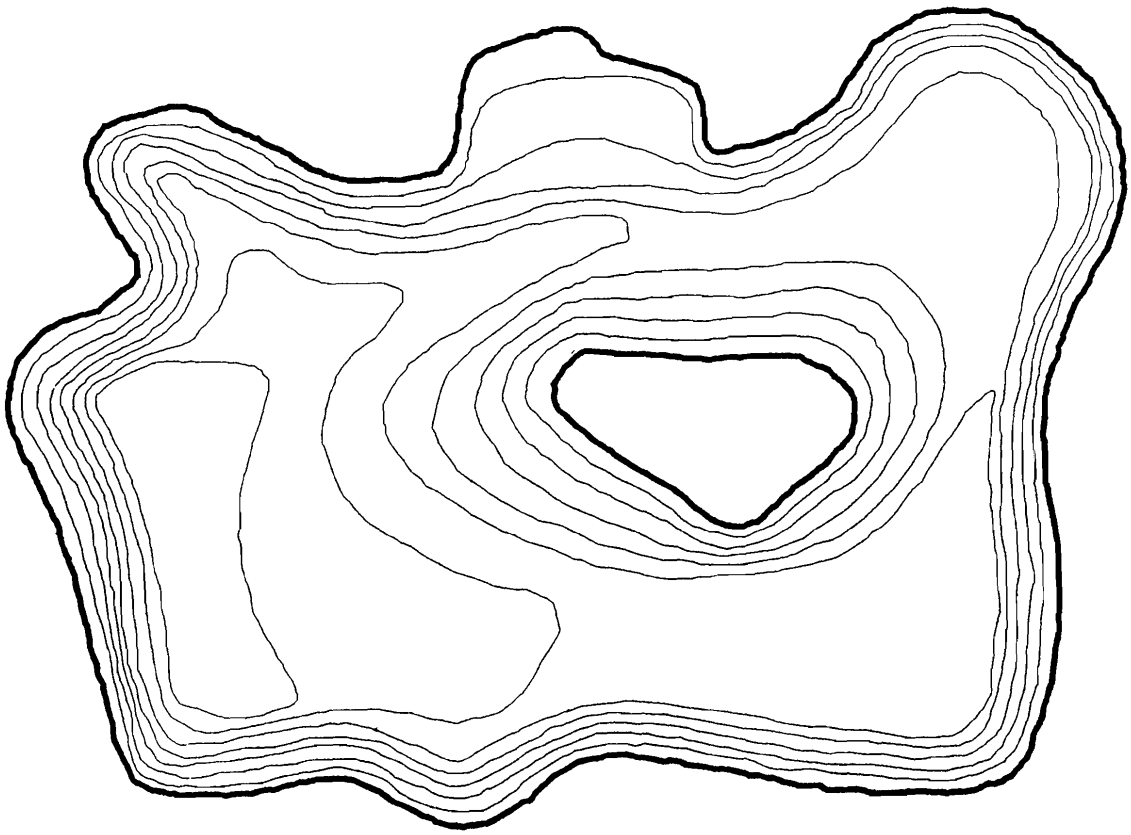
Schmeeckle Lake Aquatic Plant Inventory

Conducted: August 1993



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INTRODUCTION

Schmeeckle lake is a man made lake located on the northeast corner of the University of Wisconsin-Stevens Point campus. This body of water is a focal point of the Schmeeckle Wildlife Reserve. Moses Creek runs parallel to the Lake and has a spillway pipe which can divert into the lake at the managers discretion.

The Lake was constructed during the 1970s as a result of a land acquisition between the University and Sentry Insurance. The Lake comprises 30 acres (12 ha) with a maximum depth of thirty-five feet (10.6m). The littoral zone comprises 8 acres (3.2 ha) or 27% of this total acreage.

Schmeeckle Lake is a relatively infertile lake. This was supported by a Lake Water Quality Status Report by Dr. Byron Shaw in March of 1979. Dr. Shaw found that after construction that levels of phosphorus and nitrogen in the lake were low in comparison to other local lakes. According to Shaw, groundwater, precipitation and runoff are the main sources of nutrient input into this system. As long as the small watershed area of this lake remains as a protective wildlife area, the productivity of this lake should remain low.

