

A

APPENDIX A

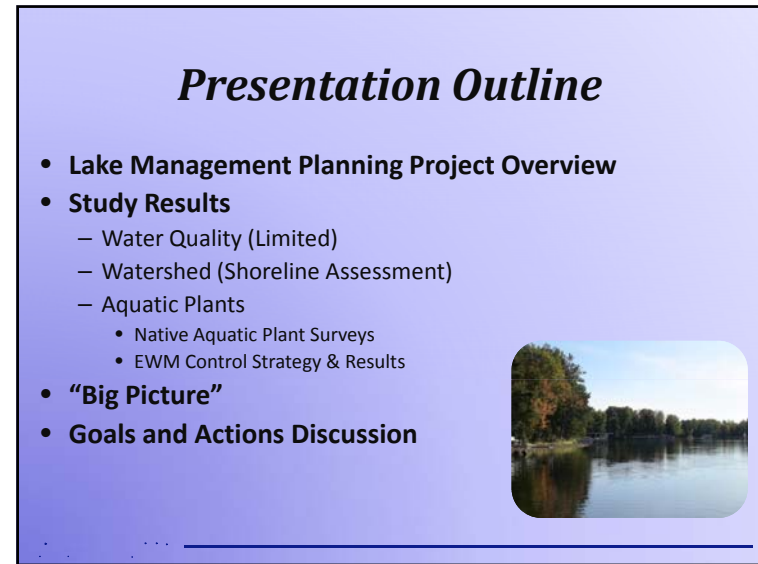
Public Participation Materials



City of Eagle River & Eagle River Silver Lake Association


Silver Lake
Early Detection and Response & Management Plan Update
Planning Meeting
July 7, 2011

Tim Hoyman, CLM
Onterra LLC
Lake Management Planning



Presentation Outline

- **Lake Management Planning Project Overview**
- **Study Results**
 - Water Quality (Limited)
 - Watershed (Shoreline Assessment)
 - Aquatic Plants
 - Native Aquatic Plant Surveys
 - EWM Control Strategy & Results
- **“Big Picture”**
- **Goals and Actions Discussion**



Study and Plan Goals

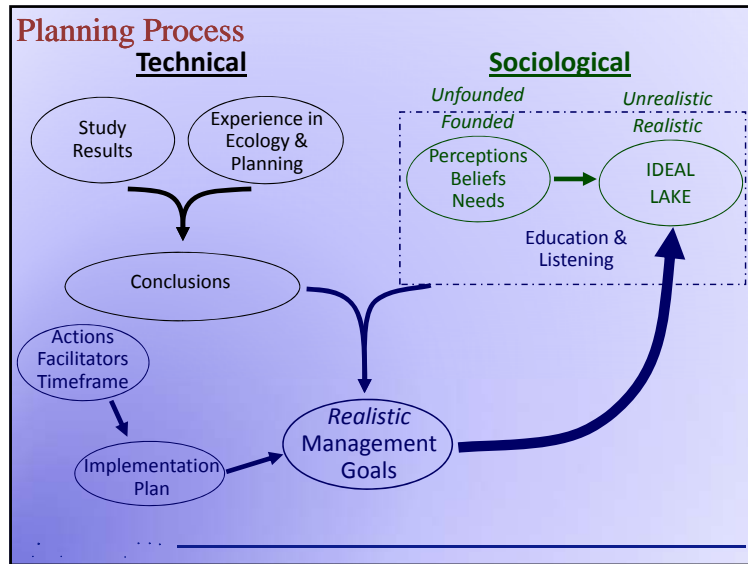
- Collect & Analyze Data
- Construct Updated & Useable Plan



