



Eagle Lake (296 acres), Hennepin County, MN

Eagle Lake, Hennepin County: 2021 Aquatic Plant Point Intercept Survey

Point Intercept Survey July 9, 2021

Prepared for:
City of Maple Grove



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Summary

On July 9, 2021, a point intercept survey was conducted on the 296 acre Eagle Lake, Hennepin County. Plant growth was found to a depth of 13 feet and aquatic plants were estimated to cover 151 acres or 51% of Eagle Lake. The most common submerged aquatic plant was coontail followed by flatstem pondweed. Coontail was observed at 80 sites (67% of the sites out to 13 feet deep). The aquatic plant community in 2021 had 14 species of submerged aquatic plants. This is an above average plant diversity condition for a lake in this setting. The number of individual plant species observed at sample points ranged from 0 to 7 with an average of 2.0 species/point (Figure S1).

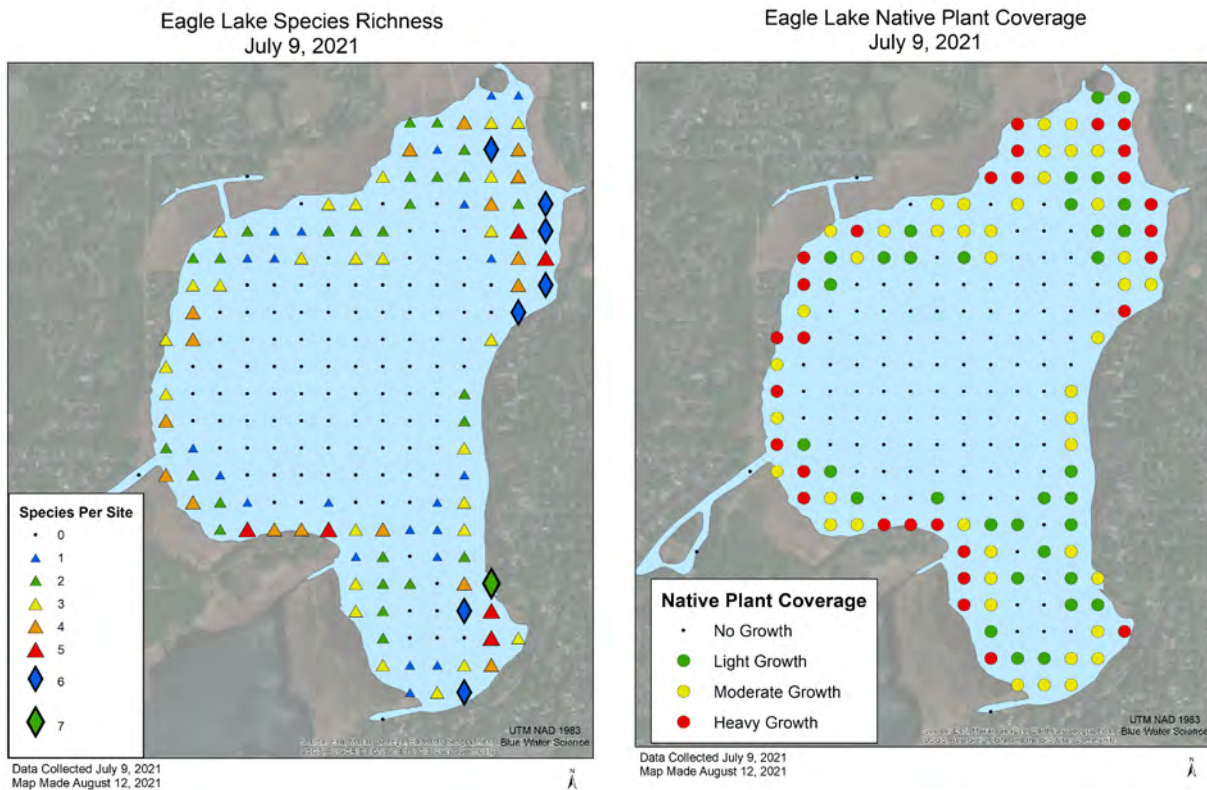


Figure S1. [left] Aquatic plant species richness for each sample site for Eagle Lake on July 9, 2021. [right] Native aquatic plant distribution for July 9, 2021.

