



Interstate Early Detection and Rapid Response

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Interstate EDRR Phase IV project

1

Facilitate
surveillance
planning and
coordination

2

Improve and
refine the
Great Lakes
surveillance
site
prioritization
system

3

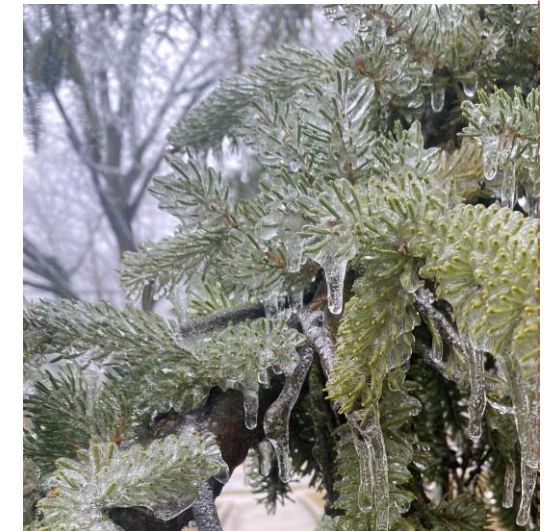
Expand the site
prioritization
system to inland
waters of Great
Lakes States and
Tribal territories

4

Develop best
practice
guidance for
aquatic plant
surveillance
methods

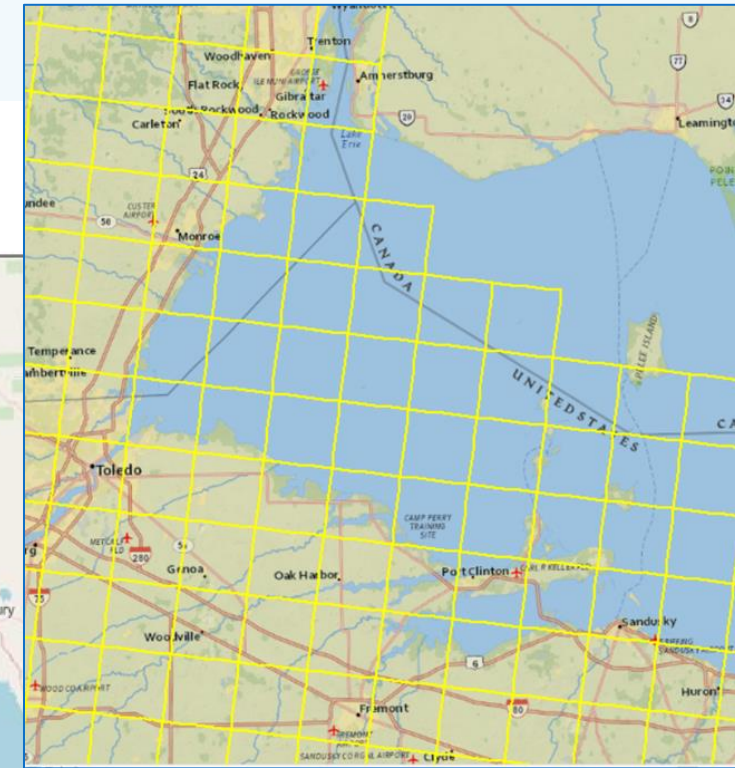
Obj. i: Facilitate regional surveillance meeting

- Feb 2023 – Ann Arbor
- First post covid in person meeting – but hybrid format
- Winter ice storm
- No cost extension – Feb 20-22 (Ann Arbor) 2024.



