



Skogman Lake, Isanti County, June 28, 2023

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## Curlyleaf Pondweed Assessment and Eurasian Watermilfoil Delineation for Skogman Lake, Isanti County, Minnesota, on June 28, 2023

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Prepared for:  
Skogman Lake  
Improvement District



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# Curlyleaf Pondweed Assessment and Eurasian Watermilfoil Delineation for Skogman Lake, Isanti County, Minnesota, on June 28, 2023

## Summary

**Curlyleaf Pondweed Assessment and Eurasian Watermilfoil Delineation:** Skogman Lake (MnDNR ID #30-0022) is a 228 acre lake located in Isanti County, Minnesota. An initial curlyleaf pondweed (CLP) assessment was conducted on June 28, 2023 by Blue Water Science which is in the time period of peak CLP growth in area lakes. Curlyleaf was sampled at 35 sites on June 28, 2023 (Figure 1).

Eurasian watermilfoil (EWM) was verified in Skogman Lake in 2014. In 2023, an EWM meander survey was conducted on June 28, 2023 and milfoil was found at 65 sites out of 348 sites sampled with light to heavy growth observed (Figure 1).

EWM growth was observed out to 9 feet of water depth and was mostly within the riparian zone which is designated by the MnDNR as 0 to 150 feet from shore. No open water EWM treatment (area outside of the 150 ft nearshore zone) is recommended. However, there is an option for lake residents to treat their nearshore area if a permit is acquired.

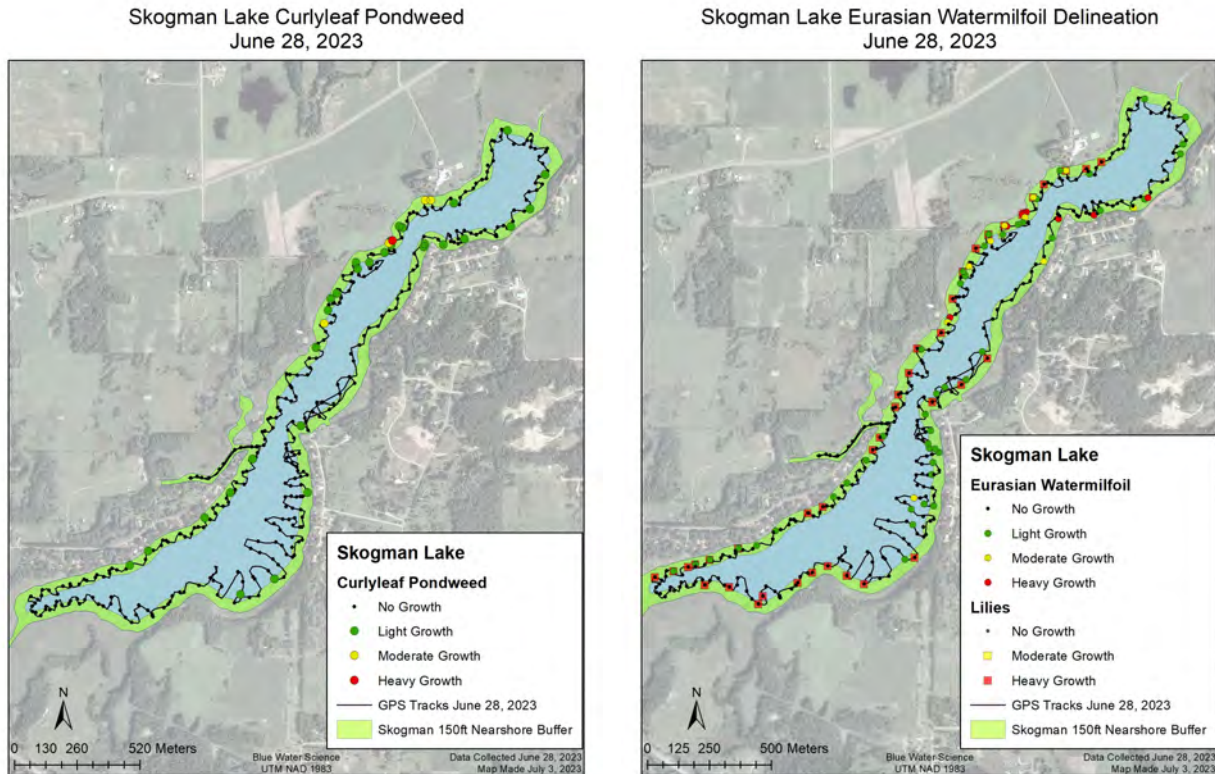


Figure 1. Curlyleaf pondweed coverage on June 28, 2023 (left) and Eurasian watermilfoil coverage on June 28, 2023 (right). Both maps show the riparian zone (0-150 feet from shore) in light green.

