

# Lake Ketchum

Lake Ketchum has low water clarity, extremely high phosphorus levels, severe algal blooms, and dense aquatic plants. Although the lake provides valuable recreation and aesthetic enjoyment, excess algae and aquatic plants impair the use of the lake at times. Farm runoff and nutrient recycling within the lake must be controlled to restore the health of the lake.



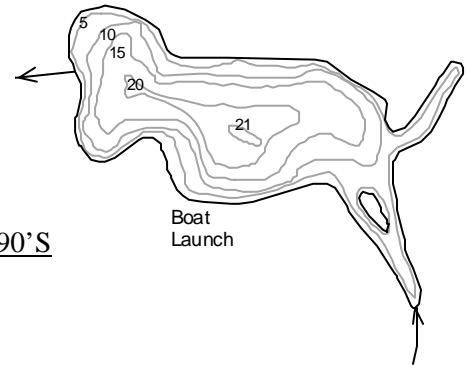
*State of the Lakes Report*  
*March 2003*

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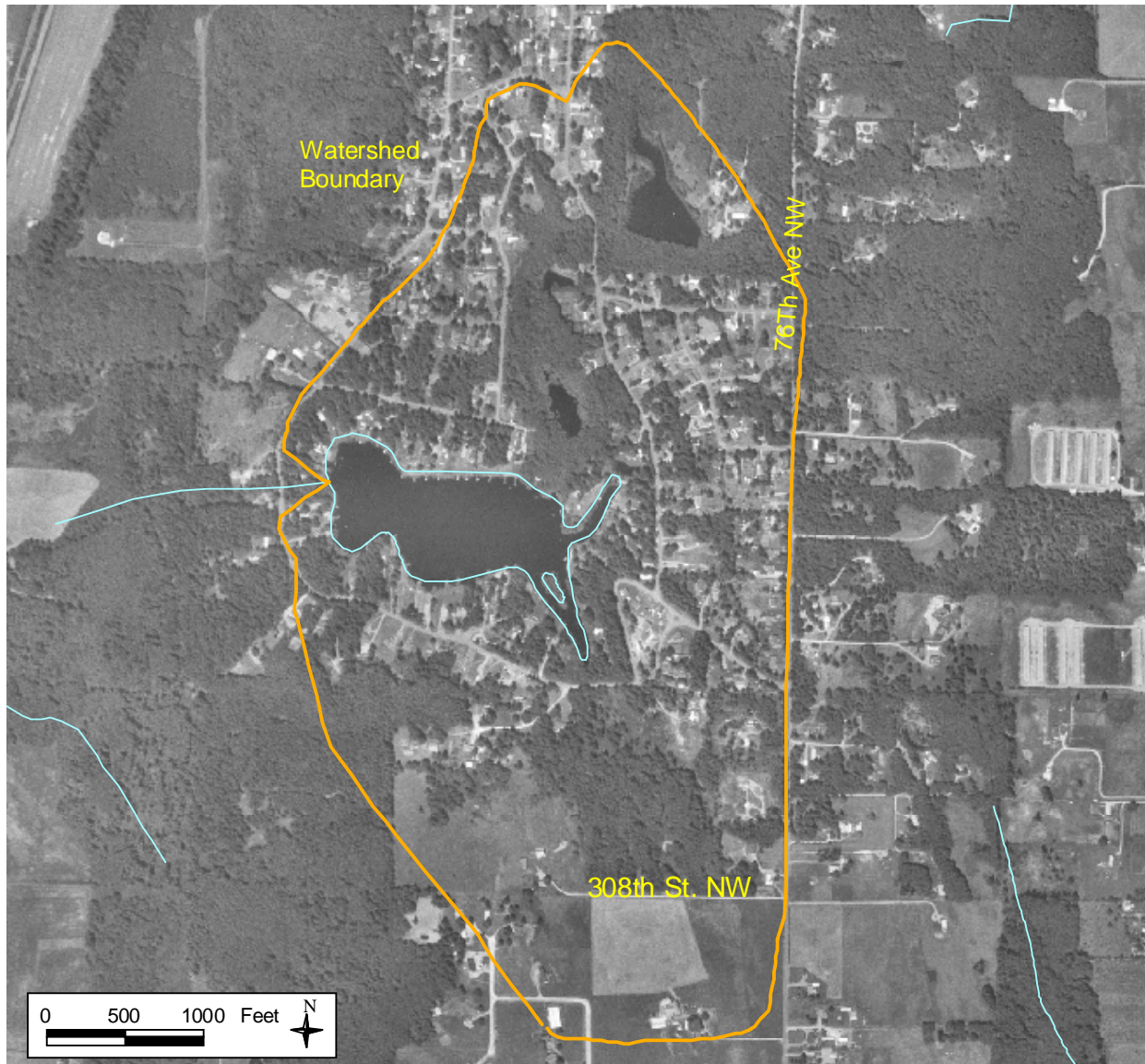
**Snohomish County Public Works**  
**Surface Water Management**

## LAKE AND WATERSHED DATA

Lake Area: 24 acres  
 Watershed Area: 352 acres  
 Watershed to Lake Area Ratio: 14.7  
 Maximum Depth: 21 feet (6.4 meters)  
 Average Depth: 12 feet (3.7 meters)  
 Lake Volume: 296 acre-feet  
 Length of Shore: 1.3 miles



	<u>1981</u>	<u>MID-90'S</u>
# of nearshore homes	59	52
# of homes/1000' of shoreline	8.6	7.6
% of homes with bulkhead or fill		46%
% of homes with some native vegetation near shore		19%
% of watershed developed (residential or commercial)	23%	41% (est.)



# LAKE ASSESSMENT

## DESCRIPTION

■ Location/Access – Lake Ketchum is located two miles north of Stanwood. In addition to ground water inflows, the lake is fed from the northeast by runoff from a large wetland area and from the southeast by a small stream that receives runoff from a former dairy farm. The lake drains to the west and eventually empties into Skagit Bay. There is a public boat launch on the south shore. A private community access park on the northwest shore serves residents of several nearby residential subdivisions. Gas-powered boats are not permitted on the lake.

