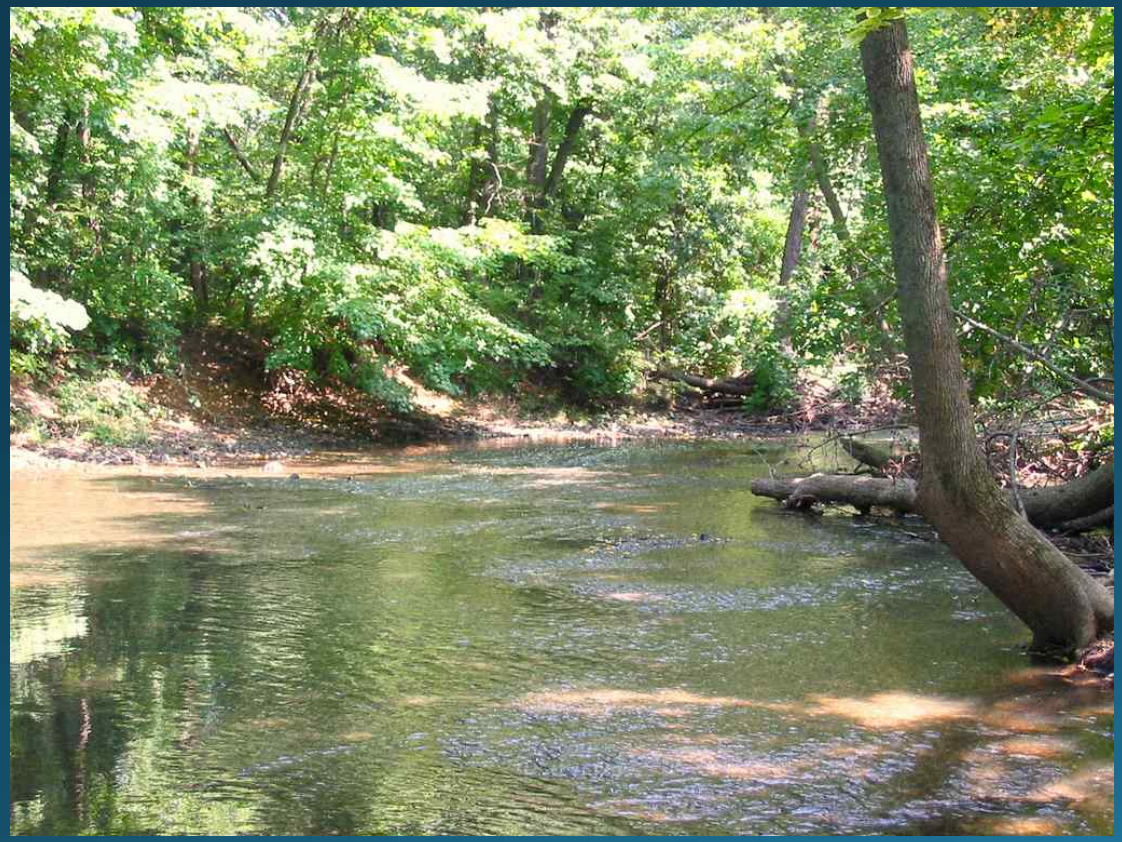
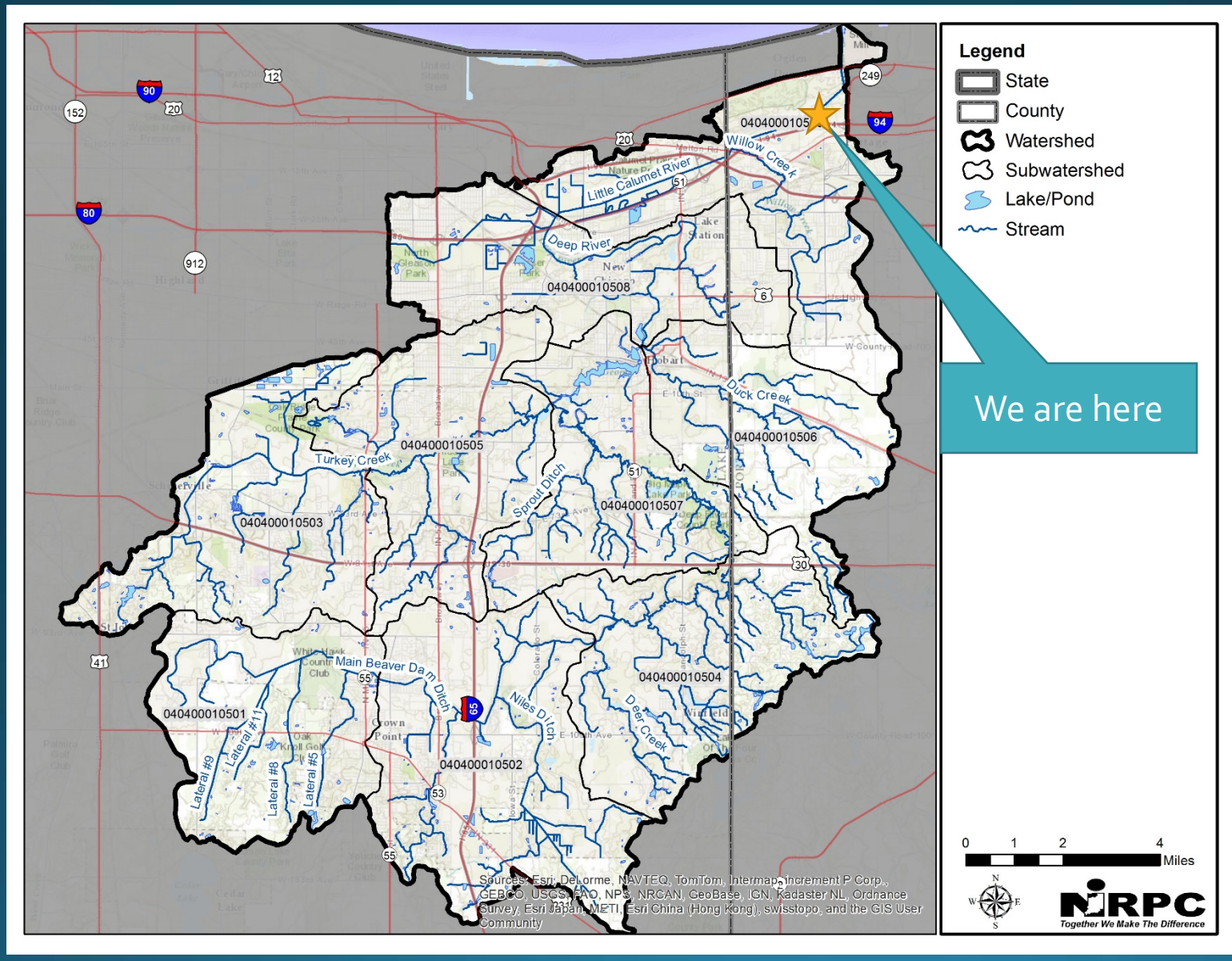
Deep River-Portage Burns Waterway Initiative



