

Onterra LLC
 Lake Management Planning
 815 Prosper Road
 De Pere, WI 54115
 920.338.8860
 www.onterra-eco.com

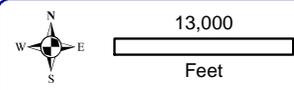
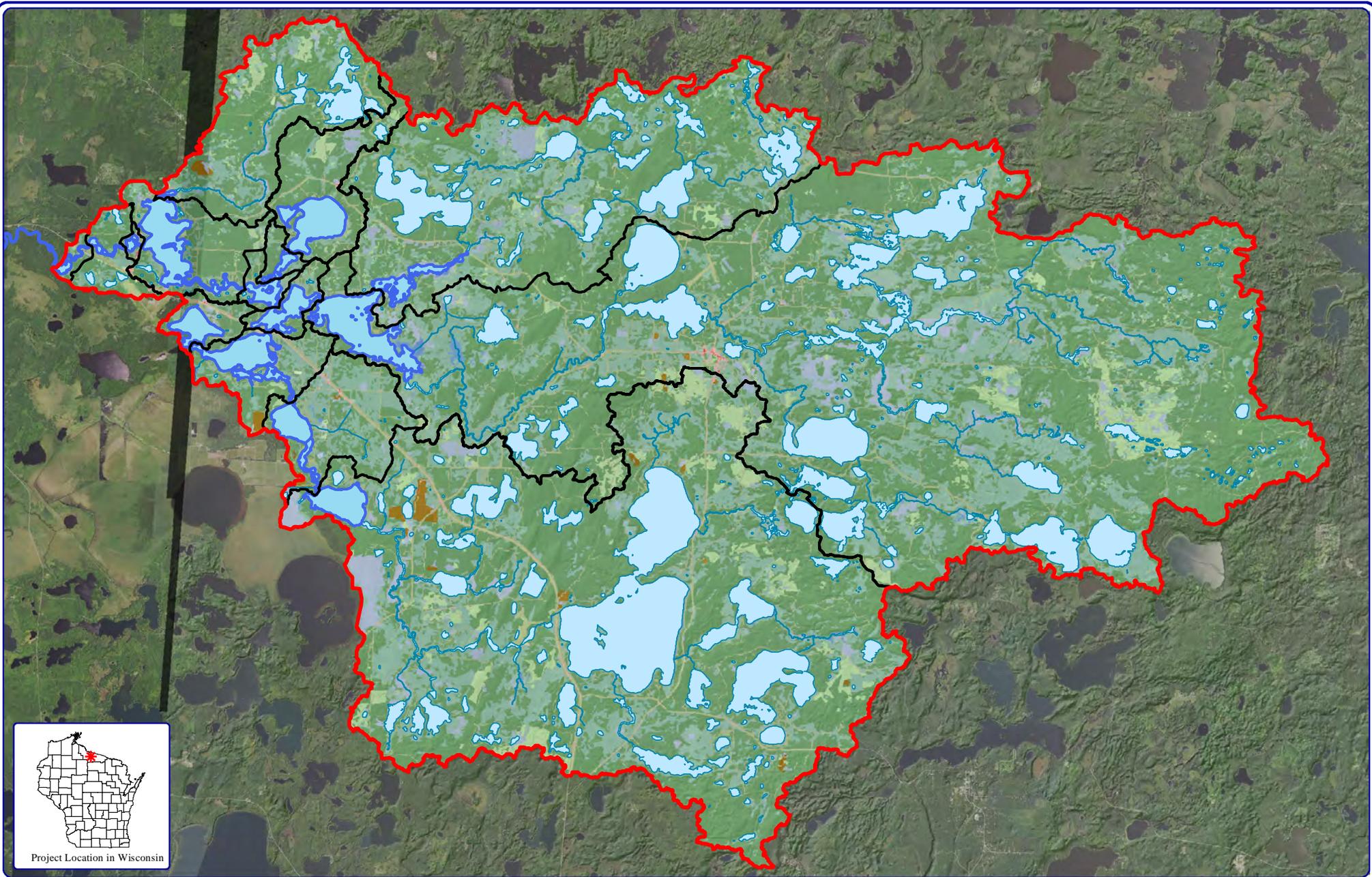
Sources:
 Roads and Hydro: WDNR
 Bathymetry: WDNR - digitized by Onterra
 Map Date: March 24, 2015
 Filename: Map1_Manitowish_Location.mxd

- Phase Ia Waterbodies
- Phase Ib Waterbodies
- Phase II Waterbodies
- Phase III Waterbodies

- Legend**
- Phase IV Waterbodies
 - Phase V Waterbodies
 - Water Quality Sampling Location

- Public Access - Carry-in
- Public Access - Ramp
- Private Access - Ramp
- Dam Location

Map 1
Manitowish Waters
 Chain of Lakes
 Vilas County, Wisconsin
Project Location &
Lake Boundaries



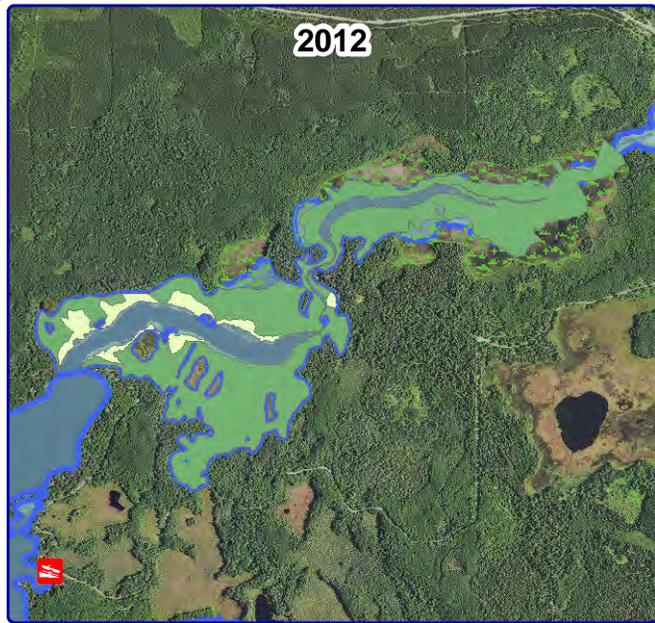
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Sources:
 Hydro: WDNR
 Orthophotography: NAIP, 2017
 Land Cover: NLCD, 2011
 Watershed Boundaries: Onterra, 2017
 Map date: September 22, 2018 JLW
 Filename: Map2_ManChain_WS.mxd

