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Coastal Lakes Aquatic Plant Survey Report

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Coastal Lakes Aquatic Plant Survey Report

Prepared for
USDA Forest Service
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Contents

List of Figures

List of Tables

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Section 1.01 Introduction

Invasive, non-indigenous plants can degrade water quality and fish habitat when they invade lakes, ponds, and streams. Changes in plant community architecture in lakes due to invasion by canopy-forming invasive aquatic plants can result in loss of native plant biodiversity and reduction of the structural complexity of the underwater habitat. Differences in photosynthetic biochemistry between non-indigenous and native plants can result in large diurnal pH and dissolved oxygen concentrations.

Humans are the primary means of dispersal of non-indigenous aquatic plants. Transportation on trailered boats is a known vector of movement between lakes. Another vector is deliberate introduction by humans. The fragrant waterlily (*Nymphaea odorata*), for example, has been intentionally planted in some lakes. The recent increase in popularity of water gardens has resulted in escape of ornamental, aquatic plants into natural systems

Early detection of new infestations is key to control of invasive aquatic plants. Since aquatic plant species vary in their response to management activities, effective management of infested lakes and ponds is predicated upon a good understanding of the species present.

Regular surveys are critical to development of baseline information on aquatic plant communities and early detection of new invaders. While some of the major lakes on the south-central coast of Oregon have been the subject of regular and somewhat rigorous aquatic plant surveys (e.g., Tenmile Lakes), most have received only cursory, if any,

attention to the aquatic plant community, especially the submersed, aquatic plant community.

Section 1.02 Methods

Twenty-two lakes within and adjacent to the boundaries of the Siuslaw National Forest were surveyed for aquatic plants in July, August, and September, 2003 (Figure 1, 2). The lakes were classified into two size categories - small (<100 acres) or large (> 100 acres) (Table 1). Fringing wetlands and emergent vegetation were not included in the survey. Plant survey protocols were different for the two size categories. Small lakes were surveyed by walking the shoreline, tossing a plant rake into the lake, and identifying the plants retrieved. Where access was possible, a small inflatable boat or canoe was used to gain access to mid-lake areas. Surveys were conducted until no new species were found for a period of one hour. GPS locations of each rake toss were recorded and voucher specimens (one per species per lake) were prepared and deposited in the PSU Herbarium. Voucher specimens of *Nuphar polysepalum* and *Nymphaea odorata* were not made.

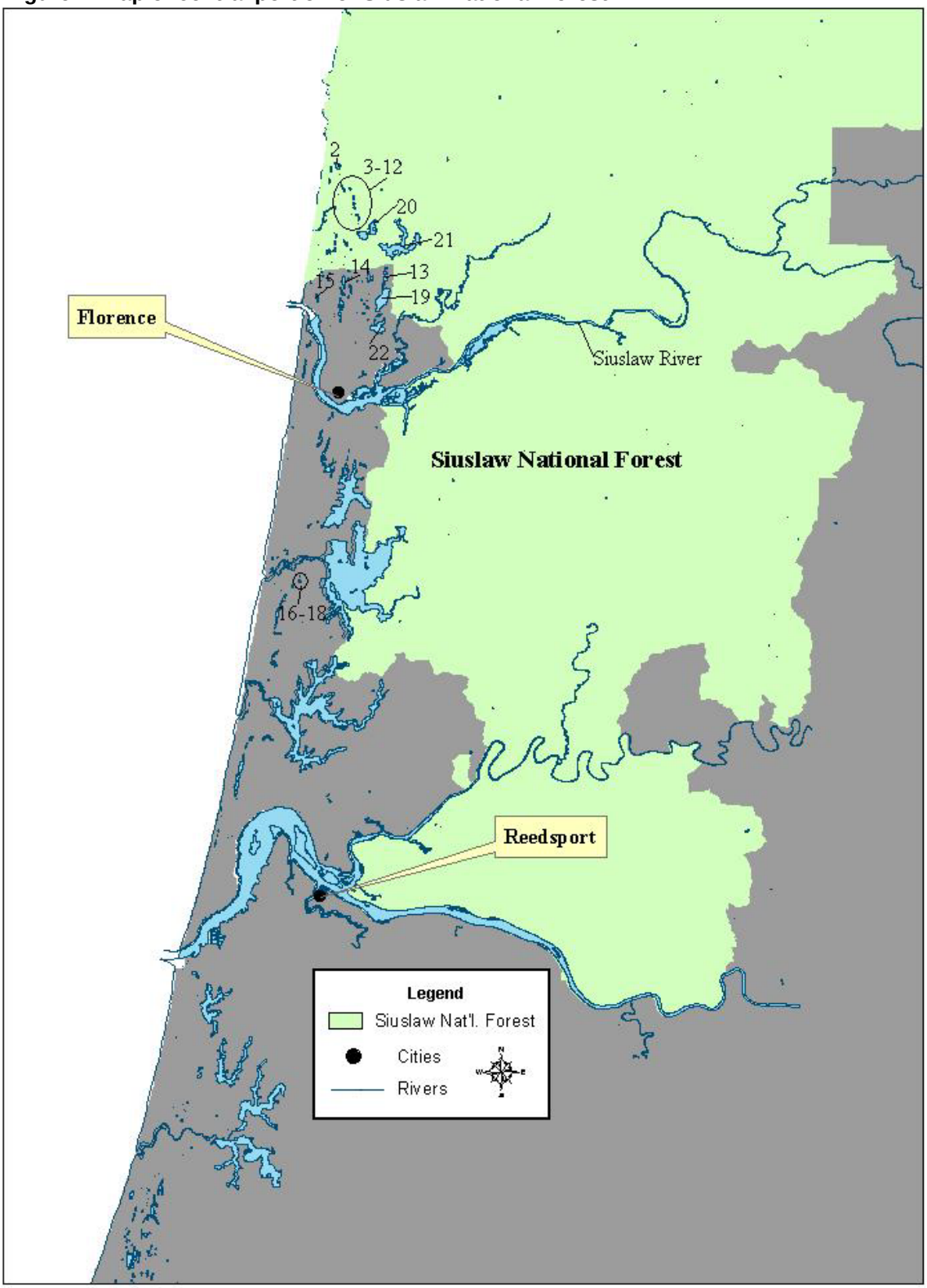
The large lakes were surveyed by choosing ten random transects in each lake. Each transect ran from shore to the maximum depth of macrophyte colonization. Rake tosses from a boat were made at every one meter increment in depth along the transect as measured by an on-board depth detector. GPS locations and species abundance were recorded for each rake toss. Voucher specimens (one per species per lake) were prepared and deposited in the PSU Herbarium.

Table 1. Lakes surveyed for aquatic plants in summer 2003. Lakes are listed from northernmost to southernmost.

#	Name of lake	Size (acres)		#	Name of lake	Size (acres)
	Small lakes				*Large lakes*	
1	Hebo Lake	1		19	Clear Lake	153
2	Lily Lake	10		20	Sutton Lake	107
3	Unnamed #1	2		21	Mercer Lake	359
4	Unnamed #2	1		22	Munsel Lake	110
5	Unnamed #3	3				
6	Lake Marr	2				
7	Alder Lake	3				
8	Dune Lake	2				
9	Buck Lake	4				
10	Unnamed #4	<1				
11	Unnamed #6	<1				
12	Orphan – Sutton Lake	1				
13	Collard Lake	43				
14	Heceta Junction Lake	8				
15	Unnamed – Heceta Beach	8				
16	North Georgia Lake	1				
17	Georgia Lake	1				
18	Erhart Lake	1				

Figure 1. Map of northern portion of Siuslaw National Forest

Figure 2. Map of central portion of Siuslaw National Forest



Section 1.03 Results

Lists of vascular plant species found in each lake are tabulated in Appendix A. Tables contain the botanical name, the common name, and whether the species grows as an aquatic or emergent. Geographic coordinates for each sample point, the botanical names of species collected at each point, and estimates of abundance are tabulated in Appendix B.

Aquatic vascular plant species that were collected and identified were placed into three categories: introduced, nuisance species (INUS); introduced, non-nuisance species (INON); and native species (NAT) (Table 2). In addition, the presence or absence of public boat ramps was recorded for each lake.

Eight of the lakes surveyed contained introduced, nuisance species (Table 3); three contained introduced, non-nuisance species (Table 4); and the remainder (eleven) contained only native species. Of those lakes containing introduced, nuisance species, two had more than one nuisance species. Unnamed- Heceta Beach had two (*Myriophyllum aquaticum* and *Myriophyllum spicatum*) and Sutton Lake had four (*Cabomba caroliniana, Egeria densa, Myriophyllum spicatum, Nymphaea odorata*). The most commonly occurring INUS was *Nymphaea odorata*, found in five lakes

The only introduced, non-nuisance, aquatic species detected in the survey was *Callitriche stagnalis* . *C. stagnalis* forms floating mats on the surface of shallow waters. It is not listed on any of the noxious weed lists of the western coastal states and does not seem to be problematic to humans.