Upon completion of the Lakes construction, the introduction of aquatic plants was attempted to provide a base for primary production in this new system. These planting were further supplemented by plantings by the Student Chapter of the Wildlife Society to enhance the wildlife forage base of the Lake.

METHODS

The purpose of this inventory was two fold. First, to provide a baseline record of what species of aquatic plants and their respective frequencies occured for future lake management decisions. Second, to provide the graduate students conducting this survey an opportunity to improve their skills in aquatic plant identification and sampling methods. This survey was conducted to provide preliminary data to further assist a larger survey, which should be performed a future date. The number of observations performed by this survey were not in the opinion of these researchers adequate to make firm management decisions. A larger survey should be conducted in the future.

An adaptation of the Jessen and Lound (1962) rake-sampling method was used. Self-contained underwater breathing apparatus (SCUBA) was used to conduct this survey. Five line transects were randomly placed along the shore of Schmeeckle Lake (Figure 1). At each transect a 50m (150 ft.) rope was attached to shore and stretched perpendicular to shore into the lake. This rope provided the divers a line of reference in the identification of the individual depth zone sites.

Four sites were sampled along each transect at depth zone of 0 - 0.5m, 0.5 - 1.5m, 1.5 - 2.5m, and >2.5m. At each of this sites a 2m diameter imaginary circle was envisioned. This circle was then divided into four equal sized quadrants (Figure 2). Within each of these quadrants a $0.1m^2$ quadrat was placed and the species present within were listed. Each species present was given a rating of 0 - 5 depending upon whether it was present or absent in the four sampled quadrats taken at each depth zone. A rating of four would suggest that a species was present in all four of the sample quadrats,

where a rating of five would suggest that the species was very abundant in all four quadrats sampled. From these samples the presence of species, their frequency of occurrence and density can be calculated.

A "No Vegetation" category was also included and counted as an individual species. This procedure has been recommended by Nichols (1993), since it reduces the sampling effort needed. This is due to the fact that "no vegetation" is often the most commonly encountered feature in many lake littoral areas.

In addition to these five transects, the whole shoreline was scanned by SCUBA and notes of weedbeds and lack of plants were made.

Figure 1. Schmeeckle Lake survey transect location.

