Appendix A

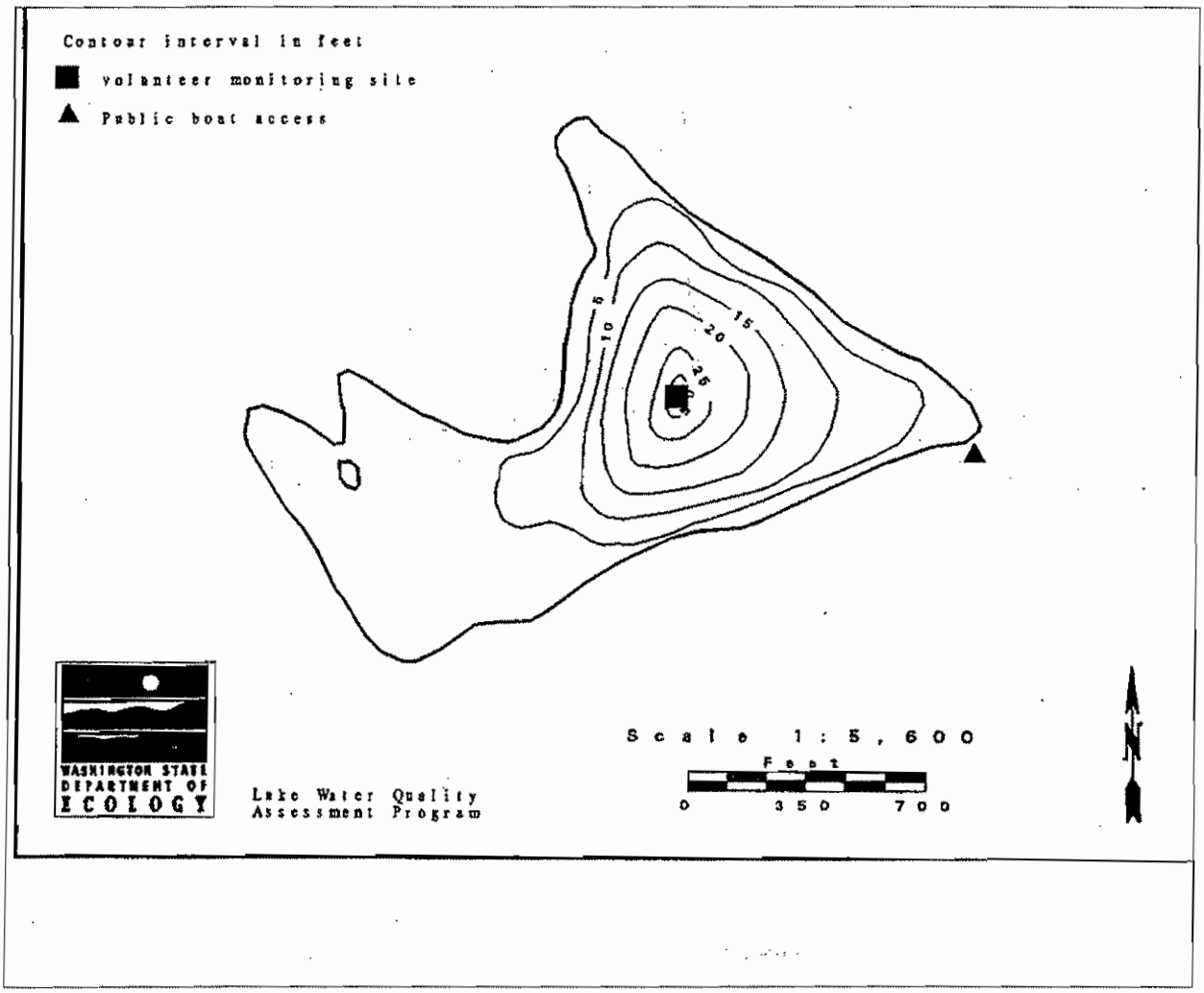
Individual Lake Assessments

The 70 individual lake assessments presented here were written primarily for the volunteers who participated in Washington's Citizen Lake Monitoring Project. As a result, layperson terms are used, and many basic limnological concepts are discussed or described.

LAKECOUNTY ALICE (KING)

DESCRIPTION Lake Alice is located 2.5 miles south of Fall City. It has no surface inlets, and drains intermittently via Icy Creek to the Raging River.

AREA (acres)	32
MAX DEPTH (feet)	30
MEAN DEPTH (feet)	8
DRAINAGE (square miles)	0.2
VOLUME (acre-feet)	260
SHORE LENGTH (miles)	1.34
ALTITUDE (feet)	875



ALICE LAKE -- KING COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/04/30	13.3	55.9		Lt Green	100	Heavy	Calm	7.5	33.0	
97/05/14	21.7	71.1		Mod Green	10	Trace	Calm	10.6	30.2	
97/05/28	16.7	62.1		Mod Green	100	Light	Calm	9.8	28.8	
97/06/11	21.1	70.0		Amber	100	None	Calm	9.2	-30.0	
97/06/25	17.2	63.0		Amber	100	Light	Calm	10.0	30.5	THESE NEW CARDS ARE NOT WATERPROOF LIKE THE OLD ONES. NO GOOD FOR PENCIL VIEW-TUBE LENS??
97/07/09	20.0	68.0		Mod Green	100	Heavy	Breezy	11.4	30.7	HOW CAN WE GET RID OF THESE GEESE? LAKE HEIGHT HIGHEST EVER SEEN ON THIS DATE
97/07/23	22.8	73.0		Mod Green	100	None	Light	10.0	0.0	FOUND VERY SMALL FROG (3/8"), BROWN. LAKE IS 6.5" HIGHER THAN 1996.
97/08/07	25.6	78.1		Mod Green	10	None	Breezy	9.1	26.7	PURPLE LOOSESTRIFE AT WEST SIDE.
97/08/19	23.3	73.9		Mod Green	100		Light	8.9	23.8	
97/09/02	20.6	69.1		Lt Green	0	Trace	Light	10.1	23.0	MAIL A NON-REFLECTING GLASS.
97/09/18	16.7	62.1	6.0	Mod Green	90	Heavy	Calm	9.3	25.3	70 INCHES OF RAIN SO FAR THIS YEAR.
97/10/03	15.6	60.1	6.0	Lt Green	100	Heavy	Breezy	9.7	27.0	
97/10/15	11.7	53.1	6.0	Lt Green	10	Trace	Light	7.3	30.2	USING A MORE SENSITIVE pH TEST KIT I GOT A READING OF 5.9
97/10/28	10.0	50.0	5.9	Pea-green	100	Mod	Calm	7.2	30.2	LAKE APPEARS TO BE ACIDIC. pH OF OUR WELL WATER IS 6.8.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/12	E	16	0.23J							
97/06/12	H	24	0.33J							
97/09/03	E	13	0.28	2.0						
97/09/03	H	27	0.43							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. The worst problems were reported as:

1. high water levels 2. suspended sediment 3. algae

Sources of actual or potential problems includes:

DOMESTIC SEPTIC SYSTEMS AND FERTILIZER USE

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

SUMMARY OF VOLUNTEER SURVEY (Continued)

OTHER----------

How many homes/new homes are there on the lake shore? ***78***
Changes since last year? ***NONE***
Lake Uses and Facilities at the lake include:
swimming fishing
The percent of the lakeshore that is sewered: ***0***
The number of storm drains leading to the lake: ***0***
Motor boat restrictions include: ***no motors allowed.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-12-97-- fish spawning beds observed near shore, -some macrophytes observed, -an osprey observed fishing

9-3-97-- daphnia very abundant in the epilimnion, -mild H2S odor detected in the hypolimnion water, SW corner of the lake has an outflow in the winter but not the summer, -lake level exceeds legal maximum height every year.

GPS at sample site= 47 31.946N 121 53.255W

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	45 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	37 (Oligotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

This relatively pristine lake has a very small watershed so impacts to the lake would most likely originate from the surrounding residents. The lake is nurtured by an adjoining wetland. There is a sag in hypolimnetic DO, most noticed in the late summer. TSI results along with the depleted hypolimnetic DO support an overall assessment of oligomesotrophic.

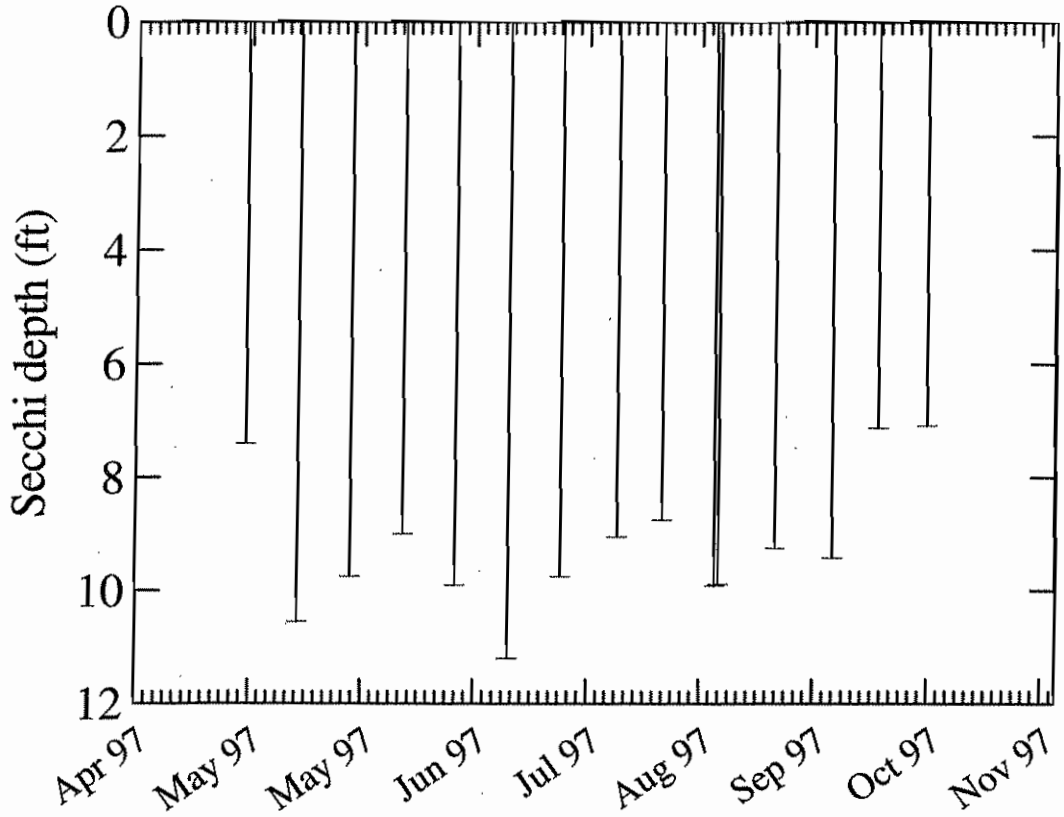
COMMENTS FROM 92/08/24 AQUATIC PLANT SURVEY

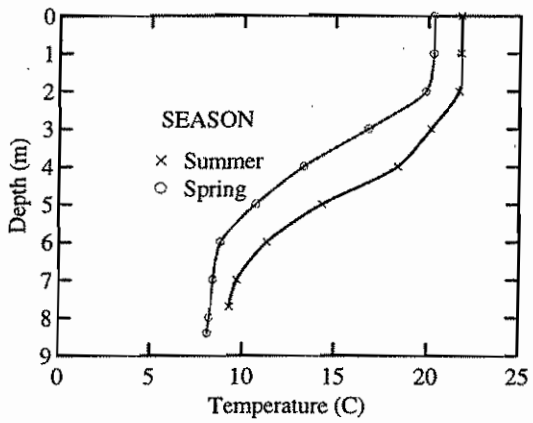
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

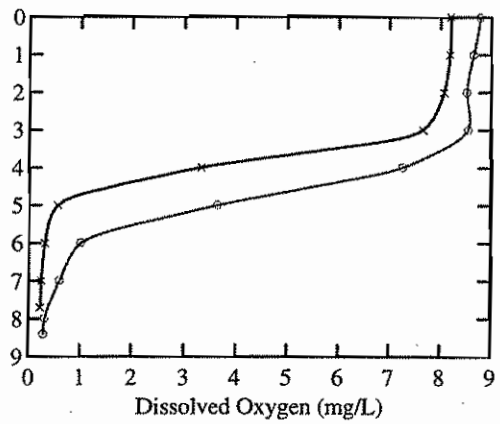
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

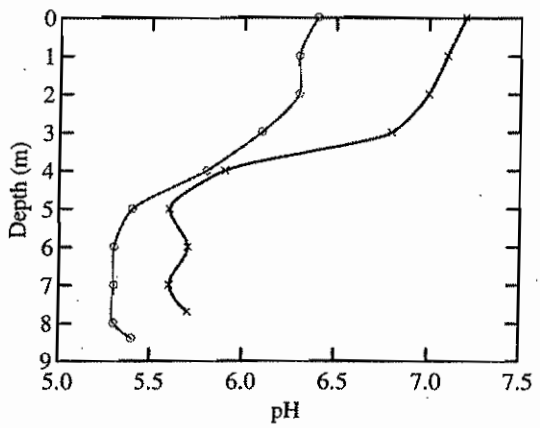
Callitriche sp. (water-starwort) *Iris pseudacorus* (yellow flag) *Isoetes sp.* (quillwort) *Nuphar lutea* (yellow water-lily) *Nymphaea sp.* (water lily) *Polygonum sp.* (smartweed) *Potamogeton sp.* (pondweed) *Scirpus sp.* (bulrush)

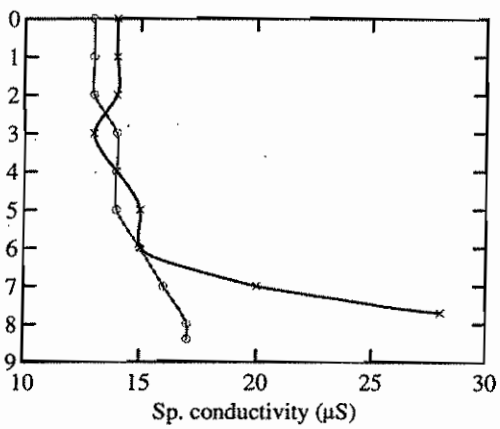
ALICE


Secchi depth (ft)
0
2
4
6
8
10
12
Apr 97
May 97
May 97
Jun 97
Jul 97
Aug 97
Sep 97
Oct 97
Nov 97


SEASON
Summer
Spring
Depth (m)
Temperature (C)

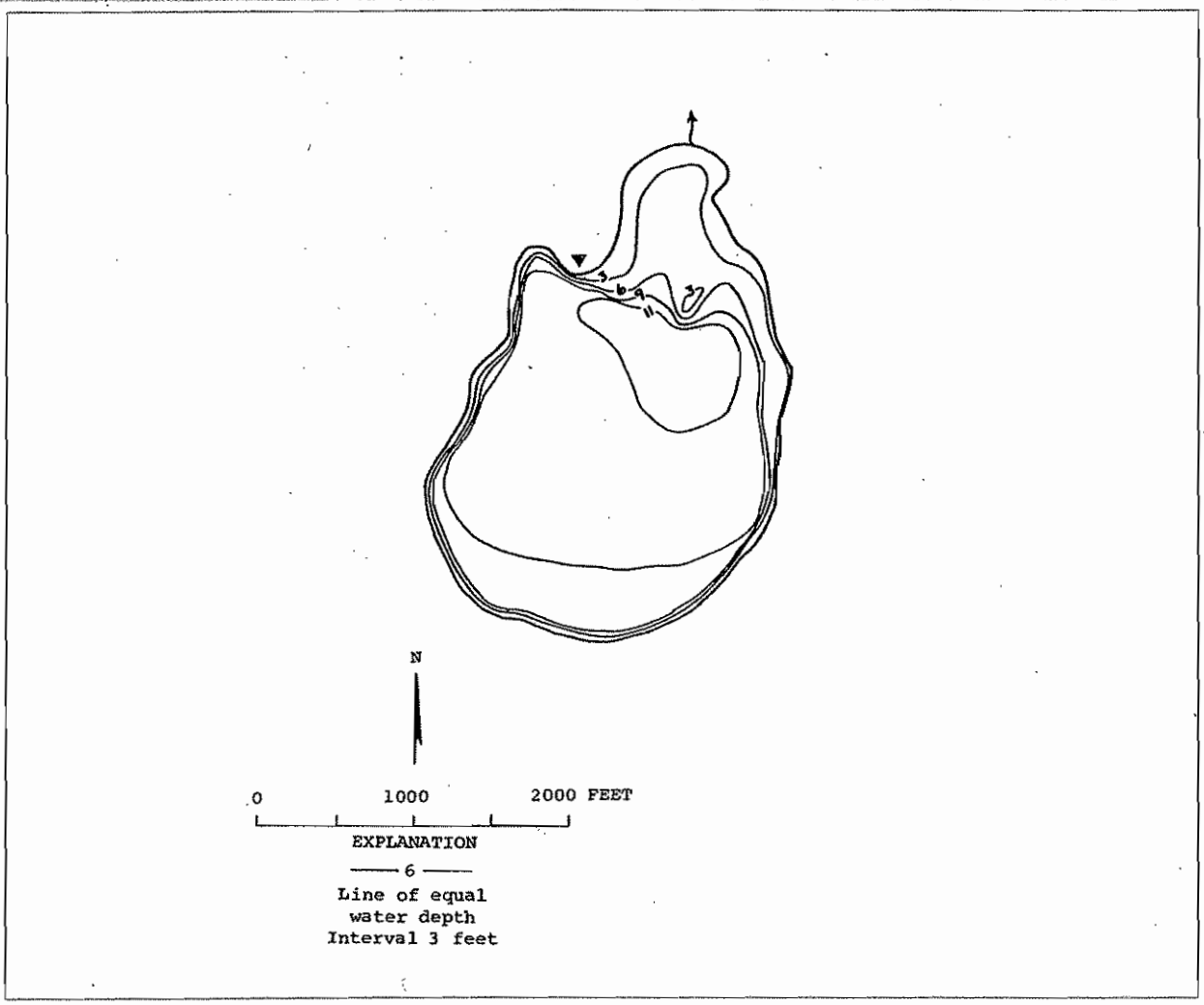

Dissolved Oxygen (mg/L)


Depth (m)
pH


Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	140
MAX DEPTH (feet)	11
MEAN DEPTH (feet)	8
DRAINAGE (square miles)	1.0
VOLUME (acre-feet)	1130
SHORE LENGTH (miles)	1.89
ALTITUDE (feet)	27



BAY LAKE -- PIERCE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/09/12				Pea-green	75	None	Calm	5.0	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/05	E	47	0.84		2	4	4.3			
97/06/05	H									
97/09/12	E	52	0.22	24.2			3.0J			

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Blue-green algae was very abundant. Elodea was very abundant around discharge pipe at boat launch. The shoreline was mostly natural (approx. 80%). Fishermen stated the lake had numerous small bass in it.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	54N* (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	61 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	62 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Bay Lake is a very shallow, very productive lake. Its pea soup color in the spring demonstrated signs of a lake rich in nutrients. Although there was not a sufficient amount of Secchi dips to calculate a valid trophic index for Secchi, the other measured parameters support an eutrophic assessment.

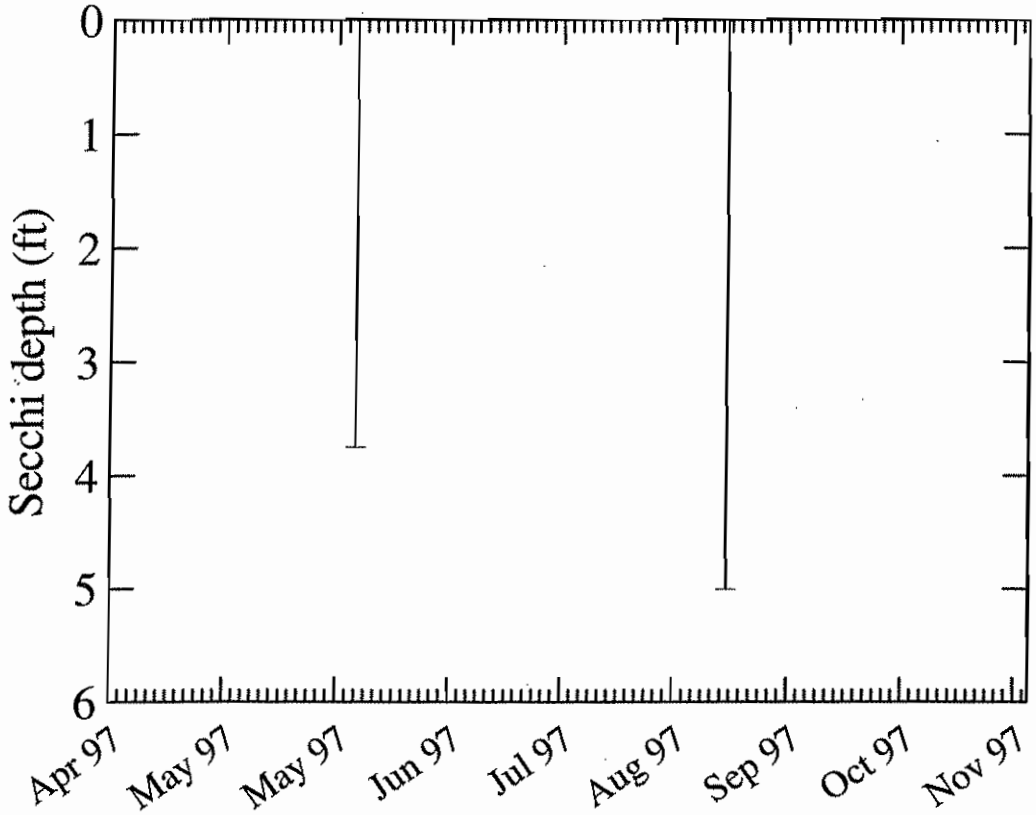
COMMENTS FROM 95/09/28 AQUATIC PLANT SURVEY

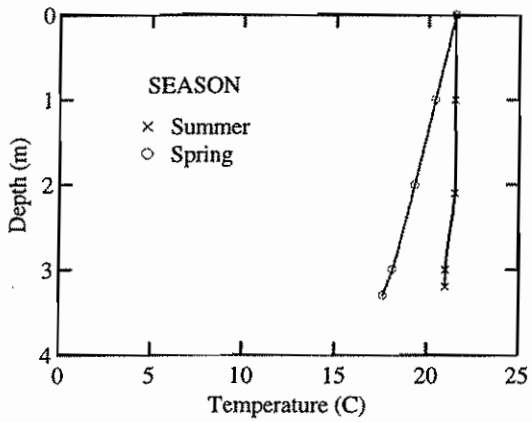
cloudy. lots b-g algae in water column. not too many plants, only 2 species submersed. caught many perch in the gill net Maximum depth of plant growth: 4.0M.

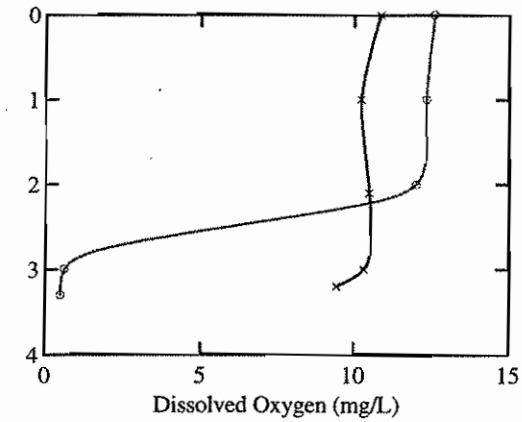
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

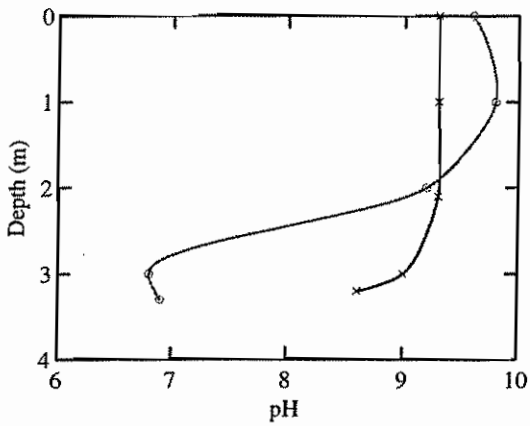
Ceratophyllum demersum (Coontail; hornwort) *Elodea canadensis* (common elodea) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Sparganium sp.* (bur-reed)

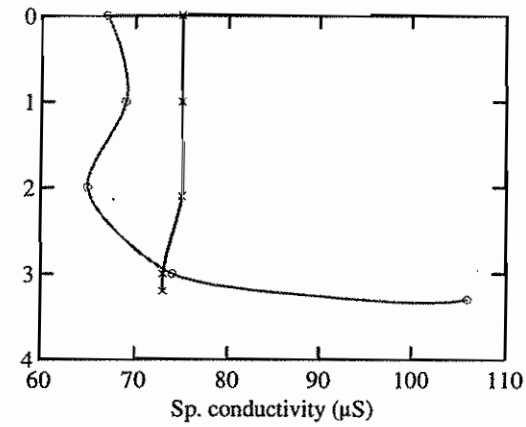
BAY


Secchi depth (ft)
0
1
2
3
4
5
6
Apr 97
May 97
May 97
Jun 97
Jul 97
Aug 97
Sep 97
Oct 97
Nov 97


SEASON
× Summer
○ Spring
Depth (m)
0
1
2
3
4
0
5
10
15
20
25
Temperature (C)


0
1
2
3
4
0
5
10
15
Dissolved Oxygen (mg/L)

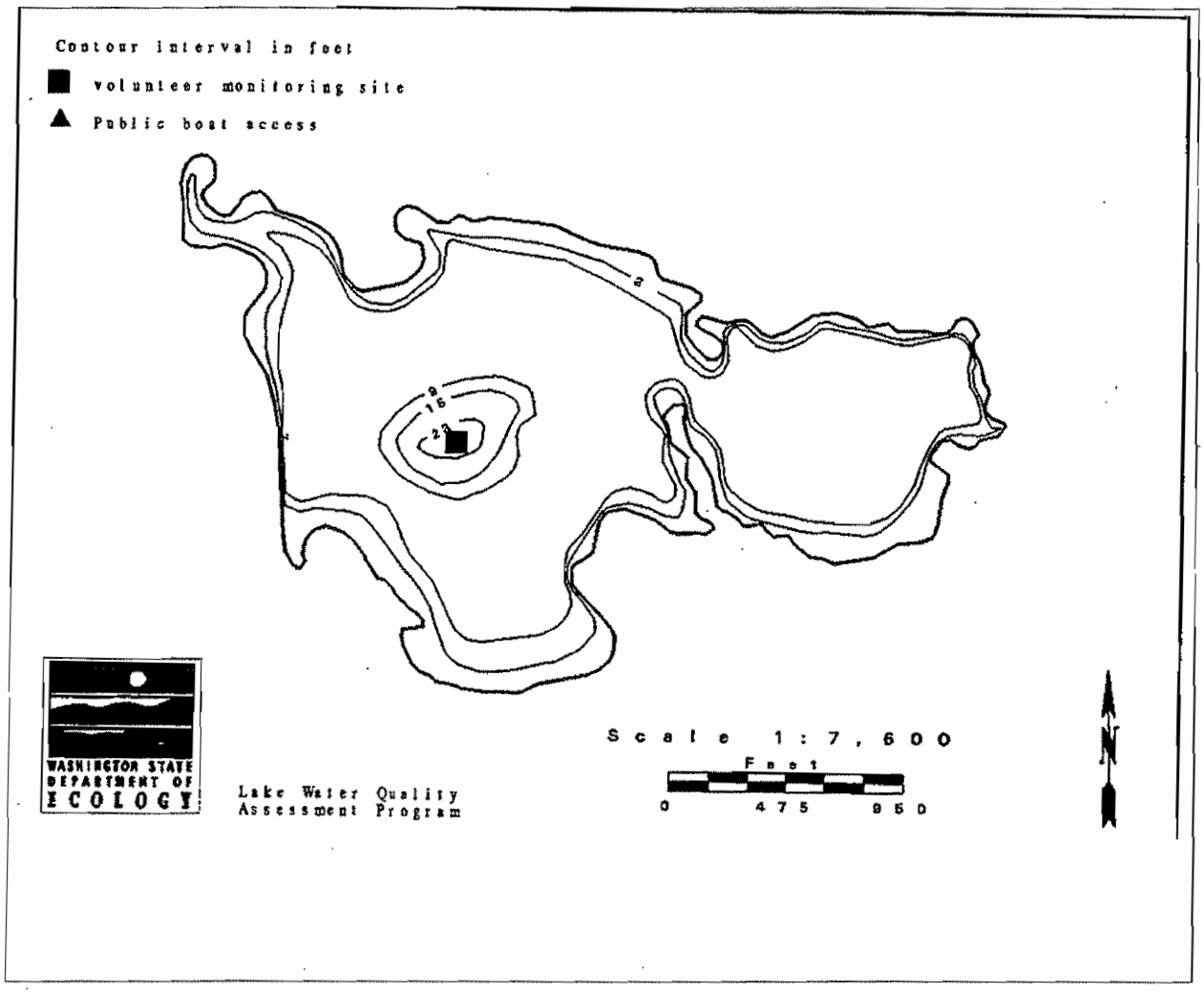

Depth (m)
0
1
2
3
4
6
7
8
9
10
pH


0
1
2
3
4
60
70
80
90
100
110
Sp. conductivity (µS)

LAKECOUNTY BIG MEADOW (PEND OREILLE)

DESCRIPTION Big Meadow Lake lies in a peat area about 20 miles northeast of Colville at the head of Meadow Creek. It drains westerly to the south fork of Deep Creek and ultimately to the Columbia River. Big Meadow Creek was dammed in the mid-seventies, which enlarged the lake from its original size of about four acres to its present size of about 72 acres.

AREA (acres)	72
MAX DEPTH (feet)	23
MEAN DEPTH (feet)	7
DRAINAGE (square miles)	1
VOLUME (acre-feet)	512
SHORE LENGTH (miles)	0
ALTITUDE (feet)	3450



BIG MEADOW LAKE -- PEND OREILLE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev. Comments
STATION 1										
97/05/30	14.0	57.2		Grn-brown	100	Heavy	Light	9.5	3.0	SITE VISIT: BLACK FLIES VERY THICK.
97/06/14	19.5	67.1		Grn-brown	25	Light	Breezy	9.8	0.0	
97/06/27	18.0	64.4		Grn-brown	25	Light	Strong	13.0	0.0	
97/07/12	17.5	63.5		Grn-brown	50	Light	Breezy	9.0	0.0	FIRST SWIMMERS SEEN THIS YEAR.
97/07/23	22.5	72.5		Grn-brown	25	Mod	Light	12.3	0.0	
97/08/06	25.0	77.0		Grn-brown	1	None	Calm	10.0	0.0	PLEASE NOTE THAT THIS LAKE IS IN PEND ORBILLE COUNTY NOT IN STEVENS
97/08/28				Grn-brown	100	Trace	Light	7.3	-9.0	FIELD VISIT. ONE ISLAND HAS RISEN, IS VERY SOLID.
97/09/10	18.0	64.4		Grn-brown	75	None	Breezy	11.0	-10.0	SECOND "ISLAND" HAS APPEARED
97/09/24	16.0	60.8		Grn-brown	0	None	Breezy	12.0	-7.5	SECOND ISLAND HAS SUBMERGED. HAD 2" RAIN IN THE LAST WEEK.
97/10/07	-12	10.5		Grn-brown	50	Light	Breezy	10.1	-8.5	
97/10/21	13.0	55.4		Grn-brown	10	Trace	Breezy	10.8	-7.0	LAST SAMPLE FOR THE SEASON.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/30	E	12								
97/05/30	H	23								
97/08/28	E	31		41.5						
97/08/28	H	42								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Aerator was not run last winter to try to kill perch. Angler reported catching perch, however, wasn't so successful. Lots of black flies during spring sampling.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	43 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	54 (Eutrophic)

Mean Trophic State Index (Chlorophyll a): 67 (Eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

There was an array of TSI values resulting from the data collected. The reason for the disparity is most likely due to the operation of an aerator which may affect some parameters and not others. Secchi values were fairly constant through the season. It is important to note that chlorophyll and Secchi values do not apparently support each other. Reasons for this are unknown but could be due to the type of algae present. Some blue-green algae may be abundant and produce large quantities of chlorophyll which grow in colonies. Sometimes the colonial growth allows for more sun light penetration into the water column than might be expected considering the amount of chlorophyll produced in the water column. All considered, Big Meadow Lake is assessed as mesoeutrophic.

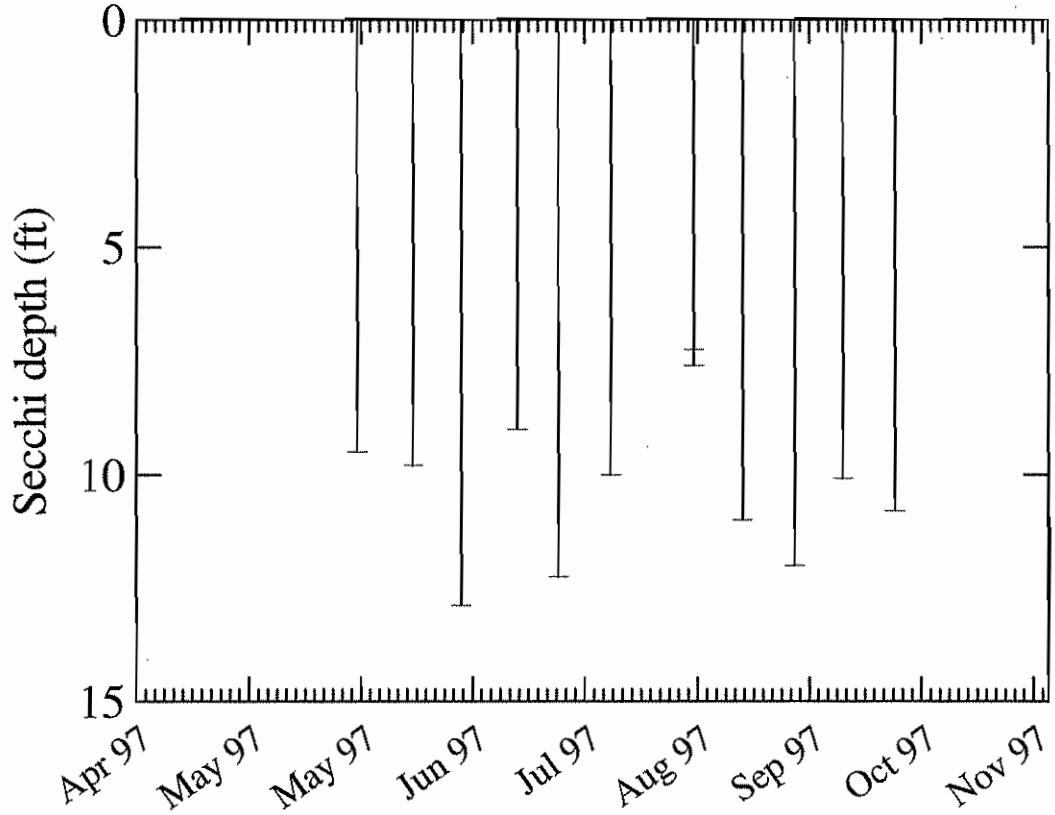
COMMENTS FROM 93/08/18 AQUATIC PLANT SURVEY

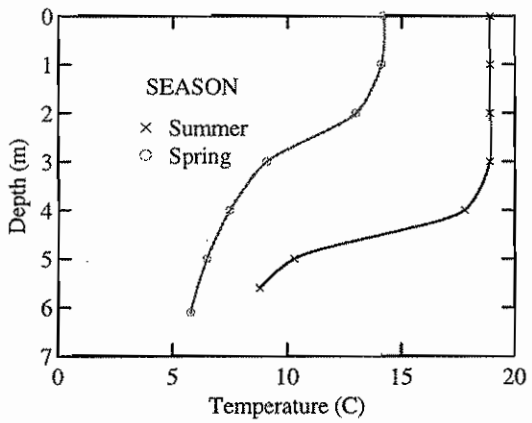
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

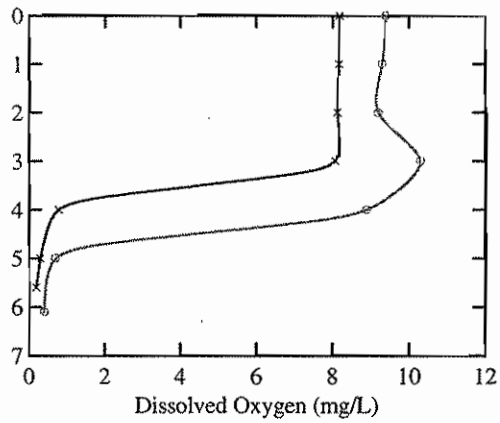
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

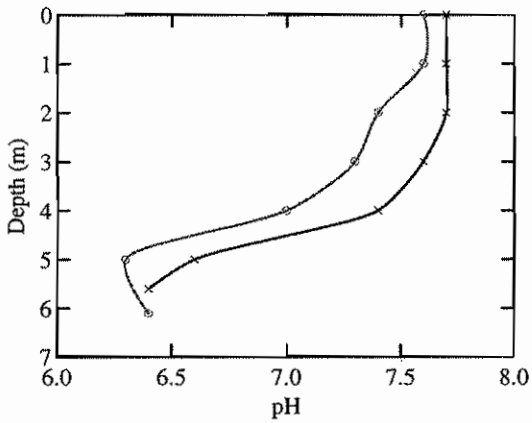
Carex sp. (sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Elodea sp.* (waterweed) *Nitella sp.* (stonewort) *Nuphar lutea* (yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Potamogeton alpinus* (red pondweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potamogeton sp.* (pondweed) *Potentilla sp.* (cinquefoil) *Scirpus sp.* (bulrush) *Sparganium sp.* (bur-reed)

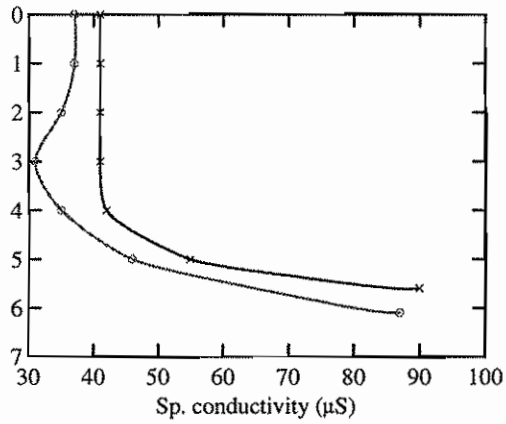
BIG MEADOW


Secchi depth (ft)
0
5
10
15
Apr 97
May 97
May 97
Jun 97
Jul 97
Aug 97
Sep 97
Oct 97
Nov 97


SEASON
Summer
Spring
Depth (m)
Temperature (C)


Dissolved Oxygen (mg/L)

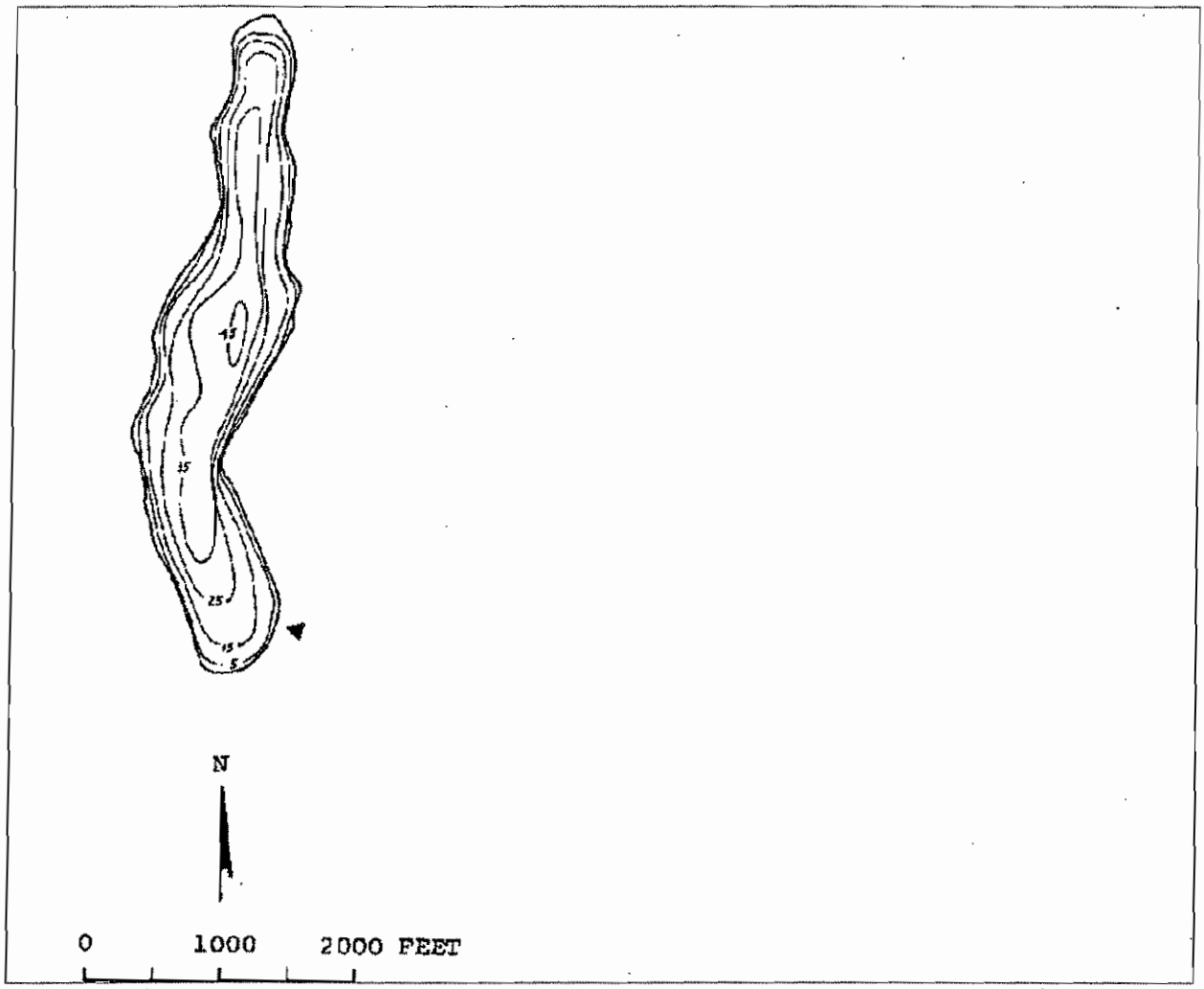

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY BLACK (STEVENS)

DESCRIPTION Black Lake is located about 12.5 miles east of Colville. It is 4,800 feet long. The main inflow is intermittent into the north end of the lake, and there is a smaller inlet on the east side of the lake. Black Lake drains southeast via Gap Creek to the Little Pend Oreille River.

AREA (acres)	70
MAX DEPTH (feet)	45
MEAN DEPTH (feet)	27
DRAINAGE (square miles)	0.9
VOLUME (acre-feet)	1863
SHORE LENGTH (miles)	2.03
ALTITUDE (feet)	3701



BLACK LAKE -- STEVENS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/08/27				Dark Brn	10		Breezy	15.0	0.0	Heavy rain Sunday.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/29	E	9								
97/05/29	H	12								
97/08/27	E	9	0.22	1.8			0.8			
97/08/27	H	16	0.19							
STATION 2										
97/05/29	E	10								
97/08/27	E	8								
97/08/27	H	1	0.16							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. The worst problems were reported as:

1. excessive aquatic plants

Sources of actual or potential problems includes:

NONE

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***27***

Changes since last year? ***NONE***

FIELD OBSERVATIONS OF ECOLOGY STAFF

A few large Daphnia in spring and small zoopl. in fall, but generally few zooplankton in either sampling. Turtle, osprey, heron seen in fall.

TROPHIC STATUS

Estimated Trophic State: Oligo-mesotrophic

Mean Trophic State Index (Secchi):	38N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	35 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	36 (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although all TSI values are indicative of an oligotrophic lake, the summertime oxygen depletion in the hypolimnion is more indicative of mesotrophy, therefore, Black Lake is assessed as oligo-mesotrophic.

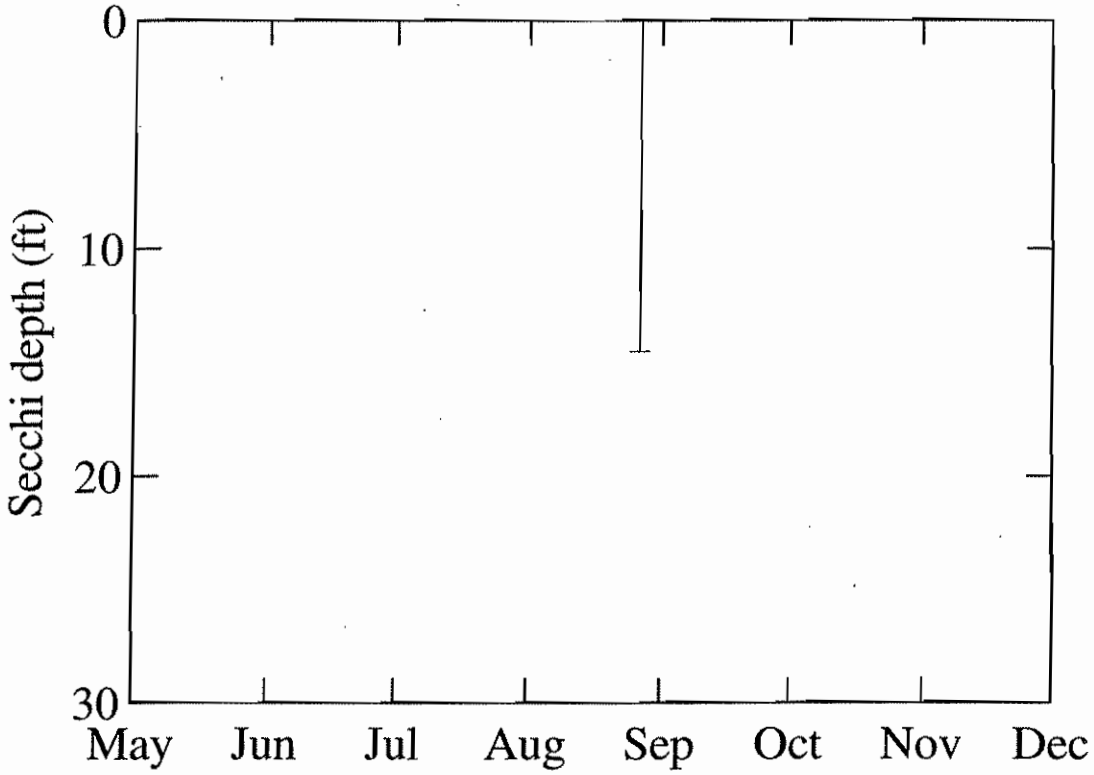
COMMENTS FROM 93/08/19 AQUATIC PLANT SURVEY

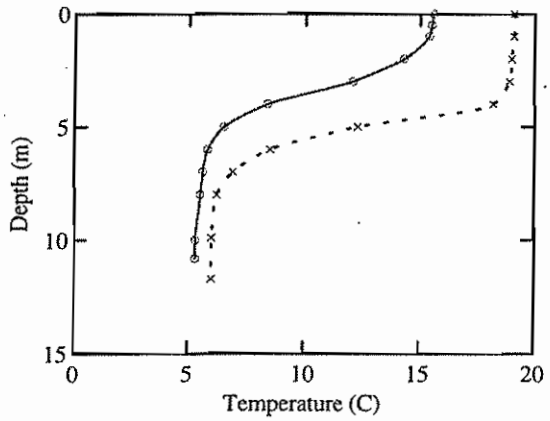
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

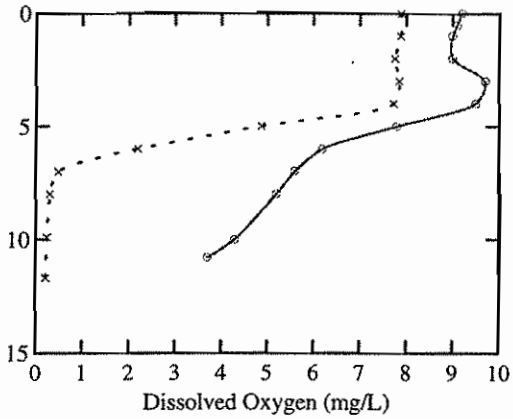
Carex sp. (sedge) *Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nuphar lutea* (yellow water-lily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potentilla sp.* (cinquefoil) *Ranunculus longirostris* (long beaked water-buttercup) *Sparganium sp.* (bur-reed) *Typha sp.* (cat-tail)

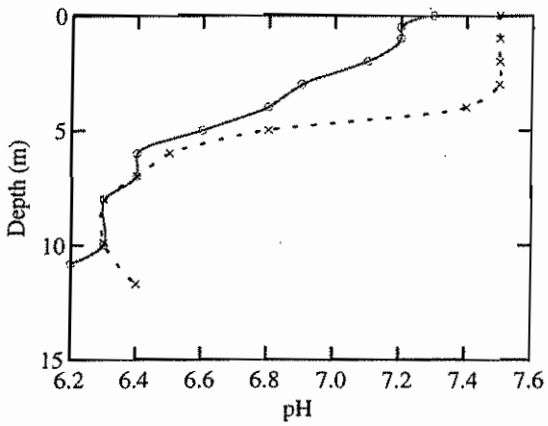
BLACK

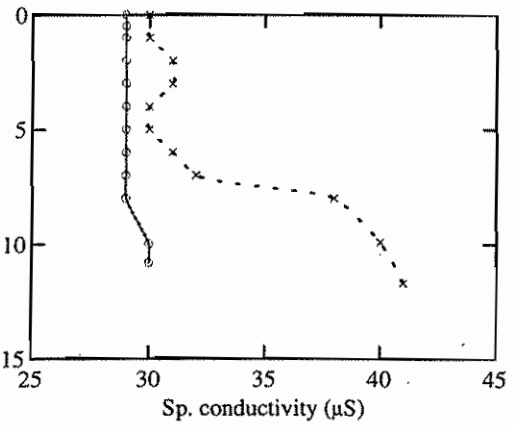




SEASON
× Summer
○ Spring



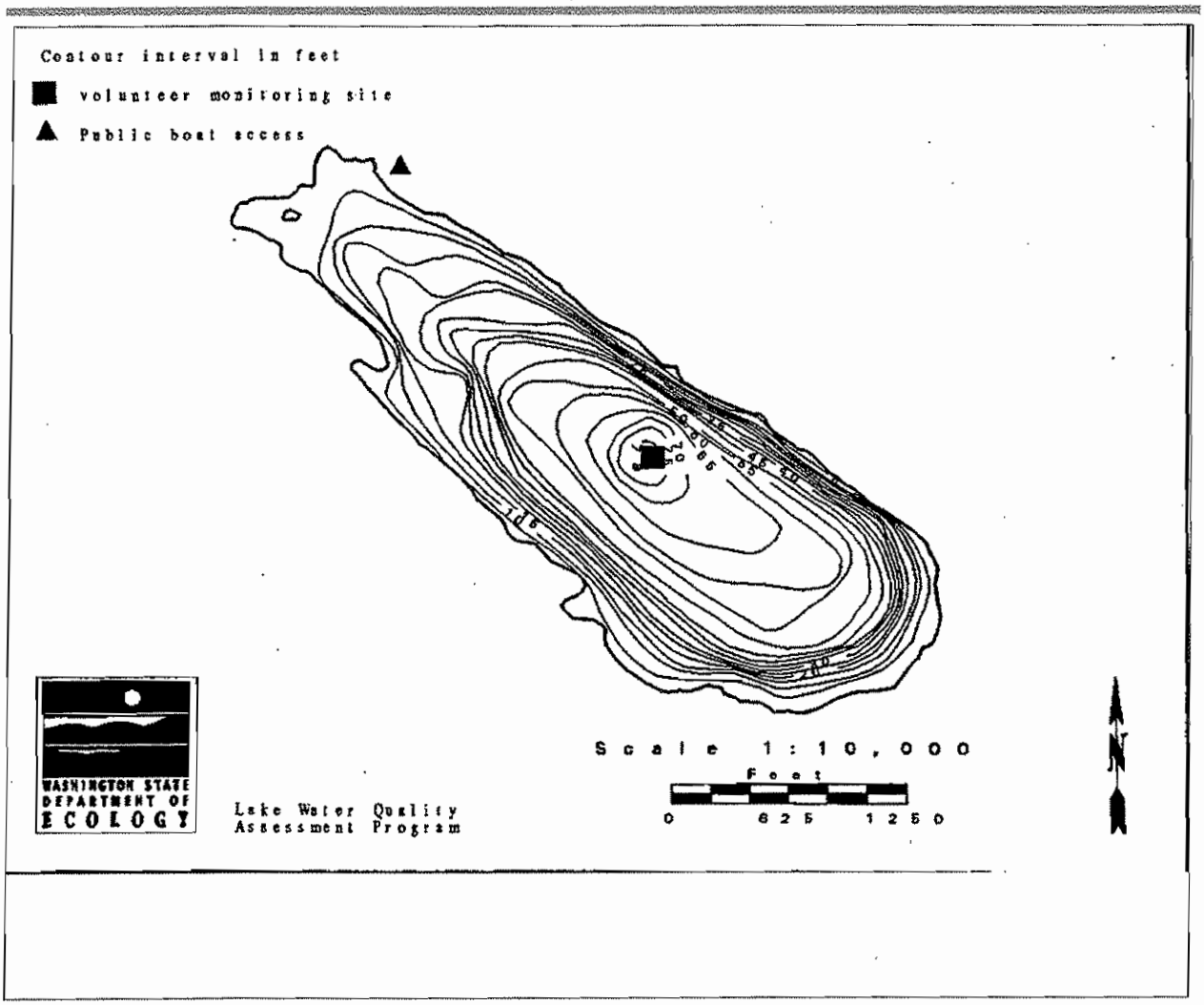




LAKECOUNTY BOSWORTH (SNOHOMISH)

DESCRIPTION Lake Bosworth is located 2.3 miles south of Granite Falls. It is fed by two unnamed inlets, and drains northeast to the Pilchuck River.

AREA (acres)	105
MAX DEPTH (feet)	79
MEAN DEPTH (feet)	35
DRAINAGE (square miles)	1.4
VOLUME (acre-feet)	3671
SHORE LENGTH (miles)	1.99
ALTITUDE (feet)	563



BOSWORTH LAKE -- SNOHOMISH COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/19	18.3	65.0		Pea-green	90	Heavy	Calm	18.0	-13.0	
97/07/02	18.9	66.0		Pea-green	25	Mod	Calm	16.0	-12.0	
97/07/16	20.0	68.0		Pea-green	50	Trace	Light	17.0	-12.5	ON JULY 8 THERE WAS A MAN IN A WHITE BOAT DOING A LAKE TEST. WHY? MAYBE HE WAS FROM THE COUNTY?!
97/07/30	22.2	72.0		Pea-green	25	None	Light	16.0	-15.0	
97/08/14	25.6	78.0		Undefined	1	None	Calm	13.0	0.0	COLOR: PEA-SOUP GREEN / GREENISH BROWN
97/08/28	21.1	70.0		Pea-green	100	Mod	Calm	12.0	-18.0	
97/09/11	21.1	70.0		Grn-brown	100	Trace	Calm	11.0	-19.0	
97/09/28				Grn-brown	100	Heavy	Breezy	13.5	-12.0	
97/10/10	14.4	57.9		Pea-green	100	Heavy	Light	16.0	-9.5	
97/10/27	12.8	55.0		Pea-green	75	Mod	Calm	20.0	-12.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/03	E	7								
97/06/03	H	9								
97/09/11	E	8	0.36	4.8						
97/09/11	H	7	0.61							
STATION 2										
97/09/11	E	6		4.3						
STATION 2										
97/09/11	E			3.9						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. The worst problems were reported as:

1. excessive aquatic plants 2. swimmer's itch 3. algae

Sources of actual or potential problems includes:

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***YES(140)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***113***

Changes since last year? ***SOME CLEARING OF PROPERTY.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-3-97 The volunteer noticed peat material floating on the surface 3 weeks ago. The lake was a mill pond years ago so the peat could have floated up from the bottom. Two eagles spotted together for the 1st time since 1984. They were spotted a week ago. An osprey was observed fishing. Blue-green algae was very abundant.

8-27-98 A few zooplankton observed in the surface samples. A turtle and osprey were observed. There was heavy rain.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	38 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	32 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	45 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Bosworth Lake has maintained its relative pristine nature through the years. TSI values are favorable for an oligotrophic lake while DO concentrations and chlorophyll TSI readings are more indicative of a mesotrophic lake, therefore, an assessment of oligo-mesotrophic is appropriate.

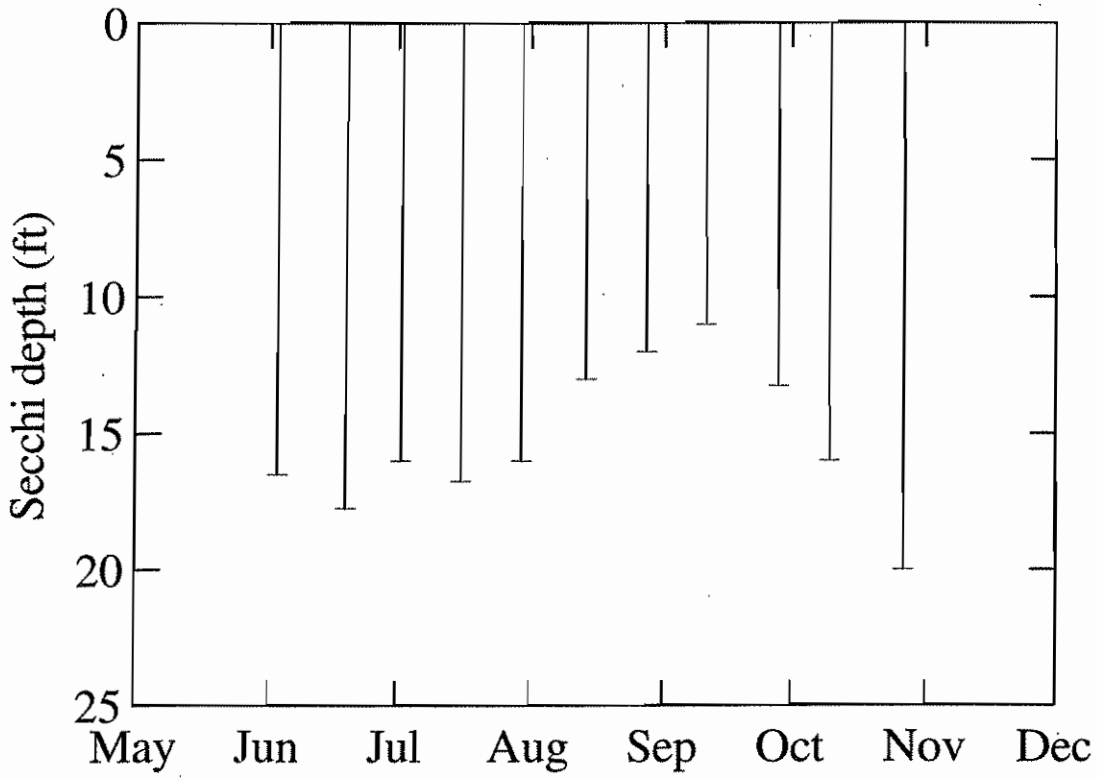
COMMENTS FROM 92/05/15 AQUATIC PLANT SURVEY

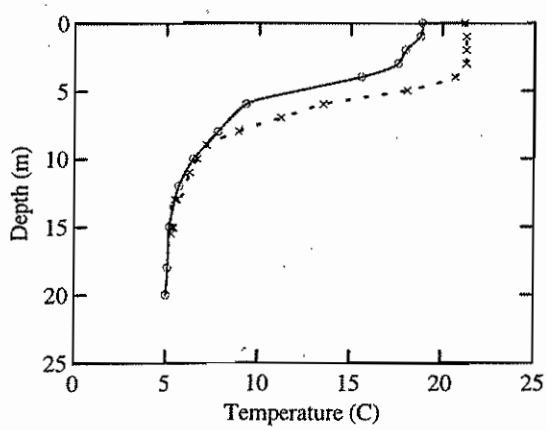
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

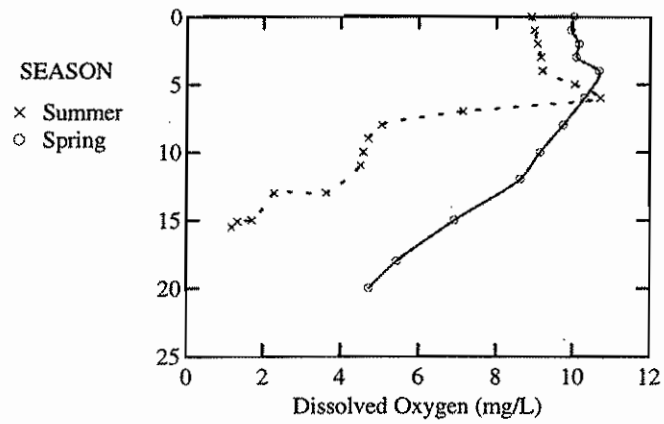
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

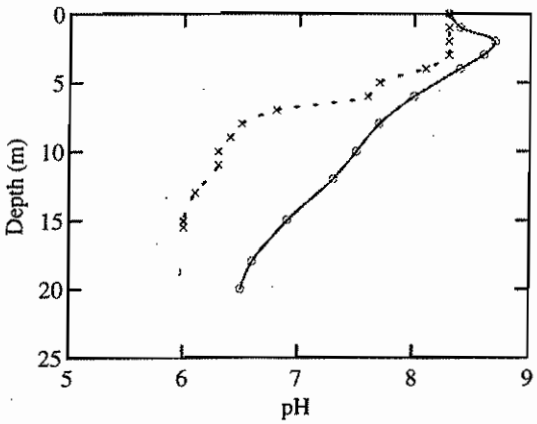
Iris pseudacorus (yellow flag)

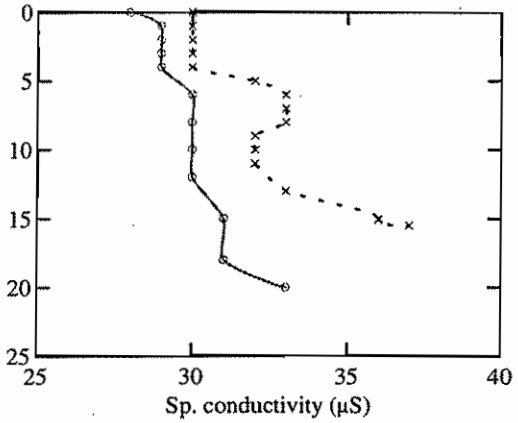
BOSWORTH


Secchi depth (ft)
0
5
10
15
20
25
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
5
10
15
20
25
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring
0
5
10
15
20
25
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)

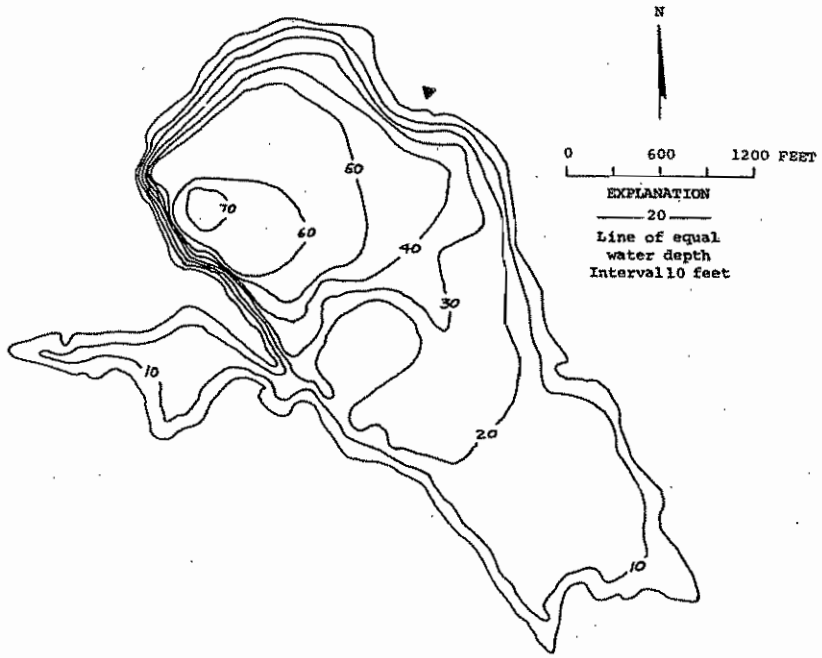

Depth (m)
0
5
10
15
20
25
5
6
7
8
9
pH


0
5
10
15
20
25
25
30
35
40
Sp. conductivity (µS)

LAKECOUNTY CASCADE (SAN JUAN)

DESCRIPTION

AREA (acres)	167
MAX DEPTH (feet)	70
MEAN DEPTH (feet)	27
DRAINAGE (square miles)	3.4
VOLUME (acre-feet)	4550
SHORE LENGTH (miles)	3.25
ALTITUDE (feet)	346



Cascade Lake, San Juan County. From U.S. Geological Survey, March 21, 1974.

CASCADE LAKE -- COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/08/18				Lt Green	100			24.0	0.0		ECOLOGY FIELD VISIT. NO SAMPLING CONDUCTED IN THE SPRING.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Cascade Lake was only sampled once in 1997 and that was during the fall season. The lake is within a state park with very little disturbances within the watershed. 95% of the shoreline is natural. A bald eagle was observed flying overhead.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	31N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Because of a database miscalculation, the TSI values for phosphorus and chlorophyll do not appear above but the corresponding readings are 6.4 ug/L for phosphorus and 2.3 ug/L for chlorophyll, both well within the range for an oligotrophic lake. Hypolimnetic DO concentrations and the presence of a strong H2S odor in the hypolimnion are more indicative of a mesotrophic lake, therefore, the lake is assessed as oligo-mesotrophic.

