Appendix A – Lake Wingra Summary Statistics 2017

Table 1: 2017 Aquatic Plant Community Statistics, Lake Wingra, Dane County, WI

Total number of sites visited	543
Total number of sites with vegetation	367
Total number of sites shallower than maximum depth of plants	503
Frequency of occurrence at sites shallower than maximum depth of plants	72.96
Simpson Diversity Index	0.75
Maximum depth of plants (ft)**	12.00
Number of sites sampled using rake on Rope (R)	0
Number of sites sampled using rake on Pole (P)	501
Average number of all species per site (shallower than max depth)	1.59
Average number of all species per site (veg. sites only)	2.17
Average number of native species per site (shallower than max depth)	1.19
Average number of native species per site (veg. sites only)	1.68
Species Richness	20*
Species Richness (including visuals)	22*
*Filamentous algae is no longer included in species richness by WI DNR	

Table 2: Historical Aquatic Plant Community Statistics, Lake Wingra, Dane County, WI

	2010	2011	2012	2017
F.o.o. at sites shallower than maximum depth of plants	---	76.6	81.1	72.96
Most Dominant Species	Eurasian water-milfoil	Eurasian water-milfoil	Eurasian water-milfoil	Coontail
	Coontail	Coontail	Coontail	Eurasian water-milfoil
	Wild Celery	Wild Celery	White-stem pondweed	White-stem pondweed
Maximum Depth of Plants	10.5	13	13	12
Species Richness	27	22	22	19
Community FQI		25.3	21.8	24.77
Average Coefficient of Conservatism				5.68

Coefficient of Conservatism C

0-3 taxa found in wide variety of plant communities and very tolerant of disturbance.
4-6 taxa typically associated with specific plant communities and tolerate moderate disturbance.
7-8 taxa found in narrow range of plant communities and tolerate minor disturbance.
9-10 taxa restricted to a narrow range of synecological conditions, with low tolerance of disturbance.

Table 3: 2017 Aquatic Plant Taxa-Specific Statistics, Lake Wingra, Dane County, WI

STATS	Frequency of occurrence within vegetated areas (%)	Frequency of occurrence at sites shallower than maximum depth of plants	Relative Frequency (%)	Number of sites where species found	Average Rake Fullness
Eurasian water-milfoil	53.83	39.17	24.94	197	1.63
Coontail	92.08	67.00	42.66	337	1.88
Muskgrasses	4.92	3.58	2.28	18	1.67
Elodea,Common waterweed	0.55	0.40	0.25	2	1
Water star-grass	3.83	2.78	1.77	14	1.29
Small duckweed	3.01	2.19	1.39	11	1
Slender naiad	2.73	1.99	1.27	10	1.2
American lotus	0.54	0.40	0.25	2	1.5
White water lily	11.75	8.55	5.44	43	1.93
Fries' pondweed	3.28	2.39	1.52	12	1
Variable pondweed	0.82	0.60	0.38	3	1
Illinois pondweed	1.37	0.99	0.63	5	1.2
White-stem pondweed	7.92	5.77	3.67	29	1.21
Clasping-leaf pondweed	0.27	0.20	0.13	1	1
Flat-stem pondweed	1.37	0.99	0.63	5	1.2
Large duckweed	1.64	1.19	0.76	6	1
Sago pondweed	16.94	12.33	7.85	62	1.18
Wild celery	6.83	4.97	3.16	25	1.36
Common bladderwort	1.63	1.19	0.75	6	1.5
Common watermeal	2.73	1.99	1.27	10	1
Filamentous algae	10.66	7.75	*	39	1.38
*Relative frequency of Filamentous algae is no longer calculated by WI DNR					

Table 4: Historical Floristic Quality Index, Lake Wingra, Dane County, WI

			Coefficient of Conservatism				
Genus	**Species**	**Common Name**	**2012**	**2013**	**2014**	**2015**	**2017**
Ceratophyllum	*demersum*	Coontail	3	3	3	3	3
Chara	*sp.*	Muskgrasses	7	7	7	7	7
Elodea	*canadensis*	Elodea,Common waterweed	3			3	3
Heteranthera	*dubia*	Water star-grass	6	6	6	6	6
Lemna	*minor*	Small duckweed	4	4	4		4
Myriophyllum	*sibiricum*	Northern water-milfoil	6	6	6	6	
Najas	*flexilis*	Slender naiad		6	6	6	6
Nelumbo	*lutea*	American lotus		7	7		7
Nuphar	*varigata*	Spatterdock	6	6	6	6	6
Nymphaea	*odorata*	White water lily	6	6	6	6	6
Potamogeton	*friesii*	Fries' pondweed			8		8
Potamogeton	*gramineus*	Variable pondweed					7
Potamogeton	*illinoensis*	Illinois pondweed	6	6	6	6	6
Potamogeton	*natans*	Floating leaf pondweed	5			5	
Potamogeton	*praelongus*	White-stem pondweed	8	8	8	8	8
Potamogeton	*richardsonii*	Clasping-leaf pondweed	5	5	5	5	5
Potamogeton	*zosteriformis*	Flat-stem pondweed	6	6	6	6	6
Spirodela	*polyrhiza*	Large duckweed	5	5	5		5
Stuckenia	*pectinata*	Sago pondweed	3	3	3	3	3
Vallisnera	*americana*	Wild celery	6	6	6	6	6
Utricularia	*vulgaris*	Common bladderwort					7
Wolffia	*columbiana*	Common watermeal	5	5	5		5
		Total Species	17	17	18	15	19
		Mean C	5.29	5.58	5.72	5.6	5.68
		Floristic Quality Index (FQI)	21.83	23.04	24.28	21.69	24.78

Please note: There is no Coefficient of Conservatism for exotic species such as Eurasian Watermilfoil or for species not identified to the species level (Sagittaria sp.).

