



# Wetlands by Design

## A Watershed Approach for Wisconsin



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# Why Wetlands? Why Ecosystem Services?



Multiple Services: >\$3B/year

Flood abatement: flood costs reduced by 92%

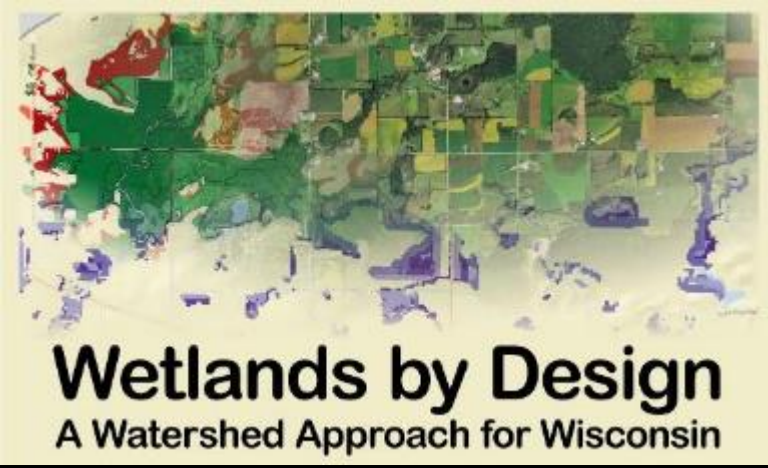
Multiple Services: Restoration value \$600/ac > current land use

Water quality: one treatment wetland saved \$282M

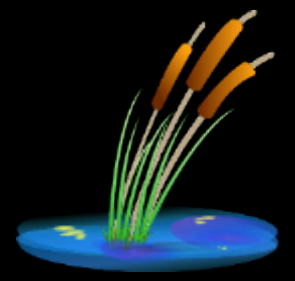
Nitrate reduction: 5x more effective than upland practices

Multiple services: \$1.6M/acre/year

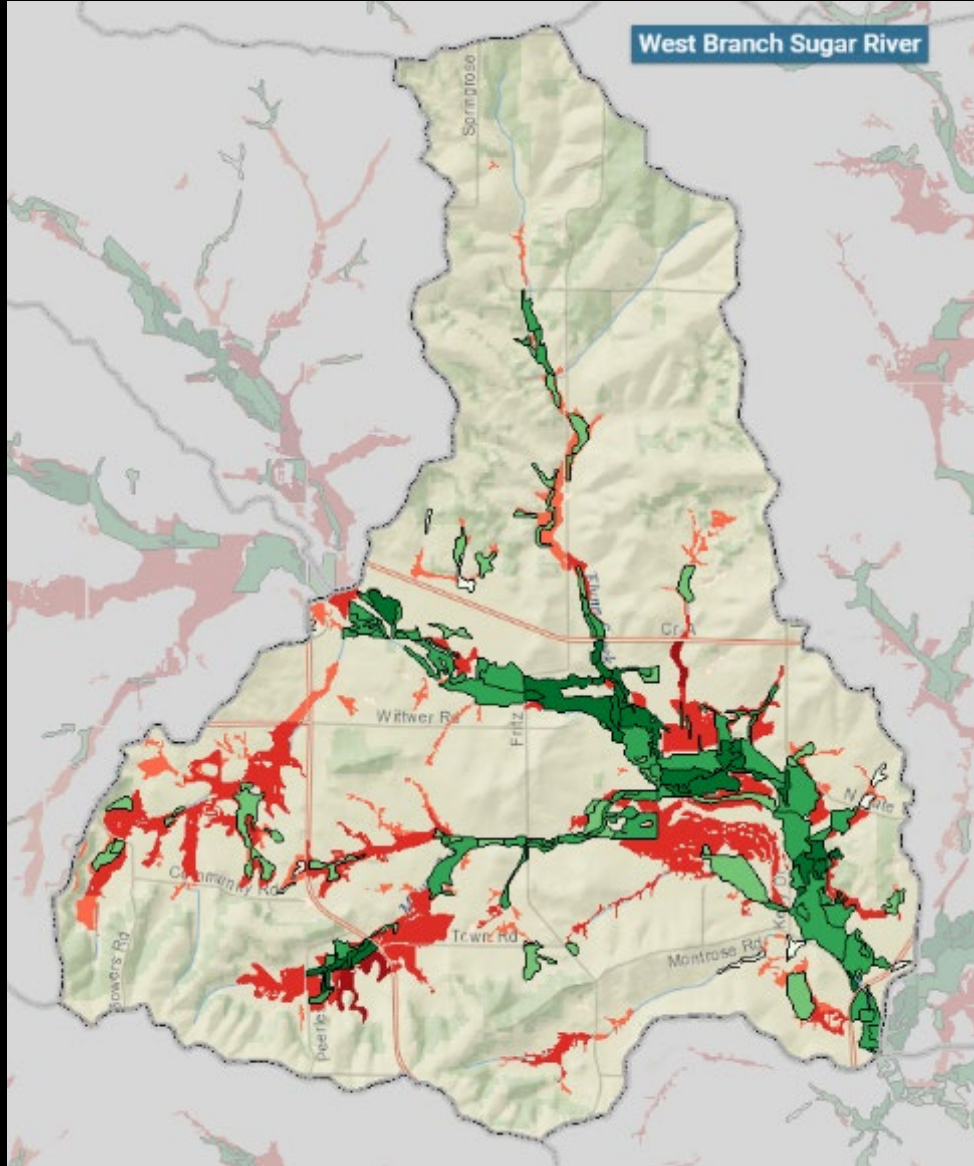
Multiple Services: valued 10x > any upland