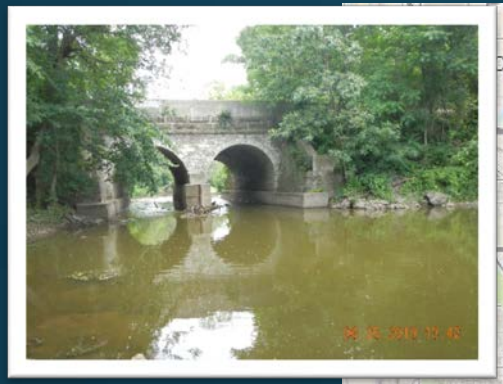
EMPC

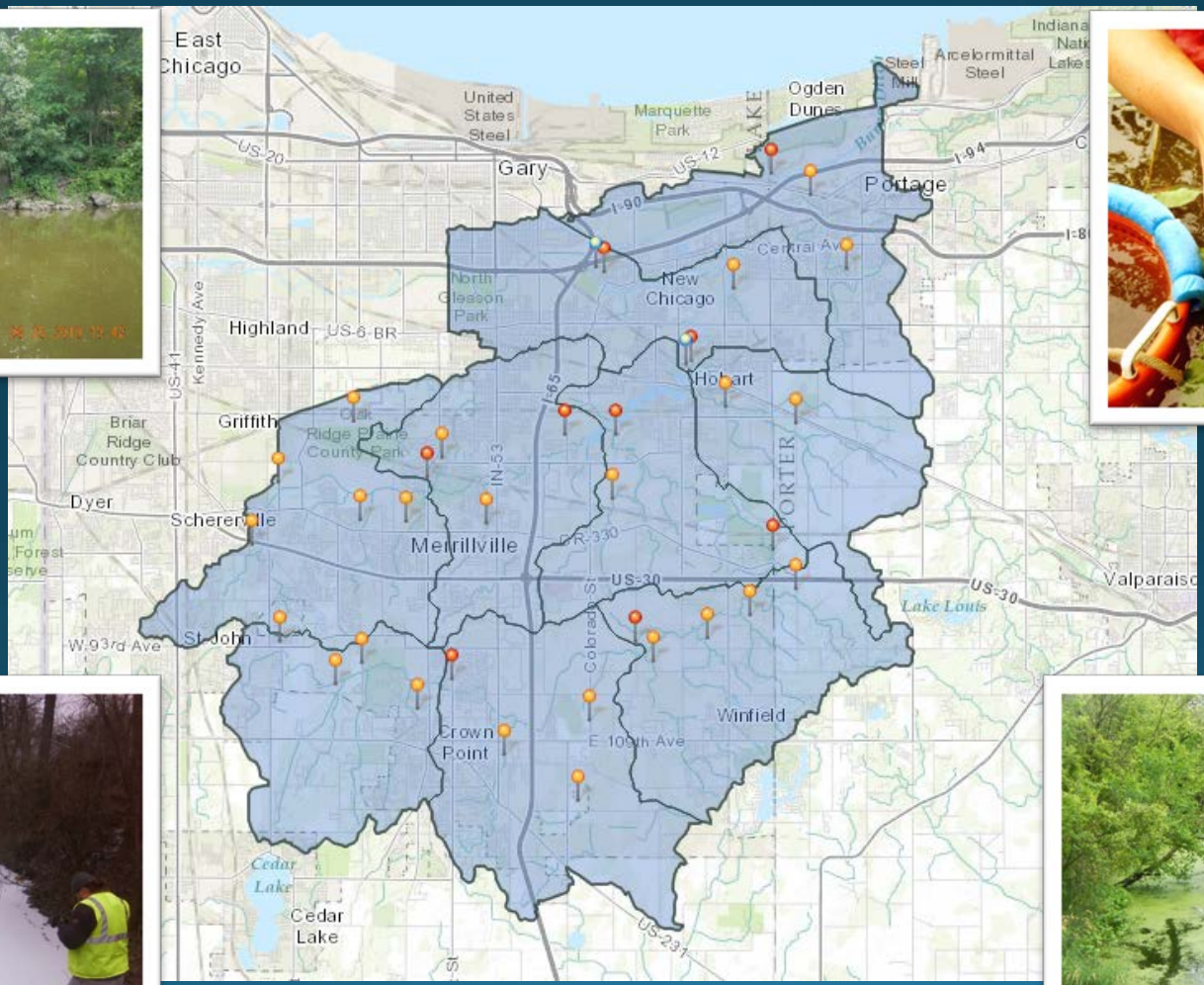
August 7, 2014

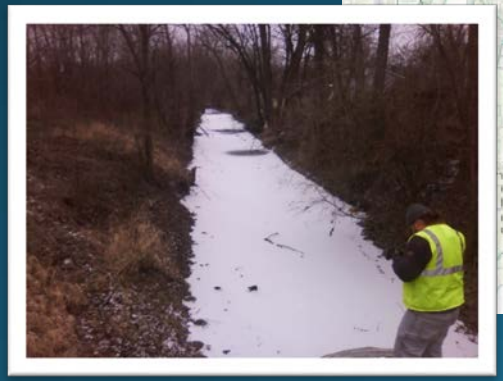
Our Watershed

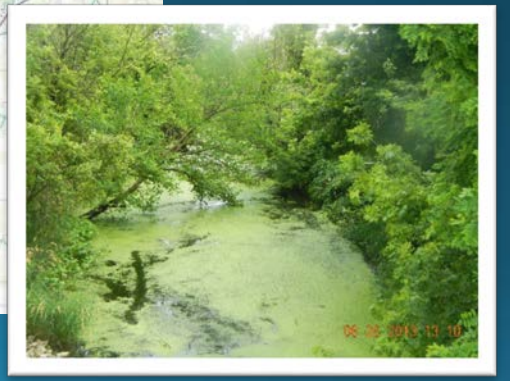


Deep River-Portage Burns Waterway Baseline Assessment & TMDL Study





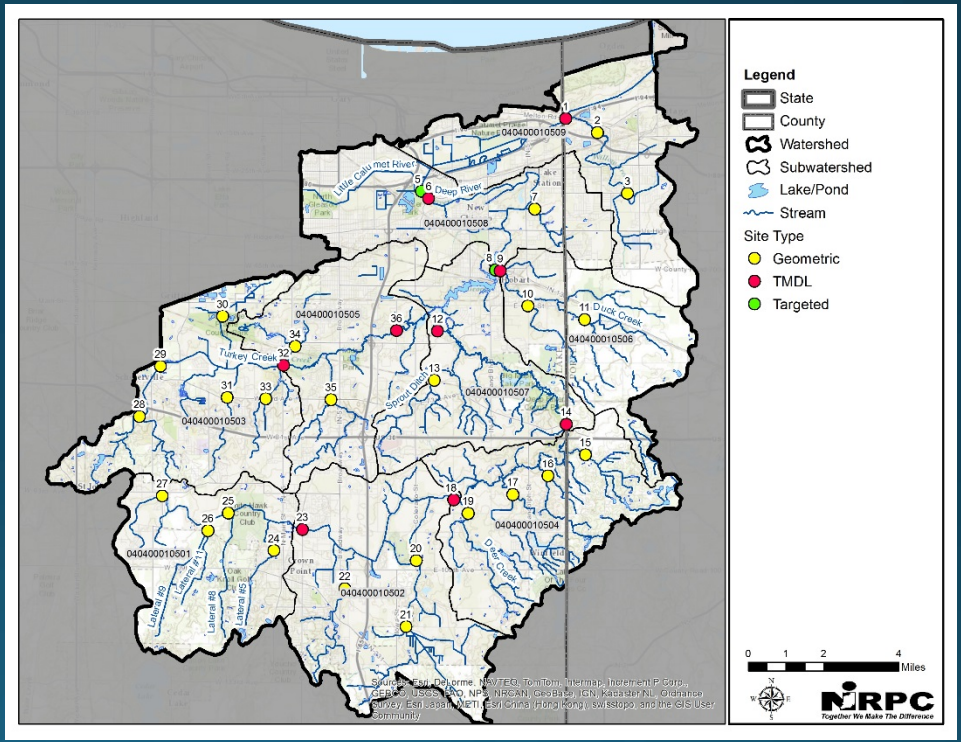




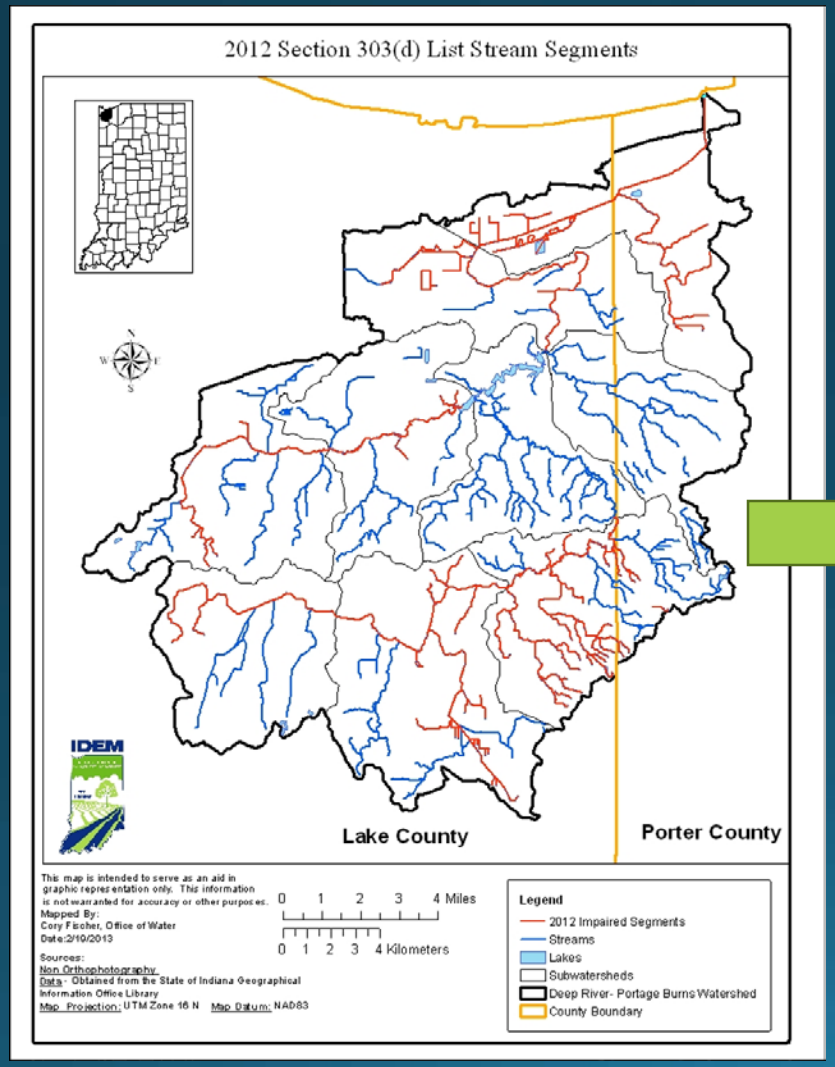
http://www.in.gov/idem/nps/3893.htm

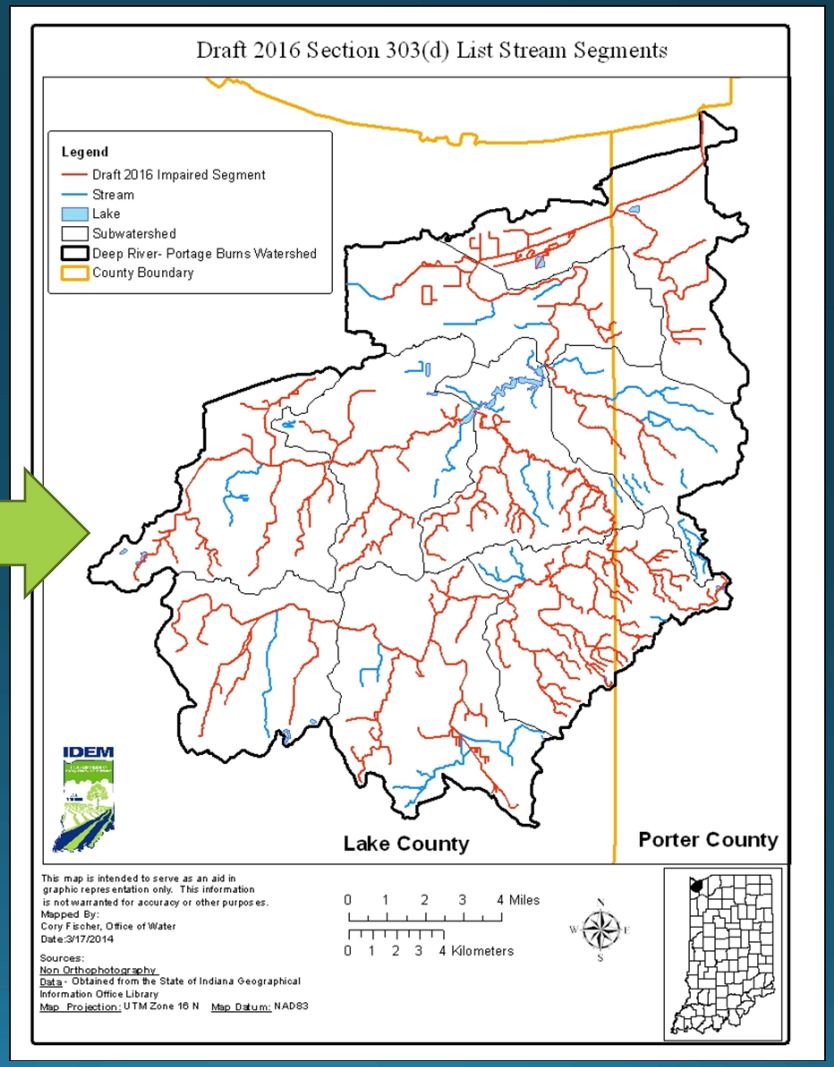
Stream Monitoring (April 2013 – March 2014)

- 35 sites sampled monthly April-October
- 9 pour point (subwatershed) sites sampled for a year
- Parameters
  - E. coli
  - Nutrients
  - Sediment
  - Flow
  - Habitat
  - Fish
  - Macroinvertebrates



Impaired Waterbodies





Impairment Summary

Impairment	2012 Impaired Miles	2016 Impaired Miles	Impaired Stream Miles Changed
IBC	92	225	+133
E. coli	51	210	+159
Nutrients	0	61	+61
Dissolved Oxygen	15	97	+82
PCBs Fish Tissue	34	34	0
Siltation	12	12	0
Free Cyanide	9	9	0

TMDL Allocations

TMDL = WLA + LA + MOS

- Wasteload allocations (WLA) for "point sources" (regulated under NPDES)
- Load allocations (LA) for nonpoint sources and
- MOS for margin of safety

