



Lake Osakis Curlyleaf Pondweed, June 16, 2025

Curlyleaf Pondweed Delineation and Assessment in Lake Osakis, Douglas and Todd Counties, Minnesota

Curlyleaf Pondweed Delineation: April 21, 2025
Curlyleaf Pondweed Treatment: May 6, 2025 (67.01 acres)
Curlyleaf Pondweed Assessment: June 16, 2025

Prepared for:
Osakis Lake Association



July 9, 2025

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Curlyleaf Pondweed Delineation and Assessment in Lake Osakis, Douglas and Todd Counties, Minnesota

Size: 6,389 acres
Littoral area: 3,389 acres
Maximum depth: 73 feet

Overview

Lake Osakis is located within Douglas and Todd Counties. A meandering survey in 2025 was used to characterize the status of curlyleaf pondweed. A total of 877 sites were sampled. Curlyleaf pondweed was sampled at 210 sites out of 877 sites on the April 21, 2025 delineation survey. Fourteen areas of projected heavy growth totaling 67.01 acres were delineated for treatment. A curlyleaf pondweed treatment was conducted on May 6, 2025. A second meandering survey was conducted on June 16, 2025 to evaluate curlyleaf pondweed growth.

Methods

Nearshore Meander Survey Used in April and June: A meandering survey was conducted using a meandering path around the entire lake. At each sample point, plants were sampled with a rake sampler.

Curlyleaf Pondweed Delineation: At the time of the spring curlyleaf delineation in April, only a fraction of the peak curlyleaf biomass is present compared to what could be present in June, at its peak. Therefore, CLP growth surveyed in April is delineated prior to curlyleaf developing peak biomass.

Predicting curlyleaf growth at its peak abundance in June is based on curlyleaf stem counts on a rake sampled in April. After a short sweep of about 1-foot (which samples about 0.1 m²), if one or two stems (10-20 stems/m²) were collected on the rake sweep, it was predicted that this area would produce only future light growth at its peak and was not delineated for treatment. Alternatively, sites where 3 stems (30 stems/m²) were collected per rake sample future potential growth was considered to be moderate. However, 4 curlyleaf stems (40 stems/m²) or more per rake sample generally indicated some plants had developed runners and would likely produce heavy growth in the next few weeks and this site would be marked for potential treatment. Curlyleaf at heavy growth can have stem densities of 400 stems/m² or greater. This early season survey method used for determining curlyleaf pondweed spot herbicide treatments is similar to the methodology published in a peer reviewed journal (McComas et al, 2015)*.

Rake Sample	Early Season Density (stems/m ²)	Potential Future Growth	Map Color Code
1-2 stems	10-20 stems/m ²	Light	Green
3 stems	30 stems/m ²	Moderate	Yellow
4+ stems	40+ stems/m ²	Heavy	Red

*McComas, S.R., Y.E. Christianson, and U. Singh. 2015. Effects of curlyleaf pondweed control on water quality and coontail abundance in Gleason Lake, Minnesota. *Lake and Reservoir Management*, 31:109–114.
<https://doi.org/10.1080/10402381.2015.1014583>

Results

Curlyleaf Pondweed Delineation Results: On April 21, 2025 a curlyleaf pondweed delineation survey sampled 877 sites (Figure 1). Curlyleaf pondweed was growing most frequently in 4-12 feet of water and was found at 210 out of 877 sample sites. Fourteen areas of projected heavy growth totaling 67.01 acres were delineated for treatment (Figure 2).

