

AQUATIC MACROPHYTE SURVEY OF NORTH LAKE, 23 OCTOBER 1988

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INTRODUCTION

We were asked by Virginia and Jerry Bachman as representatives of concerned lakeshore property owners to assess the current macrophyte population in North Lake, with special reference to identifying whether Eurasian milfoil (see Appendix 1) was present in the lake, and if it was present, to determine how abundant it was, where it was most concentrated, and prepare a brief recommendations section to address alternatives to control this exotic European species. We performed the survey on 23 October 1988 and we thank the Bachmans for their help in providing a vessel of opportunity to do the survey and the warmth of their hearth afterward. We found the lake to be a typical eutrophic inland Michigan lake, with a aquatic plant population that was not excessive or overly abundant. However, we did identify the presence of Eurasian milfoil, especially on the northeast side, where it covered over 10 acres in dense stands.

METHODS

We surveyed North Lake by traversing the entire shoreline and areas farther out where we could see aquatic plants for the species, abundances, and distribution of macrophytes. We traveled along the shoreline and established 23 stations or areas of relatively homogeneous distribution and abundance of plants (see Fig. 1) around the lakeshore. The results section is a description of what we observed as we went along the shoreline and they are keyed to these stations. We brought along a rake and sampled the plants on the bottom when we were not able to identify them from the surface and we also brought along an Ekman dredge or grab sampler to sample plants in deeper water. Information was transcribed onto waterproof paper and into a

