONTROL, TRAP, and/or TREAT	TILE DRAINAGE	SURFACE RUNOFF
IN FIELDS: Place water control / filter practices		
BELOW FIELDS Place water detention / nutrient removal practices		
RIPARIAN ZONE Place/design practices for ecosystem function and nutrient removal		

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RIPARIAN ZONE Place/design practices for ecosystem function and nutrient removal		

Assessments for prioritization and design of practices

Runoff Risk Assessment:
Prioritize fields where multiple erosion control practices are most needed

Close to stream?

Slope steepness	Yes		No
H	A	B	C
M	B	C	
L	C		

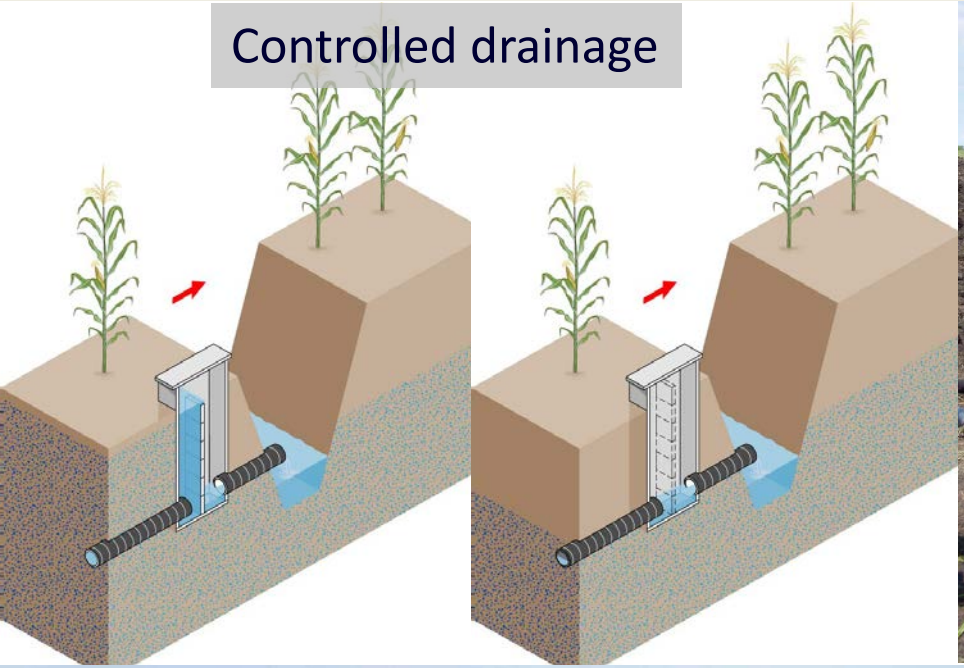
Riparian Assessment:
Identify riparian function by stream reach

Shallow water table?

Runoff delivery	Yes		No
H	CZ	MSB	SSG
M	MSB	MSB	SSG
L	DRV	DRV	SBS

Practices for Reducing Nitrate Loads from Tile Drainage

Controlled drainage

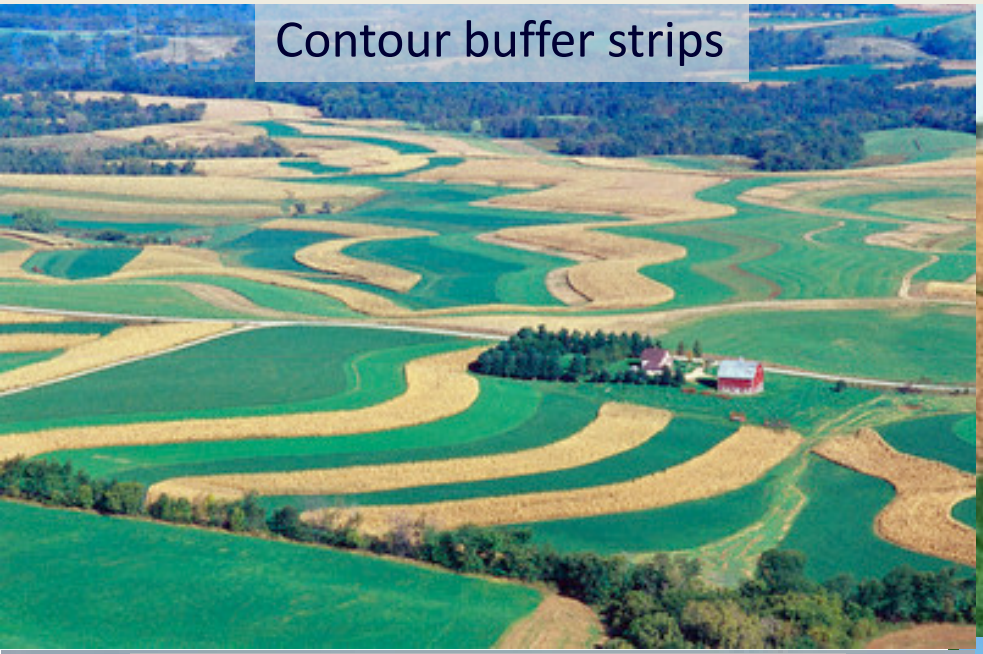


Denitrifying bioreactors

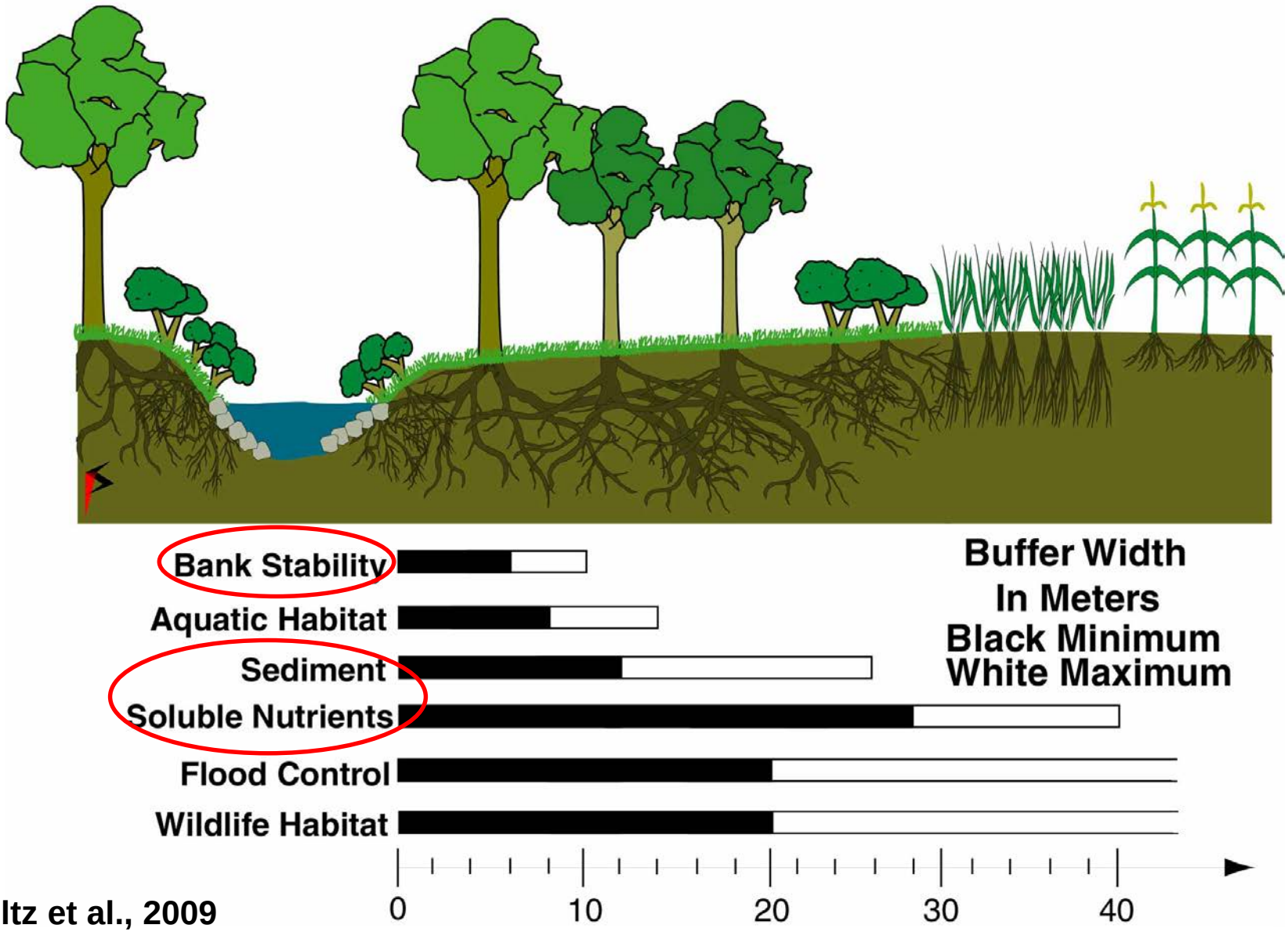
Two-stage drainage ditch

Nutrient removal wetlands

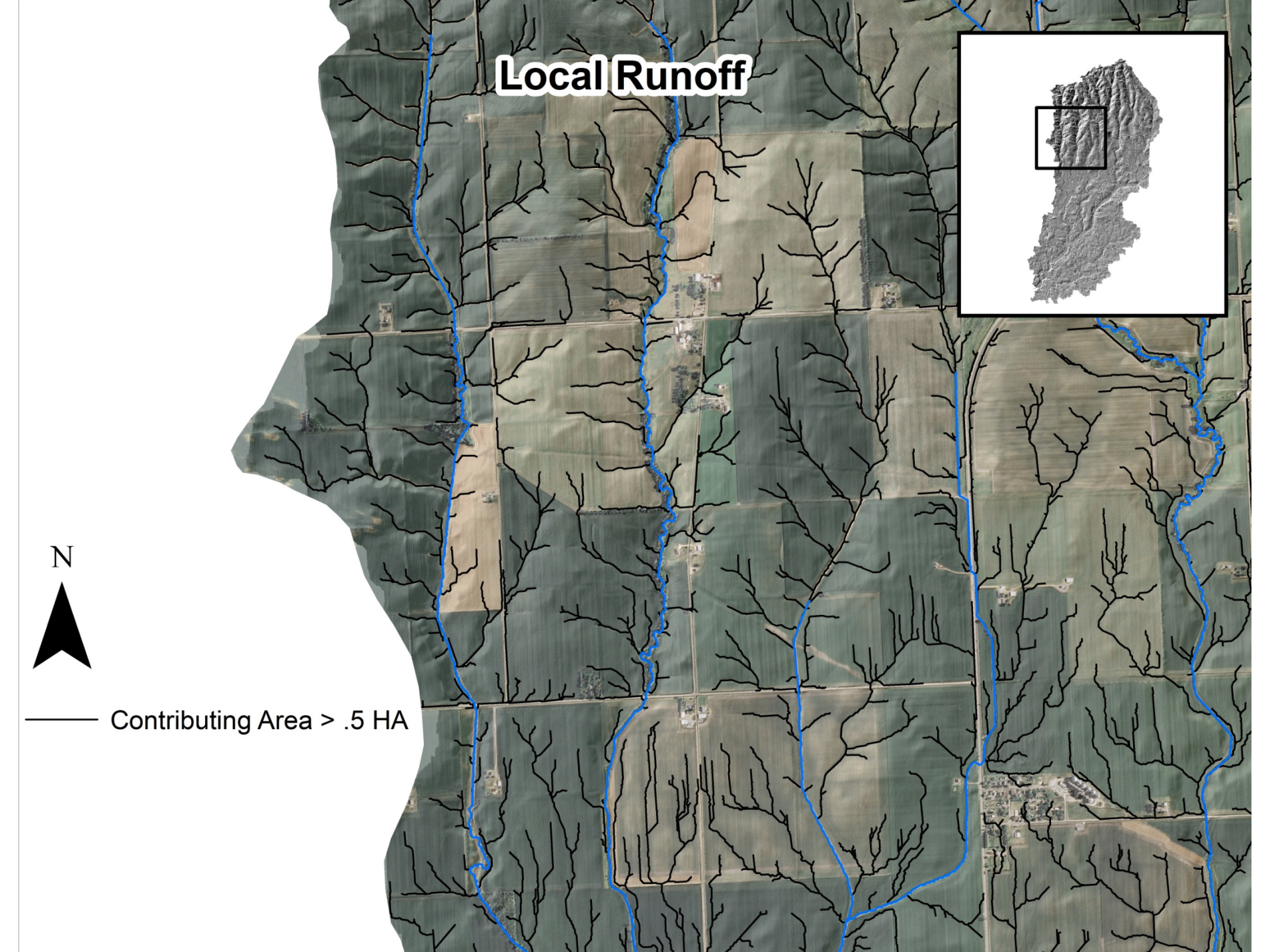
Practices to Manage Runoff & Water Quality



Potential Riparian Functions Depend on Landscape Attributes and May Be Achieved at Varying Buffer Widths



Schultz et al., 2009


Local Runoff
N
Contributing Area > .5 HA

Local Runoff & Shallow Water Table

N

Contributing Area > .5 HA

Shallow Water Table Zone

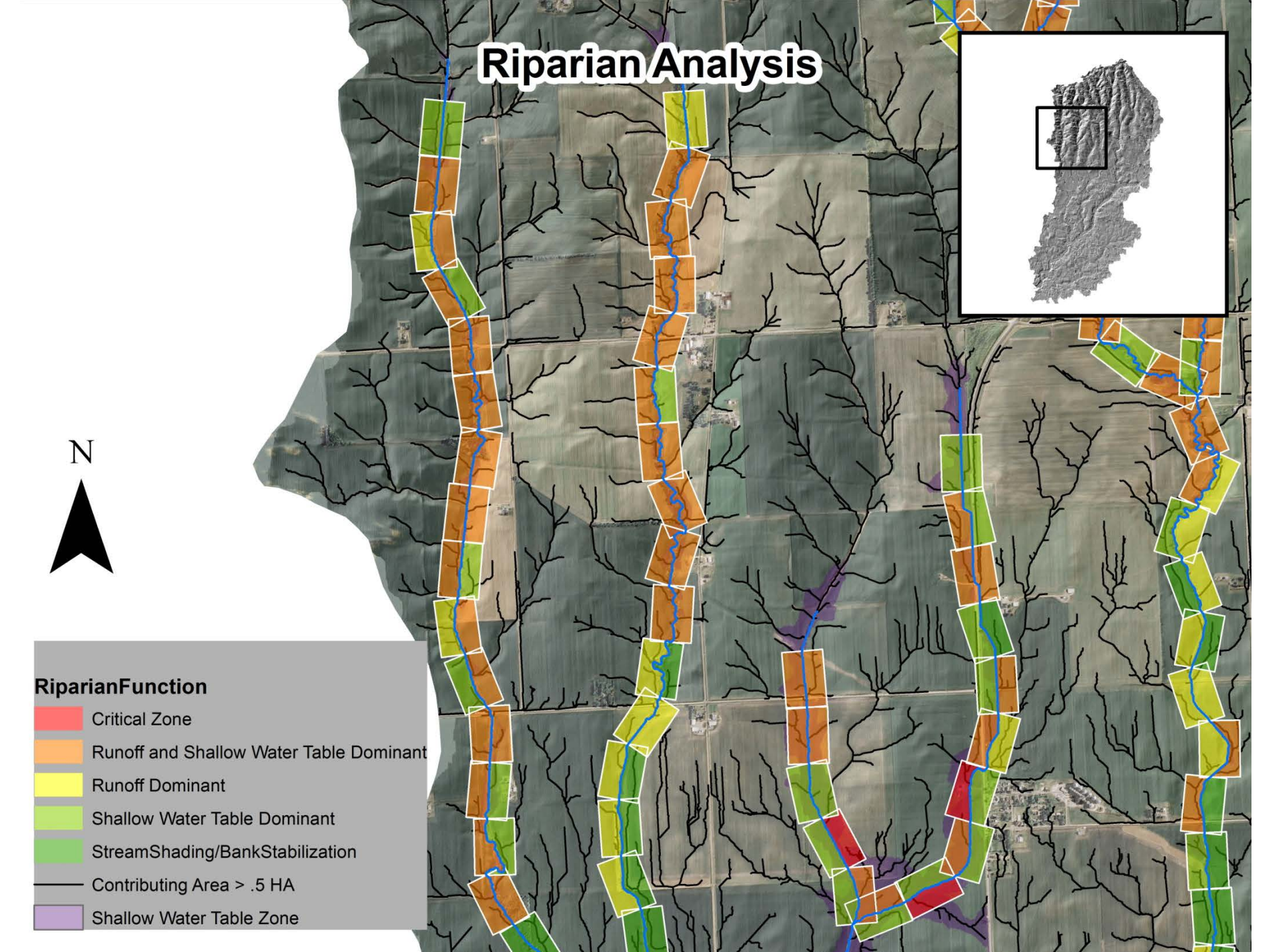
Riparian Analysis

N

Riparian Analysis

Contributing Area > .5 HA

Shallow Water Table Zone


Riparian Analysis
N
RiparianFunction
Critical Zone
Runoff and Shallow Water Table Dominant
Runoff Dominant
Shallow Water Table Dominant
StreamShading/BankStabilization
Contributing Area > .5 HA
Shallow Water Table Zone

Process for conservation planning to improve water quality in agricultural watersheds using precision technologies

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AVOID and CONTROL : Improve soil health within cropped fields to avoid and control pollutant losses by-
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Building soil organic matter and rejuvenating compacted soils with intensified crop rotations

CONTROL, TRAP, and/or TREAT	TILE DRAINAGE	SURFACE RUNOFF
IN FIELDS: Place water control / filter practices	**Controlled Drainage** where slopes are least	**Contour Filter Strips, Terraces, Conservation Cover** where slopes are steep
	Surface Intake Filters or **Restored Wetlands** where depressions occur	**Grassed Waterways** where gullies may form
BELOW FIELDS Place water detention / nutrient removal practices	**Bioreactors** or small wetlands constructed above field-tile outlets	**Perennial crops**, & novel practices to intercept flows where soils stay wet
	Water detention using impoundments of varying designs	
	Nutrient Removal Wetlands	**Sediment Control Basins** Farm Ponds
RIPARIAN ZONE Place/design practices for ecosystem function and nutrient removal	**Re-Saturated Buffers**	Design Types for **Riparian Buffers:** **CZ** Critical Zone -sensitive sites **MSB** Multi-Species Buffer **SSG** Stiff-Stemmed Grasses **DRV** Deep-Rooted Vegetation **SBS** Stream Bank Stability
	Ditch design: **Two-Stage Ditches**; novel practices for detention / diversion of tile drainage	

New Tools
(Fall 2016)

Future Tools
(vulnerable lands, 2-stage ditches, scenario assessment calculator)

Assessments for prioritization and design of practices

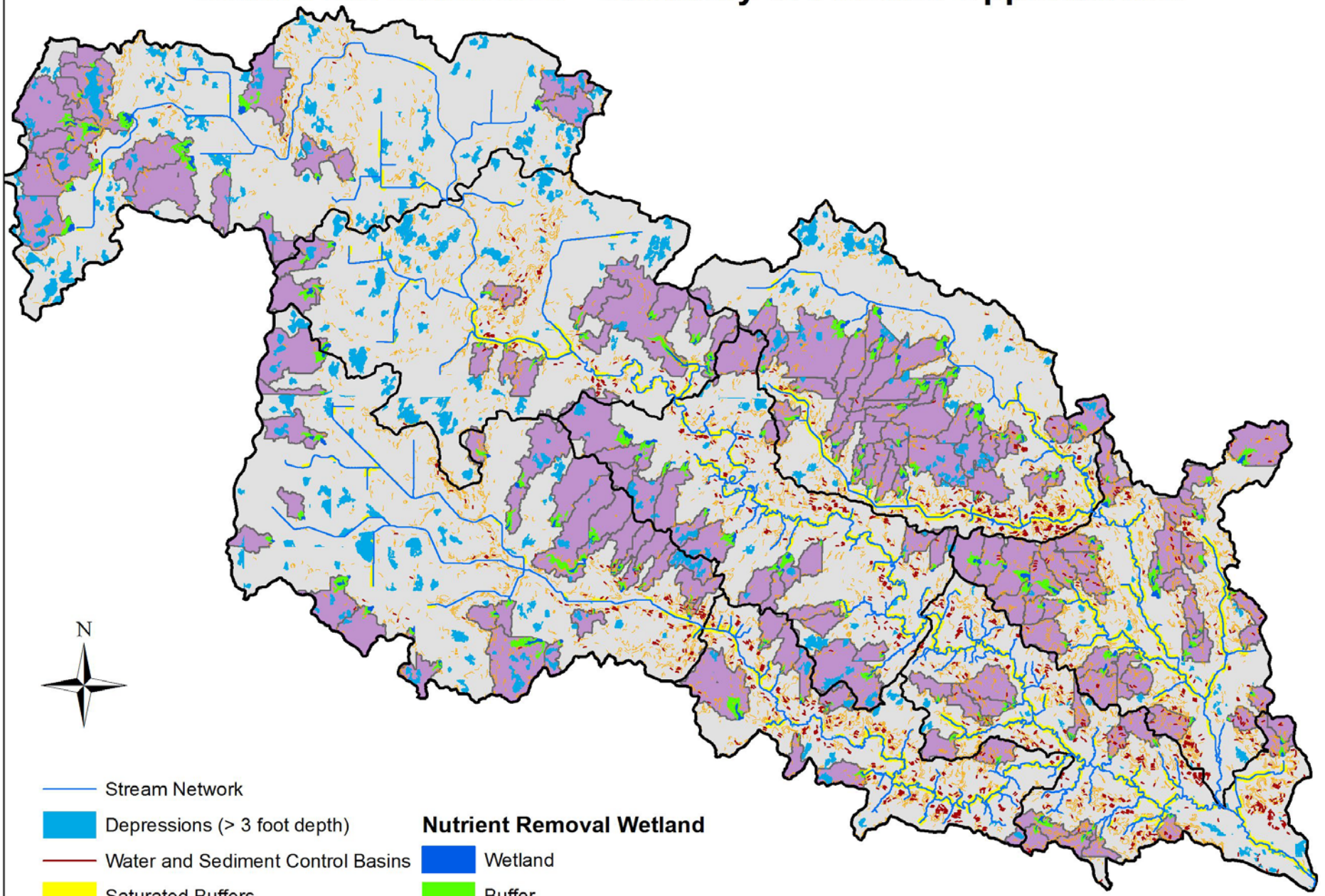
Runoff Risk Assessment: Prioritize fields where multiple erosion control practices are most needed

Slope steepness	Close to stream? Yes		No
H	A	B	C
M	B	C	
L	C		

Riparian Assessment: Identify riparian function by stream reach

Runoff delivery	Shallow water table? Yes		No
H	CZ	MSB	SSG
M	MSB	MSB	SSG
L	DRV	DRV	SBS

South Fork Watershed - Summary of Practice Opportunities



ACPF Summary: Key points

- Addresses tile drainage and runoff pathways, while stressing the importance of soil health for conservation success.
- Suggests possible beneficial locations for different types of practices placed in fields, at field edges, and in riparian zones.
- Includes well known practices and can include new types of practices if siting criteria can be defined/applied to input data.
- Input data becoming widely available.
- Tools are independent of each other. Users may select those tools of greatest interest, but are advised that any tool can show unexpectedly useful information for a given watershed.
- No recommendations are made. Intent is to develop a watershed planning resource, not a plan. Actual planning is inherently a local consultative process involving landowners.