## Skogman Lake Aquatic Plant Conditions on June 28, 2023

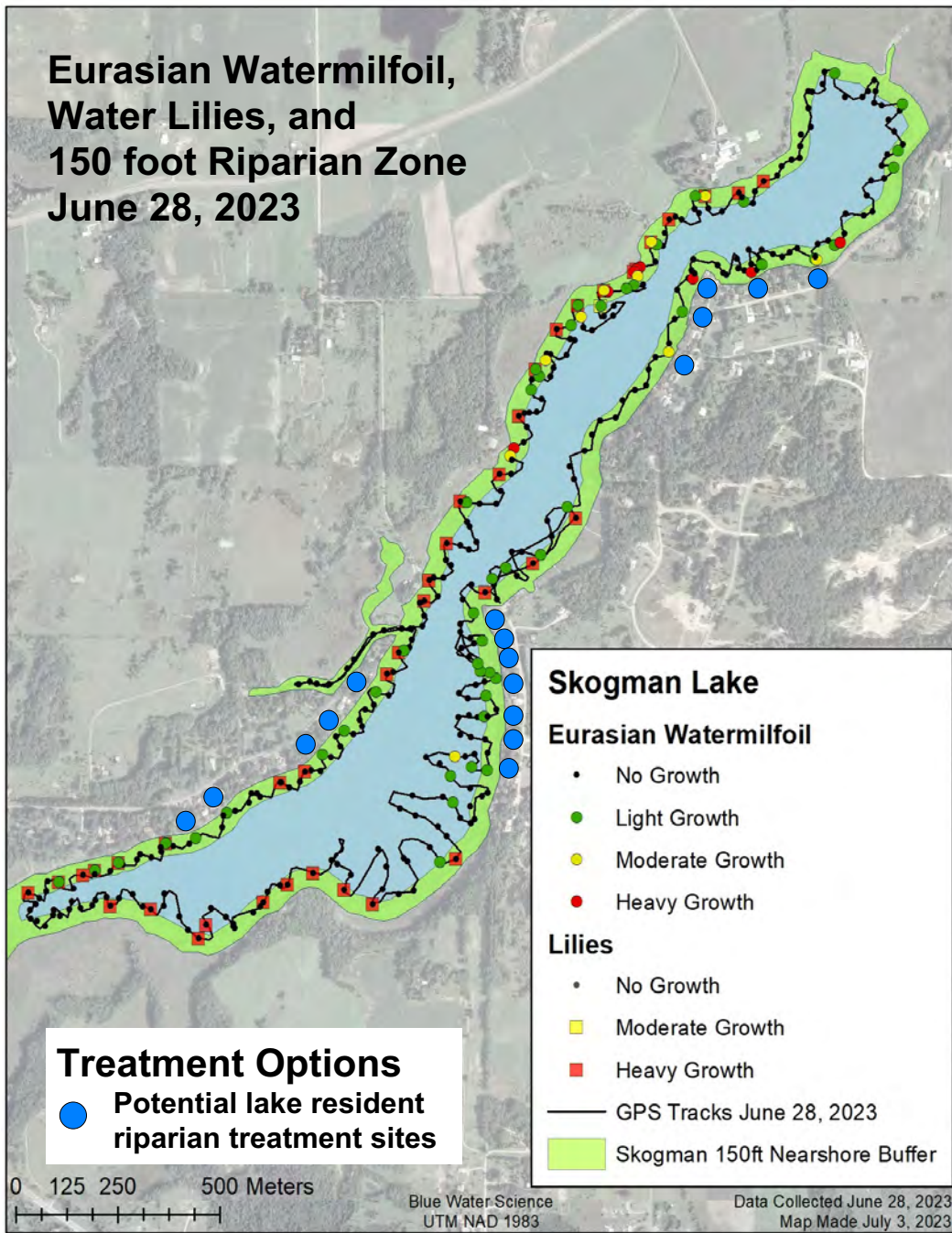


Figure 2. Curlyleaf pondweed (top pictures), Eurasian watermilfoil (middle pictures), and water lilies (spatterdock and white lilies) were common in the nearshore area around Skogman Lake (bottom pictures).

# Aquatic Plant Treatment Options

The nearshore buffer also called the riparian zone from 0 out to 150 feet from shore is designated by the MnDNR as an area that lake residents have the option to treat. The area beyond 150-foot from shore is considered open water and a lake organization such as the Skogman LID can obtain a permit for treating the open water.

**Curlyleaf Pondweed:** Curlyleaf pondweed was fairly widespread on June 28, 2023 but with light growth and mostly confined within the riparian zone. There would be very little CLP to treat with an open water treatment. However, lake property owners have the option to treat their nearshore area.



**Eurasian Watermilfoil:** In Skogman Lake because EWM growth was out to 9 feet deep, much of the EWM growth was within the riparian zone and also either adjacent or embedded in water lily growth. Based on these criteria there is very little open water EWM to treat with an open water permit and open water EWM treatments are not recommended. However, there is an option for lake residents to treat aquatic plants in their nearshore area with a MnDNR permit. Approximately 17 riparian permits at 2,500 square feet per permit could be considered totaling about 1.0 acre (Figure 3).

Figure 3. Meandering survey track and sites sampled on June 28, 2023 showing Eurasian watermilfoil and water lilies densities along with the 150 ft nearshore buffer (shown in green).

# Curlyleaf Pondweed Assessment and Eurasian Watermilfoil Delineation for Skogman Lake, Isanti County, Minnesota, on June 28, 2023

Skogman Lake, Isanti County (ID: 30-0022)  
Size: 228 acres (MnDNR)  
Littoral area: 135 acres (MnDNR)  
Maximum depth: 36 ft (MnDNR)

## Introduction and Methods

Curlyleaf pondweed (CLP) and Eurasian watermilfoil (EWM) are non-native species and both are present in Skogman Lake. CLP assessment and EWM delineation were conducted on 228 acre Skogman Lake, Isanti County in 2023. The objectives of the assessment and delineation were to locate areas of nuisance invasive species and recommend areas for potential treatments.

The CLP assessment and EWM delineation surveys were conducted using a meandering path around the nearshore area of the entire lake. Aquatic plants are sampled using a fixed 14 tine rakehead on a pole. On June 28, a total of 348 sites were sampled for CLP and EWM.