Coefficient of Conservatism
C

0-3 taxa found in wide variety of plant communities and very tolerant of disturbance.
4-6 taxa typically associated with specific plant communities and tolerate moderate disturbance.
7-8 taxa found in narrow range of plant communities and tolerate minor disturbance.
9-10 taxa restricted to a narrow range of synecological conditions, with low tolerance of disturbance.

Table 5: Historical Aquatic Plant Occurrences, Lake Wingra, Dane County, WI

Common Name	Scientific Name	% Frequency of Occurrence			
		2010	2011	2012	2017
Eurasian water-milfoil	*Myriophyllum spicatum*	63.08	67.86	73.1	39.17
Coontail	*Ceratophyllum demersum*	27.1	22.62	34.7	67
Muskgrasses	*Chara* sp.	4.67	3.57	2.4	3.58
Swamp loosestrife	*Decodon verticillatus*	visual	---	visual	---
Common waterweed	*Elodea canadensis*	1.64	0.6	0.6	0.4
Water star-grass	*Heteranthera dubia*	4.44	1.98	0.6	2.78
Small duckweed	*Lemna minor*	2.34	---	1	2.19
Forked duckweed	*Lemna trisulca*	0.23	0.2	---	---
Turion duckweed	*Lemna turionifera*	---	3.77	---	---
Purple loosestrife	*Lythrum salicaria*	visual	Visual	visual	---
Northern water-milfoil	*Myriophyllum sibiricum*	1.4	2.18	2.8	---
Slender Naiad	*Najas flexilis*	1.17	0.4	---	1.99
American lotus	*Nelumbo lutea*	---	---	visual	0.4
Spatterdock	*Nuphar variegata*	0.23	---	0.6	visual
White water lily	*Nymphaea odorata*	2.34	4.76	5.2	8.55
Curly-leaf pondweed	*Potamogeton crispus*	0.7	---	visual	---
Fries' pondweed	*Potamogeton friesii*	0.47	0.99	visual	2.39
Variable pondweed	*Potamogeton gramineus*	---	---	---	0.60
Illinois pondweed	*Potamogeton illinoensis*	4.21	5.16	2.4	0.99
Floating-leaf pondweed	*Potamogeton natans*	0.47	0	0.2	----
Long-leaf pondweed	*Potamogeton nodosus*	0	0.2	0	---
White-stem pondweed	*Potamogeton praelongus*	3.5	4.96	6.4	5.77
Clasping-leaf pondweed	*Potamogeton richardsonii*	0.93	1.19	1.6	0.2
Flat-stem pondweed	*Potamogeton zosteriformis*	1.4	1.39	0.2	0.99
Softstem bulrush	*Schoenoplectus tabernaemontani*	visual	---	visual	---
Large Duckweed	*Spirodela polyrhiza*	0.47	0.4	0.4	1.19
Sago pondweed	*Stuckenia pectinata*	2.57	4.76	3.6	12.33
Cattail	*Typha* sp.	0.23	0.6	visual	visual
Common bladderwort	*Utricularia vulgaris*	0.7	0	visual	1.19
Wild celery	*Vallisneria americana*	5.37	5.36	4	4.97
Common watermeal	*Wolffia columbiana*	---	1.59	0.2	1.99
Freshwater sponge		---	0.4	---	---

Appendix B – Aquatic Invasive Species

Wisconsin Invasive Species Laws

Inspect your boat, trailer and equipment.
Remove any attached aquatic plants or animals (before launching, after loading & before transporting on a public highway)
Never Move live fish away from a waterbody.* Fish out of water are not considered live. Transport on ice is legal and recommended.
Buy minnows from a Wisconsin bait dealer and use leftover minnows only under certain conditions. *
*You may take leftover minnows purchased from a Wisconsin bait dealer away from any state water and use them again on that same water. You may use leftover minnows on other waters only if no lake or river water, or other fish were added to their container. See fishingwisconsin.org for more information.

Minnows

You may take live minnows purchased from a Wisconsin bait dealer (which includes Wisconsin registered fish farms) away from a waterbody if any of the following three conditions are met:

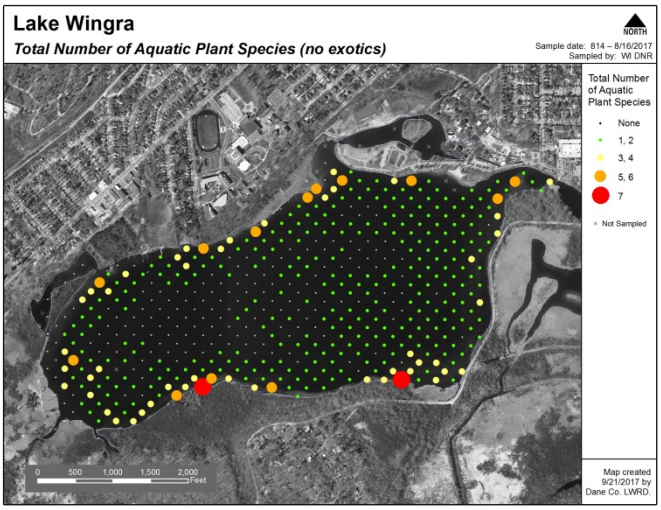
- Anglers can take purchased minnows away from a lake and use them again on that same waterbody.
- Anglers can also take purchased minnows away from a waterbody and use them elsewhere if no lake or river water or other fish were added to the bait container.
- Anglers can also take purchased minnows away from a waterbody for use elsewhere if they intend to preserve them as dead bait using approved methods.