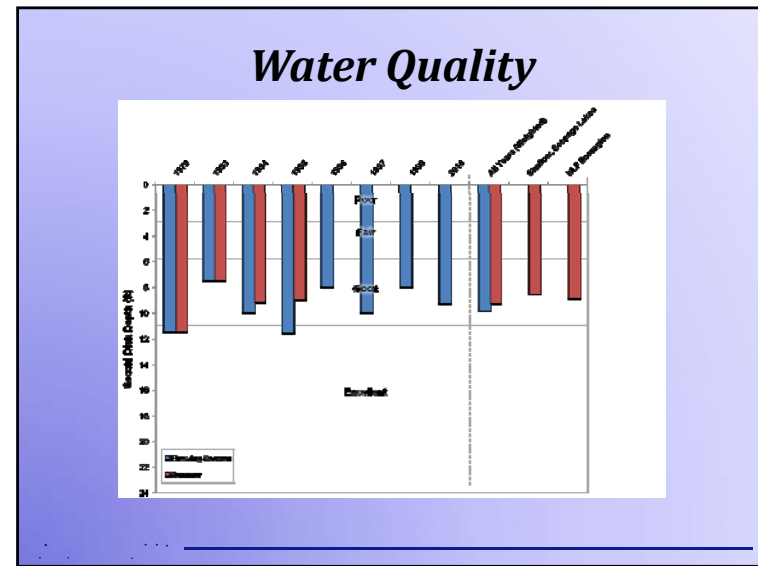
The Planning Process

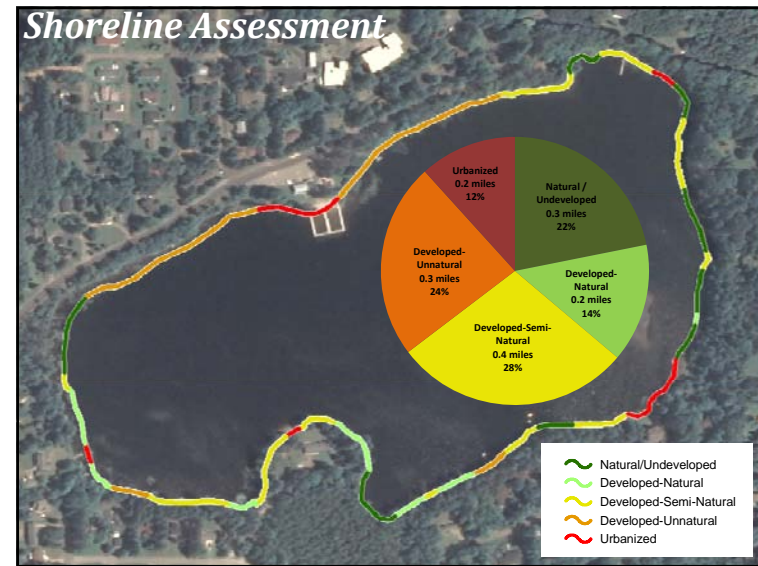
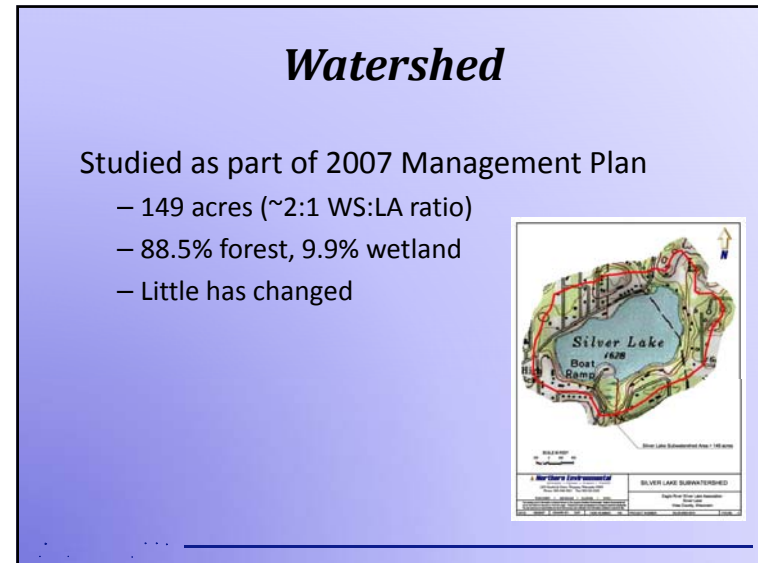
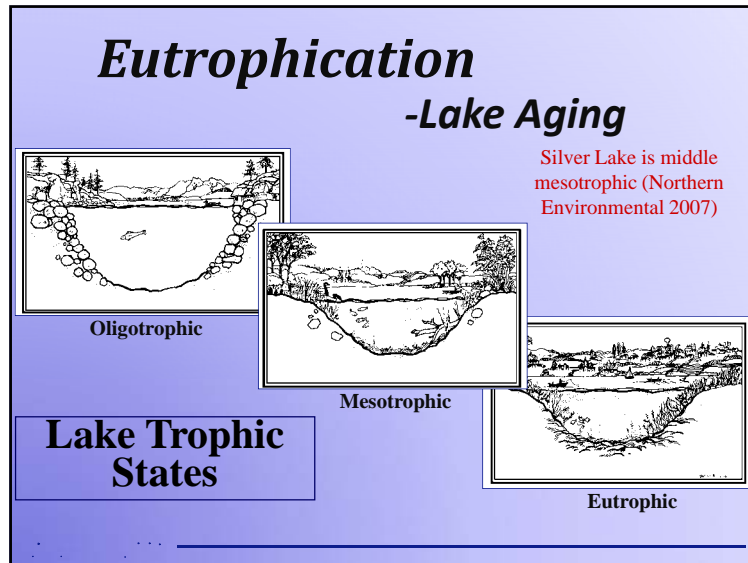
...it's not as easy as you may think.