Thank You

Sarah Porter, USDA-ARS
David James, USDA-ARS
Kathy Boomer, The Nature Conservancy
Eileen McLellan, Environmental Defense Fund

USDA-NRCS

Further information:

- http://www.jswconline.org/content/68/5/113A.full.pdf+html
- https://dl.sciencesocieties.org/publications/jeq/articles/44/3/754
- https://dl.sciencesocieties.org/publications/jeq/articles/44/3/768
- http://northcentralwater.org/acpf/

ACPF in the Upper Silver Creek Watershed

JANET BUCHANAN,
HEARTLANDS CONSERVANCY

HEARTLANDS CONSERVANCY
Investing In The Nature Of Southwestern Illinois

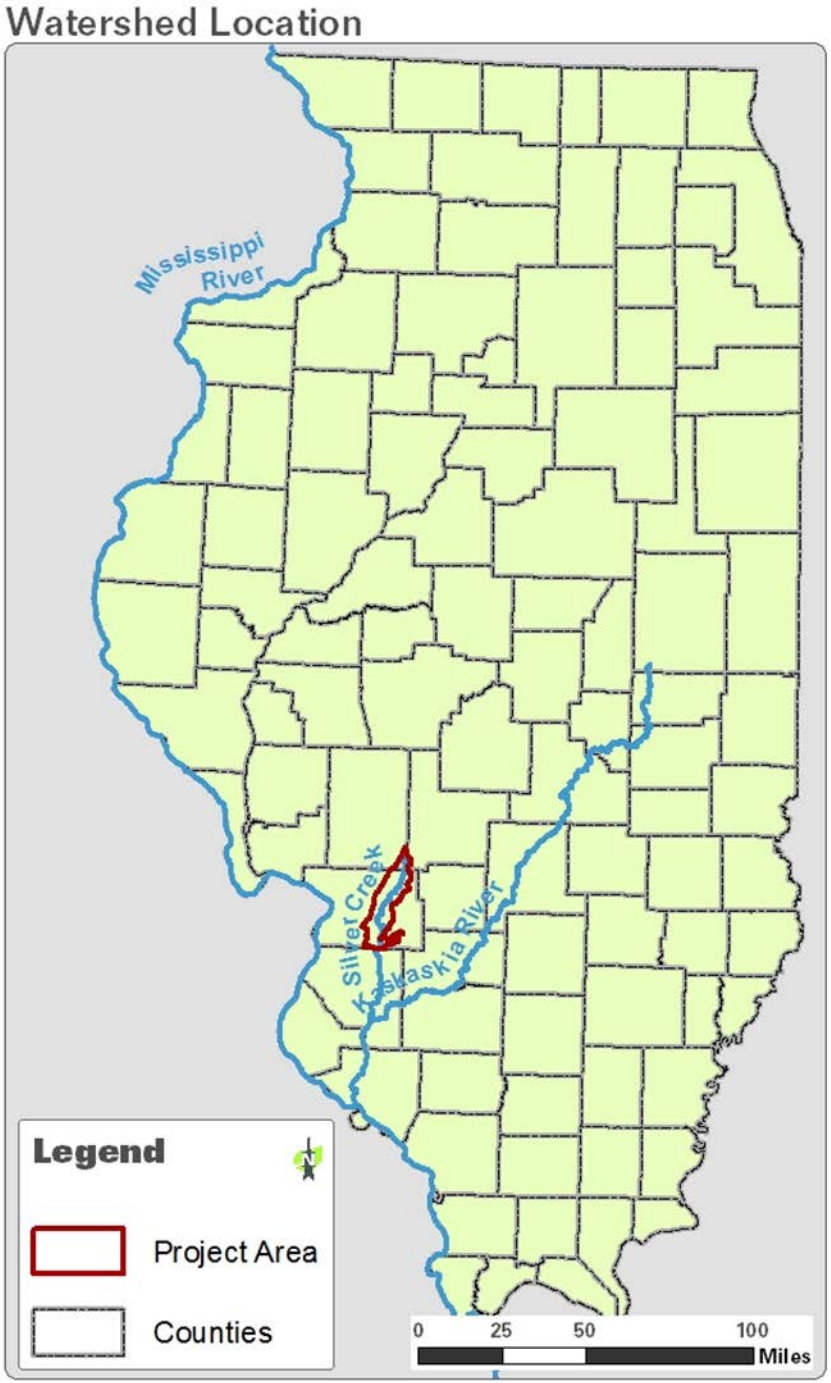
The National Great Rivers Research & Education Center

MADISON COUNTY PLANNING & DEVELOPMENT
PLAN | GROW | SUSTAIN

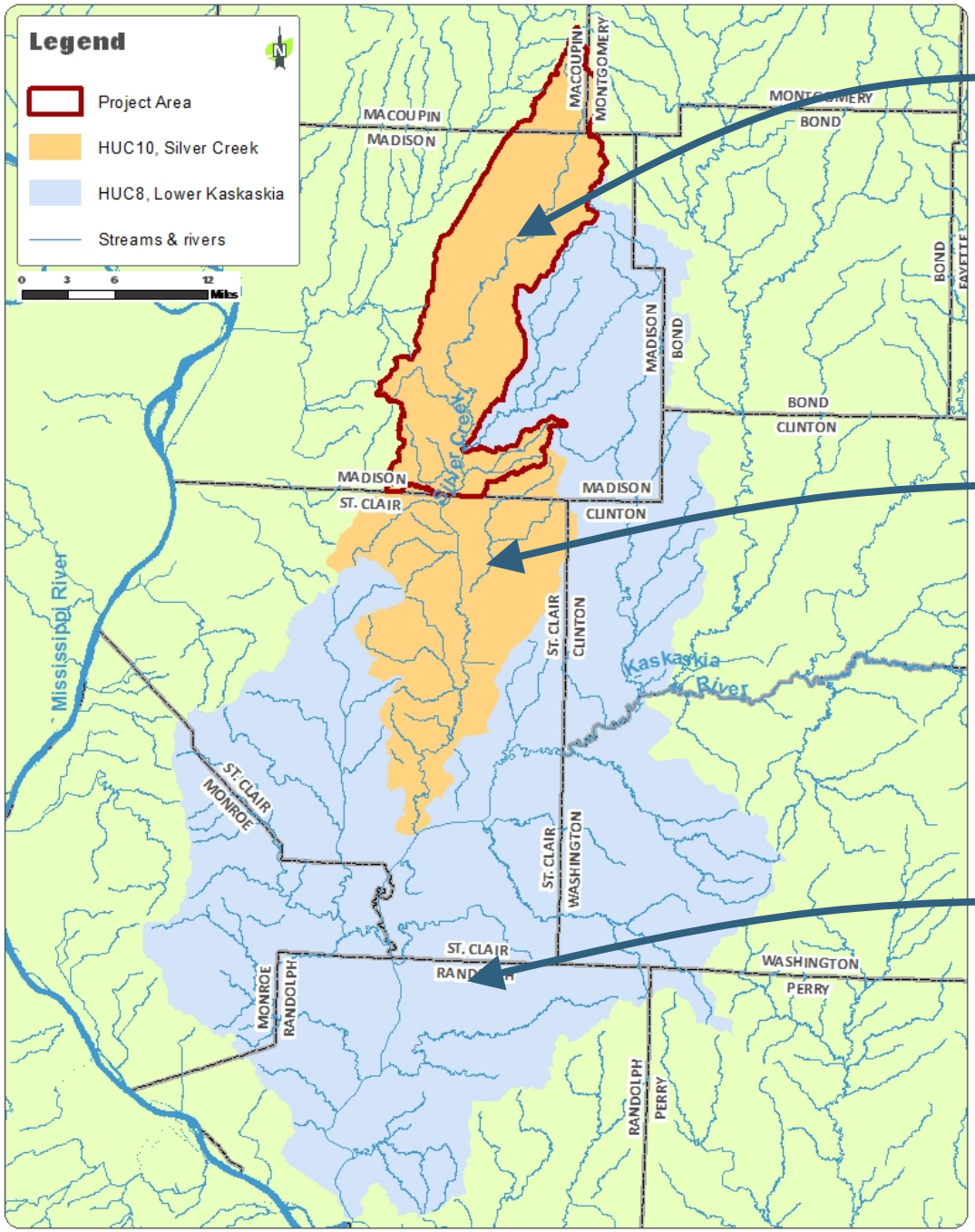
About the watershed

- Headwaters
- Largely farmland
- Water quality challenges (303d)
- Flooding events

EPA Watershed Planning grant



Watershed Boundaries



Upper Silver Creek
(seven HUC-12s)

Silver Creek
HUC-10
0714020405

Lower Kaskaskia
HUC-8
HUC 07140204

The Watershed Planning process

YEAR ONE: Watershed Resources Inventory

Identify existing conditions

Assess issues (challenges and threats)

YEAR TWO: Watershed Plan

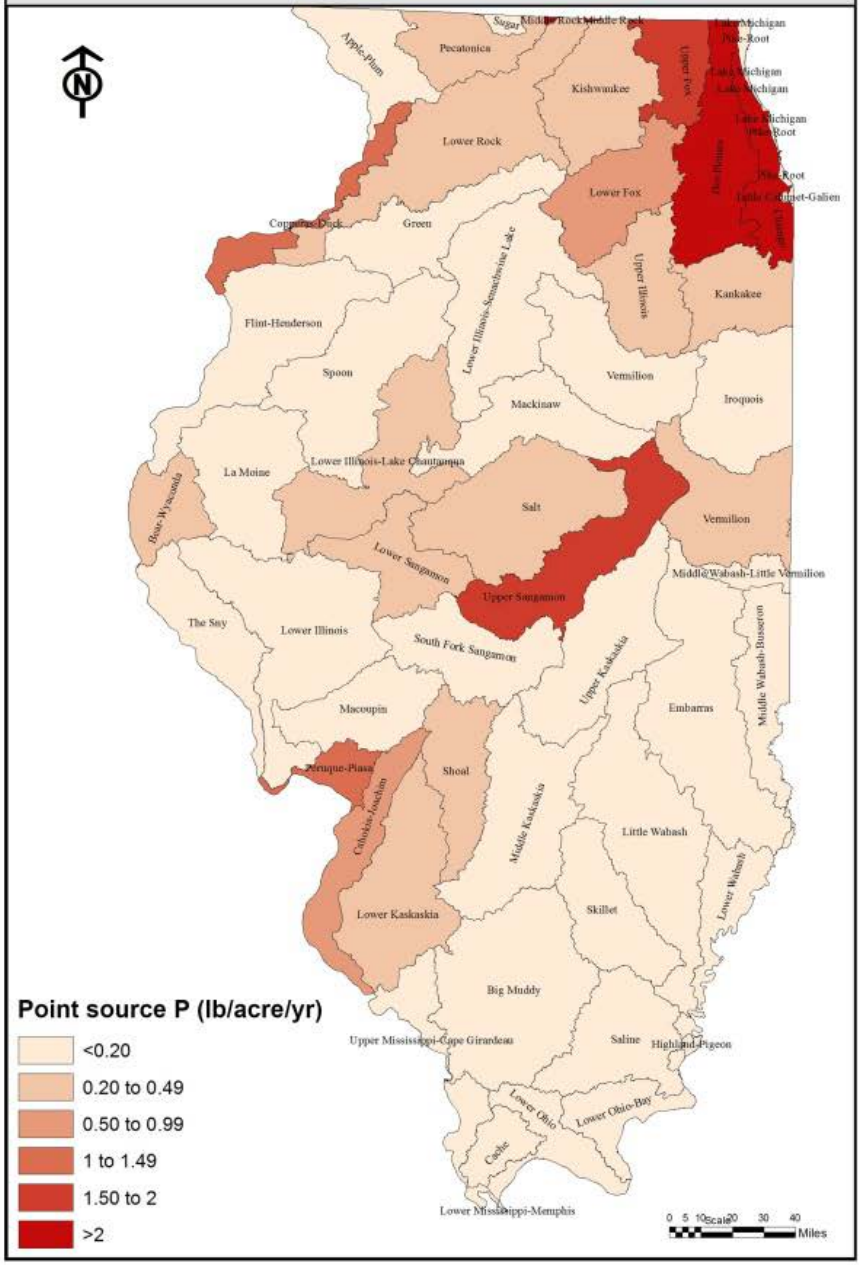
Identify Best Management Practices (BMPs)

Select BMPs and locations

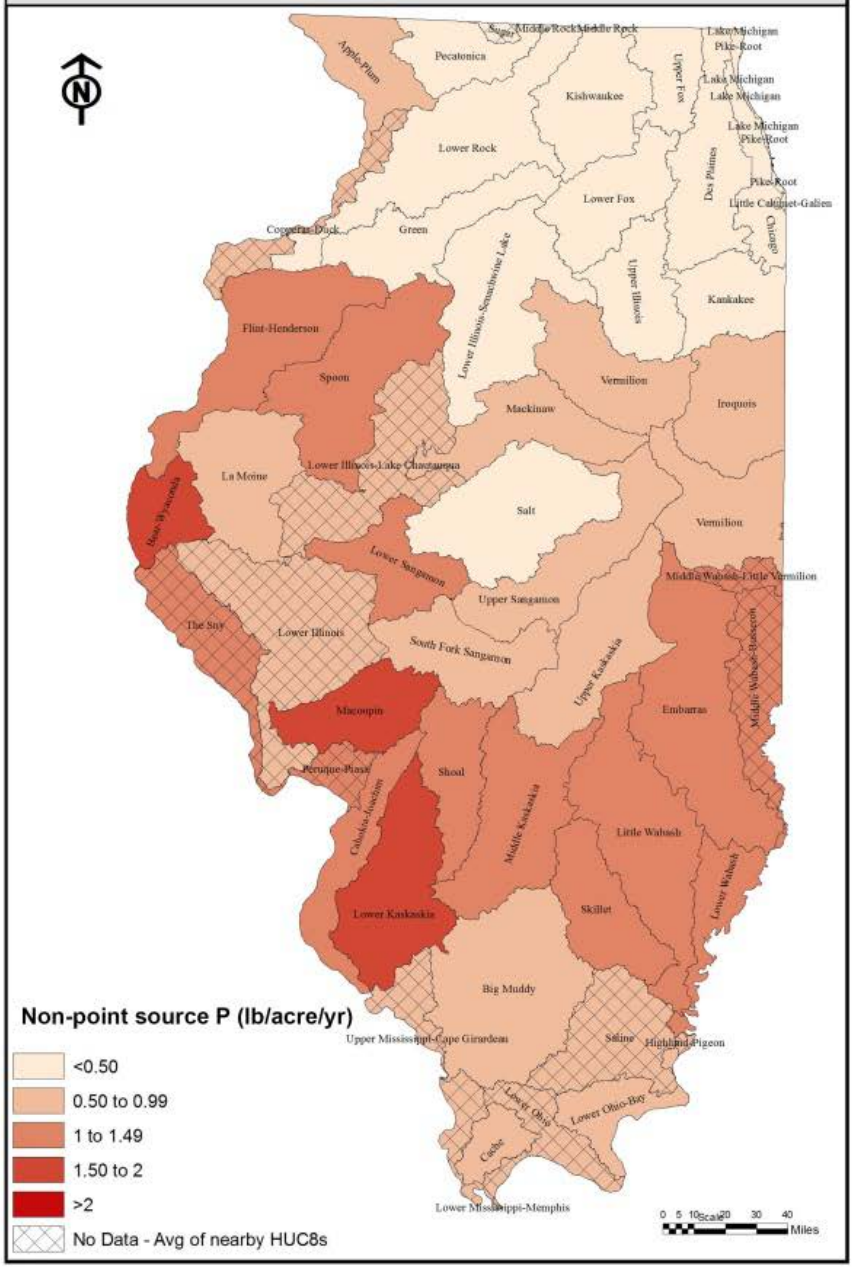
THROUGHOUT

Stakeholder engagement & technical support

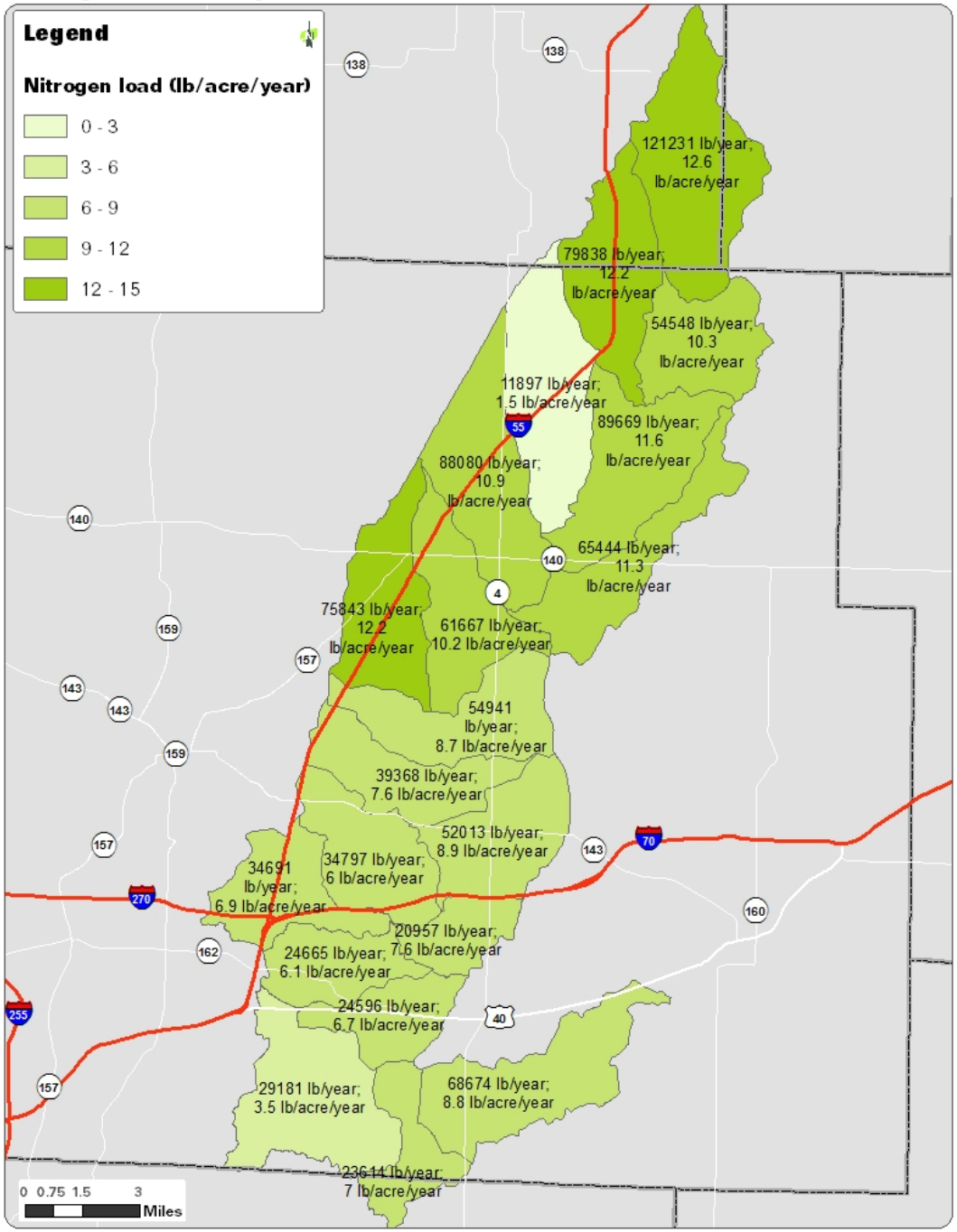
HUC8 point source P yield



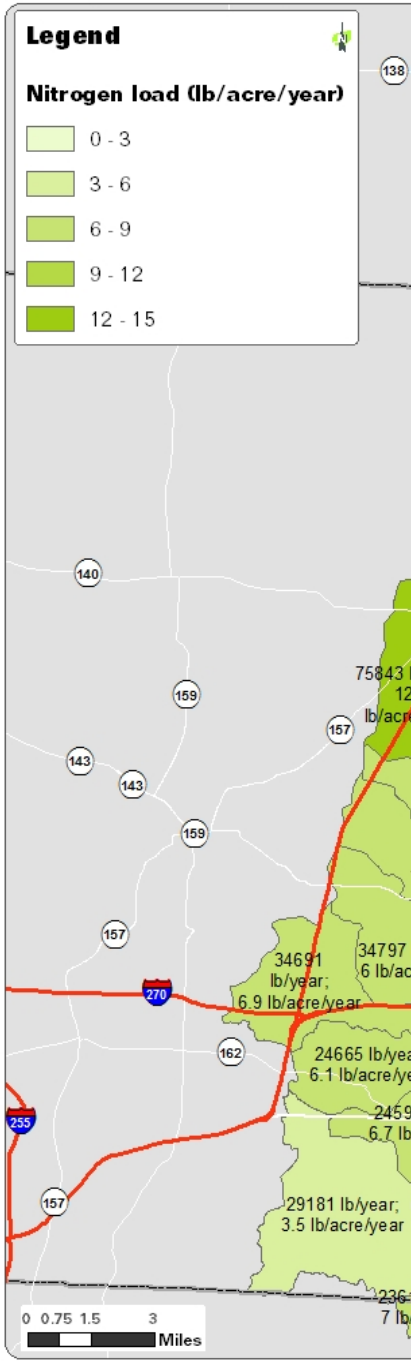
HUC8 non-point source P yield



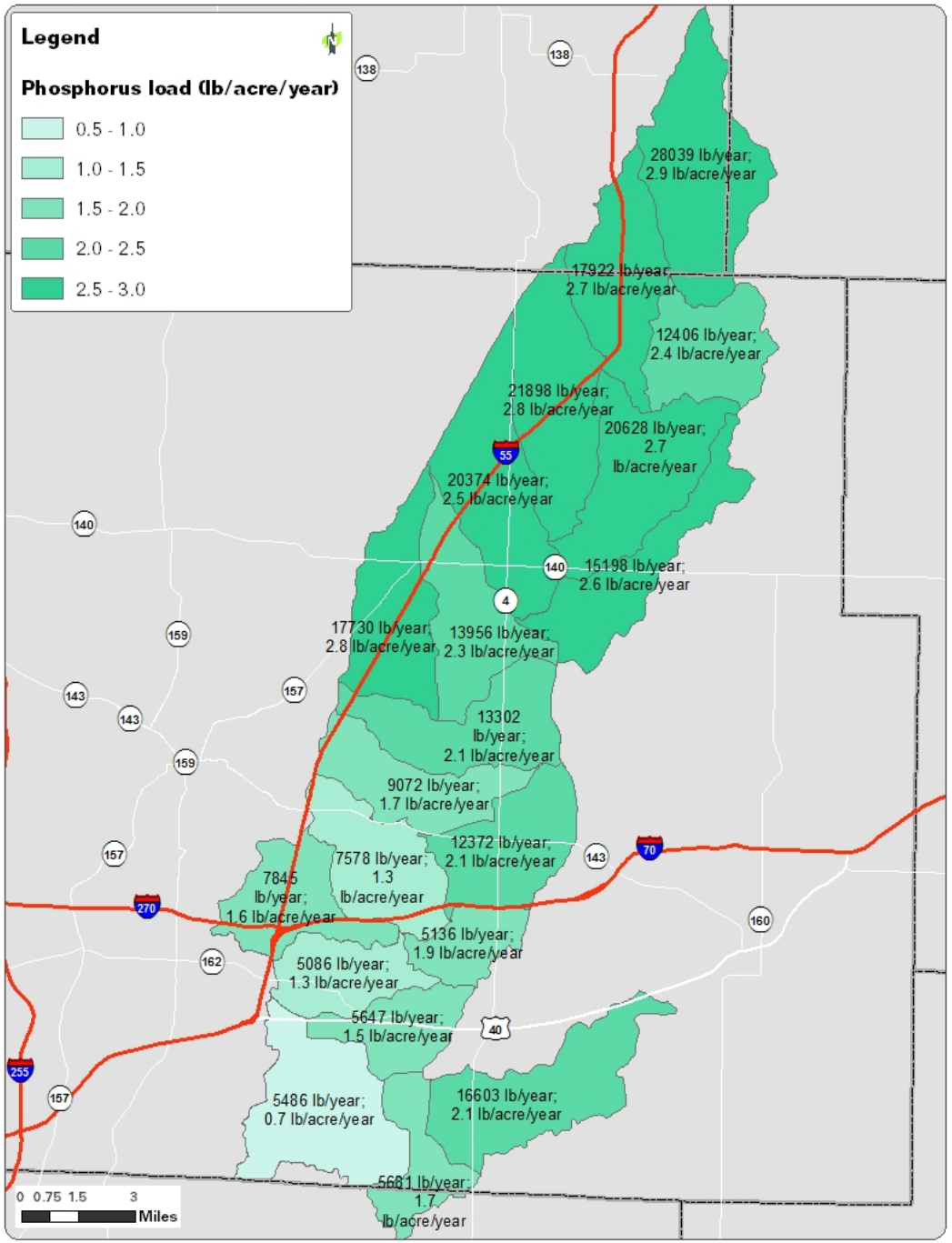
Nitrogen loads (by HUC14)