TMDL Target Values

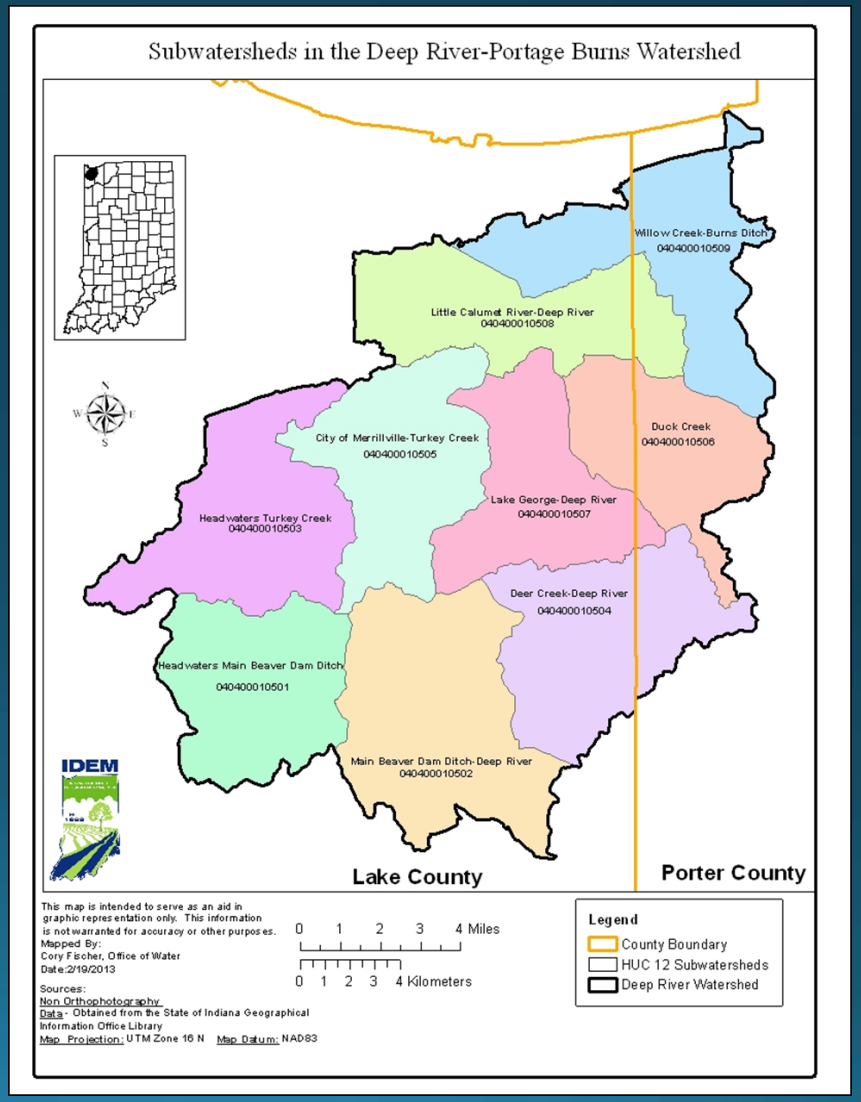
• E. coli	125 counts/100mL (geo. mean)
• Total Phosphorus	0.30 mg/L
• Total Nitrogen	10mg/L
• Total Suspended Solids	30mg/L

Percent Reductions Needed

HUC 12	E. coli	TP	TN	TSS
Headwaters Main Beaver Dam Ditch	82%	59%	0%	66%
Main Beaver Dam Ditch	70%	82%	51%	89%
Headwaters Turkey Creek	71%	89%	0%	77%
Deer Creek- Deep River	67%	35%	0%	73%
City of Merrillville-Turkey Creek	82%	23%	0%	80%
Duck Creek	81%	65%	0%	69%
Lake George-Deep River	75%	57%	0%	89%
Little Calumet River- Deep River	64%	0%	0%	9%
Willow Creek-Burns Ditch	82%	0%	0%	62%

$$\% \text{ Reduction} = \frac{(\text{Observed Maximum} - \text{Target Value or WQS})}{\text{Observed Maximum}}$$

$$\% \text{ Reduction} = \frac{(\text{Observed Geomean} - \text{Target Value or WQS})}{\text{Observed Geomean}}$$

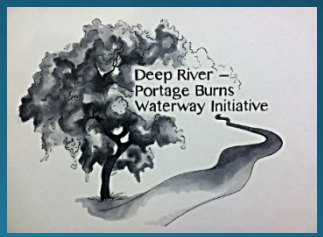


Potential Priority Implementation Areas & BMPs

Subwatershed	PPIA Rank	Implementation Actions
Lake George- Deep River (040400010507)	1	Outreach and education and training Stormwater Planning and Management Conservation tillage/residue management Cover crops Conservation easements Grazing land management Comprehensive Nutrient Management Plan Drainage Water Management Stream fencing (animal exclusion) Manure handling, storage, treatment, and disposal Riparian buffers Filter strips Rain garden Green roof Dam modification or removal Constructed Wetland
Willow Creek- Burns Ditch (040400010509)	2	
Deer Creek- Deep River (040400010504)	3	
City of Merrillville- Turkey Creek (040400010505)	4	
Little Calumet River- Deep River (040400010508)	5	
Headwaters Turkey Creek (040400010503)	6	
Main Beaver Dam Ditch (040400010502)	7	
Headwaters of Main Beaver Dam Ditch (040400010501)	8	
Duck Creek (040400010506)	9	

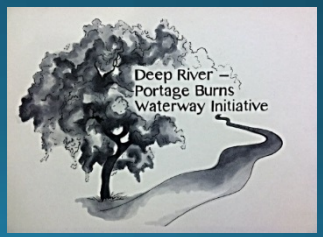
The Watershed Management Plan

- Watershed Community Initiative (elements 1-3)
- Watershed Inventory (elements 4-16)
- Identify Problems & Causes (elements 17-18)
- Identify Sources & Calculate Loads (elements 19-21)
- Set Goals & Identify Critical Areas (elements 22-24)
- Choose Measures/ Best Management Practices (elements 25-26)
- Action Register & Schedule (element 27-31)
- Tracking Effectiveness (elements 32-33)

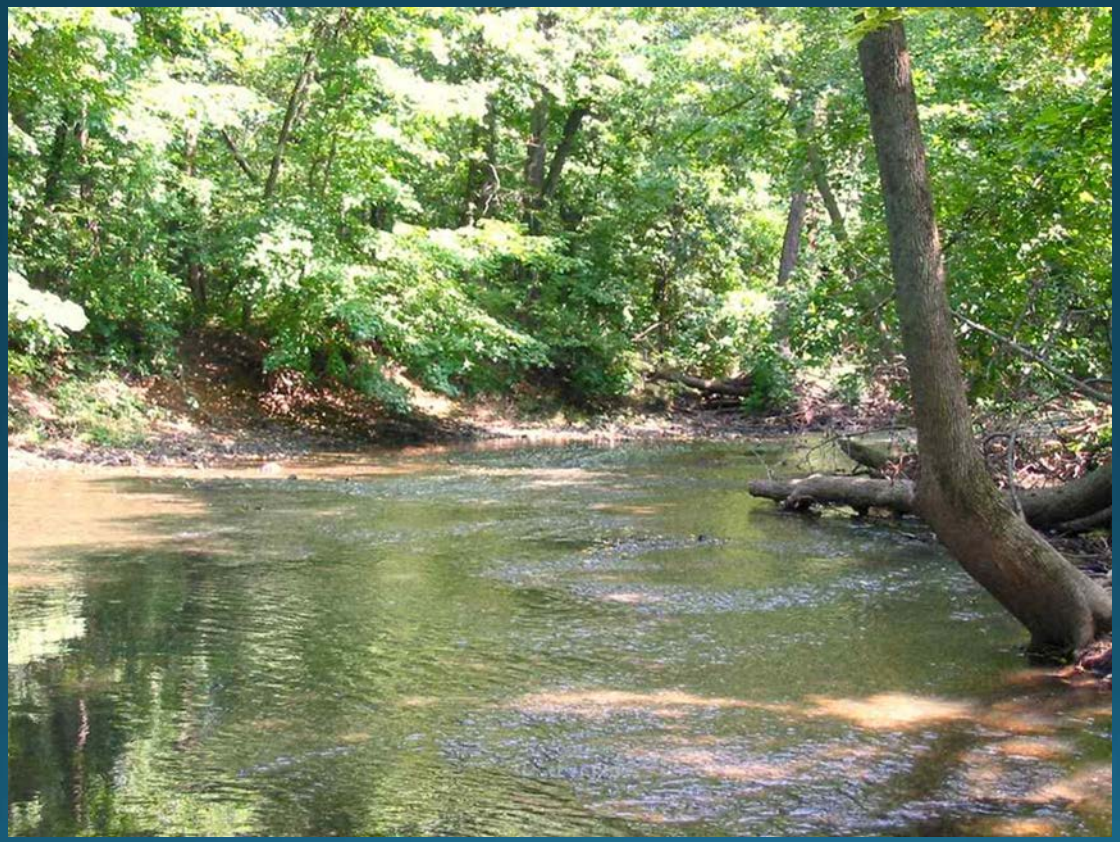


Watershed Plan- Work Completed to Date

- Why the watershed project was initiated
- Steering committee
- Stakeholder concerns
- Geology/Topography
- Hydrology
- Soil Characteristics
- Land-Use
- Other Planning Efforts
- Endangered/ Threatened/ Rare Species
- Relevant Relationships

