Watershed Planning from the NWQI Perspective

Accelerating voluntary conservation for clean water, and fostering rural community partnerships across the US

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National Water Quality Initiative (NWQI) Launched in 2012

- Working collaboratively with EPA and states to improve water quality in small agricultural watersheds
- Primary goal to reduce nonpoint sources of nutrients and sediment, and pathogens related to animal agriculture

More Information on NWQI:

2012 overview Watershed Academy webcast :
https://www.epa.gov/watershedacademy/watershed-academy-webcast-usdas-national-water-quality-initiative

2013 S&T conservation webinar on WQ monitoring and data sharing:
http://www.conservationwebinars.net/webinars/nrcs-epa-water-quality-initiative/

NRCS NWQI webpage:
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/initiatives/?cid=stelprdb1047761

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The “NWQI Perspective”

- NOT a new approach to planning
- NOT PL-566 small watershed planning
- NOT an area-wide plan with a formal sponsor

So what IS it?

Cooperative watershed planning, using existing watershed plans often developed by partners, as a foundation for additional assessment, targeting, and outreach to achieve water quality goals through conservation implementation

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NWQI and Watershed Planning

- NWQI targets high-priority watersheds
- Watersheds selected for NWQI have established/build new partnerships
- Watersheds typically have an existing watershed plan(s) (319, TMDL, TMDL implementation plan, other) with **watershed goals** described
- Existing plans may not have the detail to inform the most effective implementation of practices for water quality benefit
- Need further watershed assessment at HUC-12 scale

NWQI Watershed Assessment and Outreach

- Watershed assessment at the HUC-12 scale helps to identify critical source areas needing treatment, and assess effective conservation systems amenable to producers
  - Assessment ties into/complements the existing watershed plan(s) – it is not a stand-alone document
  - Assessment follows the NRCS area-wide planning policy, and includes the first 6 steps of planning
  - Assessment is a useful document to inform conservation planning at the field level
- NWQI pilot project is providing resources to support watershed assessments **and outreach strategies**

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Successful Watershed Planning*

- Establish strong partnerships through stakeholder, community and producer involvement
- Define achievable and measureable watershed goals
- Clearly understand the pollutants of concern and transport modes
- Target conservation to critical source areas
- Develop conservation systems that address the pollutants, and that meet producers' needs (fit the watershed and fit the operations)
- Apply effective outreach strategies
- Plan for the long-term – flexibility and innovation

** CEAP watersheds synthesis (2012), Rural Clean Water Program evaluation (1993), EPA watershed planning (2008), RESOLVE review of NRCS watershed projects (2015)*

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Importance of Multi-Partner Approach

Katie Flahive, Environmental Scientist, USEPA

Erika Larsen, Physical Scientist, USEPA

Elements of Success: Multi Partner Approach

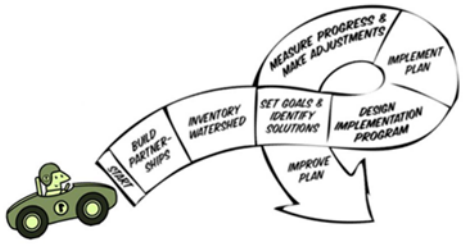
- The watershed approach is fundamental to achieving water quality results, specifically for watershed planning and water quality monitoring
- Partnerships are essential for all aspects of the project to work together
- Identify and engage watershed stakeholders and key partners during the planning stage, including producers, state and local agencies, soil & water conservation districts, universities, industry and watershed groups
- Beneficiaries of improved water quality (e.g., drinking water customers) are critical partners in the watershed project
- Collaborators can identify existing plans, data analyses and assessments

Adapted from: Lessons Learned from the National Institute of Food and Agriculture (NIFA)-CEAP Synthesis

Watershed Planning Focus

- A watershed plan, e.g., a 319 9-element watershed based plan, is developed as a holistic plan or a roadmap for implementation most likely to deliver water quality results
- USDA and EPA science confirm that targeting management practices in the right places is essential to water quality results
- The 9-elements are:
    1. Identify causes & sources to be controlled*
    2. Estimate load reductions expected from conservation practices and BMPs
    3. Describe Nonpoint source management measures (in agriculture areas, conservation practice systems) & targeted critical areas*
    4. Identify related loading/water quality success criteria or indicators
    5. Describe interim, measurable implementation milestones
    6. Describe load reduction/water quality monitoring program
    7. Describe info & education needed to promote conservation practices and BMPs
    8. Estimate technical assistance, funding, & sources required for implementation
    9. Schedule implementation of conservation practices and BMPs, assign tasks

    * Items to be discussed on this webinar



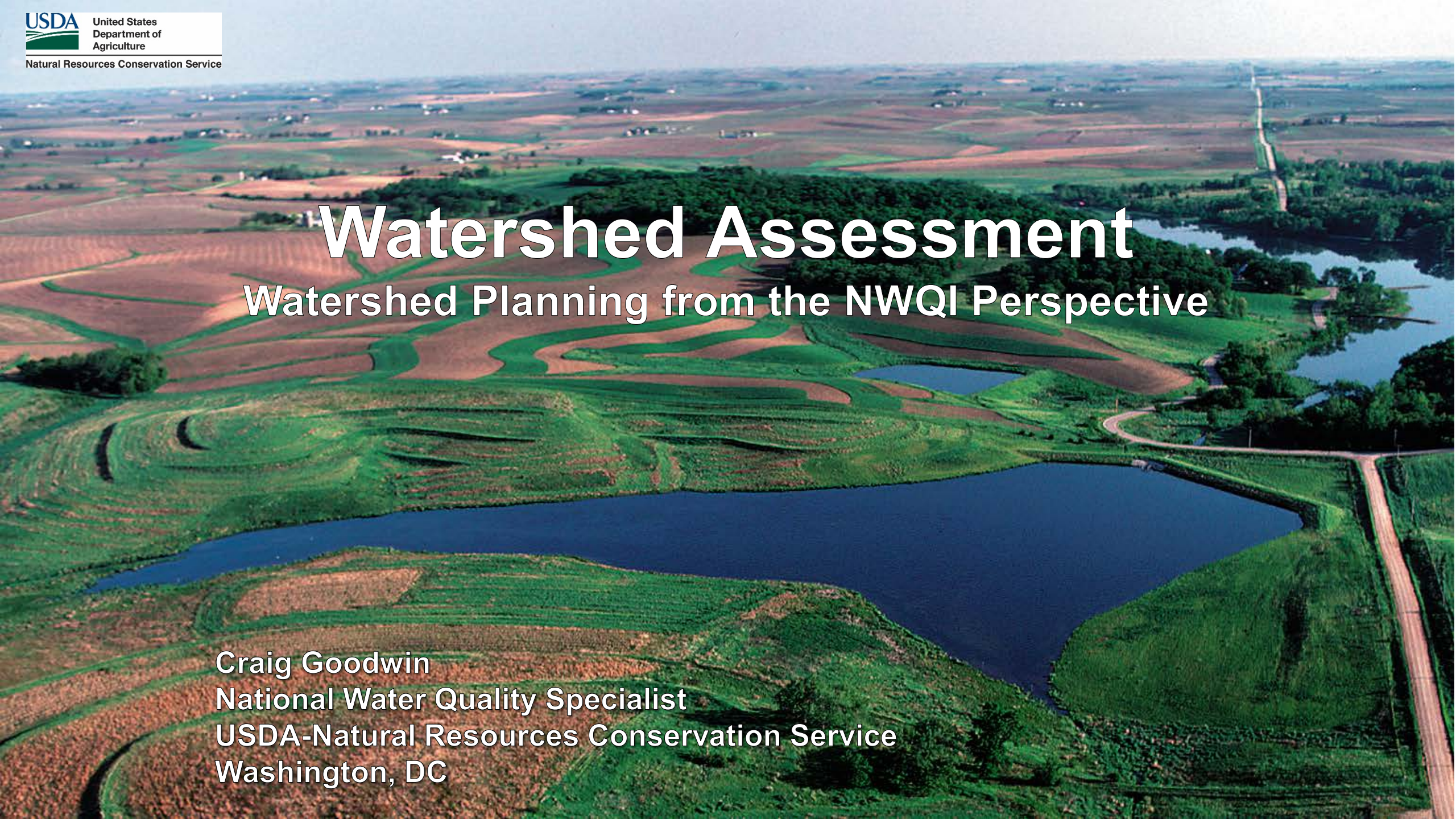
Source: US EPA 319 Supplemental Guidelines

Outreach and Leveraging for planning

- Leveraging various resources for watershed planning
  - Watershed groups/watershed coordinators are key in building capacity, identifying collaborators and local partners, tracking progress, etc.
  - Producer groups/farmers networks can have strong role in outreach and encouraging landowner engagement

NWQI investments: §319 and USDA Conservation Programs

- Are complementary: shared goals; rely on local partners, voluntary action by landowners
- §319 funds expand and complement USDA funds
  - EQIP financial assistance funds may only go to practices
  - Planning and siting that is key for water quality outcomes
  - Build and sustain local coalitions for action
  - Assistance through local CDs and other partners adds capacity for technical assistance, outreach
- Significant 319 investment in NWQI watersheds for a wide range of activities including: focused instream water quality monitoring, watershed planning, outreach, coordination, technical assistance, tracking implementation and conservation practice implementation
- These activities require leveraging and partnership with a variety of partners
- There are over 670 restored waters (472 success stories), about half of which feature USDA collaboration