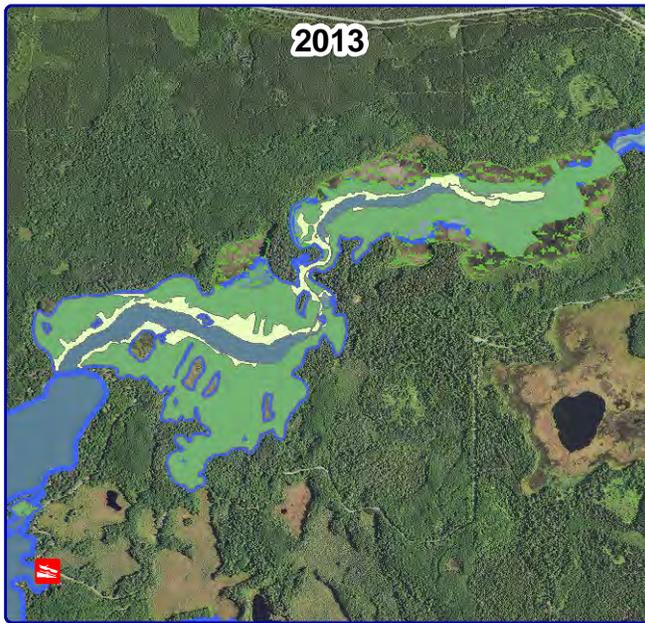
Legend

-  Forest
-  Forested Wetlands
-  Pasture/Grass
-  Rural Open Space
-  Row Crops
-  Wetland
-  Open Water
-  Rural Residential
-  Urban - Medium Density
-  Urban - High Density
-  Subwatershed Boundaries
-  Manitowish Chain of Lakes Watershed Boundary
-  Manitowish Chain of Lakes

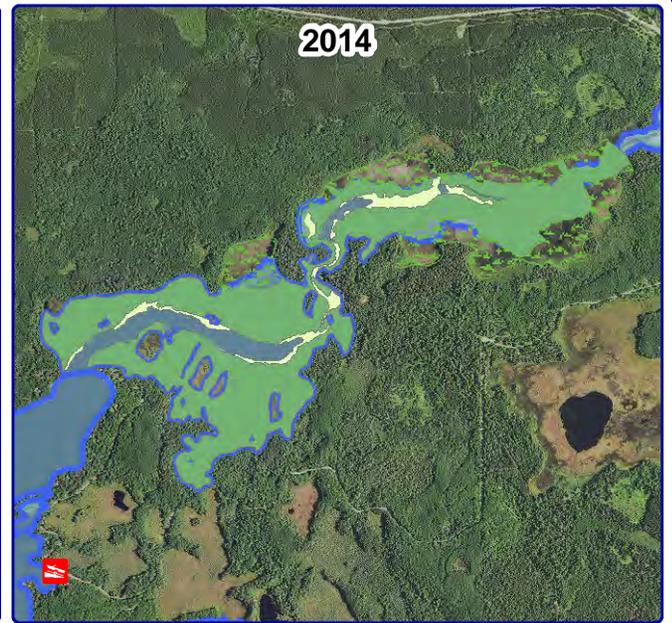
Map 2
 Manitowish Waters
 Chain of Lakes
 Vilas County, Wisconsin
**Watershed Boundaries
 & Land Cover Types**



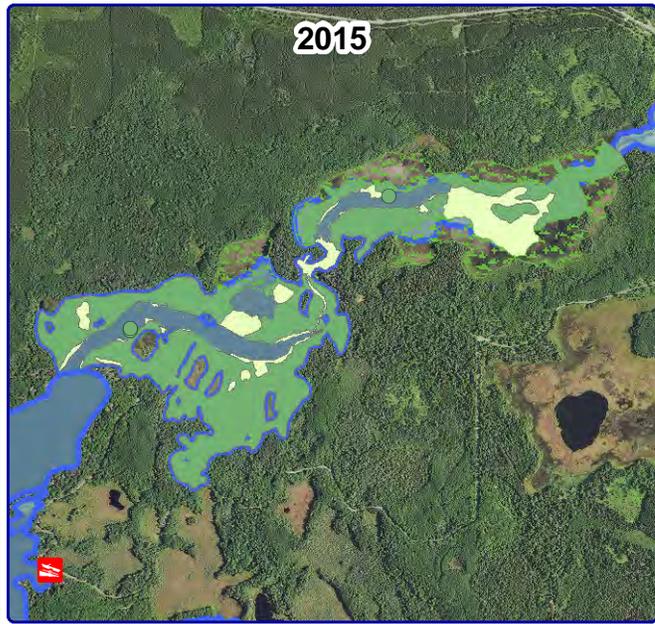
2012



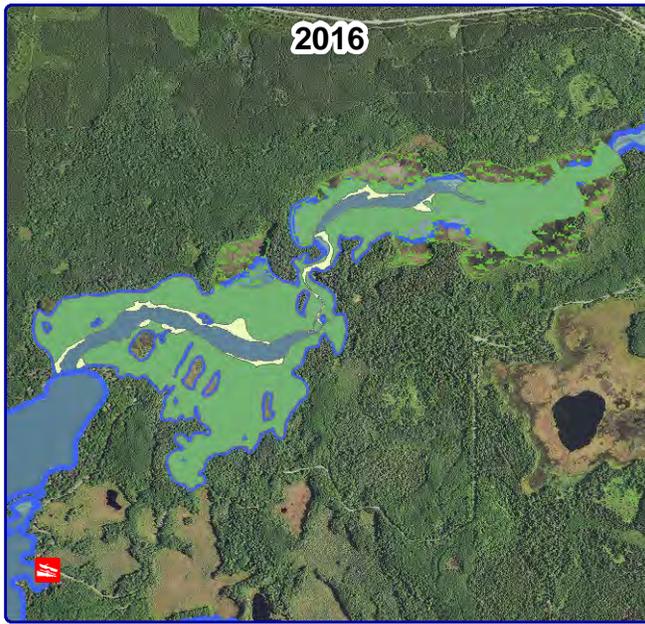
2013



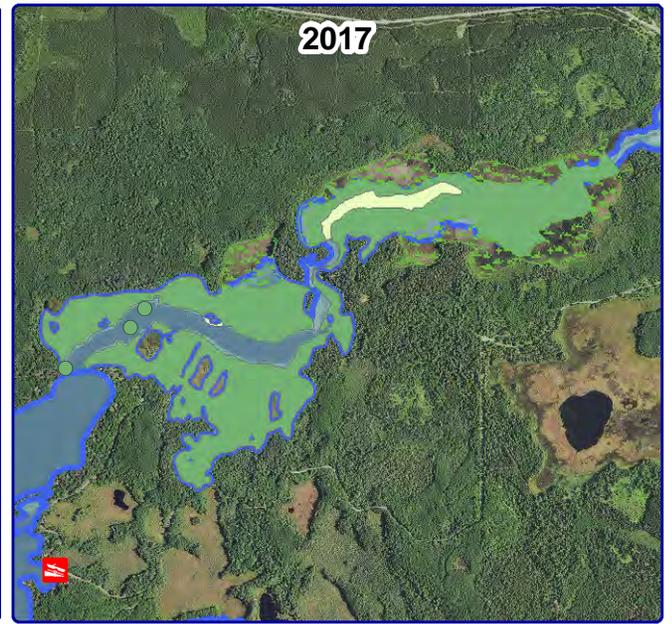
2014



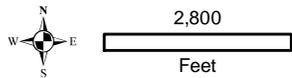
2015



2016

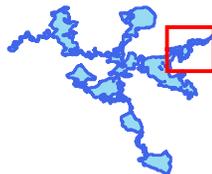


2017



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Sources:
 Hydro: WDNR
 Orthophotography: NAIP, 2015
 Aquatic Plants: Onterra, 2012-2017
 Map Date: January 2, 2018
 Filename: Manitowish_RiceCreek_WildRice_2012-2017.mxd