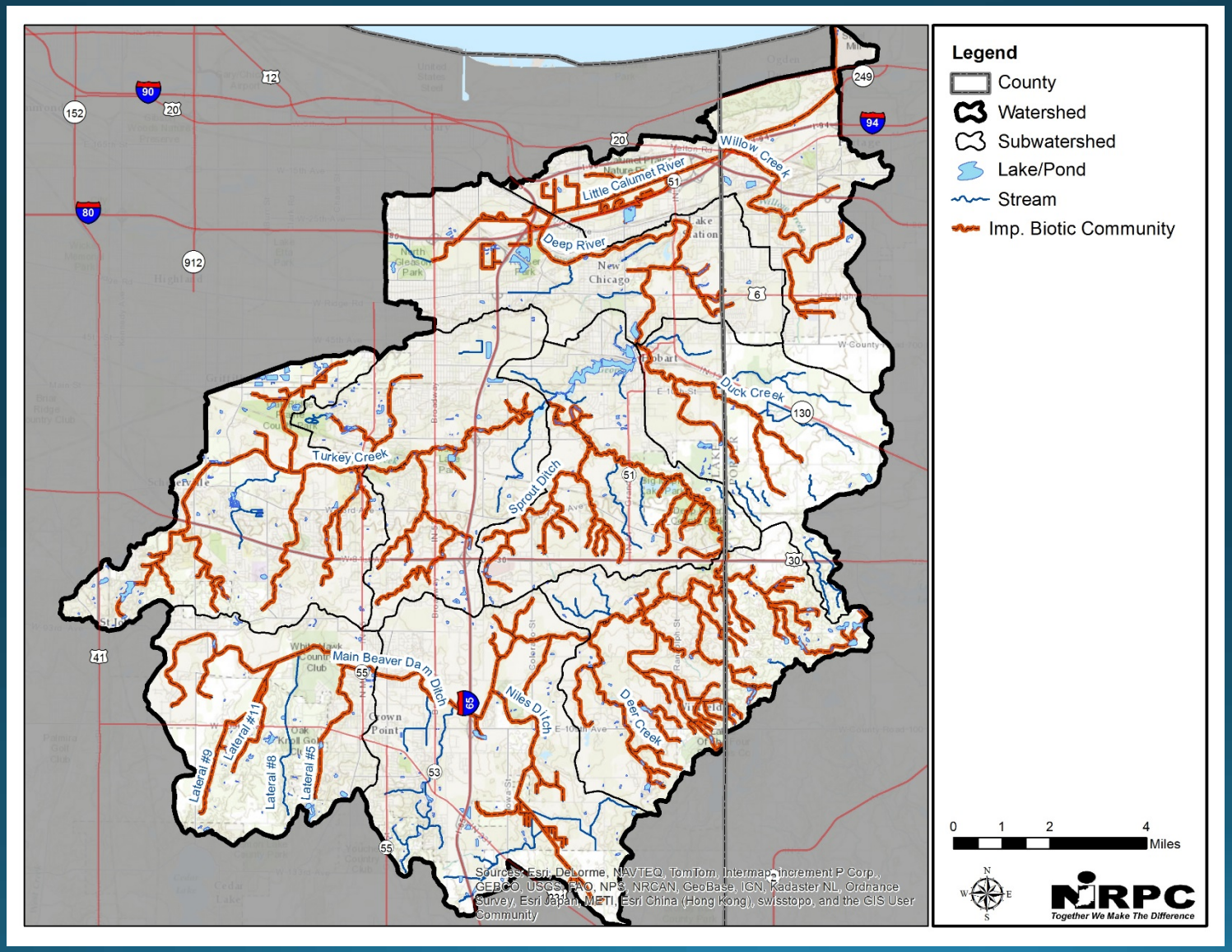


Establishing Target Values to Restore/ Protect Stream Health

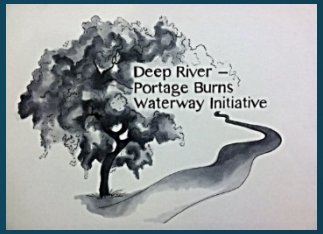


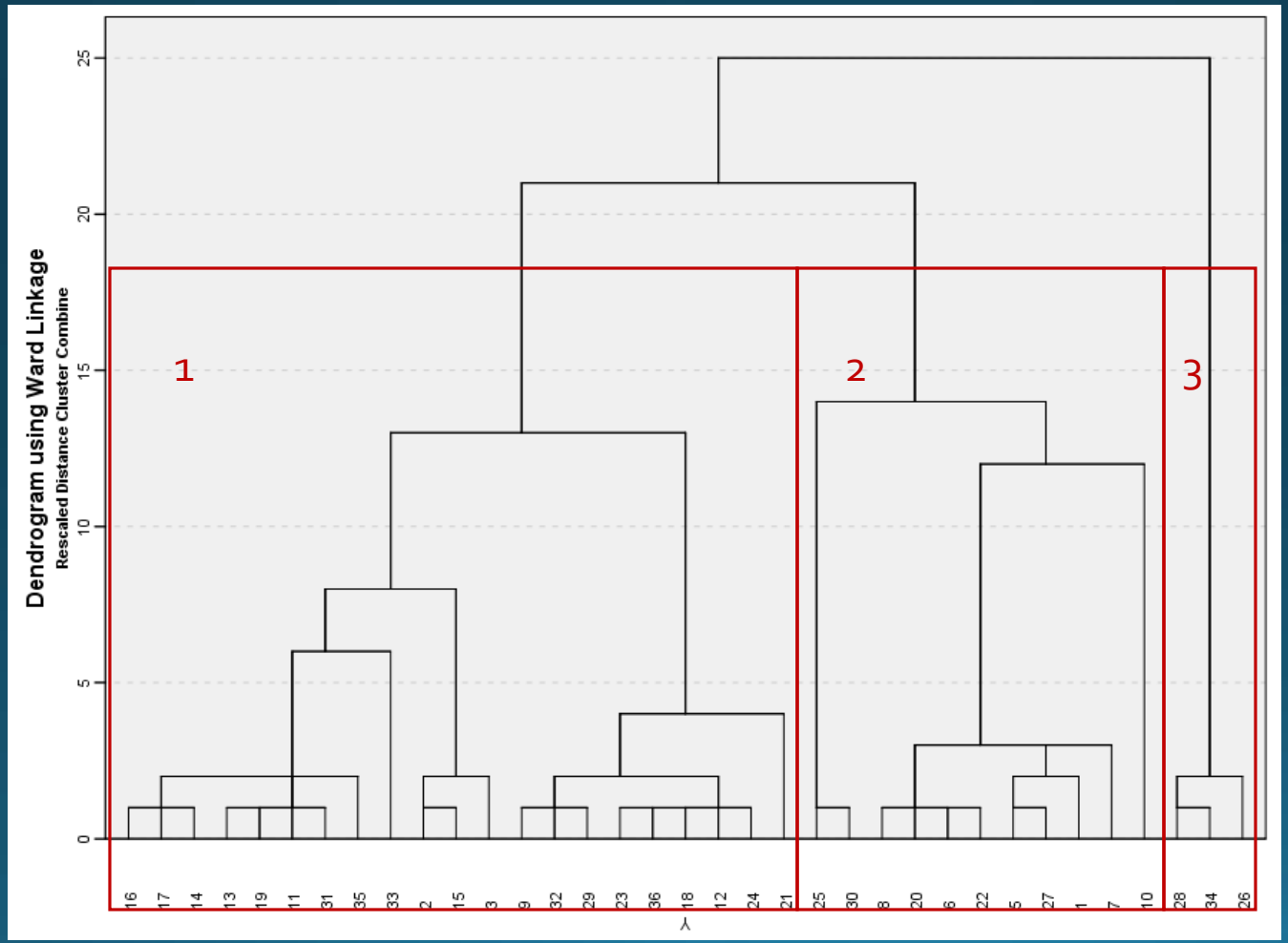
Deep River – Portage Burns Waterway Initiative

Impaired Biotic Communities



Mining the Data





Explaining Variability in Fish Communities

Communalities

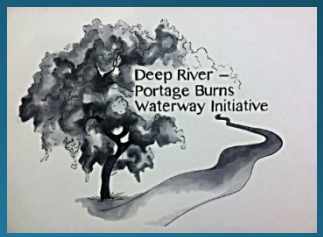
	Initial	Extraction
Temp	1.000	.653
DO	1.000	.957
DO_Sat	1.000	.945
LC13	1.000	.951
Channel	1.000	.707
Nitrate	1.000	.556

Extraction Method: Principal Component Analysis.