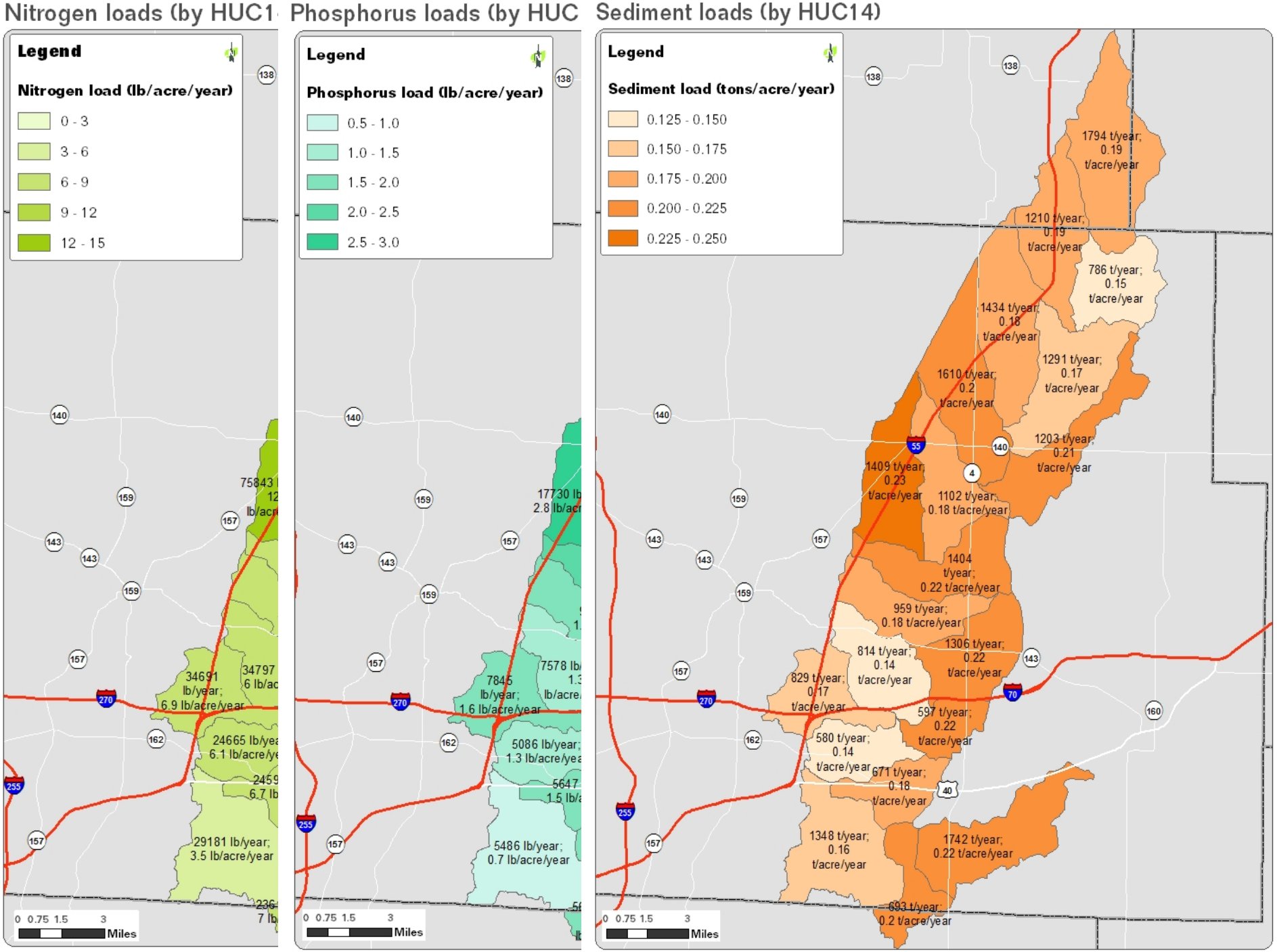


Nitrogen loads (by HUC1

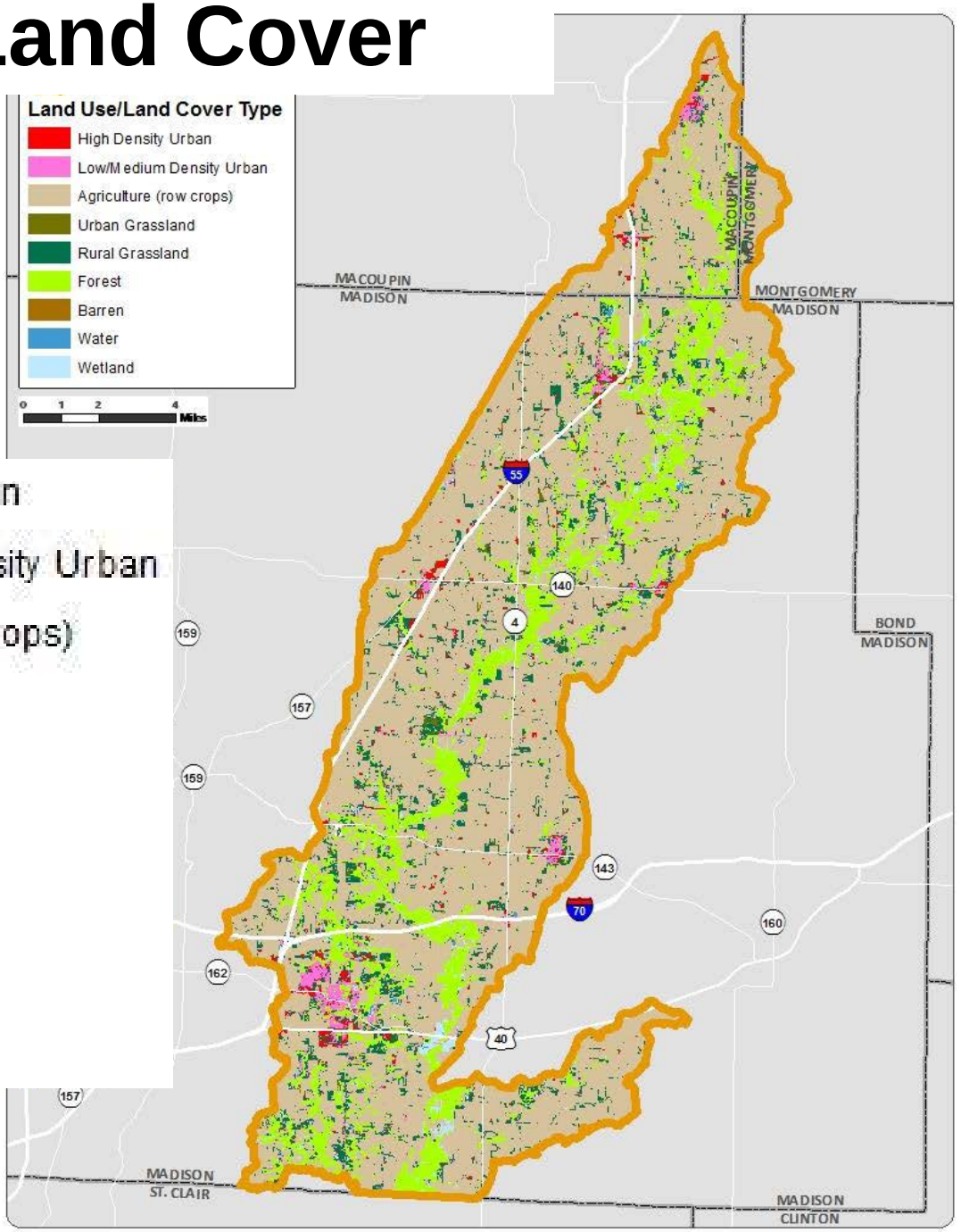


Phosphorus loads (by HUC14)




Nitrogen loads (by HUC1
Legend
Nitrogen load (lb/acre/year)
0 - 3
3 - 6
6 - 9
9 - 12
12 - 15
34691 lb/year; 6.9 lb/acre/year
24665 lb/yea 6.1 lb/acre/ye
29181 lb/year; 3.5 lb/acre/year
0 0.75 1.5 3 Miles
Phosphorus loads (by HUC
Legend
Phosphorus load (lb/acre/year)
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
7845 lb/year; 1.6 lb/acre/year
5086 lb/year; 1.3 lb/acre/ye
5486 lb/year; 0.7 lb/acre/year
0 0.75 1.5 3 Miles
Sediment loads (by HUC14)
Legend
Sediment load (tons/acre/year)
0.125 - 0.150
0.150 - 0.175
0.175 - 0.200
0.200 - 0.225
0.225 - 0.250
1794 t/year; 0.19 t/acre/year
1210 t/year; 0.19 t/acre/year
786 t/year; 0.15 t/acre/year
1434 t/year; 0.18 t/acre/year
1610 t/year; 0.2 t/acre/year
1291 t/year; 0.17 t/acre/year
1203 t/year; 0.21 t/acre/year
1409 t/year; 0.23 t/acre/year
1102 t/year; 0.18 t/acre/year
1404 t/year; 0.22 t/acre/year
959 t/year; 0.18 t/acre/year
814 t/year; 0.14 t/acre/year
1306 t/year; 0.22 t/acre/year
829 t/year; 0.17 t/acre/year
597 t/year; 0.22 t/acre/year
580 t/year; 0.14 t/acre/year
671 t/year; 0.18 t/acre/year
1348 t/year; 0.16 t/acre/year
1742 t/year; 0.22 t/acre/year
693 t/year; 0.2 t/acre/year
0 0.75 1.5 3 Miles

Land Use/Land Cover



High Density Urban

Low/Medium Density Urban

Agriculture (row crops)

Urban Grassland

Rural Grassland

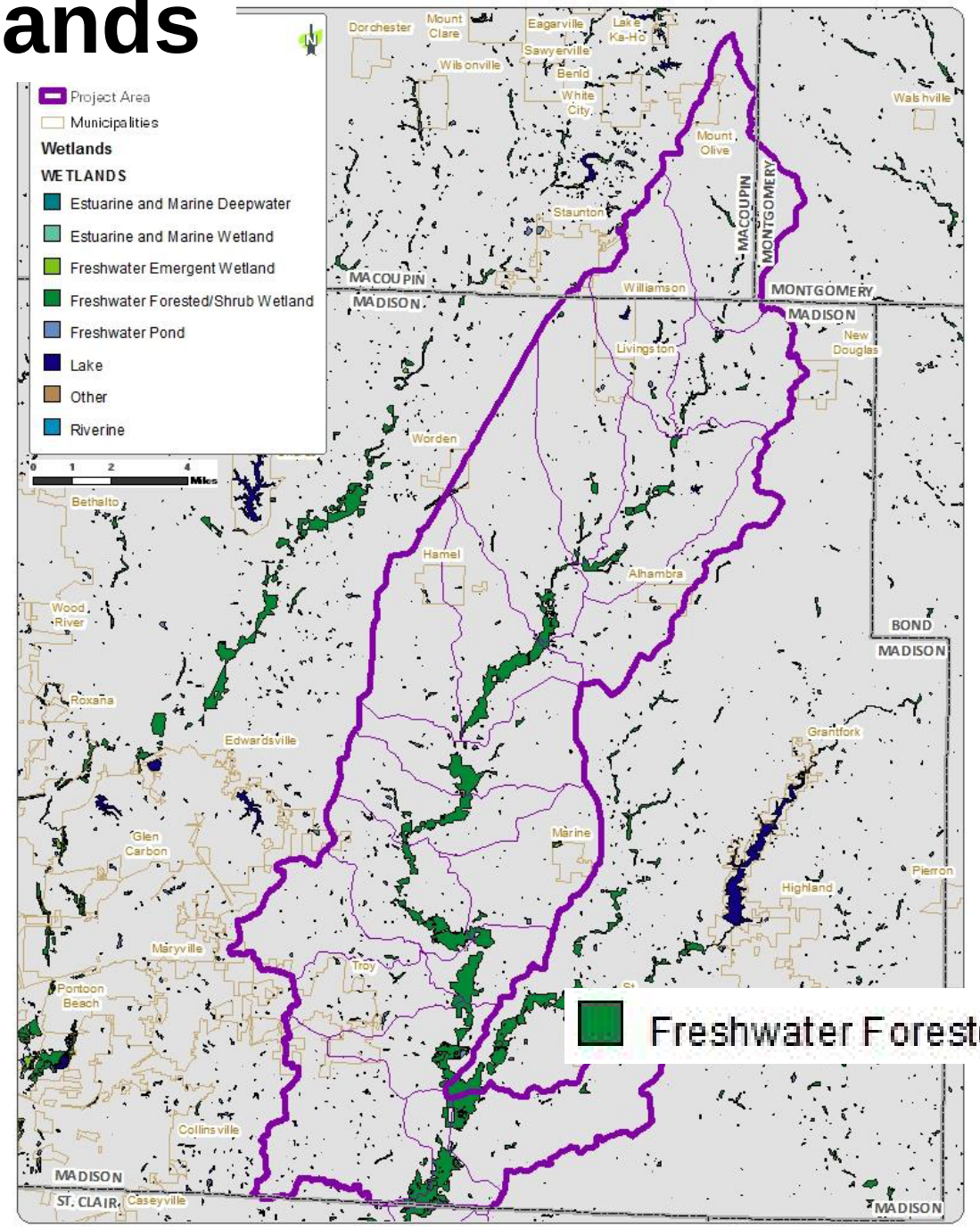
Forest

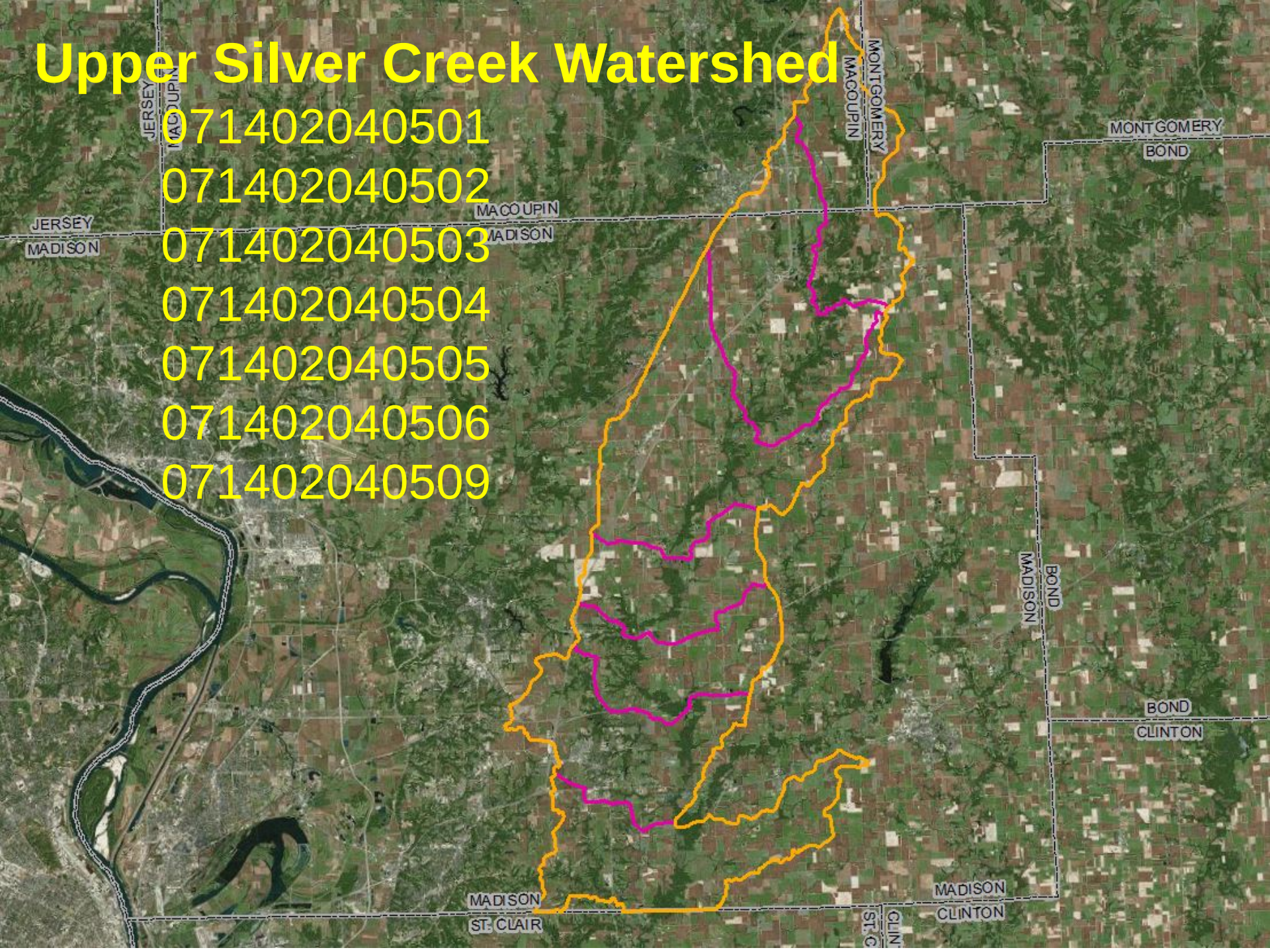
Barren

Water

Wetland

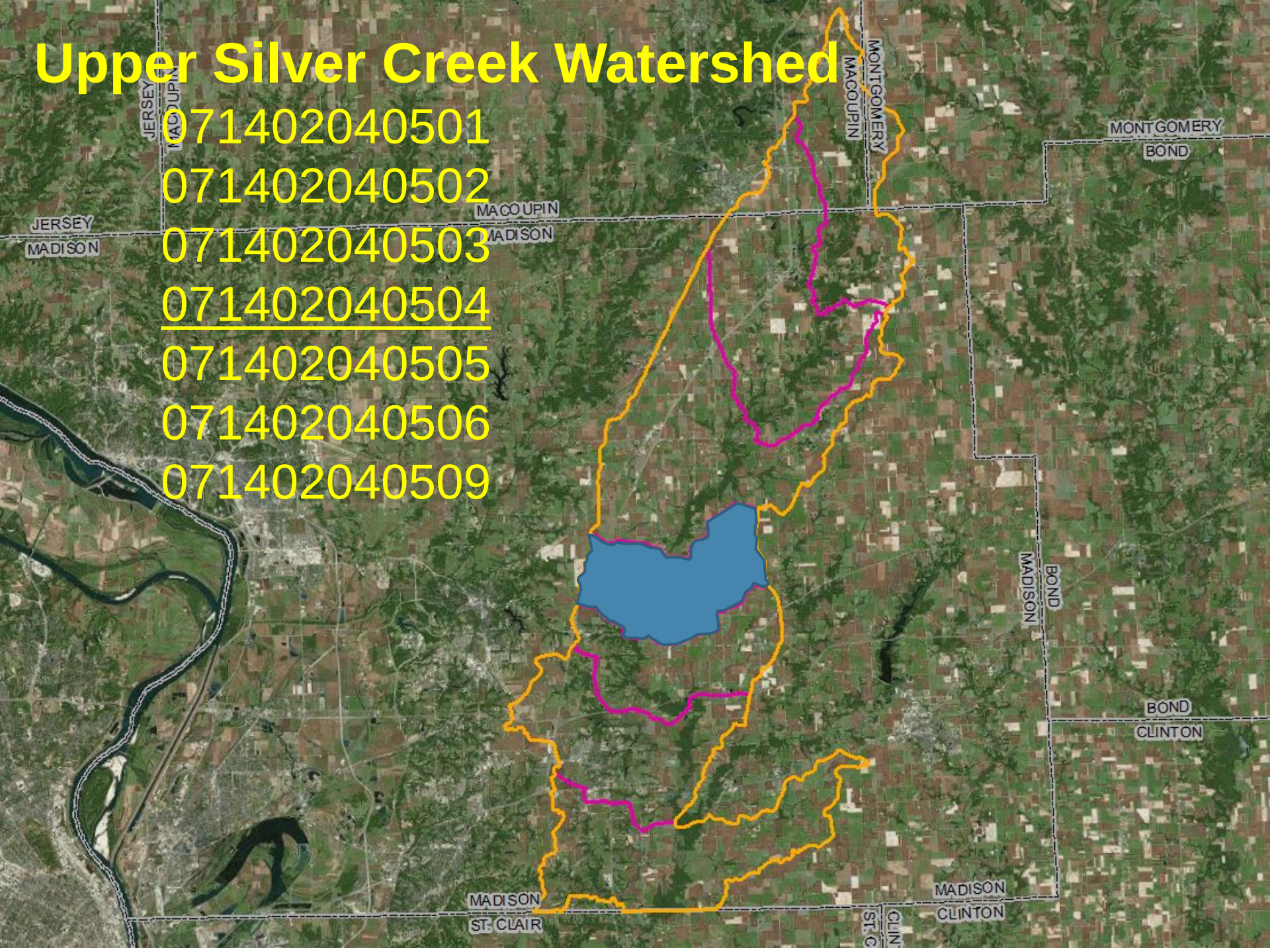
Wetlands


Project Area
Municipalities
Wetlands
WETLANDS
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
0 1 2 4 Miles
Dorchester
Mount Clare
Eagarville
Lake Ka-Ho
Sawyerville
Wilsonville
Benld
White City
Walshville
Mount Olive
Staunton
MACOUPIN
MONTGOMERY
Williamson
MADISON
New Douglas
Livingston
Worden
Bethalto
Hamel
Alhambra
Wood River
BOND
Roxana
Edwardsville
Granfork
Glen Carbon
Marine
Pierron
Highland
Maryville
Troy
Pontoon Beach
Collinsville
ST. CLAIR
Caseyville
Freshwater Forested/Shrub Wetland


