

RUNYAN LAKE MANAGEMENT PLAN STUDY FINDINGS AND CONCLUSIONS

PROGRESSIVE

ARCHITECTURE

ENGINEERING

PLANNING

Study findings indicate the water quality of Runyan Lake is generally good. The lake maintains a healthy diversity of aquatic plants although there are isolated areas in which nuisance plant growth is occurring. The construction of the sewer system around the lake in the late 1980's has had a positive impact on overall water quality conditions.

Since the initial settlement of Runyan Lake as a resort area began in the 1940's, most of the land adjacent to the lake has been converted to residential development. Today, over 225 cottages and year-round homes border the lake. Currently, surface water drainage from developed shoreland areas appears to be the largest controllable source of lake pollution. Proper management of these lands to control pollution runoff is critical to long-term water quality protection. As additional development occurs in the Runyan Lake watershed, wetland protection and stormwater management issues will take on greater importance.

With the advent of high-speed boats and personal watercraft, congestion on the lake is becoming a problem. Steps need to be taken to ensure future development in the area does not overburden the lake.

In light of these considerations, the management plan for Runyan Lake is proposed to include the following:

- The control of nuisance aquatic vegetation via the limited use of herbicides and mechanical harvesting.
- The construction of swimming beaches by individual property owners.
- The preparation of a lake protection guidebook for lake residents which would include information on Runyan Lake and its watershed, lake water quality, lakeside landscaping and lawn care, wetland protection, invader species control, and watershed management techniques to protect water quality.
- The enactment of an ordinance to regulate future access to the lake.
- A water quality monitoring program to better discern water quality conditions.

1811

4 MILE

ROAD NE

GRAND RAPIDS

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AFG/mkf
9503-26
5/24/96

1996

**RUNYAN LAKE
PHYSICAL CHARACTERISTICS**

Lake Surface Area	174 Acres
Approximate Maximum Depth	55 Feet
Shoreline Length	3.6 Miles
Shoreline Development Factor	1.9
Watershed Area	7471 Acres
Ratio of Lake Area to Watershed Area	1:43

Watershed Land Uses	Acres	Percent Of Total
Agriculture	1957	26%
Residential Development	887	12%
Wooded	1492	20%
Undeveloped Open Space	2390	32%
Wetlands	<u>745</u>	<u>10%</u>
	7471	100%

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LAKE CLASSIFICATION CRITERIA

LAKE CLASSIFICATION	TOTAL PHOSPHORUS (µg/L)	CHLOROPHYLL-a (µg/L)	SECCHI TRANSPARENCY (feet)
OLIGOTROPHIC	less than 10	less than 2.2	greater than 15.0
MESOTROPHIC	10 to 20	2.2 to 6.0	7.5 to 15.0
EUTROPHIC	greater than 20	greater than 6.0	less than 7.5

Notes:

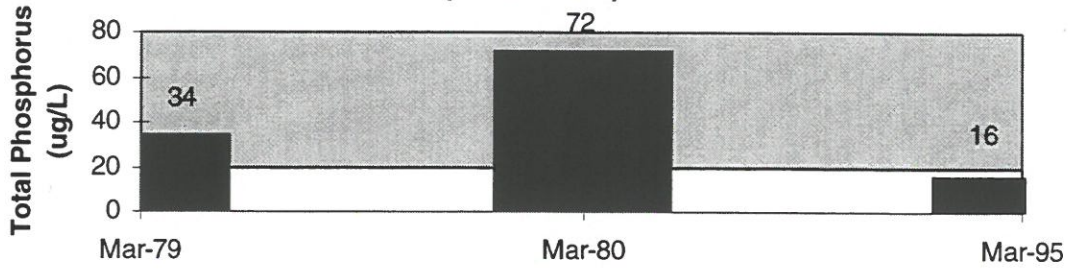
1. The criteria listed above are guidelines for the upper midwest and northeast regions of the U.S. that have been generally accepted by water resource management professionals. These guidelines do not represent standards adopted by the Michigan Department of Natural Resources, but rather criteria for evaluating water quality.
2. Oligotrophic lakes are generally deep, clear, and have little aquatic plant growth. Eutrophic lakes are generally shallow, turbid, and have a great abundance of aquatic plants. Mesotrophic lakes are intermediate in water quality.
3. Phosphorus is the nutrient that most often stimulates the growth of aquatic plants.

Chlorophyll-a is the pigment that makes plants green in color. A rough estimate of the quantity of algae in lake water can be made by measuring the amount of chlorophyll-a in a water sample.

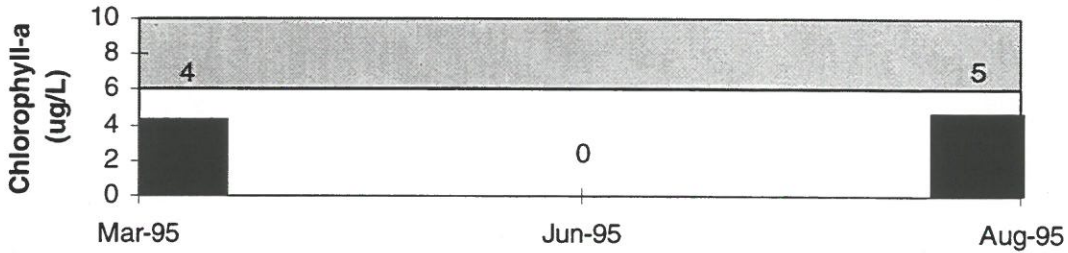
A Secchi disk is a flat, circular disk, 8 inches in diameter, the surface of which is divided into 4 pie-shaped sections with the alternating sections painted black and white. The Secchi disk is used to estimate water clarity.

