

ERCOL I Elk Lake Aquatic Vegetation Survey

A total of 27 aquatic plant taxa were documented during the survey conducted on Elk Lake. Of the total, 19 taxa were documented at sample sites (Table xx). The other 8 taxa were noted during community mapping and included: cattail (*Typha spp.*), sweet gale (*Myrica gale*), purple loosestrife (*Lythrum salicaria*), softstem bulrush (*Schoenoplectus tabernaemontani*), three square bulrush (*Schoenoplectus americanus.*), white water lily (*Nymphaea odorata*), yellow water lily (*Nuphar variegata*), and rushes (*Juncus spp.*). Aquatic plants were found at 105 of 349 sample sites. The number of aquatic plant taxa found at a site ranged from zero to six with an average of 0.63 taxa per site. Typical for lakes in this region, the pondweed family (*Potamogetonaceae*) was the most speciose, with a total of 7 pondweed species documented in Elk Lake. Two invasive plant species were encountered during this survey: purple loosestrife and hybrid Eurasian watermilfoil.

Table xx. Elk Lake aquatic plant taxa occurrence at sample sites.

Scientific Name	Common Name	Total Sites	Total % Sites*
<i>Chara spp.</i>	Muskgrass	119	52.0
<i>Valisneria americana</i>	Eelgrass	22	9.6
<i>Potamogeton amplifolius</i>	Broad-leaf Pondweed	18	7.9
<i>Najas flexilis</i>	Slender Naiad	18	7.9
<i>Myriophyllum heterophyllum</i>	Variable-leaf Watermilfoil	15	6.6
<i>Schoenoplectus subterminalis</i>	Swaying bulrush	6	2.6
<i>Potamogeton spp.</i>	Pondweed (species unknown)	6	2.6
<i>Potamogeton gramineus</i>	Variable-leaf Pondweed	5	2.2
<i>myriophyllum spicatum x sibiricum</i>	Hybrid Watermilfoil	3	1.3
<i>Sagittaria spp.</i>	Arrowhead	3	1.3
<i>Potamogeton zosteriformis</i>	Flat-stem Pondweed	2	0.9
<i>Potamogeton natans</i>	Floating-leaf Pondweed	2	0.9
<i>Elodea canadensis</i>	Waterweed	2	0.9
<i>Myriophyllum sibiricum</i>	Northern Watermilfoil	2	0.9
<i>Stuckenia filiformis</i>	Pondweed (Stuckenia)	2	0.9
<i>Potamogeton richardsonii</i>	Richardson's Pondweed	1	0.4
<i>Potamogeton robbinsii</i>	Robbin's Pondweed	1	0.4
<i>Potamogeton friesii</i>	Frei's Pondweed	1	0.4
<i>Stuckenia pectinata</i>	Pondweed (Stuckenia)	1	0.4

*Percent of sites based on vegetated sites.

Muskgrass, eelgrass, broad-leaf pondweed, and slender naiad were the most commonly encountered species, collected at approximately 52%, 10%, 8%, and 8% of vegetated sites, respectively (Table xx). The next most commonly collected taxa were variable-leaf watermilfoil,

swaying bulrush, pondweed (species unknown), and variable pondweed, which were collected at 7%, 3%, 3%, and 2% of vegetated sites, respectively. In addition to being the most commonly collected plant, Muskgrass was also the most abundant, found in abundance at 6.5% of vegetated sites (Table xx). Eelgrass and slender naiad followed with being the most abundant at 1.3% and 0.9% of vegetated sites, respectively. Variable leaf watermilfoil and broad-leaf pondweed, which were both commonly encountered species, were only considered abundant at one vegetated site.