Aquatic plant density was estimated based on a scale from 1-3 with 1 being the less dense and 3 representing plants matting at the surface. An example of a plant density of a 3 is shown in Figure 5. Plant density ratings were based on the amount of plants collected on a rake head. A single stem or a trace of an identifiable plant was rated at a density of "1". If plants were collected up to at least one half of the rake head (7 out of 14 tines) it was rated at a density of "2". If plants covered all of the rake tines, the density was a "3".

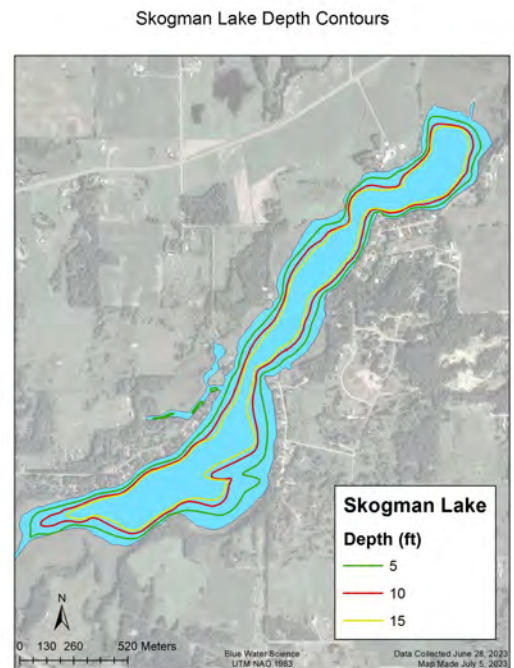


Figure 4. Lake contours for 5, 10, and 15 feet.

## Chart of Aquatic Plant Density Ratings



Figure 5. Aquatic plant density ratings from 1 to 3.

**Results for Curlyleaf Pondweed:** Curlyleaf pondweed was observed at 35 out of 348 sample sites and was found at mostly light growth. More CLP was observed in the north end than the south end (Figure 6).

### Skogman Lake Curlyleaf Pondweed June 28, 2023

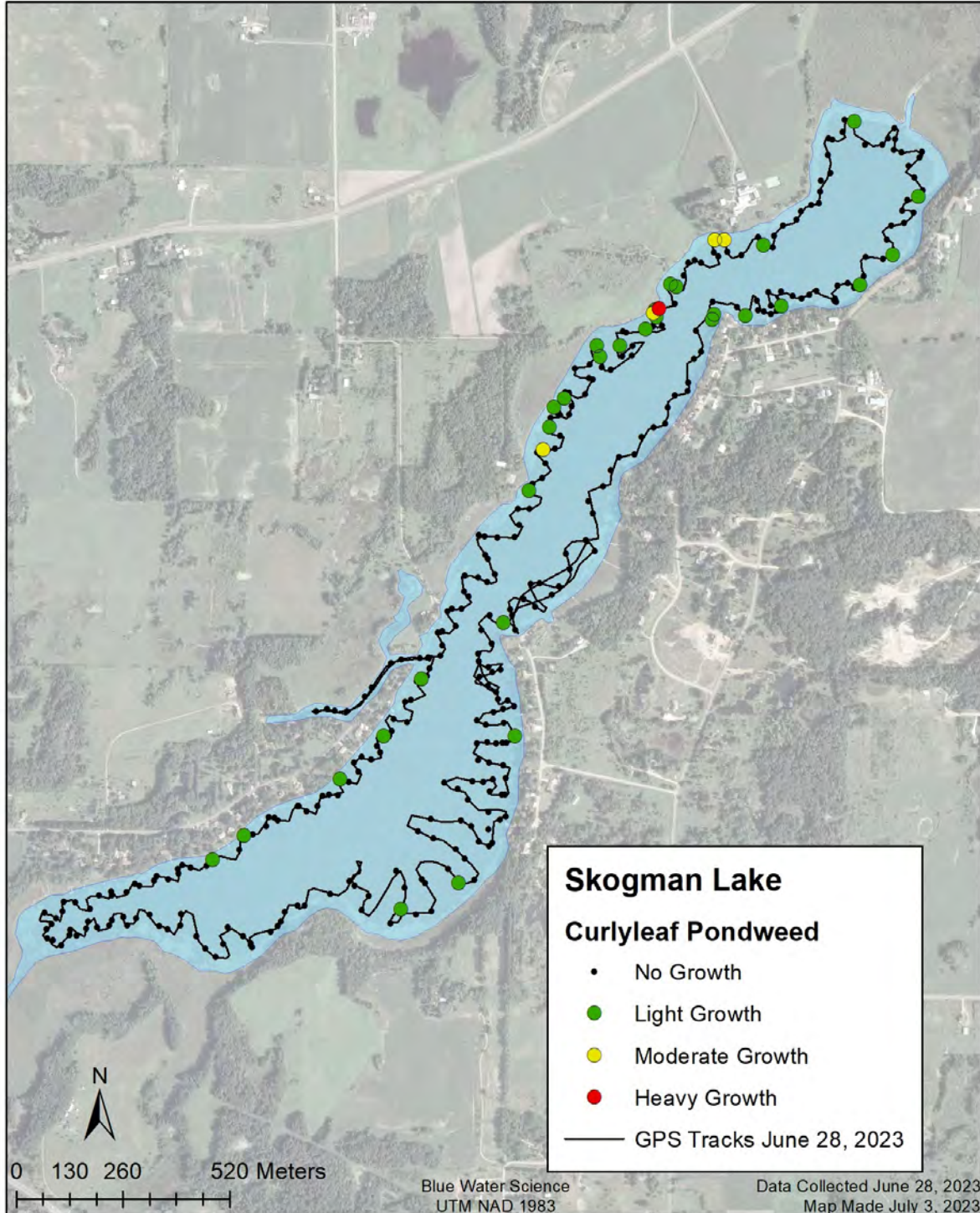


Figure 6. Meandering survey track and sites sampled on June 28, 2023 showing curlyleaf pondweed densities.