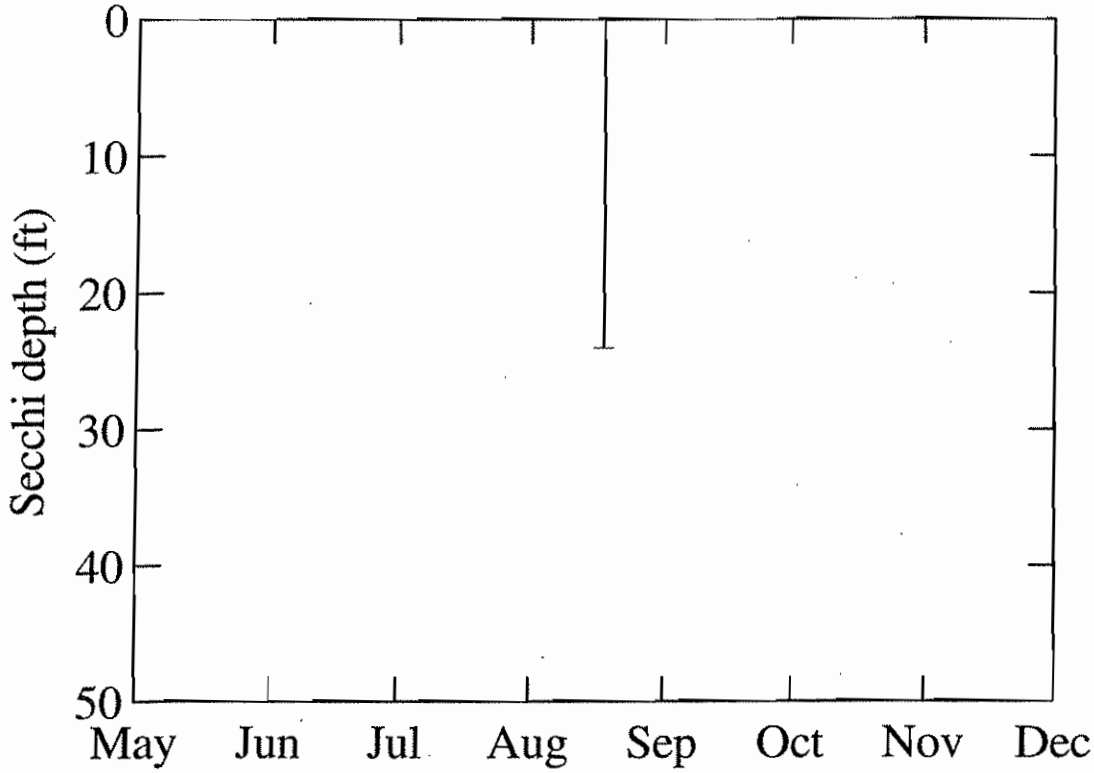
COMMENTS FROM 97/09/09 AQUATIC PLANT SURVEY

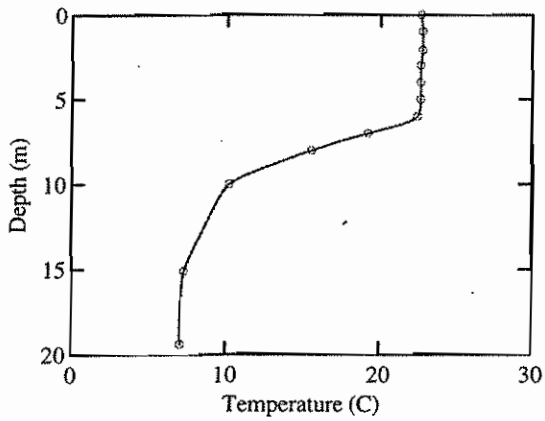
Sunny, breeze. Dense macrophyte growth in areas with sunny gently sloping bottoms - diverse plant community. Many snails! Popular swimming area. Much more productive than Mountain Lake. Plants with calcium deposites on leaves. Most areas with mucky substrate. Maximum depth of plant growth: 6.5M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

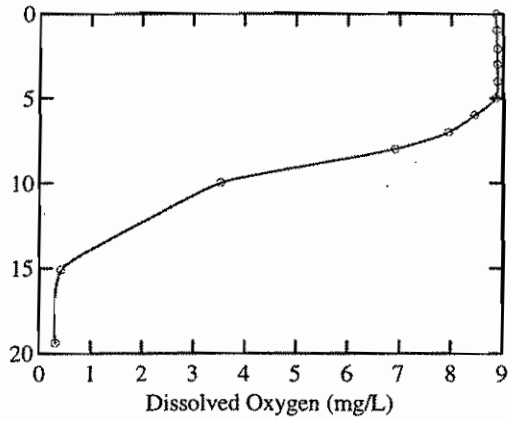
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Glyceria sp.* (mannagrass) *Isoetes sp.* (quillwort) *Limosella aquatica* (mudwort) *Myriophyllum sibiricum* (northern watermilfoil) *Najas flexilis* (common naiad) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Polygonum amphibium* (water smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Scirpus sp.* (bulrush) *Sparganium sp.* (bur-reed) *Typha latifolia* (common cat-tail)

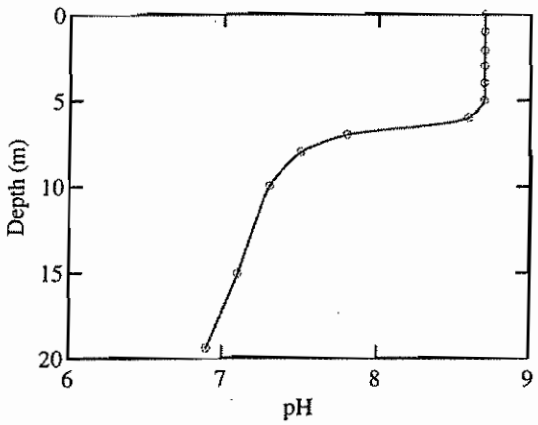
CASCADE

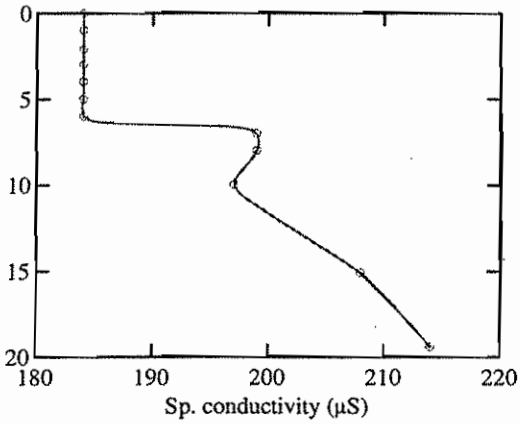




SEASON
× Summer
○ Spring



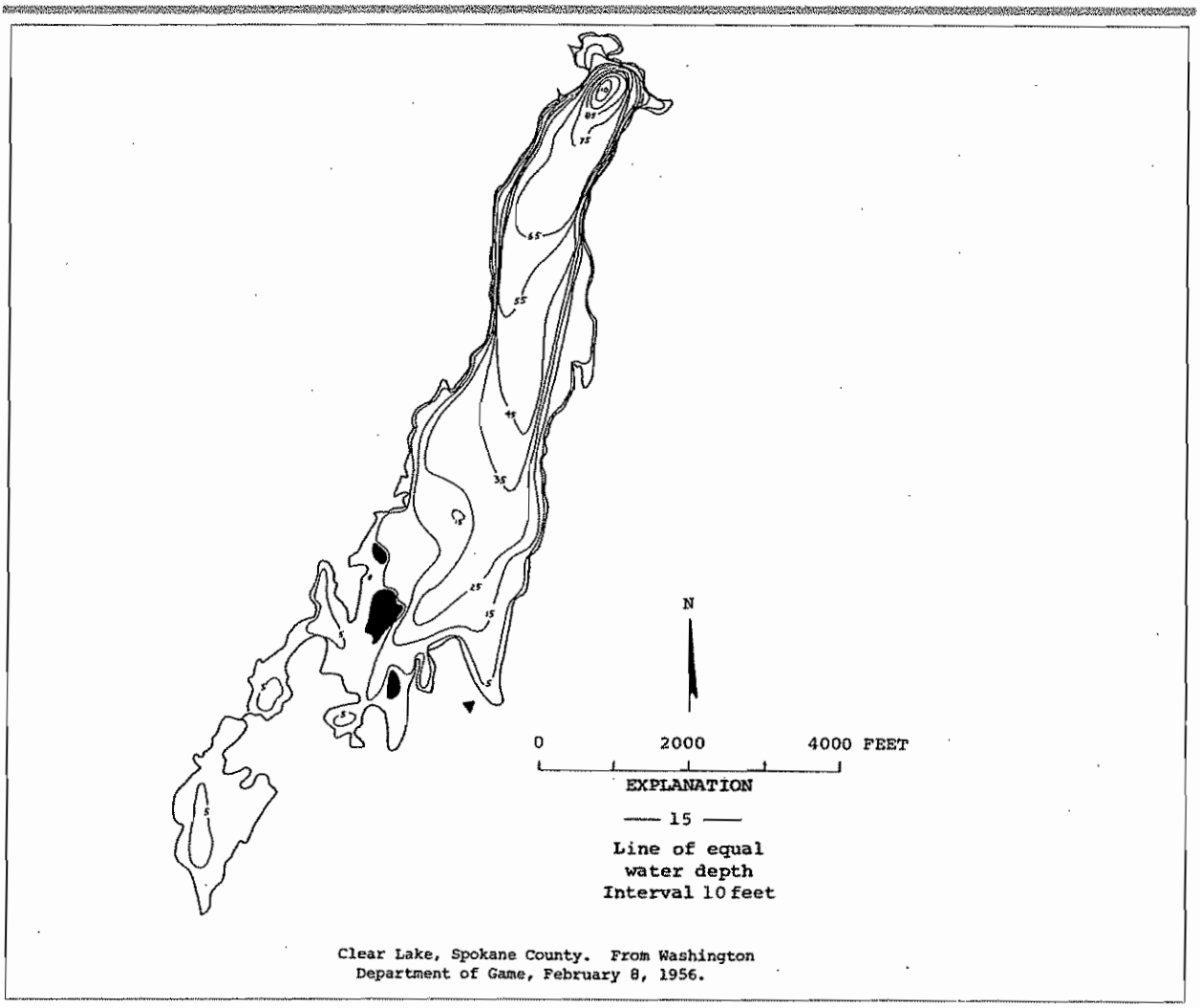




LAKECOUNTY CLEAR (SPOKANE)

DESCRIPTION Clear Lake is located 2.1 miles south of the Town of Medical Lake. It has no surface inlets or outlets, and is within the Crab Creek drainage.

AREA (acres)	410
MAX DEPTH (feet)	110
MEAN DEPTH (feet)	26
DRAINAGE (square miles)	9.5
VOLUME (acre-feet)	11000
SHORE LENGTH (miles)	9.09
ALTITUDE (feet)	2342



Clear Lake, Spokane County. From Washington Department of Game, February 8, 1956.

CLEAR LAKE -- SPOKANE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/17	17.8	64.0	8.0	Lt Green	90	None	Calm	15.0	0.0	
97/07/02	17.8	64.0	8.0	Mod Green	90	Mod	Calm	7.5	0.0	SURE DID CHANGE FROM LAST TIME. LOTS OF LITTLE GREEN PARTICLES IN THE WATER.
97/07/18	18.9	66.0	8.0	Mod Green	25	None	Breezy	7.0	0.0	WATER STILL NOT AS CLEAR AS NORMAL, BUT SMALL PARTICLES ARE LESS.
97/07/31	19.4	66.9	8.0	Mod Green	10	Trace	Calm	11.0	0.0	LITTLE YELLOW-GREEN PARTICLES ARE LESS ABUNDANT.
97/08/20				Lt Green	100		Light	10.5	0.0	
97/09/25	14.4	57.9	8.0	Mod Green	10	None	Light	10.0	0.0	
97/10/16	10.0	50.0	7.5	Mod Green	0	None	Calm	9.0	0.0	LAST TIME THIS YEAR.
STATION 2										
97/05/22					0			16.2	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/22	E	28								
97/05/22	H	60								
97/08/20	E	19		3.9	1U	8				
97/08/20	H	153								
STATION 2										
97/05/22	E	37								
97/05/22	H	45								
97/08/20	E	20		3.8						
97/08/20	H	20								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Volunteer reports that West Medical is overflowing into Clear this year. Water levels had been very high in spring (2345ft). (Down 2.25ft by sampling). Zooplankton in all spring casts, though fewer in hypolimnion. By summer, moderate number of small zooplankton in epilimnion, Chaoborus in 10 M sample. H2S smell at 15 and 20 M. Algae mats had been floating throughout lake in early spring but by spring sampling were only seen near shoreline.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	44 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	47 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	44 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

All TSI values are tightly aligned and suggest an overall assessment of mesotrophic.

The hydrolab profile data shown for the summer is from site #2.

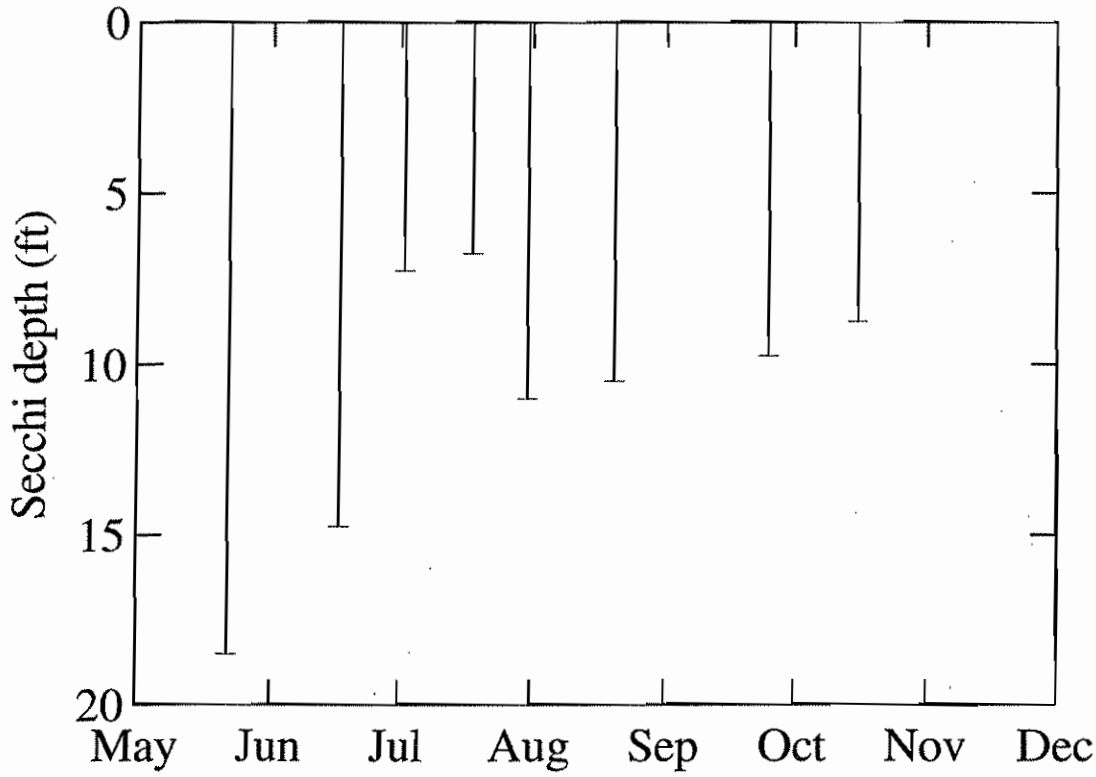
COMMENTS FROM 94/08/04 AQUATIC PLANT SURVEY

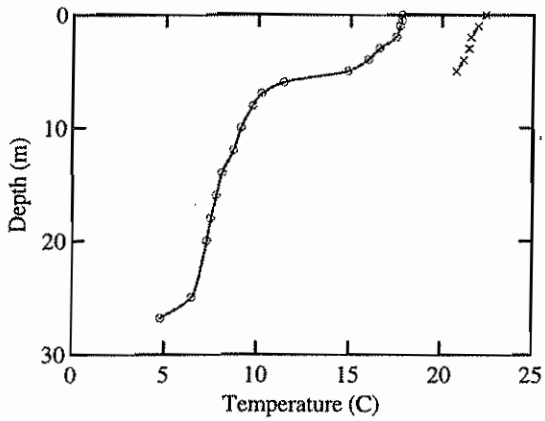
sunny, calm. Water level down 2-3 feet from what looks normal, can not access the southern part of the lake. Water is pea soup color, many fish and birds, algae covering plants, forming mats in spots. Dominant macrophyte is M. sibiricum, with thick patches through the littoral zone. Other prevalent plants were P. pectinatus and P. richardsonii. Maximum depth of plant growth: 5.8M.

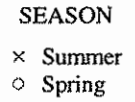
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

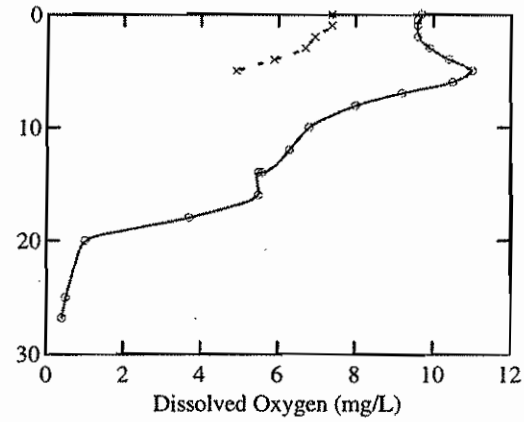
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Elodea nuttallii* (Nuttall's waterweed) *Myriophyllum sibiricum* (northern watermilfoil) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton pusillus* (slender pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Ranunculus aquatilis* (water-buttercup) *Ruppia maritima* (ditch-grass) *unknown plant* (unknown)

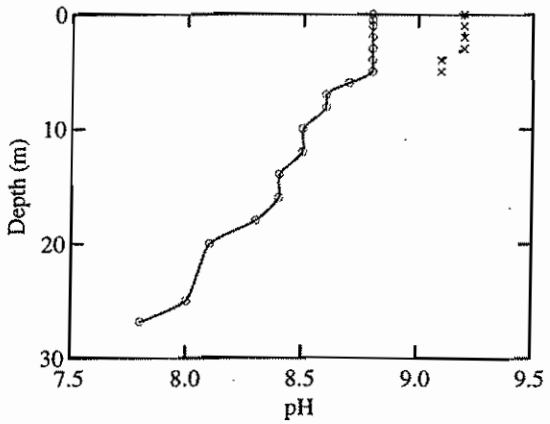
CLEAR

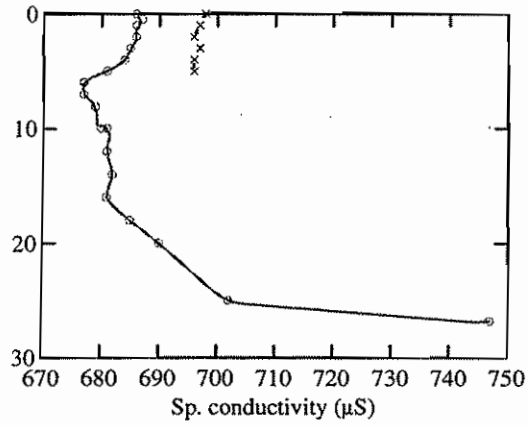

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring


0
10
20
30
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)

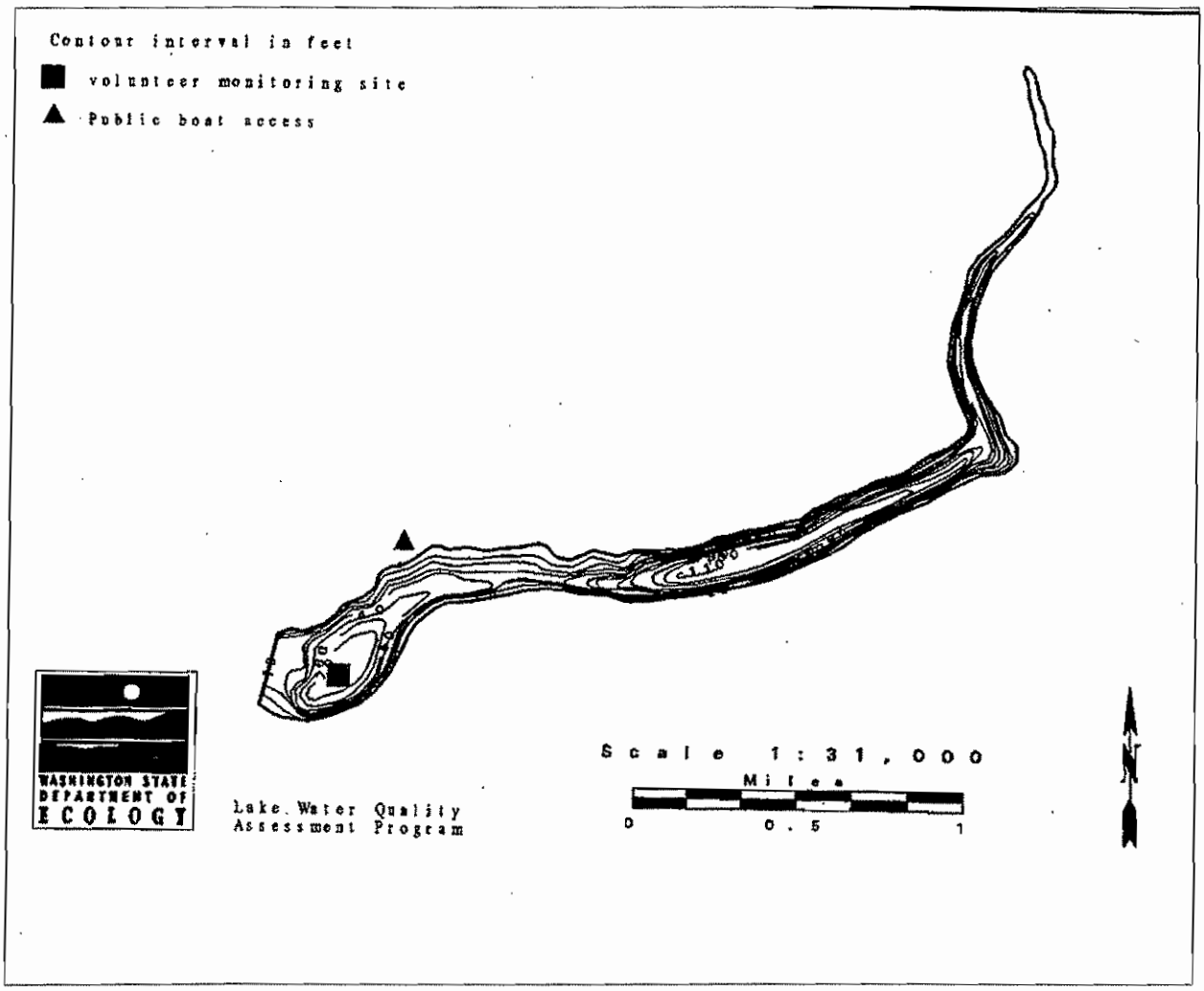

Depth (m)
0
10
20
30
7.5
8.0
8.5
9.0
9.5
pH


0
10
20
30
670
680
690
700
710
720
730
740
750
Sp. conductivity (µS)

LAKECOUNTY CONCONULLY (OKANOGAN)

DESCRIPTION The south end of Conconully Lake is located at Conconully. It is an artificial reservoir created in 1919-1921 by damming Salmon Creek. It is fed by the North Fork of Salmon Creek, which enters Conconully Lake just above the dam. The lake drains south via Salmon Creek to Conconully Reservoir. Before Salmon Creek was dammed, the lake was known as Salmon Lake.

AREA (acres)	273
MAX DEPTH (feet)	109
MEAN DEPTH (feet)	47
DRAINAGE (square miles)	50.
VOLUME (acre-feet)	12907
SHORE LENGTH (miles)	6.82
ALTITUDE (feet)	2287



CONCONULLY LAKE -- OKANOGAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/03	9.0	48.2		Mod Green	75	Light	Light	11.0	0.0	WATER LEVEL AT 75%
97/05/11	10.0	50.0			50	Light	Calm	11.5	0.0	WATER LEVEL AT 78%
97/05/17	8.9	48.0		Lt Green	50	Trace	Strong	17.0	0.0	
97/08/18	22.2	72.0		Undefined	40		Calm	19.0	0.0	WATER WAS APPLE GREEN.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/19	E	38	0.23				13.0			
97/05/19	H	55	0.25							
97/08/18	E	13	0.20	4.3						
97/08/18	H	86	0.28							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

At spring sampling, pool was about 80% full. In summer, Aphanizomenon in 5 and 10M samples, Anabaena (?) at 1,3, and 5M. Slight H2S smell at 20M.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	36N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	45 (Mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Conconully appears to be highly productive in the summer. This is demonstrated by elevated epilimnetic chlorophyll concentrations and pH readings. The depleted oxygen

concentration in the summertime hypolimnion, the presence of blue-green algae and the slight smell of H2S from the hypolimnion further support the mesotrophic assessment.

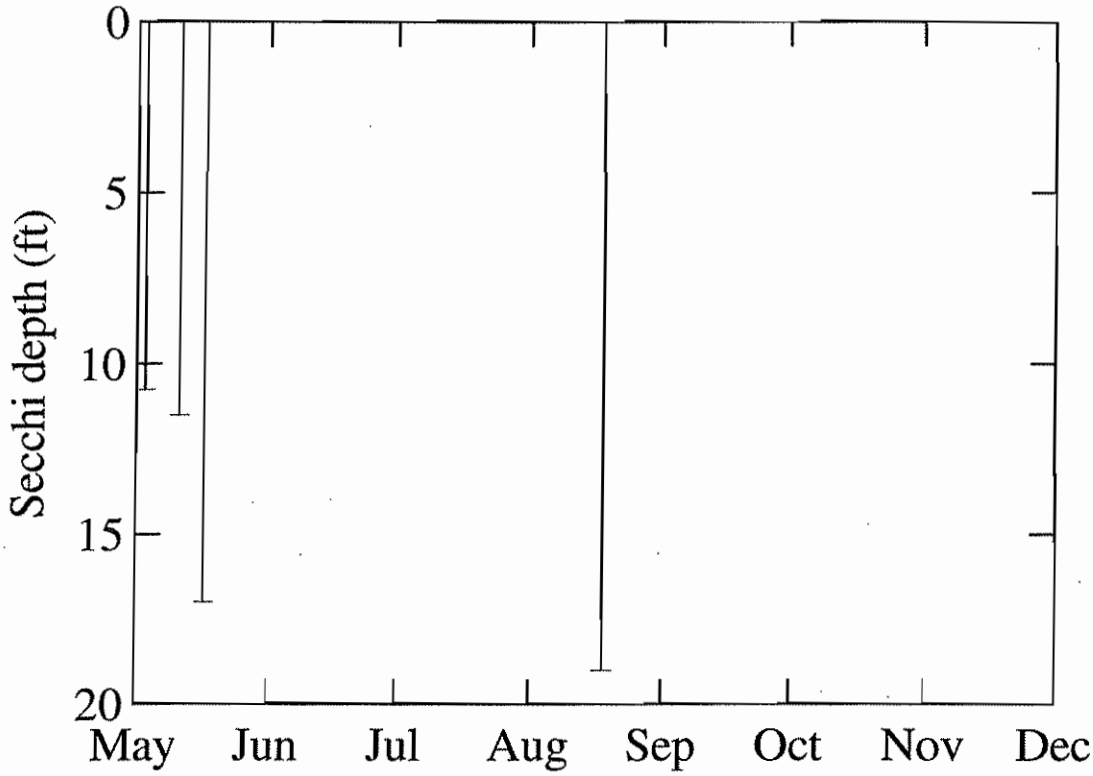
COMMENTS FROM 94/07/26 AQUATIC PLANT SURVEY

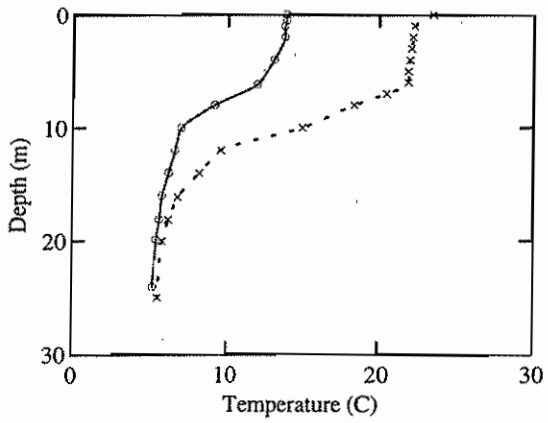
sunny, slight breeze. milfoil with characteristics of M. spicatum and M. sibiricum widely distributed. Dominant macrophytes were P. illinoensis, Myriophyllum, Ceratophyllum demersum. Maximum depth of plant growth: 6.5M.

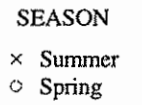
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

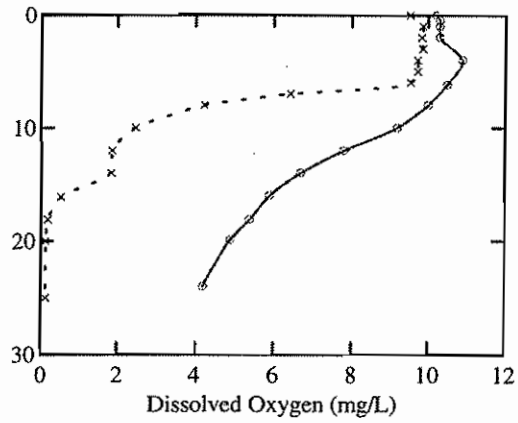
Alisma gramineum (narrowleaf water-plantain) *Callitriche hermaphroditica* (northern water-starwort) *Ceratophyllum demersum* (Coontail; hornwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum sp.* (water-milfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Nitella sp.* (stonewort) *Potamogeton foliosus* (leafy pondweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potamogeton sp.* (pondweed) *Ranunculus aquatilis* (water-buttercup) *Scirpus sp.* (bulrush) *unknown plant* (unknown)

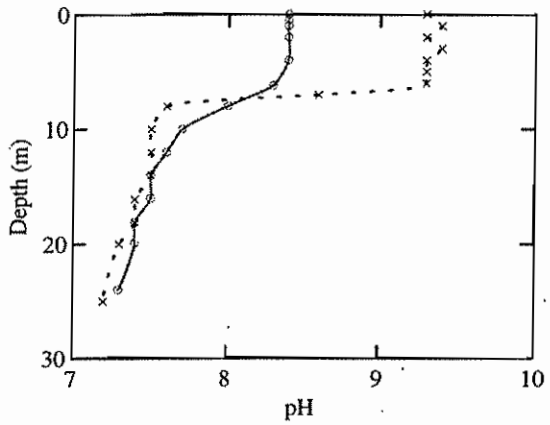
CONCONULLY

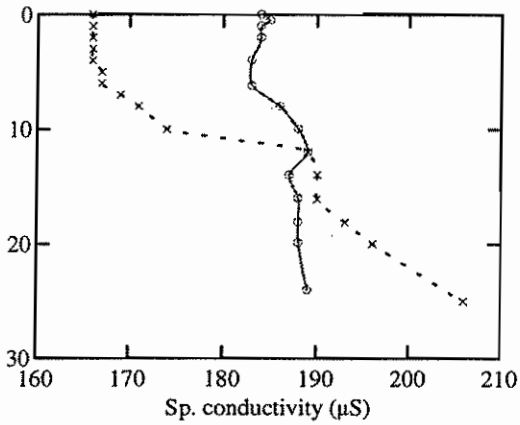

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
0
10
20
30
Temperature (C)


SEASON
Summer
Spring

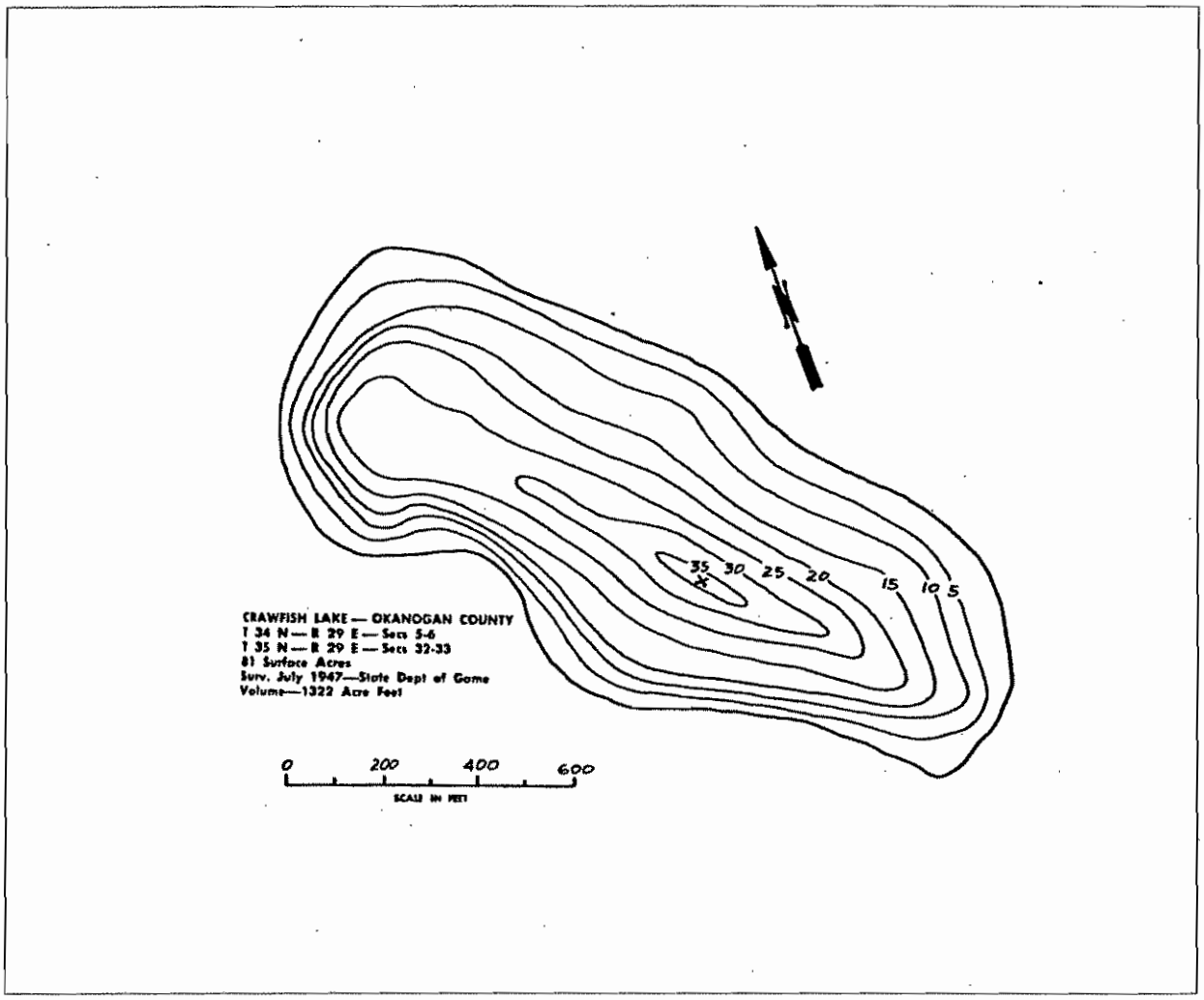

0
10
20
30
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)


Depth (m)
0
10
20
30
7
8
9
10
pH


0
10
20
30
160
170
180
190
200
210
Sp. conductivity (µS)

DESCRIPTION Crawfish Lake is located 15 miles northeast of Omak, and 8.5 miles north of Disautel. It drains intermittently to the east to Lost Creek and the West Fork of the Sanpoil River. The north half of the lake is on USFS land, and the south half is on the Colville Indian Reservation.

AREA (acres)	80
MAX DEPTH (feet)	36
MEAN DEPTH (feet)	0
DRAINAGE (square miles)	N/A
VOLUME (acre-feet)	0
SHORE LENGTH (miles)	0
ALTITUDE (feet)	4475



CRAWFISH LAKE -- OKANOGAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev. Comments
STATION 1										
97/07/03	16.4	61.5		Lt Brown	50	None	Breezy	14.3	0.0	INITIAL OBSERVATION
97/07/15	17.8	64.0		Lt Brown	100	Trace	Light	15.6	0.0	
97/07/28	15.3	59.5		Lt Brown	0	None	Calm	18.3	0.0	
97/08/17	20.6	69.1		Lt Brown	25	None	Light	16.0	-9.0	SUN BEHIND CLOUD.
97/08/31	17.2	63.0		Lt Brown	10	None	Light	16.4	-9.5	SUSPENDED PARTICLES OF VEGETATION.
97/09/16	14.4	57.9		Lt Brown	100	Mod	Strong	14.5	-10.3	
97/09/30	14.4	57.9		Lt Brown	100	None	Light	14.3	-10.0	
97/10/22	8.9	48.0		Lt Brown	50	None	Light	11.7	120.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/08/17	E	8	0.32	2.2						
97/08/17	H	11	0.30							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***
Were fish stocked this year? ***YES***
Any lake groups present (such as a lake association)? ***YES***
Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***42***
Changes since last year? ***FEWER VISITS SINCE OUBOARD MOTORS WERE BANNED***
Lake Uses and Facilities at the lake include:
swimming fishing camping
The percent of the lakeshore that is sewered: ***50***
The number of storm drains leading to the lake: ***0***
Motor boat restrictions include: ***no motors allowed.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

No spring sampling visit. Volunteer reports ice-out as 13 May, later than usual; fewer weeds than usual this year (aquatic plants are generally sparse); 17 new septic systems replaced old ones since 1993. Motors have been prohibited since 1996 for fishing.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	38 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	34 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	38 (Oligo-mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

All indicators suggest an oligotrophic assessment for Crawfish Lake.

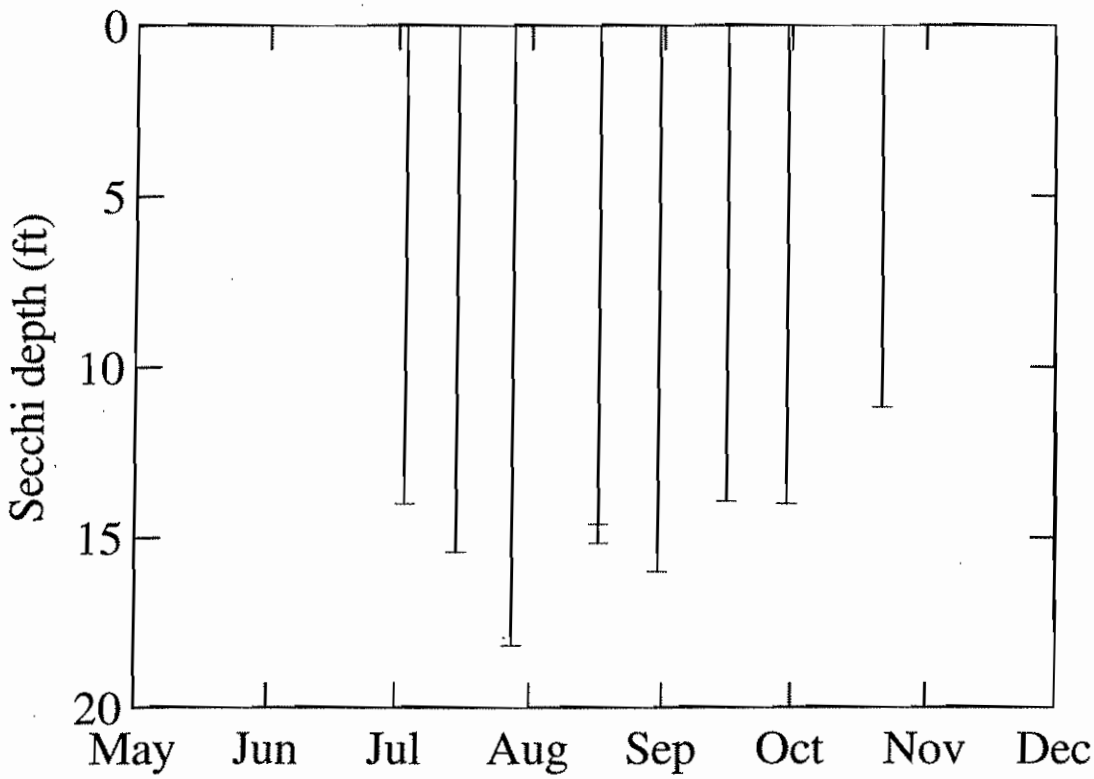
COMMENTS FROM 96/08/28 AQUATIC PLANT SURVEY

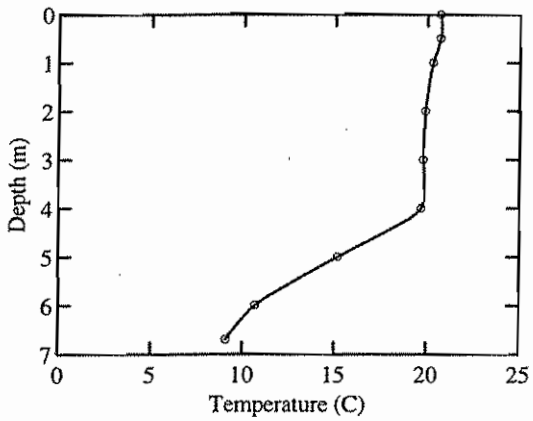
cloudy, breeze. Much downed wood, large littoral zone, tho' plants only patchy, lots of bare sediment. Many ducks Maximum depth of plant growth: 3.0M.

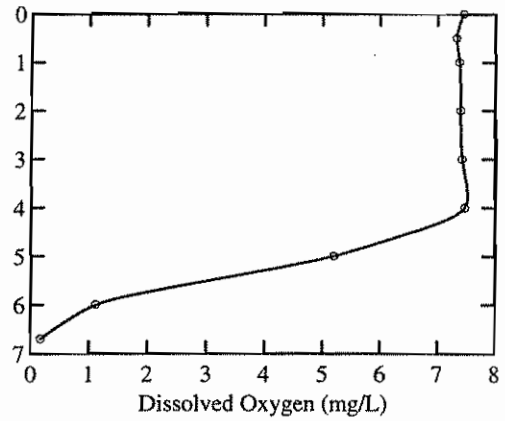
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

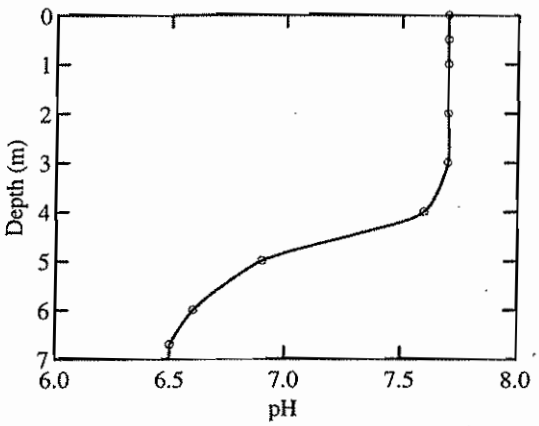
Carex sp. (sedge) *Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Nitella sp.* (stonewort) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potentilla palustris* (purple (marsh) cinquefoil)

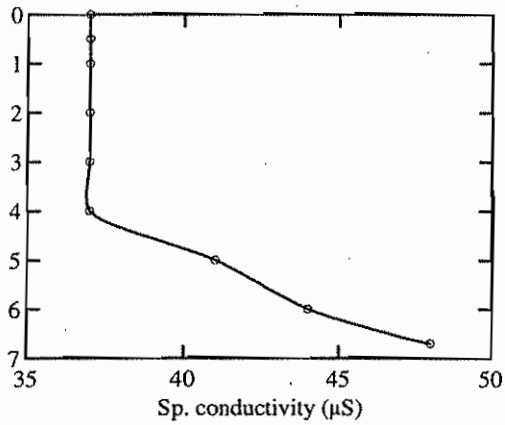
CRAWFISH


Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
1
2
3
4
5
6
7
0
5
10
15
20
25
Temperature (C)


0
1
2
3
4
5
6
7
0
1
2
3
4
5
6
7
8
Dissolved Oxygen (mg/L)

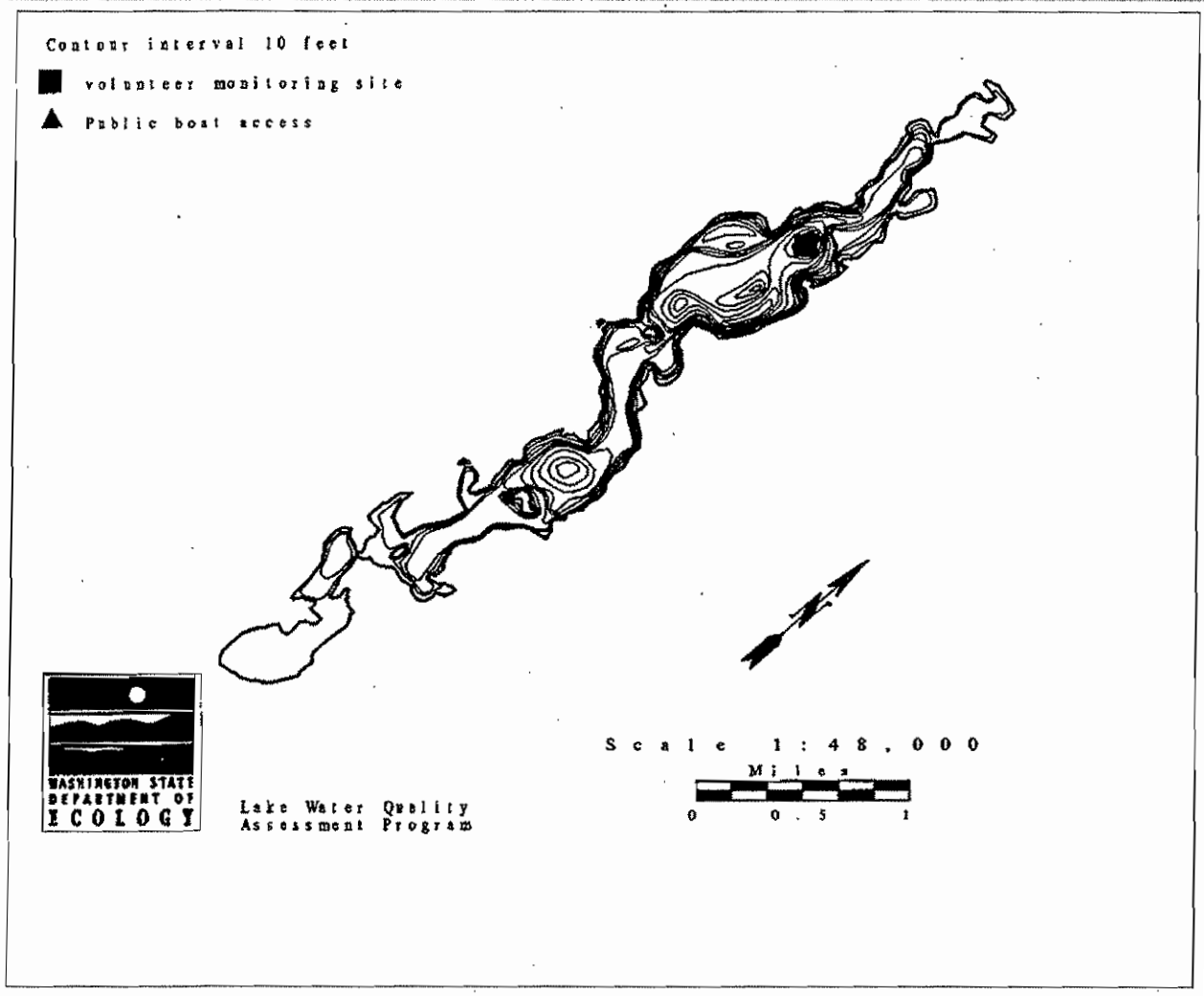

Depth (m)
0
1
2
3
4
5
6
7
6.0
6.5
7.0
7.5
8.0
pH


0
1
2
3
4
5
6
7
35
40
45
50
Sp. conductivity (µS)

LAKECOUNTY CURLEW (FERRY)

DESCRIPTION Curlew Lake is located 4.8 miles northeast of Republic. It is a natural lake, and water level fluctuations are stabilized by a three foot dam built in 1926. The lake extends northerly 4.8 miles to the outlet. There are four islands, totaling 20 acres, that are not included in the reported acreage. Inlets include Herron, Mires, Barrett, and Trout Creeks.

AREA (acres)	921
MAX DEPTH (feet)	130
MEAN DEPTH (feet)	43
DRAINAGE (square miles)	64.
VOLUME (acre-feet)	39519
SHORE LENGTH (miles)	15.78
ALTITUDE (feet)	2333



CURLEW LAKE -- FERRY COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/01	12.8	55.0		Lt Green	10	Heavy	Calm	16.5	44.0	MANY THREADLIKE CRESCENT SHAPED GREEN THINGS
97/06/14	15.6	60.1		Lt Brown	10	None	Calm	14.5	42.0	SMALL CLUMPS OF POLLEN. THREAD-LIKE THINGS (SEE 6/1)
97/06/29	13.3	55.9		Lt Green	75	Light	Light	13.5	38.0	THERE ARE PAINT-LIKE AQUA CLUMPS < 5 CM FLOATING.
97/08/09	17.8	64.0		Undefined	0	None	Light	16.5	19.0	WATER WAS DARK GREEN. THERE WAS A TREMENDOUS CLOUDBURST/THUNDERSTORM THREE DAYS AGO.
97/08/24	16.7	62.1		Lt Green	100	Light	Calm	15.5	29.0	LOTS OF LEAVES, NEEDLES, FEATHERS& STYROFOAM FLOATING.
97/09/06	15.0	59.0		Lt Green	75	Heavy	Breezy	15.5	29.0	FEWER FLOATING PARTICLES.
97/09/20	10.0	50.0		Undefined	100			15.0	29.0	WATER WAS DARK GREEN. DENSE A.M. FOG FOR THE PAST WEEK.
97/10/05	8.9	48.0		Undefined	100	Light	Breezy	20.0	16.0	WATER WAS DARK GREEN. SPRINKLING LIGHTLY. SNAILS PRESENT IN LAKE.
97/10/20	5.6	42.1		Undefined	50		Calm	17.5	15.0	WATER WAS DARK GREEN. CLOUD COVER IS FOG. LOOKS LIKE IT IS GOING TO BE CLEAR. GREEN PARTICLES FLOATING IN BANDS. LOOKS LIKE ONLY THE GIRST FEW INCHES.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/18	E	20	0.38							
97/05/18	H	56	0.44							
97/08/26	E	13		2.7J						
97/08/26	H	199								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***fair***. The worst problems were reported as:

1. declining long-term trend 2. swimmer's itch 3. algae

Sources of actual or potential problems includes:

INCRESED SHORELINE DEVELOPMENT.

Were there days (and how many) when poor water quality impaired

Fishing - ***YES(3)*** Swimming - ***YES(6)*** Aesthetics - ***YES(25)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***288-290***

SUMMARY OF VOLUNTEER SURVEY (Continued)

Changes since last year? ***NEW BOAT RAMP, SOME CLEARING, NEW CONST./EXCAVATION.***
Lake Uses and Facilities at the lake include:
swimming fishing motor boating jet skiing camping picnic facilities parks
The percent of the lakeshore that is sewered: ***0***
Motor boat restrictions include: ***no wake restriction.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

Large Daphnia, especially at 3M cast in spring. Few zooplankton in deep water samples. County health department posted "Potentially Toxic Bloom" notices over July 4th weekend.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	37 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	40J* (Oligo-mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although Curlew demonstrates characteristics of oligotrophy with low nutrient concentrations and deep Secchi readings, there are other indicators of a more productive lake. DO concentrations are severely reduced in the summertime hypolimnion. During the August sampling, there was a posting of a potentially toxic algal bloom in the lake. Therefore, Curlew is assessed as oligo-mesotrophic.

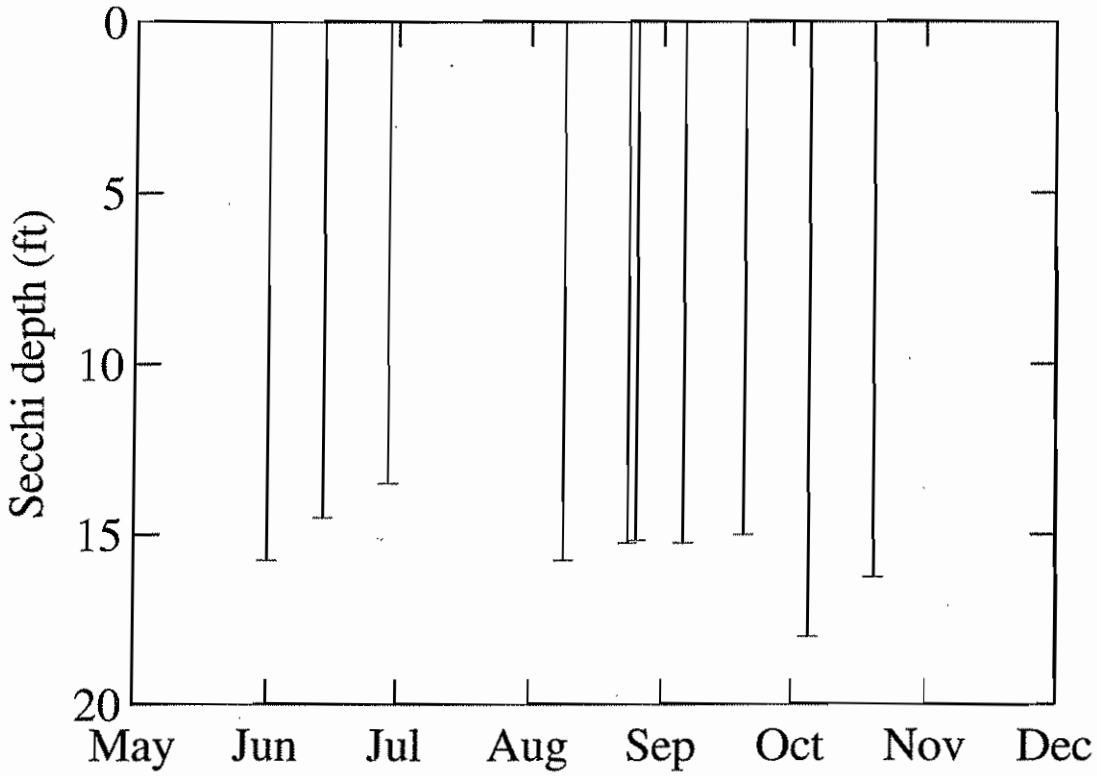
COMMENTS FROM 98/05/19 AQUATIC PLANT SURVEY

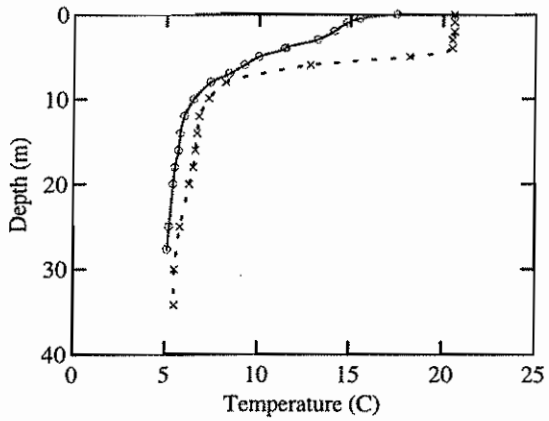
Aquatic plant ID training, met at lake after morning workshop to discuss sampling methods. Went to a couple of sites near the boatlaunch. Still seemed early in the season for much plant growth.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

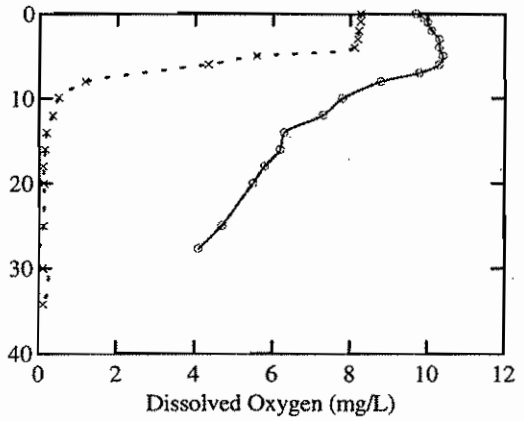
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Heteranthera dubia* (water star-grass) *Lemna trisulca* (star duckweed) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum sp.* (water-milfoil) *Najas sp.* (water-nymph) *Nitella sp.* (stonewort) *Potamogeton crispus* (curly leaf pondweed) *Potamogeton friesii* (flat-stalked pondweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Potentilla sp.* (cinquefoil)

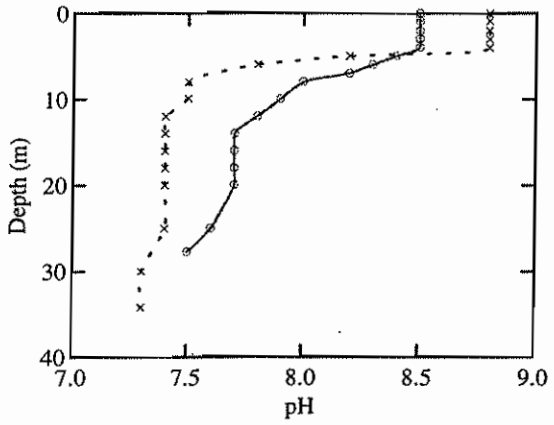
CURLEW

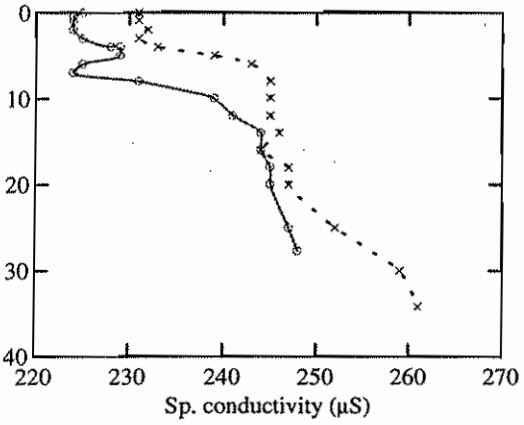




SEASON
× Summer
○ Spring



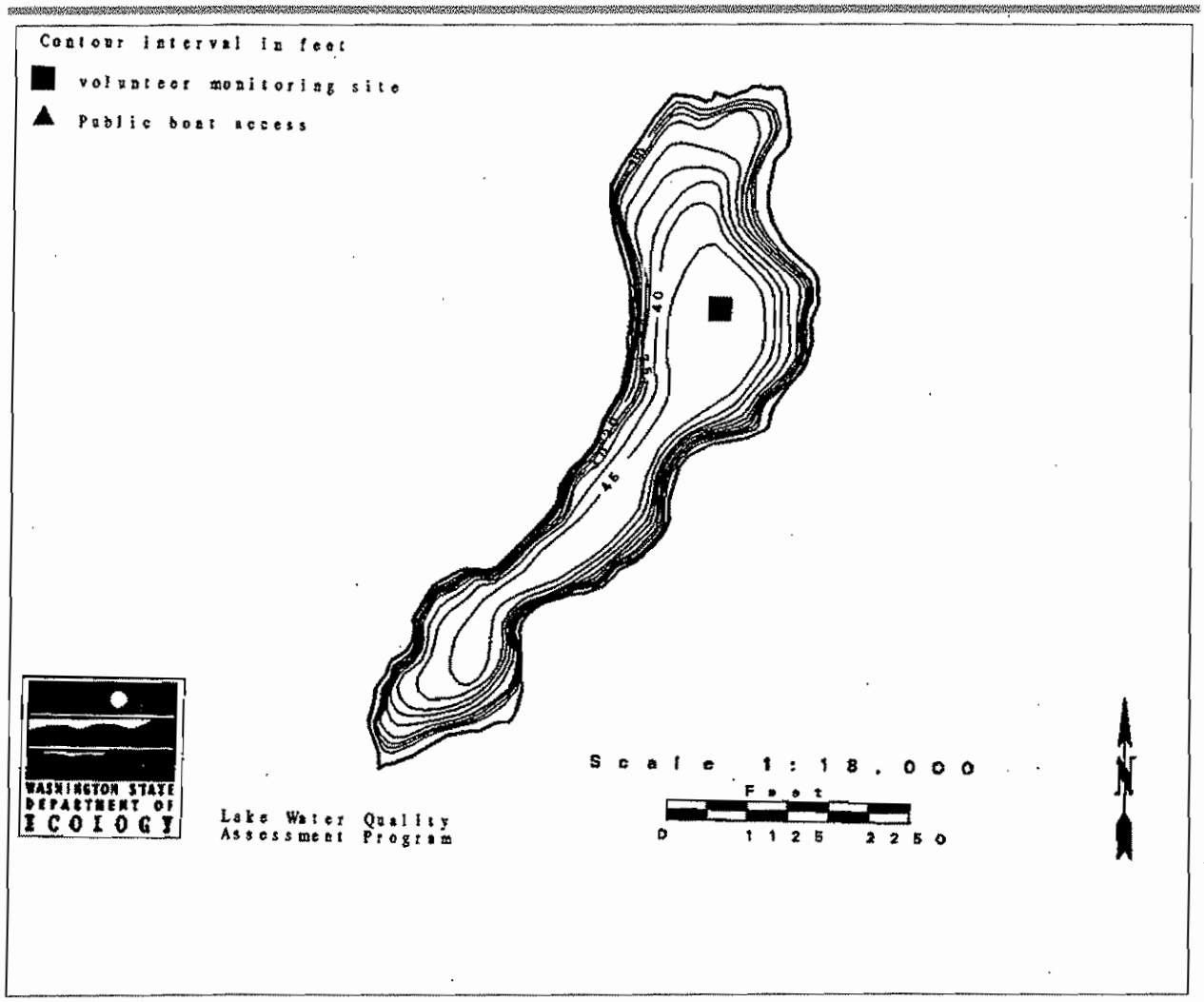




LAKECOUNTY DEEP (STEVENS)

DESCRIPTION Deep Lake is located nine miles south of Northport, and 25 miles northeast of Colville. The lake is 1.4 miles long and the shoreline is steep. The lake is fed by the north fork of Deep Creek, and drains via Deep Creek to the Columbia River (Lake Roosevelt). This lake was monitored by Ecology staff only.

AREA (acres)	210
MAX DEPTH (feet)	49
MEAN DEPTH (feet)	34
DRAINAGE (square miles)	48.
VOLUME (acre-feet)	7203
SHORE LENGTH (miles)	3.5
ALTITUDE (feet)	2025



DEEP LAKE -- STEVENS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/07/05	20.0	68.0	8.0	Grn-brown	10	Mod	Breezy	8.5	0.0	RAIN EVERY DAY FOR 4 WEEKS STRAIGHT
97/07/19	22.0	71.6	8.0	Grn-brown	10	Trace	Calm	11.0	0.0	RAINFALL STOPPED AFTER SIX WEEKS
97/08/03	22.0	71.6	8.0	Grn-brown	0	None	Calm	8.3	0.0	LAKE LEVEL NOT AVAILABLE. LOTS OF BOAT TRAFFIC CHANGING THE LAKE.
97/08/16	22.0	71.6	8.0	Grn-brown	50	None	Light	8.5	0.0	REALLY HOT LAST TWO WEEKS
97/08/16	22.0	71.6	8.0	Grn-brown	50	None	Light	8.8	0.0	REALLY HOT FOR THE LAST TWO WEEKS.
97/08/26	20.2	68.4	8.0	Grn-brown	10	Light	Light	13.5	0.0	HEAVY RAIN ON SUNDAY, BRIGHT TODAY. NO BOAT TRAFFIC TODAY, HUGE CLARITY DIFF.
97/09/21	17.0	62.6		Grn-brown	0	Mod	Calm	15.0	0.0	COLD NIGHTS, HOT DAYS.
97/10/12	11.5	52.7	8.0	Pea-green	90	Heavy	Light	14.5	0.0	THIS IS MY LAST SAMPLE THIS YEAR. LOTS OF FROST THE LAST TWO NIGHTS.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/30	E	20	0.17							
97/05/30	H	18	0.17							
97/08/26	E	13	0.13	1.4J						
97/08/26	H	40	0.20							
STATION 2										
97/05/30	E	10	0.11							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***fair***. The worst problems were reported as:

1. suspended sediment 2. swimmer's itch 3. algae

Sources of actual or potential problems includes:

SEPTIC TANK LEAKAGE, ANIMAL FECES, AND PESTICIDES FROM FARMS.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***NO***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***100***

Changes since last year? ***NONE***

Lake Uses and Facilities at the lake include:
swimming fishing motor boating jet skiing camping picnic facilities
The percent of the lakeshore that is sewered: *5*
The number of storm drains leading to the lake: *2*
Motor boat restrictions include: ***no restrictions.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

At May sampling, water level was down ~1 ft from peak. Cattle in pasture at upper end. At summer sampling, lake was clearer than usual, according to volunteer. Lots of rain on the Sunday before sampling.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	34J* (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Deep Lake demonstrates many properties of an oligotrophic lake but considerable DO concentration depletion in the summertime hypolimnion is more indicative of eutrophy, therefore, Deep Lake is assessed as oligo-mesotrophic.

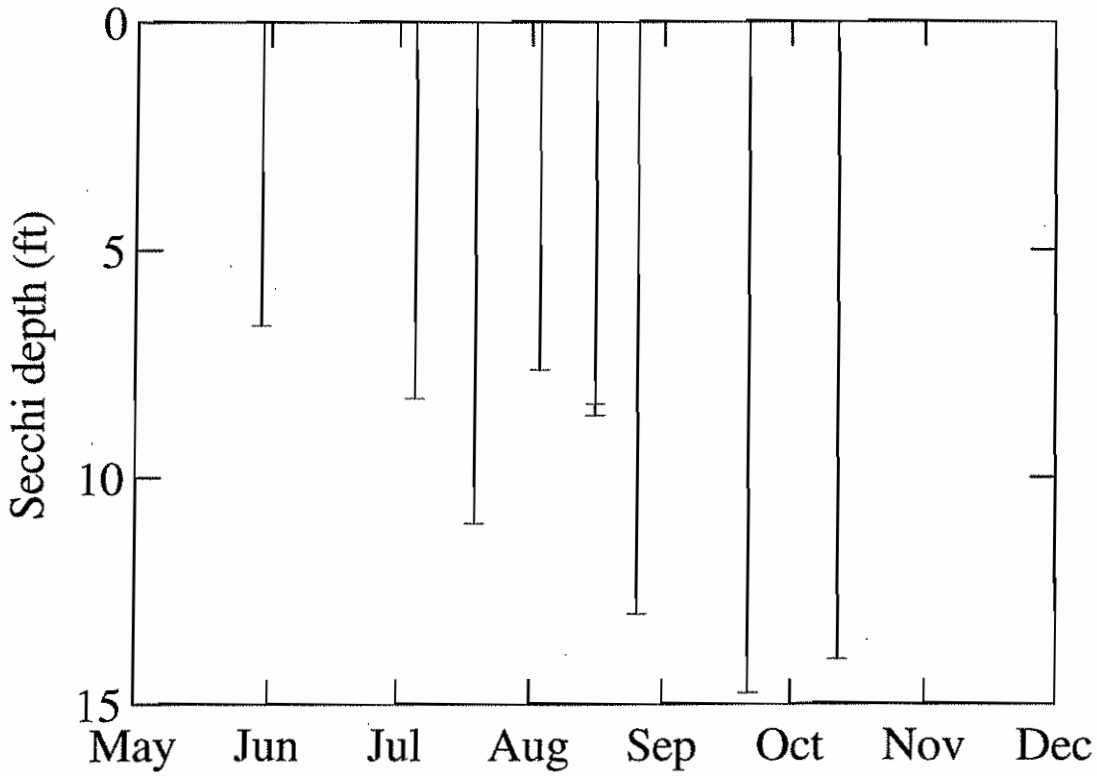
COMMENTS FROM 97/07/30 AQUATIC PLANT SURVEY

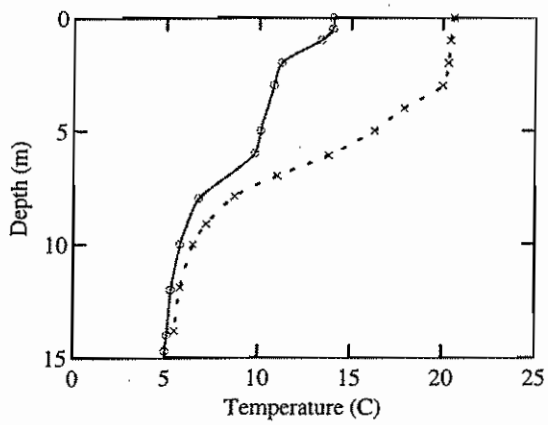
rainy, breeze, cleared up later. Gold fish. Diverse plant community, dense in shallow areas. Much of shoreline with summer homes. Many water fowl, dabblers and fish eaters. Plant community seems at its prime. Maximum depth of plant growth: 7.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

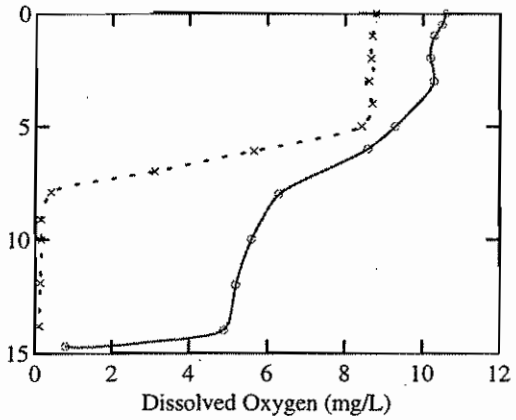
Brasenia schreberi (watershield) *Ceratophyllum demersum* (Coontail; hornwort) *Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Equisetum sp.* (horse tail) *Fontinalis antipyretica* (water moss) *Heteranthera dubia* (water star-grass) *Lemna trisulca* (star duckweed) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum sp.* (water-milfoil) *Myriophyllum verticillatum* (whorled watermilfoil) *Najas sp.* (water-nymph) *Nuphar lutea* (yellow water-lily) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton natans* (floating leaf pondweed) *Potamogeton nodosus* (longleaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton sp.* (pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Ranunculus aquatilis* (water-buttercup) *Ranunculus sp.* (buttercup) *Scirpus sp.* (bulrush) *Spirodela polyrhiza* (great duckweed) *Typha sp.* (cat-tail) *Utricularia vulgaris* (common bladderwort)

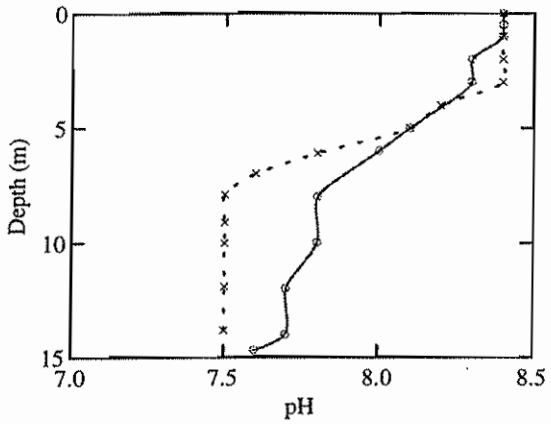
DEEP

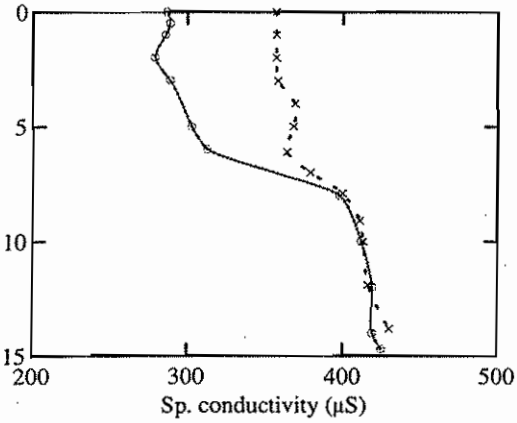




SEASON
× Summer
○ Spring

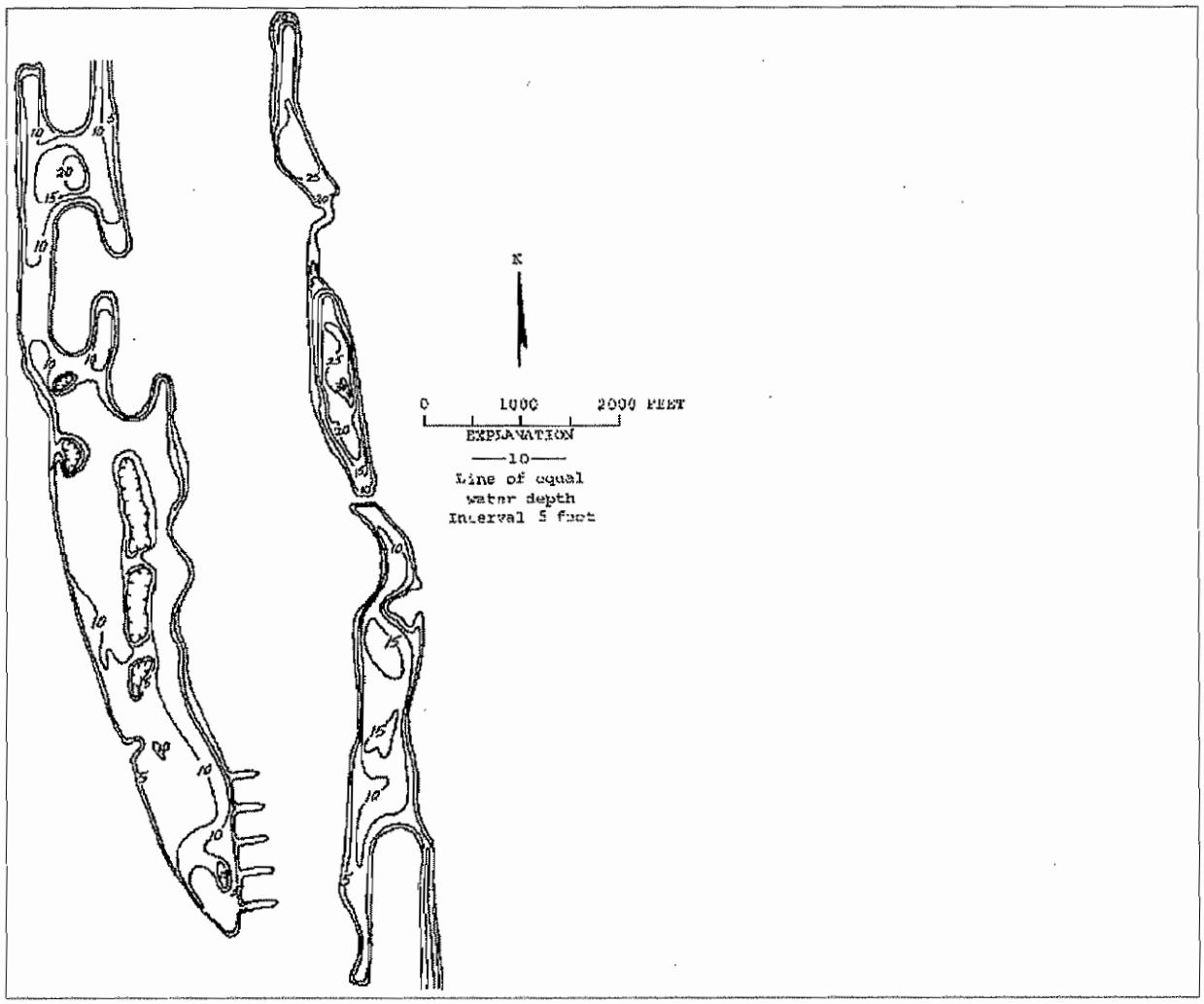






DESCRIPTION

AREA (acres)	278
MAX DEPTH (feet)	30
MEAN DEPTH (feet)	11
DRAINAGE (square miles)	1.4
VOLUME (acre-feet)	3000
SHORE LENGTH (miles)	11.3
ALTITUDE (feet)	10



DUCK LAKE -- GRAYS HARBOR COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev. Comments
STATION 1										
97/07/17	21.7	71.0		Undefined	0	None	Breezy	7.0	0.0	WATER WAS GREENISH-YELLOW.
97/07/30	21.1	70.0		Undefined	0	None	Light	6.0	0.0	WATER WAS GREENISH BROWN TO YELLOW
97/08/13	21.1	70.0		Undefined	7	None	Light	5.5	0.0	GREENISH-BROWN YELLOW
97/08/28	20.6	69.1		Grn-brown	75	Heavy	Light	7.0	0.0	
97/09/10	21.1	70.0		Grn-brown	100	None	Light	7.0	0.0	
97/09/24	20.0	68.0		Undefined	0	None	Light	8.0	0.0	WATER COLOR WAS GREENISH-BROWN MIXED WITH YELLOW
97/10/11	14.4	57.9		Grn-brown	90	Heavy	Light	4.0	0.0	LAST READING OF THE SEASON.
STATION 2										
97/07/02	21.7	71.0		Undefined	0	None	Light	9.0	0.0	WATER WAS GREENISH-BROWN / YELLOW
97/07/17	21.7	71.0		Mod Green	0	None	Breezy	9.0	0.0	
97/07/30	21.1	70.0		Undefined	0	None	Light	8.0	0.0	WATER WAS GREENISH -BROWN TO YELLOW.
97/08/28	20.6	69.1		Grn-brown	75	Heavy	Light	6.0	0.0	
97/09/24	20.0	68.0		Undefined	0	None	Light	8.0	0.0	WATER WAS GREENISH-BROWN MIXED WITH YELLOW.
97/10/11	14.4	57.9		Grn-brown	75	Heavy	Light	5.0	0.0	LAST READING OF THE SEASON.
STATION 3										
97/07/02	22.2	72.0		Mod Green	10	None	Light	4.0	0.0	
97/07/17	21.7	71.0		Mod Green	0	None	Light	4.0	0.0	TIME IS APPROXIMATE. SAMPLERS DID NOT WRITE DOWN THE TIME .
97/07/30	21.1	70.0		Undefined	0	None	Light	7.5	0.0	WATER WAS GREENISH-BROWN TO YELLOW
97/08/13				Grn-brown	7	None	Light	9.0	0.0	
97/08/28	20.6	69.1		Grn-brown	90	Heavy	Light	8.0	0.0	
97/09/10	21.1	70.0		Grn-brown	100	None	Light	8.5	0.0	
97/09/24	20.0	68.0		Mod Green	0	None	Light	7.5B	0.0	
97/10/11	14.4	57.9		Grn-brown	75	Heavy	Light	6.0	0.0	LAST READING OF THE SEASON.

