Lake Goodwin

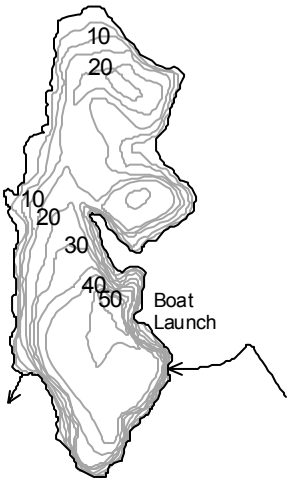
Lake Goodwin appears to be in healthy condition, with high water clarity, low nutrients, and low amounts of algae. The future health of the lake depends on controlling nutrients from surrounding homes and mitigating the impacts of new land development in the watershed.

State of the Lakes Report
March 2003

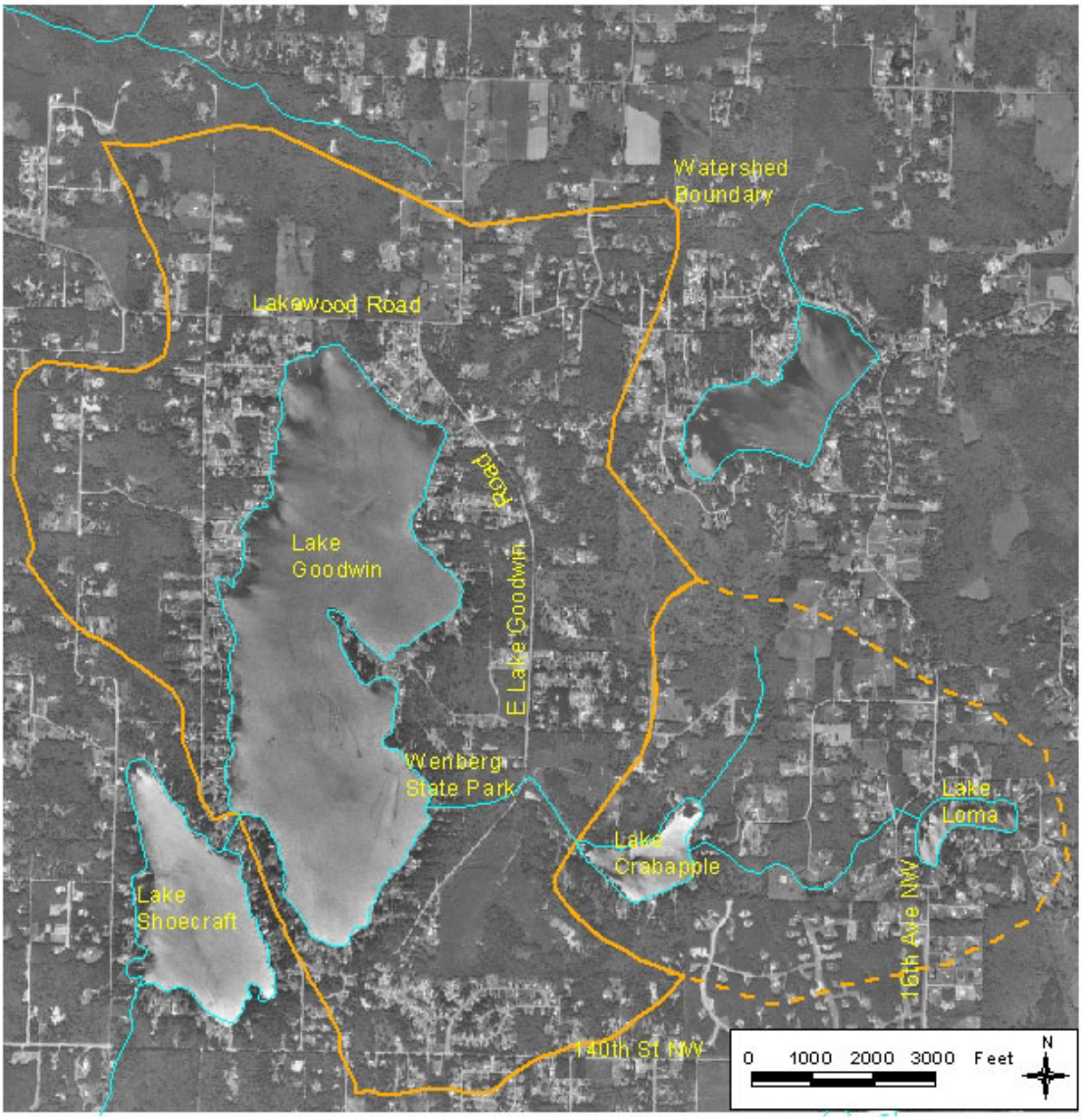
Snohomish County Public Works
Surface Water Management

LAKE AND WATERSHED DATA

Lake Area:	535 acres
Watershed Area:	2604 (3466 total area) acres
Watershed to Lake Area Ratio:	4.9 (6.5 total area)
Maximum Depth:	50 feet (15.2 meters)
Average Depth:	23 feet (7.0 meters)
Lake Volume:	13,000 acre-feet
Length of Shore:	5.4 miles



	1972	MID-90'S
# of nearshore homes	381	377
# of homes/1000' of shoreline	13.4	13.2
% of homes with bulkhead or fill		82%
% of homes with some native vegetation near shore		18%
% of watershed developed (residential or commercial)	14%	30% (est.)



LAKE ASSESSMENT

DESCRIPTION

■ *Location/Access* – Lake Goodwin is located in the Seven Lakes area north of the Tulalip Reservation. Lake Goodwin is fed by Lake Crabapple and Lake Loma and drains into Lake Shoecraft. Recreational use on the lake, including fishing, swimming, and power boating, is heavy. Wenberg State Park is located on the east shore, and a new County park is proposed for development at the north end of the lake. Several private recreational vehicle parks provide additional access to the lake.

■ *Size/Shape* – At 535 surface acres, the lake is the second largest natural lake in the county. For a lake of that size, however, it is relatively shallow, having a maximum depth of 15.2 meters and an average depth of 7.0 meters. The north half of the lake is especially shallow, with a maximum depth of 9 meters. The lake volume contains 13,000 acre-feet of water. The shallow depth and large size mean that wind mixes the lake easily and that the hypolimnion is relatively small.

