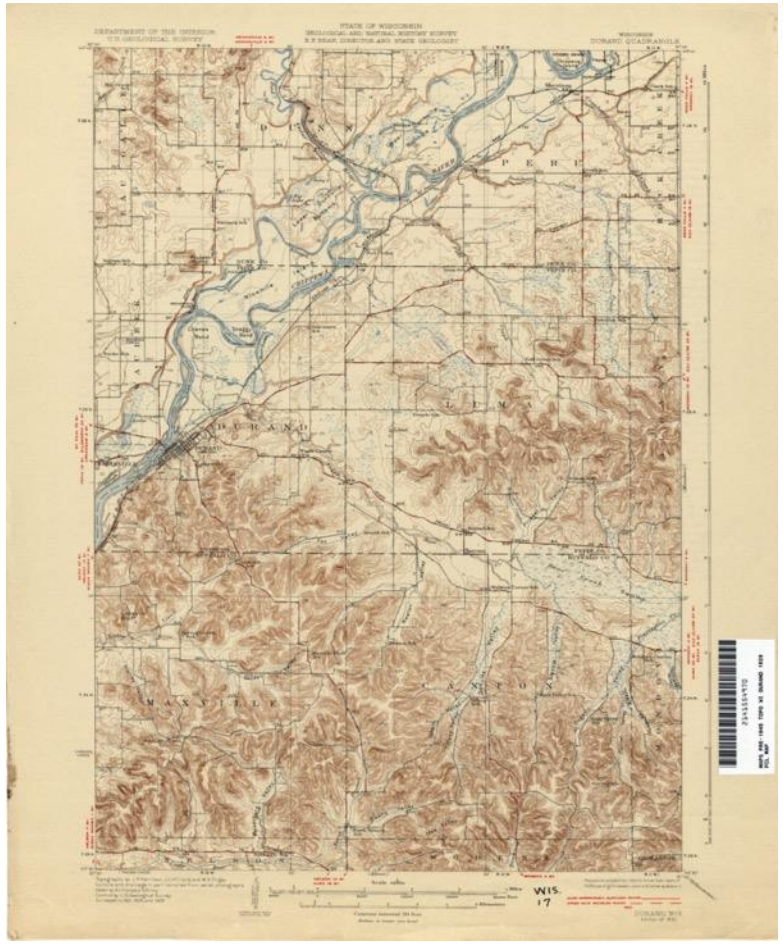
Wisconsin Wetlands Association

- Non-profit
- Science-based
- Non-partisan
- Statewide membership
- We help people and communities see wetlands as solutions to our water issues
- Celebrated our 50th Anniversary in 2019

Hydrologic assessment (HA)

Interdisciplinary, watershed-scale look at:

1. How and where water used to move across the landscape
2. Current conditions
3. What can be restored or improved to help address specific water challenges?



Hydrologic Restoration

Practices designed *to the extent possible* to return wetland, stream, and floodplain hydrology to a natural and self-regulating condition in order to achieve such goals as to:

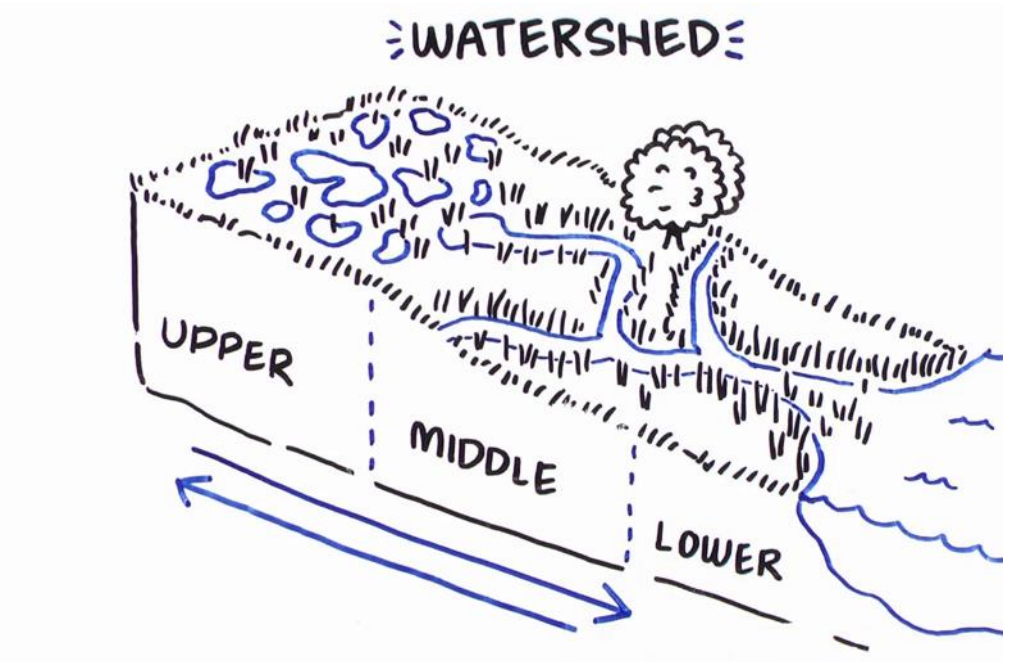
- slow the flow of runoff,
- restore surface and groundwater connections,
- improve water quality,
- increase soil retention,
- increase infiltration,
- increase base flow,
- increase upper watershed storage,
- improve flood resilience.