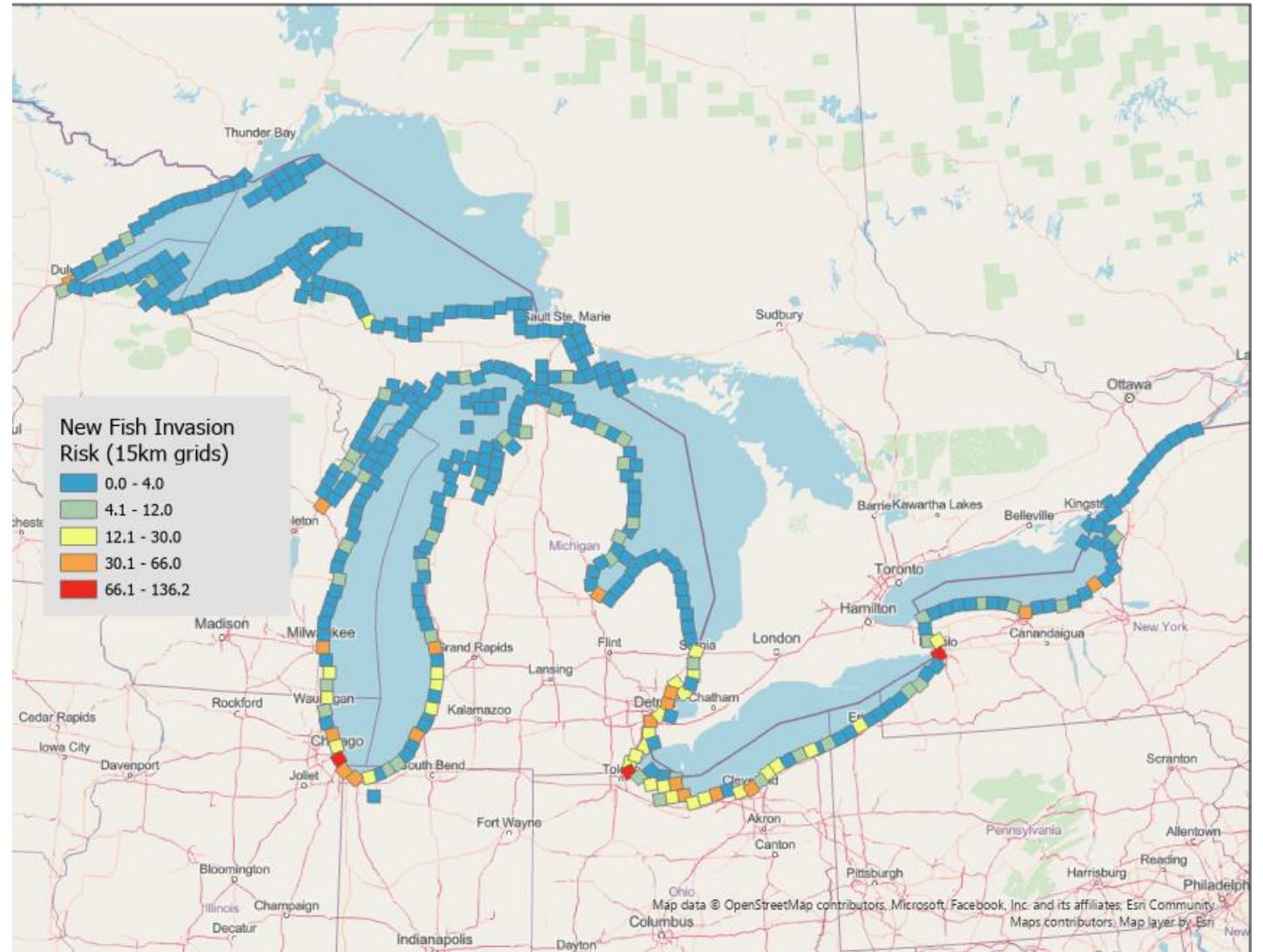
Obj ii: Refine Great Lakes site prioritization

- ◆ Develop new underlying framework
- ◆ Based on the GLAHF 9x9km regular grid cells
- ◆ However, grid cells often are not centered on sites of interest like harbors
- ◆ Did not extend into St Lawrence
- ◆ A larger grid cell would mitigate this issue