B - Secchi disk hit bottom

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/16	E	54	0.25J							
97/06/16	H	32	0.35J							
97/08/21	E	20	0.27	8.0						
97/08/21	H	30	0.74							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Strong H2S odor in the hypolimnetic water. Lots of Brazilian elodea fragments observed.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	51 (Meso-eutrophic)
Mean Trophic State Index (Total Phosphorus):	47 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	51 (Meso-eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Duck Lake demonstrates many properties of an eutrophic lake. The lake is rich with macrophytes that line most of the shoreline and cover the majority of the sediment. This excessive biomass is not indicated in the trophic indicies which, in themselves, may suggest a meso-eutrophic assessment. Therefore, Duck Lake is assessed as eutrophic.

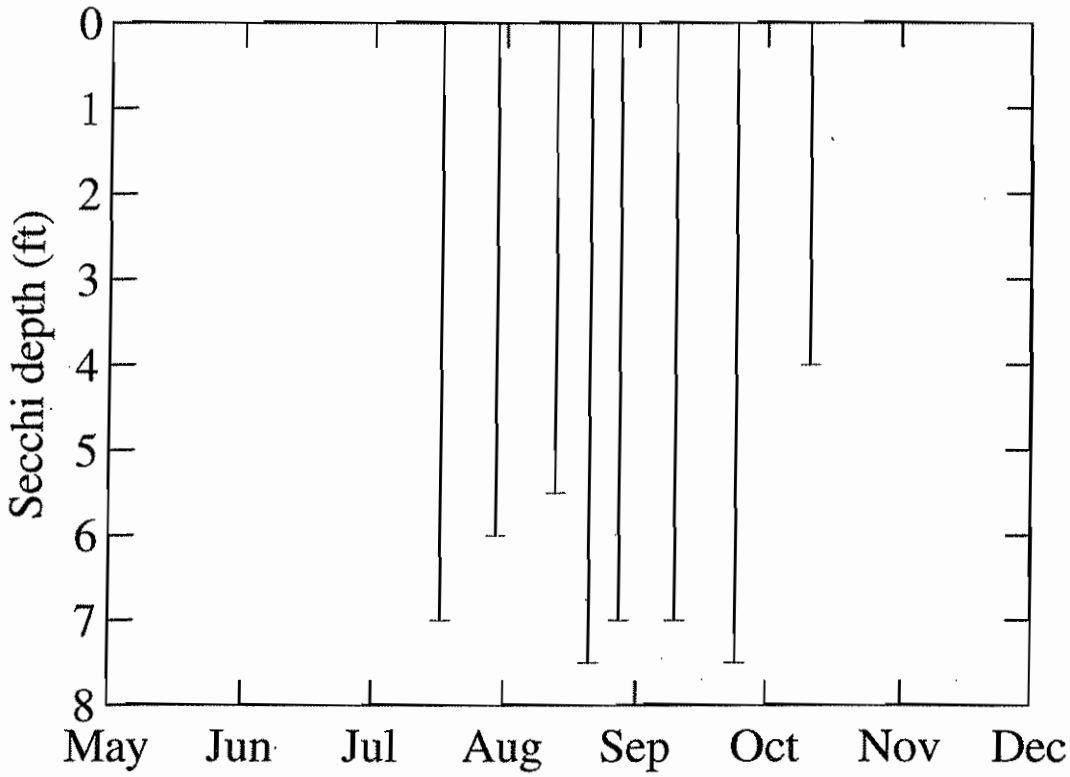
COMMENTS FROM 98/08/18 AQUATIC PLANT SURVEY

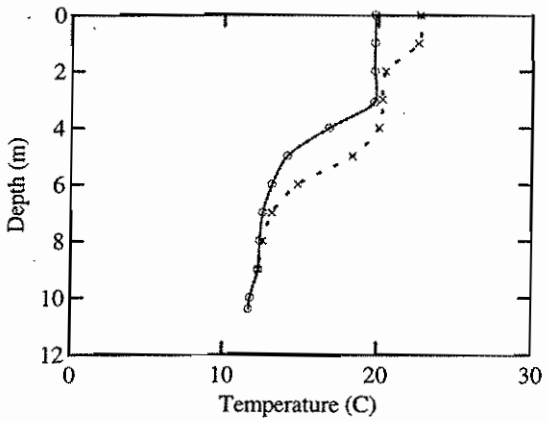
Cloudy, light breeze. Egeria densa north of area around Overlake Rd much more dense. South lake with more algae growing on plants, fewer plants and murkier seeming water. Only quickly motored shoreline in most of Duck Lake proper, skipped the canals. Stopped over canal at Overlake Rd and did not see submersed plants growing. Maximum depth of plant growth: 3.5M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

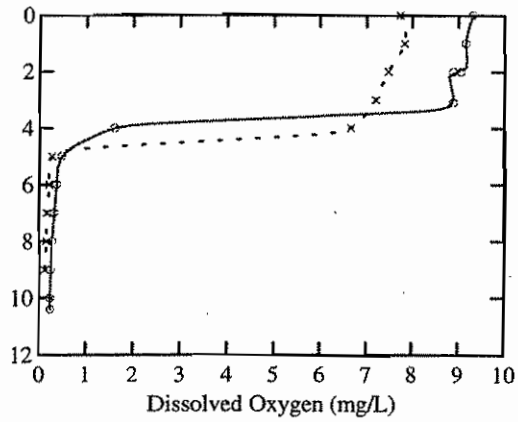
Carex sp. (sedge) *Cicuta douglasii* (western water-hemlock) *Egeria densa* (Brazilian elodea) *Elodea canadensis* (common elodea) *Hydrocotyle ranunculoides* (water-pennywort) *Iris pseudacorus* (yellow flag) *Juncus sp.* (rush) *Lythrum salicaria* (purple loosestrife) *Myriophyllum spicatum* (Eurasian water-milfoil) *Nuphar lutea* (yellow water-lily) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp.* (pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Solanum sp.* (nightshade) *Sparganium eurycarpum* (broadfruited bur-reed) *Spirodela polyrhiza* (great duckweed) *Typha sp.* (cat-tail)

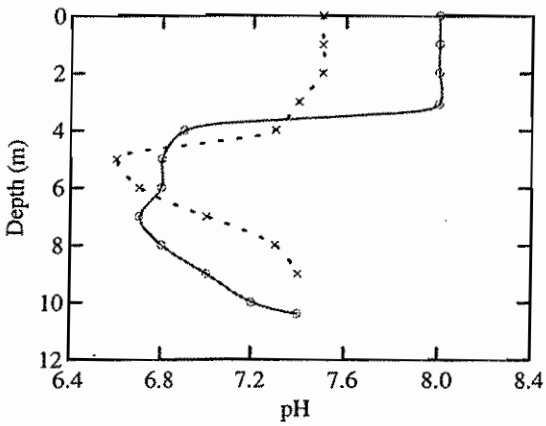
DUCK

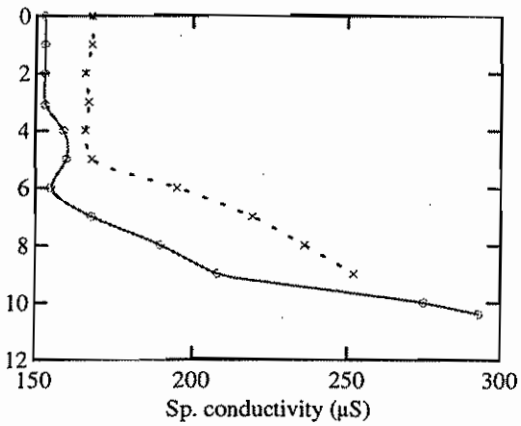




SEASON
× Summer
○ Spring

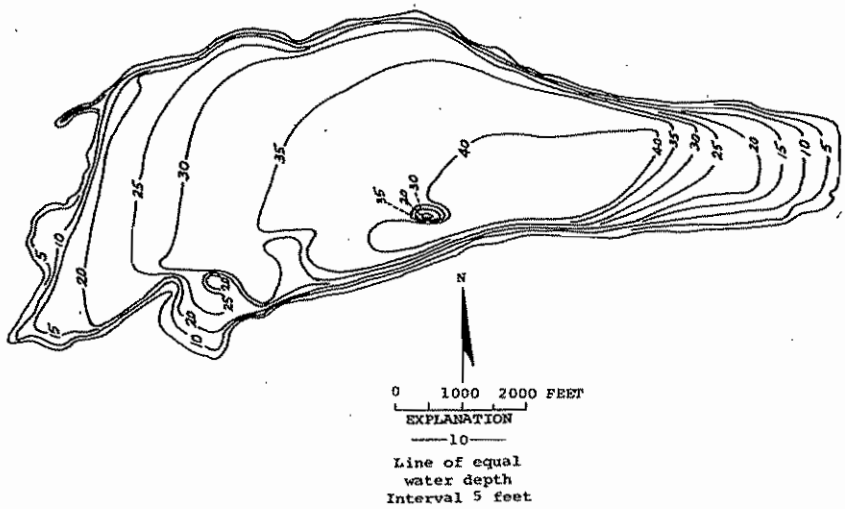






DESCRIPTION

AREA (acres)	533
MAX DEPTH (feet)	45
MEAN DEPTH (feet)	27
DRAINAGE (square miles)	5.5
VOLUME (acre-feet)	14600
SHORE LENGTH (miles)	4.96
ALTITUDE (feet)	1850



Fish Lake, Chelan County. From U.S. Geological Survey, July 23, 1974.

FISH LAKE -- CHELAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/27					0			11.6	0.0	ALGAE IN ALL CASTS (APHANAZOMENON). ALGAE BEGINNING TO CLUMP. LOTS OF MOSQUITOS.
97/08/29				Lt Green	20		Calm	10.5	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/27	E	17	0.24		1U	1U				
97/05/27	H	22	0.26							
97/08/29	E	59	0.45	26.6J						
97/08/29	H	54	0.43							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

There is a ~40 acre "wetland" of floating grasses and Merianthes at the west end of the lake. Spring sampling: Algae in all casts (Aphanizomenon?), just beginning to clump. Very windy days before sampling. Many mosquitoes. Summer sampling: Algae bloom extensive. Inch-wide clumps of Aphanizomenon+Anabaena(?), some beginning to senesce, in spite of heavy rain prior to sampling. Lots of fishermen and lots of fish rising to a tan midge. Osprey also fishing. Less Elodea than usual, according to a resort owner. Bottom very soft, lake not stratified.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	42N* (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	63 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	63J* (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Fish Lake appears to be high in nutrients and algae but Secchi depth and DO concentrations are more indicative of a less productive lake, therefore, Fish Lake is assessed as mesotrophic.

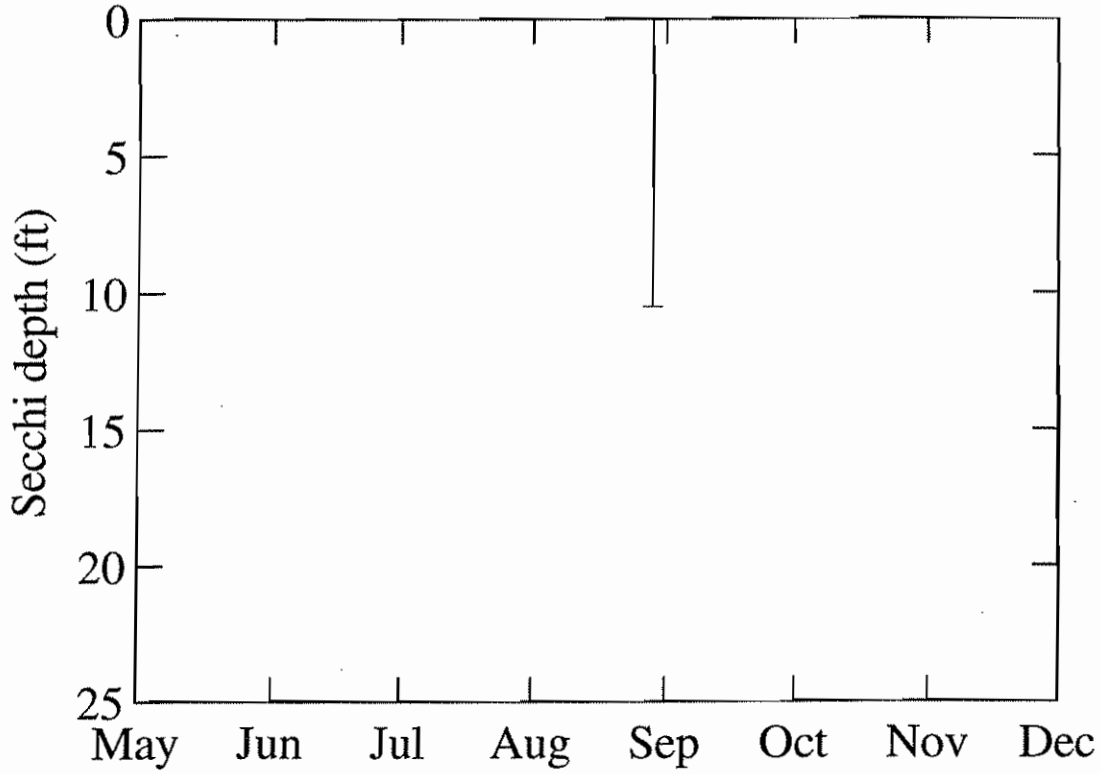
COMMENTS FROM 97/06/16 AQUATIC PLANT SURVEY

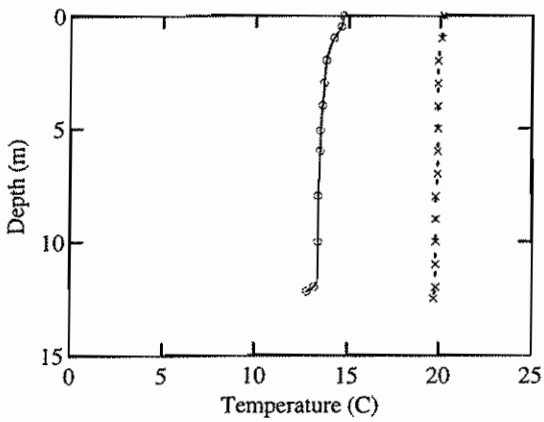
Cloudy, windy. Still early season. Only sampled in 3 locations - at 2 launches and near bog at west end due to weather. Popular fishing lake. Interesting floating bog at west end. Maximum depth of plant growth: 4.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

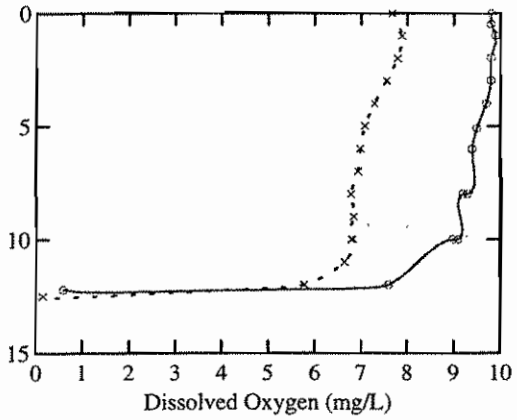
Carex sp. (sedge) *Ceratophyllum demersum* (Coontail; hornwort) *Elodea canadensis* (common elodea) *Menyanthes trifoliata* (buckbean) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail)

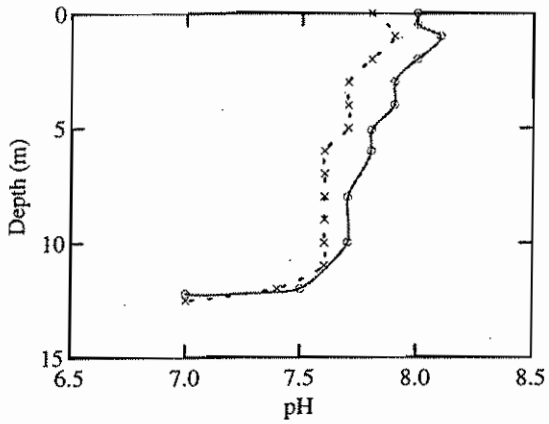
FISH

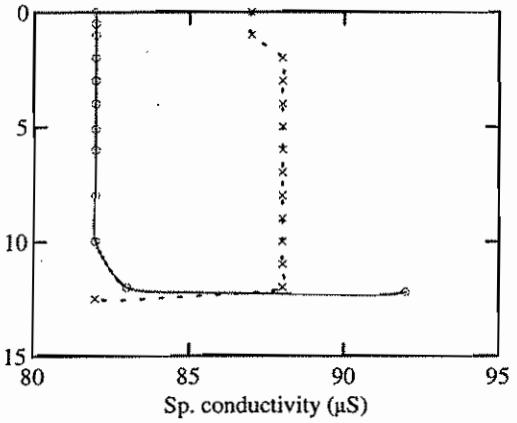




SEASON
× Summer
○ Spring

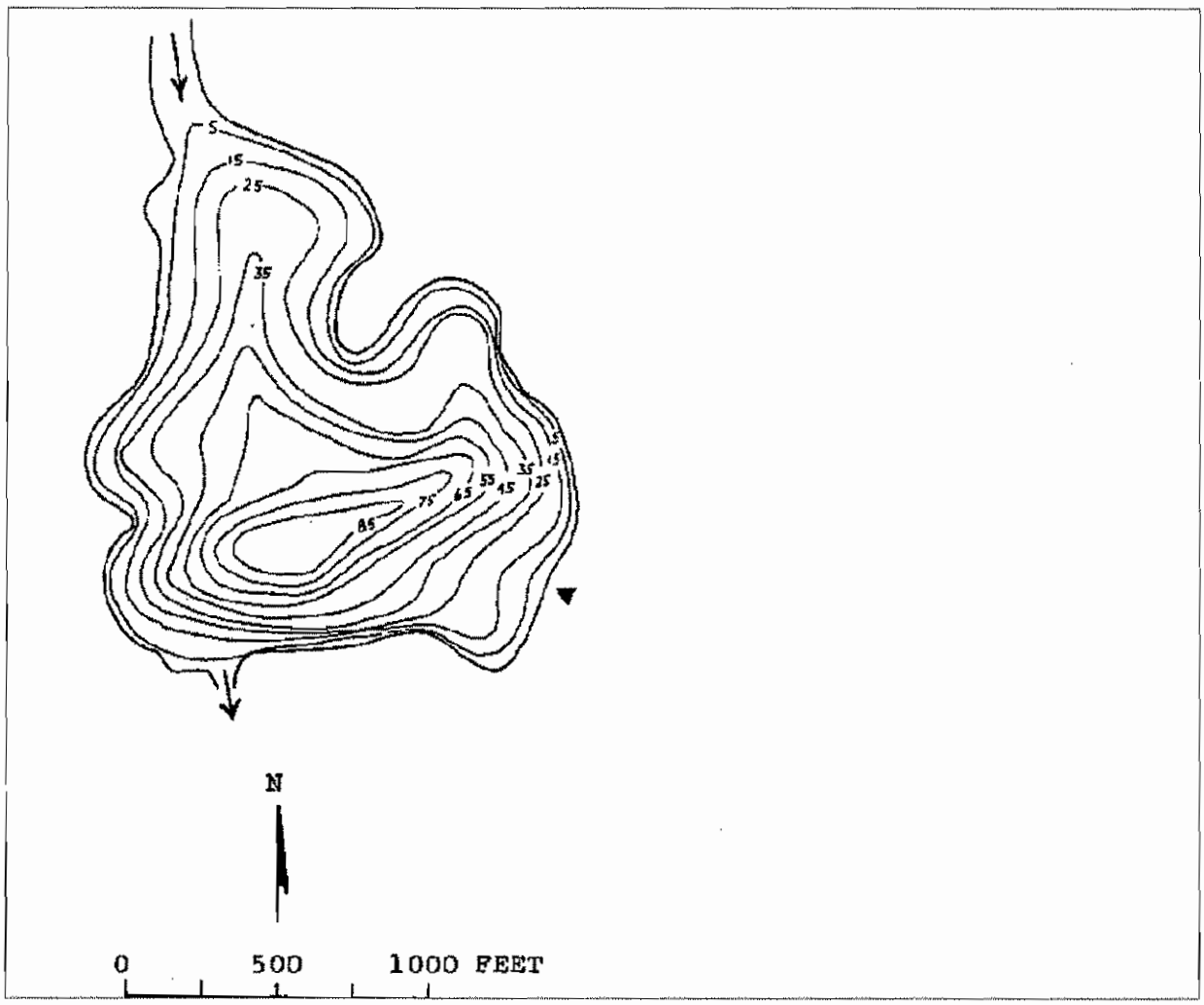






DESCRIPTION

AREA (acres)	47
MAX DEPTH (feet)	85
MEAN DEPTH (feet)	34
DRAINAGE (square miles)	14.
VOLUME (acre-feet)	1600
SHORE LENGTH (miles)	1.27
ALTITUDE (feet)	3160



GILLETTE LAKE -- STEVENS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/25	18.9	66.0		Undefined	0	Heavy	Calm	9.0	24.3	WATER COLOR WAS YELLOW-GOLD. OVERCAST WEATHER.
97/07/17	22.2	72.0		Undefined	90	None	Light	12.5	-3.5	WATER WAS YELLOW-GOLD.
97/08/05	26.1	79.0		Mod Green	0	None	Light	13.0	-4.0	HEAVY BOAT & JET SKI TRAFFIC LAST 3 DAYS.
97/08/19	22.2	72.0		Mod Green	50	None	Breezy	14.0	-4.0	LOTS OF WATER CRAFT.
97/09/08	22.2	72.0		Mod Green	100	Trace	Calm	14.4	0.0	
97/09/16	16.7	62.1		Mod Green	50	Mod	Breezy	13.5	0.0	FISH AND WILDLIFE IS LOWERING THE LAKE LEVEL IN PREPARATION FOR ROTANONE.
97/10/08	12.2	54.0		Mod Green	90	Heavy	Breezy	13.0	0.0	LAKE BEING LOWERED FOR ROTENONE APPLICATION. VERY LOW.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/29	E	12	0.23							
97/05/29	H	984J	2.69							
97/08/27	E	9	0.13	4.7	4	8				
97/08/27	H	533	1.19							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

In spring, 20M sample very yellow, H2S smell. In summer, H2S at 12 and 20M; a few large Daphnia in 1M sample. Lake was treated this summer with Sonar to control Eurasian Milfoil.

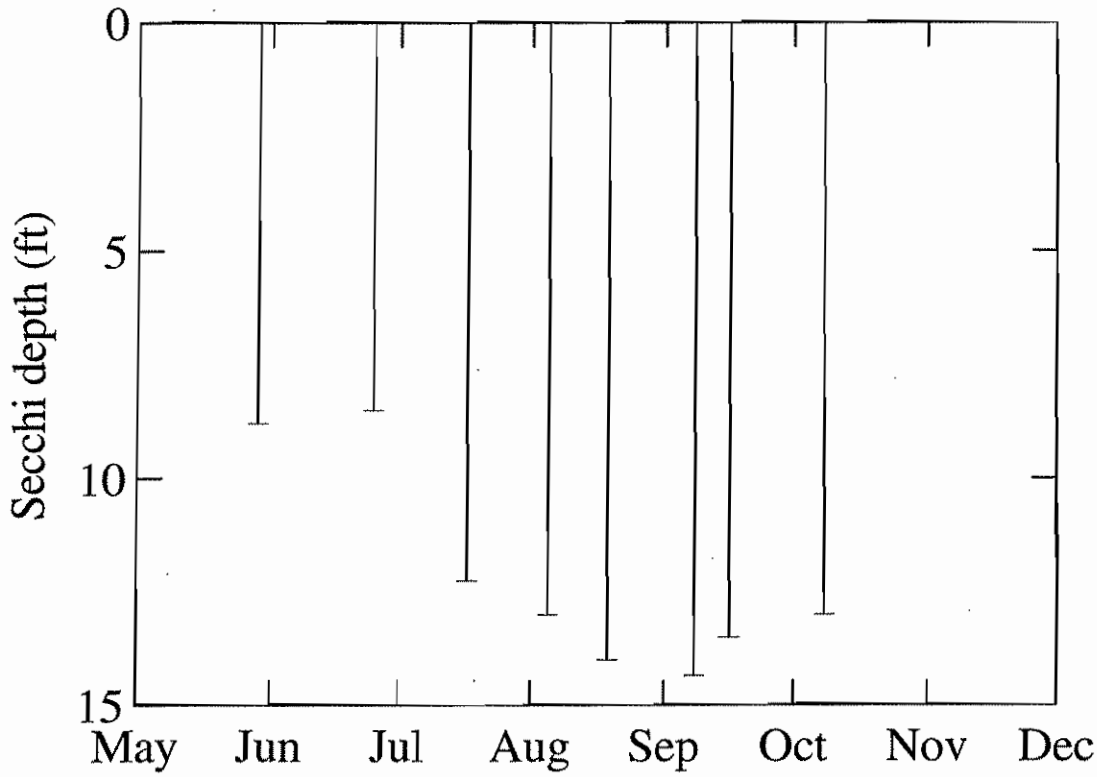
TROPHIC STATUS

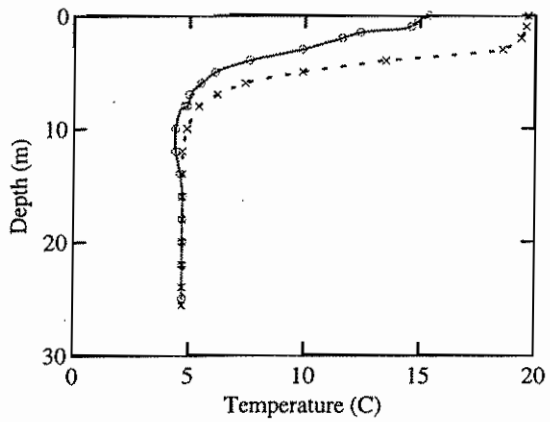
Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	40 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	36 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	46 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

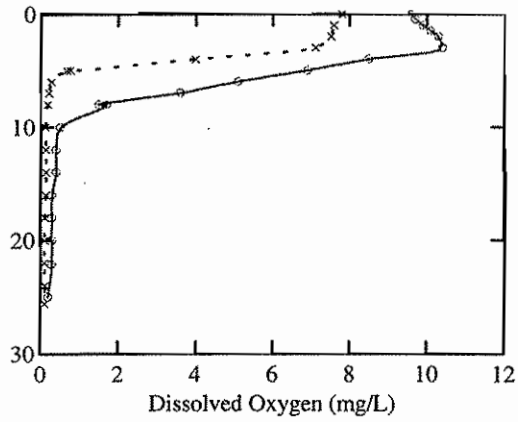
Because of the abundance of milfoil, it is difficult to assess the lake based on the TSI because many of the nutrients could be tied up in the plant biomass. Hypolimnetic DO concentrations in both spring and summer are indicative of a very productive lake. A mesotrophic assessment is assigned to Gillette based on DO, abundant plant biomass, the presence of H2S in the hypolimnion and significant chlorophyll concentrations.

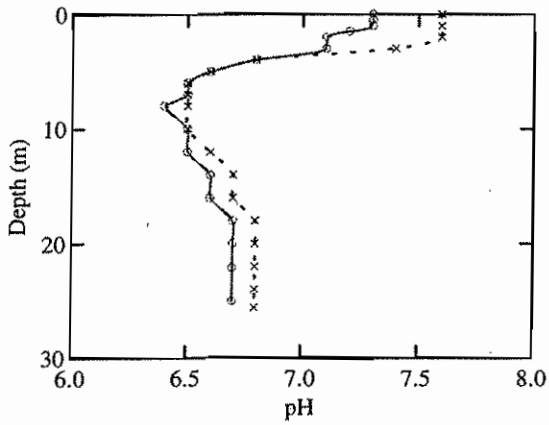
GILLETTE

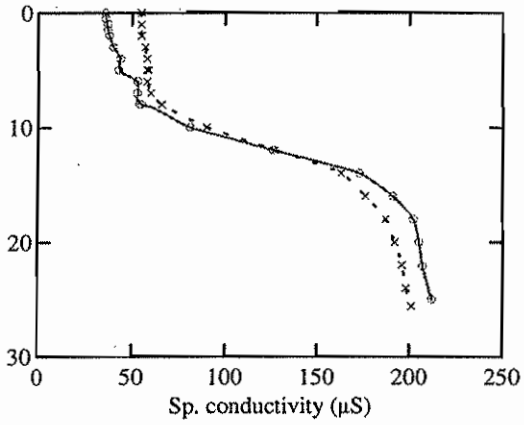




SEASON
× Summer
○ Spring



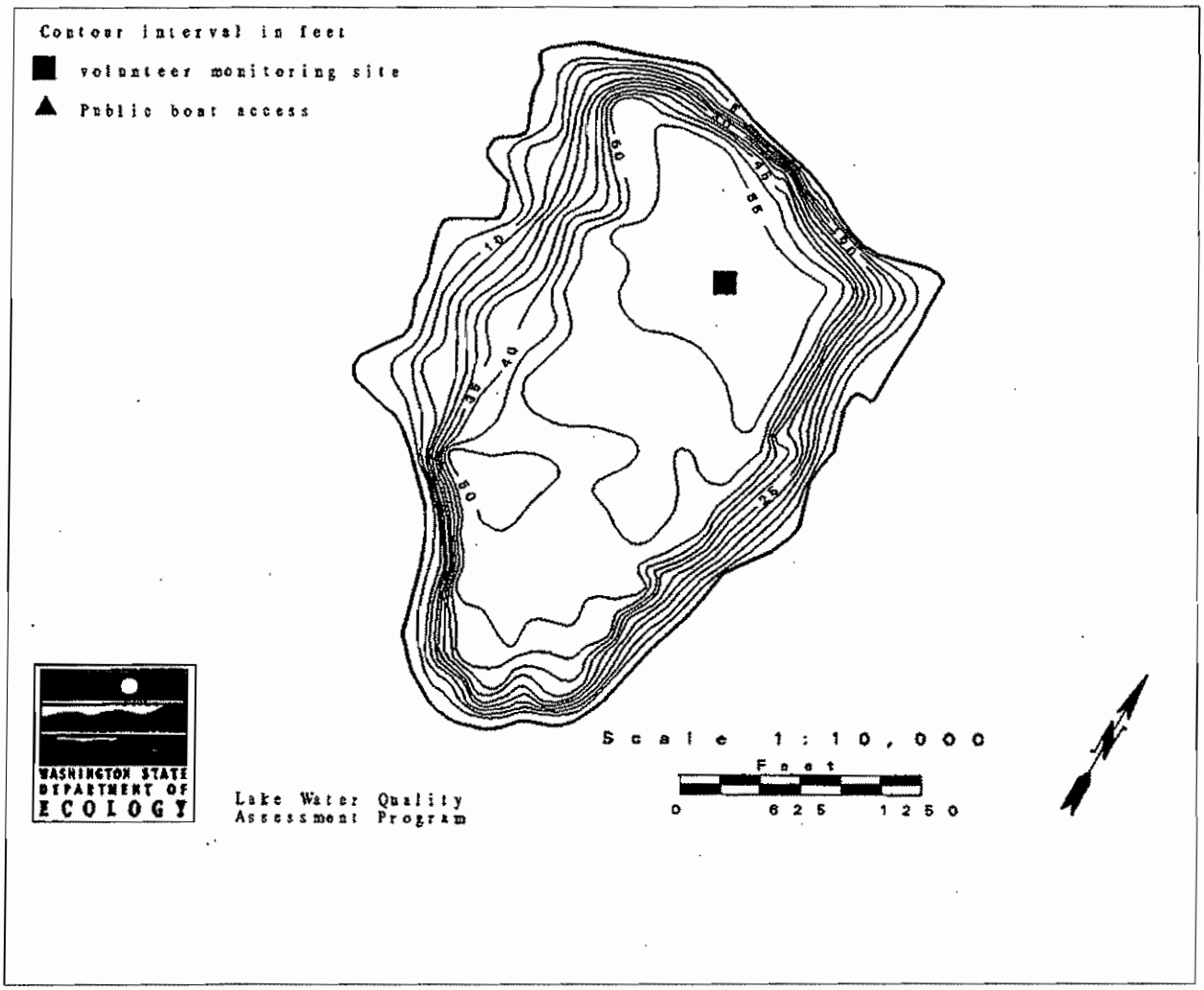




LAKECOUNTY GRAVELLY (PIERCE)

DESCRIPTION Gravelly Lake is located 0.5 mile northwest of Ponders, between American and Steilacoom Lakes. It has no surface inlets, and seeps to Puget Sound. Although Gravelly Lake is listed as a public lake in Chapter 173-20 WAC, there is no public boat access on the lake.

AREA (acres)	160
MAX DEPTH (feet)	55
MEAN DEPTH (feet)	38
DRAINAGE (square miles)	0.6
VOLUME (acre-feet)	6000
SHORE LENGTH (miles)	2.09
ALTITUDE (feet)	220



GRAVELLY LAKE -- PIERCE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 0										
97/09/05	22.2	72.0			50			30.0	0.0	STRONG H2S ON BOTTOM. WATER LEVEL DOWN 3' FROM SPRING
STATION 1										
97/07/20	22.8	73.0		Clear	0	None	Light	30.0	12.0	LAKE TREATED 7/17. SLIGHT WAVE ACTION FROM BOATS.
97/08/11	24.4	75.9		Clear	0	None	Light	29.0	18.0	
97/09/05	22.2	72.0		Undefined	50	None		30.0	0.0	WATER WAS AQUA-MARINE.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/19	E	8	0.71							
97/06/19	H	36	1.33							
97/09/05	E	4	0.42	2.6						
97/09/05	H	125	1.41							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

9-5-97 Strong H2S odor from the bottom hypolimnion sample. Water level down 3' from the spring.

TROPHIC STATUS

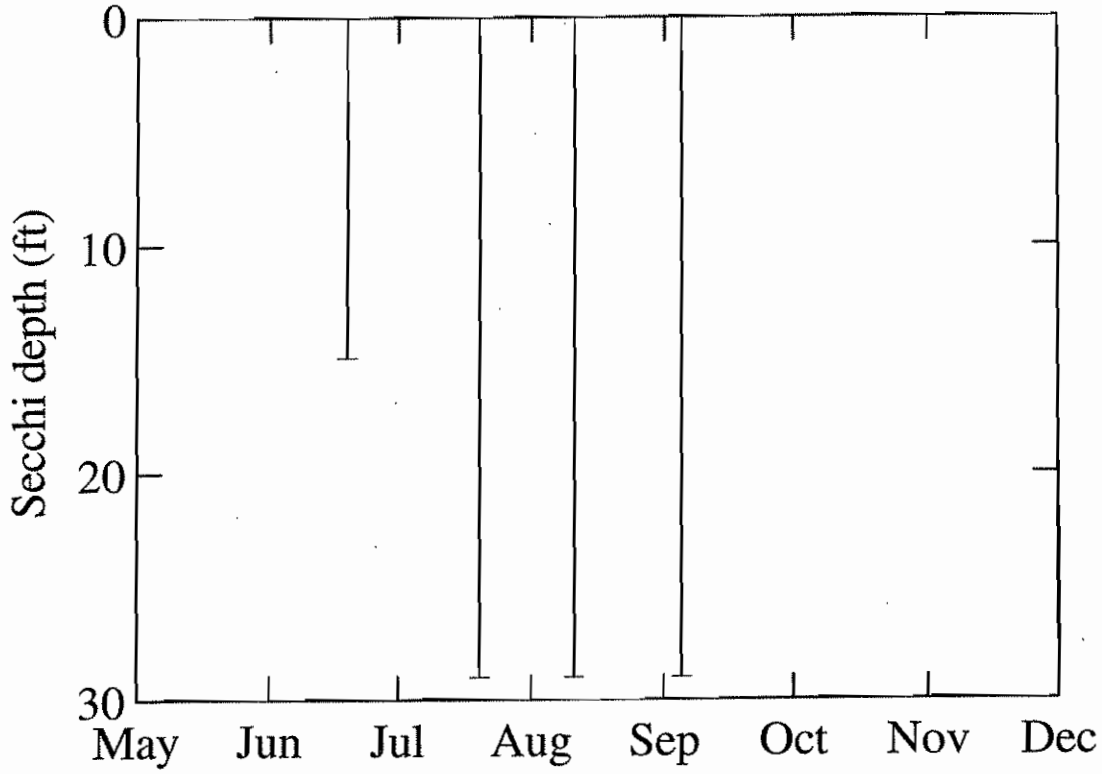
Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	28N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	25 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	40 (Oligo-mesotrophic)

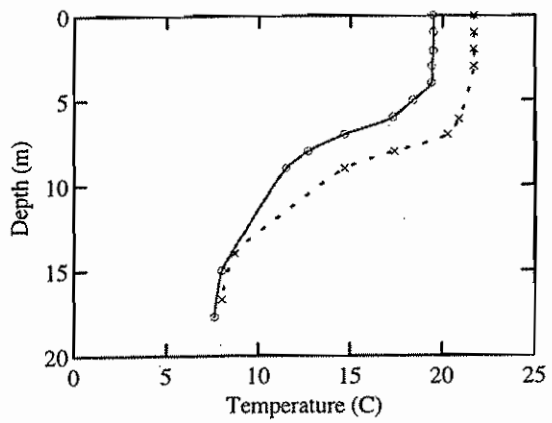
*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

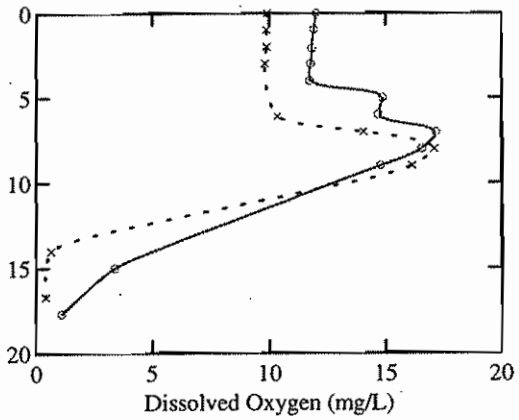
Gravelly Lake is a lake that has undergone copper sulfate applications in the past. With the low phosphorus concentrations, you would expect a relatively insignificant algal population yet TSI values for chlorophyll remain high compared to values for phosphorus and Secchi. TSI values for Secchi and phosphorus suggest an ultra-oligotrophic lake yet hypolimnetic DO concentrations and H2S presence along with the elevated chlorophyll concentrations support an oligo-mesotrophic assessment.

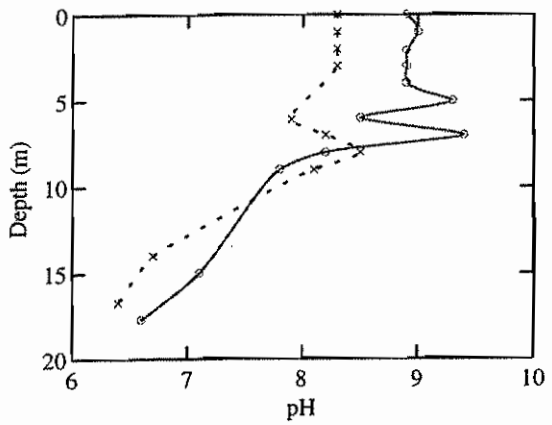
GRAVELLY

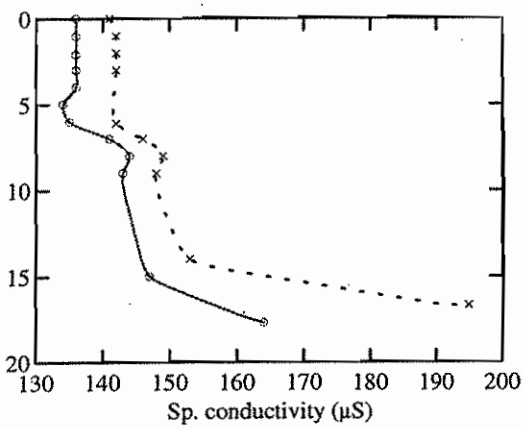




SEASON
× Summer
○ Spring

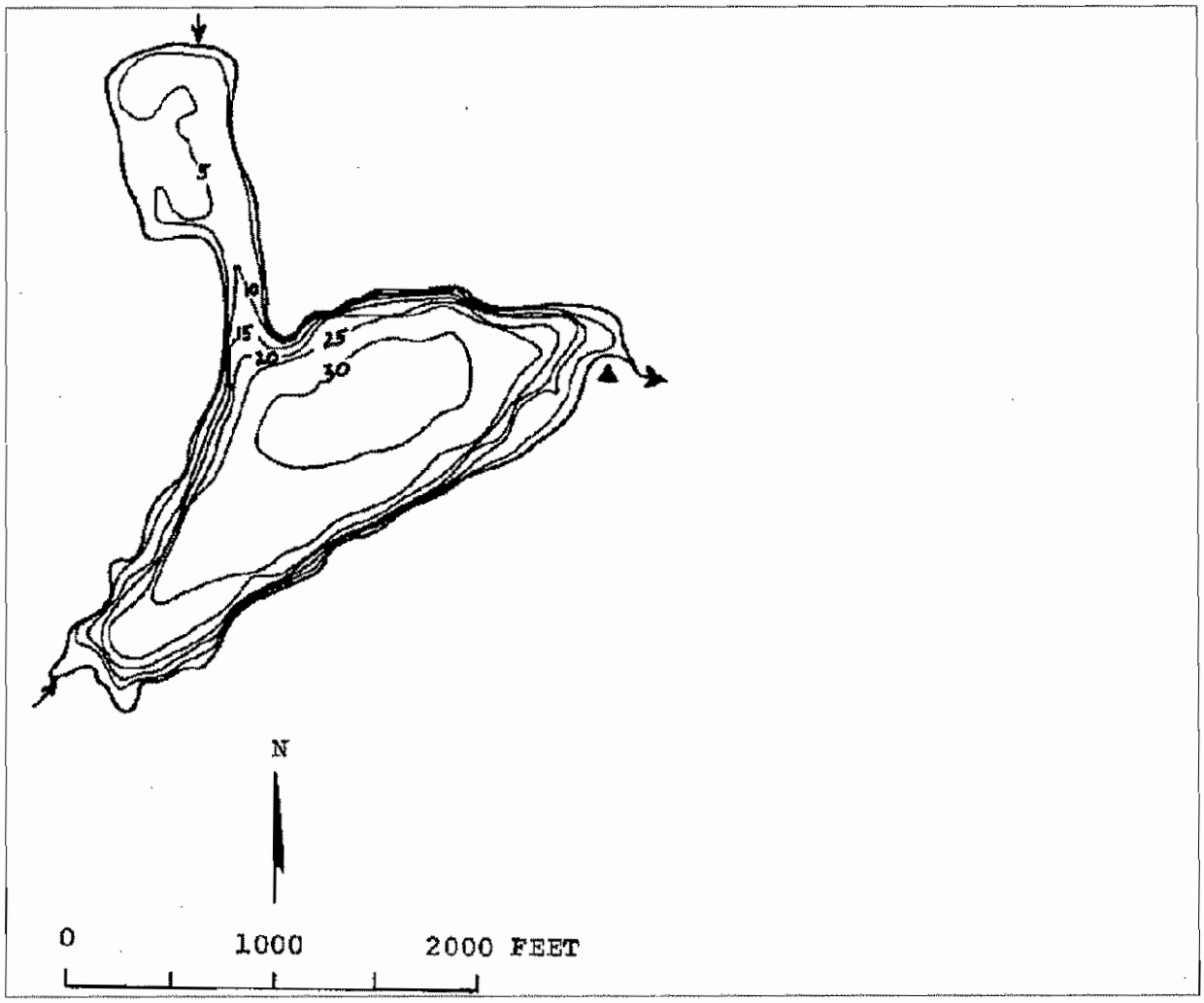






DESCRIPTION

AREA (acres)	69
MAX DEPTH (feet)	31
MEAN DEPTH (feet)	18
DRAINAGE (square miles)	1.1
VOLUME (acre-feet)	1270
SHORE LENGTH (miles)	2.16
ALTITUDE (feet)	366



HAVEN LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/20	19.0	66.2		Lt Green	75	Mod	Light	20.5	372.0	
97/07/04	21.0	69.8		Lt Green	25	None	Calm	20.5	-2.0	
97/07/18	21.0	69.8		Lt Green	90	None	Calm	19.5	-1.0	
97/08/01	22.0	71.6			25	None		27.0	366.0	FLOATING MOSS.
97/08/15	18.0	64.4		Lt Green	5		Calm	22.3	0.0	
97/08/29	23.0	73.4		Lt Green	0	Mod	Calm	23.5	0.0	
97/09/12	20.0	68.0		Lt Green	75	Mod	Strong	22.5	-6.0	
97/09/16				Lt Green	100	Heavy	Breezy	17.0	0.0	
97/09/24	-7.2	19.0		Lt Green	10	None	Calm	20.5	-4.0	
97/10/11	10.0	50.0		Lt Green	10	Mod	Breezy	18.3	1.0	WINDY ROUGH WATER.
97/10/24	19.0	66.2		Lt Green	25	None	Calm	19.5	354.0	DRIFTING MARR-LIKE VEGETATION.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/05	E	4			2	1U				
97/06/05	H	9								
97/09/16	E	6	0.16	10.0	11					
STATION 1										
97/09/16	E				9					
STATION 1										
97/09/16	E				14					
STATION 1										
97/09/16	E				17					
STATION 1										
97/09/16	E				3					
STATION 2										
97/09/16	E				9					

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent.*** The worst problems were reported as:

1. excessive aquatic plants 2. poor aesthetics 3. algae

Sources of actual or potential problems includes:

CONTINUED INCREASE IN SHORLINE CONSTRUCTION & REMOVAL OF VEGETATION.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***YES(35)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

SUMMARY OF VOLUNTEER SURVEY (Continued)

Any lake management activities this year? ***NO***
OTHER----------
How many homes/new homes are there on the lake shore?~ ***156***
Changes since last year? ***iNCREASE IN THE CLEARING OF TREES & GROUND COVER***

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-5-97 Very clear water

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	33 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	29 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	53 (Eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Haven Lake is a very clean and clear lake nestled in Mason County adjacent to Wooten Lake, another clean lake. Haven Lake receives overfill water from Wooten Lake. Haven Lake appears to be richer in aquatic macrophytes compared to Wooten Lake. TSI values for Secchi and phosphorus are indicative of an oligo-trophic lake but the abundant macrophyte growth and the elevated chlorophyll concentrations are more characteristic of a productive lake, therefore, Haven Lake is assessed as oligo-mesotrophic. Hypolimnetic DO concentrations also support this assessment.

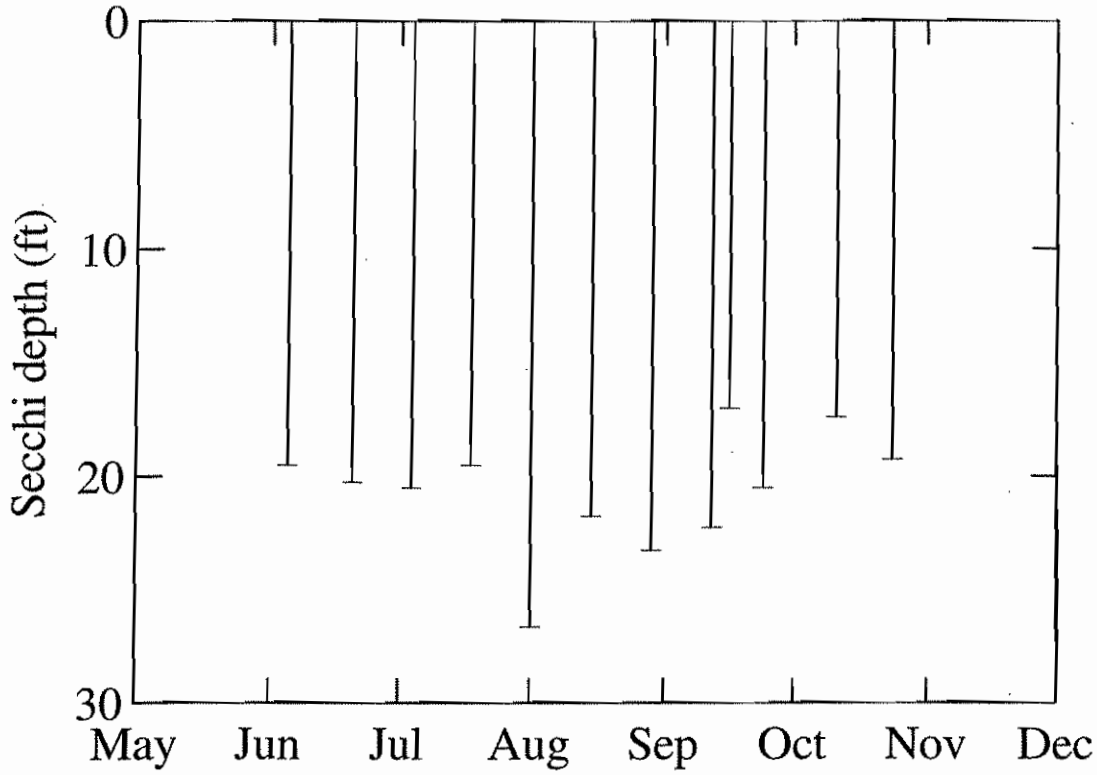
COMMENTS FROM 98/06/08 AQUATIC PLANT SURVEY

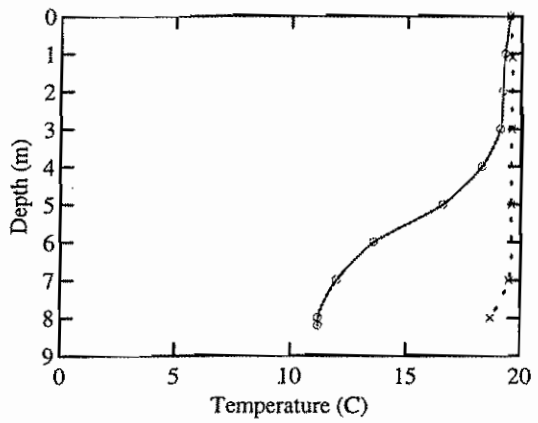
Met with lake resident Neil Wissing. Most of shoreline with shrubs and trees, developed but youses mostly set in trees with docks. Bullfrog tadpoles, long gray ropey amphibian eggs, big fish and many small ones, 1 turtle on a log, rough -skin newts.. Many water intakes in the lake. Did not see any plants of concern, many areas with bare sediment. Big 'pillows' on algae on the bottom at the south end. Maximum depth of plant growth: 3.5M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

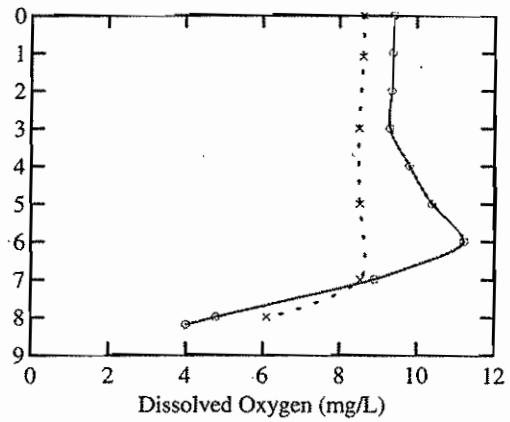
Carex obnupta (slough sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Iris pseudacorus* (yellow flag) *Juncus balticus* (Baltic rush) *Juncus sp.* (rush) *Ludwigia sp* (water primrose) *Mimulus guttatus* (yellow monkey-flower) *Nitella sp.* (stonewort) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton foliosus* (leafy pondweed) *Potamogeton pusillus* (slender pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Sparganium angustifolium* (narrowleaf bur-reed) *Typha latifolia* (common cat-tail) *Typha sp.* (cat-tail)

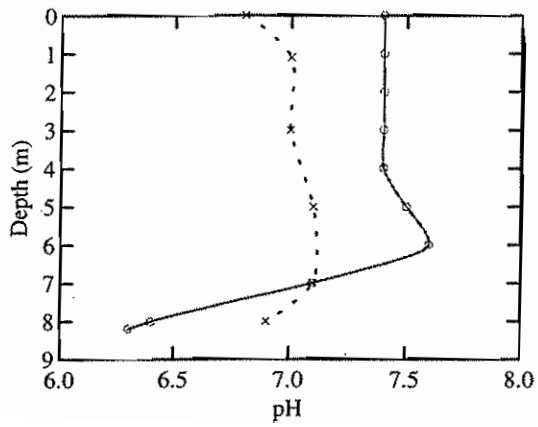
HAVEN

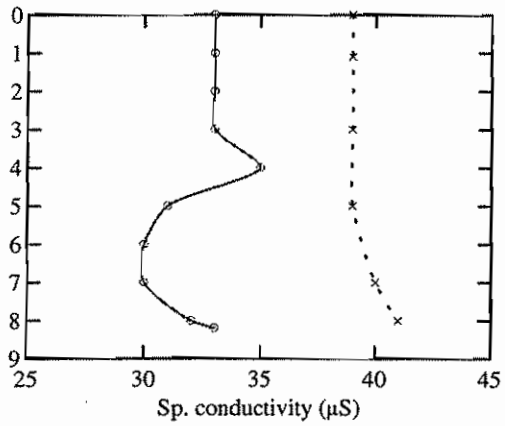




SEASON
× Summer
○ Spring

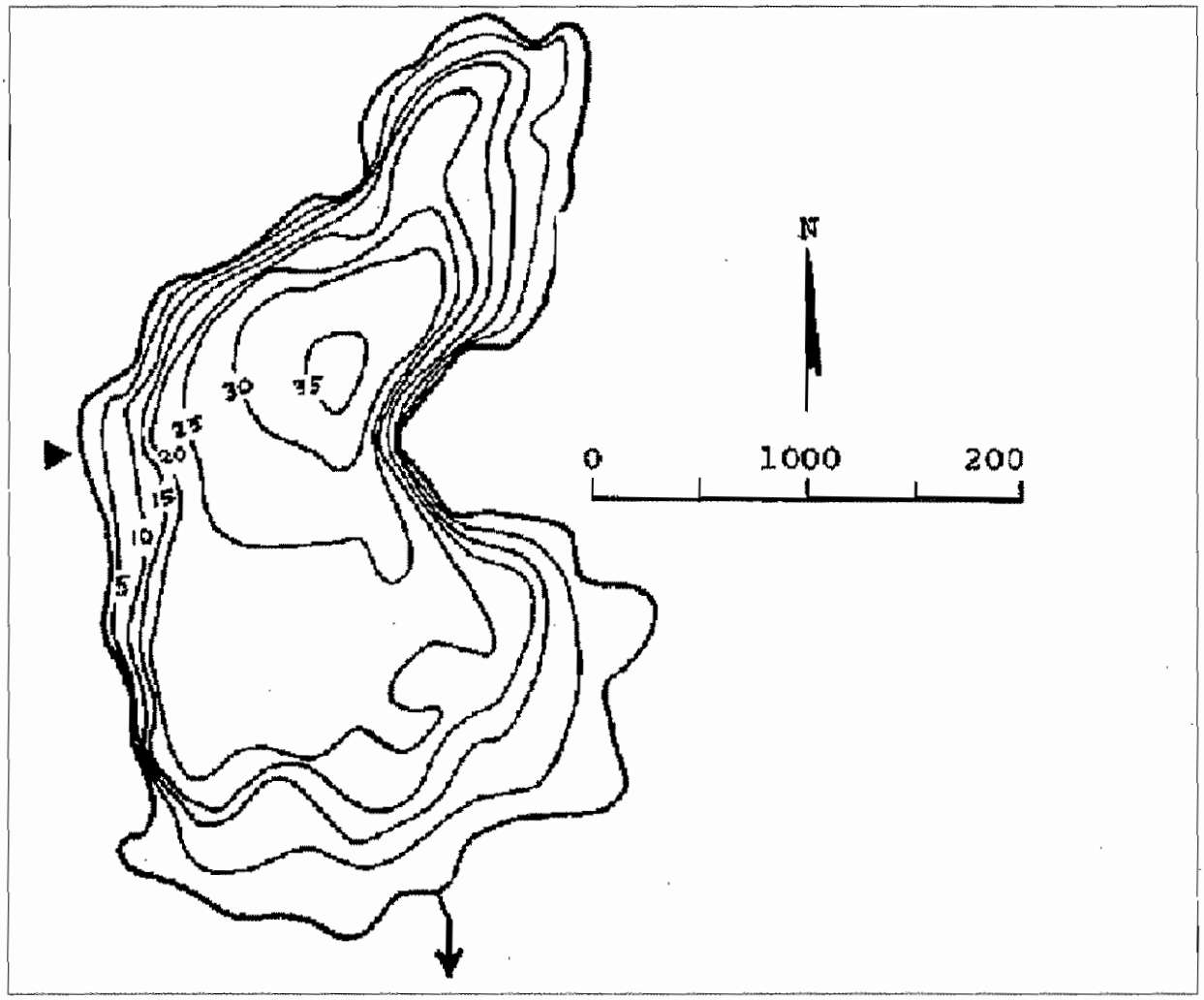






DESCRIPTION

AREA (acres)	160
MAX DEPTH (feet)	35
MEAN DEPTH (feet)	18
DRAINAGE (square miles)	1.8
VOLUME (acre-feet)	2700
SHORE LENGTH (miles)	2.44
ALTITUDE (feet)	162



HICKS LAKE -- THURSTON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/02	20.0	68.0		Undefined	0	Heavy	Calm	10.0	0.0	WATER COLOR IS GREENISH YELLOW.
97/07/11	21.1	70.0		Lt Brown	75	Mod	Calm	9.0	7.4	TWO OBSERVERS FOR SECCHI DEPTH. ONE GOT 8 & 9, THE OTHER GOT 8 & 9.5.
97/07/29	24.4	75.9		Undefined	50	None	Calm	7.5	7.0	WATER WAS YELLOWISH IN COLOR.
97/08/21	24.4	75.9		Undefined	90	Mod	Light	6.5	128.0	WATER COLOR WAS YELLOWISH.
97/10/16	15.6	60.1	6.0	Undefined	0	None	Calm	8.5	6.8	WATER WAS BROWNISH-YELLOW.
97/11/14	11.7	53.1	6.0	Undefined	100	None	Calm	6.0	7.0	WATER WAS YELLOWISH

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. No specific problems were listed.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***110***

Changes since last year? ***NO***

FIELD OBSERVATIONS OF ECOLOGY STAFF

9-2-97 Bryozoans observed. The water is a very unusual gold color. The lake appears sterile. pH at the surface reads 6.0 on the pH paper.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	47 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Hicks Lake is assessed as meso-eutrophic based on TSI values and summertime hypolimnetic DO concentrations.

Information regarding TSI values for TP and Chlorophyll were provided by Thurston County Environmental Health along with profile data for dissolved oxygen.

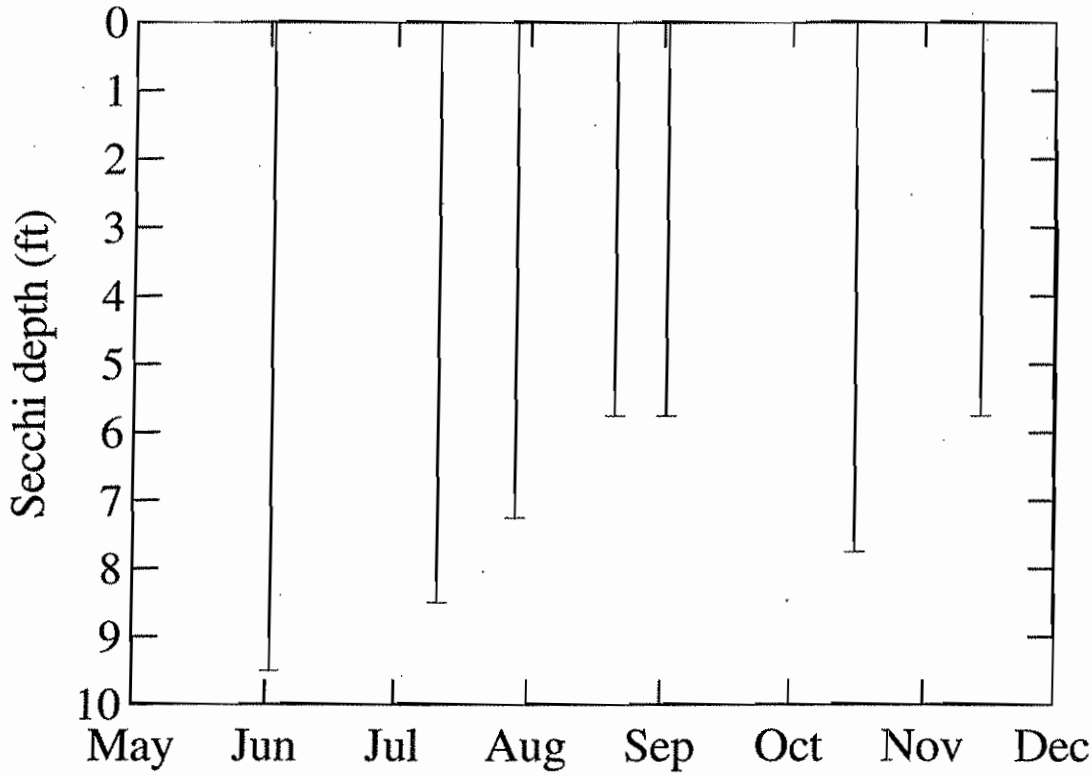
COMMENTS FROM 95/05/24 AQUATIC PLANT SURVEY

Still early in the season, testing penetrometer

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Brasenia schreberi (watershield) *Eleocharis palustris* (common spike-rush) *Fontinalis antipyretica* (water moss) *Iris pseudacorus* (yellow flag) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Mentha sp.* (mint) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Polygonum sp.* (smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Rorippa palustris* (marsh yellowcress) *Salix sp.* (willow) *Scirpus sp.* (bulrush) *Utricularia inflata* (big floating bladderwort) *unknown plant* (unknown)

HICKS

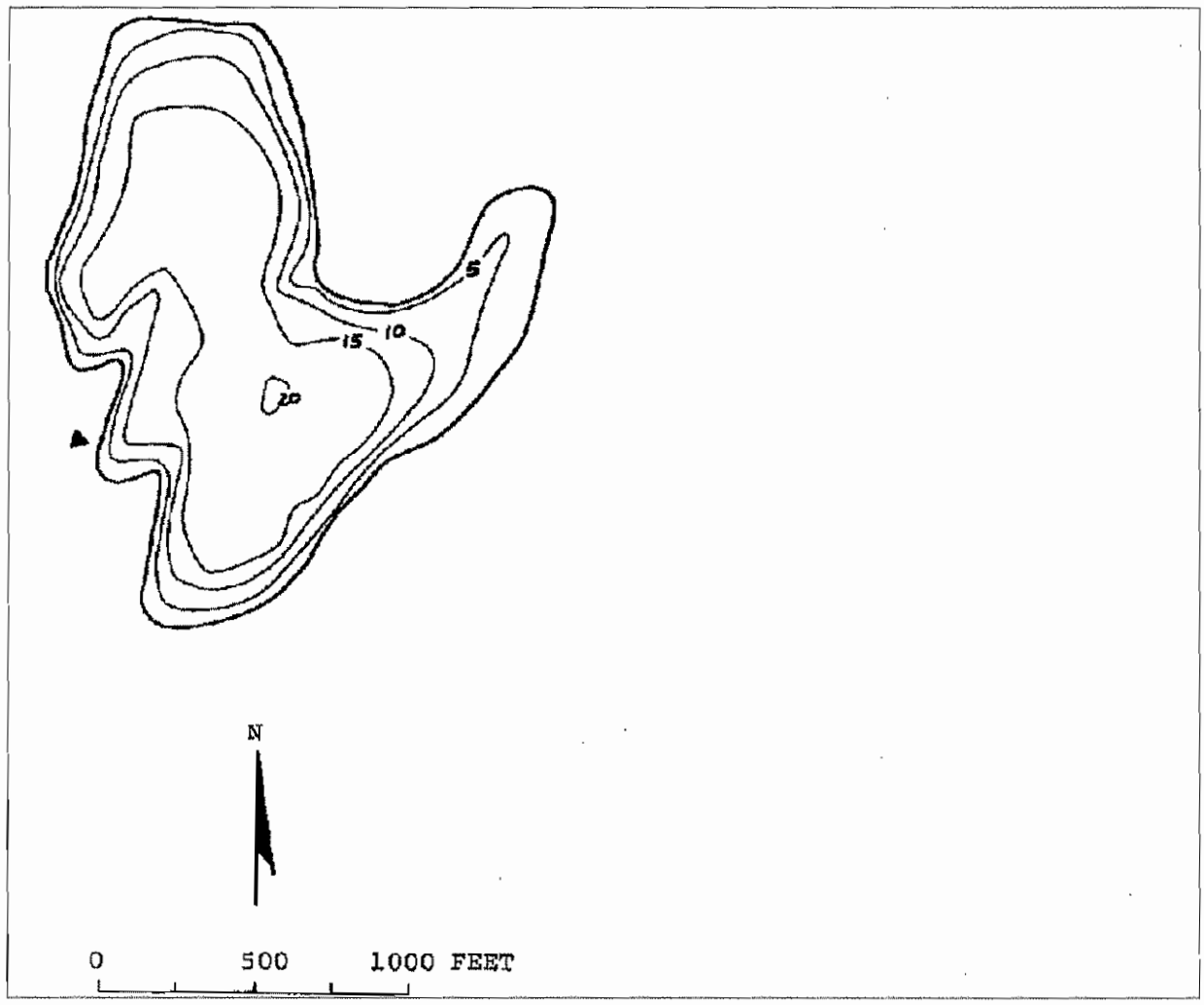


SEASON

× Summer
○ Spring

DESCRIPTION

AREA (acres)	40
MAX DEPTH (feet)	20
MEAN DEPTH (feet)	12
DRAINAGE (square miles)	0.4
VOLUME (acre-feet)	470
SHORE LENGTH (miles)	1.29
ALTITUDE (feet)	270



HORSESHOE LAKE -- KITSAP COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/11	19.0	66.2		Lt Green	10		Breezy	19.5	0.0	MORE WEEDS THAN EVER BEFORE.
97/06/08	23.0	73.4		Lt Green	25	Mod	Breezy	16.5	0.0	
97/07/03	24.0	75.2		Mod Green	0	Trace	Breezy	10.0	0.0	
97/07/13	24.0	75.2		Mod Green	2	None	Calm	11.0	0.0	
97/07/27	26.0	78.8		Pea-green	0	None	Calm	13.0	0.0	CLOUDS OF GREEN SLIMY STUFF, NEVER SEEN BEFORE.
97/08/10	26.0	78.8		Mod Green	1	None	Light	11.5	0.0	LOTS OF CLEAR JELLY BLOBS ATTACHED TO AND BY DOCK, ALGAE IDENTIFIED AS GROENBELEIA NEGLECTA
97/08/30	25.0	77.0		Mod Green	10	Mod	Calm	10.0	0.0	ALGAE BLOOMS GONE THOUGH SOME ALGAE SITTING LIKE A LAYER ON THE BOTTOM OF THE LAKE.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/19	E	22	0.29J							
97/06/19	H	13	0.24J							
97/09/12	E	10	0.21	6.0						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-19-97 Lilies have been harvested several times this year and have a deep red color. Some zooplankton observed. Water level is very high.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	39Y* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	37 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	48 (Meso-eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

The water in Horseshoe Lake is very clear but the lake community appears to suffer from excessive macrophyte growth in the shallow areas of the lake. Although the phosphorus concentrations and Secchi depths favor an oligotrophic assessment, hypolimnetic DO concentrations, an elevated chlorophyll TSI and excessive macrophytes suggest a more productive lake, therefore, Horseshoe Lake is assessed as oligo-mesotrophic.