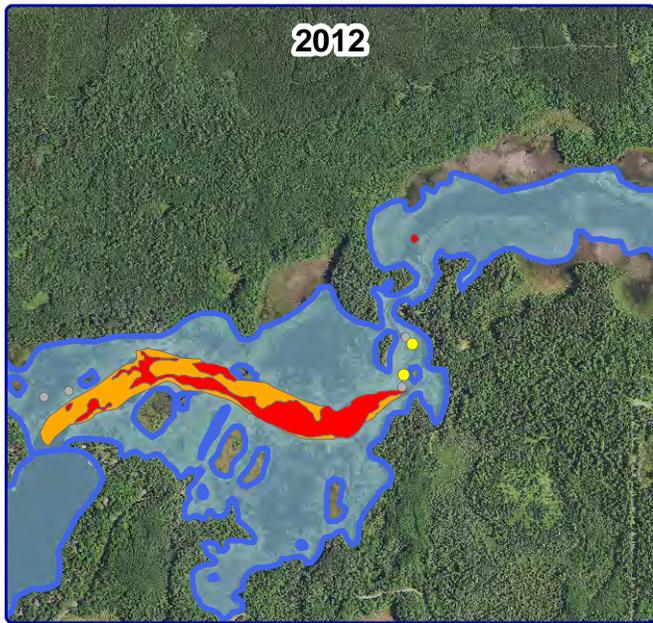


Inset Map Location in red

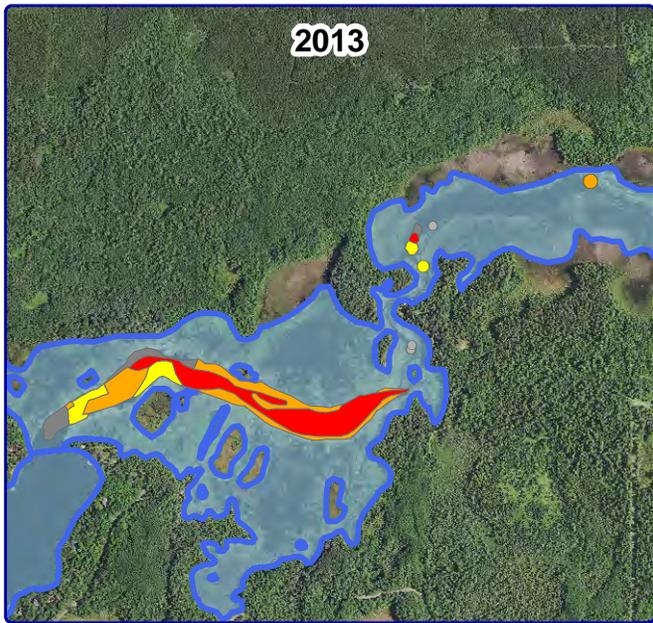
Legend

-  Sparse Wild Rice
-  Dense Wild Rice
-  Adjacent Wetland Habitat

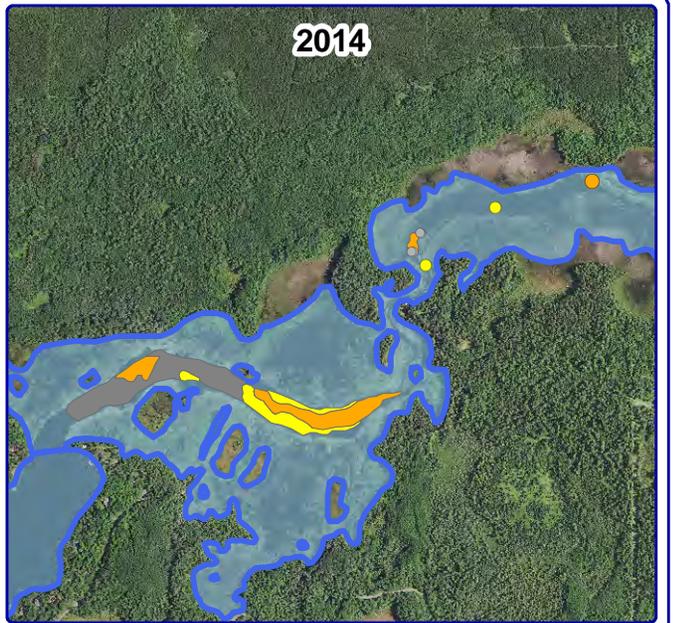
Map 3
 Rice Creek
 Vilas County, Wisconsin
**Rice Creek Wild
 Rice Communities**