2025 Lake Osakis Curlyleaf Pondweed Delineation
April 21, 2025

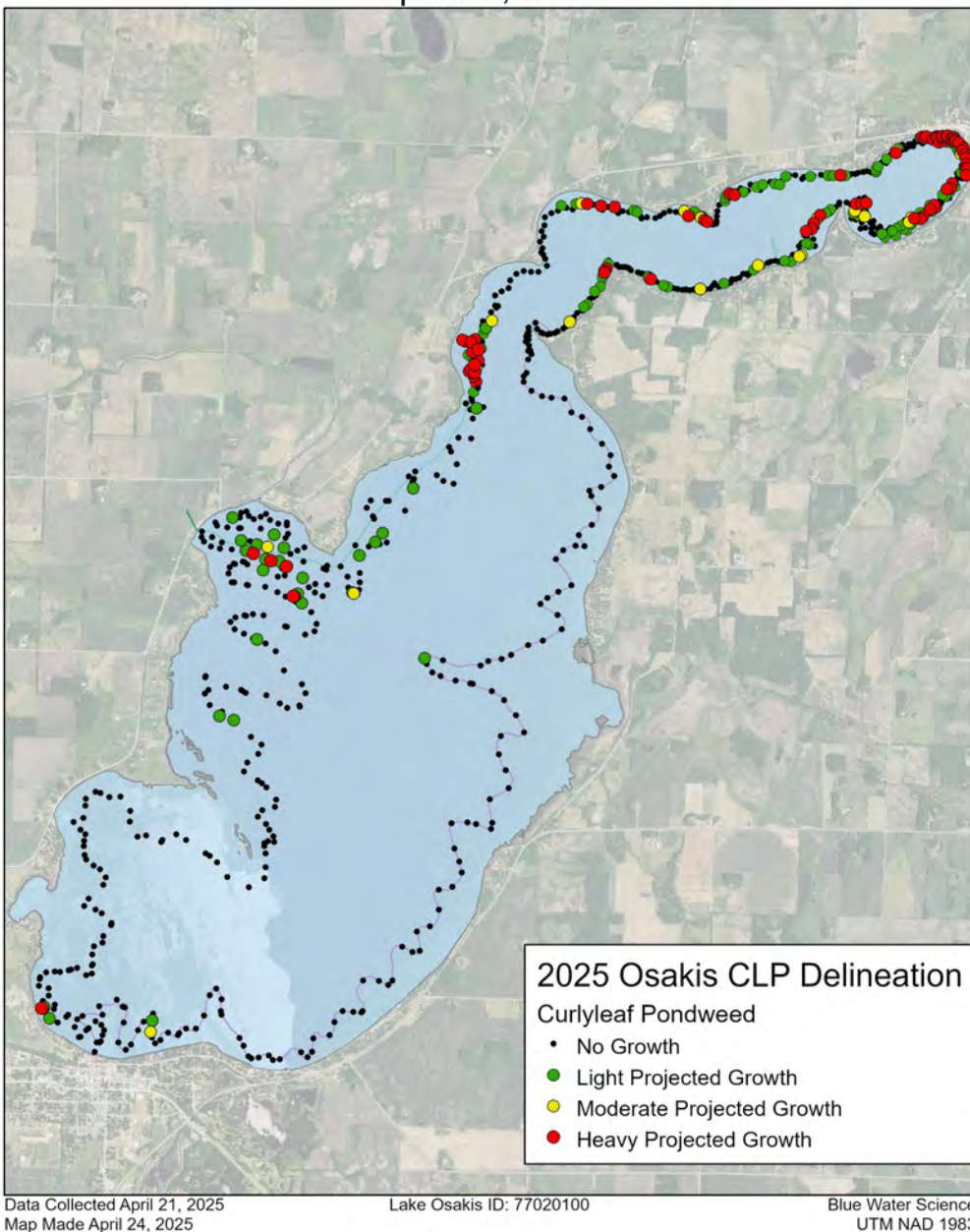


Figure 1. Lake Osakis sample sites and tracks around Lake Osakis on April 21, 2025.