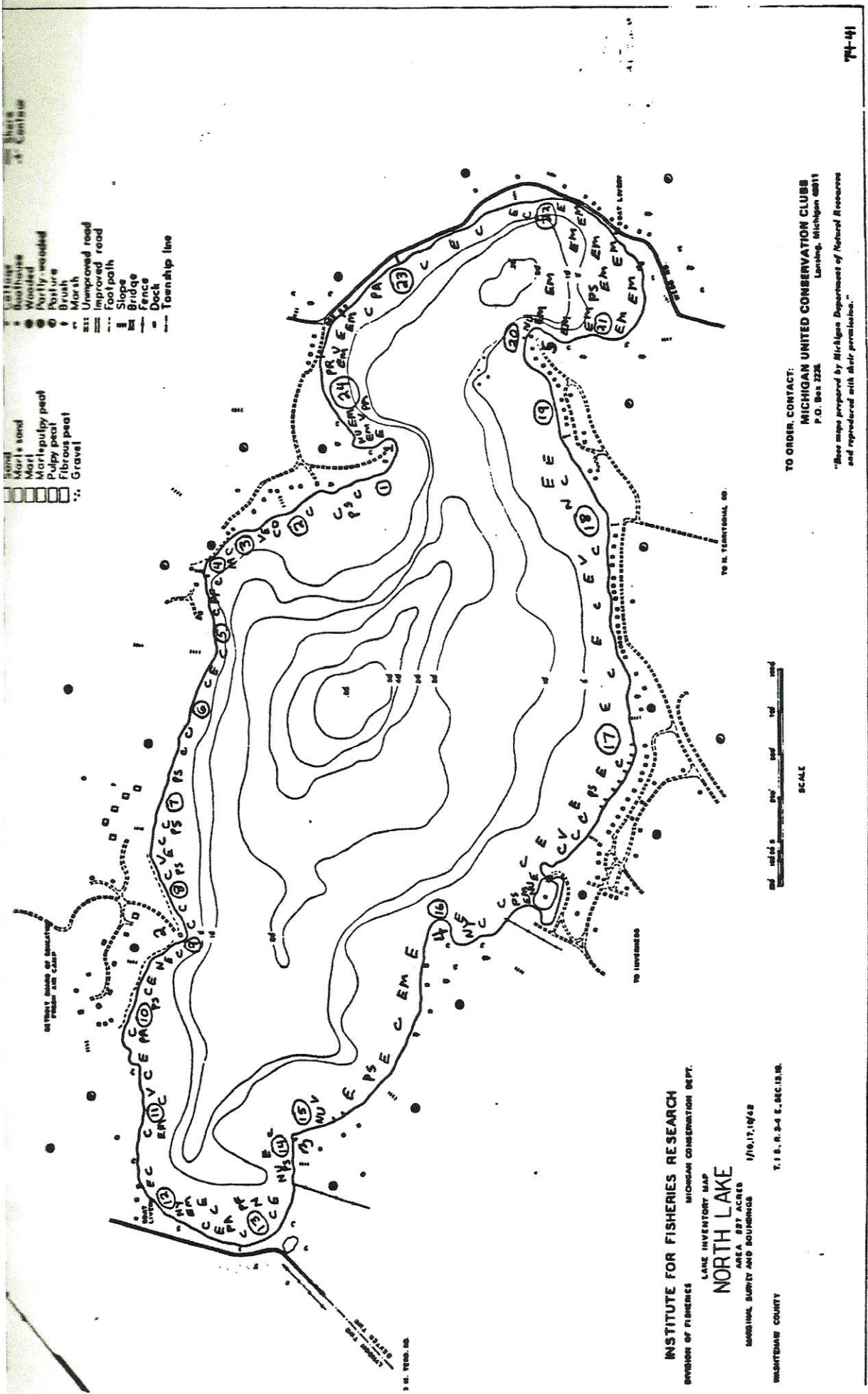


Figure 1. Map of North Lake, Washtenaw County, showing the distribution of aquatic macrophytes (two letter codes- see text for definitions) and stations (circled numbers- see text for description of station and plants found there) surveyed on 23 October 1988.



tape recorder and later entered into a computer and edited. The following species and their common names were seen or identified during our survey:

<u>Common Name</u>	<u>Code</u>	<u>Scientific Name</u>
wild celery or tape grass	V	<u>Vallisneria</u>
green alga	C	<u>Chara</u>
coontail	CD	<u>Ceratophyllum demersum</u>
arrowroot	S	<u>Sagittaria</u>
water lily (yellow flowers)	NU	<u>Nuphar</u>
water lily (white flowers)	NY	<u>Nymphaea</u>
waterweed	E	<u>Elodea canadensis</u>
pondweed	PS	<u>Potamogeton</u> spp.
sago pondweed	PP	<u>P. pectinatus</u>
large-leaf pondweed	PA	<u>P. amplifolius</u>
clasping-leaf pondweed	PR	<u>P. richardsonii</u>
pondweed	PF	<u>P. filiformis</u>
curly-leaf pondweed	PC	<u>P. crispus</u>
Eurasian milfoil	M	<u>Myriophyllum spicatum</u>
water milfoil	ME	<u>M. exalbescens</u>
bushy pondweed	N	<u>Najas flexilis</u>

## RESULTS

### NORTH LAKE AQUATIC PLANT SURVEY DESCRIPTIONS

#### Station 1

Station No. 1 is off point 1 (see Fig. 1) with the flag which is located on the north shore of the west basin of the lake. Stations were numbered starting here and proceeding counter-clockwise around the entire lake. It is sandy here, no plants that we can see, a few leaves, it is shallow all the way out 50 yards from shore. We found some Potamogeton species and Chara, very sparse. We are proceeding toward the Bachmans now, we are in about 2 feet of water and probably a hundred yards down from Station 1 into the Station 2 area.

#### Station 2

The situation is pretty much the same, sandy bottom with some rocks. We cannot see any large accumulations of plants. There are a few patches as we get closer to shore, but very few. There are a few rocks, sand, and it is only about a foot and a half deep out here too. Rake samples showed modest amounts of Chara, so it looks like those patches of plants are Chara on the bottom, which would probably be expected. We found a few sprigs of coontail in the Station 2 area. We are moving down shore, we are about a hundred yards from Jerry Bachman's now.

### Station\_3

Station 3 is a hundred yards from the Bachman's. There are fairly high accumulations of plants: Vallisneria, Chara, and Elodea were found in the samples. There is some Potamogeton filiformis. We are about 50 yards from Jerry's house now. We see Elodea, lily pads near shore, fairly sparse, Eurasian milfoil, not too abundant, mostly Elodea, scattered Eurasian milfoil within a bed of Elodea, and some Chara too.

### Station\_4

Dead Elodea and Chara are very thick right at Jerry's dock, very common, and a few scattered Potamogeton amplifolius, and a Eurasian milfoil here and there. We are traveling now from Jerry's dock to the next dock. There are vast beds of Elodea that are all dead, some scattered Vallisneria is in very dense patches.

### Station\_5

Now, moving on to Station 5, we are now beyond the dock next to Jerry's, heading along the shoreline, there is more Chara here, a little bit reduced volume, pretty good coverage though, a little more sand here, Potamogeton filiformis, Chara right at the pontoon boat.