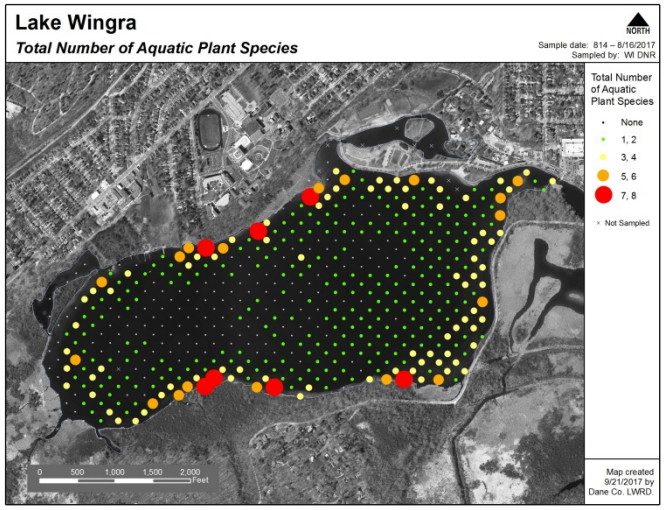
In each of these cases minnows may be transported in the amount of water needed to keep the minnows alive, up to 2 gallons. No other fish may be held in the minnow container.

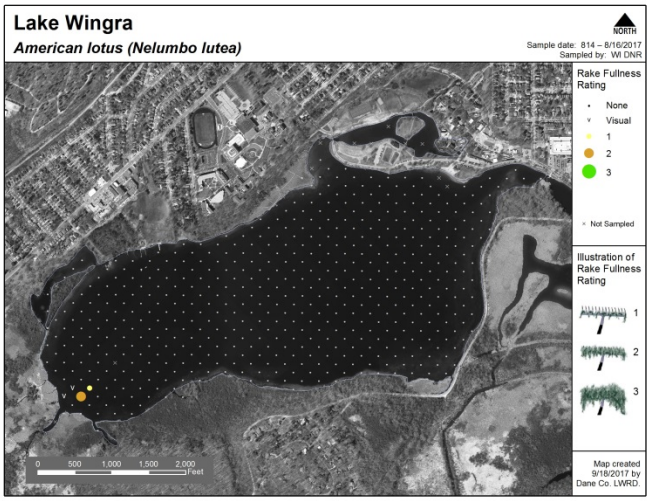
Additional Dane County Prevention Steps

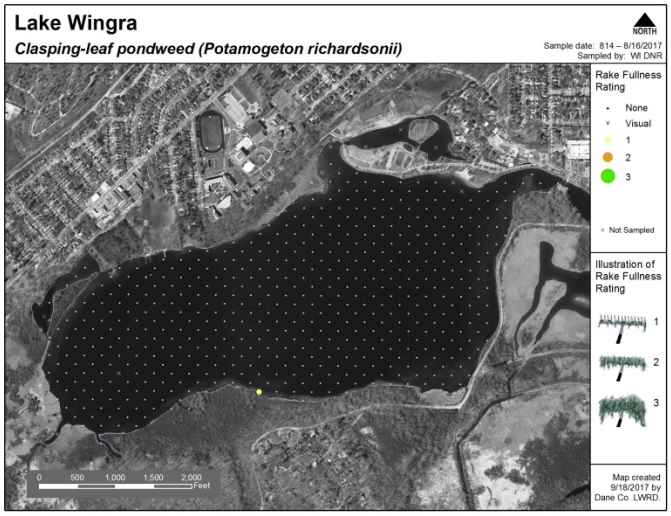
- Dane County staff will remove all vegetation, mud, and other debris that is accessible from the machines before moving them away from any waterbody. (Machines include boats, harvestors, barges, and elevators)
- Dane County staff will remove the machines from a waterbody for a minimum of five dry days before moving them to another waterbody.
- When it is not possible to wait for 5 days Dane County staff will use a 2% Virkon solution mixed no more than seven days prior to application and allowing 10 minutes of contact time before rinsing with hot water to disinfect the machines before moving to another waterbody.
- Dane County staff will try to plan to move only downstream when working in the Yahara river chain as an added layer of protection
- Per Wisconsin DNR protocol found here: http://dnr.wi.gov/topic/Invasives/disinfection.html