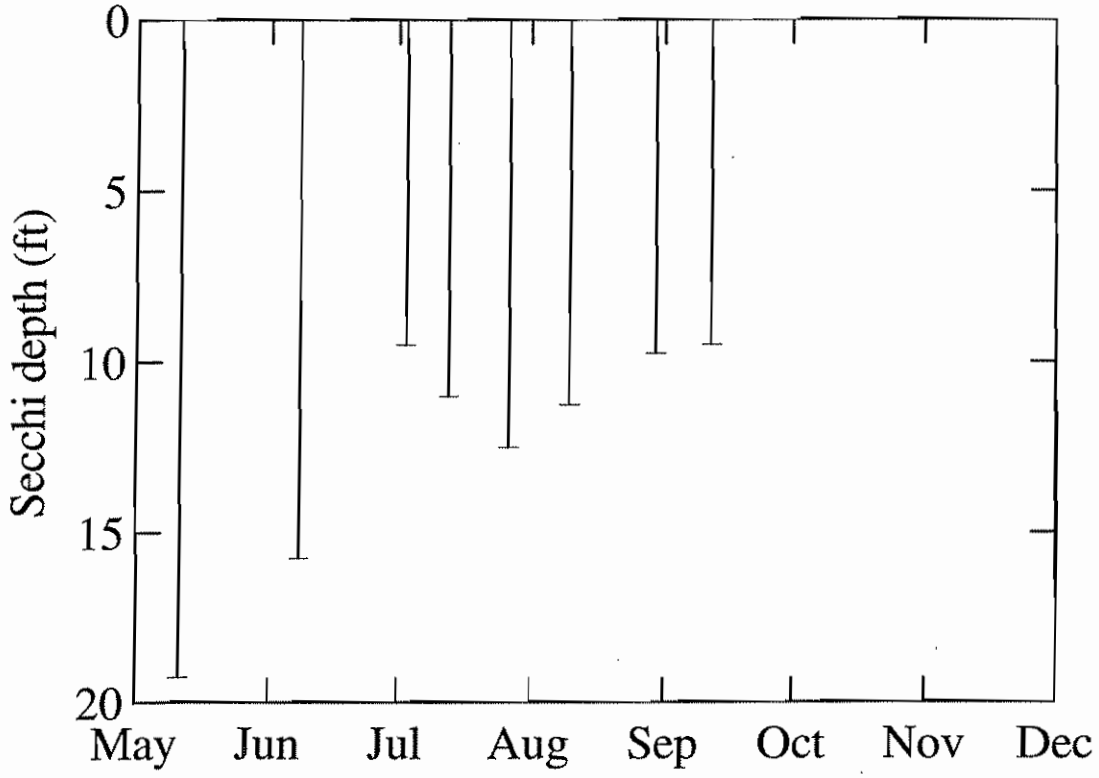
COMMENTS FROM 96/08/22 AQUATIC PLANT SURVEY

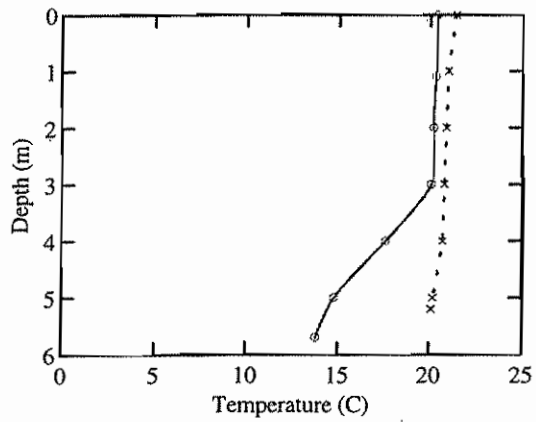
Circumnavigated lake. Osprey, frogs. Clear, breeze. Popular recreational lake. Mostly rocky bottom, lots of lilies, but not many submersed plants, homogenous community. Maximum depth of plant growth: 4.0M.

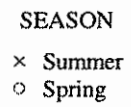
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

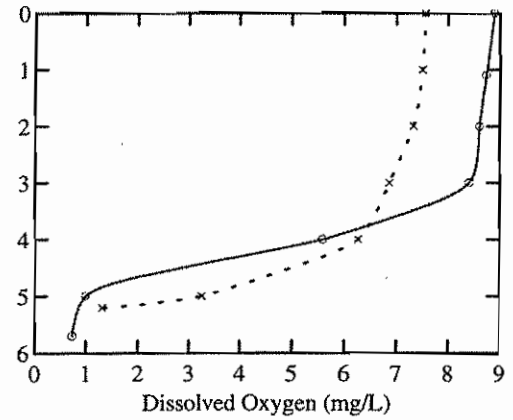
Elodea nuttallii (Nuttall's waterweed) *Iris pseudacorus* (yellow flag) *Isoetes lacustris* (lake quillwort) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Juncus supiniformis* (spreading rush) *Ludwigia palustris* (water-purslane) *Nitella sp.* (stonewort) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton pusillus* (slender pondweed) *Typha sp.* (cat-tail) *Utricularia inflata* (big floating bladderwort)

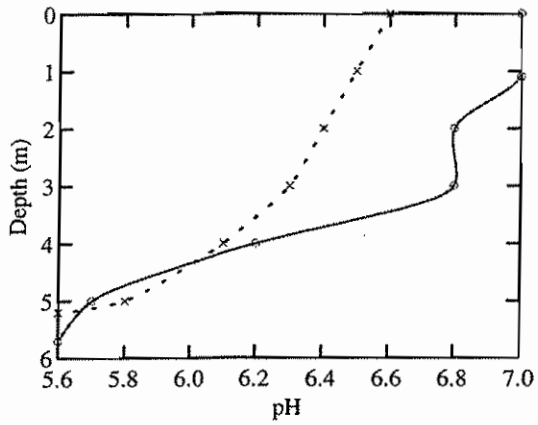
HORSESHOE

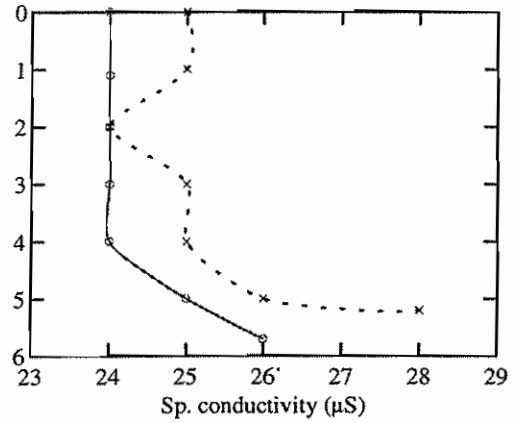

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring

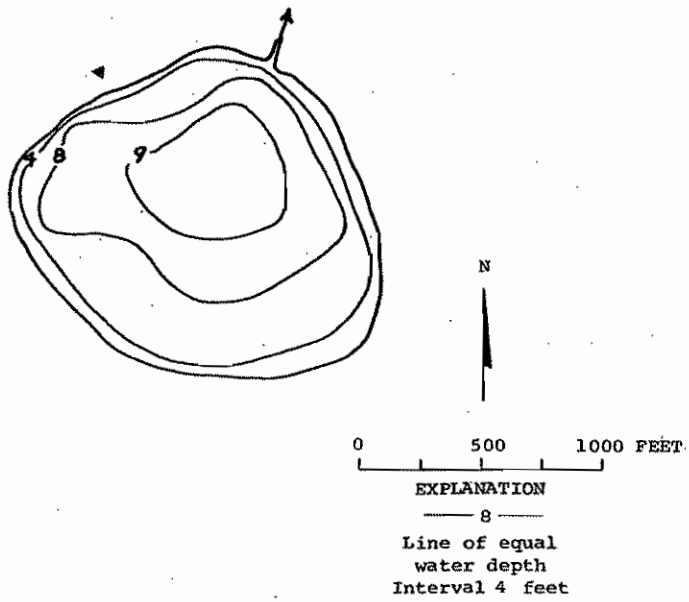

Dissolved Oxygen (mg/L)


Depth (m)
pH


Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	36
MAX DEPTH (feet)	12
MEAN DEPTH (feet)	8
DRAINAGE (square miles)	0.8
VOLUME (acre-feet)	272
SHORE LENGTH (miles)	0.97
ALTITUDE (feet)	97



Hummel Lake, San Juan County. From Washington Department of Game, May 19, 1948.

HUMMEL LAKE -- SAN JUAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/08/19				Dark Brn	0			3.0	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/18	E	119	1.09J		1	2	4.4			
97/06/18	H									
97/08/19	E	219	1.20	32.4	4	6	6.2			
97/08/19	H									

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-18-97 Lots of blue-green algae and zooplankton activity.

8-19-97 Water has a sewer-like odor to it. Bald eagle sighted.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	61N* (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	82 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	65 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Hummel Lake was rich with aquatic plants and blue-green algae. All observations and scientific data support an eutrophic assessment for the lake.

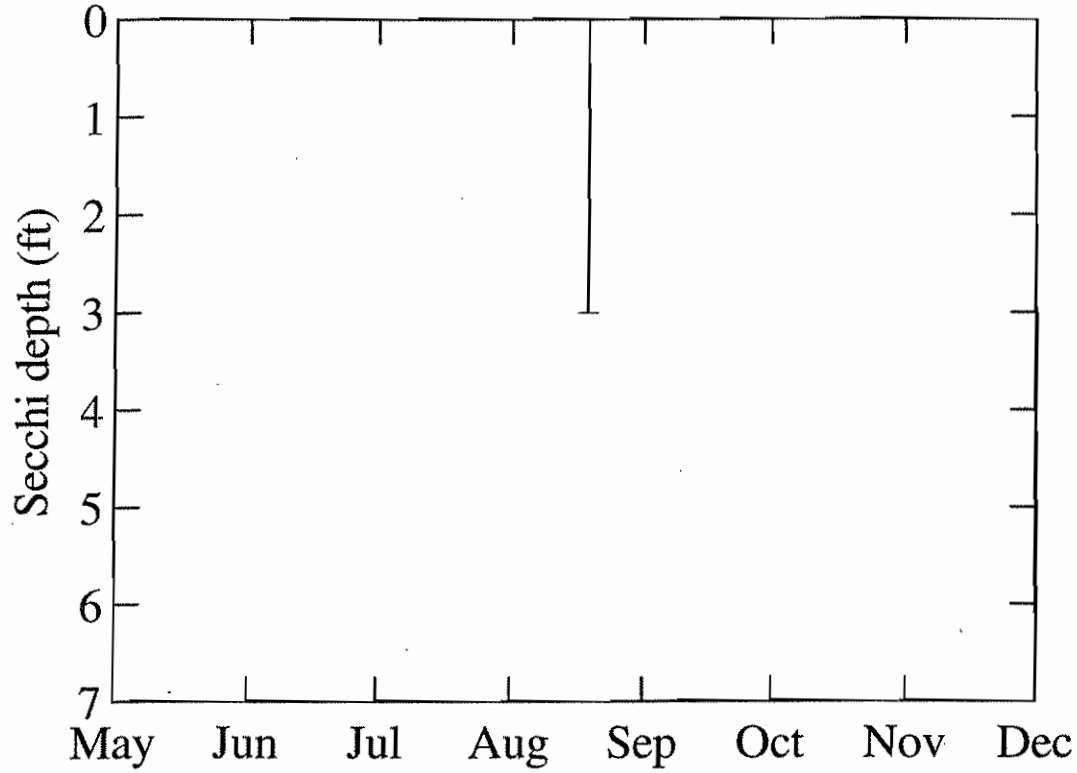
COMMENTS FROM 97/09/08 AQUATIC PLANT SURVEY

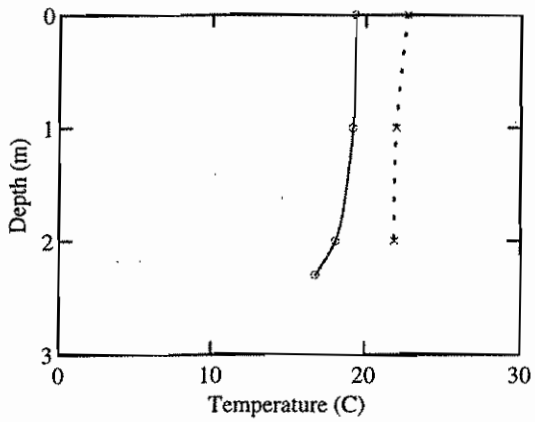
Sunny, light breeze. Water brown (muck) color. Lots of sickle-shape blue-green algae. Circumnavigated the lake. Met with Dan Silkiss, Amy and Nancy (Land Bank) to discuss plans for the lake. Lake ringed by riparian vegetation. submersed plants grow on margins to about 2 m deep, the rest of the lake is open water. Algae forming surface scum on southeast edge. Maximum depth of plant growth: 2.0M.

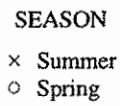
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

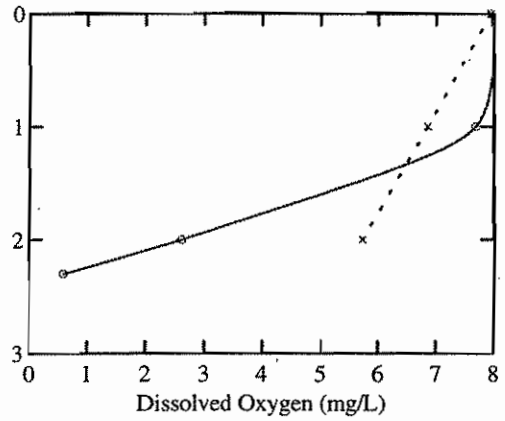
Ceratophyllum demersum (Coontail; hornwort) *Lemna minor* (duckweed) *Myriophyllum sp.* (water-milfoil) *Nuphar sp.* (yellow water-lily) *Phalaris arundinacia* (reed canarygrass) *Potentilla palustris* (purple (marsh) cinquefoil) *Scirpus sp.* (bulrush) *Solanum sp.* (nightshade) *Typha latifolia* (common cat-tail)

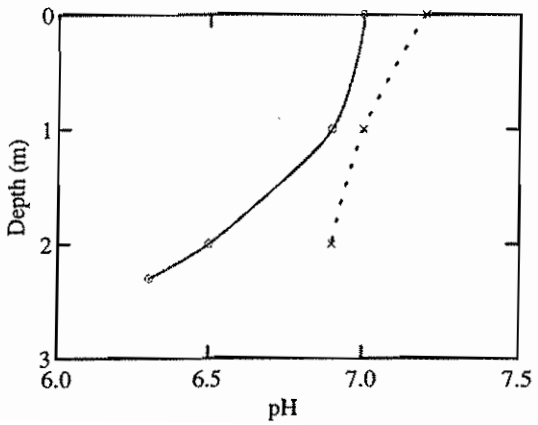
HUMMEL

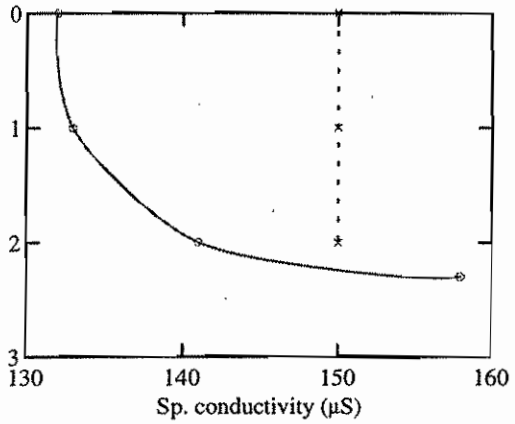

Secchi depth (ft)
0
1
2
3
4
5
6
7
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
1
2
3
0
10
20
30
Temperature (C)


SEASON
× Summer
○ Spring

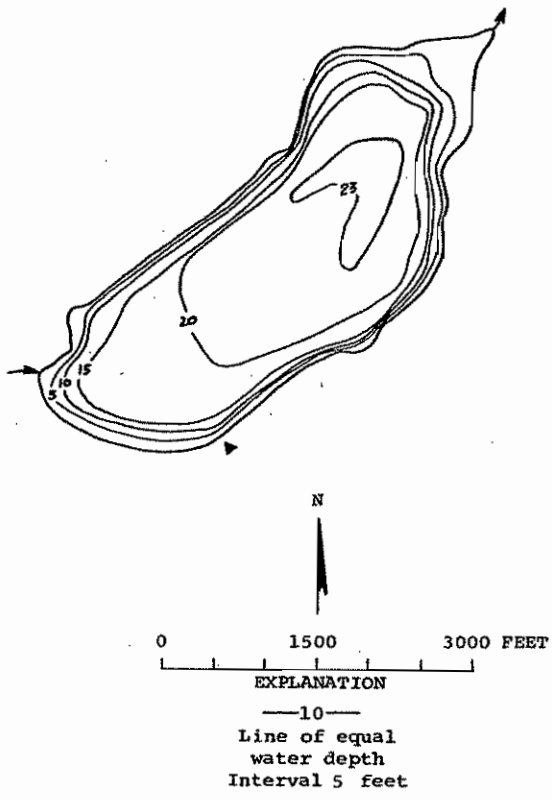

0
1
2
3
0
1
2
3
4
5
6
7
8
Dissolved Oxygen (mg/L)


Depth (m)
0
1
2
3
6.0
6.5
7.0
7.5
pH


0
1
2
3
130
140
150
160
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	200
MAX DEPTH (feet)	23
MEAN DEPTH (feet)	16
DRAINAGE (square miles)	17.
VOLUME (acre-feet)	3200
SHORE LENGTH (miles)	2.46
ALTITUDE (feet)	150



Isabella Lake, Mason County. From Washington Department of Game, June 25, 1952.

ISABELLA LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/28	20.0	68.0		Mod Green	10	Mod	Calm	12.0	17.3	FIRST READING FOR LAKE LEVEL.
97/07/18	20.0	68.0		Mod Green	0	None	Calm	11.0	0.0	
97/08/09	22.0	71.6		Mod Green	1	None	Calm	11.6	0.0	
97/08/25				Undefined	50	None		14.8	0.0	WATER WAS A MODERATE GREEN COLOR.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/21	H	43								
97/05/21	E	9	0.14		1U	120	0.9			
97/08/25	E	12	0.13		12	160J	0.8			
97/08/25	H	34	0.13							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. The worst problems were reported as:

1. excessive aquatic plants 2. high water levels 3. algae

Sources of actual or potential problems includes:

ALGAE BLOOMS (BLUE-GREEN), AND RUN-OFF FROM CLEAR CUTS

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***YES(14)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***20***

Changes since last year?

Lake Uses and Facilities at the lake include:

swimming fishing motor boating jet skiing parks

The percent of the lakeshore that is sewered: ***0***

The number of storm drains leading to the lake: ***0***

Motor boat restrictions include: ***no restrictions.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-21-97 Appears to be a clear-cut area in the watershed about 2 yrs old. A new state park going in. Lake level is very high.

8-25-97 Osprey observed

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	41N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	40 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although shallow, Isabella Lake does not demonstrate eutrophic characteristics usually typical of shallow lakes in western Washington. In fact, observations and water quality results suggest the lake is low in nutrients, relatively clear with very little aquatic plant growth, all which support the oligo-mesotrophic assessment for Isabella Lake.

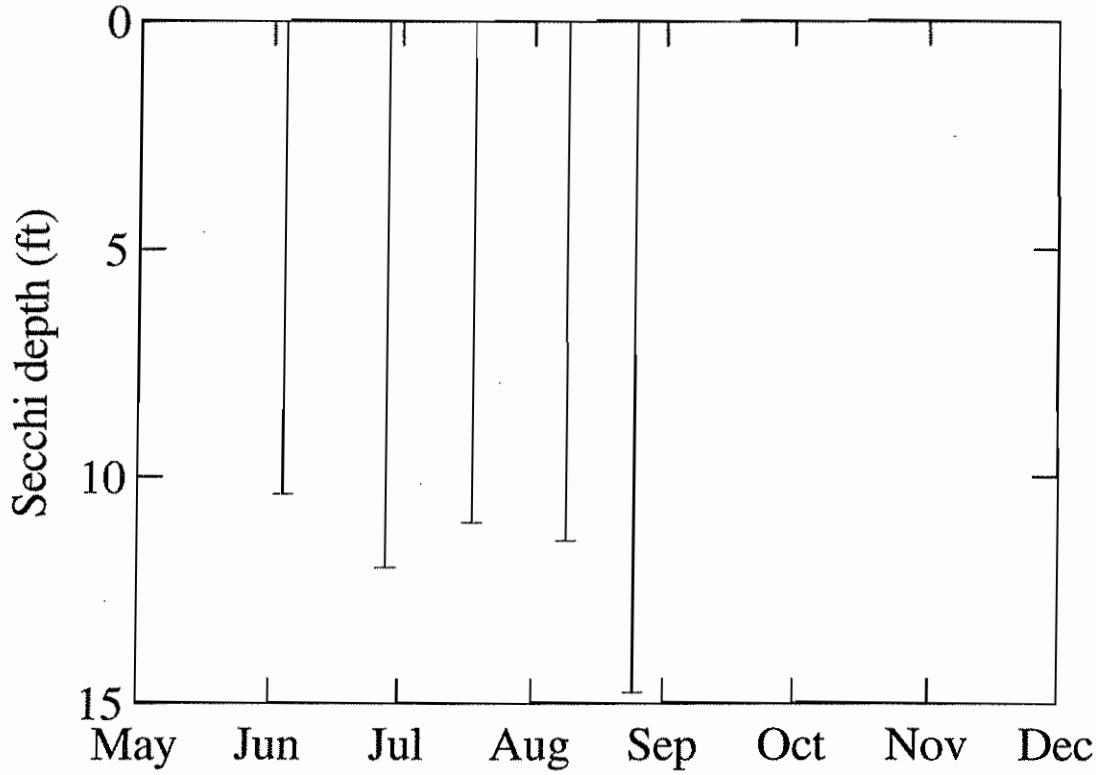
COMMENTS FROM 97/08/18 AQUATIC PLANT SURVEY

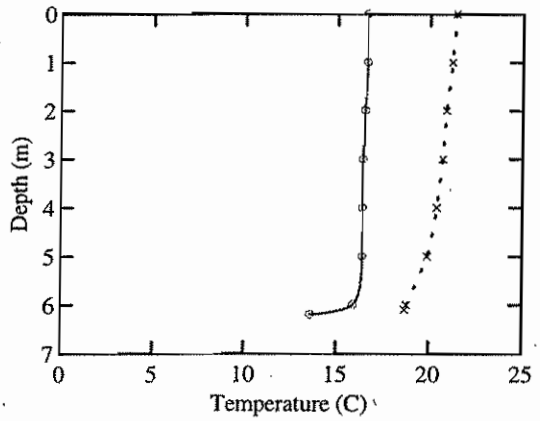
mussels, sponges, bryozoans, lots of ducks. Cloudy, cool, breeze. Plant community dense in areas, but not really surfacing. Wetlands along much of shoreline. Outlet creek (Mill Cr) is navigable for a long way, that is where the patch of L. salicaria is, we went as far as the bridge. Maximum depth of plant growth: 3.5M.

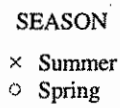
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

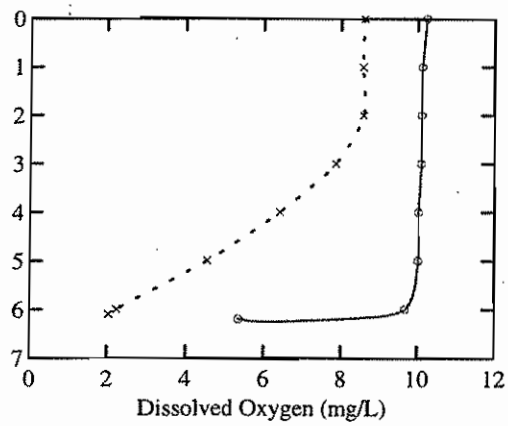
Callitriche stagnalis (pond water-starwort) *Carex sp.* (sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Iris pseudacorus* (yellow flag) *Isoetes sp.* (quillwort) *Juncus sp.* (rush) *Lythrum salicaria* (purple loosestrife) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Polygonum hydropiperoides* (common smartweed) *Potamogeton alpinus* (red pondweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton obtusifolius* (bluntleaf pondweed) *Potamogeton pusillus* (slender pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp.* (pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Ranunculus aquatilis* (water-buttercup) *Scirpus acutus* (hardstem bulrush) *Scirpus sp.* (bulrush) *Sparganium angustifolium* (narrowleaf bur-reed) *Sparganium sp.* (bur-reed) *Typha latifolia* (common cat-tail) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort)

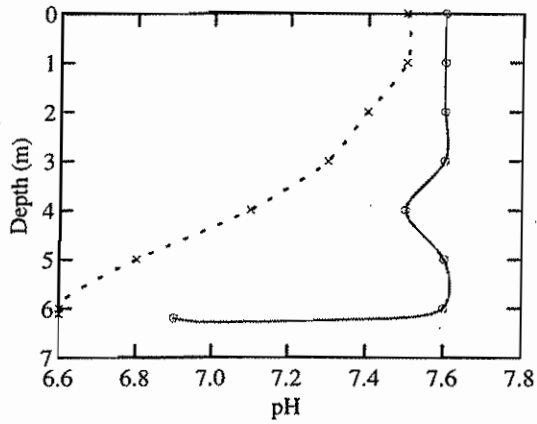
ISABELLA

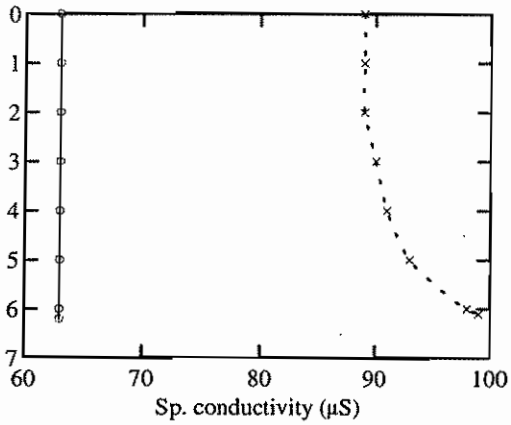

Secchi depth (ft)
0
5
10
15
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring


Dissolved Oxygen (mg/L)

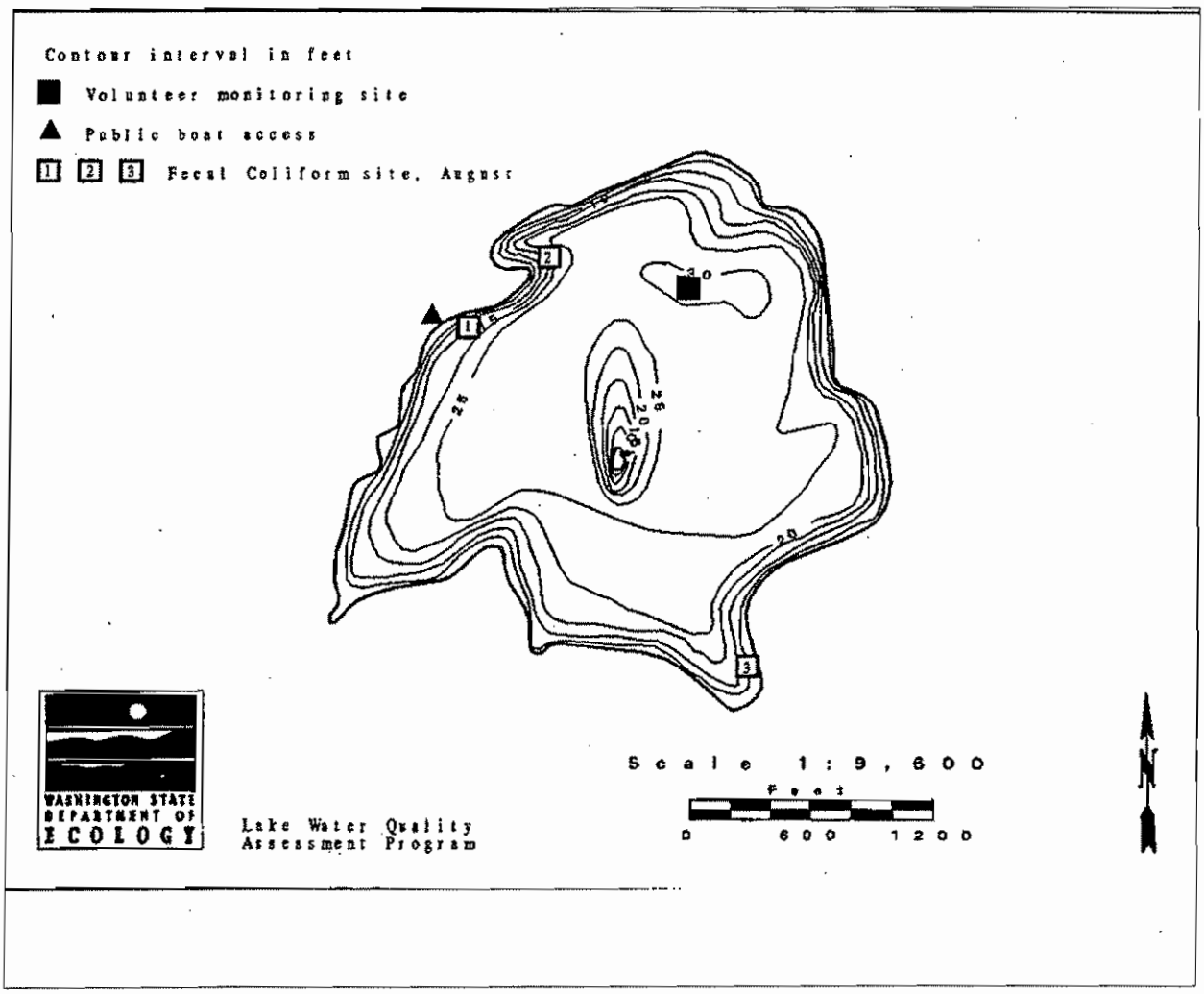

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY ISLAND (MASON)

DESCRIPTION Island Lake is located 2.5 miles north of Shelton. It drains via a swamp to Goldsborough Creek and Oakland Bay.

AREA (acres)	108
MAX DEPTH (feet)	31
MEAN DEPTH (feet)	21
DRAINAGE (square miles)	0.2
VOLUME (acre-feet)	2246
SHORE LENGTH (miles)	1.74
ALTITUDE (feet)	230



ISLAND LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/04	18.3	64.9	6.5	Lt Green	0	Light	Light	19.0	7.5	MEASURED FROM BOTTOM OF WHITE HOUSE BULKHEAD TO W.S.
97/06/20	18.9	66.0	6.5	Lt Green	10	Trace	Calm	19.0	2.0	WATER LEVEL MEASURED FROM TEH TOP OF BULKHEAD (DROPPING). CLOUDINESS VARIED FROM 0 - 10 %.
97/07/09	18.9	66.0	6.5	Lt Green	100	Mod	Breezy	17.0	0.0	WATER AT BASE OF BULKHEAD. NO MORE PLACES TO MEASURE HEIGHT OF WATER.
97/08/05	23.3	73.9	6.5	Lt Green	100	None	Calm	18.0	0.0	THUNDER SHOWERS.
97/08/20	21.1	70.0	6.5	Lt Green	100	None	Light	15.0	0.0	MILFOIL SPREADING BEYOND THE BOAT LAUNCH. RAIN BEGAN THIS A.M. CONTINUED THROUGHOUT SAMPLING.
97/08/25				Undefined	0			16.0	0.0	WATER WAS A MODERATE GREEN.
97/09/03	20.0	68.0	6.5	Lt Green	50	Trace	Light	18.0	0.0	
97/09/24	17.8	64.0	6.5		0	None	Calm	14.0	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/21	E	7								
97/08/25	E	7	0.15	4.8						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-21-97 Eurasian milfoil submerged. Low ionic pH kit reading one unit lower that hydrolab.

8-25-97 Moderate blue-green algal bloom observed.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	36 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	32 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	46 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Island Lake was very clear in 1997. The low phosphorus concentrations and clear water are indicative of an oligotrophic lake, however, the low hypolimnetic DO and moderate chlorophyll concentrations are more characteristic of a mesotrophic lake, therefore, Island Lake is assessed as oligo-mesotrophic.

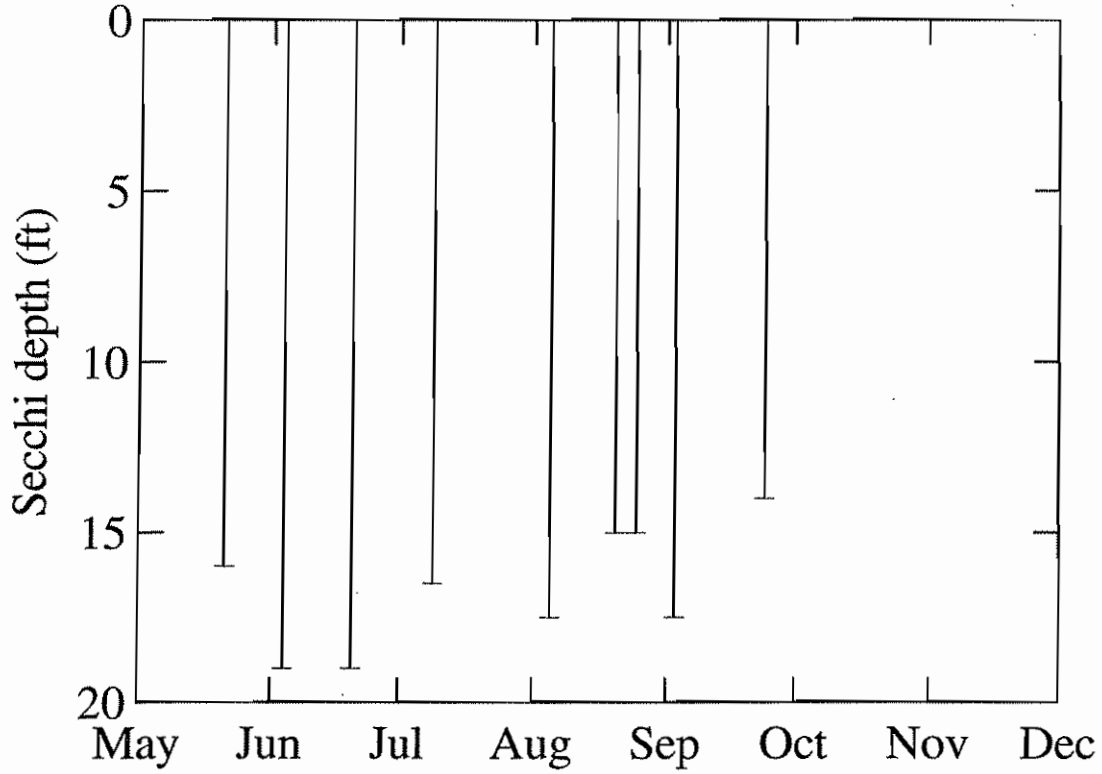
COMMENTS FROM 98/07/09 AQUATIC PLANT SURVEY

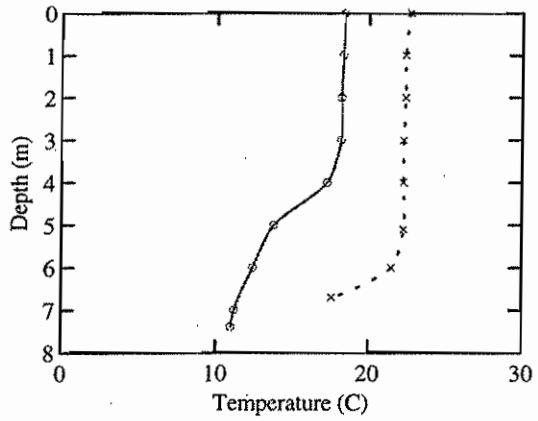
Calm, partly cloudy. Lake treated with sonar June 24, 1998 - plants starting to show some bleaching, especially the Najas. Milfoil mostly still not showing signs, a little bright green. Milfoil very dense in many areas, mostly near the boat launch and to the north. East side still just individual plants with occasional dense patches. Bullfrogs heard. Conducted habitat survey for Kirk Smith. Maximum depth of plant growth: 4.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

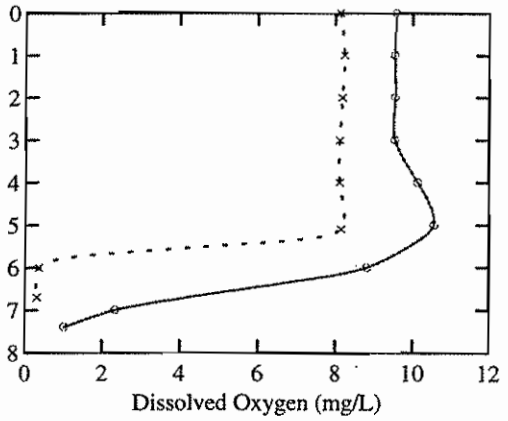
Brasenia schreberi (watershield) *Carex lenticularis Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Iris pseudacorus* (yellow flag) *Iris sp.* (Iris) *Isoetes lacustris* (lake quillwort) *Myriophyllum spicatum* (Eurasian water-milfoil) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nymphaea odorata* (fragrant waterlily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton foliosus* (leafy pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton pusillus* (slender pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp.* (pondweed) *Ranunculus aquatilis* (water-buttercup) *Scirpus sp.* (bulrush)

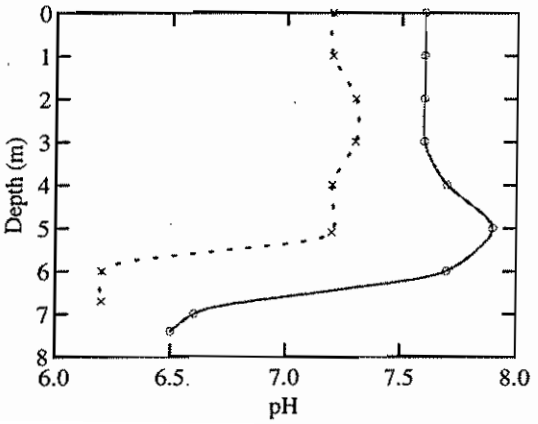
ISLAND

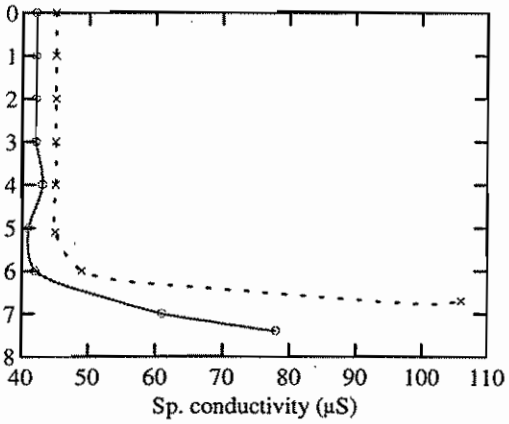




SEASON
× Summer
○ Spring



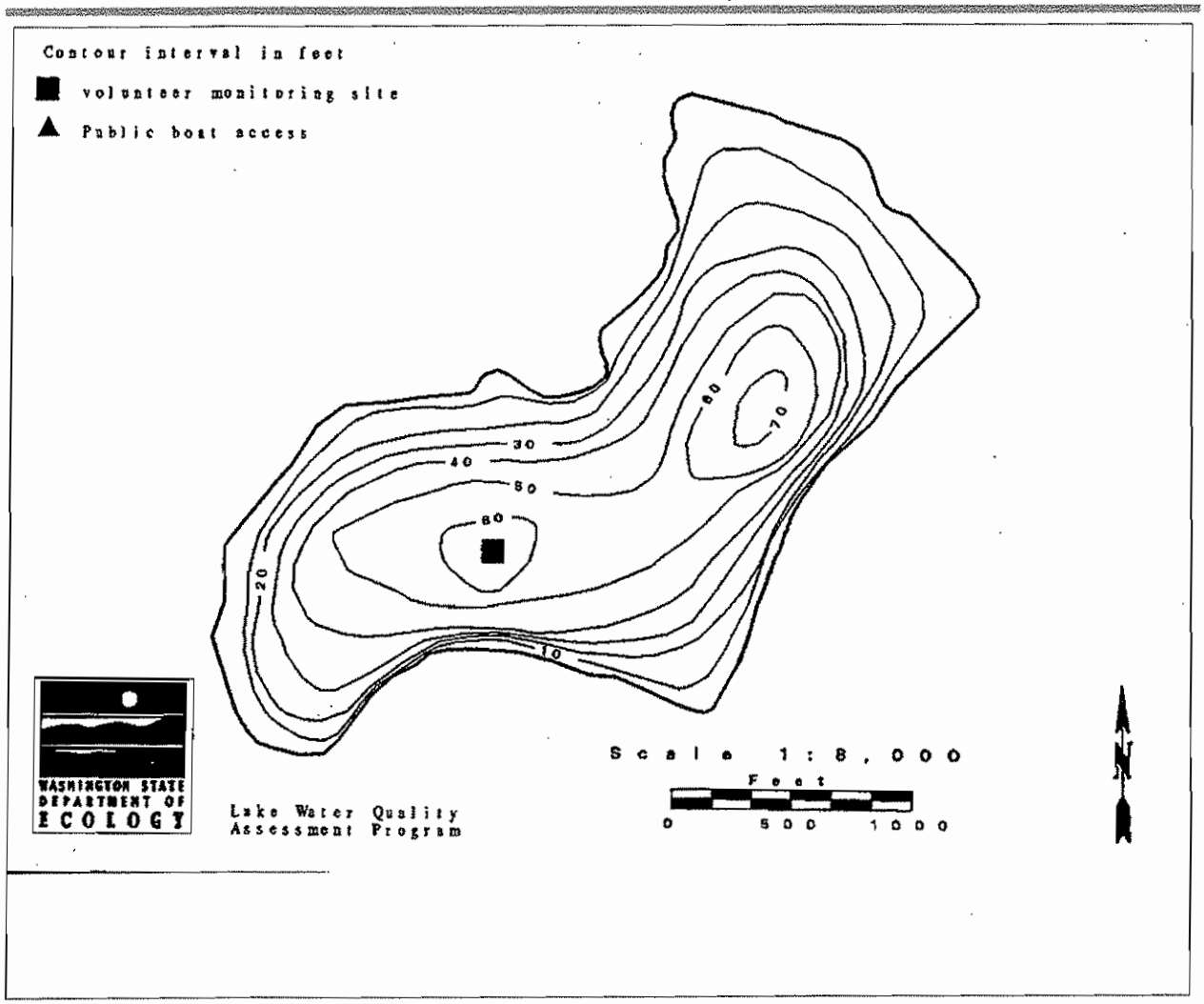




LAKECOUNTY KI (SNOHOMISH)

DESCRIPTION Lake Ki is located 7.75 miles northwest of Marysville. It has an intermittent surface inlet at the south end, and drains via an unnamed outlet to Portage Creek and South Slough

AREA (acres)	98
MAX DEPTH (feet)	70
MEAN DEPTH (feet)	33
DRAINAGE (square miles)	0.7
VOLUME (acre-feet)	3250
SHORE LENGTH (miles)	1.87
ALTITUDE (feet)	414



KI LAKE -- SNOHOMISH COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 2										
97/05/13	17.8	64.0		Lt Green	0	None		29.0	24.0	WATER DEPTH 24 INCHES ON MY MARKER.
97/06/17	17.2	63.0		Lt Green	50	Light	Gusty	29.0	24.0	
97/07/14	22.2	72.0		Pea-green	0			25.0	22.0	36 CANADIAN GEESE, LAKE HEIGHT 22" ON MY MARKER DOWN 2" FORM LAST TIME
97/07/27	23.3	73.9		Lt Green	0	None	Calm	26.0	-1.7	GEESE GONE :)
97/08/07	23.9	75.0		Lt Green	0	None	Breezy	24.0	-3.7	
97/09/03	23.3	73.9		Lt Green	50	None	Calm	25.0	-4.0	
97/09/13	19.4	66.9			0	Trace	Calm	26.0	-2.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 2										
97/06/04	E	5								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***
Were fish stocked this year? ***YES***
Any lake groups present (such as a lake association)? ***NO***
Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***70***
Changes since last year? ***SEVERAL NEW HOMES. SAME AS COMMENTED ABOVE.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-4-97 There are very few macrophytes in the water. The water is extremely clear.

TROPHIC STATUS

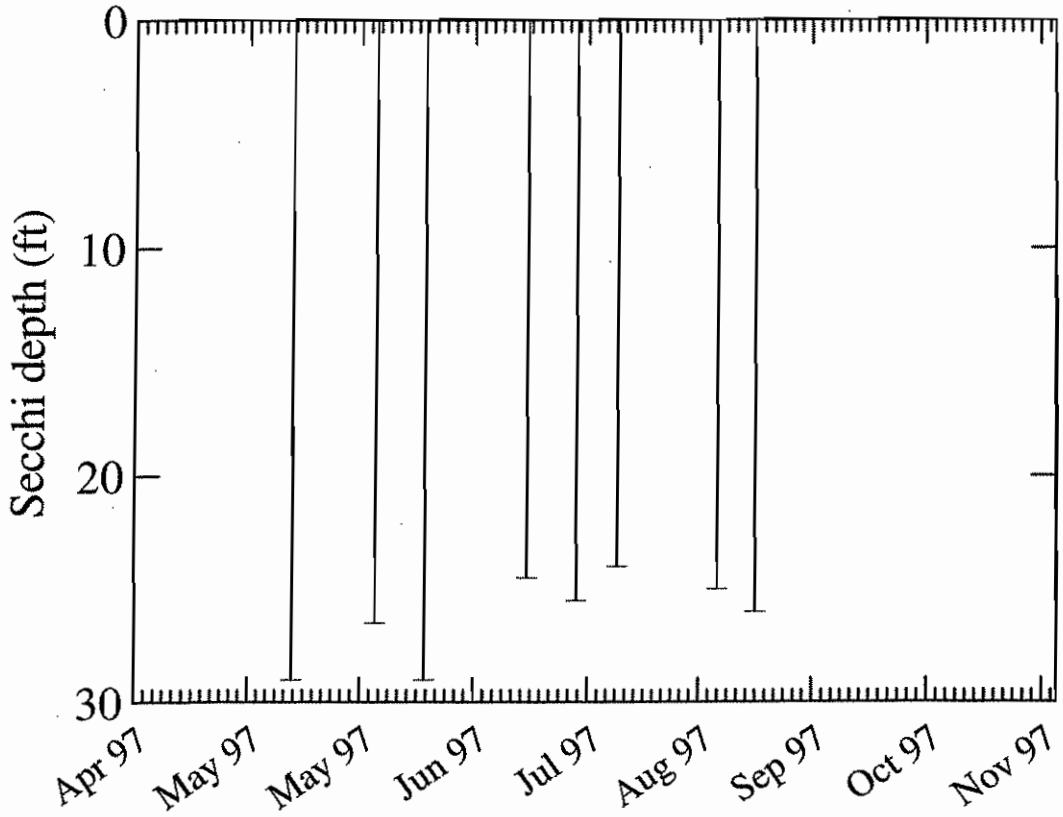
Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	30 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	28S* (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

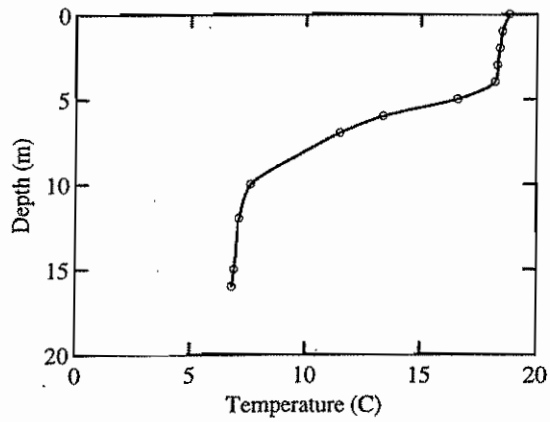
*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

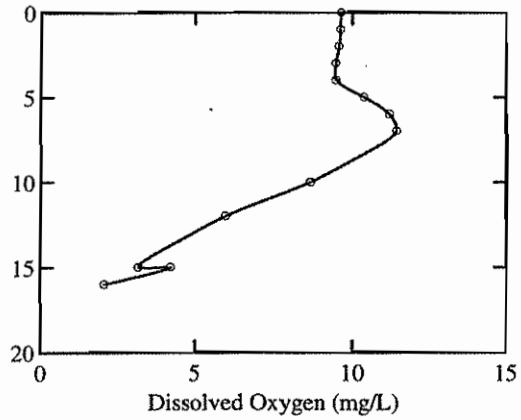
SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

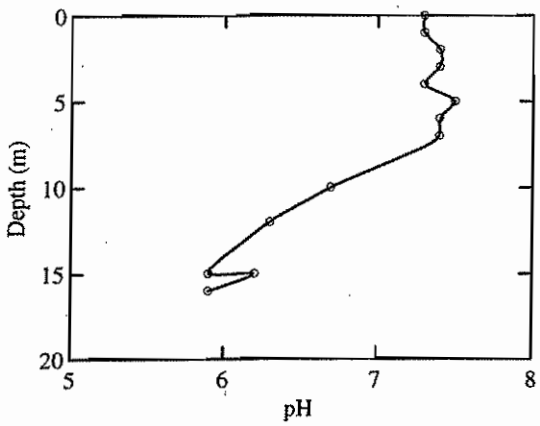
Lake Ki is a very clean, clear oligotrophic lake. Secchi depths have remained consistently deep in the lake while phosphorus and chlorophyll concentrations remain low.

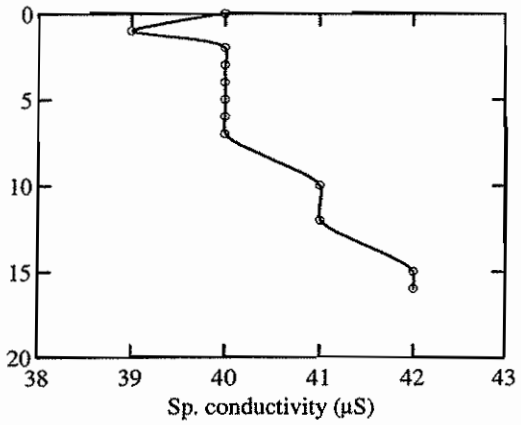
KI


Secchi depth (ft)
0
10
20
30
Apr 97
May 97
May 97
Jun 97
Jul 97
Aug 97
Sep 97
Oct 97
Nov 97


Depth (m)
Temperature (C)


Dissolved Oxygen (mg/L)

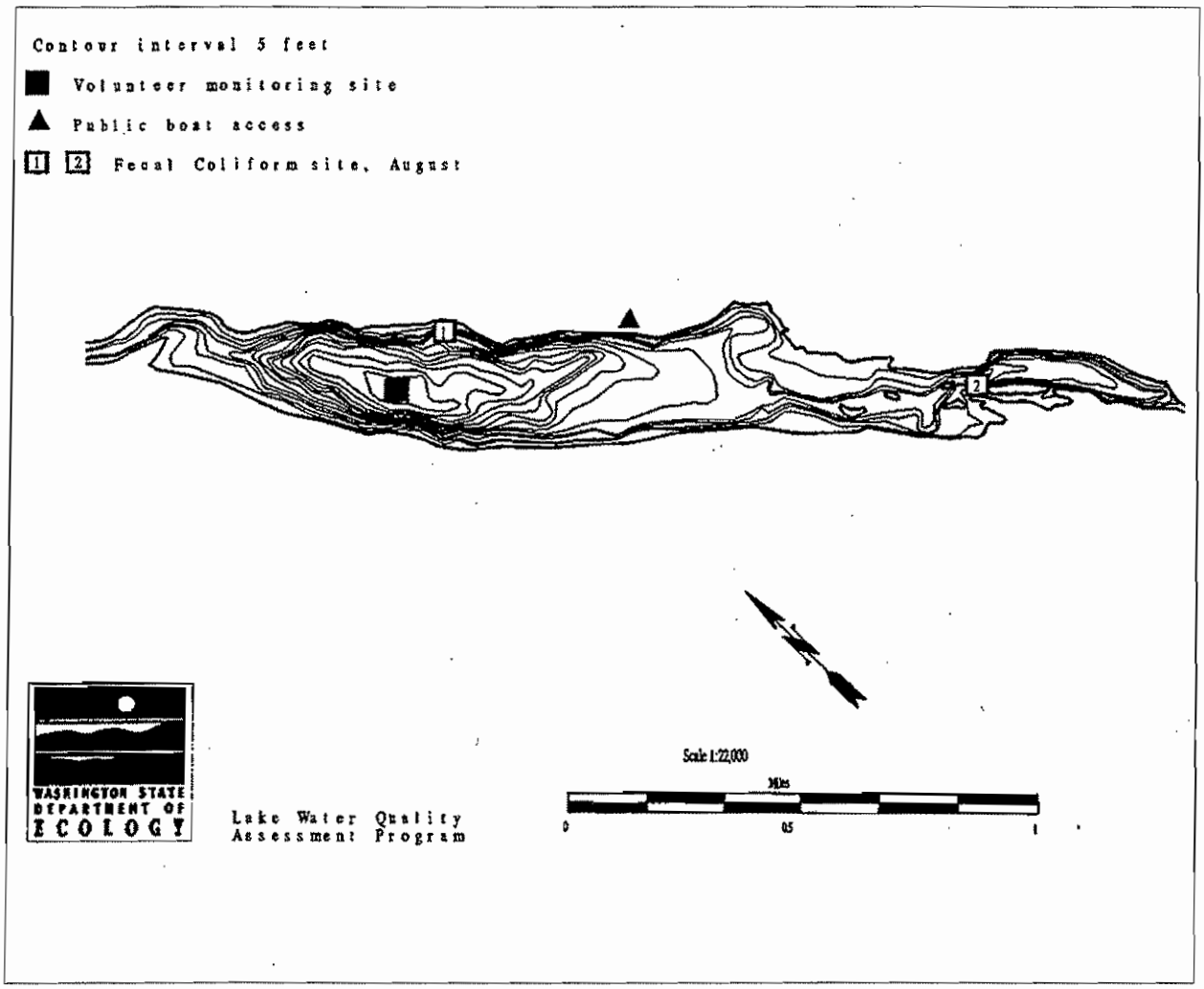

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY LACAMAS (CLARK)

DESCRIPTION Lacamas Lake is located one mile north of Camas. It is formed by two dams in Lacamas Creek. Lacamas Lake is fed by Lacamas Creek, and drains via Round Lake to Lacamas Creek and the Washougal River.

AREA (acres)	315
MAX DEPTH (feet)	65
MEAN DEPTH (feet)	24
DRAINAGE (square miles)	64.
VOLUME (acre-feet)	7489
SHORE LENGTH (miles)	5.34
ALTITUDE (feet)	179



LACAMAS LAKE -- CLARK COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/29	20.0	68.0		Mod Green	10		Light	9.7	0.0	
97/06/20	18.3	64.9	7.5	Milky-grn	50		Light	7.5	0.0	FICAL 12
97/07/09	17.8	64.0		Mod Green	90		Light	4.8	0.0	OX = 12 PPM AT 6" . LARGE AMOUNTS OF PARTICULATE MATTER (ALGAE).
97/08/14	25.0	77.0	7.5	Grn-brown	0	None	Breezy	6.8	6.0	LOTS OF SMALL ALGAE.
97/08/21	21.1	70.0	8.0	Mod Green	90	Heavy	Breezy	6.5	0.0	
97/09/02	21.9	71.4	8.0	Mod Green	0	None	Light	6.0	1.0	HIGH ALGAE COUNT.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/29	E	18	0.61		12	2				
97/05/29	H	36	0.87							
97/09/02	E	39	0.61	23.8						
97/09/02	H	193	0.70							
STATION 2										
97/09/02	E	26								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***poor***. The worst problems were reported as:

1. declining long-term trend 2. suspended sediment 3. algae

Sources of actual or potential problems includes:

ANNUAL WASTE AND RECYCLING IN THE LAKE ITSELF - PLANT DECAY

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***YES(365)*** Aesthetics - ***YES(60)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***NO***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***YES***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***25 TO 30***

Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-29-97 A horrific blue-green algal bloom observed. The lake is reportedly a good brown trout and bass fishery. Very few zooplanton observed in the water samples.

9-2-97 There is a heavy H2S odor in the hypolimnion samples. Duplicate site straight out from launch. Duplicate coordinates = 45 36.813N; 122 25.333W.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	50 (Meso-eutrophic)
Mean Trophic State Index (Total Phosphorus):	54 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	62 (Eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Lacamas Lake is an eutrophic lake rich in nutrients, aquatic macrophytes and algae. All TSI indicators support the eutrophic assessment.

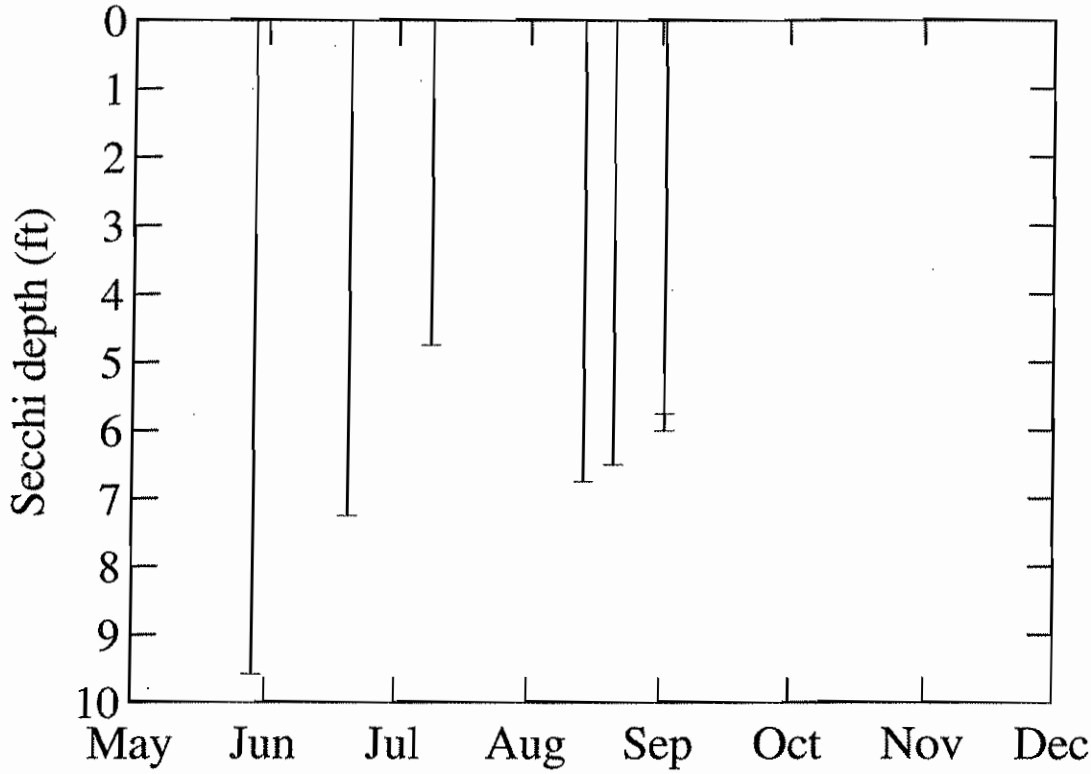
COMMENTS FROM 97/09/03 AQUATIC PLANT SURVEY

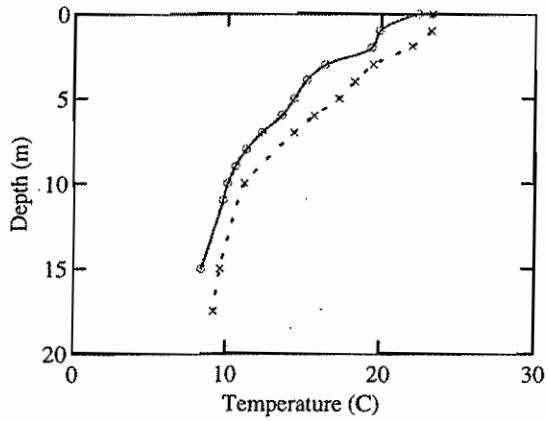
Partly cloudy, calm. Met to 'map' aquatic plants in the lake. Dominant plant was a P. amplifolius hybrid. E. canadensis and Egeria densa present in some dense patches, and dominant in some areas, but not throughout the lake. Bryozoans, otters, waterfowl. Most of shoreline with natural vegetation. Water very green. Maximum depth of plant growth: 4.5M.

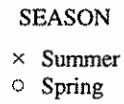
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

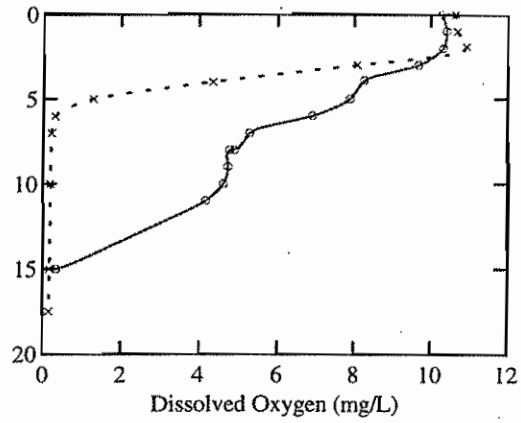
Brasenia schreberi (watershield) *Ceratophyllum demersum* (Coontail; hornwort) *Egeria densa* (Brazilian elodea) *Elodea canadensis* (common elodea) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Najas flexilis* (common naiad) *Nuphar lutea* (yellow water-lily) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Scirpus sp.* (bulrush) *Sparganium angustifolium* (narrowleaf bur-reed)

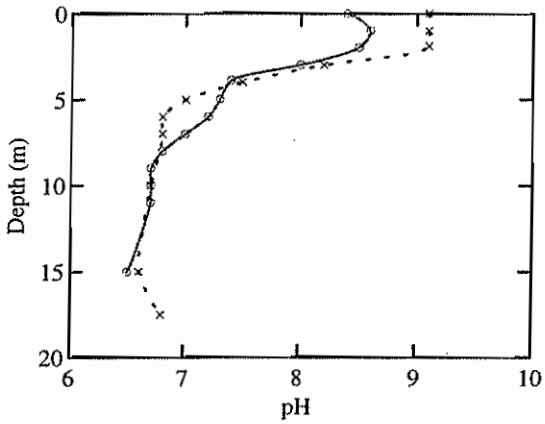
LACAMAS

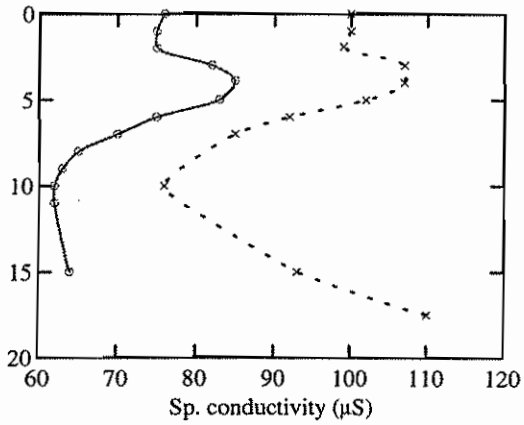

Secchi depth (ft)
0
1
2
3
4
5
6
7
8
9
10
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
5
10
15
20
0
10
20
30
Temperature (C)


SEASON
× Summer
○ Spring


0
5
10
15
20
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)


Depth (m)
0
5
10
15
20
6
7
8
9
10
pH


0
5
10
15
20
60
70
80
90
100
110
120
Sp. conductivity (µS)

LAVENDER

Kittitas County

Lake ID: LAVKI1

Ecoreigon: 4

Lavender is a small lake on the north side of Interstate 90, just west of Cle Elum. There is a public fishing access on the lake.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
	13			
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
		2150	47 12 50.0	121 07 56.0

LAVENDER LAKE -- KITTITAS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 0											
97/05/31					90			11.2	0.0		MILFOIL AROUND LAKE. BEEN ESPECIALLY BAD LAST 2 YEARS. MILFOIL HAS BEEN IN LAKE FOR APPROX. 10 YEARS.
STATION 1											
97/07/24	-6.4	20.5		Lt Green	0	None	Breezy	11.5	0.0		
97/08/24				Milky-grn	100	Mod	Calm	7.0	0.0		
97/09/13	15.0	59.0		Pea-green	0	Heavy	Light	7.5W	147.0		

W - Secchi disk entered weeds

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/31	E	7J	0.05							
97/05/31	H	11	0.06							
97/08/24	E	25	0.25	6.1J						
97/08/24	H	20	0.24							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Eurasion milfoil around most of lake. According to the volunteer: the milfoil has been in the lake for ~10 year, but has been especially bad the last 2 years; rotenone treatment a few years ago; Yakima river is ~100 ft away and the lake flooded in 1995 resulting in an introduction of squawfish.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	46YWN* (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	51 (Meso-eutrophic)
Mean Trophic State Index (Chlorophyll a):	48J* (Meso-eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Meso-eutrophic is the best assessment based on the available data.

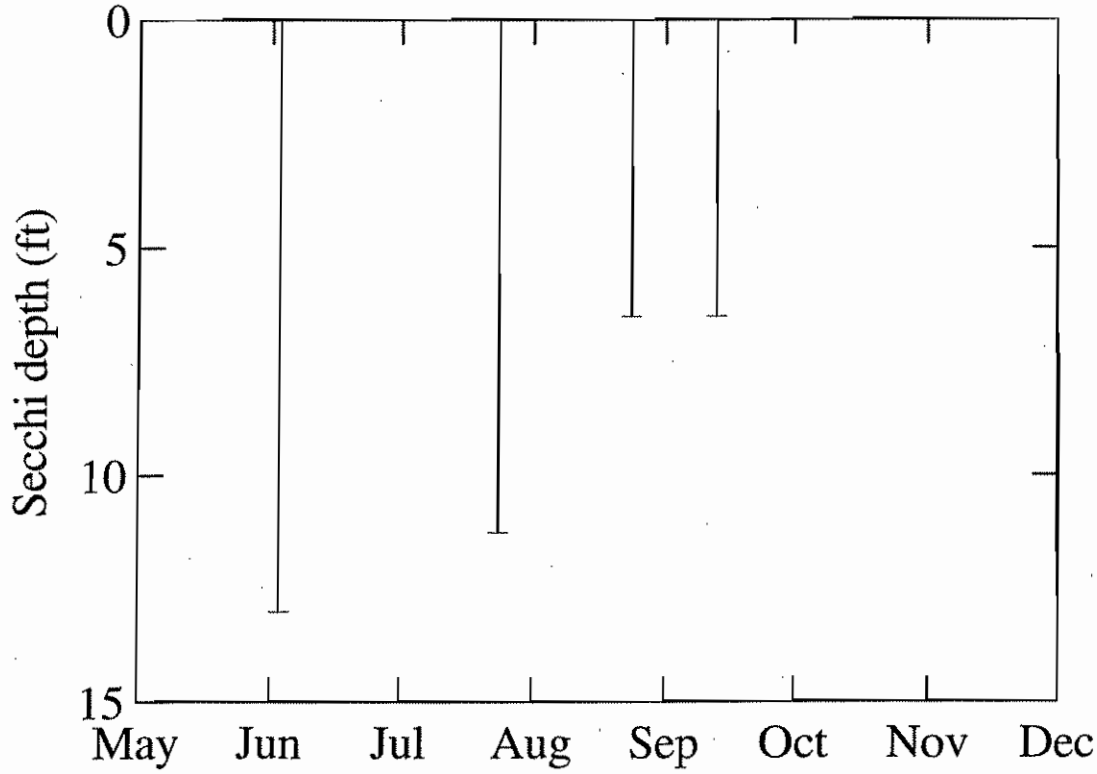
COMMENTS FROM 98/07/27 AQUATIC PLANT SURVEY

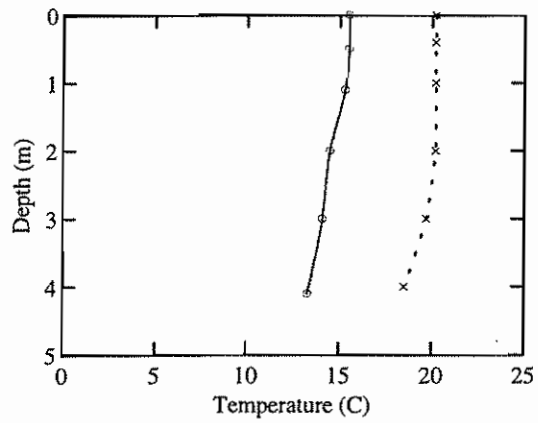
Alkalinity is 12 carbonate, 25 total. Sunny, breeze. Milfoil forms a dense band around lake from 1.5 m to around 3 m deep. Milfoil growth increased from last year, topping out or nearly so, and blooming. Maximum depth of plant growth: 4.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

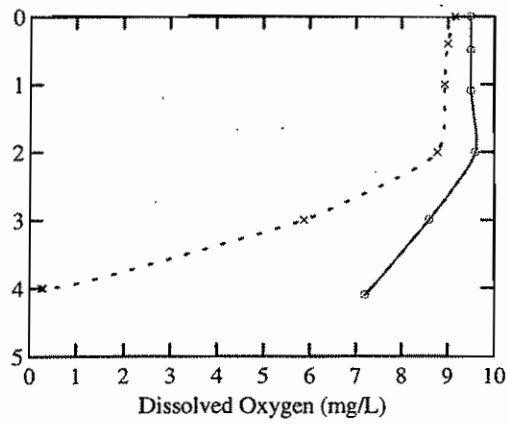
Chara sp. (muskwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Fontinalaceae* (aquatic moss) *Juncus sp.* (rush) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Phalaris arundinacia* (reed canarygrass) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Ranunculus flammula* (creeping buttercup) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail)

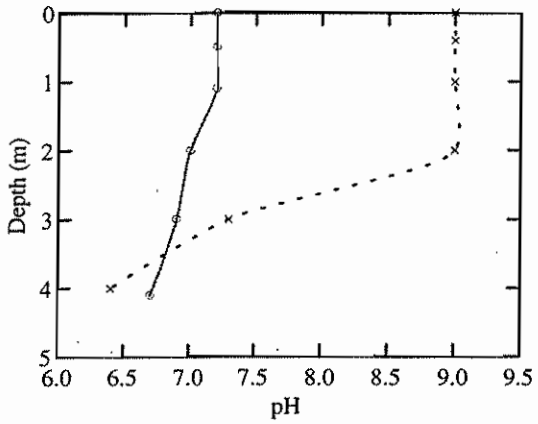
LAVENDER

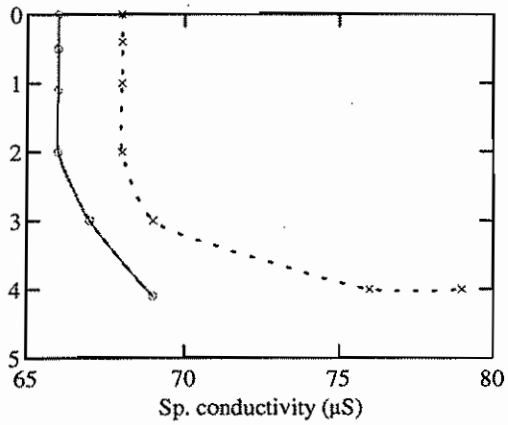




SEASON
× Summer
○ Spring

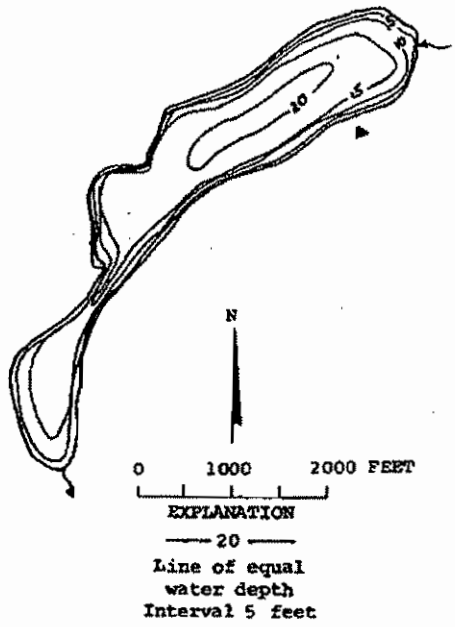






DESCRIPTION

AREA (acres)	107
MAX DEPTH (feet)	20
MEAN DEPTH (feet)	13
DRAINAGE (square miles)	5.7
VOLUME (acre-feet)	1415
SHORE LENGTH (miles)	2.75
ALTITUDE (feet)	190



Leland Lake, Jefferson County. From Washington Department of Game, June 19, 1952.