### Station\_6

We are at Station 6 beyond the double docks beyond the pontoon now. Chara and Elodea mixed. It seems like a lot less dense than it was, although some medium leafed Potamogeton spp exists. Moving along into a little bay, a little bay before another point, there is Chara, native milfoil, a lot sparser here, sandy bottom, predominated by Chara, fairly extensive, but nothing like we saw at the other stations.

### Station\_7

Station 7 has a log sticking out from shore here. We are running into a few scattered Potamogetons here past Station 7, a lot of plant cover all over, Chara and Potamogeton mixed together (could be amplifolius).

### Station\_8

We are going on to Station 8 which is sort of up to the point, there is a brown house or shed here at the point, looks like a lot of Chara on the bottom, not very high, covers the whole bottom, and a few other plant species too.



Chara with about 10% Potamogeton spp., some Vallisneria, very thick here, Chara, Elodea, some P. amplifolius. We are almost at the brown shed now, mostly Chara here, a few open spots, looks like sandy shore, no plants within 5-6 feet of the shoreline, but once you get from there on out it is covered, a lot of Chara, a lot of other different species here, including Potamogeton amplifolius. Now we are in an area that looks like a beach, which has been cleaned out; it is all sandy.

#### Station 9

We are going around the bend now from the beach, we are right at point 2 (Station 9), there is a little bay here, it is fairly sandy here, a few sprigs of Chara probably, very sparse in this area again, kind of like what we had at the other Station 1. We will call this Station 9. Going around the bend there are big beds of Elodea here and looks like a little bit of Najas here and there, lily pads along the shoreline, mucky bottom, some marl. We are about 20 yards from the point right now, looks like some Chara down here, it is fairly dense, although there are patches where it is not too dense. Mostly Chara with 20% Potamogeton. We are about 50 or 70 yards from the point, moving toward an oak tree buffer zone below the houses all along here; ahead about a hundred yards is a house right on the lake.

#### Station 10

Chara is common here along with a patch of lily pads, some P. crispus, Chara and Elodea are common on the bottom and beneath the lily pads. We haven't seen much Eurasian milfoil here. We are about 50 yards north of the house that's on the shoreline in this little bay. Looks like Chara and a few Potamogeton. We are right at the house now, we went through a few patches of algae at the house, a lot more sparse, wide open areas of sand, patches of Elodea and Chara. It is shallow (1.5 ft) here 20 yards offshore, plants are a lot more sparse here. Dead plants on the bottom, Chara, P. amplifolius, scattered, a few open spots of mud, plants are not too dense.

#### Station 11

We will call this Station 11, right out in front of a blue cabin. There are about 12 houses along the shore, then we are going to run into a road here soon. We are angling to the road, we are still at Station 11. Where the road would run into the lake we will call Station 12. At station 11, it there is some Eurasian milfoil, a few sprigs, it is not very abundant, also Chara, Elodea. It is a lot deeper out here, we are about 70 yards offshore, Vallisneria, Elodea, Chara, Eurasian milfoil right here. Eurasian milfoil is very common here, very heavy patches about 70



yards from shore. We are still in the Station 11 area, very common here. Now we are close to where the road touches the lake and there are not many plants on the bottom here, we are 70, 60, 50 yards offshore, it looks like Chara, sand, marl kind of substrate and very sparse plants here, very surprising compared to the fact that 50 yards behind us there are dense stands of Eurasian milfoil.

#### Station\_12

We are running into a bed of Nuphar or lily pads right now, some cattails on the shore, it is about a foot and a half deep here, it is about 30 yards from shore, still similar stuff. We right at a catamaran now, still same kinds of plants, such as lily pads, marly sandy substrate, there is some Eurasian milfoil, a few scattered sprigs of Eurasian milfoil. We are moving past that spot where the road first touches the lake, looks like we are running into a big bed of lily pads here, cattails on the shoreline, plants are still sparse on the bottom, looks like some Elodea and Chara again. In the bed itself, there is a lot of Elodea and we found some Eurasian milfoil as well by the lily pad bed here.

#### Station\_13

We are moving on now to where the road curves and if you drove straight you'd hit the lake. We are at that point right now and we'll call it Station 13. Moving past that point again we see a lot of dense plants on the bottom, probably Chara and Elodea. There is a lily pad bed, 2 or 3 lily pad beds. We are in a little bay and we are heading toward the point (Point 3) of this bay going around the other side of the lake now. Looks like some Potamogeton amplifolius, a lot of Chara, and probably Chara again, some spots of open area here, some Eurasian milfoil, a few strands of Eurasian milfoil in with the Potamogeton filiformis.