Table xx. Elk Lake plant taxa abundance at sample sites.*

Scientific Name	Common Name	Abundant % of Sites	Common % of Sites	Uncommon % of Sites	Rare % of Sites
Chara spp.	Muskgrass	6.5	11.3	12.6	21.3
Valisneria americana	Eelgrass	1.3	1.7	0.9	5.6
Potamogeton amplifolius	Broad-leaf Pondweed	0.4	0.4	0	5.2
Najas flexilis	Slender Naiad	0.9	0.4	5.2	1.3
Myriophyllum heterophyllum	Variable-leaf Watermilfoil	0.4	0.9	3.9	1.3
Schoenoplectus subterminalis	Swaying bulrush	0	0	0	0.4
Potamogeton spp.	Pondweed (species unknown)	0.4	0.4	0.9	0.9
Potamogeton gramineus	Variable-leaf Pondweed	0	0.4	1.3	0.4
myriophyllum spicatum x sibiricum	Hybrid Watermilfoil	0	0	0.4	0.9
Sagittaria spp.	Arrowhead	0	0	0	1.3
Potamogeton zosteriformis	Flat-stem Pondweed	0	0.9	0	0
Potamogeton natans	Floating-leaf Pondweed	0	0	0	0.9
Elodea canadensis	Waterweed	0	0	0	0.9
Myriophyllum sibiricum	Northern Watermilfoil	0	0	0	0.9
Stuckenia filiformis	Pondweed (Stuckenia)	0	0	0	0.9
Potamogeton richardsonii	Richardson's Pondweed	0	0	0.4	0
Potamogeton robbinsii	Robbin's Pondweed	0	0	0	0.4
Potamogeton friesii	Frei's Pondweed	0	0	0	0.4
Stuckenia pectinata	Pondweed (Stuckenia)	0	0	0.4	0

*Abundance based on number of rake throws the plant is collected at each vegetated site. 4 = Abundant, 3 = Common, 2 = Uncommon, 1 = Rare.

No plant growth was found at the majority of samples sites on Elk Lake. Roughly 30 % of the lake supported aquatic plant communities. Approximately 22% of total lake area fell into light vegetation categories (very light, light, and light to moderate). Most of the remaining lake area was classified as moderate or moderate to heavy density vegetation at 5.4% and 1.4%, respectively. Very heavy-density vegetation was not found at any sites on Elk Lake and heavy vegetation was limited to two sites.

Table xx. Elk Lake plant densities at sample sites.

Density Category	Number of Sites	Percentage of Sites
Little/no vegetation	244	69.9
Very Light	38	10.8
Light	25	7.1
Light to Moderate	16	4.5
Moderate	19	5.4
Moderate to Heavy	5	1.4
Heavy	2	0.5
Very Heavy	0	0
TOTAL	349	100