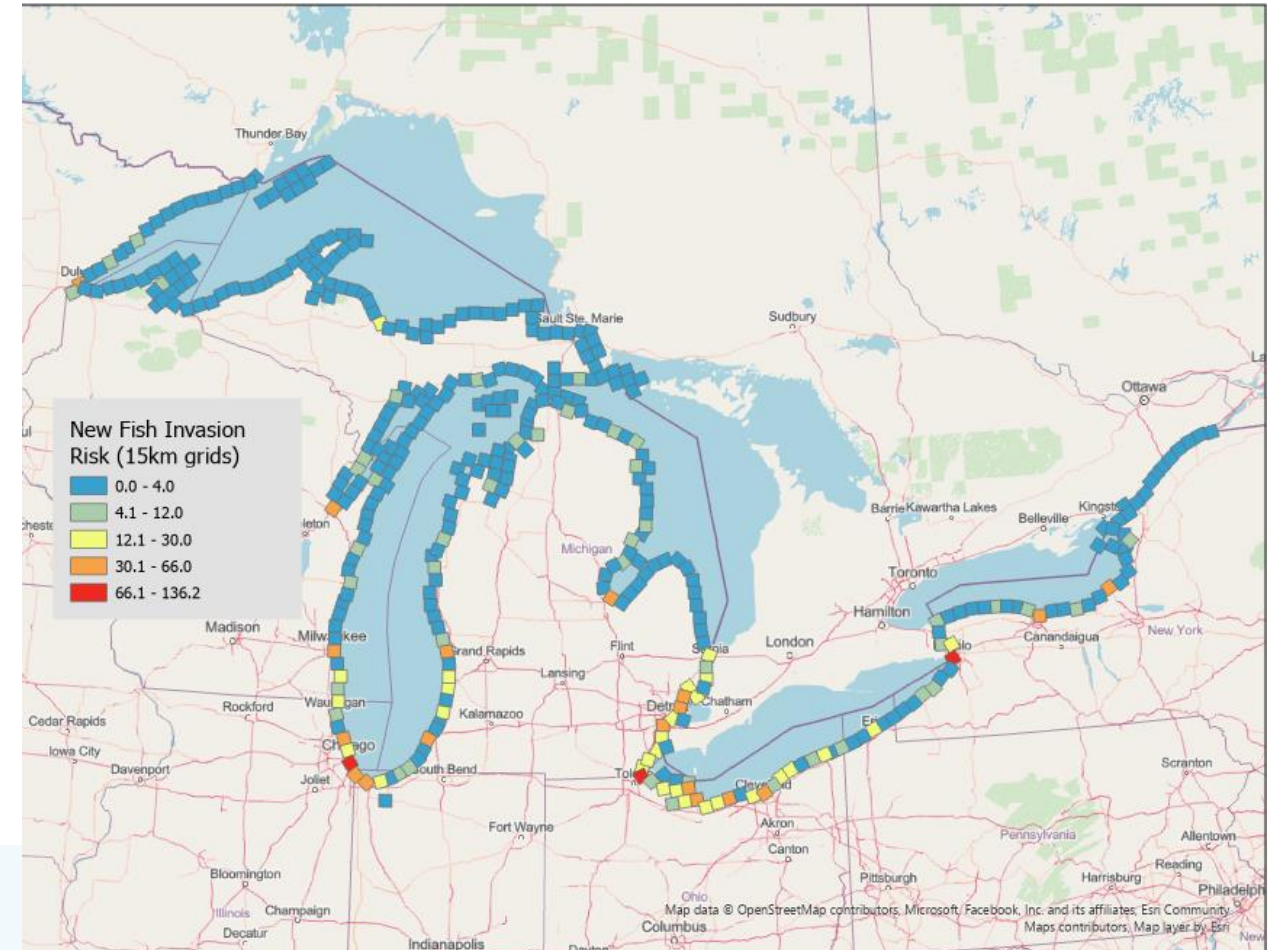
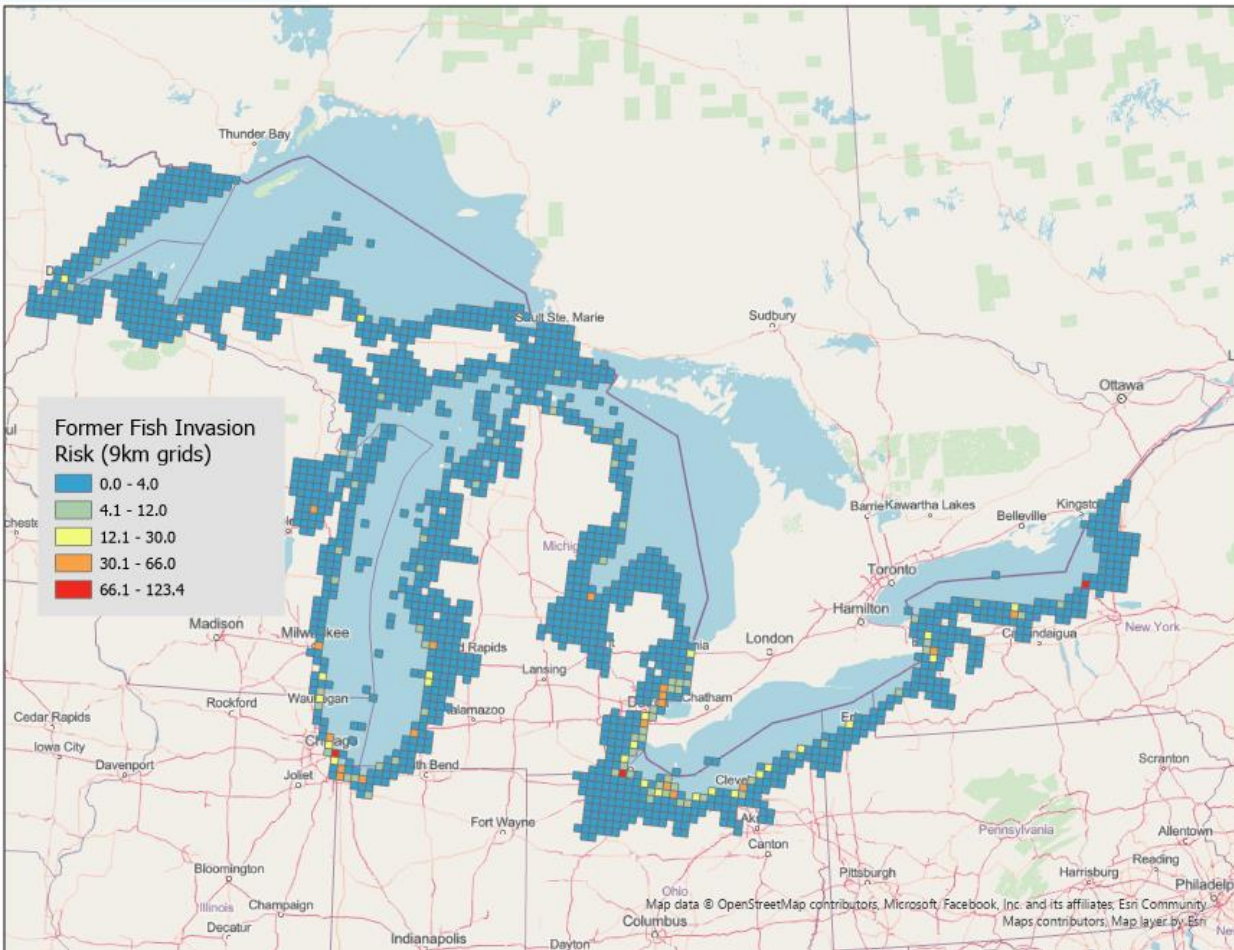