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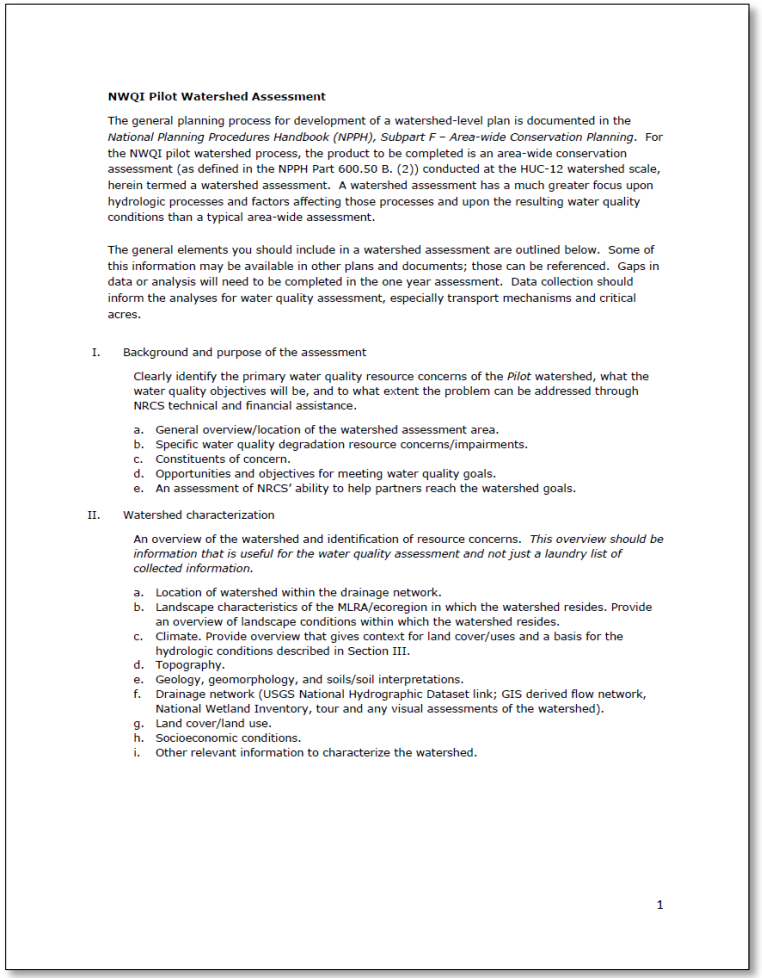
Watershed Assessment

Watershed Planning from the NWQI Perspective

Craig Goodwin
National Water Quality Specialist
USDA-Natural Resources Conservation Service
Washington, DC

NWQI Pilot Watershed Assessment

I. Background and purpose of the assessment
II. Watershed characterization
III. Hydrologic and water quality characterization
IV. Resource Analysis/Source Assessment
V. Summary and Recommendations



NWQI Pilot Watershed Assessment

The general planning process for development of a watershed-level plan is documented in the *National Planning Procedures Handbook (NPPH), Subpart F – Area-wide Conservation Planning*. For the NWQI pilot watershed process, the product to be completed is an area-wide conservation assessment (as defined in the NPPH Part 600.50 B. (2)) conducted at the HUC-12 watershed scale, herein termed a watershed assessment. A watershed assessment has a much greater focus upon hydrologic processes and factors affecting those processes and upon the resulting water quality conditions than a typical area-wide assessment.

The general elements you should include in a watershed assessment are outlined below. Some of this information may be available in other plans and documents; those can be referenced. Gaps in data or analysis will need to be completed in the one year assessment. Data collection should inform the analyses for water quality assessment, especially transport mechanisms and critical acres.

I. Background and purpose of the assessment

Clearly identify the primary water quality resource concerns of the *Pilot* watershed, what the water quality objectives will be, and to what extent the problem can be addressed through NRCS technical and financial assistance.

a. General overview/location of the watershed assessment area.
b. Specific water quality degradation resource concerns/impairments.
c. Constituents of concern.
d. Opportunities and objectives for meeting water quality goals.
e. An assessment of NRCS' ability to help partners reach the watershed goals.

II. Watershed characterization

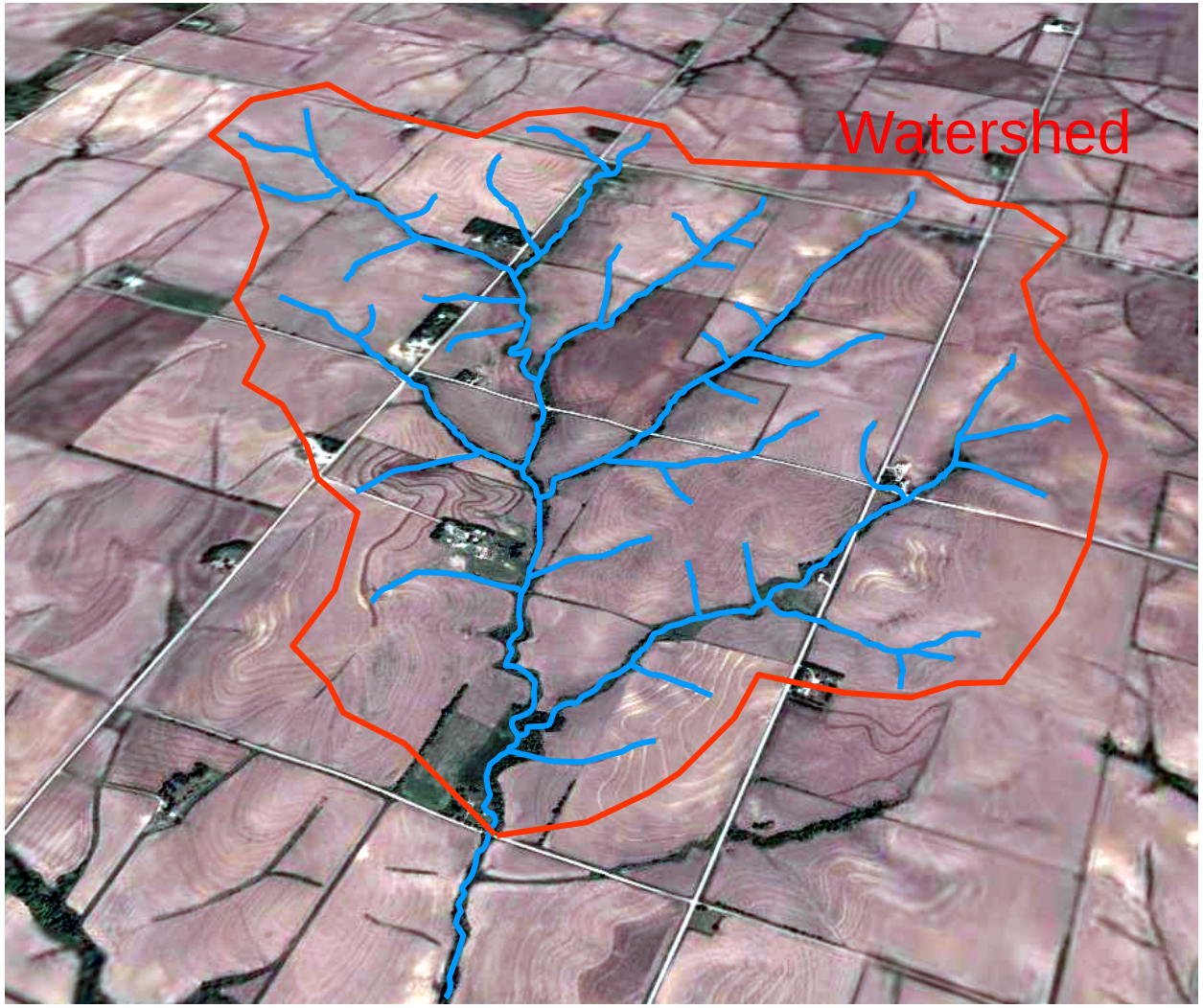
An overview of the watershed and identification of resource concerns. *This overview should be information that is useful for the water quality assessment and not just a laundry list of collected information.*

a. Location of watershed within the drainage network.
b. Landscape characteristics of the MLRA/ecoregion in which the watershed resides. Provide an overview of landscape conditions within which the watershed resides.
c. Climate. Provide overview that gives context for land cover/uses and a basis for the hydrologic conditions described in Section III.
d. Topography.
e. Geology, geomorphology, and soils/soil interpretations.
f. Drainage network (USGS National Hydrographic Dataset link; GIS derived flow network, National Wetland Inventory, tour and any visual assessments of the watershed).
g. Land cover/land use.
h. Socioeconomic conditions.
i. Other relevant information to characterize the watershed.

1

Think Outside the Box!

A **watershed** is an area of land that drains water and sediment to a specific point on a stream.



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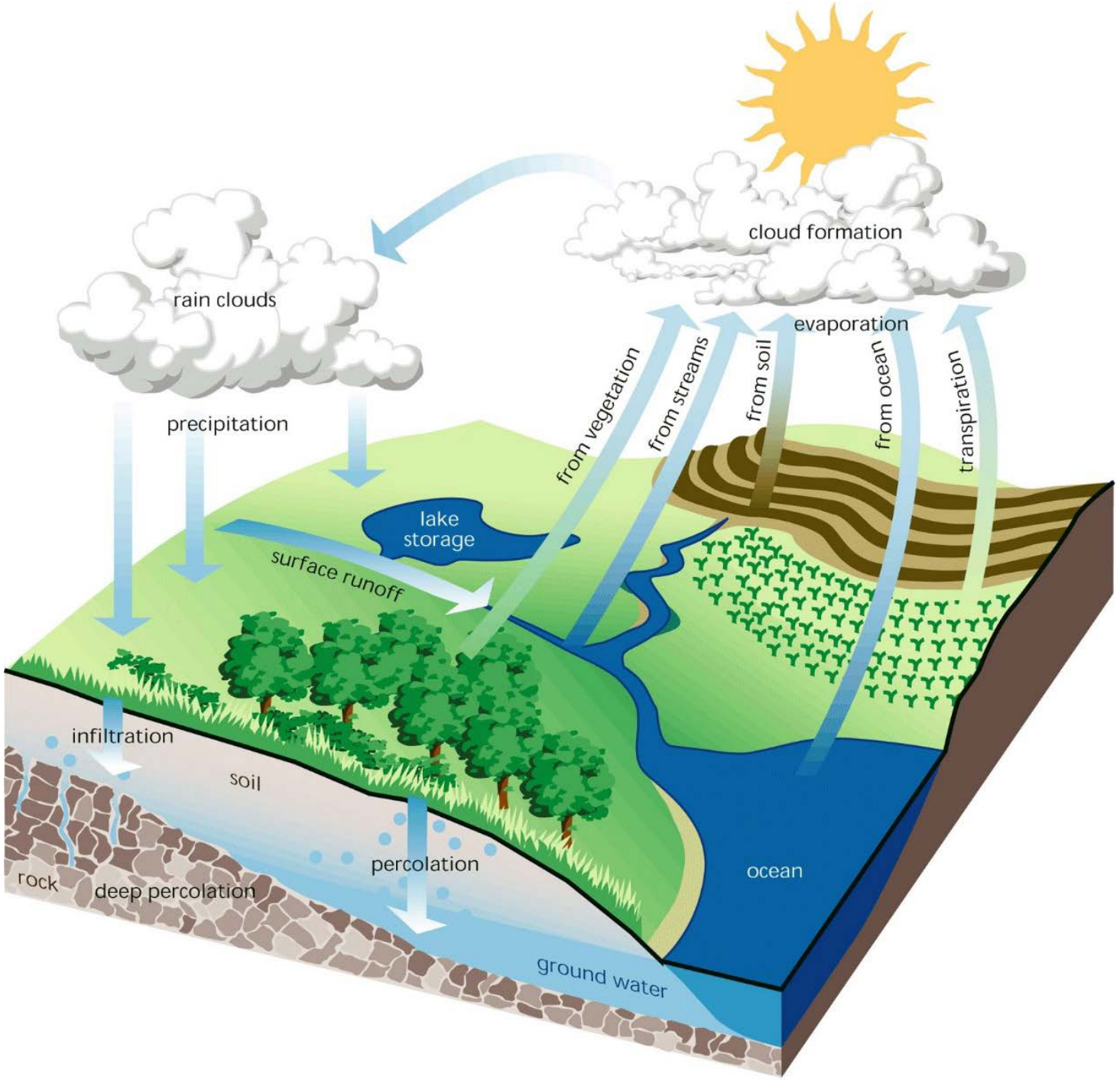
Think Hydrology!