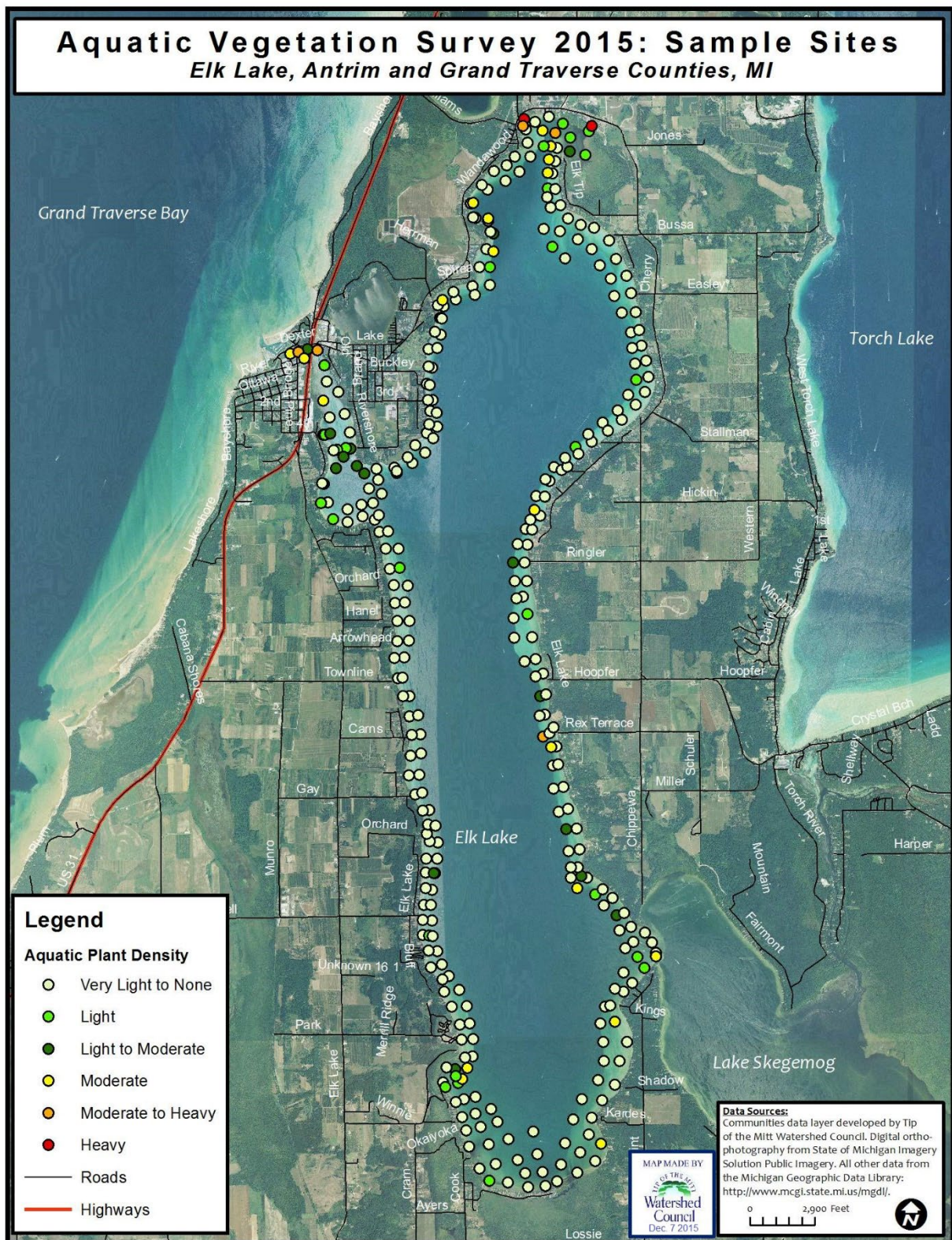


Figure xx. Sample sites for Elk Lake vegetation survey.

Elk Lake Aquatic Plant Communities

Plant community mapping showed that 3.7% of Elk Lake contained aquatic vegetation (Table xx). Of the area supporting aquatic plant growth, 61% was muskgrass. The next most extensive plant community was water lilies, both yellow and white. Approximately 10% of the vegetated area was dominated by emergent vegetation, which occurred primarily in nearshore areas (Figure xx).

Table xx. Elk Lake dominant aquatic plant communities.

Dominant Community Type	Lake Surface Area (acres)	Surface Area (percent)*
Muskgrass	189.29	61.08
Waterlily	27.63	8.92
Eelgrass	18.06	5.83
Naiad and Muskgrass	13.93	4.50
Watermilfoil and Sagitaria	10.75	3.47
Eelgrass and Muskgrass	10.51	3.39
Pondweed, Naiad, and Muskgrass	8.69	2.81
Pondweed and Watermilfoil	6.17	1.99
Pondweed, Eelgrass, and Naiad	5.05	1.63
Multiple Species	5.04	1.63
Pondweed and Muskgrass	4.25	1.37
Pondweed	3.22	1.04
Cattail	2.25	0.73
Watermilfoil	2.08	0.67
Pondweed, Eelgrass, and Muskgrass	1.27	0.41
Purple Loosestrife	0.53	0.17
Pondweed, Watermilfoil, and Muskgrass	0.43	0.14
Bulrush	0.39	0.13
Sweet Gale	0.20	0.07
Eurasian Watermilfoil	0.04	0.01
Arrowhead	0.02	0.01
TOTAL	309.90	100.0

*Refers to percent of surface area with aquatic vegetation (i.e., 309.90 acres).

Vert light-density plant growth was common in Elk Lake for approximately 38% of vegetated areas (Table xx). Heavy-density growth, including very heavy, accounted for less than one acre. There were two main patches of moderate growth in Elk Lake, in the northern-most bay and on the west side of the lake near Elk Rapids (Figure xx).

Table 1. Elk Lake plant community density statistics.

