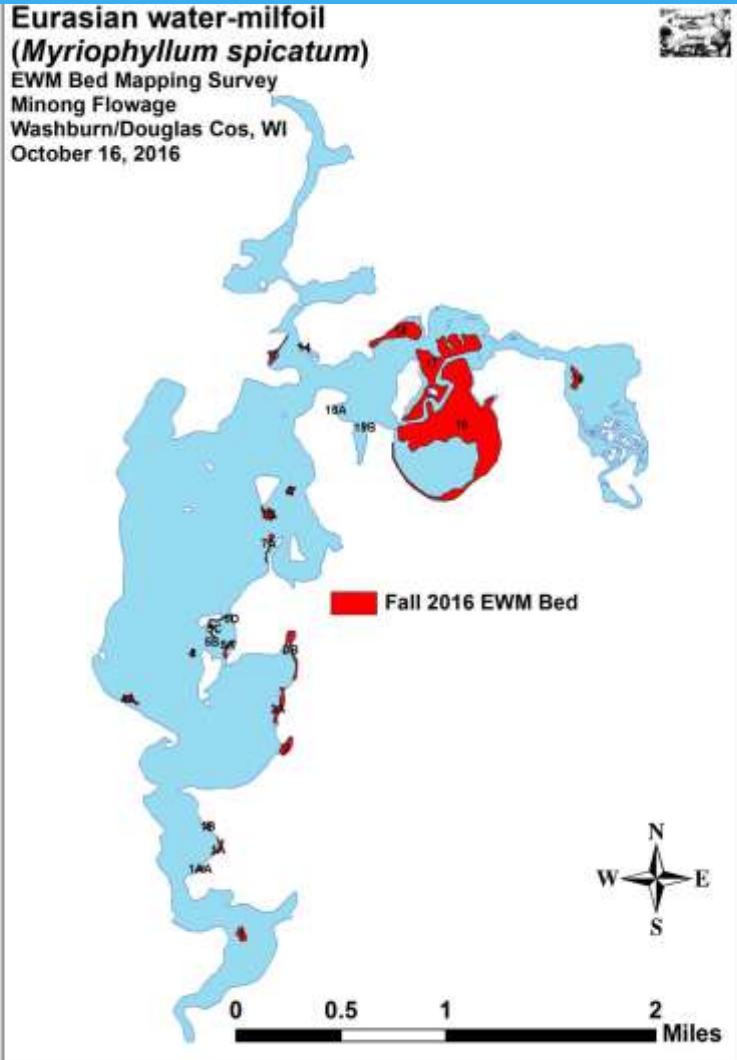


2018 Minong Flowage Association Annual Meeting

**EWM Management Update and Winter Drawdown
Information**

June 9, 2018

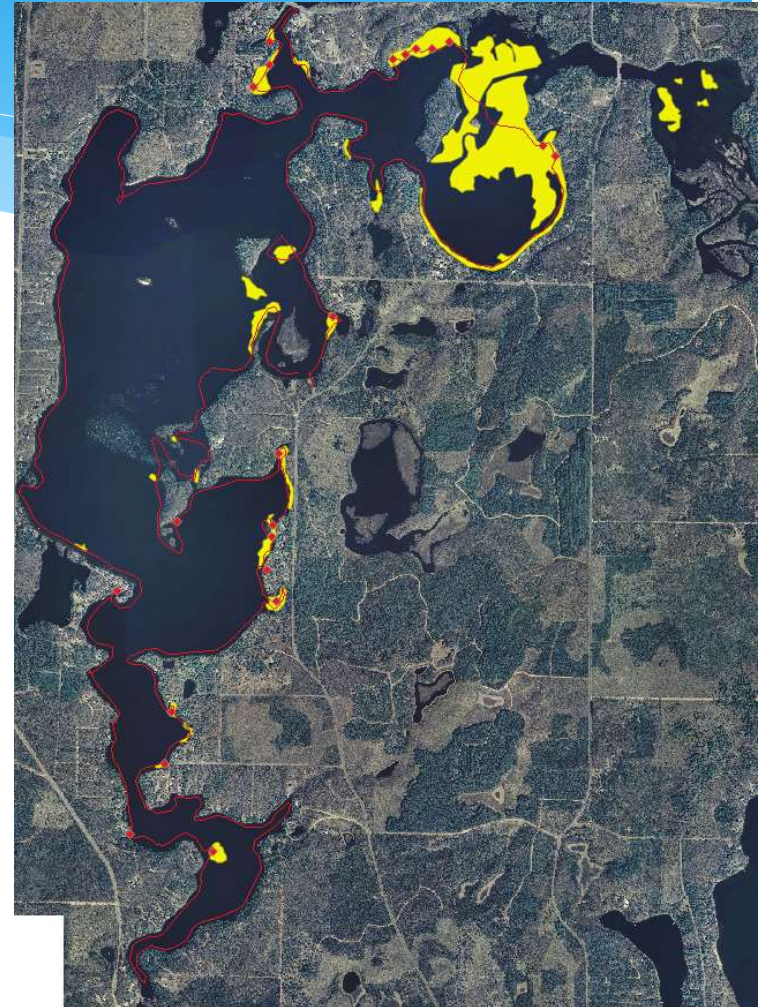
How Much EWM?



Fall 2016 - 125.58 acres

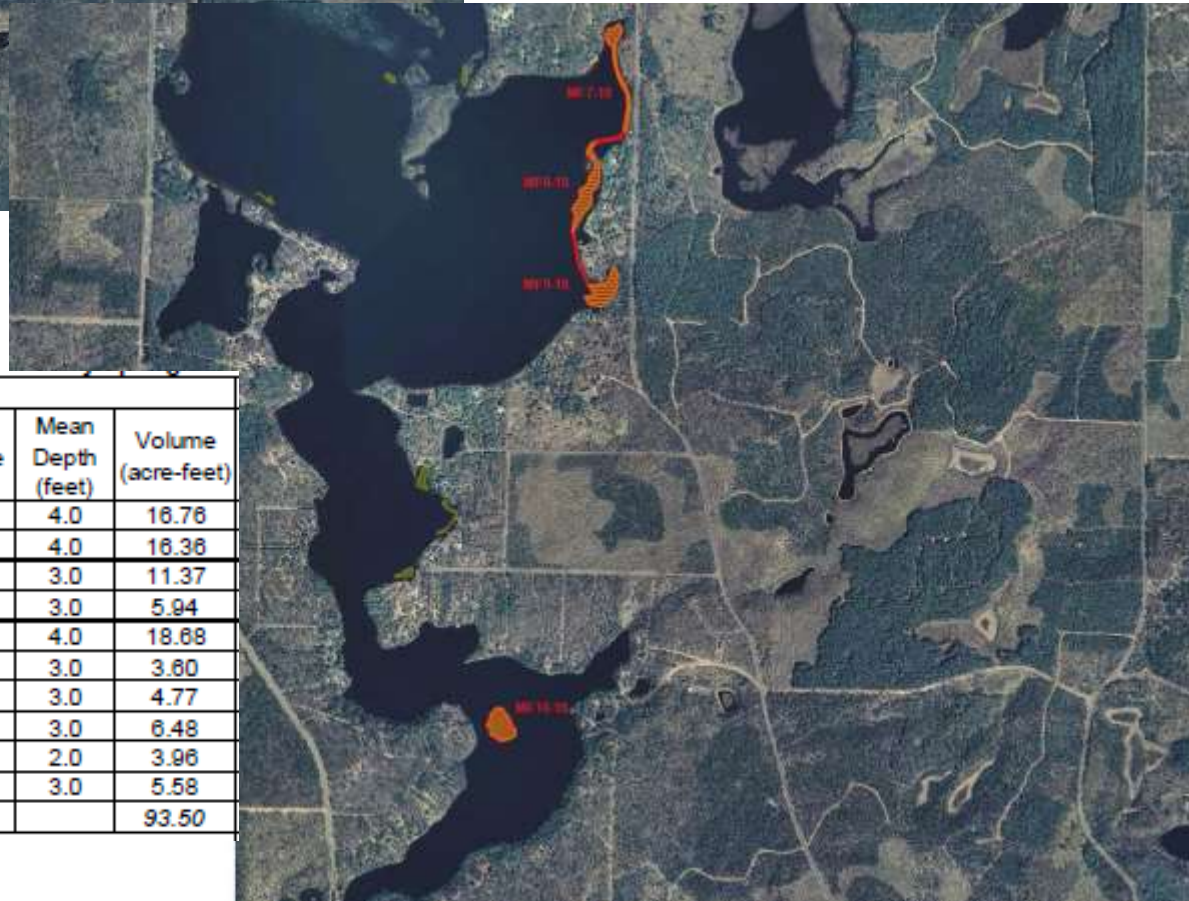
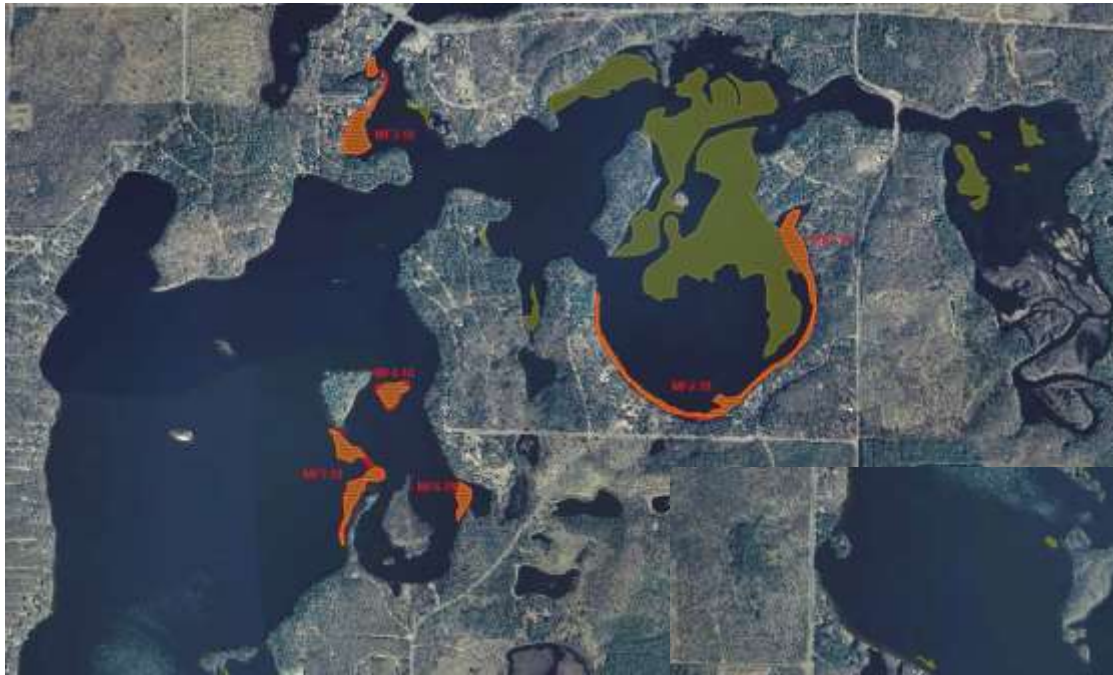
Fall Bedmapping Acres