Characteristics of Healthy Watersheds

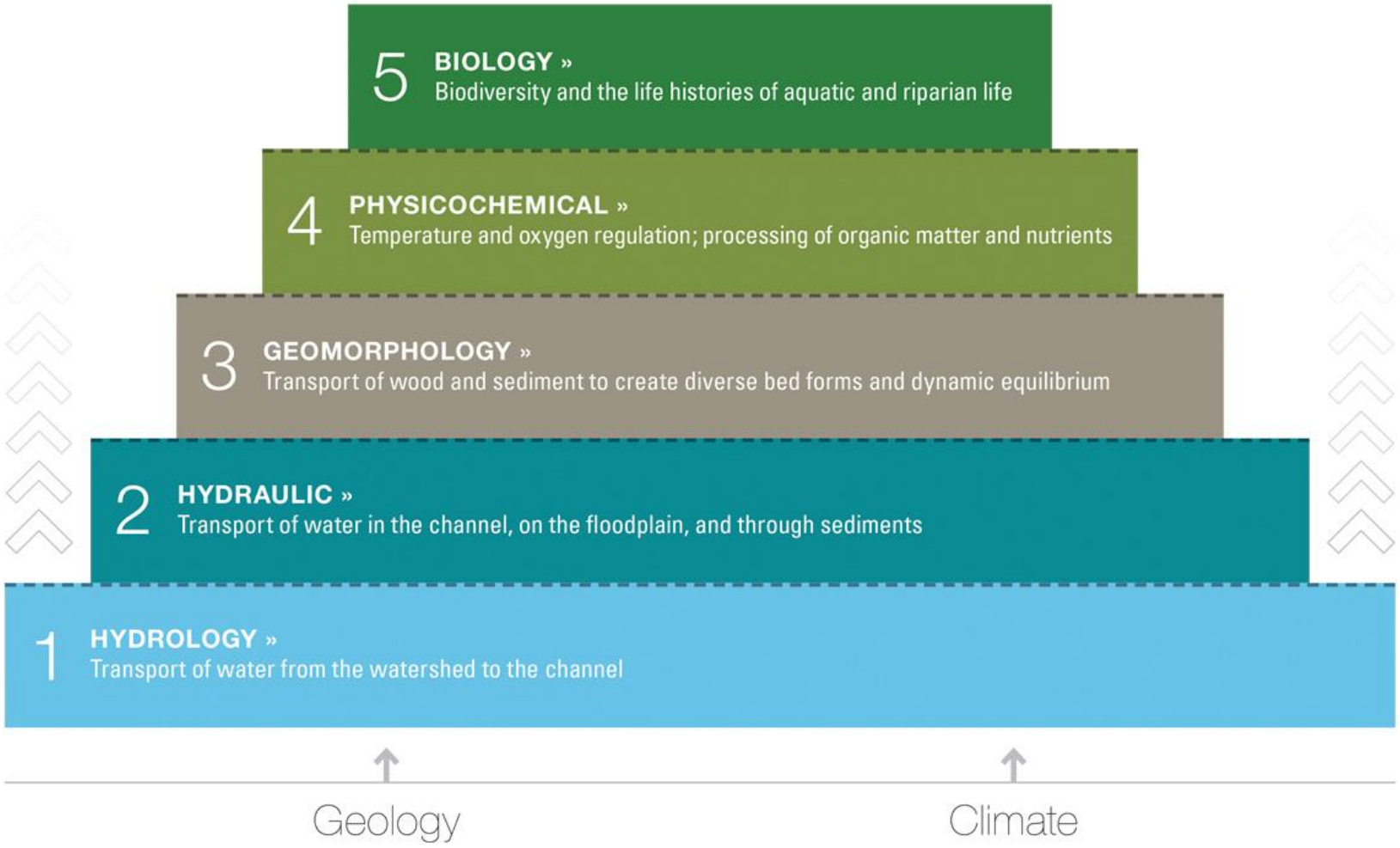
1) Abundant upper watershed wetlands (headwaters/source waters)

2) Streams well-connected to floodplains and meander

3) Intact hydrologic "processes"
- Storage
- Infiltration
- Dynamic water levels/flows