New 15km Risk Grid Centered on Former High Priority Sites

- Framework completed
- Attributed with invasion risk layers

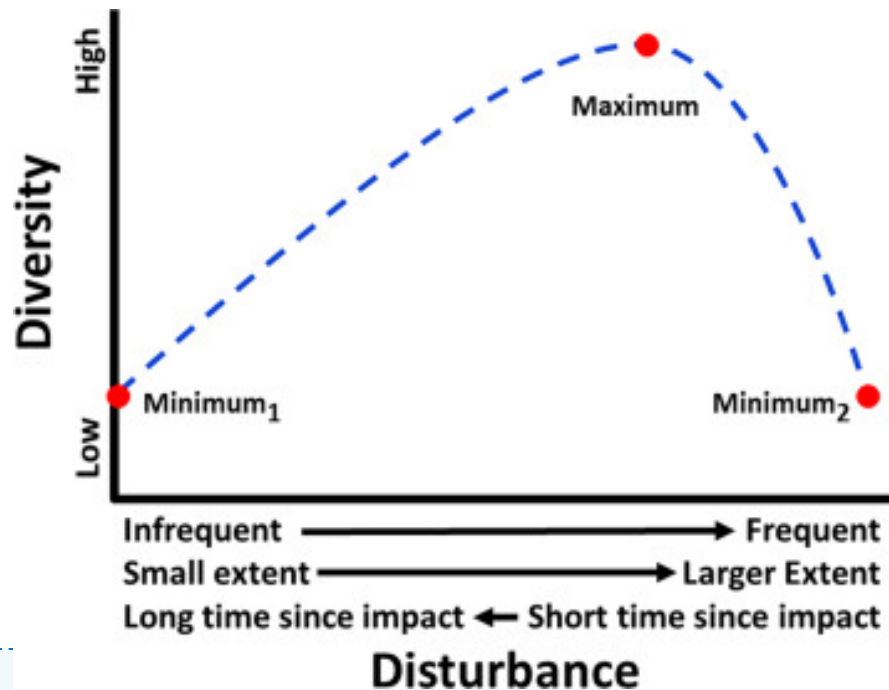


Side by Side



Anthropogenic Disturbances

Attributing grid squares with these as we speak



Shoreline hardening

Impervious cover in catchment

Suspended sediments

Phosphorus loading?

