


Invasive Species Databases Can Guide Wetland Invasives Control Around Your Lake

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Wetland Invasive Species & Lakes

- Wetland invaders cause problem for lakes
 - Reduce beach and shoreline use
 - Reduce land values
 - Alter ecosystem functions
 - Reduce species diversity
 - Reduce recreational & hunting opportunities



Invasive Species Databases

- To help stop invasives, where are they found?
- Current online systems, many have millions of records:
 - GISIN (Global Invasive Species Information Network)
 - MISIN (Midwest Invasive Species Information Network)
 - EDDMapS (Early Detection Distribution Mapping System)
 - GLEDN (Great Lakes Early Detection Network)
 - WDNR's SWIMS (Surface Water Integrated Monitoring System)

Invasive Species Databases

- These databases are mostly repositories
 - Display Coordinates, Dates, Observers ...
- Records aren't used in an ecological context
 - Data typically identified by State or County
 - SWIMS identifies affected waterbodies
 - None identify threats to wetlands, woodlands, or other areas
- Using ArcGIS and available data from the WDNR, it is possible to identify invasive species in a more explicit sense.

Process

How do we identify potential threats?

1. Assemble invasive species records
2. Intersect the data against other spatial data to place the records in context
3. Create ecological models using ArcGIS tools and export data
4. Combine with Priority Areas for Invasive Species Management Model (PAISM)

Assembling Invasive Species Records

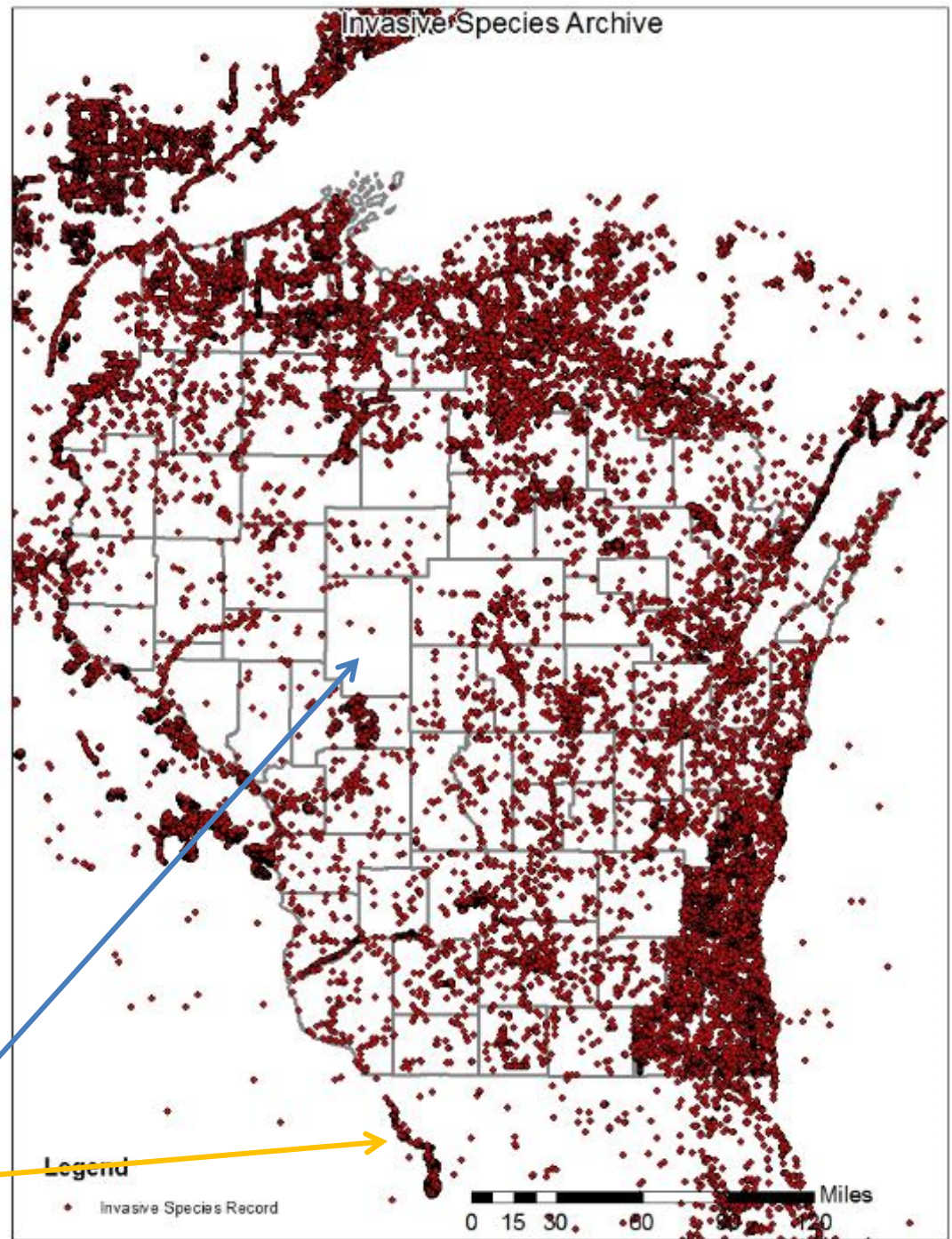
- The WDNR is developing a system to collect invasive species records from multiple source and combine them together
 - Called the “Invasive Species Archive”
- Although the idea isn’t new, we are using it to help at statewide and regional levels.
- We download available data, reformat, and recombine it using ArcGIS.