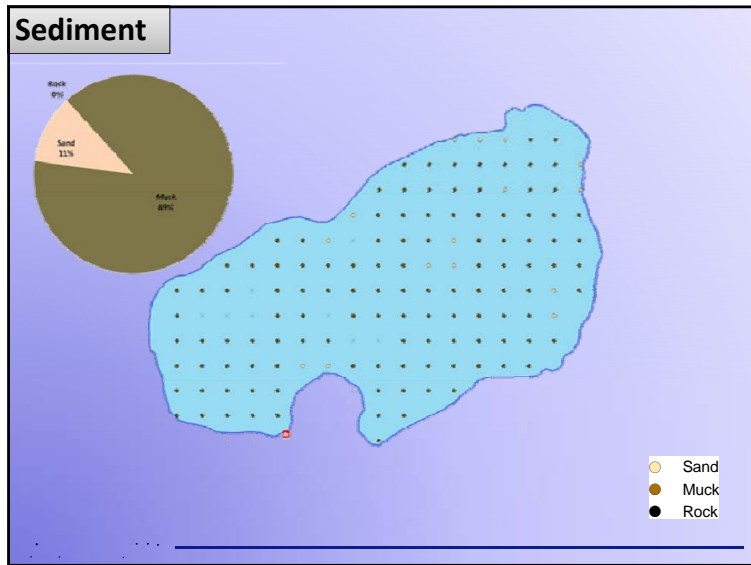
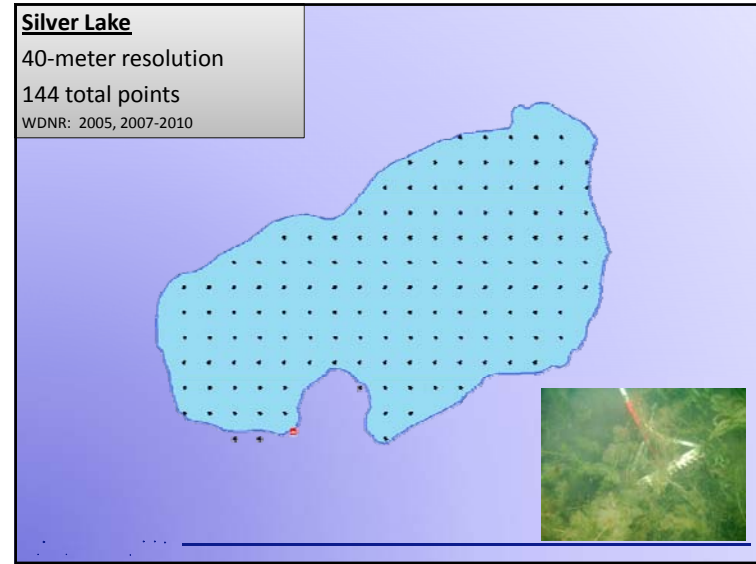




- ### Water Quality
- ↑ Phosphorus (Limiting Plant Nutrient)
 - ↑ Chlorophyll-*a* (Algal Abundance)
 - ↓ Water Clarity (Secchi Disk)