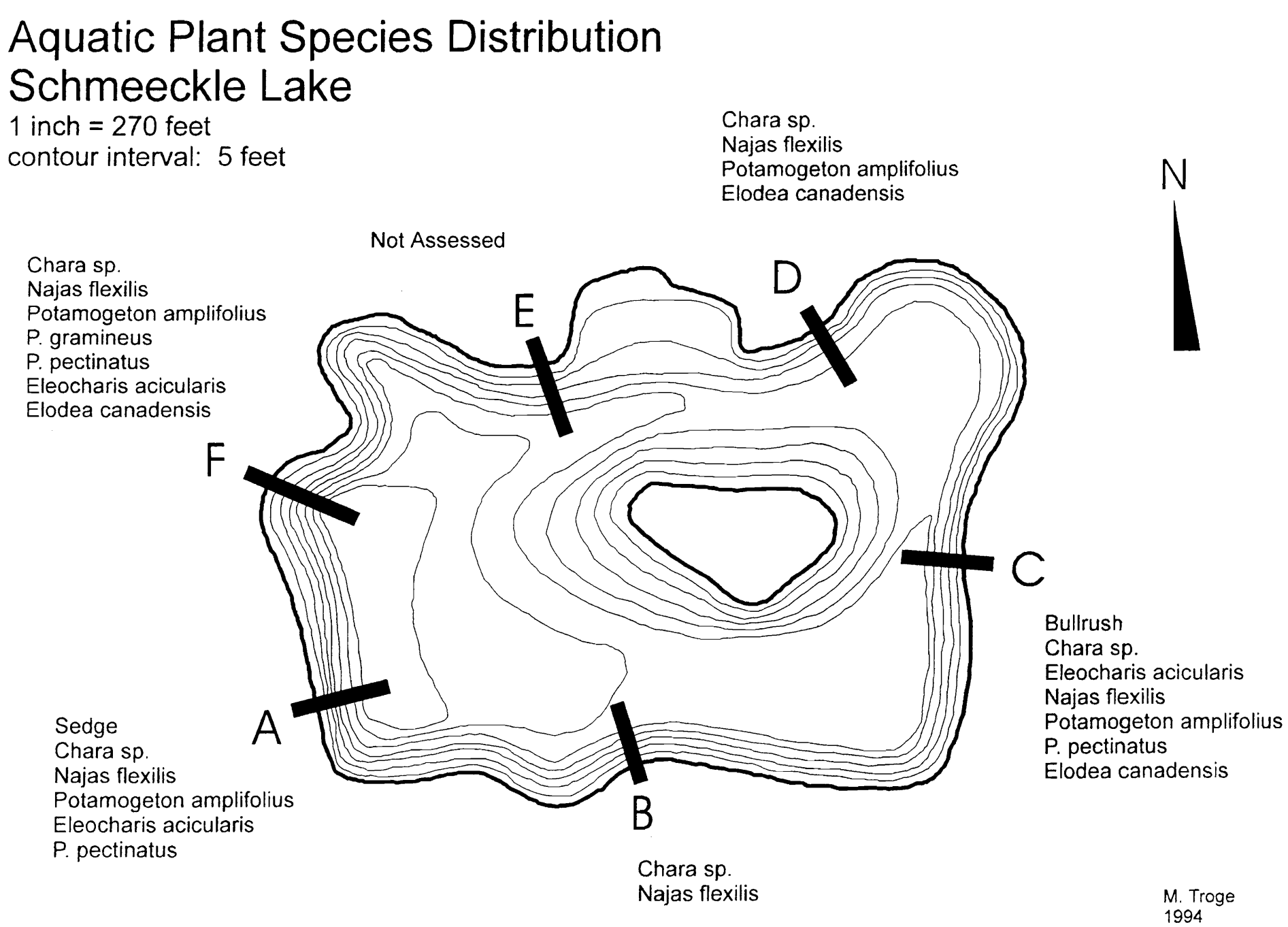
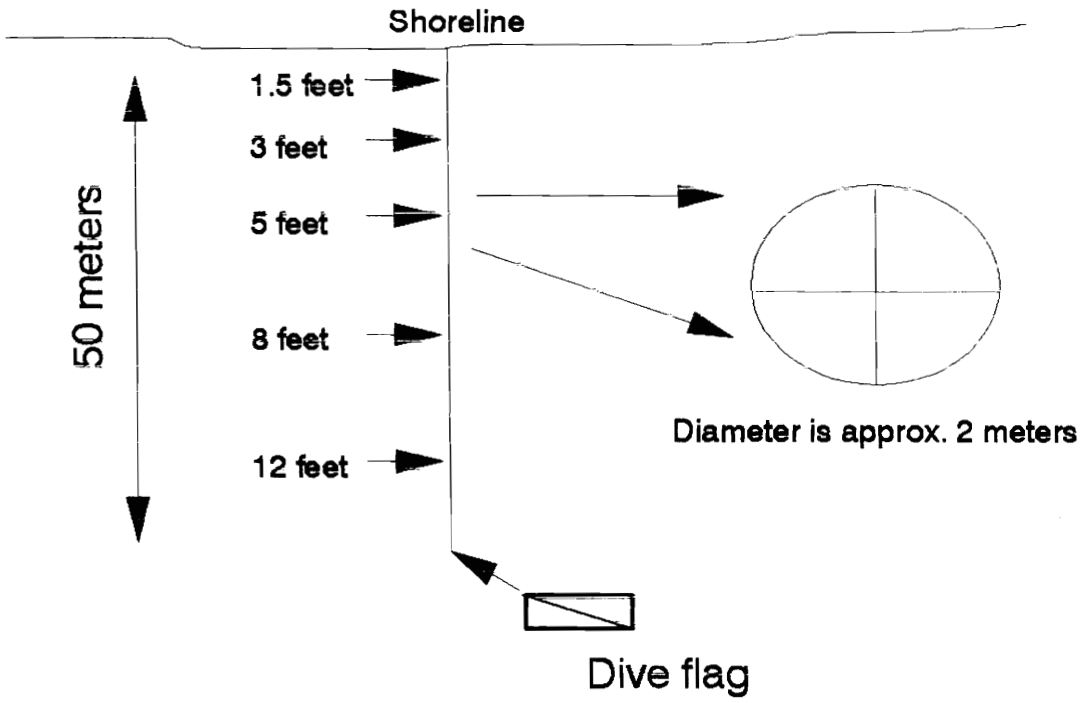