4. µg/L = micrograms per liter, or parts per billion.

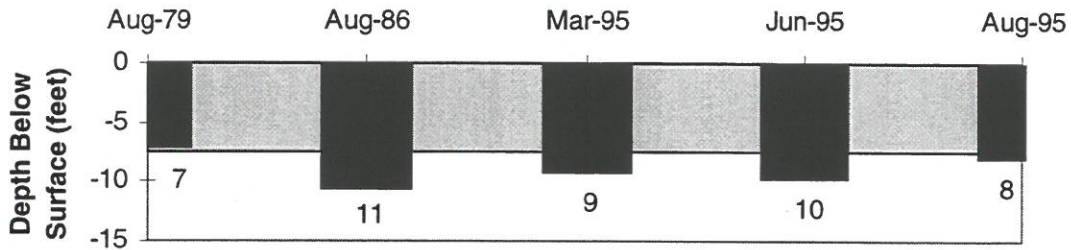
**Average Spring Total Phosphorus Concentrations
(1979-1995)**



**Average Chlorophyll-a Concentrations
(1995)**



**Average Secchi Transparency
(1979-1995)**



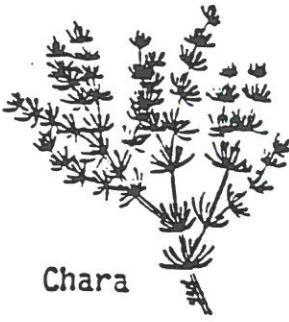
Runyan Lake water quality data. The shaded areas show the level at which water quality problems typically begin to occur.

TABLE 1
RUNYAN LAKE
DEEP BASIN WATER QUALITY DATA

Sample Location	Sample Depth (feet)	Temperature (°F)	Dissolved Oxygen (mg/L) ¹	Total Phosphorus (µg/L) ²
March 28, 1995				
2	1	42.0	12.8	14
2	10	42.0	12.8	---
2	20	42.0	13.0	---
2	30	42.0	13.0	22
2	40	42.0	12.6	---
2	50	42.0	11.6	14
August 14, 1995				
2	1	81.5	8.1	15
2	10	81.0	8.0	10
2	20	72.0	8.6	15
2	30	55.0	7.6	68
2	40	54.0	7.0	24
2	50	50.0	0.2	38

¹mg/L = milligrams per liter = parts per million.

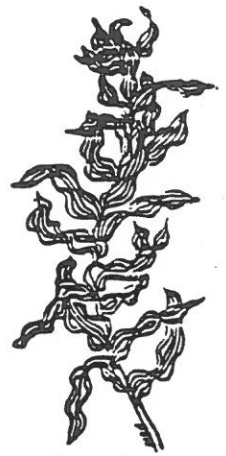
²µg/L = micrograms per liter = parts per billion.



Chara



Coontail



Claspingleaf Pondweed



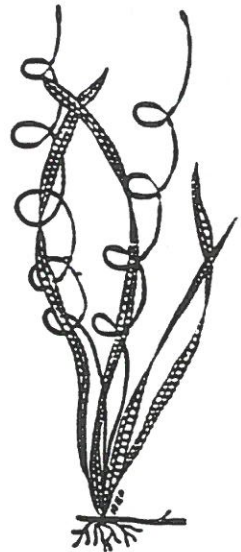
Watermilfoil



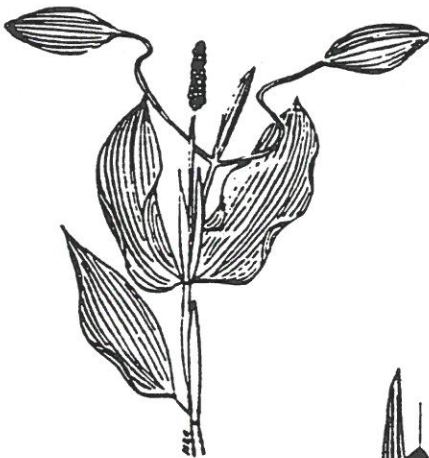
American elodea



Floating-leaf Pondweed



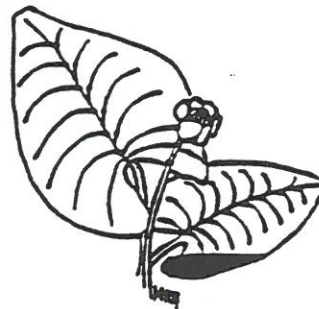
Wild Celery



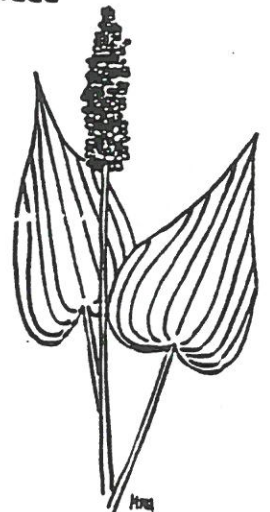
Large-leaf Pondweed



Curly-leaf Pondweed



Yellow Water Lily



Pickerelweed



Cattail



Duckweed

3x actual size