2008 - 336
2009 - 227.79
2010 - 163.74
2011 - 80.95
2012 - 92.89
2013 -
Extended
Drawdown
2014 - 14.02
2015 - 90.36
2016 - 125.58
2017 - 112.88



Fall 2017 - 112.88 acres

2018 Proposed EWM Chemical Treatment



Treatment Area Characteristics

Treatment Location	Site Name	ERS Bed #	Acreage	Mean Depth (feet)	Volume (acre-feet)
Serenity Bay West	MF1-18	Partial Bed 16	4.19	4.0	16.76
Serenity Bay South	MF2-18	Partial Bed 16	4.09	4.0	16.36
Channel to Cranberry	MF3-18	13 & 13A	3.79	3.0	11.37
DNR Bay	MF4-18	8	1.98	3.0	5.94
DNR Bay	MF5-18	7A,7B	4.67	4.0	18.68
DNR Bay	MF6-18	7C	1.20	3.0	3.60
East Shore	MF7-18	3B	1.59	3.0	4.77
East Shore	MF8-18	3A	2.16	3.0	6.48
East Shore	MF9-18	2	1.98	2.0	3.96
South Basin	MF10-18	1	1.86	3.0	5.58
Total			27.51		93.50

Criteria for Herbicide Use in the Approved APM Plan

* Outside of Serenity Bay

- * >20 acres
- * Density – Average 2 or greater
- * Treatment areas 3 acres or greater in size

* Fall 2017 Numbers Outside of Serenity Bay

- * 19.43 acres
- * 1.2 average density
- * Only one area greater than 3 acres
 - * Can combine smaller areas to get to 3 acres

Criteria for Winter Drawdown in the Approved APM Plan

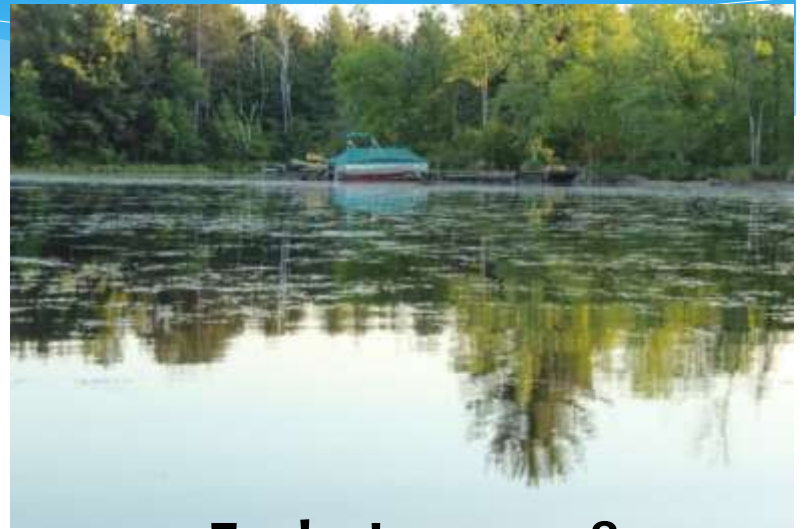
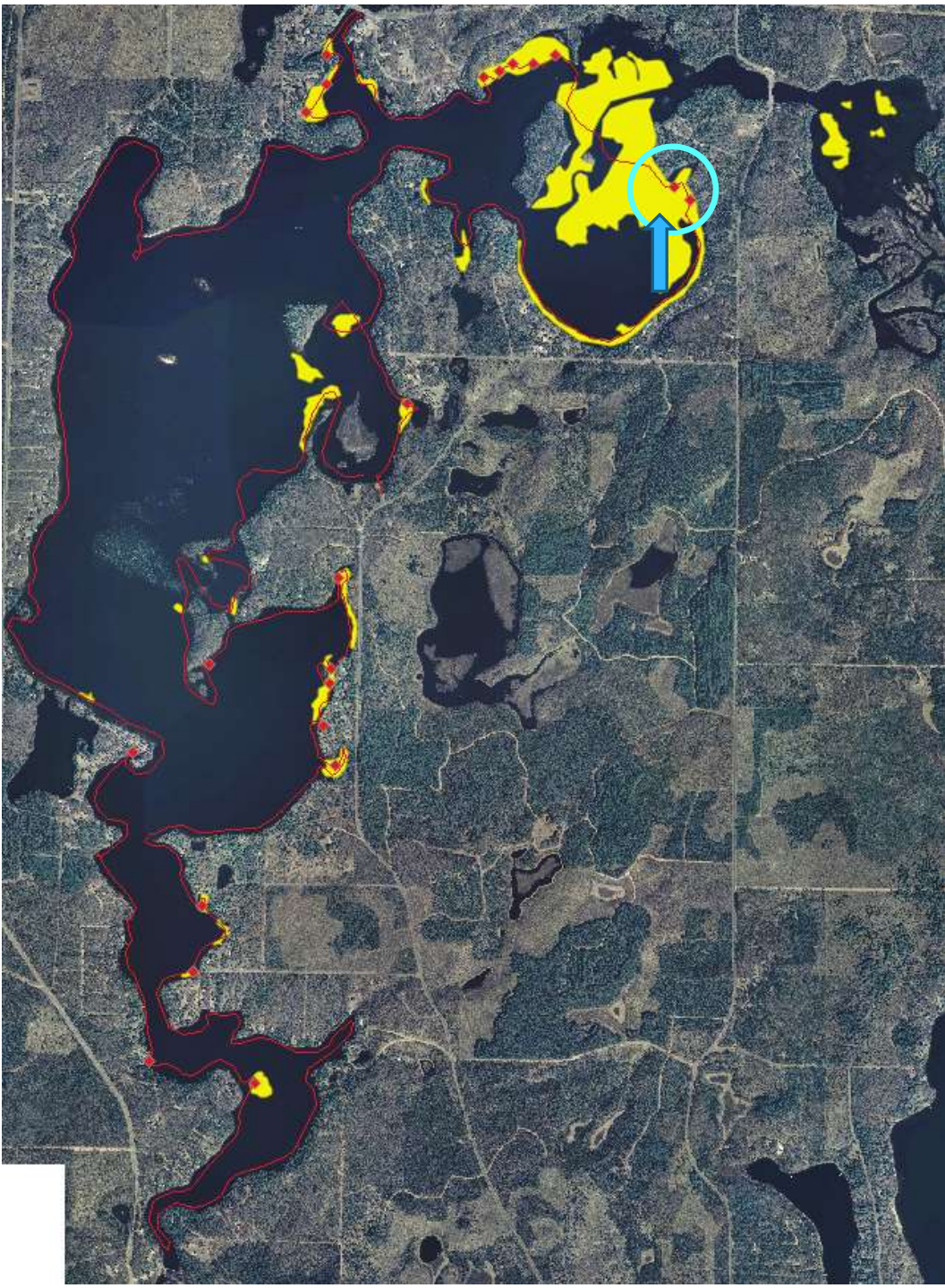
* Within Serenity Bay

- * Greater than 70 acres
- * Average density 2.0 or greater
- * If <3.0 acres and < 2.0 average density leave unmanaged

* 2017 Numbers for Serenity Bay

- * 88.45 acres
- * Average density 2.0
- * Three large areas greater than 3.0 acres