Table S1. Eagle Lake aquatic plant occurrences and densities for the July 9, 2021 survey based on 120 sites in the plant growth zone, out to 13 feet of water depth for Eagle Lake. Density ratings are 1-3 with 1 being low and 3 being most dense.

	All Stations (n=120 sites out to 13 feet)		
	Occurrence	% Occurrence	Density
Emergent			
Bulrush (<i>Scirpus sp</i>)	2	2	1.0
Cattails (<i>Typha sp</i>)	6	5	2.3
Floatingleaf			
Spatterdock (<i>Nuphar variegata</i>)	12	10	2.0
White Lily (<i>Nymphaea odorata</i>)	23	19	2.1
Duckweed (<i>Lemna minor</i>)	1	1	1.0
Submergents			
Coontail (<i>Ceratophyllum demersum</i>)	80	67	1.4
Curlyleaf Pondweed (<i>Potamogeton crispus</i>)	5	4	1.0
Elodea (<i>Elodea canadensis</i>)	1	1	1.0
Flatstem Pondweed (<i>Potamogeton zosteriformis</i>)	72	60	1.4
Illinois pondweed (<i>Potamogeton illinoensis</i>)	9	8	1.7
Naiads (<i>Najas sp</i>)	8	7	1.1
Moss (<i>Drepanocladus sp</i>)	1	1	1.0
Northern watermilfoil (<i>Myriophyllum sibiricum</i>)	16	13	1.2
Sago pondweed (<i>Stuckenia pectinata</i>)	2	2	1.0
Stringy pondweed (<i>P. strictifolius</i>)	10	8	1.0
Star Duckweed (<i>Lemna trisulca</i>)	6	5	1.0
Water Celery (<i>Vallisneria americana</i>)	18	15	1.2
Water Stargrass (<i>Heteranthera dubia</i>)	8	7	1.4
Plant-Like Algae			
Chara (<i>Chara spp</i>)	31	26	1.6
Number of submerged species	14		

Methods - Aquatic Plant Surveys

Point Intercept Survey: An aquatic plant survey of Eagle Lake using a point intercept sampling method was conducted by Blue Water Science on July 9, 2021. A map and sampling grid were prepared by Blue Water Science and consisted of a total of 211 points that were distributed throughout the lake. Points were spaced 75 meters apart. Each point represented about 1.4 acres. At each sample point, plants were sampled with a rake sampler. In water less than 15 feet, a fixed-head rake sampler on a telescoping pole was used. In water deeper than 15 feet, a double-headed rake sampler on a rope was tossed into the lake to sample plants. A plant density rating was assigned to each plant species on a scale from 1 to 3 (Figure 2). A density of a “1” indicated sparse growth and a “3” rating indicated heavy plant growth (Figure 2).

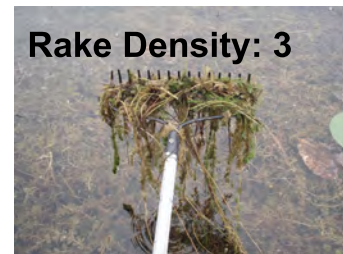


Figure 2. Aquatic plant density ratings from 1 to 3.



Figure 3. Two different rake samplers used during the Eagle Lake surveys.
[left] Fixed head sampler.
[right] Double headed throw rake.

Point Intercept Survey - July 9, 2021

The submerged aquatic plants were common in Eagle Lake for the July 2021 point intercept plant survey. Coontail was the dominant plant in Eagle Lake. Flatstem pondweed was also common. A total of 14 submerged aquatic plants, 2 emergent plant species, and 3 floatingleaf species were found (Table 1 and Figure 4).

Watermilfoil was relatively common and was found at 16 sites. It was identified in the field as

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northern watermilfoil and no pure Eurasian watermilfoil was observed. However its possible milfoil in Eagle Lake has hybridized and genotype testing would be needed to make the distinctions between northern, Eurasian, or hybrid milfoil. For this report, milfoil was called northern watermilfoil based on field identification.

A summary of plant density and occurrence for individual species is shown in Table 1.