Source: FISRWG (10/1998). Stream Corridor Restoration: Principles, Processes, and Practices. By the Federal Interagency Stream Restoration Working Group (FISRWG).

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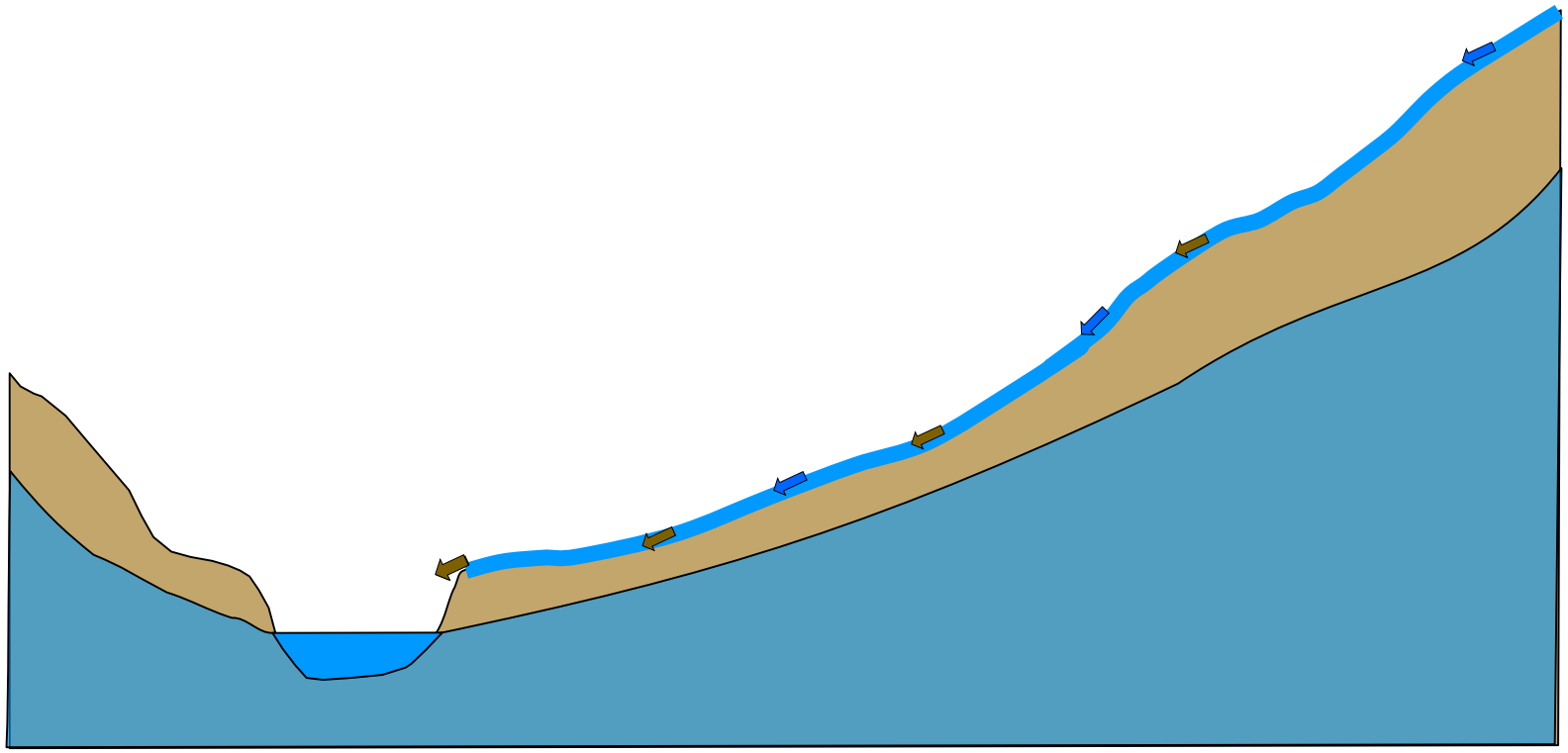
Overland Flow Runoff

Movement of:

- Water and dissolved material
- Sediment/particulate material



Note: Vertical Scale Exaggerated

Overland Flow Runoff


Tim McCabe, NRCS

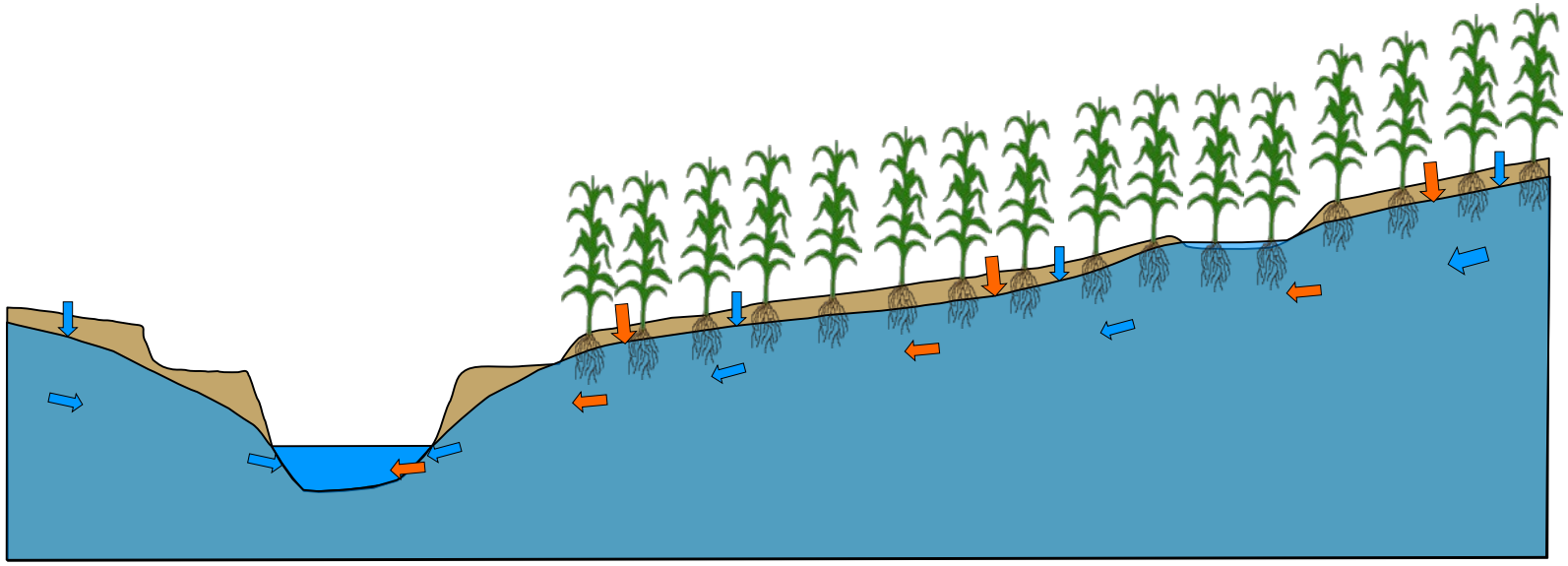

Lynn Betts, NRCS

Groundwater Baseflow

Movement of:

Water

Dissolved material



Note: Vertical Scale Exaggerated

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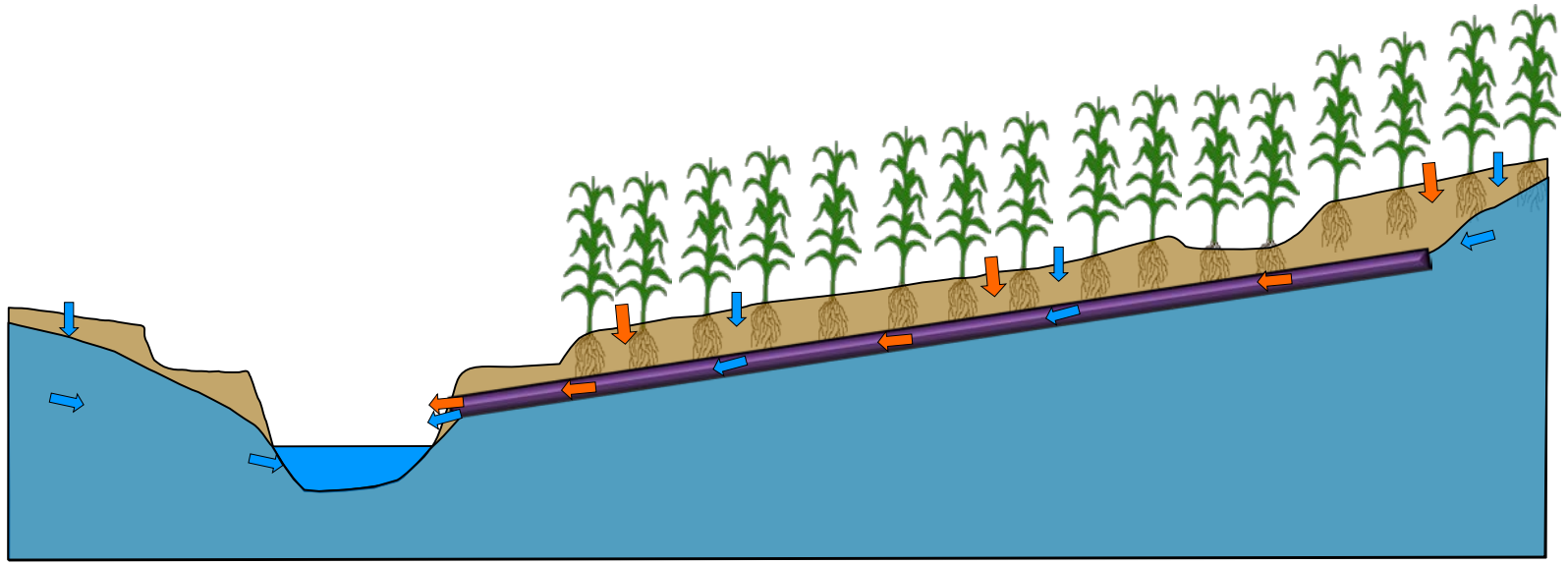
Groundwater Baseflow-Adding Tile Drain

Movement of:

Water

Dissolved material



Note: Vertical Scale Exaggerated

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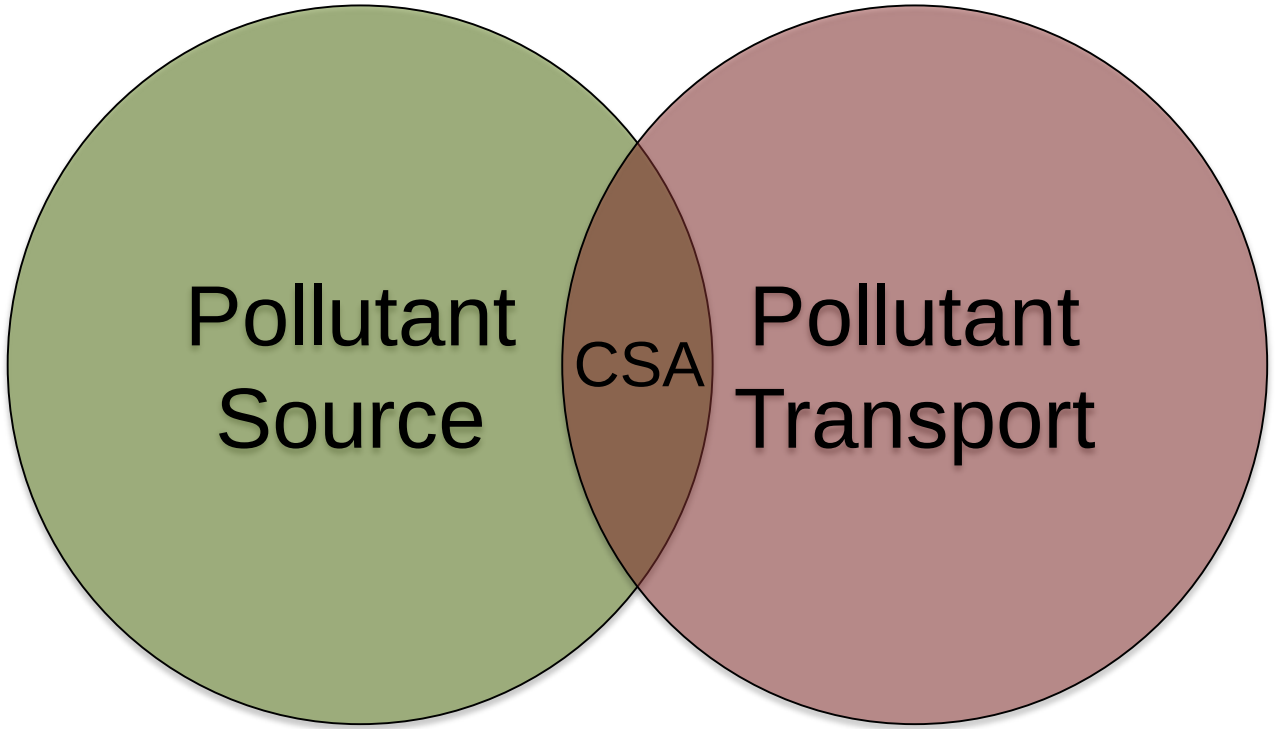
Critical Source Areas

Source of pollutant

Transport mechanism

A relatively small fraction of a watershed can generate a majority of a watershed's nonpoint source load



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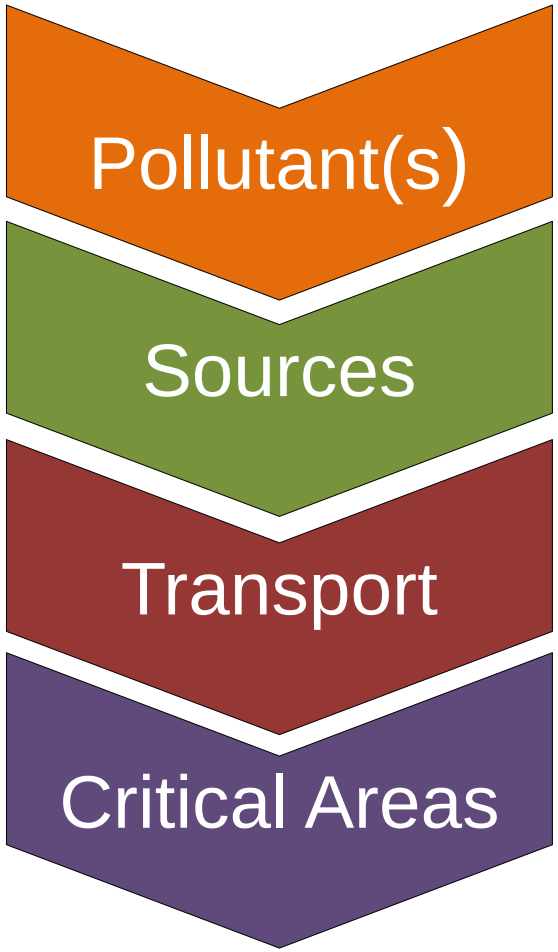
Within Watershed Targeting Process



- Identify pollutants of concern
- Set reduction goals
- Identify pollutant sources
- Identify pollutant transport mechanisms and routes
- Identify and target conservation to critical source areas

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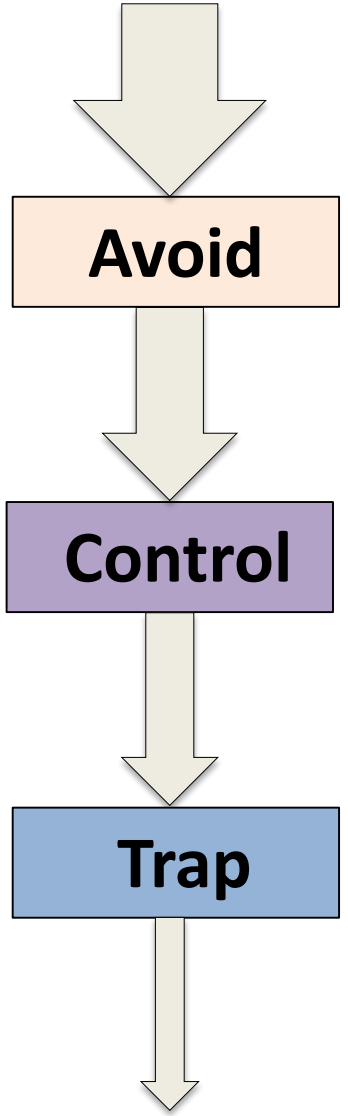
Systems Approach to Non-Point Source Control:
Avoid, Control, and Trap (ACT)

Avoid point and non-point source contributions from agricultural operations

Control runoff, erosion, and leaching to ground water

Trap or physically stop contaminants before they can exit the agricultural landscape