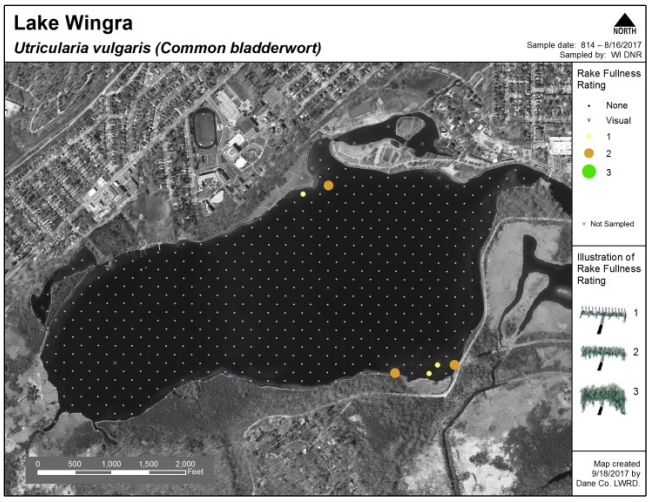
Appendix C – Mapped Aquatic Plant Distributions for Lake Wingra

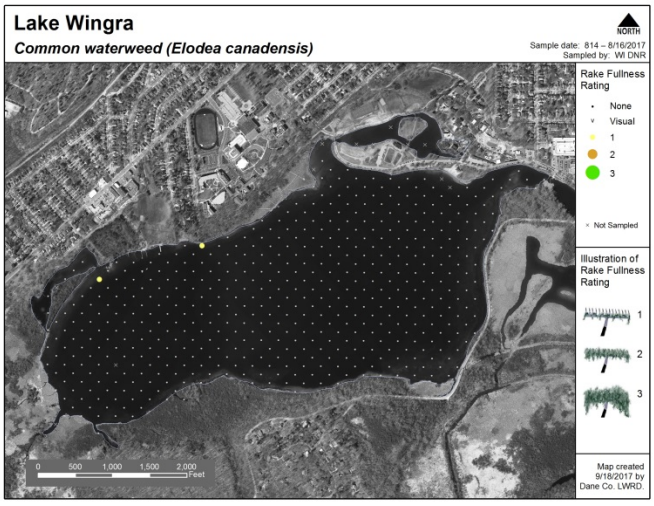


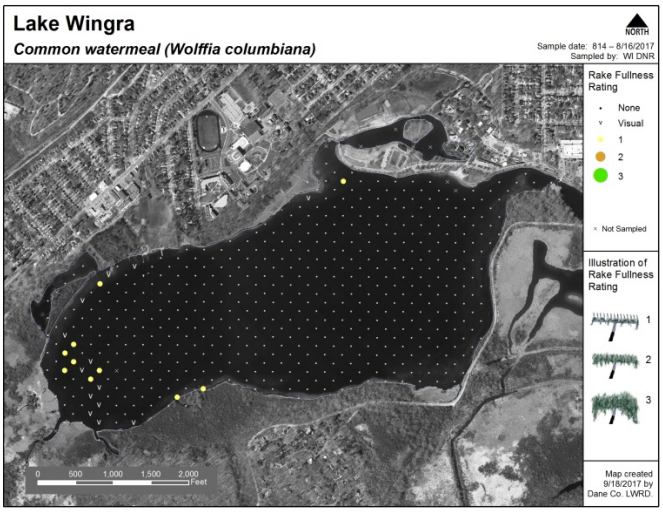


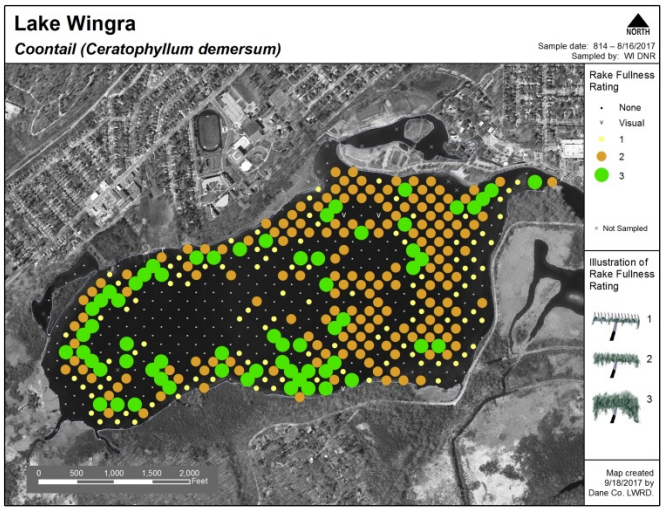


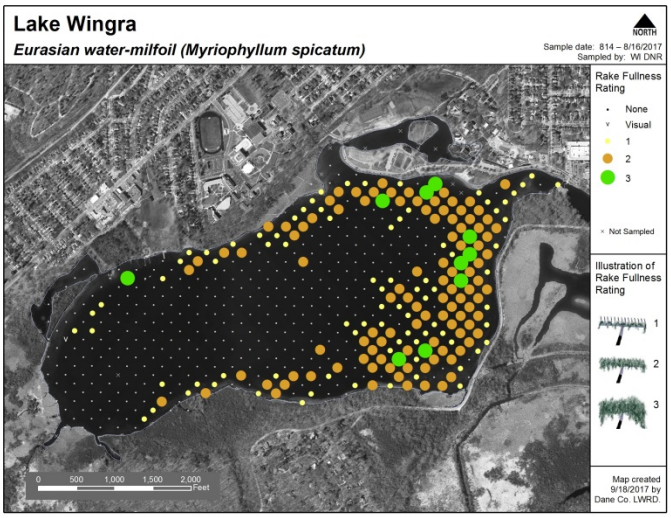


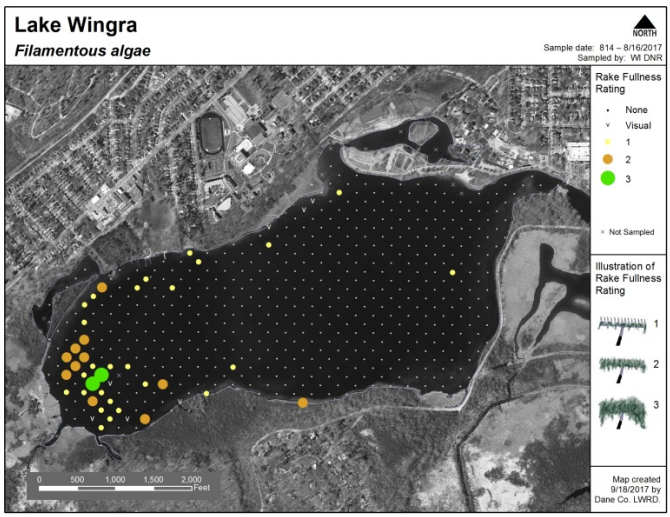