#### Station\_14

We are getting very close to point 3 and there is a lily pad bed here. We will call that station 14, just before the point, a muskrat house here, some cattails, and arrowhead abundant along the shoreline. We just made contact with point 3, it is very shallow, about an inch deep here, very sandy, and we are going to have to go way around it to get around the point. We are rounding the point, we are on the other side now. It is fairly sparse with plants here, the same plants again, Elodea, some Chara probably. We are running into plant beds that are a little more dense now as we round the bend, we are about 30 yards around the bend coming in front of a house here. Looks like right along here the whole bottom is covered with plants, although



we cannot tell how thick they are. Looks like Elodea and Chara again, no Potamogeton or Eurasian milfoil that we can see sticking out anywhere, just a whole blanket of plants down there on the bottom composed mostly of Chara and some Potamogeton species. We are out about 70 yards from shore and it all looks the same in through here. There is one little stand of Nuphar up here, and there is one about 40-50 yards around point 3 and another one about a hundred yards west of the point.

#### Station 15

We are moving up along the shoreline now. We'll call this Station 15 in the area beyond point 3 and point 4. There is actually another patch of lily pads along here, fairly common in this particular area, and we are moving on toward point 4. We are going right through the lily pad bed right now. We went through a little bit of Vallisneria, but it is fairly sparse in this particular section. We are about a hundred and fifty yards from the point 4 in the Station 15 area. Not much for plants on the bottom, there is marly substrate here. Here we are running into some Elodea or Chara, there is some Eurasian milfoil, a couple of sprigs of Eurasian milfoil here and there, thick beds now of Elodea. They're very abundant in through this area. Another sprig of Eurasian milfoil here, and about a hundred geese sitting out here. Some Najas here amongst the Elodea, looks like some Potamogeton spp. Now we are about 70 yards before coming to point 4, we are 40 yards from shore, there are a few patches of gray where there aren't any plants and out where we are there is Elodea. There are a few more areas here where there is no plants on the bottom, but big beds of Elodea in other spots.

#### Station 16

We are at point 4 now, we'll call this Station 16, we are going around the point. Plants are fairly sparse although there are areas that are covered a lot with Elodea. Now we are running into an area where it is pretty windswept, not much on the bottom. What is here is probably Chara, mostly mud and sand or marl, not many plants. It says private beach, members only here, so it might be treated with herbicides as well. This is a beach area just going around the point, there is a little bay around this point, it has a lot of lily pads in it, again this is all sandy area here, sandy or marly, not much for aquatic plants at all, from the point all the way around the bend here until we get around it there is lily pads. There is a channel right here, looks like a canal, a prime spot for Eurasian milfoil, although it looks to be fairly good so far here. We are going through the lily pads right now. There is a lot of Eurasian milfoil on the right hand side (west side) as we go into the canal in amongst the lily pads,

looks like some on the bottom too, some Potamogeton. Again, the dominant surface plants are the lily pads. The canal seems to be fairly deep in here, like about 3-4 feet. Not much for plants that we can see, except for the lily pads. It looks like they did treat plants with herbicides here; everything looks dead. It goes on, it is pretty big. We are now out of the canal proceeding around the bend from the canals about a hundred yards, we went through a lily pad bed again, it is Eloдея on the bottom. We are right next to another little canal system here and there is a rope hanging from a tree. There are fewer plants here, some more of that open sandy area with a few scattered beds of probably Chara and Eloдея for a good part of this shoreline. This looks like a little park here. It says private beach, association members only. We went by a rocky point here past that little park. There is one sprig of Eurasian milfoil here. It is all pretty much open here, we are about 40 yards past that park now, going along the shore. It is not the kind of thick abundant plants we saw before, it is fairly sparse along here with some Chara in scattered spots. You can see a lot of exposed bottom here; sparse aquatic plant growth. We are moving along the shoreline now, we are quite a ways along this whole shoreline, at least close to shore where it is fairly shallow, it is sparsely populated with plants. Once you get out a little deeper then the Chara is a little more dense in about 3 or 4 feet of water. There are a few Vallisneria sticking up along here, some Potamogeton and Najas on occasion, but the whole bottom is covered with Eloдея. We are getting close toward the other end of the lake. We just ran into some sandy shoreline along here.