Invasive Species Archive

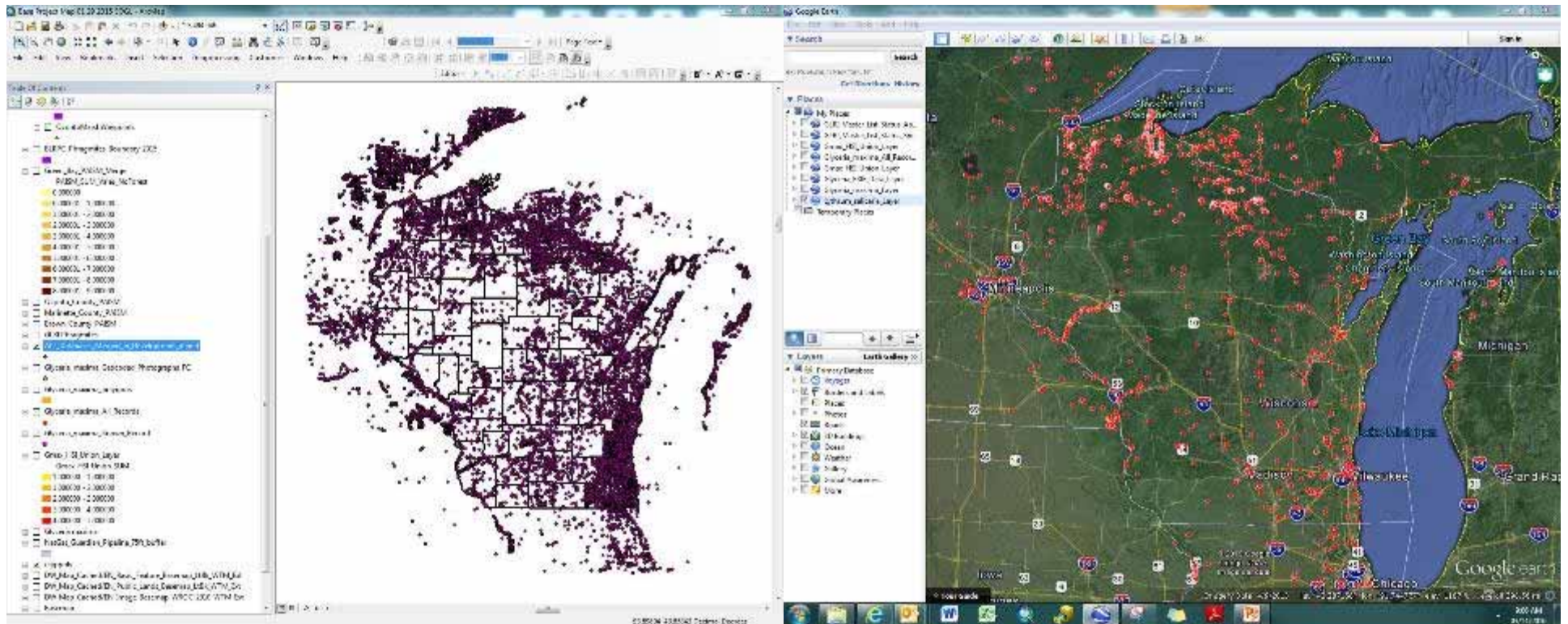
- Currently at 114,000 records

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- Generate regional & site analysis
 - Multiple species within counties or defined areas
 - Species records
 - Find gaps in reporting (Example: Clark Co.)
 - External threats



How to use Invasive Species Archive?



If you have access to ArcGIS, we can share a unified Layer Package via email.

If you don't have ArcGIS, download GoogleEarth and WDNR will email KMZ files.

- GoogleEarth is free
- Has easy Drag & Drop interface

What can we do with the data?

How can the public use this data?

- Create lists for education & outreach
- Mobile application

How is the WDNR using this data?

- Analyze spatial patterns
 - Find invasion fronts
 - Find isolated populations
- Focus search areas with Habitat Suitability Index (HSI) Models.
- Visual comparison to aerial imagery.
- Integrate with Priority Areas for Invasive Species Management (PAISM) model.

NR 40 Lists

- We have outreach materials covering invasive species in NR 40
 - Invasive Species Control Rule
- We can customize these lists for each county for aquatic, wetland, and terrestrial species.

Regulated Aquatic Invasive Plants in WI

Please report any **prohibited** species (as indicated by the red frame box) to the WDNR.
Report by email to: Invasive.Species@wi.gov or **by phone at: (608) 266-6437**
 OR to find out more information, for information on reporting restricted species and whom to contact go to:
<http://dnr.wi.gov/invasives/aquatic/whattodo/>

Flowering rush (<i>Butorides umbellatus</i>)	Purple loosestrife (<i>Lythrum salicaria</i>)	Curly-leaf pondweed (<i>Potamogeton crispus</i>)	Eurasian water milfoil (<i>Najas sp.</i>)
Australian swamp stonecrop (<i>Crassula helmsii</i>)	Brazilian waterweed (<i>Egeria densa</i>)	Hydrilla (<i>Hydrilla verticillata</i>)	European frog-bit (<i>Hydrocharis morsus-ranae</i>)
African elodea (<i>Lagerstroemia major</i>)	Parrot feather (<i>Myriophyllum aquaticum</i>)	Brittle water nymph (<i>Najas minor</i>)	Yellow floating heart (<i>Nymphaeoides peltata</i>)
Water chestnut (<i>Trapa natans</i>)	Fanwort (<i>Cabomba caroliniana</i>)	Didymo or rock snot (alga) (<i>Didymosira geminata</i>)	Starry stonewort (alga) (<i>Najas sp.</i>)