Figure 2. Sample site layout for Schmeeckle Lake.



RESULTS AND DISCUSSION

SPECIES PRESENT

As a result of this survey the following aquatic plants species were found. This inventory primarily looked at those species which were in the water at the time of sampling, so those species which may have been aquatic by nature but did not occur in the sample plots were not included. A total of nine (9) species of aquatic plants were found. Of these only two were emergents, genus' Carex sp. and Scirpus sp. (Table 1).

Table 1. List of aquatic plant species found in Schmeeckle Lake during August 1993.

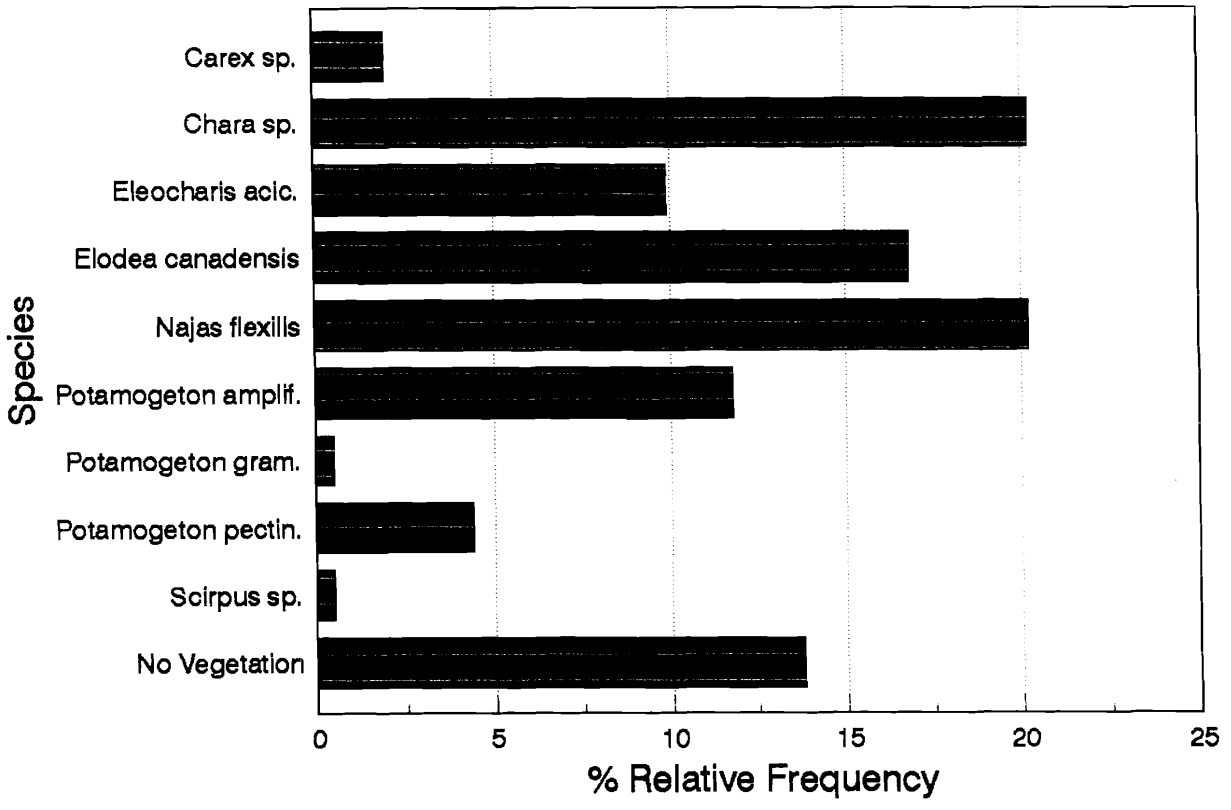
Species	Citation	Common Name	Abbreviation
Carex sp.		Sedge	CARSP
Chara sp.		Muskgrass	CHARA
Eleocharis acicularis	(L.) R.& S.	Needle Rush	ELEAC
Elodea canadensis	Michaux		ELOCA
Najas flexilis	(Willdi) R. & S.	Bushy Pondweed	NAJFL
Potamogeton amplifolius	Tuckerman	Largeleaf Pondweed	POTAM
Potamogeton gramineus	L.	Variable Pondweed	POTGR
Potamogeton pectinatus	L.	Sago Pondweed	POTPE
Scirpus sp.		Bullrush	SCISP
No Vegetation			NOVEG

