


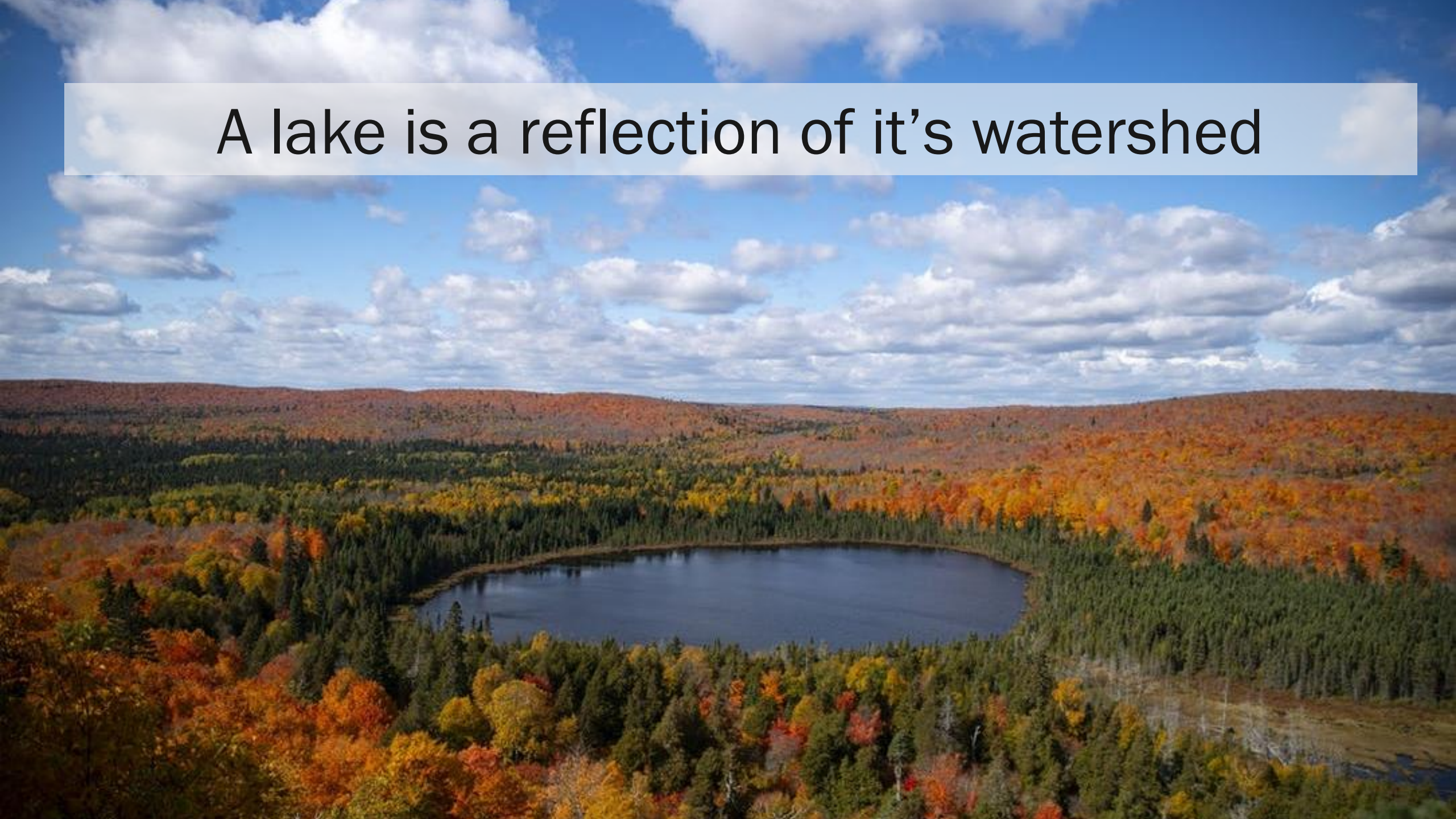
Watershed Actions for Lakes: Looking beyond the shoreline



Erick Elgin
Michigan State University Extension
Michigan Natural Shoreline Partnership
MiCorps Cooperative Lakes Monitoring Program

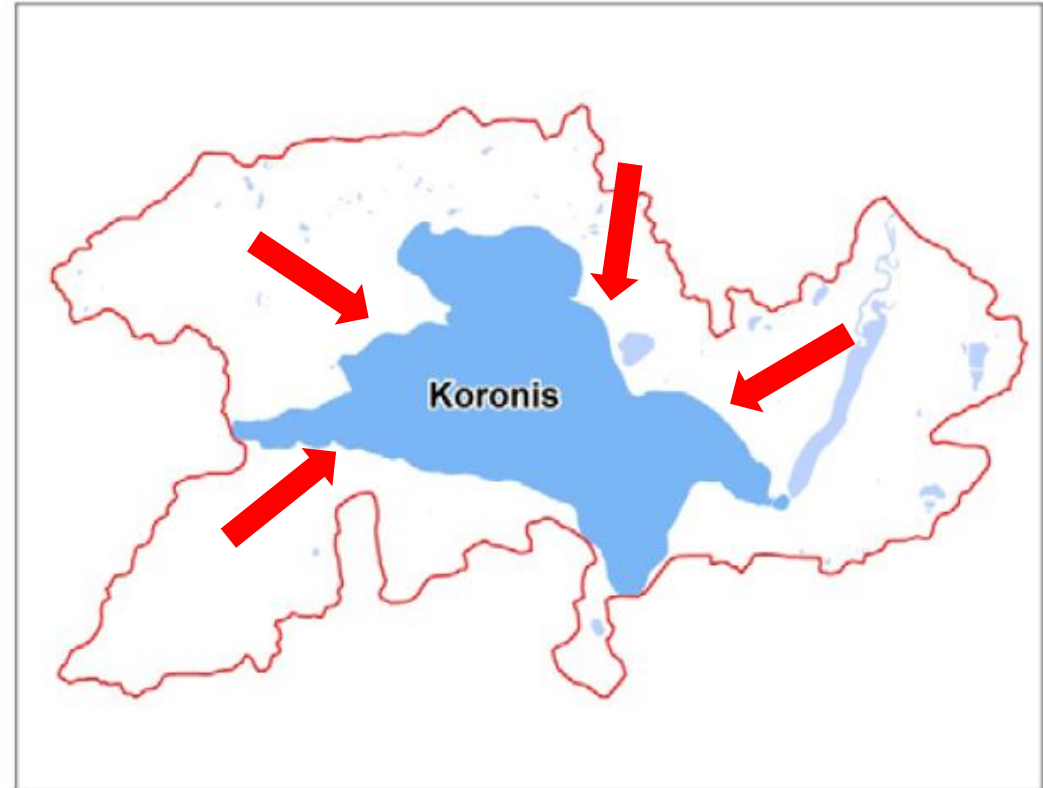
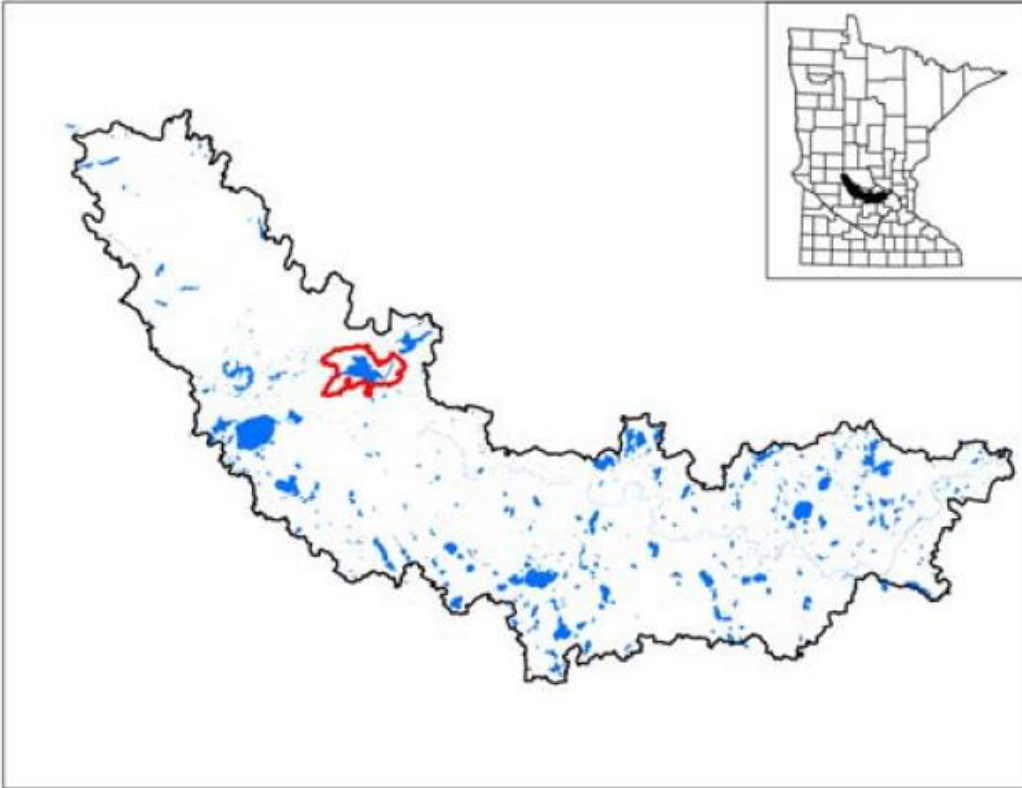
MICHIGAN STATE
UNIVERSITY | **Extension**