Restricted Species Prohibited Species
 For more information about NR 40 (WI's Invasive Species Rule), Restricted, or Prohibited species please visit: www.dnr.wi.gov/invasives/classification

Bureau of Watershed Management
 Wisconsin Department of Natural Resources
 Box 7821
 Madison, WI 53707-7821
 DNR PUB-WT-960-2011

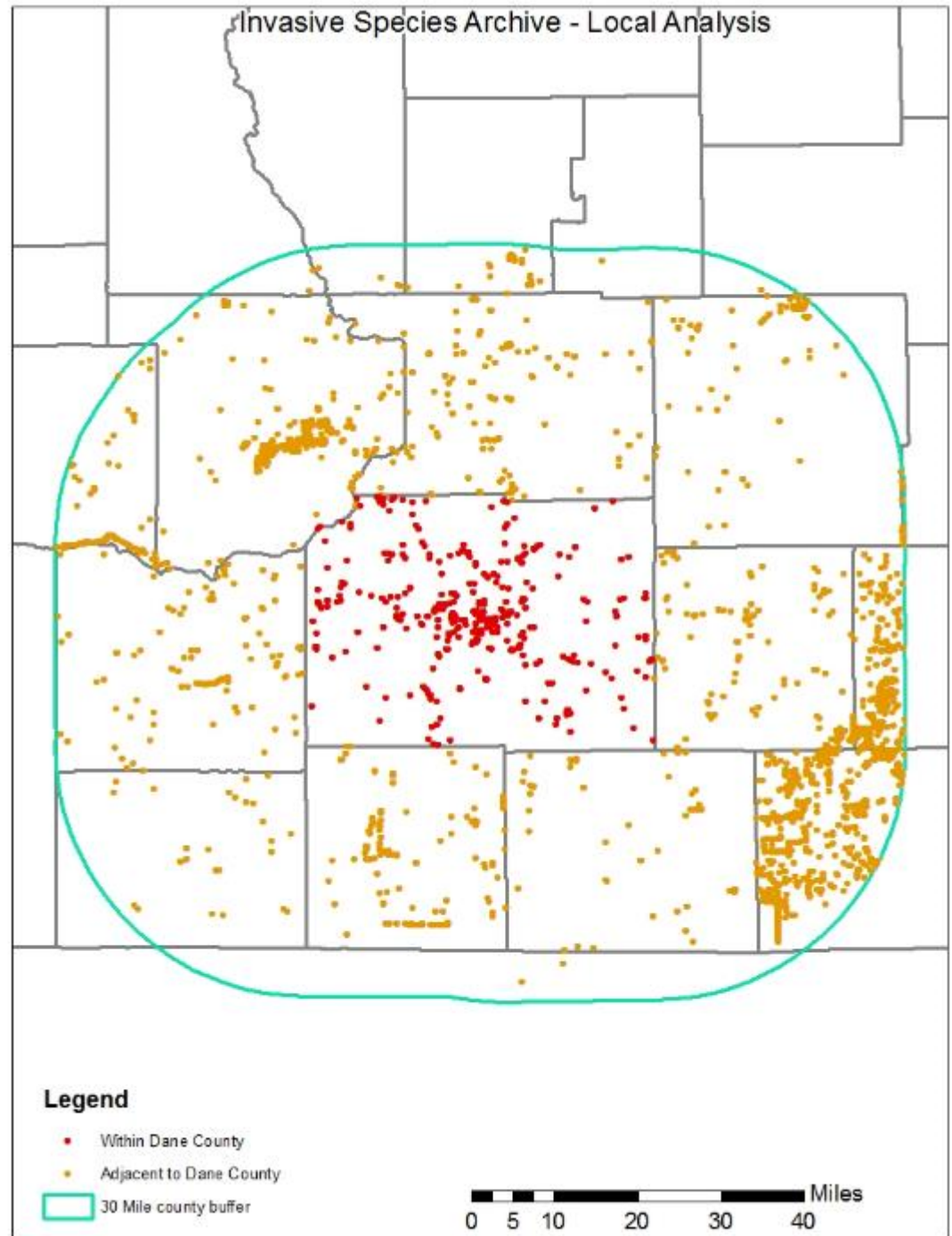
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Short List of IS

- Using the Archive, we can find records of species within & adjacent to counties
- Easier to teach citizens what species they should expect to find
- List for ALL invasive species is available now as a spreadsheet

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Short List of IS: The Spreadsheet “Regional Analysis” tab