■ Size/Shape – The lake is 24 acres in size and relatively shallow, with a maximum depth of 6.4 meters and an average depth of 3.7 meters. The lake volume contains 296 acre-feet of water.

■ Watershed – The watershed, including the lake, covers 352 acres. The watershed is 14.7 times the size of the lake. In 1981 approximately 23% of the watershed supported residential uses, with some agriculture south of the lake. By the mid-90s, residential development had expanded to 41% of the watershed and agricultural uses had decreased. A dairy farm south of the lake ceased animal operations in the areas that drain to the lake in the 1990s. However, runoff from the farm continues to be a major factor in the health of the lake.

■ Shoreline – The shoreline of Lake Ketchum is 1.3 miles in length. Two man-made arms of the lake, dredged 50 or 60 years ago, help account for this length and provide water access for numerous homes on the east side of the lake. Along the shoreline, there were 59 homes in 1981. By the mid-90s, there were only 52 homes, mainly because numerous small cabins were replaced by larger, year-round homes. Approximately 46% of the existing nearshore homes have modified the shoreline with bulkheads or fill. Only 19% of the homes have retained some native vegetation along the shore, one of the lowest percentages in the county. A zone of vegetation is important for filtering pollution.



## LAKE CONDITIONS

■ Water Clarity – Summer water clarity in Lake Ketchum is low. Averages have ranged from 1.3 to 2.1 meters between 1992 and 2002, except for 1997 when the average was only 0.7 meters. These low values reflect abundant algae in the lake and the color of the water.

■ Color – The lake is colored by algae and by dissolved organic (humic) material from wetlands. The water usually appears medium to dark brown or greenish-brown.

■ Nutrients – A detailed Phase I diagnostic study of the lake was conducted by Entranco for Snohomish County SWM in 1995. The study found that the mean summer (May-October) total phosphorus concentration from epilimnion composite samples was 543  $\mu\text{g/l}$ . Composite total phosphorus samples collected by the Department of Ecology from 1992-1995 ranged from 347 to 632  $\mu\text{g/l}$  in the epilimnion. Summer average epilimnion total phosphorus concentrations from discrete samples collected by Snohomish County SWM from 1996-2002 ranged from 152  $\mu\text{g/l}$  to 484  $\mu\text{g/l}$ . While composite and discrete samples are not directly comparable, these data confirm that the epilimnion phosphorus levels are extremely high.

Likewise, summer total phosphorus averages in the hypolimnion are also the highest of any lake in the county. The Entranco study found an average of 1368  $\mu\text{g/l}$  during the summer of 1995. Samples collected by Ecology ranged from 492 to 3095  $\mu\text{g/l}$  in the hypolimnion. Discrete samples taken by SWM in 1996-2002 had averages ranging from

1155 to 1968 µg/l. These data indicate that there is substantial release of phosphorus from the bottom sediments during periods of oxygen depletion. This internal release of phosphorus is the current primary source of nutrients to the lake. The 1995 study also identified runoff from the former dairy farm as the primary watershed source of phosphorus. Total phosphorus concentrations coming off the farm averaged more than 10,000 µg/l during the study. The levels of total phosphorus from the farm runoff have declined somewhat since 1995, but still averaged 4,300 µg/l during the winter of 2001-2002. The median total nitrogen concentrations in the lake during the 1995 study were 1655 µg/l in the epilimnion and 1770 µg/l in the hypolimnion. Ammonia was also high in the hypolimnion. These data reveal that, although nitrogen is abundant, it is the nutrient limiting algal growth because of the vast stores of phosphorus in the lake. The lake is listed on the State's 303(d) list as impaired due to excess phosphorus.

- Oxygen/Temperature – Vertical profiles of dissolved oxygen and temperature for the summers of 1995 through 2002 show strong stratification between warm, oxygenated upper waters and cool, oxygen-depleted bottom waters. Dissolved oxygen is often depleted below about 2 meters during the warm months. After fall turnover, the entire lake is starved for oxygen for several weeks. These profiles point to the presence of large amounts of decaying organic matter in the lake bottom.

- Algae – Lake Ketchum is very productive of algae. The Entranco study and Ecology data revealed that chlorophyll *a* averaged 43 µg/l during the summer of 1995, which indicates very high levels of algae. Limited data from 1992, 1994, and 2002 also showed high chlorophyll *a* values. The 1995 study identified nuisance blue-green algae species as the dominant algae. Observations by SWM staff and volunteers have also noted that severe blue-green algal blooms occur regularly in the lake. In the 1980s, local residents treated the lake with copper compounds to control the heavy algal growth. A bloom of toxic blue-green algae was discovered in the lake during the summer of 2000. Toxic algae are a potential health threat to animals and humans if the water is ingested.

- Aquatic Plants – Lake Ketchum is also very

productive of aquatic plants. All of the shallow areas around the lake support dense growths of rooted aquatic plants which interfere with boating and other lake uses. The dominant plants are elodea, thin-leaf pondweed, nitella, and yellow water-lily—all of which are native species. In addition, free-floating aquatic plants—duckweed and Mexican water fern—sometimes grow in such profusion that they cover large portions of the lake surface. The local homeowners group has repeatedly treated the lake with herbicides to control the excess aquatic plants.

## SUMMARY

- Trophic State – Based on low water clarity, extremely high phosphorus concentrations, severe oxygen depletion, and excess productivity of algae and aquatic plants, Lake Ketchum may be classified as eutrophic. The lake is the most nutrient-enriched lake in Snohomish County.

- Current Conditions/Trends – Lake Ketchum suffers from excess algae and aquatic plants, which impair the use of the lake at times. However, the lake still provides valuable recreational and aesthetic enjoyment, and there is no evidence of trends toward further declines in water quality.