East of Smith Bridge – 4 EWM beds, 4.88 acres, Average Density = 1



Early June 2018

Lloyd
Dahlberg



Past Management Results

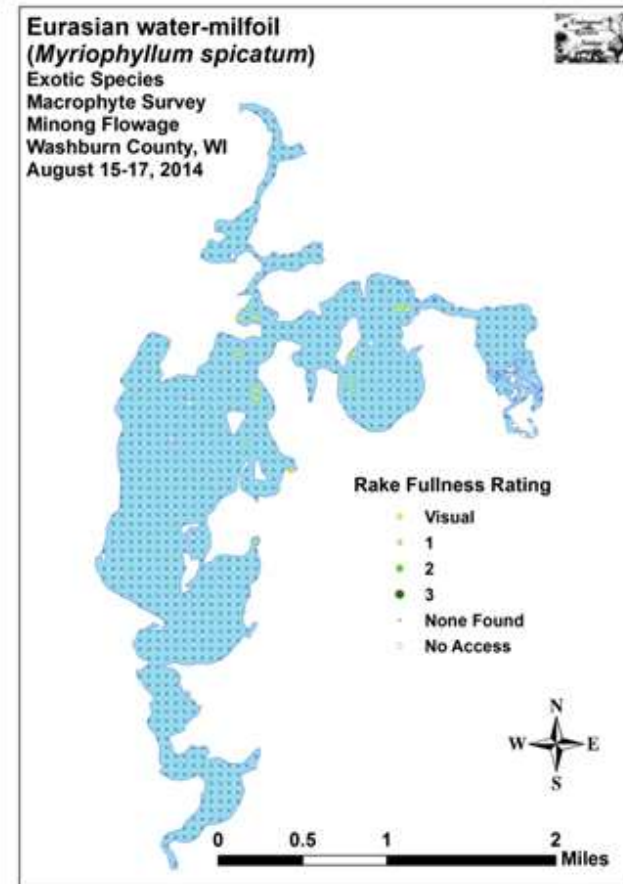
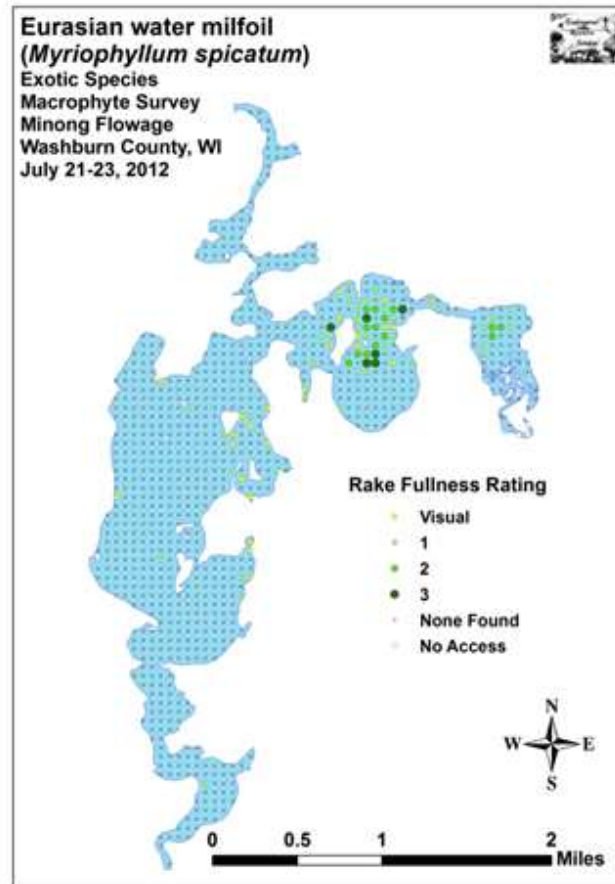
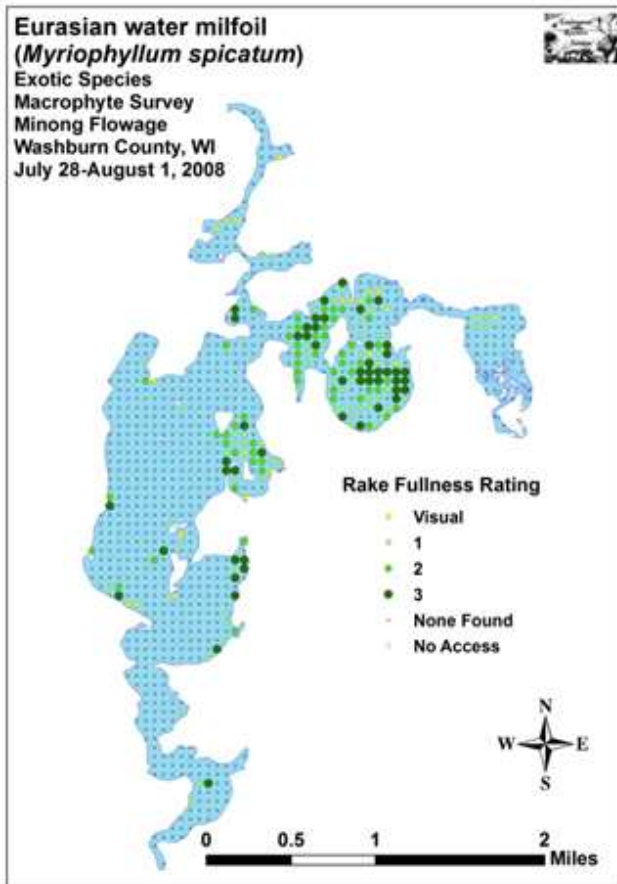
3 years of herbicide

- * 2009 – 69 acres treated
- * 2010 – 122 acres treated
- * 2011 – 88 acres treated
 - * Fall 2008 – 336 acres (before chemical treatment)
 - * Fall 2011 – 81 acres (after 3 years of chemical treatment)
- * 76% decrease in EWM in 3 seasons
- * Cost (financial):
 - * Treatment - \$176,000.00
 - * Match - \$58,667.00

11 month extended drawdown

- * 2013 – Extended (March – February) Drawdown of 5.5-ft
 - * Fall 2012 – 93 acres (before drawdown)
 - * Fall 2014 – 14 acres (after drawdown)
- * 85% decrease in EWM in two seasons
- * Cost (financial):
 - * No direct costs as it was a part of the dam repair project

Summer EWM 2008, 2012, 2014



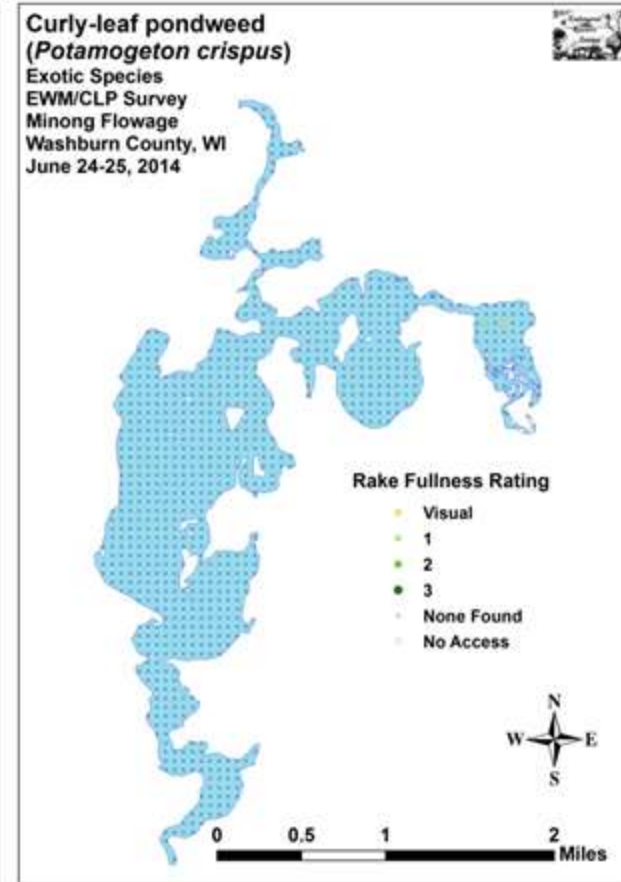
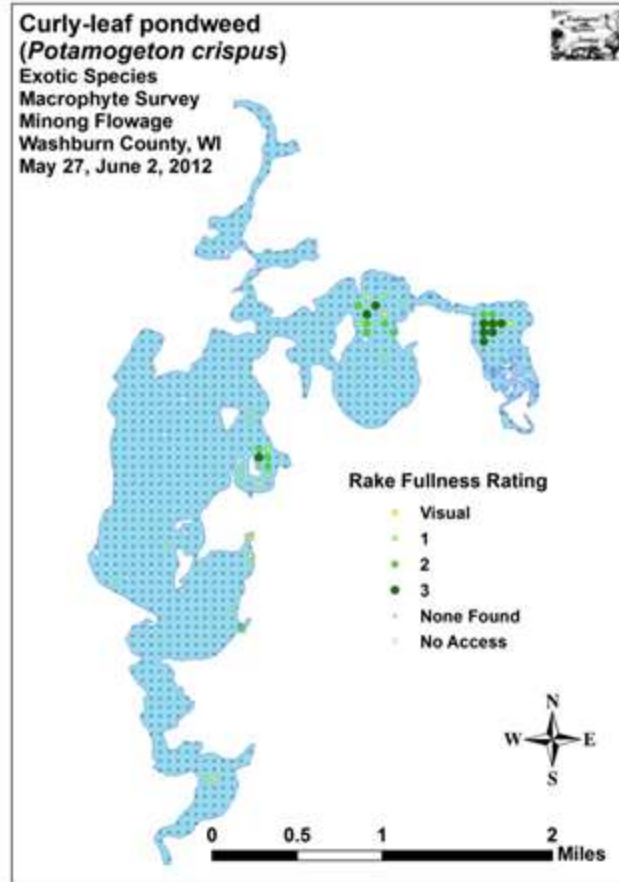
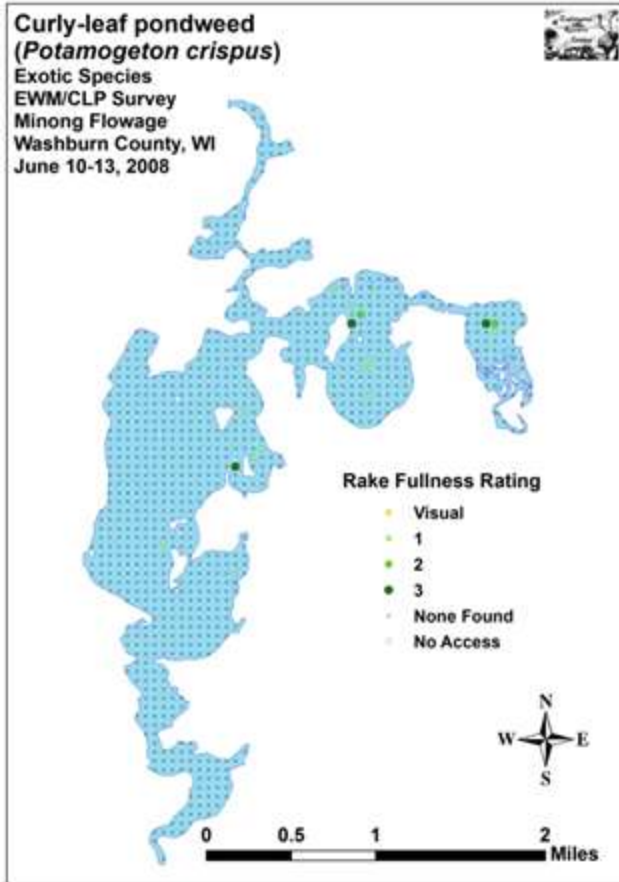
* Frequency of Occurrence in Sites with vegetation