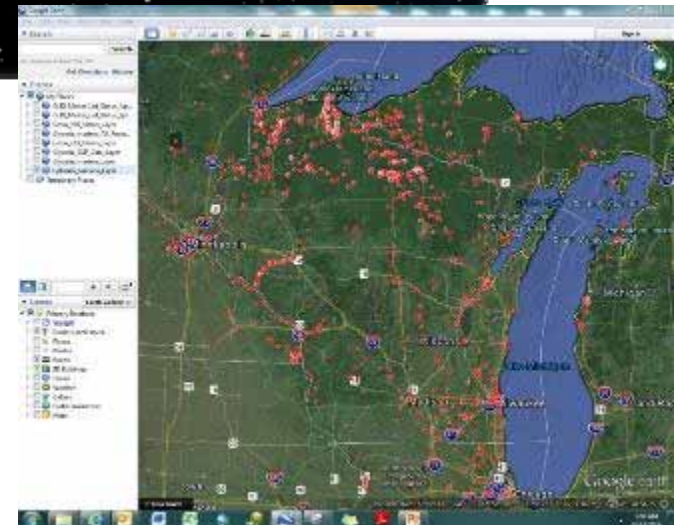
- Regional Analysis shows what is within and adjacent to your county
 - Acts as an index for which Google Earth files to use.

1		Analysis_focus	County_Name
1866	Acer platanoides	County	Dane_County
1867	Agrostis gigantea	County	Dane_County
1868	Agrostis gigantea	30 mile Buffer	Dane_County
1869	Ailanthus altissima	County	Dane_County
1870	Alliaria petiolata	County	Dane_County
1871	Alliaria petiolata	30 mile Buffer	Dane_County
1872	Alnus glutinosa	County	Dane_County
1873	Alnus glutinosa	30 mile Buffer	Dane_County
1874	Ampelopsis brevipedunculata	County	Dane_County
1875	Ampelopsis brevipedunculata	30 mile Buffer	Dane_County
1876	Ampelopsis brevipedunculata	County	Dane_County
1877	Ampelopsis glandulosa	County	Dane_County
1878	Anthriscus sylvestris	County	Dane_County
1879	Anthriscus sylvestris	30 mile Buffer	Dane_County
1880	Arnoglossum plantagineum	30 mile Buffer	Dane_County
1881	Berberis japonica	30 mile Buffer	Dane_County
1882	Berberis thunbergii	County	Dane_County
1883	Berberis thunbergii	30 mile Buffer	Dane_County
1884	Berberis vulgaris	30 mile Buffer	Dane_County
1885	Besseya bullii	30 mile Buffer	Dane_County
1886	Bithynia tentaculata	30 mile Buffer	Dane_County
1887	Bunias orientalis	30 mile Buffer	Dane_County

Mobile Use

- Download Google Maps app
- You can email the KMZ files to yourself on a smartphone or tablet.
- Blue dot is you, red dot is invasive species.