Table 2. Numbers of aquatic plant species found in lakes within Siuslaw National Forest. (INUS = Introduced, nuisance species; INON = Introduced, non-nuisance species; NAT = Native species)

Name of lake	Public boat ramp	INUS	INON	NAT	TOTAL
Small lakes					
Hebo Lake	No	1	0	3	4
Lily Lake	No	0	1	12	13
Unnamed #1	No	0	0	5	5
Unnamed #2	No	0	0	2	2
Unnamed #3	No	0	0	3	3
Lake Marr	No	0	0	11	11
Alder Lake	No	0	0	7	7
Dune Lake	No	0	0	6	6
Buck Lake	No	0	0	7	7
Unnamed #4	No	0	0	1	1
Unnamed #6	No	0	0	2	2
Orphan-Sutton Lake	No	0	1	8	9
Collard	No	1	0	11	12
Heceta Junction Lake	No	0	0	9	9
Unnamed-Heceta Beach	No	2	0	8	10
North Georgia Lake	No	0	0	1	1
Georgia Lake	No	0	1	3	4
Erhart Lake	No	1	0	2	3
Large lakes					
Clear Lake	No	1	0	12	13
Sutton Lake	Yes	4	0	14	18
Mercer Lake	Yes	1	0	4	5
Munsel Lake	Yes	1	0	10	11

Table 3. Introduced, nuisance species (INUS) of aquatic plants found in lake surveys.

Name of lake	INUS
Hebo Lake	*Nymphaea odorata*
Collard Lake	*Nymphaea odorata*
Unnamed Heceta Beach	*Myriophyllum aquaticum, Myriophyllum spicatum*
Erhart Lake	*Myriophyllum aquaticum*
Clear Lake	*Nymphaea odorata*
Sutton Lake	*Cabomba caroliniana, Egeria densa, Myriophyllum spicatum, Nymphaea odorata*
Mercer Lake	*Egeria densa*
Munsel Lake	*Nymphaea odorata*

Table 4. Introduced, non-nuisance species of aquatic plants (INON) found in lake surveys

Name of lake	INON
Lily Lake	*Callitriche stagnalis*
Orphan Sutton Lake	*Callitriche stagnalis*
Georgia Lake	*Callitriche stagnalis*

All of the lakes which have a public boat ramp contain at least one INUS. In contrast, INUS were detected at only 22% of lakes having no public boat ramp (Figure 1). These data provide additional support for the hypothesis that trailered boats are a primary vector for transport of nuisance aquatic plants.

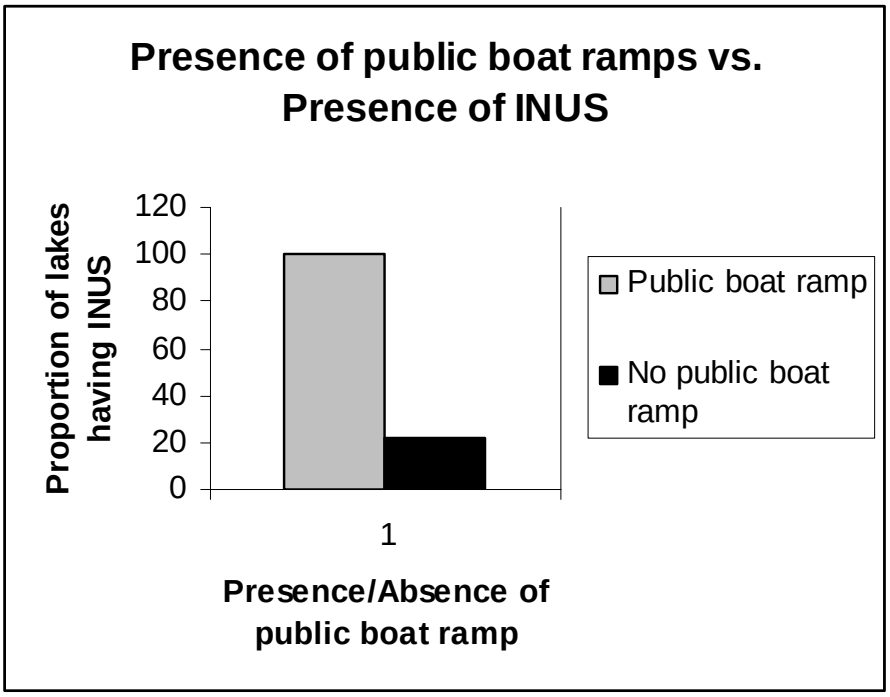


Figure 3. Presence of public boat ramps vs presence of introduced, nuisance aquatic plant species (INUS) in lakes of Siuslaw National Forest, 2003

Section 1.04 Conclusions and recommendations

It is likely that the limited public access to the smaller lakes, generally restricted to foot access (or none as in the case of lakes on private property), is a major factor in their relatively low levels of invasion by aquatic nuisance plants. Data from this survey clearly show that the presence of introduced aquatic plant species in lakes is correlated with the presence of public boat ramps. Limiting the number of boat ramps on lakes within the Siuslaw National Forest to those already in existence would be an effective management strategy to help prevent infestation of other lakes.

Water chemistry parameters, such as pH, alkalinity, clarity, and turbidity, play a significant role in determining the locations and abundance of aquatic weeds in lakes. Future aquatic plant surveys would be more informative if, in addition to identifying plant species present, basic water chemistry parameters were measured.

Development and implementation of management plans for those lakes already infested with INUS would be a way to control INUS in those waterbodies. Preventive measures

would reduce the likelihood of their spread to other, uninfested waterbodies. Given the heavy human use of many of the lakes included in this survey, public education and outreach activities could reduce the likelihood of future infestations of lakes within the Siuslaw National Forest.

The remainder of this section discusses each of the 22 surveyed lakes.

Hebo Lake is a small, man made lake which is bordered by a campground and several constructed fishing docks. The dominant aquatic plans there are *Nymphaea odorata* (fragrant waterlily), which forms a solid floating mass of leaves on the east side of the lake, and *Nitella*, a macro-alga, which carpets the lake bottom. *Nymphaea odorata* typically inhabits water of no more than two meters in depth so it is unlikely that it will spread over the entire surface of the lake. The lake contains native crayfish, which were caught several times in the sampling rake, and newts. Trailered boats cannot be launched there although canoe and raft access is easy.

Lily Lake has restricted foot access and is one of the most species-rich lakes surveyed. Lily Lake contains 13 aquatic plant species, twice the average for this survey, none of which are introduced, nuisance species. There is a Forest Service loop trail that passes by Lily Lake, however the trail does not extend through the dense stand of bulrushes which surrounds the lake. This vegetative barrier seems to act as an effective screen to all but the most determined. Maintaining this limited access would help prevent the spread of invasive aquatic plants to this lake by humans.

Unnamed ponds 1, 2, and 3 are difficult for humans to access on foot, especially ponds 2 and 3. Pond 2 lies at the base of a steep sided, brush covered slope. Pond 3 was little more than a large, snag- filled mudflat at the time of the survey although it is clear that water levels are much higher earlier in the season. None of them contained introduced aquatic plant species although these could be brought in as fragments or seeds by birds from neighboring waterbodies

Lake Marr is on private, fenced property. The property owners have a paddle boat on the lake but no dock. The bottom of this lake is covered with *Scirpus subterminalis* (water bulrush) which is on the Natural Heritage Program List of Rare, Threatened and Endangered Plants and Animals of Oregon. This species was found in several other lakes surveyed and is probably not as uncommon as once thought. Submersed, aquatic plants tend to be underreported and seldom surveyed adequately.

Alder Lake and **Dune Lake** are situated adjacent to one another within a Forest Service campground. Neither lake has a boat ramp although access to both lakes by foot is convenient. Alder Lake has a large shallow arm at its west end which contains *Phalaris arundinacea* (Reed's canary grass), an aggressive colonizer of saturated soils. This grass is less tolerant of inundation so as long as water levels remain high, it will probably not be a serious problem. If lake levels drop however, it could spread into exposed sediments .

The southern shoreline of **Buck Lake** is managed by the USFS which has not developed any trails or public access points. The remainder of the shoreline is owned by a trailer park which hosts temporary visitors as well as permanent residents. There is easy foot access to the lake from the trailer park for residents and their guests who use the lake for swimming and fishing. No non-indigenous aquatic plants were found.

Access to **unnamed ponds 4 and 6** is difficult. Pond 4 lies at the base of a steep sand dune. It is very small and dark colored from dissolved tannins. Pond 6 is surrounded by dense forest and was accessed from Highway 101. Only one sample point was possible in each of these ponds due to the difficult terrain. The plant rake did not collect any specimens so those species identified were done so from leaves floating on the surface some distance from the sample point. It is possible that other aquatic species which we were not able to sample are in these two ponds.

Orphaned portion of Sutton Lake was formed by the construction of U.S. Highway 101 which isolated the northwest corner from the rest of Sutton Lake. Like Sutton Lake proper, it is relatively species rich but only one non-indigenous aquatic plant species was found here -*Callitriche stagnalis* (pond waterstarwort). We were not able to access and sample the entire lake so this lake could contain other non-indigenous aquatic plant species. Human access to this pond is difficult and unlikely to be a vector for infestation. Animal transport of propagules from the heavily infested Sutton Lake proper is, however, quite possible.

Sutton Lake is particularly rich in aquatic plant species (18), although four of these species are INUS. Among these four is *Cabomba caroliniana* (fanwort) which, until now, has only been known on the Oregon coast from Clatsop County. *Cabomba* is pH sensitive, i.e., it prefers neutral to acidic water. The pH of this lake is 6.8 which would explain its growth there. Sutton Lake has a public boat ramp and the lake is popular with visitors to the coast. Transport on trailered boats from Clatsop lakes is a possible source of the *Cabomba* infestation here. This new report of an INUS points up the need for preventive measures like public education as part of an overall management plan for Forest Service lakes. *Myriophyllum spicatum* (Eurasian watermilfoil), *Egeria densa* (Brazilian elodea), and *Nymphaea odorata* (fragrant waterlily) are well established and abundant in the lake while *Cabomba* was only found in small amounts.