LELAND LAKE -- JEFFERSON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/26	18.9	66.0	6.5	Amber	100	Light		4.5	13.0	
97/06/15	21.7	71.1	6.5	Amber	100	None	Calm	6.5	11.0	
97/07/02	20.0	68.0	6.5	Amber	75	Light	Calm	7.0	16.0	
97/07/18	22.2	72.0	6.5	Amber	0	None	Calm	7.5	16.0	
97/08/01	22.2	72.0	6.5	Amber	0	None	Calm	8.5	270.0	
97/08/17	26.1	79.0	6.5	Amber	10	None	Calm	8.5	9.5	
97/08/26				Undefined	100	Trace	Calm	6.0	0.0	WATER WAS YELLOW-BROWN.
97/09/21	17.2	63.0	6.5	Grn-brown	0	None	Calm	3.0	11.0	DENSE ALGAE BLOOM.
97/10/05	16.7	62.1	6.5	Amber	90	Heavy	Calm	5.0	14.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/22	E	32								
97/05/22	H	38								
97/08/26	E	36	0.46	12.8						
97/08/26	H	336	1.16							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available***. No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***
Were fish stocked this year? ***NO***
Any lake groups present (such as a lake association)? ***NO***
Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?
Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-22-97 Gave the volunteer a view tube. There was very high water over the winter. Brazilian elodea was much worse this year. An Aphanizomenon bloom observed.

8-26-97 Slight H2S odor in the hypolimnion. An osprey observed.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	51 (Meso-eutrophic)
Mean Trophic State Index (Total Phosphorus):	56 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	56 (Eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

All TSI values, field observations and profile data support an eutrophic assessment.

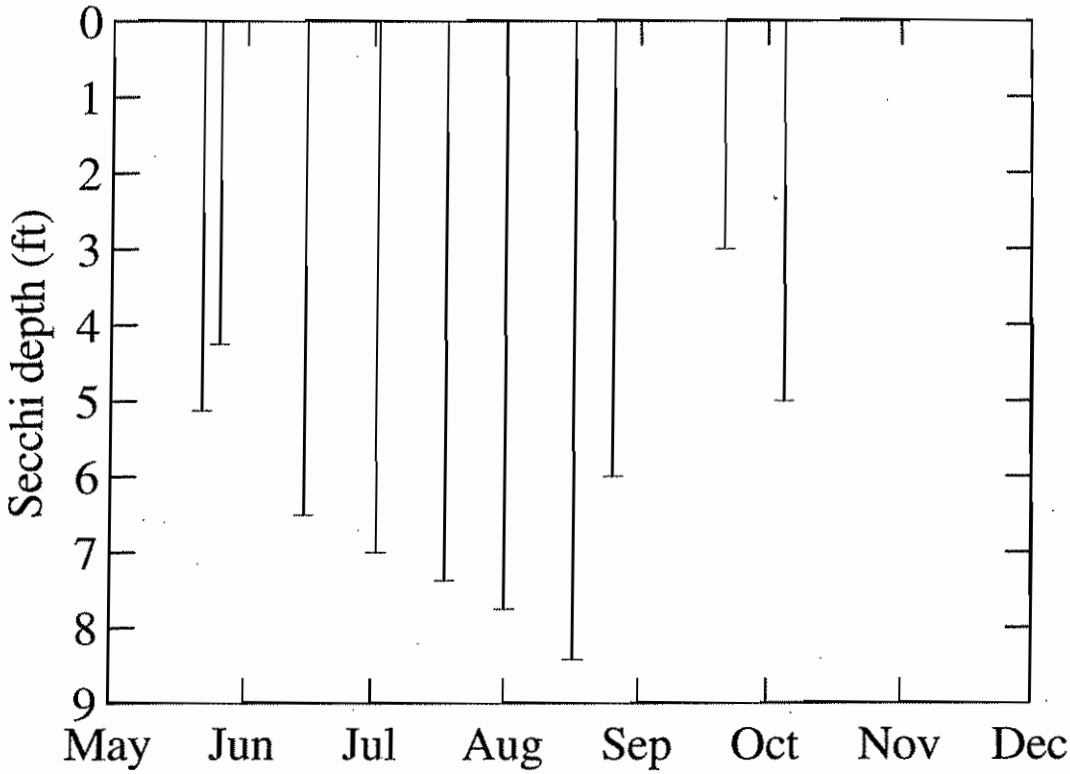
COMMENTS FROM 98/09/03 AQUATIC PLANT SURVEY

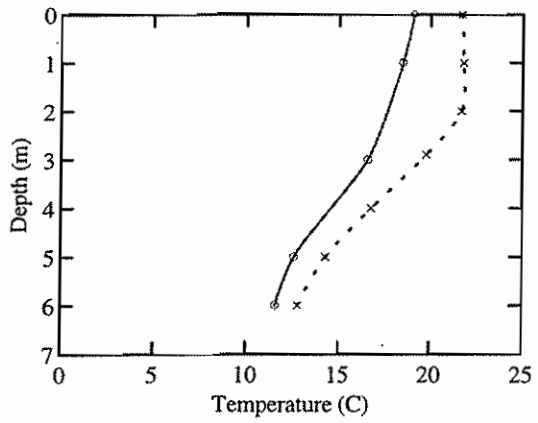
Sunny, calm. Visited to do vegetation survey for Kirk Smith. Egeria still patchy in main part of lake, though well distributed. Also plentiful P. praelongus and P. robbinsii. Egeria not at surface in most of lake, though dense below surface at the west end. Maximum depth of plant growth: 3.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

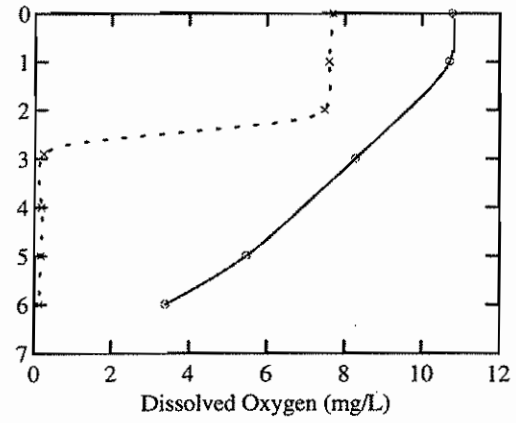
Carex sp. (sedge) *Ceratophyllum demersum* (Coontail; hornwort) *Ceratophyllum sp.* (coontail) *Egeria densa* (Brazilian elodea) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Iris pseudacorus* (yellow flag) *Lysimachia nummularia* (creeping loosestrife) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Sagittaria sp.* (arrowhead) *Scirpus acutus* (hardstem bulrush) *Scirpus sp.* (bulrush) *Sparganium angustifolium* (narrowleaf bur-reed) *Sparganium sp.* (bur-reed) *Spirodela polyrhiza* (great duckweed) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *Utricularia vulgaris* (common bladderwort) *Wolffia sp.* (water-meal) *Zizania aquatica* (wild rice) *aquatic Bryophyte* (moss or liverwort)

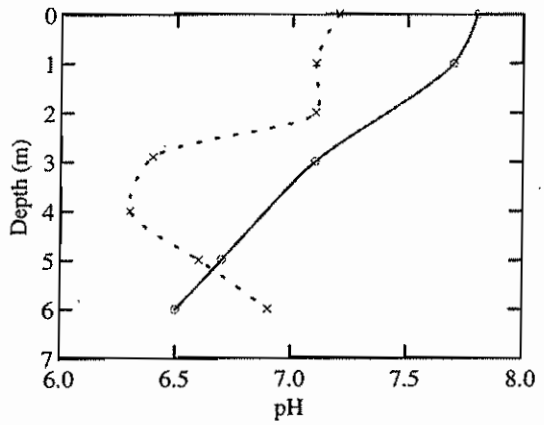
LELAND

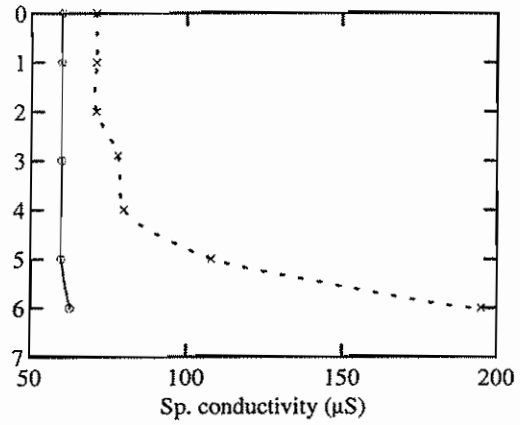




SEASON
× Summer
○ Spring







LENORE

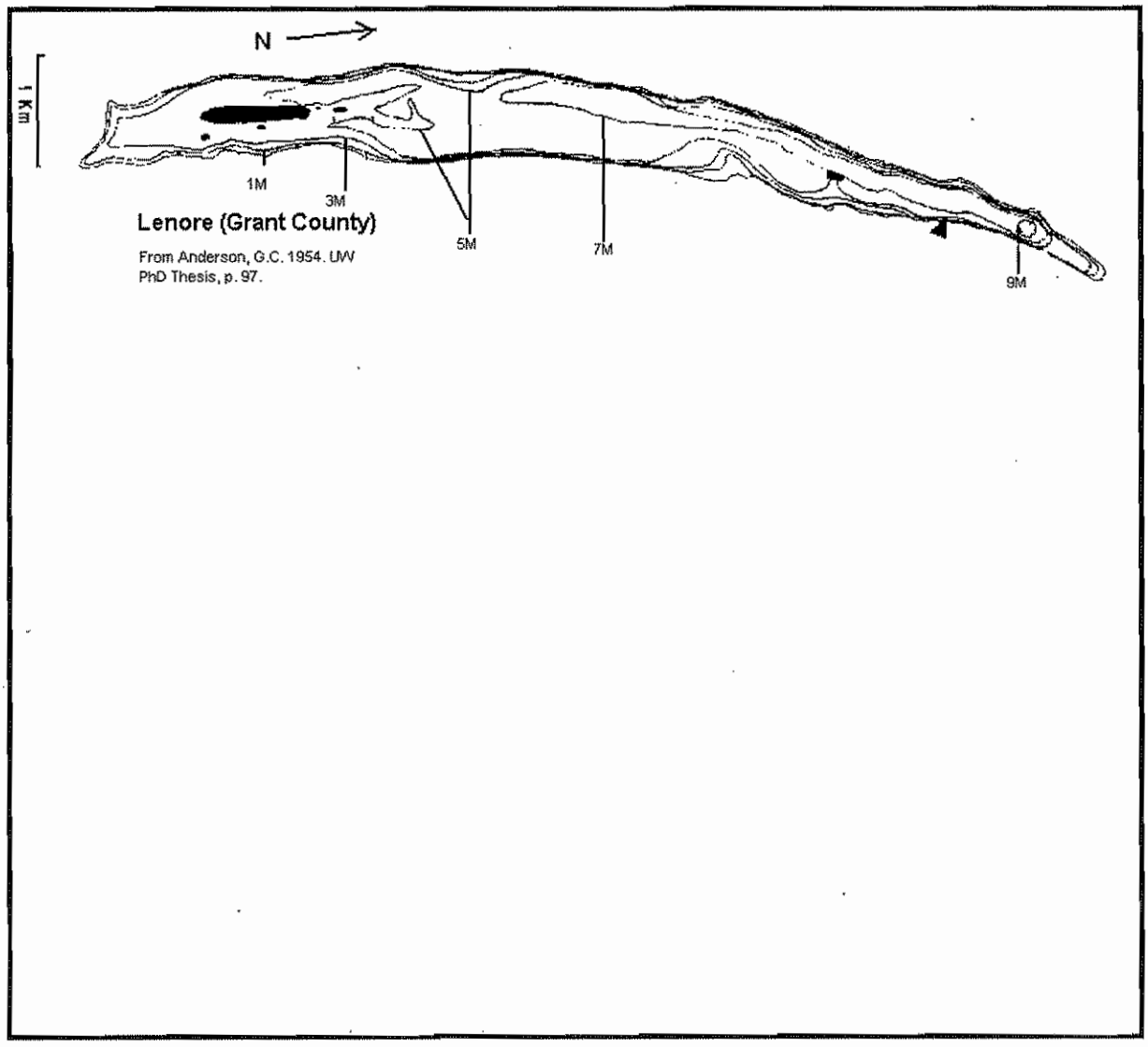
GRANT County

Lake ID: LENGR1

Ecoreigon: 7

Lake Lenore is a highly saline lake characterized by possessing a prime cutthroat trout fishery. The lake is one in a chain of lakes in the Lower Grand Coulee.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
1300	27	15	367	
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
20000	14.39	1075	47 27 03.	119 31 10.



LENORE LAKE -- GRANT COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/05/21					0			13.5	0.0		ALGAE COLONIES VISIBLE. WATER LEVEL IS DOWN 1-2 FEET. LOTS OF COPEPODS IN 2 TO 4 METERS. A FEW LARGE DAPHNIA AT 6 METERS

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/22	E	59	0.74							
97/08/19	E	59	0.94	13.7			3.0			

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

In spring: algae colonies were visible; water level was ~1-2 ft below deposited salts on the shoreline. Many small green-red copepods in 2 and 4M casts; a few large Daphnia at 6M. Not stratified at summer sampling; algae bloom evident; many cladocerans and copepods in samples.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	40N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	63 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	56 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although there weren't enough Secchi dips to make an accurate Secchi TSI, all other indicators suggest a very productive lake. DO concentrations in the summertime hypolimnion are not indicative of an eutrophic lake, therefore, an assessment of

meso-eutrophic is justified.

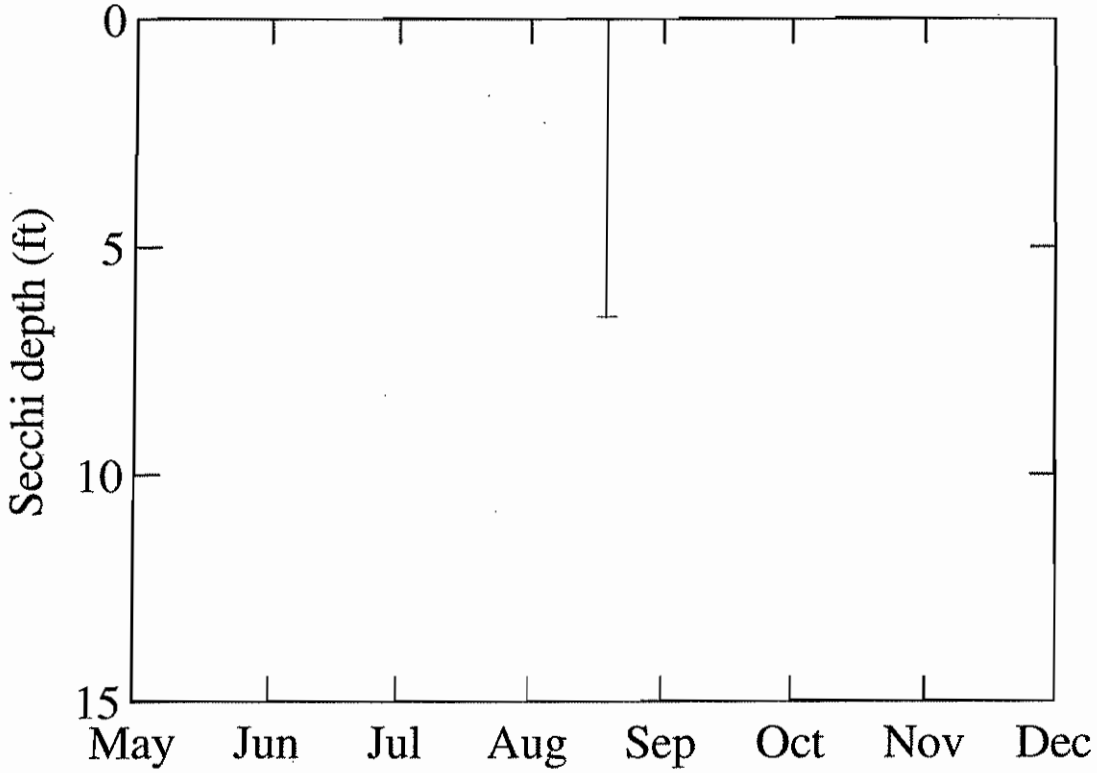
COMMENTS FROM 96/07/17 AQUATIC PLANT SURVEY

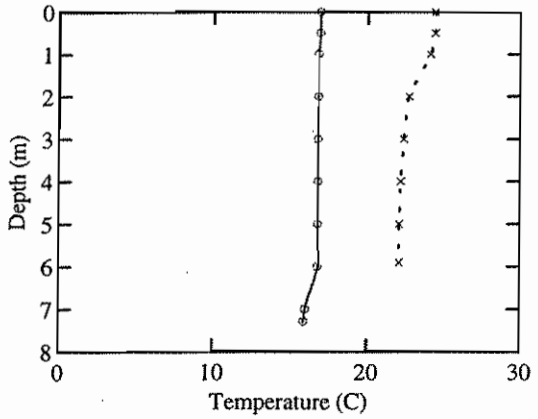
sunny, calm at first then got really WINDY so did not do boat survey on south 1/3 of lake, looked from shore there. No plants in shallows unless in a protected area. Thick Ruppia in deeper water. Water level fluctuates from pumping, appears low now. Algae on plants thick. Alkalinity 138 mg/l carbonate, 503 mg/l bicarbonate. 741 mg/l total. Maximum depth of plant growth: 2.0M.

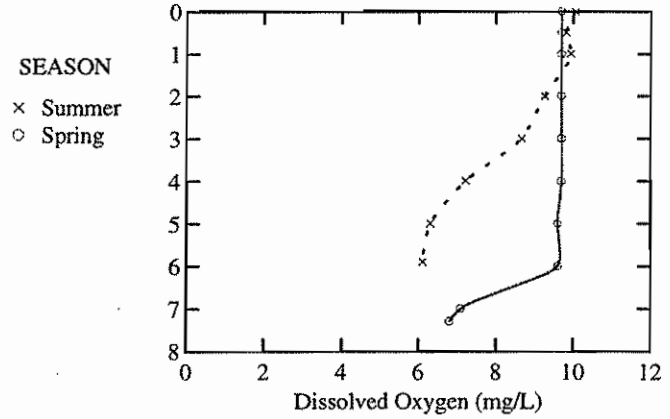
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Potamogeton pectinatus (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Ruppia maritima* (ditch-grass) *Scirpus acutus* (hardstem bulrush) *Scirpus americanus* (american bulrush) *Scirpus maritimus* (seacoast bulrush)

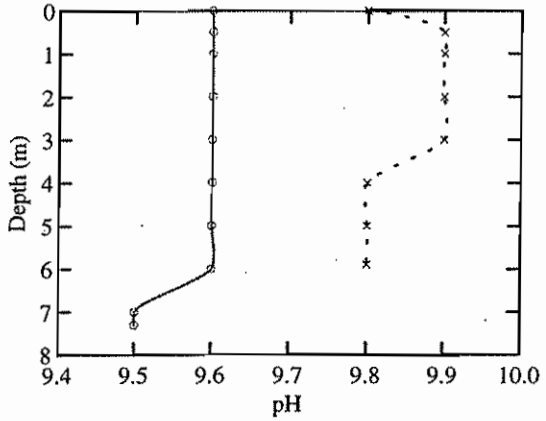
LENORE

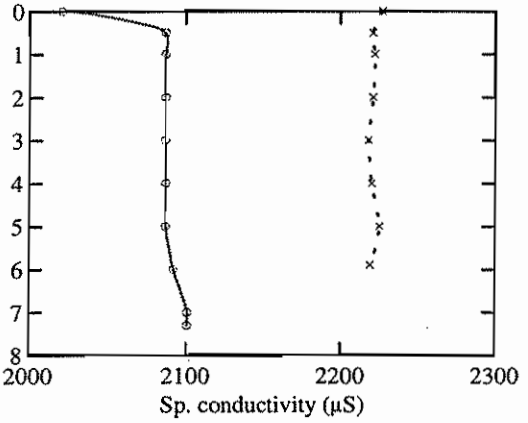

Secchi depth (ft)
0
5
10
15
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring

Dissolved Oxygen (mg/L)

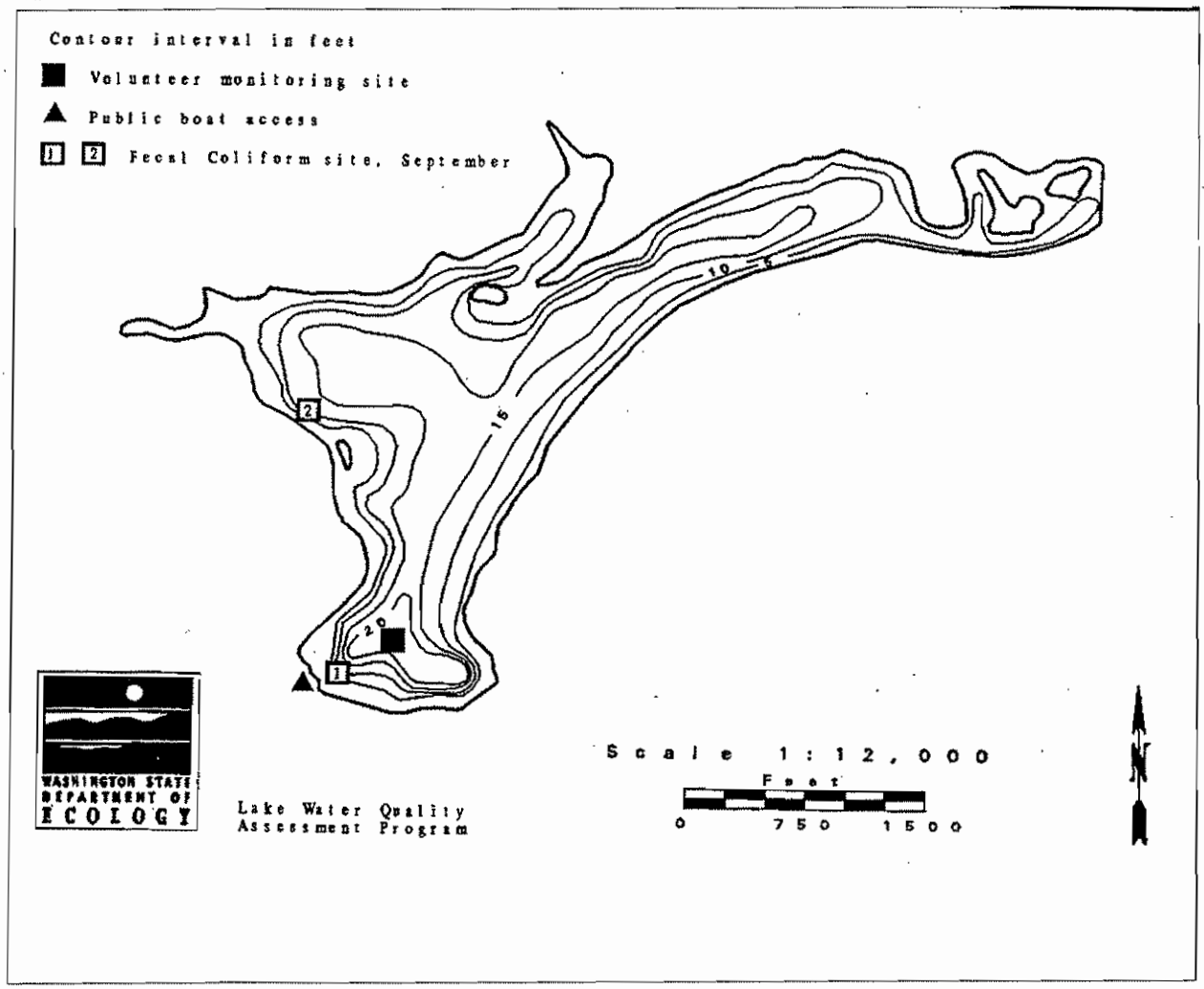

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY LIMERICK (MASON)

DESCRIPTION Lake Limerick is located about five miles northeast of Shelton. It was formed in 1966 by impoundment of Cranberry Creek. Lake Limerick is fed mainly by Cranberry Creek, as well as three other minor inlets.

AREA (acres)	129
MAX DEPTH (feet)	24
MEAN DEPTH (feet)	9
DRAINAGE (square miles)	13.
VOLUME (acre-feet)	1210
SHORE LENGTH (miles)	4.39
ALTITUDE (feet)	220



LIMERICK LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/05/17	18.9	66.0		Lt Brown	100	Light	Calm	11.4	15.0		
97/06/10	21.1	70.0	6.5	Lt Brown	0	None	Calm	13.3	180.5		
97/07/11	21.1	70.0	6.5	Lt Brown	75	Trace	Calm	10.4	15.0		
97/07/22	22.2	72.0	7.0	Lt Brown	0	None	Calm	9.0	11.0		
97/08/05	25.6	78.1	6.5	Lt Brown	0	None	Calm	9.2	9.5		
97/08/19	22.2	72.0	6.5	Lt Brown	100	None	Calm	6.0	8.0		
97/09/01				Amber	50	None	Light	6.3	0.0		
97/09/23	18.9	66.0	7.0	Lt Brown	0	None	Calm	10.5	14.0		
97/10/07	15.0	59.0	7.0	Lt Brown	100	None	Calm	7.0	15.0		
STATION 8											
97/09/02	22.2	72.0	6.5	Lt Brown	0	Trace	Calm	8.2	8.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/27	E	8	0.15							
97/09/01	E	14	0.23	7.3						
97/09/01	H	30	0.47							
STATION 2										
97/05/27	E	9	0.13							
97/09/01	E	15	0.23							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-27-97 The lake was treated with SONAR the previous year.

9-1-97 H2S odor in the hypolimnion

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	44Y* (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	43 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	50 (Meso-eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Lake Limerick is a very productive lake rich in aquatic macrophytes. Since it is a reservoir, the typical nutrient concentration expected in an eutrophic lake is not observed. DO concentrations are depleted only at the very bottom of the hypolimnion and the lake did not thermally stratify in 1997. All factors support a meso-eutrophic assessment.

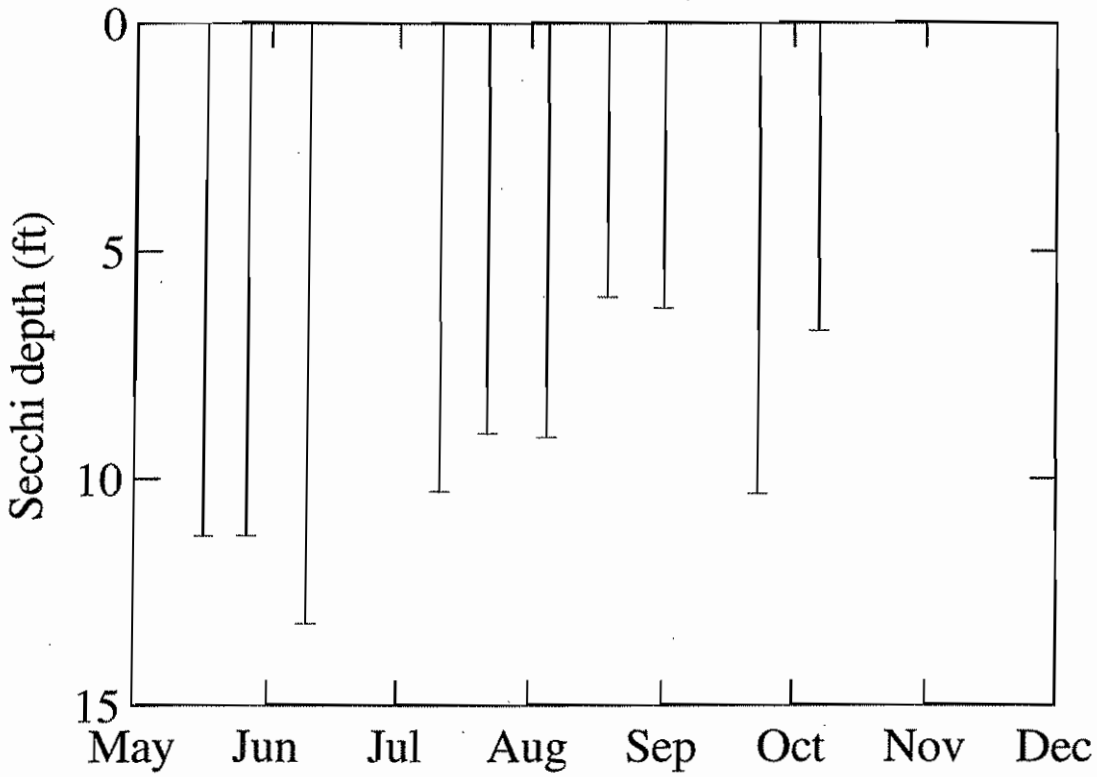
COMMENTS FROM 98/07/08 AQUATIC PLANT SURVEY

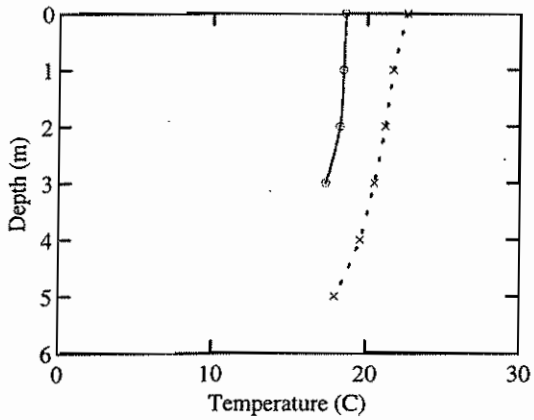
Partly cloudy, calm. Vegetation survey done for Kirk Smith. Bullfrog. Did not survey whole shoreline carefully. Patches of dense P. amplifolius, thin leaved pondweed, many aeas with much algae and few plants. Egeria densa found during snorlke at launch in water ~ 2 m deep, widely scattered small plants, at islands patchy, some dense growth Maximum depth of plant growth: 2.5M.

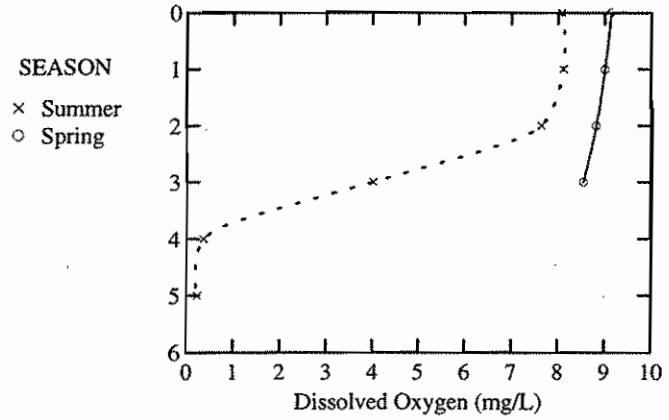
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

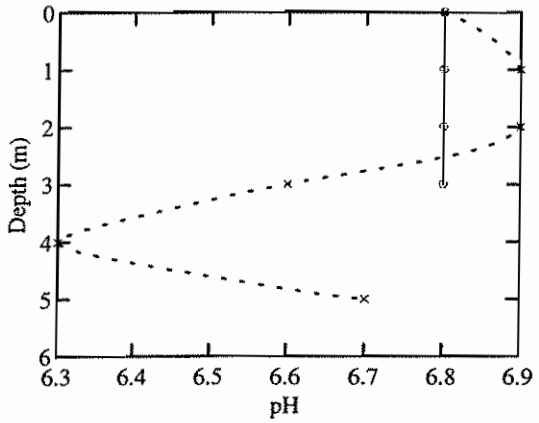
Alisma plantago-aquatica (American water-plantain) *Brasenia schreberi* (watershield) *Callitriche stagnalis* (pond water-starwort) *Carex sp.* (sedge) *Chara sp.* (muskwort) *Dulichium arundinaceum* (Dulichium) *Egeria densa* (Brazilian elodea) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Isoetes sp.* (quillwort) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Lemna minor* (duckweed) *Ludwigia palustris* (water-purslane) *Myriophyllum hippuroides* (western watermilfoil) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Polygonum hydropiperoides* (common smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potamogeton zosteriformis* (eel-grass pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Sparganium sp.* (bur-reed) *Typha sp.* (cat-tail) *Utricularia inflata* (big floating bladderwort) *Utricularia sp.* (bladderwort) *Vallisneria americana* (water celery) *unknown plant* (unknown) *unknown plant 2* (unknown)

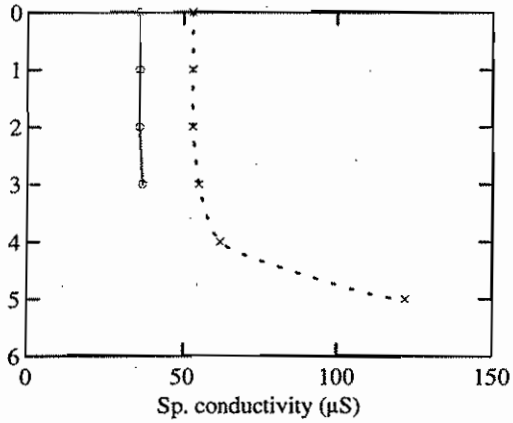
LIMERICK


Secchi depth (ft)
0
5
10
15
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring
Dissolved Oxygen (mg/L)

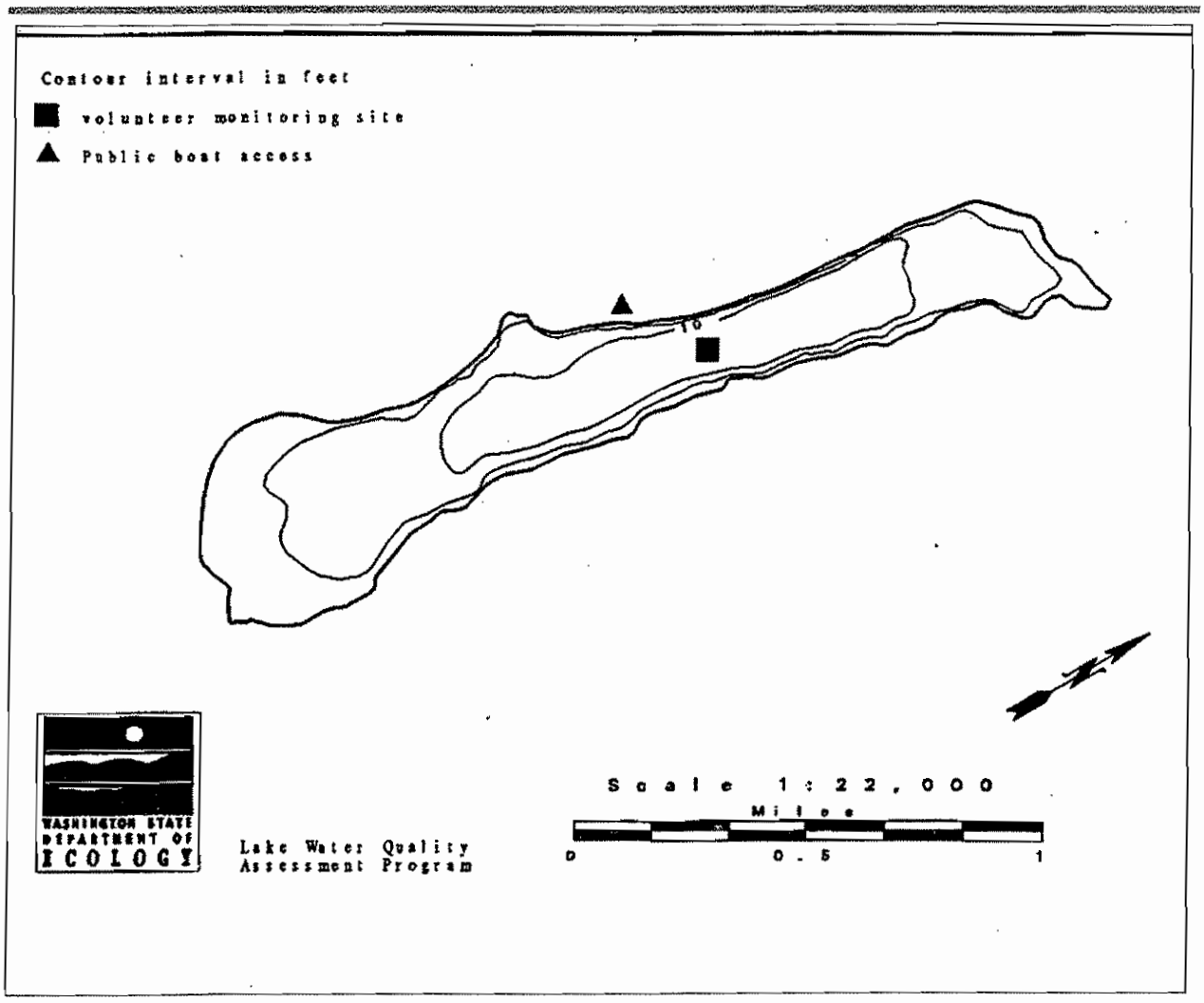

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY LONG (KITSAP)

DESCRIPTION Long Lake is located 3.5 miles southeast of Port Orchard. It is two miles long. The lake is fed principally by Salmonberry Creek, and drains via Curley Creek to Yukon Harbor.

AREA (acres)	339
MAX DEPTH (feet)	12
MEAN DEPTH (feet)	6
DRAINAGE (square miles)	9.3
VOLUME (acre-feet)	2180
SHORE LENGTH (miles)	5.07
ALTITUDE (feet)	118



LONG LAKE -- KITSAP COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/08/26				Pea-green	100	None		4.0	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/22	E	27	0.43							
97/08/26	E	37	0.50	23.4						
STATION 2										
97/05/22	E	34	0.46							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. The worst problems were reported as:

1. excessive aquatic plants 2. algae

Sources of actual or potential problems includes:

EXCESSIVE AQUATIC PLANT GROWTH.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year?	***NO***
Were fish stocked this year?	***NO***
Any lake groups present (such as a lake association)?	***YES***
Any lake management activities this year?	***NO***

OTHER----------

How many homes/new homes are there on the lake shore?

Changes since last year? ***LOTS OF NEW HOMES.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-22-97 Lots of Daphnia in water samples.

8-26-97 Hundreds of barn swallows flying over the water.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	57N* (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	56 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	61 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Long Lake is a very productive lake. All observations and TSI values support an eutrophic assessment.

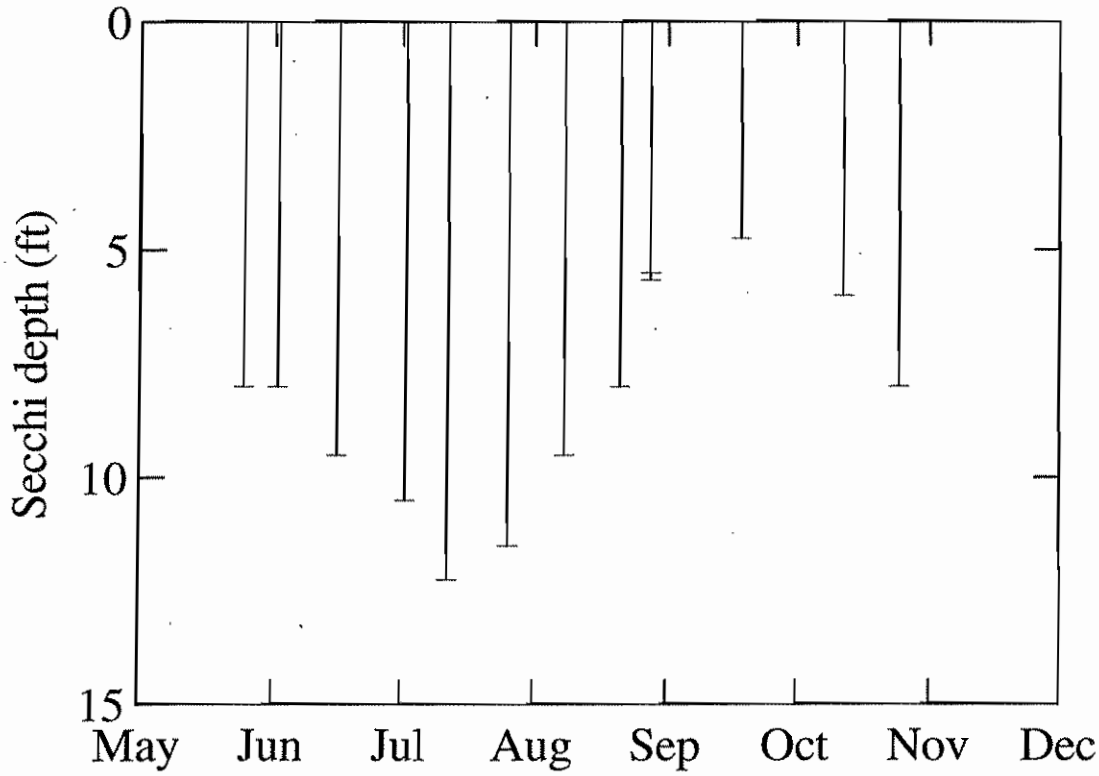
COMMENTS FROM 97/08/28 AQUATIC PLANT SURVEY

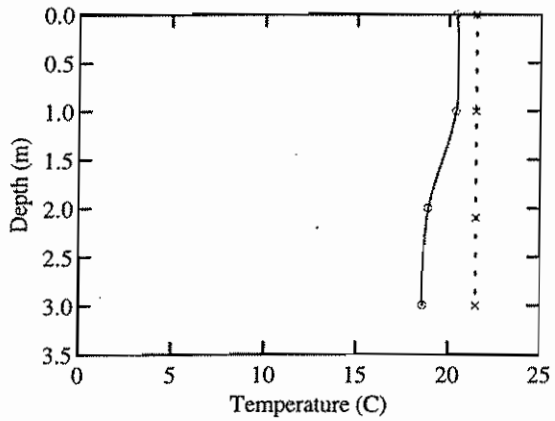
Partly sunny, breeze. Met with Stuart, Heather & Leslie (?) from Kitsap Co to go over plant ID. Went to south and north ends. Didn't spend time or survey in between. Water very turbid, plants not growing very deep.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

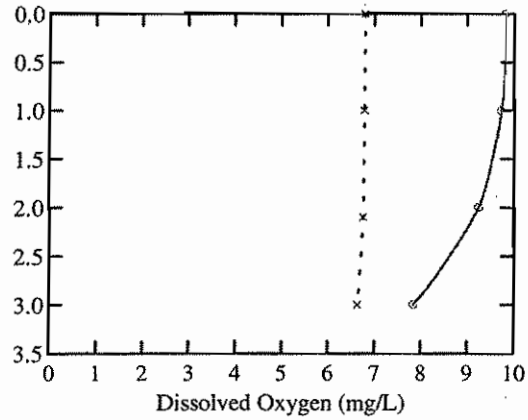
Brasenia schreberi (watershield) *Callitriche sp.* (water-starwort) *Ceratophyllum demersum* (Coontail; hornwort) *Chara sp.* (muskwort) *Egeria densa* (Brazilian elodea) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Epilobium sp.* (willow herb) *Equisetum sp.* (horse tail) *Hydrocotyle ranunculoides* (water-pennywort) *Iris pseudacorus* (yellow flag) *Limosella acaulis* (mudwort) *Lythrum salicaria* (purple loosestrife) *Myriophyllum spicatum* (Eurasian water-milfoil) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nuphar sp.* (yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Nymphaea sp.* (water lily) *Polygonum hydropiperoides* (common smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton crispus* (curly leaf pondweed) *Potamogeton foliosus* (leafy pondweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton pusillus* (slender pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *unknown plant* (unknown)

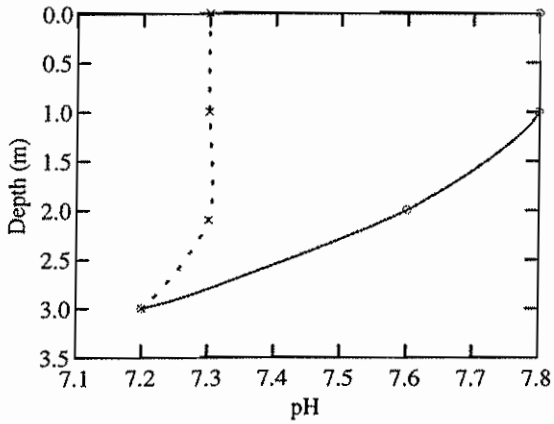
LONG

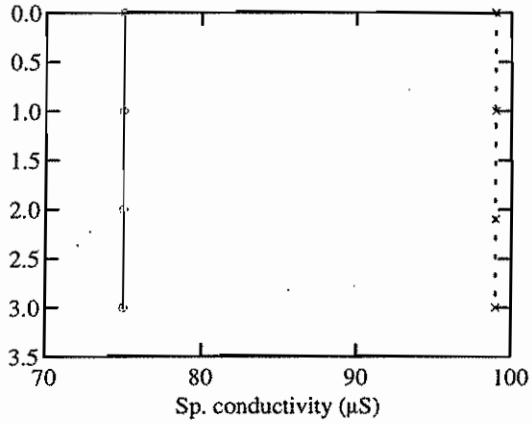




SEASON
× Summer
○ Spring



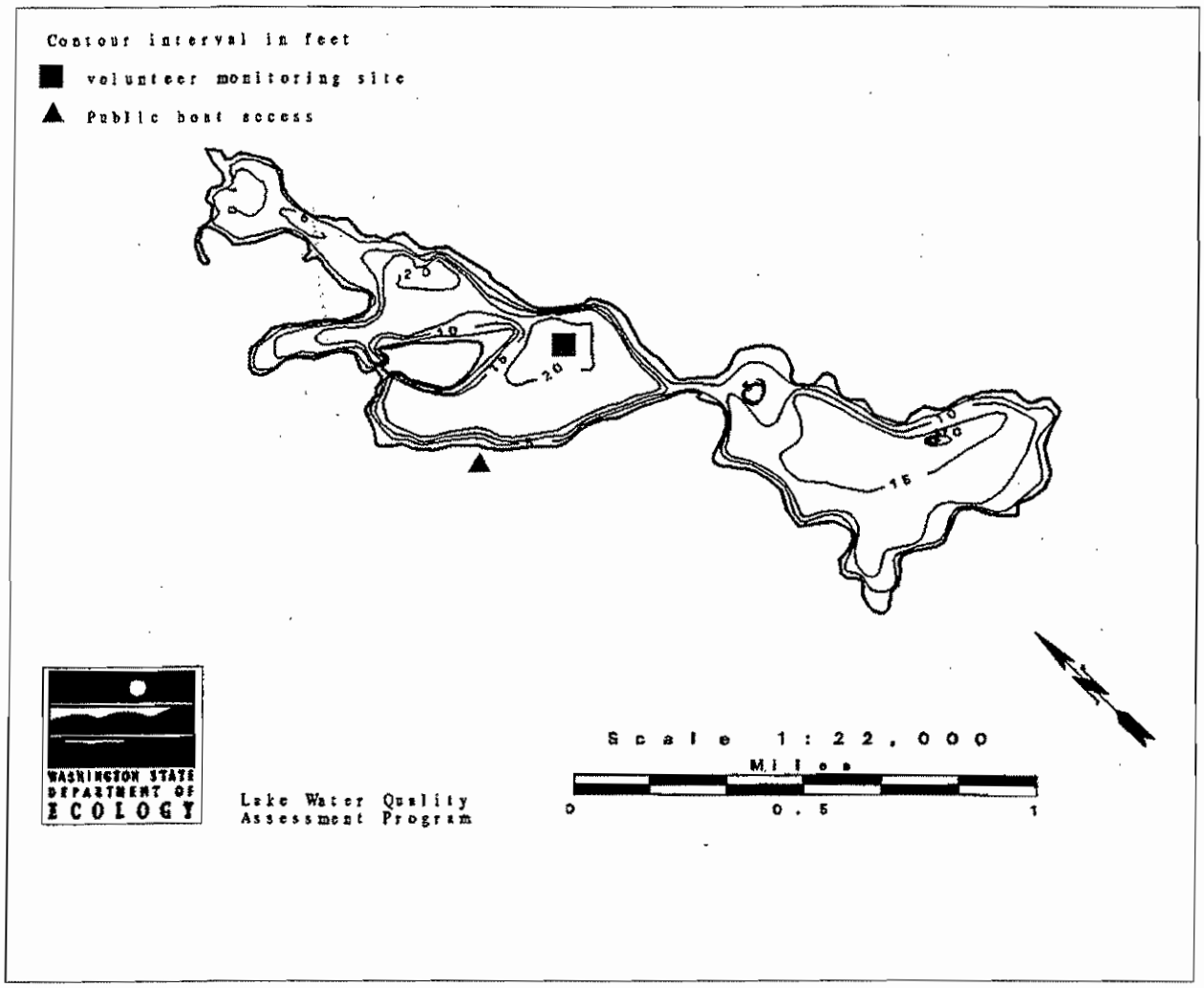




LAKECOUNTY LONG (THURSTON)

DESCRIPTION Long Lake is located 5.5 miles east of Olympia. It consists of two basins, which are connected by a narrow neck. It is two miles long and has two islands, Holmes Island (13 acres) and Kirby Island (2.4 acres). Long Lake is fed by Pattison Lake and drains via Himes/Woodland Creek and Lois Lake to Henderson Inlet.

AREA (acres)	330
MAX DEPTH (feet)	21
MEAN DEPTH (feet)	12
DRAINAGE (square miles)	8.2
VOLUME (acre-feet)	3900
SHORE LENGTH (miles)	7.08
ALTITUDE (feet)	153



LONG LAKE -- THURSTON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/10	18.9	66.0		Grn-brown	50	None	Breezy	7.0J	3.0	LAKE LEVEL VERY HIGH.
97/05/25	20.0	68.0		Grn-brown	100		Light	8.0	1.0	GREEN PAINT ALGAE.
97/06/02				Grn-brown	100	Light	Light	8.0	-2.0	
97/06/16	21.1	70.0		Grn-brown	10	None	Calm	10.0	-5.0	
97/07/02	22.8	73.0		Grn-brown	0	None	Light	11.0	-8.0	
97/07/12	22.8	73.0		Grn-brown	0	None	Calm	12.5	-10.0	
97/07/26	23.9	75.0		Grn-brown	50	None	Light	12.0	-12.0	ALGAE (BRIGHT GREEN FRAGMENTS IN WATER).
97/08/08	25.6	78.1		Grn-brown	50	None	Light	10.0	13.5	DISCOVERED MILFOIL OFF MY FLOAT.
97/08/21	24.4	75.9		Grn-brown	75	Light	Light	8.0	13.5	LARGE BAND 25' WIDE FOUND 200' OFF MY DOCK.
97/08/28	21.1	70.0		Grn-brown	100	Light	Light	5.5	-12.0	ALGAE PRESENT IN WATER.
97/09/18	17.8	64.0		Grn-brown	100	Heavy	Breezy	5.0	-11.0	MORNING GREEN SCUM ON WATER.
97/10/12	15.6	60.1		Grn-brown	50	None		6.0	-10.0	HEAVY RAIN FOR 3 WEEKS.
97/10/25	13.3	55.9		Grn-brown	50	None	Calm	8.0	-9.2	ALGAE ON SURFACE.

J - Estimate or QC requirements were not met

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

8-28-97 Many macrophytes observed.
Information regarding water chemistry and other lake data was provided by Thurston County Environmental Health.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	46 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although Secchi data may suggest a mesotrophic lake, data provided by Thurston County Environmental Health suggests a lake that is more nutrient rich than the Secchi readings might imply. Summertime phosphorus concentrations are quite elevated and dissolved oxygen concentrations are depleted, especially in the hypolimnion. Substantial blue-green algal blooms and abundant macrophyte densities further support an eutrophic assessment for Long Lake.

COMMENTS FROM 95/11/02 AQUATIC PLANT SURVEY

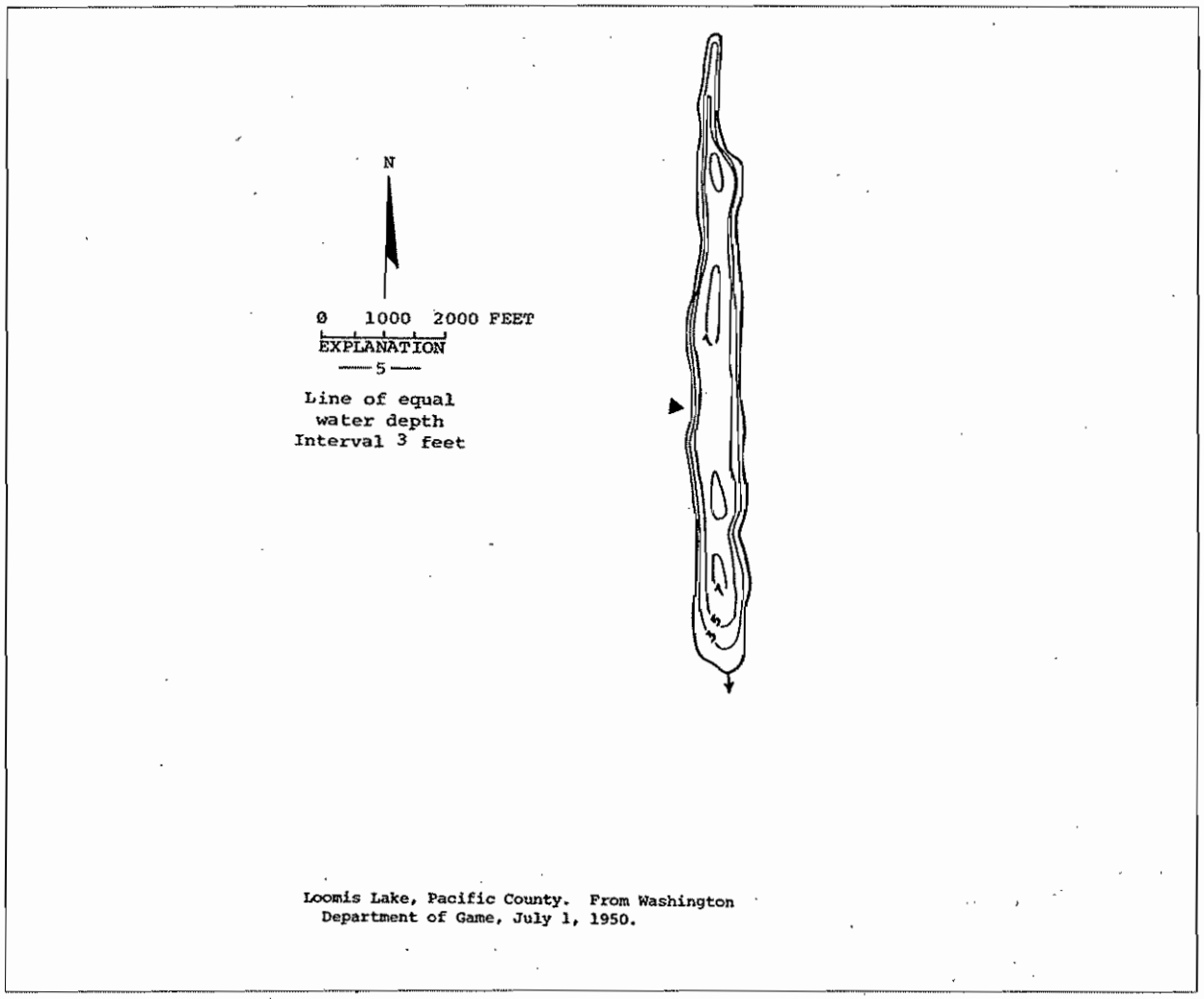
visited to observe installation of bottom barrier. collected more of the milfoil, not sure what species it is

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Iris pseudacorus (yellow flag) *Myriophyllum sp.* (water-milfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Nitella sp.* (stonewort) *Nuphar lutea* (yellow water-lily) *Typha sp.* (cat-tail)

DESCRIPTION

AREA (acres)	165
MAX DEPTH (feet)	9
MEAN DEPTH (feet)	5
DRAINAGE (square miles)	1.4
VOLUME (acre-feet)	825
SHORE LENGTH (miles)	4.32
ALTITUDE (feet)	17



Loomis Lake, Pacific County. From Washington Department of Game, July 1, 1950.

LOOMIS LAKE -- PACIFIC COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/26	19.0	66.2		Amber	0	Trace	Calm	5.5	-38.1	DEPTH AT MEASUREMENT SITE 83 INCHES
97/06/09	19.0	66.2		Mod Green	0	None	Light	5.5	-36.5	
97/06/23	19.0	66.2		Amber	50	Heavy	Light	5.5	-36.0	AT BEST SIGHT DEPTH 96 INCHES.
97/07/07	23.0	73.4		Lt Brown	25	Mod	Light	5.0	-39.0	MILLFOIL AROUND 3 TO 4 FEET TALL.
97/07/21	21.0	69.8		Mod Green	75	Trace		4.0	2.0	
97/08/04	24.0	75.2		Mod Green	0	None	Calm	3.3	-42.5	
97/08/18	22.0	71.6		Mod Green	50	None	Calm	5.5	0.0	
97/09/02	22.0	71.6		Mod Green	0	None	Calm	4.5	-43.5	
97/09/15	18.0	64.4		Mod Green	25	Mod	Breezy	4.0	-42.5	
97/09/29	17.0	62.6		Mod Green	10	Light	Calm	5.5	-40.5	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/08/21	E	36	0.49	4.9	8	3				
97/08/21	H									

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good.*** The worst problems were reported as:

1. algae 2. declining long-term trend

Sources of actual or potential problems includes:

SEPTIC SYSTEM DRAINAGE FROM LAND DEVELOPMENT

Were there days (and how many) when poor water quality impaired

Fishing - ***YES(30)*** Swimming - ***NO(0)*** Aesthetics - ***YES(30)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***20***

Changes since last year? ***NO***

Lake Uses and Facilities at the lake include:

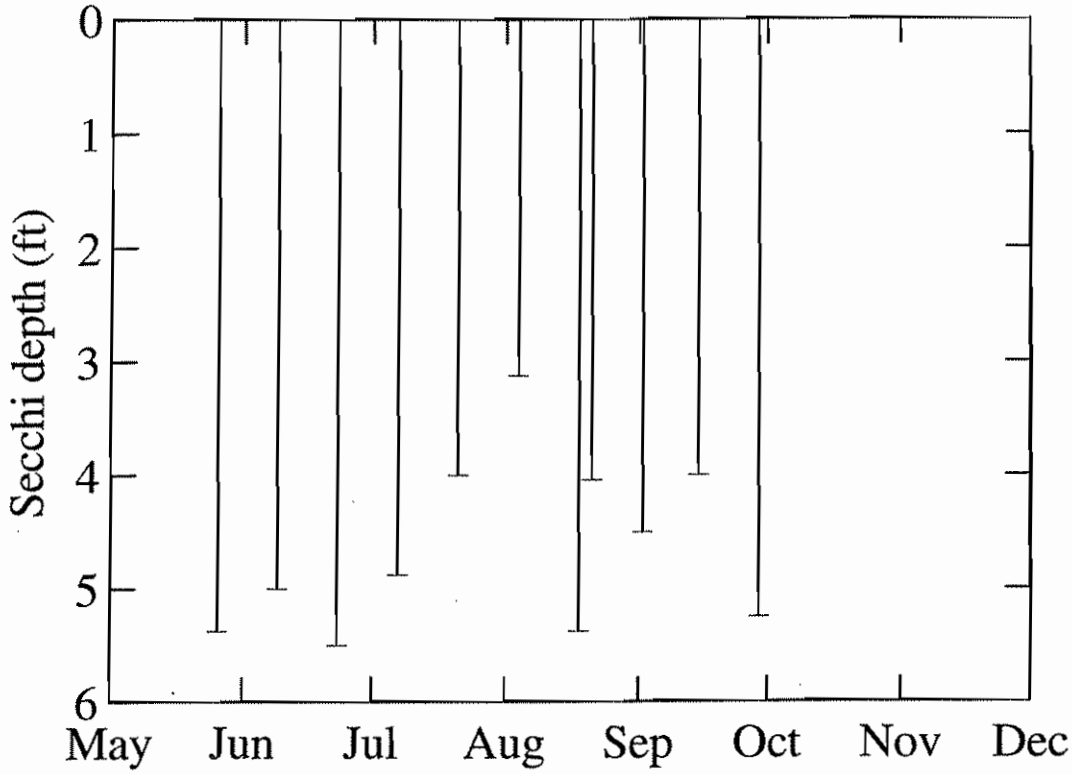
fishing jet skiing

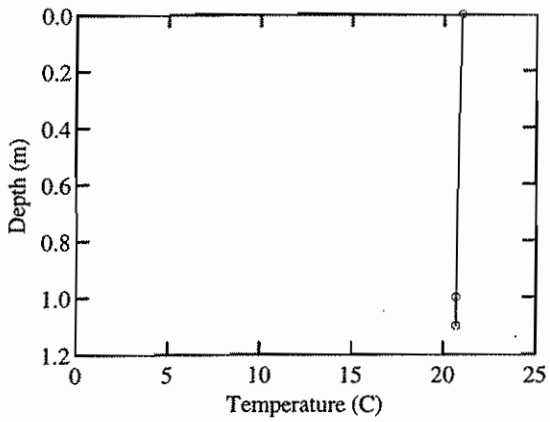
The percent of the lakeshore that is sewered: ***0***

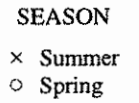
The number of storm drains leading to the lake: ***0***

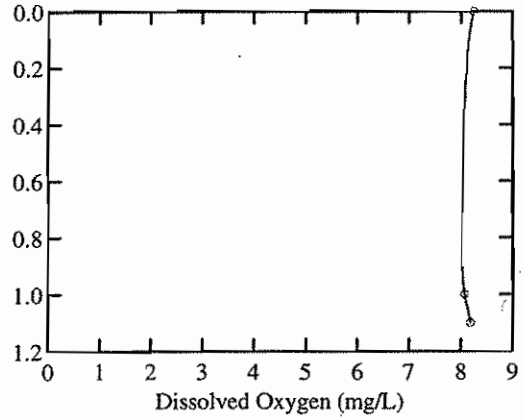
Motor boat restrictions include: ***no restrictions.***

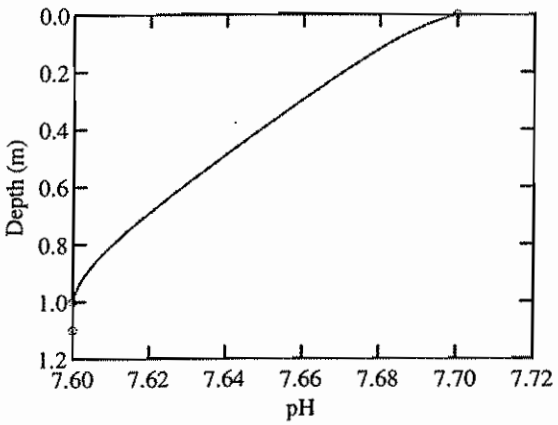
LOOMIS

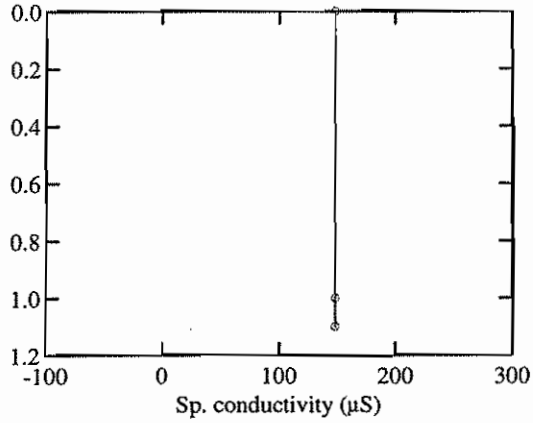

Secchi depth (ft)
0
1
2
3
4
5
6
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
5
10
15
20
25
Temperature (C)


SEASON
× Summer
○ Spring

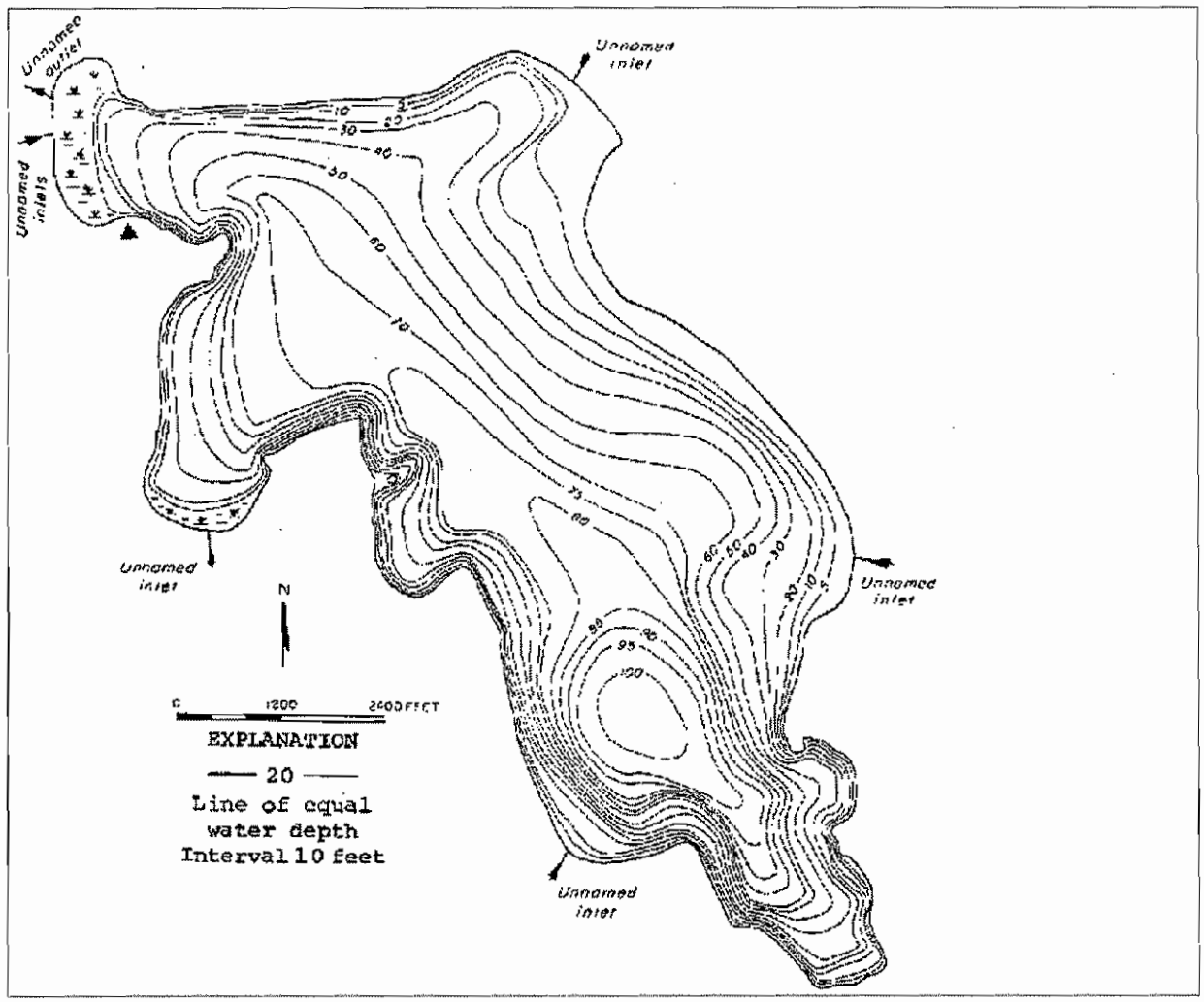

0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
1
2
3
4
5
6
7
8
9
Dissolved Oxygen (mg/L)


Depth (m)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
7.60
7.62
7.64
7.66
7.68
7.70
7.72
pH


0.0
0.2
0.4
0.6
0.8
1.0
1.2
-100
0
100
200
300
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	1100
MAX DEPTH (feet)	100
MEAN DEPTH (feet)	46
DRAINAGE (square miles)	14.
VOLUME (acre-feet)	52000
SHORE LENGTH (miles)	7.92
ALTITUDE (feet)	2381



LOON LAKE -- STEVENS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/07	17.0	62.6		Lt Green	0	None	Light	26.0	0.0	LAKE AT HIGH WATER MARK. TRUE ELEVATION OF THE LAKE IS 2381.525 FEET
97/06/25	18.0	64.4		Lt Green	10	Trace	Light	23.0	0.0	LAKE IS TURNING OVER. WATER LEVEL AT 2381 FT. 3.2 INCHES.
97/07/08	18.1	64.6		Lt Green	25	None	Breezy	21.0	0.0	WATER LEVEL AT 2381' 2.2"
97/07/19	21.1	70.0		Lt Green	0	None	Calm	22.0	0.0	WATER LEVEL WAS 2381.8 FEET ABOVE SEA LEVEL.
97/08/01	23.9	75.0		Lt Green	10	None	Light	24.0	0.0	
97/08/16			6.0	Lt Green	0	Mod	Strong	23.5	0.0	WATER LEVEL WAS 2380.54 FEET ABOVE SEA LEVEL.
97/09/06	20.6	69.1		Lt Green	10	None	Light	22.0	4.7	
97/09/19	17.8	64.0		Lt Green	10	Heavy	Calm	23.0	0.0	WATER WAS AT 2380.42 FEET ABOVE SEA LEVEL.
97/10/10				Lt Green	50	Light	Calm	20.0	0.0	WATER WAS AT 2380 FEET 4.2 INCHES ABOVE SEA LEVEL. LAST TEST FOR THE SEASON.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/28	E	9	0.31							
97/05/28	H	11	0.37							
97/08/25	E	6		1.3J	1	3				
97/08/25	H	16								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent.*** The worst problems were reported as:

1. algae 2. algae 3. excessive aquatic plants

Sources of actual or potential problems includes:

TRHE DISCOVERY OF MILFOIL AROUND THE LAKE.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***YES***

Were fish stocked this year? ***NO***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***YES***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***486***

Changes since last year? ***NONE***

Lake Uses and Facilities at the lake include:

swimming fishing motor boating jet skiing camping picnic facilities

The percent of the lakeshore that is sewered: ***100***

The number of storm drains leading to the lake: ***3***

SUMMARY OF VOLUNTEER SURVEY (Continued)

Motor boat restrictions include: ***50 mph speed restrictionno wake restriction no restrictions.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

Milfoil seen at volunteers dock and also at a private dock on the road side of the lake. Lots of rain and cooler prior to summer sample.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	32 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	30 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	33J* (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

All of the TSI values suggest an oligotrophic assessment for Loon Lake, however, low DO concentrations in the summertime hypolimnion suggest a more eutrophic assessment.