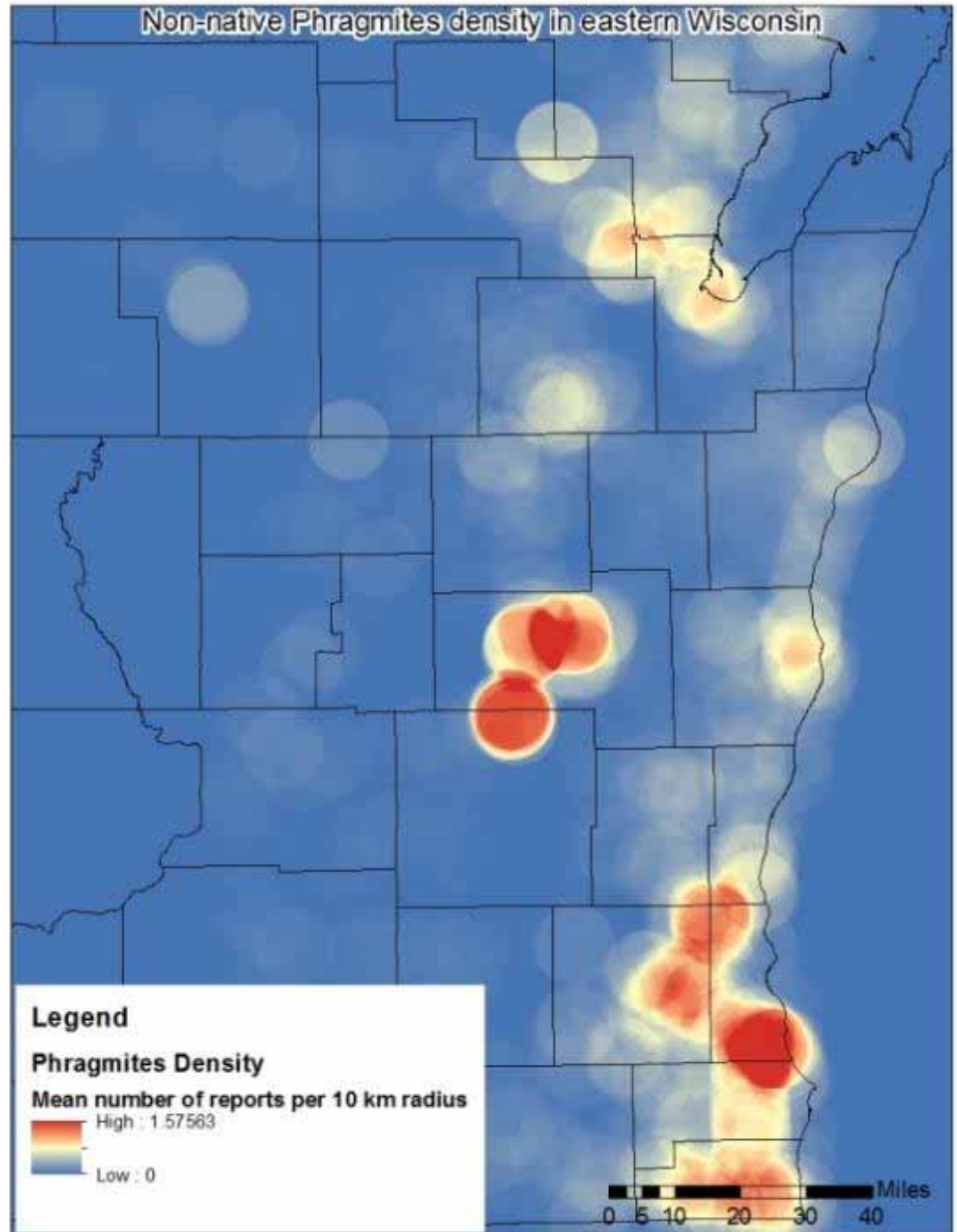
Google



Population Density

How abundant is a species in the landscape?

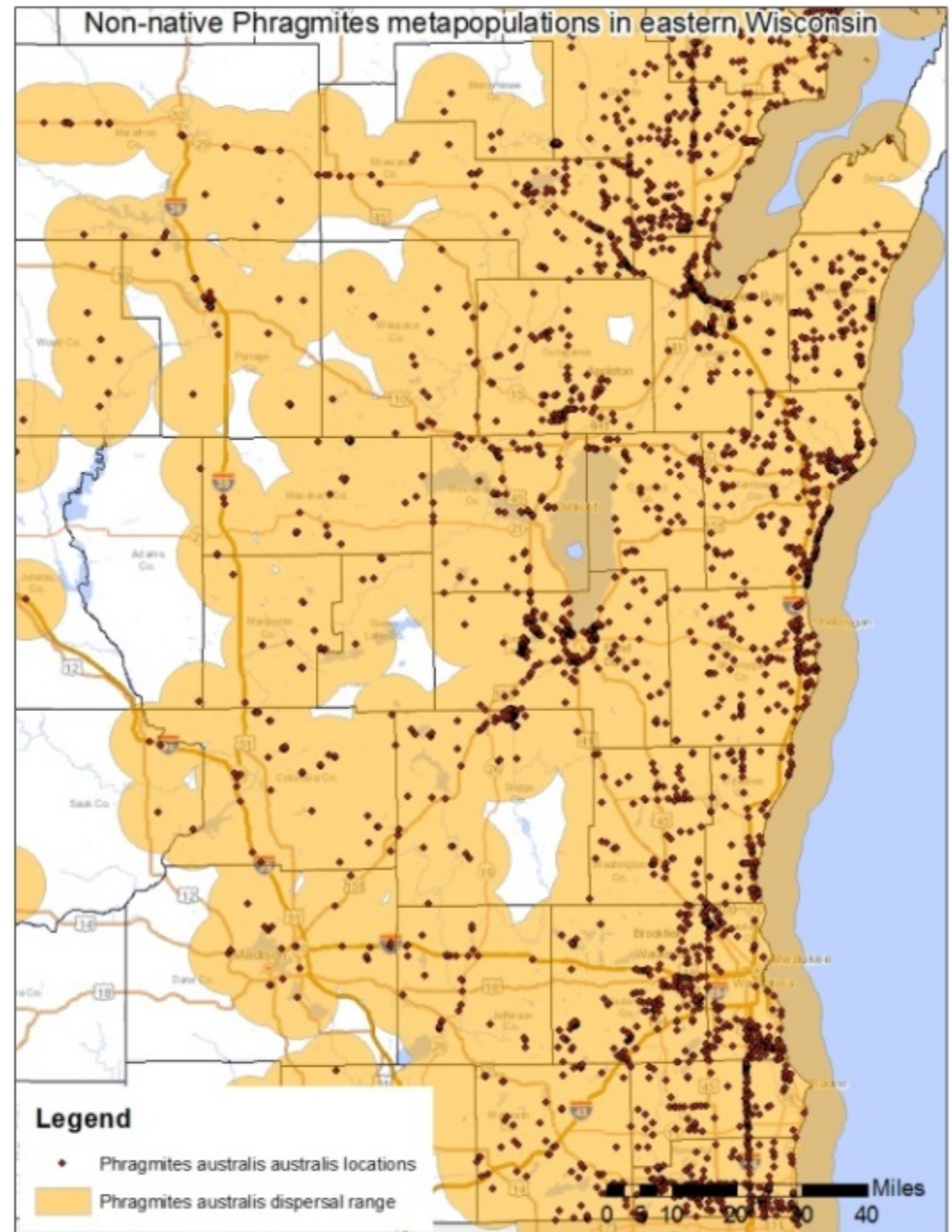
- Areas with regional high density and few reports suggests additional reconnaissance.



Metapopulations

What is the network structure of a species?