- Future Concerns/Targets – The primary concern for Lake Ketchum is nutrient pollution coming from the former dairy farm to the south. Until this nutrient source is cleaned up and in-lake nutrient recycling is controlled, the lake will continue to suffer from poor water quality. Improving water clarity and reducing phosphorus levels are targets for the lake.

- Recommendations – A rehabilitation plan developed for the former dairy farm should be implemented. Wetlands north and south of the lake are important in filtering pollution and should be protected. Monitoring of the lake and farm runoff should continue to track nutrient levels and to identify potential toxic algal blooms. Other recommendations are also included in the lake management plan developed as part of the 1995 Entranco study.

## CITIZEN VOLUNTEERS

Thanks to Bob Arnold, Anton Ehinger, and Jane Hilleary for volunteer monitoring of the lake.

## ***DATA SUMMARY TABLE***

Source	Date	Secchi Depth (meters)	Total Phosphorus ( $\mu\text{g/l}$ )		Color (Pt-Co scale)	Chlorophyll a ( $\mu\text{g/l}$ )
			Surface	Bottom	Epilimnion	Epilimnion
Sumioka and Dion, 1985	7/09/81	3.0	190	950	-	2
DOE	Summer 1992	1.1 - 2.0 (1.6) $n = 9$	-	-	60	9.2 - 13.4 (11.3) $n = 2$
DOE	Summer 1993	1.5 - 2.7 (2.0) $n = 5$	-	-	-	-
SWM Staff or DOE	Summer 1994	0.6 - 4.0 (2.0) $n = 10$	-	-	30 - 40 (35) $n = 2$	5.4 - 51 (27) $n = 4$
Entranco, 1997 Volunteer or DOE	Summer 1995	0.8 - 2.8 (1.9) $n = 16$	See note	See note	-	3.7 - 139 (43) $n = 14$
SWM Staff or Volunteer	Summer 1996	0.8 - 1.9 (1.3) $n = 6$	425 - 431 (428) $n = 2$	1440 - 2310 (1875) $n = 2$	-	-
SWM Staff or Volunteer	Summer 1997	0.5 - 1.4 (0.7) $n = 12$	212 - 220 (216) $n = 2$	1530 - 1990 (1760) $n = 2$	-	-
SWM Staff or Volunteer	Summer 1998	1.0 - 3.5 (2.1) $n = 7$	466 - 513 (484) $n = 4$	1450 - 2400 (1968) $n = 4$	-	-
SWM Staff or Volunteer	Summer 1999	0.9 - 3.0 (1.7) $n = 12$	249 - 331 (274) $n = 4$	1280 - 1600 (1460) $n = 4$	-	-
SWM Staff or Volunteer	Summer 2000	1.3 - 3.0 (2.0) $n = 6$	146 - 388 (209) $n = 4$	682 - 1620 (1157) $n = 4$	-	-
Volunteer	Summer 2001	0.9 - 2.2 (1.4) $n = 9$	179 - 558 (332) $n = 4$	621 - 2280 (1285) $n = 4$	-	-
Volunteer	Summer 2002	1.2 - 2.5 (1.8) $n = 6$	73 - 241 (152) $n = 4$	302 - 2050 (1155) $n = 4$	-	5.9 - 54 (21) $n = 4$

### ***NOTES***

- Table includes summer (May-Oct) data only.
- Each box shows the range on top, followed by summer average in ( ) and number of samples (n).
- Total phosphorus data are from samples taken at discrete depths only.
- The 1995 Entranco study used composite samples. May-Oct. total phosphorus averages during the study were 543  $\mu\text{g/l}$  for epilimnion composites and 1368  $\mu\text{g/l}$  for hypolimnion composites.
- DOE = Washington Department of Ecology

## SUMMARY OF OTHER DATA

■ **Total Phosphorus** – composite samples taken by the Department of Ecology in 1992, 1994, and 1995 ranged from 347 -- 632 µg/l in the epilimnion and 492 -- 3095 µg/l in the hypolimnion; median values from composite samples taken by Entranco during the 1995 Phase I study were 494 µg/l in the epilimnion and 1225 µg/l in the hypolimnion. These composite data are not directly comparable to the discrete samples shown above, but confirm that Ketchum has extremely high phosphorus levels.

■ **Nitrogen** – single samples for total nitrogen in 1981 showed 1.6 mg/l in the epilimnion and 2.3 mg/l in the hypolimnion; total nitrogen values from 1992-1995 Ecology samples averaged 1.20 mg/l in the epilimnion and 2.00 mg/l in the hypolimnion; 1995 Phase I total nitrogen samples had a median of 1.66 mg/l in the epilimnion and 1.77 mg/l in the hypolimnion; in 1995 ammonia concentrations were high in the hypolimnion (up to 1.14 mg/l), reflecting vigorous decomposition of organic matter. These data show that nitrogen is abundant, but that the availability of nitrogen still limits algal growth because of the vast stores of phosphorus in the lake.

■ **Alkalinity** – data from 1994 and 1995 ranged from 49 – 71 mg/l CaCO<sub>3</sub>, which suggests that Ketchum has a high buffering capacity.

■ **pH** – 1994-2000 data averaged 7.9 near the surface and 6.5 near the bottom, with numerous higher readings up to 10.4 during vigorous algal growth. Readings in 2002 were similar.

■ **Conductivity** – the median from the 1995 study was 199 µmhos in the epilimnion and 215 µmhos in the hypolimnion; routine monitoring data from 1994-2000 averaged 138 µmhos in the epilimnion and 223 µmhos near the lake bottom; these data indicate very high levels of dissolved materials in the water. Readings in 2002 were similar.

■ **Iron** – data from 1994-95 showed high levels in the epilimnion (avg. 206 µg/l) and in the hypolimnion (avg. 480 µg/l, high of 820 µg/l),

which indicates release of iron and phosphorus from the bottom sediments under low oxygen conditions.