* 2008 – 44.03%

* 2012 – 23.55% (after three years of herbicide)

* 2014 – 2.63% (After an extended drawdown)

Spring CLP 2008, 2012, 2014



Impacts on Native Plants

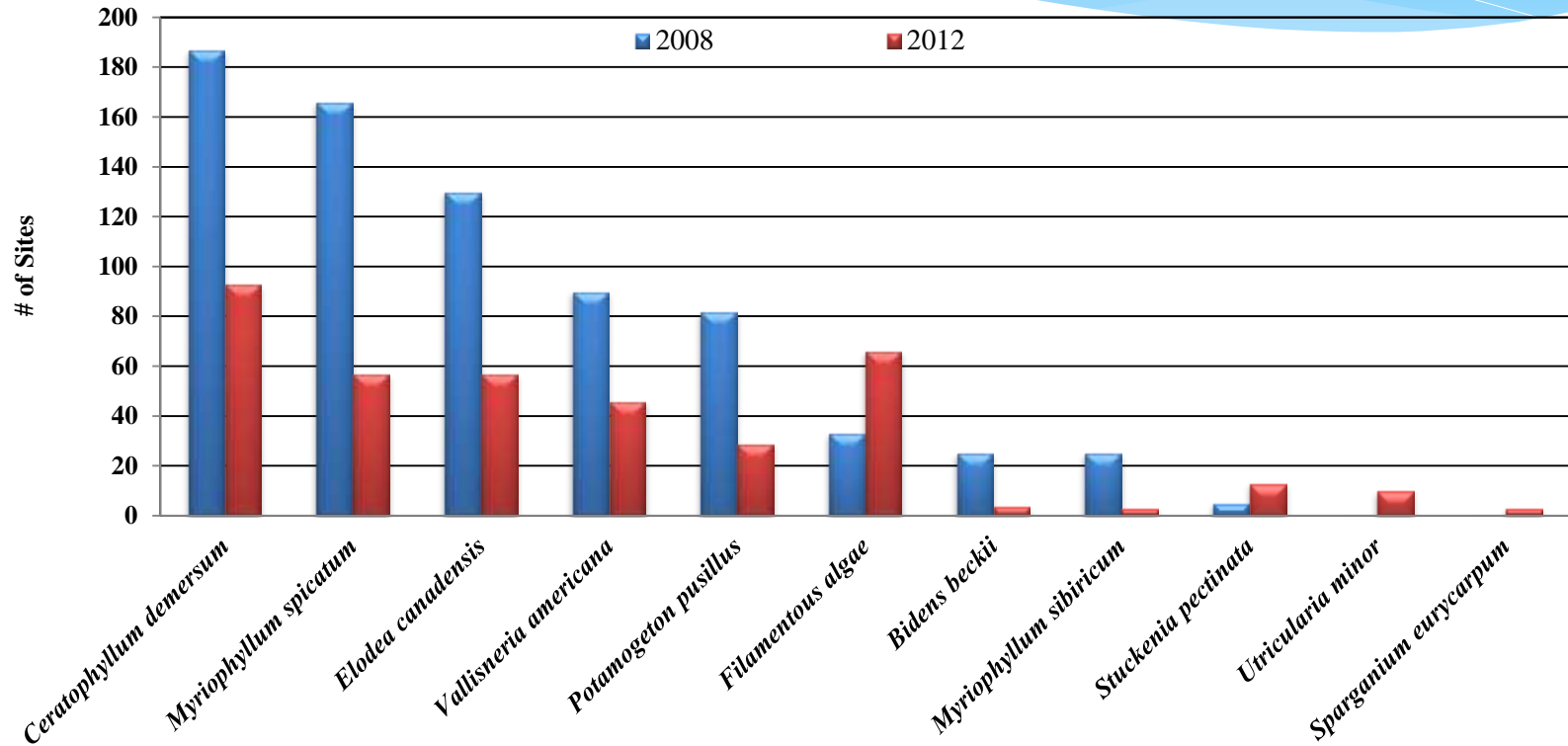
Herbicides

Summary Statistics:

	2008	2012
Total number of points sampled	875	876
Total number of sites with vegetation	377	242
Total number of sites shallower than the maximum depth of plants	517	374
Frequency of occurrence at sites shallower than maximum depth of plants	72.92	64.71
Simpson Diversity Index	0.94	0.95
Maximum depth of plants (ft)	9.5	7.5
Mean depth of plants (ft)	4.0	3.1
Median depth of plants (ft)	4.0	3.0
Average number of all species per site (shallower than max depth)	2.77	2.31
Average number of all species per site (veg. sites only)	3.80	3.57
Average number of native species per site (shallower than max depth)	2.44	2.15
Average number of native species per site (veg. sites only)	3.48	3.48
Species richness	59	57
Species richness (including visuals)	61	60
Species richness (including visuals and boat survey)	65	69
Mean rake fullness (veg. sites only)	2.69	2.18

***Lost some distribution of plants due to water clarity (plant depth 9.5 ft vs 7.5 ft)**

Species with Significant Changes Minong Flowage, Douglas/Washburn Counties July 28-August 1, 2008 and July 21-23, 2012