Stream Functions Pyramid



Responses

Processes

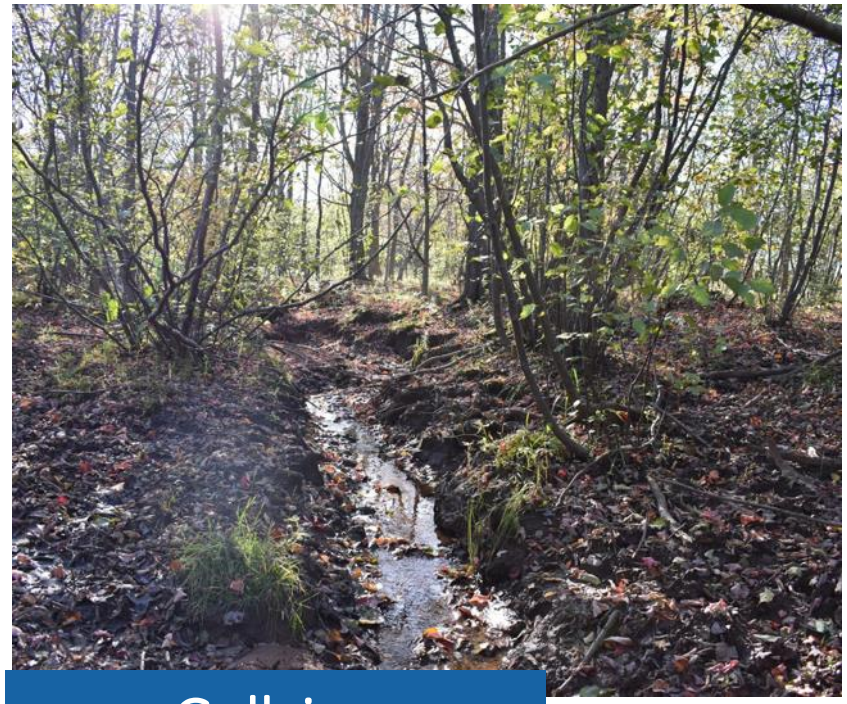
(Harman et al. 2012 - *A Function-Based Framework for Stream Assessment and Restoration Projects*)

When hydrology is degraded, our landscapes lose the capacity to manage water

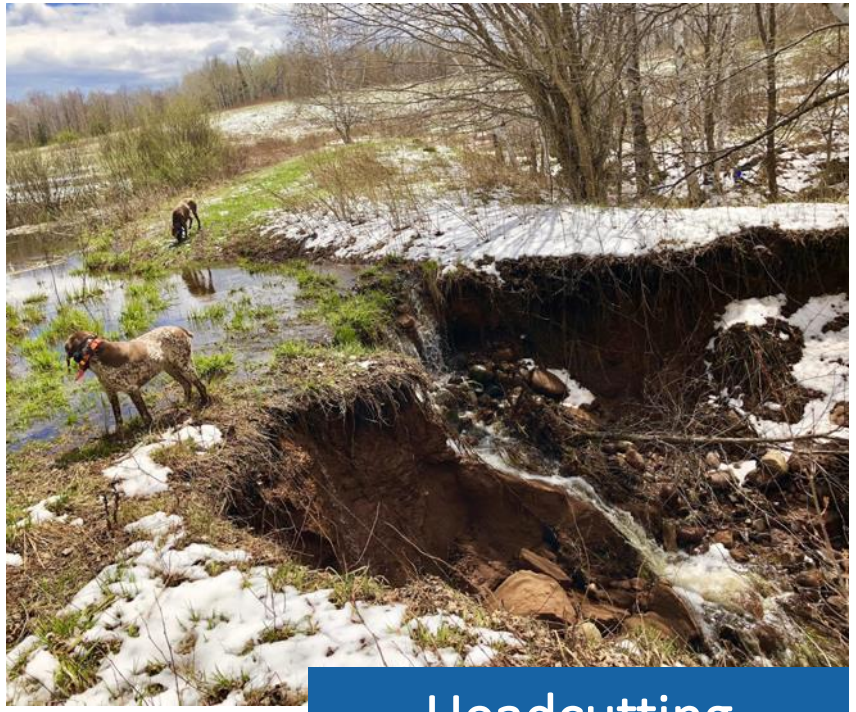
Loss of Upstream Wetland Storage

Drainage Ditches & Tiles

Loss of Upstream Wetland Storage (Erosion)