Sutton Lake is connected to **Mercer Lake** via Mercer Creek so water transport of plant parts between the two waterbodies is possible. Despite this, *Cabomba* is unlikely to successfully invade Mercer Lake due to the high pH = 8.7 of that lake. *Egeria densa* (already present in Mercer Lake), *Myriophyllum aquaticum*, and *M. spicatum* all tolerate a broad pH range (pH 5 to pH 11) thus their potential range is less restricted than that of *Cabomba*. The presence of a public boat ramp coupled with the long and irregular shoreline makes for many possible sites of new infestations which could easily go undetected.

Collard, Clear, and **Munse**l Lakes are part of of a string of lakes that lie on the North Florence dunal aquifer. These lakes are all connected to each other via permanent streams. Collard Lake has private residences lining its shores many of which have small, private docks on the lake. So far, the only INUS in Collard Lake (*Nymphaea odorata*) was likely planted there as an ornamental. There is a high risk of invasion by other INUS from boats being brought into the lake from other, infested waterbodies. If other INUS become established in Collard Lake, fragments could be easily transported via Collard Creek into Clear Lake, which is a drinking water supply for the area,. This risk could be reduced by educating residents about INUS, particularly about preventive measures such as cleaning boats and equipment.

Access to Clear Lake is by permission of the Heceta Water District. Generally, the only boats on the lake are those of the water district personnel doing water quality sampling. Thus, the likelihood of transport of INUS into the lake via boats is low. The *Nymphaea odorata* which is there could have come from seeds, which are water dispersed, or from intentional plantings.

The only INUS detected in Munsel Lake was *Nymphaea odorata.* Munsel Lake has a public boat ramp so it is likely that other INUS will eventually show up there.

Heceta Junction Lake is relatively rich in species (9). The lake is privately owned and has several residences lining the shore. Residents use the lake for boating, swimming and fishing. Its limited access will probably reduce the likelihood of new, unintentional introductions of INUS, however residents should be educated about preventive measures that they can take.

Of special interest is **unnamed – Heceta Beach lake**, the unnamed lake on the east side of the dunes which border Heceta Beach, near the north jetty of the Siuslaw River. Human access to this small, shallow lake is inconvenient, requiring a hike through scrub

vegetation and then through trees surrounding the lake. The lake is shallow with a soft, muddy bottom and a raft or canoe is necessary to adequately access it. Not only does this lake support a high number of aquatic plant species (12), it is the only one surveyed which supports a sphagnum bog community. The bog is on the eastern shore of the lake and contains a large population of *Drosera rotundifolia* (roundleaf sundew). It also contains *Lillaea scilloides*, which is on the Oregon Natural Heritage Program List of Rare, Threatened and Endangered Plants and Animals of Oregon, as well as other species. Unfortunately, *Myriophyllum aquaticum* (parrotsfeather) and *M. spicatum* (Eurasian watermilfoil) are dominant vegetation components on the western side of the lake and will likely spread to dominate the entire waterbody if some sort of control activity is not done.

Given the limited human access now in effect, it is curious that this lake contains two aggressive, aquatic, nuisance species. These nuisance species could have been introduced into the lake by humans in the past. There are old water control structures nearby which might indicate an historic human impact on the hydrology of the lake. It is also possible that birds were the source of these introductions, especially since both of these invasives are well established in the local area.

North Georgia Lake and **Georgia Lake** both lie south of the Siuslaw River on the east side of U.S. Highway 101. Access to both lakes is by foot and both lakes are popular fishing spots. The only aquatic plant found in North Georgia Lake (*Callitriche* sp.) was not identifiable to species due to the absence of flowers or fruits. It could be one of several species of *Callitriche* present in local lakes one of which is an introduced, non-nuisance plant, *Callitriche stagnalis.* Georgia Lake is closer to the highway than North Georgia Lake and is easier to access. Both lakes are close to waterbodies which are already infested with *Myriophyllum aquaticum* (parrotsfeather) and they could become invaded by this species.

While it is not the only aquatic plant species present in **Erhart Lake**, *M. aquaticum* is the most abundant. There is no boat ramp on this small lake and it is possible that plant

fragments carried in by birds from surrounding infested lakes were the initial source of the population in Erhart Lake.

Section 1.05 Acknowledgements

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Steve and Jan Wray, Lake Marr

Charlie Chance, Buck Lake

Andy and Sandy Fedoruk, Collard Lake

Elmer Waite (Heceta Water District), Clear Lake

Leo Estegreen, Heceta Lake

Section 1.06 Appendix A. SPECIES LISTS

Gray shading indicates that the species is non-indigenous.

Table 5. Hebo Lake species list

Botanical name	Common name	Aquatic	Emergent
Chara sp.	Muskgrass	+	
Elodea canadensis	Common waterweed	+	
Nitella sp.	Nitella	+	
Nymphaea odorata	Fragrant waterlily	+	

Table 6. Lily Lake species list

Botanical name	Common name	Aquatic	Emergent
Azolla mexicana	Mexican water fern	+	
Callitriche hermaphroditica	Autumnal water-starwort	+	
Callitriche heterophylla	Different leaved water-starwort	+	
Callitriche stagnalis	Pond water -starwort	+	
Hydrocotyle ranunculoides	Water pennywort	+	
Lemna minor	Lesser duckweed	+	
Najas flexilis	Slender water-nymph	+	
Nuphar polysepalum	Spatterdock	+	
Potamogeton epihydrus	Ribbonleaf pondweed	+	
Potamogeton pusillus	Small pondweed	+	
Utricularia vulgaris *	Common bladderwort	+	

Table 7. Unnamed pond #1 species list

Botanical name	Common name	Aquatic	Emergent
Eleocharis palustris	Common spike-rush		+
Potamogeton natans	Floating leaved pondweed	+	
Ranunculus flammula	Small creeping buttercup	+	
Veronica catenata	Chain speedwell	+	

Table 8. Unnamed pond #2 species list

Botanical name	Common name	Aquatic	Emergent
Veronica catenata	Chain speedwell	+	

Table 9. Unnamed pond #3 species list

Botanical name	Common name	Aquatic	Emergent
Carex sp.	Sedge		+
Eleocharis sp.	Spikerush		+
Potentilla anserina	Common silverweed		+

Table 10. Lake Marr species list

Botanical name	Common name	Aquatic	Emergent
Callitriche heterophylla	Different leaved water-starwort	+	
Callitriche verna	Spring water- starwort	+	
Ludwigia palustris	Water purslane	+	
Najas flexilis	Slender water-nymph	+	
Nuphar polysepalum	Spatterdock	+	
Potamogeton epihydrus	Ribbonleaf pondweed	+	
Potamogeton pusillus	Small pondweed	+	
Ranunculus flammula	Small creeping buttercup	+	
Scirpus subterminalis	Water bulrush	+	
Sparganium eurycarpum	Giant bur-reed		+
Utricularia vulgaris *	Common bladderwort	+	

Table 11. Alder Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche verna	Spring water starwort	+	
Carex lyngbei	Lyngby's sedge		+
Juncus supiniformis	Spreading rush	+	
Nuphar polysepalum	Spatterdock	+	
Phalaris arundinacea	Reed's canary grass		+
Polygonum amphibium	Water smartweed	+	

Table 11. Alder Lake cont'd.

Ranunculus flammula	Small creeping buttercup	+	
Scirpus subterminalis	Water bulrush	+	
Sparganium eurycarpum	Giant bur-reed		+
Veronica catenata	Chain speedwell	+	

Table 12. Dune Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche hermaphroditica	Autumnal water starwort	+	
Juncus supiniformis	Spreading rush	+	
Ludwigia palustris	Water purslane	+	
Najas flexilis	Slender water -nymph	+	
Potamogeton natans	Floating leaved pondweed	+	
Ranunculus flammula	Small creeping buttercup	+	
Veronica catenata	Chain speedwell	+	

Table 13. Buck Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche heterophylla	Different leaved water starwort	+	
Chara sp.	Musk grass	+	
Juncus supiniformis	Spreading rush	+	
Najas flexilis	Slender water-nymph	+	
Potamogeton pusillus	Small pondweed	+	
Ranunculus flammula	Small creeping buttercup	+	
Veronica catenata	Chain speedwell	+	

Table 14. Unnamed pond #4 species list

Botanical name	Common name	Aquatic	Emergent
Nuphar polysepalum	Spatterdock	+	

Table 15. Unnamed pond #6 species list

Botanical name	Common name	Aquatic	Emergent
Nuphar polysepalum	Spatterdock	+	
Potamogeton sp.	Pondweed	+	

Table 16. Orphaned portion of Sutton Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche heterophylla	Different leaved water - starwort	+	
Callitriche stagnalis	Pond water -starwort	+	
Juncus supiniformis	Spreading rush	+	
Ludwigia palustris	Water purslane	+	
Nuphar polysepalum	Spatterdock	+	
Utricularia vulgaris	Common bladderwort	+	
Veronica catenata	Chain speedwell	+	

Table 17. Collard Lake species list

Botanical name	Common name	Aquatic	Emergent
Brasenia schreberi	Water –shield	+	
Isoetes occidentalis	Quillwort	+	
Juncus supiniformis	Spreading rush	+	
Lilaeopsis occidentalis	_	+	
Myriophyllum hippuroides	Western milfoil	+	
Najas flexilis	Slender water-nymph	+	
Nuphar polysepalum	Spatterdock	+	
Nymphaea odorata	Fragrant water lily	+	
Potamogeton amplifolius	Big-leaf pondweed	+	
Potamogeton pusillus	Small pondweed	+	
Potamogeton robbinsii	Fern-leaf pondweed	+	
Scirpus subterminalis	Water bulrush	+	
Utricularia vulgaris *	Common bladderwort	+	