**Results for Curlyleaf Pondweed (concluded):** Curlyleaf pondweed was found growing out to 8 feet of water depth. Because Skogman Lake depths drop off relatively quickly, nearly all CLP growth was within the 150-foot riparian zone (nearshore buffer)(Figure 7).

### Skogman Lake Curlyleaf Pondweed June 28, 2023

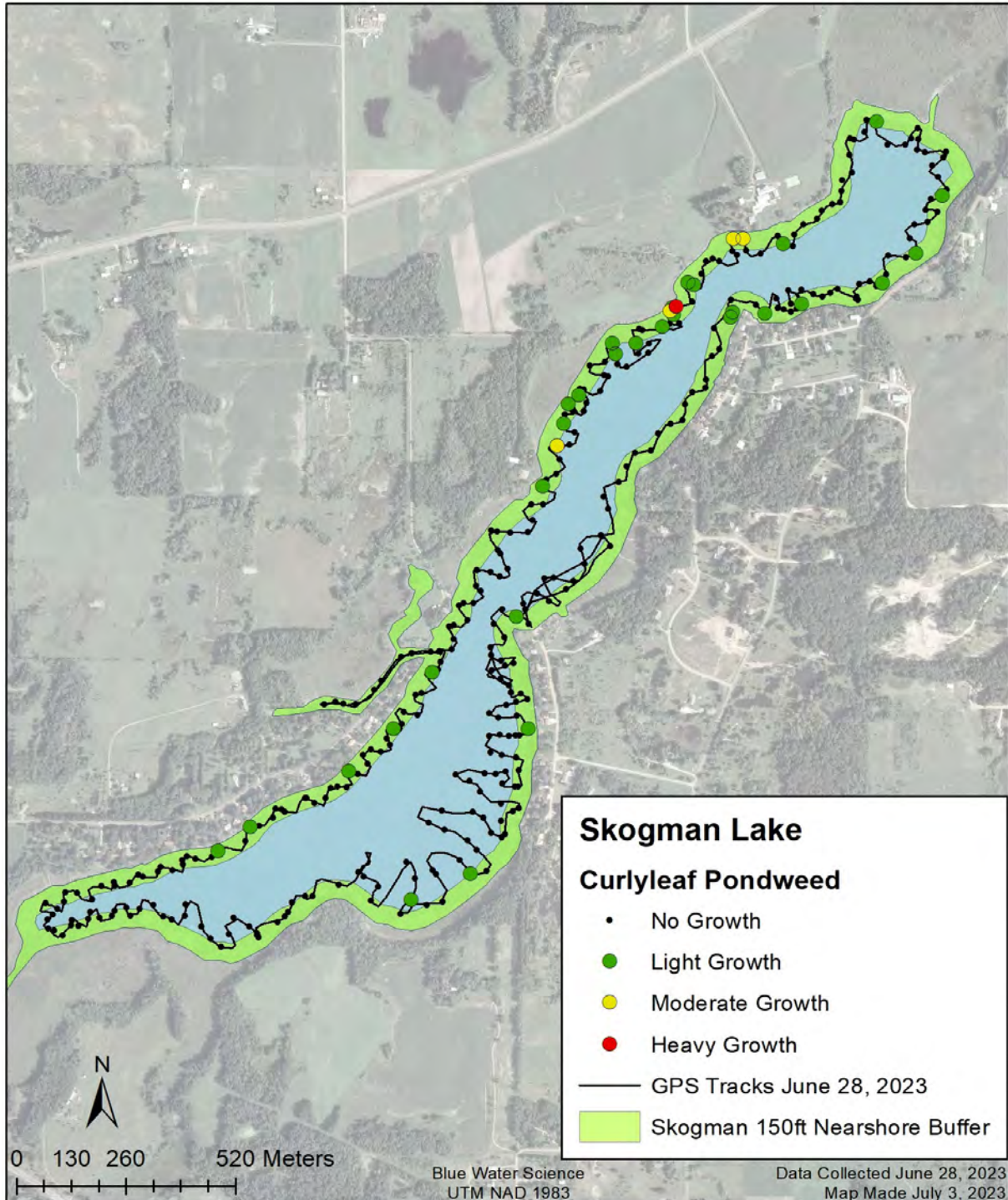


Figure 7. Meandering survey track and sites sampled on June 28, 2023 showing curlyleaf pondweed densities along with the 150 ft nearshore buffer (shown in green).

**Results for Eurasian Watermilfoil:** Eurasian watermilfoil was found at 65 out of 348 sample sites with a mix of light to heavy growth (Figure 8). EWM was more abundant in the north end than the south end of Skogman Lake.