2025 Lake Osakis Curlyleaf Pondweed Treatment Areas

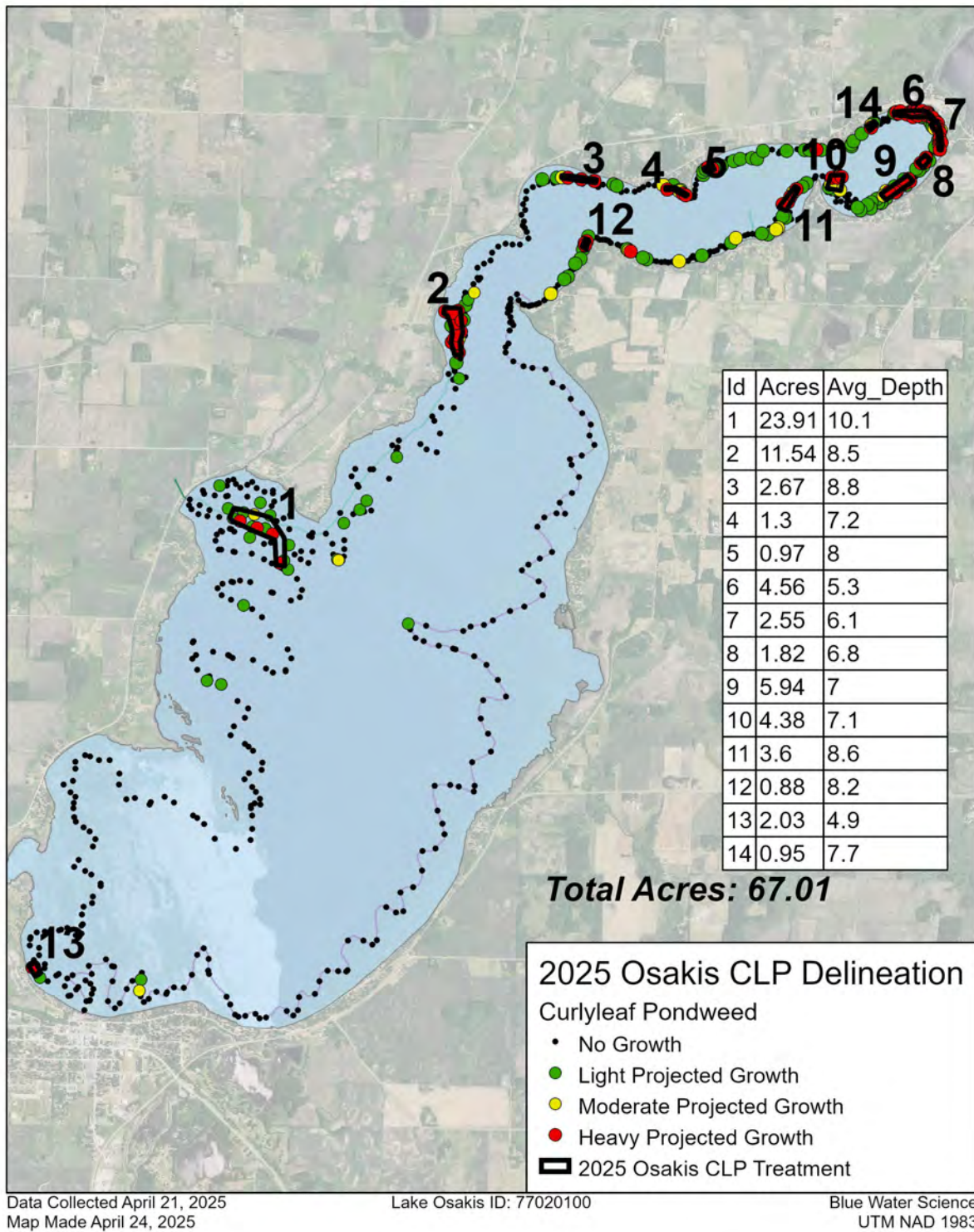


Figure 2. Lake Osakis projected growth and treatment of curlyleaf pondweed on April 21, 2025.

Curlyleaf Pondweed Treatment: Curlyleaf pondweed was treated on May 6, 2025.

Curlyleaf Pondweed Assessment Results: On June 16, 2025 a curlyleaf pondweed assessment survey sampled 703 sites (Figure 3). Curlyleaf pondweed was found to be growing with light to heavy growth Lake Osakis after treatment. Curlyleaf growth was in 5-14 feet of water and was found at 138 out of 703 sample sites.

Control of curlyleaf in all the treatment areas was good. Outside of the treatment areas, on June 16, 2025 there was mostly light growth to moderate growth of curlyleaf pondweed with a few sites of heavy growth.