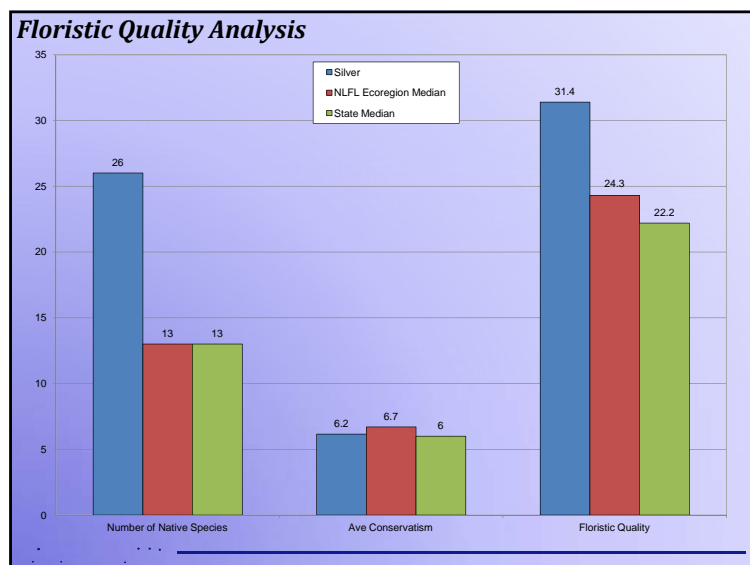
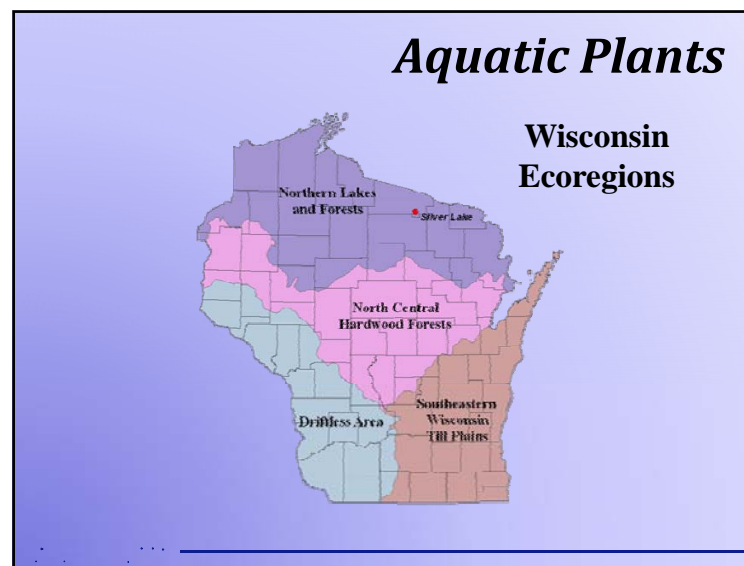
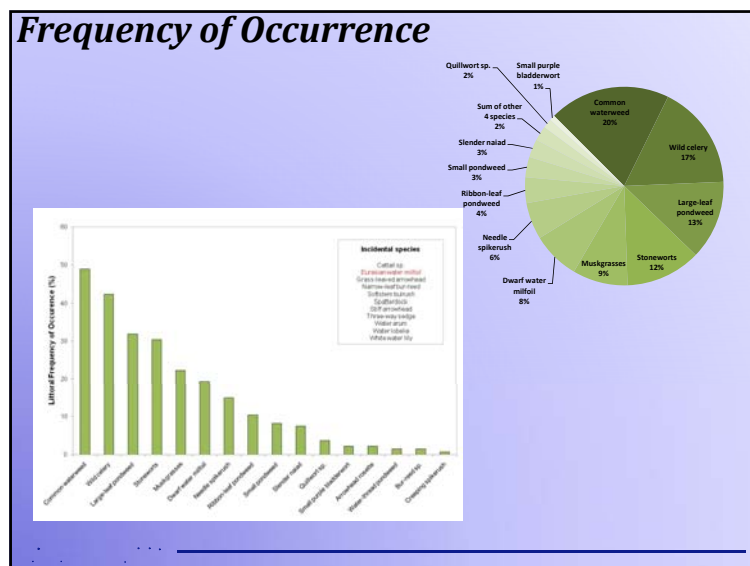


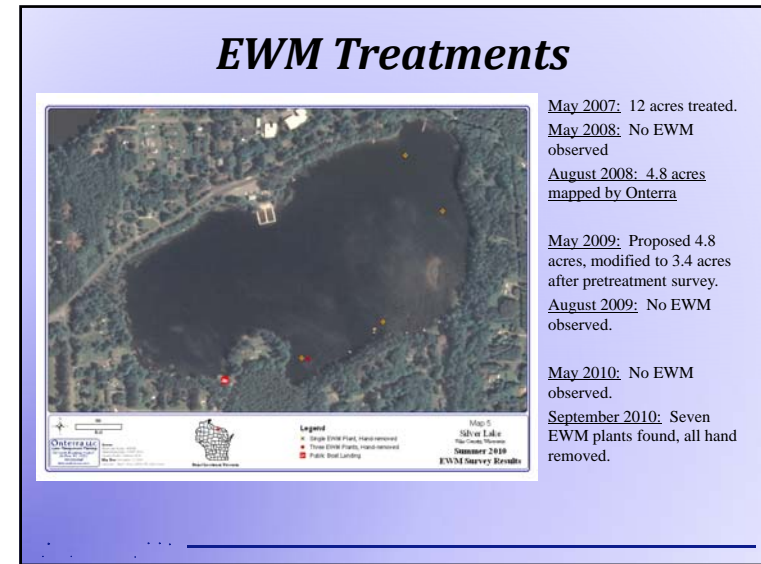
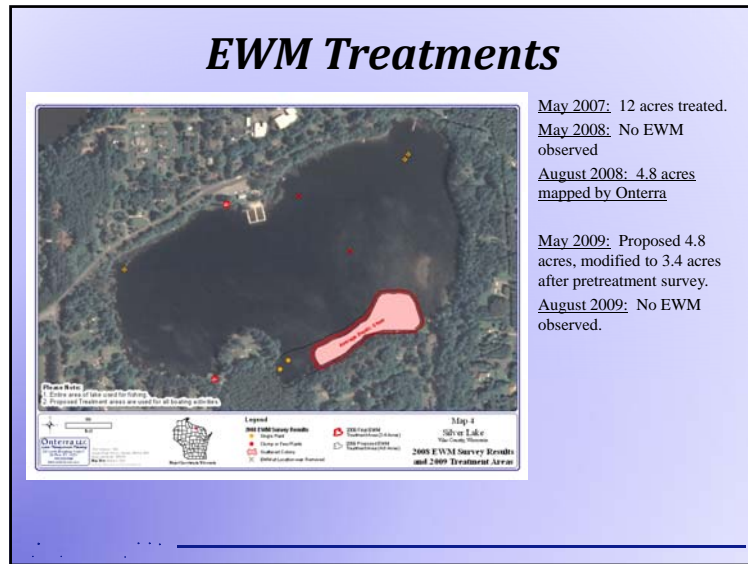
Species List