PCBs

AOCs

Nitrogen loading

Dredge channels

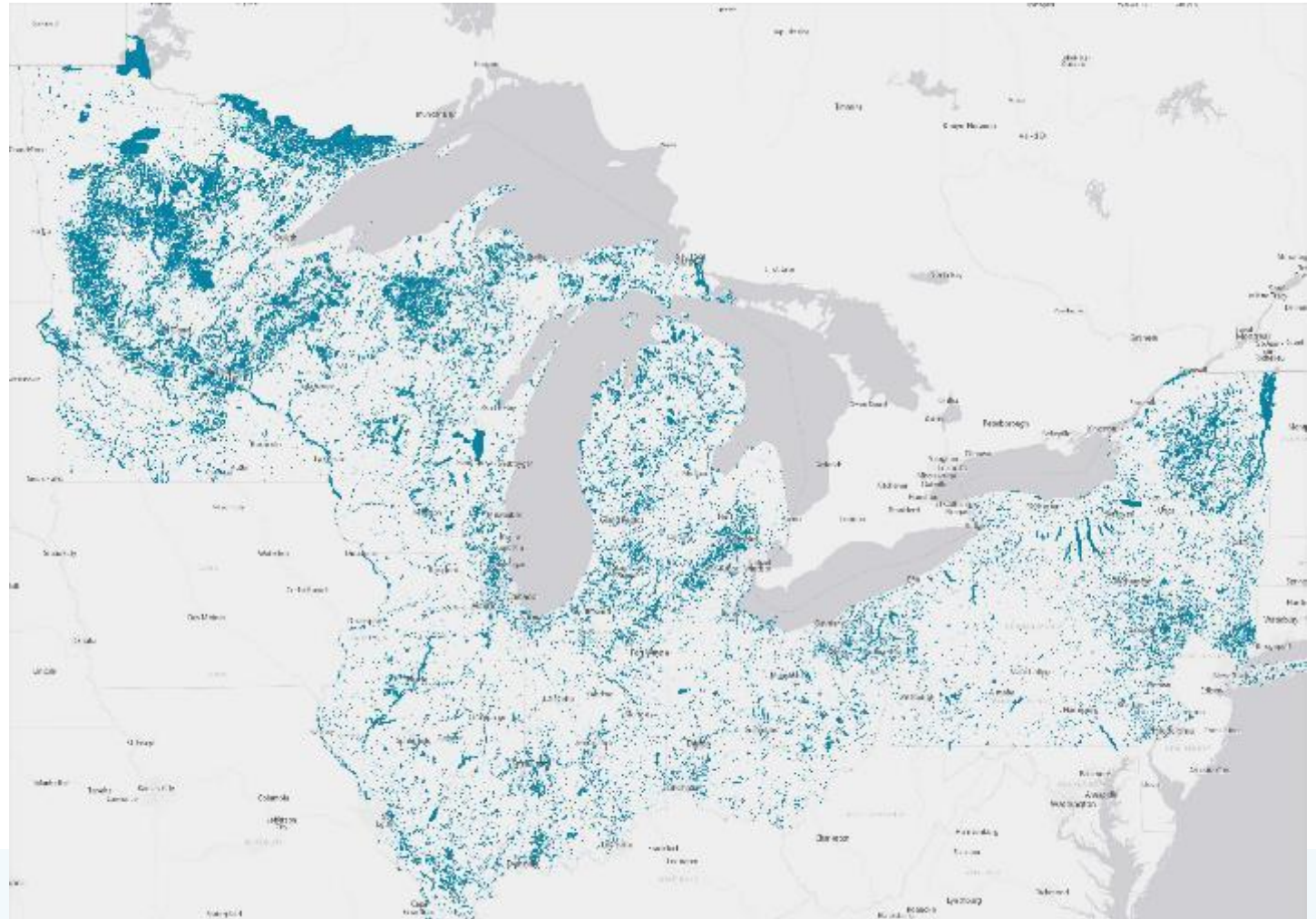
Next Steps

- Incorporate Connectivity data
- Build out habitat diversity measures for each grid square. (*winter /spring 24*)
(e.g. depth, substrate, exposure, lacustrine wetlands, SAV)