Gullying



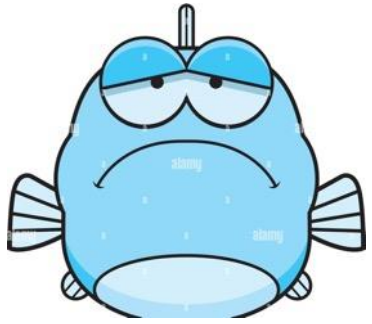
Headcutting

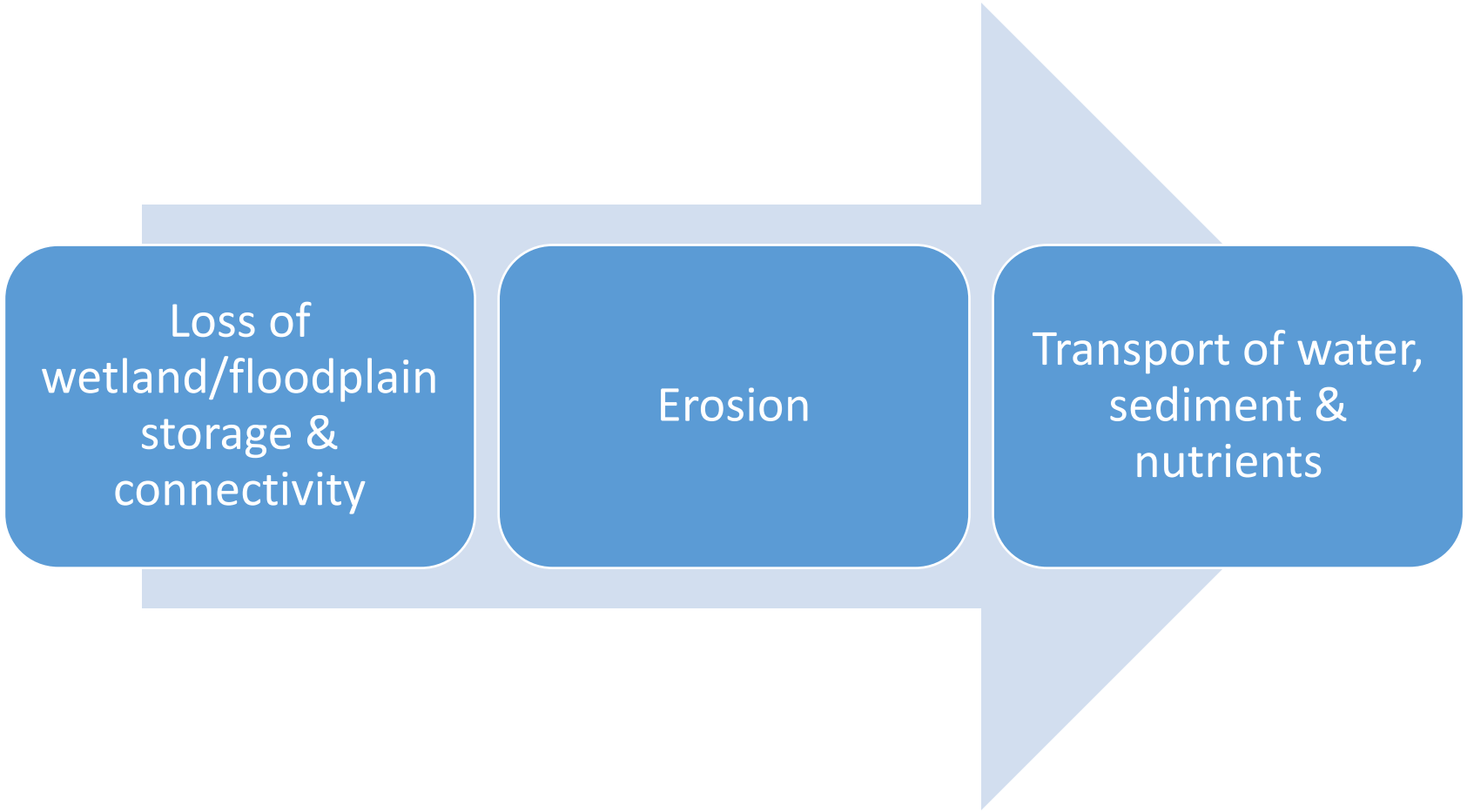
Downstream Flooding & Infrastructure Damage

Stream Channelization

Floodplain disconnection

Creeks Acts Like Drains (& accelerate erosion & runoff)




Loss of wetland/floodplain storage & connectivity
Erosion
Transport of water, sediment & nutrients

Muddy rivers connect to Great Lakes

Traditional NM Approaches

Regulations, technologies, & BMPS are designed to **prevent, reduce, or treat** water pollution

VS

Hydrology-Focused Approaches

Wetland, stream, & floodplain restoration are designed to **repair the processes** needed to control the runoff itself

Site Specific Practices
Address Symptoms

vs

Systems Level Improvements
Address Root Cause

Wetlands alone won't fix the problems, but we can't fix the problems without wetlands