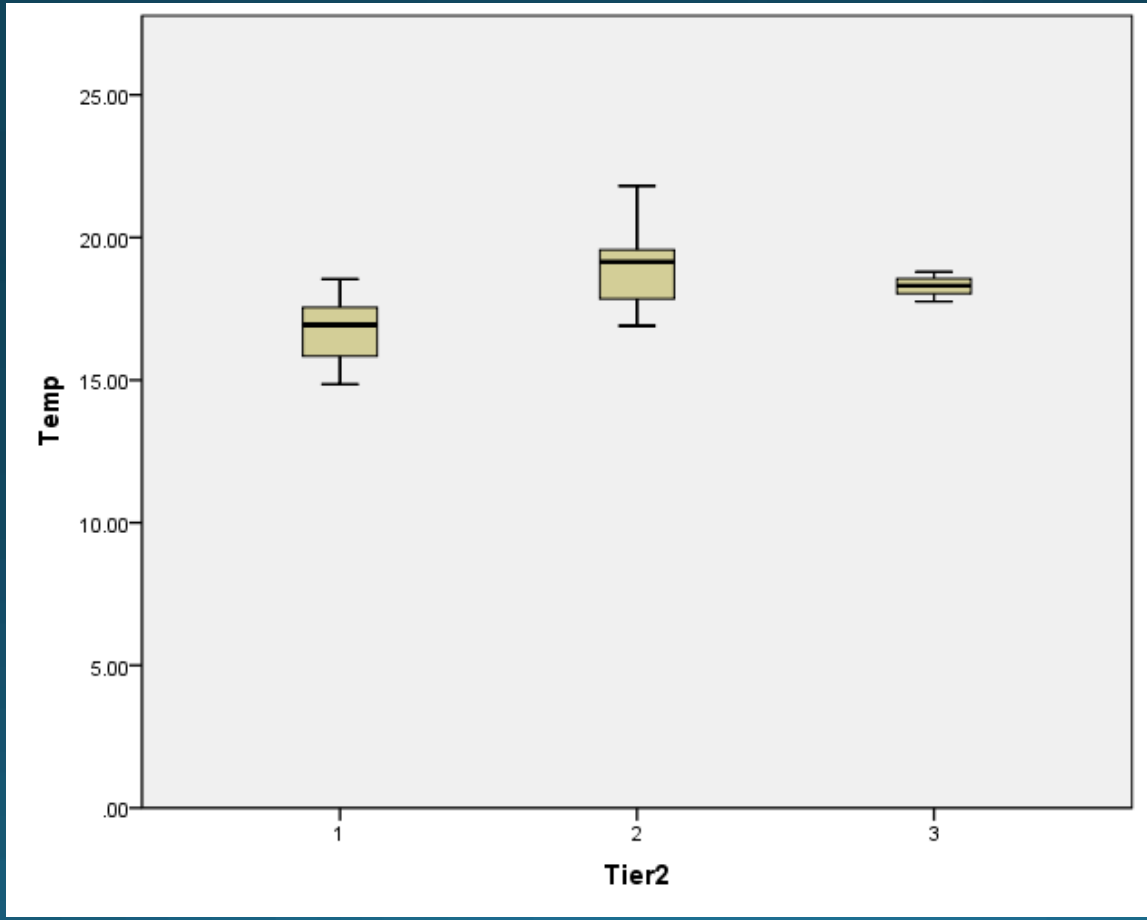
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.599	43.320	43.320	2.599	43.320	43.320
2	1.141	19.023	62.343	1.141	19.023	62.343
3	1.028	17.129	79.472	1.028	17.129	79.472
4	.877	14.621	94.093			
5	.353	5.889	99.981			
6	.001	.019	100.000			

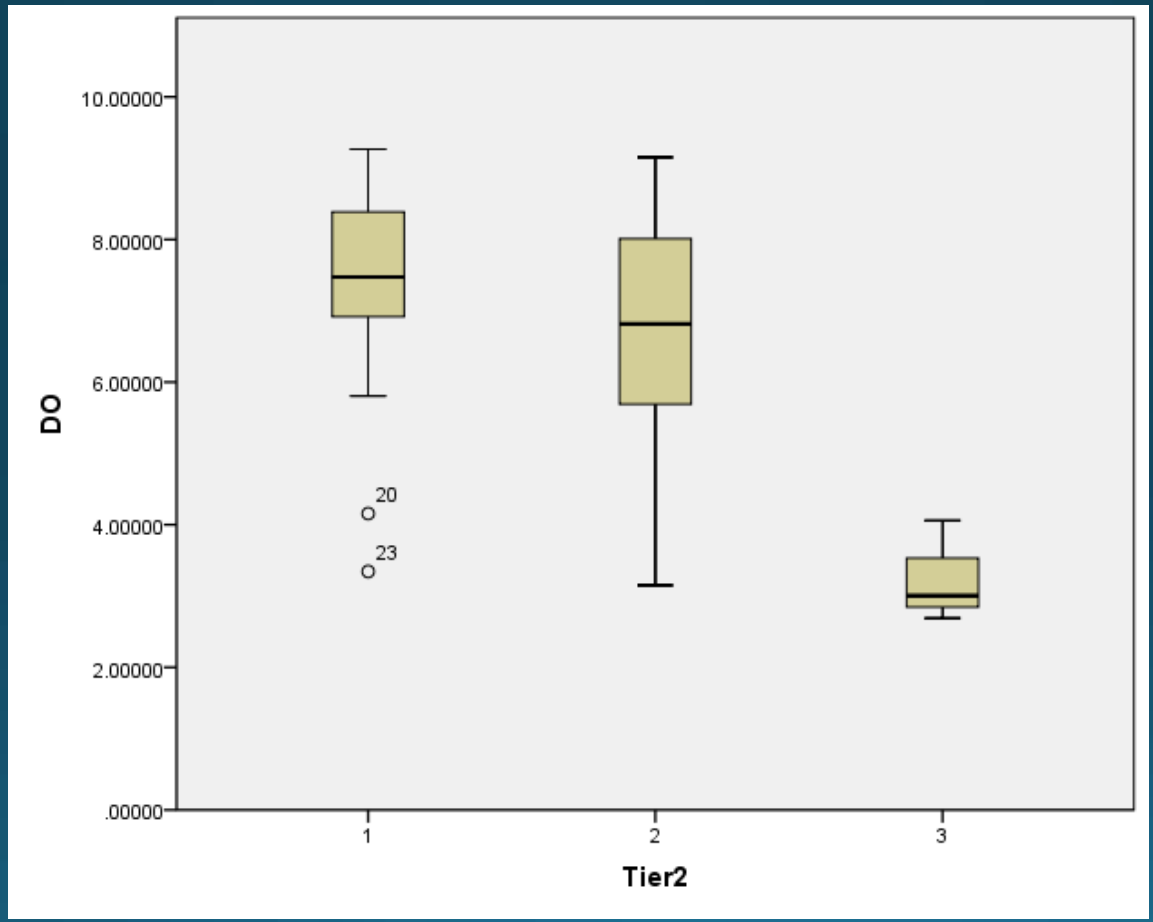
Extraction Method: Principal Component Analysis.