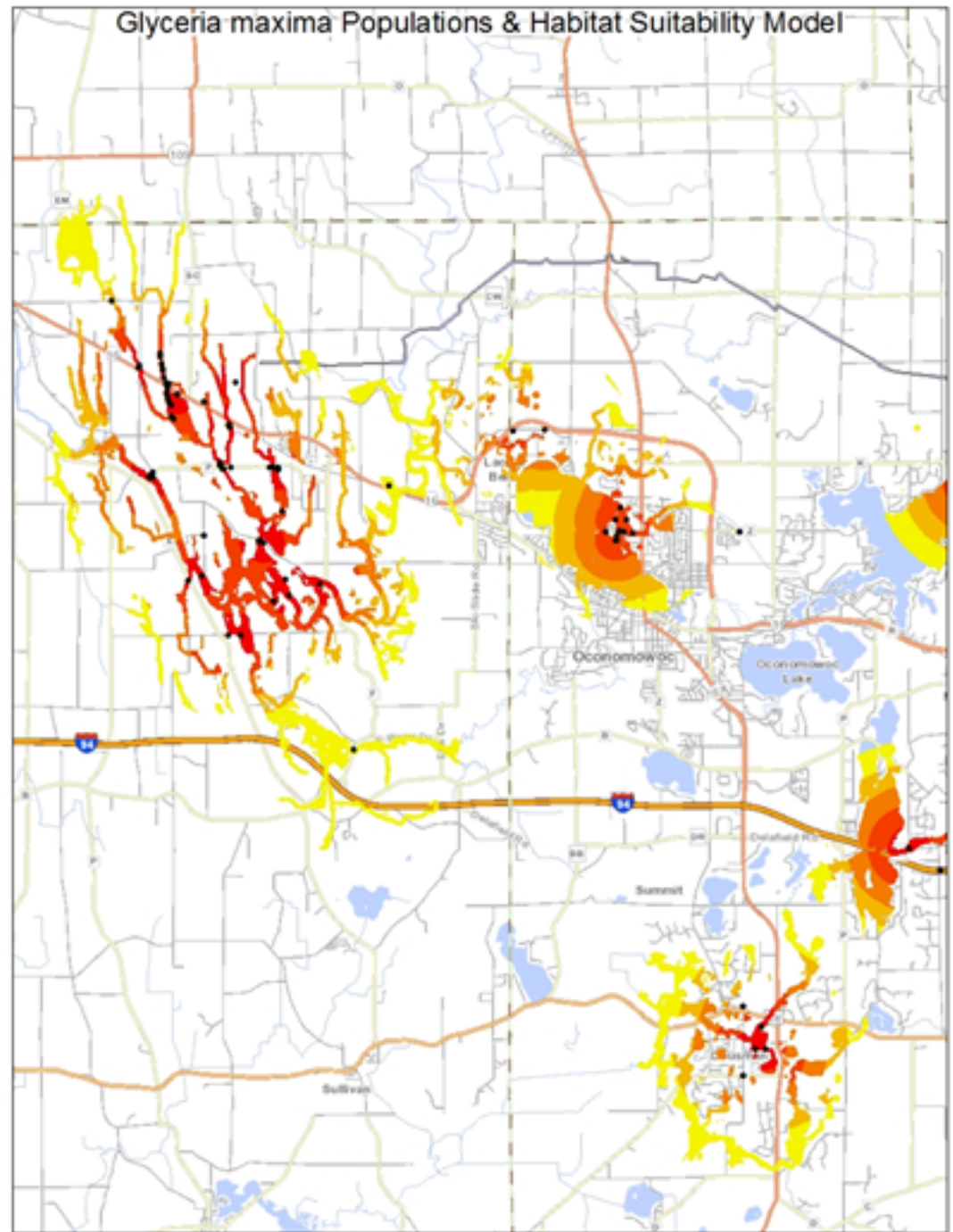
- “A population of populations”
- Finds invasion fronts
- When used with estimates of dispersal range, potential survey areas can be defined.



Habitat Suitability

Where are the likely places to find a species?

- Develop a simple model from literature
 - Wisconsin Wetlands Inventory, select suitable wetlands.
 - WDNR 24k HYDRO for waterways
 - Survey envelope (2.5 km buffer)
- Helps identify what parcels need access permissions