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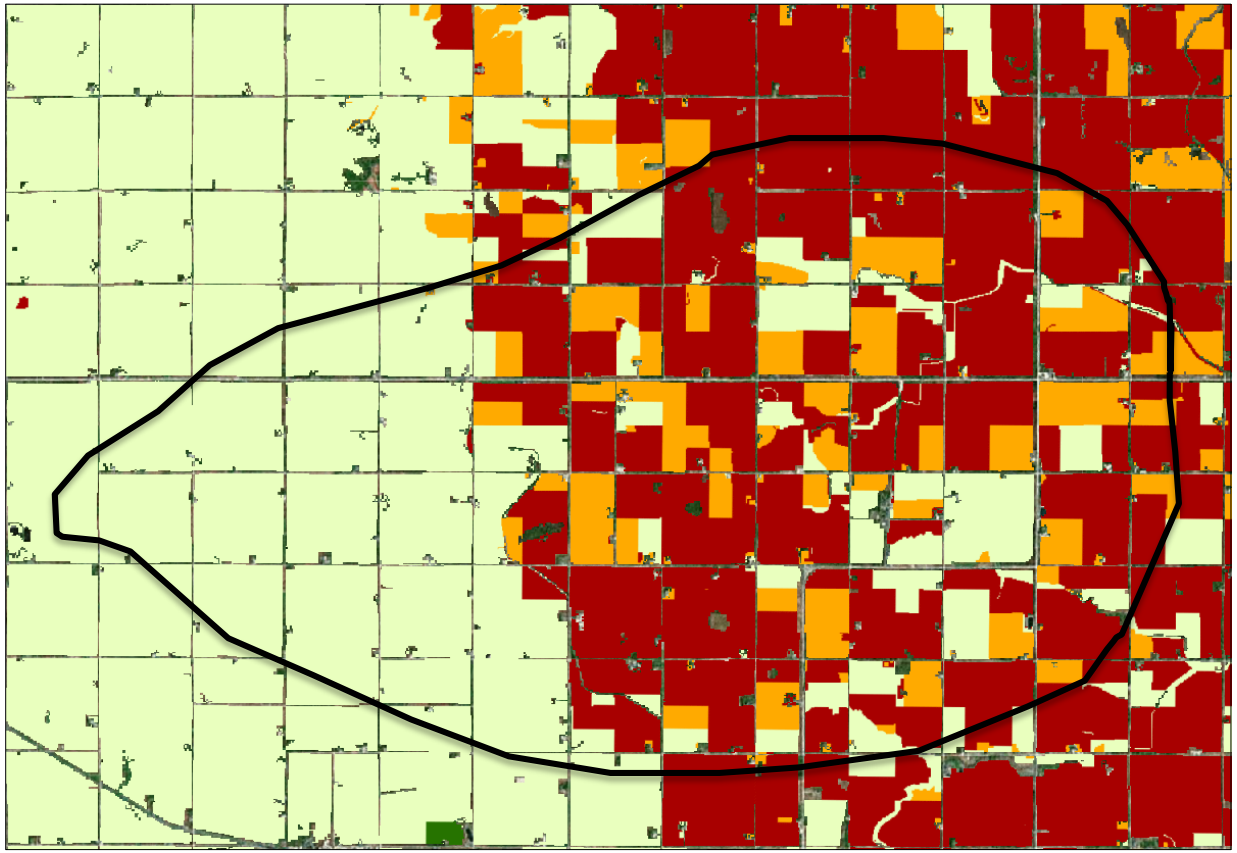
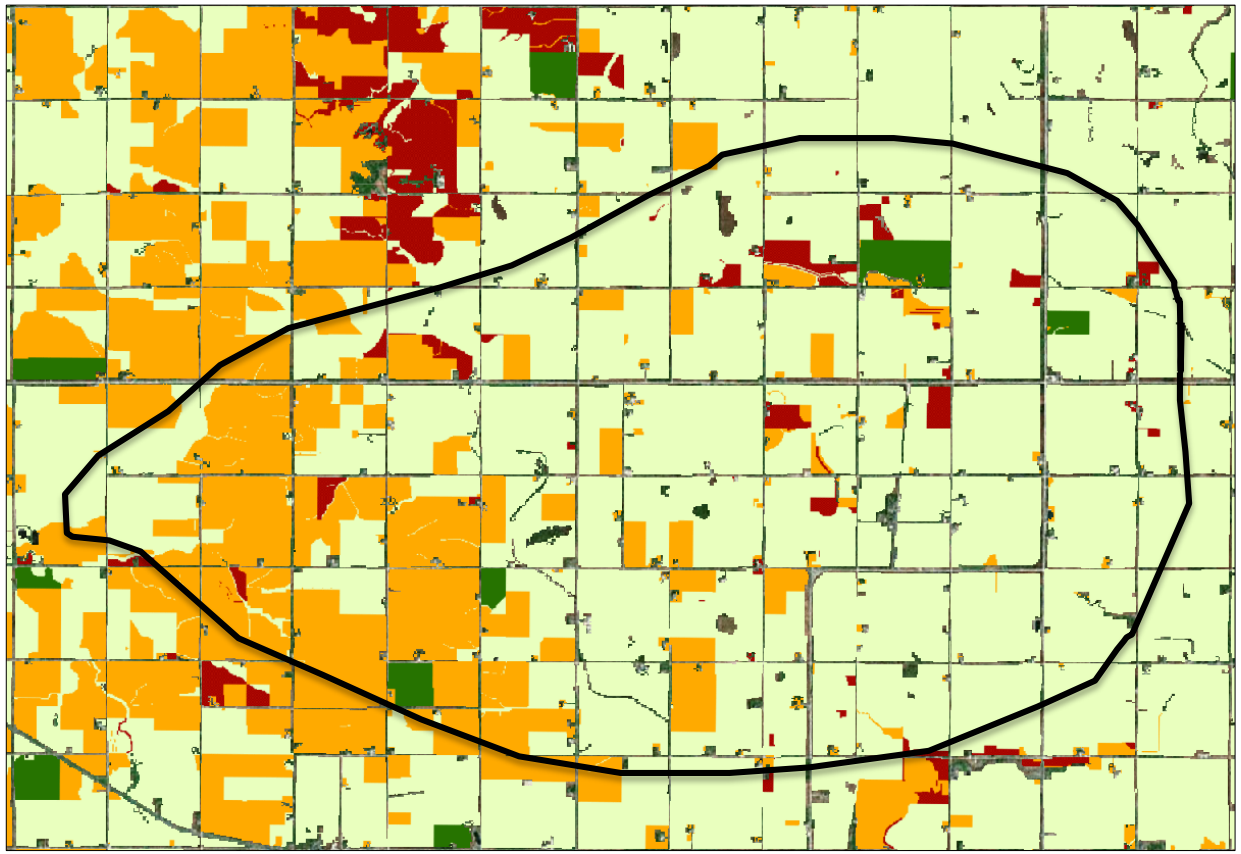
Watershed Assessment Tools