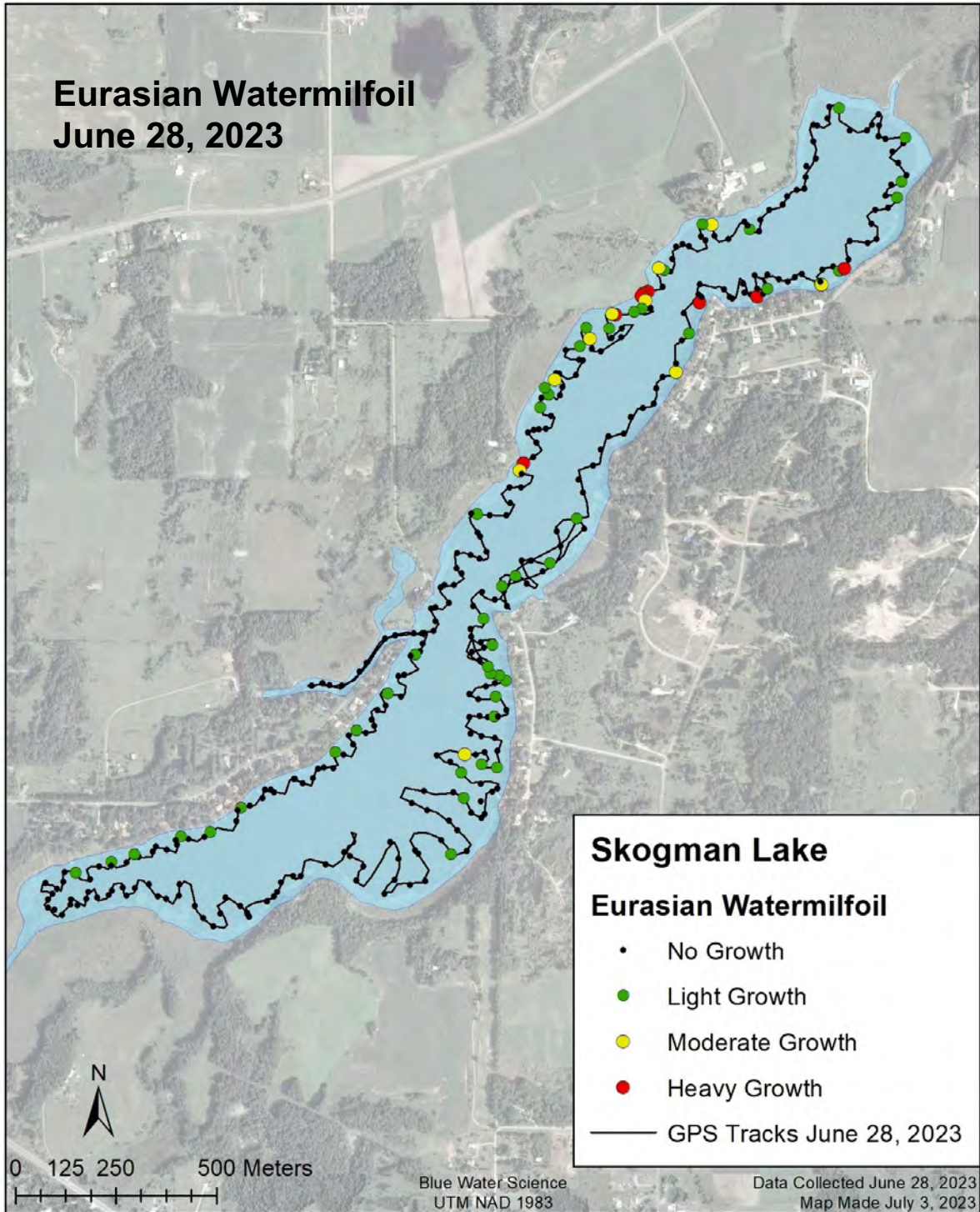


Figure 8. Meandering survey track and sites sampled on June 28, 2023 showing Eurasian watermilfoil densities.



**Results for Eurasian Watermilfoil (continued):** Water lilies were common in the nearshore area (Figure 8 shown with red squares). Often, EWM was growing in the lily beds or adjacent to the lilies. Spatterdock dominated in deeper water and white lilies typically were in shallow water. EWM is not typically treated in or adjacent to lilies because the herbicide could damage or kill the lilies. Using this approach, there is very little heavy growth of EWM to treat that was separated from the lilies (Figure 9).