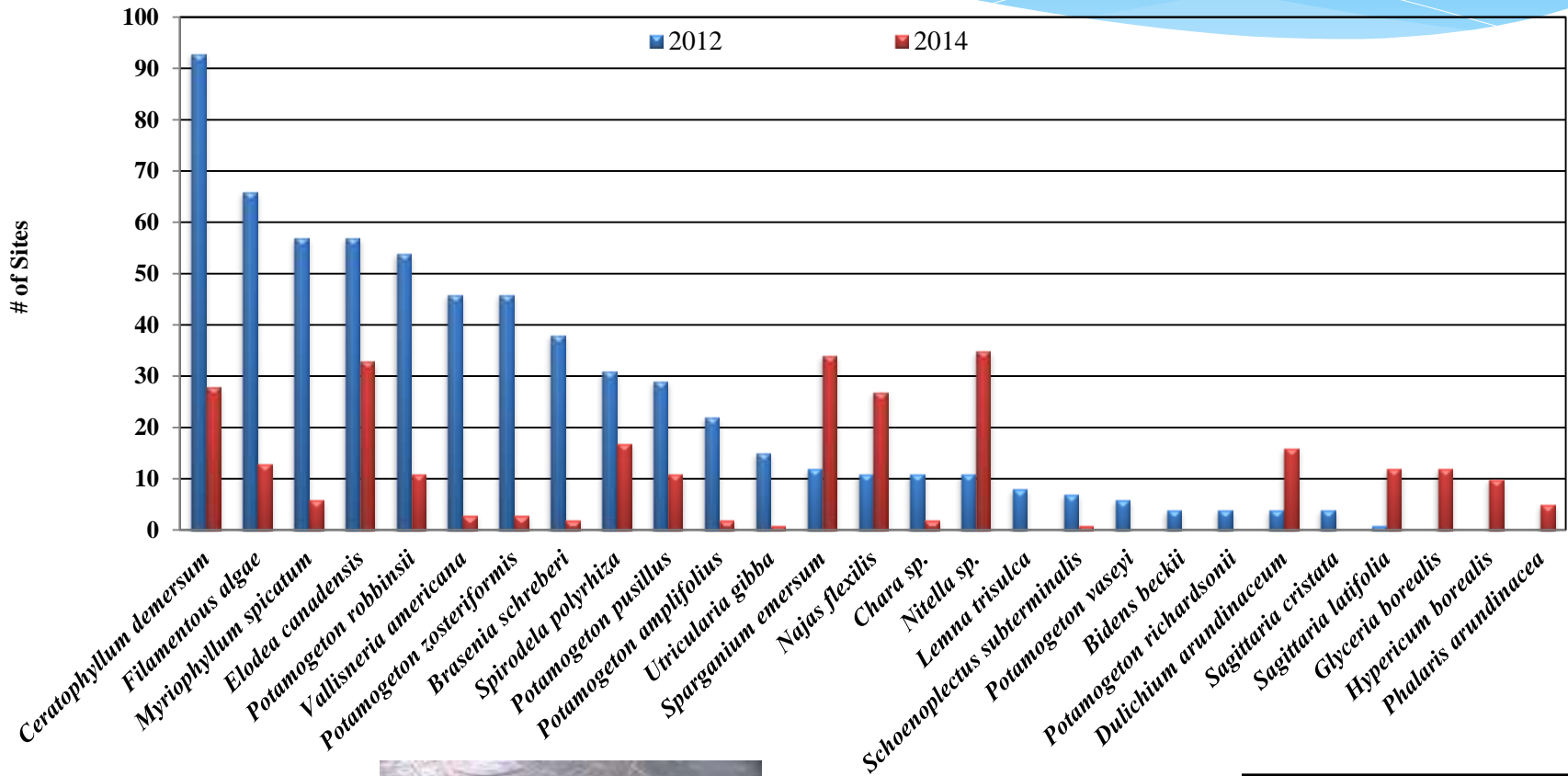
Impacts on Native Plants

Extended Drawdown

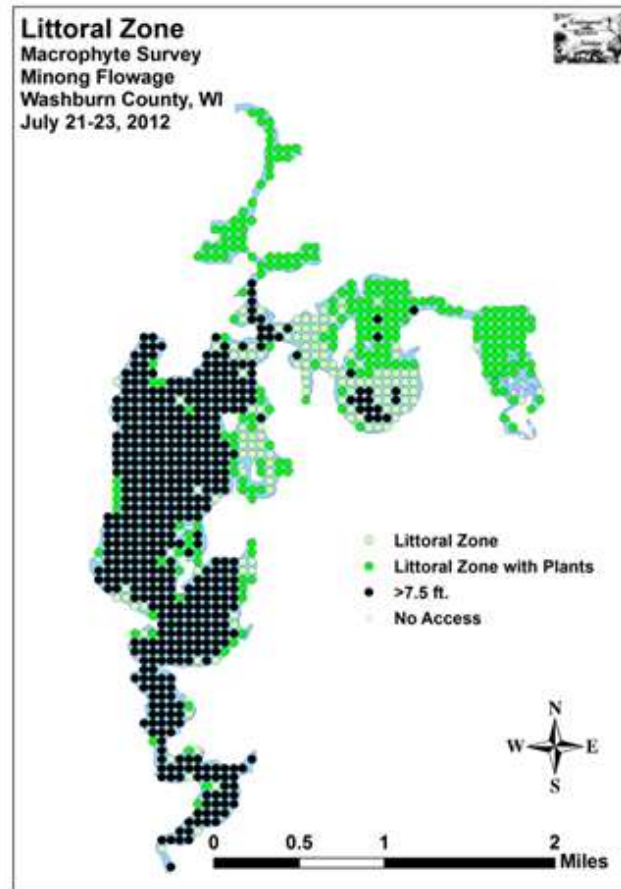
Summary Statistics:

	2008	2012	2014	<i>p</i>
Total number of points sampled	875	876	875	n.s.
Total number of sites with vegetation	377	242	227	n.s.
Total number of sites shallower than the maximum depth of plants	517	374	461	n.s.
Frequency of occurrence at sites shallower than maximum depth of plants	72.92	64.71	49.24	***
Simpson Diversity Index	0.94	0.95	0.96	n.s.
Maximum depth of plants (ft)	9.5	7.5	9.0	n.s.
Mean depth of plants (ft)	4.0	3.1	3.2	n.s.
Median depth of plants (ft)	4.0	3.0	3.0	n.s.
Average number of all species per site (shallower than max depth)	2.77	2.31	1.36	***
Average number of all species per site (veg. sites only)	3.80	3.57	2.75	***
Average number of native species per site (shallower than max depth)	2.44	2.15	1.33	***
Average number of native species per site (sites with native veg. only)	3.48	3.48	2.75	***
Species richness	58	55	52	n.s.
Species richness (including visuals)	60	59	55	n.s.
Species richness (including visuals and boat survey)	65	68	64	n.s.
Mean rake fullness (veg. sites only)	2.69	2.19	2.10	n.s.

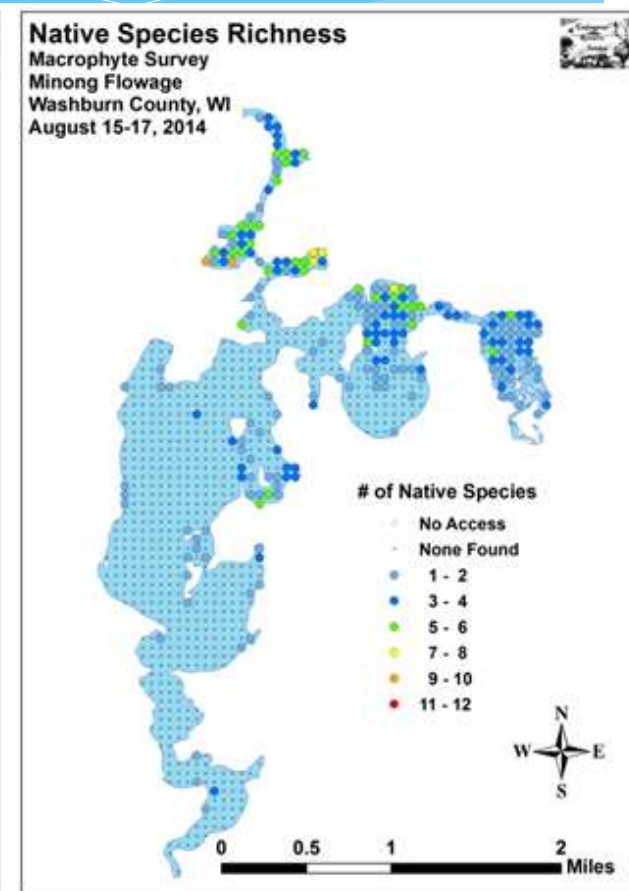
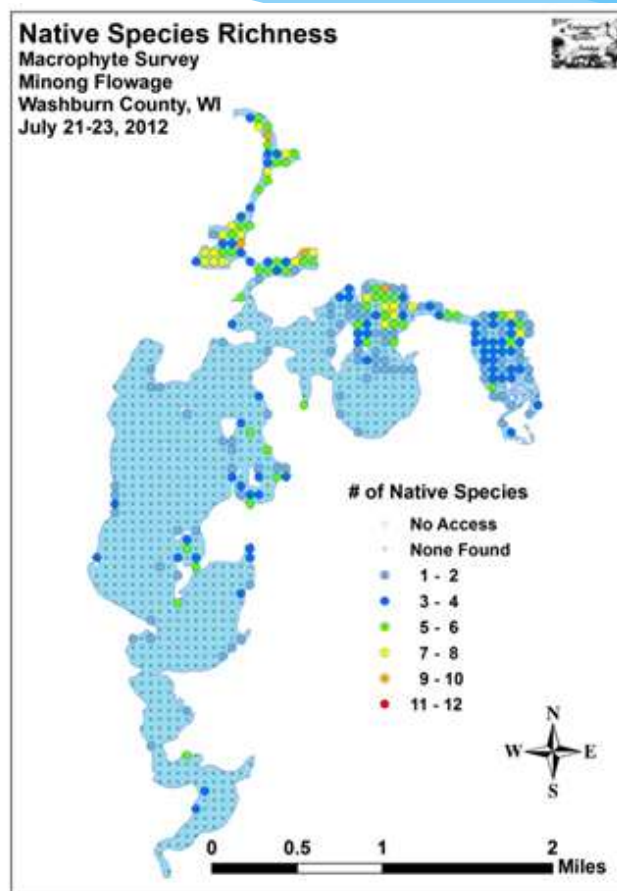
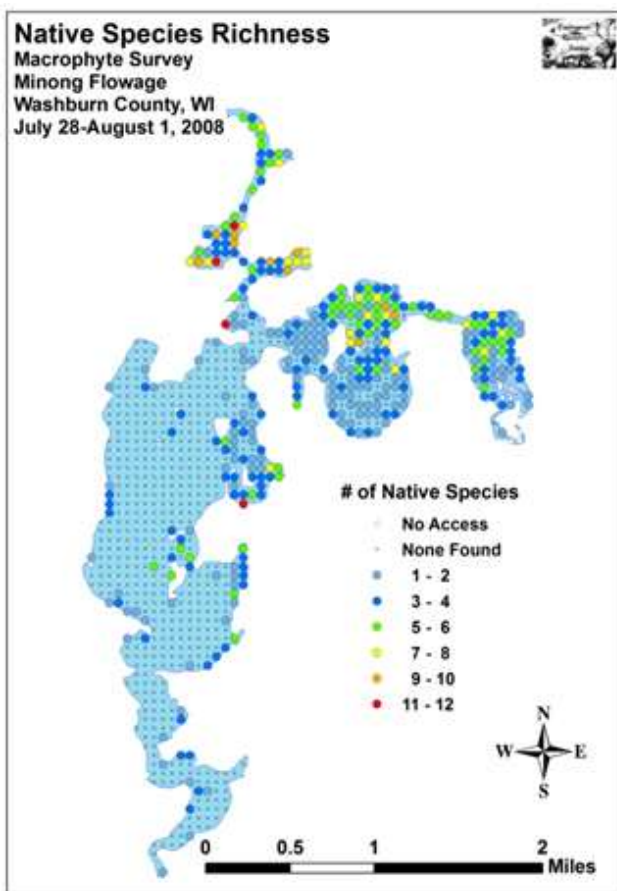
Species with Significant Changes Minong Flowage, Douglas/Washburn Counties July 21-23, 2012 and August 15-17, 2014