## *Why a Watershed Approach?*

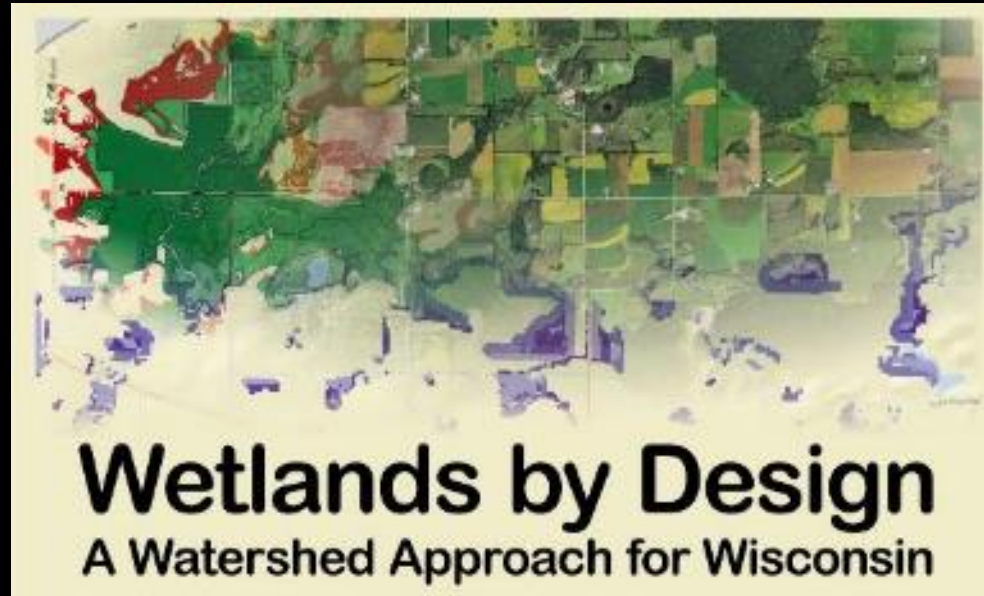


# *Wetland Conservation Opportunities*



*Preservation Opportunities*  
*Restoration Opportunities*





**A. Determine Watershed Needs**

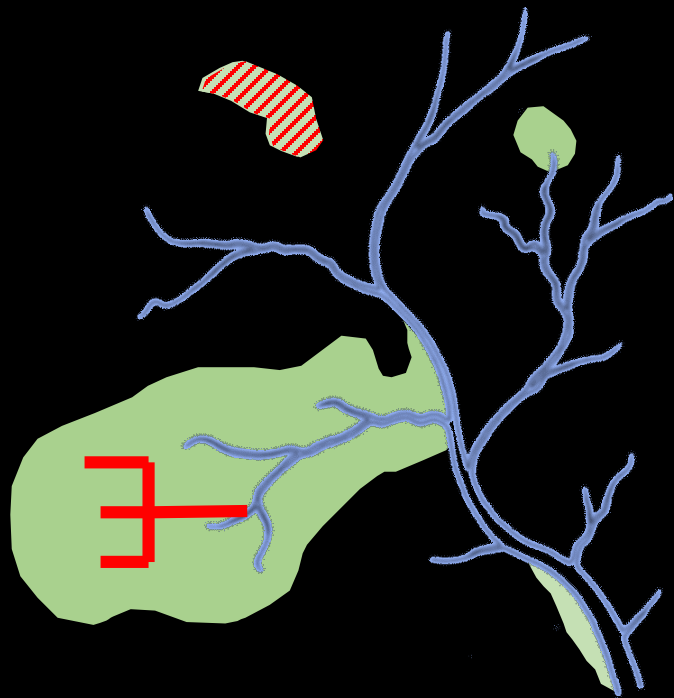
**B. Prioritize Sites**

**C. Consider Wetland Wildlife Habitat**

# A. Watershed Needs



**Historical  
Service Provision**

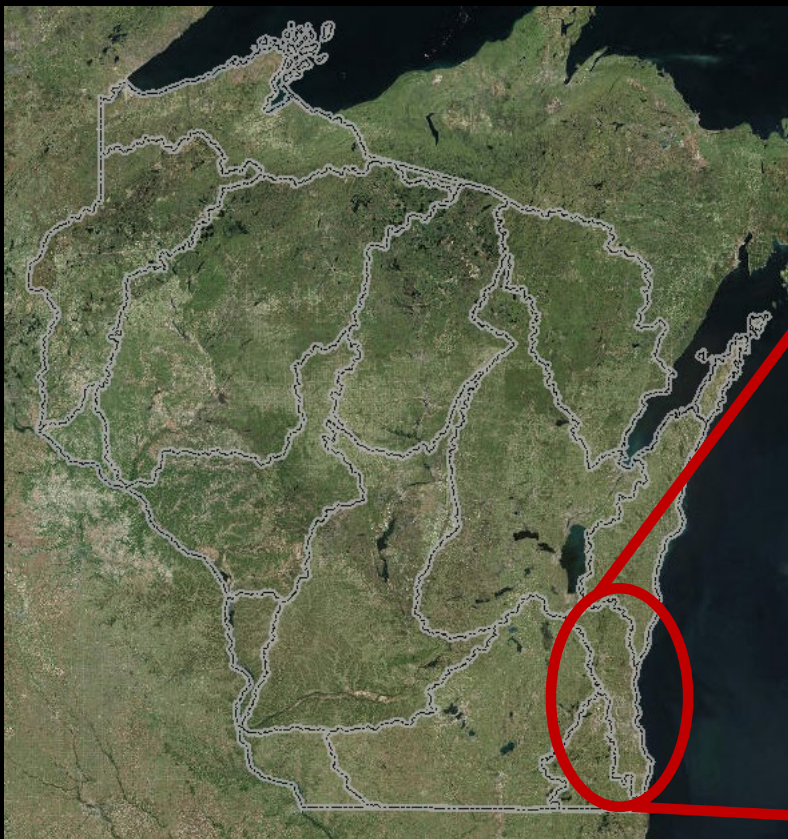


**Current  
Service Provision**

**Watershed Service  
Loss  
Need  
Opportunity**

- Flood Abatement
- Fish & Aquatic Habitat
- Sediment Retention
- Nutrient Transformation
- Surface Water Supply