Osakis Lake Curlyleaf Pondweed Assessment June 16, 2025

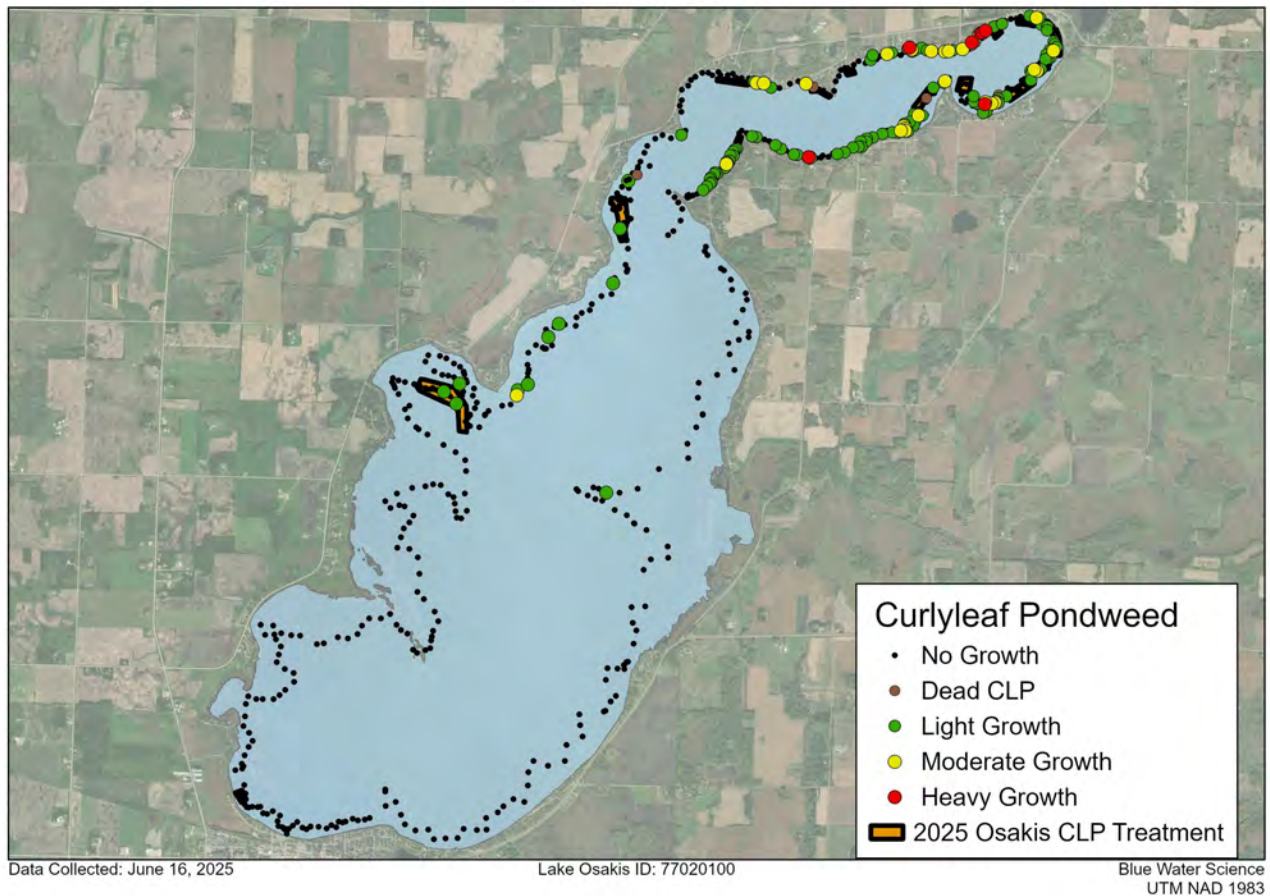


Figure 3. Lake Osakis curlyleaf pondweed assessment map on June 16, 2025.