A lake is a reflection of it's watershed



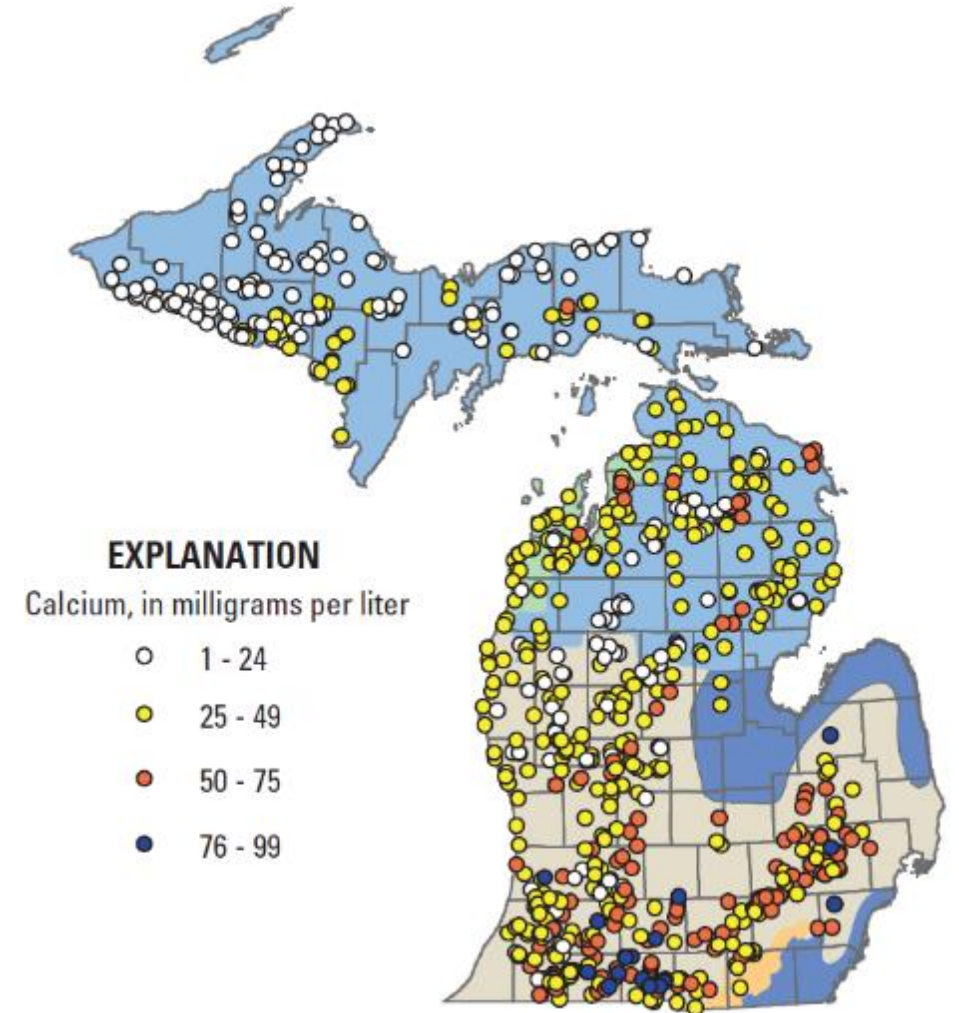
The Watershed (Lakeshed)

Lakeshed – all the land that drains to a particular lake



Geology, groundwater, and land use greatly influence lake ecosystems
Example: Calcium and phosphorus