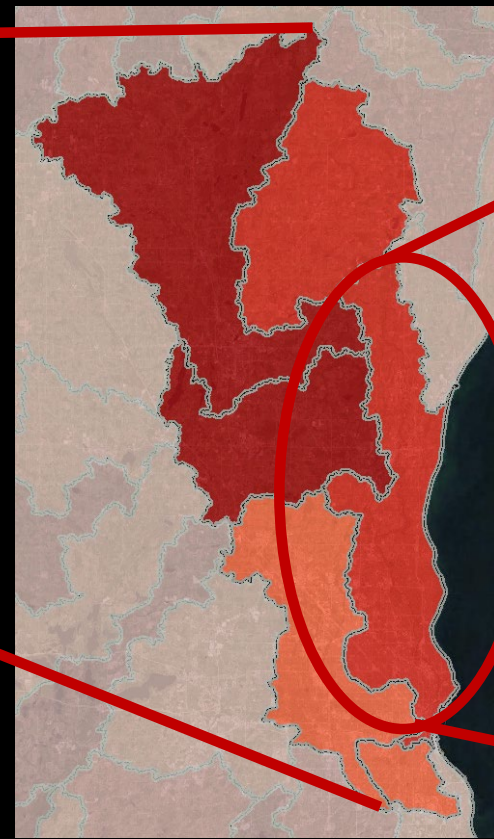
## *A. Watershed Needs (Results)*



**SW Lake Michigan**



**Milwaukee  
River**



**Lower  
Milwaukee  
River**



**Pigeon  
Creek**

## ***B. Prioritize Sites***

Example: Flood abatement



### Water Quality

- Nitrogen Reduction
- Phosphorus reduction
- Sediment Reduction

Shoreline protection

Fish & aquatic habitat

Surface water supply

Carbon storage

Floristic Integrity

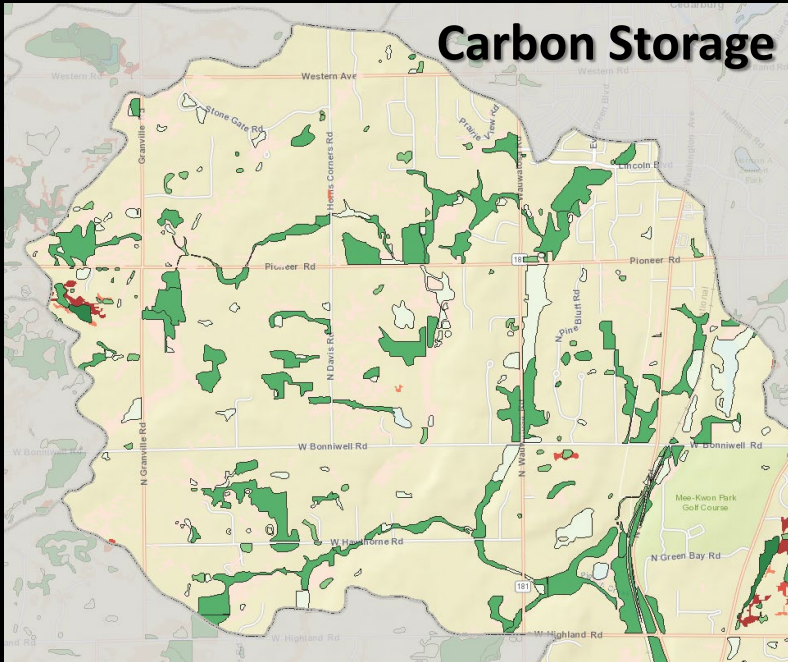
**Opportunity**

**Effectiveness**

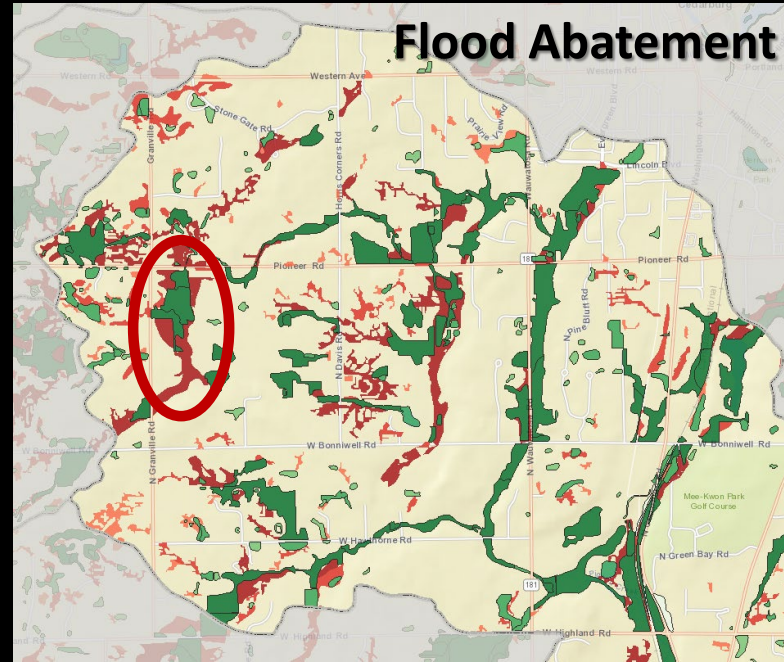