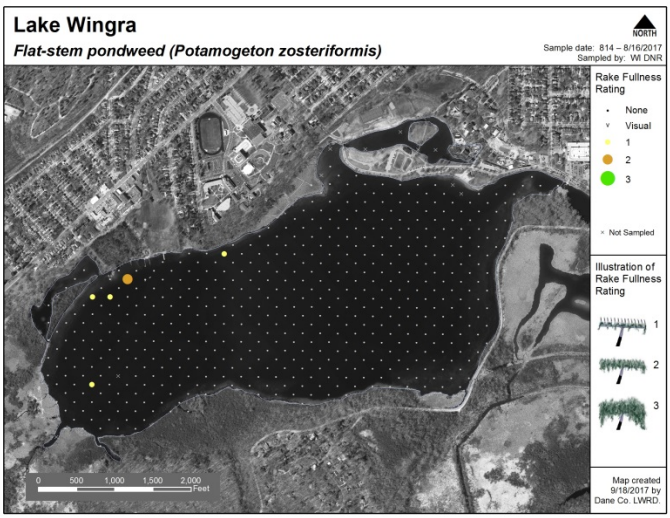


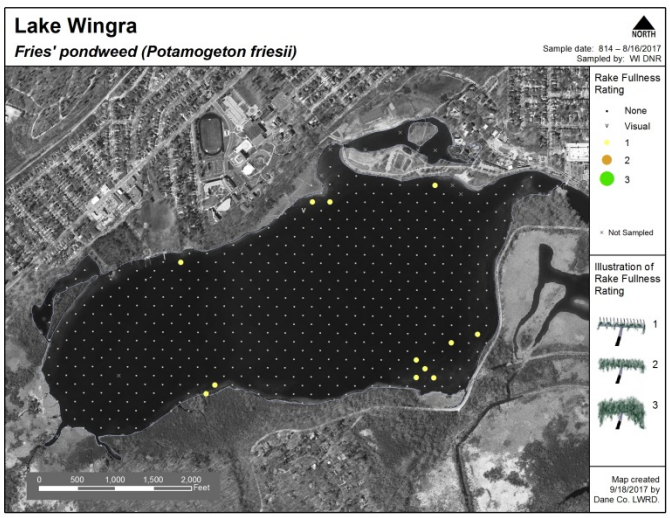

Lake Wingra
Common watermeal (Wolffia columbiana)
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

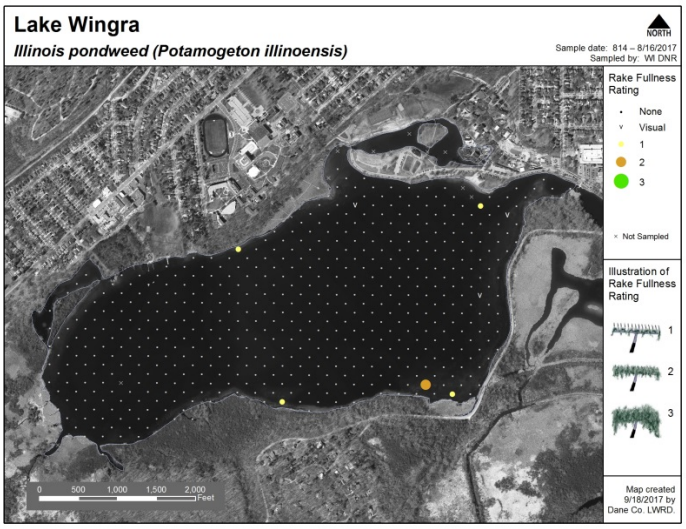

Lake Wingra
Coontail (Ceratophyllum demersum)
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