Table 18. Heceta Junction Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche hermaphroditica	Autumnal water starwort	+	
Callitriche stagnalis	Pond water starwort	+	
Juncus supiniformis	Spreading rush	+	
Nuphar polysepalum	Spatterdock	+	
Polygonum amphibium	Water smartweed	+	
Potamogeton epihydrus	Ribbonleaf pondweed	+	
Potamogeton natans	Floating leaved pondweed	+	
Ranunculus flammula	Small creeping buttercup	+	
Utricularia vulgaris	Common bladderwort	+	
Veronica catenata	Chain speedwell	+	

Table 19. Unnamed – Heceta Beach species list

Botanical name	Common name	Aquatic	Emergent
Ceratophyllum demersum	Coontail	+	
Hippuris vulgaris	Mare's tail	+	
Hydrocotyle ranunculoides	Water pennywort	+	
Lemna minor	Duckweed	+	
Lilaea scilloides	Flowering quillwort	+	
Myriophyllum aquaticum	Parrot's feather	+	
Myriophyllum spicatum	Eurasian water milfoil	+	
Potamogeton friessii	Flat-stalked pondweed	+	
Potamogeton natans	Floating-leaved pondweed	+	
Ranunculus flammula	Small creeping buttercup	+	
Sparganium eurycarpum	Giant bur-reed	+	

Table 20. North Georgia Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche sp.	Water starwort	+	

Table 21. Georgia Lake species list

Botanical name	Common name	Aquatic	Emergent
Callitriche hermaphroditica	Autumnal water starwort	+	
Callitriche stagnalis	Pond water starwort	+	
Juncus supiniformis	Spreading rush	+	
Ludwigia palustris	Water purslane	+	

Table 22. Erhart Lake species list

Botanical name	Common name	Aquatic	Emergent
Myriophyllum aquaticum	Parrot's feather	+	
Najas flexilis	Slender water nymph	+	
Nitella sp.	Nitella	+	
Potamogeton pusillus	Small pondweed	+	

Table 23. Clear Lake species list

Botanical name	Common name	Aquatic	Emergent
Brasenia schreberi	Water shield	+	
Chara sp.	Muskgrass	+	
Eleocharis acicularis	Needle spike rush	+	
Elodea canadensis	Common waterweed	+	
Equisetum sp.	Horsetail		+
Isoetes occidentalis	Quillwort	+	
Juncus sp.	Rush		+
Juncus supiniformis	Spreading rush	+	
Najas flexilis	Slender water-nymph	+	
Nuphar polysepalum	Spatterdock	+	
Nymphaea odorata	Fragrant waterlily	+	
Potamogeton amplifolius	Big-leaf pondweed	+	
Potamogeton epihydrus	Ribbonleaf pondweed	+	
Potamogeton gramineus	Grass-leaved pondweed	+	
Scirpus subterminalis	Water bulrush	+	

Table 23. Clear Lake cont'd.

Typha latifolia	Wide leaved cattail		+
Utricularia vulgaris *	Common bladderwort	+	

Table 24. Sutton Lake species list

Botanical name	Common name	Aquatic	Emergent
Brasenia schreberi	Watershield	+	
Cabomba caroliniana	Fanwort	+	
Callitriche hermaphroditica	Autumnal water starwort	+	
Egeria densa	Brazilian elodea	+	
Elodea canadensis	Common waterweed	+	
Isoetes occidentalis	Quillwort	+	
Myriophyllum hippuroides	Western milfoil	+	
Myriophyllum spicatum	Eurasian water milfoil	+	
Najas flexilis	Slender water-nymph	+	
Nuphar polysepalum	Spatterdock	+	
Nymphaea odorata	Fragrant waterlily	+	
Potamogeton amplifolius	Big-leaf pondweed	+	
Potamogeton epihydrus	Ribbonleaf pondweed	+	
Potamogeton natans	Floating leaved pondweed	+	
Potamogeton pusillus	Small pondweed	+	
Potamogeton robbinsii	Fern-leaf pondweed	+	
Scirpus acutus	Hardstem bulrush		+
Scirpus subterminalis	Water bulrush	+	
Utricularia vulgaris *	Common bladderwort	+	

Table 25. Mercer Lake species list

Botanical name	Common name	Aquatic	Emergent
Egeria densa	Brazilian elodea	+	
Eleocharis sp.	Spike rush		+
Elodea canadensis	Common waterweed	+	
Nuphar polysepalum	Spatterdock	+	
Potamogeton amplifolius	Big-leaf pondweed	+	
Potamogeton robbinsii	Fern-leaf pondweed	+	

Table 26. Munsel Lake species list

Botanical name	Common name	Aquatic	Emergent
Brasenia schreberi	Watershield	+	
Carex sp.	Sedge		+
Najas flexilis	Slender water-nymph	+	
Nitella sp.	Nitella	+	
Nymphaea odorata	Fragrant waterlily	+	
Potamogeton amplifolius	Big-leaf pondweed	+	
Potamogeton epihydrus	Ribbonleaf pondweed	+	
Potamogeton gramineus	Grass leaved pondweed	+	
Potamogeton richardsonii	Richardson's pondweed	+	
Potamogeton robbinsii	Fern-leaf pondweed	+	
Scirpus subterminalis	Water bulrush	+	
Utricularia vulgaris *	Common bladderwort	+	

* No specimens of *Utricularia* were found in bloom. It is possible that *U. inflata*, an introduced species on the west coast of the U.S., is present in these lakes. It is difficult to distinguish the native *U. vulgaris* from the introduced species when they are not in flower.

Section 1.07 Appendix B. SURVEY DATA

Table 27. Hebo Lake sample locations and species found

Latitude	Longitude	Species			
no satellite		*Elodea canadensis*			
no satellite		*Elodea canadensis*			
45°13.725'	123°47.832'	*Elodea canadensis*	*Nitella sp.*		
45°13.862'	123°47.793'	*Elodea canadensis*	*Nitella sp.*	*Nymphaea odorata*	
45°13.879'	123°47.771'	*Elodea canadensis*	*Nitella sp.*	*Nymphaea odorata*	
45°13.873'	123°47.734'	*Elodea canadensis*	*Nitella sp.*	*Chara sp.*	*Nymphaea odorata*
45°13.892'	123°47.711'	*Elodea canadensis*	*Nitella sp.*	*Nymphaea odorata*	
45°13.87'	123°47.717'	*Elodea canadensis*	*Nitella sp.*	*Nymphaea odorata*	

* Secchi reading 1.5 meters , lat 45°13.871', long 123°47.744'

Table 28. Lily Lake sample locations and species found

Latitude	Longitude	Species			
44°05.549'	124°07.105'	*Potamogeton epihydrus*			
44°05.549'	124°07.114'	*Lemna minor*	*Callitriche stagnalis*	*Scirpus subterminalis*	*Potamogeton pusillus*
44°05.535'	124°07.109'	*Potamogeton epihydrus*	*Najas flexilis*		
44°05.502'	124°07.078'	*Potamogeton epihydrus*			
44°05.476'	124°07.062'	*Potamogeton epihydrus*	*Potamogeton pusillus*	*Lemna minor*	*Nuphar polysepalum*
44°05.469'	124°07.050'	*Potamogeton epihydrus*	*Utricularia vulgaris*		
44°05.467'	124°07.038'	*Potamogeton pusillus*	*Utricularia vulgaris*	*Nuphar polysepalum*	
44°05.453'	124°07.000'	*Hydrocotyle ranunculoides*	*Potamogeton pusillus*	*Potamogeton epihydrus*	*Utricularia vulgaris*
		Lemna minor	*Nuphar polysepalum*		
44°05.474'	124°06.971'	*Sparganium sp.*			
44°05.519'	124°06.934'	*Potamogeton epihydrus*	*Potamogeton pusillus*	*Callitriche heterophylla*	*Utricularia vulgaris*
44°05.535'	124°06.923'	*Nuphar polysepalum*	*Utricularia vulgaris*	*Sparganium sp.*	*Najas flexilis*
		Lemna minor	*Hydrocotyle ranunculoides*		
44°05.546'	124°06.910'	*Nuphar polysepalum*	*Utricularia vulgaris*	*Potamogeton pusillus*	*Potamogeton epihydrus*
		Najas flexilis	*Hydrocotyle ranunculoides*		
44°05.573'	124°06.916'	*Potamogeton epihydrus*	*Nuphar polysepalum*	*Hydrocotyle ranunculoides*	*Lemna minor*
		Sparganium sp.	*Najas flexilis*	*Utricularia vulgaris*	*Callitriche stagnalis*

Table 28. Lily Lake cont'd.