Summer Littoral (Plant Growing) Zone 2008, 2012, 2014



Summer Native Species Distribution and Diversity 2008, 2012, 2014



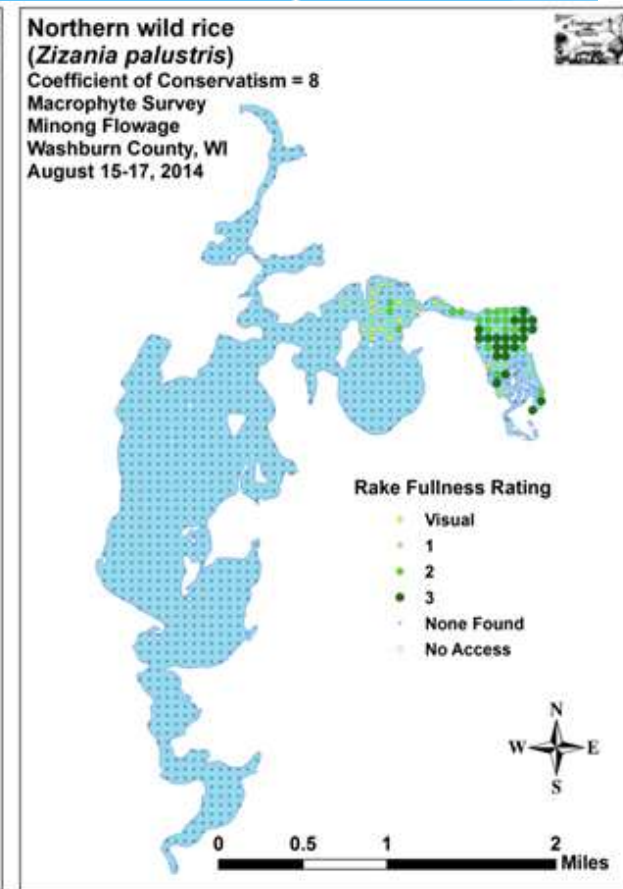
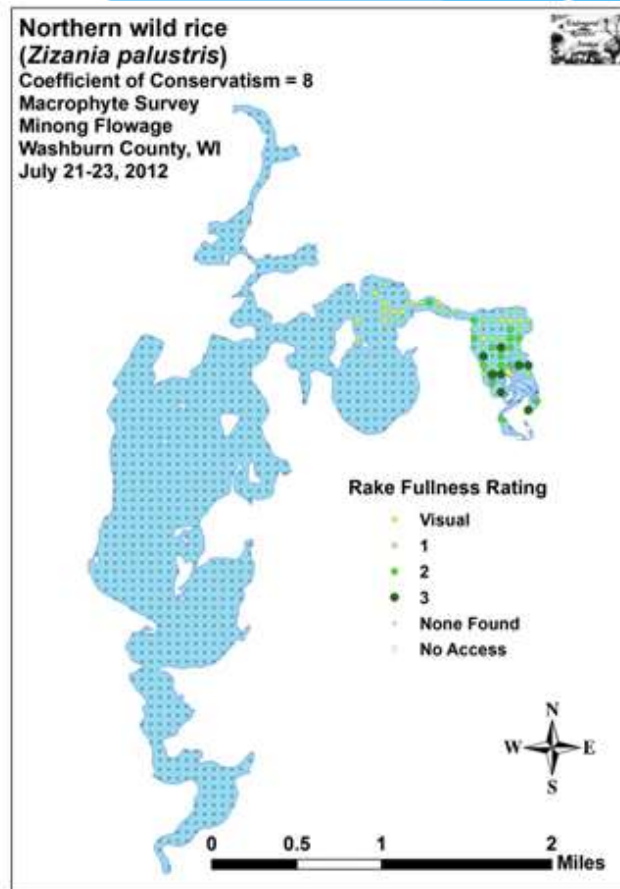
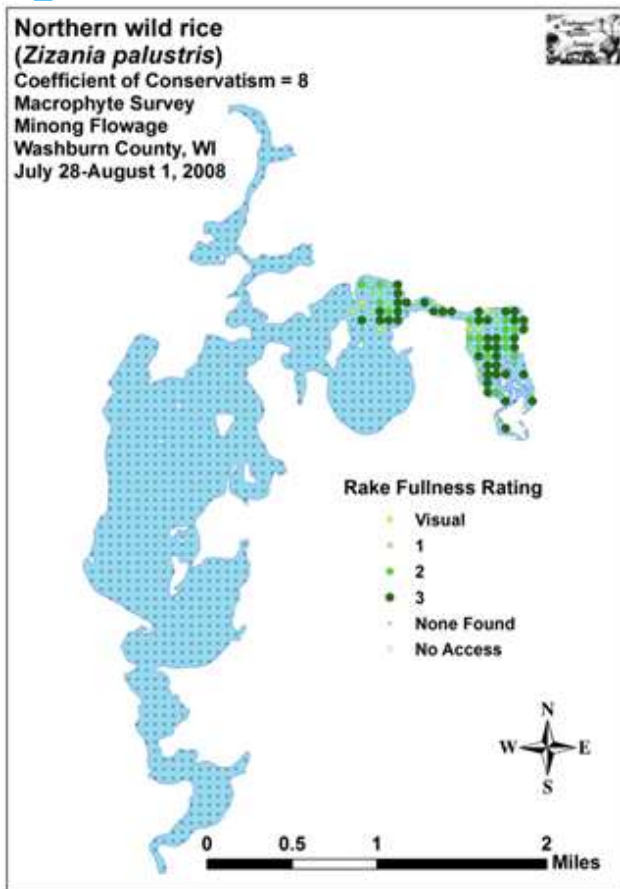
Other Measurements of Aquatic Plant Community Health

Floristic Quality Index (FQI), Mean Coefficient of Conservatism (Mean C)

Year	# of Species	Mean C	FQI
2008	52	6.6	47.3
2012	51	6.5	46.5
2014	45	6.4	42.9

Average for Lakes in this Region - Mean C 6.7; FQI 24.3 (Nichols, 1999)

Wild Rice 2008, 2012, 2014



***A lot of wild rice was uprooted in the 2016 flood that has yet to recover. There has been a 76% decline in rice bed acreage from 2014 to 2017.**

What about Native Plants Now?

**We don't know... a
summer PI survey is
being completed in
2018.**

2016 Fisheries Survey Summary

Craig Roberts, WDNR

- * Walleye recruitment is excellent
- * The northern pike density is lower than in 2005, (likely related to habitat changes induced by the drawdown)
- * Largemouth bass are not common in the Minong Flowage
- * The smallmouth bass population saw a modest increase in 2013 compared to 2010
- * Fewer bluegill under 6” than in 2010, (likely related to habitat changes induced by the drawdown)
- * The 2013 drawdown had positive and negative impacts on the fishery that need to be considered during planning for future drawdown events
- * Preventing the establishment of new invasive species and monitoring of established invasive species should continue
- * Habitat preservation/reestablishment should be encouraged

Fisheries Impacts – Craig Roberts WDNR

Drawdown

- Walleye and smallmouth bass seemed to benefit
- Based on aging data, Northern pike and largemouth bass had less fish in 2013, but not severe
- Bluegill seemed to have the biggest drop with a very low number of 2013 fish



No vegetation management

IF EXTREMELY HIGH LEVELS of EWM/aquatic vegetation occur

- Favors Largemouth Bass, Bluegill, and Northern Pike
- Bass populations could take off
- This hasn't occurred on the flowage, even when EWM was abundant

Using frequent drawdowns

IF DRAWDOWNS ARE USED FREQUENTLY

- Favors Walleye, Smallmouth Bass, other riverine fish species
- Potential long term impacts on bluegill and largemouth bass (depending on frequency)
- May create a window for carp
- Timing of the drawdown is important

Craig Roberts, WDNR

Fisheries Manager – Washburn
and Burnett Counties

Craig.roberts@wisconsin.gov

715-635-4095

Extended Drawdown – Other Costs

- * Wells gone dry
- * Shoreland trees dying
- * Some clam/mussel impact but on common species
- * Drying out of woody debris formally waterlogged and stuck on the bottom
- * Dried stumps and logs dislodged from the bottom washed up on shores
- * Loss of winter recreation – fishing and snowmobiling



Active Management of EWM – Three Options

- * **Continue Winter Drawdown Planning**
 - * Possible winter drawdown winter 2018-19 or 2019-20
- * **Wait for EWM levels to meet criteria for a chemical management proposal**
 - * Maybe in 2019, could be 2020
- * **Do no management except landowner physical removal (or contracted physical removal)**



Winter Drawdown

Likely criteria

- * 2018/19 or 2019-20
- * Begin lowering water level in early October
- * Lower water level by 1-2 inches per day
- * Lower a total of 5-ft (60 inches)
 - * **Approximately 1-1/2 months**
- * Refill with spring snowmelt and rains once ice begins to separate from the shore and other dark objects
 - * **Expected to take 2-4 weeks**
- * **Has to be requested by Washburn County Highway Department**
 - * They have agreed to do so if the MFA and other stakeholders support it.

Stakeholder Opinion

- * **Washburn County (forestry and highways)**
 - * **would not oppose**
- * **GLIFWC/Tribal Resources**
 - * **would not oppose**
- * **WDNR**
 - * **would not oppose**
 - * **Requires only a general DNR permit**
- * **Cranberry Flowage Association**
 - * **May oppose simply because it does not benefit them, it only lowers the water level**
- * **Renewable World Energy**
 - * **Will work with the MFA but there may still be compensation needed for loss of power generation**
- * **Douglas County**
 - * **Has not been contacted yet**
- * **Towns of Minong and Wascott**
 - * **Have not been contacted yet**
- * **Local Businesses**
 - * **Have not been contacted yet, but would likely rather not see a winter drawdown**

MFA Survey Results

* 2015

- * 142 responses
- * 50% support future drawdown (winter) for control of EWM
- * 26% would not support
- * 17% had issues with wells
- * 58% had issues with woody debris in the lake or washed to the shoreline