Example: Wetland & Nitrates

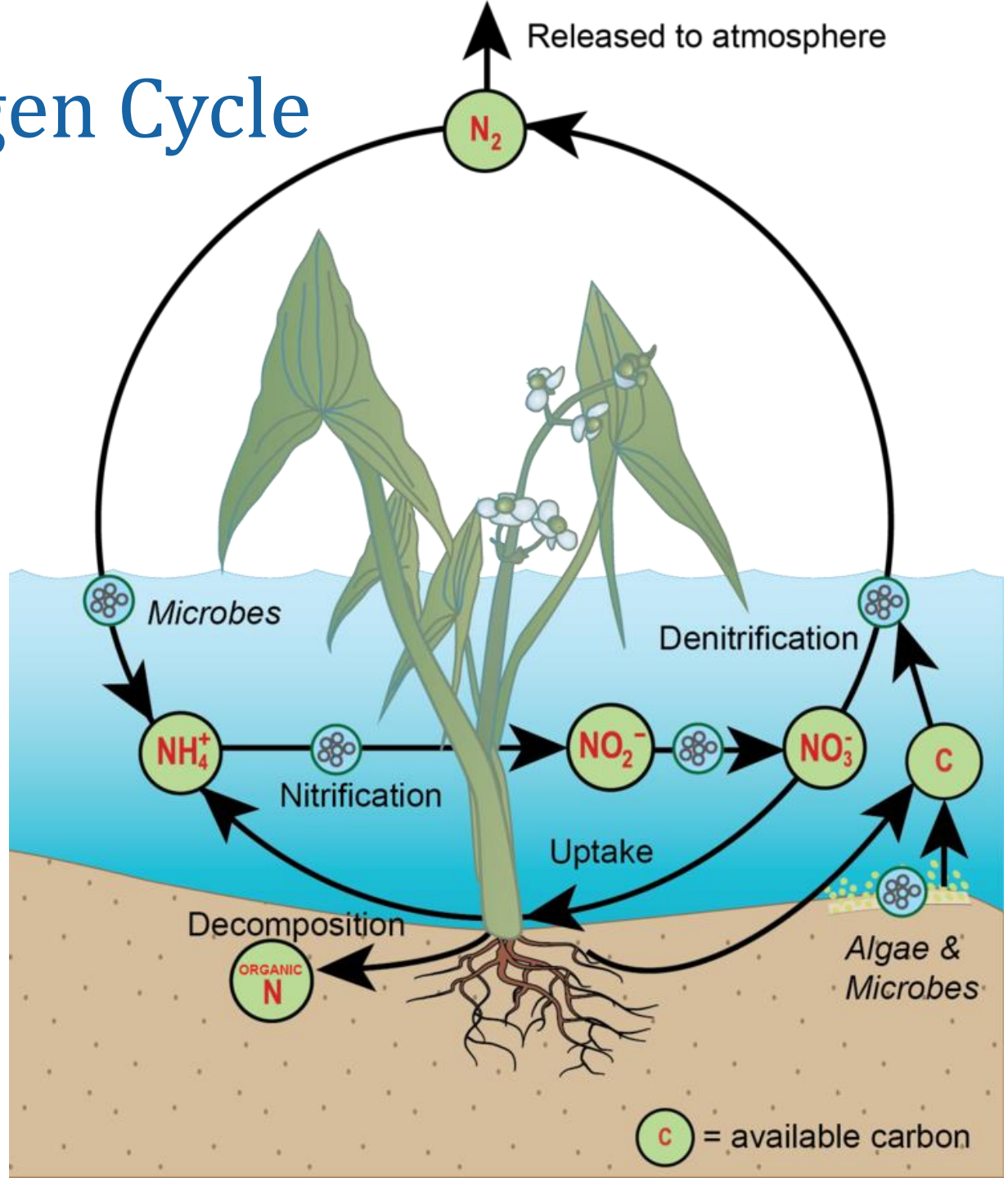
- Wetland complexes can be **FIVE TIMES BETTER** at reducing nitrate than the best land-based nitrogen mitigation strategies
- (i.e., cover crops, land retirement)

*Hansen et al 2018. Contribution of Wetlands to Nitrate Removal at a Watershed Scale. Nature Geoscience, 11, 127-132. 2018

Wetlands and the Nitrogen Cycle

Wetland soils have high organic matter (carbon) b/c plants don't decompose as quickly in the low oxygen (wet) environment.

Carbon dependent bacteria convert harmful nitrates (NO_3) to nitrogen gas (N_2)