Aerial imagery

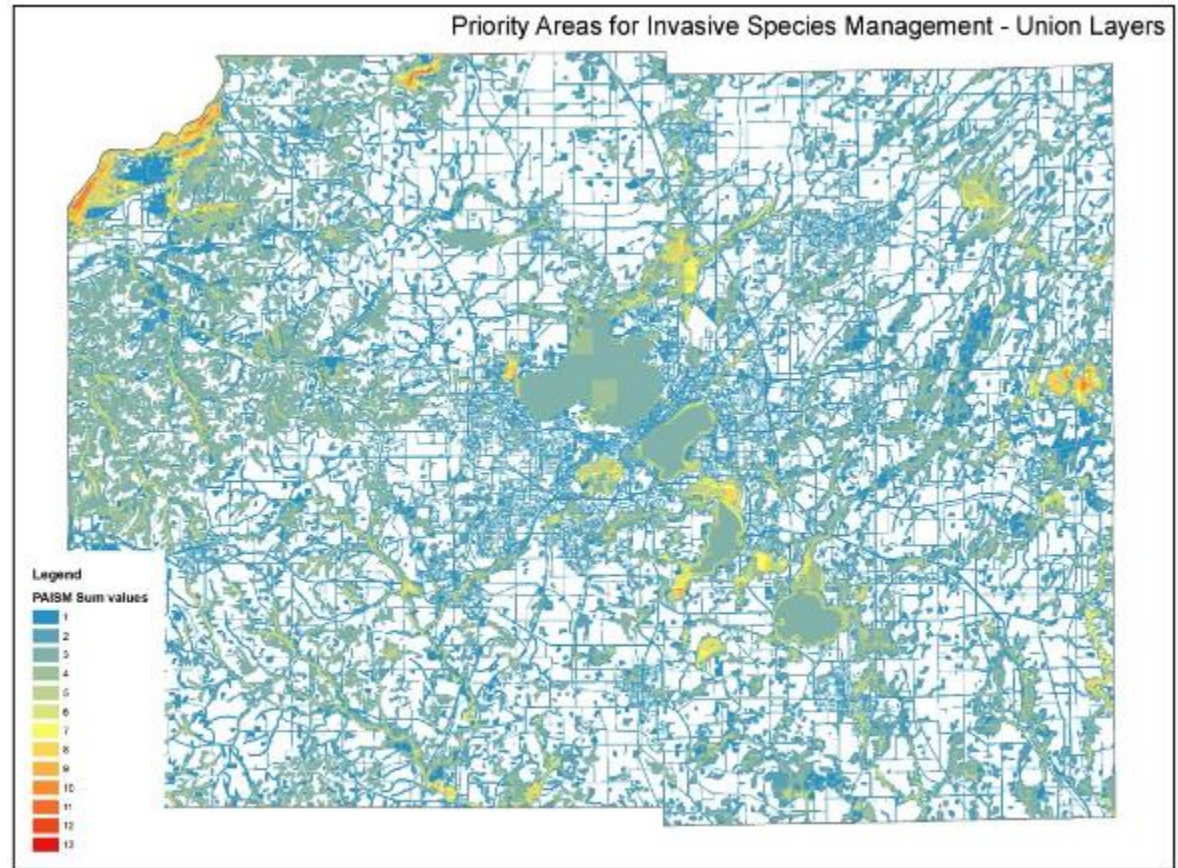
- With precise invasive species data, you can use it to interpret aerial imagery and find suspected sites.
- We used it for our GLRI *Phragmites* project



Combine Archive with PAISM

What does the species threaten?

- Priority Areas for Invasive Species Management
 - Ecological Importance
 - Invasive Species Susceptibility
- Being developed by WDNR
 1. Longer-term effective restoration.
 2. Proactive over opportunistic planning.
 3. Strategic use of available management resources.



BLUE = Few Layers

Red = Many Layers

XENOS model

- Xenos is Greek for “*Stranger*” or “*Alien*”
- New model combines Invasive Species Archive + NR40 Classification + Priority Areas for Invasive Species Management
- Creates a Threat Score for Invasive Species reports