Curlyleaf Pondweed Hot Spot Map from 2022-2025

Osakis Lake Curlyleaf Pondweed Treatment Areas 2022-2025

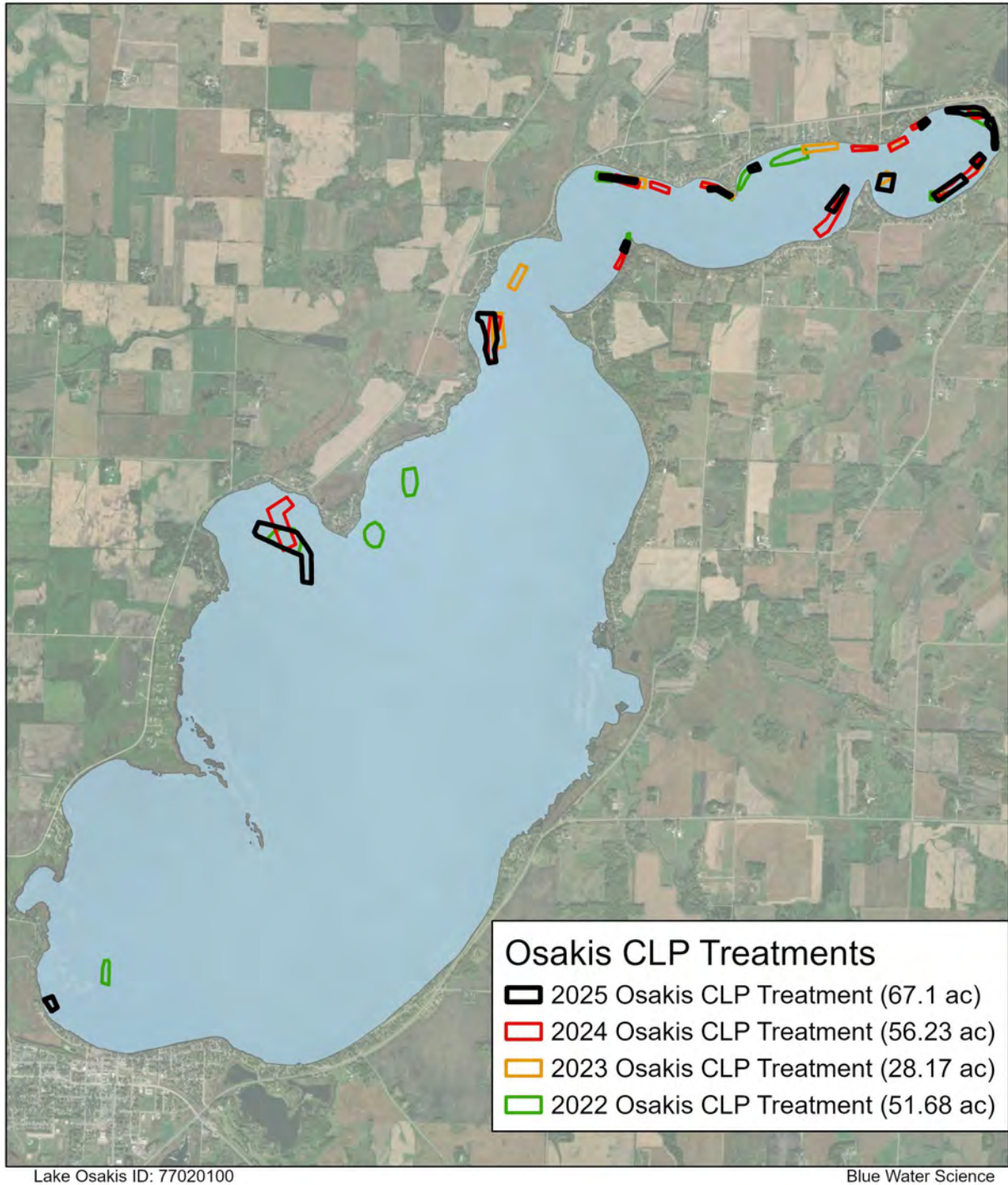
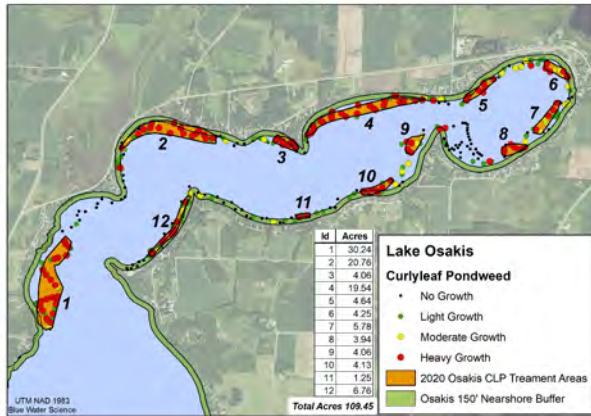


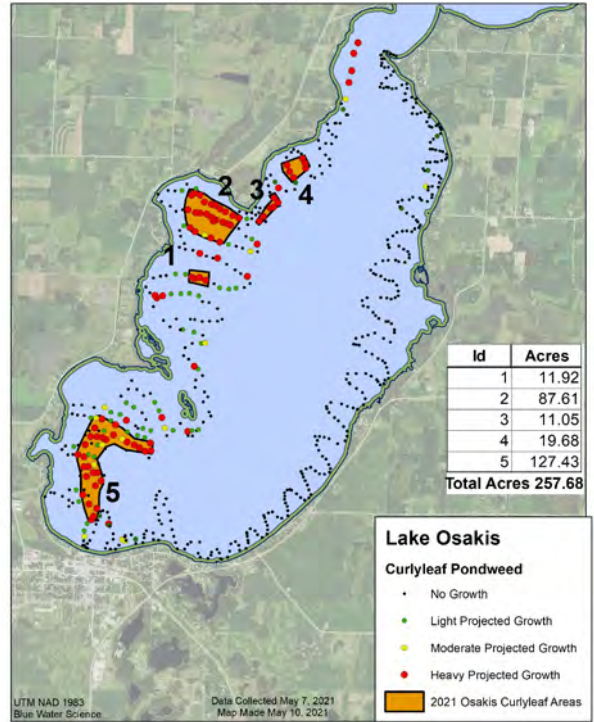
Figure 4. Lake Osakis curlyleaf pondweed treatment areas 2022-2025.