**Social significance**



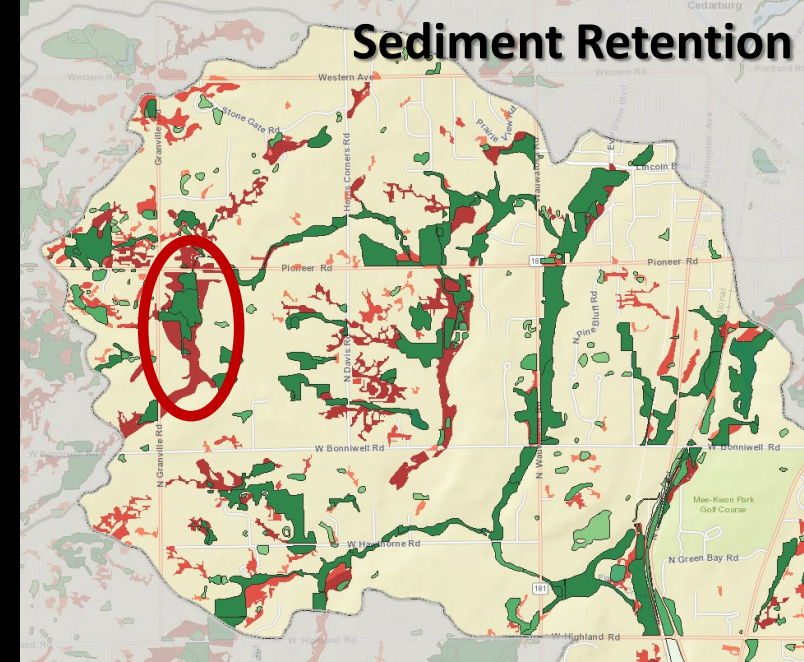
**Carbon Storage**



**Flood Abatement**

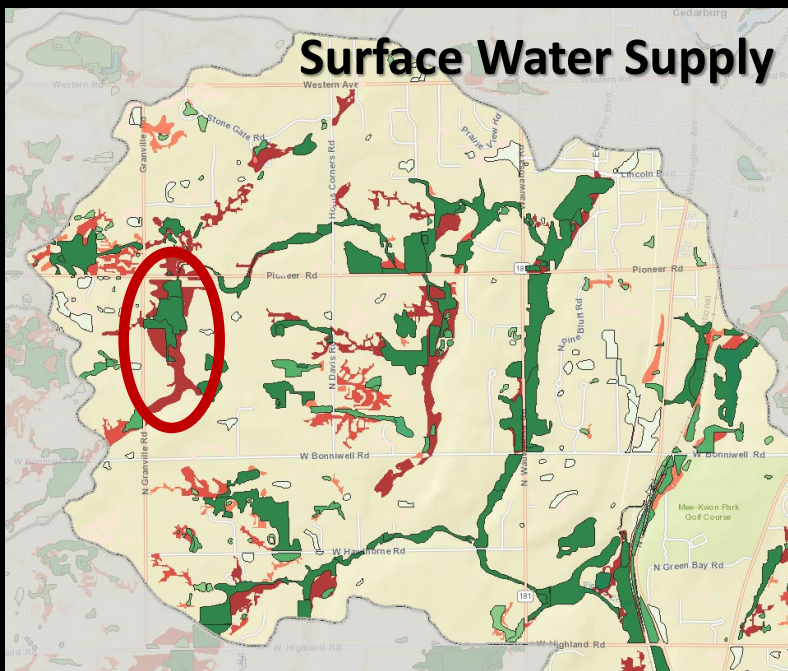


**Sediment Retention**



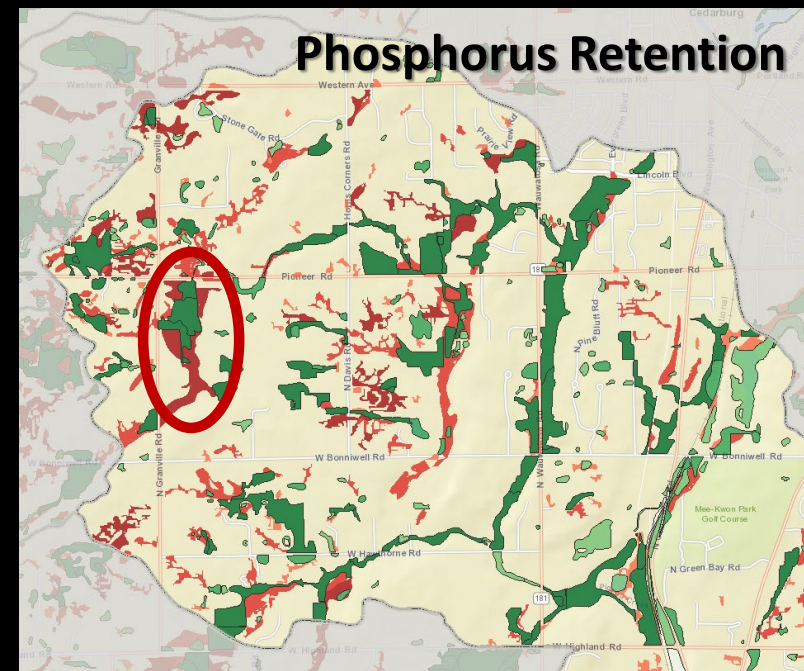
***B. Prioritize Sites (Results)***

**Surface Water Supply**



**Pigeon Creek  
(Milwaukee River)**

**Phosphorus Retention**



# ***C. Wetland Wildlife Habitat***

## **Forest Interior Guild**



## **Shallow Marsh Guild**



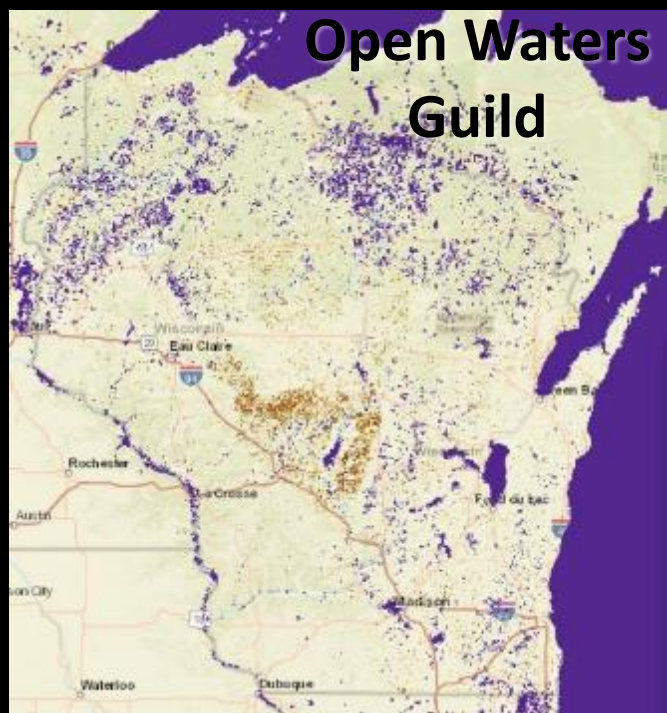
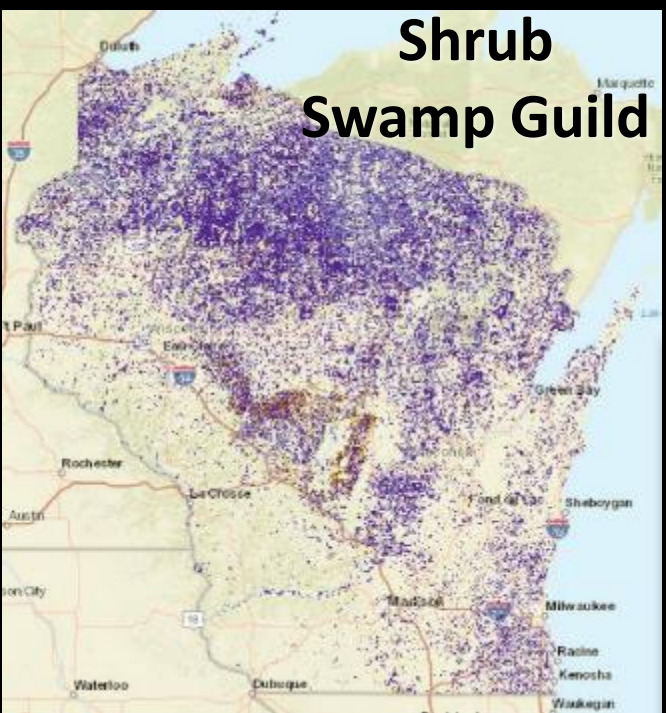
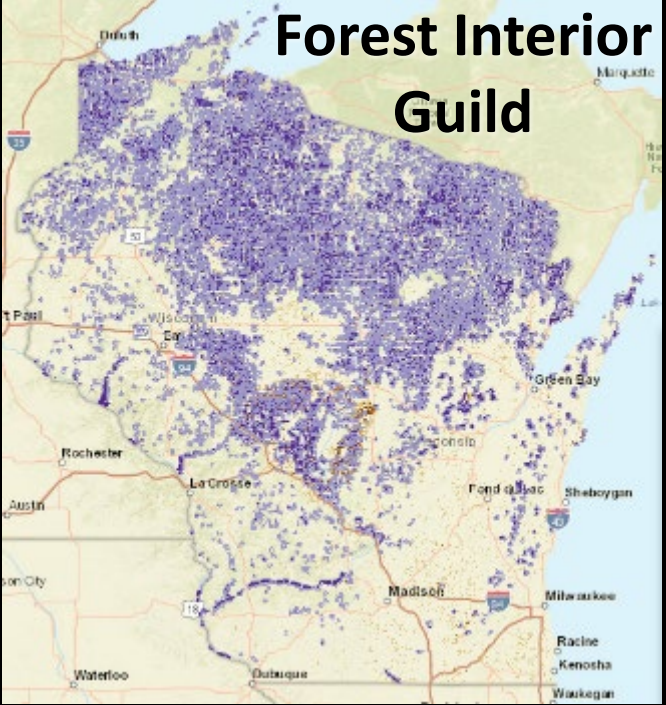
## **Open Waters Guild**

