Pine Creek Stakeholder Meeting

Rachel Curry Watershed Outreach Associate



Improving our water resources with collaboration and innovation





What is a Watershed?

- A *watershed* is the land that water drains across or under on its way to the nearest water body, like a pond, lake, wetland, stream, creek, river, or ocean
- Watersheds come in all shapes and sizes!
- We all live in a watershed, and our actions can impact water quality where we live and downstream





What is a Watershed Plan?

Document that results from a watershed planning process

Provides assessment and management information Voluntary

Road map





Gulf of Mexico Hypoxic Zone

- Hypoxia = low oxygen
- One leading cause is excess nutrients primarily N and P
 - Promote algal overgrowth and eutrophication
 - Algae die and decomposition process consumes oxygen
- 2021 hypoxic zone was larger than average (approximately 6,300 square miles) and almost 3 x's larger than the 2035 goal



Map of measured Gulf hypoxia zone, July 25–31, 2021 (LUMCON/NOAA). Red area denotes 2 mg/L of oxygen or lower, the level which is considered hypoxic, at the bottom of the seafloor.



Illinois' Contributions

Total Nitrogen			Total Phosphorus				
State	Percent	Cumulative	Delivered	State	Percent	Cumulative	Delivered
	of Total	Percent of	Yield		of Total	Percent of	Yield
1	Flux	Total Flux	(kg km ⁻² yr ⁻¹)		Flux	Total Flux	$(\text{kg km}^2 \text{ yr}^1)$
Illinois	16.8	16.8	1734.9	Illinois	12.9	12.9	117.4
Iowa	11.3	28.1	1167.2	Missouri	12.1	25.0	89.4
Indiana	10.1	38.2	1806.6	Iowa	9.8	34.8	89.2
Missouri	9.6	47.8	800.5	Arkansas	9.6	44.4	94.6
Arkansas	6.9	54.7	750.1	Kentucky	9.0	53.4	113.4

Source: Alexander et al., 2008







How Are We Doing?



Biennial Report 2021











Illinois Nutrient Sources







NLRS Watershed Coordinators Priority Watersheds





- Coordinator Priority Watershed -Nitrogen
- Coordinator Priority Watershed -Phosphorus

watershed outreach associates











Pine Creek Watershed



HUC 10 watershed

Covers almost 43,000 acres all in Ogle Co.

Lower Rock River Watershed – N priority

Mt. Morris Creek North – 303 D Stream, Total P





Pine Creek Watershed 303(d)



Appendix C-2. Illinois' 2020/2022 303(d) List

1.5	Hydrologic Unit		Assessment Unit	Water	-	
Priority	Code	Water Body Name	ID	Size*	Designated Use	Cause
Medium	0709000505	Mt Morris Creek North	IL_PJBA-C1	2.77	Aquatic Life	PHOSPHORUS, TOTAL
	AND REAL PROPERTY AND ADDRESS.	The second se	11 T. 11 M. 11 T.	4.000	The second se	a series due teste :



Agricultural Solutions to Nutrient Loss

NITRATE

• IN FIELD PRACTICES

- NITROGEN MANAGEMENT
 - MRTN, INHIBITORS, SPLIT APPL.
- COVER CROPS
- **EDGE OF FIELD PRACTICES**
 - BIOREACTORS
 - BUFFERS (NON-TILE DRAINED)
 - WETLANDS
- LAND USE CHANGE
 - PERENNIAL/ENERGY CROPS

PHOSPHORUS

- IN FIELD PRACTICES
 - REDUCED TILLAGE SYSTEMS
 - SOIL TESTS/NUTRIENT
 MANAGEMENT
 - COVER CROPS
 - EDGE OF FIELD PRACTICES
 - BUFFERS
- LAND USE CHANGE
 - PERENNIAL/ENERGY CROPS





In Field Practices

Reduced Tillage No Tillage Nitrogen Management MRTN N inhibitors Cover Crops





Controlled Drainage



Image courtesy of *Ten Ways to Reduce Nitrogen Loads from Drained Cropland in the Midwest.*

Drainage water management is the process of adjusting elevation of a drainage system outlet, called a control structure, to control the volume of water leaving the field and reduce nutrient loss



Woodchip Bioreactors

A woodchip bioreactor is a lined trench filled with a C source (wood chips). Drainage water is routed to the bioreactor through control structures. The control structures are used to manage drainage water.