■ **Algae** – two samples collected in 1994 showed that the total algal volumes were extremely high and that blue-greens and greens were most prevalent. Samples collected during the 1995-1996 Entranco study showed that during May through mid-October biovolumes were high and dominated by blue-greens. In contrast, cryptomonads were dominant from fall through spring (except for one sample dominated by diatoms in the spring).

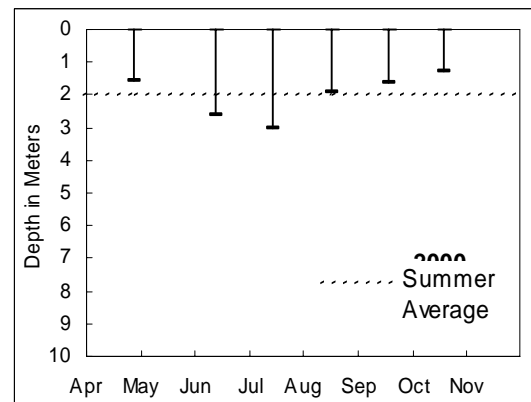
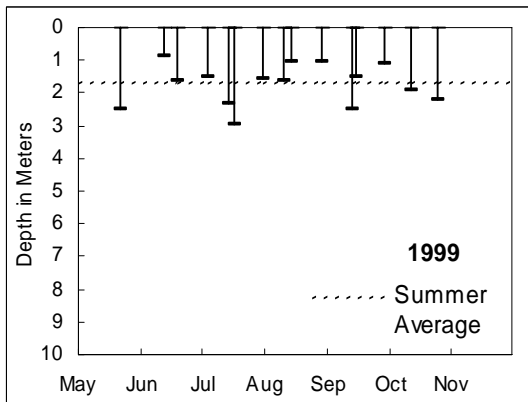
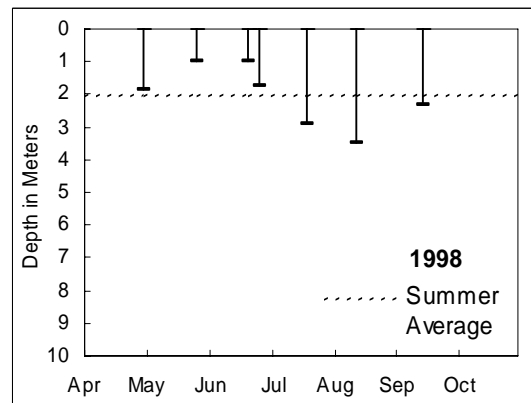
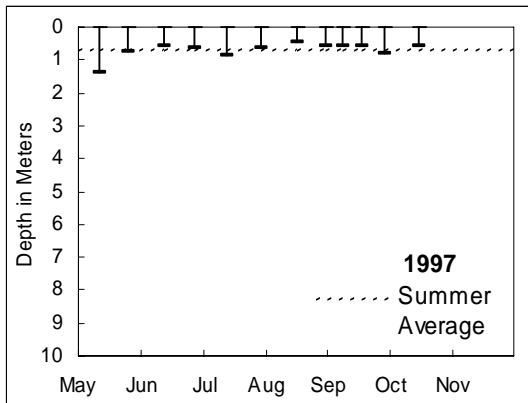
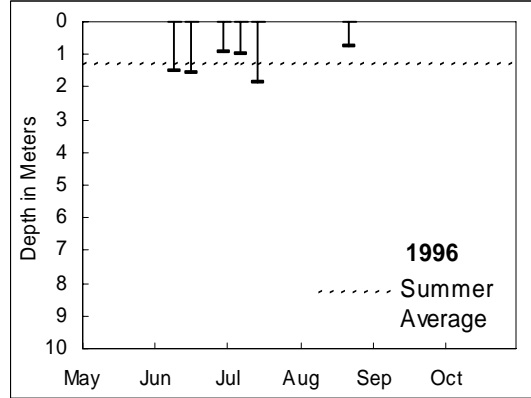
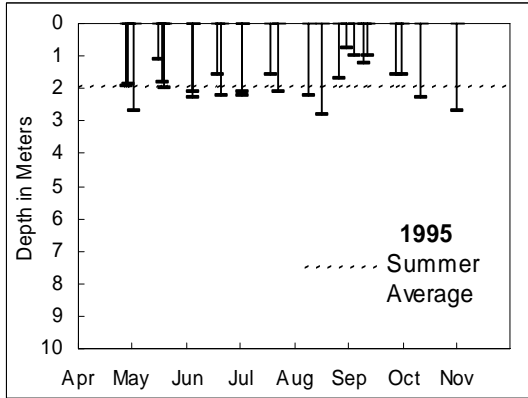
ALGAE TYPES	7/6/94	9/7/94	Averages	
			May-mid-Oct. 1995	Oct.-April 1995-1996
Cyanophyta (Blue-greens)	64%	0%	60%	3%
Chlorophyta (Greens)	0%	97%	6%	18%
Chrysophyta (Golden/diatoms)	1%	0%	6%	19%
Cryptophyta (Cryptomonads)	0%	0%	3%	60%
Euglenophyta (Euglenoids)	1%	0%	0%	0%
Pyrrhophyta (Dinoflagellates)	33%	3%	26%	0%
<b>TOTAL BIOVOLUME (mm<sup>3</sup>/l)</b>	18.681	467.17	14.426	5.876

■ **Fish** – according to the Washington State Department of Fish and Wildlife (WDFW), fish species found in Lake Ketchum include rainbow trout, largemouth bass, black crappie, yellow perch, bluegill, pumpkinseed sunfish, and brown bullhead catfish. WDFW usually stocks the lake each year with rainbow trout.