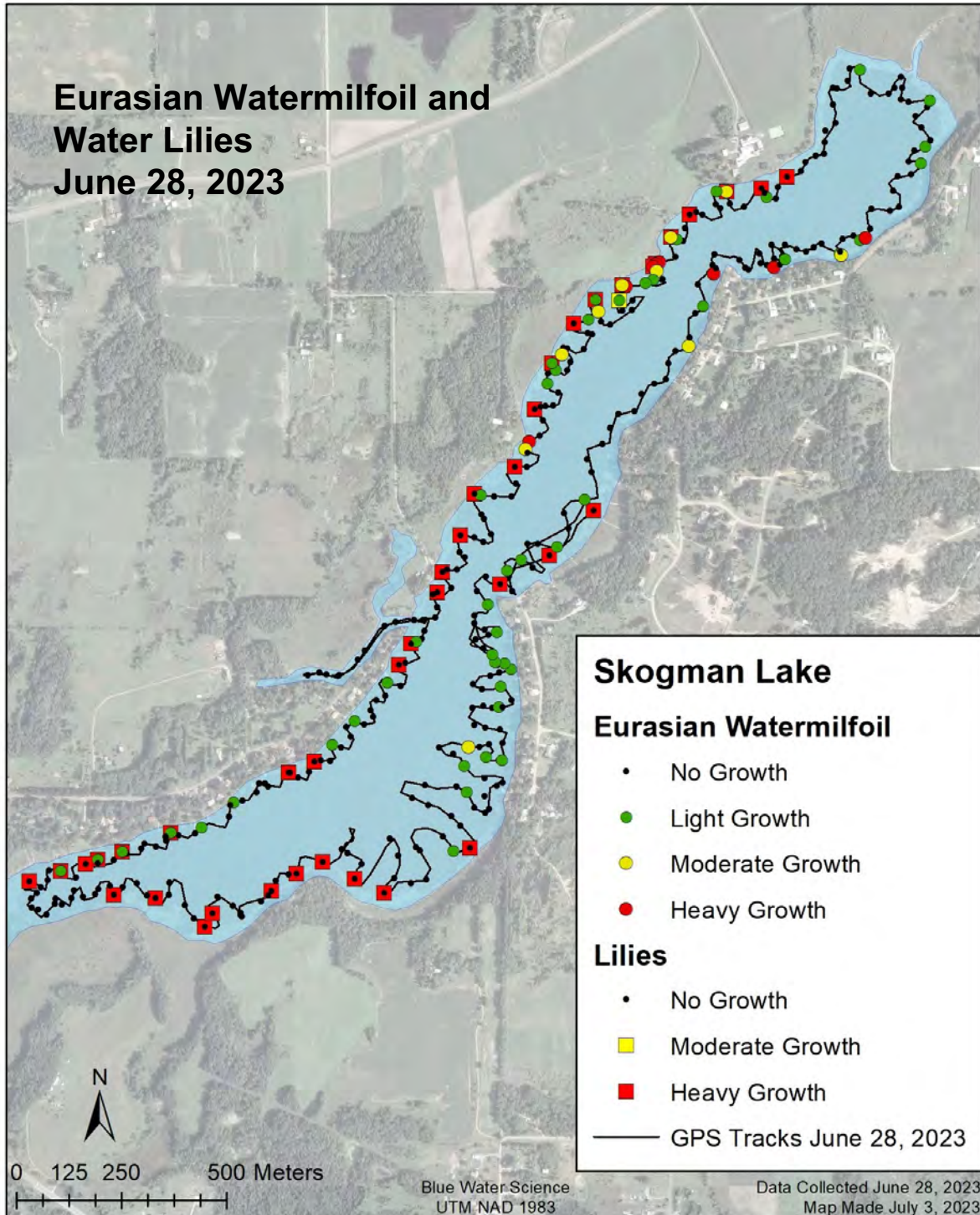


Figure 9. Meandering survey track and sites sampled on June 28, 2023 showing Eurasian watermilfoil and water lilies densities.

**Results for Eurasian Watermilfoil (continued):** Eurasian watermilfoil was found growing out to 9 feet of water depth. Much of the EWM growth was within the 150-foot riparian or nearshore buffer except for some growth in the shallow SE portion of Skogman Lake (Figure 10).