Previous Curlyleaf Pondweed Delineations: 2020-2025

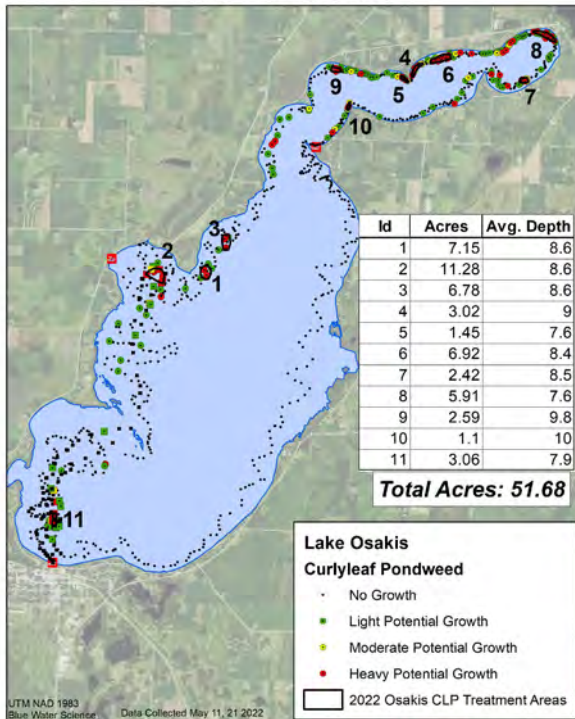
Lake Osakis Curlyleaf Pondweed Growth and Potential Treatment Areas
June 4, 2020



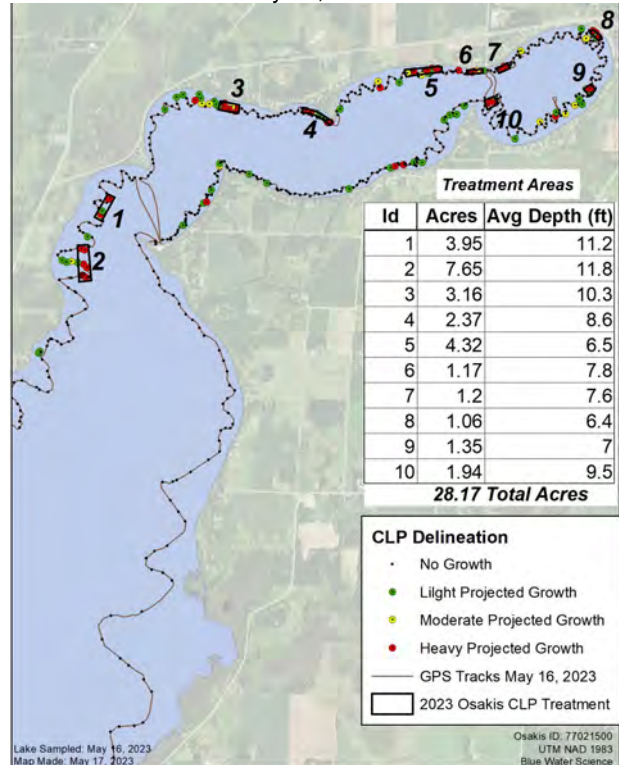
Lake Osakis Curlyleaf Pondweed Delineation
May 7, 2021