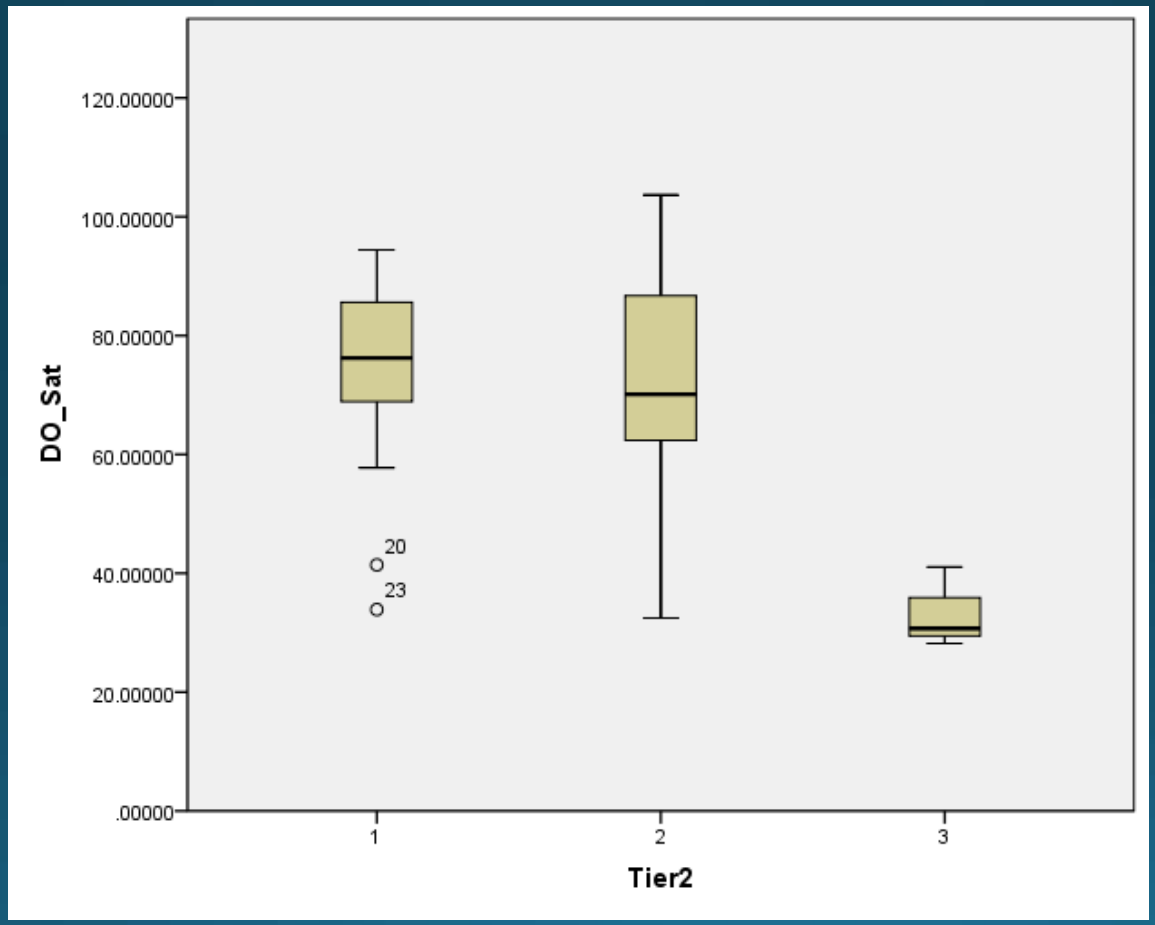
Water Temperature



Dissolved Oxygen

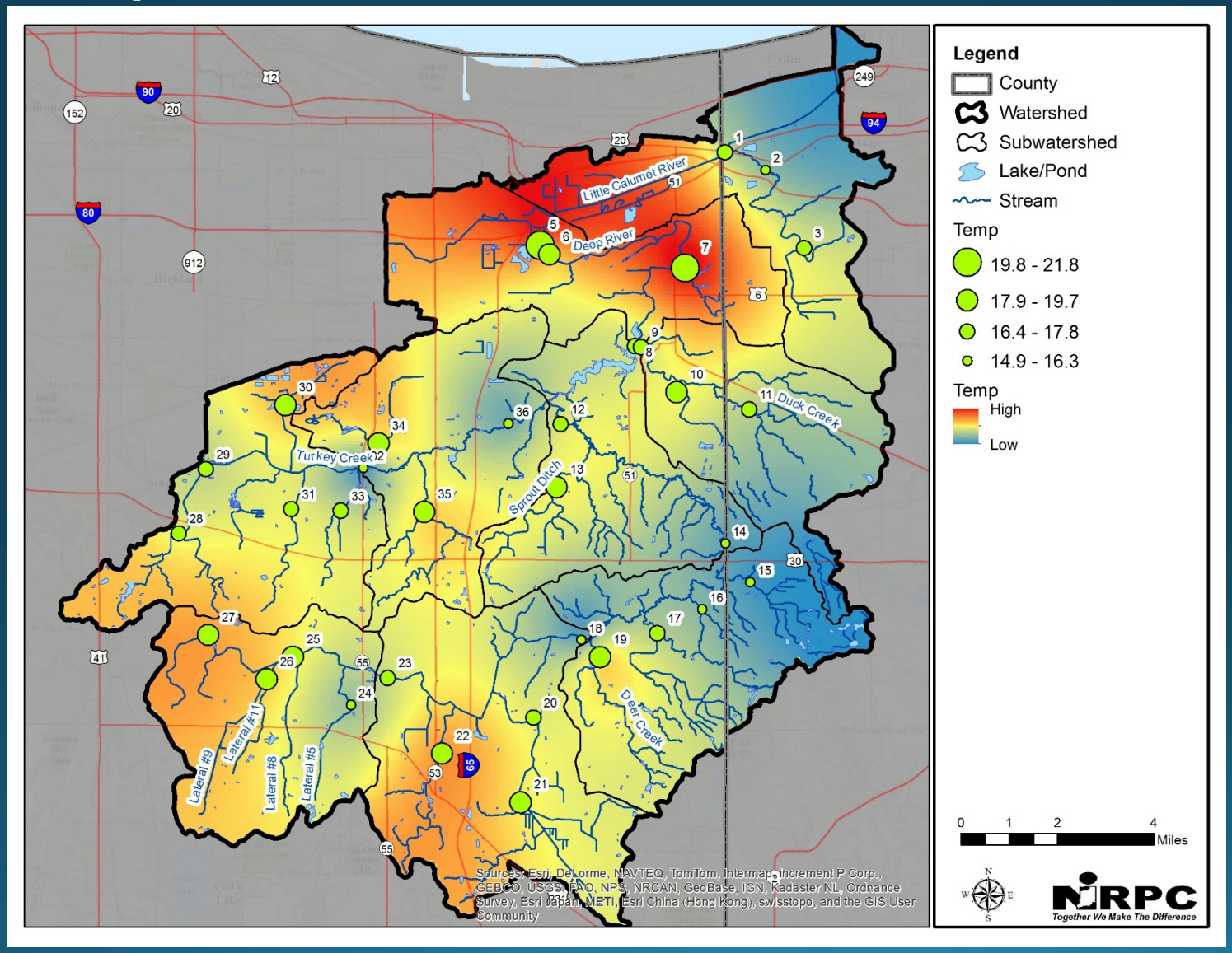


Dissolved Oxygen % Saturation

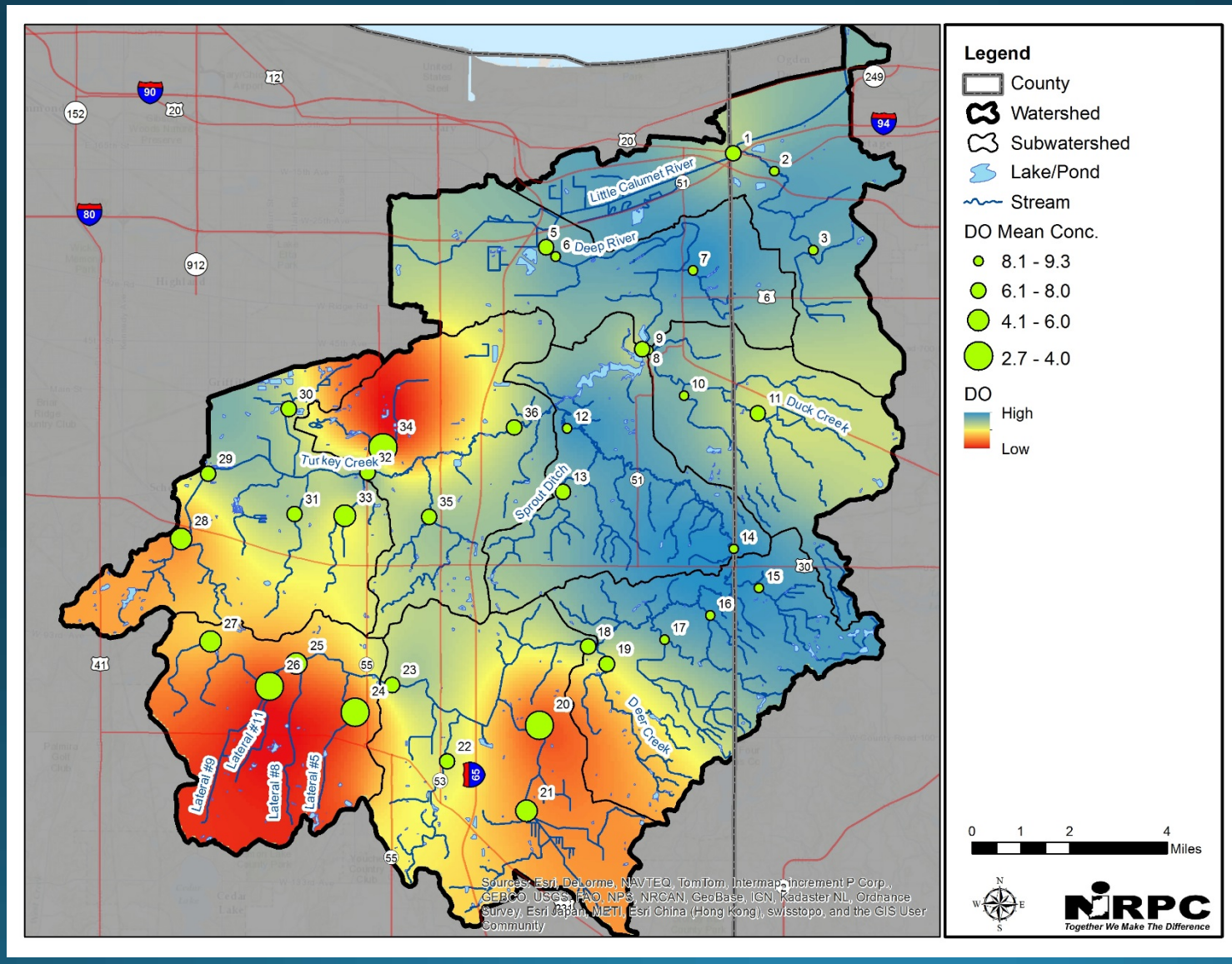


Deep River – Portage Burns Waterway Initiative

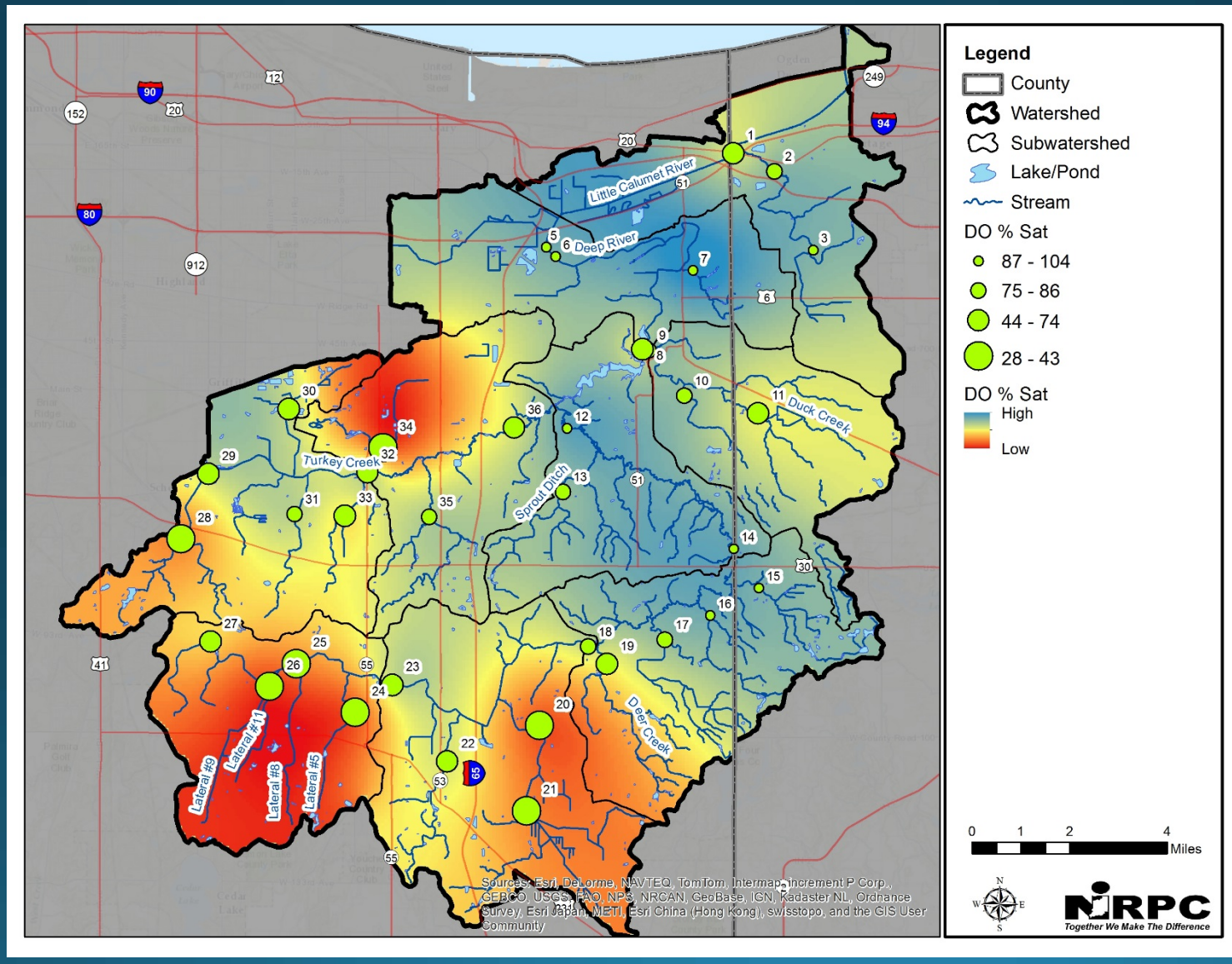
Temperature



Dissolved Oxygen



Dissolved Oxygen % Saturation



Next Steps

- Complete Watershed Inventory (Parts II-III)

Next Quarter (Oct-Dec)

- Load Reductions from TMDL
- ID Problems & Causes
- ID Sources & Calculate Loads
- Set Goals & ID Critical Areas

Questions/Comments?

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http://www.nirpc.org/environment/deep-river-portage-burns-waterway-initiative.aspx