■ *Watershed* – Lake Goodwin is the third lake in a four-lake chain. The immediate watershed draining to the lake covers 2604 acres, including the lake surface. Adding the watersheds of Lake Loma and Lake Crabapple brings the total watershed to 3466 acres. Both the immediate watershed and total watershed are small compared to the lake area—only 4.9 and 6.5 times the size of the lake, respectively. This means that Goodwin should have less potential for impacts from pollution coming from the surrounding lands than a lake with a large watershed. The percentage of residential and commercial development in the immediate watershed increased from 14% in 1973 to 30% by the mid-90s. This growth has the potential for negative impacts to lake water quality.

■ *Shoreline* – The shoreline of Lake Goodwin is 5.4 miles long. Along the shoreline, there were 381 homes in 1973 and 377 in the mid-90s. The change is the result of small seasonal cabins being replaced by large, year-round homes. Residential

development around the lake is the second densest in the county—an average of 13.2 homes per 1000 feet of shoreline. About 82% of the nearshore homes have modified the shoreline with bulkheads or fill. This is the highest percentage of modified shoreline for lakes surveyed in the county. Only 18% of the homes have retained some native vegetation along the shore. Heavy shoreline development without buffers of native vegetation can result in significant pollution reaching the lake.

LAKE CONDITIONS

■ *Water Clarity* – Summer water clarity in Lake Goodwin averaged 5.3 meters during the 1983 Entranco study. The long-term average of summer water clarity from 1992 through 2002 was 5.2 meters, with averages for individual summers ranging from 4.6 to 6.0 meters. Overall, Goodwin has high water clarity; although during times of algal blooms, individual water clarity readings can be much lower.

■ *Color* – One reason for the high water clarity is that the lake has very little natural color. The water can be described as light green.

■ *Nutrients* – Summer average total phosphorus concentrations in the epilimnion ranged from 5 µg/l to 8 µg/l between 1996 and 2002, which is low for Snohomish County lakes. Samples taken during the 1983 study averaged less than 5 µg/l total phosphorus in the epilimnion. Total phosphorus averages in the hypolimnion were higher, ranging

from 12 to 46 µg/l from 1996-2002. This suggests that phosphorus is being released from the bottom sediments during times of oxygen depletion. However, the hypolimnion of Goodwin is small, so the impacts of this release may be tempered. Nitrate and ammonia concentrations in the lake were both low during the 1983-84 study. Nitrogen availability may have limited algal growth at that time. Because both phosphorus and nitrogen levels are low in Goodwin, additions of either nutrient—for example from fertilizer runoff or soil erosion—might result in nuisance algal growth.

■ *Oxygen/Temperature* – Vertical profiles of dissolved oxygen and temperature for the summers of 1995 through 2002 show that the warm, oxygenated epilimnion reaches down to almost 8 meters deep. The large size of the lake provides a long fetch that allows the wind to mix the warm water deeper than in most lakes. The small hypolimnion is cool, and depleted of oxygen during much of the summer. This indicates that there is some organic matter being decomposed on the lake bottom.

■ *Algae* – Chlorophyll *a* data are available from the summers of 1983, 1994, 1995, and 2002. Values ranged from 0.5 µg/l to 2.7 µg/l, indicating a low abundance of algae. Analysis of samples in 1994 and 1995 revealed low volumes, with blue-greens, greens, and diatoms each most dominant at times. Blue-greens were most abundant by count. Monitors have observed blue-green algal blooms on occasion during summer months.

■ *Aquatic Plants* – In spite of having large shallow areas suitable for the growth of aquatic plants, Lake Goodwin supports a sparse and patchy distribution of native aquatic plants. This is because much of the bottom sediment is rocky or sandy and lacks organic matter. Chara, naiad, and pondweeds are the most common native plants in the lake. However, in the 1990s, Lake Goodwin became infested with an invasive non-native plant, Eurasian watermilfoil. Within a few years, the plant spread widely around the lake shore and formed dense patches in several places. Because milfoil has the potential to eventually take over most of the shallow water areas, lake residents worked with Snohomish County SWM to implement a milfoil control project in Lake Goodwin and nearby Lake Shoecraft. Since 1997, this project has used diver hand removal and burlap bottom barriers to eliminate all but a few hundred milfoil plants scattered around the lake. Continued work every year will be necessary to prevent Eurasian watermilfoil from reclaiming the lake shore.

■ *Waterfowl* – There are sometimes large numbers of ducks and Canada geese at the lake, but less in recent years than in the past. Waterfowl droppings are unsightly and pollute the water.

SUMMARY

■ *Trophic State* – Based on high water clarity, low phosphorus and nitrogen concentrations, moderate oxygen depletion, occasional blue-green algal blooms, and limited aquatic plants, Lake Goodwin may be classified as oligo-mesotrophic.

■ *Current Conditions/Trends* – Lake Goodwin appears to be in healthy condition. There are no trends to indicate a decline in water quality.

■ *Future Concerns/Targets* – There is the potential of future declines in water quality if land development and other activities, such as fertilizer use, road runoff, and improperly maintained septic systems contribute nutrients to the lake. The target for the lake is to maintain current water clarity and phosphorus levels.

■ *Recommendations* – The lake should be monitored carefully to determine if water clarity decreases or nutrients increase. All new development in the watershed should take precautions to control runoff and reduce nutrient pollution. Existing homes on the lake shore should be encouraged to re-create buffers of native vegetation to filter out pollution before it reaches the lake. Resident waterfowl should be controlled.

CITIZEN VOLUNTEERS

Thanks to Karen and Mark Thompson for years of volunteer monitoring, and also to Steve Nelson, Michael Brown, and Wally Sullivan for past monitoring.