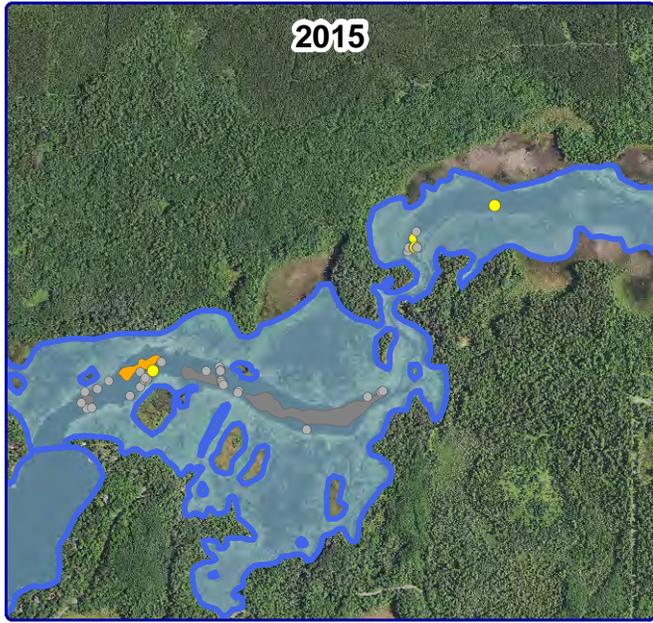
2012



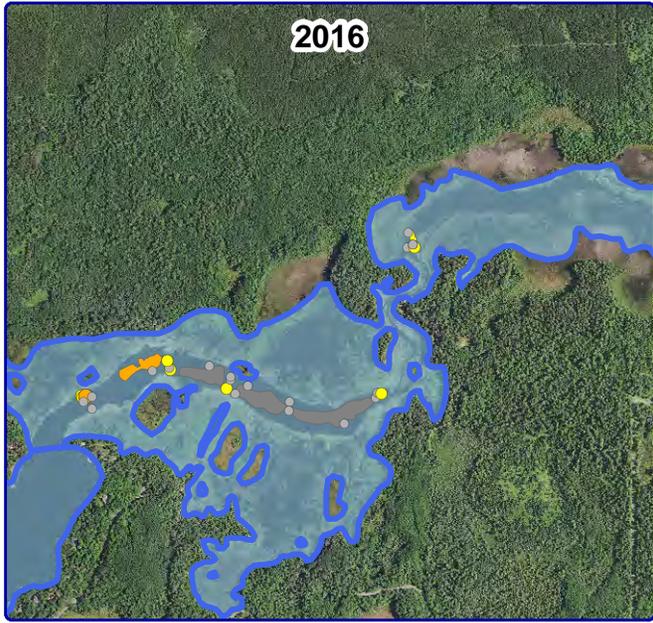
2013



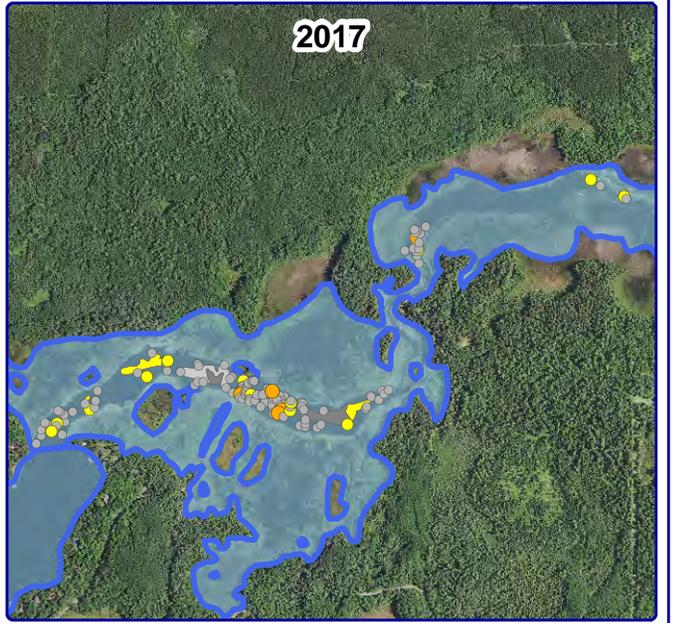
2014



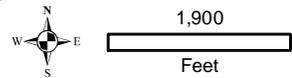
2015



2016

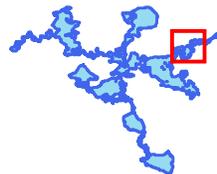


2017



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Sources:
 Hydro: WDNR
 Orthophotography: NAIP, 2015
 Aquatic Plants: Onterra, 2012-2017
 Map Date: January 2, 2018
 Filename: Manitowish_RiceCreek_CLP_2012-2017.mxd