Upper Silver Creek Watershed
071402040501
071402040502
071402040503
071402040504
071402040505
071402040506
071402040509
JERSEY
MADISON
MACOUPIN
MONTGOMERY
BOND
CLINTON
ST. CLAIR

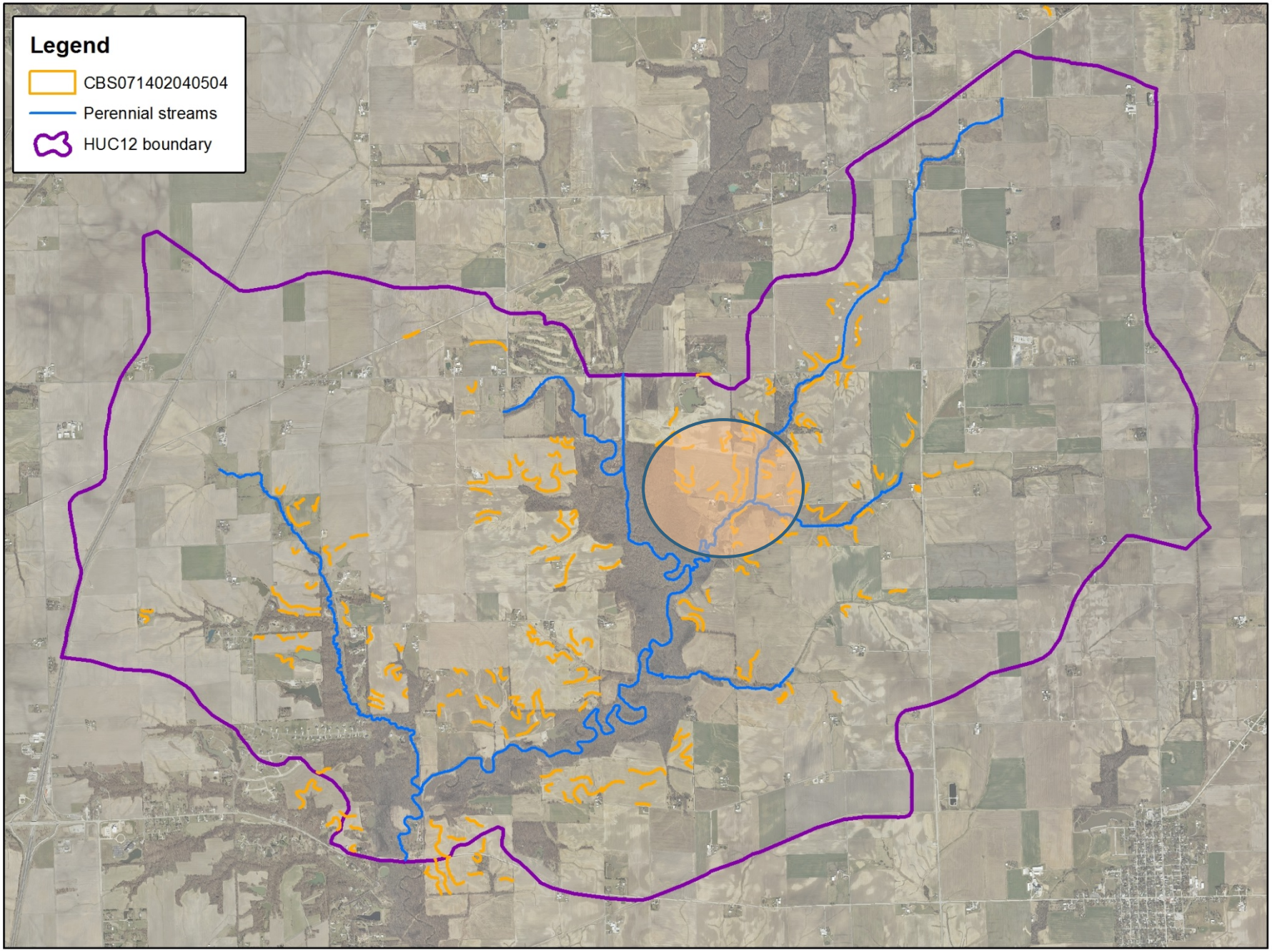
Upper Silver Creek Watershed

071402040501
071402040502
071402040503
071402040504
071402040505
071402040506
071402040509



Contour Buffer Strips - HUC071402040504

Length of buffer strips: 73.2 km

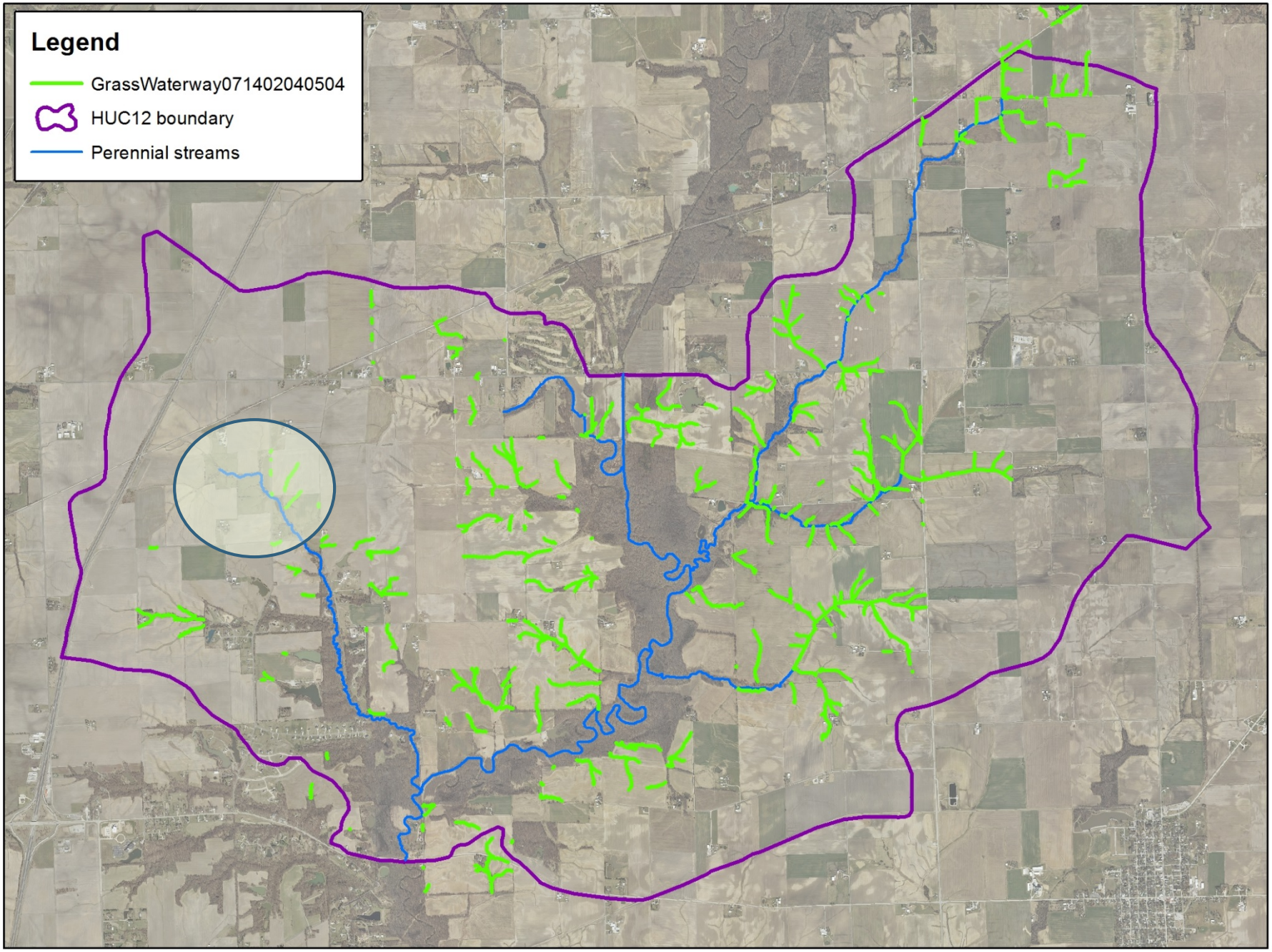


Contour Buffer Strips example - HUC071402040504

Length of buffer strips: 73.2 km

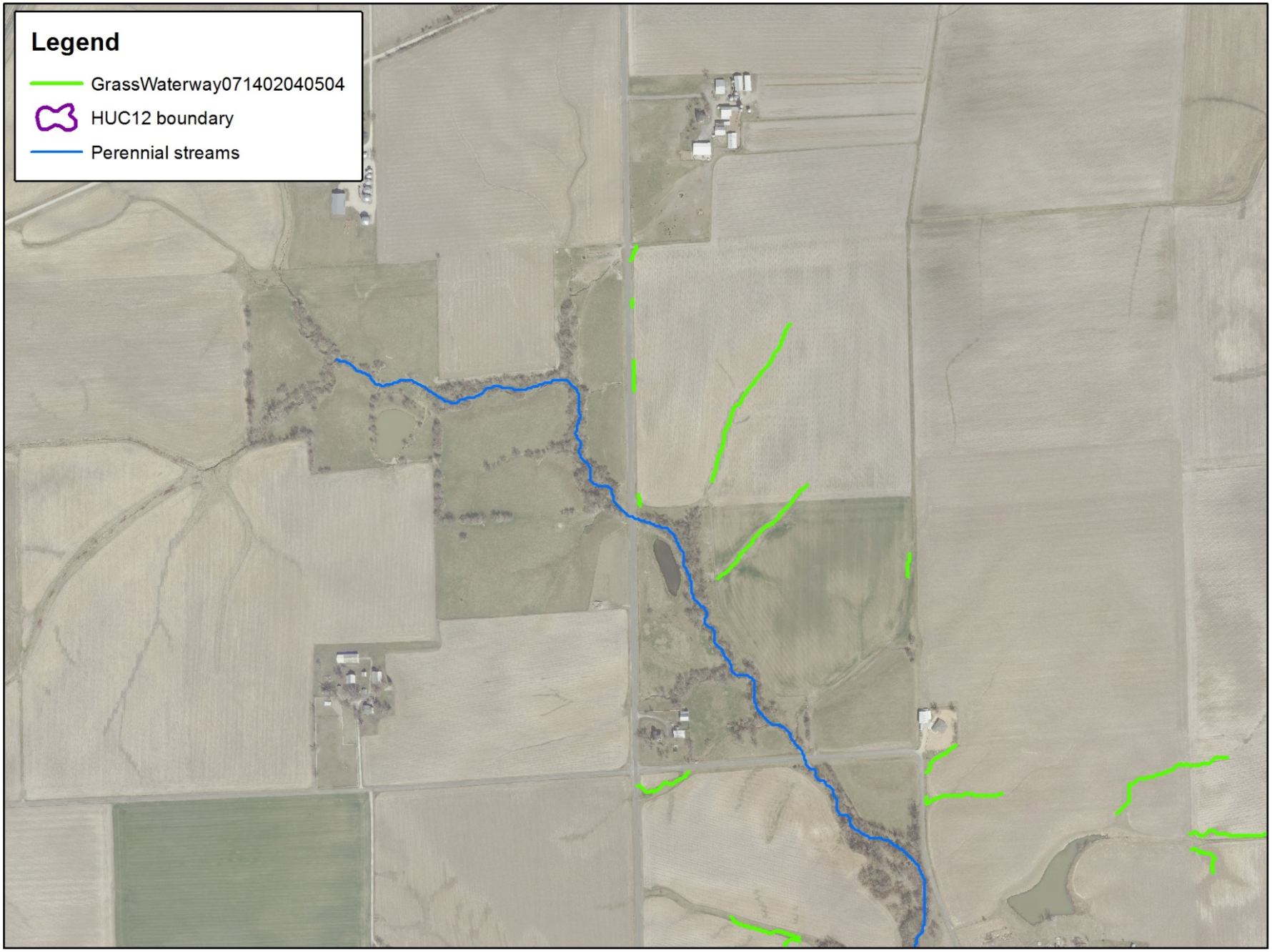
Grass waterways - HUC071402040504

Total length of grass waterways: 56.6 km



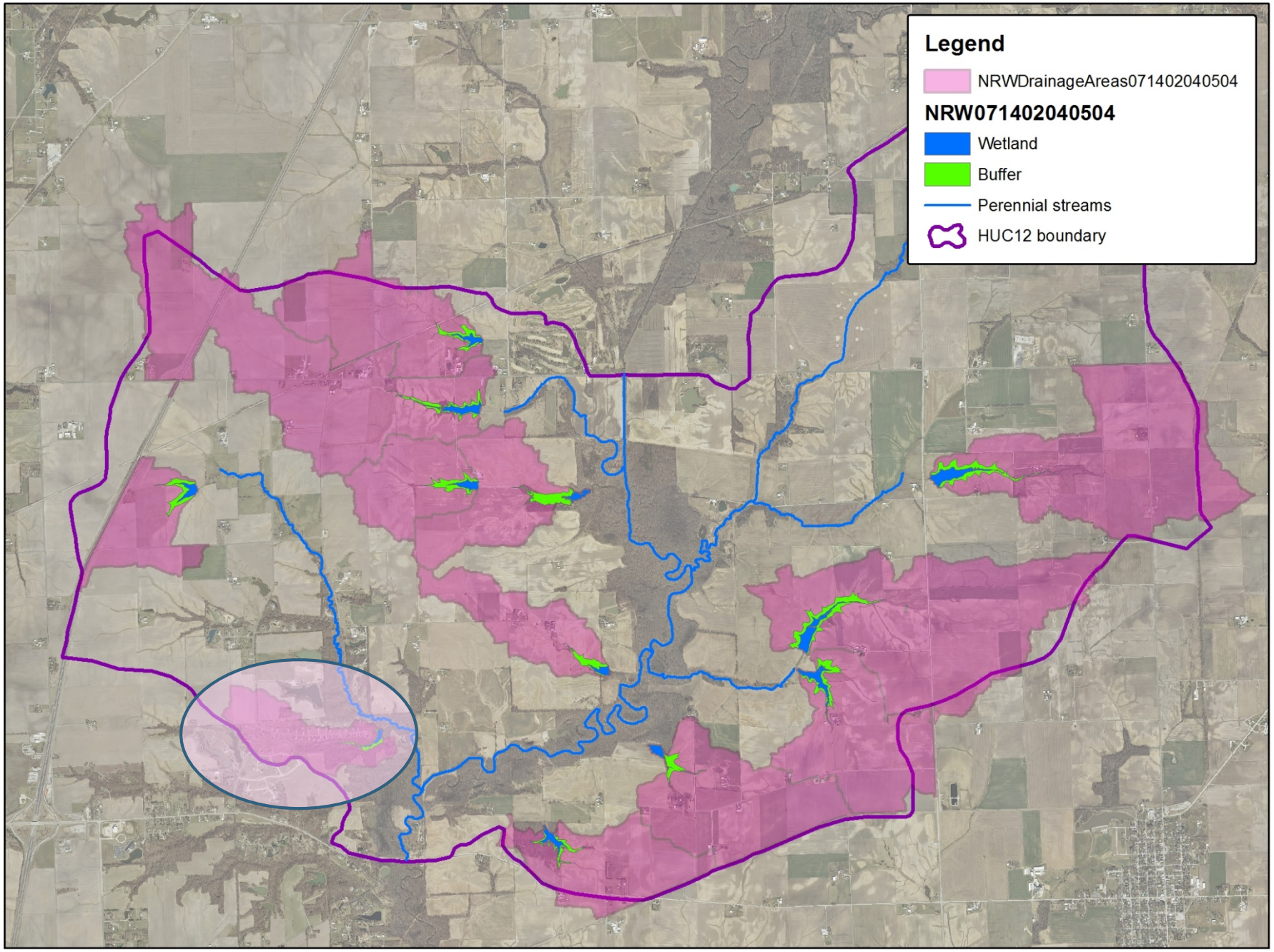
Grass waterways example - HUC071402040504

Total length of grass waterways: 56.6 km



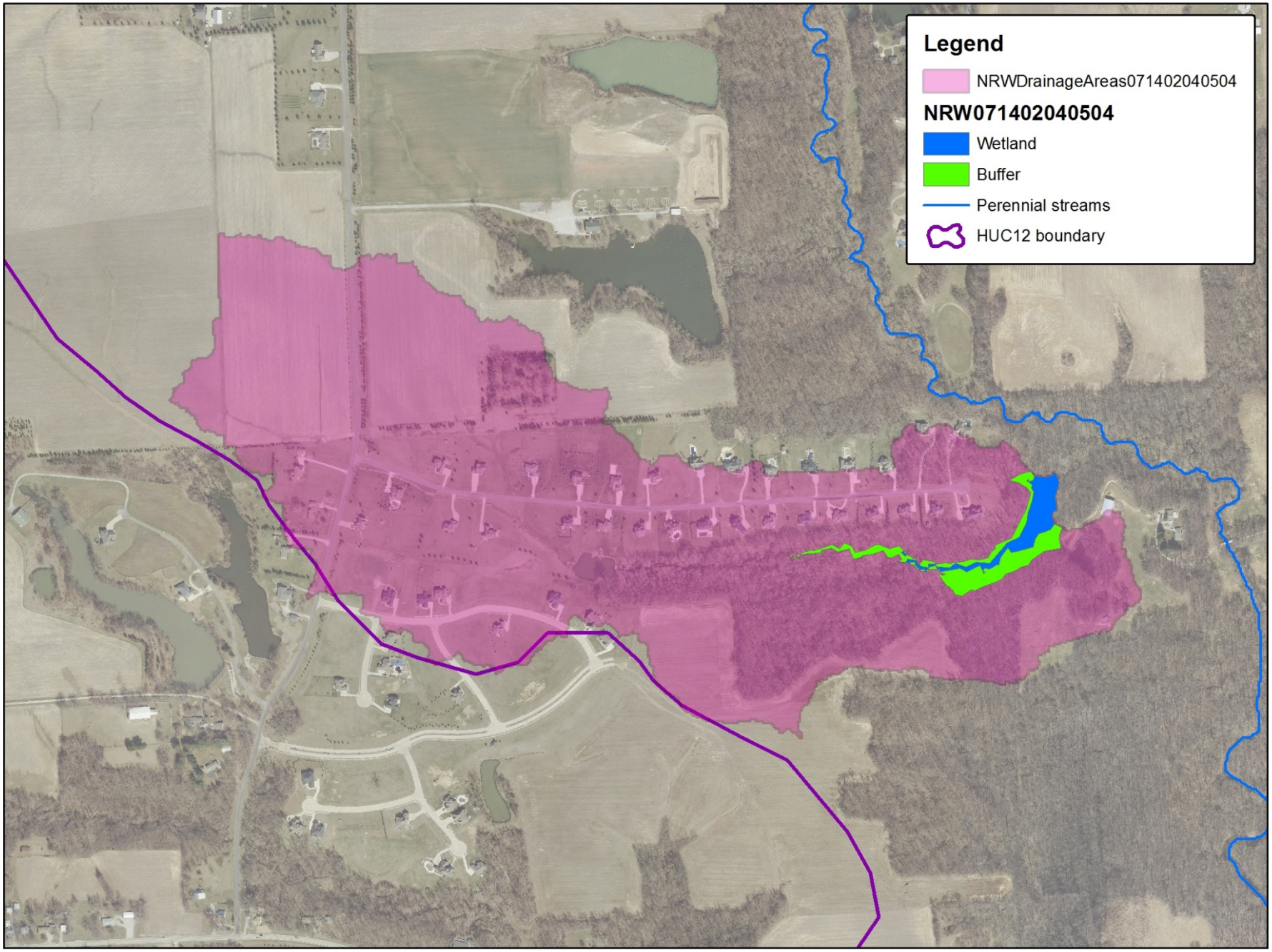
Nutrient Removal Wetlands - HUC071402040504