VAPPT: Nitrogen Leaching



VAPPT: Sediment

United States Department of Agriculture

Middle Eel, Beargrass Watershed

Jill Reinhart, ASTC Partnerships

National Water Quality Initiative Webinar
April 25, 2017

Layering Approaches

Implementing Watershed Management Plans

- Priority areas
- Priority practices
- Targeted Funding

Promoting Soil Health

- Conservation Cropping System Initiative

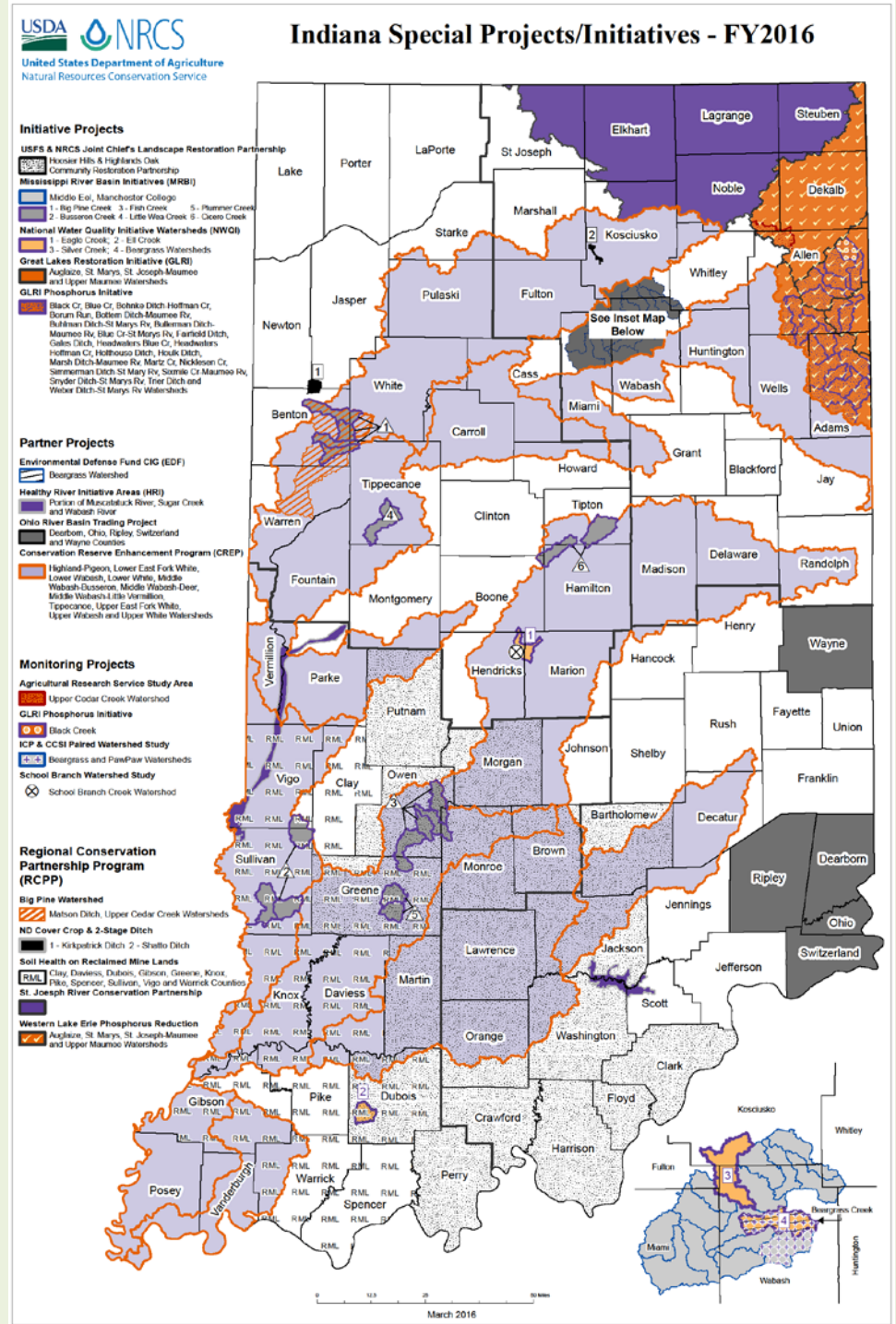
Water Quality Monitoring

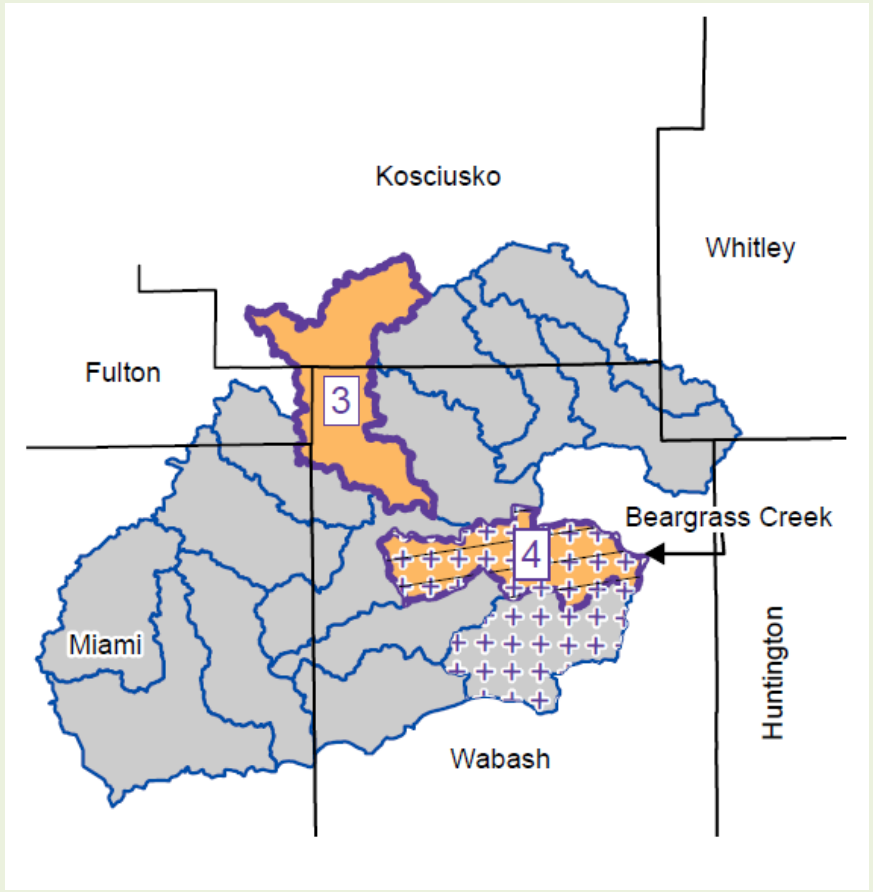
- Chemical & Biological

Social Indicator Surveys

Modeling

- Region 5 Model
- Ag Conservation Planning Framework


USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service
Indiana Special Projects/Initiatives - FY2016
Initiative Projects
USFS & NRCS Joint Chief's Landscape Restoration Partnership
Hoosier Hills & Highlands Oak Community Restoration Partnership
Mississippi River Basin Initiatives (MRBI)
Middle Eel, Manchester College
1 - Big Pine Creek 3 - Fish Creek 5 - Plummer Creek
2 - Busseron Creek 4 - Little Wea Creek 6 - Cicero Creek
National Water Quality Initiative Watersheds (NWQI)
1 - Eagle Creek; 2 - Elt Crook
3 - Silver Creek; 4 - Beargrass Watersheds
Great Lakes Restoration Initiative (GLRI)
Auglaize, St. Marys, St. Joseph-Maumee and Upper Maumee Watersheds
GLRI Phosphorus Initative
Black Cr, Blue Cr, Bohnke Ditch-Hoffman Cr, Borum Run, Bothen Ditch-Maumee Rv, Buhlman Ditch-St Marys Rv, Bullerman Ditch-Maumee Rv, Blue Cr-St Marys Rv, Fairfield Ditch, Gallis Ditch, Headwaters Blue Cr, Headwaters Hoffman Cr, Holthouse Ditch, Houk Ditch, Marsh Ditch-Maumee Rv, Martz Cr, Nicklesen Cr, Simmerman Ditch St Mary Rv, Sixmile Cr-Maumee Rv, Snyder Ditch-St Marys Rv, Trier Ditch and Weber Ditch-St Marys Rv Watersheds
Partner Projects
Environmental Defense Fund CIG (EDF)
Beargrass Watershed
Healthy River Initiative Areas (HRI)
Portion of Muscatatuck River, Sugar Creek and Wabash River
Ohio River Basin Trading Project
Dearborn, Ohio, Ripley, Switzerland and Wayne Counties
Conservation Reserve Enhancement Program (CREP)
Highland-Pigeon, Lower East Fork White, Lower Wabash, Lower White, Middle Wabash-Busseron, Middle Wabash-Deer, Middle Wabash-Little Vermillion, Tippecanoe, Upper East Fork White, Upper Wabash and Upper White Watersheds
Monitoring Projects
Agricultural Research Service Study Area
Upper Cedar Creek Watershed
GLRI Phosphorus Initiative
Black Creek
ICP & CCSI Paired Watershed Study
Beargrass and PawPaw Watersheds
School Branch Watershed Study
School Branch Creek Watershed
Regional Conservation Partnership Program (RCPP)
Big Pine Watershed
Matson Ditch, Upper Cedar Creek Watersheds
ND Cover Crop & 2-Stage Ditch
1 - Kirkpatrick Ditch 2 - Shelto Ditch
Soil Health on Reclaimed Mine Lands
Clay, Daviess, Dubois, Gibson, Greene, Knox, Pike, Spencer, Sullivan, Vigo and Warrick Counties
St. Joesph River Conservation Partnership
Western Lake Erie Phosphorus Reduction
Auglaize, St. Marys, St. Joseph-Maumee and Upper Maumee Watersheds
See Inset Map Below
March 2016


Kosciusko
Whitley
Fulton
3
Beargrass Creek
4
Miami
Huntington
Wabash

EPA/IDEM Section 319 Grants

- 2009-12 for Middle Eel Watershed Management Plan, cost share and water quality monitoring **($1 million)**
- 2012-15 for continued Middle Eel implementation and hiring four technicians **($500,000)**
- 2016-18 for cost-share in Beargrass watershed **($237,000)**

NRCS Mississippi River Basin Initiative*
Environmental Quality Incentives Program (EQIP)

	Allocated	Obligated
FY10	$146,938	$149,106
FY11	$594,481	$808,227
FY12	$594,481	$1,100,802
FY13	$594,481	$1,450,000
FY14	$594,481	$735,000
FY15	$390,000	$549,782
FY16	$450,000	$226,534
TOTAL	**$3,364,862**	**$5,019,451**

*Not official NRCS REAP numbers

NRCS National Water Quality Initiative*
Environmental Quality Incentives Program (EQIP)

	Obligated
FY15	$1,076
FY16	$67,500
TOTAL	**$5,019,451**

*Not official NRCS REAP numbers

Other Funding Sources and Projects

- US Fish & Wildlife Service and OH River Basin Fish Habitat Improvement to remove three dams in the Eel River **($158,000)**
- Paired Watershed Study (Beargrass and PawPaw)
  - IASWCD **($56,000)**
  - Environmental Defense Fund **($60,000)**
  - IN Corn Marketing Council & IN Soybean Alliance **($56,000)**
- IN Dept. Natural Resources for black bass study in Eel River **($114,000)**
- US Fish & Wildlife Service for mussel reintroduction **($10,000),** upland conservation **($15,000),** and 2 stage ditch **($60,000)**
- Environmental Defense Fund Conservation Innovation Grant
  - Social Indicator Survey (Purdue University, Linda Prokopy)
  - Ag Conservation Planning Framework Model (ARS Iowa, Mark Tomer)

Measuring Results: R5 Model

The Indiana Conservation Partnership is utilizing the EPA Region 5 Model to track conservation accomplishments statewide, and by watershed.

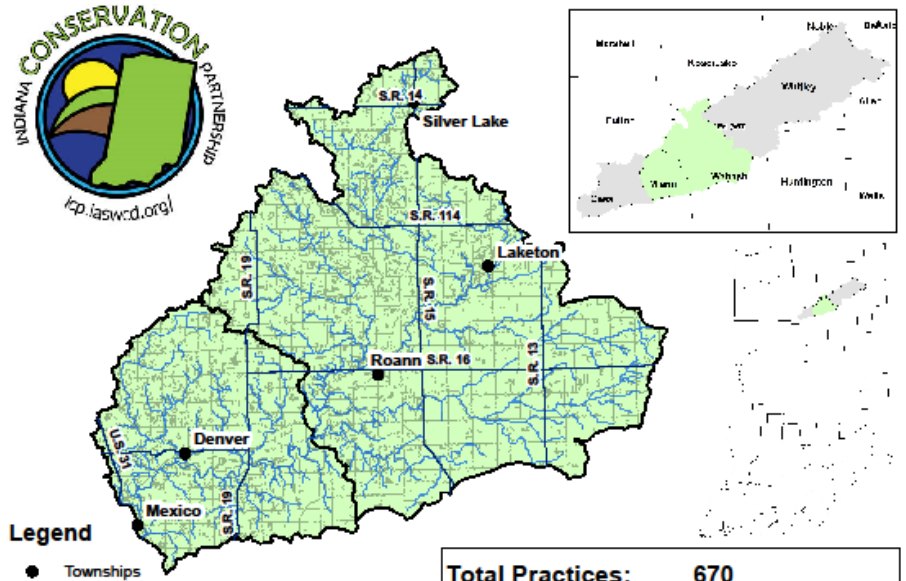
		2013 - 2015 aggregated				
HUC_NAME	HUC_12	R5M Practices	All Practices	Sediment (tons)	Phosphorus (lbs.)	Nitrogen (lbs.)
Beargrass Creek	051201040503	230	453	15,462	21,488	43,182
Little Wea Creek	051201080105	25	46	1,577	91,742	4,474
Brumm Ditch-Big Pine Creek	051201080405	31	88	2,248	2,771	5,541
Darby Ditch-Big Pine Creek	051201080406	2	14	162	222	444
Prairie Creek	051202010601	6	8	273	579	933
Tobin Ditch-Cicero Creek	051202010605	10	19	744	1,006	2,010

Measuring Results: R5

Natural Resources Conservation Service

2014 Middle Eel Creek Nutrient and Sediment Load Reductions

Accomplished by Private Landowners and the Indiana Conservation Partnership.