DATA SUMMARY TABLE

Source	Date	Secchi Depth (meters)	Total Phosphorus (*ug*/l)		Color (Pt-Co scale)	Chlorophyll *a* (*ug*/l)
			Surface	Bottom	Epilimnion	Epilimnion
Bortleson, et al, 1976	**7/27/72**	4.0	5	16	5	-
Entranco, 1986	Summer **1983**	4.1 - 6.0 (5.3) *n = 5*	<5 (<5) *n = 5*	7 - 20 (13) *n = 5*	-	1.1 - 2.3 (1.5) *n = 5*
DOE	Summer **1989**	4.2 - 6.9 (5.0) *n = 8*	-	-	-	-
Volunteer	Summer **1992**	3.6 - 7.0 (4.9) *n = 7*	-	-	-	-
Volunteer	Summer **1993**	5.3 - 7.1 (6.0) *n = 4*	-	-	-	-
SWM Staff	Summer **1994**	5.7 - 6.2 (5.9) *n = 2*	-	-	<5 (<5) *n = 2*	0.5 - 2.7 (1.6) *n = 2*
SWM Staff	Summer **1995**	5.6	-	-	<5	1.9
Volunteer	Summer **1996**	4.0 - 6.5 (4.8) *n = 10*	<2 - 13 (8) *n = 2*	9 - 14 (12) *n = 2*	-	-
SWM Staff or Volunteer	Summer **1997**	3.4 - 7.7 (5.2) *n = 12*	7 - 9 (8) *n = 2*	23 - 36 (30) *n = 2*	-	-
Volunteer	Summer **1998**	3.4 - 7.2 (4.6) *n = 15*	4 - 8 (7) *n = 4*	20 - 39 (28) *n = 4*	-	-
SWM Staff or Volunteer	Summer **1999**	3.4 - 5.9 (4.7) *n = 12*	5 - 14 (8) *n = 4*	16 - 44 (36) *n = 4*	-	-
SWM Staff or Volunteer	Summer **2000**	3.3 - 7.0 (5.1) *n = 11*	3 - 7 (5) *n = 4*	2 - 47 (29) *n = 4*	-	-
Volunteer	Summer **2001**	3.8 - 6.0 (5.0) *n = 12*	6 - 8 (7) *n = 4*	26 - 68 (46) *n = 4*	-	-
SWM Staff or Volunteer	Summer **2002**	4.2 - 6.5 (5.5) *n = 10*	5 - 8 (7) *n = 4*	20 - 48 (36) *n = 4*	-	0.5 - 1.9 (1) *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.
- DOE = Washington Department of Ecology

SUMMARY OF OTHER DATA

■ *Nitrogen* – single total nitrogen samples in 1972 showed 0.53 mg/l in the epilimnion and 1.25 mg/l in the hypolimnion; 1983-1984 samples by Entranco showed low nitrate levels (average of 0.033 ug/l in the epilimnion with values up to 0.168 mg/l) and low ammonia (averages of 0.022 mg/l in the epilimnion and 0.026 mg/l in the hypolimnion, with values up to 0.080 mg/l); these data suggest low nitrogen availability, perhaps low enough to limit algal growth.

■ *Alkalinity* – data from 1983 ranged from 21 – 41 mg/l $CaCO_3$ while 1994 and 1995 data ranged from 28 -- 35 mg/l $CaCO_3$, which suggests that Goodwin has a moderate buffering capacity.

■ *pH*—1994-2000 data averaged 7.4 near the surface and 6.6 near the bottom, which is close to neutral. Readings from 2002 were similar.

■ *Conductivity* – data from 1983 ranged from 66 – 100 µmhos; 1994-2000 data averaged 81 µmhos in the epilimnion and 105 µmhos near the lake bottom, indicating moderate to high levels of dissolved materials in the water. Readings from 2002 were similar.

■ *Iron* – limited 1994-95 data showed low levels in the epilimnion (avg. 44 µg/l) and the hypolimnion (avg. 257 µg/l, high of 390 µg/l), which indicates only minor release of iron and phosphorus from the bottom sediments under low oxygen conditions.

■ *Algae* – the following table shows the total biovolume and percent biovolume of the main types of algae from three samples collected in 1994-95. The data show that the total algal volumes were low and that blue-greens, greens, and diatoms were each most prevalent at times. Cell counts of the same samples revealed that blue-green algae were most abundant, ranging from 59% to 80%.

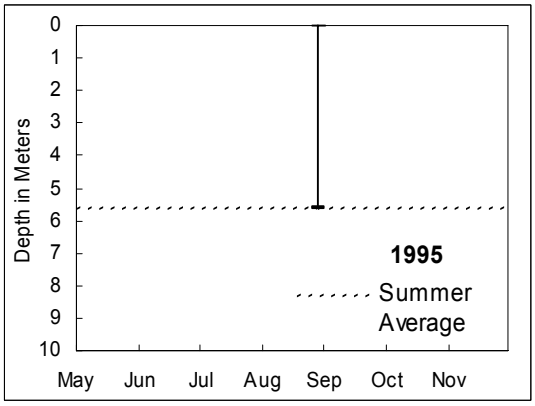
ALGAE TYPES	6/22/94 (south site)	6/22/94 (north site)	8/24/94 (south site)	8/26/94 (north site)	8/30/95 (south site)
Cyanophyta (Blue-greens)	50%	63%	28%	5%	3%
Chlorophyta (Greens)	20%	4%	44%	66%	37%
Chrysophyta (Golden/diatoms)	5%	2%	6%	6%	44%
Cryptophyta (Cryptomonads)	0%	0%	21%	18%	15%
Euglenophyta (Euglenoids)	0%	0%	0%	0%	0%
Pyrrhophyta (Dinoflagellates)	25%	30%	1%	5%	1%
TOTAL BIOVOLUME (mm^3/l)	0.405	0.613	0.288	0.245	0.261

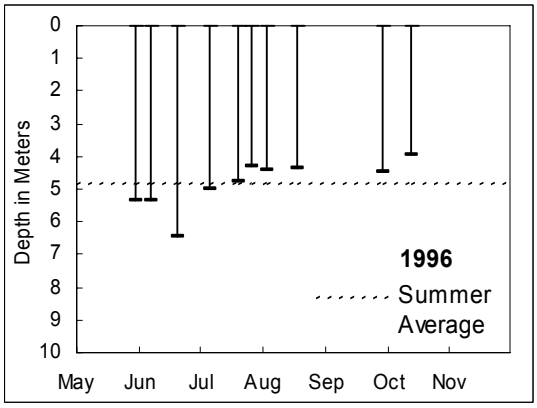
■ *Fish* – according to the Washington State Department of Fish and Wildlife (WDFW), fish species found in Lake Goodwin include rainbow trout, cutthroat trout, largemouth bass, smallmouth bass, black crappie, yellow perch, and pumpkinseed sunfish. WDFW usually stocks the lake each year with rainbow trout.