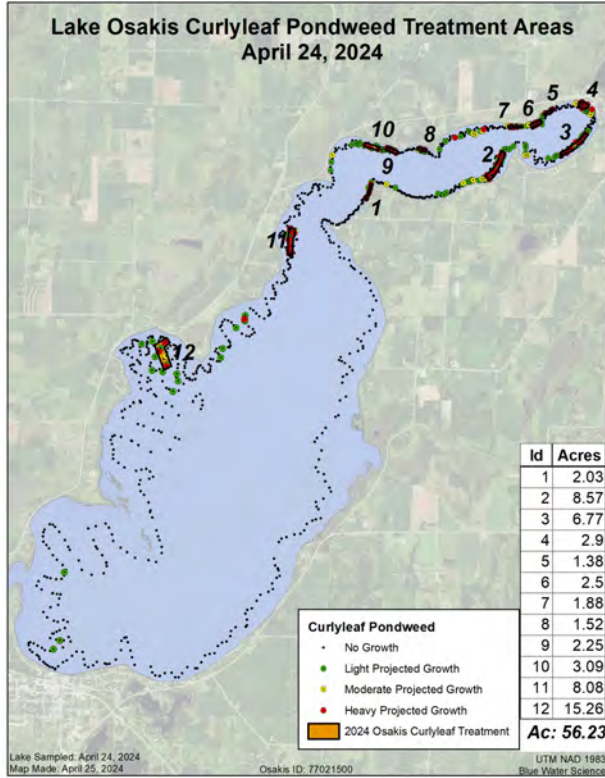


Lake Osakis - Curlyleaf Pondweed Delineation and Treatment
May 11 and 21, 2022

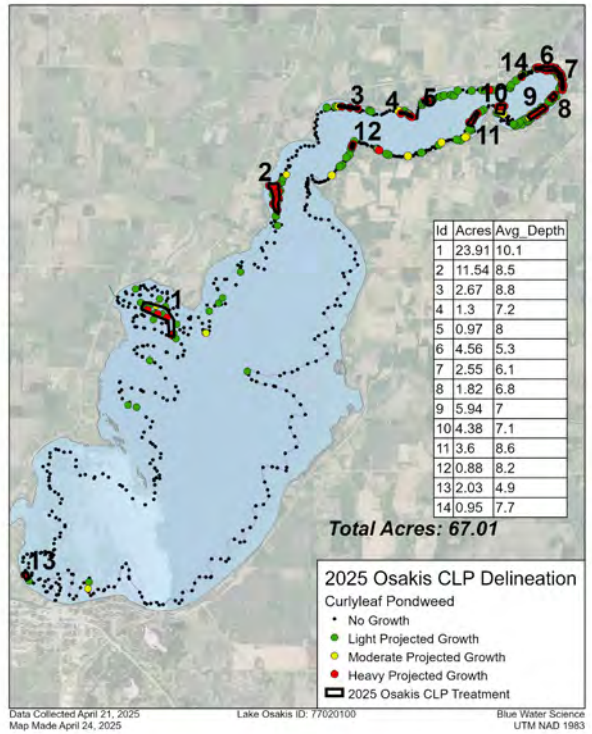


Lake Osakis Curlyleaf Delineation
May 16, 2023





2025 Lake Osakis Curlyleaf Pondweed Treatment Areas



APPENDIX

2025 DELINEATION: Lake Osakis individual site data collected by Blue Water Science on April 21, 2025.

MAIN BASIN

Waypoint	Depth (ft)	CLP - stems
1		
15	6	
19	6	1
21	5	
22	5	2
24	5	3
26	4	6
27	4	
28	4	
29	5	
30	5	
31	4	
49	13	
89	8	
98	15	
108	10	1
110	10	2
125	12	
132	11	2
146	15	
150	13	1
153	12	10
154	12	7
155	12	
157	12	2
160	10	
161	10	
173	9	1
176	11	4
177	11	2
178	10	2
180	9	4
181	9	2
184	9	9
185	8	1
181	4	
193	6	
195	6	1
197	8	2
198	9	3
199	7	1
200	7	
202	6	
207	6	1
221	10	2
227	11	1
239	14	2
240	14	3
246	12	2
247	9	
250	12	1
252	16	
253	13	2
263	12	2
275	15	
278	12	1

Waypoint	Depth (ft)	CLP - stems
280	11	
281	8	10
282	8	6
283	10	5
284	10	2
285	12	3
286	10	
289	20	
329	14	
330	15	
331	14	2
332	15	
333	15	
400	12	3
406	12	1
415	11	
419	7	
420		
Average		2.9
Occur (420 sites)		41

NORTH ARM

Waypoint	Depth (ft)	CLP - stems
1		
4	8	1
6	8	4
7	9	10
8	8	4
9	7	6
10	8	7
11	10	3
13	8	5
14	8	1
15	7	2
16	9	9
17	11	2
19	8	5
20	7	6
22	6	7
23	9	9
24	8	1
50	5	2
53	9	1
54	8	3
55	8	5
58	10	8
62	9	4
66	6	2
67	7	2
77	8	3
79	9	4
80	7	1
81	6	1

Waypoint	Depth (ft)	CLP - stems
84	7	3
85	6	1
86	6	5
87	8	10
96	9	2
97	8	1
98	6	2
99	9	6
100	9	6
103	10	1
106	9	2
108	6	1
110	10	2
111	10	1
113	5	2
118	9	2
122	9	1
124	8	1
126	7	9
128	8	1
137	9	2
138	8	2
140	10	2
144	8	2
149	7	3
150	8	5
153		
155	8	2
170	4	4
171	4	5
172	4	2
174	4	10
175	4	8
176	4	3
180	5	7
182	5	10
183	4	10
184	5	4
185	7	3
187	5	5
188	8	6
191	6	4
192	4	8
193	4	7
194	4	10
195	4	9
197	7	1
200	5	5
201	4	11
202	3	12
203	4	9
204	5	4
206	7	1
209	5	5
210	7	1
211	7	1
212	6	1
213	5	3