nutrient removal wetlands: 12

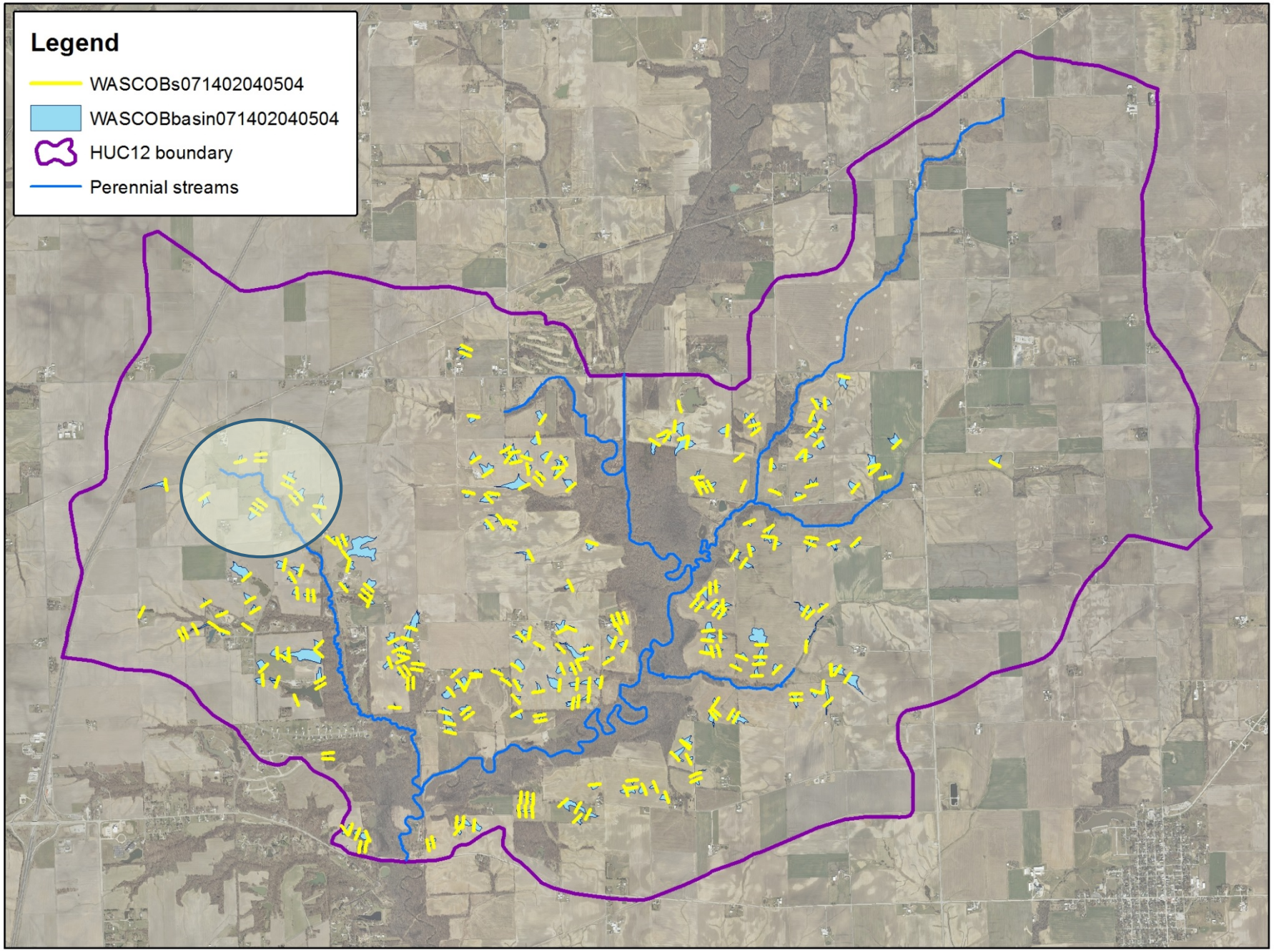


Nutrient Removal Wetlands example - HUC071402040504

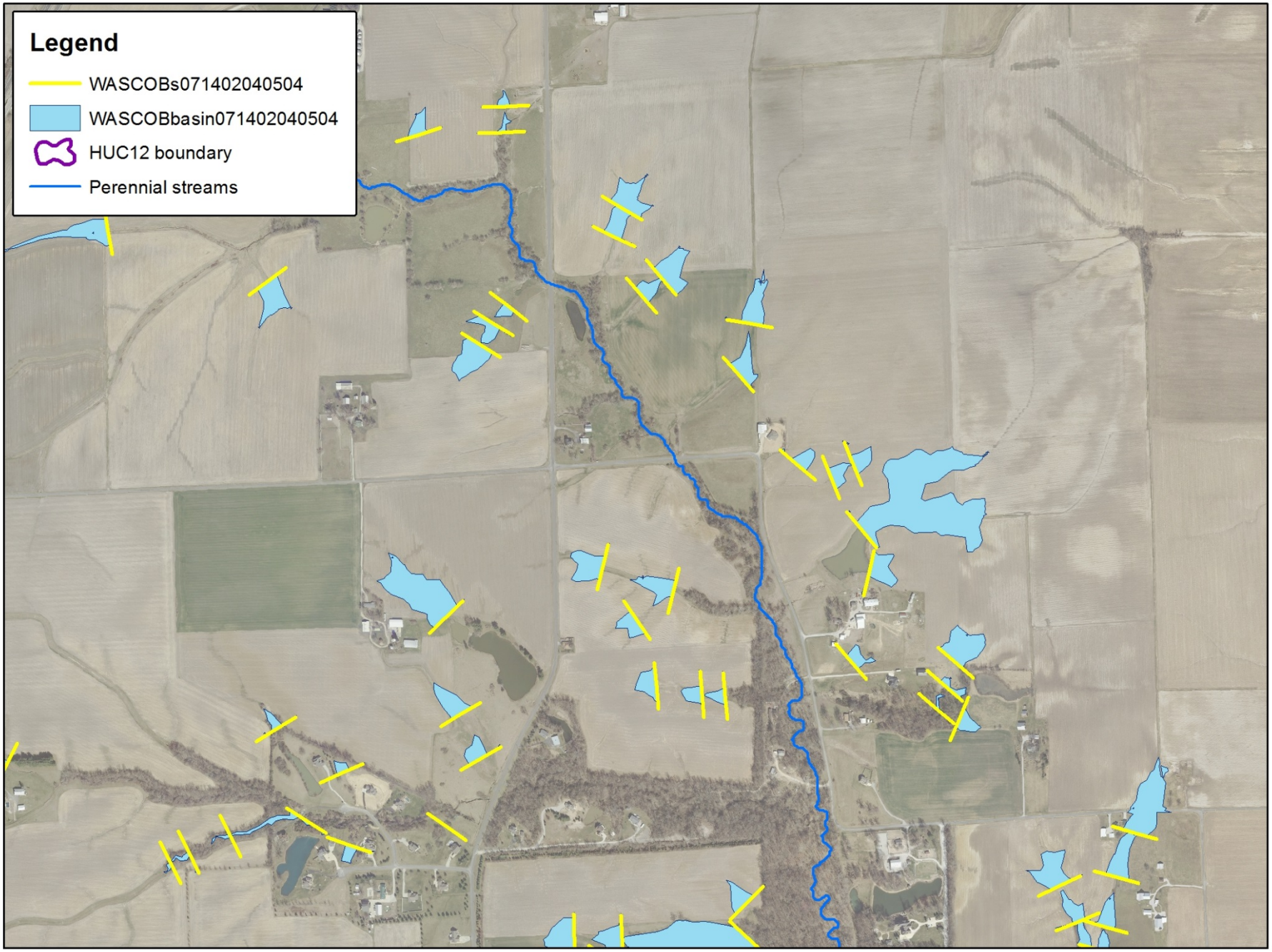
nutrient removal wetlands: 12



WASCOB basins - HUC071402040504

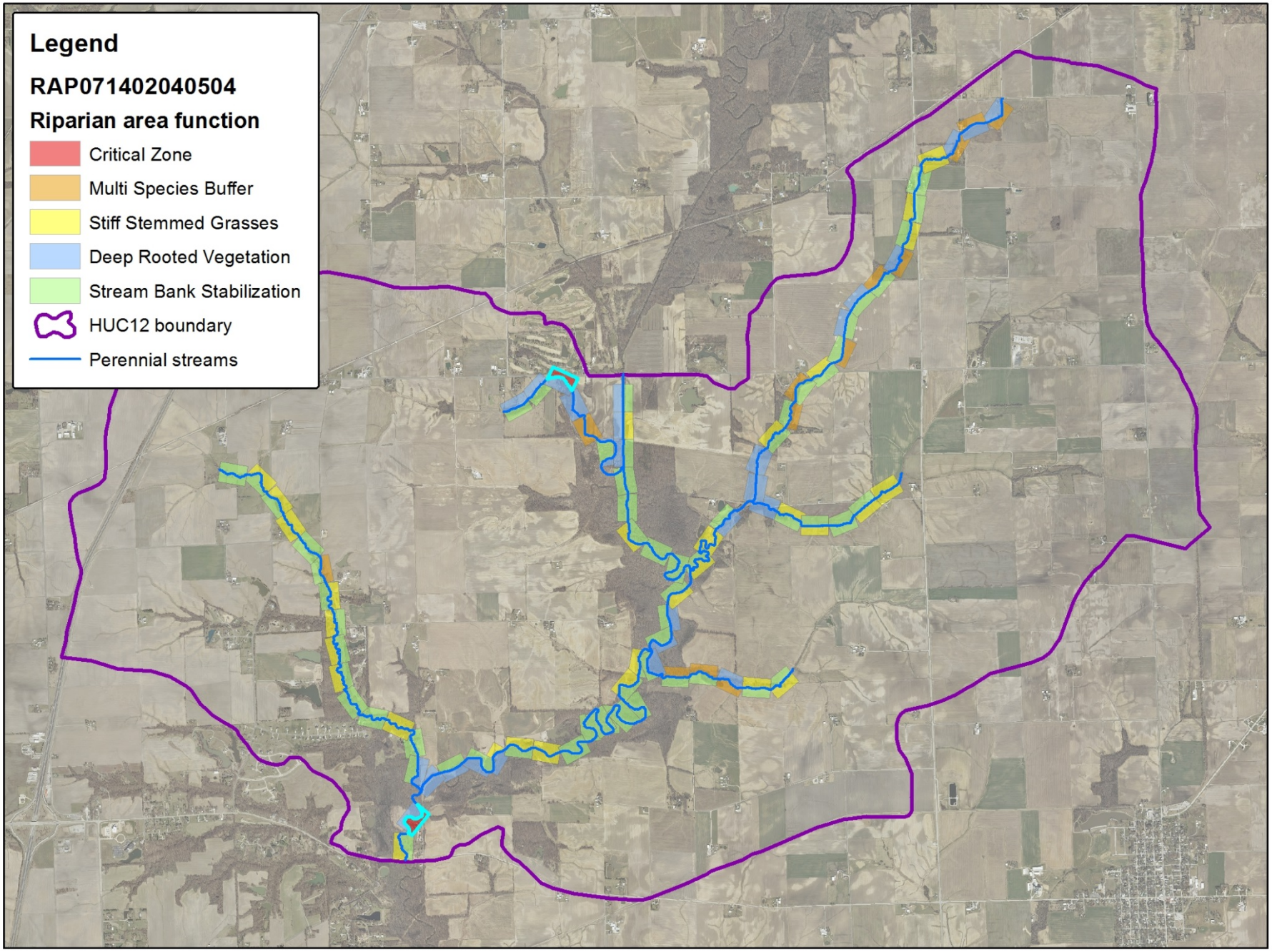


WASCOB basins example - HUC071402040504



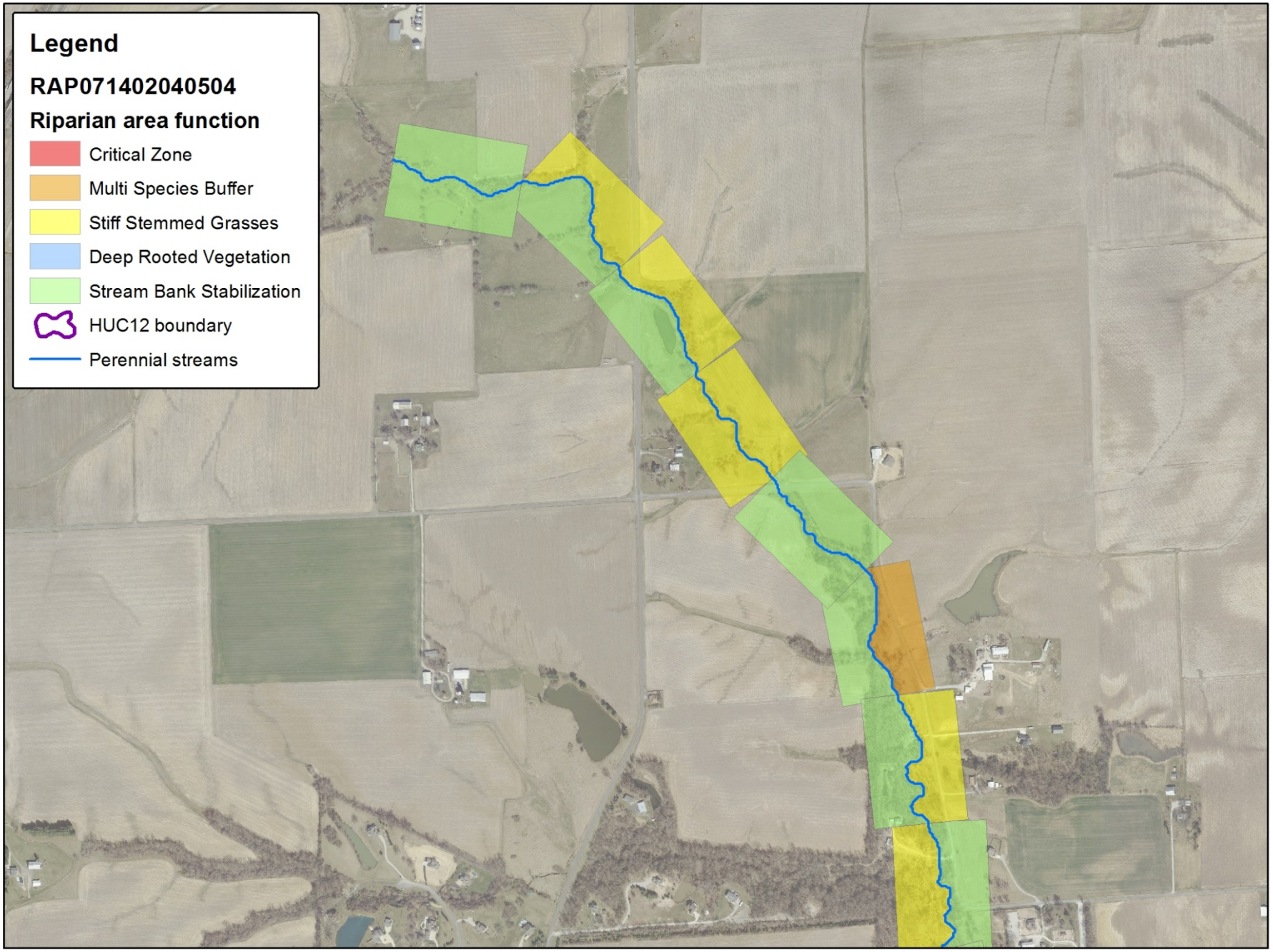
Riparian function - HUC071402040504

Avg suggested buffer width: 23 meters. # Critical Zone areas: 2.



Riparian function example - HUC071402040504

Avg suggested buffer width: 23 meters. # Critical Zone areas: 2.



Summary of recommended conservation practices for each HUC-12.

HUC12 07140204 05_	Area (Ha)	# nutrient removal wetlands	# drainage management polygons	# contour buffer strips	Grass waterways total length (km)	# WASCOB
_01	6,027	1	220	20	91	57
_02	8,916	1	316	105	119	159
_03	10,581	0	428	253	179	157
_04	4,648	12	79	191	50	270
_05	4,713	0	75	229	73	106
_06	6,247	14	11	254	79	138
_09	7,886	1	49	520	131	404
TOTAL	**49,018**	**29**	**1178**	**1572**	**723**	**1291**

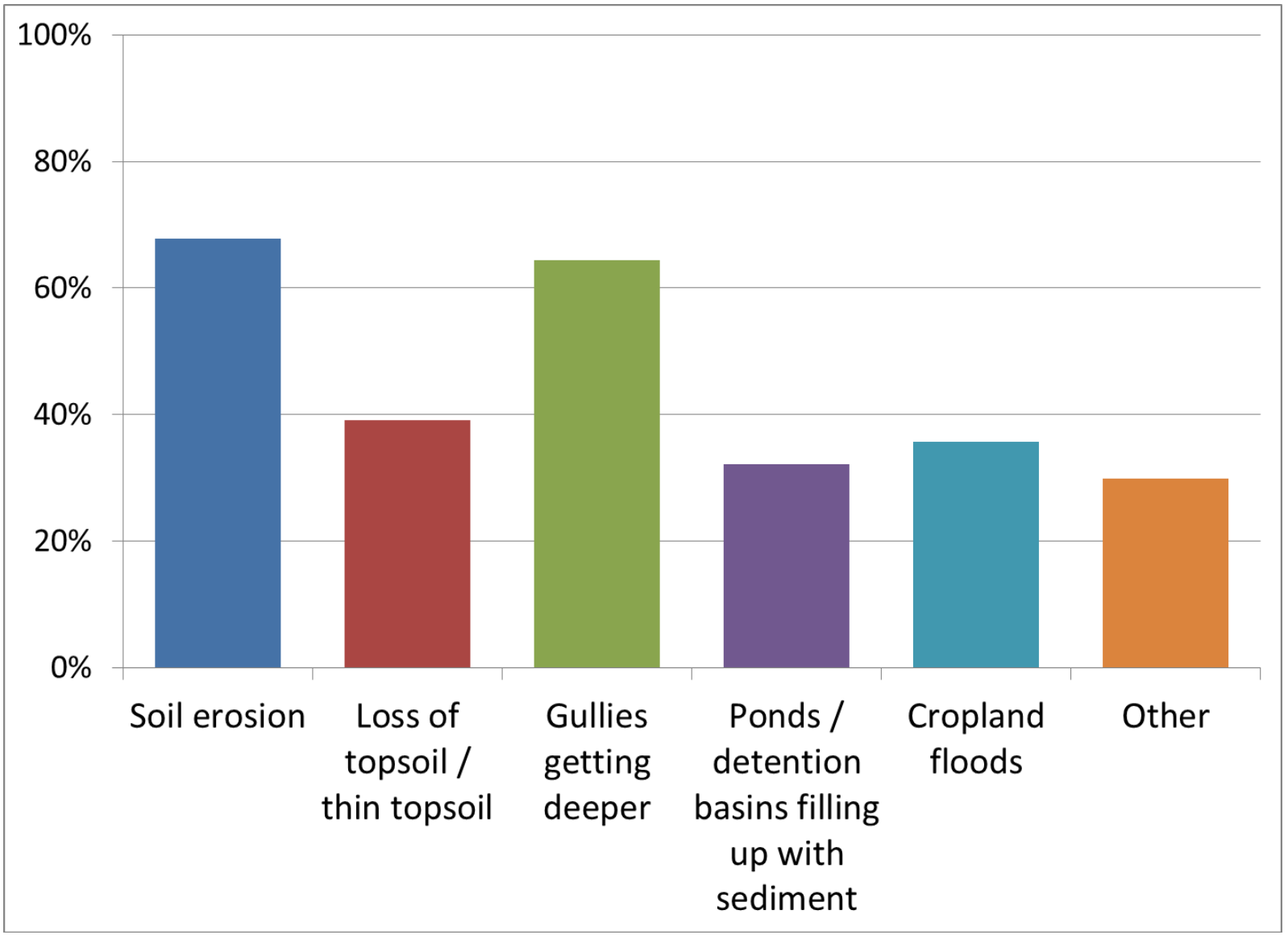
Summary of recommended Riparian Area conservation practices for each HUC-12.

HUC12 07140204 05_	Area (Ha)	# Critical Zone segments (CZ)	# Multi Species Buffer (MSB)	# Stiff Stemmed Grasses (SSG)	# Deep Rooted Vegetation (DRV)	# Stream Bank Stabilization (SBS)
_01	6,027	22	22	56	229	207
_02	8,916	25	24	80	435	378
_03	10,581	51	44	97	464	394
_04	4,648	2	14	36	33	77
_05	4,713	26	16	35	215	182
_06	6,247	12	13	33	195	155
_09	7,886	25	23	66	311	285
TOTAL	**49,018**	**163**	**156**	**403**	**1882**	**1678**

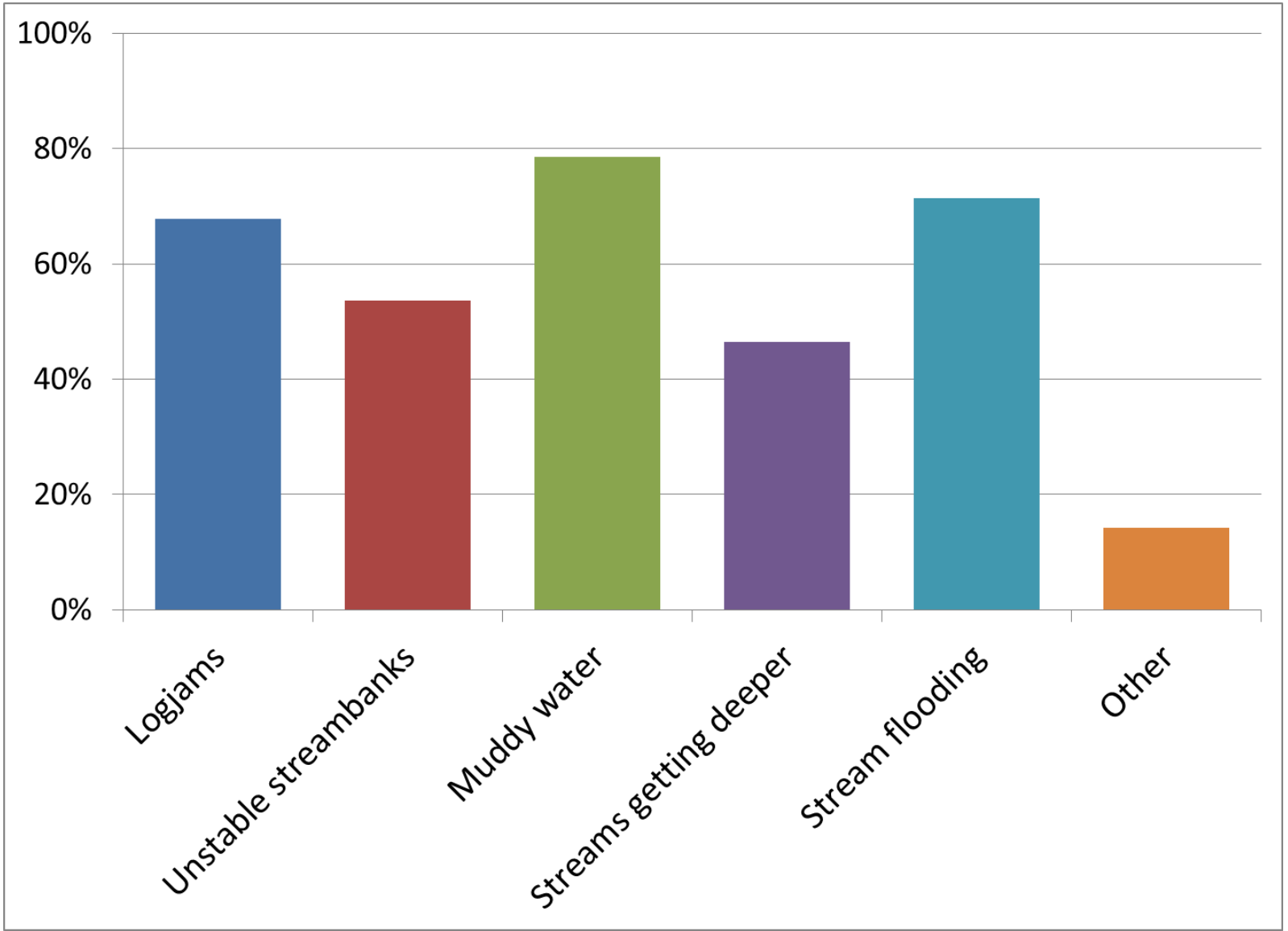
Landowner/Farmer Survey

- Determine landowners' knowledge of conservation programs and/or their interest in pursuing conservation practices.
- 10 questions
- Mailed to almost 1,000 addresses of owners of parcels >5 acres
- 105 Responses

Which of these issues have you noticed on your land / cropland?