FREQUENCY ANALYSIS

WHOLE LAKE

Aquatic plants were found at 82.1% of the sampling points. Chara sp., Najas flexilis and Elodea canadensis were the most commonly found species with relative frequencies of 20.2%, 20.2% and 16.8% respectively (Figure 3). Relative frequency is the frequency of individual species occurence divided by the sum of total frequency of all species. This allows us to convert individual species frequencies based on a scale of 100% into a format which allow for comparisons between species. Chara sp. is not a vascular plant, but a macroalgae which shares many characteristics with vascular plants. Najas flexilis is an annual vascular plant which commonly is considered a pioneer species in new aquatic environments.

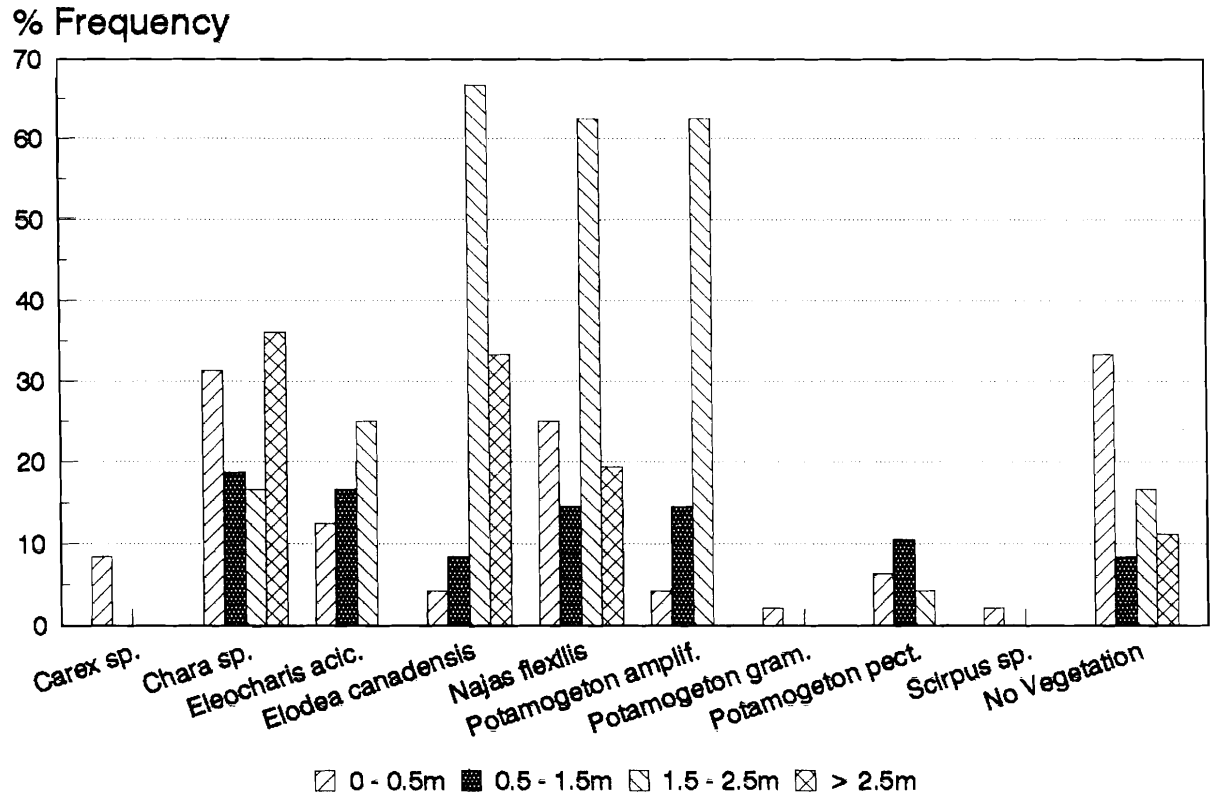
Figure 3. Percent relative frequency for the aquatic plants of Schmeeckle Lake.