Waypoint	Depth (ft)	CLP - stems
214	5	6
215	6	5
216	7	3
219	6	5
221	4	3
222	6	4
226	6	11
227	9	2
230	6	4
231	4	6
232	5	3
233	8	1
236	4	5
238	4	
242	7	7
243	5	2
245	8	10
247	8	9
248	6	1
252	8	2
253	8	2
255		
257	7	4
258	8	9
260	9	1
261	6	14
262	5	1
264	8	1
266	8	2
267	6	1
268	5	4
269	6	5
272	7	7
274	8	3
276	6	2
277	9	3
281	5	2
282	6	2
283	10	1
285	7	2
288	4.5	1
289	8	1
293	4	2
294	5	1
307	7	3
310	6	1
311	5	2
315	5	2
316	6	3
317	7	2
318	8	9
319	9	7
320	10	8
328	6	1
330	7	2
331	8	5
332	9	3
334	8	10

Waypoint	Depth (ft)	CLP - stems
337	8	5
338	10	5
343	8	2
344	8	1
348	6	3
349	6	3
353	6	1
356	6	1
363	10	3
366	7	2
377	9	2
384	8	3
393	9	1
394	8	1
397	7	8
399	6	3
401	6	2
414	7	2
416	8	7
417	8	6
418	8.5	6
421	9	1
425	6	1
427	7	1
432	8	1
433	7	1
437	7	3
457		
Average		3.9
Occur (457 sites)		169

2025 ASSESSMENT: Lake Osakis individual site data collected by Blue Water Science on June 16, 2025.

MAIN BASIN

Waypoint	Depth (ft)	CLP	Notes
1			
138	10	1	
143	11	1	
149	10	1	
182	12	2	CLP patchy, 3 ft from surface, no turions
183	11	1	
188	12	1	
203	11	1	
204	11	1	
210	11	1	
223	14	1	
232	8	1	
247	7	1	
290	14	1	In the flats, 8 ft from surface
372			End
Average Occur (372 sites)		1.1	
		13	

NORTH ARM

Way-point	Depth (ft)	CLP	CLP - dead	Butter-cup	Coon-tail	White-stem	Notes
1							
9			1				
17	9	1					
36	9	1					
37	12	2					
38	9	1					
39	8	2					
41	11	1					
48	10	2					
49	10		1				
50	10		1				
62	6	1					
63	6	1					
66	7	2					
67	6	1					
71	6	1			3		
72	7	3					
73	6	2					
74	8	1					
75	6	1			3		
77	5	1			3		
78		1			3		
79	9	2					
82	9	2					
83	9	2					
84	10	1					
86	9	2					
89	8		2				
90	6	3					
91	9		2				
93	6	2					
94	5	3					
95	6	3					
96	6	3					
100	8	1					
102	5	1					
110	6	1					
113	6	2					
114	5	1					
116	7	1					CLP resprout, 1 ft tall
120	8	1					
121	7	1					
122	6		1				
128	8	1					
129	7	1					
130	5	1		3			
132	6	2					
133	7	1					
134	7	1					
135		1					
136	5			3			
137	6	1					
139	6	1					
142	8						
143						2	
144	5	1					
146	7	1					
147	7	2					
148	9	2					

Way-point	Depth (ft)	CLP	CLP - dead	Butter-cup	Coon-tail	White-stem	Notes
150	9	1					
151	7	1				2	
152	7						
153	5	1					
164	6	1				2	
166							
167	9		2				
168	7	1					
169	6	1					
170	5	1					
171	6	2					
173	6	2					
175	5	1					
176	7	1					
177	8	2					
178	7	3					
179		1					
180	6	1					
181	5	1					
182	5	1					
186	7	1					
189	7	1					
190		1					
202	9	2					
203	8	1					
206	7	1					
210	7		1				
216	5	1					
217	9	2					
218	9	1					
220	8	1					
222	6	1					
223	7	1					
224	12	1					
225	10	2					
226	7	2					
227	5	1					
228	8	2					
229	11	1					
230	9	1					
231	8	2					
233	6	1					
235	7	1					
239	8	1					
242	7	1					
244	10	1					
245	7	1					
247	11	1					
248	7	1					
249	7	1					
250	6	1					
254	7	1					
256	8	1					
263	7	2					
264	6	3					CLP spot
269	9	1					
270	9	1					
275	8	1					
277	8	1					
280	9	1					
282	9	1					
292	9	1					
293	9	1					
295	10	1					
297	8	1					
298	9	1					
301	10	1					
302	10	1					
303	7	1					
304	8	2					
307	7	1					
314	9	1					
315	11	1					
316	10	1					
321	12	1					
322	10	1					
324	6	1					
326	6	1					
329	7	1					
331	7	1					
Average Occur (331 sites)		1.3	1.4	3.0	3.0	2.0	
		125	8	2	4	3	