#### Station 18

This station is a large area along this southern shore. It is amazing the dearth of plants here, it is very sparse, we see a little Chara on the bottom here and there, and there is nothing really near shore, we are out about 70-80 yards from shore right now and the deeper you go out the more abundant the plants become. For example, we are running into a little more dense growth on the bottom, but it is not very thick and it is mostly Eloдея. So this whole shoreline along here looks like not much of a problem with regard to Eurasian milfoil. Call this whole area along here Station 18. There is a lot of houses along here and a few docks here and there, one diving raft is sticking out here. We are getting about 2 or 3 hundred yards approaching point 5, sort of the major point on the lake and the one that divides the lake into two lobes. We will call the intermediate area between where we've been (station 18) and Point 5 station 19.



Station\_19

We are about 200 yards away from point 5 now. There is nothing around here, no plants at all. It is all sandy and nice, it is a beautiful spot right here, a lot of houses. We are about a hundred and fifty yards from point 5 now and it is sandy, no plants. We ran into a bed of Elodea here, it is just one little bed about ten feet thick, ten feet in diameter. We are approaching the point which is sandy, gravelly, no plants whatsoever. We are in about 2 feet of water, 40 yards from shore.

Station\_20

Call the point station 20. It got deep off the point and looks like a few plants down there too. Around the bend from the point there is a little bay in here, there is a lot of Eurasian milfoil and lily pads in here. We are probably 40-50 yards around the point. A bit of Eurasian milfoil out in front of the lily pads. This is the most Eurasian milfoil we've seen, it is very abundant in here.

Station\_21

There is a canal where we are right now where the Eurasian milfoil is just thicker than we have seen anywhere in the lake. It is just extremely abundant, covering the entire bay. It is right next to the canal, this is a tremendous area of infestation, probably about 50 yards by 25 yards at least, right by this canal. And it is out in real deep water as well. We'll call this Station 21, right by the canal. Our estimates are widening. It looks like this entire bay is infested with Eurasian milfoil. We are seeing acres instead of square yards of Eurasian milfoil here--we are almost cutting right straight across here over toward the other road that comes in here, looks like this whole bay is infested from one shore to the other. We are out in the middle about a hundred yards from all three shores here, and it is solid Eurasian milfoil. As we approach the other shore here it is either too deep or there isn't any, because we kind of ran out of it about 70 yards from shore. We are on the other shore now, right where the road along the lake goes up a little hill.

Station\_22

At Station 22, which is adjacent to the road where it starts up the hill here we are running into sandy, gravelly substrate with very few plants on the bottom, nothing much to speak of, mostly Chara, probably some Elodea as well.

### Station 23

We are approaching point 1 where we started, we are probably 150 yards from it, call it station 23. There are heavy growths of Potamogeton amplifolius, Chara on the bottom. Aquatic plants are fairly dense in here. Prior to this time, plants were fairly sparse and it was quite shallow.

### Station 23

This station is the entire area of the bay just before point 1 (station 1 where the study was initiated we found Vallisneria, Elodea, a couple of Potamogetons, and a few areas where there were no plants at all. Another big bed of Eurasian milfoil was recorded; Eurasian milfoil is fairly thick over here again, we are about a hundred yards from the point, there are lily pad beds here, lot of plants on the bottom, probably Elodea, a few spots where it is bare again, but there are a few areas of occurrence of P. amplifolius. We note here some more lily pads, a stand of Eurasian milfoil by the lily pads. We are right before the point, in this little bay, or at least this little indentation, it looks like another good spot for a lot of plant growth. We found Elodea, Potamogeton amplifolius, we are out about 70 yards from shore, there is some Eurasian milfoil, so it looks like Eurasian milfoil is sort of interspersed in here. It is not as abundant as it was at the other spot, but here and there, there is another big stand of it. We are getting close to the point now, more Eurasian milfoil, and the lily pads close to shore. We are right at the point now, and as might be expected this is that windswept point, similar to what we started out at at Station 1. It is shallow and sort of devoid of plants.

### RECOMMENDATIONS

We discovered that North Lake is a typical eutrophic lake with a healthy growth of aquatic macrophytes along its shoreline. In some areas, there may be some excessively dense stands of aquatic plants that may restrict swimming beaches or other forms of recreation. The main area of abundant plants was in the northeastern part of the lake. Here there is an infestation of Eurasian milfoil (see Appendix 1), which was most likely brought in from the public access on a boat or trailer which had fragments of this plant on it from other contaminated lakes in Michigan. This is a common method for this plant to spread since any fragment or piece can sprout new growths. Since Eurasian milfoil is a threat to the recreational and fishery interests in a lake, it should be eradicated or it will take over more of the lake as it spreads to available habitat in



other sections of the lake. Since it is able to outcompete native species, and grows in dense stands in up to 12 feet of water, this plant has gained a considerable amount of respect by lake managers in most of the US and Canada. We are of the opinion that Eurasian milfoil is the only plant causing a problem in North Lake; the other plants were not abundant nor dense enough to justify their extirpation, in all but the most serious cases where a swimming beach is desired.