Aquatic Plant Density	Lake Surface Area (acres)*	Lake Surface Area (percent)*
Very Light	119.61	38.6
Light	81.63	26.34
Light to Moderate	35.90	11.58
Moderate	64.07	20.67
Moderate to Heavy	5.95	1.92
Heavy	2.43	0.78
Very Heavy	0.31	0.10
TOTAL	309.90	100.0

*Refers to percent of surface area with aquatic vegetation (i.e., 309.90 acres).

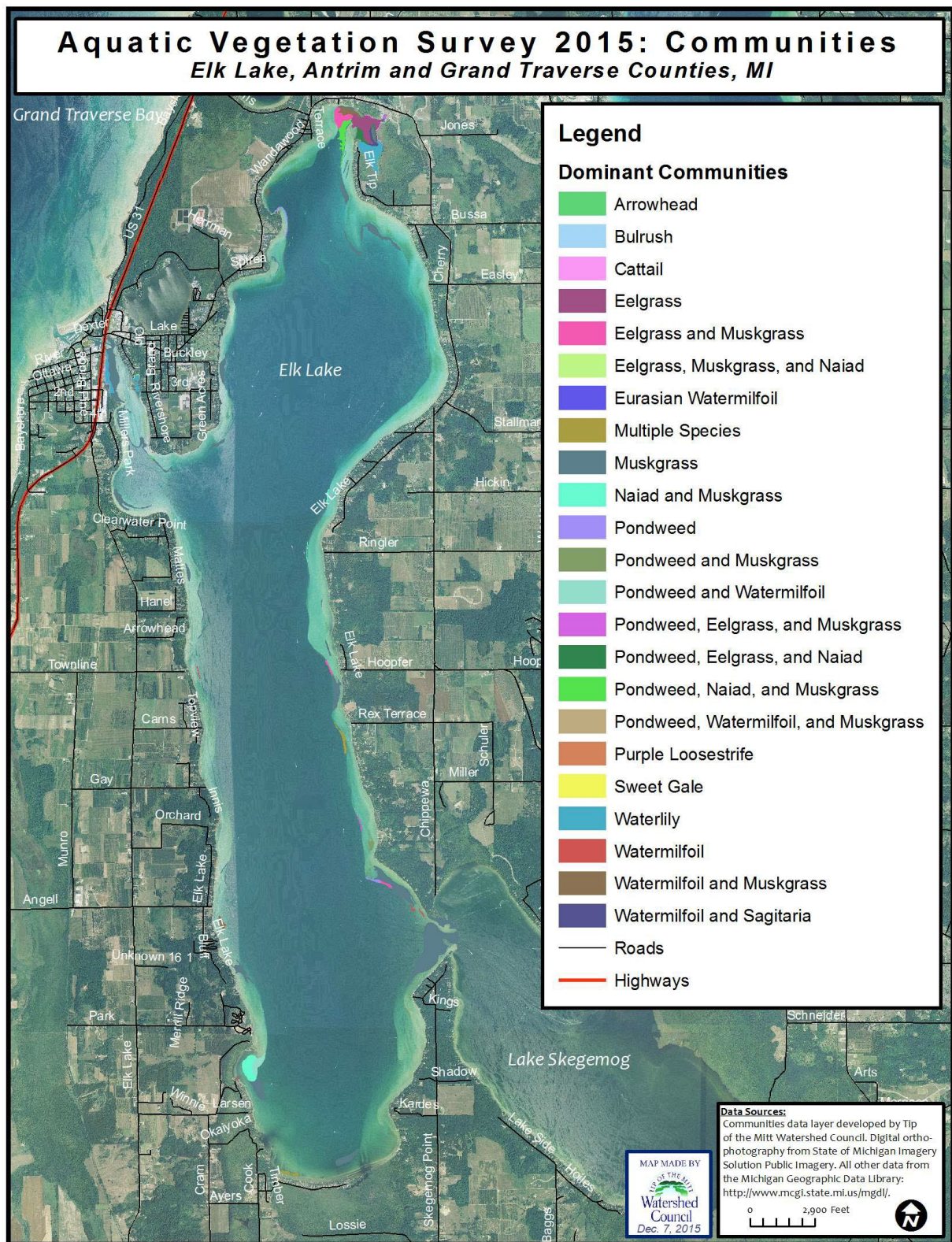


Figure xx. Aquatic plant communities in Elk Lake.