44°05.633'	124°06.994'	*Callitriche hermaphroditica* *Nuphar polysepalum*	*Potamogeton epihydrus*	*Lemna minor*	*Sparganium sp.*
44°05.666'	124°07.092'	*Callitriche hermaphroditica*	*Callitriche heterophylla* *Callitriche hermaphroditica*	*Sparganium sp.*	44°05.666'
44°05.671'	124°07.119'	*Callitriche heterophylla*	*Callitriche hermaphroditica*	*Nuphar polysepalum*	44°05.671'
44°05.662'	124°07.149'	*Potamogeton epihydrus* *Hydrocotyle ranunculoides*			

Table 29. Unnamed pond #1 sample locations and species found

Latitude	Longitude	Species			
44°04.993'	124°06.808'	*Eleocharis sp.*	*Veronica catenata*	*Ranunculus flammula*	*Nuphar polysepalum*
44°04.990'	124°06.792'	*Veronica catenata*	*Ranunculus flammula*		
44°05.001'	124°06.790'	*Ranunculus flammula*	*Juncus supiniformis*		
44°05.020'	124°06.815'	*Ranunculus flammula*	*Veronica catenata*	*Eleocharis sp.*	
44°05.015'	124°06.813'	*Ranunculus flammula*	*Veronica catenata*	*Eleocharis sp.*	*Potamogeton natans*
44°05.027'	124°06.836'	*Ranunculus flammula*	*Potamogeton natans*	*Eleocharis sp.*	
44°04.982'	124°06.823'	*Veronica catenata*	*Ranunculus flammula*	*Eleocharis sp.*	
44°05.009'	124°06.821'	*Veronica catenata*	*Ranunculus flammula*	*Carex sp.*	
44°05.027'	124°06.848'	*Veronica catenata*	*Nuphar polysepalum*	*Ranunculus flammula*	*Potamogeton natans*
44°05.042'	124°06.87'	*Ranunculus flammula*	*Veronica catenata*	*Eleocharis sp.*	

Table 30. Unnamed pond #2 sample locations and species found

Latitude	Longitude	Species		
44°04.918'	124°06.761'	*Veronica catenata*	*Eleocharis sp.*	*Potamogeton natans*

Table 31. Unnamed pond #3 sample locations and species found

Latitude	Longitude	Species	
Latitude	Longitude		
44°04.820'	124°06.735'	*Eleocharis sp.*	*Potentilla anserina*
44°04.808'	124°06.717'	*Eleocharis sp.*	*Potentilla anserina*
44°04.795'	124°06.701'	*Eleocharis sp.*	*Potentilla anserina*

Table 31. Unnamed pond 3 cont'd.

44°04.787'	124°06.706'	*Eleocharis sp.*	*Carex sp.*	*Potentilla anserina*	
44°04.778'	124°06.689'	*Eleocharis sp.*	*Carex sp.*	*Potentilla anserina*	
44°04.821'	124°06.701'	*Eleocharis sp.*	*Carex sp.*	*Potentilla anserina*	
44°04.832'	124°06.748'	*Eleocharis sp.*		*Potentilla anserina*	

Table 32. Lake Marr sample locations and species found

Latitude	Longitude	Species			
44°04.797'	124°06.403'	*Scirpus subterminalis*			
44°04.787'	124°06.410'	*Scirpus subterminalis*	*Ranunculus flammula*		
44°04.799'	124°06.396'	*Scirpus subterminalis*	*Ranunculus flammula*	*Utricularia vulgaris*	*Najas flexilis*
44°04.786'	124°06.417'	*Scirpus subterminalis*	*Ranunculus flammula*	*Utricularia vulgaris*	*Potamogeton epihydrus*
44°04.818'	124°06.424'	*Scirpus subterminalis*	*Ranunculus flammula*	*Utricularia vulgaris*	*Callitriche heterophylla*
44°04.816'	124°06.435'	*Scirpus subterminalis*	*Ranunculus flammula*	*Utricularia vulgaris*	*Najas flexilis*
		Potamogeton epihydrus	*Potamogeton natans*	*Sparganium sp.*	
44°04.837'	124°06.439'	*Scirpus subterminalis*	*Ranunculus flammula*	*Utricularia vulgaris*	*Najas flexilis*
44°04.849'	124°06.459'	*Scirpus subterminalis*	*Najas flexilis*	*Potamogeton epihydrus*	*Nuphar polysepalum*
44°04.862'	124°06.473'	*Scirpus subterminalis*	*Najas flexilis*	*Sparganium sp.*	
44°04.869'	124°06.459'	*Scirpus subterminalis*	*Potamogeton epihydrus*		
44°04.866'	124°06.414'	*Najas flexilis*	*Potamogeton epihydrus*		
44°04.836'	124°06.371'	*Scirpus subterminalis*	*Ranunculus flammula*	*Sparganium sp.*	*Potamogeton epihydrus*
		Najas flexilis	*Ludwigia palustris*	*Nuphar polysepalum*	
44°04.782'	124°06.401'	*Sparganium sp.*	*Ludwigia palustris*	*Scirpus subterminalis*	*Nuphar polysepalum*
		Potamogeton pusillus	*Callitriche verna*	*Callitriche heterophylla*	

*** Secchi reading = 4 meters @ lat 44°04.922', long 124°06.441**

Table 33. Alder Lake sample locations and species found

Latitude	Longitude	Species			
44°04.249'	124°06.172'	*Juncus supiniformis*	*Veronica catenata*	*Callitriche verna*	*Scirpus subterminalis*
44°04.240'	124°06.159'	*Juncus supiniformis*	*Ranunculus flammula*	*Scirpus subterminalis*	
44°04.247	124°06.138'	*Juncus supiniformis*	*Veronica catenata*	*Scirpus subterminalis*	
44°04.255'	124°06.146'	*Juncus supiniformis*	*Scirpus subterminalis*		
44°04.249'	124°06.162'	*Juncus supiniformis*	*Ranunculus flammula*	*Scirpus subterminalis*	
44°04.258'	124°06.200'	*Juncus supiniformis*	*Ranunculus flammula*	*Scirpus subterminalis*	
44°04.281'	124°06.215'	*Juncus supiniformis*	*Scirpus subterminalis*	*Ranunculus flammula*	*Veronica catenata*
44°04.283'	124°06.241'	*Juncus supiniformis*	*Scirpus subterminalis*	*Ranunculus flammula*	

Table 33. Alder Lake cont'd.

44°04.252'	124°06.262'	*Polygonum amphibium*			
44°04.251'	124°06.256'	*Polygonum amphibium*	*Scirpus subterminalis*		
no satellite		*Phalaris arundinacea*	*Polygonum amphibium*		
no satellite		*Phalaris arundinacea*	*Carex sp.*	*Juncus supiniformis*	*Veronica catenata*
		Nuphar polysepalum			
44°04.163'	124°06.176'	*Phalaris arundinacea*	*Carex sp.*	*Juncus supiniformis*	*Scirpus subterminalis*
		Veronica catenata	*Nuphar polysepalum*		
44°04.182'	124°06.134'	*Sparganium sp.*	*Carex sp.*	*Juncus supiniformis*	*Nuphar polysepalum*
44°04.190'	124°06.189'	*Carex sp.*			
44°04.213'	124°06.207'	*Phalaris arundinacea*	*Scirpus subterminalis*	*Carex sp.*	
44°04.240'	124.°06.200'	*Ranunculus flammula*	*Callitriche verna*	*Juncus supiniformis*	*Scirpus subterminalis*
44°04.249'	124°06.182'	*Carex sp.*	*Ranunculus flammula*	*Juncus supiniformis*	

Table 34. Dune Lake sample locations and species found

Latitude	Longitude	Species			
44°04.065'	124°06.157'	*Ludwigia palustris*	*Veronica catenata*	*Ranunculus flammula*	*Carex sp.*
44°04.063'	124°06.131'	*Ludwigia palustris*	*Veronica catenata*	*Potamogeton natans*	*Najas flexilis*
44°04.063'	124°06.129'	*Ludwigia palustris*	*Veronica catenata*	*Juncus supiniformis*	
44°04.059'	124°06.144'	*Veronica catenata*	*Najas flexilis*	*Potamogeton natans*	
44°04.030'	124°06.116'	*Juncus supiniformis*			
44°04.035'	124°06.078'	*Ranunculus flammula*			
44°04.027'	124°06.084'	*Potamogeton natans*	*Ludwigia palustris*	*Ranunculus flammula*	
44°04.040'	124°06.041'	*Najas flexilis*			
44°04.044'	124°06.972'	*Sparganium sp.*	*Ludwigia palustris*	*Ranunculus flammula*	
44°04.016'	124°06.067'	*Juncus supiniformis*			
44°04.006'	124°06.085'	*Ranunculus flammula*	*Juncus supiniformis*		
44°04.001'	124°06.100'	*Juncus supiniformis*	*Ranunculus flammula*	*Callitriche sp.*	
44°04.010'	124°06.116'	*Eleocharis sp.*	*Ludwigia palustris*	*Juncus supiniformis*	
44°04.017'	124°06.129'	*Juncus supiniformis*	*Ranunculus flammula*		

* Secchi reading = 2.5 meters@ lat 44°04.027', long 124°06.084'

Table 35. Buck Lake sample locations and species found

Latitude	Longitude	Species			
44°03.878'	124°06.030'				
44°03.875'	124°05.939'	*Nuphar polysepalum*			
44°03.900'	124°05.928'	*Ranunculus flammula*	*Callitriche heterophylla*	*Potamogeton*	
44°03.945'	124°05.951'	*Ranunculus flammula*			
44°03.959'	124°05.980'	*Najas flexilis*	*Potamogeton*	*Chara sp.*	
44°03.966'	124°05.975'	*Ranunculus flammula*	*Veronica catenata*	*Ludwigia palustris*	*Juncus supiniformis*

* Secchi reading = 2.25 m (disk was on lake bottom) @ lat 44°03.959', long 124°05.989;' Secchi reading at approx. mid-lake= 3.25 m.