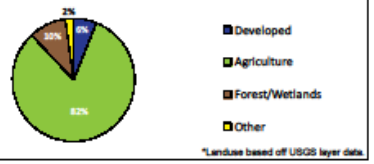


Legend

- Townships
- Highways
- Streams
- Landuse
- Middle Eel Watersheds

HUC10s: 512010406, 512010407
*HUCs are part of a numeric system used to identify specific watersheds.

Major Land Uses in Middle Eel Watersheds



*Landuse based off USGS layer data.

Data provided by: Indiana State Department of Agriculture, Indiana Department of Environmental Management, Indiana Department of Natural Resources, Indiana Soil and Water Conservation Districts, and the USDA Natural Resources Conservation Service.

To learn more about Indiana's Nutrient Reduction Strategy please visit ***isda.in.gov***

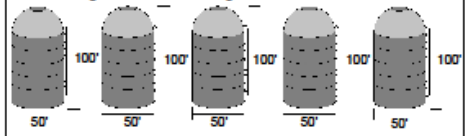
Total Practices: 670

Top practices include use of cover crops, residue and tillage management, no till, and conservation cover. Conservation practices in this watershed have reduced the volumes below from entering Eel Creek.

*Nutrient estimates only consider sediment bound N and P, not dissolved.
**Practices do not include the many unassisted practices designed and installed solely by a private landowner without ICP assistance.

Sediment: 92,428,400 lbs.

Which is enough to fill about 5 50x100 grain silos!



Phosphorus: 59,135 lbs.

Which is enough to fill approximately 1 backyard swimming pool.

Nitrogen: 118,987 lbs.

Which is enough to fill about 2 backyard swimming pools.

*Load reductions based off the EPA region 5 load reduction model.

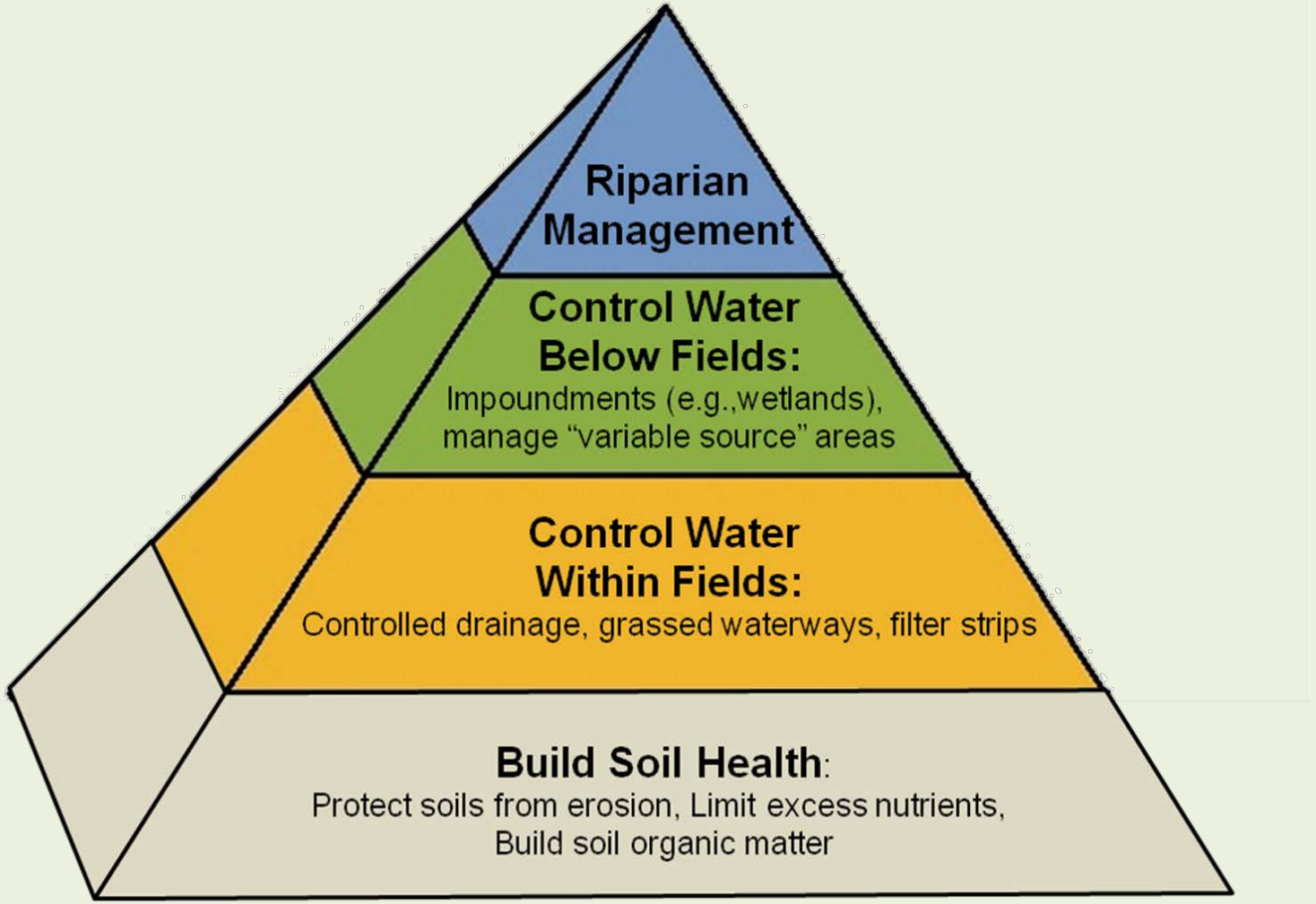
November 25, 2015
Trevor Laureys, ISDA Resource Specialist

For more information contact: ISDANutrientReduction@isda.in.gov or (317) 232-8770

Measuring Results: ACPF Model

Concept for Agricultural Conservation Planning Framework (ACPF):

A CONSERVATION PYRAMID FOR AGRICULTURAL WATERSHEDS



Agricultural Conservation Planning Framework
OUTLINE OF INITIAL PRACTICE PLACEMENT ASSESSMENTS FOR BEARGRASS WATERSHED

Soil management and soil building practices:
Nutrient/manure management, Cover Crops, No-tillage or strip tillage

CONTROL, TRAP, and/or TREAT	TILE DRAINAGE	SURFACE RUNOFF
IN FIELDS: Place water control / filter practices	**Controlled Drainage** where slopes are least	**Water/Sediment Control Basins** to detain runoff/sediment
	Surface Intake Filters (e.g., Blind inlets) in depressions	**Grassed Waterways** to slow concentrated flows
BELOW FIELDS Place water detention / nutrient removal practices	**Denitrifying Bioreactors** above field-tile outlets where ditches are deep	**Sediment Detention Basins** (to be determined)
RIPARIAN ZONE Place/design practices for ecosystem function and nutrient removal	**Shallow wetlands in near-stream depressions** Novel, site-specific designs	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
	Two-Stage Ditches Shallow ditches easily widened	

Supplemental Landscape Assessments

Runoff Risk Assessment: Fields where runoff control is most needed

Close to stream?

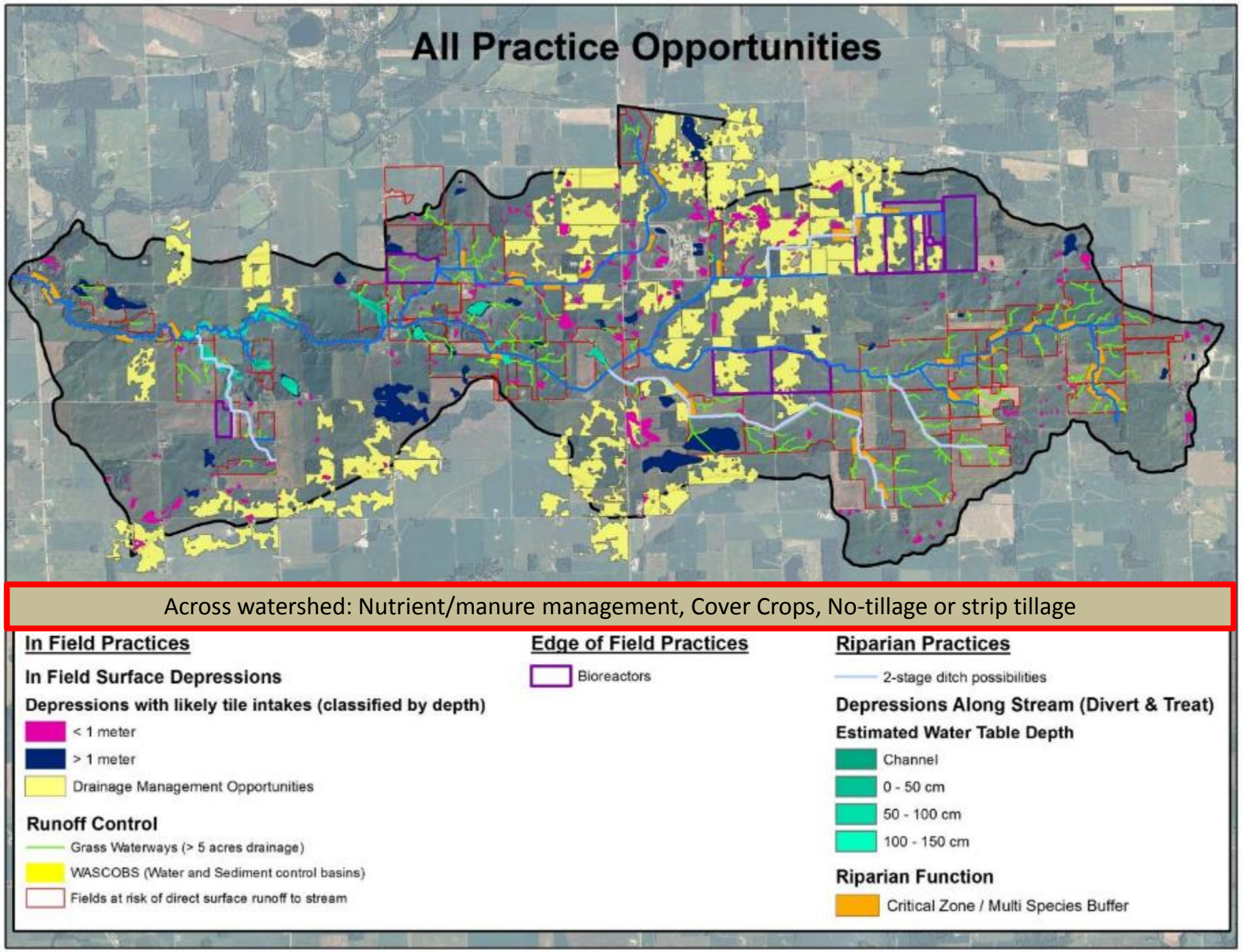
Slope steepness	Yes		No
H	A	B	C
M	B	C	
L	C		

Riparian Assessment: Match buffer designs and landscape settings

Shallow water table?