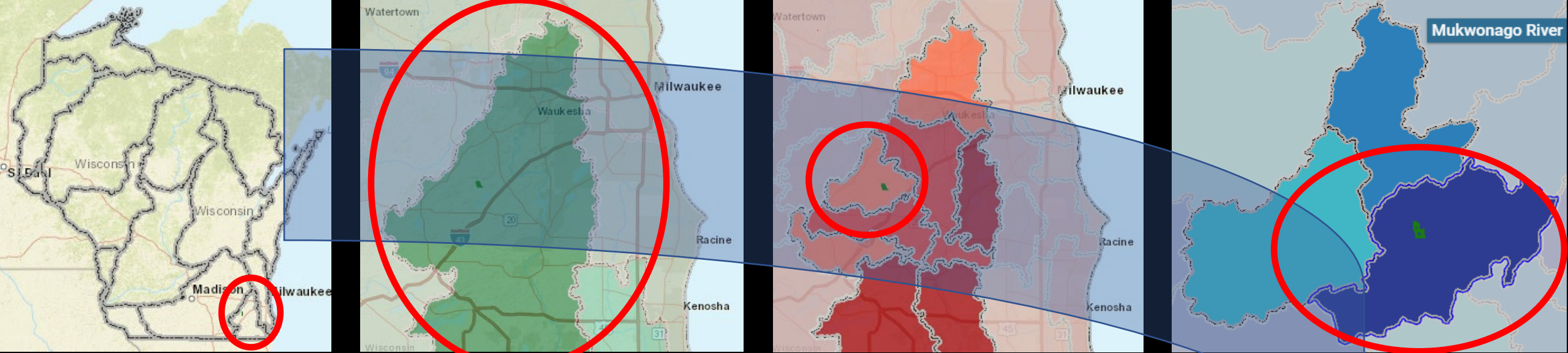


## **Shrub Swamp Guild**

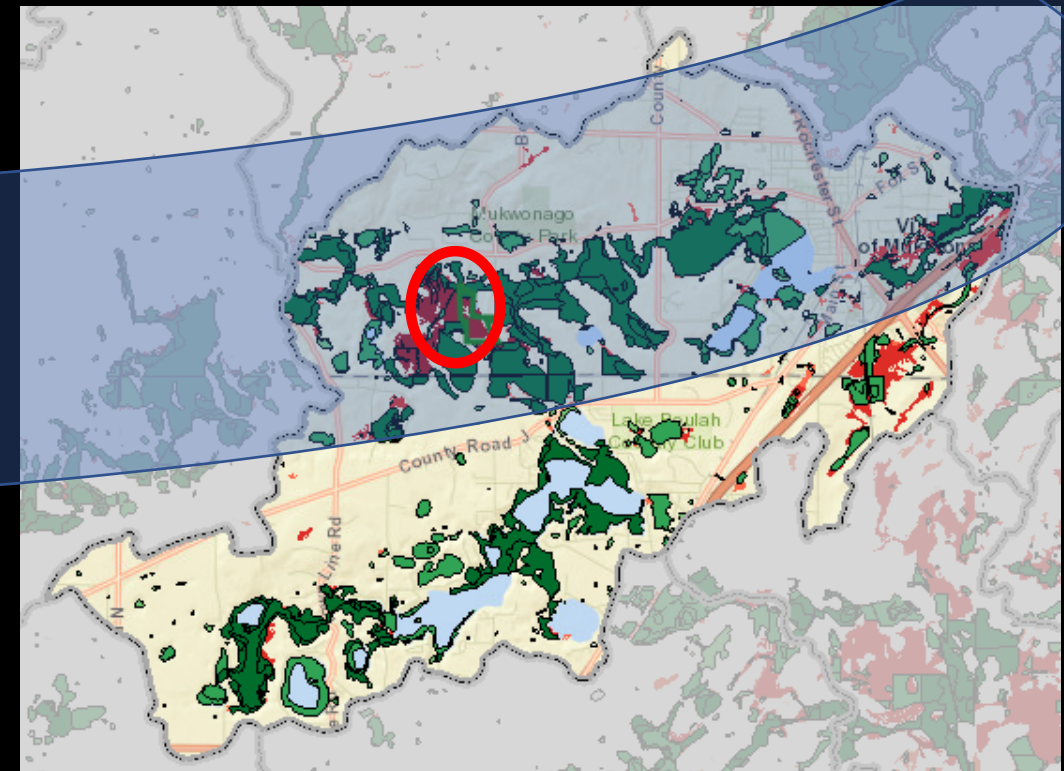
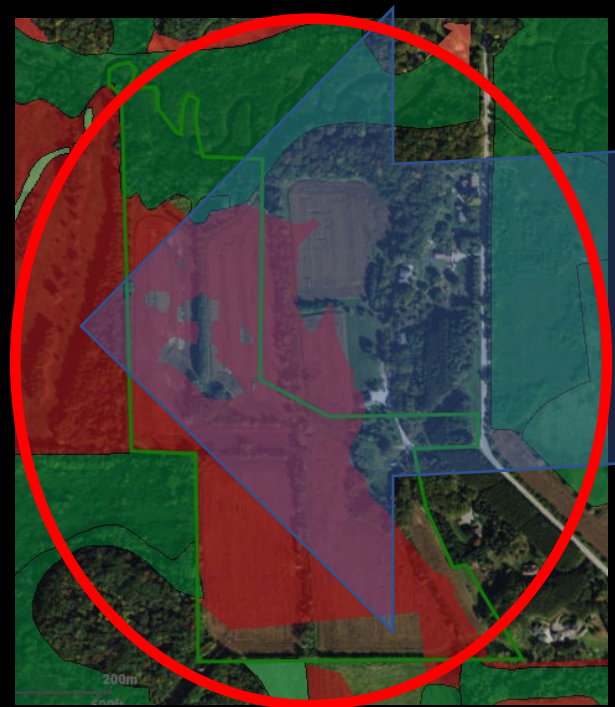