Table 36. Unnamed pond #4 sample locations and species found

Latitude	Longitude	Species
44°03.812'	124°06.001'	*Nuphar polysepalum*

Table 37. Unnamed pond #6 sample locations and species found

Latitude	Longitude	Species	
44°03.574'	124°05.924'	*Nuphar polysepalum*	*Potamogeton sp.*

Table 38. Orphaned portion of Sutton Lake sample locations and species found

Latitude	Longitude	Species			
44°03.452'	124°05.986'	*Veronica catenata*	*Ludwigia palustris*	*Juncus supiniformis*	*Callitriche stagnalis*
		Nuphar polysepalum	*Potamogeton natans*	*Scirpus subterminalis*	
44°03.474'	124°05.975'	*Brasenia schreberi*	*Veronica catenata*		
44°03.490'	124°05.982'	*Utricularia vulgaris*	*Veronica catenata*	*Juncus supiniformis*	*Brasenia schreberi*
		Scirpus subterminalis			
44°03.493'	124°05.988'	*Brasenia schreberi*	*Potamogeton natans*	*Juncus supiniformis*	*Nuphar polysepalum*
no satellite		*Juncus supiniformis*	*Callitriche stagnalis*	*Ludwigia palustris*	
44°03.484'	124°06.204'	*Brasenia schreberi*	*Juncus supiniformis*	*Veronica catenata*	

Table 39. Collard Lake sample locations and species found

Latitude	Longitude	Species			
44°02.405'	124°04.727'	*Nuphar polysepalum*	*Juncus supiniformis*	*Potamogeton robbinsii*	*Brasenia schreberi*
		Nymphaea odorata			
44°02.399'	124°04.753'	*Potamogeton robbinsii*	*Utricularia vulgaris*	*Callitriche hermaphroditica*	*Nuphar polysepalum*
		Juncus supiniformis			
44°02.392'	124°04.760'	*Nuphar polysepalum*	*Nymphaea odorata*	*Juncus supiniformis*	
44°02.363'	124°04.761'	*Nuphar polysepalum*	*Juncus supiniformis*	*Utricularia vulgaris*	
44°02.324'	124°04.747'	*Utricularia vulgaris*	*Juncus supiniformis*	*Potamogeton robbinsii*	*Scirpus subterminalis*
44°02.316'	124°04.752'	*Utricularia vulgaris*	*Najas flexilis*	*Potamogeton pusillus*	*Juncus supiniformis*
44°02.303'	124°04.755'	*Utricularia vulgaris*	*Scirpus subterminalis*	*Potamogeton robbinsii*	
44°02.288'	124°04.752'	*Utricularia vulgaris*	*Scirpus subterminalis*	*Najas flexilis*	*Potamogeton amplifolius*
		Nymphaea odorata	*Nuphar polysepalum*	*Brasenia schreberi*	*Juncus supiniformis*
44°02.268'	124°04.760'	*Nuphar polysepalum*	*Potamogeton amplifolius*	*Utricularia vulgaris*	*Najas flexilis*
		Scirpus subterminalis	*Brasenia schreberi*	*Juncus supiniformis*	
44°02.245'	124°04.763'	*Brasenia schreberi*	*Utricularia vulgaris*	*Juncus supiniformis*	*Scirpus subterminalis*
44°02.201'	124°04.764'	*Nymphaea odorata*	*Juncus supiniformis*	*Utricularia vulgaris*	*Scirpus subterminalis*
44°02.188'	124°04.766'	*Nymphaea odorata*	*Utricularia vulgaris*	*Scirpus subterminalis*	
44°02.171'	124°04.768'	*Utricularia vulgaris*	*Nymphaea odorata*	*Juncus supiniformis*	*Scirpus subterminalis*
44°02170'	124°04.751'	*Isoetes occidentalis*	*Najas flexilis*	*Scirpus subterminalis*	
44°02.145'	124°04.746'	*Potamogeton robbinsii*	*Nymphaea odorata*	*Brasenia schreberi*	
44°01.952'	124°04.770'	*Potamogeton amplifolius*	*Nymphaea odorata*		
44°01.935'	124°04.774'	*Brasenia schreberi*	*Nymphaea odorata*		
44°01.805'	124°04.841'	*Brasenia schreberi*	*Nymphaea odorata*	*Potamogeton amplifolius*	*Lilaeopsis occidentalis*
44°01.731'	124°04.796'	*Brasenia schreberi*	*Nymphaea odorata*		
44°01.797'	124°04.779'	*Nuphar polysepalum*	*Potamogeton amplifolius*		
44°01.856'	124°04.735'	*Nuphar polysepalum*	*Brasenia schreberi*	*Potamogeton amplifolius*	
44°02.013'	124°04.589'	*Potamogeton amplifolius*	*Potamogeton pusillus*		
44°02.316'	124°04.746	*Utricularia vulgaris*	*Scirpus subterminalis*	*Najas flexilis*	*Nymphaea odorata*
44°02.339'	124°04.726'	*Sparganium sp.*	*Potamogeton amplifolius*		

Table 39. Collard Lake cont'd.

no satellite		*Sparganium sp.*	*Najas flexilis*	*Utricularia vulgaris*	*Myriophyllum hippuroides*
		Potamogeton amplifolius	*Scirpus subterminalis*	*Juncus supiniformis*	

***** Secchi reading = 3.75 m @lat 44°01.773', long 124°04.798 Secchi reading = 3.5 m @ lat 44°02.172', long 124°04.679, Secchi reading = 3.5 m @ lat 44°02.172', long 124°04.679''

Table 40. Heceta Junction Lake sample locations and species found

Latitude	Longitude	Species			
44°01.543'	124°06.643'	*Veronica catenata*	*Callitriche stagnalis*	*Eleocharis sp.*	
44°01.525'	124°06.634'	*Veronica catenata*	*Ranunculus flammula*	*Juncus supiniformis*	*Callitriche hermaphroditica*
		Utricularia vulgaris	*Nuphar polysepalum*		
44°01.517'	124°06.626'	*Veronica catenata*	*Ranunculus flammula*	*Polygonum amphibium*	
44°01.515'	124°06.608'	*Potamogeton natans*			
44°01.532'	124°06.590'	*Potamogeton epihydrus*			
44°01.499'	124°06.605'	*Potamogeton epihydrus*	*Polygonum amphibium*	*Ranunculus flammula*	*Callitriche hermaphroditica*
		Veronica catenata	*Ludwigia palustris*		
44°01.469'	124°06.553'	*Juncus supiniformis*	*Ranunculus flammula*	*Callitriche hermaphroditica*	*Veronica catenata*
		Nuphar polysepalum	*Polygonum amphibium*		
44°01.422'	124°06.507'	*Potamogeton epihydrus*	*Nuphar polysepalum*	*Ranunculus flammula*	*Juncus supiniformis*
		Carex sp.			
44°01.426'	124°06.476'	*Juncus supiniformis*	*Ranunculus flammula*	*Potamogeton epihydrus*	
44°06.459'	124°06.494'	*Juncus supiniformis*	*Potamogeton epihydrus*		
44°01.491'	124°06.504'	*Juncus supiniformis*	*Ranunculus flammula*	*Eleocharis sp.*	
44°01.526'	124°06.527'	*Juncus supiniformis*	*Ranunculus flammula*	*Potamogeton epihydrus*	*Veronica catenata*
44°01.616'	124°06.607'	*Juncus supiniformis*	*Ranunculus flammula*	*Veronica catenata*	*Eleocharis sp.*
			Nuphar polysepalum		
44°01.685'	124°06.670'	*Ranunculus flammula*	*Nuphar polysepalum*	*Veronica catenata*	*Sparganium sp.*
		Potamogeton epihydrus			

***** Secchi reading = 1.25 m (disk on bottom of lake) @ lat 44°01.532', long 124°06.590

Table 41. Unnamed Heceta Beach sample locations and species found

Latitude	Longitude	Species			
44°01.212'	124°07.65'	*Nuphar polysepalum*	*Hydrocotyle ranunculoides*	*Potamogeton friesii*	*Ceratophyllum demersum*
		Ranunculus flammula	*Lemna minor*	*Myriophyllum aquaticum*	
44°01.22'	124°07.652'	*Ceratophyllum demersum*	*Potamogeton friesii*	*Potamogeton natans*	*Nuphar polysepalum*
		Lemna minor	*Hydrocotyle ranunculoides*		
44°01.238'	124°07.658'	*Nuphar polysepalum*	*Hydrocotyle ranunculoides*	*Potamogeton friesii*	*Ceratophyllum demersum*
44°01.289'	124°07.662'	*Potamogeton friesii*	*Lemna minor*	*Hydrocotyle ranunculoides*	*Myriophyllum aquaticum*
		Ceratophyllum demersum	*Hippurus vulgaris*	*Sparganium eurycarpum*	
44°01.36'	124°07.706'	*Ceratophyllum demersum*	*Lemna minor*	*Potamogeton friesii*	*Ceratophyllum demersum*
		Myriophyllum aquaticum	*Hydrocotyle ranunculoides*	*Sparganium eurycarpum*	*Nuphar polysepalum*
44°01.389'	124°07.731'	*Nuphar polysepalum*	*Ceratophyllum demersum*	*Lemna minor*	*Potamogeton friesii*
		Myriophyllum aquaticum	*Myriophyllum spicatum*		
44°01.425'	124°07.748'	*Potamogeton friesii*	*Nuphar polysepalum*	*Myriophyllum spicatum*	*Ceratophyllum demersum*
		Lemna minor	*Myriophyllum aquaticum*	*Hydrocotyle ranunculoides*	
44°01.419'	124°07.683'	*Myriophyllum spicatum*	*Hydrocotyle ranunculoides*	*Potamogeton friesii*	*Potamogeton natans*
44°01.384'	124°07.66'	*Myriophyllum aquaticum*	*Potamogeton friesii*	*Potamogeton natans*	*Myriophyllum spicatum*
		Lemna minor	*Ceratophyllum demersum*	*Hydrocotyle ranunculoides*	
44°01.33'	124°07.627'	*Myriophyllum spicatum*	*Ceratophyllum demersum*	*Potamogeton natans*	*Nuphar polysepalum*
		Hydrocotyle ranunculoides	*Myriophyllum aquaticum*	*Lemna minor*	
44°01.205'	124°07.602'	*Myriophyllum spicatum*	*Ceratophyllum demersum*	*Potamogeton friesii*	*Myriophyllum aquaticum*

Table 41. Unnamed Heceta Beach cont'd.