Inset Map Location in red

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting

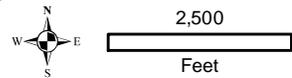
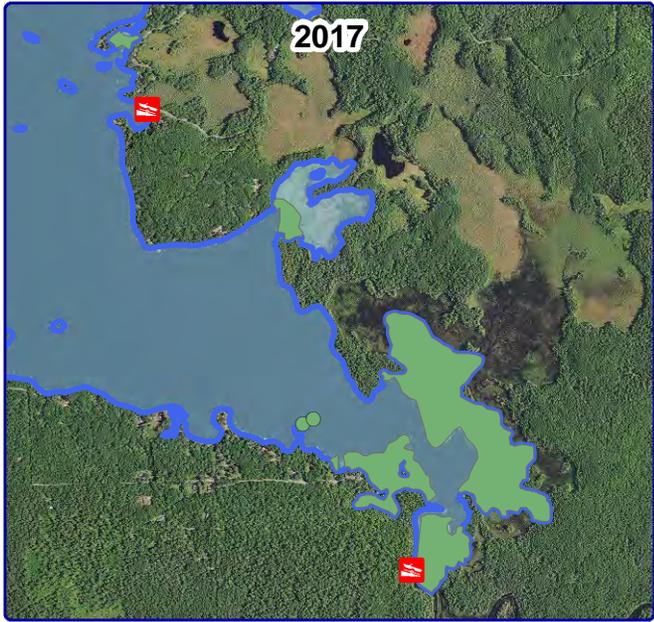
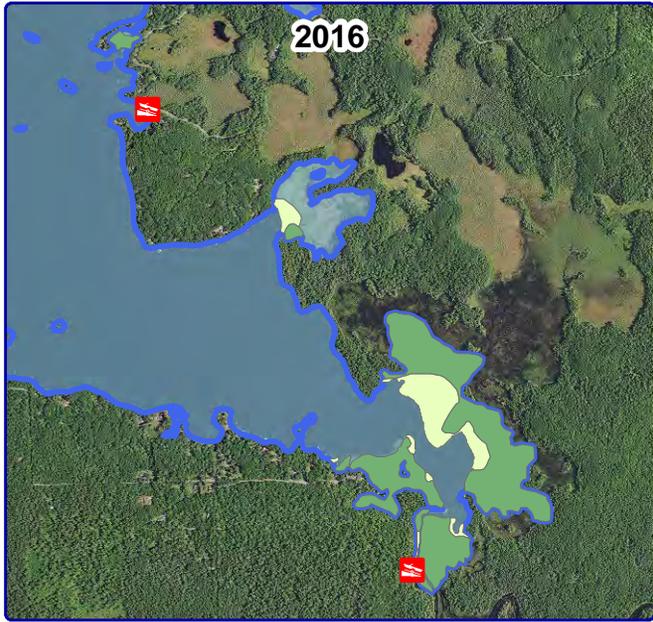
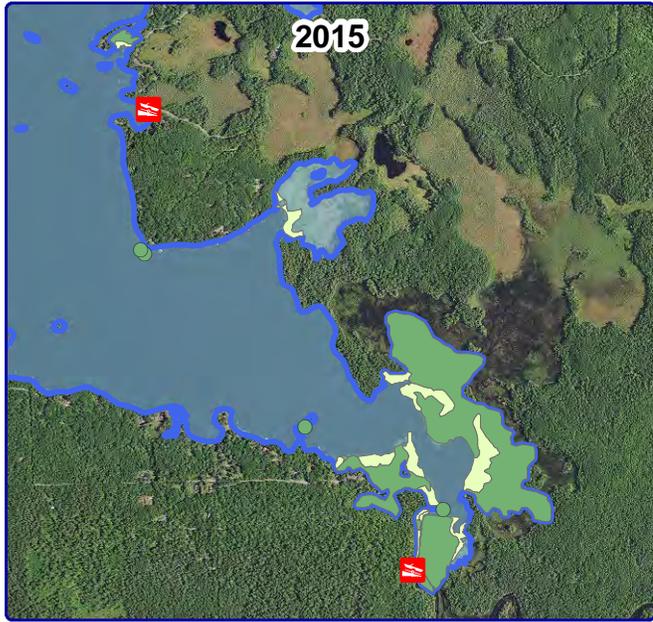
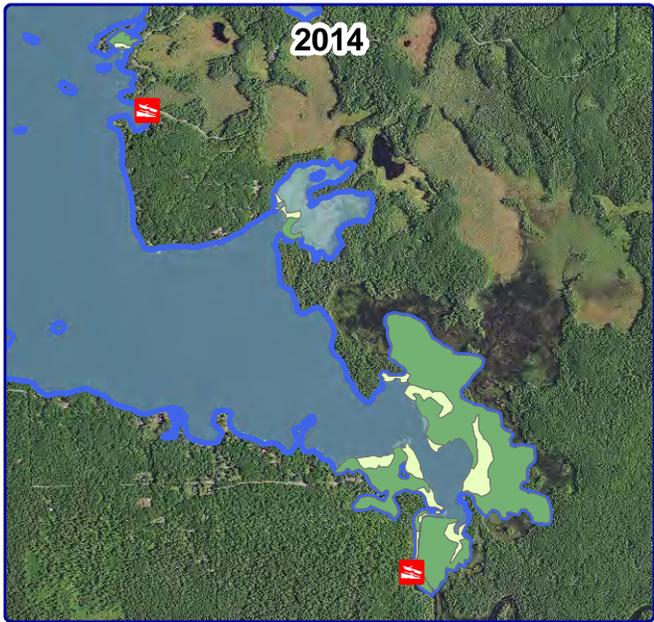
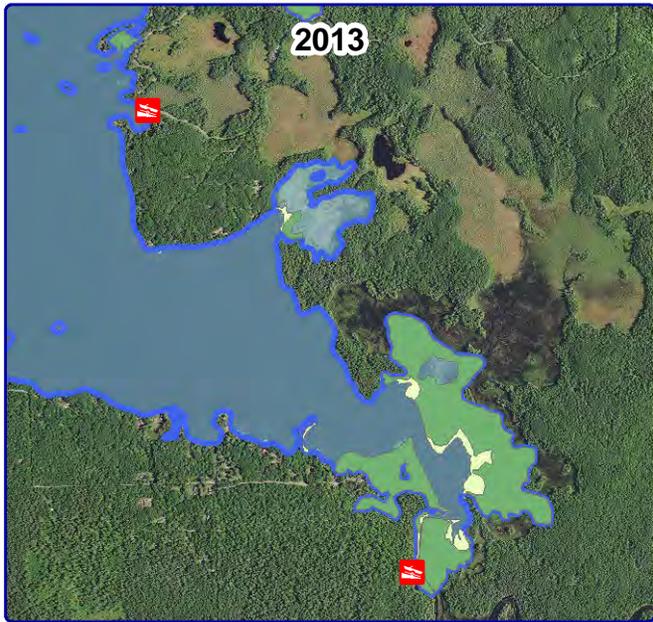
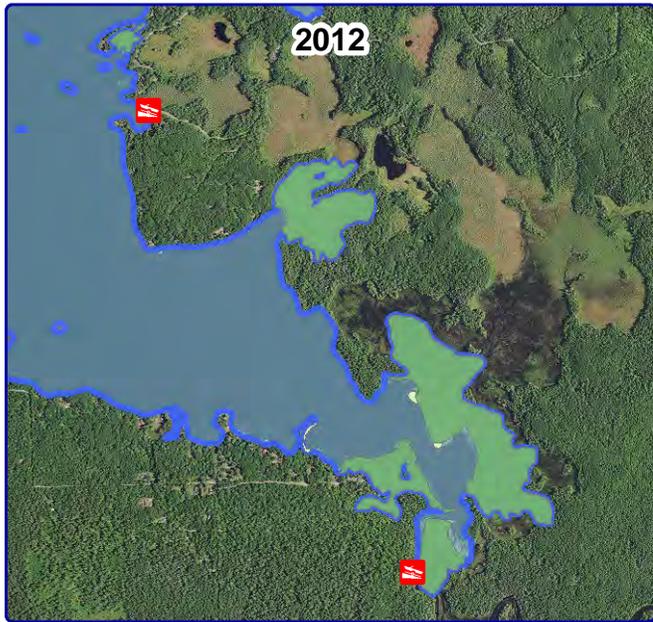
Legend

- Single or Few Plants
- Clump of Plants
- Small Plant Colony

Map 4

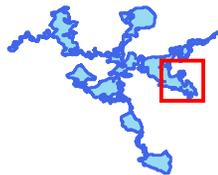
Rice Creek
 Vilas County, Wisconsin

**Rice Creek CLP
 Peak-Growth Mapping**



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Sources:
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 Orthophotography: NAIP, 2015
 Aquatic Plants: Onterra, 2012-2017
 Map Date: January 2, 2018
 Filename: Manitowish_Island_WildRice_2012-2017.mxd