DISTRIBUTION BY DEPTH

Plants were found in all of the depth zones sampled (Figure 4). In those sites sampled located on the west side of the island a uniform band of no plant life was found. This band was located between the 3.5m and 5.2m depth. A reason for the lack of plant life within this area is not known. At depths greater than 5.2m the macroalgae Chara sp. was the only plant found. The east end of the lake was shallower and exhibited plants from the shore region to the maximum depth for that area. Two large beds of Potamogeton amplifolius were found along the eastern shore. These beds were fairly large and comprised the majority of the lakes population for this species. These Potamogeton amplifolius beds occupied the 0 - 2.5m range of lake depth. These two beds also provide an excellent area for fish habitat.

Figure 4. Distribution of aquatic plant % frequency by depth range for Schmeeckle Lake.



CONCLUSIONS

Schmeeckle Lake at the time of this inventory was approximately twenty years old. A very fine silty sediment layer has accumulated over the hardclay/bedrock bottom. This substrate does not appear to be sufficient to support the growth forms which prefer vertical distribution (Potamogeton amplifolius) to the low growth form species (Chara sp., Najas flexilis). Those areas which were vegetated, were comprised of primarily a sand substrate.

It is our recommendation that a long term monitoring program be established to track the overall productivity of Schmeeckle Lake. Considering this is property of the University of Wisconsin, faculty participation should be encourage to promote and make use of Schmeeckle Lake as an undergraduate training grounds. The following is a list of suggested research topics which could be incorporated into Schmeeckle Lakes Management Plan:

1. Distribution of aquatic macrophytes as Schmeeckle Lake ages.
2. Fisheries inventory
3. Fisheries use of macrophytes in Schmeeckle Lake.
4. Fisheries habitat improvement
5. Invertabrate inventory
6. Long term changes in lake water quality.

The above list is proposed to draw attention to the Lakes management needs. This waterbody holds a number of research opportunities for the undergraduate program in the College of Natural Resources and should be considered.

LITERATURE CITED

Jessen, R. and R. Lound. 1962. An Evaluation of a Survey Technique of Submerged Aquatic Plants. Game Investigational Report, Minnesota Dept. of Conservation.

Nichols, S.A. 1993. University of Wisconsin Extension - Natural History and Geologic Survey. Personal communication, July 1993.

Shaw, B. 1979. Current status of University Lake water quality. University of Wisconsin-Stevens Point. (Unpublished).