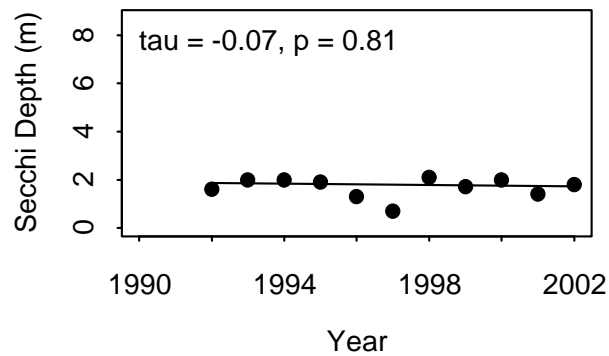
### DATA SOURCES

In addition to data from Snohomish County SWM staff and citizen volunteers, data for Lake Ketchum are also available from: Entranco, 1997; Rector, 1994; Rector, 1996; Smith and Rector, 1997; and Sumioka and Dion, 1985. Please refer to the full list of references in the County-Wide Summary.

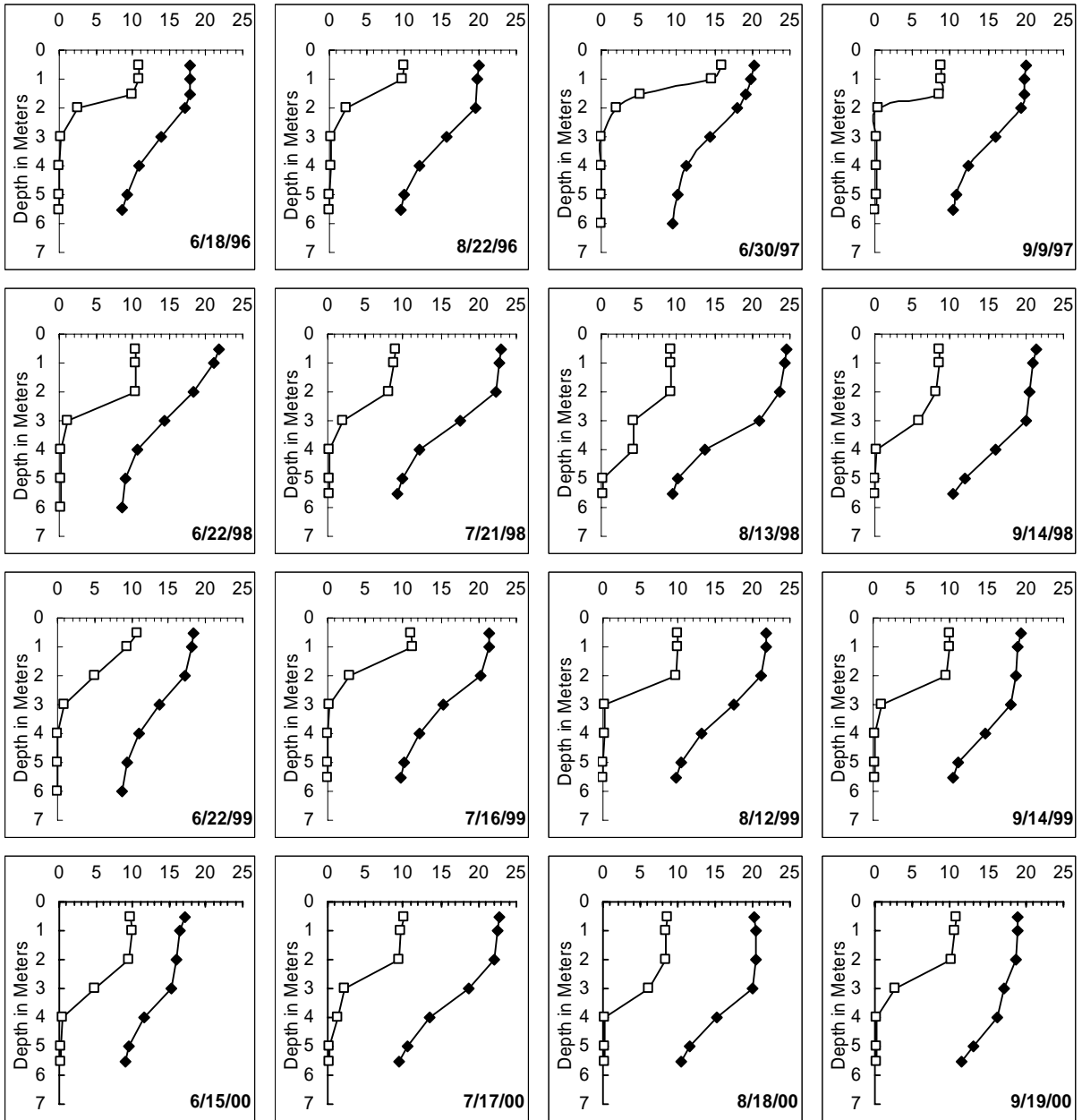
# WATER CLARITY



## TREND ANALYSIS

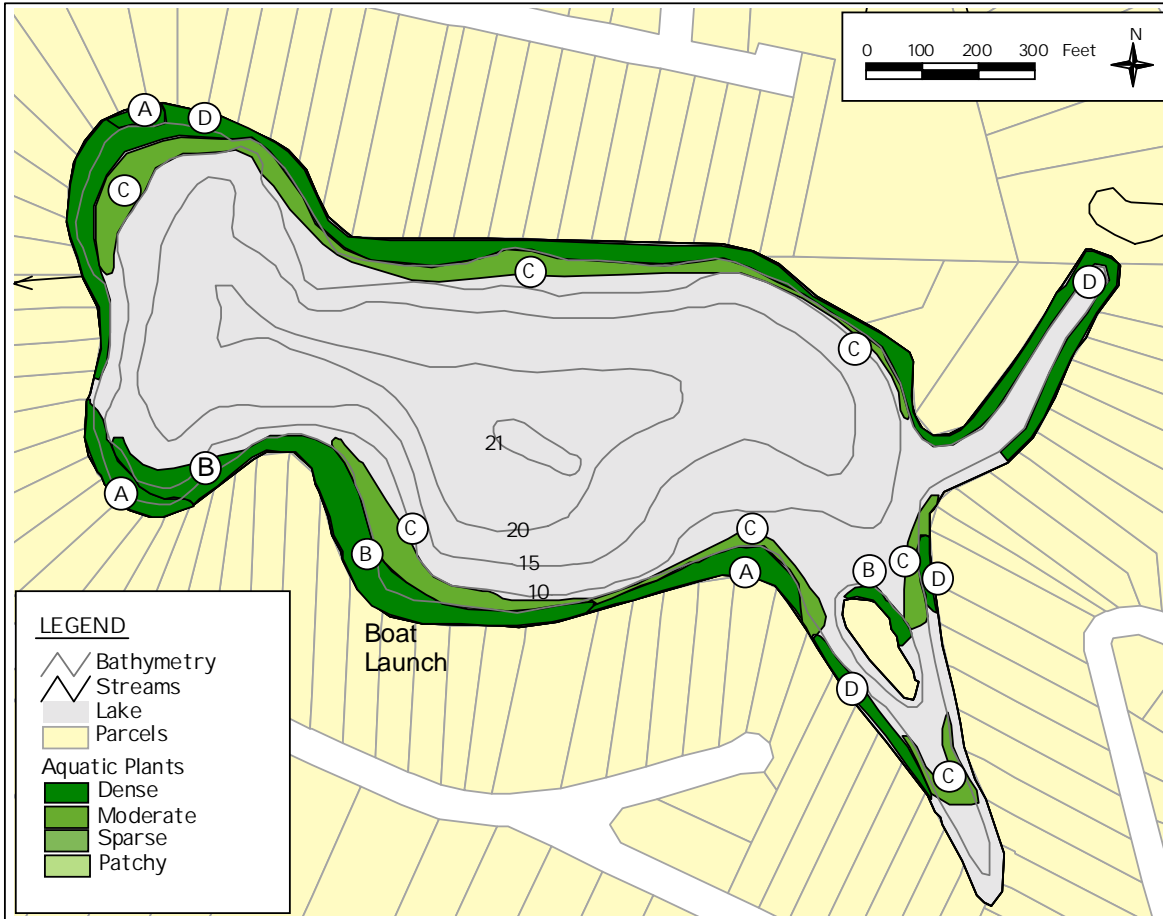


# DISSOLVED OXYGEN AND TEMPERATURE PROFILES (SELECTED YEARS)



—□— DO (mg/l)      —◆— Temp (°C)

# AQUATIC PLANTS



Area	Density	Dominant Plants	Other Plants
A	Dense	<i>Nuphar polysepalum</i> (Yellow water-lily)	
B	Dense	<i>Elodea canadensis</i> (Common elodea)	<i>Nitella sp.</i> (Brittlewort) <i>Nuphar polysepalum</i> (Yellow water-lily) <i>Potamogeton amplifolius</i> (Large-leaf pondweed) <i>Nymphaea odorata</i> (Fragrant water-lily)
C	Moderate	<i>Nitella sp.</i> (Brittlewort)	
D	Dense	<i>Potamogeton sp.</i> (Thin-leaf pondweed)	<i>Nitella sp.</i> (Brittlewort) <i>Nuphar polysepalum</i> (Yellow water-lily) <i>Potamogeton amplifolius</i> (Large-leaf pondweed) <i>Nymphaea odorata</i> (Fragrant water-lily)

Note: Floating plants such as *Ceratophyllum demersum* (Coontail), *Lemna minor* (Duckweed), *Azolla mexicana* (Mexican water fern), and *Wolffia* spp. (Dotted watermeal) at times are dense and cover large areas of the lake. *Ricciocarpus natans* (Purple-fringed riccia) is another floating plant found on the lake. *Typha* sp. (Cattail) is commonly found growing among the water-lilies. *Veronica americana* (American speedwell) is a wetland plant growing on the east shore.

## BASIC MONITORING DATA

1995									
DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
1/22/95	3.7	4.8	4.9	18	0	none	calm	lt brown	Moderate aquatic plants. ~50 ducks/geese. Water level has increased in recent weeks. Significant amount of duckweed present. Recent logging in watershed (approx 20 acres).
2/5/95	3.3	10	6.9	16	90	trace	calm	lt brown	Slight algae, moderate aquatic plants. ~40 ducks/geese. Significant duckweed.