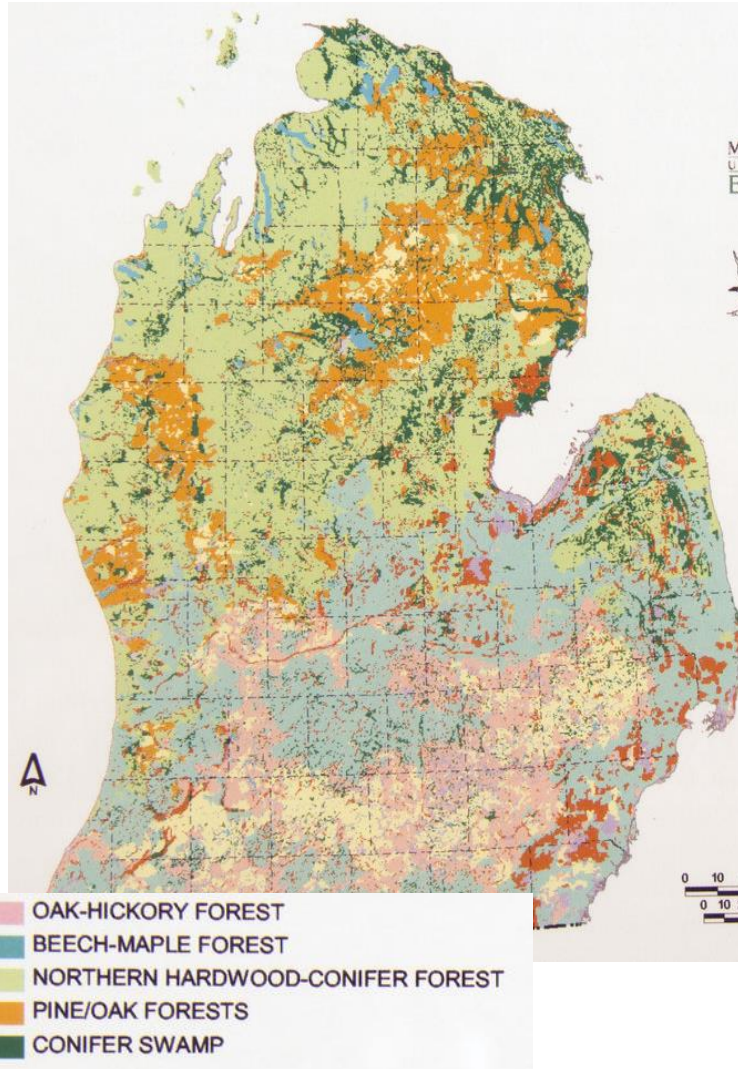
Geology, Calcium, and Zebra Mussels



Changes in Land Cover

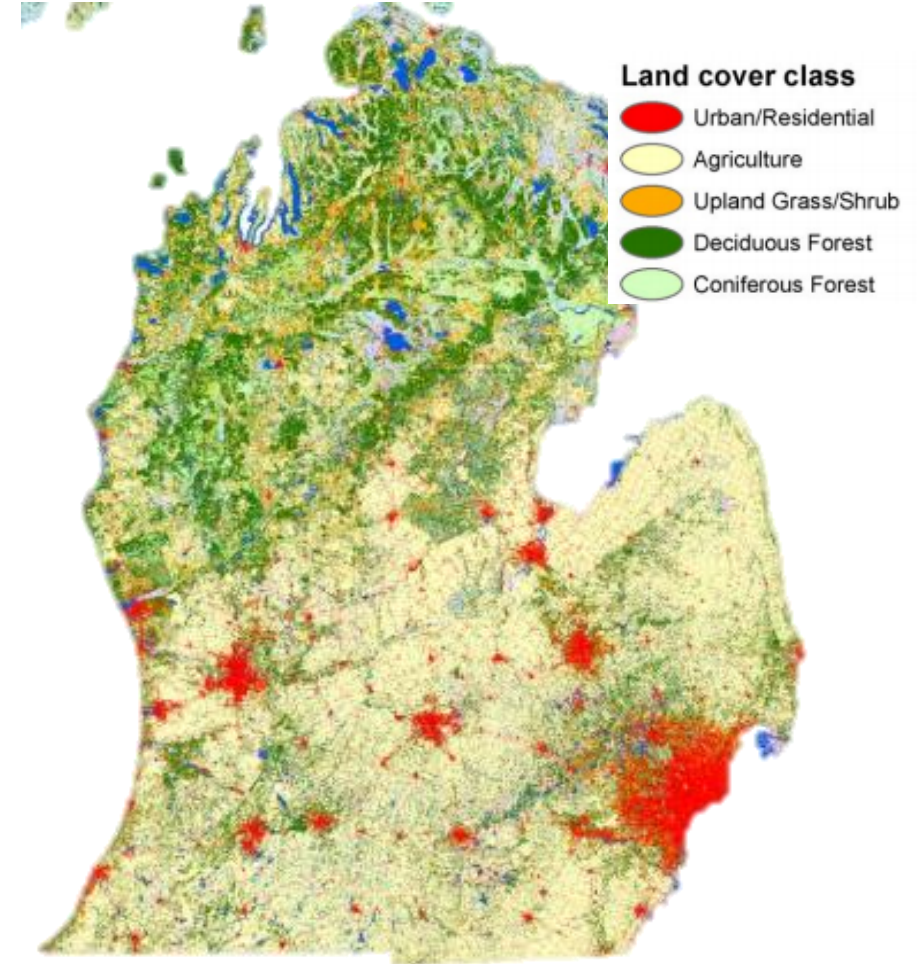


Pre-Settlement Vegetation



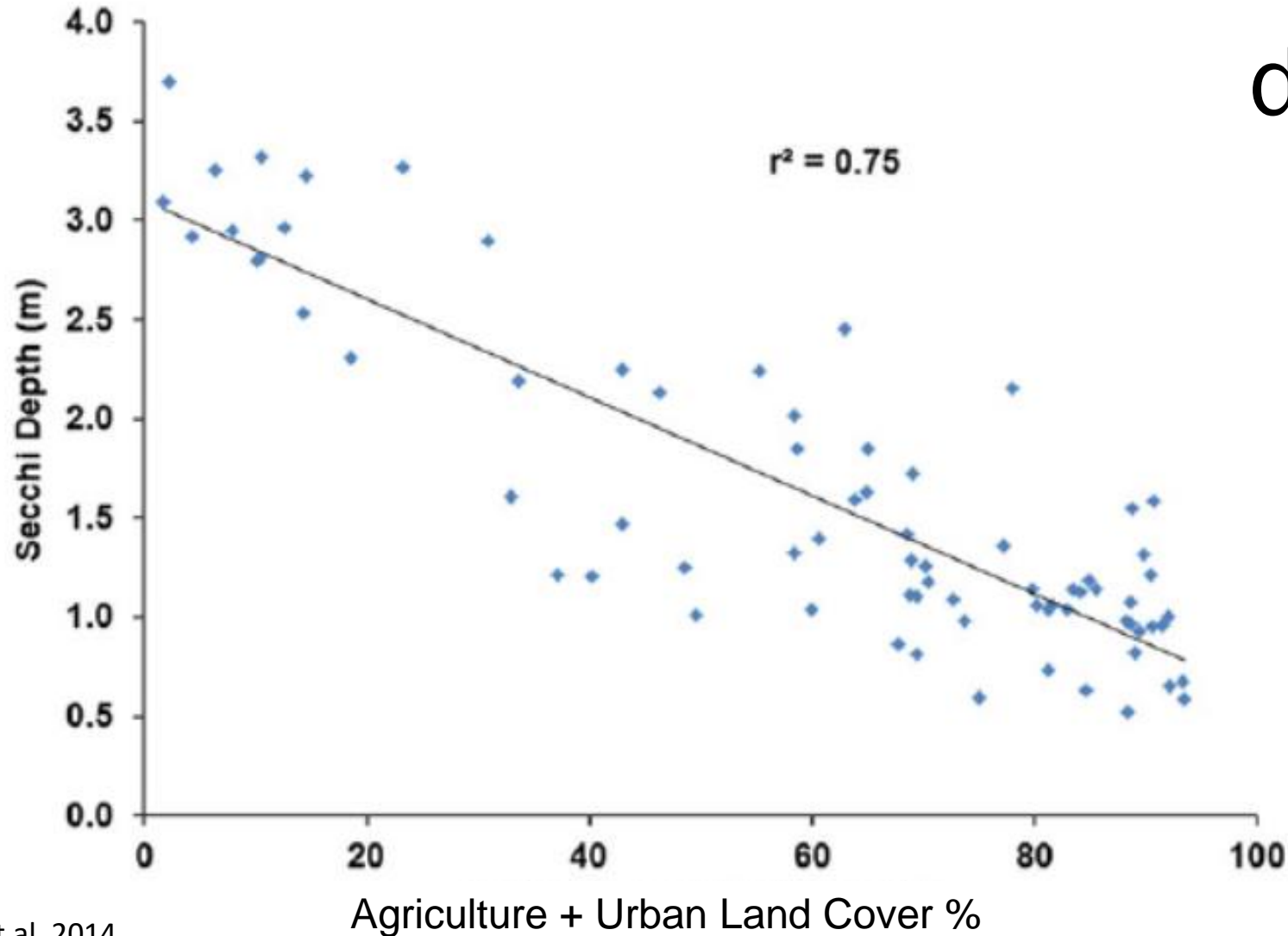
**Results in
increased
pollutant loads**