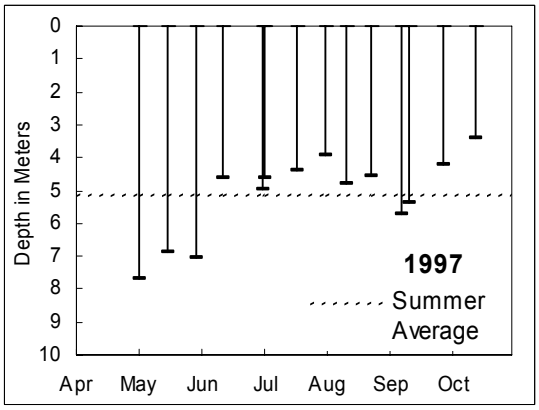
DATA SOURCES

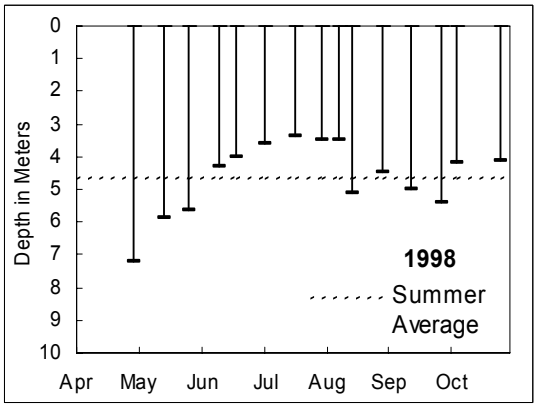
In addition to data from Snohomish County SWM staff and citizen volunteers, data for Lake Goodwin are also available from: Bortleson, et. al., 1976; Entranco Engineers, 1986; and Rector and Hallock, 1991. Please refer to the full list of references in the County-Wide Summary.