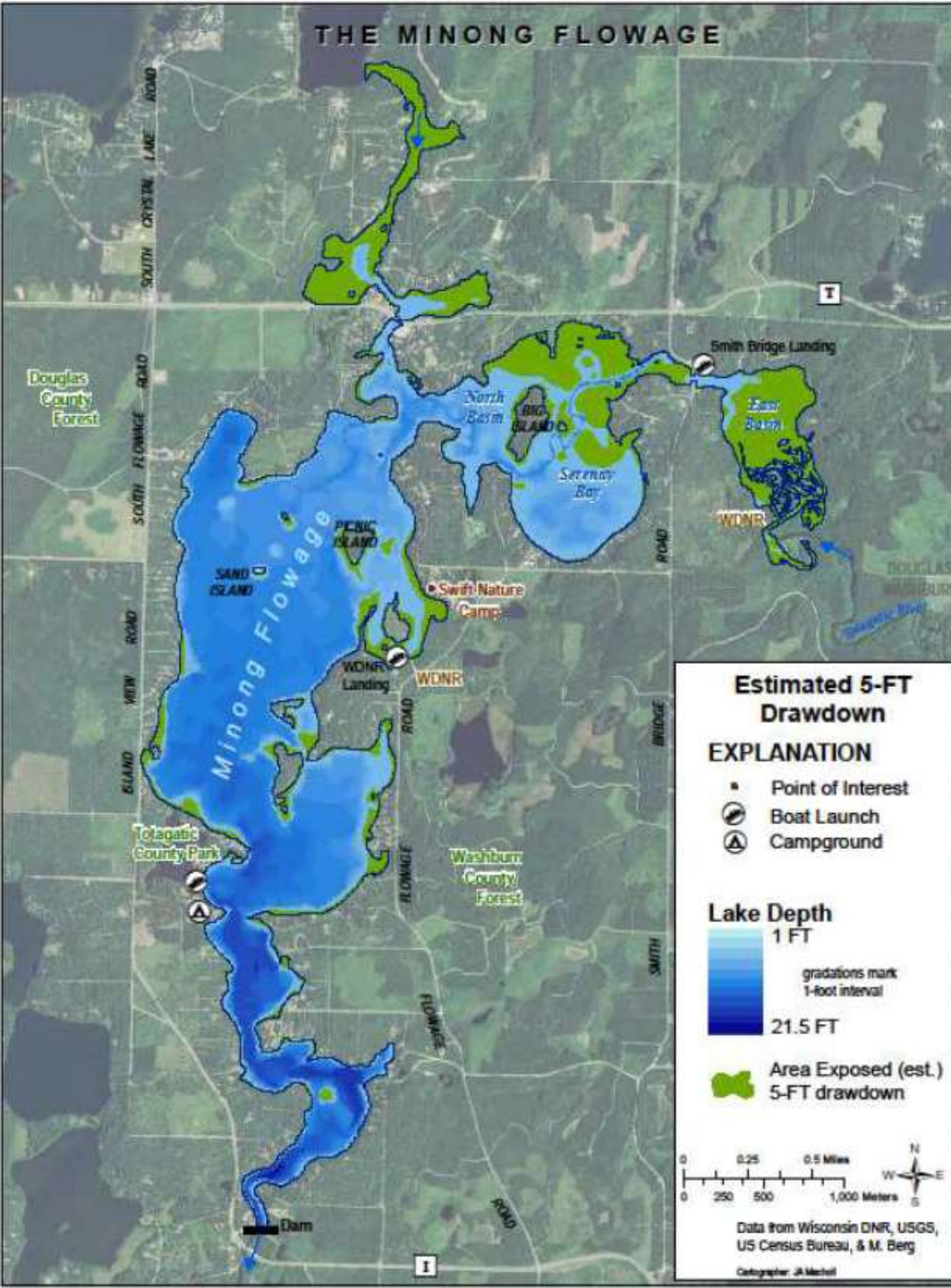
* 2018

- * 84 responses
- * 80% would support future drawdown (winter) for control of EWM
- * 8 % would not support
- * 44% EWM returned moderately
- * 42% EWM unnoticed

MFA Drawdown Concerns

- * Duration and timing of a drawdown
 - * How far down do we have to go
 - * Will it kill EWM
 - * Loss of aquatic vegetation
 - * Impacts on the fishery
 - * Spawning, oxygen levels, survival of young fish
 - * Impacts on other wildlife
 - * mussels, fur bearers, amphibians, ducks, and reptiles
 - * Impacts on shoreland vegetation
 - * trees, shrubs, & grass
 - * Impacts on water quality
 - * How long to refill and when would it start
- * Winter use of the Flowage
 - * Snowmobiling and ice fishing
 - * Removal of problem stumps
 - * WDNR/Tribal Politics
 - * Paying for lost power generation
 - * Woody debris washed into the shore and floating in the Flowage
 - * Wells going dry
 - * Shoreland improvements, dock and boat removal