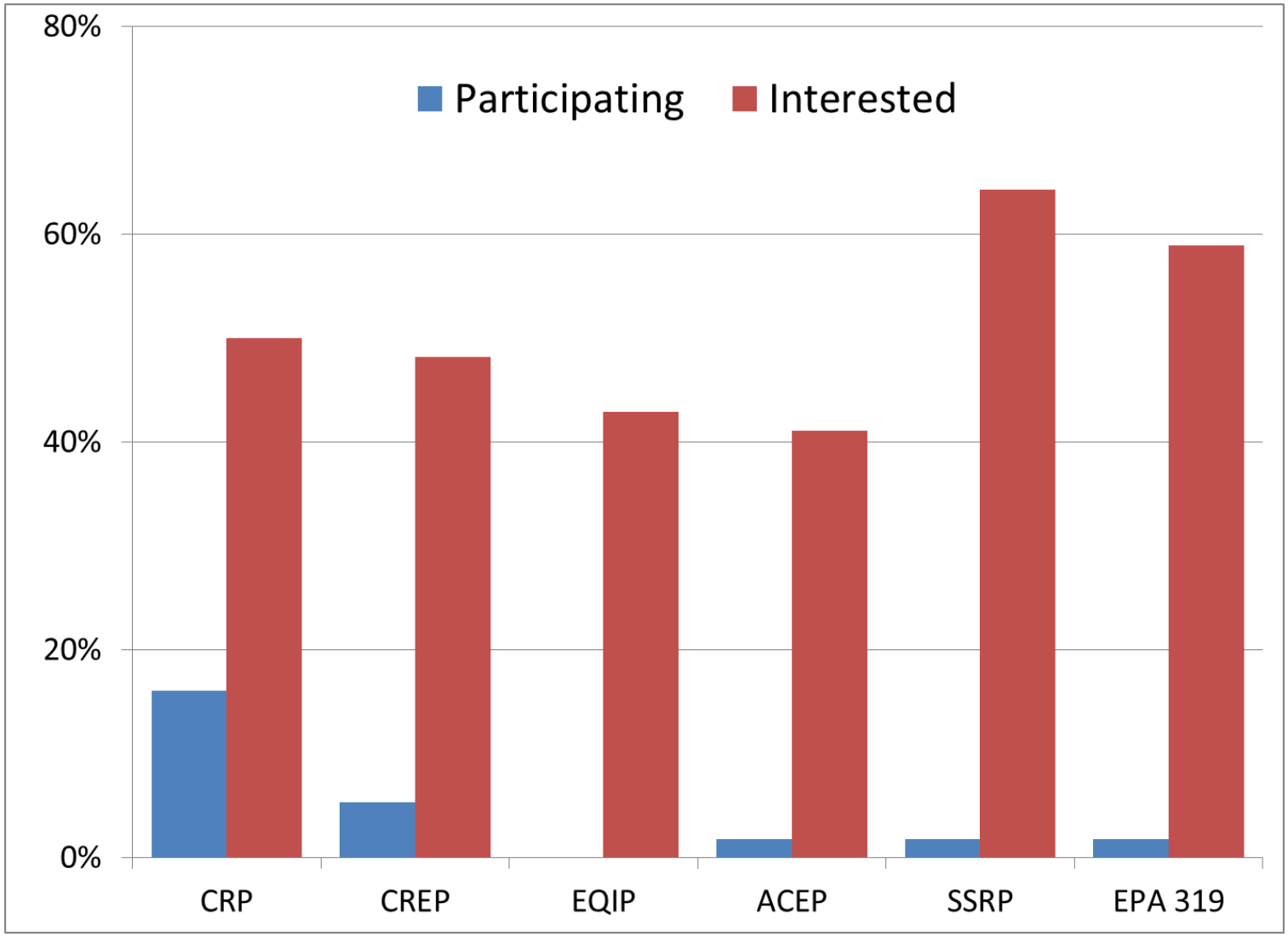


Which of these issues have you noticed in the creeks and streams on or adjacent to your land?

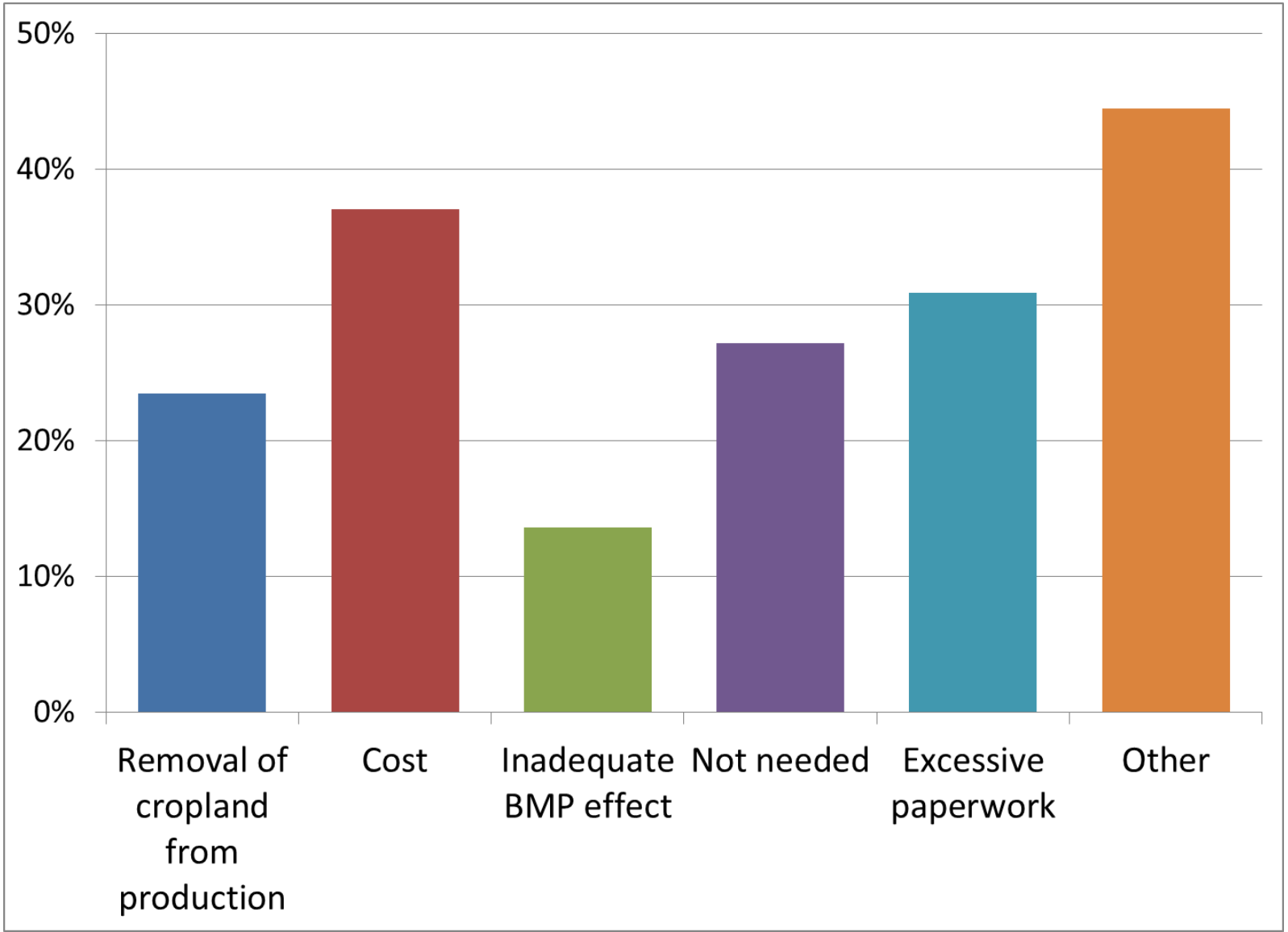


Which of the following programs are you participating in?

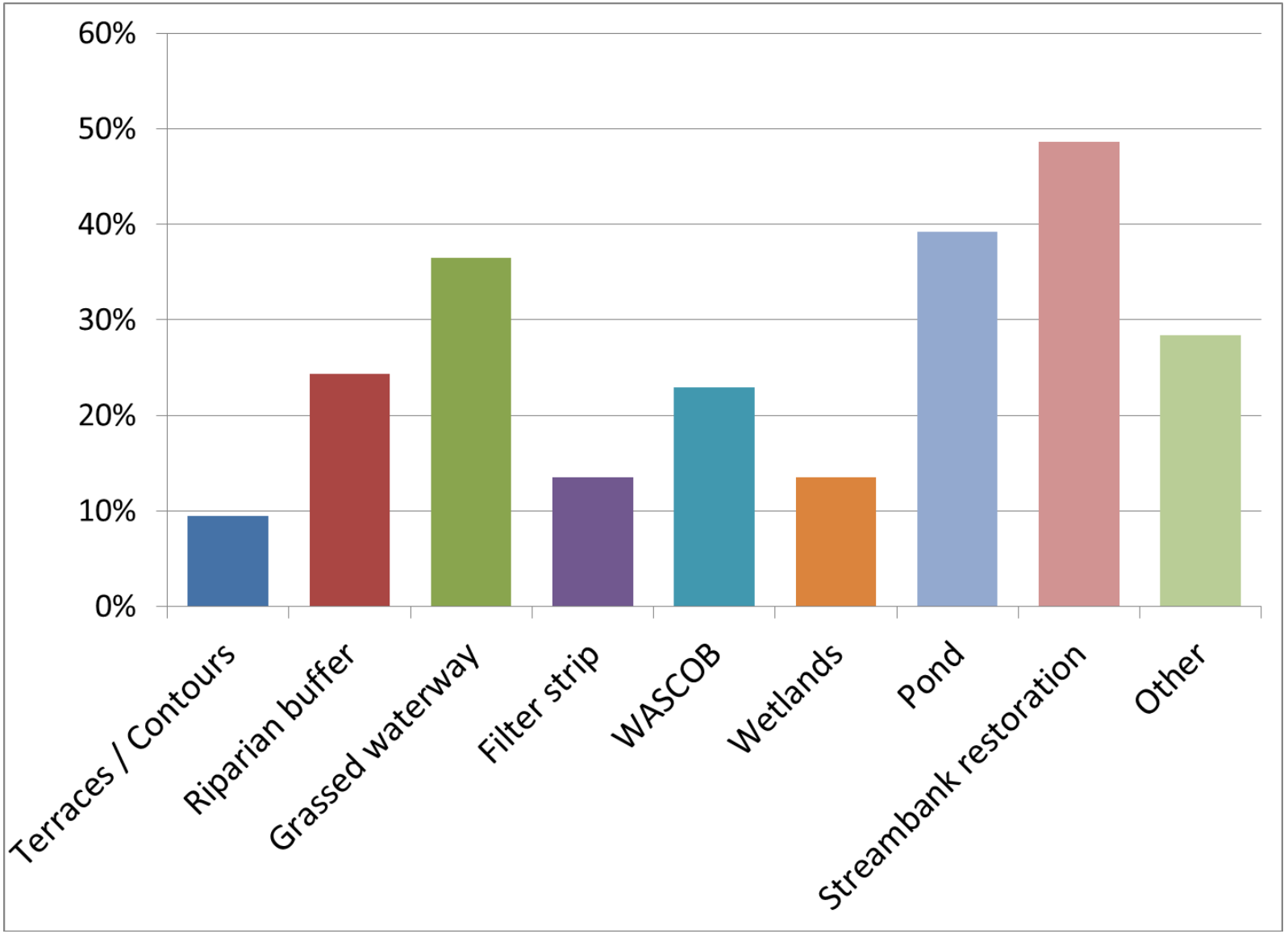
Which program(s) might you be interested in participating in?



If you are aware of any or all of the programs above, what concerns prevented you from applying / participating?



What type(s) of projects might you be interested in implementing on your land?



Summary

- The ACPF provided guidance on where to focus conservation practices.
- Landowner/Farmer Survey and stakeholder engagement educated and created leads.

Next Steps

- Watershed Plan approved by IEPA, Nov 2015
- County making changes; will adopt in 2016
- Implementation thru 319 grant etc.
- Continued outreach

Thank You!

Questions?

Contact: Janet Buchanan at janet.buchanan@heartlandsconservancy.org or John Sloan at jjsloan@lc.edu

Visit: www.heartlandsconservancy.org/uppersilvercreek

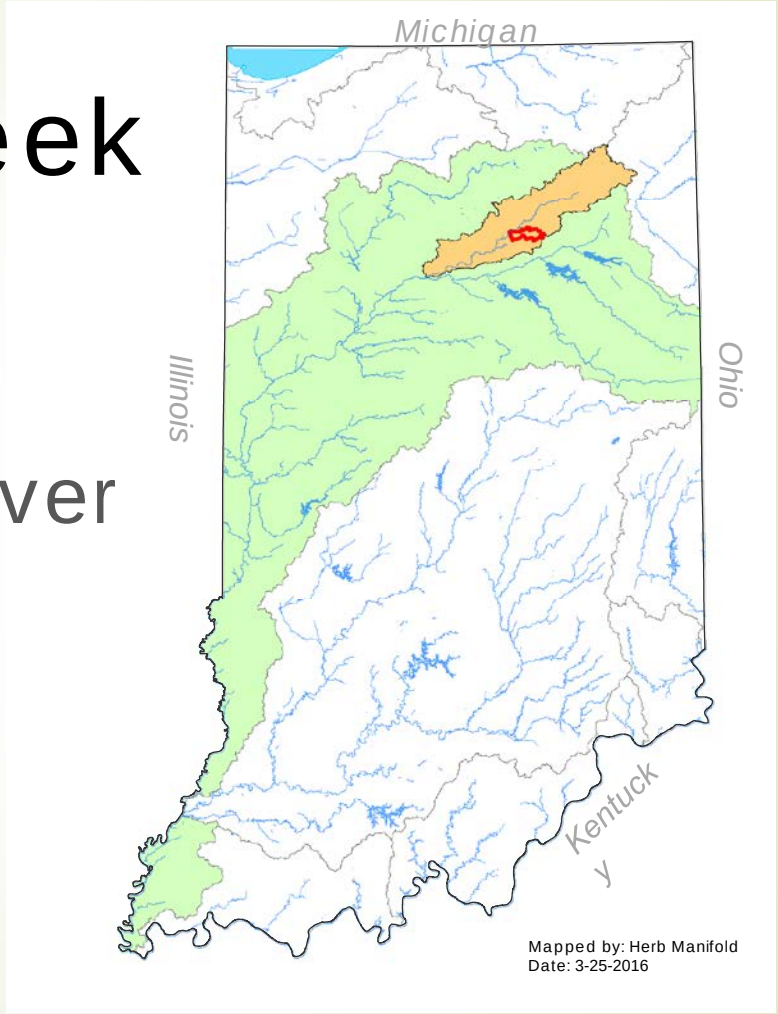
Agricultural Conservation Planning Framework in the Beargrass Creek Watershed

Dr. Joe Magner-Watershed Recovery, University of Minnesota

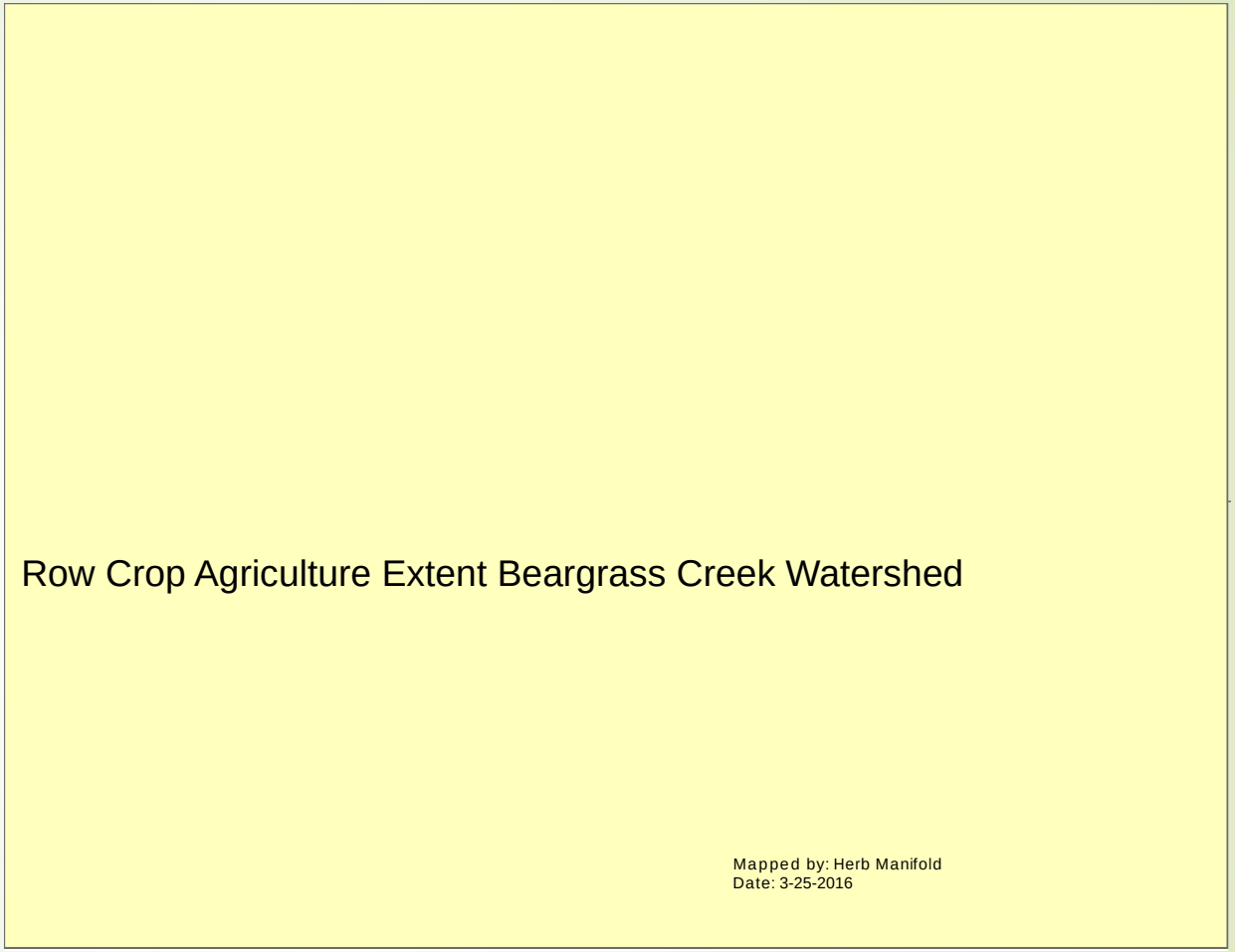
Susi Stephan-Wabash County Soil & Water Conservation District Executive Director

Beargrass Creek Watershed

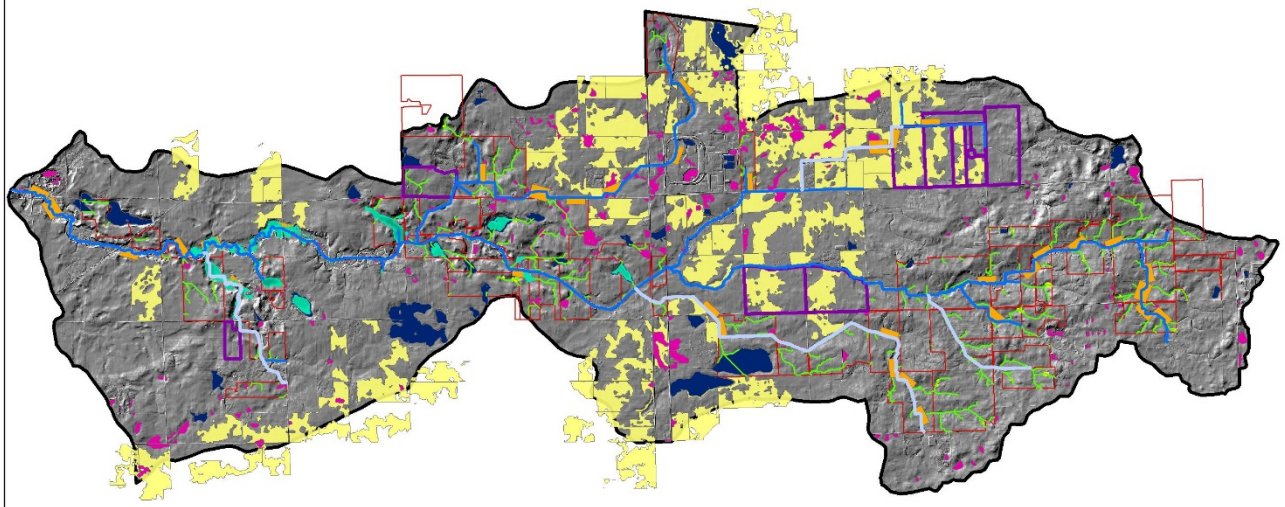
Within the Eel River Watershed
Wabash County, Indiana



- 14,000 acres
- 85 Total Operators
- 50 Primary Operators
- 32% of the watershed is managed by 4 farming operations



Practice Opportunities



In Field Practices

In Field Surface Depressions

Depressions with likely tile intakes (classified by depth)

- < 1 meter
- > 1 meter
- Drainage Management Opportunities

Runoff Control

- Grass Waterways (> 5 acres drainage)
- WASCOBS (Water and Sediment control basins)
- Fields at risk of direct surface runoff to stream

Edge of Field Practices

- Bioreactors

Riparian Practices

- 2-stage ditch possibilities

Depressions Along Stream (Divert & Treat)

Estimated Water Table Depth

- Channel
- 0 - 50 cm
- 50 - 100 cm
- 100 - 150 cm

Riparian Function

- Critical Zone / Multi Species Buffer

The Watershed **(Restaurant)** Approach

- Mark and Sarah have produced the Menu
- Joe and Susi have been taking orders
  - Some producers are ordering appetizers
  - Others are ordering meals
  - Some have been here before and have already tasted Cover Crops so are trying a new entrée such as bioreactors
- Most recently we have moved up to Chef status
- Herb Manifold, Manchester University Students and University of Minnesota Students are collecting ingredients

“Tag Team” is Working Great

- Joe-Year’s of Research and Field Work, Combined with life experiences produces great interaction with the farmers.

- Susi-Born and raised in Wabash County and through the SWCD and past experiences has a personal connection with many of the landowners.