- Empirical analyses to look at best predictors of invasive species and native species richness (as a surrogate measure of habitat suitability). (*Summer 23*)

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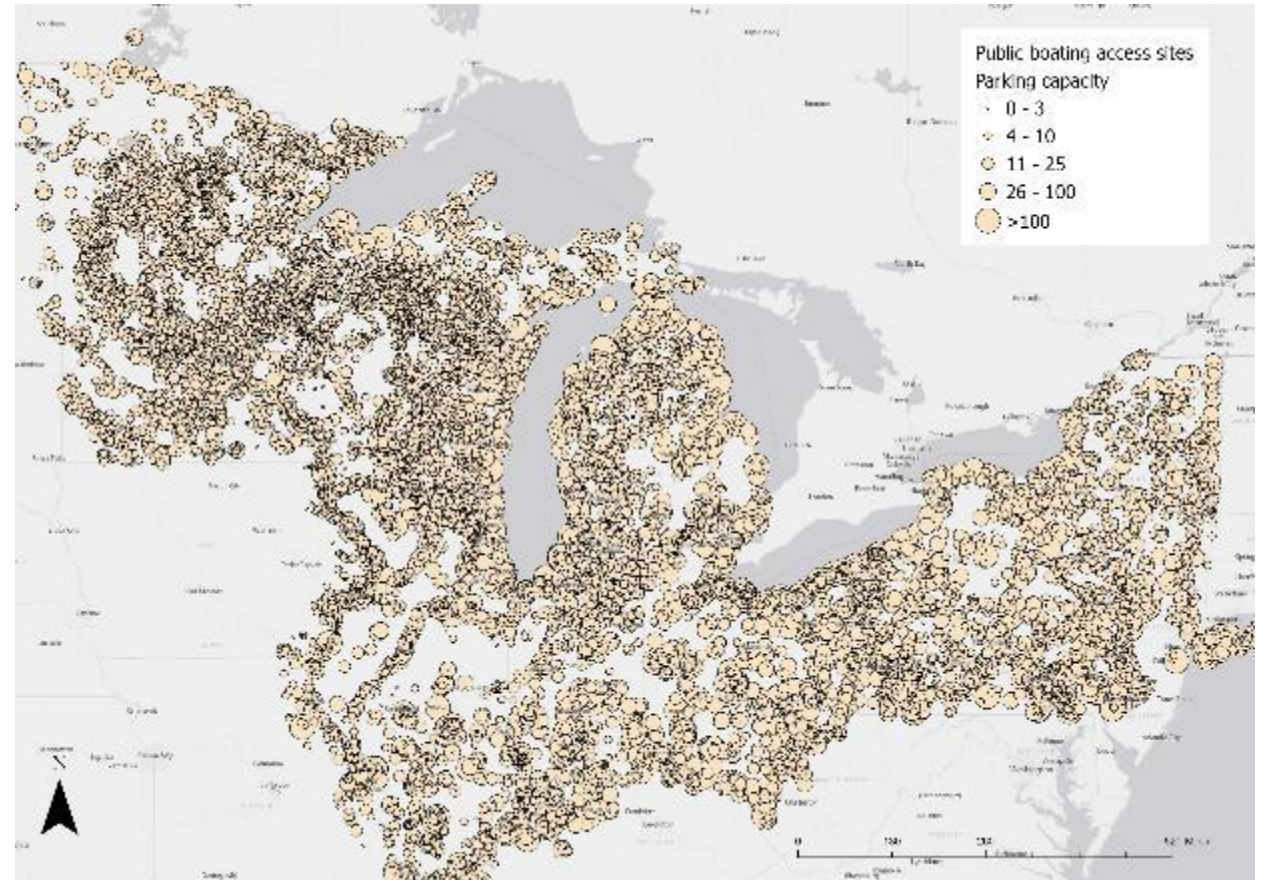
Inland lakes surveillance prioritization model