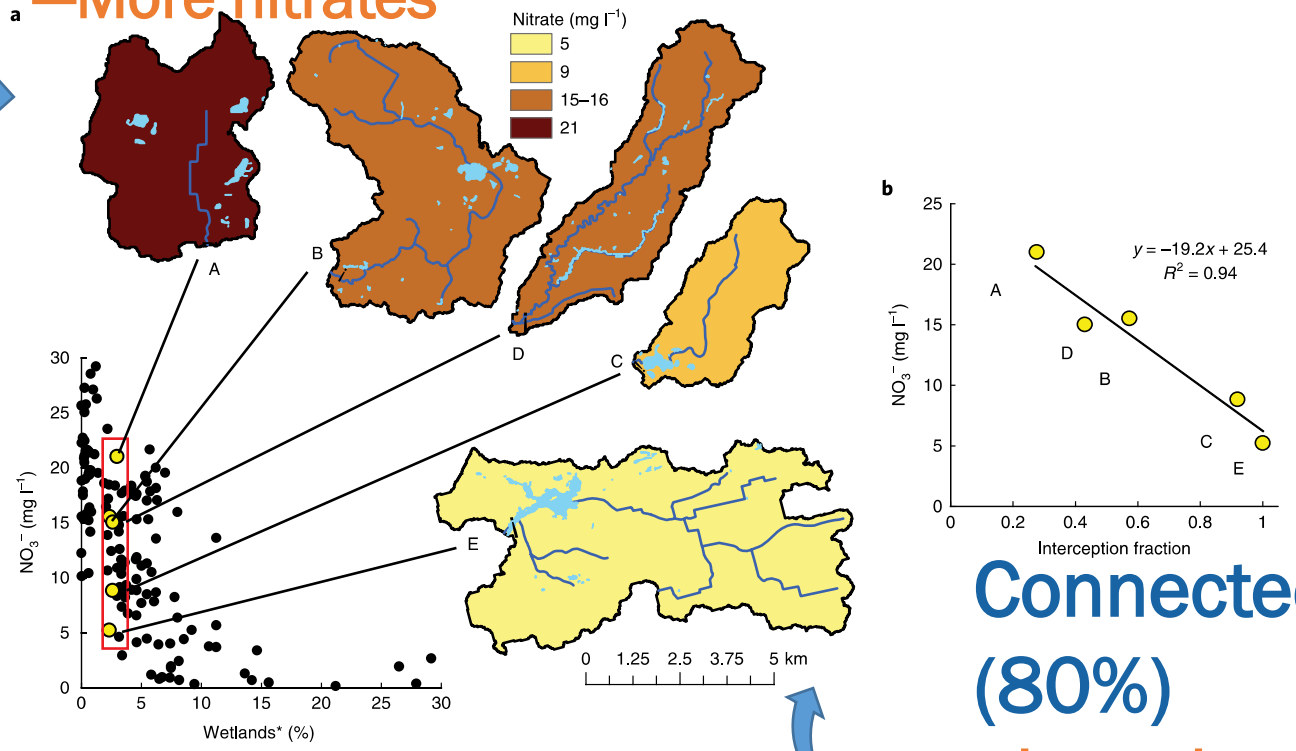


Source:
www.wetlands-initiative.org/nutrient-removal

Requires Connected Wetlands *Across the Watershed*

Disconnected wetlands (20%)