2/20/95	2.3	11.5	6.5	12.8	100	heavy	breezy	lt brown	Slight algae, aquatic plants (wind has blown most of duckweed to shoreline). ~60 ducks (mostly common mergansers). Suspended plant/animal matter in water has increased.
3/5/95	1.3	8	7	12.5	75	light	light	lt brown	Moderate algae, slight aquatic plants. 60 ducks/geese. Significant suspended matter.
3/19/95	1.4	9	10	11	100	moderate	light	lt brown	Slight algae, algae scum, and aquatic plants. 30 ducks/geese. Significant suspended matter.
4/1/95	3.3	14	12.7	11.8	25	light	calm	lt brown	Moderate algae, slight algae scum, aquatic plants. 30 ducks/geese. Dime sized chunks of filamentous algae suspended in water. Water is much clearer than in recent weeks.
4/17/95	3.1	6.5	11.5	12	100	light	light	lt brown	Slight algae, algae scum, and aquatic plants. 20 ducks/geese.
5/1/95	2.0	14	16.5	11.8	100	moderate	light	lt brown	Moderate algae, algae scum, slight aquatic plants. 20 ducks/geese. Backyard logging in watershed continues. Significant algae, duckweed near shoreline.
*05/02/95	1.9								
5/6/95	2.7	16.5	17.5	9.5	10	none	breezy	lt brown	Moderate algae, algae scum, slight aquatic plants. 10 ducks/geese. Algae scum near shoreline and in floating mats.
*05/19/95	1.1								
5/22/95	2.0	22	21.5	10	10	none	light	milky green	Heavy algae bloom, moderate algae scum, aquatic plants (duckweed) around shorelines. Logging of watershed continues. ~10 ducks/geese. Lake level very high.
6/7/95	2.3	23	19.5	12.5	25	trace	breezy	lt brown	Slight algae, moderate algae scum, aquatic plants (duckweed) around shoreline. Floating islands of duckweed and algae. ~10 ducks/geese.
*06/21/95	1.6								
6/23/95	2.3	23	21	13.5	50	none	light	medgreen	Algae scum is heavy near inlet. 3 ducks/geese.
7/5/95	2.3	20.5	20	15.8	10	moderate	light		Slight algae in water. Heavy duckweed at shoreline, clear in middle of lake. Lake level measurement from 7/4/95.
*07/20/95	1.6								
7/25/95	2.1	17.5	23.5	20	50	none	light	lt brown	Moderate algae in water, algae scum, aquatic plants. 2 ducks/geese.
*08/10/95	2.2								
8/18/95	2.8	20	19	18.1	90	heavy	breezy	lt brown	Slight algae, moderate algae scum, heavy aquatic plants (duckweed). Slight musty smell.