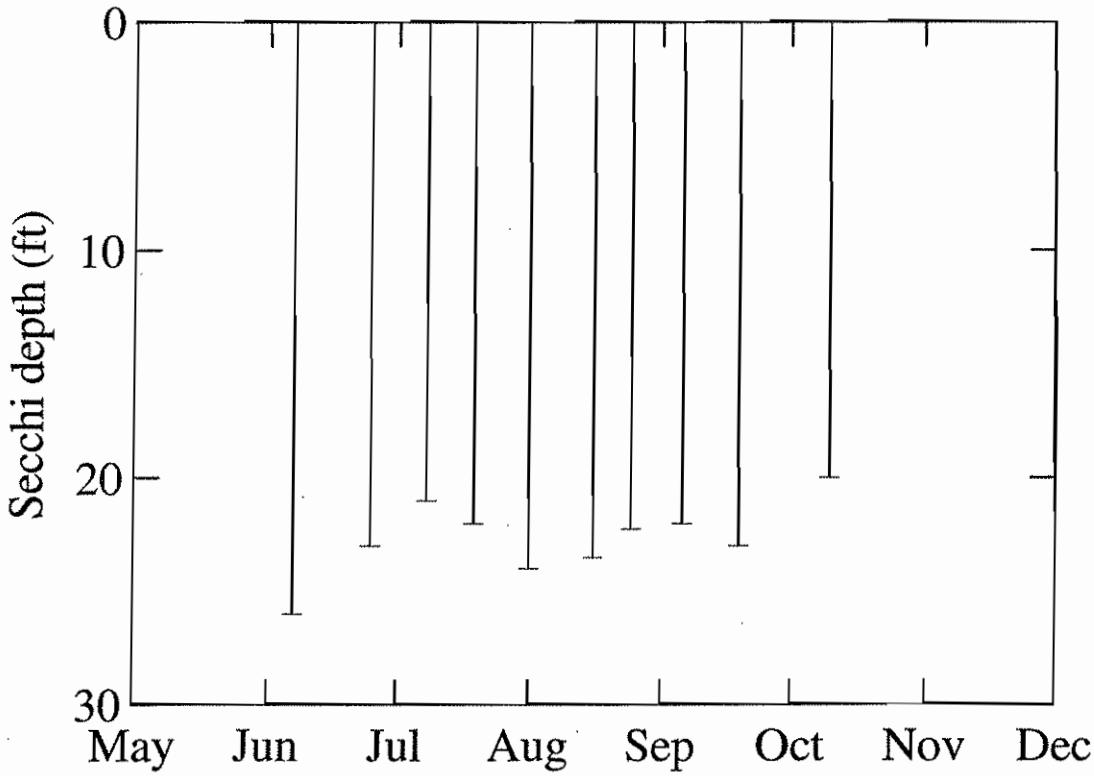
COMMENTS FROM 98/08/11 AQUATIC PLANT SURVEY

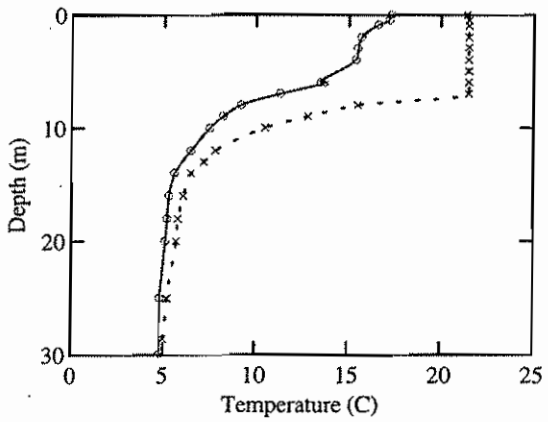
Sunny, breeze. Treated M. spicatum patches with 2,4-D after July 4th (the 6th?). The Nuphar and Brasenia have curled leaves, thought looking like they will grow out of it. Megalodonta and M. sibiricum with clumped growing tips, non-dividing leaves. M. spicatum reduced, but still many healthy plants in some areas, knocked over and covered with sediment, but green beneath, looks like they will survive. Maximum depth of plant growth: 6.7M.

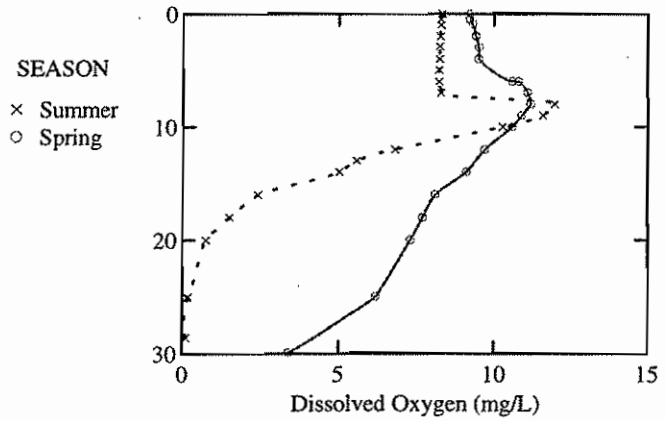
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Brasenia schreberi (watershield) *Ceratophyllum demersum* (Coontail; hornwort) *Ceratophyllum sp.* (coontail) *Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Fontinalaceae* (aquatic moss) *Heteranthera dubia* (water star-grass) *Iris pseudacorus* (yellow flag) *Isoetes sp.* (quillwort) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Lysimachia vulgaris* (garden loosestrife) *Lythrum salicaria* (purple loosestrife) *Megalodonta beckii* (water marigold) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum sp.* (water-milfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Najas flexilis* (common naiad) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Polygonum amphibium* (water smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp.* (pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Ranunculus aquatilis* (water-buttercup) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *Vallisneria americana* (water celery)

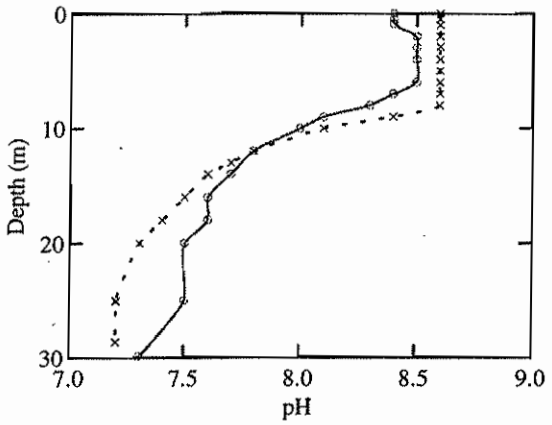
LOON

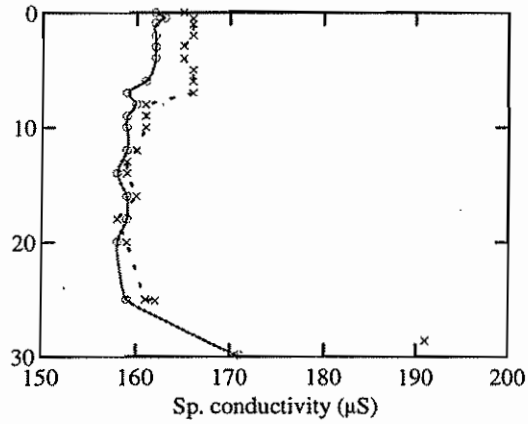

Secchi depth (ft)
0
10
20
30
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring

0
10
20
30
0
5
10
15
Dissolved Oxygen (mg/L)

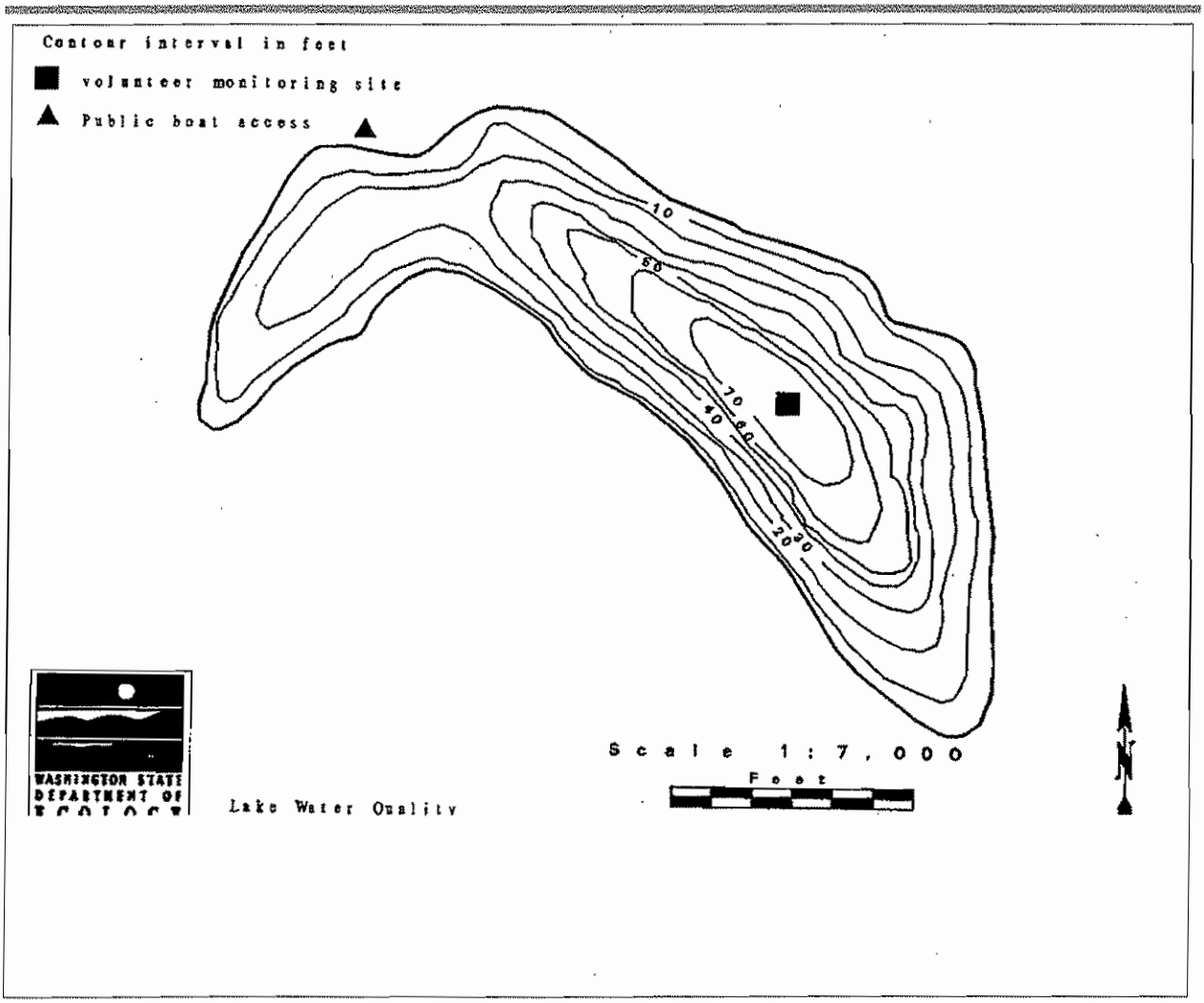

Depth (m)
0
10
20
30
7.0
7.5
8.0
8.5
9.0
pH


0
10
20
30
150
160
170
180
190
200
Sp. conductivity (µS)

LAKECOUNTY MARTHA (LAKE MARTHA) (SNOHOMISH)

DESCRIPTION Lake Martha is located 10.5 miles northwest of Marysville, and one mile east of Warm Beach. It is fed by Lake Howard and drains to Port Susan. (There is another Lake Martha, known as Martha Lake, located near Alderwood Manor.)

AREA (acres)	62
MAX DEPTH (feet)	70
MEAN DEPTH (feet)	33
DRAINAGE (square miles)	1.6
VOLUME (acre-feet)	2034
SHORE LENGTH (miles)	1.76
ALTITUDE (feet)	186



MARTHA (LAKE MARTHA) LAKE -- SNOHOMISH COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/24	19.4	66.9		Amber	0	Mod	Light	15.0	29.0	LAKE LOOKS QUITE CLEAR. IRIS IN BLOOM. TROUT PLANTED 2 WEEKS AGO.1 NEW LARGE BULKHEAD ON THE LAKE. GEESE 30+. BIRD SCARE TAPE EVERYWHERE.
97/06/02	20.0	68.0		Amber	0	Light	Calm	14.0	28.0	lots of small particulate - unknown shore weed. muskrat color : more golden amber
97/06/12	21.1	70.0		Amber	90	Heavy	Calm	14.0	29.5	lots of varying sized particulate
97/06/25	20.6	69.1		Undefined	90	Mod	Breezy	14.0	29.0	WATER LOOKS DARK. PIED BILLED GREBE WITH FOUR CHICKS. WINDY FOR TWO DAYS. WATER COLOR WAS PALE GOLD.
97/07/10	21.1	70.0		Undefined	6	Heavy	Calm	12.0	0.0	COLOR - PEA SOUP YELLOW, WATER MURKY LOOKING. NO MORE LARGE LEAVED PIND WEED. NEIGHBOR REPORTS ORANGE-RED ALGAE IN COVE YESTERDAY. LOON CALLING
97/07/25	23.3	73.9		Undefined	0	None	Light	16.5	32.8	WATER COLOR WAS LIGHT GOLD. WATER WAS QUITE CLEAR WITH VERY FINE PARTICULATE MATTER.
97/08/09	23.9	75.0		Undefined	0	None	Breezy	16.0	35.0	WATER COLOR WAS LIGHT GOLD. WATER LOOKS VERY CLEAR. ONLY SMALL PARTICLES.
97/08/23	23.9	75.0		Undefined	0	None	Light	16.0	37.5	WATER WAS LIME GOLD. LOOKS SAME AS LAST TIME. TWO PATCHES OF PURPLE LOOSESTRIFE.
97/09/04	22.0	71.6	6.5	Undefined	0	None	Calm	16.5	0.0	WATER COLOR WAS LIGHT GOLD.
97/09/21	18.0	64.4	6.5	Undefined	0	None	Calm	14.8	39.0	WATER WAS GREEN-GOLD. LOTS OF FLOATING PARTICLES.
97/10/07	15.0	59.0	6.3	Undefined	0	Trace	Calm	14.5	39.0	WATER WAS GOLD. LOTS OF PARTICULATES.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/12	E	13	0.42J							
97/06/12	H	14	0.65J							
97/09/04	E	10	0.33	3.0						
97/09/04	H	14	0.66							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available***. No specific problems were listed.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***NO***

SUMMARY OF VOLUNTEER SURVEY (Continued)

Any lake groups present (such as a lake association)? ***NO***
Any lake management activities this year? ***NO***
OTHER----------
How many homes/new homes are there on the lake shore?
Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-12-97 Very few zooplankton observed in the water samples. A bald eagle was observed during sampling. Water level was very high. Very few algal cells observed in the water samples.

9-4-97 Spherical blue-green algae observed.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	38 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	37 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	41 (Oligo-mesotrophic)

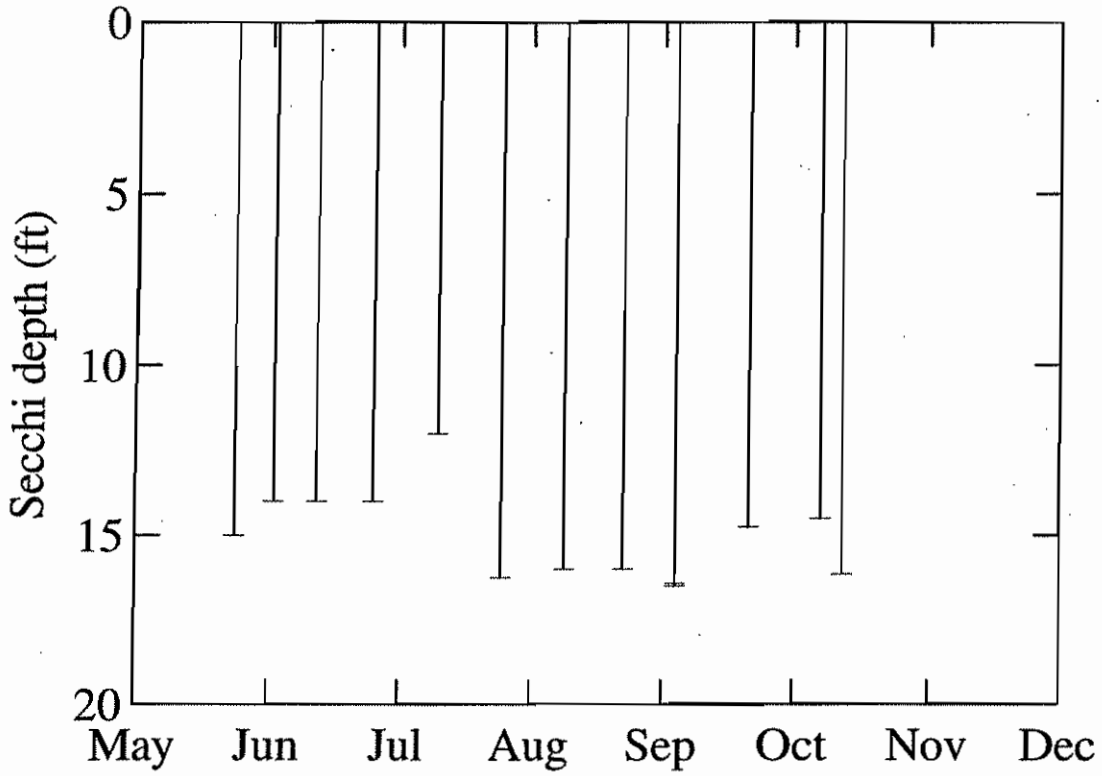
SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

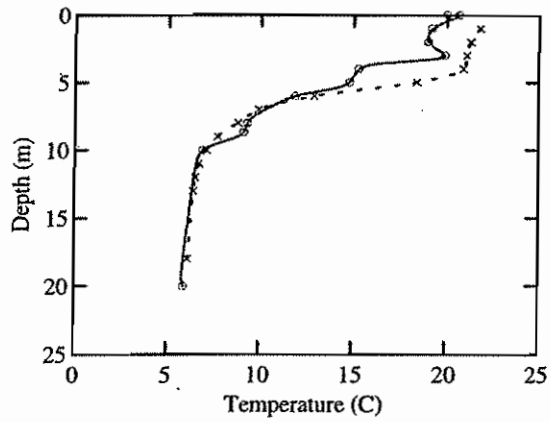
Lake Martha is a small, clean and relatively clear lake. All field observations and TSI values support an oligo-mesotrophic assessment.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

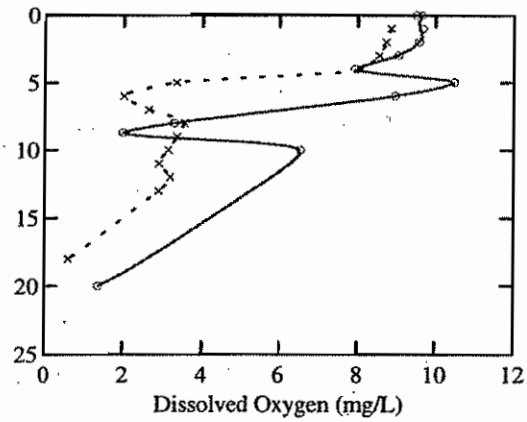
Elodea sp. (waterweed) *Nymphaea odorata* (fragrant waterlily)

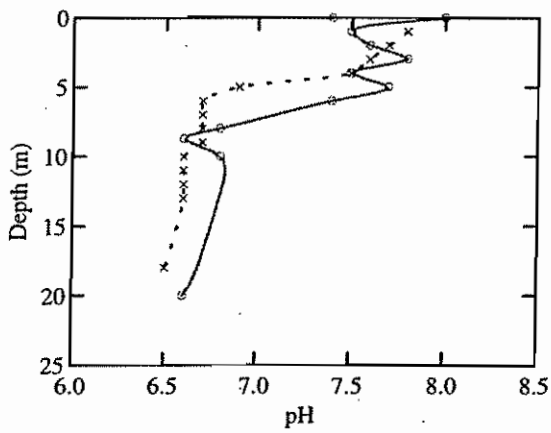
MARTHA

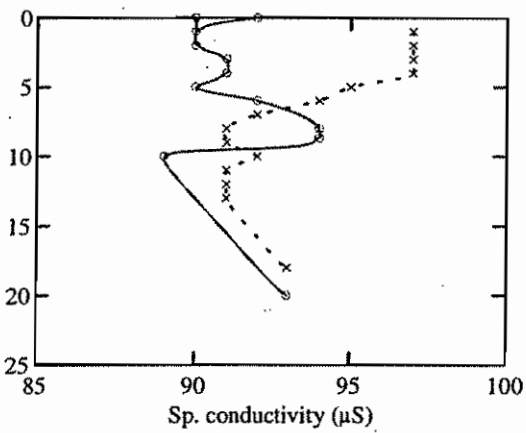




SEASON
× Summer
○ Spring



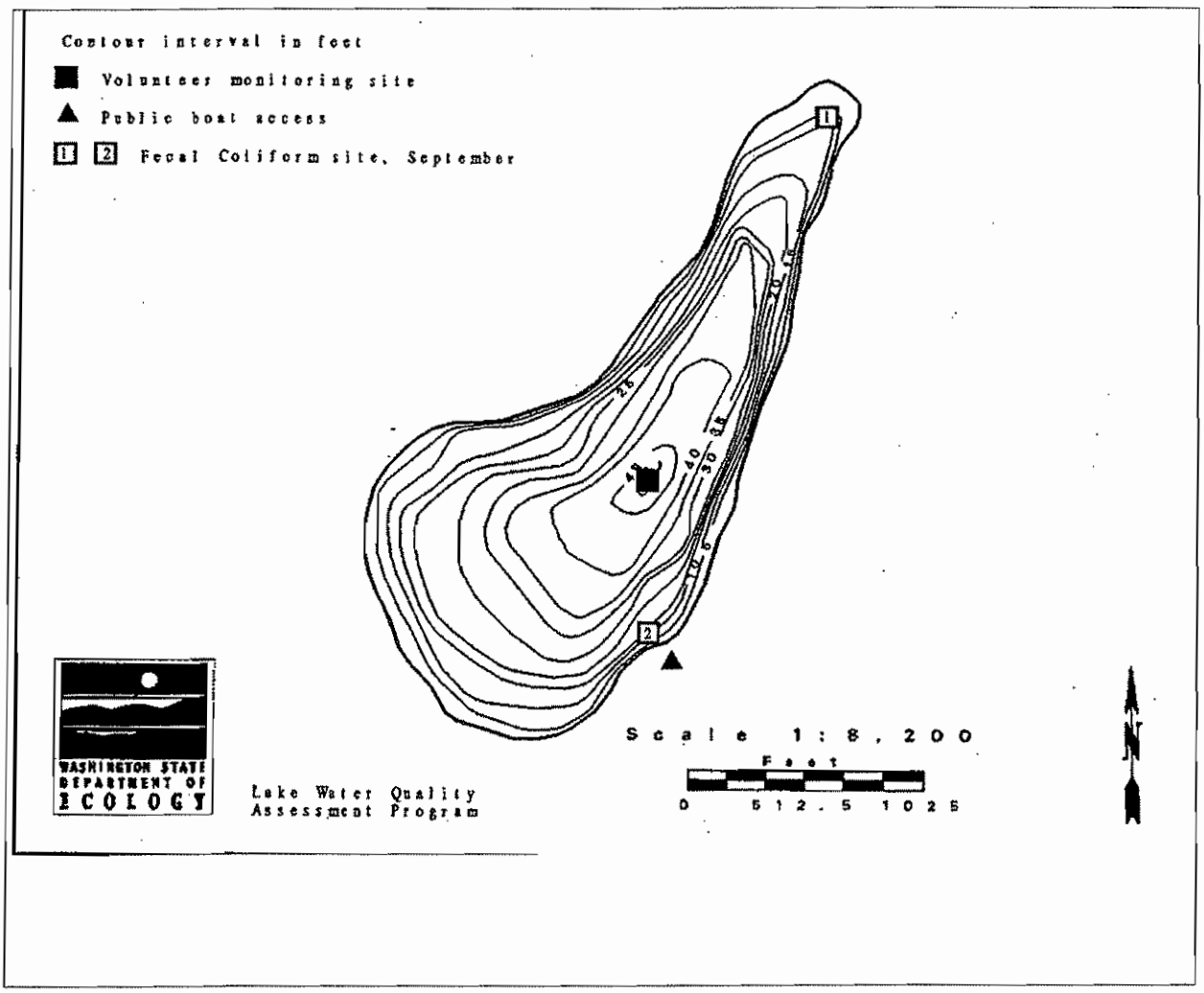




LAKECOUNTY MARTHA (MARTHA LAKE) (SNOHOMISH)

DESCRIPTION Martha Lake is located 2.5 miles northeast of Alderwood Manor. It was originally called Manor Lake. It has an intermittent inlet, and drains via a marsh to Swamp Creek and the Sammamish River. (There is another Martha Lake, called Lake Martha, located near Stanwood.)

AREA (acres)	57
MAX DEPTH (feet)	48
MEAN DEPTH (feet)	24
DRAINAGE (square miles)	0.8
VOLUME (acre-feet)	1346
SHORE LENGTH (miles)	1.41
ALTITUDE (feet)	450



MARTHA (MARTHA LAKE) LAKE -- SNOHOMISH COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/07/06	21.0	69.8	6.6	Mod Green	50	Mod	Light	10.9	444.0	92 GEESE, 41 DUCKS.
97/07/20	22.5	72.5		Mod Green	0	None	Calm	10.9	12.8	SECCHI DISK READINGS ARE SUBSTANTIALLY LESS THAN LAST YEAR AT THIS TIME.
97/08/01	24.0	75.2		Mod Green	0	None	Light	13.2	161.0	WATERFOWL COUNT NOT TAKEN.
97/08/17	25.0	77.0		Mod Green	0	None	Calm	4.4	18.3	
97/08/31	23.0	73.4		Lt Green	10	None	Calm	18.5	19.5	HEAVY ALGAL BLOOM
97/09/03				Lt Green	90	None	Light	17.5	0.0	
97/09/27	18.3	64.9			100	Heavy	Strong	4.7	18.0	
97/10/12	14.8	58.6		Mod Green	100	Heavy	Calm	16.8	156.3	SEDIMENT BARRIER NOTED ON SEPT 27 IS STILL DOWN.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/09	E	7			20	97				
97/06/09	H	11								
97/09/03	E	5	0.22	2.0						
97/09/03	H	16	0.33							
STATION 2										
97/09/03	E	6	0.27							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-9-97 65 geese counted this morning. Macrophytes just coming out.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	42 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	28 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	37 (Oligotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Martha Lake remains amazingly clear and clean, especially considering the urban setting of the lake. Phosphorus and chlorophyll concentrations suggest an oligotrophic assessment, but low DO concentrations in the summertime hypolimnion and an elevated Secchi TSI support the oligo-mesotrophic assessment.

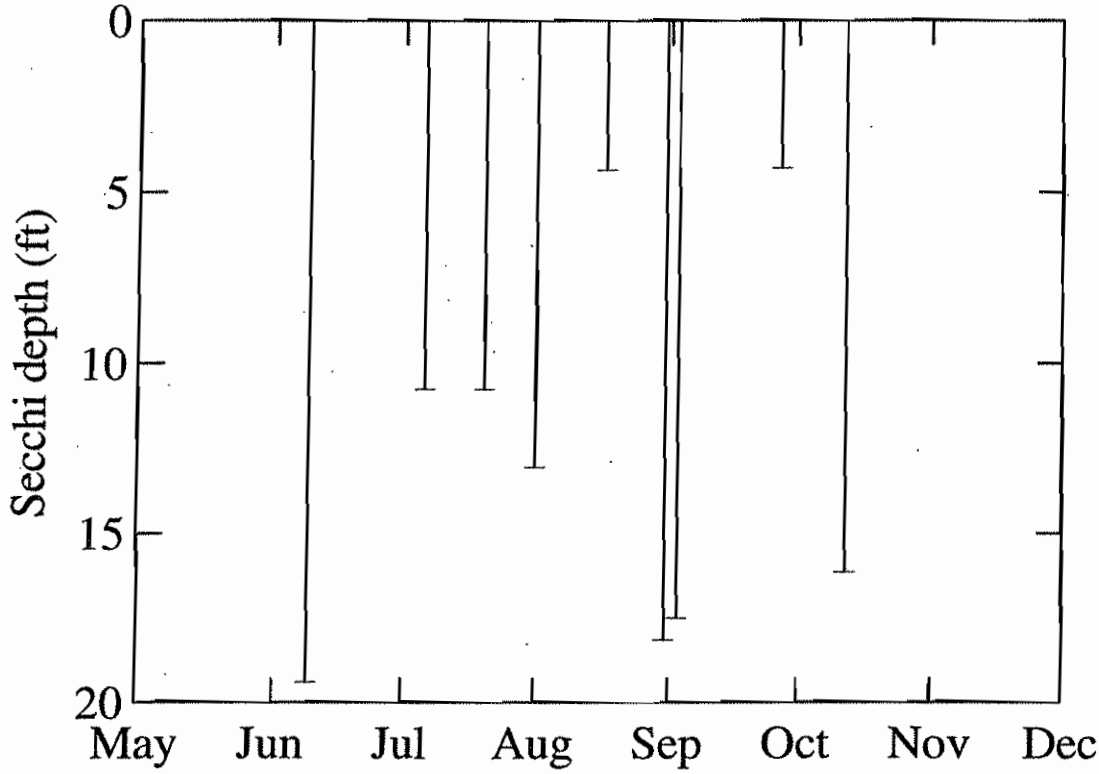
COMMENTS FROM 98/08/05 AQUATIC PLANT SURVEY

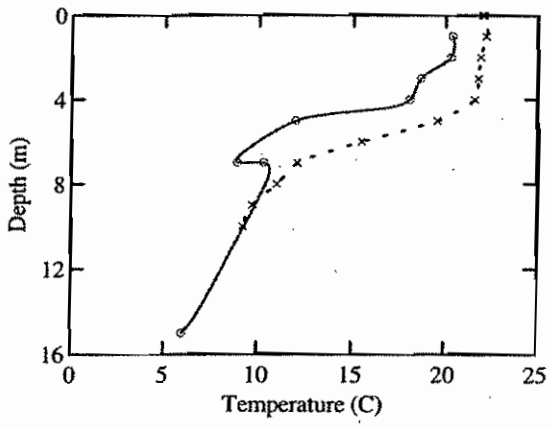
Sunny, breeze. Houses ring shore, many docks, patches of riparian vegetation. Seems to be a popular recreational area. Many dabbling ducks seen. Submersed plant community dominated by Najas, Nitella in deeper water. Some areas with few aquatic plants. Park at south end closed for construction activity. Maximum depth of plant growth: 6.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

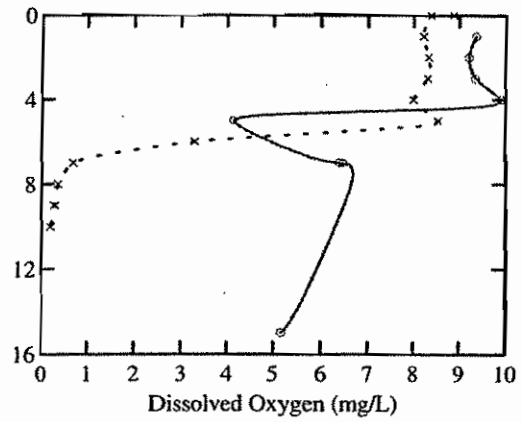
Elodea canadensis (common elodea) *Elodea sp.* (waterweed) *Iris pseudacorus* (yellow flag) *Lysimachia nummularia* (creeping loosestrife) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nuphar lutea* (yellow water-lily) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort)

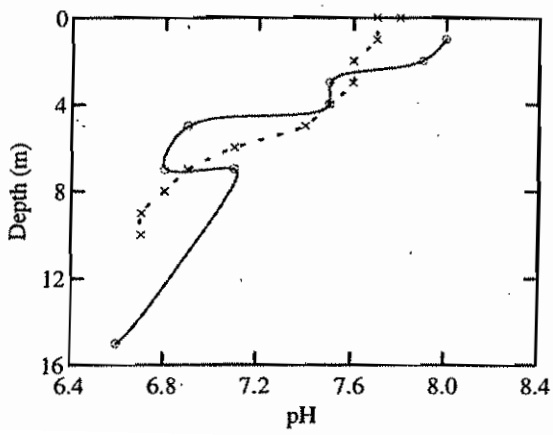
MARTHA

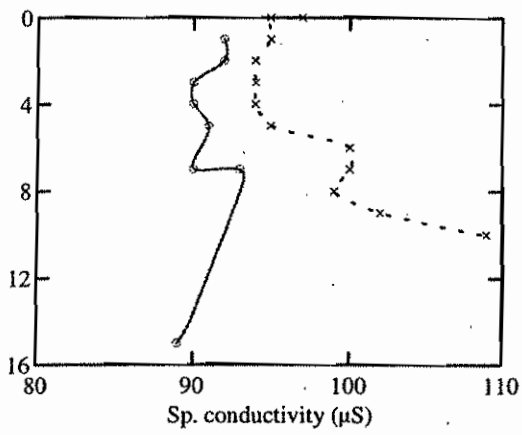

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
4
8
12
16
0
5
10
15
20
25
Temperature (C)


SEASON
× Summer
○ Spring


0
4
8
12
16
0
1
2
3
4
5
6
7
8
9
10
Dissolved Oxygen (mg/L)

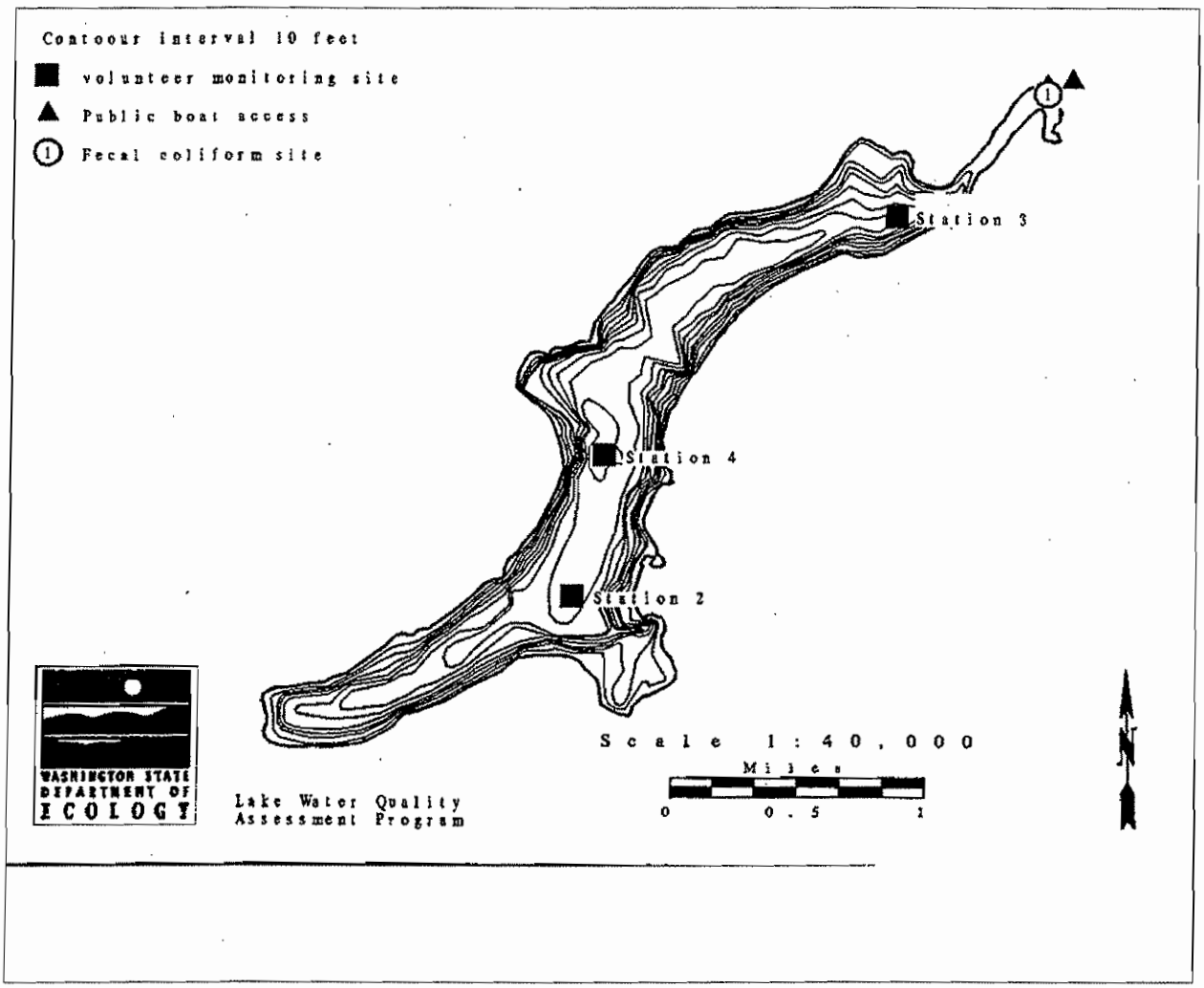

Depth (m)
0
4
8
12
16
6.4
6.8
7.2
7.6
8.0
8.4
pH


0
4
8
12
16
80
90
100
110
Sp. conductivity (µS)

LAKECOUNTY MASON (MASON)

DESCRIPTION Mason Lake is located eight miles southwest of Belfair. It is four miles long and is fed by Shumocher Creek. Mason Lake drains via Sherwood Creek to North Bay and Case Inlet. It is the largest and deepest lake in Mason County.

AREA (acres)	1000
MAX DEPTH (feet)	90
MEAN DEPTH (feet)	48
DRAINAGE (square miles)	20.
VOLUME (acre-feet)	49000
SHORE LENGTH (miles)	10.9
ALTITUDE (feet)	194



MASON LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 2										
97/05/31	18.0	64.4	6.5	Undefined	100	Mod	Light	17.0	0.0	WATER DARK GREEN IN COLOR
97/06/13	20.0	68.0	6.5	Lt Green	50	None	Calm	22.0	0.0	
97/06/30	20.0	68.0	6.5	Lt Green	75	Light	Calm	23.0	0.0	
97/07/12	21.0	69.8	6.5	Lt Green	75	Trace	Calm	22.0	0.0	
97/07/30	24.0	75.2	6.5	Lt Green	90	None	Calm	23.0	0.0	VIEW TUBE USED FOR BOTH SECCHI READINGS.
97/08/12	24.0	75.2	6.3	Lt Green	2	None	Calm	25.0	0.0	
97/08/28	23.0	73.4	6.5	Lt Green	50	Heavy	Calm	21.0	0.0	
97/09/11	22.0	71.6	6.3	Undefined	90	Trace	Calm	21.0	0.0	WATER WAS DARK GREEN.
97/09/26	1.0	33.8	6.3	Lt Green	0	None	Calm	22.0	0.0	
STATION 3										
97/06/12	-6.9	19.5		Lt Green	50	Trace	Light	20.5	25.0	
97/06/25	19.0	66.2		Lt Green	10	Trace	Light	22.0	0.0	
97/07/10	20.0	68.0	6.5	Lt Green	50	Heavy	Breezy	21.0	0.0	
97/07/23	23.0	73.4	6.5	Lt Green	25	None	Calm	22.0	0.0	
97/08/08	25.0	77.0	6.5	Lt Green	10	Light		25.0	0.0	
97/08/22	24.0	75.2	7.0	Lt Green	0	Light	Calm	26.0	0.0	ALGAE BLOOM.
97/09/07	24.0	75.2	6.5	Lt Green	0	None	Calm	28.0	0.0	
97/10/04	18.0	64.4	6.5	Lt Green	100	Heavy	Strong	18.0J	0.0	ROTTEN DAY TO DO THIS.
STATION 4										
97/06/24	18.3	64.9	6.3	Lt Green	90	Light	Calm	24.0	324.8	
97/07/02	19.4	66.9	6.5		50	Trace	Light	24.0	348.0	GONE DOWN 1.25 INCHESSINCE 6-24. IN THAT PERIOD HAD .47" RAIN.
97/07/18	21.1	70.0	6.5	Lt Green	75	None	Calm	21.0	348.3	
97/08/05	25.0	77.0	6.5	Undefined	25	None	Calm	25.0	32.0	
97/08/15	25.0	77.0	6.5	Lt Green	2	None	Calm	25.0	0.0	
97/09/01				Lt Green	0	None	Calm	22.6	0.0	
97/09/04	22.2	72.0	6.7	Lt Green	10	None	Calm	25.0	31.8	
97/09/15	20.0	68.0	6.5	Lt Green	100	Heavy	Calm	22.0	31.5	
97/09/22	21.0	69.8	6.5	Lt Green	0	None	Calm	21.0	0.0	
97/10/04	18.0	64.4	6.5	Lt Green	100	Heavy	Strong	16.0	0.0	

J - Estimate or QC requirements were not met

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 2										
97/06/05	E	4	0.03							
STATION 4										
97/06/05	E	4	0.10							
97/06/05	H	5	0.03							
97/09/01	E	15	0.08	1.9						
97/09/01	H	20	0.05							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available***. No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year?	***NO***
Were fish stocked this year?	***NO***
Any lake groups present (such as a lake association)?	***NO***
Any lake management activities this year?	***NO***

OTHER----------

How many homes/new homes are there on the lake shore?
Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-5-97 Highest water level noted in years this past February.

9-1-97 2 osprey observed. Moderate boating for a holiday.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	32 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	43 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	37 (Oligotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although Secchi depth remains favorable in Mason Lake, phosphorus and chlorophyll concentrations depict a lake that is slightly more eutrophic than the Secchi data may infer. Additionally, summertime hypolimnetic DO concentrations are depleted and there was a moderate blue-green algal bloom in the summer. All considering, an oligo-mesotrophic assessment is justified.

COMMENTS FROM 98/09/14 AQUATIC PLANT SURVEY

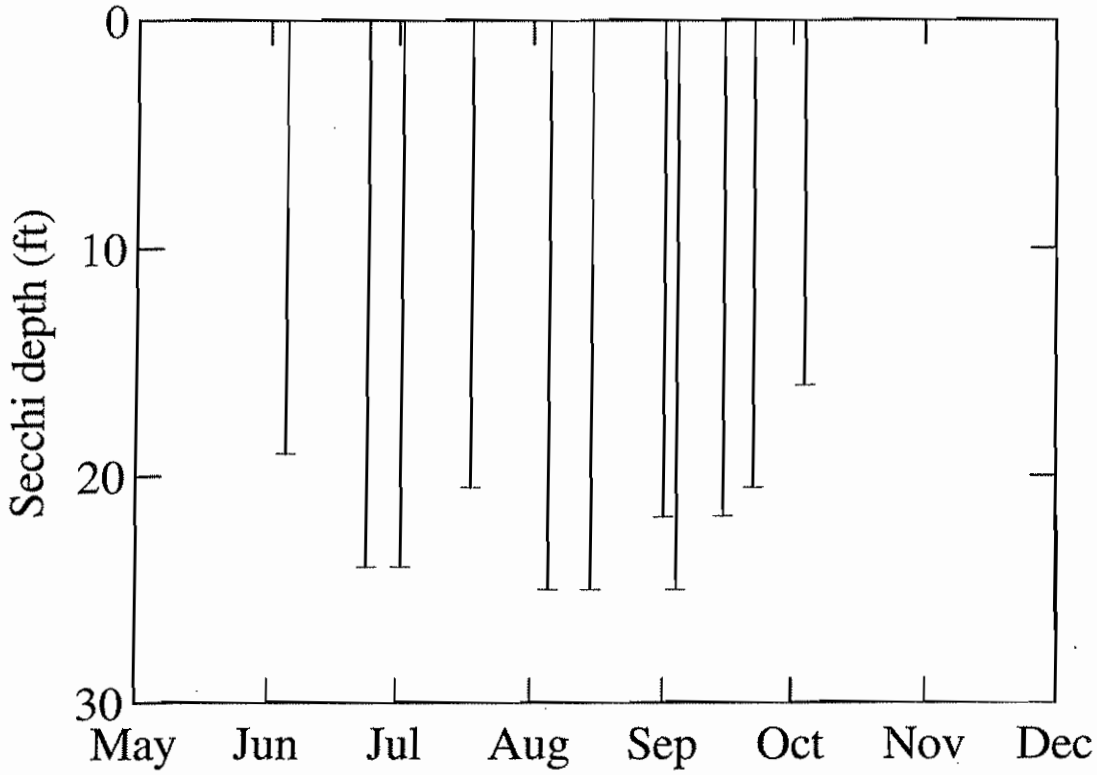
Sunny, calm. Surveyed entire shoreline, did habitat survey for Kirk Smith. Plants patchy, occasional dense areas of P. amplifolius, but many areas with open sediment. Much tiny ball-like algae suspended in water. M. spicatum only seen in Paradise Estates launch area. Observed a loon at south end, herons, few mallards, fish, osprey, heard frogs (didn't sound like adult bullfrogs). Maximum depth of plant growth: 6.0M.

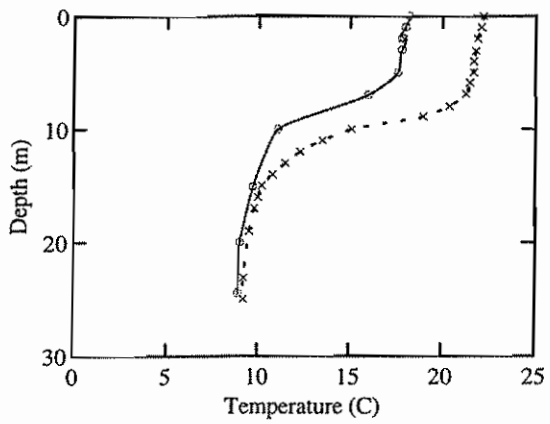
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Brasenia schreberi (watershield) *Callitriche sp.* (water-starwort) *Carex obnupta* (slough sedge) *Carex sp.* (sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Hippuris vulgaris* (common marestail) *Iris pseudacorus* (yellow flag) *Isoetes sp.* (quillwort) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Lilaeopsis occidentalis* (lilaeopsis) *Lobelia dortmanna* (water gladiole; water lobelia) *Myriophyllum sp.* (water-milfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton gramineus* (grass-leaved

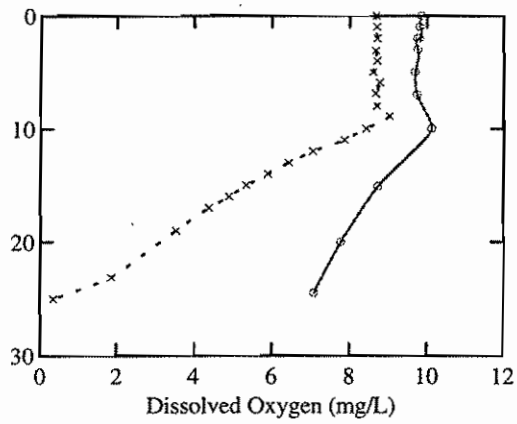
pondweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp.* (pondweed) *Ranunculus aquatilis* (water-buttercup) *Sagittaria graminea* (slender arrowhead) *Scirpus sp.* (bulrush) *Utricularia sp.* (bladderwort) *Vallisneria americana* (water celery)

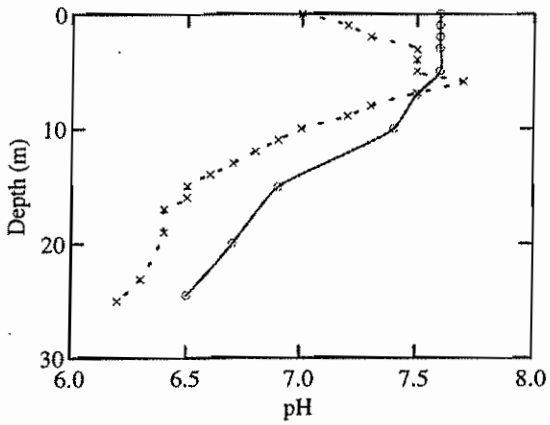
MASON

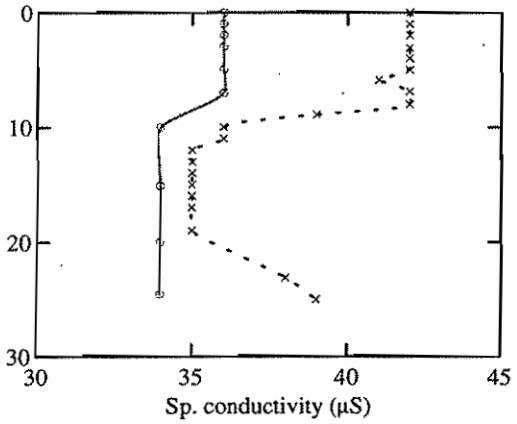




SEASON
× Summer
○ Spring



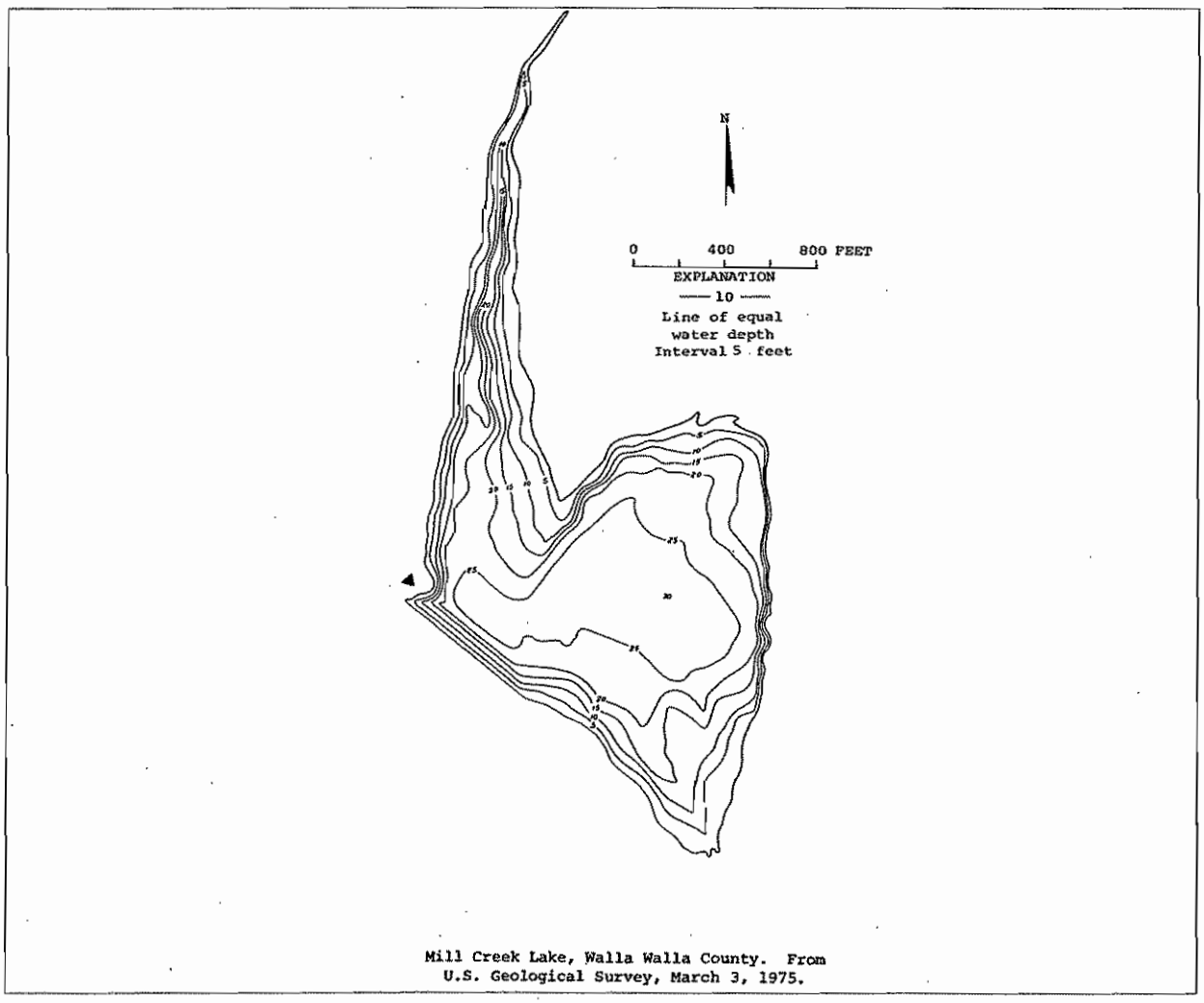




LAKECOUNTY MILL CREEK (WALLA WALLA)

DESCRIPTION

AREA (acres)	52
MAX DEPTH (feet)	30
MEAN DEPTH (feet)	17
DRAINAGE (square miles)	N/A
VOLUME (acre-feet)	865
SHORE LENGTH (miles)	1.95
ALTITUDE (feet)	1205



Mill Creek Lake, Walla Walla County. From U.S. Geological Survey, March 3, 1975.

MILL CREEK LAKE -- WALLA WALLA COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Recent Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 1											
97/05/21					0			1.0	0.0		VERY TURBID WITH FINE SILT. SEVERAL FISHERMEN ALONG SHORE, FEW BOATS. NO HOUSES. NO ZOO IN CASTS.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/22	E	198J	0.87				95.0			
97/05/22	H	239J	0.88							
97/08/20	E	147	0.50	6.4			45.0			
97/08/20	H	163	0.49							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Renamed "Bennington." Reservoir is very turbid with fine silt (thin coffee with cream-colored). Popular for shoreline fishing; few boats, no houses, undeveloped except Corps of Engineers access. Level is far below dam top. No submerged or emergent vegetation (consolidated mud shoreline). No zooplankton visible in casts. In summer, large Aphanazomenon (?) flakes (not bundles) evident. According to fisherman, dam was built in 1939, lake has rainbow, largemouth bass, and catfish.

TROPHIC STATUS

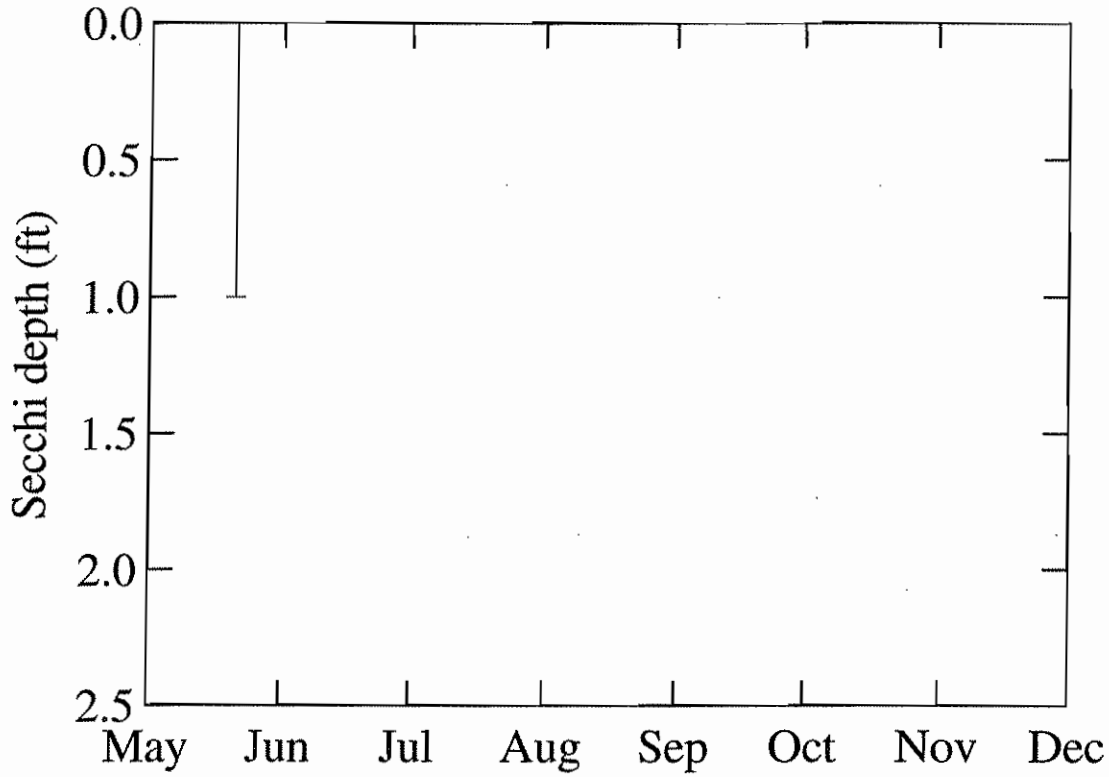
Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	77N* (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	76 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	49 (Meso-eutrophic)

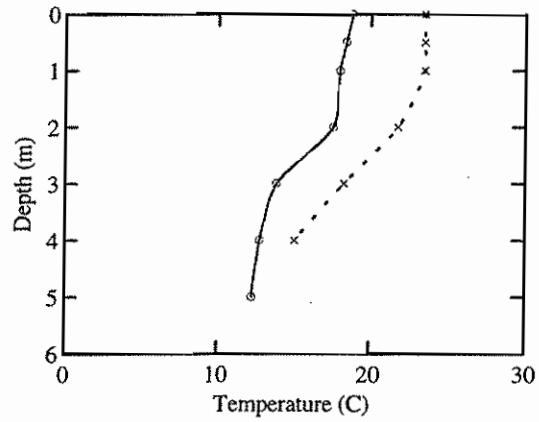
*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

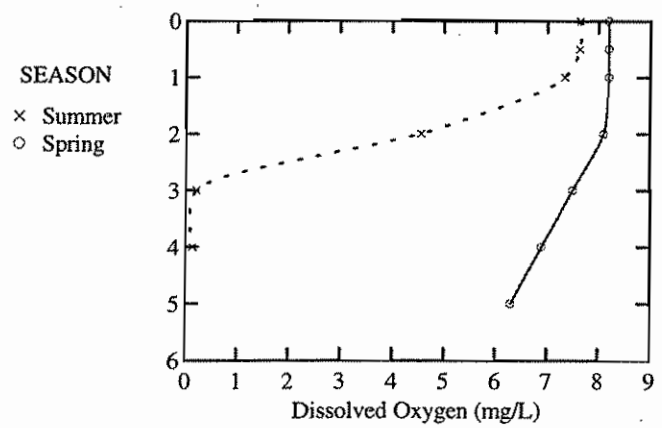
SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

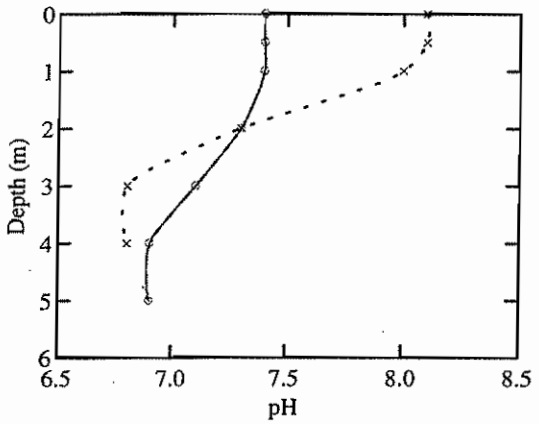
Although Secchi TSI is not informative in this case because there aren't enough measurements and because the water is turbid, all other indicators suggest a very productive lake, therefore an eutrophic assessment is justified.

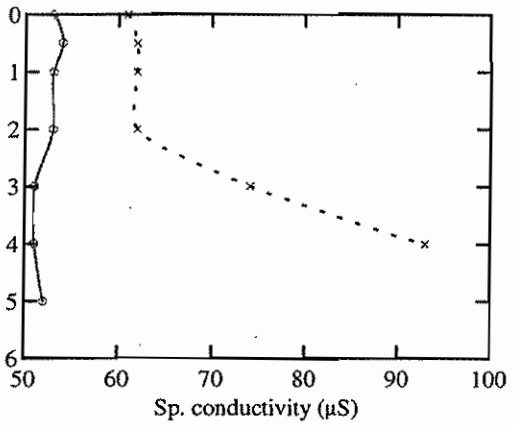
MILL CREEK


Secchi depth (ft)
0.0
0.5
1.0
1.5
2.0
2.5
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
1
2
3
4
5
6
0
10
20
30
Temperature (C)


SEASON
× Summer
○ Spring
0
1
2
3
4
5
6
7
8
9
Dissolved Oxygen (mg/L)

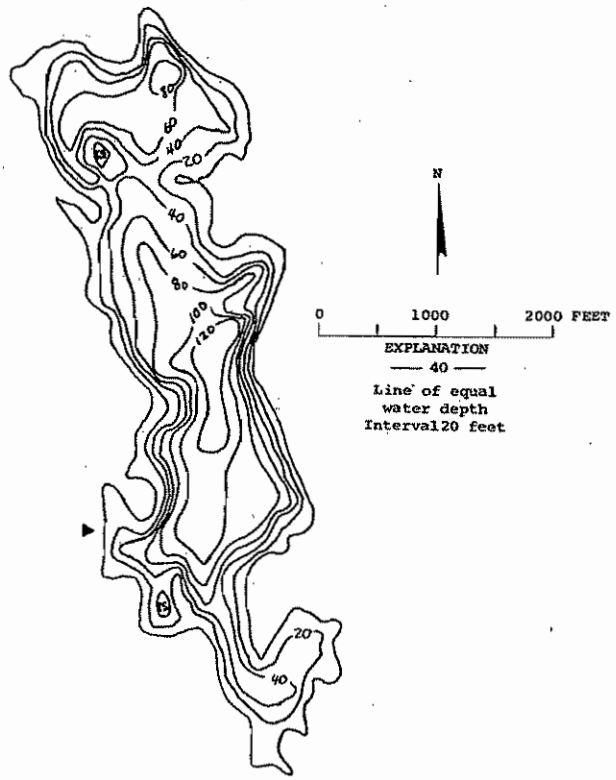

Depth (m)
0
1
2
3
4
5
6
6.5
7.0
7.5
8.0
8.5
pH


0
1
2
3
4
5
6
50
60
70
80
90
100
Sp. conductivity (µS)

LAKECOUNTY MOUNTAIN (SAN JUAN)

DESCRIPTION

AREA (acres)	179
MAX DEPTH (feet)	138
MEAN DEPTH (feet)	49
DRAINAGE (square miles)	2.2
VOLUME (acre-feet)	8800
SHORE LENGTH (miles)	4.25
ALTITUDE (feet)	914



Mountain Lake, San Juan County. From U.S. Geological Survey, March 20, 1974.

MOUNTAIN LAKE -- SAN JUAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/08/18				Undefined	0			30.0	0.0		WATER WAS AQUA-MARINE. SECCHI DISK READING IS APPROXIMATE BECAUSE THERE WAS NOT ENOUGH ROPE.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/18	E	2	0.03J		1U	240	0.5U			
97/06/18	H	6	0.10J							
97/08/18	E	1	0.43	1.4			0.5U			

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-18-97 A clear mountain lake. Very few macrophytes. Lake appears to be very high--launch is under water.
8-18-97 Drifting too much to take a hypolimnion sample so no TP or TN sample taken in the hypolimnion.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	28N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	8 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	34 (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Mountain Lake is a very pristine, clear, clean lake. The Secchi line was not long enough to get an accurate Secchi measurement. All indicators support an oligotrophic

assessment.