Aquatic Plant Maps for Eagle Lake

The number of aquatic plant species found at a sample point is referred to as species richness. The species richness in Eagle Lake for each sample site is shown in Figure 4. The number of plant species at a sample point ranged from 0 to 7 with an average of 2.0 species per sample point. This is a above average species richness. Additional aquatic plant maps for individual plant species showing abundance and distribution are shown on the next page. Overall, aquatic plant growth in Eagle Lake is mostly light to moderate.

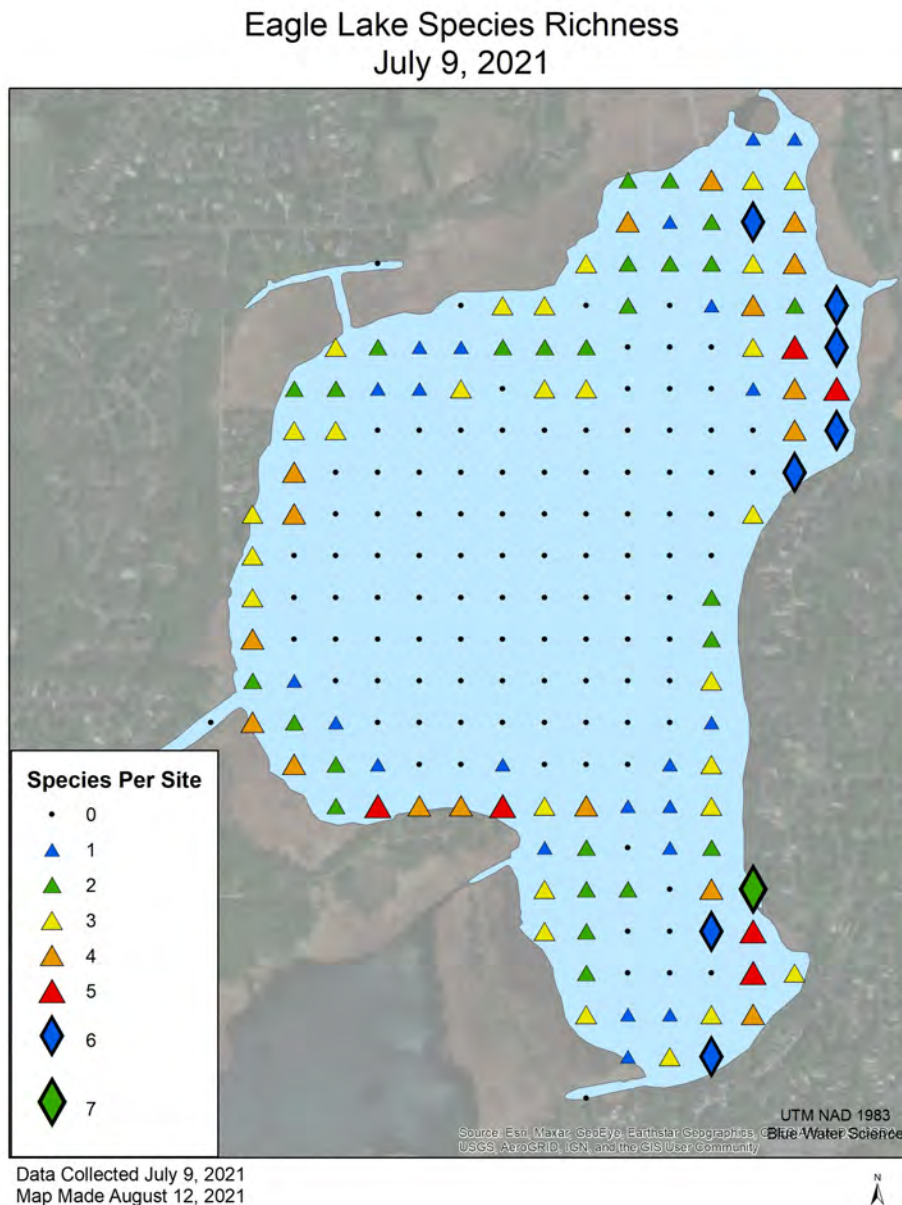
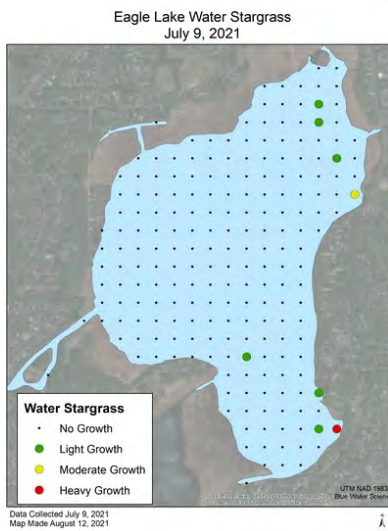
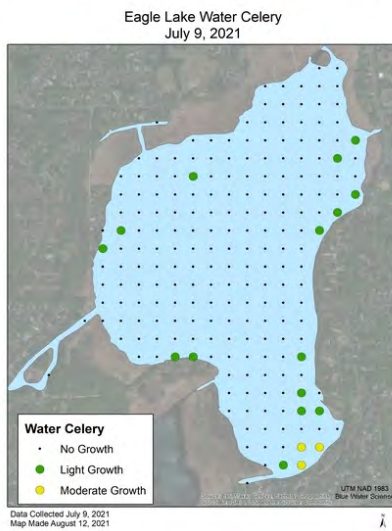
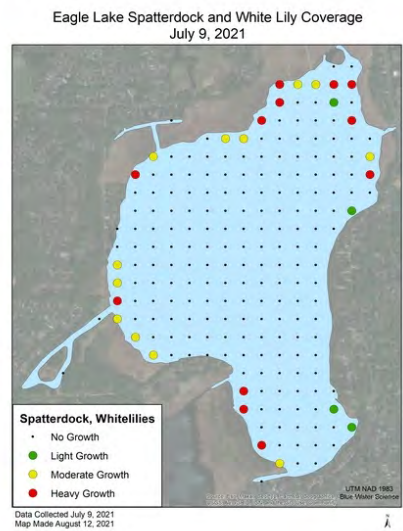
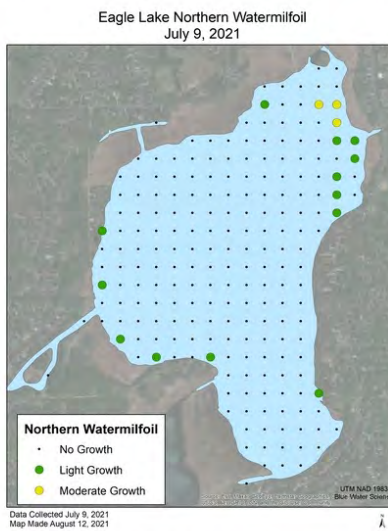
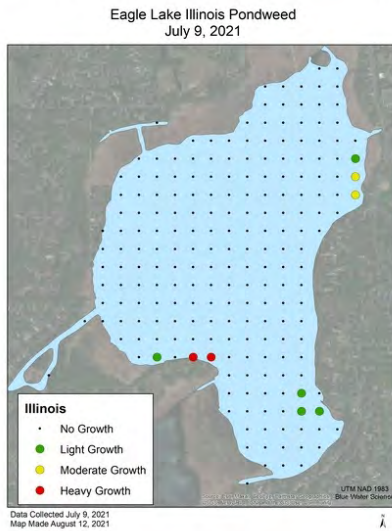
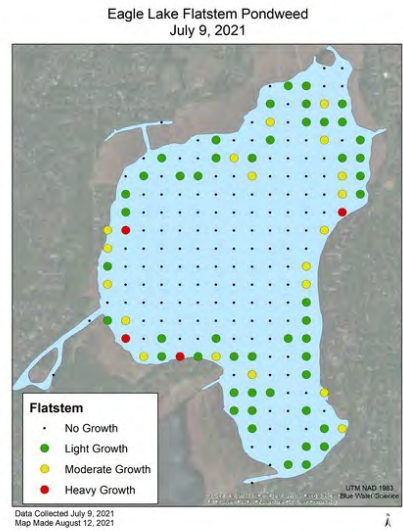
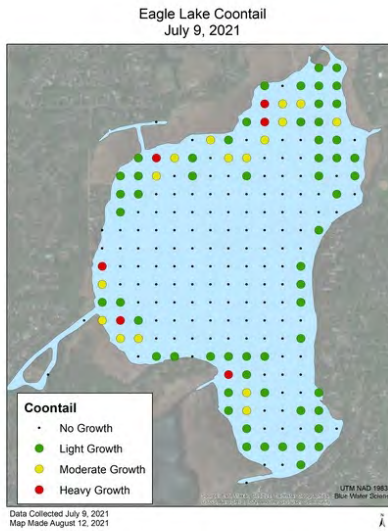
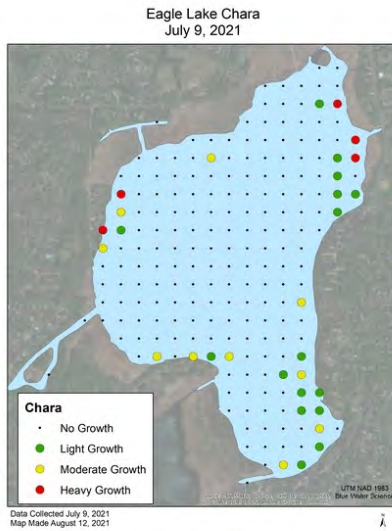