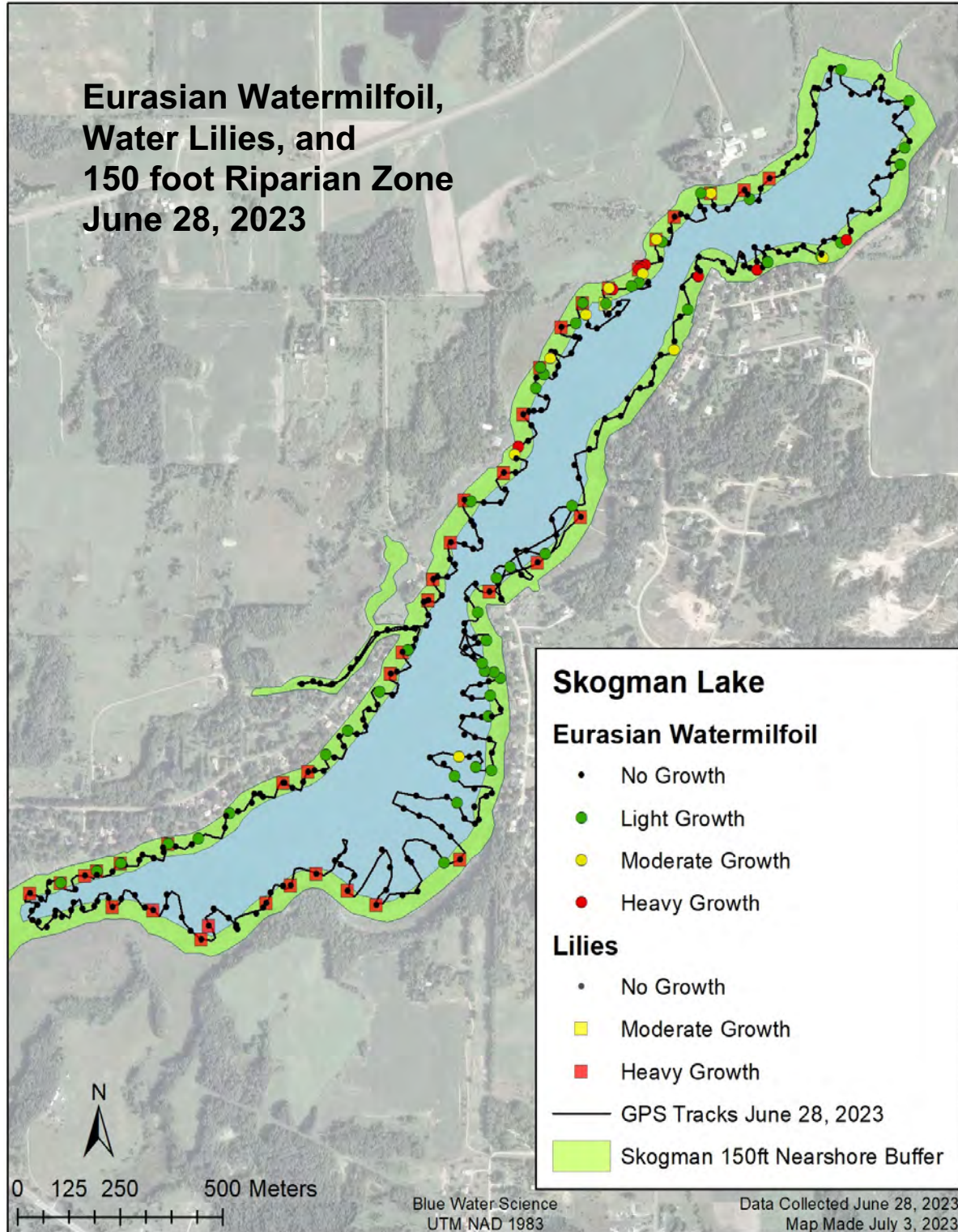


Figure 10. Meandering survey track and sites sampled on June 28, 2023 showing Eurasian watermilfoil and water lilies densities along with the 150 ft nearshore buffer (shown in green).

**Results for Eurasian Watermilfoil (concluded):** Based on the June 28, 2023 meander survey most of the EWM in Skogman Lake is near water lilies or is within the 150 ft nearshore buffer (Figure 11). The light EWM growth outside the riparian zone is sparse and is not a recreational nor ecological problem. The map in Figure 11 shows the EWM setting.

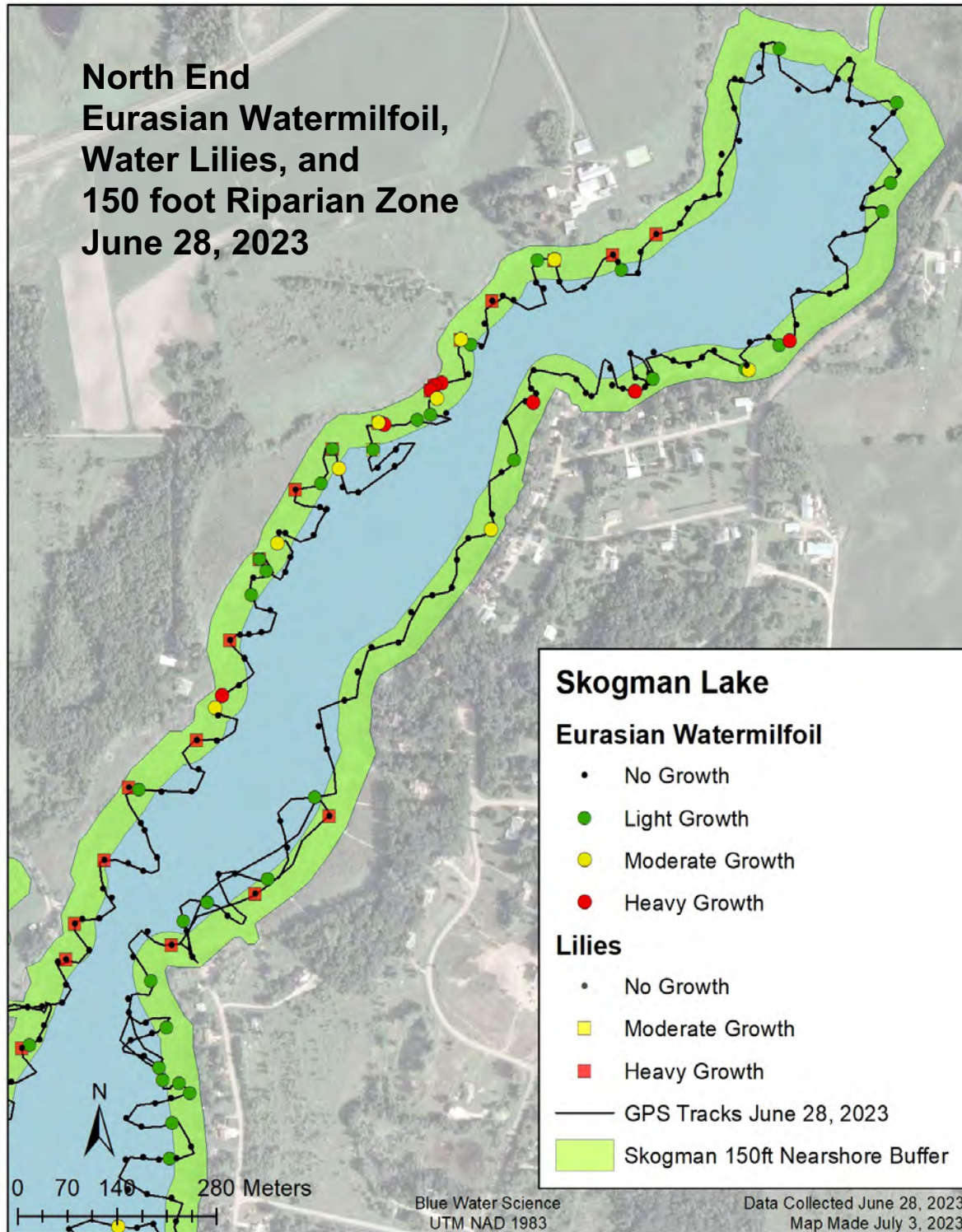


Figure 11. Meandering survey track and sites sampled on June 28, 2023 showing Eurasian watermilfoil and water lilies densities along with the 150 ft nearshore buffer (shown in green).