THE MINONG FLOWAGE



Estimated 5-FT Drawdown

EXPLANATION

- Point of Interest
- 🚤 Boat Launch
- ⛺ Campground

Lake Depth



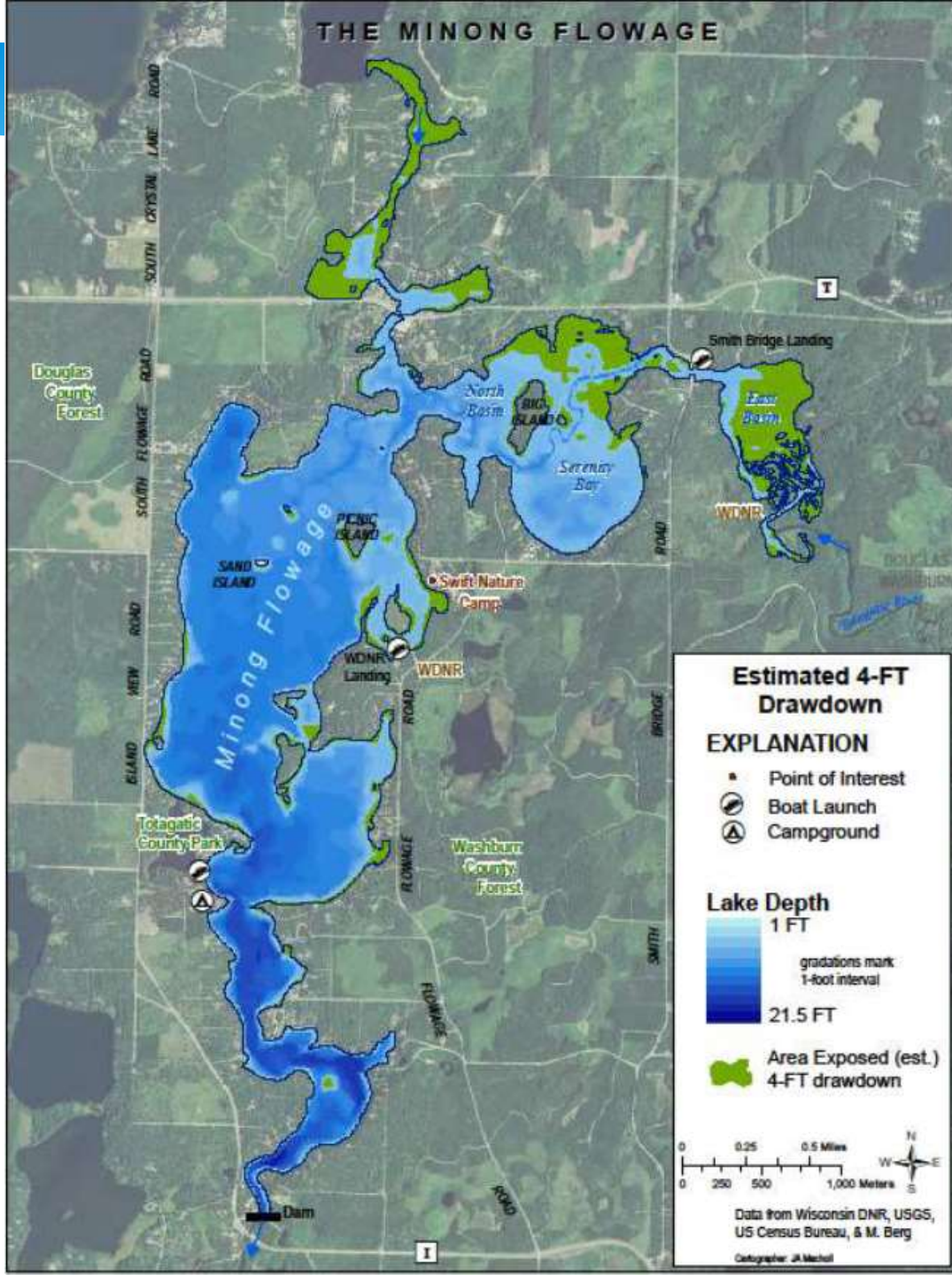
Area Exposed (est.)
5-FT drawdown



Data from Wisconsin DNR, USGS,
US Census Bureau, & M. Berg

Cartographer: J. Michell

THE MINONG FLOWAGE



Estimated 4-FT Drawdown

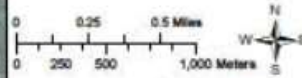
EXPLANATION

- Point of Interest
- 🚤 Boat Launch
- △ Campground

Lake Depth



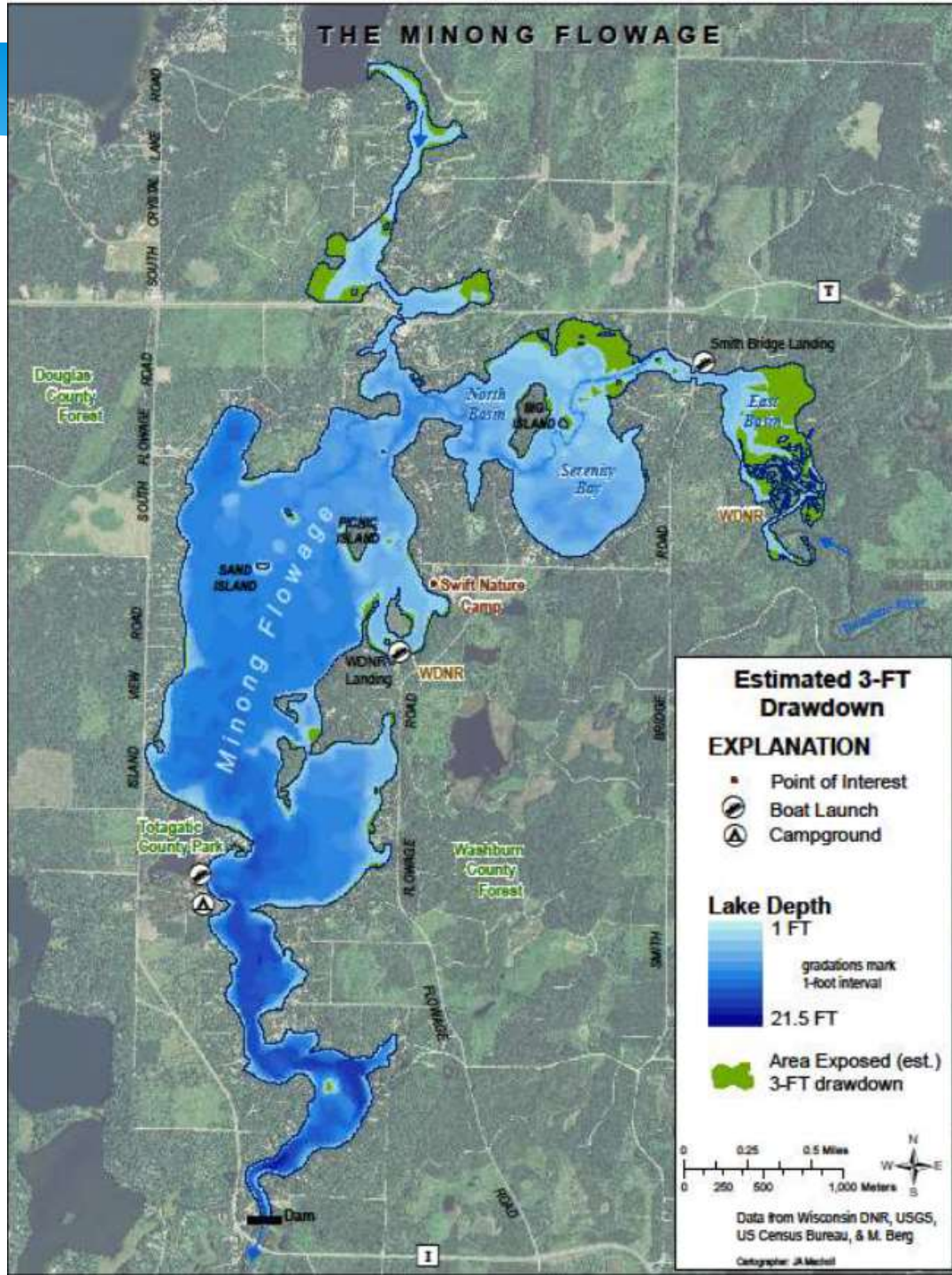
Area Exposed (est.) 4-FT drawdown



Data from Wisconsin DNR, USGS, US Census Bureau, & M. Berg

Cartographer: J. Mehal

THE MINONG FLOWAGE



Estimated 3-FT Drawdown

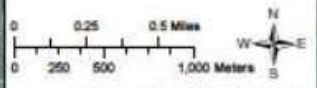
EXPLANATION

- Point of Interest
- 🚤 Boat Launch
- ⚖️ Campground

Lake Depth



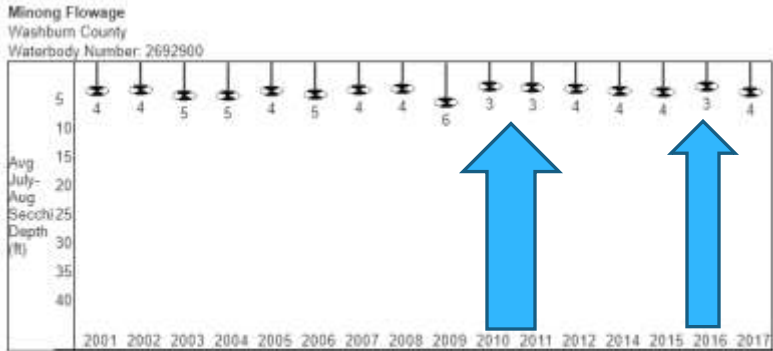
Area Exposed (est.)
3-FT drawdown



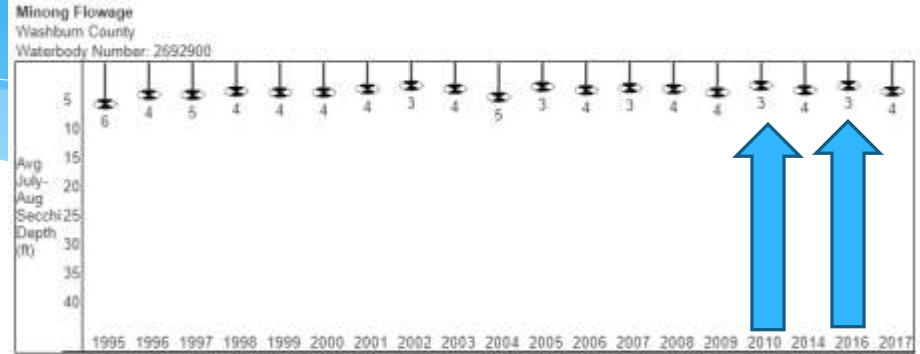
Data from Wisconsin DNR, USGS,
US Census Bureau, & M. Berg

Cartographer: J. Mehall

Water Quality

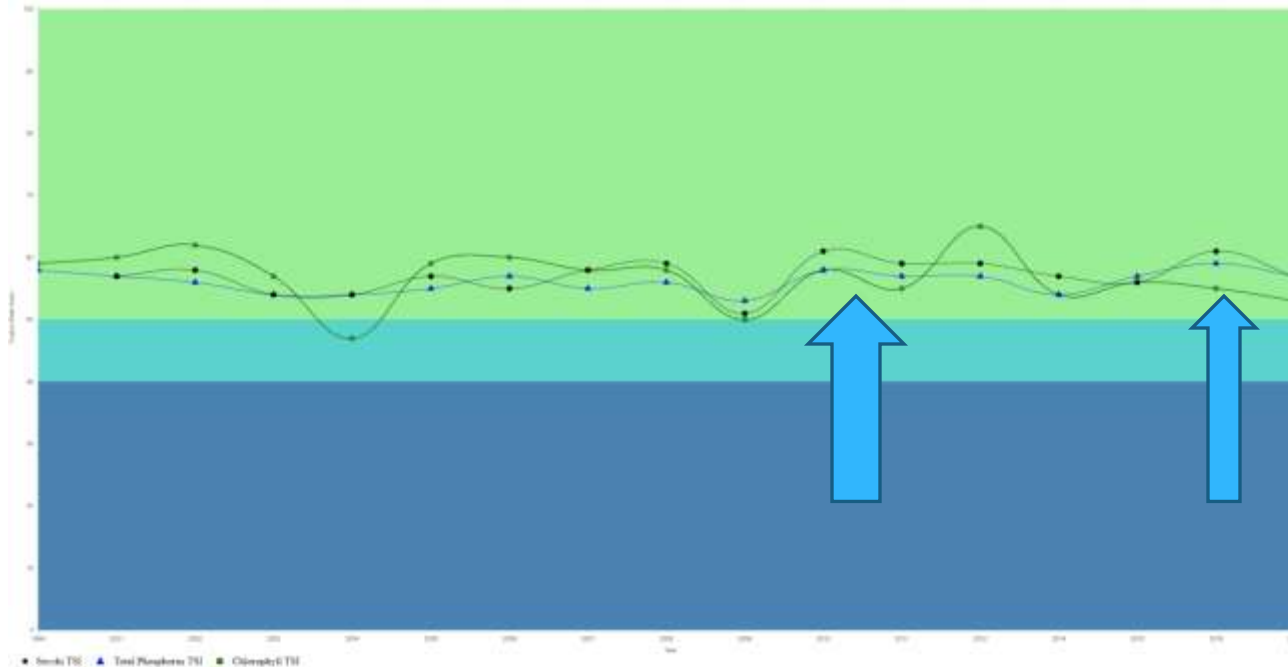


Past secchi averages in feet (July and August only).



Past secchi averages in feet (July and August only).

Trophic State Index Graph: Minong Flowage - Deep Hole 1/3 Mi Above Dam - Washburn County



Monitoring before, during, and after a Winter Drawdown

- * **Native Aquatic Plants**
- * **Eurasian watermilfoil and curly-leaf pondweed**
- * **Dissolved Oxygen**
- * **Water quality**
- * **Voluntary Bag Limits**
- * **WDNR/Tribal Fisheries Surveys**
- * **Well Monitoring**
- * **Amphibian Surveys (?)**
- * **Power Generation/Flow over and through the dam**
 - * **It is expected that some power generation would be maintained even through the drawdown**
- * **Could be other things**

What Needs to Be Done to Implement a Winter Drawdown this year (2018-19)

- * **General approval/support to do so by the MFA**
 - * Maybe today
 - * this is not a full commitment, just an acknowledgement that a winter drawdown should be considered and planned for
- * **Pull in the rest of the Stakeholders to determine their level of support**
 - * June/July
- * **Analyze 2018 Summer Aquatic Plant Survey Results**
 - * Late July/early August
- * **Develop a final winter drawdown plan**
 - * June-August
 - * Public meeting on that plan on or about August 15, 2018
- * **Put in a request to the Washburn County Highway Department to submit a permit request for the drawdown**
 - * This likely means the MFA completes the permit and Washburn County just submits the request
 - * August
- * **Develop a monitoring plan including what to monitor and who is going to do it**
 - * July-August
- * **Work out final details**
 - * September
- * **Begin implementation – water level drawdown**
 - * Early to mid October



Questions and Comments