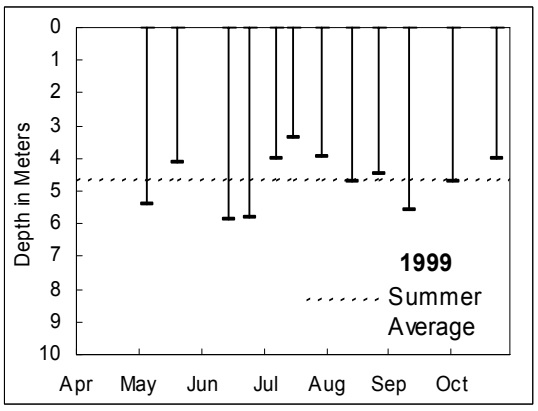
WATER CLARITY

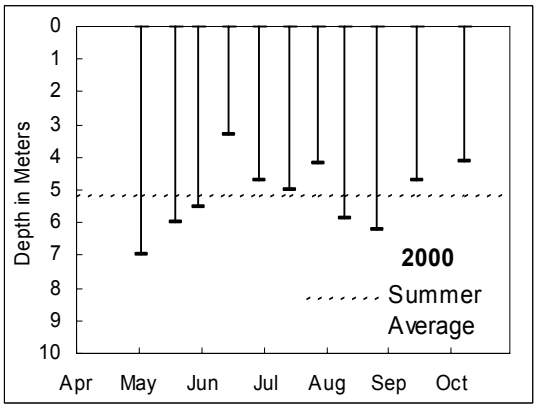




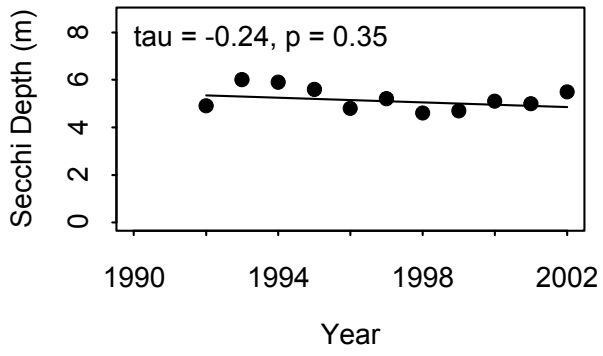




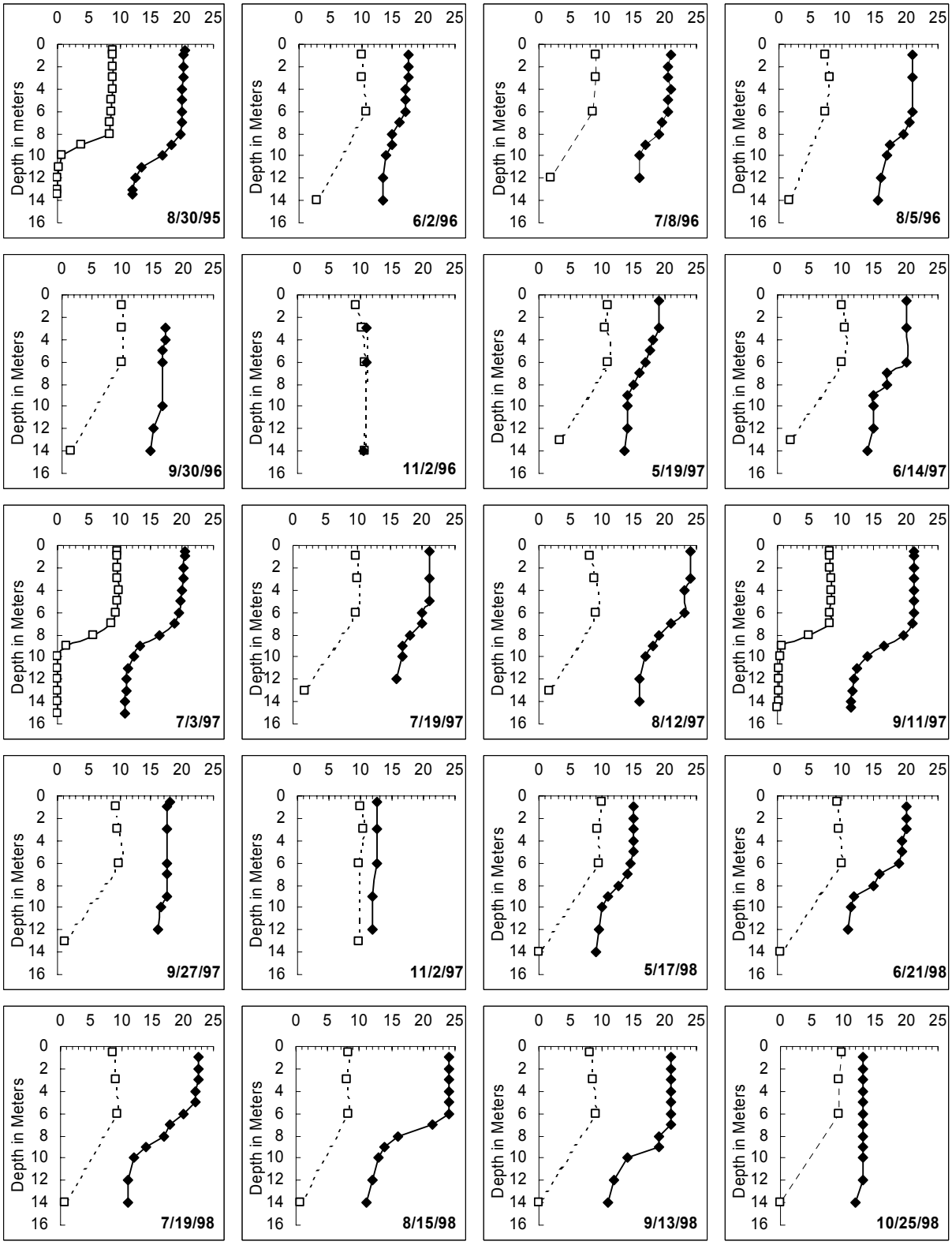




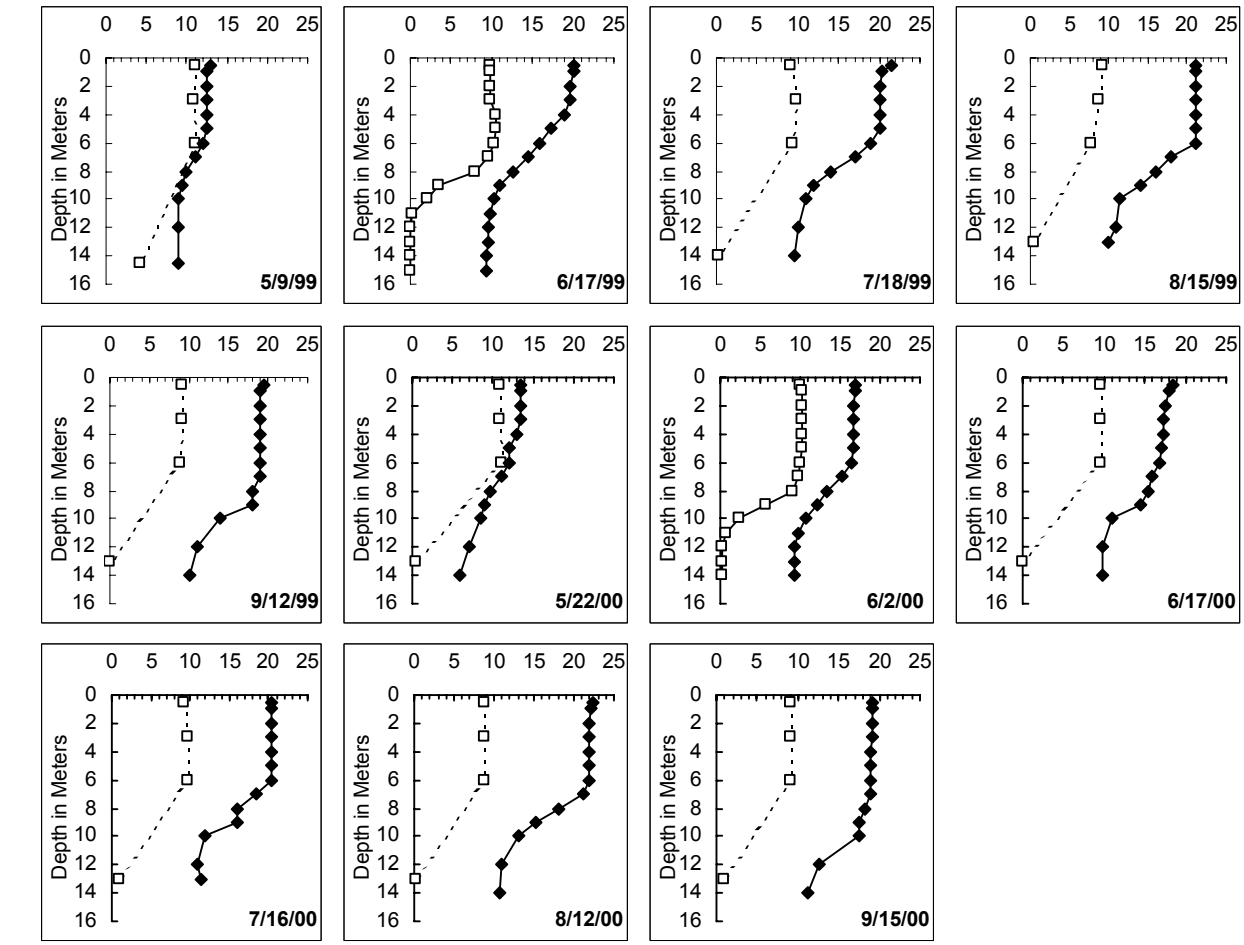
TREND ANALYSIS



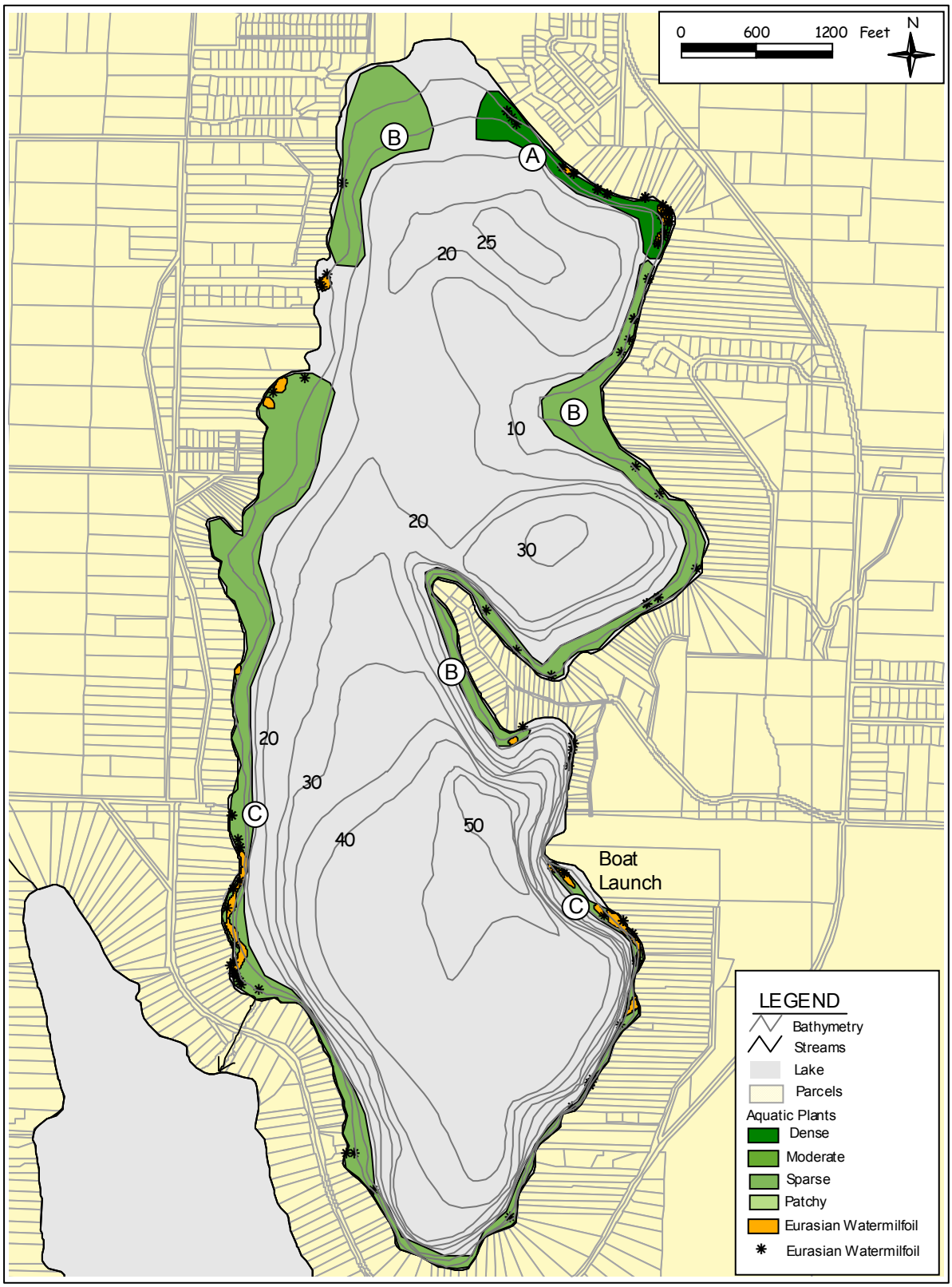
DISSOLVED OXYGEN AND TEMPERATURE PROFILES (SELECTED YEARS)



—□— DO (mg/l) —◆— Temp (ºC)


0 5 10 15 20 25
Depth in Meters
0 2 4 6 8 10 12 14 16
5/9/99
6/17/99
7/18/99
8/15/99
9/12/99
5/22/00
6/2/00
6/17/00
7/16/00
8/12/00
9/15/00
DO (mg/l)
Temp (ºC)

AQUATIC PLANTS



Area	Density	Dominant Plants	Other Plants
A	Dense	*Chara sp.* (Stonewort, Muskgrass) *Potamogeton sp.* (Thin-leaf pondweed)	*Najas flexilis* (Water-nymph, Naiad) *Potamogeton amplifolius* (Large-leaf pondweed)
B	Patchy	*Chara sp.* (Stonewort, Muskgrass) *Potamogeton sp.* (Thin-leaf pondweed)	*Najas flexilis* (Water-nymph, Naiad) *Potamogeton amplifolius* (Large-leaf pondweed)
C	Patchy	*Najas flexilis* (Water-nymph, Naiad) *Chara sp.* (Stonewort, Muskgrass)	*Potamogeton sp.* (Thin-leaf pondweed) *Nitella sp.* (Brittlewort)
-	-	*Myriophyllum spicatum* (Eurasian water-milfoil)	

Note: Most of the *Myriophyllum spicatum* (Eurasian watermilfoil) shown on the map has been eliminated by diver removal.

BASIC MONITORING DATA

1995									
DATE	**Secchi Depth (meters)**	**Air Temp (C)**	**Water Temp (C)**	**Lake Level (in)**	**Clouds (%)**	**Rain**	**Wind**	**Color**	**COMMENT**
*08/30/95	5.6				0	none	strong	lt green	Milfoil growing south of Wenberg Park on E. shore, and moving south; growth starting on west shore just south of park. Many fragments seen floating in water.

1996									
DATE	**Secchi Depth (meters)**	**Air Temp (C)**	**Water Temp (C)**	**Lake Level (in)**	**Clouds (%)**	**Rain**	**Wind**	**Color**	**COMMENT**