Current Land Cover



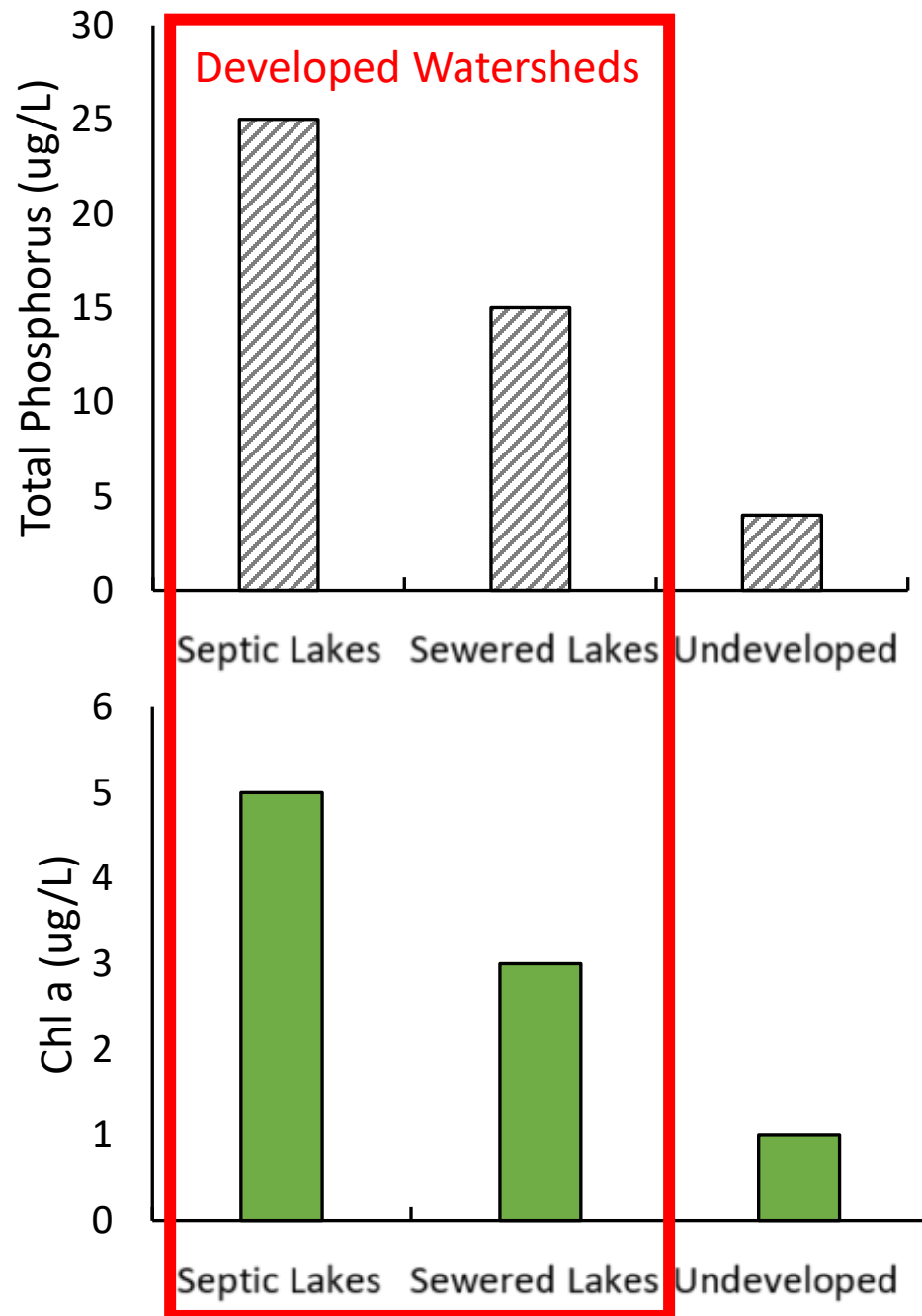
Watershed disturbance and water clarity

Water clarity declines with increasing watershed disturbance

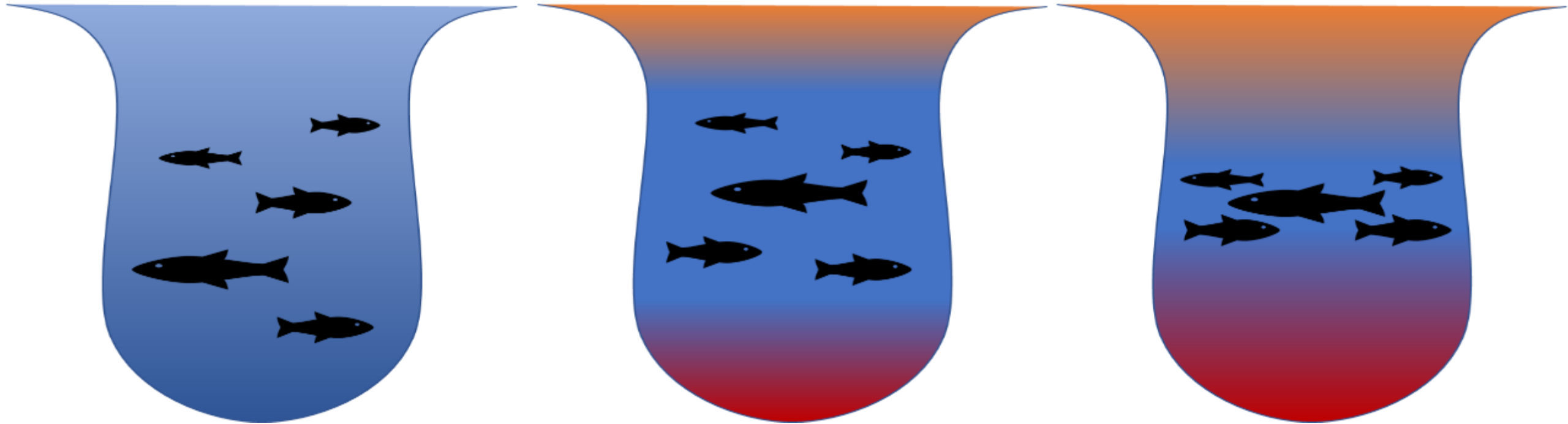


Impacts of Development on External Loading

Total Phosphorus and **Chl-*a*** are higher in developed lakes compared to undeveloped ones



Watershed impacts on coldwater fish



Spring

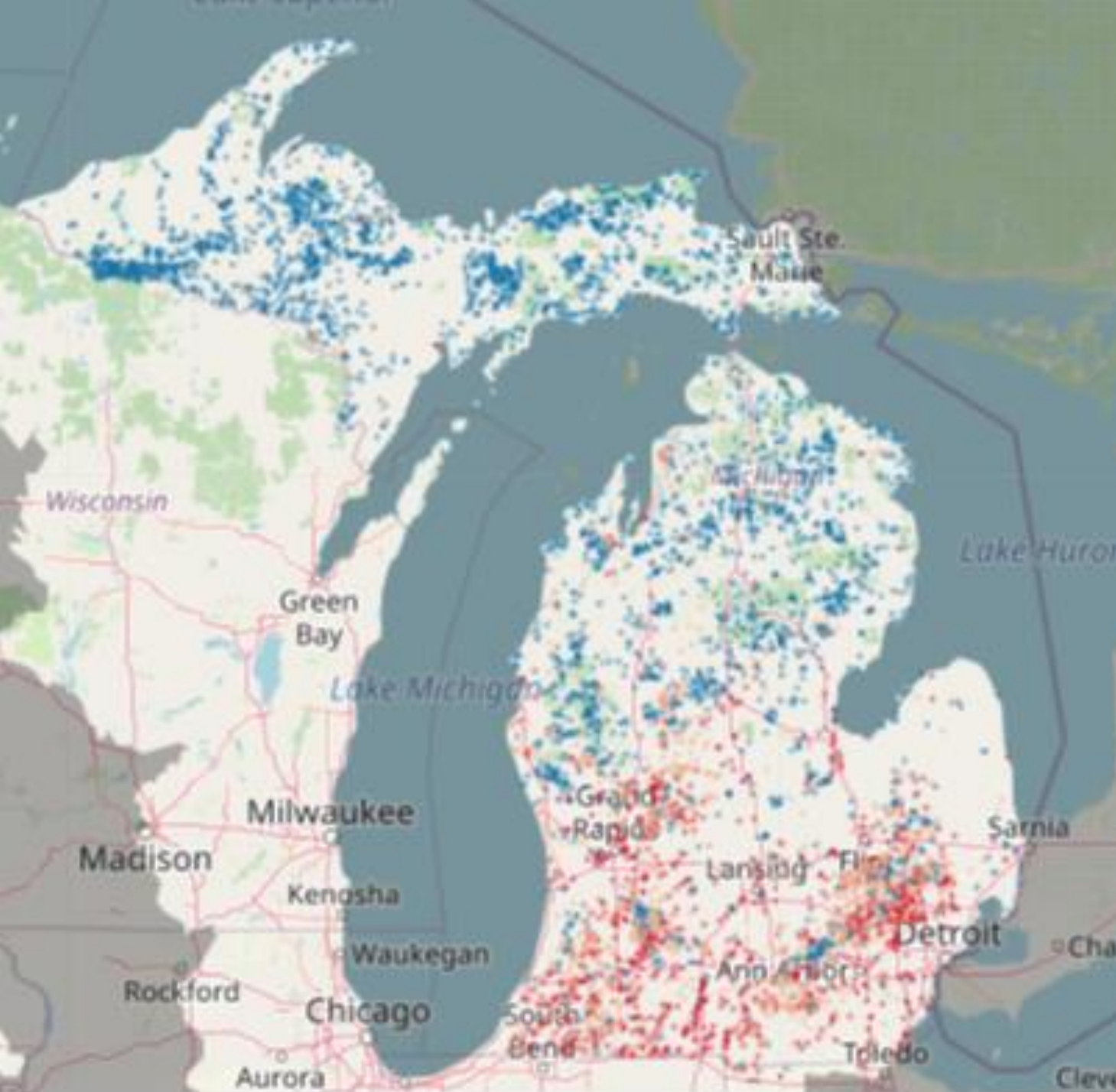
Middle summer

Late summer

State of Michigan's Lakesheds

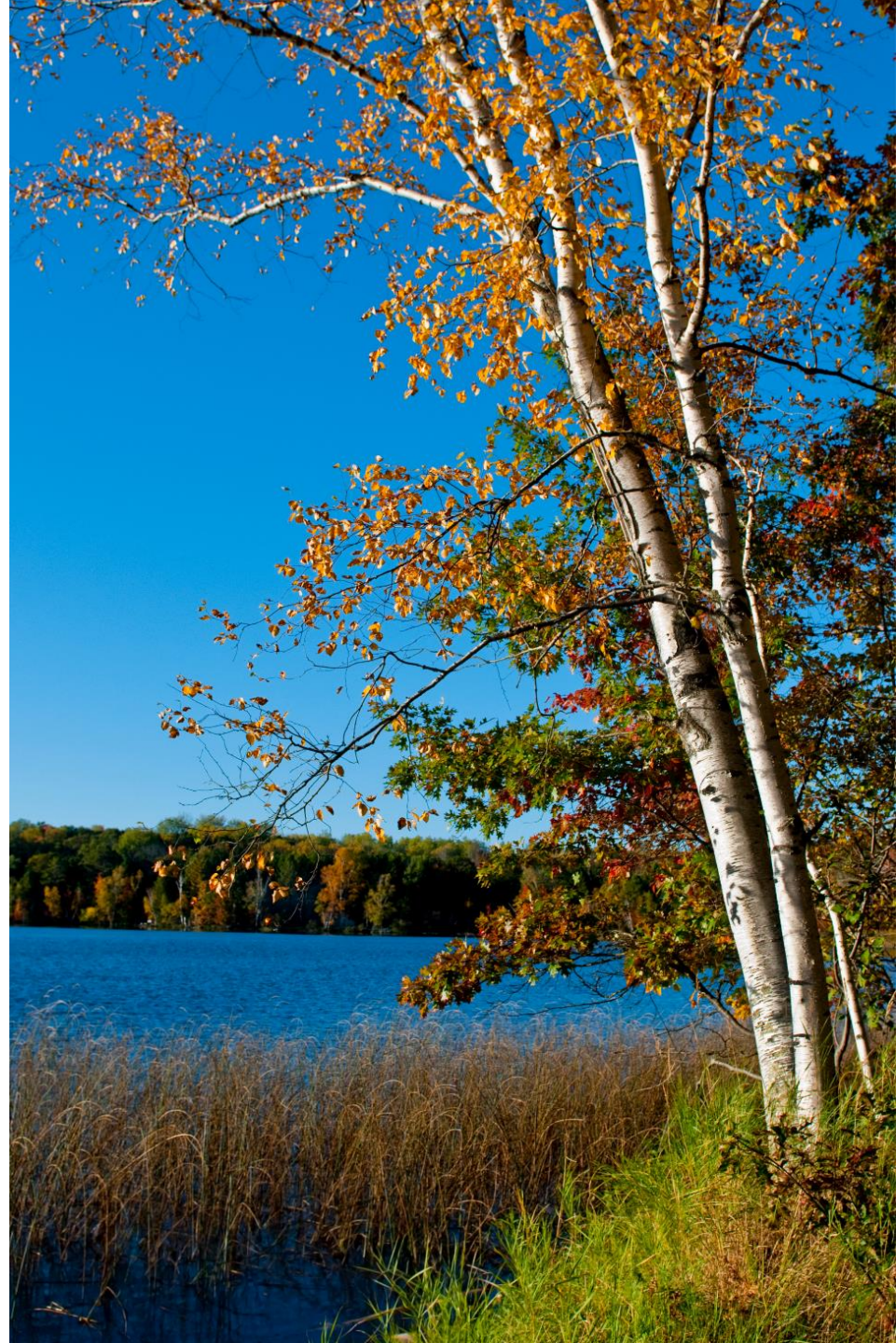
The proportion of the watershed area with urban or agricultural land cover.