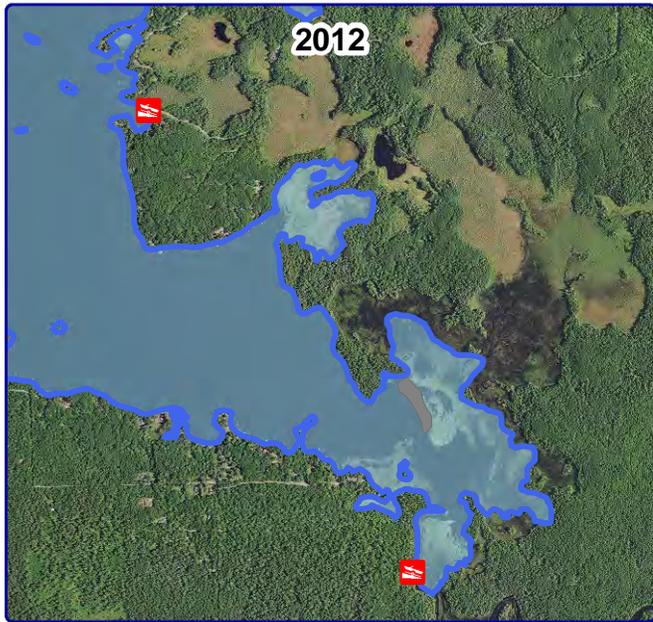


Inset Map Location in red

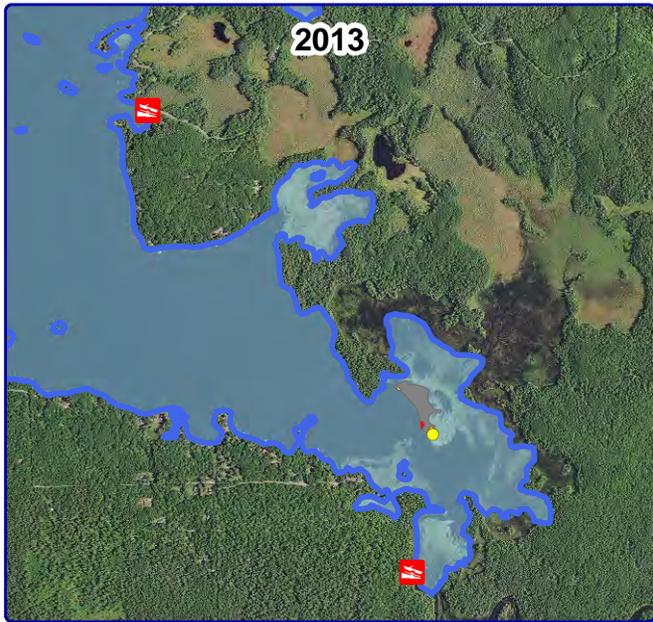
Legend

-  Sparse Wild Rice
-  Dense Wild Rice
-  Adjacent Wetland Habitat

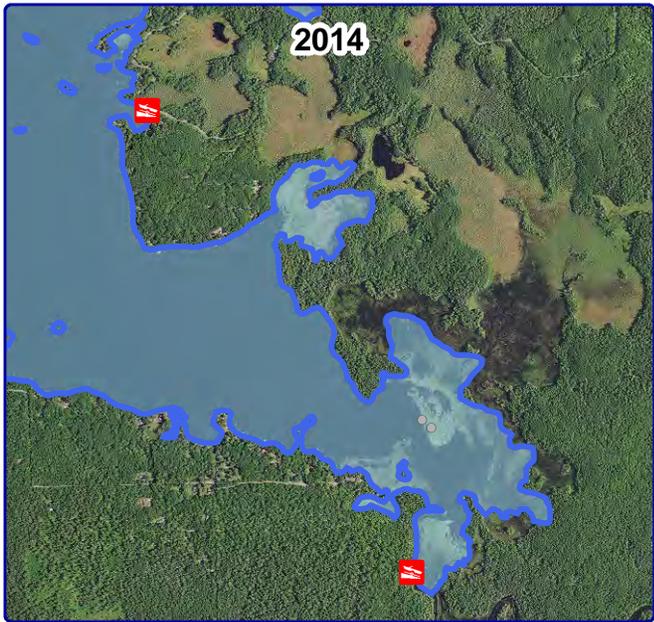
Map 5
 Island Lake
 Vilas County, Wisconsin
**Island Lake Wild
 Rice Communities**



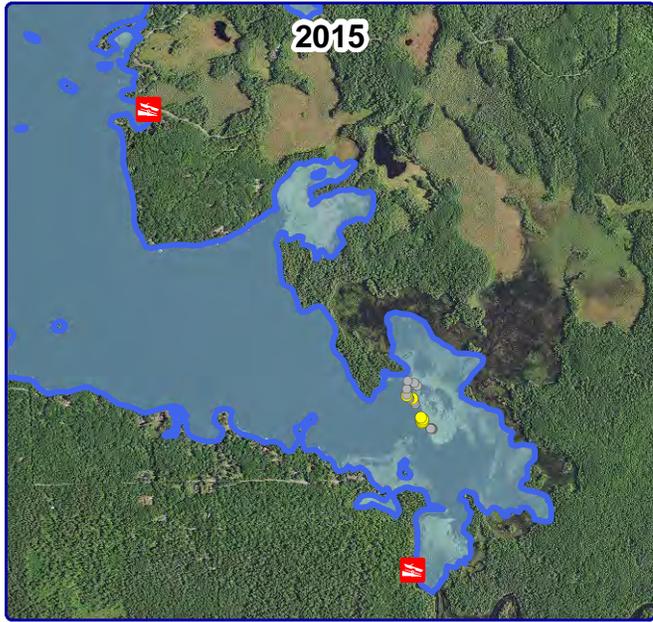
2012



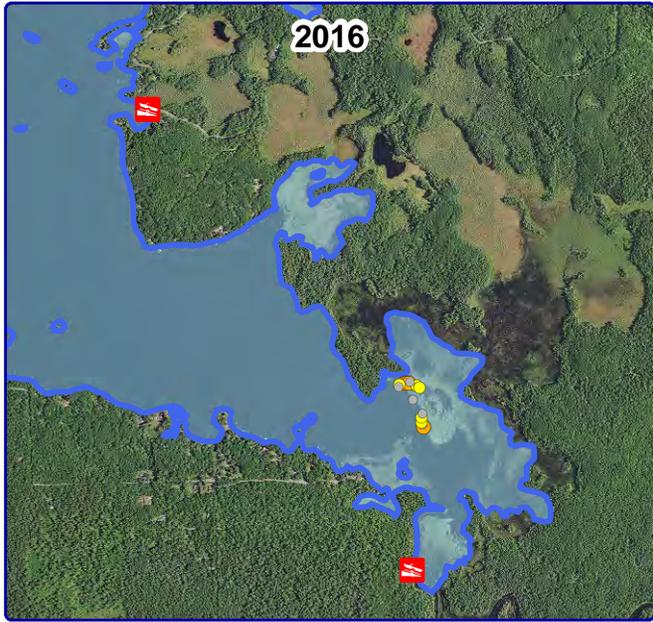
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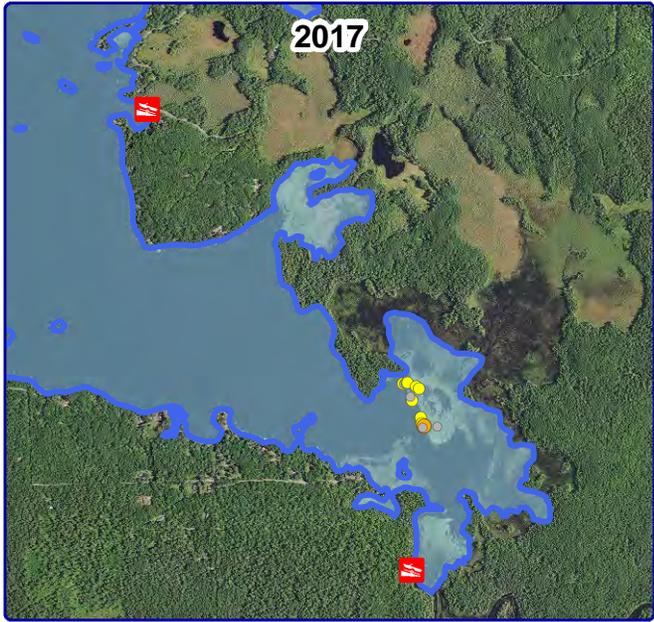
2015



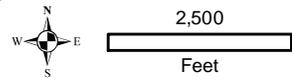
2015



2016

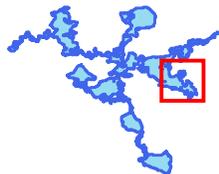


2017



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Sources:
 Hydro: WDNR
 Orthophotography: NAIP, 2015
 Aquatic Plants: Onterra, 2012-2017
 Map Date: January 2, 2018
 Filename: Manitowish_Island_CLP_2012-2017.mxd