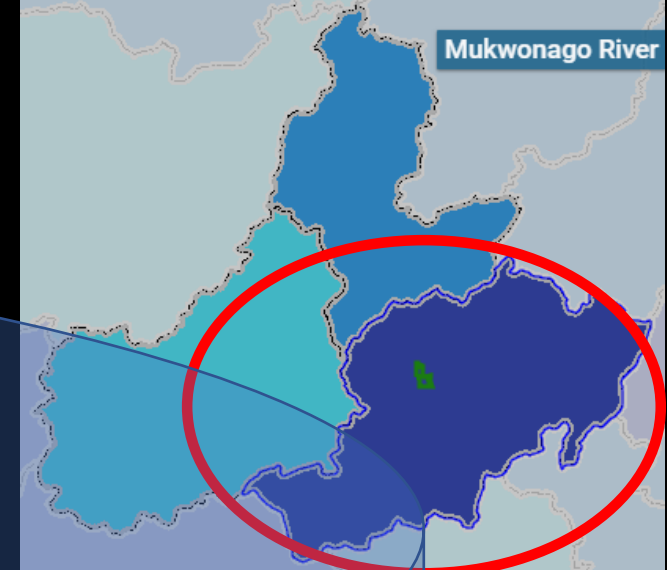
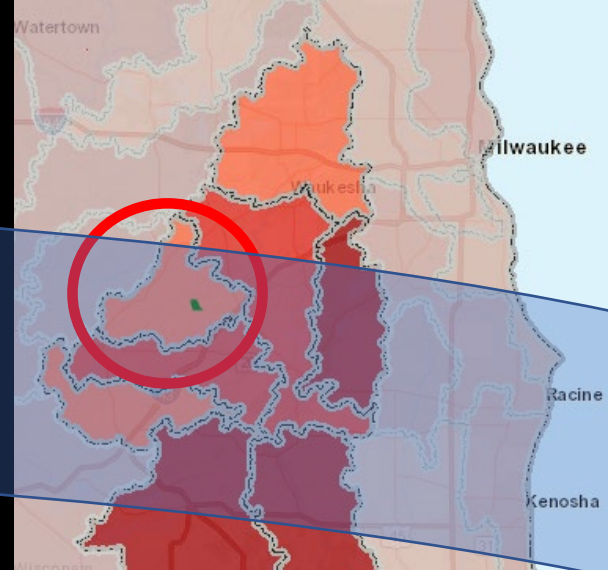
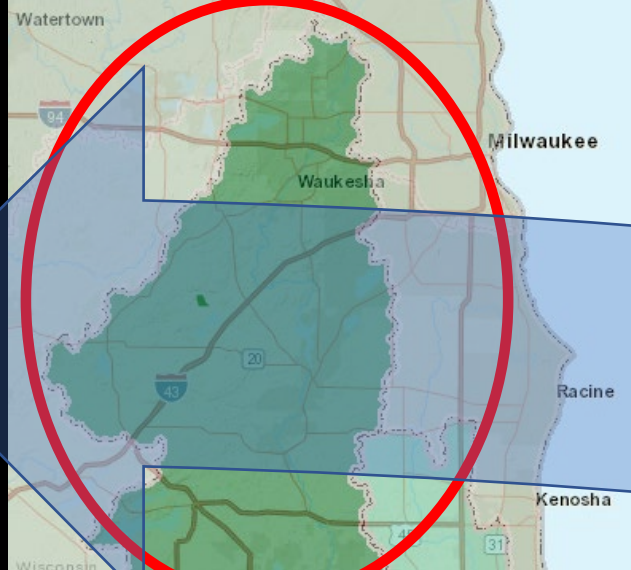
# C. Wetland Wildlife Habitat (Results)