Non-summer data indicated by shading.

\*Indicates data collected by Snohomish County staff.

1995									
DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
8/27/95	1.7	22.5	21	19	25	none	light	milky green	Heavy algae, aquatic plants, moderate algae scum. A major algae bloom occurred several days ago, now diminishing. Blue-green algae scum appeared, now receding.
*08/31/95	0.8								
9/10/95	1.2	20	21	20.5	10	none	light	lt green	Heavy algae, algae scum, aquatic plant growth (duckweed and other plants). Slight musty odor.
*09/12/95	1.0								
10/1/95	1.6	16	17	23	100	moderate	calm	lt green	Heavy algae, algae scum, aquatic plants. Blue-green oily scum along north shore. Significant duckweed present. Slight musty odor.
*10/11/95	2.3								
*10/31/95	2.7								
11/19/95	2.9	11	9	13.5	10	trace	breezy	lt brown	Slight algae, plants (duckweed); no scum, odor. 20 ducks/geese.

1996									
DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
6/11/96	1.5	18	18.5	6.5	75	trace	light	lt brown	Huge amounts of elodea. Minimal duckweed. Lots of algae. Heavy algae, scum, plants, no odor.
*06/18/96	1.6				100	light	light	grn brown	Aphanizomenon bloom. Strong H <sub>2</sub> S odor.
7/1/96	1.0	22.5	20	76	10	none	light	grn brown	Heavy algae, scum, plants, no odor. 1 adult male mallard, & 1 wood duck hen with 8 ducklings
7/8/96	1.0	25			0	none	light	medbrown	Moderate scum, heavy algae, plants.
7/15/96	2.0	21	26	75	0	none	light	grn brown	Lake condition has improved since June '96 (last survey). No odor, slight scum, moderate algae, heavy plants. 1 American coot observed.
*08/22/96	0.8				10	none	light	pea-soup	Lots of algae forming flakes in water.

## 1997

DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
4/29/97	1.6	10.5	13.5	73.2	100	light	light	lt brown	slight algae, scum, moderate plants. 12 ducks/geese.
5/15/97	1.4	13.3	21		75	moderate	light	dk brown	moderate algae, scum, heavy plants (azolla). Few ducks/geese nesting.
5/29/97	0.8	12.2	17.5	78	100	hvy-4.5"	light	dk brown	heavy algae, scum, plants. Few ducks/geese on nest.
6/15/97	0.6	17.8	21		100	moderate	light	dk brown	Heavy algae, plants. 3 adult ducks/17 juveniles. Azolla extending 30' out from shore.
*06/30/97	0.7				90	moderate	light	grnbrown	H <sub>2</sub> S odor heavy 4m and below. Thick growth of azolla and filamentous algae - not much duckweed.
7/15/97	0.9	15	20.5	73.2	90	trace	calm	lt brown	Heavy algae, plants, moderate algae scum. A few wood ducks, ducklings. Azolla abundant but dying back.
8/1/97	0.7	17	21.5	69.6	100	none	calm	pea-soup	Heavy algae, scum, plants. A few wood duck broods; ducklings large. Azolla disappearing but with many small fragments in lake, still some nuphar, duckweed along shoreline.
8/18/97	0.5	16	23	68	10	trace	calm	grnbrown	Heavy algae, plants, moderate scum, no odor. 12+ Wood ducks
9/1/97	0.6	18.5	21	68	50	moderate	light	grnbrown	Heavy algae, plants, slight scum, no odor. Few ducks.
*09/09/97	0.6				0	light	light	yellow brown	Thick growths of wolffia (watermeal) throughout lake, some duckweed, forming mats along shore.
9/18/97	0.6	17	16.5	73	75	heavy	breezy	grnbrown	Heavy algae, plants, slight scum, no odor. Few ducks/geese. Watermeal abounds.
9/29/97	0.8	15	17	72	100	none	light	lt brown	Heavy algae, plants, slight scum, no odor. 4 Shovelers, 8 wood ducks.
10/15/97	0.6	16.5	13	74	10	none	light	dk brown	Moderate algae, scum, heavy plants, no odor. 12 Canada geese, 4 Coots, 2 heron, 1 gull, Flock of 20 Widgeons, 2 Mallards.
11/1/97	0.5	12	11	75.6	10	moderate	calm	dk brown	Moderate algae, scum, plants, no odor. 20 ducks.