## Conclusions

The riparian buffer from 0 out to 150 feet from shore is designated by the MnDNR as an area that lake residents have the option to treat. The area beyond 150-foot from shore is considered open water and a lake organization such as the Skogman LID can obtain a permit for treating the open water.

**Curlyleaf Pondweed:** Curlyleaf pondweed was fairly widespread but with light growth and mostly confirmed within the riparian zone. There would be very little CLP to treat with an open water treatment. However, lake property owners have the option to treat their nearshore area.

**Eurasian Watermilfoil:** In Skogman Lake because EWM growth was out to 9 feet deep, much of the EWM growth was within the riparian zone.

Based on these criteria there is very little open water EWM to treat and open water EWM treatments are not recommended. However, there is an option for lake residents to treat aquatic plants if they get a permit.



Figure 12. Water lilies (spatterdock and white lilies) were common in the nearshore area around Skogman Lake.

# APPENDIX

Table 1. Skogman Lake individual site data for June 28, 2023.

Site	Depth (ft)	Lilies	Coon-tail	CLP	EWM
1					
3	7				1
4	9				1
5	6				
8	6				1
9	7				
11	7				1
12	7				
14	7				
17	5				
18	10				
20					
23	6				2
24	9				
26	6				1
29	6			1	3
30	9			1	
35	5			1	
38	7				
39	6				3
40					
42					
46	5			1	1
52	5				1
53	5				2
54	5				
57	7				1
58	6			1	3
59	11				
62	7			1	
66	5				1
69	6			1	1
74	7		3		1
77					
82	7		3	1	1
87	10				
94	12				
95	7	3			
98	8			1	1
100		3			
101	11				
103	5	3	3	2	2
104	6		3	2	1
105	10				
109	7	3			
112	7			1	1
113	7	3		1	2
115	3			3	3
116	3	3		1	3
117	3	3		2	3
118	5			1	2
119	7				1
121	5			1	1
122	4				3
123	4	3			2
124	6	2		1	1
130	5			1	2
131	4	3		1	1
132	6				1
133		3			
134	11				
139	6			1	2
142	7				1
143	5	3		1	1
145	7			1	1
149	8			2	
150	6	3			
153	4				3
154	4			1	2

Site	Depth (ft)	Lilies	Coon-tail	CLP	EWM
155	10				
157	6	3			
161	6				1
162	6	3			
164	8				
168	6	3			
173	7	3			
175	5	3			
180	6				
182	5				
191	7			1	1
192	6	3			
194	5	3			
196	4				1
197	9				
198	7			1	
202	3				1
206	4			1	1
209	5	3			
213	5	3			
219	4			1	1
221	15				
222	6			1	1
223	16				
225	6	3			1
232	8	3			1
233	16				
234	7	3			1
235	13				
236	7	3			
238	7	3			1
239	8				
242	7	3			
244	11		1		
249	12				
252	12				
255	12				
257	7	3			
260	6				
261	6	3			
263	12				
265	7				
266	5	3			
267	6	3			
274	7	3			
277	7	3			
278	7	3			
281	7				
282	5	3			
285	7			1	
286	5	3			
290	10				
291	12				
292	7			1	1
293	5	3			
294	9				
296	10				
297	11				
300	7				1
306	5				
308	7				1
311	8				2
312	8				
313	7				
314	7			1	1
316	7				1
317	7				
318	7				
323	9				

Site	Depth (ft)	Lilies	Coon-tail	CLP	EWM
324	7				1
326	5			1	
327	8				1
329	16				
331	7				
332	6				1
333	4				1
334	8				1
335	10				
338	7				1
339	9				
340	8				1
342	9				
343	5				1
346	6	3		1	
347	6	3			
348	5	3			
Average		3.0	2.6	1.2	1.4
Occurrence (348 sites)		41	5	35	65

# Eurasian Watermilfoil Growth Characteristics

(source: Steve McComas, Blue Water Science)

## Light Growth Conditions

Plants rarely reach the surface.

Plants are in scattered patches\*.

Navigation and recreational activities generally are not hindered.

Stem density: 1 - 90 stems/m<sup>2</sup>

Biomass: 0 - 70 g-dry wt/m<sup>2</sup>

**MnDNR rake sample density equivalent for light growth conditions: 1.**

*\*patch = EWM stems arising from a single root crown. Generally 5 to 10+ stems sprout from a root crown.*



## Moderate Growth Conditions

Broken surface canopy conditions. However, stems are usually unbranched.

Plants are in beds\* with some patches.

Navigation and recreational activities may be hindered.

Lake users may opt for control.

Stem density: 90 - 180 stems/m<sup>2</sup>

Biomass: 70 - 200 g-dry wt/m<sup>2</sup>

**MnDNR rake sample density equivalent for moderate growth conditions: 2.**

*\*beds = EWM patches close together forming an area of dominant EWM growth.*



## Heavy Growth Conditions

Solid or near solid surface canopy conditions. Stems typically are branched near the surface.

Plants grow in continuous beds.

Navigation and recreational activities are limited.

Control is necessary for navigation and/or recreation.

Stem density: 180+ stems/m<sup>2</sup>

Biomass: >200 g-dry wt/m<sup>2</sup>

**MnDNR rake sample density equivalent for heavy growth conditions: 3.**