		Nuphar polysepalum	*Lemna minor*	*Hydrocotyle ranunculoides*	
44°01.176'	124°07.615'	*Nuphar polysepalum*	*Hydrocotyle ranunculoides*	*Ceratophyllum demersum*	*Myriophyllum spicatum*
44°01.198'	124°07.631'	*Potamogeton friesii* *Hydrocotyle ranunculoides*	*Lemna minor* *Ceratophyllum demersum*	*Myriophyllum aquaticum*	*Lemna minor*

Table 42. N. Georgia Lake sample locations and species found

Latitude	Longitude	Species			
43°52.384'	124°07.827'	*Callitriche sp.*			

* Secchi reading = 2.5 m @ lat 43°52.381', long 124°7.872

Table 43. Georgia Lake sample locations and species found

Latitude	Longitude	Species			
43°52.298'	124°07.924'	*Ludwigia palustris*			
43°52.232'	124°07.884'	*Juncus supiniformis*	*Callitriche stagnalis*	*Ludwigia palustris*	
43°52.24'	124°07.831'	*Callitriche stagnalis*	*Ludwigia palustris*	*Callitriche hermaphroditica*	
43°52.265'	124°07.898'	*Juncus supiniformis*	*Ludwigia palustris*		

* Secchi reading = 4.5 m @ lat. 43°52.240', long. 124°7.93'

Table 44. Erhart Lake sample locations and species found

Latitude	Longitude	Species			
43°52.298'	124°07.924'	*Ludwigia palustris*			
43°52.232'	124°07.884'	*Juncus supiniformis*	*Callitriche stagnalis*	*Ludwigia palustris*	
43°52.24'	124°07.831'	*Callitriche stagnalis*	*Ludwigia palustris*	*Callitriche hermaphroditica*	
43°52.265'	124°07.898'	*Juncus supiniformis*	*Ludwigia palustris*		

*** Secchi reading = 4.5 m @ lat 43°52.240', long 124°7.93'**

Table 45. Clear Lake sample locations and species found

Latitude	Longitude	Species			
44.01914°	124.08394°	*Elodea canadensis* (1) *Nitella* sp. (1)	*Eleocharis acicularis* (2)	*Potamogeton gramineus* (1)	*Chara* sp.(1)
44.01993°	124.08452°	*Juncus* sp. (1)	*Equisetum* sp.(1)		
44.02114°	124.08508°	*Najas flexilis* (1)			
44.02183°	124.08483°	*Najas flexilis* (1)			
44.02304°	124.08441°	*Eleocharis acicularis* (1)			
44.02306°	124.08385°	*Brasenia schreberi* (1)			
44.02406°	124.08238°	*Nitella* sp.(2)	*Najas flexilis* (1)		
44.02472°	124.08138°	*Najas flexilis*(1)			
44.02524°	124.08080°	*Najas flexilis* (3*)*	*Potamogeton gramineus(2)*		
44.02523°	124.08086°	*Potamogeton gramineus* (2)	*Juncus supiniformis* (2)		
44.02522°	124.08097°	*Juncus supiniformis* (2)	*Eleocharis acicularis* (2)	*Nuphar polysepalum* (1)	
44.02549°	124.08060°	*Brasenia schreberi* (2)	*Nuphar polysepalum* (1)	*Potamogeton epihydrus* (1)	
44.02544°	124.08052°	*Isoetes occidentalis* (2)	*Potamogeton epihydrus* (2)	*Najas flexilis* (1)	
44.02624°	124.08003°	*Najas flexilis* (3)	*Potamogeton amplifolius* (1)		
44.02691°	124.08030°	*Najas flexilis* (3)	*Brasenia schreberi* (2)		
44.02698°	124.08017°	*Utricularia vulgaris (*1)	*Scirpus subterminalis* (3)	*Brasenia schreberi* (2)	
44.02714°	124.07986°	*Nymphaea odorata* (1)	*Brasenia schreberi* (2)		
44.02795°	124.07965°	*Brasenia schreberi* (2)			
44.02862°	124.07819°	*Potamogeton amplifolius* (1)			
44.02844°	124.07652°	*Nuphar polysepalum* (1)			
44.02802°	124.07497°	*Potamogeton amplifolius* (2)			
44.02733°	124.07527°	*Potamogeton amplifolius* (1)	*Nuphar polysepalum* (2)		
44.02504°	124.07541°	*Brasenia schreberi* (3)	*Typha latifolia* (1)	*Nuphar polysepalum (*1)	
44.02007°	124.07855°	*Brasenia schreberi* (1)	*Nuphar polysepalum*(2)		

Table 45. Clear Lake cont'd.

44.01927°	124.07974°	*Potamogeton amplifolius*(1)	*Potamogeton gramineus*(1)	
44.01723°	124.08125°	*Potamogeton amplifolius* (1)	*Nitella sp.* (1)	*Isoetes occidentalis* (1)
44.01688°	124.08183°	*Isoetes occidentalis*(2)		
44.01640°	124.08270°	*Potamogeton amplifolius* (2)	*Najas flexilis* (2)	*Brasenia schreberi* (2)

Table 46. Munsel Lake sample locations and species found

Latitude	Longitude	Depth (m)	Species		
TRANSECT 1					
44.00642°	124.08792°	0.5	*Nymphaea odorata* (3)		
44.00648°	124.08793°	1.5	0		
44.00650°	124.08784°	2.5	0		
44.00648°	124.08774°	3.5	0		
44.00653°	124.08762°	4.5	0		
TRANSECT 2					
44.00772°	124.08774°	0.5	*Nymphaea odorata* (3)		
44.00766°	124.08750°	1.5	*Nymphaea odorata* (3)		
44.00765°	124.08715°	1.75	*Brasenia schreberi* (2) *Nitella* (1)	*Potamogeton gramineus* (2)	*Potamogeton epihydrus* (2)
44.00717°	124.08649°	2.5	0		
44.00715°	124.08622°	3.5	0		
TRANSECT 3					
44.00725°	124.08567°	3.5	*Nitella* sp. (3)		
44.00721°	124.08556°	4.5	*Nitella* sp. (3)		
44.00714°	124.08561°	5.5	0		
44.00739°	124.08595°	2.5	0		
44.00760°	124.08613°	1.5	*Brasenia schreberi* (2)		
		1	*Brasenia schreberi* (2)	*Potamogeton gramineus* (3)	*Nitella* sp. (1)
44.00852°	124.08673°	0.5	*Brasenia schreberi* (1)		
TRANSECT 4					
44.00729°	124.08525°	5.5	0		
44.00725°	124.08552°	4.5	*Nitella* sp. (3)		

Table 46. Munsel Lake cont'd.

44.00756°	124.08507°	3.5	0	
44.00777°	124.08485°	2.5	*Potamogeton richardsonii* (2)	*Potamogeton gramineus* (2)
44.00795°	124.08463°	1.5	*Brasenia schreberi* (2)	
44.00807°	124.08467°	0.5	0	
TRANSECT 5				
44.00972°	124.08275°	5.5	0	
44.00973°	124.08274°	4.5	0	
44.00981°	124.08273°	3.5	*Potamogeton gramineus* (1)	
44.00987°	124.08277°	2.5	*Potamogeton gramineus* (1)	
44.00990°	124.08279°	1.5	*Brasenia schreberi* (1)	*Scirpus subterminalis* (2)
44.01000°	124.08288°	0.5	*Brasenia schreberi* (1)	*Scirpus subterminalis* (3)
TRANSECT 6				
44.01306°	124.07753°	5.5	0	
44.01318°	124.07757°	4.5	*Potamogeton robbinsii* (1)	
44.01320°	124.07760°	3.5	*Potamogeton robbinsii* (3)	*Utricularia vulgaris* (1)
44.01318°	124.07755°	2.5	*Potamogeton robbinsii* (3)	
44.01318°	124.07759°	1.5	*Brasenia schreberi* (3)	
44.01323°	124.07760°	0.5	*Brasenia schreberi* (3)	
TRANSECT 7				
44.01054°	124.07729°	5.5	0	
44.01044°	124.07703°	4.5	0	
44.01046°	124.07702°	3.5	0	
44.01046°	124.07700°	2.5	0	
44.01045°	124.07709°	1	*Potamogeton amplifolius* (2)	*Potamogeton robbinsii* (3)
TRANSECT 8				
44.00716°	124.07733°	5.5	0	
44.00718°	124.07737°	4.5	0	