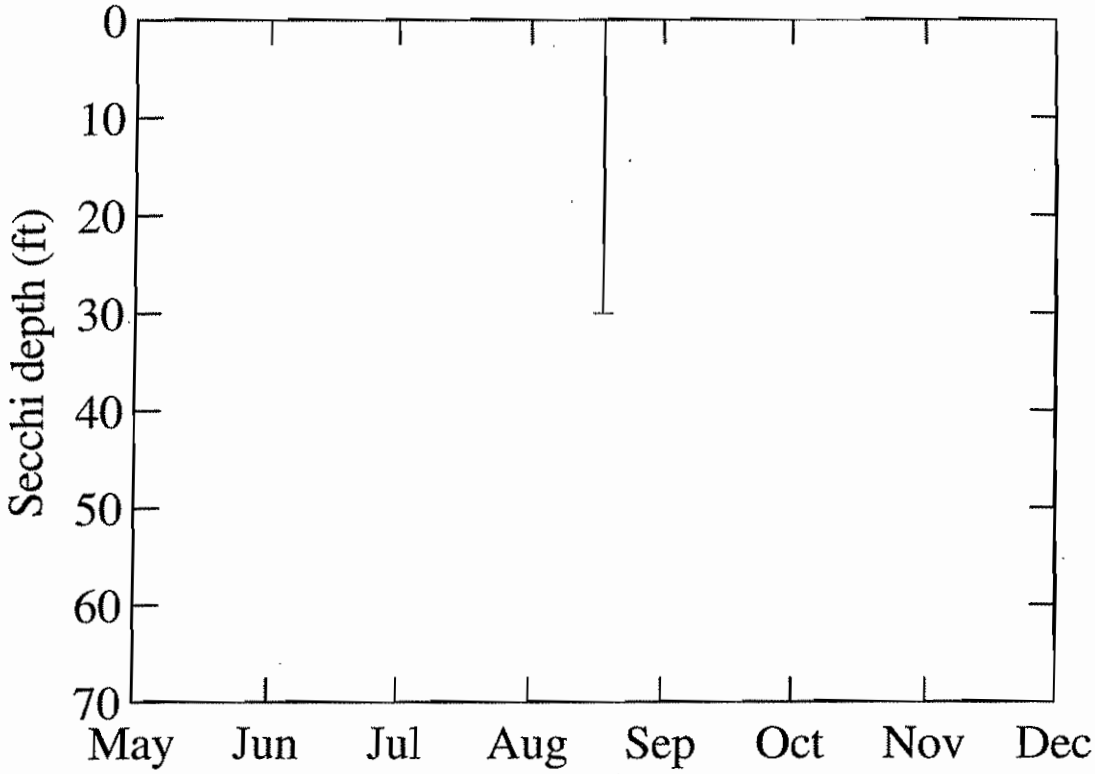
COMMENTS FROM 97/09/09 AQUATIC PLANT SURVEY

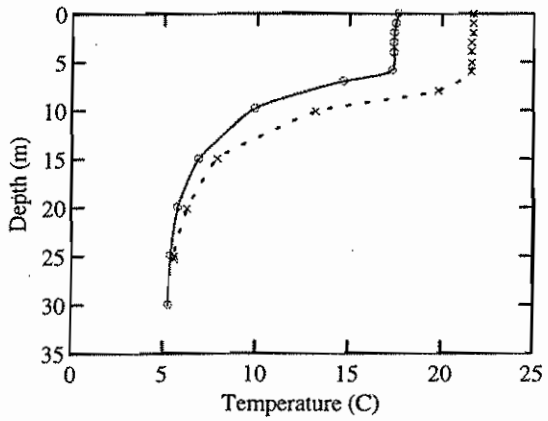
light breeze, high clouds. Lots of logs along shoreline, sediment coated in floculant detritus / algae. Green slgae plumes in coves. Max depth of plant growth > 4 m. Much of shoreline steep sided and rocky, plants mostly in coves. Submersed plant community sparse. Otter at north end, osprey. shoreline with native vegetation, trail circumnavigates the lake.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

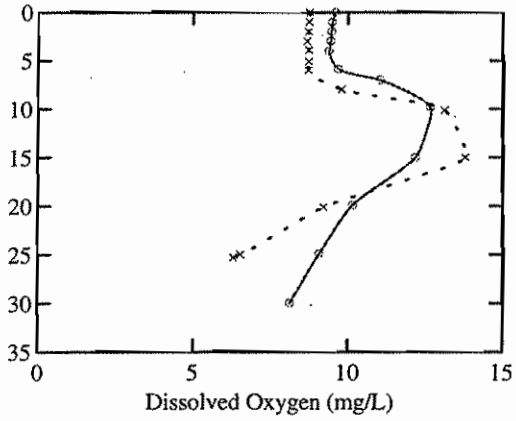
Carex sp. (sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Equisetum sp.* (horse tail) *Juncus sp.* (rush) *Lobelia dortmanna* (water gladiole; water lobelia) *Mentha sp.* (mint) *Myriophyllum sibiricum* (northern watermilfoil) *Najas flexilis* (common naiad) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton pusillus* (slender pondweed) *Ranunculus aquatilis* (water-buttercup) *Sparganium sp.* (bur-reed) *Typha latifolia* (common cat-tail)

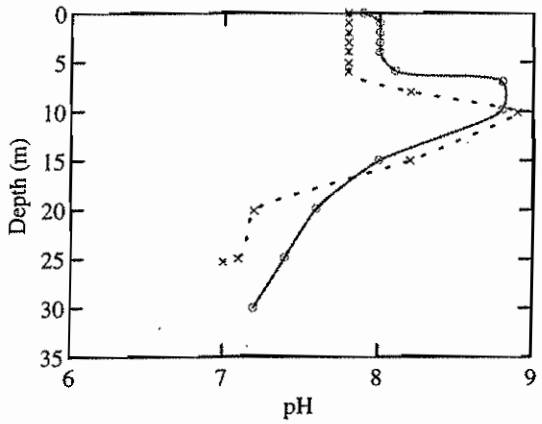
MOUNTAIN

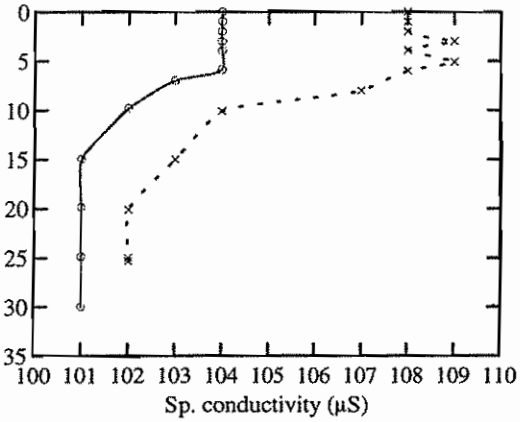




SEASON
× Summer
○ Spring



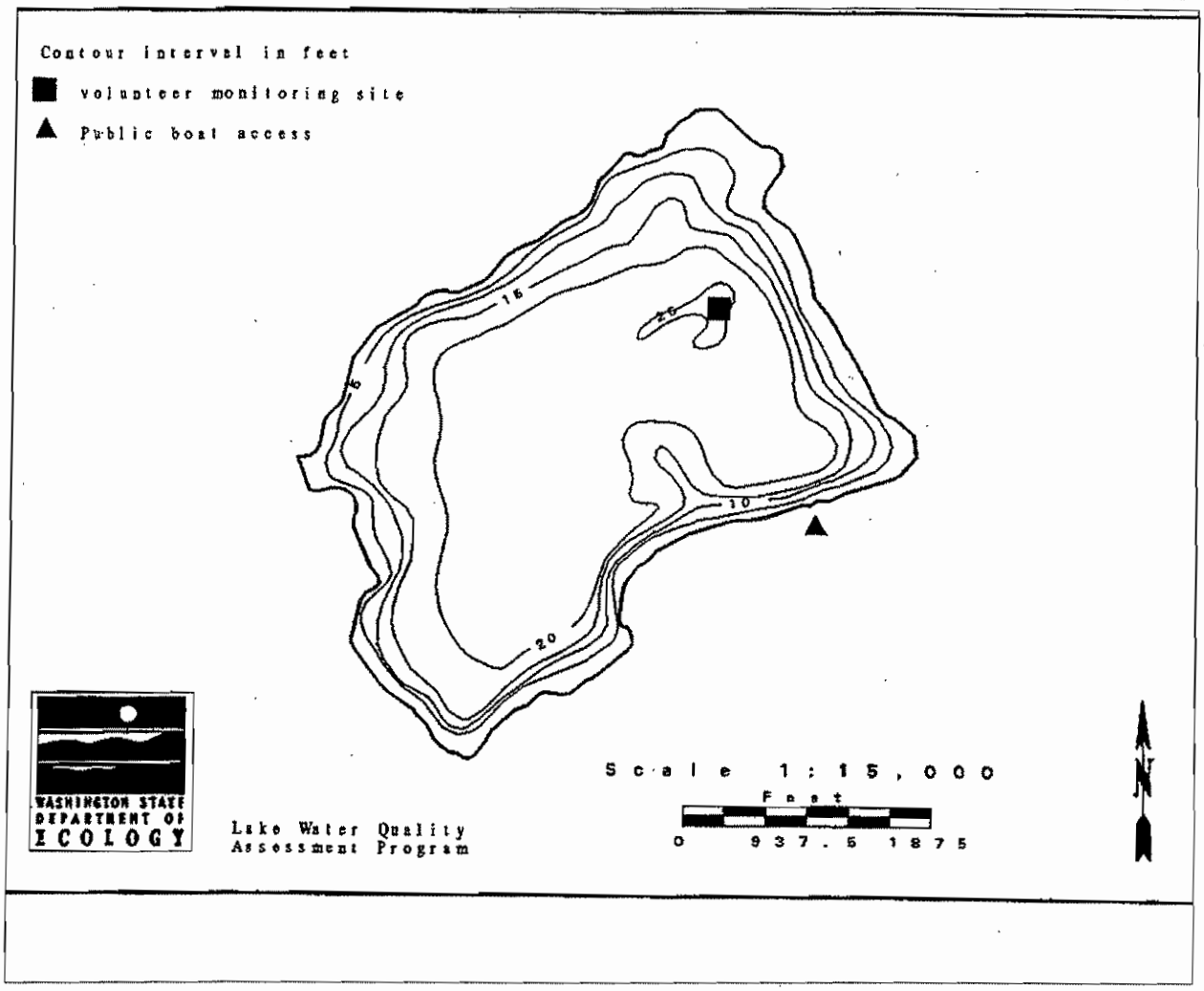




LAKECOUNTY NAHWATZEL (MASON)

DESCRIPTION Lake Nahwatzel is located 11 miles west of Shelton. It has two unconfirmed inlets, and drains via Outlet Creek to the East Fork of the Satsop River. The outlet seeps through a swampy area.

AREA (acres)	269
MAX DEPTH (feet)	25
MEAN DEPTH (feet)	17
DRAINAGE (square miles)	6.2
VOLUME (acre-feet)	4642
SHORE LENGTH (miles)	2.92
ALTITUDE (feet)	440



NAHWATZEL LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 1											
97/06/22	17.8	64.0		Lt Green	100	Heavy	Light	15.0	0.0		AIR TEMP 52 DEGREES F.
97/07/03	21.1	70.0		Lt Green	0	None	Calm	17.5	-5.0		
97/07/18	23.3	73.9		Lt Green	0	None	Calm	18.0	-5.5		
97/08/02	23.3	73.9		Lt Green	0	None	Light	18.0	-4.5		LOONS ON LAKE LAST WEEK. ALSO OSPREY AND BALD EAGLE.
97/08/25	23.3	73.9		Lt Green	100	Heavy	Calm	20.0	-8.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/08/25	E	5	0.12	2.0						
STATION 1										
97/06/16	E	6	0.03J							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-16-97 Extremely rainy and dark but extrordinary Secchi reading under the conditions.

8-25-97 Newts abundant. 2 osprey observed flying in the area. The water is very clear and calm.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	36 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	27 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	37 (Oligotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

All indicators support the oligotrophic assessment.

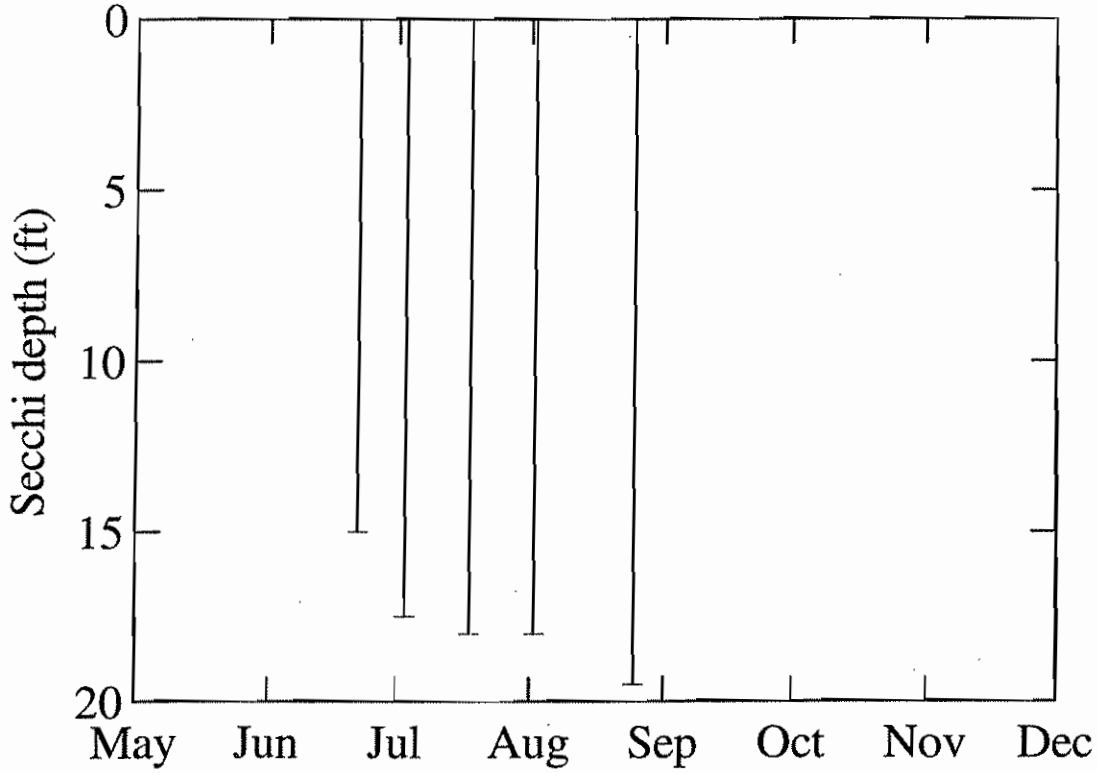
COMMENTS FROM 97/06/26 AQUATIC PLANT SURVEY

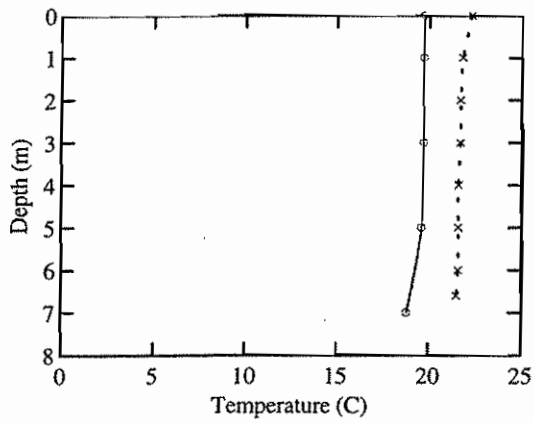
cloudy, rain - sun patches, breeze. Lots of sediment / algae on bottom Lobelia along east and west ends. Mostly gravel bottom, sandy at inlet, much covered in algae / detritus film. Water level seems high. Much of shoreline developed, tho many areas with emergent plants.

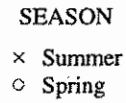
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

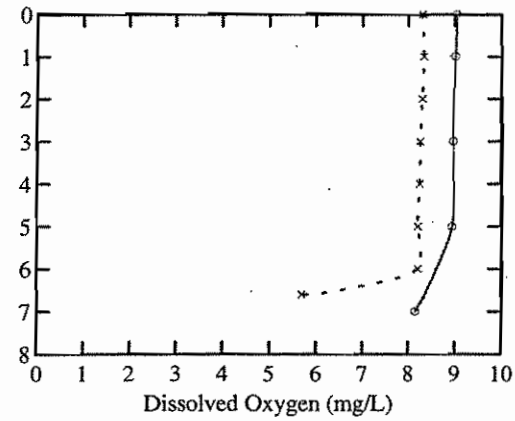
Carex sp. (sedge) *Dulichium arundinaceum* (Dulichium) *Elodea canadensis* (common elodea) *Iris pseudacorus* (yellow flag) *Iris sp.* (Iris) *Isoetes sp.* (quillwort) *Juncus balticus* (Baltic rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Lobelia dortmanna* (water gladiole; water lobelia) *Lobelia sp. Ludwigia palustris* (water-purslane) *Lysimachia nummularia* (creeping loosestrife) *Myosotis scorpioides* (common forget-me-not) *Nitella sp.* (stonewort) *Nymphaea odorata* (fragrant waterlily) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton pusillus* (slender pondweed) *Scirpus sp.* (bulrush) *Typha latifolia* (common cat-tail)

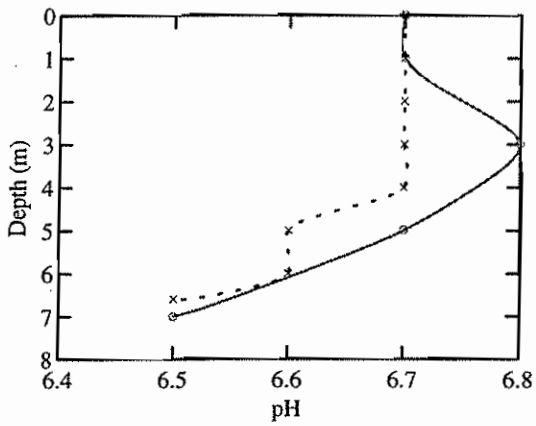
NAHWATZEL

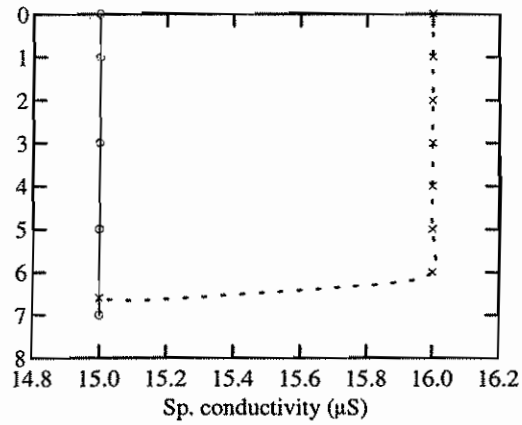

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring

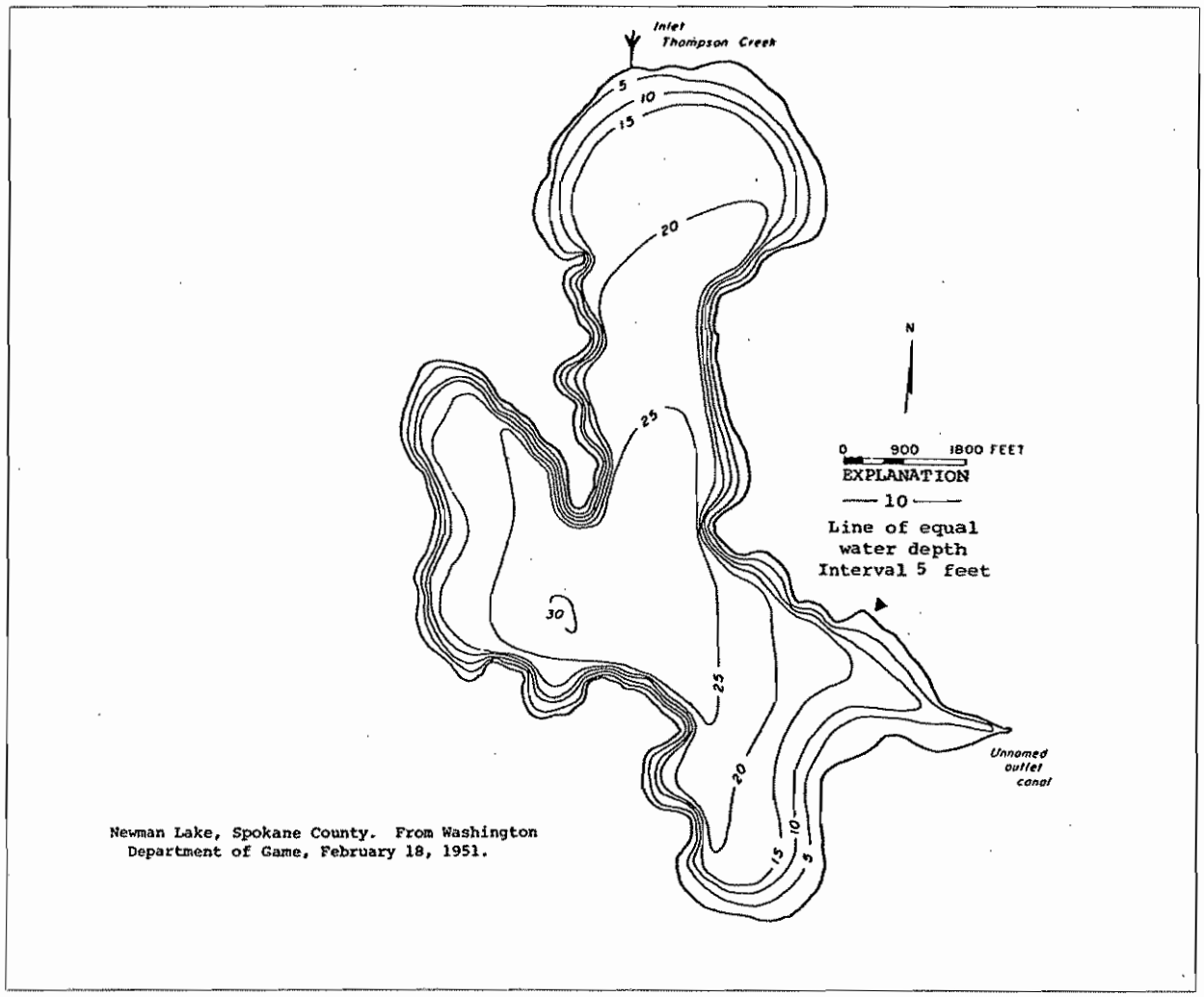

Dissolved Oxygen (mg/L)


Depth (m)
pH


Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	1200
MAX DEPTH (feet)	30
MEAN DEPTH (feet)	19
DRAINAGE (square miles)	28.
VOLUME (acre-feet)	23000
SHORE LENGTH (miles)	9.75
ALTITUDE (feet)	2124



Newman Lake, Spokane County. From Washington Department of Game, February 18, 1951.

NEWMAN LAKE -- SPOKANE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/26	18.0	64.4		Lt Green	0	None	Calm	6.0	-3.0	71 DEGREES AND SUNNY. DOES CLOUDINESS PERTAIN TO THE SKY OR THE WATER?
97/07/09				Milky-grn	25	Light	Light	5.1	-11.0	
97/07/23	26.0	78.8		Milky-grn	10	Light	Light	4.2	-18.0	
97/08/04	27.0	80.6		Mod Green	0	None	Calm	3.3	-24.0	
97/08/23	24.0	75.2		Mod Green	0	None	Breezy	5.7	0.0	
97/09/01	2.0	35.6		Mod Green	25	None	Calm	3.5	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/28	E	19	0.41		1U	1U	2.1			
97/05/28	H	36	0.39							
97/08/25	E	33	0.55	9.2J	1	1	2.5			
97/08/25	H	29	0.59							
STATION 2										
97/05/28	E	19	0.33							
97/08/25	E	32		9.1J						
97/08/25	H			13.4J						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***fair***. The worst problems were reported as:

1. suspended sediment 2. algae

Sources of actual or potential problems includes:

NO SEWAGE TREATMENT

Were there days (and how many) when poor water quality impaired

Fishing - ***YES(30)*** Swimming - ***YES(20)*** Aesthetics - ***YES(30)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?

Changes since last year? ***UPGRADED HOMES.***

Lake Uses and Facilities at the lake include:

swimming fishing motor boating jet skiing camping picnic facilities

FIELD OBSERVATIONS OF ECOLOGY STAFF

Aerator install ~4 years ago; alum is now being injected. Bubbles visible on surface about 100yds from sample site. Summer sampling preceded by heavy rains and cooler than usual weather. No temperature stratification, however, oxygen was stratified. Bottom very soft.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	55 (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	54 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	52J* (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Despite restoration efforts, Newman Lake remains nutrient rich and very productive. The aerator does deliver oxygen to the hypolimnion and the lake is not thermally stratified, even in mid-summer. Restoration efforts have produced conditions in the lake very similar to that of mesotrophy.

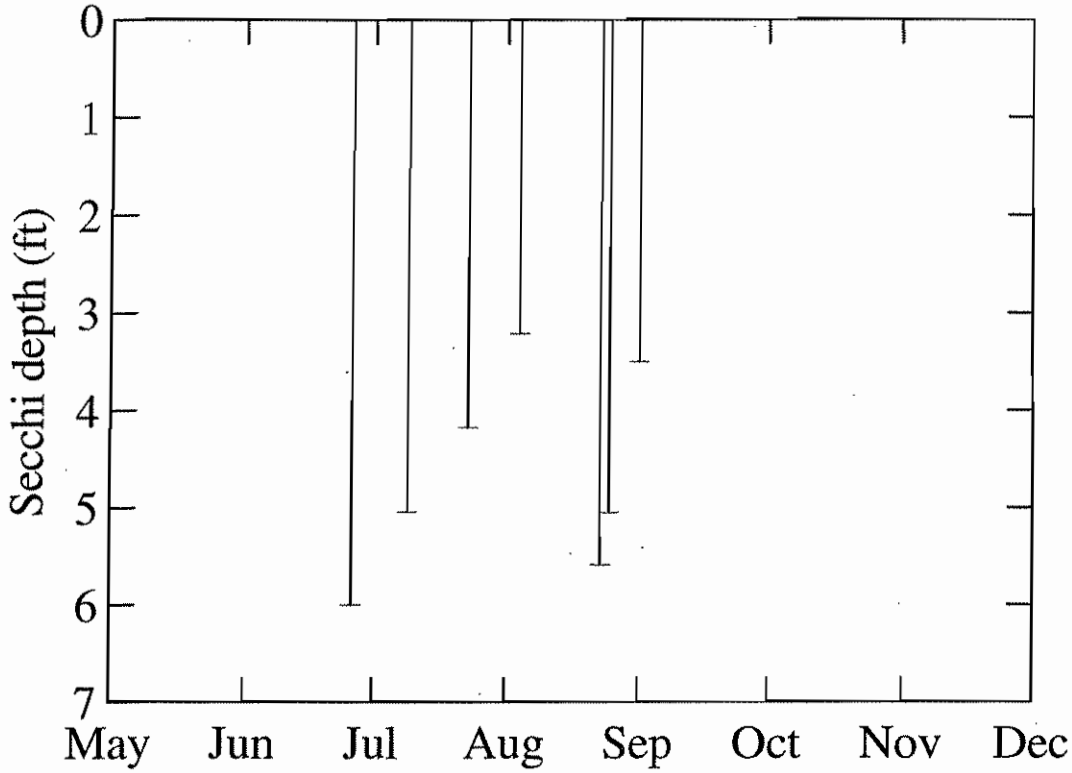
COMMENTS FROM 90/08/09 AQUATIC PLANT SURVEY

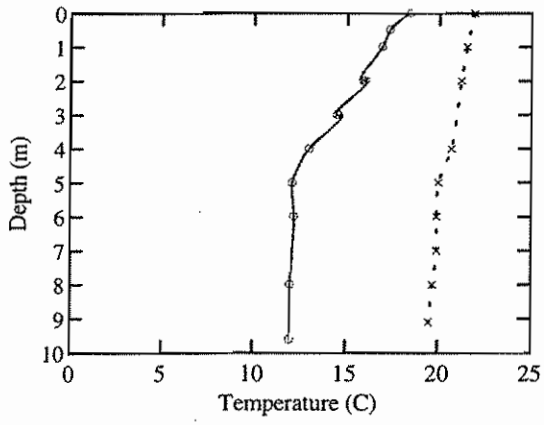
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

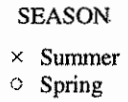
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

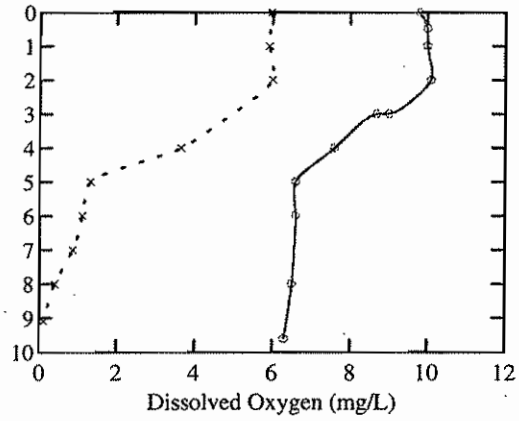
Potamogeton robbinsii (fern leaf pondweed)

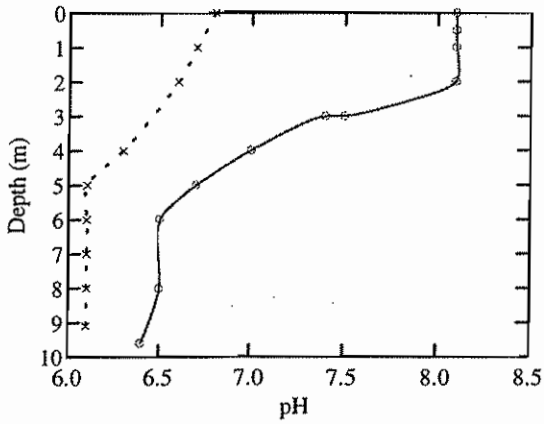
NEWMAN

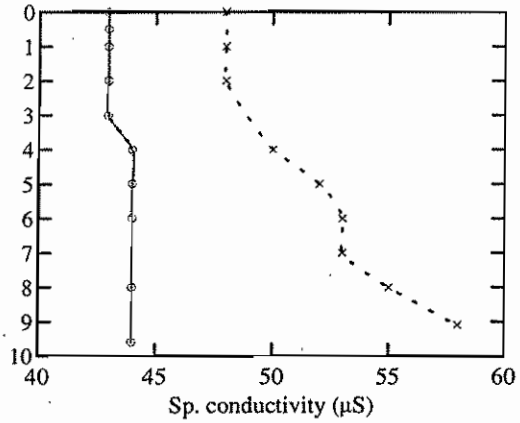

Secchi depth (ft)
0
1
2
3
4
5
6
7
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring


Dissolved Oxygen (mg/L)

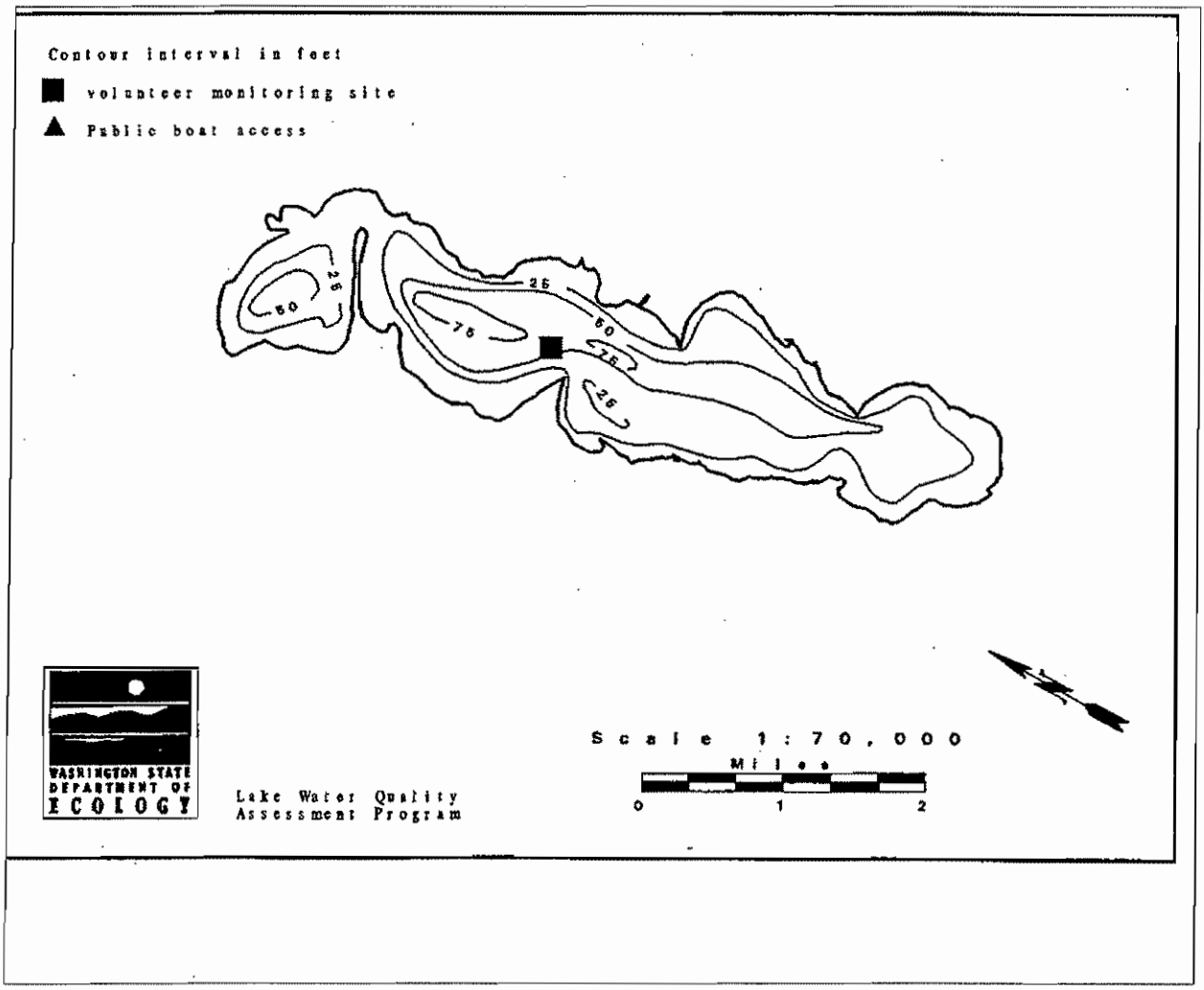

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY OSOYOOS (OKANOGAN)

DESCRIPTION Lake Osoyoos is located one mile north of Oroville. It is ten miles long and extends north into Canada. The total size of the lake is 5,729 acres; 3,693 acres lie in British Columbia, Canada, and 2,036 acres lie in the U.S. Lake Osoyoos is fed principally by the Okanogan River in Canada and drains south via the Okanogan River in the U.S. to the Columbia River.

AREA (acres)	5800
MAX DEPTH (feet)	208
MEAN DEPTH (feet)	46
DRAINAGE (square miles)	3150.
VOLUME (acre-feet)	266000
SHORE LENGTH (miles)	29.73
ALTITUDE (feet)	911



OSOYOOS LAKE -- OKANOGAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/02	18.9	66.0		Lt Green	0	Heavy	Calm	14.5	168.7	
97/06/16	21.1	70.0		Lt Green	10	Heavy	Light	10.0	0.0	LAKE AT 913.68 FEET ABOVE SEA LEVEL
97/07/02	22.8	73.0		Lt Green	0	Light	Calm	12.5	0.0	MILLFOIL SHOWING WASHED UP ON SHORE. WATER LEVEL AT 912'AND .48" ABOVE SEA LEVEL.
97/07/18	23.9	75.0		Lt Brown	0	Light	Calm	11.5	0.0	MILFOIL GROWING. LOTS OF BOAT TRAFFIC AND TOURISTS.
97/08/03	25.0	77.0		Lt Green	0	None	Calm	11.0	0.0	MILFOIL DEEP ON MY SHORELAND. WATER LEVEL WAS AT 912 FEET AND FOUR INCHES.
97/08/18	22.2	72.0		Lt Green	10	Trace	Calm	16.0	0.0	WATER LEVEL WAS 911 FEET 9 INCHES. DAVE HALLOCK WAS WITH ME.
97/09/12	21.1	70.0		Lt Green	10	Mod	Light	16.5	0.0	MISSED sEPT. 1 (VACATION). WATER LEVEL WAS 911 FEET 7 INCHES.
97/10/06	17.2	63.0		Lt Green	0	Trace	Calm	10.0	0.0	LAKE WAS AT 911.16 FEET ABOVE SEA LEVEL. CAN'T EXPLAIN DROP TO 10' ON DISK.
97/10/20	14.4	57.9		Lt Brown	0	Trace	Calm	9.0	0.0	LOTS OF BROWN ALGAE ON ROCKS + MANY OBJECTS IN THE WATER.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/19	E	10	0.30							
97/05/19	H	10	0.26							
97/08/18	E	13		3.2						
97/08/18	H	46								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available***. No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***
Were fish stocked this year? ***NO***
Any lake groups present (such as a lake association)? ***NO***
Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?
Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

According to volunteer, spring water levels were higher than they have been since 1974. State park was closed due to high water. At summer sampling, volunteer reported more milfoil than usual in some areas. H2S smell at 20M.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	42 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	42 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although TSI values suggest an oligo-mesotrophic assessment, summertime hypolimnetic DO concentrations show a lake that is nearly anoxic in the hypolimnion. All factors considered, a mesotrophic assessment is most suited for Lake Osoyoos.

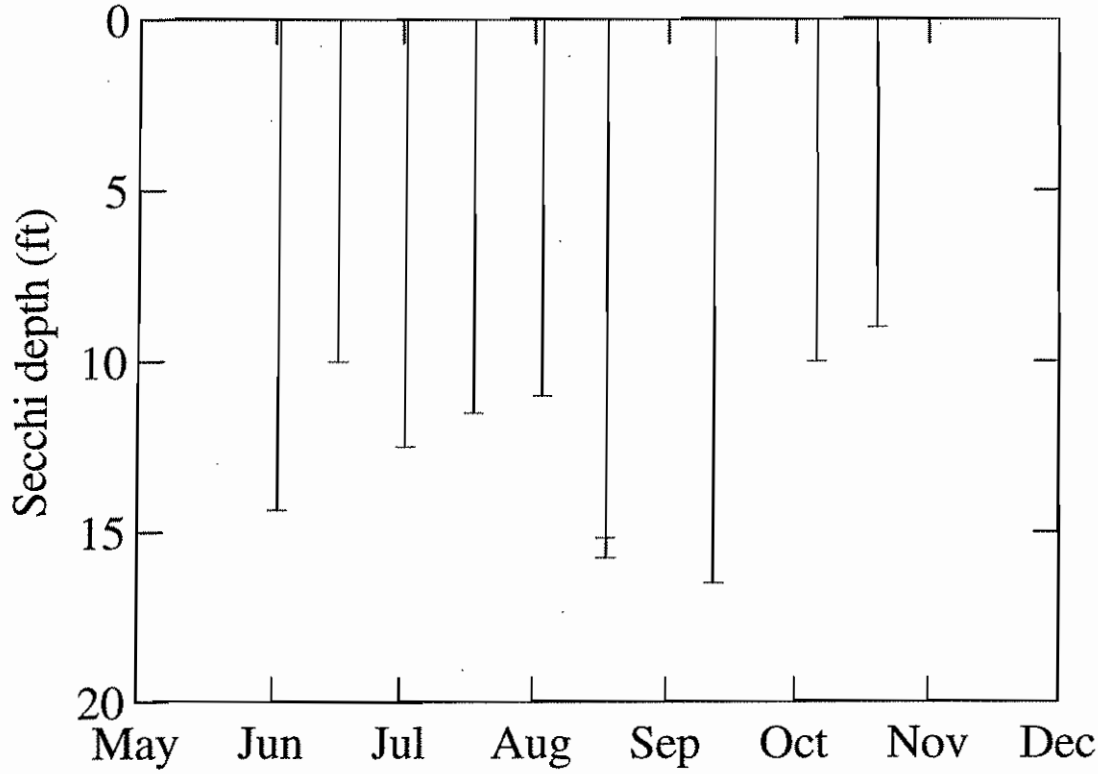
COMMENTS FROM 92/10/01 AQUATIC PLANT SURVEY

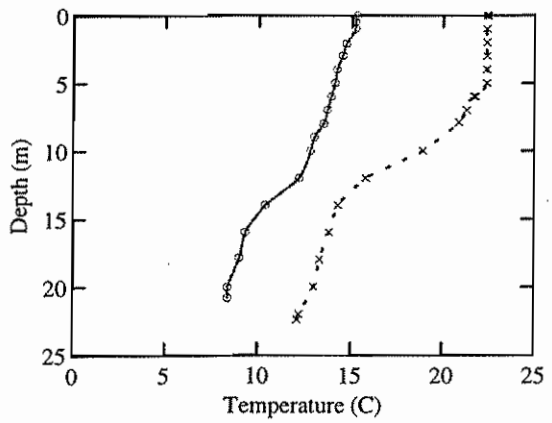
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

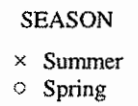
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

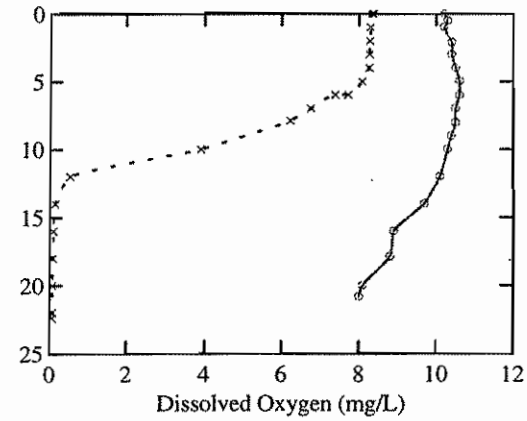
Elodea canadensis (common elodea) *Myriophyllum sp.* (water-milfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Potamogeton crispus* (curly leaf pondweed)

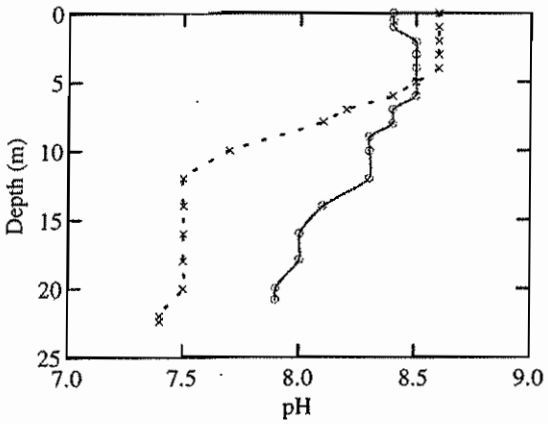
OSOYOOS

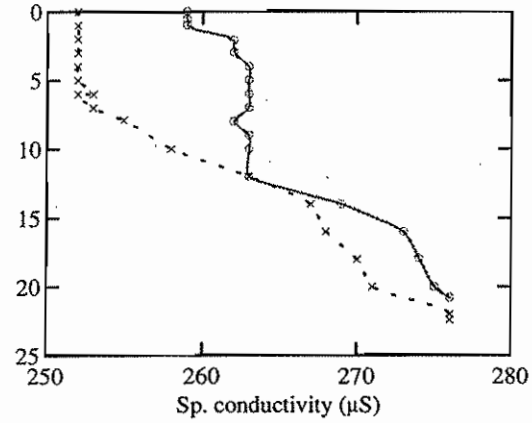

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
5
10
15
20
25
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring


0
5
10
15
20
25
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)


Depth (m)
0
5
10
15
20
25
7.0
7.5
8.0
8.5
9.0
pH


0
5
10
15
20
25
250
260
270
280
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	157
MAX DEPTH (feet)	59
MEAN DEPTH (feet)	27
DRAINAGE (square miles)	2.6
VOLUME (acre-feet)	4270
SHORE LENGTH (miles)	2.26
ALTITUDE (feet)	447

Padden Lake, Whatcom County. Bathymetric map from U.S. Geological Survey, January 22, 1974. Aerial photo, June 16, 1969.

PADDEN LAKE -- WHATCOM COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 1											
97/09/10				Undefined	90	None	Light	15.8	0.0		WATER WAS MODERATE GREEN.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/10	E	13	0.38J		3	5	1.5			
97/06/10	H	10	0.43J							
97/09/10	E	18	0.20	3.0	5	1U	0.8			
97/09/10	H	61	0.41							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-10-98 Sample site is about 200yds straight out from the boat ramp. Many small sculpins observed along the shoreline. The shoreline is all natural except for the park. There are no homes along the shore. There are not many waterfowl except around picnic/swim area.
9-10-97 Strong H2S odor in the hypolimnion. The lake appears to be more eutrophic than one might expect--could be an indicator of problems in the watershed.

TROPHIC STATUS

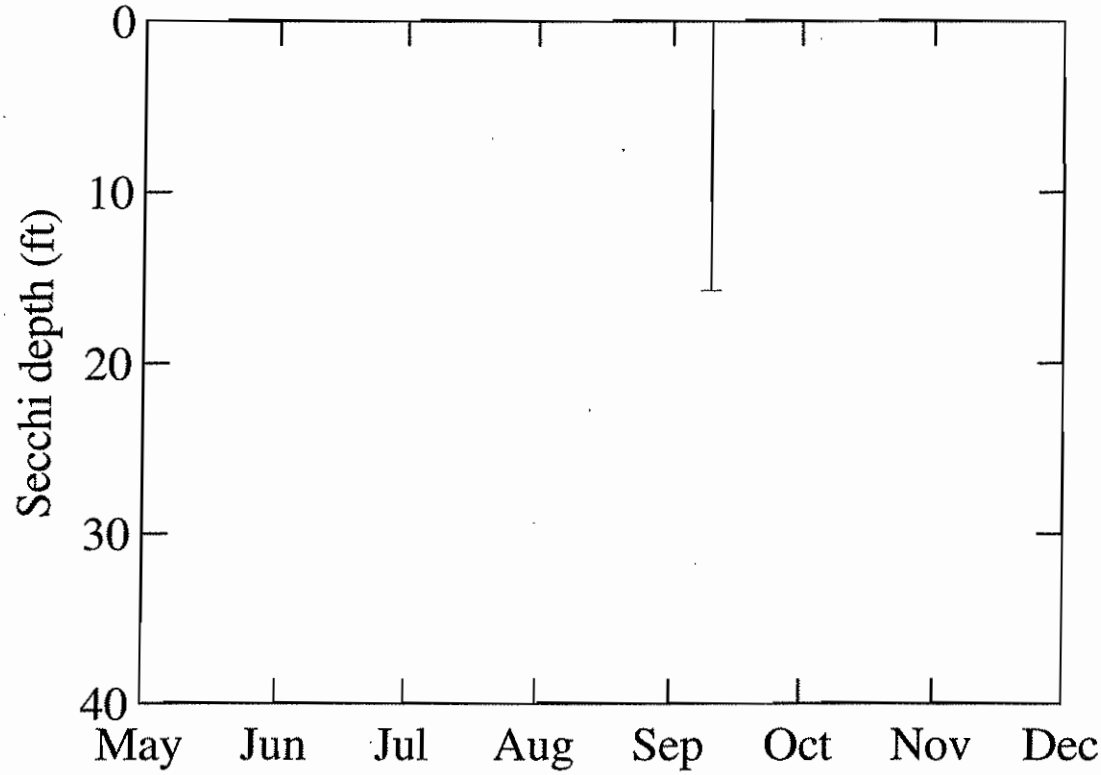
Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	37N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	46 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	41 (Oligo-mesotrophic)

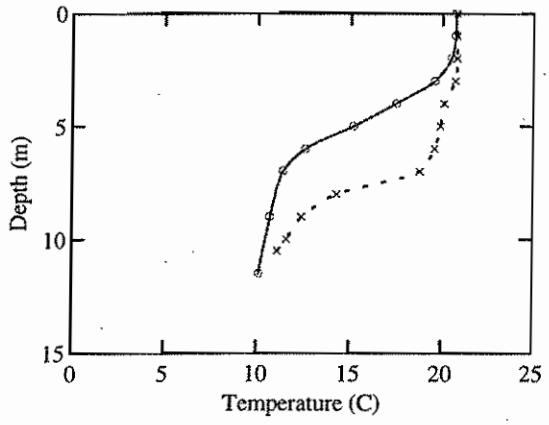
*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

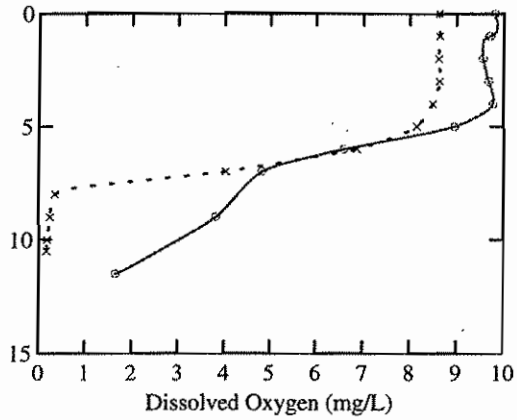
Lake Padden has many natural features in its watershed but observation of the watershed suggest many potential threats to its water quality. There is a nearby golf course which could contribute many nutrients from fertilyzers. Additional nutrient loading could originate from numerous waterfowl which reside at the local park on the lake.

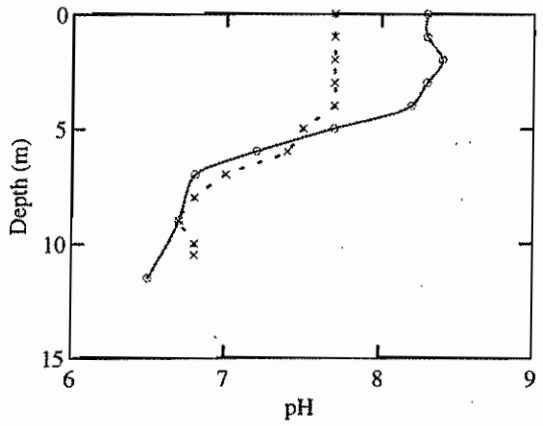
PADDEN

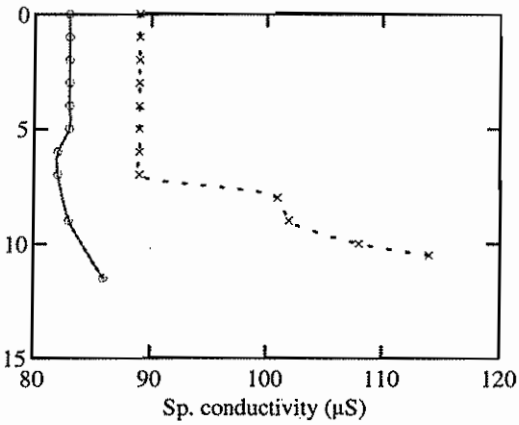




SEASON
× Summer
○ Spring

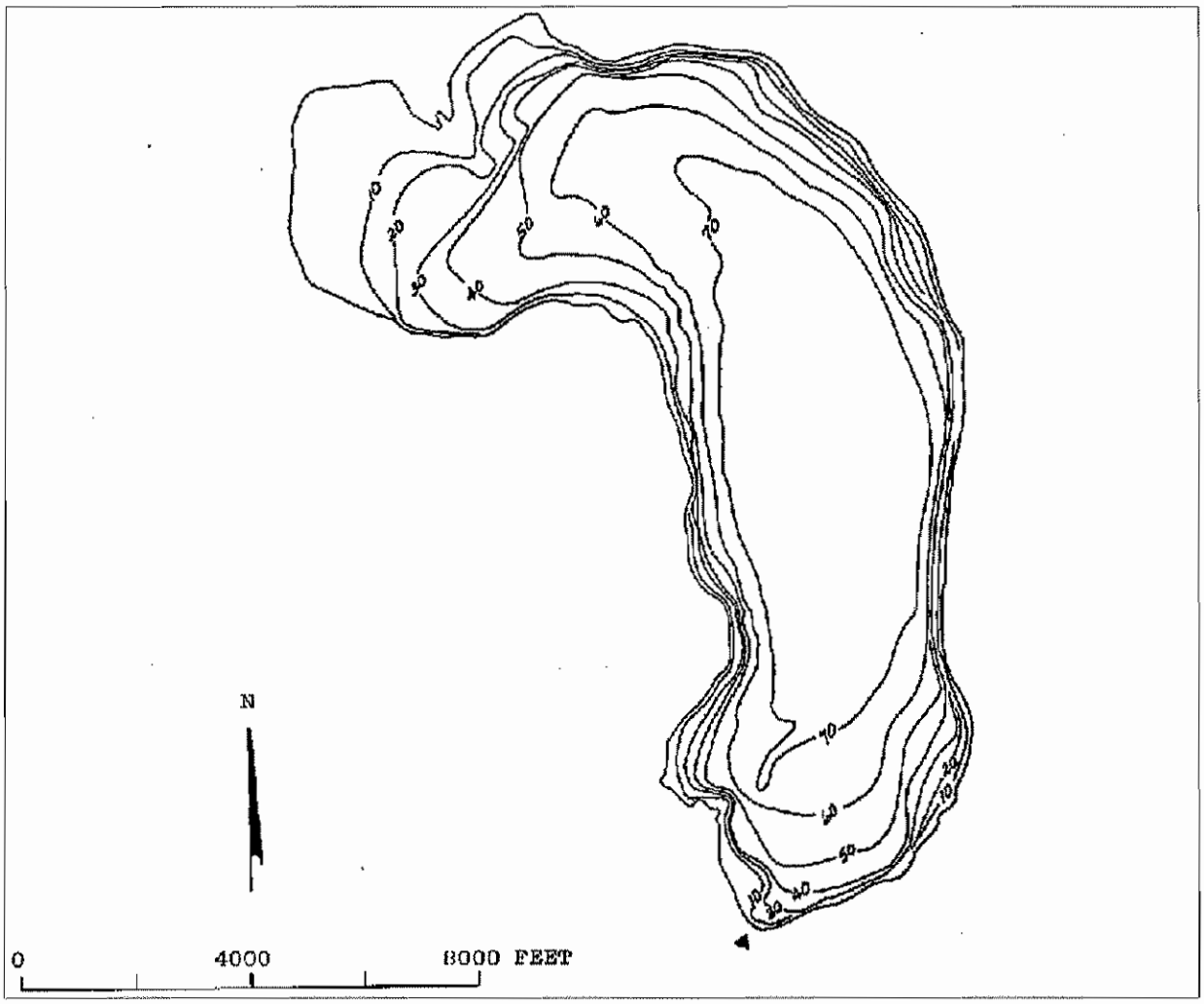






DESCRIPTION

AREA (acres)	2110
MAX DEPTH (feet)	79
MEAN DEPTH (feet)	51
DRAINAGE (square miles)	296.
VOLUME (acre-feet)	107000
SHORE LENGTH (miles)	9.93
ALTITUDE (feet)	1145



PALMER LAKE -- OKANOGAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/19	17.0	62.6		Lt Brown	0	None	Strong	3.0	168.0	WATER 168 INCHES ABOVE NORMAL LOW.
97/06/03	18.0	64.4		Lt Brown	25	Light	Light	4.0	126.0	LAKE REACHED 15 FEET 6 INCHES ON 5/17. HIGHEST POINT THIS YEAR.
97/06/18	20.0	68.0		Lt Brown	50	Trace	Calm	7.0	111.0	
97/07/04	22.0	71.6		Lt Brown	75	Mod	Light	7.0	84.0	MULTIPLE THUNDER STORMS.
97/07/21	25.0	77.0		Lt Brown	50	Light		7.0	30.0	
97/08/05	24.0	75.2		Amber	0	None	Calm	11.5	12.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/19	E	33	0.27							
97/05/19	H	24	0.28							
97/08/18	E	41	0.23	3.2						
97/08/18	H	80	0.28							
STATION 2										
97/05/19	E	31	0.27							
97/08/18	E	15	0.22	3.7						
97/08/18	H			4.2						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

At spring sampling: Lake height down 1.5 ft from peak (~14ft above normal low); very turbid with debris on surface (heavy winds previous day); 14, 18, and 22M casts were not noticably turbid; 22M cast had visible algae colonies. Silver fishing reportedly good. This year was cooler and wetter than usual: 2 hay cuttings instead of usual 4-5.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	50 (Meso-eutrophic)
Mean Trophic State Index (Total Phosphorus):	52 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	43 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Palmer Lake appears to be nutrient rich but does not show the typical signs of a lake suffering from eutrophication. There is ample oxygen in the summertime hypolimnion except near the sediment and chlorophyll concentrations appear to be favorable although chlorophyll concentrations could be diminished due to turbid conditions. Palmer Lake is assessed as mesotrophic.

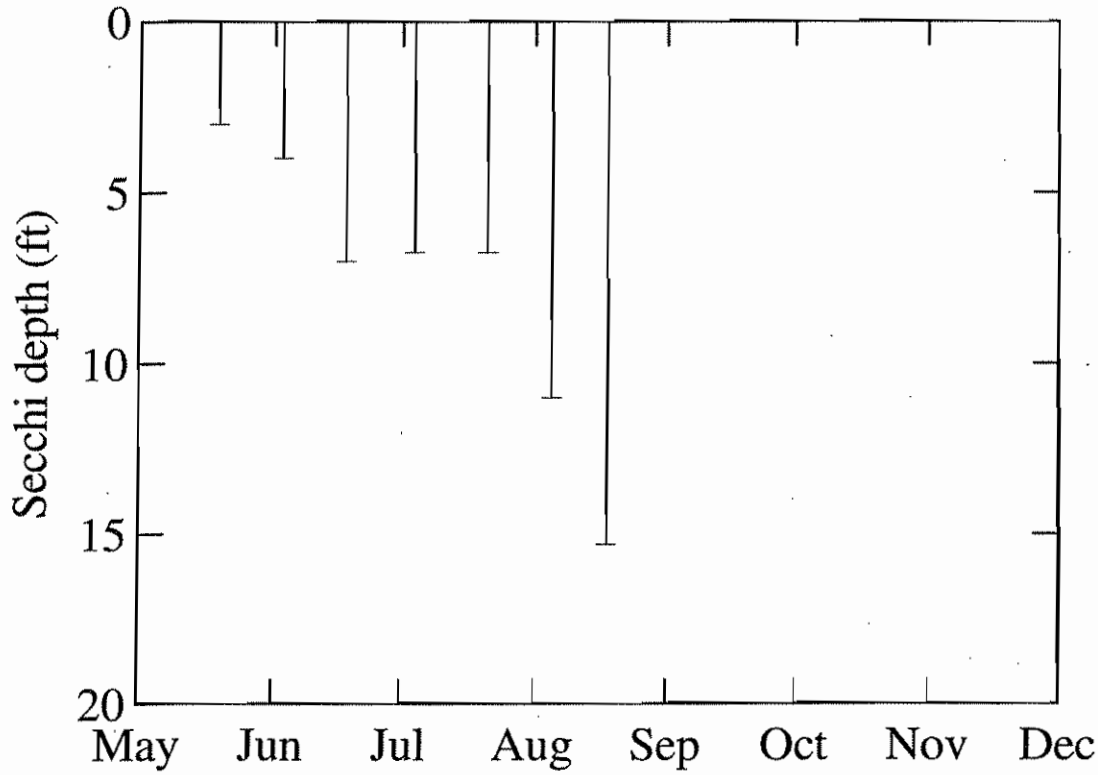
COMMENTS FROM 95/06/28 AQUATIC PLANT SURVEY

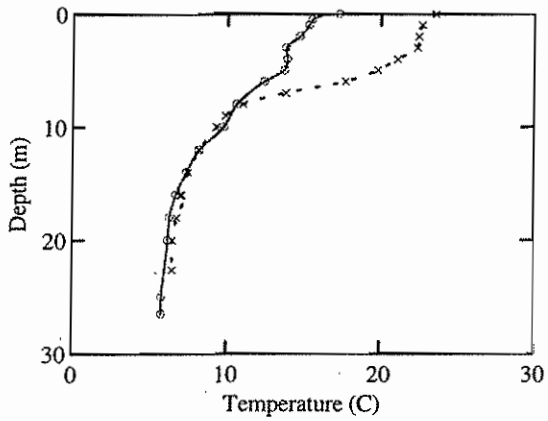
clear, calm. Not many plants, mostly at SW and NW ends. Rocky bottom. Water tea colored, much algae on the surface and suspended. Circumnavigated the shoreline, tho' quickly in spots

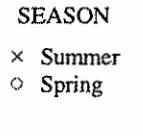
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

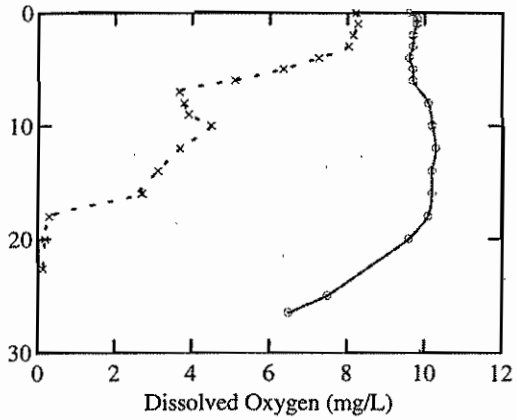
Ceratophyllum demersum (Coontail; hornwort) *Elodea canadensis* (common elodea) *Elodea sp.* (waterweed) *Myriophyllum sibiricum* (northern watermilfoil) *Najas flexilis* (common naiad) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Polygonum amphibium* (water smartweed) *Potamogeton illinoensis* (Illinois pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton nodosus* (longleaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Ranunculus aquatilis* (water-buttercup) *Scirpus fluviatilis* (river bulrush)

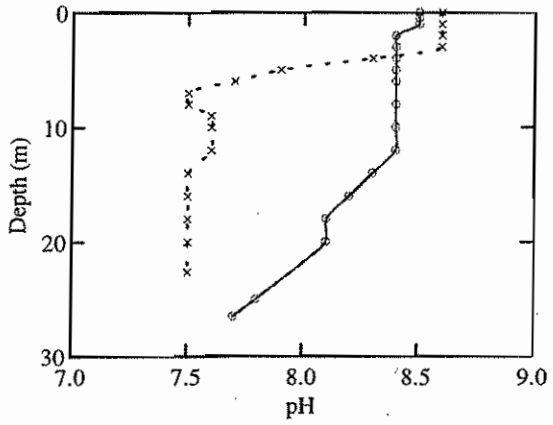
PALMER

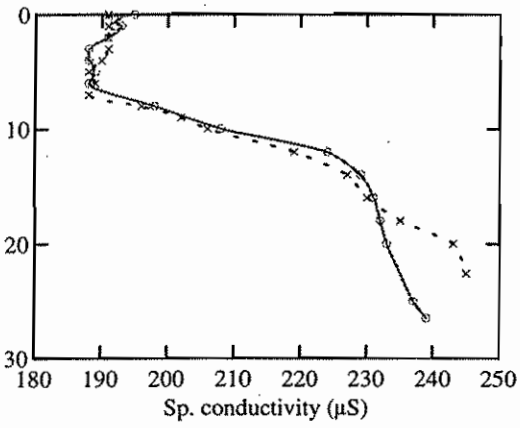

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
0
10
20
30
Temperature (C)


SEASON
Summer
Spring


0
10
20
30
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)

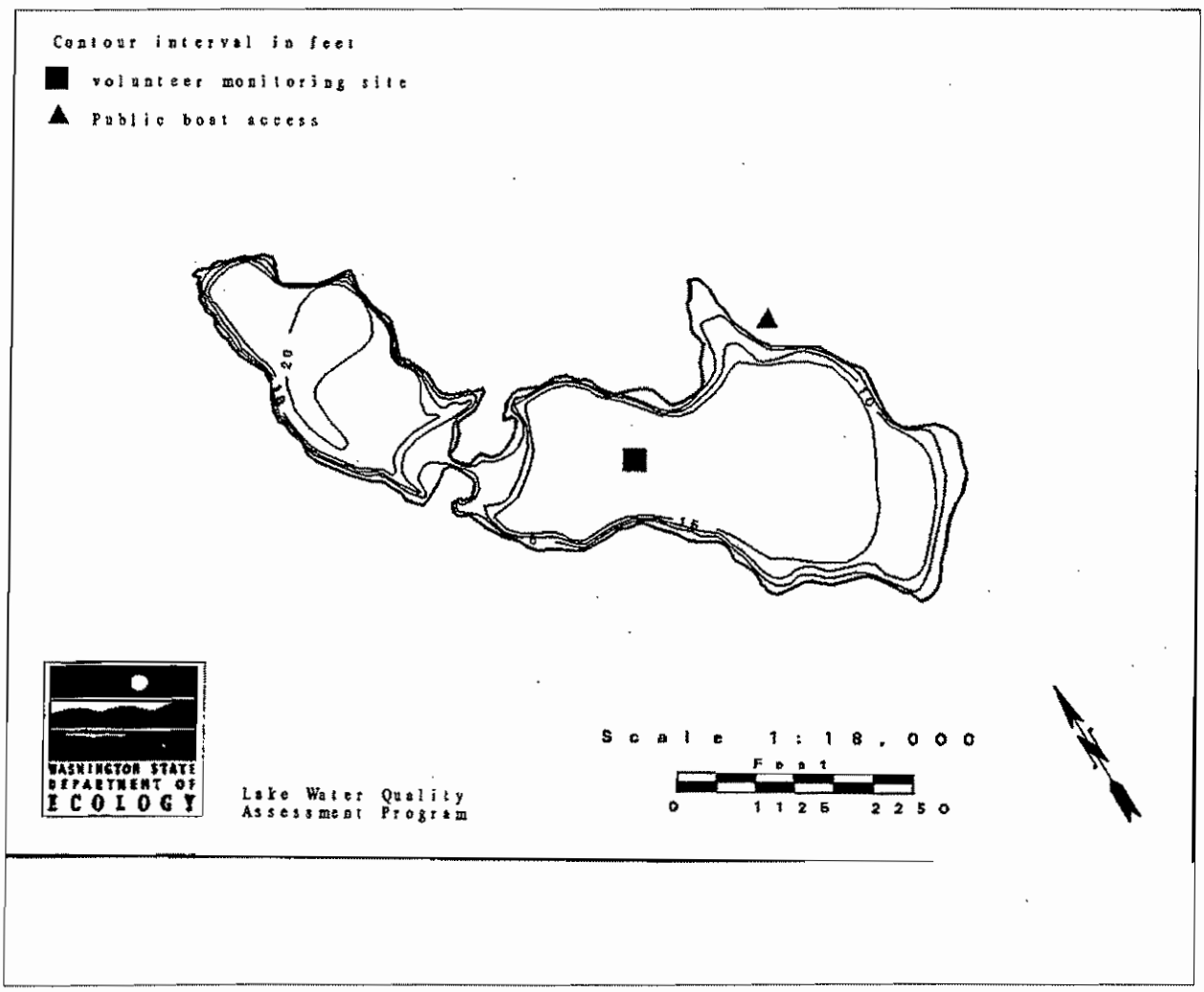

Depth (m)
0
10
20
30
7.0
7.5
8.0
8.5
9.0
pH


0
10
20
30
180
190
200
210
220
230
240
250
Sp. conductivity (µS)

LAKECOUNTY PATTISON (NORTH ARM) (THURSTON)

DESCRIPTION Pattison Lake is located six miles southeast of Olympia. It consists of two basins separated by a narrow channel. The north basin covers 75 acres and the south basin covers 190 acres. The north lake is fed by Hicks Lake, drains through south Pattison Lake to Long Lake, which ultimately drains to Henderson Inlet via Himes/Woodland Creek. Pattison Lake is also listed in references as Lake.

AREA (acres)	81
MAX DEPTH (feet)	22
MEAN DEPTH (feet)	14
DRAINAGE (square miles)	2.9
VOLUME (acre-feet)	1120
SHORE LENGTH (miles)	1.68
ALTITUDE (feet)	154



PATTISON (NORTH ARM) LAKE -- THURSTON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/17	20.0	68.0		Dark Brn	75	Mod	Calm	3.8	8.0	
97/05/20	20.6	69.1		Dark Brn	0	None	Light	3.0J	8.0	A GREAT DEAL OF ALGAE THROUGHOUT THE WATER.
97/06/10	21.1	70.0		Dark Brn	10	None	Light	3.8	8.5	BLUE-GREEN ALGAE
97/06/25	20.6	69.0		Lt Brown	25	Trace	Breezy	4.0	0.0	
97/07/11	21.1	70.0		Dark Brn	50	Trace	Calm	5.0	0.0	
97/08/04	26.7	80.1		Dark Brn	10	None	Light	6.5	86.4	
97/08/28	19.4	66.9		Dark Brn	100	Mod	Light	9.0	68.0	WITH CHRIS DOE.
97/09/21	17.8	64.0		Lt Brown	0	None	Light	6.8	82.0	WATER CLARITY HAS INCREASED.

J - Estimate or QC requirements were not met

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

There were no field observations recorded for PATTISON (NORTH ARM) (THURSTON) in 1997

TROPHIC STATUS

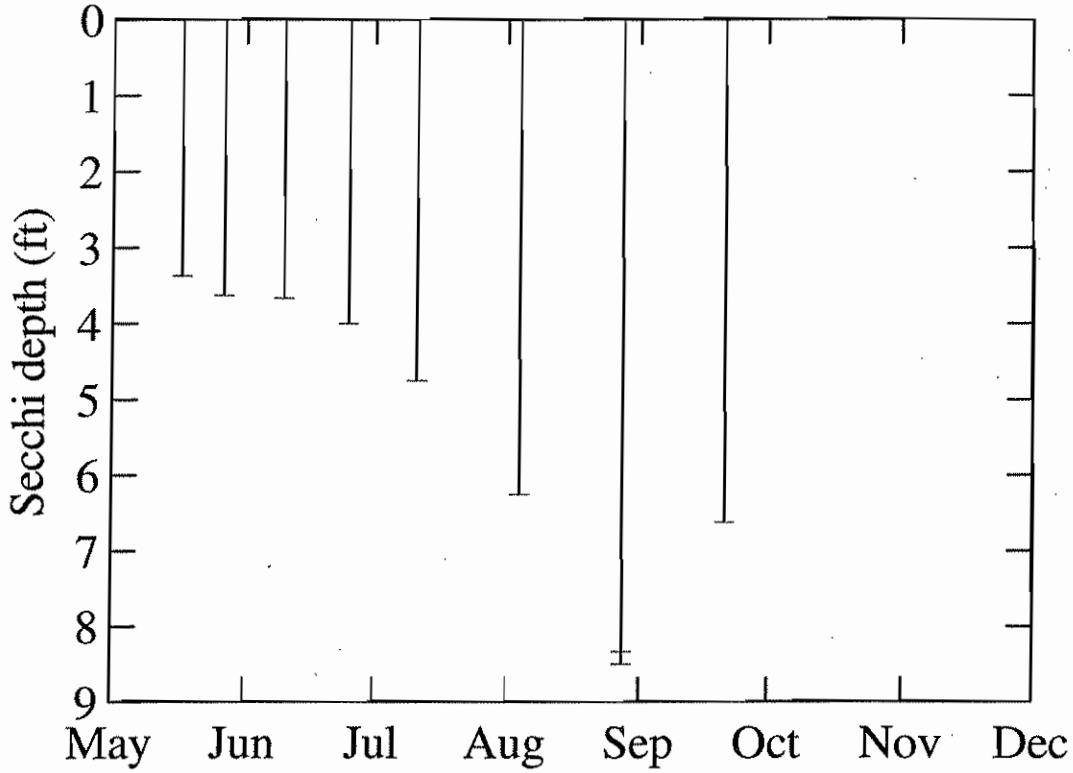
Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	52 (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Pattison Lake is assessed as eutrophic based on TSI values and the severly depleted summertime DO concentration in the hypolimnion. Additionally, Pattison Lake has many macrophytes that line the nearshore sediment.

Information regarding TP and Chlorophyll TSI and information on the hypolimnetic DO concentration was provided by Thurston County Environmental Health.

PATTISON



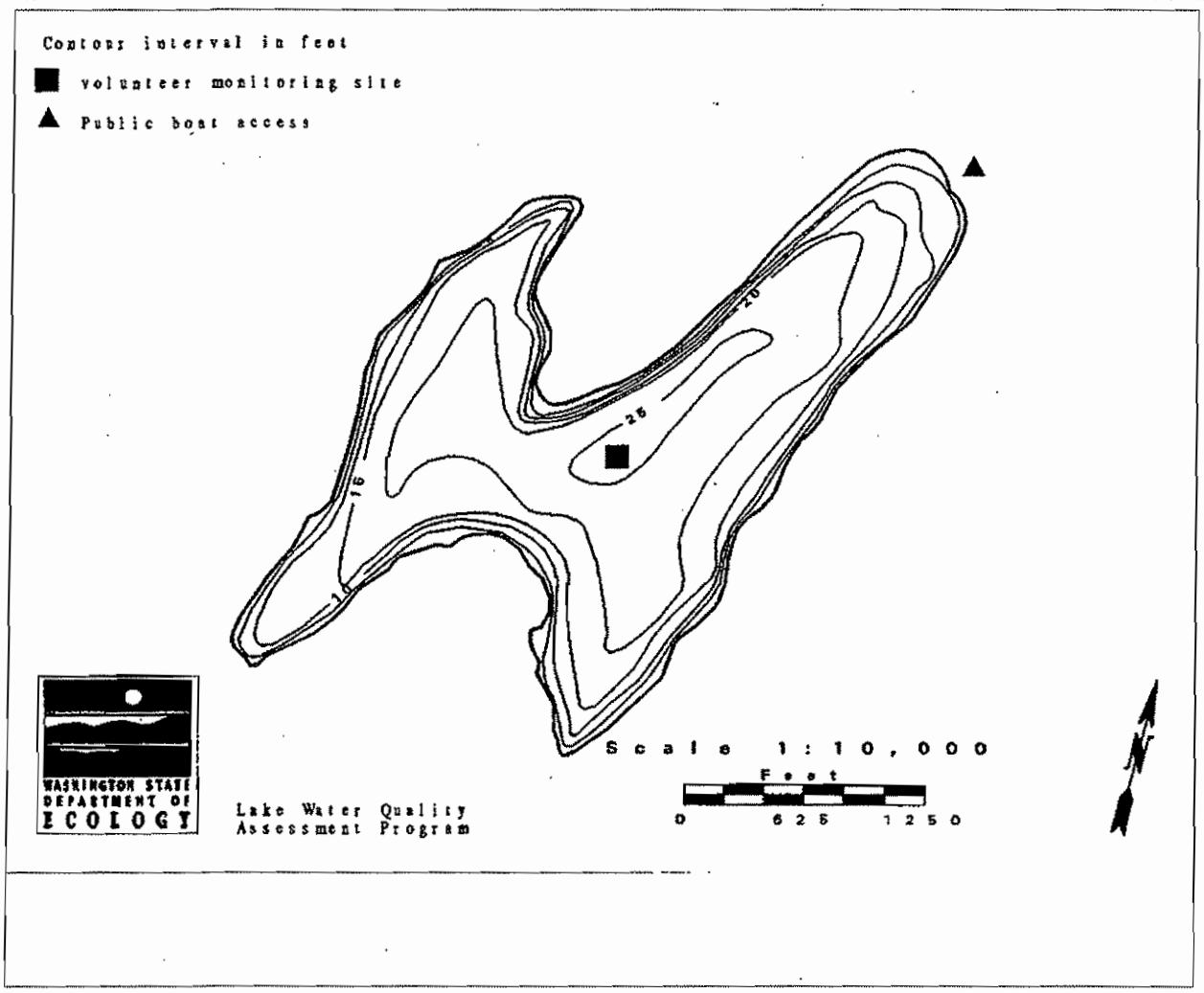
SEASON

× Summer
○ Spring

LAKECOUNTY PHILLIPS (MASON)

DESCRIPTION Phillips Lake is located seven miles north of Shelton. It has no surface inlets, and drains via Campbell Creek through a marshy area to Oakland Bay.