Level 1 Threat

vs



Level 10 Threat

&

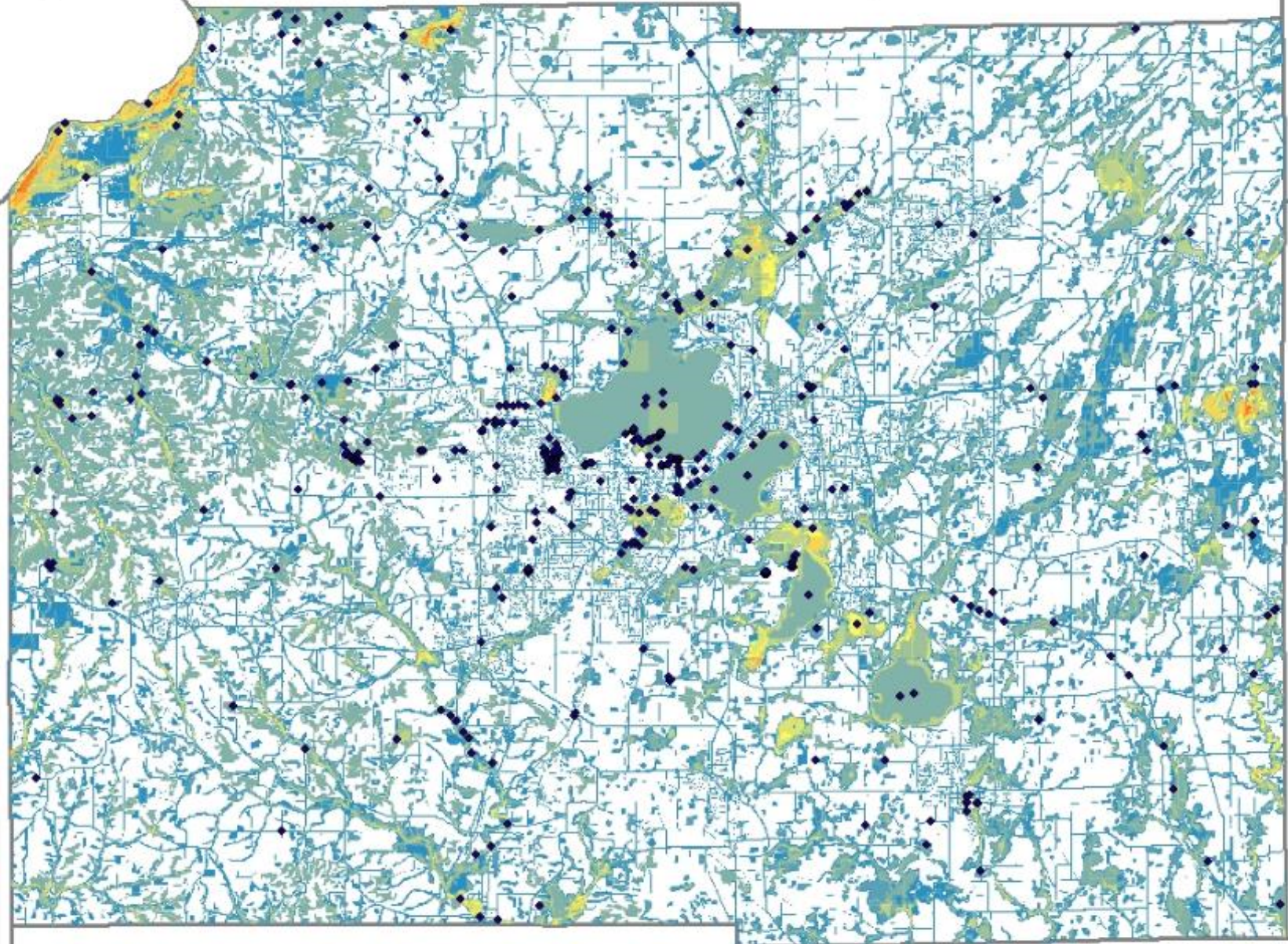


Low PAISM score

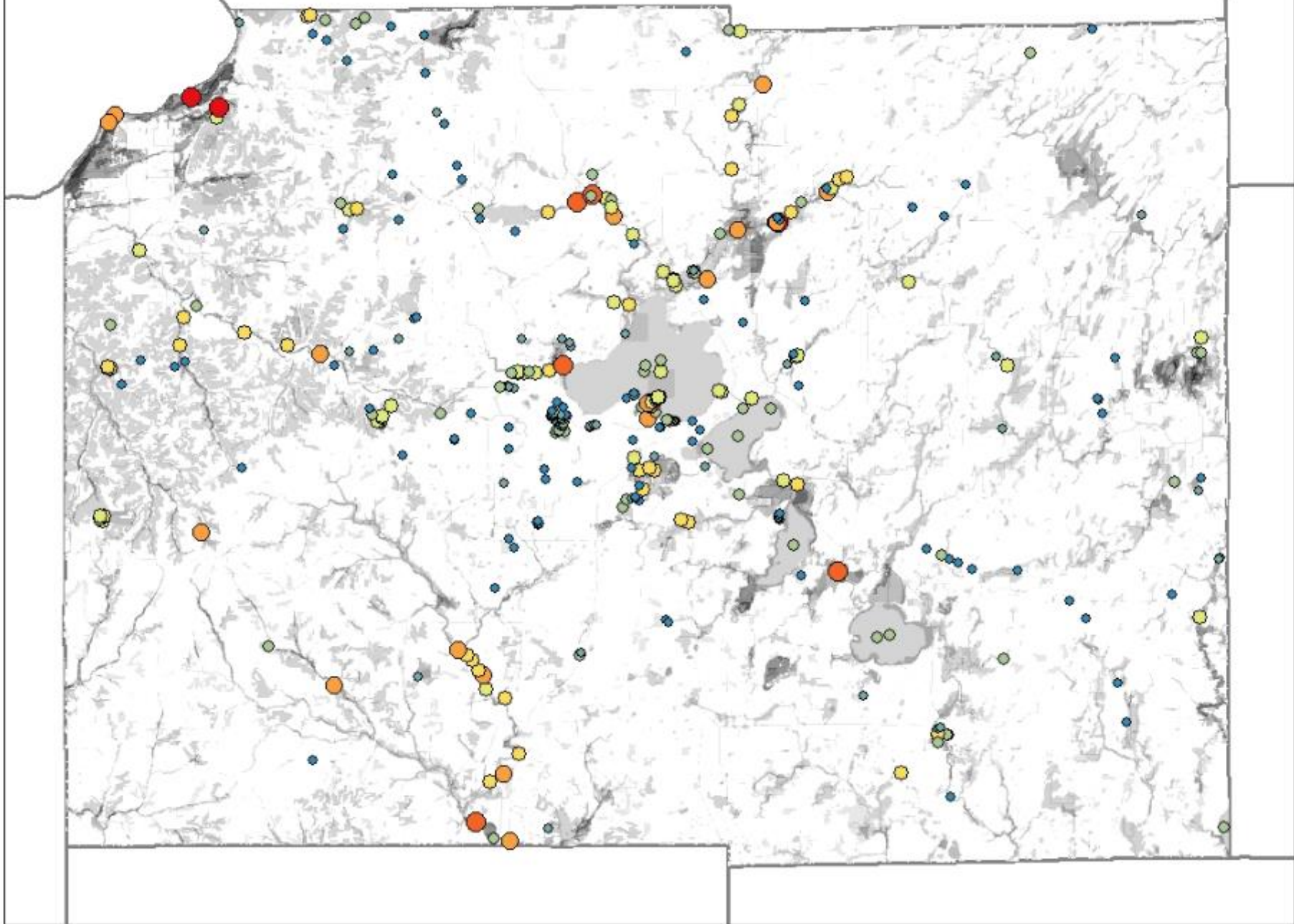
vs

High PAISM score

Priority Areas for Invasive Species Management - Dane County



XENOS - Dane County




Questions?

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