Table 46. Munsel Lake cont'd

44.00719°	124.07730°	3.5		0	
44.00707°	124.07730°	2.5		0	
44.00710°	124.07716°	1.5	*Potamogeton amplifolius* (2)	*Najas flexilis* (2)	
44.00710°	124.07715°	0.5	*Carex* sp. (3)		
TRANSECT 9					
44.00533°	124.08079°	5.5		0	
44.00529°	124.08081°	4.5		0	
44.00528°	124.08081°	3.5		0	
44.00526°	124.08082°	2.5		0	
44.00525°	124.08082°	1.5		0	
		0.5		0	
TRANSECT 10					
44.00612°	124.08493°	5.5		0	
44.00611°	124.08495°	4.5		0	
44.00611°	124.08501°	3.5		0	
44.00609°	124.08509°	2.5		0	
44.00606°	124.08517°	1.5		0	
		0.5	*Potamogeton robbinsii* (3)	*Potamogeton richardsonii* (2)	

Table 47. Sutton Lake sample locations and species found

Latitude	Longitude	Depth (m)	Species		
TRANSECT 1					
44.05523°	124.09706°	5.5		0	
44.05512°	124.09711°	4.5		0	
44.05502°	124.09707°	3.5		0	
44.05504°	124.09700°	2.5		0	
44.05523°	124.09706°	5.5		0	
44.05502°	124.09691°	1.5	*Potamogeton pusillus* (3)	*Najas flexilis* (1)	
44.05503°	124.09701°	0.5	*Brasenia schreberi* (2)	*Najas flexilis* (3)	*Elodea canadensis* (1)
TRANSECT 2					
44.05800°	124.09822°	5.5		0	
44.05791°	124.09815°	4.5		0	
44.05796°	124.09816°	3.5		0	
44.05803°	124.09816°	2.5		0	

Table 46. Sutton Lake cont'd.

44.05803°	124.09831°	1.5	0		
44.05803°	124.09829°	0.5	*Nuphar polysepalum* (2)	*Nymphaea odorata* (2)	*Scirpus acutus* (1)
TRANSECT 3					
44.05732°	124.09364°	2	*Potamogeton pusillus* (3)	*Elodea* canadensis (1)	
44.05733°	124.09330°	1.5	*Najas flexilis* (3)	*Potamogeton pusillus* (1)	
44.05735°	124.09305°	1	*Najas flexilis* (2)		
44.05734°	124.09290°	1	*Najas flexilis* (1)	*Elodea canadensis* (2)	*Potamogeton natans* (3)
			Brasenia schreberi (3)	*Nuphar polysepalum* (2)	*Egeria densa* (2)
			Isoetes occidentalis (1)	*Utricularia vulgaris* (1)	
44.05727°	124.09284°	1			
44.05743°	124.09192°	1	*Najas flexilis* (2)	*Scirpus subterminalis* (1)	
44.09151°	124.09151°	2.5	*Najas flexilis* (1)	*Potamogeton pusillus* (2)	*Potamogeton epihydrus* (3)
TRANSECT 4					
44.05993°	124.09190°	4.5	0		
44.05979°	124.09240°	3.5	0		
44.05973°	124.09250°	2.5	0		
44.05970°	124.09255°	2	*Najas flexilis* (3)		
44.05967°	124.09263°	4.5	*Najas flexilis* (3)		
44.05960°	124.09272°	1	*Najas flexilis* (2)		
TRANSECT 5					
44.06321°	124.08968°	4.5	0		
44.06332°	124.08963°	3.5	0		
44.06333°	124.08953°	2.5	0		
44.06359°	124.08976°	1.5	*Potamogeton pusillus* (3)	*Najas flexilis* (2)	*Nuphar polysepalum* (2)
44.06348°	124.08979°	0.5	*Cabomba caroliniana* (1)	*Utricularia vulgaris* (1)	*Callitriche hermaphroditica* (1)
			Nuphar polysepalum (2)	*Myriophyllum hippuroides* (3)	*Myriophyllum spicatum* (1)

Table 46. Sutton Lake cont'd.

TRANSECT 6					
44.06423°	124.08579°	3.5	0		
44.06426°	124.08559°	2.5	*Potamogeton pusillus* (1)		
44.06424°	124.08560°	1.5	*Cabomba caroliniana* (2)	*Utricularia vulgaris* (1)	*Najas flexilis* (1)
44.06433°	124.08557°	0.5	*Potamogeton robbinsii* (2)	*Potamogeton amplifolius* (1)	
TRANSECT 7					
44.06115°	124.08758°	4.5	0		
44.06105°	124.08740°	3.5	0		
44.06105°	124.08742°	2.5	*Potamogeton pusillus* (3)		
44.06116°	124.08737°	1.5	*Potamogeton pusillus* (3)	*Najas flexilis* (1)	
44.06124°	124.08732°	0.5	*Potamogeton amplifolius* (2) *Scirpus acutus* (2)	*Potamogeton robbinsii* (1) *Nuphar polysepalum*(3)	*Najas flexilis* (1)
TRANSECT 8					
44.05809°	124.08740°	4.5	0		
44.05807°	124.08739°	3.5	0		
44.05806°	124.08727°	1.5	*Egeria densa* (3)		
		0.5	*Potamogeton epihydrus* (1)		
TRANSECT 9					
44.05607°	124.09336°	3.5	0		
44.05611°	124.09330°	2.5	*Najas flexilis* (1)	*Potamogeton pusillus*(1)	
44.05622°	124.09318°	1.5	*Potamogeton amplifolius* (2)	*Najas flexilis* (3)	*Elodea canadensis* (1)
44.05624°	124.09315°	0.5	*Utricularia vulgaris* (1)	*Potamogeton amplifolius* (1)	*Najas flexilis* (2)
TRANSECT 10					
44.05449°	124.09475°	3.5	0		
44.05444°	124.09474°	2.5	0		
44.05442°	124.09470°	1.5	*Egeria densa* (3)		

Table 46. Sutton Lake cont'd.

44.05432°	124.09445°	0.5	*Egeria densa* (3)			
44.05449°	124.09475°	3.5		0		

Table 48. Mercer Lake sample locations and species found

Latitude	Longitude	Depth (m)	Species			
TRANSECT 1						
44.05438°	124.09440°	5.5		0		
44.05438°	124.09440°	4.5		0		
44.05282°	124.05334°	3.5		0		
44.05273°	124.05309°	2.5		0		
44.05276°	124.05313°	1.5	*Elodea canadensis* (1)			
44.05277°	124.05318°	0.5	*Elodea canadensis* (2)			
TRANSECT 2						
44.05673°	124.05424°	5.5		0		
44.05674°	124.05436°	4.5		0		
44.05672°	124.05443°	3.5	*Egeria densa* (3)			
44.05669°	124.05424°	2.5	*Egeria densa* (3)			
44.05673°	124.05402°	1.5	*Egeria densa* (3)			
44.05781°	124.05696°	0.5	*Egeria densa* (2)		*Elodea canadensis* (1)	*Eleocharis* sp. (2)
TRANSECT 3						
44.05776°	124.05682°	5		0		
44.05785°	124.05687°	4.5	*Egeria densa* (1)			
44.05803°	124.05688°	2.5	*Egeria densa* (3)			
		1	*Egeria densa* (3)			
		0.5	*Egeria densa* (3)			
TRANSECT 4						
44.05140°	124.06571°	5.5		0		
44.05137°	124.06574°	4.5		0		
44.05138°	124.06555°	3.5	*Egeria densa* (1)			
44.05135°	124.06545°	1.5	*Egeria densa* (2)			
44.05136°	124.06540°	0.5	E*geria densa* (3)			
TRANSECT 5						
44.06560°	124.06947°	5.5		0		

Table 48. Mercer Lake cont'd.

44.06561°	124.06932°	4.5	0		
44.06569°	124.06914°	3.5	0		
44.06566°	124.06908°	2.5	*Elodea canadensis* (2)		
44.06568°	124.06906°	1	*Elodea canadensis* (1)		
TRANSECT 6					
44.06467°	124.07288°	5.5	0		
44.06465°	124.07316°	4.5	0		
44.06465°	124.07351°	3.5	0		
44.06464°	124.07339°	2.5	0		
44.06462°	124.07342°	1.5	*Nuphar polysepalum* (3)		
TRANSECT 7					
44.05250°	124.06983°	5.5	0		
44.05263°	124.06981°	4.5	0		
44.05267°	124.06983°	3.5	*Egeria densa* (2)		
		0.5	E*geria densa* (3)		
TRANSECT 8					
44.05173°	124.08071°	5.5	0		
44.05167°	124.08031°	4.5	0		
44.05161°	124.08031°	3.5	*Egeria densa* (2)		
44.05185°	124.08037°	2.5	*Egeria densa* (2)		
44.05181°	124.08023°	1.5	*Egeria densa* (3)		
		0.5	*Egeria densa* (3)		
TRANSECT 9					
44.04718°	124.07370°	4.5	0		
44.04723°	124.07376°	3.5	*Egeria densa* (2)		
44.04732°	124.07386°	2.5	*Egeria densa* (2)	*Potamogeton amplifolius* (1)	
TRANSECT 10					
44.04675°	124.06939°	5.5	0		
44.04670°	124.06939°	4.5	0		
44.04665°	124.06929°	3.5	0		
44.04664°	124.06933°	2.5	0		
44.04663°	124.06938°	1.5	*Potamogeton robbinsii* (1)	*Nuphar polysepalum* (3)	*Elodea canadensis* (1)

Key to symbols used:

Numbers in parentheses after species names are estimates of abuncance. (1) = low ; (2) = moderate; (3) = high