6/2/96	5.4	19.5	17	12.5	0	none	breezy	lt green	Slight algae, no scum, odor. Osprey/ Jet skis/ fishermen/ Water skiers/ pleasure boats.
6/10/96	5.4	14.2	18.5	13.8	75	none	light	lt green	Fishermen. No algae, scum, plants, odor.
6/23/96	6.5	13	18.5	15.5	100	light	light	lt green	Several fishermen (3-4). No algae, scum, plants , odor. 29 canada geese, 1 osprey, lots of mallards, at north end.
7/8/96	5.0	18	21	17	0	none	light	lt green	Slight algae, no scum, odor. Few waterskiers, jet skiers, fishermen, 1 osprey, few gulls-1 with fish, 2 seaplanes practicing landings. Sun & Sat was active day with many jetskis, motor boats and water skiers.
7/22/96	4.8	16.5	20	19	0	light	breezy	lt green	1 fisherman, 2 skiers, 2 osprey, 2 jetskis. Slight algae, scum, odor, plants. 20 mallard ducks in front of my house.
7/28/96	4.3	17.5	23.5	20	10	none	light	lt green	Waterskiers, jetskiers, fishermen. Slight algae, plants, no scum, odor. Saw a few ducks.
8/5/96	4.4	15	20.5	21	100	light	calm	lt green	Slight algae, no scum, odor. 2 osprey; 2 Bonaparte's gulls; 2 fishermen, 2 waterskiers.
8/19/96	4.4	17.5	21	24.8	100	trace	light	lt green	2 fishermen, 1 jetski; white bubbles floating on lake/some near my shore.
9/30/96	4.5	13	17	25	10	none	light	lt green	2 fisherman, 1 jetski. Saw 5 mallards at neighbor's . Slight algae, no scum, odor.
10/13/96	4.0	12	15.5	24	100	light	light	medgreen	2 western grebes, 2 coots, 2 fishermen, 1 waterskier.
11/2/96	4.5	8	11	21.3	0	none	light	lt green	Slight algae, plants. 25 coots, 4 fishermen, maple leaves floating on surface.
11/17/96	6.3	4.5	9.5	19	100	light	light	lt green	Cold! 2 Cormorants.
12/8/96	6.2	5.5	6.5	11	100	moderate	breezy	lt green	Foam bubbles on lake surface; 4 Buffleheads.
12/22/96	8.0	4	7	10	100	light	calm	lt green	No algae, scum, plants, odor. 1 eagle.