Figure 4. The number of aquatic plant species found at a sample point.

Aquatic Plant Abundance and Distribution



Eagle Lake Point Intercept Survey Statistics

A summary of plant statistics from the point intercept survey is shown in Tables 2 and 3 and Figure 5. Plants were observed in depths up to 13 feet and a total of 120 points were sampled from 0 to 13 feet of depth. However, 95% of plant occurrences were recorded from 2 to 11 feet representing 111 points (Table 2).

The aquatic plant coverage of Eagle Lake was estimated at 151 acres or 51% of the lake area. Since plant coverage does exceeds the 40% coverage criterium for good water clarity, Eagle may be sensitive to excessive nutrient inputs and loss of clarity in the future.

Table 2. Eagle Lake aquatic plant statistics (using M nDNR format).

Total # Points Sampled	148
Depth Range of Vegetation	2-13 ft
Maximum Depth of Growth (95%) in feet	11
# Points in Max Depth Range	111
# Points in Littoral Zone (0-15 feet)	133
% Points w/ Native Submersed Taxa	78
Mean Native Submersed Taxa/Point	2.0
Mean Density of Native Submersed Taxa	1.2
# Submersed Native Taxa	13

Table 3. Aquatic plants sampled by depth.

Depth (feet)	Number of Sites Sampled at that Depth	Percent Occurrence of Plants at that Depth
0	0	0
1	0	0
2	23	87%
3	34	100%
4	13	92%
5	11	100%
6	7	100%
7	4	75%
8	5	100%
9	3	100%
10	4	50%
11	7	71%
12	7	29%
13	2	50%
14	4	0
15	9	0
16	5	0
17	3	0
18	1	0
19	2	0
20	1	0
All sites	145	

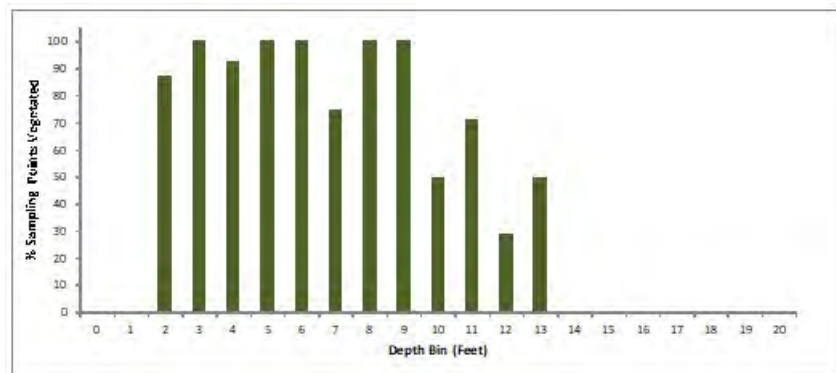


Figure 5. Growth depth of plant colonization out to 13 feet.

Representative Aquatic Plants in Eagle Lake

A total of 14 submerged aquatic plant species were observed in the Eagle Lake aquatic plant survey. Representative aquatic plant conditions and species are in Figure 6.



Figure 6. Representative aquatic plants and conditions in Eagle Lake in 2021.

APPENDIX

Individual Site Data for the Point Intercept Survey for Eagle Lake

Table A1. Individual site data for July 9, 2021. Numbers indicate plant density.