Classified watershed disturbance as low (0 – 25%), medium (25%-60%), and high (60% - 100%).



Actions

- Protection – “Protect the sponge”
 - Protect forests and prairies
- Restoration
 - Specifically wetlands and floodplains
- Mitigation
 - Reduce the impact of our activities





Protection: Conservation Easements

- **Protects land forever**
- **Remains private**
- **Can keep it in working lands**



Restoration: Rebuilding wetlands

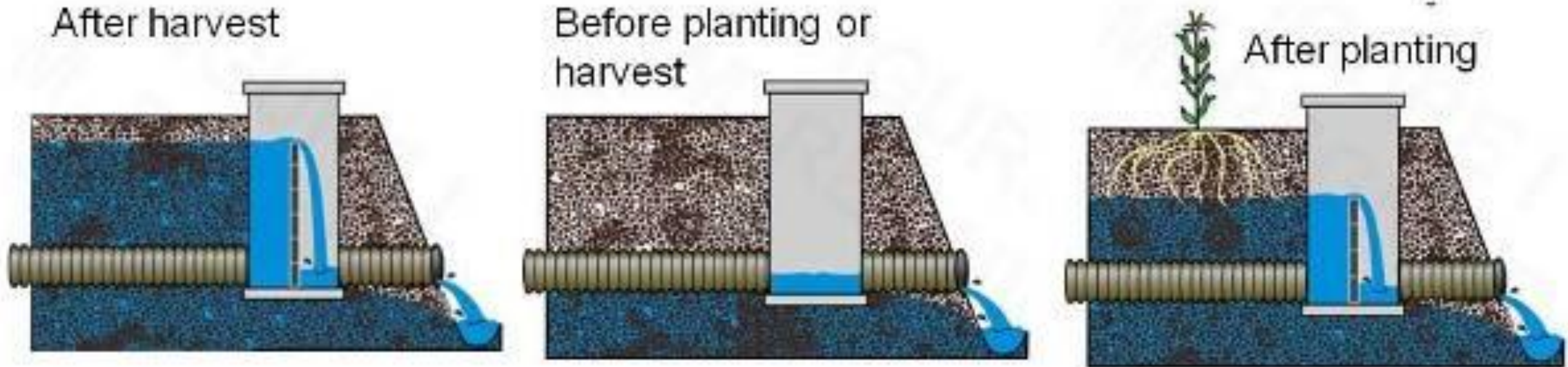
- Brings back an important sponge
- Collects water before entering into the lake
- Cost share available

Mitigation: Reducing our impact

- Drain tile water level control structure
- Buffer your waterways
- Livestock exclusion
- Rain garden, rain barrel, reduce impervious surfaces