Non-summer data indicated by shading.
*Indicates data collected by Snohomish County staff.

1997									
DATE	**Secchi Depth (meters)**	**Air Temp (C)**	**Water Temp (C)**	**Lake Level (in)**	**Clouds (%)**	**Rain**	**Wind**	**Color**	**COMMENT**
1/5/97	7.0	3	6	0.25	0	trace	calm	lt green	Bits of grass, seeds, yard debris floating on water. 8 cormorants on swim raft, gulls, coots.
1/26/97	7.0	-2	5	8	0	none	breezy	lt green	10+ cormorants, 8 common mergansers. White foam around shoreline on eastside.
2/9/97	5.5	4.5	5	10.5	75	none	calm	lt green	6 geese , some mallards, 1 cormorant, 2 buffleheads, coots. 3 water skiers, 1 fisherman,
2/22/97	5.0	5.5	6.5	9	0	light	breezy	medgreen	Many coots. 2 jetskis.
3/9/97	3.6	9.5	7	11	50	light	strong	medgreen	White caps.
3/30/97	4.5	15.5	9.5	11	0	none	breezy	medgreen	1 jet ski, 3 fishing boats, 3 mallard, 2 buffleheads.
4/13/97	5.2	8.5	12	14	90	trace	light	lt green	Female mallard with 5 ducklings, 2 common loons, 1 cormorant, buffleheads.
5/5/97	7.8	13.5	13	14	50	light	breezy	lt green	No algae, odor or plants. Few ducks/geese, 2 - Osprey. Lots of jumping fish. Model float plane group launching at park. 3 fishermen.
5/19/97	7.0	16	19	16	0	none	breezy	lt green	No algae, odor or plants. 40 male mallards, 1 female with 10 ducklings, 2 osprey, many boats and personal watercraft.
6/1/97	7.2	14	18	16.5	90	light	breezy	lt green	Slight plants, no odor, scum or algae. 2 Canada Geese & 6 goslings. 5 fishermen, 1 windsurfer, 1 waterskier. yellow irises on east shoreline.
6/14/97	4.7	17	20	17.5	10	light	calm	medgreen	Slight algae. 2 osprey. Some yard debris near shore. 7 jet skis, 8 fishermen, 7 recreational boats.
*07/03/97	5.0				0	none	light	lt green	
7/4/97	4.6	16.5	21	18.5	10	none	light	medgreen	Slight plants near shore. Mallards with ducklings. Many recreational boats, jet skis. 8 fishermen.
7/19/97	4.4	18	21	10.3	0	none	calm	medgreen	Slight algae. 15 ducks. Many recreational boats and personal watercraft. Osprey and eagle continue to fish daily.
8/2/97	4.0	22	24	21	0	none	light	medgreen	Slight algae. 30 mallards
8/12/97	4.8	18	24	22	10	none	calm	medgreen	Slight algae. 10-15 mallards. White soaplike bubbles on surface (created by boats, in wake of boats). 4 recreational boats - skiers, innertubes. Swimmers at park. 4 fishermen.
8/24/97	4.6	18	23	24	90	trace	breezy	medgreen	15 mallards. jetskis and fishermen.
9/7/97	5.8	16	20.5	25	10	none	calm	lt green	No algae, scum, odor. Water skiers, jet skis.
*09/11/97	5.5				100	light	light	lt green	
9/27/97	4.2	16	18	25	100	moderate	breezy	medgreen	No algae, scum, odor, slight plants nearshore. Numerous mallards, 4 Western grebes, 4 flocks of coots. 3 fishermen/boats, 1 waterski boat.
11/2/97	4.2	13.5	12.5	21	75	light	light	medgreen	No algae, scum, plants. 10+ mallard, 30+ Bufflehead, also Western grebe, Canada geese.
11/15/97	4.9	8	11.5	20.5	0	none	light	medgreen	No algae, scum. Mallards, Western grebes.
11/30/97	5.5	7	9.5	19	75	light	light		No algae, scum, plants. 16 Canada geese, 6 Mallard, 5 Coots.
12/22/97	6.5	3.5	7	16	90	heavy	calm	lt green	No algae, scum, plants. Hooded and Common merganser, Coot, Pied-billed Grebes.