“The fact that a number of agency staff are personally connected to the watershed, farm themselves or are from a farming family, also appears to have cemented their reputations”-Social Science Findings Report

Outreach

2 Landowner Meetings:

December 2014-50 in attendance about ½ producers and ½ agency

Introduced the Project, Importance of Manure Management, Nitrogen Cycle, PARP, Showed Maps, Trap and Treat Practices.

January 2016- 39 in attendance 21farmers-Key Producers!

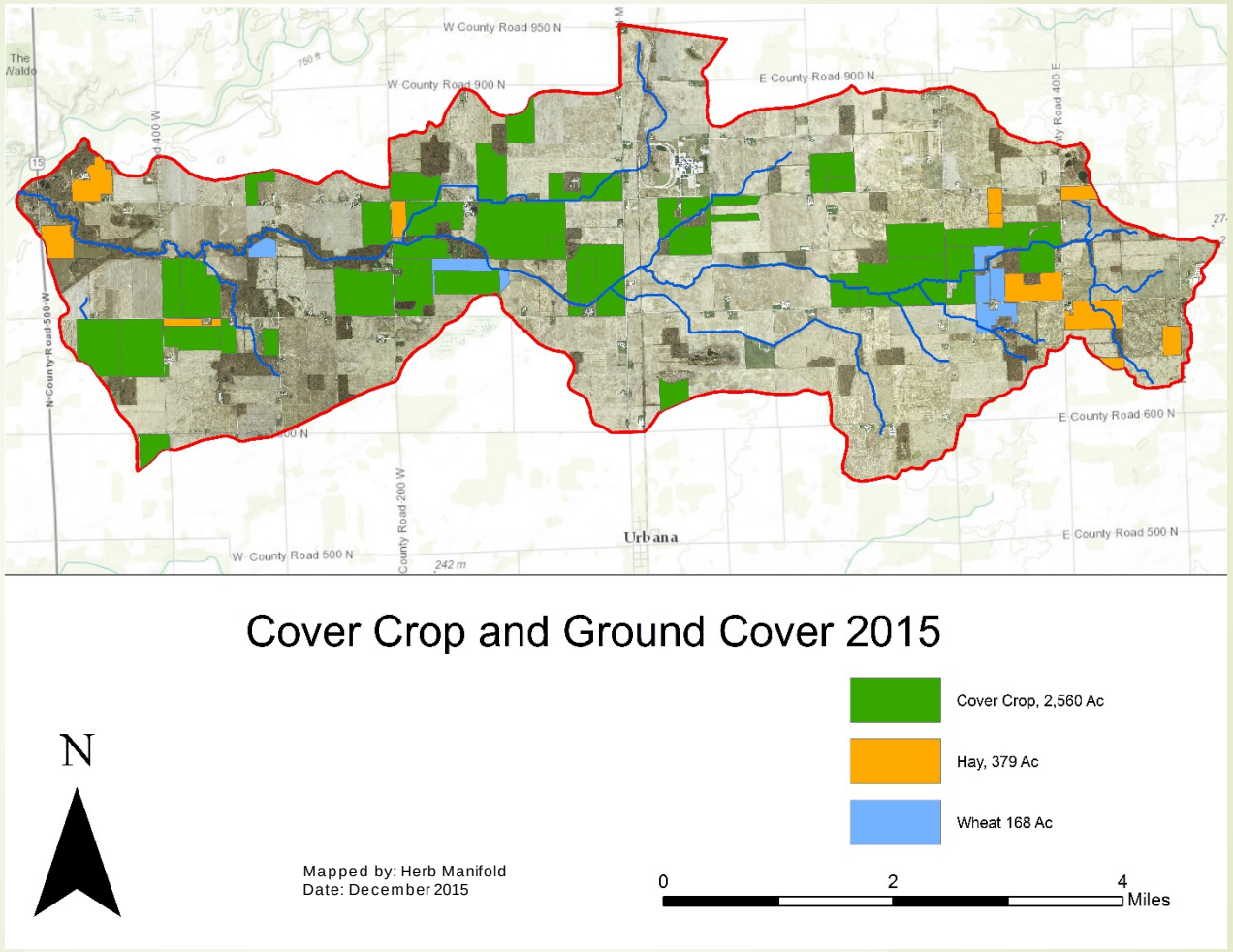
Purdue University- October 2014-13 interviews, combination of farmers with both conventional and conservation management practices.

Shop Meetings:

December 18 & 19, 2014- Met with 4 producers

March 10, 2015-Met with 8 Producers

March 15 & 16, 2016-Met with 9 producers


W County Road 950 N
W County Road 900 N
E County Road 900 N
E County Road 600 N
E County Road 500 N
W County Road 500 N
N County Road 500 W
County Road 200 W
Urbana
Cover Crop and Ground Cover 2015
N
Cover Crop, 2,560 Ac
Hay, 379 Ac
Wheat 168 Ac
Mapped by: Herb Manifold
Date: December 2015
0
2
4
Miles

Next Steps:

- Preparing Orders with field data ingredients
  - Two-Stage Ditch, Denitrifying Bioreactors, Stream Channel Modification and Utilization of Oxbows
- Presentation to the Table!

Questions?

Communication is ALWAYS key!

Contact Information:

- Dr. Joe Magner

  Watershed Recovery, University of Minnesota

  magne027@umn.edu

- Susi Stephan

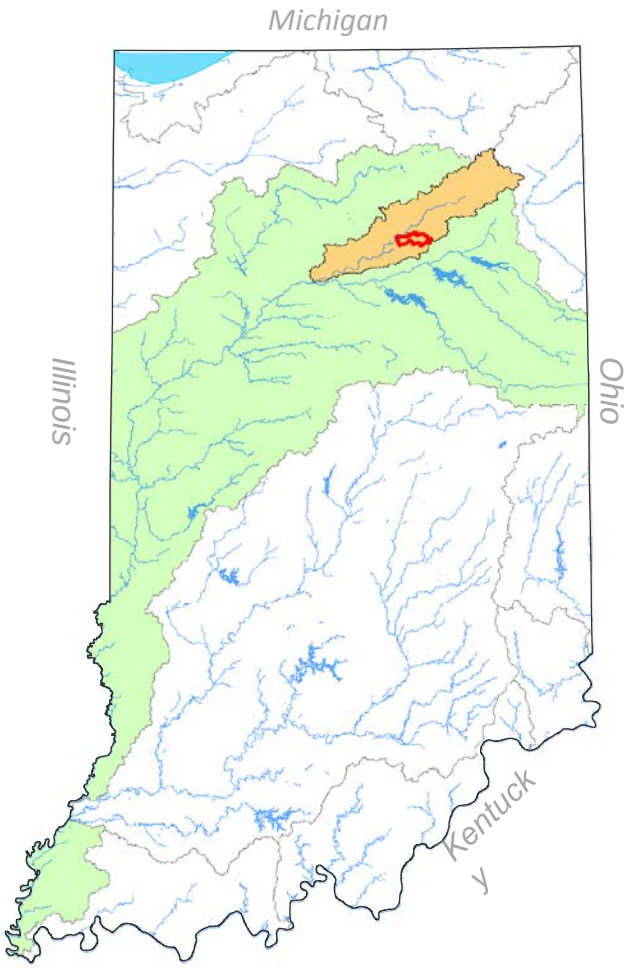
  Wabash County Soil & Water Conservation District Executive Director

  Susan.Stephan@in.nacdnet.net

Nutrient Budget of Beargrass Creek Watershed

Herb Manifold, University of Minnesota

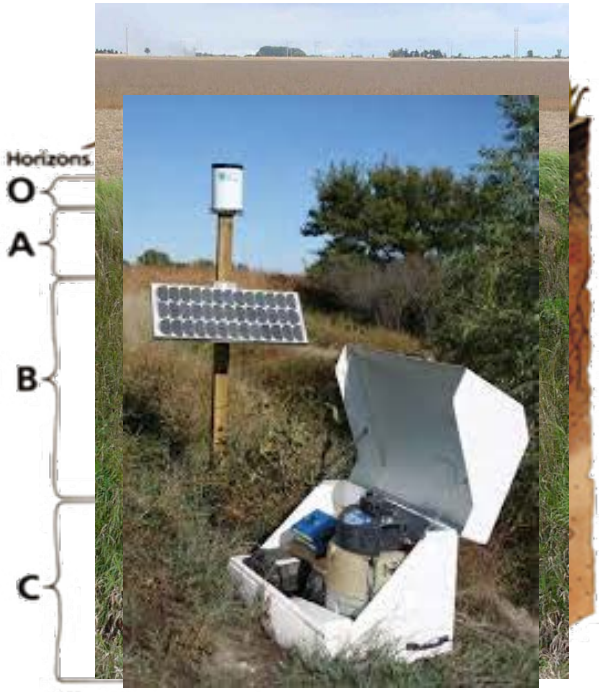
- Beargrass Creek Watershed
  - 14,000 acres
  - 85% Row Crop Agriculture
  - 13 Animal Feeding Operations



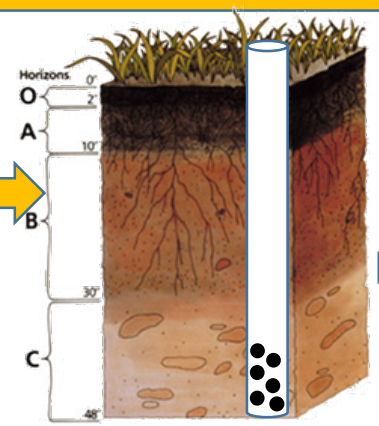
Experimental Design

- Track Nutrients from Application to Exit

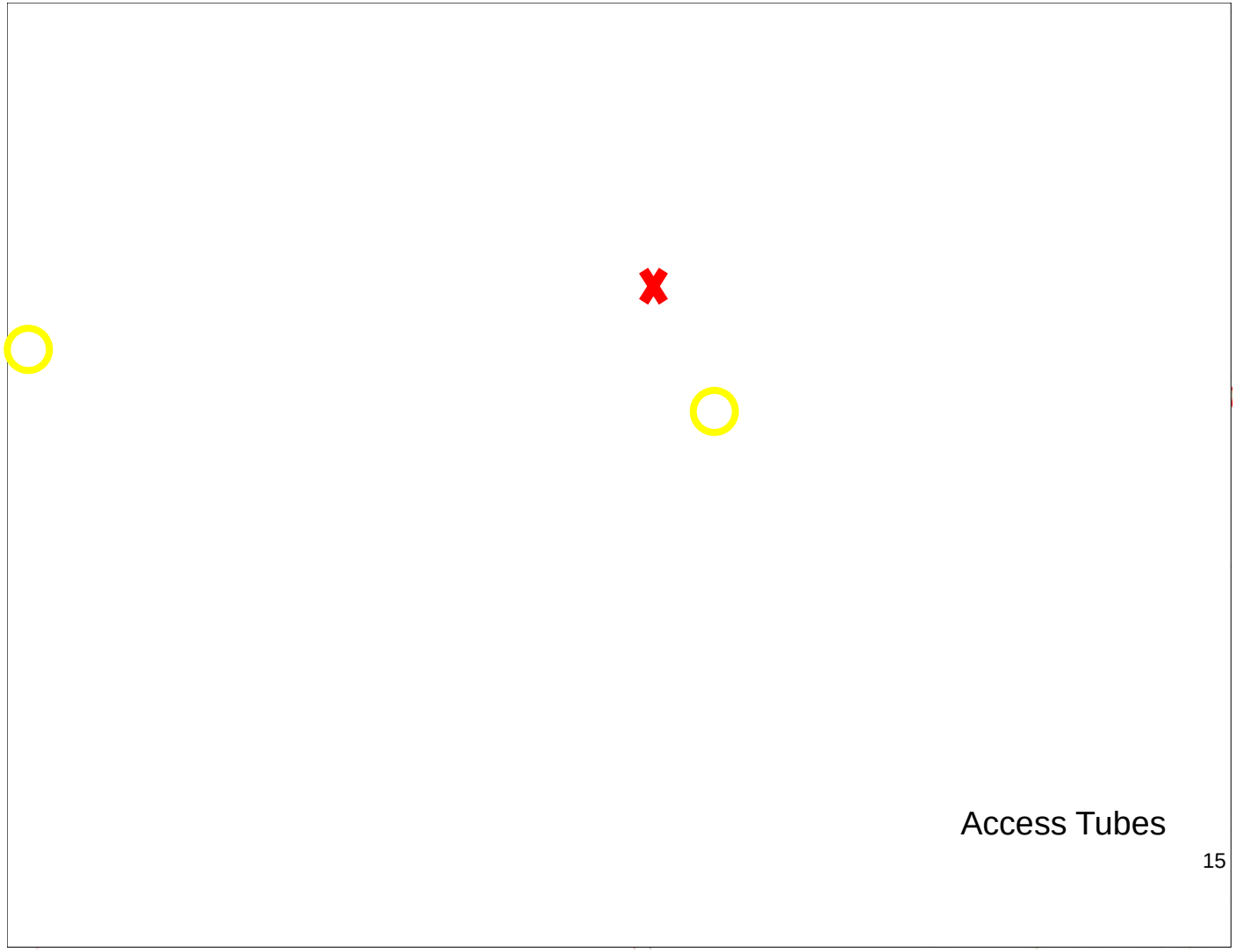
- Fertilization
  - Commercial Fertilizer
  - Amount Manure Applied
    - Nutrient Analysis of Manure
- Water Quality
  - Access Tubes, Loads
  - Field Tile, Loads
  - Stream Gage Station, Loads



(Hunter College, Michigan State University, ISCO)



(Hunter College,, ISCO, Milward 2014, Stromberg 2013)

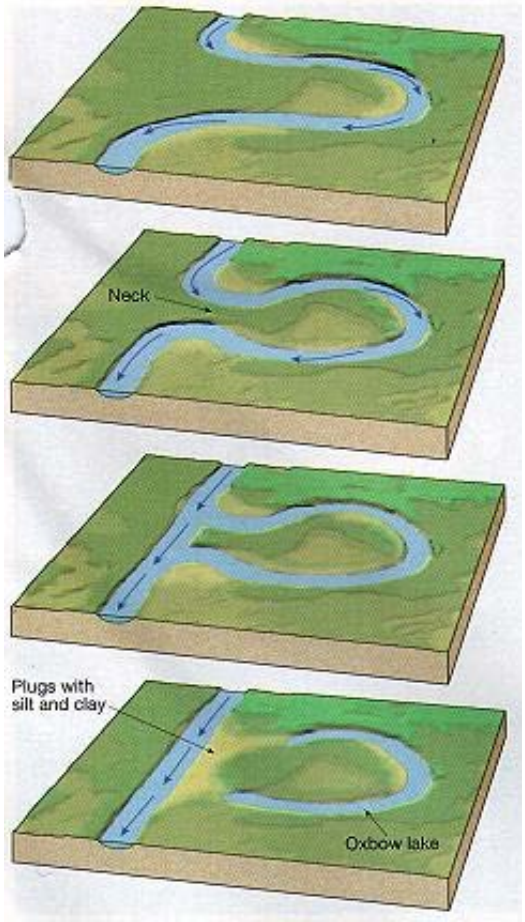


Access Tubes

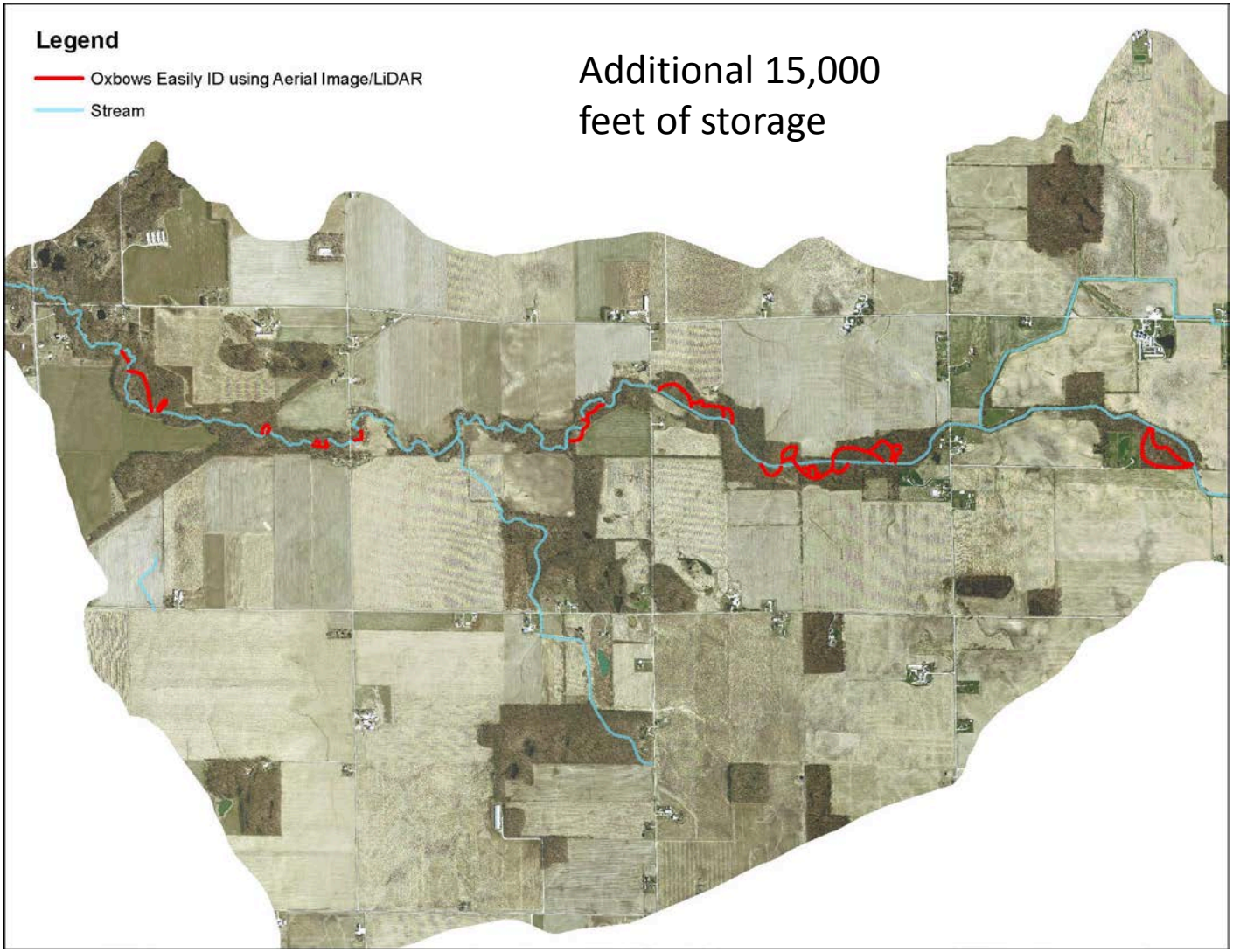
What is an Oxbow

- Old part of stream channel
- Predominate in non productive areas
- Extended residence time

- Off Channel Storage
  - Non-productive areas
  - Additionally nutrient reduction

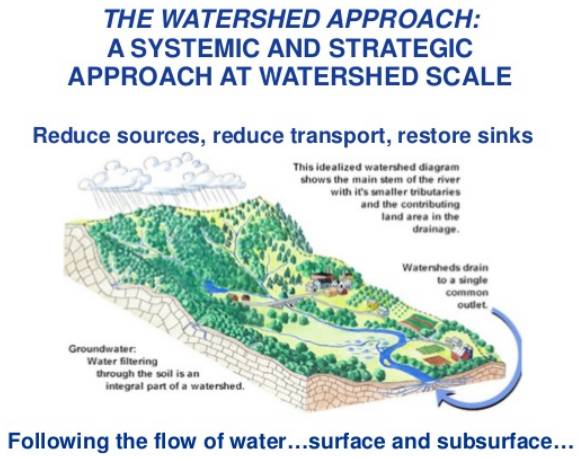


(BCC)


Legend
Oxbows Easily ID using Aerial Image/LiDAR
Stream
Additional 15,000
feet of storage

Summary

- Stream samples and access tube samples seem to show similar concentration of nutrients.
- More in-depth analysis of data will be done soon to better describe the nutrient budget



(McLellan)

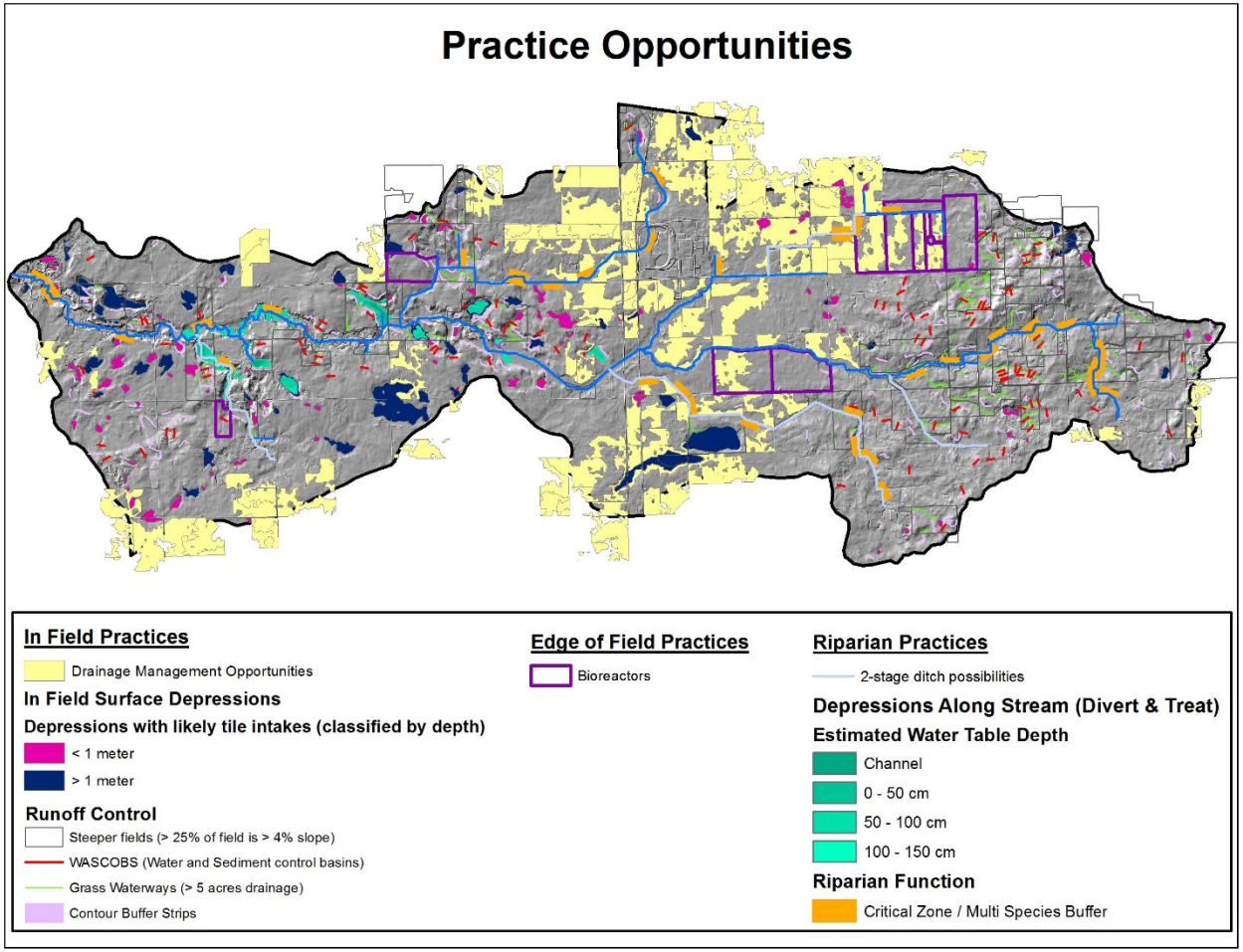
Stakeholder Responses to Watershed Planning with ACPF

Dr. Linda Prokopy
Director, Natural Resources Social Science Lab
Professor of Natural Resources Social Science

PURDUE UNIVERSITY
1913 - 2013
FORESTRY AND NATURAL RESOURCES
100 YEARS OF EXCELLENCE

PURDUE UNIVERSITY

Is this scary to farmers???