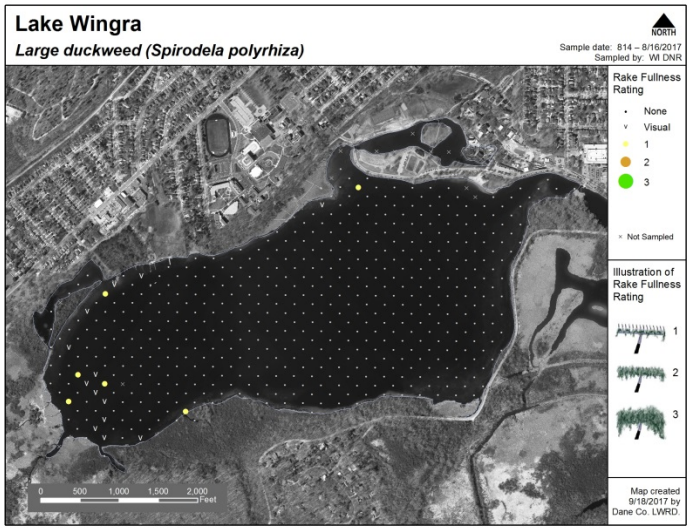

Lake Wingra
Eurasian water-milfoil (Myriophyllum spicatum)
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

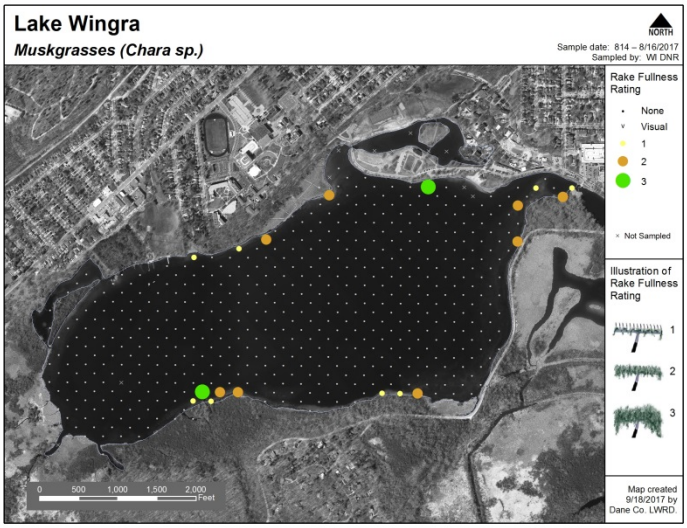

Lake Wingra
Filamentous algae
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

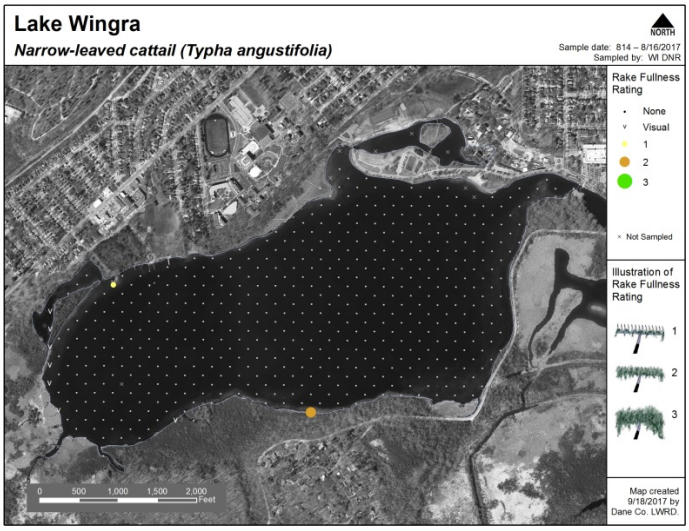

Lake Wingra
Flat-stem pondweed (Potamogeton zosteriformis)
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

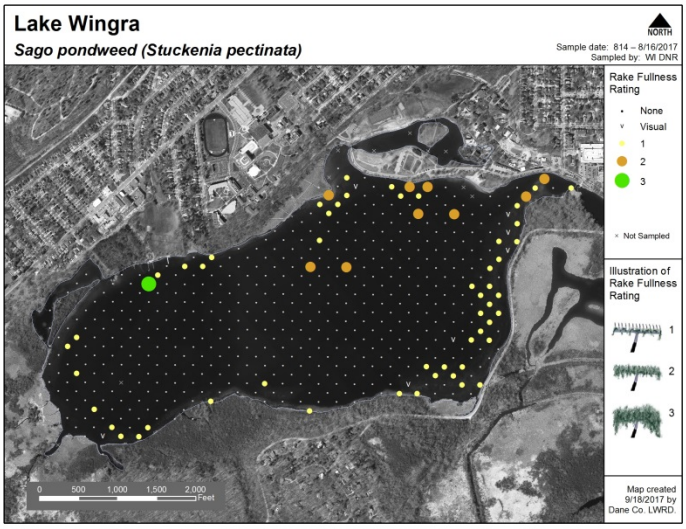

Lake Wingra
Fries' pondweed (Potamogeton friesii)
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

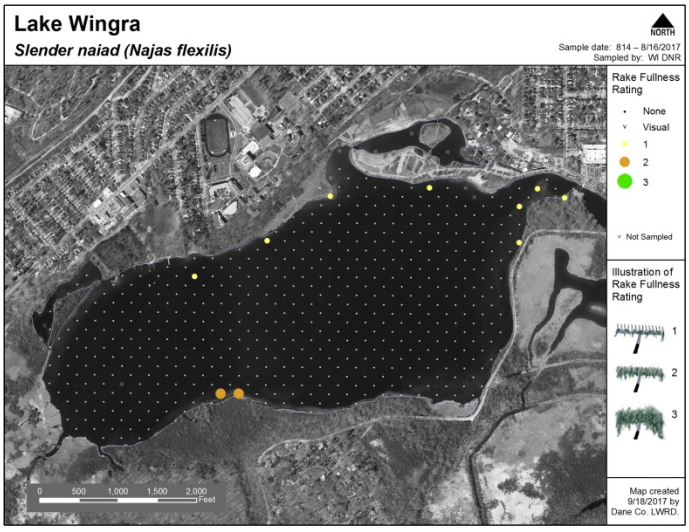

Lake Wingra
Illinois pondweed (Potamogeton illinoensis)
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
NORTH
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