Site	Depth (ft)	Bulrush	Cattails	Duckweed	Spatterdock	White lilies	Chara	Coontail	CLP	Elodea	Flatstem	Illinois	Moss	Naiads	NWM	Sago	Star duckweed	Stringy	Water celery	Water star-grass	
1																					
2	2		1			2															
3	3						2				1									1	
4	3						1	1			1			1		1				2	
5	2				1	3		1													
6	13							1													
7	11							1													
8	5							1			1									2	
9	2						1	1			1									2	
10	11							1			1										
11	17																				
12	27																				
13	19																				
14	3						2	1			1			1							1
15	2					1					2										3
16	3					3		1			1										
17	3							2			1										
20	5						1	1			1	1		1						1	
21	3			1	1		1	1				1								1	
22	3					3		1			1										
23	5							2			1										
24	12							1			1										
25	19																				
26	4						1					1		1						1	
27	2						1	1	1		2			1	1						1
29	4							3													
30	4	1						1			2										
31	4																				
32	4						1														
33	6						2				1										
34	3					2					2										
35	3						2	1			1	1			1						
36	3							1			3								1	1	
37	2						2				1	3								1	
38	3						1	1			2	3			1						
39	5						2	1			1										
40	8							1			1								1		1
41	11							1													
42	7								1												
43	5						1				1									1	
44	4					2		2			3				1						
45	8							2									1				
46	10										1										
47	10																				
48	10																				
49	6										1										
50	15																				
51	18																				
52	20																				
53	8										1										
54	5							1	1		1										
56	3				2	2		2			1										
57	5							3			2										
58	10							1													
59	15																				
60	16																				
61	15																				
62	16																				
63	17																				
66	17																				
67	6										1										

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68	3					3		1												
69	7							1												
70	11																			
71	26																			
78	21																			
79	5						2	1			1									
80	2					2		2			2				1					
81	12																			
82	15																			
91	6							1			2									
92	3					2		3			1									
93	12																			
94	15																			
103	6							1			2									
104	3						2				2								1	
105	11																			
106	16																			
115	12																			
116	3						3				2				1					
117	5						1				3							1	1	
118	15																			
127	15																			
128	4							1			2									1
129	3						2	1			1			1						
130	14																			
139	16																			
140	7																			
141	3				1		1				3				1			1	1	
142	3						3	1			1									
143	8							1	1				1							
144	15																			
152	16																			
153	14																			
154	4						1	1			2				1					
155	2						1				1	2		1					1	2
156	2					3		1												
157	3							1			1									
158	7							2												
159	9										1									
160	6							1			1								1	
161	13																			
162	5								1							1	1			
163	11							1			2							1		
166	14																			
167	8							1												
168	4						1				2				1				1	
169	2				3			1			1	2							1	
170	2				2	1		1												
171	2							3			1									
172	3							2												
173	3							1												
174	3						2				1									
175	4		1					2			2									
176	4							2			1									
177	12																			
178	15																			
179	14																			
180	12							1		1							1			
181	4						1	1			1								1	1
182	3				2		3	1			1	1			1					
183	2		3																	
184	3				2			2			1									
185	2				2	1		1												
186	2		3																	
187	3							2			1									
188	12																			
189	11																1			
190	6							1			2						1	1		
191	3							1							1					

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192	3						3				1			2	1			1	1	
193																				
194	2					3		1										1		
195	2							3			2									
196	9							2									1			
197	9							1			1									
198	4	1						1			1									1
199	3					3		2			1				2					
200	3					3		3			1				1					
201	5							2												
202	3							2			1									
203	3					1	1	1			2				2					1
204	2						3	1			1				2					
205	2					3		1												
206	2					2					1									
207	3				2	1		1			1									
208	3				3	1		1												
209	2				3	1		1												
210	2		3					1												
211	2		3					1												
Average		1.0	2.3	1.0	2.0	2.1	1.6	1.4	1.0	1.0	1.4	1.7	1.0	1.1	1.2	1.0	1.0	1.0	1.2	1.4
Occur (150sites)		2	6	1	12	23	31	80	5	1	72	9	1	8	16	2	6	10	18	8
% occur		1	4	1	8	15	21	53	3	1	48	6	1	5	11	1	4	7	12	5