- 26 Native Species
- 2 Non-native Species
 - Eurasian water milfoil
 - Purple loosestrife

Life Form	Scientific Name	Common Name	Coefficient of Conservatism (c)
Emergent	<i>Calla palustris</i>	Water lily*	9
	<i>Dulichium arundinaceum</i>	Three-way sedge*	9
	<i>Elodea canadensis</i>	Creeping spikegrass*	8
	<i>Lyturus salsicans</i>	Purple loosestrife*	Exotic
	<i>Schoenoplectus tabernaemontani</i>	Softstem bulrush*	4
	<i>Sparganium sp.</i>	Bur-reed sp.	N/A
FL	<i>Najas sp.</i>	Cattail sp.*	1
	<i>Najas sp.</i>	Spatterdock*	6
FL/E	<i>Najas sp.</i>	White water lily*	6
	<i>Sparganium angustifolium</i>	Narrow-leaf bur-reed*	9
Submergent	<i>Chara sp.</i>	Muskgrasses	7
	<i>Elodea canadensis</i>	Common waterweed	3
	<i>Isocetes sp.</i>	"Duckfoot" sp.	N/A
	<i>Lobelia dortmanna</i>	Water lobelia*	10
	<i>Myriophyllum spicatum</i>	Eurasian water milfoil*	Exotic
	<i>Myriophyllum tenellum</i>	Desert water milfoil	10
	<i>Najas flexilis</i>	Slender reed	6
	<i>Najas sp.</i>	Stoneworts	7
	<i>Potamogeton diversifolius</i>	Water-thread pondweed	8
	<i>Potamogeton pusillus</i>	Small pondweed	7
	<i>Potamogeton ephedrus</i>	Ribbon-leaf pondweed	8
	<i>Potamogeton amplifolius</i>	Large-leaf pondweed	7
	<i>Sagittaria sp. (looseleaf)</i>	Arrowhead rosette	N/A
<i>Utricularia resupinate</i>	Small purple bladderwort	9	
<i>Vallisneria spiralis</i>	Wild celery	6	
W/SP	<i>Elodea canadensis</i>	Needle spikegrass*	5
	<i>Sagittaria arifolia</i>	Grass-leaved arrowhead*	9
	<i>Sagittaria rigida</i>	Stiff arrowhead*	8

FL/E = Floating Leaf and Emergent
FL = Floating Leaf
S/E = Submergent and Emergent
* = Incidental