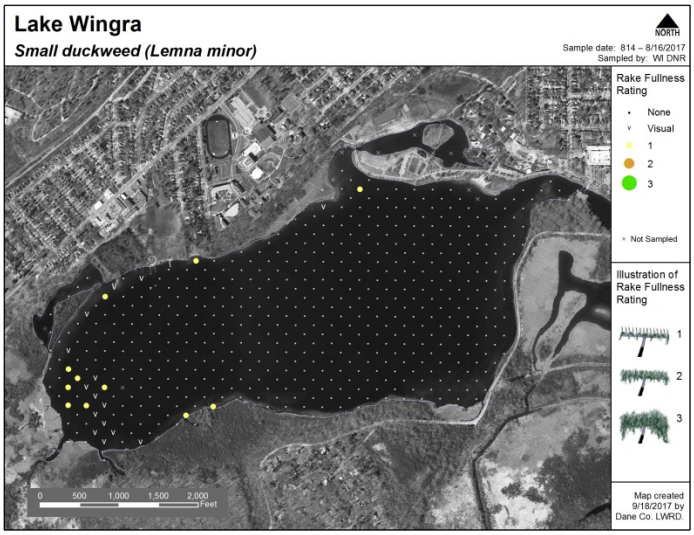

Lake Wingra
Large duckweed (Spirodela polyrhiza)
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
NORTH
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

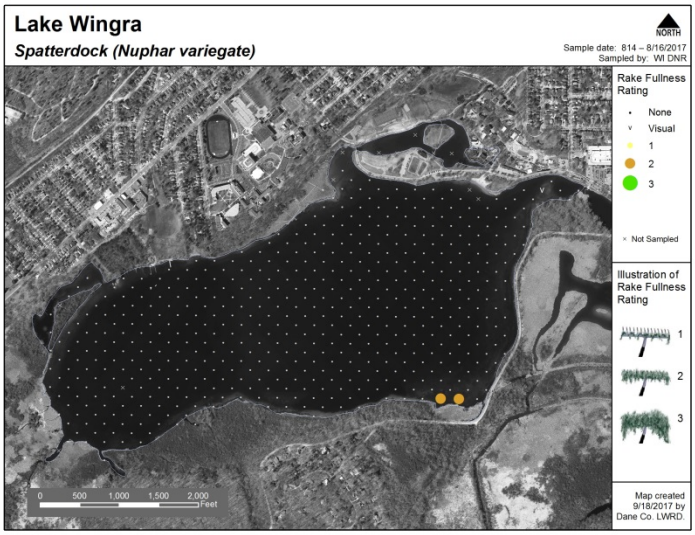

Lake Wingra
Muskgrasses (Chara sp.)
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
NORTH
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

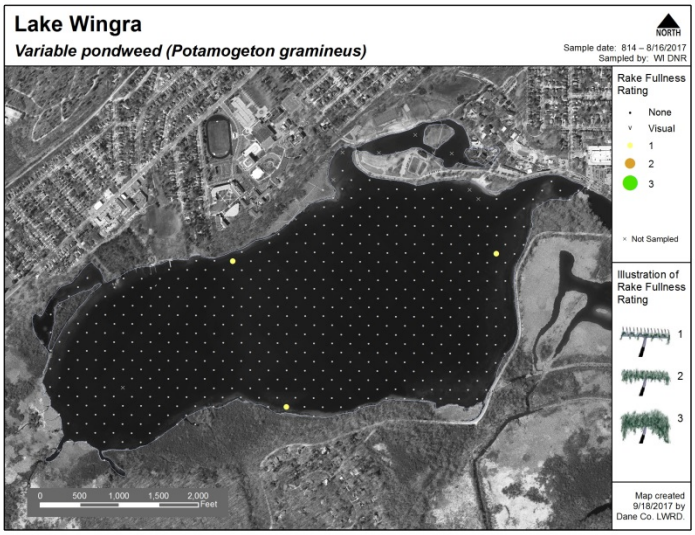

Lake Wingra
Narrow-leaved cattail (Typha angustifolia)
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
NORTH
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

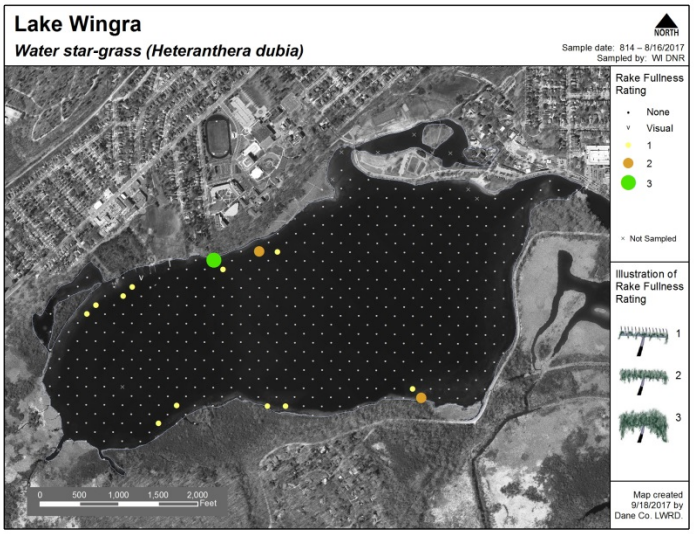

Lake Wingra
Sago pondweed (Stuckenia pectinata)
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
NORTH
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