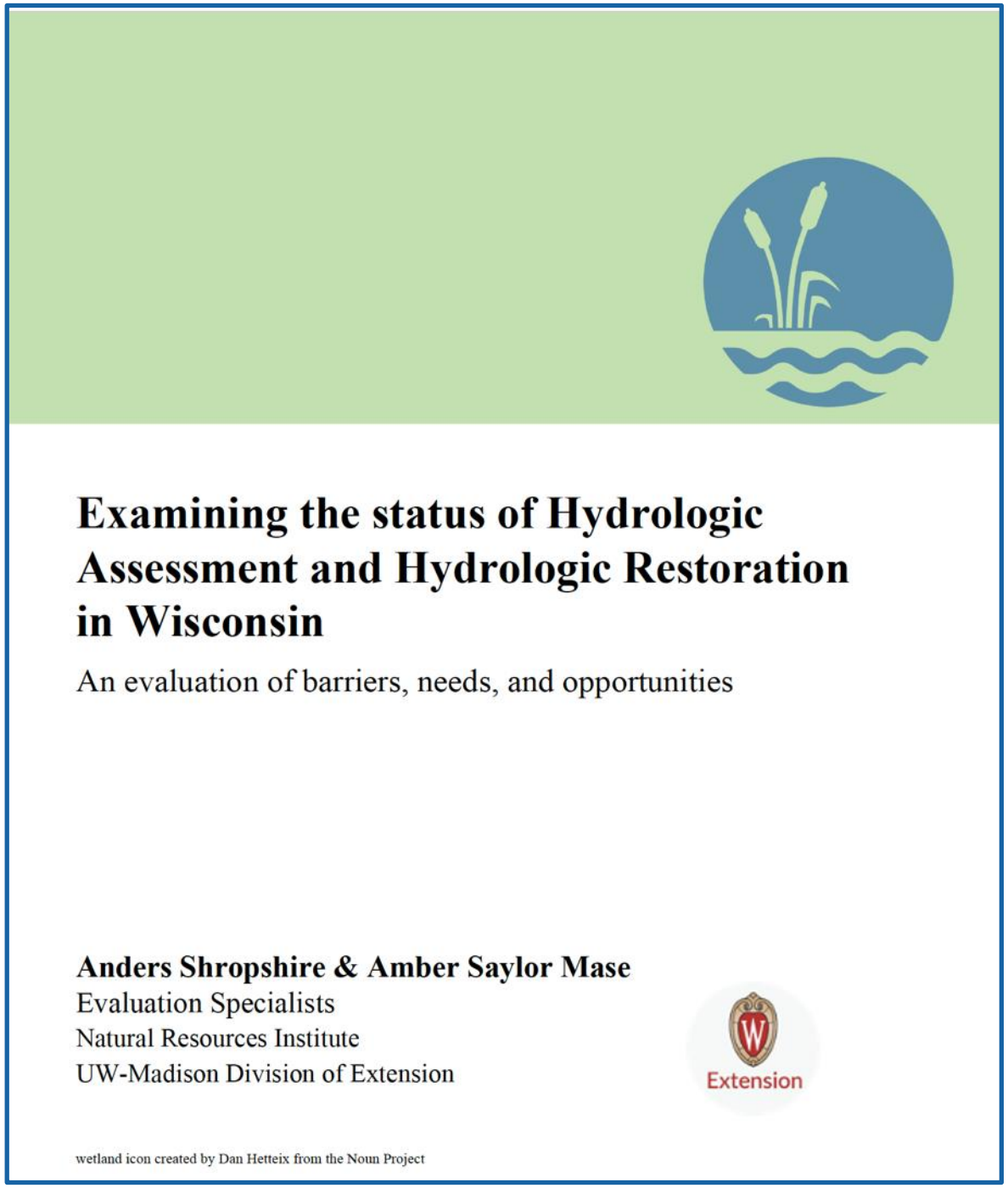
—More nitrates



Connected wetlands (80%)

—Less nitrates

How well do your state/province policies and programs support watershed-scale hydrologic assessment and restoration?



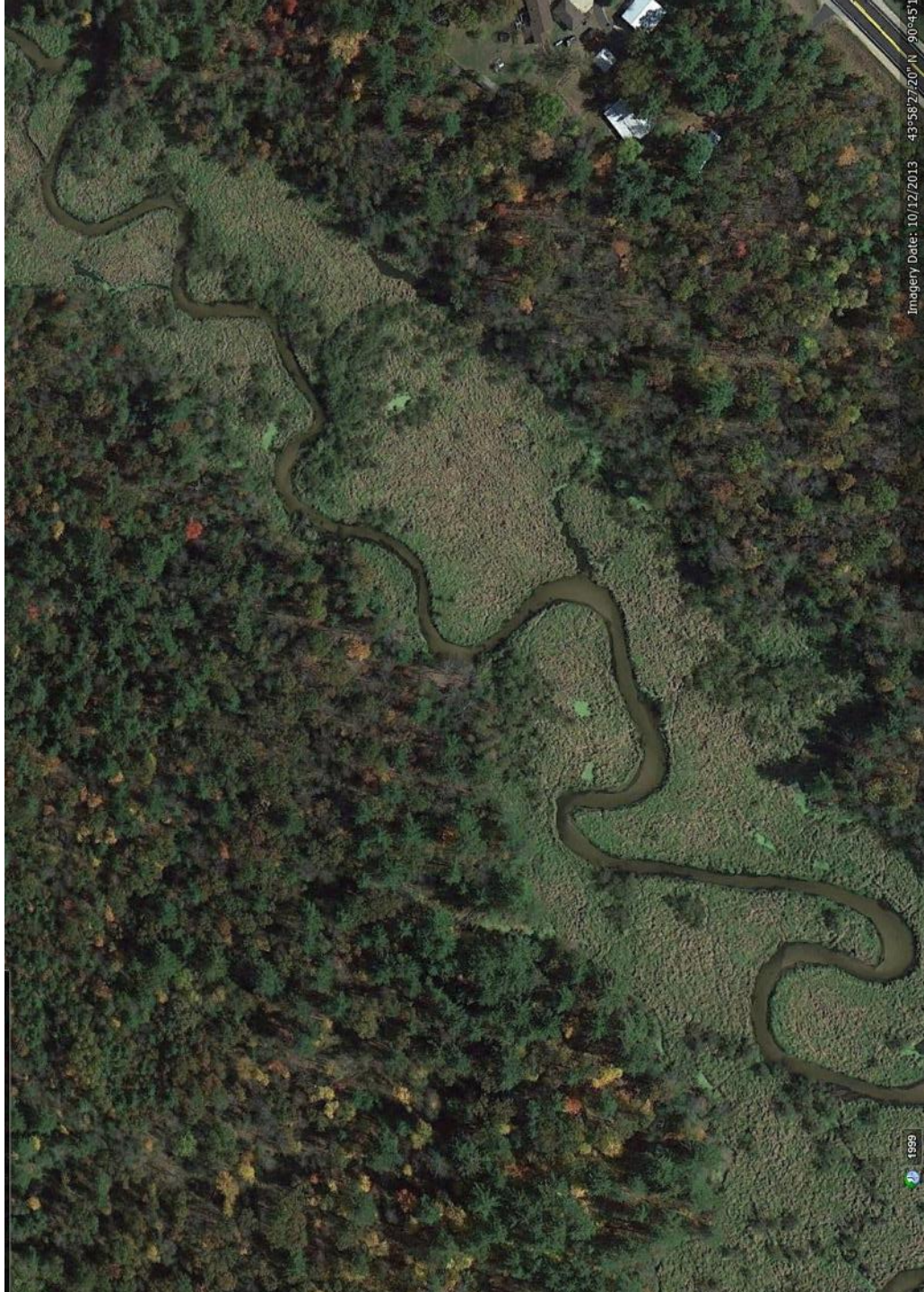
Funded by:

WI – Not very well

Barriers:

- Data
- Decision-support tools
- Design/engineering capacity
- Funding prioritizes site-specific/short-term projects

Policy recommendations to elevate hydrologic restoration approaches in the implementation of GLLC's *Model Policies to Reduce Nutrient Pollution in the Great Lakes Region*



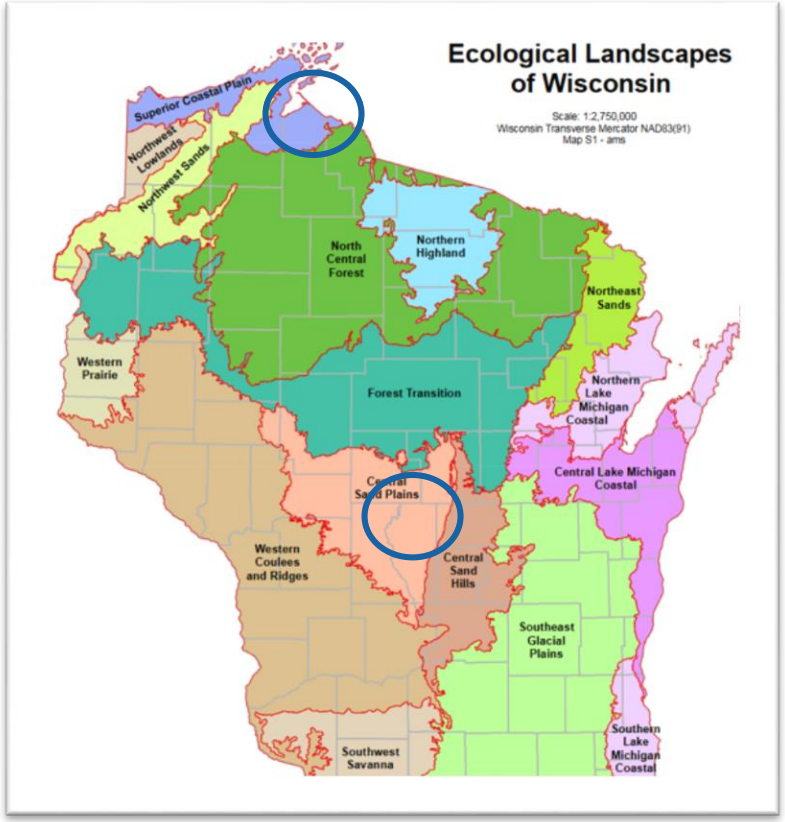
GLLC Model Policy #1: Engage with & incentivize ag producers to adopt best practices for managing nutrients.

- Ensure wetland practices are eligible for state cost share and grants / train ag engineers consultants to recognize and restore degraded hydrology.
  (*In progress in WI*)
- Streamline regulatory review and approval for hydrologic restoration projects.
  (2021 WI Act 77)

GLLC #2: Engage in educational and outreach activities to share information on the causes and impacts of nutrient pollution and the role each person can play in reducing the problem

Invest in:

- Watershed-scale hydrologic *assessment* projects to help communities identify restoration goals and priority sites. *(2017-2019 state budget appropriation)*
- Projects to demonstrate hydrologic restoration practices. *(2019 WI Act 157)*
- Research to quantify benefits, particularly for nitrate reduction.



GLLC #3: Include the installation of green infrastructure among the tools used to improve the management of nutrients

Enable installation of “natural infrastructure” as well. Define it in a way that:

a. enables utilities/local govs to invest in upstream solutions to solve downstream problems

b. prioritizes the reestablishment of healthy hydrologic processes

Benefits of watershed-scale hydrologic assessment & restoration

- Assumes no “one size fits all” problems *or* solutions
- Can be low-cost, low-tech, and highly effective
- Enables multi-objective work
- Community driven to address specific problems
- Can be strategic/targeted
- Voluntary and compatible with current land uses

Questions?

Erin O'Brien
Policy Programs Director
policy@wisconsinwetlands.org

Wisconsin Wetlands ASSOCIATION