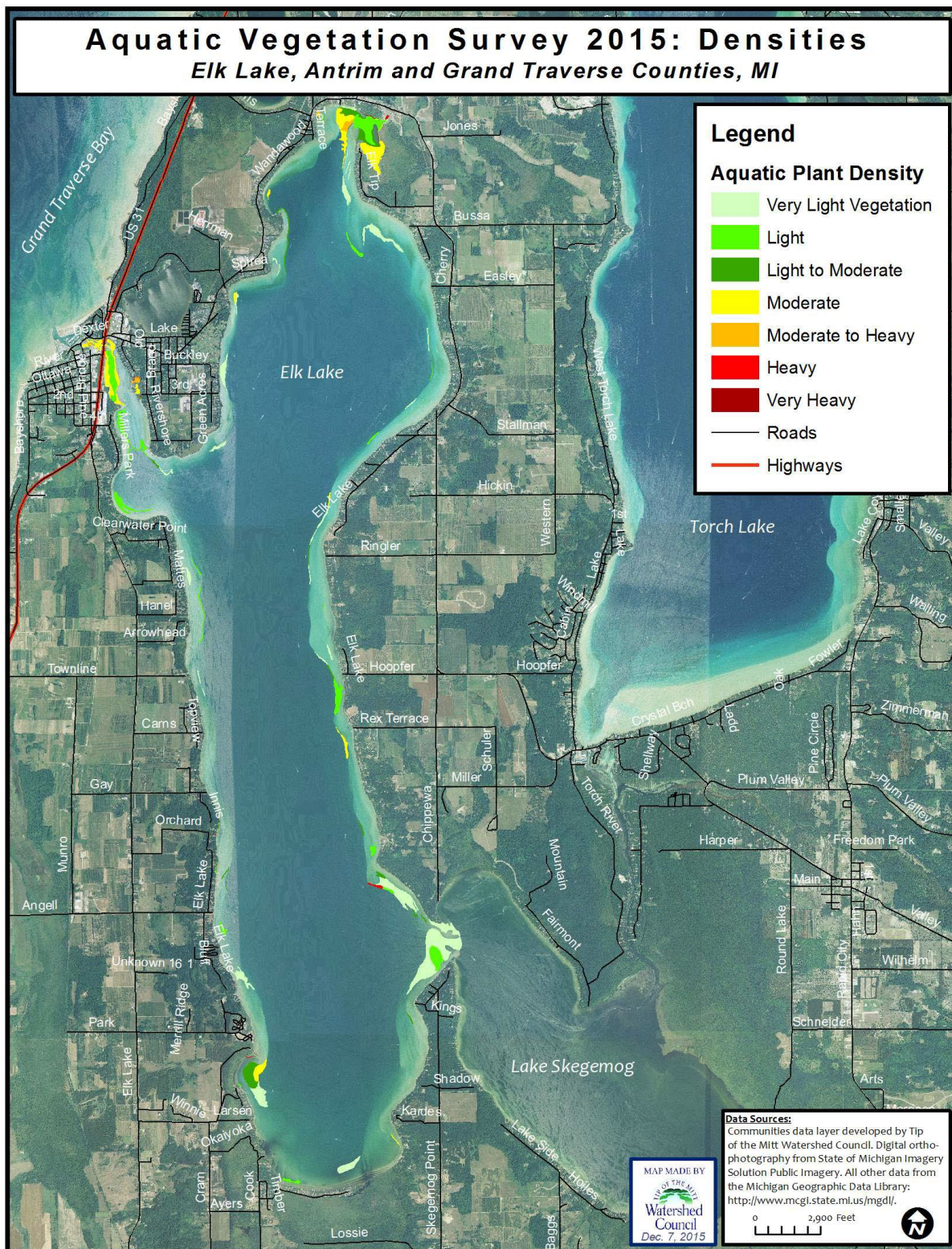


Figure xx. Elk Lake aquatic plant community densities.