1998									
DATE	**Secchi Depth (meters)**	**Air Temp (C)**	**Water Temp (C)**	**Lake Level (in)**	**Clouds (%)**	**Rain**	**Wind**	**Color**	**COMMENT**
1/11/98	8.0	-1.5	6	11	50	none	calm	lt green	No algae, scum, plants. 40+ Mallards, 30+ Common Mergansers, 10 Cormorants, Coots. Ice formed at lake edges. **Secchi depth was greater than 8 m -- rope wasn't long enough.
1/31/98	7.0	9	7	7	50	trace	calm	lt green	No algae, scum, odor. 3 female/1 male Buffleheads, 10 Canada Geese, 15 Cormorants, 50+ ducks, many Coots, 50+ Common Mergansers. 1 ski boat.
2/24/98	5.5	5.5	7.5	12.5	50	trace	calm	lt green	Slight algae--heavier near shore. Coots, Buffleheads, Osprey, Common Mergansers.
3/20/98	6.7	11.5	10	12.5	10	none	calm	lt green	No scum, odor, slight to moderate algae. 12+ Mallards, 6 Common Mergansers, many Coots. 7 fishing boats.
3/29/98	6.7	7	10	12	10	light	calm	lt green	No scum, odor, moderate algae. 6 Mallards, several flocks Common Mergansers, few Bufflehead. 1 jetski, 1 fishing boat, 2 pleasure boats.
4/11/98	6.0	8	11.5	13	75	light	light	lt green	No odor, slight algae.
5/2/98	7.2	14.5	17.5	15	25	none	light	lt green	No algae, scum, odor. Female Mallard w/ 10 ducklings. Osprey regular in evening, eagle in morning.
5/17/98	5.9	13.5	15	15	100	trace	light	lt green	No algae, scum, slight hydrogen sulfide odor at 14 m. Mallards and Buffleheads as well as eagle and osprey daily.
5/29/98	5.7	15.5	16	14	75	light	light	lt green	No algae, scum or odor; water skiers; jet skis.
6/12/98	4.3	14	19	16	100	trace	light	medgreen	1 Female Mallard + 2 chicks; fishermen; jet skiers; yellow Iris along East/South shore.
6/21/98	4.0	21	20	17	50	trace	breezy	medgreen	No algae, scum or odor; 13 Mallards; numerous jet skis; pleasure boats.
7/4/98	3.6	14.5	20	17	100	light	calm	medgreen	24 mallards; 15 Canada geese.
7/19/98	3.4	19	22	18	90	none	light	pea-soup	Temp. taken @ 15m = 10.5; odor at 15m (rotten egg); many personal watercraft; 3 fishermen
8/9/98	3.5	19	23.5	20	100	trace	light	pea-soup	Slight algae, no scum; earlier in week (7/27) moderate algae in lake.
8/15/98	5.1	20	24	22.5	90	none	light	lt green	Slight algae & rotten egg odor; male & female Osprey; soap-like bubbles on surface; personal watercraft, recreation boats; fishermen/women.
8/30/98	4.5	23	22	24.5	0	none	light	medgreen	Moderate algae; slight plants.
9/13/98	5.0	22	21	26	100	none	light	lt green	No algae or scum; moderate rotten egg odor; lots of personal watercraft; osprey.
9/27/98	5.4	16	19	28	0	trace	calm	lt green	Slight algae.
10/4/98	4.2	15	16.5	28	90	light	calm	medgreen	No algae. Aquatic plants are dying back. Coots and buffleheads.
10/25/98	4.1	15	13	26	100	trace	light	medgreen	No algae, scum, plants. Slight odor at 14m.
11/8/98	4.4	9.5	11	24.5	50	trace	calm	medgreen	10 buffleheads, 12+ mallards.
11/28/98	4.9	6.5	8	21	75	light	light	medgreen	
12/26/98	4.7	5.5	3.5	15.5	100	light	light	clear	50 Common Mergansers, 50 Mallards, 30 Buffleheads, 2 Ruddy Ducks, 2 Hooded Mergansers, 4 Mergansers, 10 Cormorants.

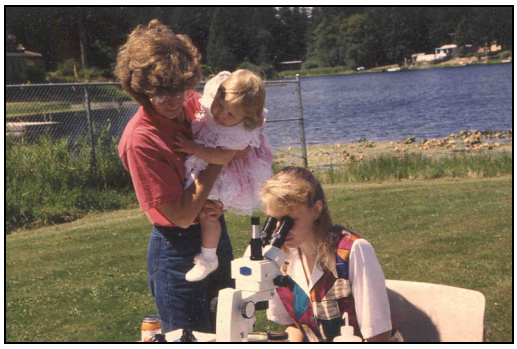
1999									
DATE	**Secchi Depth (meters)**	**Air Temp (C)**	**Water Temp (C)**	**Lake Level (in)**	**Clouds (%)**	**Rain**	**Wind**	**Color**	**COMMENT**
1/24/99	7.4	4	5.5	12	10	trace	light	lt green	50 Common Mergansers, 20 Mallards.
2/27/99	7	8	5.5	9	50	light	strong	grnbrown	80 Common Mergansers, 10 Buffleheads, 10 Mallards.
4/11/99	6.8	16	9	13.5	100	trace	light	lt green	Many boats on lake today.
5/9/99	5.4	11.5	13	12	50	light	light	lt green	
5/23/99	4.1	18	16	13	0	none	light	medgreen	Mallards w/ ducklings. @ eagles, 1 osprey.
*6/17/99	5.9	20	20.1		75	none	light	lt green	
6/27/99	5.8	15	18	14.5	100		light	medgreen	
7/10/99	4	21	20.5	15	0	none	calm	medgreen	Fireworks debris litters shoreline. Many personal watercraft on lake last 2 days.
7/18/99	3.4	21.5	20.5	15.5	25	heavy	light	dk green	Slight odor from 14 m.
8/1/99	4	16.5	21	17	100	none	calm	dk green	Numerous boats & personal watercraft last few days.
8/15/99	4.7	14.5	21	17.5	100	light	calm	medgreen	Slight odor at 13 m. Light rain.
8/28/99	4.5	24	21.5	20	75	none	light	dk green	Many personal watercraft. 1 Eagle caught fish.
9/12/99	5.6	20.5	19.5	20.5	0	none	light	lt green	Many lake users today.
10/3/99	4.7	15	16	22	0	none	light	lt green	Mallards, Coots & 1 Pied-billed Grebe.
10/24/99	4	10.5	13	22.5	50	trace	calm	medgreen	Suspended sediments in water. 2 Western Grebes, 2 Pied-billed Grebes, 1 Kingfisher.
11/14/99	5.1	11.5	15	18	10	moderate	light	lt green	

2000									
DATE	**Secchi Depth (meters)**	**Air Temp (C)**	**Water Temp (C)**	**Lake Level (in)**	**Clouds (%)**	**Rain**	**Wind**	**Color**	**COMMENT**
5/6/00	7	10	13.5	16	0	none	breezy	dk green	8 ducks and slight algae.
5/22/00	6	18	13.5	15	100	trace	light	dk green	Zooplankton found.
*06/02/00	5.5	20	16.99		50	none	calm	medgreen	8 ducks, moderate algae and aquatic plants, and slight algae scum.
6/17/00	3.3	20	18.4	17	0	none	calm	lt green	Green dots in water (algae). Moderate algae.
7/2/00	4.7	14	20	18	100	trace	light	dk green	12 ducks and no algae.
7/16/00	5	17	20.9	20	0	none	light	Medgreen	10 ducks and slight algae.
7/30/00	4.2	18.5	22	21	0	none	light	Medgreen	16 ducks and slight algae.
8/12/00	5.9	18	22.4	23	0	none	light	Medgreen	No ducks and slight algae.
8/27/00	6.2	15	21	24.5	75	trace	calm	dk green	No ducks, algae, algae scum, or aquatic plants.
9/15/00	4.7	20	19.2	26.5	50	none	breezy	lt green	
10/8/00	4.1	15	16	26	100	none	calm	dk green	100+ coots. 3 ducks.

Click here to view more recent data.

HOW YOU CAN HELP LAKE GOODWIN

- 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 Goodwin.

(TTY users call 425-388-3700)

Snohomish County
Public Works
Surface Water Management

Working together for people, streams & fish.