Inset Map Location in red

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting

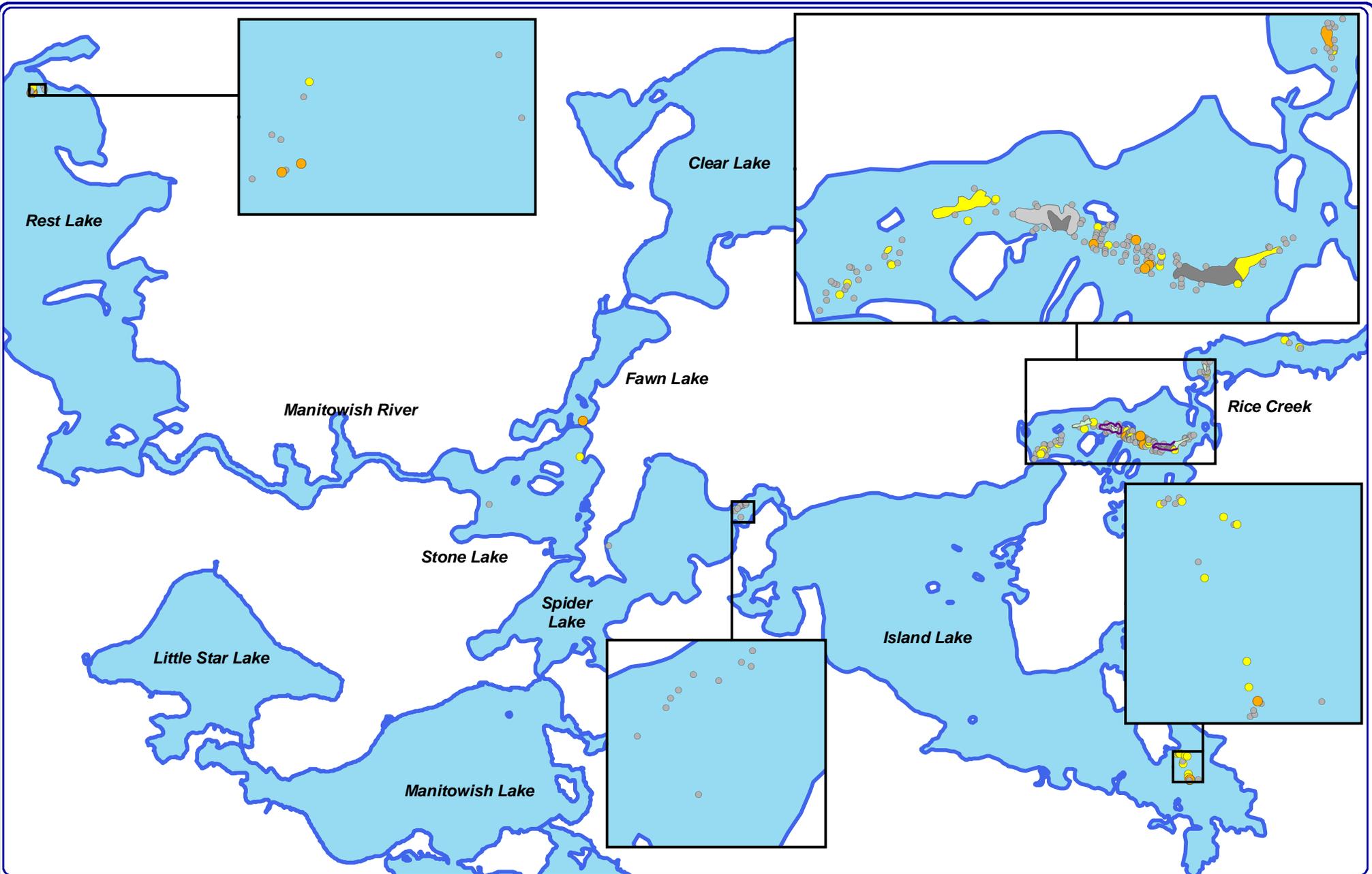
Legend

- Single or Few Plants
- Clump of Plants
- Small Plant Colony

Map 6

Island Lake
 Vilas County, Wisconsin

**Island Lake CLP
 Peak-Growth Mapping**



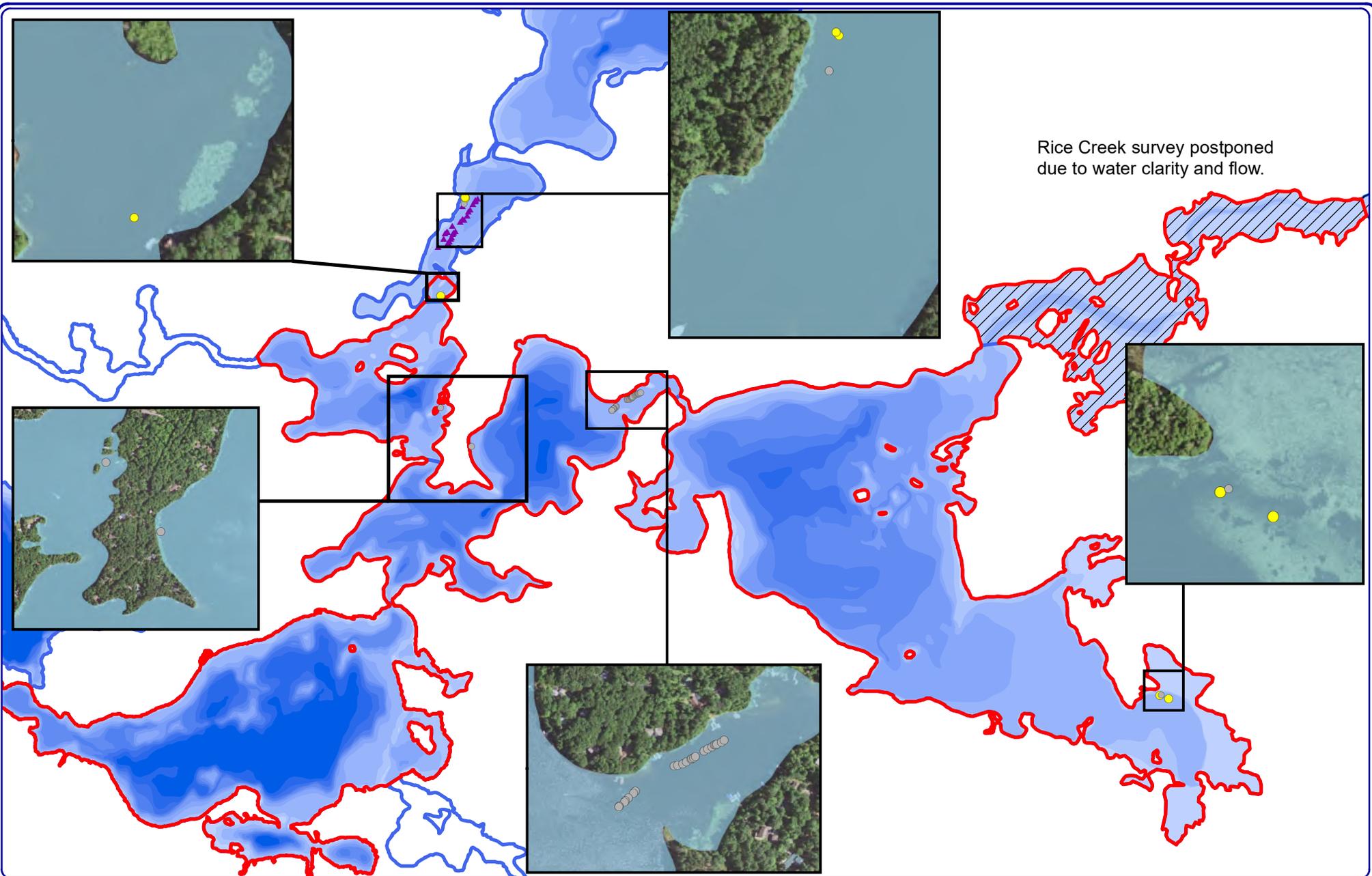
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Sources:
 Roads and Hyrd: WDNR
 Aquatic Plants: Onterra, June 2017
 Map Date: June 21, 2017
 Filename: Manitowish_CLPPB_June17.mxd