Mitigation: Keep the water and nutrients in the field



Mitigation: Buffer your waterways

How
buffers
protect
water

Trees

- Hold soil in place
- Use up nutrients
- Shade the water
- Provide habitat

Roots stabilize
soil and absorb nutrients

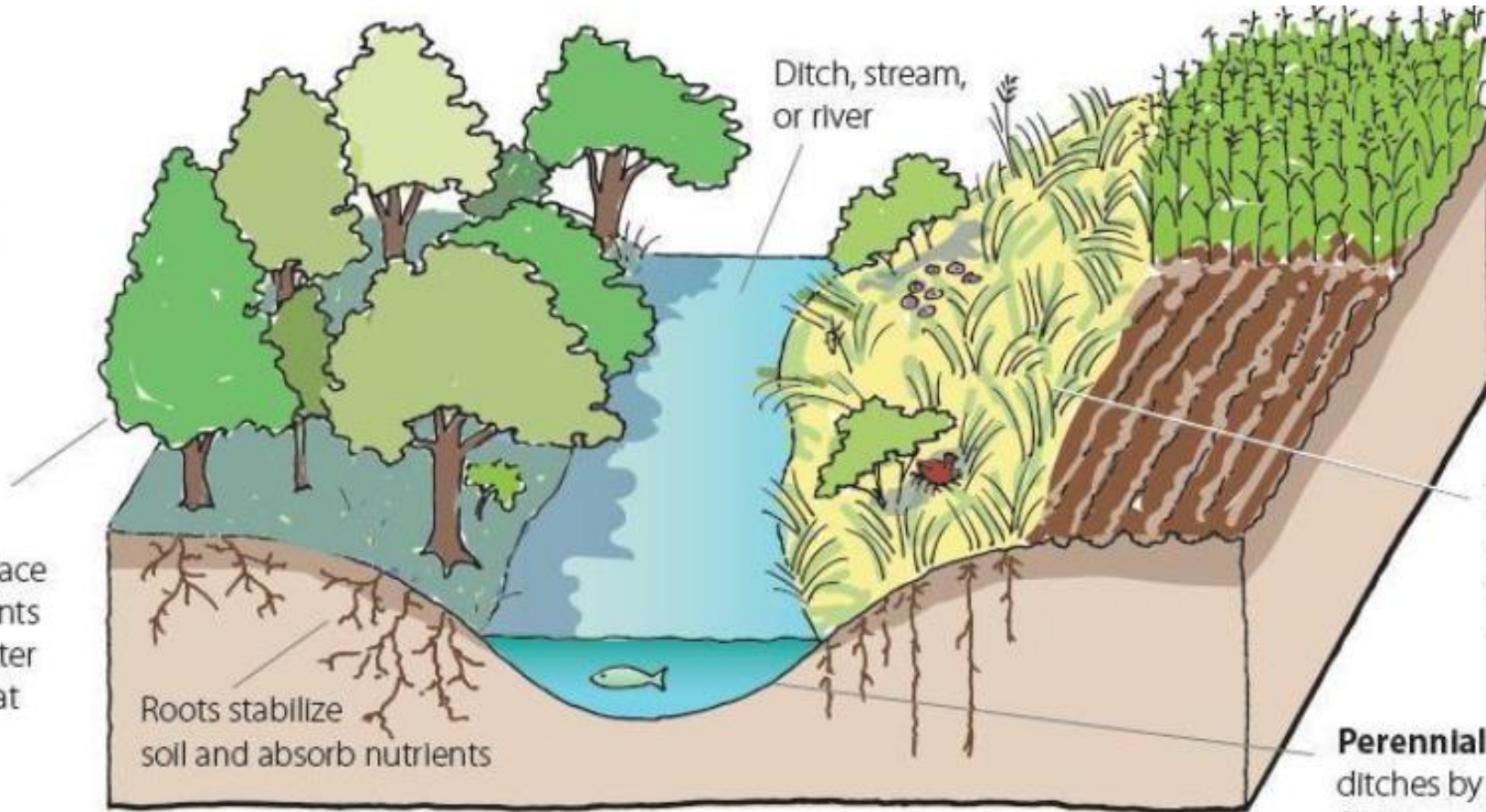
Ditch, stream,
or river

Cropland

Tall native grasses

- Prevent erosion
- Filter pollutants in runoff
- Provide habitat

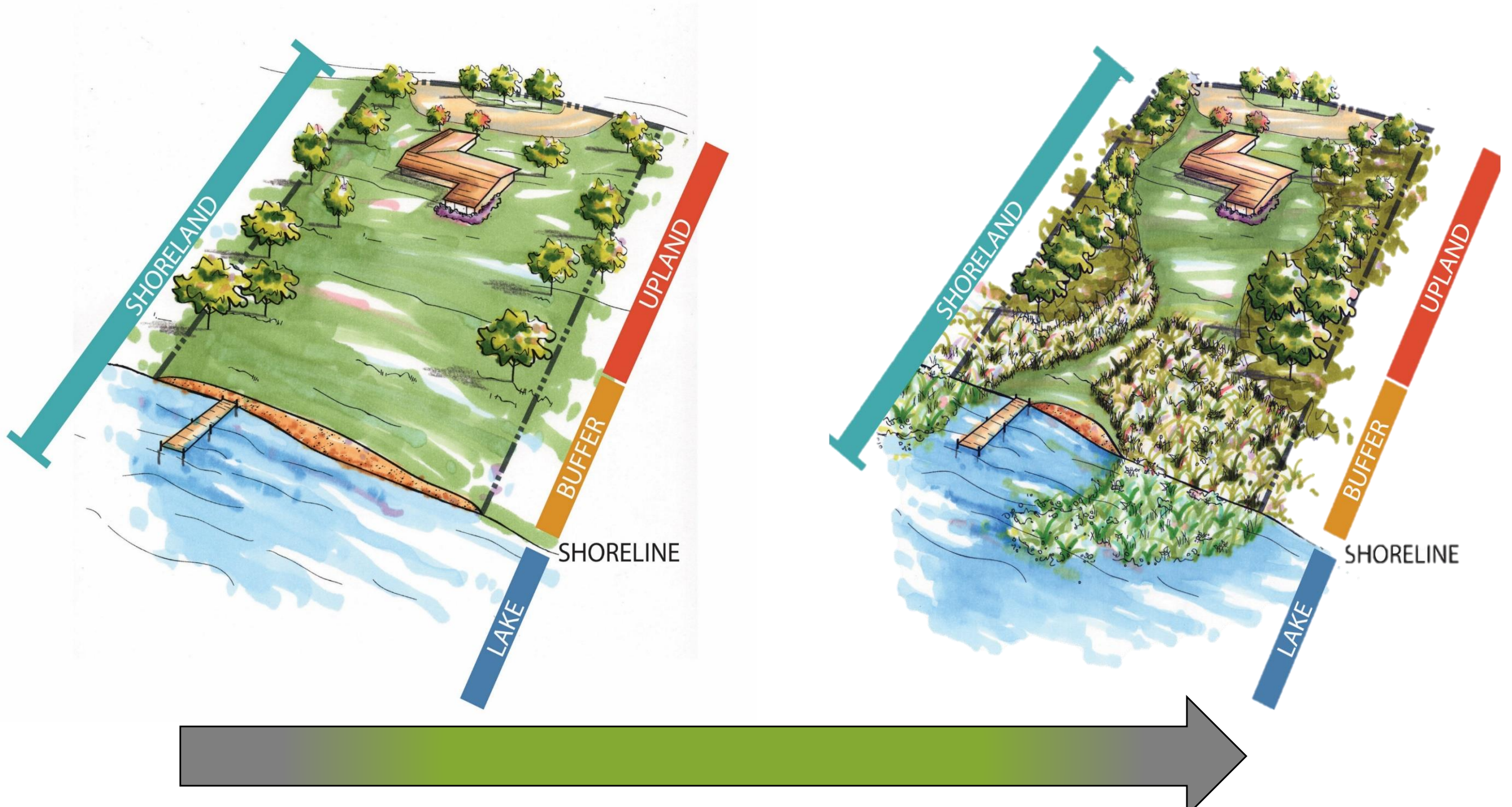
Perennial buffers help maintain
ditches by preventing erosion and
fill-in



Mitigation: Livestock exclusion



Mitigation: Shoreland Transformation



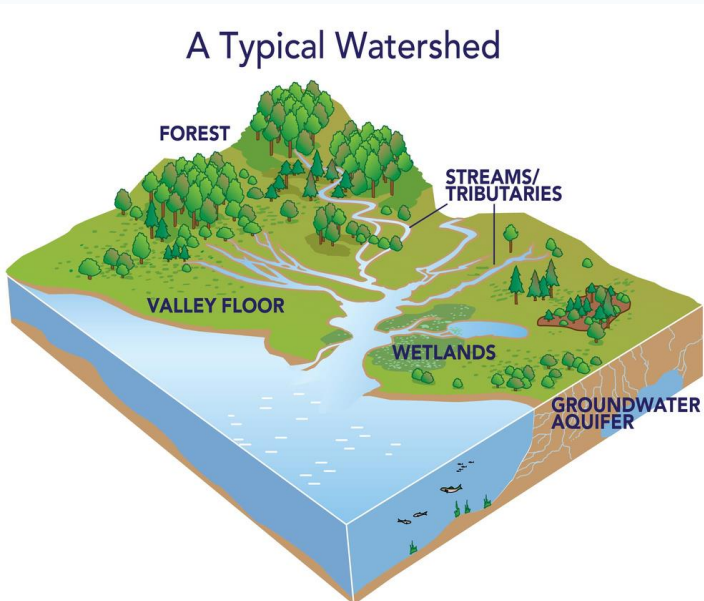


Mitigation: Rain Gardens

Mitigation:

Soak in the rain where it lands

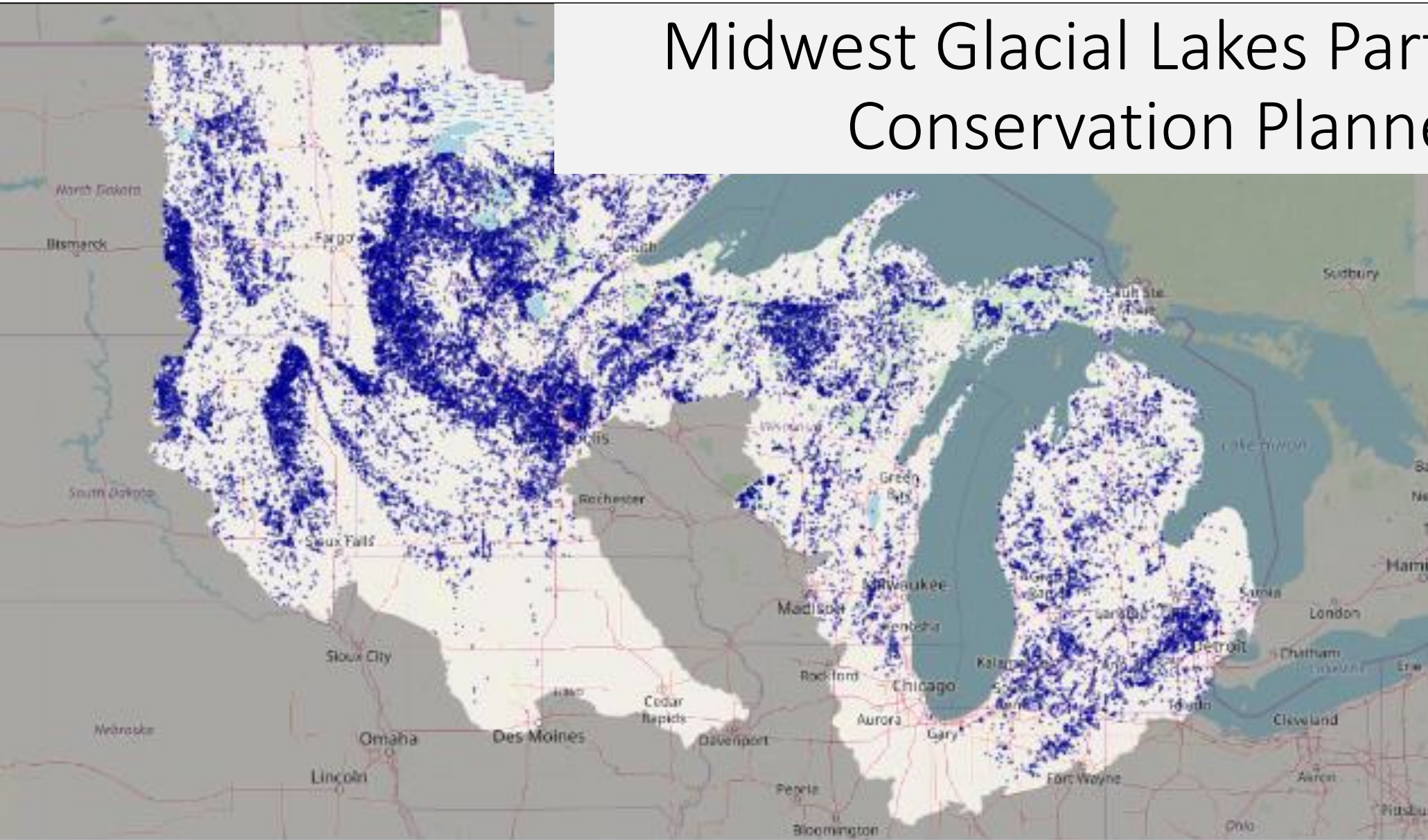
REDUCES POLLUTION RUNOFF, PROVIDES HABITAT & ADDS BEAUTY



Appropriate actions are different depending on the current conditions



Midwest Glacial Lakes Partnership Conservation Planner



<http://ifrshiny.seas.umich.edu/mglp/>

John Ford Lake, MI

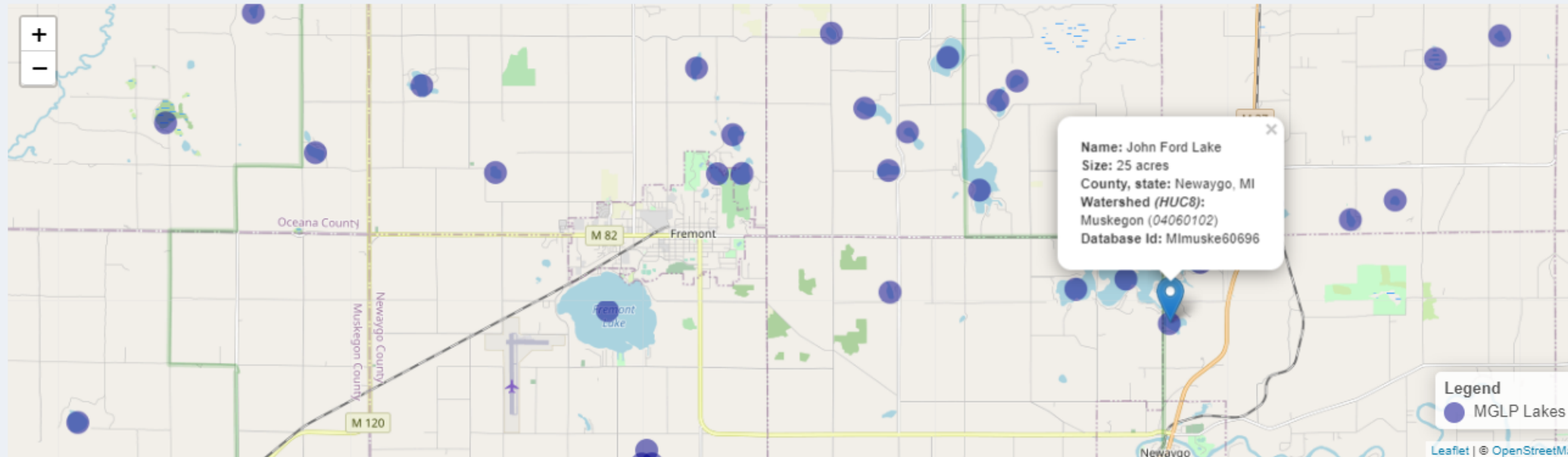
Lake symbols ?

Show which lakes?

Background map

Tools

Reset



Summary

Watershed details

Shoreland details

Climate vulnerability ?

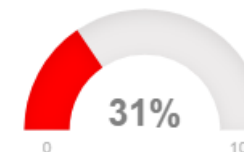
Medium

Vulnerability

Watershed disturbance ?



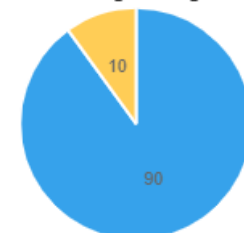
Shoreland disturbance ?



Suitability ?

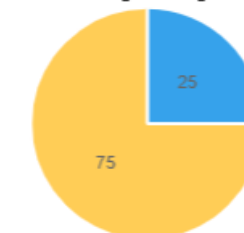
Bluegill	Likely	Likely
Northern pike	Unlikely	Unlikely
Walleye	Unlikely	Unlikely
Coldwater spp.	Unlikely	Unlikely

Watershed management guideline ?



Protection Rehabilitation & mitigation

Shoreland management guideline ?

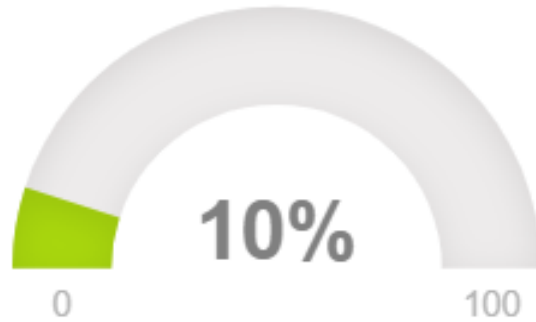


Protection Rehabilitation & mitigation

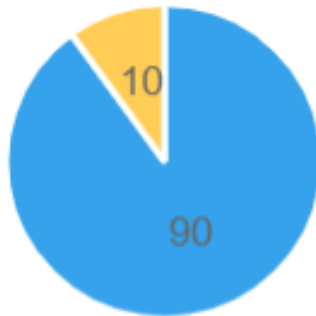
Lakeshed Disturbance

Agriculture + urban development in the 100m buffer

Watershed disturbance ?



Watershed management guideline ?



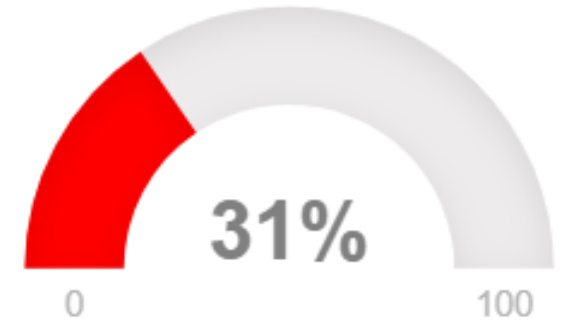
Protection Rehabilitation & mitigation

Conservation Effort

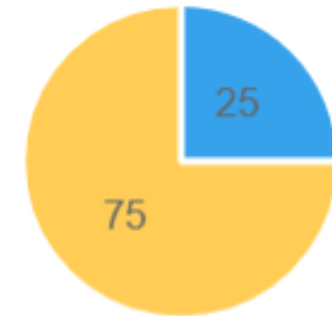
Shoreland Disturbance

Agriculture + urban development in the 100m buffer

Shoreland disturbance ?



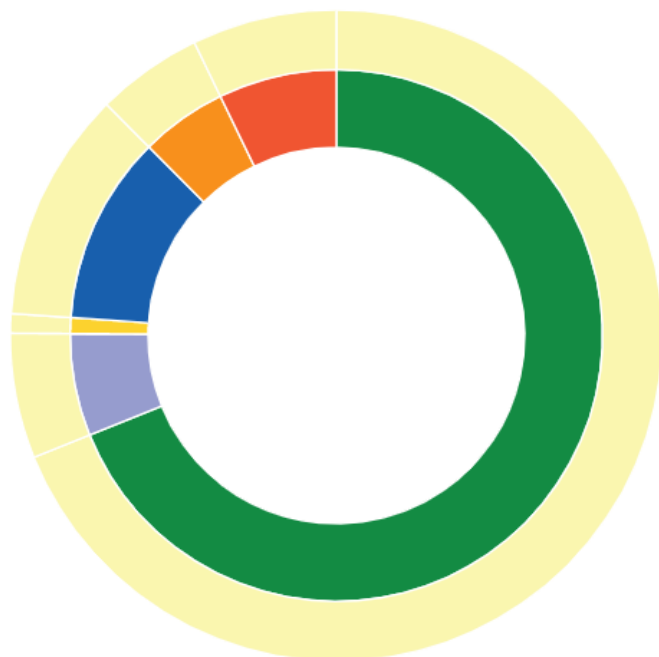
Shoreland management guideline ?