(Image from L. Christianson, UIUC)



Saturated Buffers

Saturated buffers store water within the soil profile of field buffers, by diverting tile water into shallow laterals that raise the water table within the buffer and slow outflow.



Image courtesy of *Ten Ways to Reduce Nitrogen Loads from Drained Cropland in the Midwest*.



Land Use Change

Less productive ground out of row crops

Energy Crops

Perennial Crops



Photo: Jeff Skousen





Agricultural Sector: State and Federal Cost-Share Programs

U.S. Department of Agriculture Natural Resources Conservation Service



Conservation Reserve Program

Environmental Quality Incentives program

Conservation Stewardship Program

Wetland Reserve Easement Program



Conservation Reserve Enhancement Program



Partners for Conservation

Cover Crop Premium Discount Program



319 Nonpoint Source Grant Program



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Contact information

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Types of Pollution

Point Source Pollution

Any discernible, confined, and discrete conveyance from which pollutants may be discharged.

- Pipe
- Ditch
- Tunnel
- Conduit
- Well
- Concentrated animal feeding operation (CAFO)
- Vessel or other floating craft

Nonpoint Source Pollution Harder to define...

- Excess fertilizers and pesticides from agricultural lands and residential areas
- Oil, grease, and toxic chemicals from urban runoff
- Sediment construction sites, forest and crop land, eroding streambanks
- Livestock on pasture and pet waste







LUMCON/NOAA



The Illinois Nutrient Loss Reduction Strategy

- Released July 21, 2015
- Addresses nutrient loads from Point Sources, Urban Stormwater, and Agriculture Nonpoint Sources
- Gulf of Mexico hypoxia
- Impacts of nutrients on local water quality

<u>GOAL</u>: REDUCE N AND TOTAL P LOSSES BY 45% <u>INTERIM GOAL</u>: REDUCE N BY 15% AND TOTAL P BY 25% BY 2025







Riverine Loads of Nitrate-N and Total P



Figure 3.5. Riverine loads of nitrate-nitrogen and total phosphorus averaged for 1980-1996 and 1997-2011.



Table 3.2 Statewide Riverine Flow and Loads

	1980-96 Baseline	2013-17		2014-18		2015-19	
	Average Value	Average Value	% Change from Baseline	Average Value	% Change from Baseline	Average Value	% Change from Baseline
Water Yield (in/yr)	13.0	14.7	+13%	14.1	+9%	16.3	+25%
Nitrate-N Load (million lb/yr)	397	425	+7%	380	-4.4%	448	+13%
Total Phosphorus Load (million lb/yr)	34	42	+23%	41	+20%	46	+35%





Dr. Greg McIsaac

Figure 3.4 Nitrate-N Load



Dr. Greg McIsaac



Nitrate-N Load Estimates in Major Rivers in Illinois 1980-96 and 2013-17

No. 10 Annual State Stat

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Figure 3.5 Changes in Nitrate-N Load





Figure 3.7 Total Phosphorus Loads





Figure 3.8 Changes in Total Phosphorus Loads



Dr. Greg McIsaac



Figure 3.6 Changes in Water Yield





Dr. Greg McIsaac

Nutrient Loss Practices

Practice	Decision	Efficiency Number	Cost	
Saturated buffers	Include as an NLRS practice	40% nitrate-N loss reduction; 0% P loss reduction	\$10/ac/yr*	
Grade stabilization	Insufficient information	-	-	
Blind inlets	Insufficient information	-	-	
Terraces	Include as an NLRS practice	40% P loss reduction in non-tiled fields; 0% nitrate-N loss reduction	\$40/ac/yr	
WASCOBs	Insufficient information	-	-	





How Can We Reach the interim goals?



Figure 8.5. Agricultural implementation as compared with scenario NP7 (which reflects interim goals)



How Can We Reach 45% Reduction?



Figure 8.6. Agricultural implementation as compared with scenario NP8



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