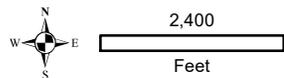


- Curly-leaf Pondweed (June 2017)**
- Highly Scattered
 - Scattered
 - Dominant
 - Highly Dominant
 - Surface Matting
 - Single or Few Plants
 - Clumps of Plants
 - Small Plant Colony

Map 7
Manitowish Chain of Lakes
 Vilas County, Wisconsin
**June 2017 Curly-leaf
 Pondweed Survey Results**



Rice Creek survey postponed due to water clarity and flow.



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Sources:
 Roads and Hyrd: WDNR
 Aquatic Plants: Onterra, June 2018
 Orthophoto: NAIP, 2017
 Map Date: June 22, 2018



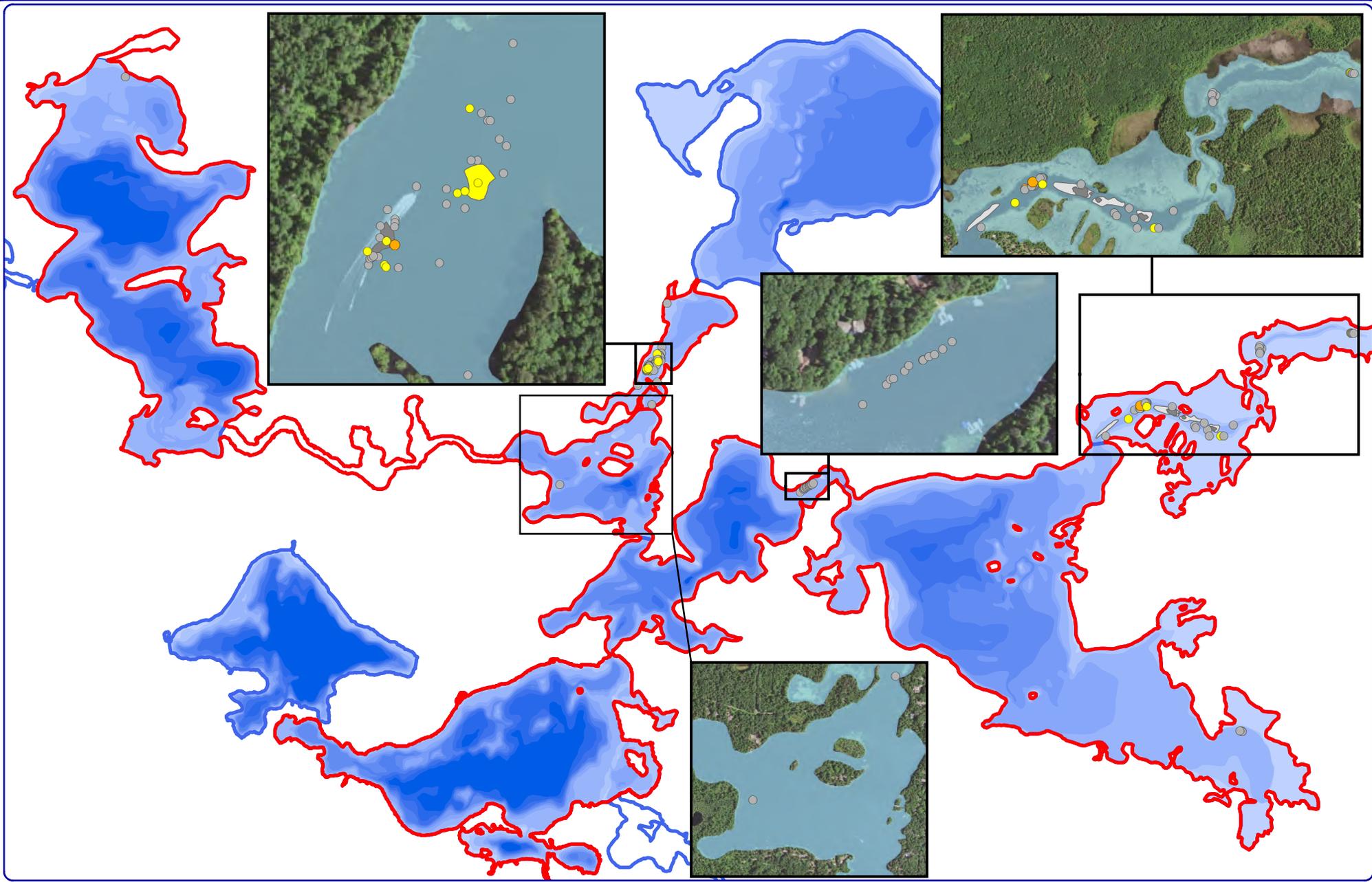
Project Location in Wisconsin

Curly-leaf Pondweed (June 2018)

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- Onterra Survey Lakes

Map 8
 Manitowish Waters Chain of Lakes
 Vilas County, Wisconsin

**June 2018 Curly-leaf
 Pondweed Survey Results**



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Sources:
 Roads and Hyrd: WDNR
 Aquatic Plants: Onterra, June 2019
 Orthophoto: NAIP, 2017
 Map Date: June 19, 2019



- Curly-leaf Pondweed (June 2019)**
- Highly Scattered
 - Scattered
 - Dominant
 - Highly Dominant
 - Surface Matting
 - Single or Few Plants
 - Clumps of Plants
 - Small Plant Colony
 - Onterra Survey Lakes

Map 9
Manitowish Waters Chain of Lakes
 Vilas County, Wisconsin
June 2019 Curly-leaf
Pondweed Survey Results