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General Thoughts on Targeting

- Sometimes assumed to be a dirty word!
- But increasing evidence suggests that farmers and agency staff "get it"

  (Arbuckle 2013; Kalcic et al. 2014)

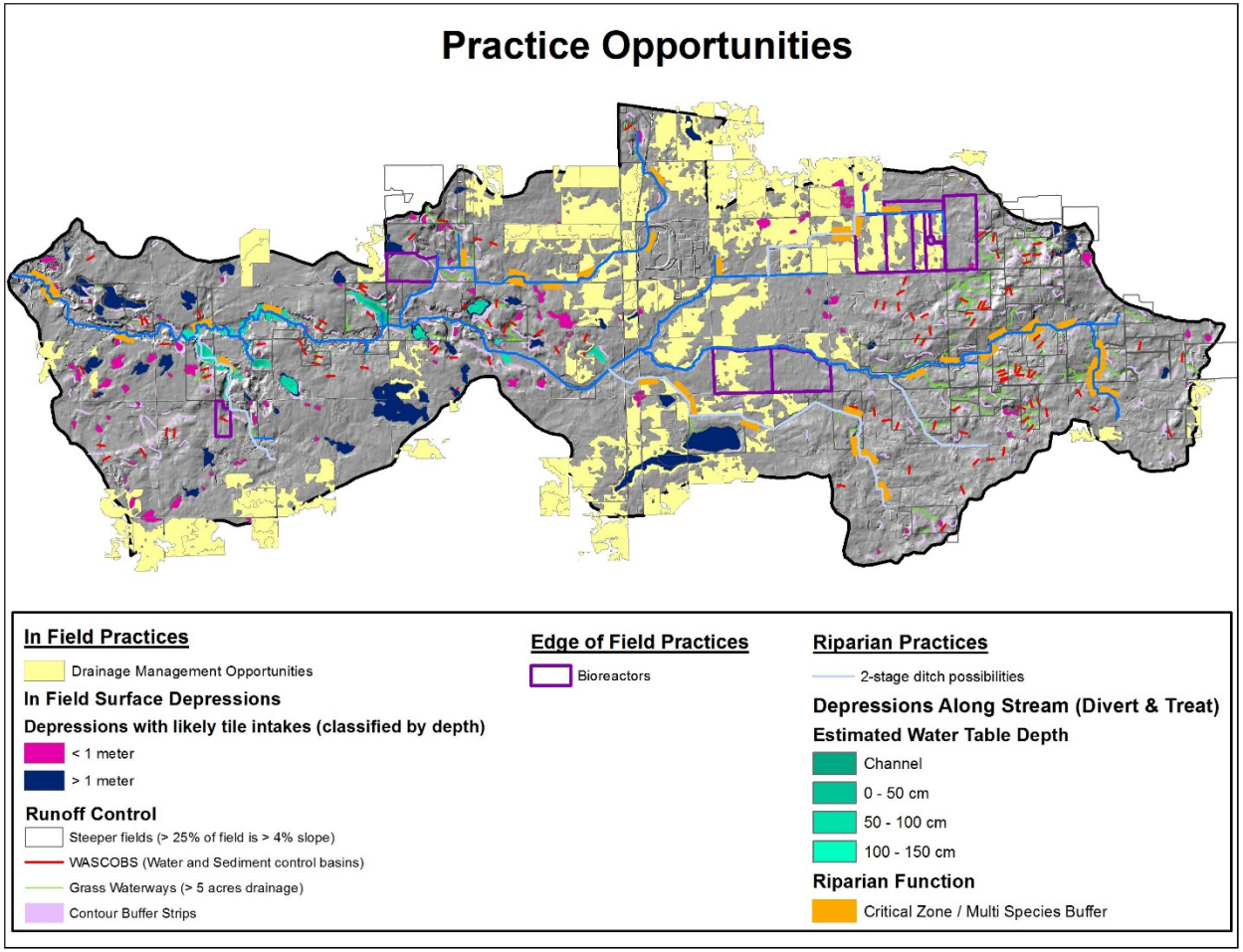
"Well, biggest bang for the buck. We do not have unlimited funds to spend, either personally, or businesses or the government, any of us. So we have to do the most for the least amount of money." (farmer in Kalcic et al. 2014)

"We all know places where there are filter strips where there doesn't need to be a filter strip. . And there are just places where it really does need to be." (NRCS employee)

Our Process in Watershed Approach

1) Start with a watershed with sufficient capacity
2) Interview agency staff
3) Interview producers
4) Social indicator surveys
5) Detailed report with outreach recommendations
6) Ongoing guidance for conducting farmer meetings
7) Evaluation

Beargrass



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1. Social Capacity

- Paid watershed staff
- Inter-agency trust and collaboration
- Problem salience and awareness
- “Basic” BMPs already adopted
- Some farmers are conservation leaders

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2. Interview Agency Staff (2014)

- Staff are really committed and excited about ACPF!

"You have to have the grassroots approach – number one. Hence the Soil and Water Conservation District. If they are not behind you, you got nothing. You have to have the right people at the right place at the right time. And I'm not going to say that's luck, I'm going to say if you have the right people doing what they need to be doing, they can tailor things so that you are at the right place at the right time" – Agency Staff

3. Interview Producers (2014)

Recommendations:

- Clearly articulate goals of the project
- Emphasize that project is an opportunity for producers
- Alleviate fears: participation is voluntary
- Provide evidence of environmental problems resulting from agriculture
- Familiarize producers with range of conservation practices and their purpose
- Provide evidence practices work
- Have trusted individuals convey messages and findings
- Provide multiple opportunities for dialogue

4. Social Indicator Surveys, 2014

Your Views on Local Water Resources

Dear agricultural producer,

Purdue University, in partnership with the Natural Resource Conservation Service, the Wabash County Soil and Water Conservation District and the Middle Eel River Watershed Initiative, is working to improve and protect the water quality of our lakes and streams. As an agricultural producer in the Beargrass Creek watershed, your insights are particularly important in helping to direct technical and financial assistance for local conservation efforts. We would greatly appreciate your participation in this survey to help us learn how we might best serve your needs.

There are two ways in which you can complete our survey. The most convenient way is for you to enter the following website address into your web browser: http://tinyurl.com/Beargrass99 and provide your responses securely online. If you choose to complete the survey online you will need to enter the following code:_____. This will let us know that you have completed the survey so that we will stop sending reminders. We have also included a paper version with a postage-paid return envelope if you prefer to respond by mail. The information you provide is confidential and will never be linked to your name, only to this code, which is used only for the purpose of knowing who has responded to the survey.

We ask that this survey be completed by the person in your home **that makes most of the agricultural management decisions** and is at least 18 years old. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, **please check the selection that best describes your situation or opinion for the agricultural operation located within the Beargrass Creek watershed, which is the area inside of blue lines shown on the map above.** The survey should take approximately 20 minutes to complete. Please read each question carefully. For more information about the Middle Eel River Watershed Initiative, please contact Susi Stephan at susan.stephan@in.nacdnet.net or at (260) 563-7486 Ext. 3. For information regarding the survey, please contact Linda Prokopy at lprokopy@purdue.edu or at (765) 496-2221. Thank you in advance for your help!

Susi Stephan

Susi Stephan, Executive Director
Wabash County
Soil and Water Conservation District

Linda Prokopy

Linda Prokopy
Purdue University

Following SIPES protocol (www.iwr.msu.edu/sidma)

N=60

73% response rate

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Survey Results

	Strongly Disagree/Disagree	Neutral
Government use of satellite imagery and GIS to map characteristics of private land is an invasion of privacy.	21%	43%

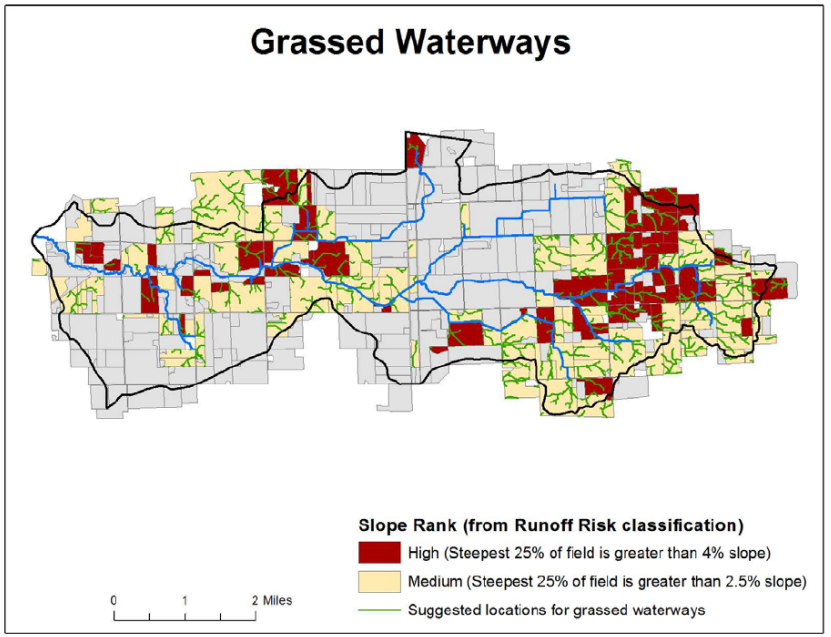
More Survey Results

	Strongly Agree/Agree
a. Conservation funding should be higher for land that is most vulnerable to soil and water quality problems.	71%
b. Targeted conservation is a good idea because limited resources should be spent where they have the most impact.	77%
c. Satellite imagery, GIS and other technologies can be valuable tools to help farmers improve their farm's environmental performance.	64%

Grassed Waterways

Goal: reduce risk of concentrated flow (gully) erosion

Currently use: 77%



	Never heard of it	Heard of it	Used it in the past
Not willing to try	0%	3%	2%
Might be willing to try	0%	7%	5%

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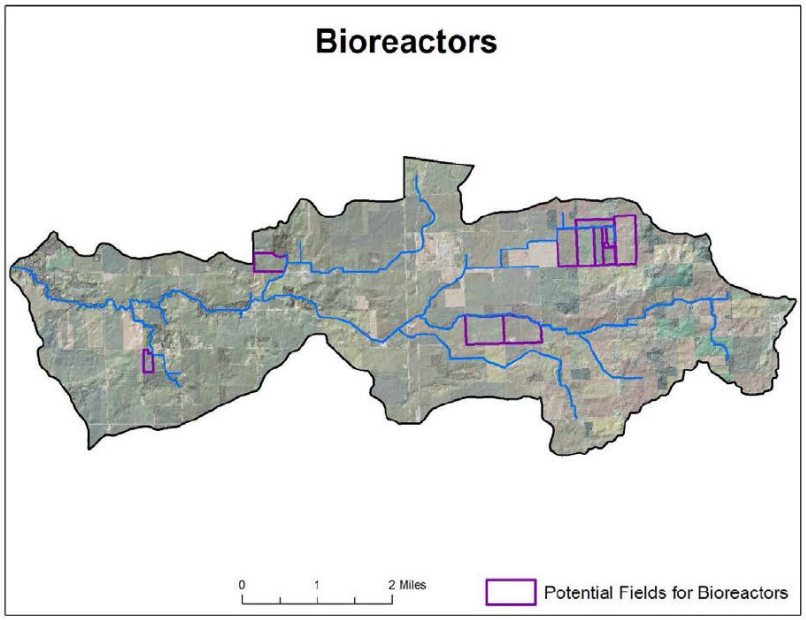
Bioreactors

Goal: denitrification

Currently use: 2%



	Never heard of it	Heard of it	Used it in the past
Not willing to try	19%	7%	2%
Might be willing to try	41%	22%	5%

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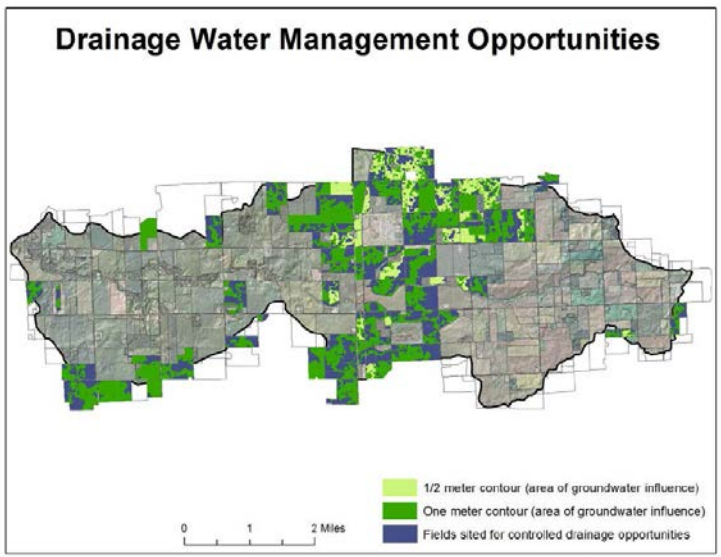
Controlled Drainage

Goal: reduce nitrogen loads

Currently use: 3%



	Never heard of it	Heard of it	Used it in the past
Not willing to try	13%	10%	2%
Might be willing to try	20%	40%	0%

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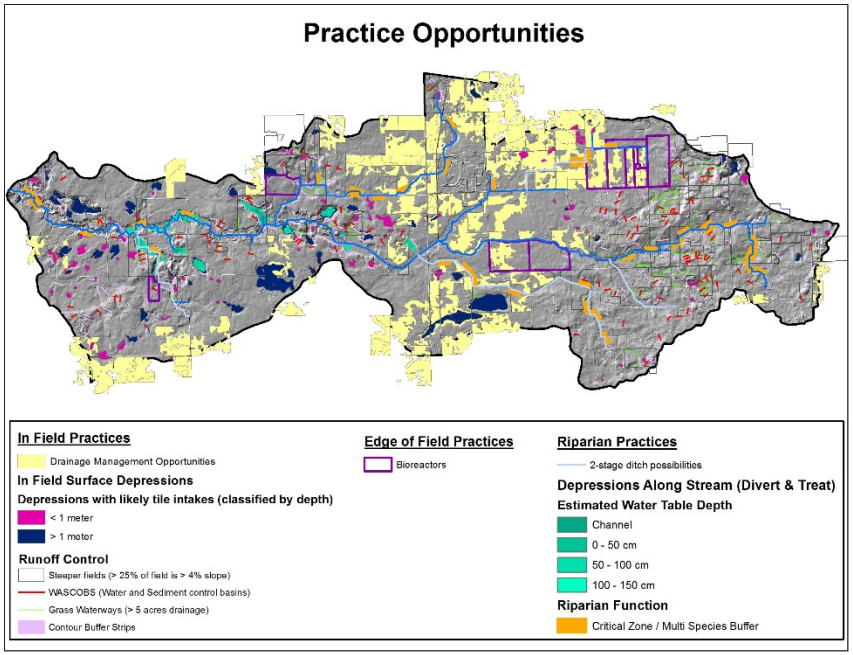
Two Stage Ditches

Goal: trap sediment and reduce nutrient loading

Currently use: 2%



	Never heard of it	Heard of it	Used it in the past
Not willing to try	16%	11%	2%
Might be willing to try	35%	23%	2%

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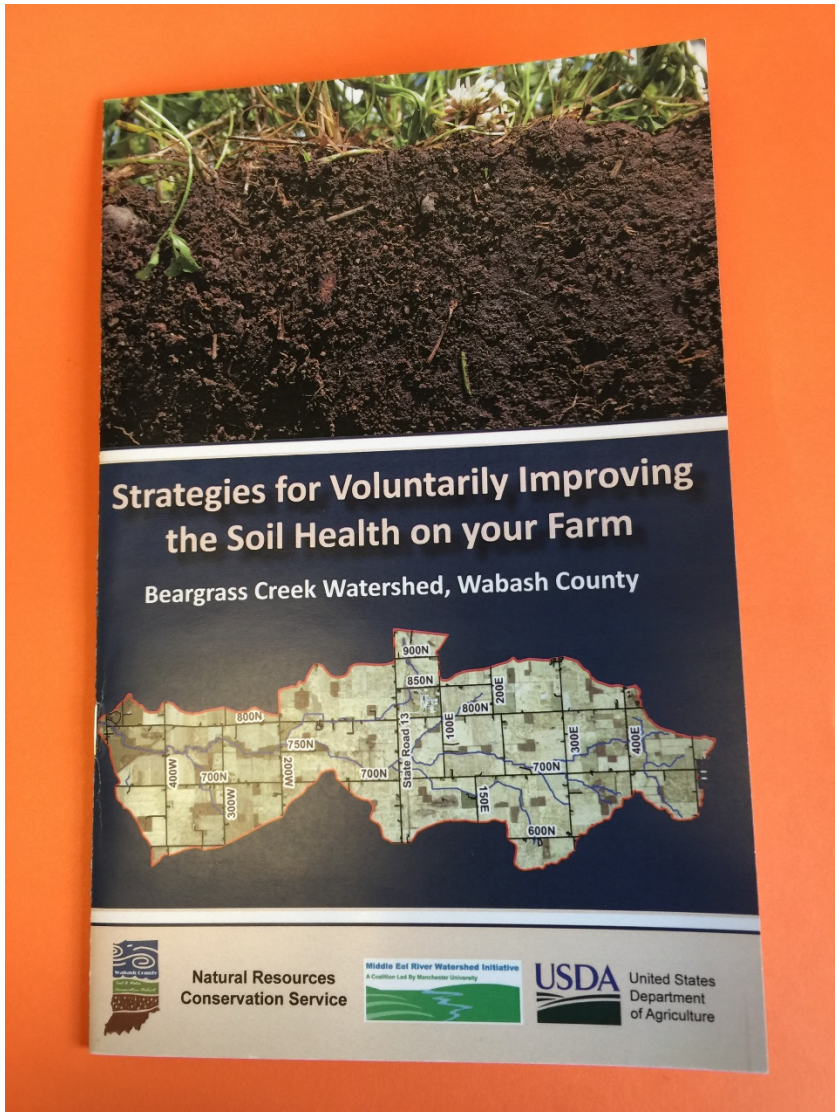
Our Process in Watershed Approach

1) Start with a watershed with sufficient capacity
2) Interview agency staff
3) Interview producers
4) Social indicator surveys
5) Detailed report with outreach recommendations
6) Ongoing guidance for conducting farmer meetings
7) Evaluation

Promoted Practices



"Menu of Options"

- Grassed waterways
- Filter strips
- Water and Sediment Control Basins (WASCOBs)
- Controlled Drainage
- Crop Residue Management
- Cover Crops
- Nutrient Management
- Manure Storage
- Precision Agriculture
- Two Stage Ditches
- Bioreactors
- Saturated Buffers
- Stream Channel Modifications

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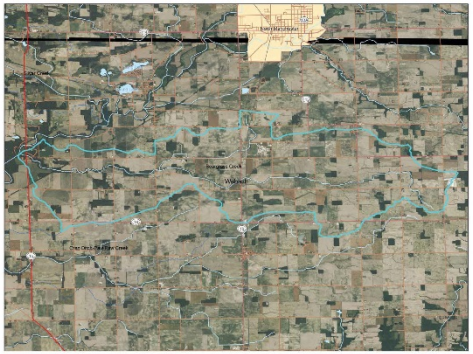
7. Evaluation – later this year!

Your Views on Local Water Resources



Dear agricultural producer,

Purdue University, in partnership with the Natural Resource Conservation Service, the Wabash County Soil and Water Conservation District and the Middle Eel River Watershed Initiative, is working to improve and protect the water quality of our lakes and streams. As an agricultural producer in the Beargrass Creek watershed, your insights are particularly important in helping to direct technical and financial assistance for local conservation efforts. We would greatly appreciate your participation in this survey to help us learn how we might best serve your needs.

There are two ways in which you can complete our survey. The most convenient way is for you to enter the following website address into your web browser: http://tinyurl.com/Beargrass99 and provide your responses securely online. If you choose to complete the survey online you will need to enter the following code:_____. This will let us know that you have completed the survey so that we will stop sending reminders. We have also included a paper version with a postage-paid return envelope if you prefer to respond by mail. The information you provide is confidential and will never be linked to your name, only to this code, which is used only for the purpose of knowing who has responded to the survey.

We ask that this survey be completed by the person in your home **that makes most of the agricultural management decisions** and is at least 18 years old. Your participation in this survey is voluntary. Your answers will be kept confidential and will be released only as summaries where individual answers cannot be identified.

Unless otherwise instructed, **please check the selection that best describes your situation or opinion for the agricultural operation located within the Beargrass Creek watershed, which is the area inside of blue lines shown on the map above.** The survey should take approximately 20 minutes to complete. Please read each question carefully. For more information about the Middle Eel River Watershed Initiative, please contact Susi Stephan at susan.stephan@in.nacdnet.net or at (260) 563-7486 Ext. 3. For information regarding the survey, please contact Linda Prokopy at lprokopy@purdue.edu or at (765) 496-2221. Thank you in advance for your help!

Susi Stephan

Susi Stephan, Executive Director
Wabash County
Soil and Water Conservation District

Linda Prokopy

Linda Prokopy
Purdue University

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Plus. .

Will be working in other watersheds that have used ACPF:

- How did they introduce it to stakeholders?
- How was it received?
- Did it lead to behavior changes?

Will make recommendations on how to use ACPF from a social perspective in other watersheds.

(Funding from USEPA through University of Minnesota and ARS)

Acknowledgements

Thank You!

Linda Prokopy

lprokopy@purdue.edu

Twitter: @lprokopy

Questions?

Agricultural Conservation Planning Framework: an Overview and Experience in Beargrass Creek and Silver Creek Watersheds

Mark Tomer, USDA, Agricultural Research Service
Janet Buchanan, HeartLands Conservancy
Joe Magner, University of Minnesota
Susi Stephan, Wabash County SWCD
Linda Prokopy, Purdue University