- ◆ Baseline dataset of inland lakes/ponds
 - ◆ All lake/pond/reservoir waterbodies > 4 ha
 - ◆ Sources: NHDPlus V2 + additional water bodies >10 acres from other sources
 - ◆ Approx. 78,000 lakes
 - ◆ Related each lake to its local catchment, watershed and network



Inland lakes surveillance prioritization model

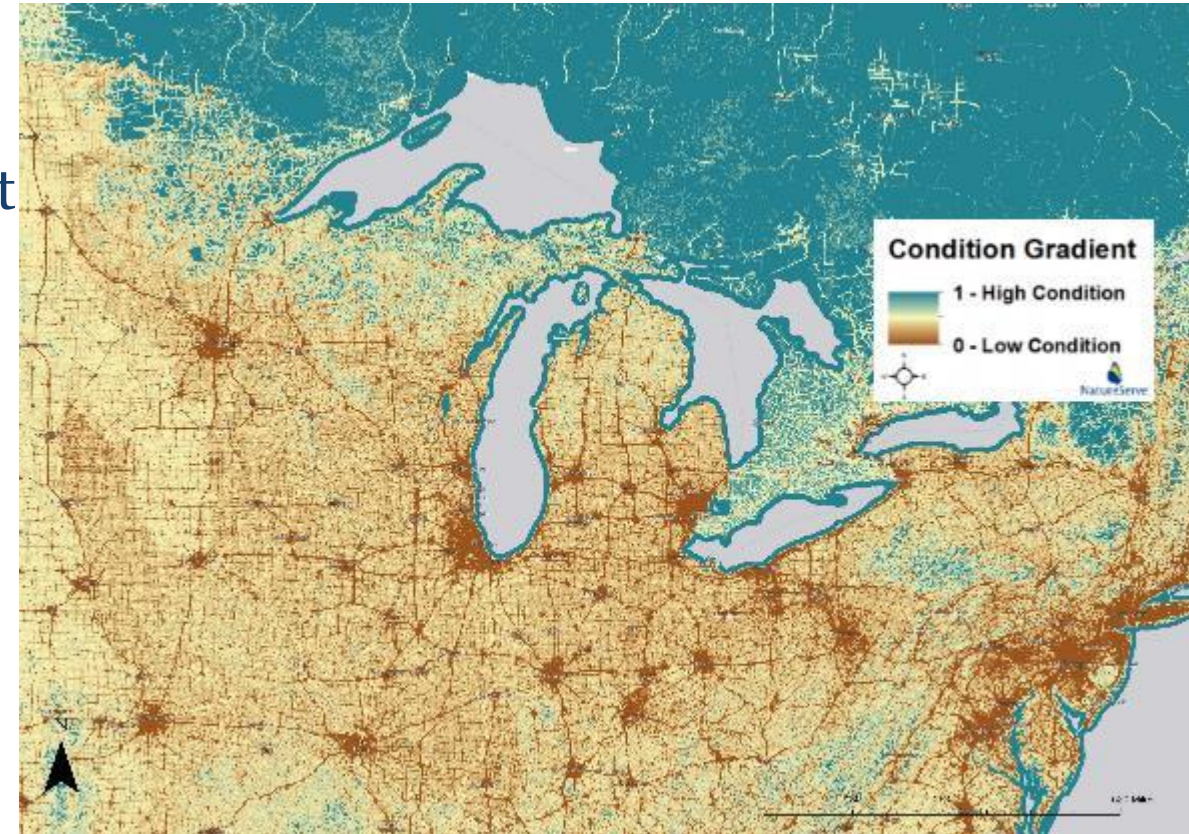
- Model inputs
 - Invasion pressure
 - Locations and size of public boat access sites
 - Population within a radius of the lake
 - Connectivity to waters known to be invaded
 - Recreational boating connectivity model