APPENDIX

SCHMEECKLE LAKE AQUATIC PLANT SURVEY DATA

Transect	Site	Depth (ft.)	Depth (m)	Distance (m)	Species	J&L
A	1	0.5	0.15		CARSP	4
A	1	1.5	0.46		CHARA	4
A	1	1.5	0.46		ELEAC	0
A	1	1.5	0.46		NAJFL	4
A	1	1.5	0.46		POTAM	1
A	2	3	0.90		ELEAC	0
A	2	3	0.90		NAJFL	3
A	2	3	0.90		POTAM	4
A	2	3	0.90		POTPE	2
A	3	8	2.50		ELEAC	3
A	3	5	1.50		NAJFL	2
A	3	5	1.50		POTAM	3
A	4	12	3.70		CHARA	4
B	1	1.5	0.46		NOVEG	4
B	1	0.5	0.15		NOVEG	4
B	2	3	0.90		NOVEG	4
B	3	8	2.50	5	CHARA	2
B	3	8	2.50	5	NAJFL	4
B	3	5	1.50		NOVEG	4
B	4	17	5.20	25	CHARA	2
C	1	1.5	0.46	4	CHARA	4
C	1	1.5	0.46	4	ELEAC	4
C	1	0.5	0.15		SCISP	1
C	2	3	0.90	6	CHARA	4
C	2	3	0.90	6	ELEAC	4
C	3	5	1.50	8	CHARA	1
C	3	5	1.50	8	ELEAC	1
C	3	8	3.70	20	ELOCA	4
C	3	8	2.50	12	ELOCA	4
C	3	5	1.50	8	NAJFL	4
C	3	5	1.50	8	POTAM	3
C	3	8	2.50	12	POTPE	1
C	4	12	3.69	25	CHARA	2
C	4	15	4.62	50	CHARA	2
C	4	12	3.69	25	ELOCA	4
C	4	15	4.62	50	ELOCA	4

SCHMEECKLE LAKE AQUATIC PLANT SURVEY DATA

Transect	Site	Depth (ft.)	Depth (m)	Distance (m)	Species	J&L
C	4	15	4.62	50	NAJFL	2
C	4	12	3.69	25	NAJFL	2
D	1	1.5	0.46	4	CHARA	3
D	1	1.5	0.46	4	NAJFL	4
D	1	0.5	0.15		NOVEG	4
D	2	3	0.90	6	CHARA	4
D	2	3	0.90	6	POTAM	3
D	3	5	1.50		POTAM	4
D	3	8	2.50	20	POTAM	4
D	4	11	3.10	45	CHARA	2
D	4	9	2.80	25	CHARA	1
D	4	13		50	ELOCA	4
D	4	9	2.80	25	NAJFL	1
D	4	11	3.10	45	NAJFL	2
E	1	0.5	0.15		NOT ASSESSED	
E	1	1.5	0.46		NOT ASSESSED	
E	2	3	0.90		NOT ASSESSED	
E	3	8	2.80		NOT ASSESSED	
E	3	5	1.50		NOT ASSESSED	
E	4	12	3.70		NOT ASSESSED	
F	1	1.5	0.46	3	CHARA	4
F	1	1.5	0.46	3	ELEAC	2
F	1	1.5	0.46	3	ELOCA	2
F	1	1.5	0.46	3	NAJFL	4
F	1	0.5	0.15		NOVEG	4
F	1	1.5	0.46	3	POTAM	1
F	1	1.5	0.46	3	POTGR	1
F	1	1.5	0.46	3	POTPE	3
F	2	3	0.90	5	CHARA	1
F	2	3	0.90	5	ELEAC	4
F	2	3	0.90	5	ELOCA	4
F	2	3	0.90	5	NAJFL	4
F	2	3	0.90	5	POTPE	3
F	3	8	2.50	15	CHARA	1
F	3	5	1.50	10	ELEAC	2
F	3	8	2.50	15	ELOCA	4

SCHMEECKLE LAKE AQUATIC PLANT SURVEY DATA

Transect	Site	Depth (ft.)	Depth (m)	Distance (m)	Species	J&L
F	3	5	1.50	10	ELOCA	4
F	3	5	1.50	10	NAJFL	4
F	3	8	2.50	15	NAJFL	1
F	3	5	1.50	10	POTAM	1
F	4	12	3.70		NOVEG	4