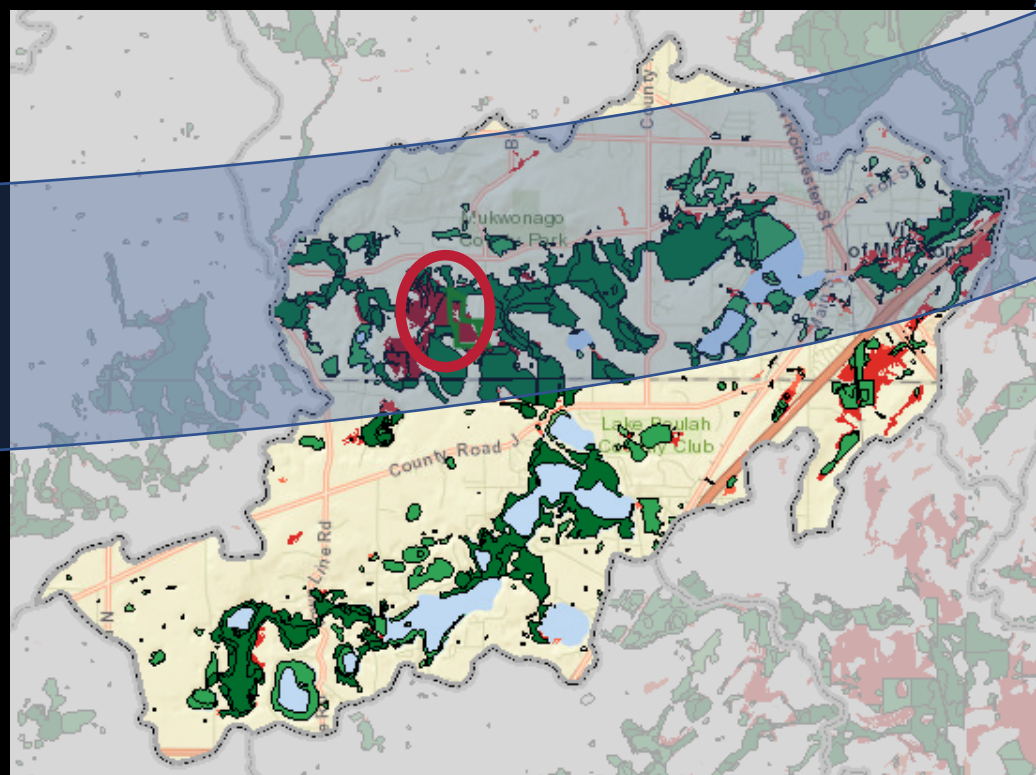


# Watershed-to-Site

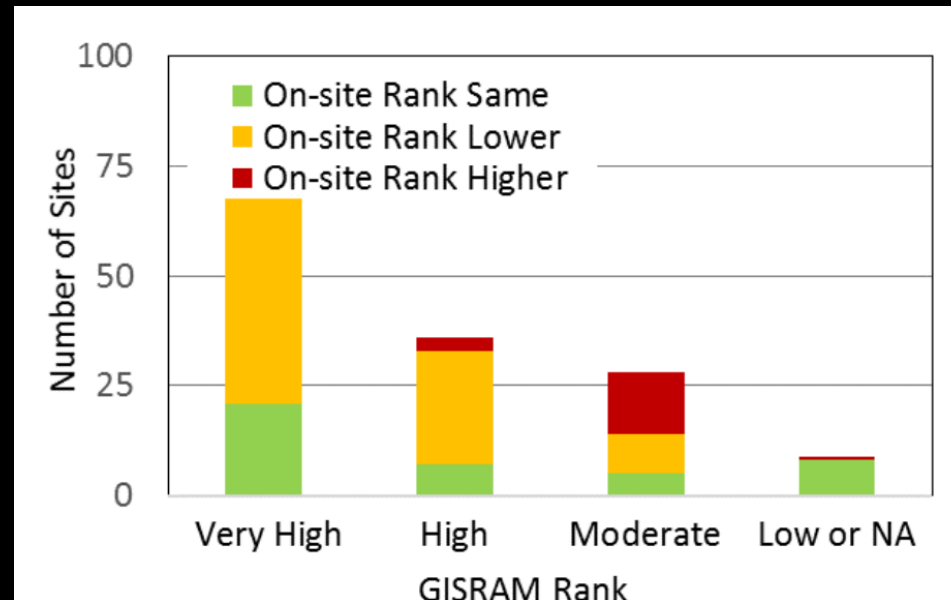
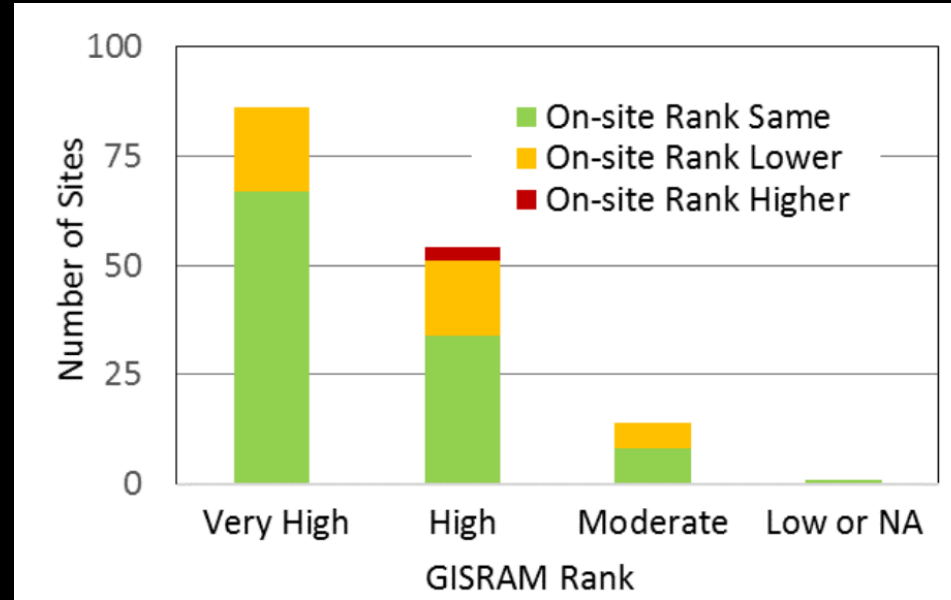
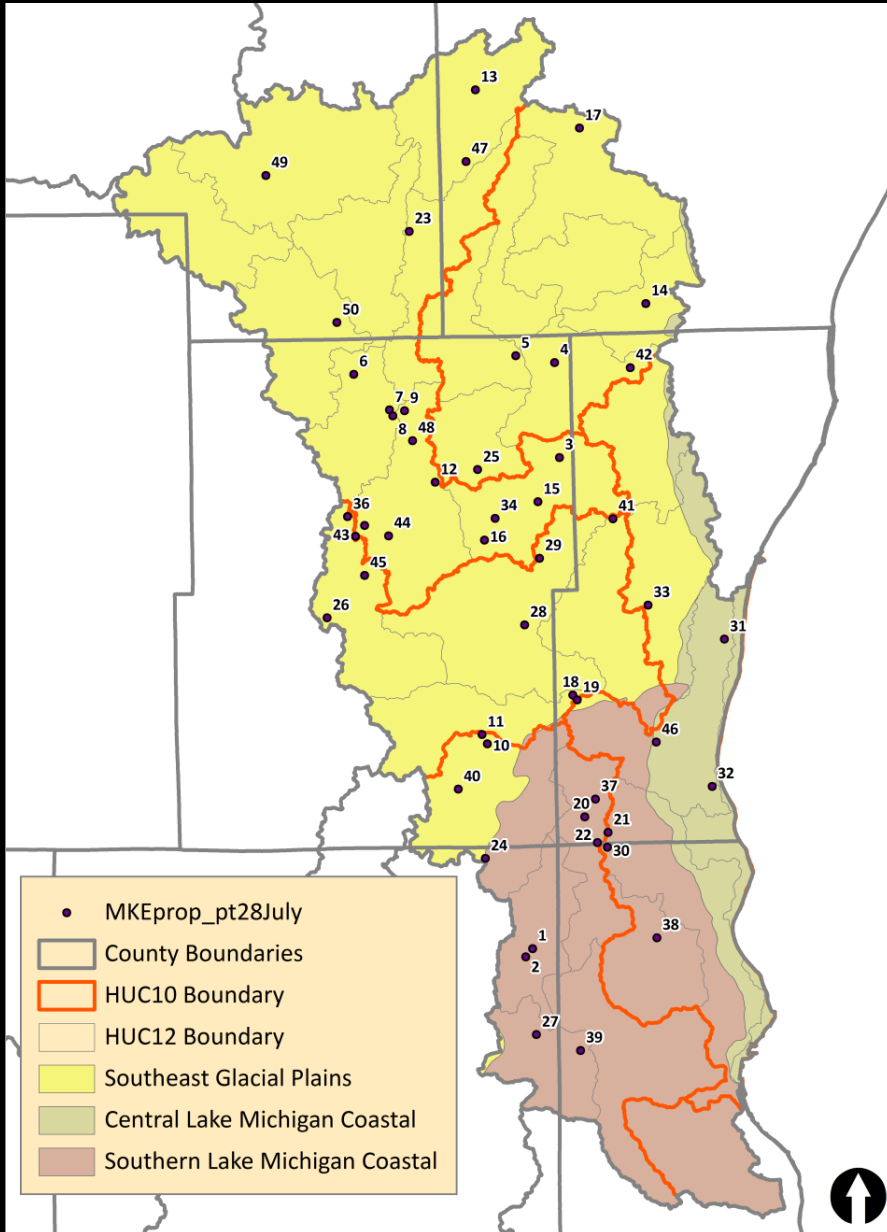




# Site-to-Watershed



# Validation: Comparing GIS & Field Assessments



## Who is this for?

**Land Trusts**  
**Local governments**  
**Wetland Consultants**  
**Planners (Counties, RPC's)**  
**Nutrient Management Specialists**  
**Mitigation regulators & project sponsors**  
**Wildlife & Natural Resource Managers**  
**Universities & Extensions**  
**Watershed Planners**  
**Private Businesses**  
**Lake Associations**

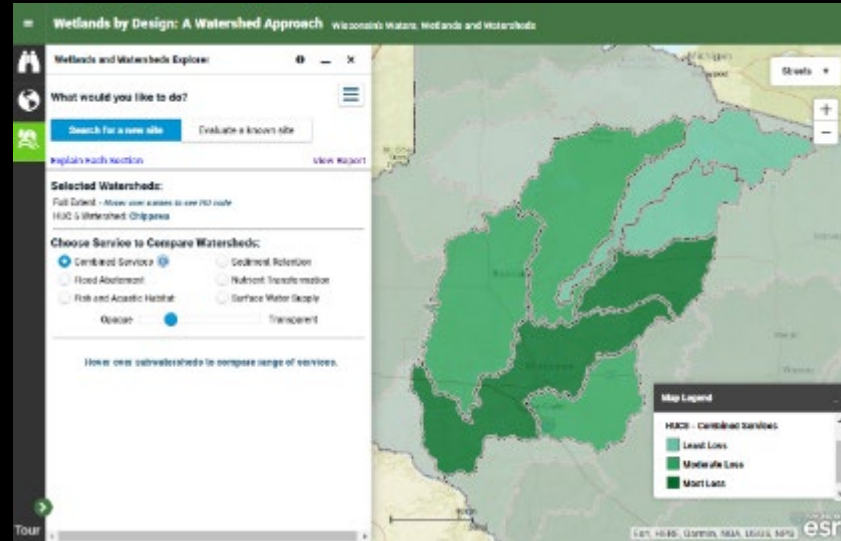
## Potential Applications

Watershed plans  
Grant proposals  
Conservation planning  
Outreach & education  
Site selection, assessment, and design  
Local & regional Comprehensive Plans  
Nutrient trading & Adaptive Management  
Siting natural infrastructure (e.g., for flood control)  
Lake management plans (incl. shoreline protection)  
Nutrient management planning  
Wetland service valuation  
Habitat improvement  
Prioritizing projects  
Research

# [www.WetlandsByDesign.org](http://www.WetlandsByDesign.org)



Report



Wetlands & Watersheds Explorer



Webinar training