## 1998

DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
*2/13/98	1.0				100	mod	light	medbrown	No ducks/geese, scum; heavy algae, zooplankton. Took TP sample in lake, also took sample from inlet and 308th.
4/8/98	0.9	9	11		10	light	light	dk brown	No scum, odor; slight algae, aquatic plants (Nuphar). 6 ducks/geese. Station depth 5.9 m.
4/19/98	0.9	6.7	12	74.5	0	trace		lt brown	No scum or odor, slight aquatic plants (very light weeds on surface), moderate algae in water. 6 ducks/geese.
5/3/98	1.9	19	20	72	0	light	breezy	grnbrown	No scum or odor, slight algae, moderate aquatic plants. 12 ducks/geese. Water-lilies in bloom. Heavy duckweed in calm areas along shore.
5/29/98	1.0	18	18	73	50	light	light	grnbrown	No odor, slight scum, moderate plants and algae. Plant growth is accelerating. 6 ducks/geese. Trout with ulcers and tumors.
*6/22/98	1.0				0	none	breezy	peagrn	No ducks/geese; moderate scum, plants; heavy algae (periphyton). Treated w/Sonar 6/21/98.
6/28/98	1.8	25	22.3	6.4	25	moderate	light	grnbrown	Slight algae, scum, odor; moderate aquatic plants. Lily pads dying back; Cattails fine.
*7/21/98	2.9				0	none	light	yellowbrwn	5 geese; slight algae, plants; mod-heavy odor. Thick filamentous algae scum on so. shore (not Spirogyra); some wolffia.
*8/13/98	3.6				0	none	light	goldbrown	No ducks/geese, plants; slight algae; moderate odor near bottom; heavy scum. 6 dead fish. Lots of zooplankton at 5.0 m.
*9/14/98	2.4				0	none	light	yellowbrwn	1 goose; no plants; heavy algae. Numerous dead fish. Thick algae scums near shore - possibly spirogyra and anabaena. Lake level - 5.60 feet.

1999									
DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
5/25/99	2.6	21	19.5	28.8	0	none	breezy	grnbrown	2 Canada Geese, & few ducks yesterday.
6/15/99	0.9	17.5	23	25.5	75	trace	light	grnbrown	6/9/99 - Noticed slight blue-green algae bloom near lake shore.
*6/22/99	1.6	15.6	18.3		90	light	light	peasoup	Fishy odor near shore. Heavy algae & no plants, did they treat the lake recently?
7/6/99	1.55	22	20.25	23.3	50	none	breezy	grnbrown	Sonar treatment 2 weeks ago (6/19).
*7/16/99	2.3	20	21.5		90	moderate	light	dk brown	Treated w/ Sonar in June. Lake looks better than it has in years.
7/19/99	3	22	23	26.3	0	trace	light	grnbrown	Heavy rain 2 nights ago.
8/2/99	1.6	22	24	27	0	none	light	grnbrown	
*8/12/99	1.6	20	21.9		75	trace	breezy	muddy	Lake level 6.28' @ outlet. Algae scum @ SW corner.
8/16/99	1.05	19	21	25.3	25	heavy	light	lt brown	
8/30/99	1.05	15.5	19	26	75	light	breezy	lt brown	
9/14/99	2.5	22	19.42		0	none	light	yellowbrn	Moderate odor from bottom sample. Lots of algae, even @ 5 m.
*9/16/99	1.5	17	17.5		100	none	calm	lt brown	
9/30/99	1.15	12	16	28.3	90	trace	breezy	lt brown	
10/12/99	2		13	27.3	100	moderate	light	lt brown	
10/25/99	2.25	12	11	28.5	100	light	breezy	lt brown	Water clearer than usual, but dark cloudlike globs (algae?) almost cover the bottom of the lake near shore.
11/14/99	2.35	10	10	25	0	moderate	calm	black	Flock of Canada Geese. Foggy.

2000									
DATE	Secchi Depth (meters)	Air Temp (C)	Water Temp (C)	Lake Level (in)	Clouds (%)	Rain	Wind	Color	COMMENT
3/26/00	1.7	13	12.5	25	10	trace	light	gr-brown	6 ducks, no algae or algae scum, and slight aquatic plants.
5/1/00	1.6	15.5	16	24.8	50	trace	light	lt brown	No ducks, algae, algae scum, or aquatic plants.
*06/15/00	2.6	18	17.03		10	moderate	light	dk brown	1 duck, heavy algae and algae scum, and no aquatic plants.
*07/17/00	3	21	22.68		0	none	calm	medbrown	Heavy algae and algae scum, and slight aquatic plants.
*08/18/00	1.9	14	20.33		100	light	light	dk brown	4 ducks, moderate algae, and no algae or aquatic plants.
*09/19/00	1.6	17	19		100	light	light	medbrown	Heavy algae and slight algae scum
11/26/00	1.8	6	6	70.8	100	light	breezy	lt brown	No ducks, algae, algae scum, or aquatic plants.
12/17/00	1.55	6	5	70.8	100	none	light	gr-brown	70 ducks, and no algae, algae scum, or aquatic plants.

[Click here to view more recent data.](#)

## HOW YOU CAN HELP LAKE KETCHUM

- Educate yourself about lake ecology and the lake's health.
- Use lawn and garden fertilizers sparingly; test your soil first; choose low or no phosphorus fertilizers.
- Retain or plant native vegetation adjacent to the water to protect the shoreline and filter pollution.
- Infiltrate or filter the runoff from rooftops, patios, and driveways rather than piping it to the lake.



- Cover or mulch bare soil areas.
- Use pesticides, herbicides, and household chemicals sparingly and never near the water.
- Maintain your septic system—have it inspected every two years and pumped when needed.
- Conserve water both inside and outside.
- Clean up pet wastes and keep livestock away from the lake shore.

- Learn to identify non-native invasive aquatic plants and animals; check your boat and trailer for invaders; never empty an aquarium into the lake.
- Do not feed geese or ducks.
- Join with neighbors or the local property owners' association to work together to protect the lake.



Contact Snohomish County Surface Water Management at 425-388-3464 for information about these topics or if you have questions about Lake Ketchum.

(TTY users call 425-388-3700)