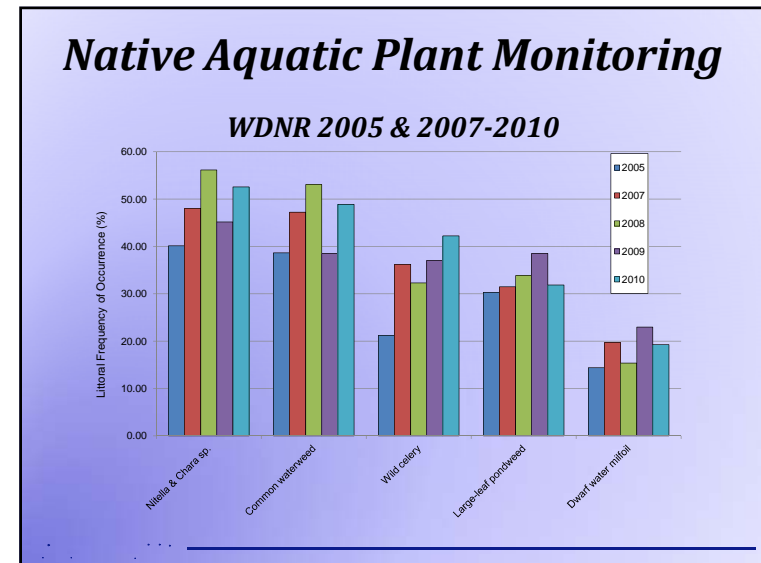




Native Aquatic Plant Monitoring

2008-2009

	Scientific Name	Common Name	2008 FOO	2009 FOO	Percent Change	Direction	Chi-square Analysis	
							Significance	p-value
Flots	<i>Myriophyllum spicatum</i>	Eurasian water milfoil	0.0	0.0	0.0	—	No	1.0000
	<i>Utricularia resupinata</i>	Small purple bladderwort	0.7	0.7	0.0	—	No	0.0895
	<i>Myriophyllum terrestre</i>	Dwarf water milfoil	13.9	21.5	55.0	▲	No	0.3165
	<i>Ceratophyllum demersum</i>	Cooktail	0.7	0.0	-100.0	▼	Yes	0.0019
	<i>Beccharis acicularis</i>	Needle spikegrass	2.8	12.5	350.0	▲	Yes	0.0424
	<i>Elodea canadensis</i>	Common waterweed	47.9	36.1	-24.8	▼	Yes	0.0265
	<i>Najas flexilis</i>	Slender naiad	14.8	6.9	-52.4	▼	Yes	0.0440
	<i>Potamogeton spirillus</i>	Spiral-fruited pondweed	2.8	0.0	-100.0	▼	No	0.2571
	<i>Potamogeton ephedrus</i>	Ribbon-leaf pondweed	5.6	9.0	62.5	▲	No	0.4263
	<i>Isotetes</i> sp.	Quillwort species	4.2	6.3	50.0	▲	No	0.3120
Non-flots	<i>Vallisneria spiralis</i>	Wild celery	29.2	34.7	19.0	▲	No	0.3173
	<i>Potamogeton amplifolius</i>	Large-leaf pondweed	30.5	36.1	18.2	▲	No	0.7384
	<i>Chara</i> sp.	Muskgrasses	13.9	15.3	10.0	▲	No	1.0000
	<i>Potamogeton pusillus</i>	Small pondweed	2.8	2.8	0.0	—	No	1.0000
	<i>Sagittaria rigida</i>	Stiff arrowhead	1.4	1.4	0.0	—	No	0.0768
	<i>Najas</i> sp.	Stones-orts	36.9	27.1	-26.4	▼	No	0.3165
	<i>Lobelia dortmanna</i>	Water lobelia	0.7	0.0	-100.0	▼	No	0.3165
	<i>Elatine minima</i>	Waterwort	0.7	0.0	-100.0	▼	No	0.3165
	<i>Beccharis palustris</i>	Creeping spikegrass	0.7	0.0	-100.0	▼	No	0.3165
	<i>Sparganium angustifolium</i>	Narrow-leaf bur-reed	0.7	0.0	-100.0	▼	No	0.3165





Conclusions

- Water quality data is minimal.
 - Volunteers need to enroll in Advanced CLMN when opportunity arises.
- Overall watershed is in great condition.
 - Land cover exports minimal phosphorus.
 - Largest, *controllable* contributor is likely shoreland properties.
 - Suggest remediation of urbanized and unnatural-developed shorelines.
- Aquatic plant community
 - Based upon standard analysis, native community is of moderately high quality
 - Eurasian water milfoil control program has been successful and has met expectations. Continued monitoring necessary.

Thank You

.....

Many of the graphics used in this presentation were supplied by:

Wisconsin Lakes Partnership ERM Extension WISCONSIN DEPT. OF NATURAL RESOURCES

B

APPENDIX B

WDNR 2010 Aquatic Plant Survey Data

Point Number	Latitude	Longitude	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)		Notes	Chara sp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Myriophyllum tenellum	Najas flexilis	Nitella sp.	Potamogeton amplifolius	Potamogeton ephedrus	Potamogeton pusillus	Sagittaria sp. (rosette)	Utricularia resupinata	Vallisneria americana	Sparganium sp.	Isoetes sp.	Potamogeton diversifolius	Aquatic moss	Filamentous algae
1	45.92152049	-89.24215536	4	M	P				1	2					1				1					
2	45.92116050	-89.24216026	12	M	P		2																	
3	45.92080051	-89.24216516	11	M	P				2			1												
4	45.92044053	-89.24217006	6	M	P				2			1		2				2						
5	45.92008054	-89.24217496	3	M	P					2									1					
6	45.91972055	-89.24217986	1	M	P				1						1	1								
7	45.92151707	-89.24163955	12	M	P		2																	
8	45.92115708	-89.24164446	18		R							1												
9	45.92079709	-89.24164936	16	M	P				1			2												
10	45.92043710	-89.24165426	8	M	P				2			1	1											
11	45.92007712	-89.24165917	8	M	P				1			1	1	1										
12	45.91971713	-89.24166407	4	M	P					1														
13	45.92187363	-89.24111884	6	M	P				1			1		1	1									
14	45.92151364	-89.24112374	15	M	P				2			1												
15	45.92115365	-89.24112865	18		R																			
16	45.92079367	-89.24113356	15	M	P				2															
17	45.92043368	-89.24113847	13	M	P				2															
18	45.92007369	-89.24114338	11	M	P				2				2											
19	45.91971371	-89.24114828	7	M	P		1		1					2	1									
20	45.91935372	-89.24115319				Terrestrial																		
21	45.92187020	-89.24060303	12	M	P		2		1															
22	45.92151021	-89.24060794	17		R							1												
23	45.92115023	-89.24061285	18		R																			
24	45.92079024	-89.24061776	15	M	P				1															
25	45.92043025	-89.24062267	14	M	P		2		1															
26	45.92007027	-89.24062758	12	M	P		1		1															
27	45.91971028	-89.24063249	9	M	P		1		1	1				1										
28	45.91935029	-89.24063741				Terrestrial																		
29	45.92222676	-89.24008230	6	M	P				1			1	2	1										
30	45.92186677	-89.24008722	11	M	P		1		2				1											