Eurasian milfoil can be controlled in a number of ways (See Appendix 2). A drawdown, whereby the lake level is lowered exposing the plants and killing them by drying and freezing is one method. Treatment with 2,4-D is another highly recommended method which has provided some control in lakes we have worked on in past years. You should consult a reputable aquatic plant treatment specialist about advice on how best to attack this species and what chemicals they recommend. We estimate that there are about 10 acres of Eurasian milfoil in the northeastern part of the lake, but to get a liberal estimate for obtaining costs of treatment, use 20-30 acres. Bear in mind that even with aggressive control using herbicides, Eurasian milfoil may remain in the lake and need to be controlled annually depending on the completeness on the control the year before and growth conditions in the year of concern.

In several cases, Eurasian milfoil has died off on its own, and biologists are still trying to find out why this occurred and discover some new ways to control this nuisance species. Harvesting is not recommended since as noted above, the plant fragments created by harvesting and cutting would contaminate other parts of North Lake that are currently uninfected. It would be a recommended method, if Eurasian milfoil had colonized all available habitat on the lake and it has been used on at least one lake we studied. However, residents were unhappy with the control, which was not unlike mowing a vast and dense lawn. Harvesting had to be ongoing at all times in the summer to just keep up with the milfoil growth.

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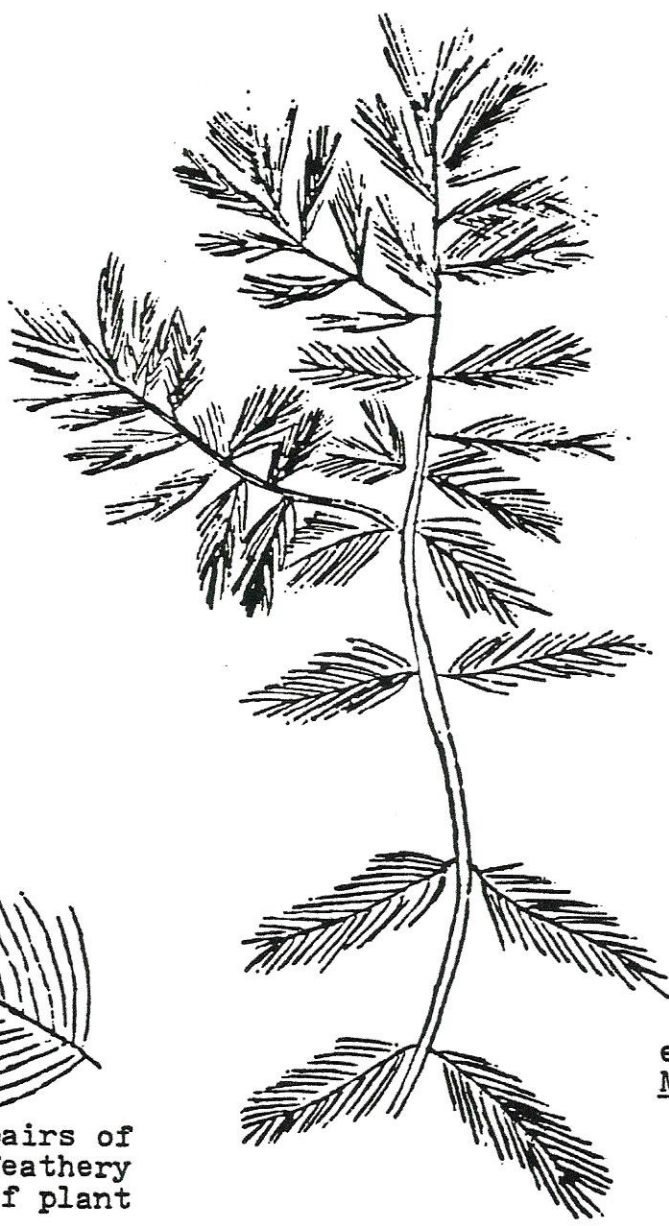
BIOLOGISTS

FOR

COMPLETE

AQUATIC

STUDIES



Note 12-16 pairs of leaves and feathery appearance of plant

eurasian milfoil  
Myriophyllum spicatum

IMPACT STUDIES LAKE MANAGEMENT