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

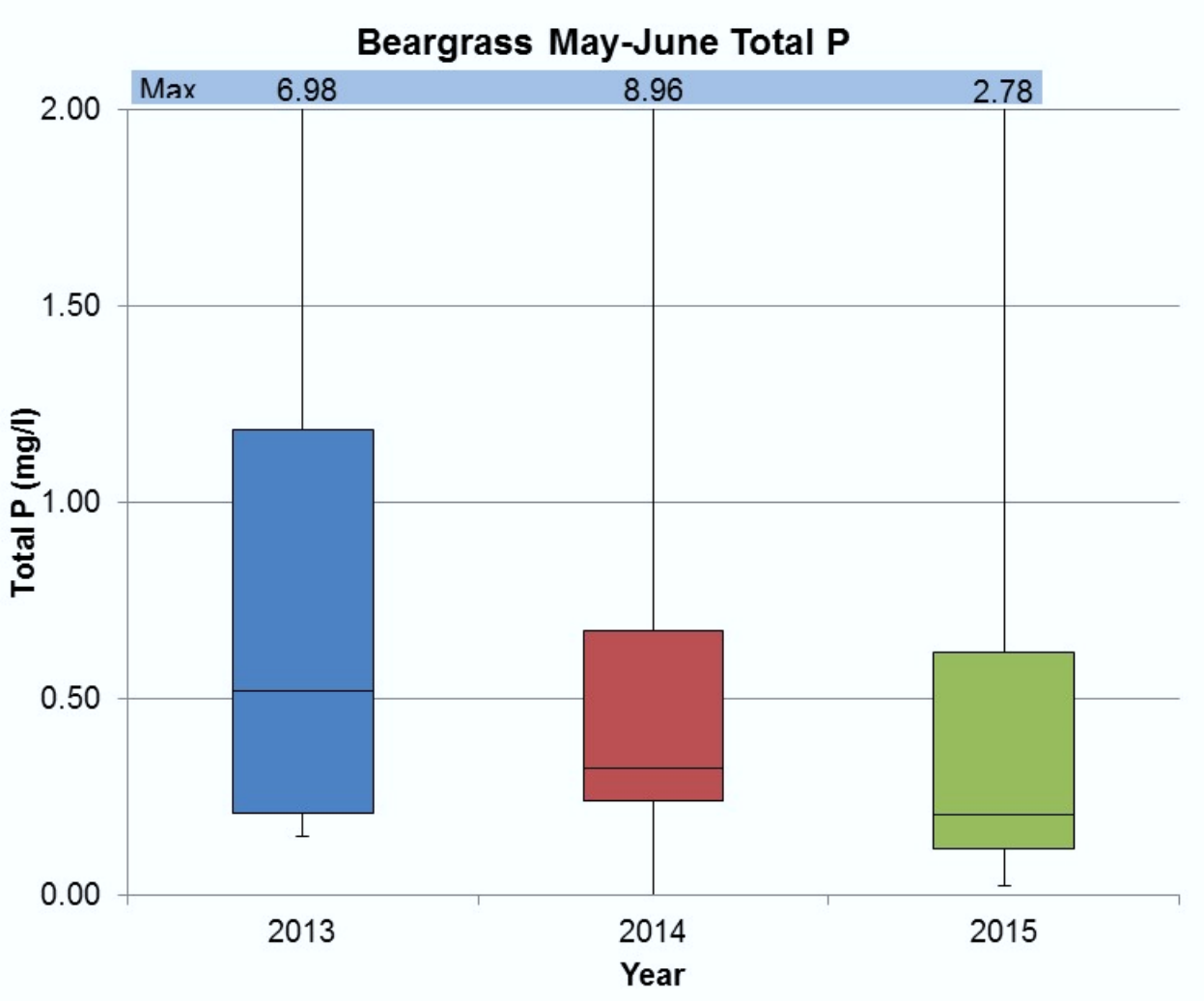
APPLICATION: Scenario development and assessment guided by landowner participants implement/ monitor/ adapt


All Practice Opportunities
Across watershed: Nutrient/manure management, Cover Crops, No-tillage or strip tillage
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

USDA
United States Department of Agriculture

Measuring Results: Water Quality

Natural Resources Conservation Service



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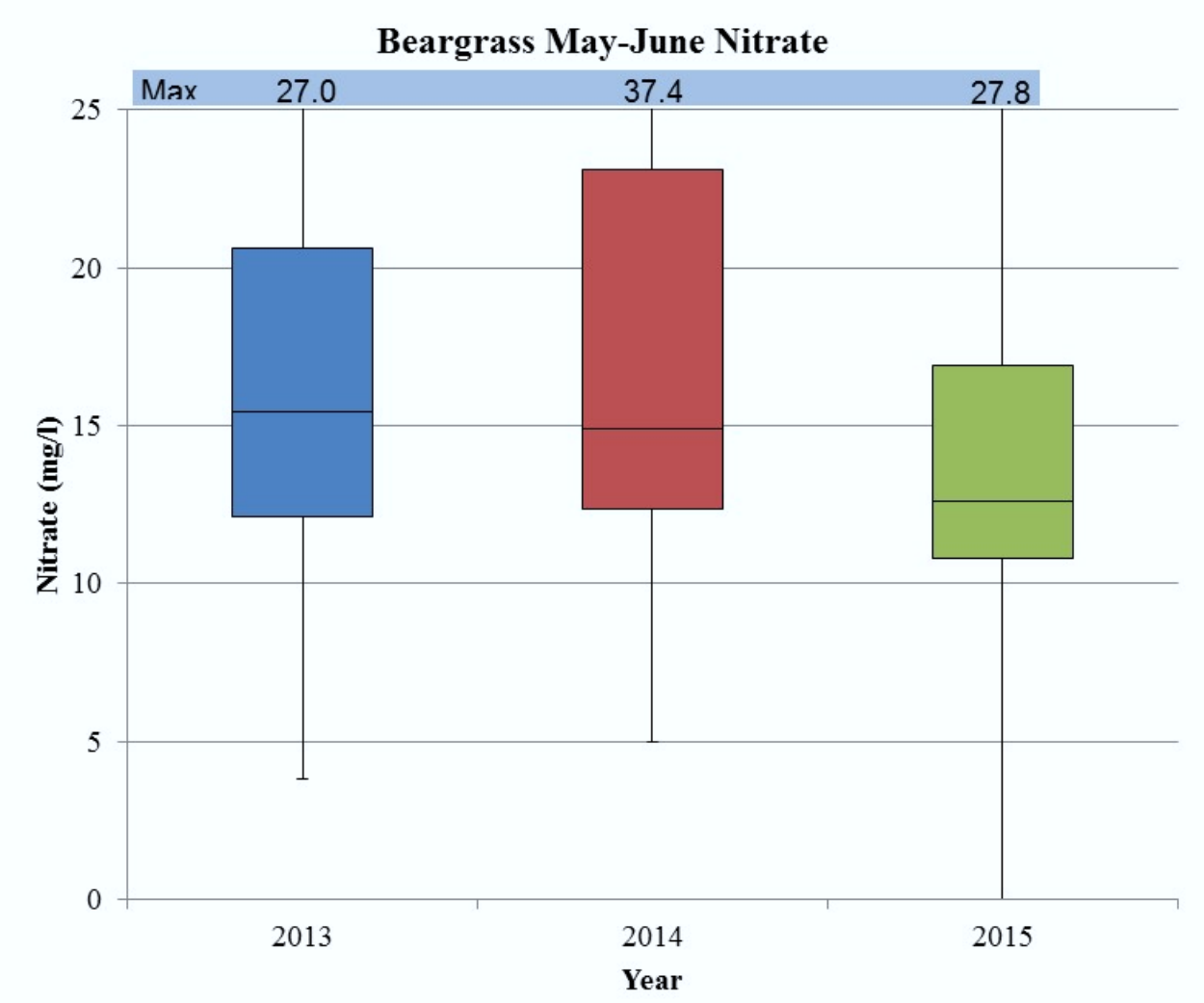

Measuring Results: Social Indicator Surveys

2014 Baseline Survey & 2016 Follow Up Survey to Measure Change

- **Adoption of 'innovative' conservation practices remained low, but awareness increased.**
  - denitrifying bioreactors, saturated buffers, controlled drainage, two stage ditches, and stream channel restoration
- **Key factors that encourage the initial adoption and continuing usage of cover crops include:**
  - availability of cost-share opportunities
  - a desire to reduce on-farm erosion and improve soil health
- **Key factors that discourage ongoing usage of cover crops include:**
  - decreased or unsightly yields
  - negative experiences with managing cover crops
- **Benefits of the Beargrass Creek Watershed Approach Project:**
  - water quality monitoring and data
  - opportunities to learn about and try new conservation practices
  - enhanced local relationships, and collaboration with other partners

Layering Conservation Results

Modeling

- Region 5
- ACPF

Monitoring

- Biological (Fish studies and Mussel reintroduction)
- Water Quality

Social Indicator Studies

Challenges

- **Staff Turnover**
  - District Conservationist
  - Watershed Coordinator
  - SWCS Manager
  - Prof. Sweeten Retiring
- **Social Change**
  - Reaching those that will work with us
  - Hit a wall with participation
  - Generational
- **Consistent Messages**
  - Public, private, university, NGO
- **Risk**
  - New management approaches: investment and uncertain outcome
  - Taking land out of production

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Natural Resources Conservation Service

Helping People Help the Land.