Point Number	Latitude	Longitude	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Notes	Chara sp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Myriophyllum tenellum	Najas flexilis	Nitella sp.	Potamogeton amplifolius	Potamogeton ephedrus	Potamogeton pusillus	Sagittaria sp. (rosette)	Utricularia resupinata	Vallisneria americana	Sparganium sp.	Isoetes sp.	Potamogeton diversifolius	Aquatic moss	Filamentous algae
31	45.92150679	-89.24009213	15	M	P								1											
32	45.92114680	-89.24009705	16	M	P																			
33	45.92078681	-89.24010196	15	M	P				2															
34	45.92042682	-89.24010688	16	M	P								1											
35	45.92006684	-89.24011179	9	M	P				2															
36	45.91970685	-89.24011671	2	M	P		1		1	1											1		1	
37	45.92222333	-89.23956649	7	M	P				1					1					2					
38	45.92186334	-89.23957141	10	M	P		1							2										
39	45.92150335	-89.23957633	14	M	P		2			2														
40	45.92114337	-89.23958125	17	M	R				1							1								
41	45.92078338	-89.23958616	16	M	P								1											
42	45.92042339	-89.23959108	8	S	P					1												1		
43	45.92221989	-89.23905068	5	S	P					1														
44	45.92185991	-89.23905560	10	M	P		2							1										
45	45.92149992	-89.23906052	14	M	P				2															
46	45.92113993	-89.23906544	20		R																			
47	45.92077995	-89.23907036	16	M	R				1															
48	45.92041996	-89.23907529	5	S	P					1												1		
49	45.92257645	-89.23852994	0	S	P			1	2								1							
50	45.92221646	-89.23853487				Swim Area																		
51	45.92185647	-89.23853979	10	M	P		2							2										
52	45.92149649	-89.23854472	15	M	P		2		1															
53	45.92113650	-89.23854964	17	M	R								1											
54	45.92077651	-89.23855457	21		R																			
55	45.92041652	-89.23855949	10	M	P				2															
56	45.92005654	-89.23856441				Terrestrial																		
57	45.92293299	-89.23800920	3	M	P				2								V		1			V		
58	45.92257301	-89.23801413	5	M	P			2				1			1									
59	45.92221302	-89.23801905	6	M	P				2					2										
60	45.92185303	-89.23802398	11	M	P		2							2	1									

Point Number	Latitude	Longitude	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Notes	Chara sp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Myriophyllum tenellum	Najas flexilis	Nitella sp.	Potamogeton amplifolius	Potamogeton ephedrus	Potamogeton pusillus	Sagittaria sp. (rosette)	Utricularia resupinata	Vallisneria americana	Sparganium sp.	Isoetes sp.	Potamogeton diversifolius	Aquatic moss	Filamentous algae
61	45.92149305	-89.23802891	13	M	P					2														
62	45.92113306	-89.23803384	14	M	P		2			1														
63	45.92077307	-89.23803877	20		R																			
64	45.92041309	-89.23804369	16	M	P								1											
65	45.92005310	-89.23804862	9	M	P								1						2					
66	45.91969311	-89.23805355	5	M	P		1												2				1	
67	45.91933313	-89.23805848	2	M	P							V			V		V		1			V		
68	45.92328954	-89.23748845	3	M	P					1									1	V				
69	45.92292955	-89.23749338	5	M	P			1		1	2					1								
70	45.92256957	-89.23749831	6	M	P					1			2	2	1				2					
71	45.92220958	-89.23750324	7	M	P		1			1				1					2					
72	45.92184959	-89.23750817	8	M	P		1							2					2					
73	45.92148961	-89.23751310	11	M	P		2			1				1										
74	45.92112962	-89.23751804	13	M	P		2			2														
75	45.92076963	-89.23752297	16	M	P								1											
76	45.92040965	-89.23752790	15	M	P					2			1	1		1								
77	45.92004966	-89.23753283	10	M	P					2				1					2					
78	45.91968967	-89.23753776	4	M	P					1									2					
79	45.92328610	-89.23697262	4	M	P						1													
80	45.92292611	-89.23697756	5	M	P			1				1	1			1			2					
81	45.92256612	-89.23698249	7	M	P								1	2		1			2					
82	45.92220614	-89.23698743	7	M	P		1			1		1							2					
83	45.92184615	-89.23699236	5	S	P		1				1			V					1		1			
84	45.92148616	-89.23699730	6	M	P					1			1	2					2					
85	45.92112618	-89.23700223	10	M	P		2																	
86	45.92076619	-89.23700717	13	M	P			1		2						1								
87	45.92040620	-89.23701210	11	M	P					2			1	1										
88	45.92004622	-89.23701704	8	M	P					2			1						1					
89	45.92364264	-89.23645186	1	S	P														1					
90	45.92328265	-89.23645680	5	M	P		1									1	1							