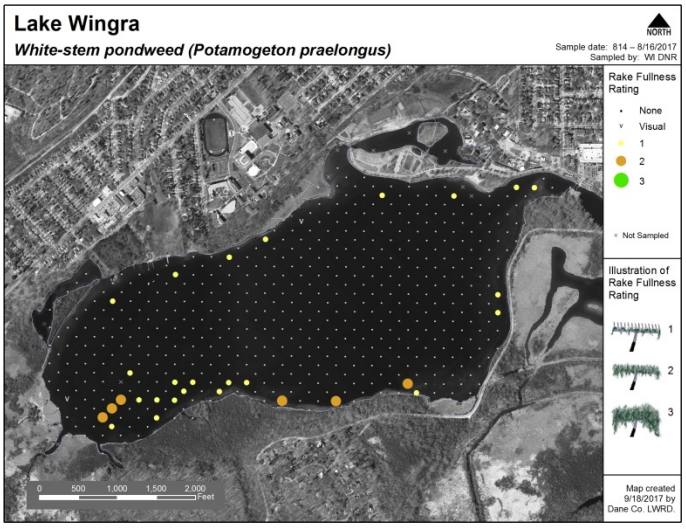

Lake Wingra
Slender naiad (Najas flexilis)
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
NORTH
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

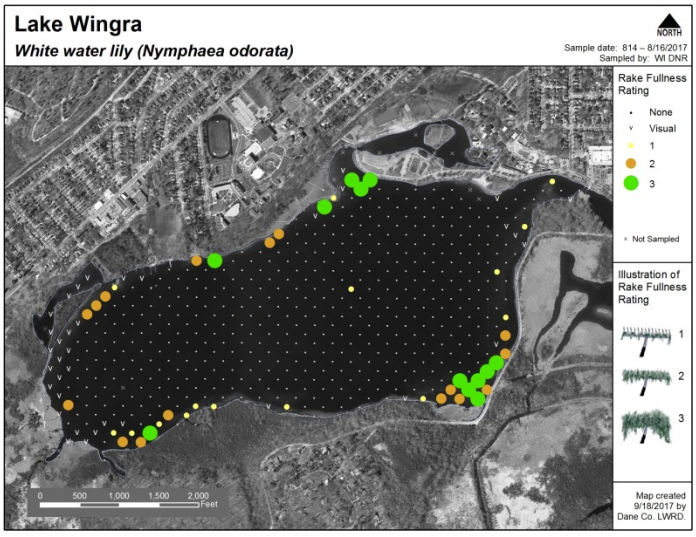

Lake Wingra
Small duckweed (Lemna minor)
NORTH
Sample date: 814 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.

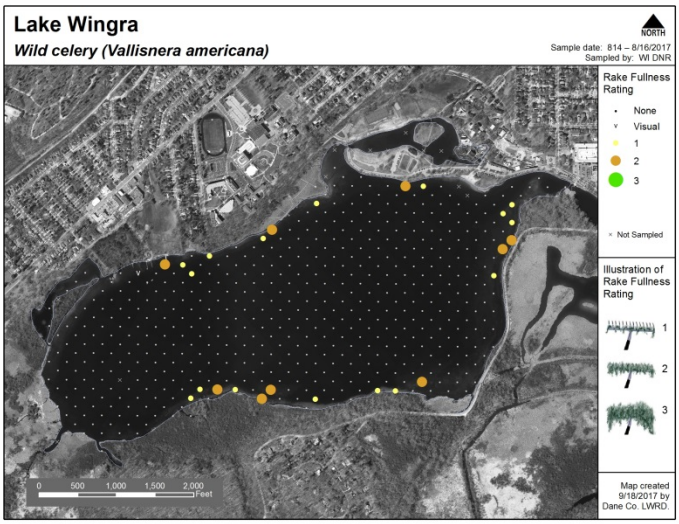

Lake Wingra
Spatterdock (Nuphar variegate)
NORTH
Sample date: 814 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.


Lake Wingra
Variable pondweed (Potamogeton gramineus)
NORTH
Sample date: 814 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.


Lake Wingra
Water star-grass (Heteranthera dubia)
NORTH
Sample date: 814 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.


Lake Wingra
White-stem pondweed (Potamogeton praelongus)
NORTH
Sample date: 814 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.


Lake Wingra
White water lily (Nymphaea odorata)
NORTH
Sample date: 814 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.


Lake Wingra
Wild celery (Vallisnera americana)
NORTH
Sample date: 8/14 – 8/16/2017
Sampled by: WI DNR
Rake Fullness Rating
None
Visual
1
2
3
Not Sampled
Illustration of Rake Fullness Rating
1
2
3
0 500 1,000 1,500 2,000 Feet
Map created 9/18/2017 by Dane Co. LWRD.