Locations and sizes of public boating access sites

Inland lakes surveillance prioritization model

- ♦ Model inputs
 - ♦ Habitat suitability: How likely is it that an invasive species will become established if it reaches a site?
 - ♦ Lake depth
 - ♦ Water temperature range
 - ♦ Water quality
 - ♦ Disturbance level
 - ♦ Lake condition: How significant is the potential impact of invasion?
 - ♦ Condition of catchment landscape
 - ♦ Degree of shoreline development
 - ♦ Protection status
 - ♦ Recreational value



NatureServe landscape condition index

Summary of inland lake input data collected/calculated/attributed

Physical/hydrology

- Surface area of lake, catchment, watershed
- Perimeter/area ratio
- Measured or estimated max, mean lake depth
- Natural or reservoir
- #s of upstream and downstream lakes, total number of connected lakes and area of connected surface water
- Is it connected to the GL via surface water? Are there any dams/barriers along the path?

Invasion pressure

- # of invaded upstream lakes and stream distance to nearest (calc so far for zebra mussel, stonewort, EWM)
- Is there public boat access/how many parking spaces
- Population within 0.4, 5 km of shoreline
- EnviroAtlas freshwater fishing demand
- Road density/impervious surface % in catchment/watershed
- Density of artificial ponds in catchment (USFWS wetland layer)
- % of catchment that is protected

Habitat suitability

- Range of monthly average air temperatures (working on LST)
- Normalized Difference Chlorophyll index from Sentinel-2 imagery
- NatureServe landscape condition index
- TNC's Midwest freshwater resilience analysis datasets
- Mean synthetic fertilizer application rate in catchment/watershed (from LakeCat database)

Inland lakes surveillance prioritization model

- Finished collecting/cleaning model inputs
- Have collate additional AIS and native species distribution data for inland lakes:
- Plant, fish and invertebrate
- NFWF aquatic plant data is in hand
- Run initial empirical models to explore relationship between variables and patterns of invasion on landscape.



Credit: MNDNR



Objective iv. Develop best practice guidance for aquatic plant surveillance methods in inland lakes

- **Technical workshop** (and associated documentation) on IAP early detection monitoring methods
 - Traditional methods (Feb)
 - Remote sensing and eDNA (March)
- An **annotated bibliography** of relevant IAP early detection monitoring methods
- Draft **best practices guidance document** that summarizes recommendations for early detection of IAP in inland lakes