Point Number	Latitude	Longitude	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)	Rope (R); Pole (P); Visual (V)	Notes	Chara sp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Myriophyllum tenellum	Najas flexilis	Nitella sp.	Potamogeton amplifolius	Potamogeton ephedrus	Potamogeton pusillus	Sagittaria sp. (rosette)	Utricularia resupinata	Vallisneria americana	Sparganium sp.	Isoetes sp.	Potamogeton diversifolius	Aquatic moss	Filamentous algae
91	45.92292266	-89.23646174	6	M	P									1										
92	45.92256268	-89.23646668	6	M	P		1							1					2					
93	45.92220269	-89.23647162	4	S	P					2														
94	45.92184270	-89.23647656	5	S	P		1			1								1						
95	45.92148272	-89.23648149	6	M	P				2			2	1											
96	45.92112273	-89.23648643	11	M	P		1		2				2											
97	45.92076274	-89.23649137	11	M	P				1				1											
98	45.92040276	-89.23649631	9	M	P								1						2					
99	45.92004277	-89.23650125	4	M	P		1	1											1					
100	45.92363919	-89.23593604	2	S	P				1															
101	45.92327920	-89.23594098	5	M	P		1												1					
102	45.92291922	-89.23594592	6	M	P				1			1	2						2					
103	45.92255923	-89.23595086	7	M	P								1	1					2					
104	45.92219924	-89.23595581	5	M	P						1	1							2				1	
105	45.92183926	-89.23596075	6	M	P								1						1			1		
106	45.92147927	-89.23596569	10	M	P									1										
107	45.92111928	-89.23597063	11	M	P		2																	
108	45.92075930	-89.23597557	9	M	P				2			1	2						2					
109	45.92039931	-89.23598051	6	M	P		1												1					
110	45.92363574	-89.23542021	3	S	P					1									1					
111	45.92327575	-89.23542516	5	M	P								1						1					
112	45.92291577	-89.23543010	5	S	P								2	1					2					
113	45.92255578	-89.23543505	5	M	P			1				1							2					
114	45.92219579	-89.23543999	5	M	P			2											1					
115	45.92183581	-89.23544494	8	M	P								1	2					2					
116	45.92147582	-89.23544988	10	M	P								1	1										
117	45.92111583	-89.23545483	8	M	P				2				2	2					1					
118	45.92075585	-89.23545977	7	M	P								1						2					
119	45.92039586	-89.23546472	4	M	P			1	1		1	1							1					
120	45.92363229	-89.23490439	5	M	P			2	1		2				2				2					

Point Number	Latitude	Longitude	Depth (ft)	Sediment type (M=muck, S=Sand, R=Rock)		Notes	Chara sp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Myriophyllum tenellum	Najas flexilis	Nitella sp.	Potamogeton amplifolius	Potamogeton epiphydrus	Potamogeton pusillus	Sagittaria sp. (rosette)	Utricularia resupinata	Vallisneria americana	Sparganium sp.	Isoetes sp.	Potamogeton diversifolius	Aquatic moss	Filamentous algae
121	45.92327230	-89.23490934	6	M	P				2		1		2											
122	45.92291231	-89.23491429	6	M	P								1	1				2						
123	45.92255233	-89.23491923	6	M	P							2	1					2						
124	45.92219234	-89.23492418	6	M	P				1			1	1					2						
125	45.92183235	-89.23492913	8	M	P		2						2					2						
126	45.92147237	-89.23493408	4	M	P				1															
127	45.92111238	-89.23493903	4	M	P			2						1				2						
128	45.92075240	-89.23494398	5	M	P			1	1									1						
129	45.92039241	-89.23494892	4	M	P			1	1	1	1	1						2			1			
130	45.92362883	-89.23438856	3	M	P				1									1						
131	45.92326885	-89.23439352	5	M	P				1			1		1				1						
132	45.92290886	-89.23439847	4	M	P				1				2					1						
133	45.92254887	-89.23440342	6	M	P								1					2						
134	45.92218889	-89.23440837	6	M	P				1			1	2					2						
135	45.92182890	-89.23441332	5	M	P		2											2						
136	45.92146891	-89.23441827	0	S	P													1						
137	45.92110893	-89.23442323	1	S	P				1															
138	45.92074894	-89.23442818	3	M	P			2	1	1								2		1				
139	45.92326539	-89.23387769	2	S	P				1									1						
140	45.92290540	-89.23388265	1	S	P																			
141	45.92254542	-89.23388760	3	M	P			1		1							V	1						
142	45.92218543	-89.23389256	4	M	P				1	1								1						
143	45.92182544	-89.23389751	4	M	P			1	1	1								2						
144	45.92146546	-89.23390247	3	M	P			1	1	1				1				1						