Protection Rehabilitation & mitigation

Watershed and Shoreland Cover and Protection

Watershed land cover and protection



Legend



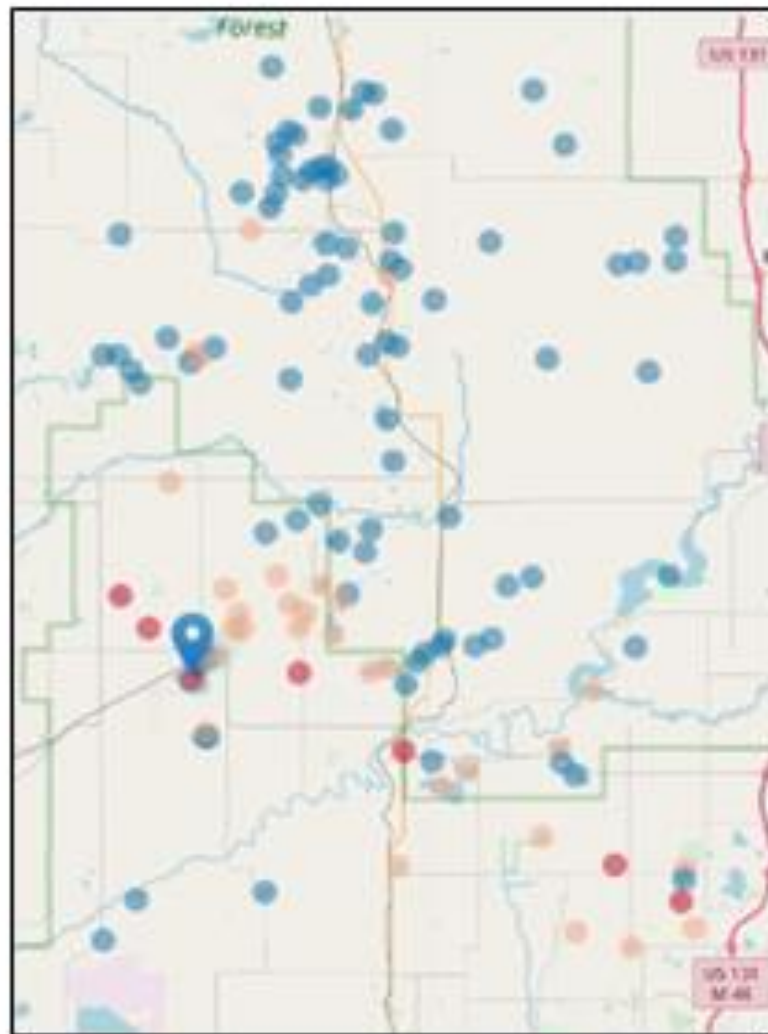
Watershed land cover and protection

Protection status (PADUS)	Land cover (NLCD2006)							
	Forest	Wetland	Grassland	Water	Other	Agriculture	Urban	Total
Fully protected	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %
Partially protected	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %	0 ac. 0 %
No protection	144 ac. 68.90 %	13 ac. 6.22 %	2 ac. 0 %	24 ac. 11.48 %	0 ac. 0 %	11 ac. 5.26 %	15 ac. 7.18 %	209 ac. 100 %
Total	144 ac. 68.90 %	13 ac. 6.22 %	2 ac. 0 %	24 ac. 11.48 %	0 ac. 0 %	11 ac. 5.26 %	15 ac. 7.18 %	209 ac. 100 %

SHORELAND DISTURBANCE



WATERSHED DISTURBANCE



How to move forward?

Cost share with partnerships

- Federal agencies
 - NRCS – Natural Resources Conservation Service
 - FSA – Farm Service Agency
 - USFWS – United States Fish and Wildlife Service
- Private land owners and local gov't
 - Lake groups – Lake Associations and Lake Boards
 - Farmers
 - Cities
 - Townships



Federal Agencies: NRCS, FSA, and USFWS

Technical Assistance
Cost Share



Lake Groups, Private Landowners and Local Gov't

Build partnerships with
Lake Groups, Landowners, Farmers, and Cities
And raise money

An aerial photograph of a suburban neighborhood during the 'golden hour' of late afternoon. The scene shows several houses of varying sizes, mostly with light-colored siding and dark roofs. The houses are interspersed with lush green trees, some of which have yellowing leaves, suggesting autumn. In the foreground, a body of water, likely a lake or a large pond, is visible. Several wooden docks extend into the water, with several boats moored at them. The water reflects the warm light of the setting sun. The overall atmosphere is peaceful and scenic.

**Remember:
Protect
Restore
Mitigate**

What we do on land impacts our lakes

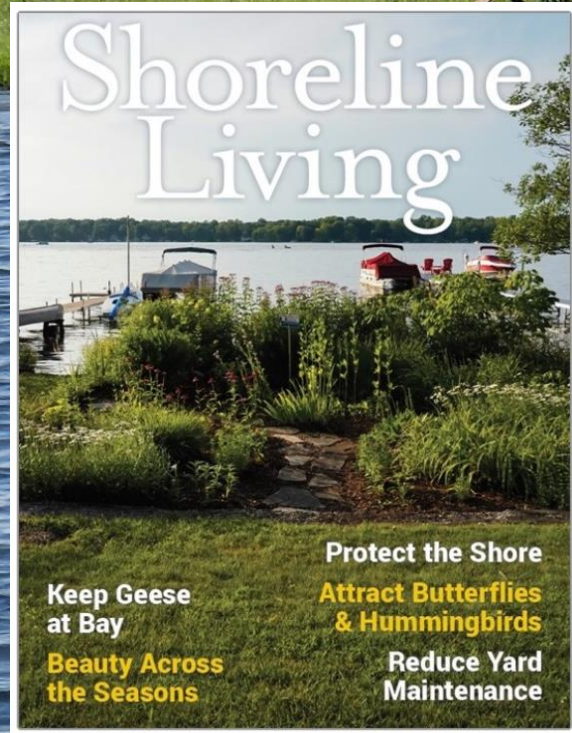
THANK YOU

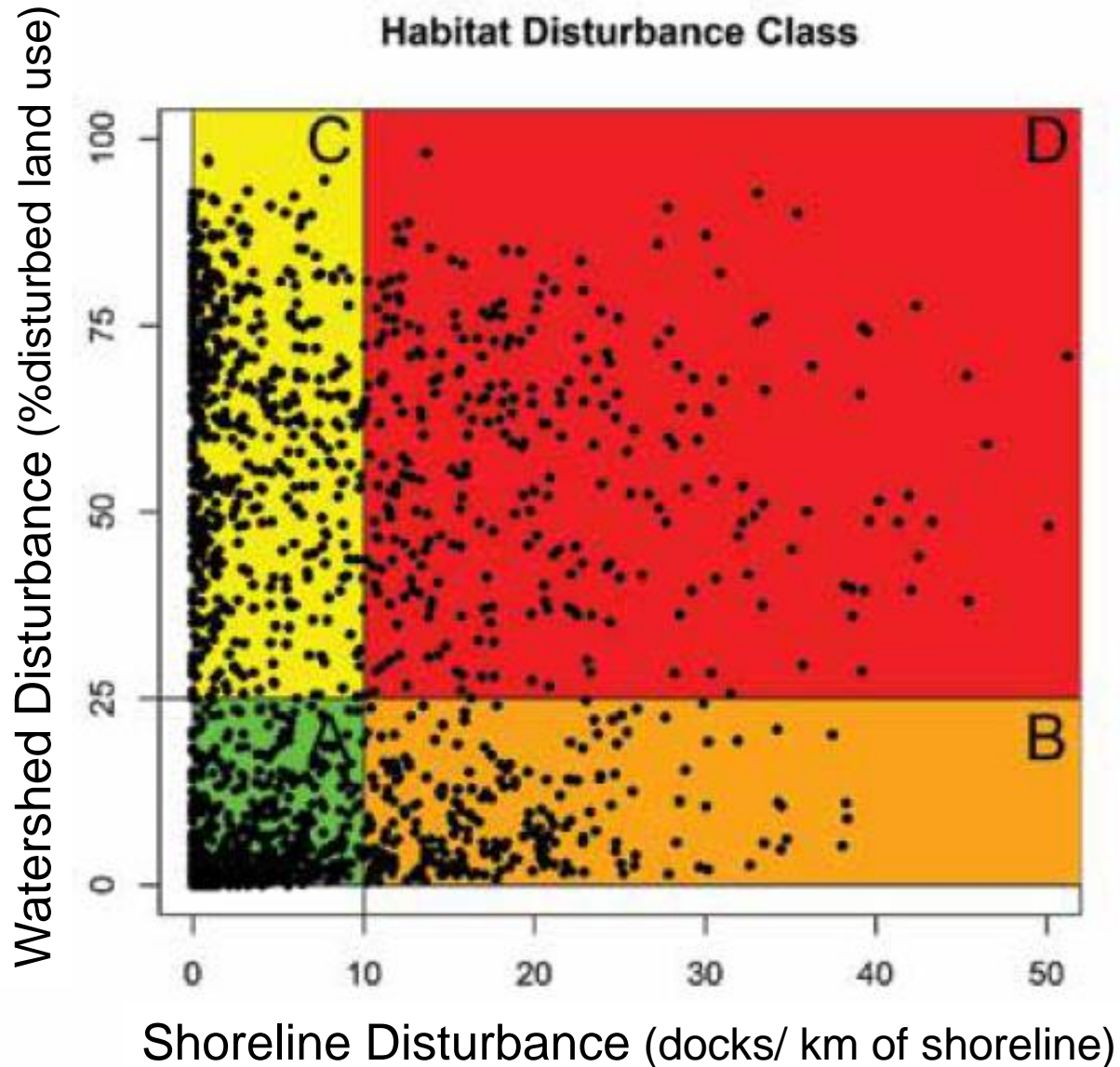
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Michigan Natural Shoreline Partnership
www.mishorelinepartnership.org

Wisconsin Healthy Lakes Program
www.healthylakeswi.com

Midwest Glacial Lakes Partnership
www.midwestglaciallakes.org





A Fish Habitat Conservation Framework

Habitat disturbance classes

- A: Minimal
- B: Physical
- C: Water Quality
- D: Physical and Water Quality