AREA (acres)	110
MAX DEPTH (feet)	25
MEAN DEPTH (feet)	16
DRAINAGE (square miles)	0.5
VOLUME (acre-feet)	1800
SHORE LENGTH (miles)	2.63
ALTITUDE (feet)	188



PHILLIPS LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/05/26	19.4	66.9		Lt Green	50	Trace	Calm	16.0	8.0		
97/06/18	19.4	66.9	6.5	Lt Green	25	Mod	Breezy	15.0	8.0		
97/07/02	21.1	70.0	6.5	Lt Green	50	Trace	Light	15.5	9.0		
97/07/17	21.7	71.1	6.5	Lt Green	25	Trace	Breezy	16.0	10.0		
97/08/07	23.3	73.9	6.5	Lt Green	10	None	Light	15.0	12.0		
97/08/18	23.3	73.9	6.5	Lt Green	75	None	Breezy	14.0	0.0		
97/09/01	22.2	72.0	6.5	Lt Green	25	Light	Light	12.0	1.5		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/26	E	8	0.17							
97/09/01	E	8	0.19	2.9						
STATION 2										
97/05/26	E	8	0.17							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***fair***. The worst problems were reported as:

1. algae 2. algae 3. declining long-term trend

Sources of actual or potential problems includes:

INCREASED LOGGING AND DEVELOPMENT AND OUTDATED SEPTIC SYSTEMS

Were there days (and how many) when poor water quality impaired

Fishing - ***YES(60)*** Swimming - ***YES(60)*** Aesthetics - ***YES(60)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***162***

Changes since last year? ***SEVERAL LOTS CLEARED AND DEVELOPED.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-26-97 Gaylord Kidney wants to do plant surveys. Very few zooplankton observed in the samples.

9-1-97 Lots of boaters which made it difficult to sample

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	38 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	33 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	41 (Oligo-mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although nearly all the data collected from Lake Phillips might suggest an oligotrophic lake, there was a significant blue-green algal bloom on the lake this year which is not typical of oligotrophy, therefore, the lake is assessed as oligo-mesotrophic.

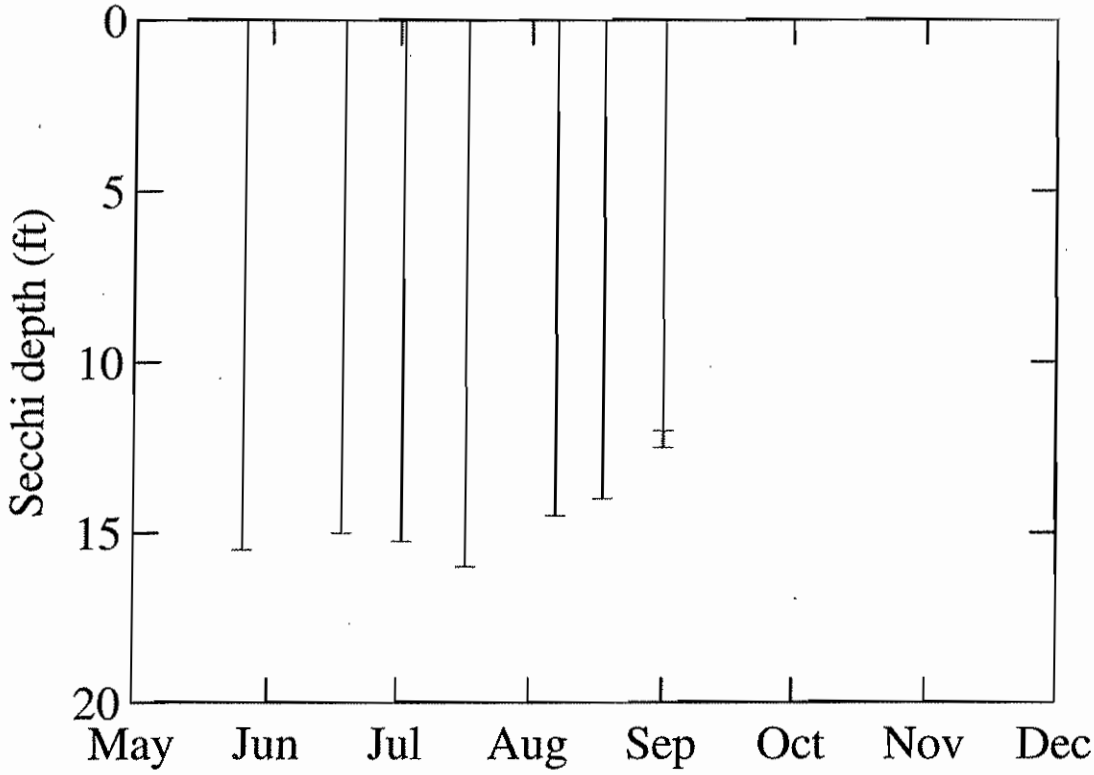
COMMENTS FROM 98/07/20 AQUATIC PLANT SURVEY

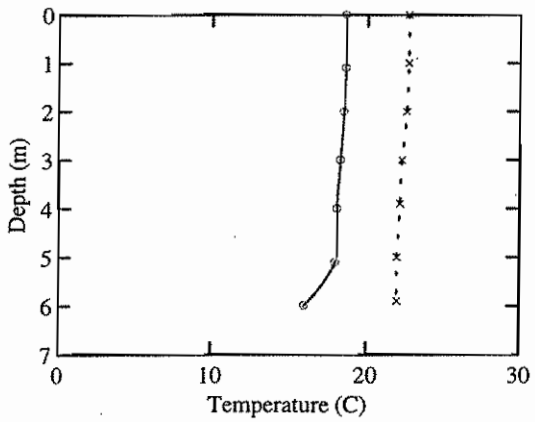
Sunny, light breeze. Shoreline is developed, many bulkheads but also many trees left standing, and many down and submersed. Aquatic plant community sparse and low growing. Much epiphytic algae on substrate and plants in NE end. Observed rough-skinned newts, bullfrog, many small fish. Conducted habitat survey for Kirk Smith. Maximum depth of plant growth: 6.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

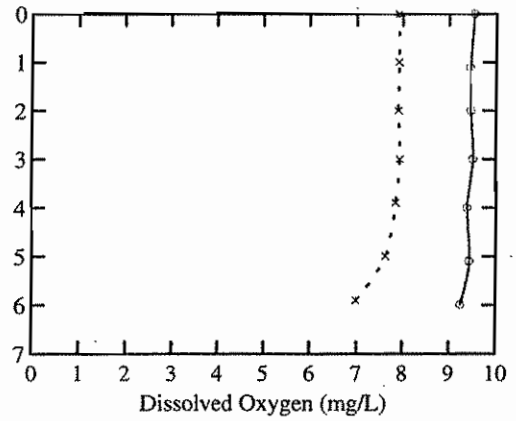
Dulichium arundinaceum (Dulichium) *Elodea canadensis* (common elodea) *Iris pseudacorus* (yellow flag) *Isoetes sp.* (quillwort) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Potamogeton pusillus* (slender pondweed) *Utricularia sp.* (bladderwort)

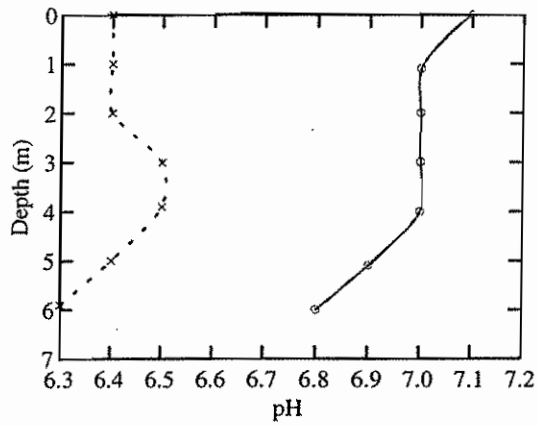
PHILLIPS

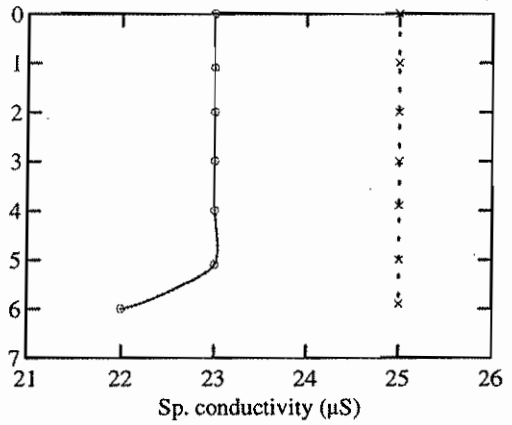




SEASON
× Summer
○ Spring

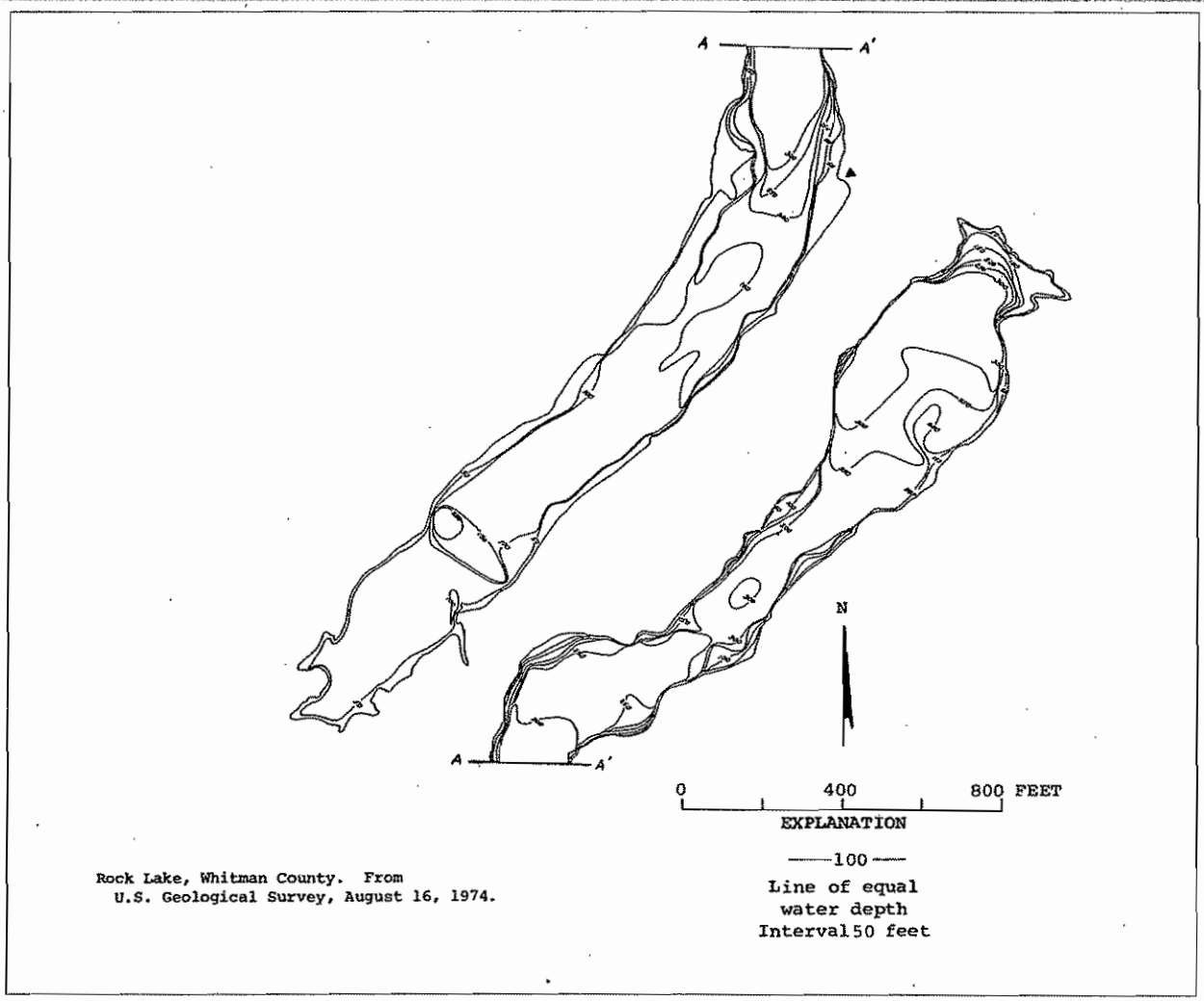






DESCRIPTION

AREA (acres)	2190
MAX DEPTH (feet)	350
MEAN DEPTH (feet)	172
DRAINAGE (square miles)	523.
VOLUME (acre-feet)	380000
SHORE LENGTH (miles)	17.8
ALTITUDE (feet)	1719



Rock Lake, Whitman County. From U.S. Geological Survey, August 16, 1974.

ROCK LAKE -- WHITMAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 0											
97/05/28					0			2.3	0.0		VERY TURBID. CARP SPLASHING AROUND SHORELINE. NO DEVELOP AT SOUTH END. TURBID AT ALL DEPTHS. NO VISIBLE ZOO. LAKE SURROUNDED BY BASALT.
STATION 1											
97/08/24				Undefined	95		Breezy	6.9	0.0		WATER WAS A HAZY BROWN-GREEN.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/28	E	200J	4.42				30.0			
97/05/28	H	202J	4.46							
97/08/24	E	78	3.81	0.7J			4.9			
97/08/24	H	144	3.99							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

No development at south end (did not go to north end); high basalt cliff around lake. Fed by Pine and Rock Creeks. Spring sampling: Very turbid (at all sample depths); no zooplankton apparent in any casts; amphipods, large leaches and mayflies seen under rocks at southern end of lake; carps mating around shoreline; local fishermen said lake has been getting clearer in the last month and that is can get turbid suddenly. Summer sampling: Aphanizomenon (?) and another colonial blue-green visible; cows have access to south end; bottom material at sample site is fine, black, clinging mud.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	49N* (Meso-eutrophic)
Mean Trophic State Index (Total Phosphorus):	67 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	27J* (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Rock Lake is high in phosphorus but it appears that much of that may not be biologically available as chlorophyll production is low. High turbidity may also contribute to the lack of chlorophyll production. The lake, however, maintains favorable concentrations of DO in the hypolimnion and shows many other signs of an oligotrophic lake. Observations of blue-green colonies support an assessment of oligo-mesotrophic.

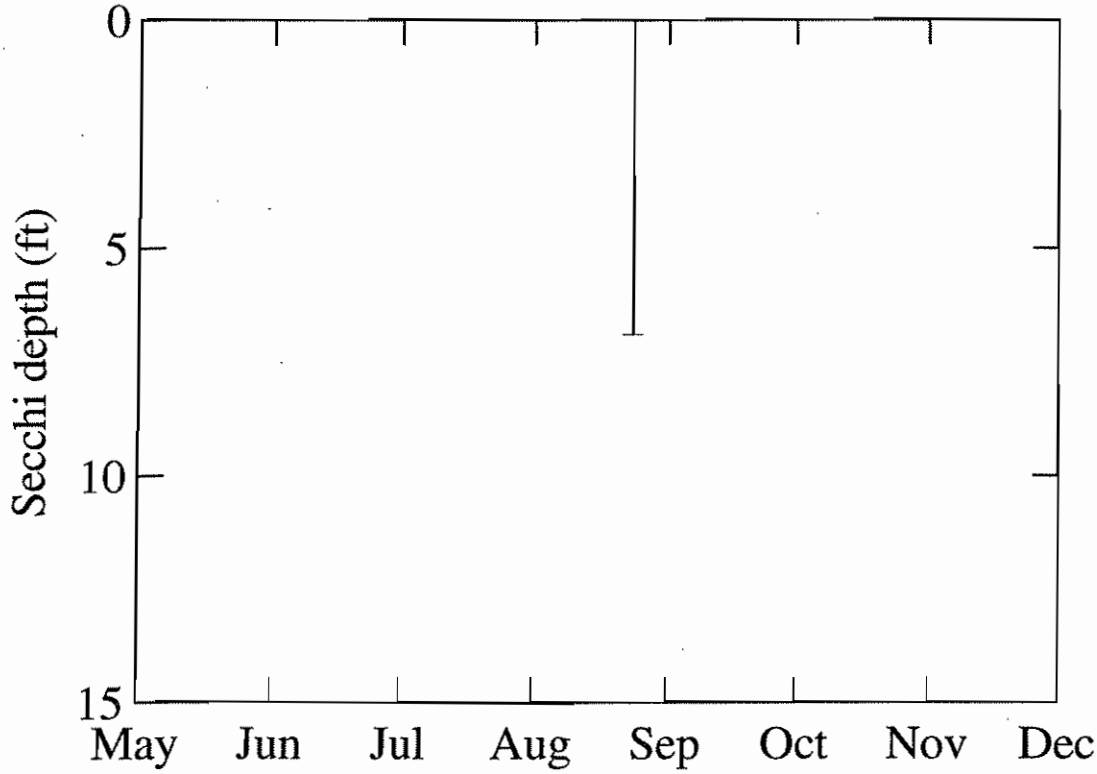
COMMENTS FROM 97/09/15 AQUATIC PLANT SURVEY

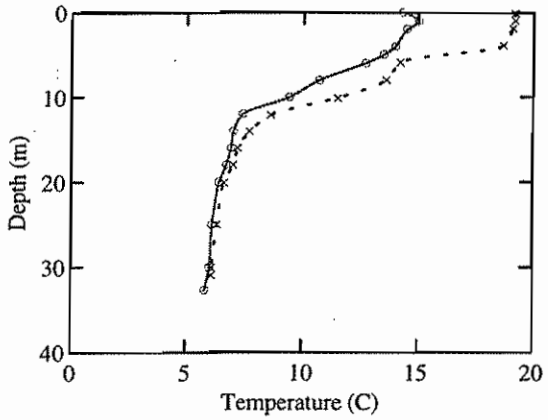
Very windy and cold, did not go out on water. Threw rake from shore, no plants around launch. Only P. crispus in channel under the bridge.

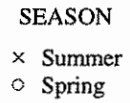
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

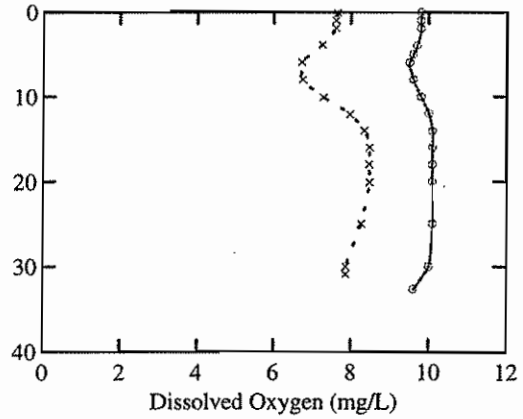
Lemna minor (duckweed) *Phalaris arundinacia* (reed canarygrass) *Potamogeton crispus* (curly leaf pondweed) *Scirpus sp.* (bulrush)

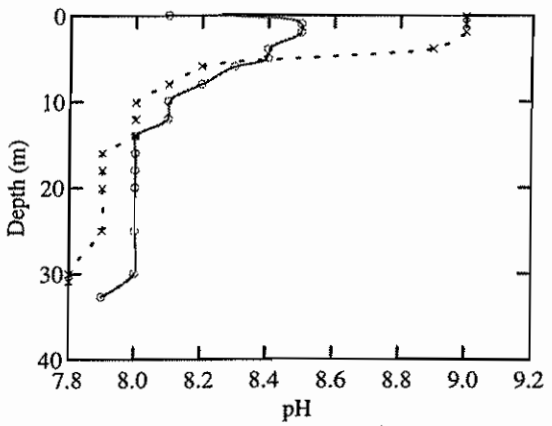
ROCK

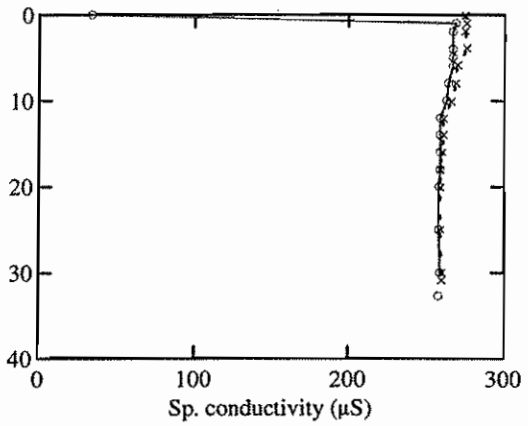

Secchi depth (ft)
0
5
10
15
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
40
0
5
10
15
20
Temperature (C)


SEASON
Summer
Spring


0
10
20
30
40
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)

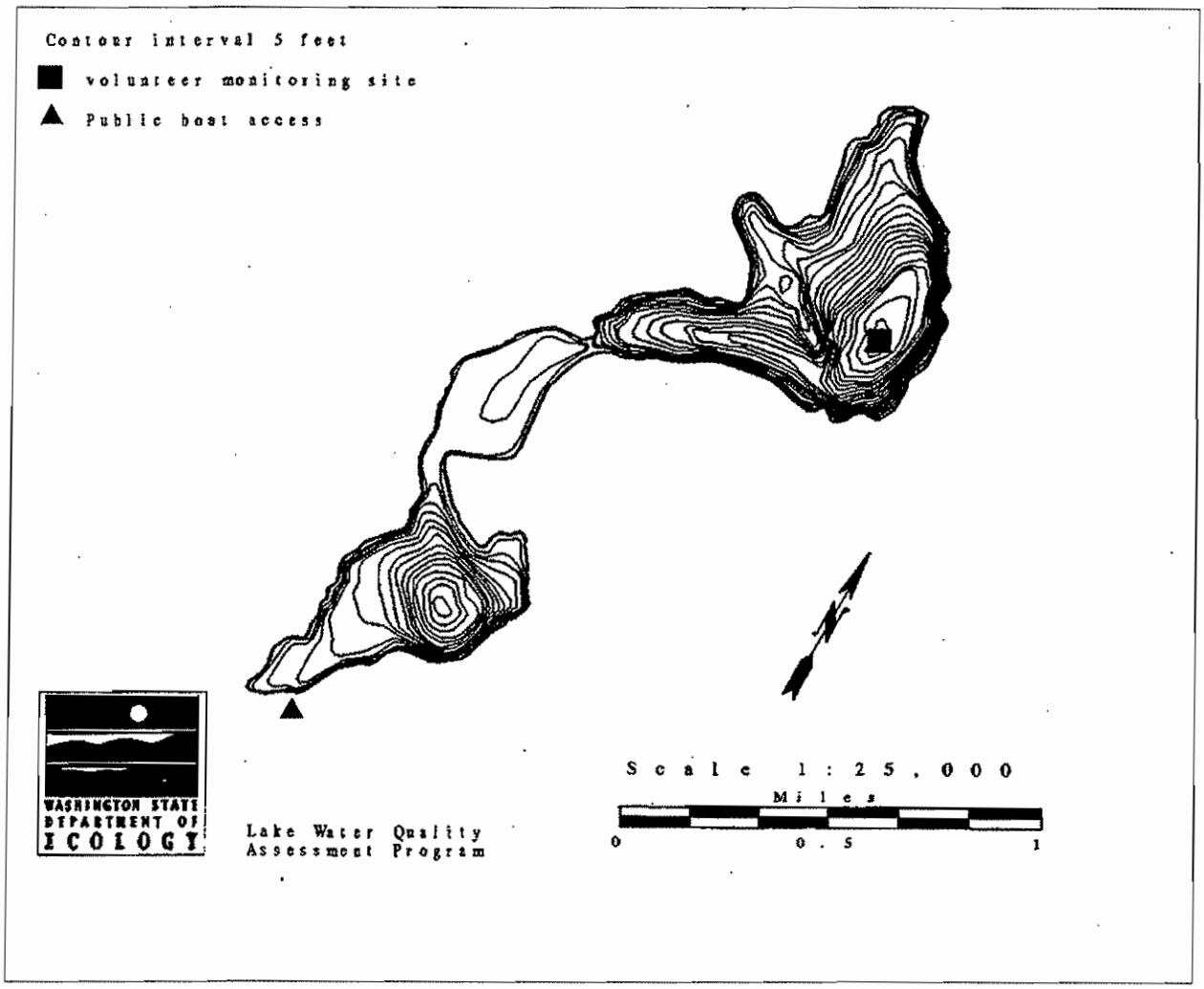

Depth (m)
0
10
20
30
40
7.8
8.0
8.2
8.4
8.6
8.8
9.0
9.2
pH


0
10
20
30
40
0
100
200
300
Sp. conductivity (µS)

LAKECOUNTY ROESIGER (NORTH ARM) (SNOHOMISH)

DESCRIPTION Roesiger is located 8.5 miles northeast of Monroe. The north and south basins of the lake are separated by a shallow connecting basin. The volunteer monitored both basins. The north basin of Lake Roesiger is fed by an intermittent stream, and drains southeast through the south basin of the lake via Roesiger Creek to Woods Creek and the Skykomish River.

AREA (acres)	200
MAX DEPTH (feet)	110
MEAN DEPTH (feet)	48
DRAINAGE (square miles)	1.9
VOLUME (acre-feet)	9600
SHORE LENGTH (miles)	2.92
ALTITUDE (feet)	570



ROESIGER (NORTH ARM) LAKE -- SNOHOMISH COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/04/26	12.5	54.5	7.0	Lt Green	100	Trace	Calm	18.0	10.0		
97/05/18	20.0	68.0	7.0	Lt Green	25	Trace	Calm	20.0	13.5		
97/07/13	20.0	68.0	7.0	Lt Green	2	None	Calm	16.0	0.0		
97/09/11					100	Trace	Light	19.8	0.0		
97/09/21	19.5	67.1	6.0	Mod Green	0	None	Calm	18.0	15.0		LEAF DEBRIS FLOATING IN THE MIDDLE OF THE LAKE.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/03	E	3								
97/06/03	H	5								
97/09/11	E	4	0.11	3.6						
97/09/11	H	19	0.38							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Very few algal cells observed in the water samples--some blue-greens present.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	35 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	23 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	43 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Data collected from Lake Roesiger (North Arm) in 1997 support an oligotrophic assessment.

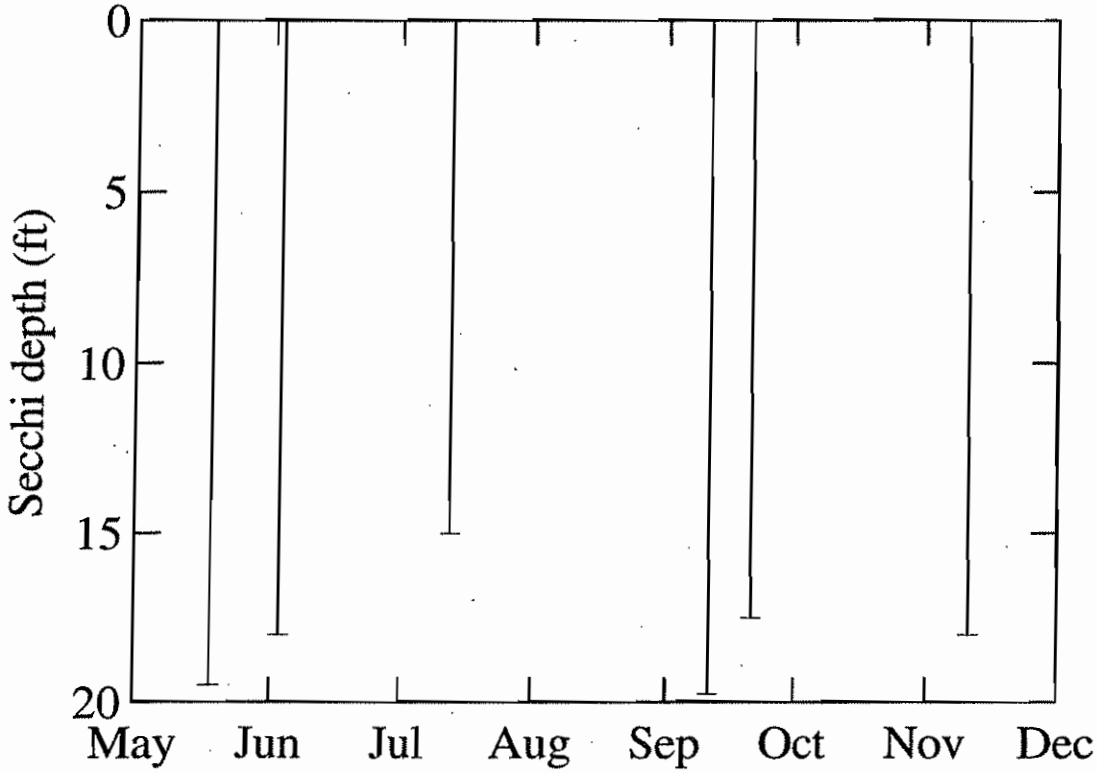
COMMENTS FROM 98/08/06 AQUATIC PLANT SURVEY

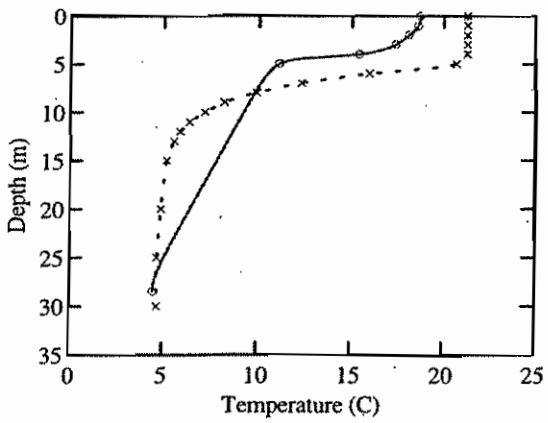
sampled along with south part of lake, found M. spicatum

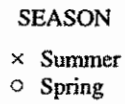
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

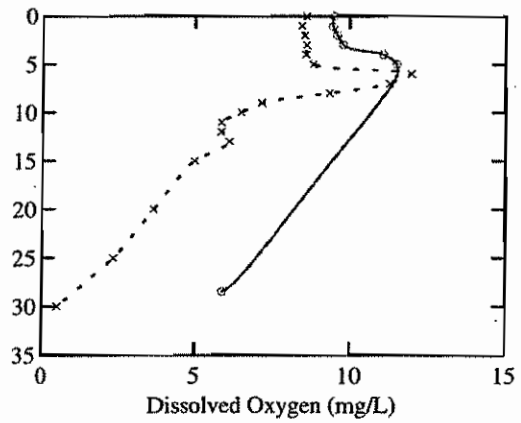
Elodea canadensis (common elodea) *Iris pseudacorus* (yellow flag) *Lythrum salicaria* (purple loosestrife) *Myriophyllum spicatum* (Eurasian water-milfoil) *Phalaris arundinacia* (reed canarygrass) *Potamogeton pusillus* (slender pondweed) *Sagittaria graminea* (slender arrowhead) *Vallisneria americana* (water celery)

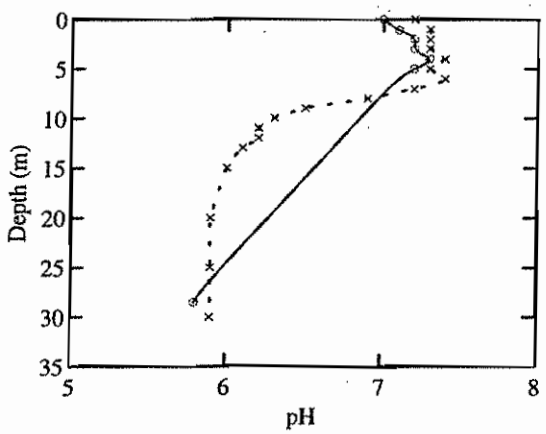
ROESIGER

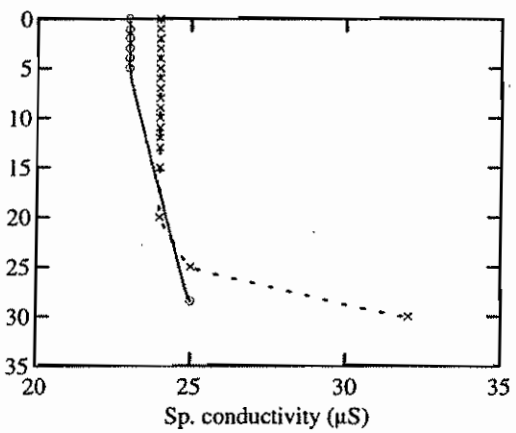

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring


Dissolved Oxygen (mg/L)

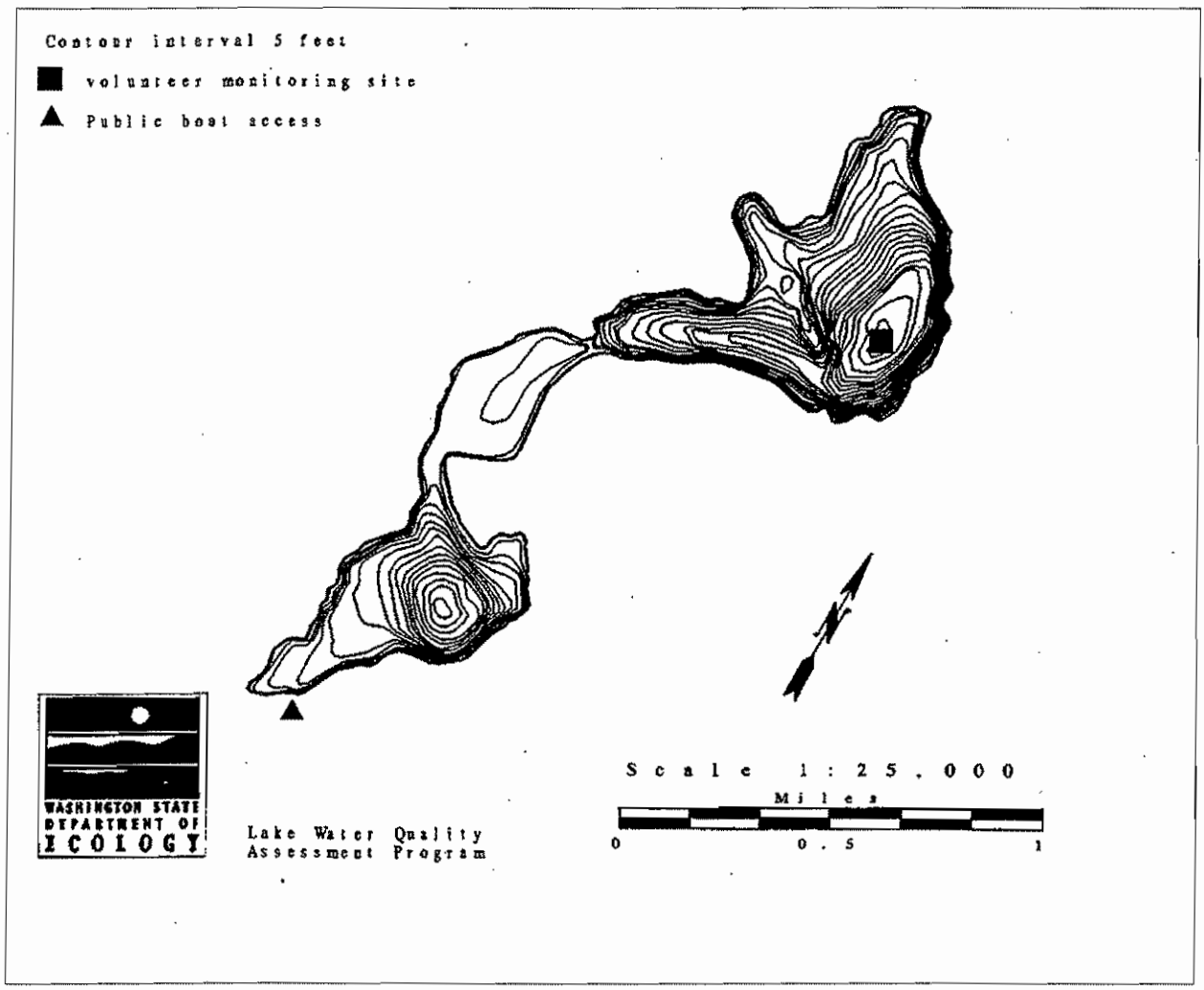

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY ROESIGER (SOUTH ARM) (SNOHOMISH)

DESCRIPTION

AREA (acres)	140
MAX DEPTH (feet)	70
MEAN DEPTH (feet)	22
DRAINAGE (square miles)	3.5
VOLUME (acre-feet)	3000
SHORE LENGTH (miles)	3.03
ALTITUDE (feet)	570



ROESIGER (SOUTH ARM) LAKE -- SNOHOMISH COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 3										
97/04/26	13.8	56.8	7.0	Lt Green	75	None	Calm	18.0	15.5	
97/06/03	-7.2	19.0	7.2	Lt Green	100	Heavy	Light	17.0	19.8	STALKS OF PLANTS SEEN. WILL TAKE SAMPLES NEXT TRIP.
97/06/27	19.0	66.2	7.0	Undefined	90	Mod	Breezy	16.5	16.0	WATER COLOR WAS BETWEEN LIGHT GREEN AND YELLOW-GREEN.
97/08/18	25.0	77.0	7.0	Lt Green	100	None	Breezy	18.0	294.0	3 WEEKS OF 70 - 90 DEGREE AIR TEMPS.
97/09/09	22.0	71.6	7.0	Lt Green	0		Calm	20.0	24.8	DEEP SITE NOT AS CLEAR AS SHALLOW SITE.
97/09/11				Lt Green	100	Trace	Calm	20.3	0.0	
97/11/11	10.0	50.0		Lt Green	0	None	Calm	18.0	15.0	HEAVY FROST IN THE MORNINGS. RAIN DELAYED THE LAST SECCHI READING.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 3										
97/06/03	E	5								
97/06/03	H	5								
97/09/11	E	3	0.13	2.8						
97/09/11	H	28	0.39							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Blue-green algae was observed in moderate amounts near the surface of the lake.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	35 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	21 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	41 (Oligo-mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although Lake Roesiger (South Arm) possesses many of the same properties as the North Arm of the lake, there is a significant DO sag in the summer and chlorophyll concentrations are elevated to the mesotrophic range, therefore, an oligo-mesotophic assessment is appropriate.

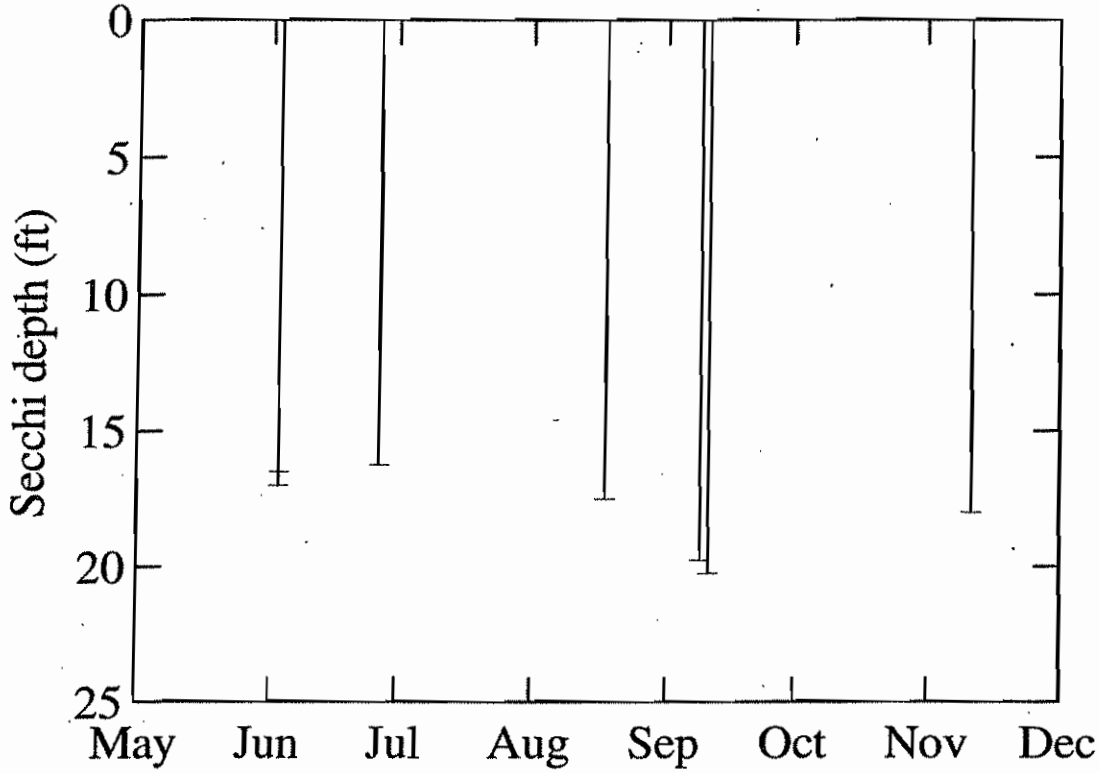
COMMENTS FROM 98/08/06 AQUATIC PLANT SURVEY

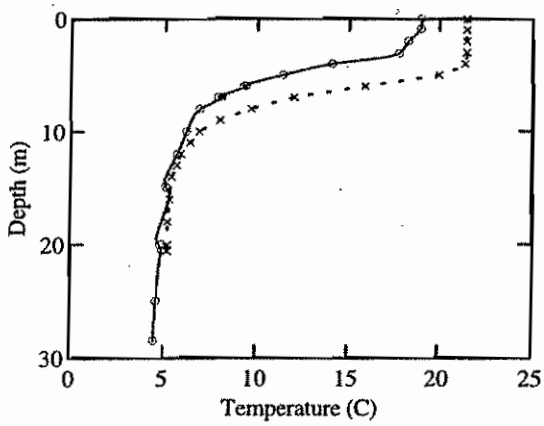
Cloudy, breeze, sunny later. WDFW planted steelhead fry today. Ducks and many small fish observed. Surveyed shoreline and sorkled boatlaunch area looking for milfoil, found several scattered plants. 2 Purple loosestrife plants at north end, removed heads and broke off at the base.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

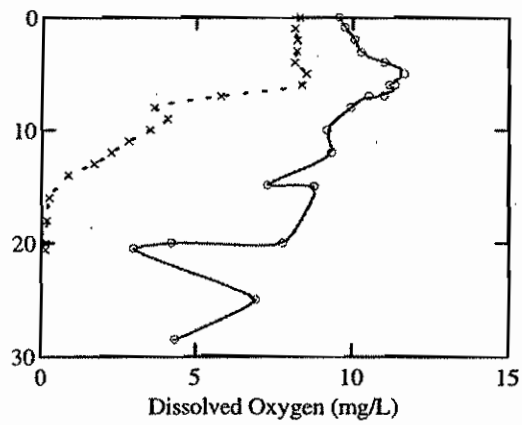
Carex unilateralis (one-sided sedge) *Elodea canadensis* (common elodea) *Elodea nuttallii* (Nuttall's waterweed) *Iris pseudacorus* (yellow flag) *Isoetes sp.* (quillwort) *Ludwigia palustris* (water-purslane) *Myriophyllum spicatum* (Eurasian water-milfoil) *Nitella sp.* (stonewort) *Nuphar sp.* (yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Nymphaea sp.* (water lily) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Sagittaria graminea* (slender arrowhead) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *Utricularia vulgaris* (common bladderwort) *Vallisneria americana* (water celery)

ROESIGER


Secchi depth (ft)
0
5
10
15
20
25
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring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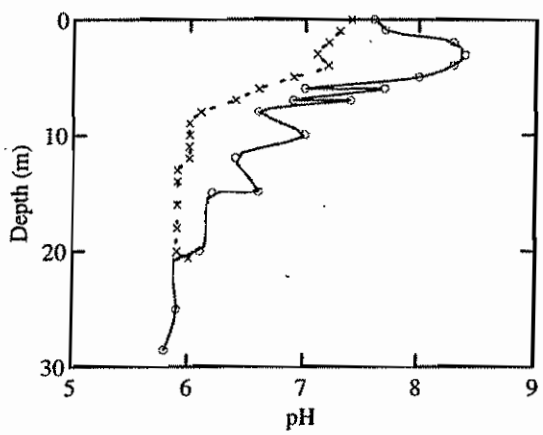
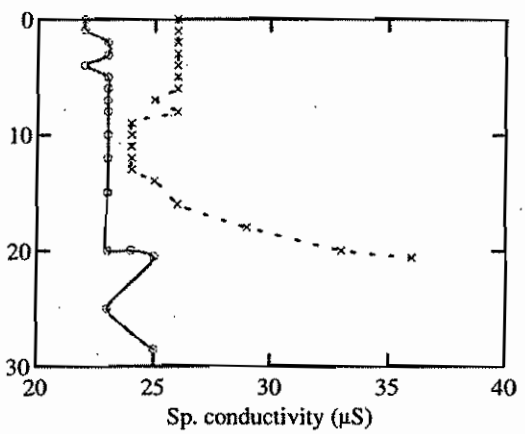
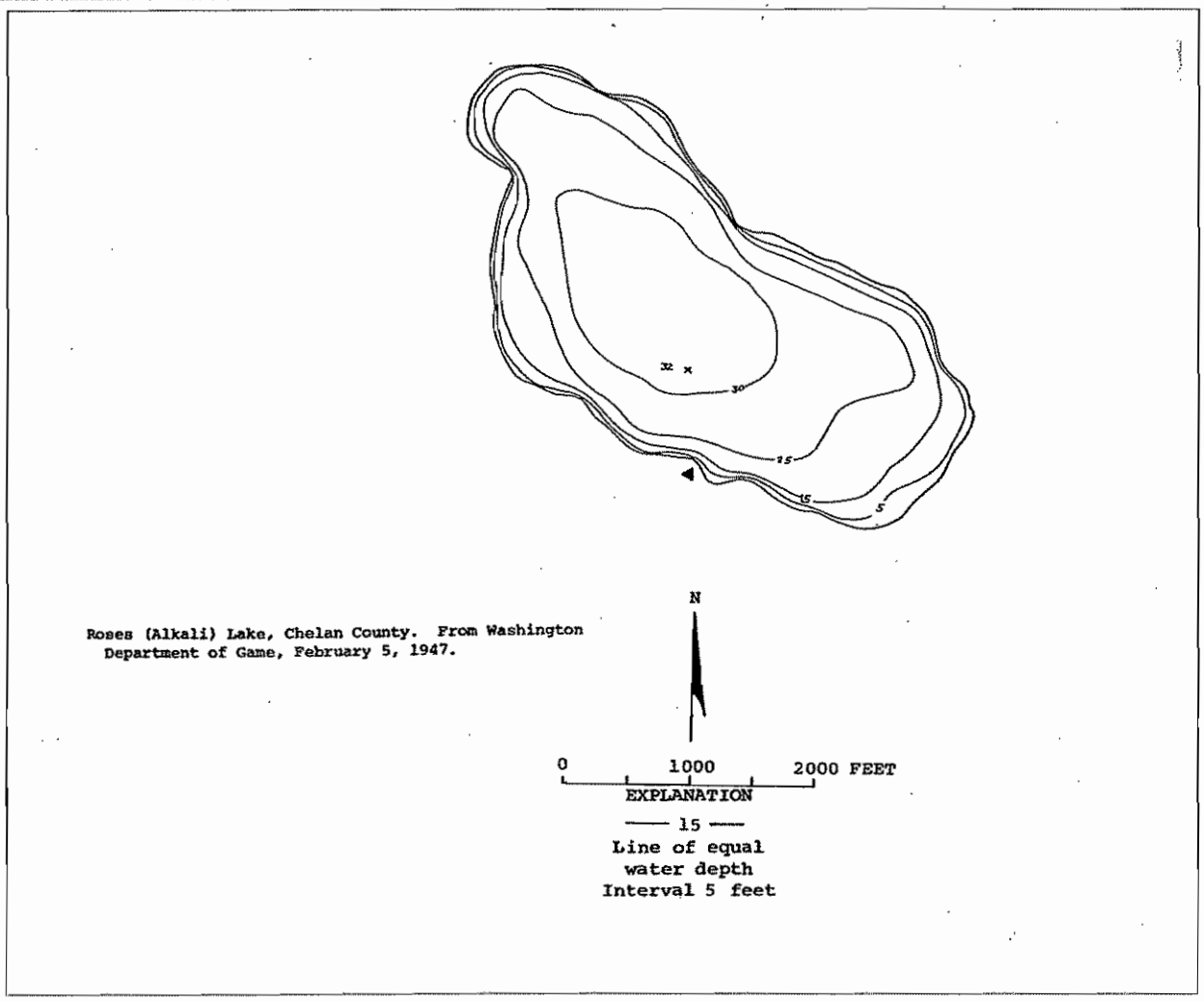
10
20
30
0
5
10
15
Dissolved Oxygen (mg/L)


Depth (m)
0
10
20
30
5
6
7
8
9
pH


0
10
20
30
20
25
30
35
40
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	131
MAX DEPTH (feet)	31
MEAN DEPTH (feet)	23
DRAINAGE (square miles)	0.8
VOLUME (acre-feet)	3075
SHORE LENGTH (miles)	2.2
ALTITUDE (feet)	1160



Roses (Alkali) Lake, Chelan County. From Washington Department of Game, February 5, 1947.

ROSES (ALKALI) LAKE -- CHELAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 1											
97/05/20					0			6.3	0.0		3MPH. SEVERAL FISHERMEN AT ACCESS. 4 HOUSES ON LAKE. ORCHARDS AROUND LAKE. LOTS OF DAPHNIA IN ALL CASTS. FILAMENTOUS ALGAE VISABLE.
97/08/19				Undefined	0	None	Calm	5.6	0.0		WATER WAS CLOUDY GREEN.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/20	E	29	1.33							
97/05/20	H	25	1.61							
97/08/19	E	28	0.84	13.8	11	67	3.0			
97/08/19	H	31	1.33							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

3mph speed limit November to April is posted, though water ski course is laid out and was being used at summer visit. Several fishermen at access but few in boats at time of sampling. Four houses on lake; mostly surrounded by orchards. Lots of Daphnia in all spring samples, filamentous algae also visible. Strong H2S at 8M in summer.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	51N* (Meso-eutrophic)
Mean Trophic State Index (Total Phosphorus):	52 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	56 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Roses Lake appears to be very productive yet still maintains favorable DO concentrations in the summer, except near the very bottom. The lake did not thermally stratify in 1997. The information provided by the data support a meso-eutrophic assessment.

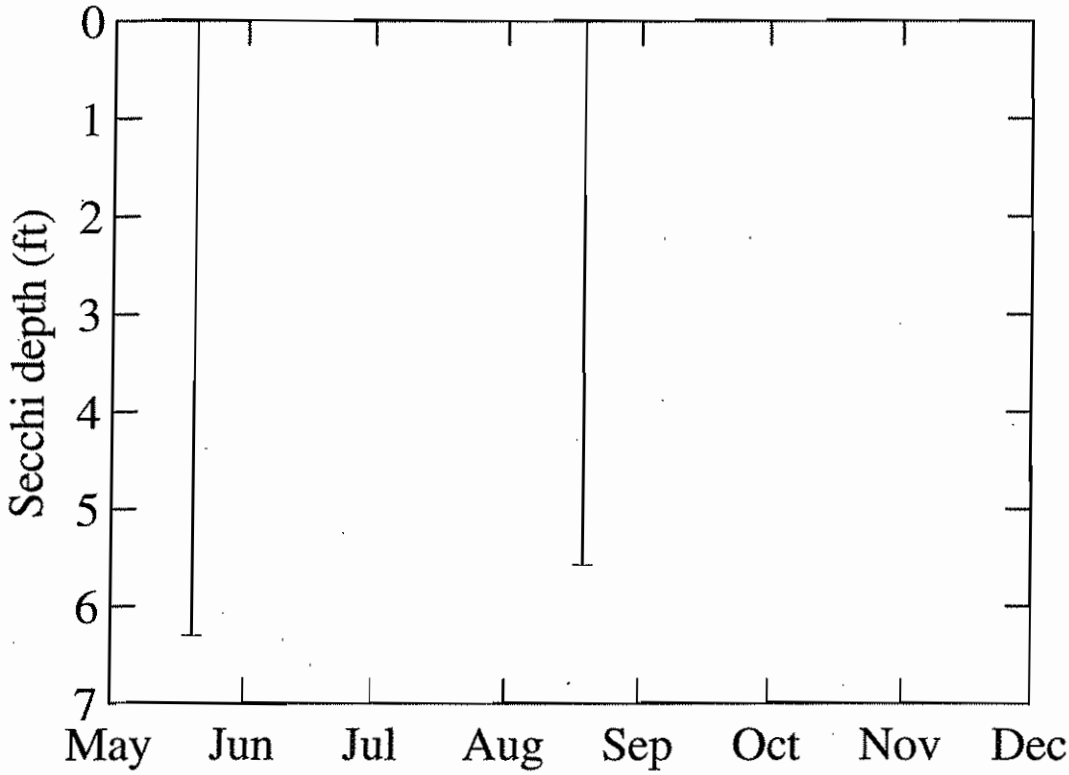
COMMENTS FROM 97/06/17 AQUATIC PLANT SURVEY

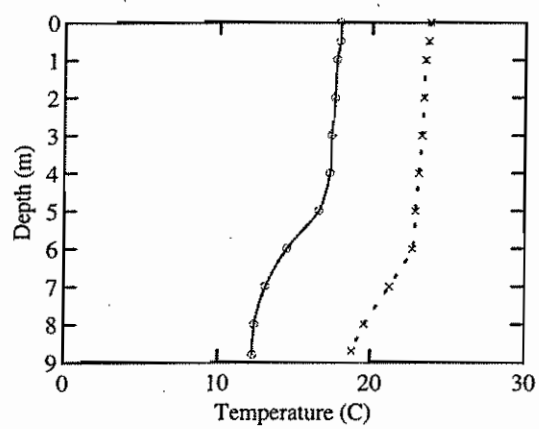
Cloudy, showers. Water level high. Plant community dominated by Ruppia, diversity is low. M. sibiricum blooming in shallows. Homogeneous plant community. Big thunderstorm! Circumnavigated shoreline, made a composite species list. Maximum depth of plant growth: 3.5M.

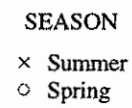
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

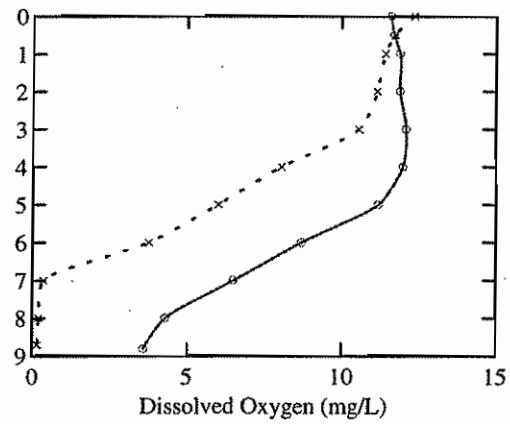
Lemna minor (duckweed) *Myriophyllum sibiricum* (northern watermilfoil) *Nymphaea odorata* (fragrant waterlily) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Ruppia maritima* (ditch-grass) *Scirpus sp.* (bulrush) *Scirpus tabernaemontani* (softstem bulrush) *Typha sp.* (cat-tail)

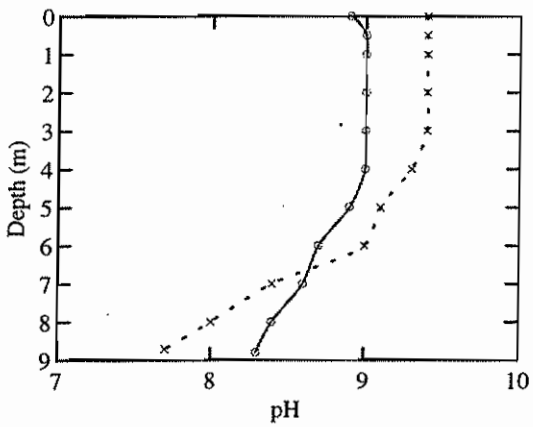
ROSES

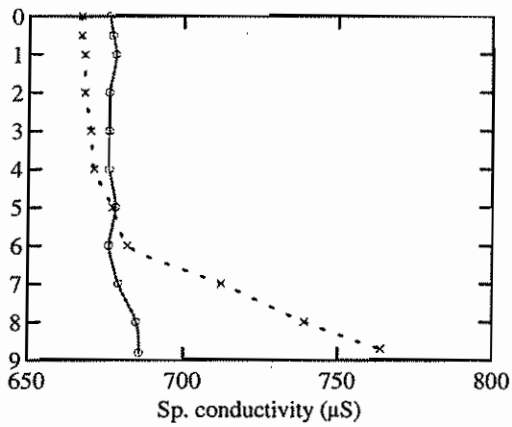

Secchi depth (ft)
0
1
2
3
4
5
6
7
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
1
2
3
4
5
6
7
8
9
0
10
20
30
Temperature (C)


SEASON
Summer
Spring

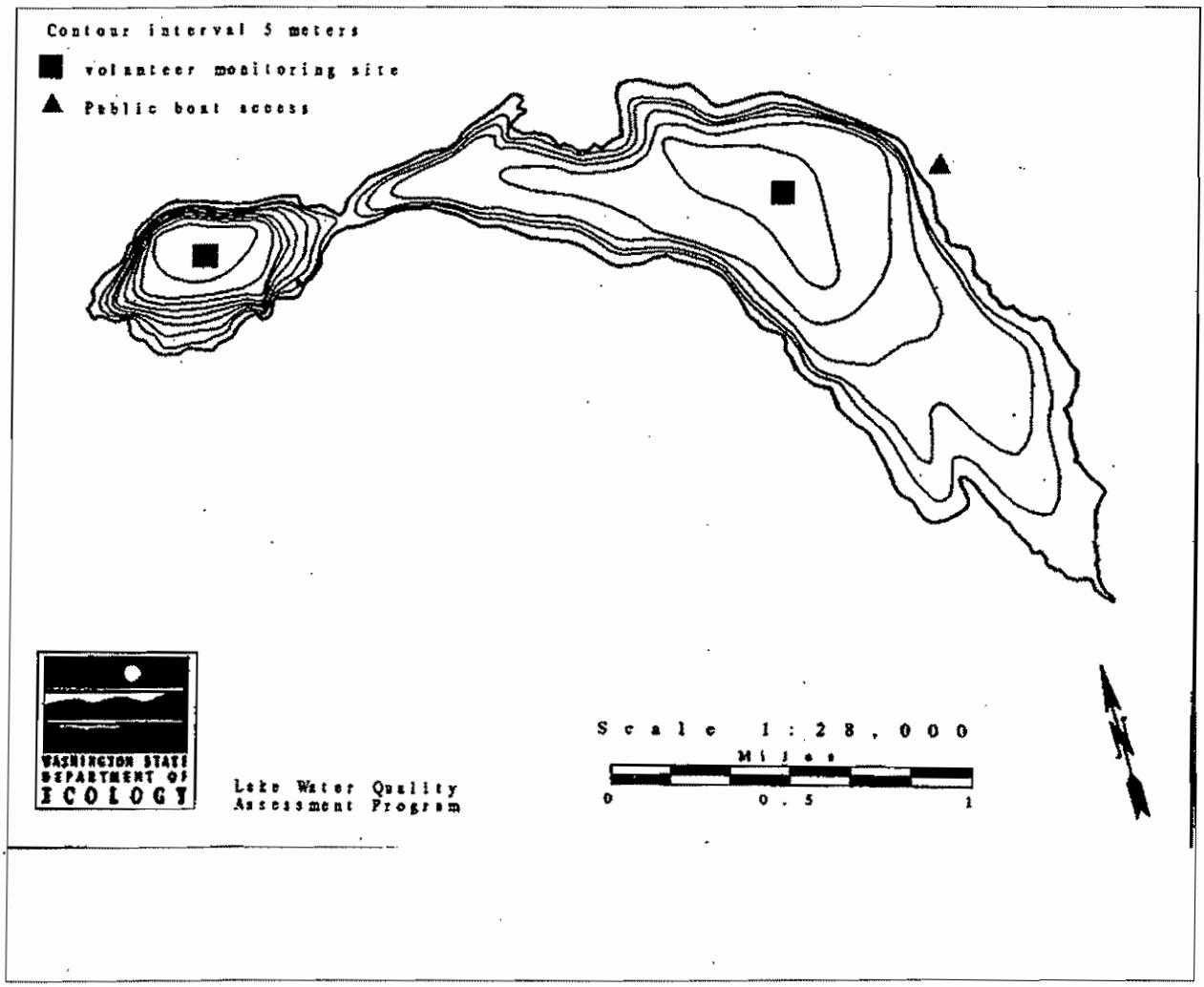

0
1
2
3
4
5
6
7
8
9
0
5
10
15
Dissolved Oxygen (mg/L)


Depth (m)
0
1
2
3
4
5
6
7
8
9
7
8
9
10
pH


0
1
2
3
4
5
6
7
8
9
650
700
750
800
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	680
MAX DEPTH (feet)	75
MEAN DEPTH (feet)	31
DRAINAGE (square miles)	9.2
VOLUME (acre-feet)	24000
SHORE LENGTH (miles)	6.27
ALTITUDE (feet)	273



SAMISH (EAST ARM) LAKE -- WHATCOM COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/18	20.0	68.0	7.0	Lt Green	10	Light	Light	24.0J	268.5	
97/07/02	-6.9	19.6	6.5	Lt Green	0	Trace	Calm	18.6	0.0	WATER LEVEL AT 268 FEET THREE INCHES.
97/07/16	20.0	68.0	6.0	Lt Green	0	None	Calm	16.2	0.0	WATER LEVEL WAS 268.5 FEET ABOVE SEA LEVEL.
97/07/29	22.0	71.6	6.0	Lt Green	0	None	Breezy	18.0	0.0	WATER LEVEL WAS 268.23 FEET ABOVE SEA LEVEL.
97/08/28	23.0	73.4	6.0	Lt Green	100	Light	Breezy	11.0	0.0	WATER LEVEL WAS 267 FEET 10 INCHES.
97/09/04				Undefined	25	None	Light	12.0	0.0	WATER WAS MODERATE GREEN.
97/09/24	-6.4	20.5	6.5	Pea-green	0	None	Calm	9.8	0.0	WATER LEVEL WAS 268.08 FEET

J - Estimate or QC requirements were not met

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/04	E	4								
97/09/04	E	8	0.19	6.1						
97/09/04	H	9	0.49							
STATION 3										
97/09/04	E	8	0.23	5.2						
STATION 3										
97/09/04	E			4.8						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available***. No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***
Were fish stocked this year? ***NO***
Any lake groups present (such as a lake association)? ***NO***
Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?
Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-4-97 Blue-green algae rare.

9-4-97 Blue-green algae--moderate amount

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	39 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	34 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	47 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Lake Samish exhibits properties of both an oligotrophic and a mesotrophic lake. Secchi and phosphorus data suggest an oligotrophic lake yet chlorophyll concentrations and summertime hypolimnion DO concentrations typify a mesotrophic lake, therefore, an oligo-mesotrophic assessment is justified.

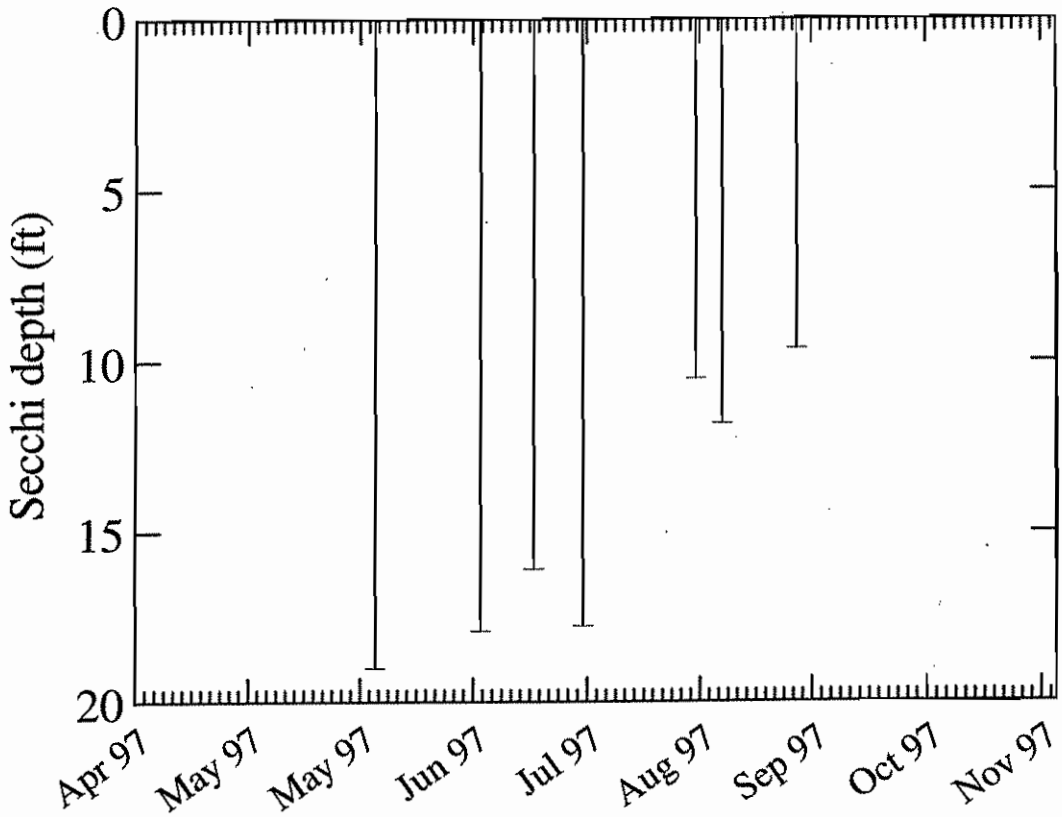
COMMENTS FROM 97/06/30 AQUATIC PLANT SURVEY

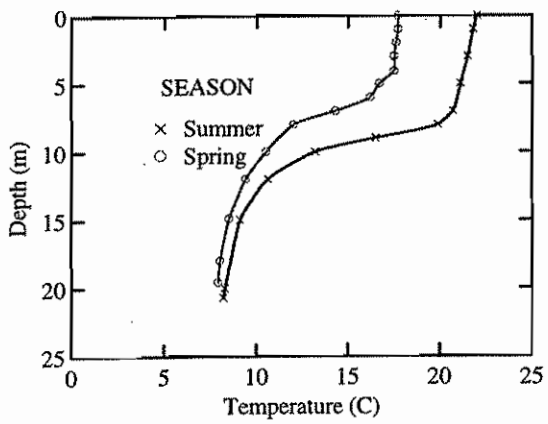
partly cloudy, breeze. Circumnavigated shoreline. Not many plants in steeper sided areas. shallows with Vallisneria / Elodea meadows. Popular recreation lake. Many water intake lines along shore. Substrate mostly sandy or rocky Maximum depth of plant growth: 4.5M.

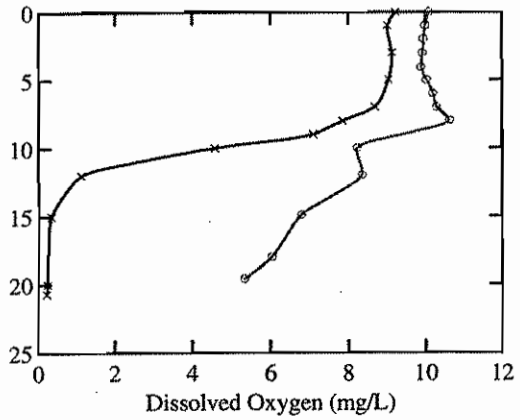
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

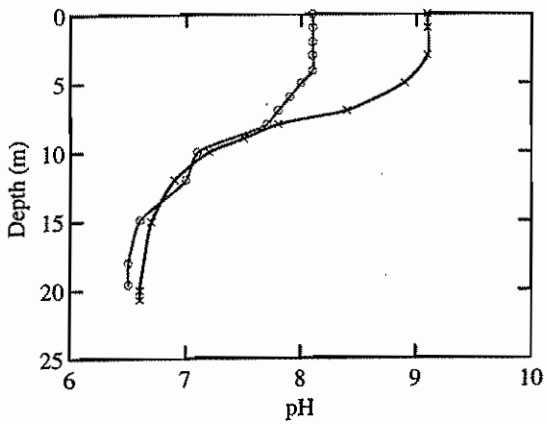
Brasenia schreberi (watershield) *Ceratophyllum demersum* (Coontail; hornwort) *Chara sp.* (muskwort) *Elatine sp.* (waterwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Elodea sp.* (waterweed) *Iris pseudacorus* (yellow flag) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Nuphar lutea* (yellow water-lily) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp.* (pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Scirpus sp.* (bulrush) *Typha latifolia* (common cat-tail) *Vallisneria americana* (water celery)

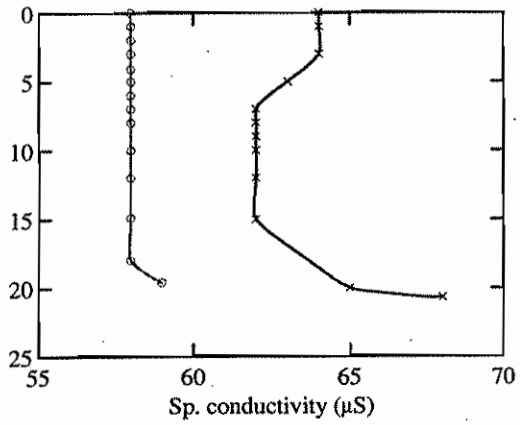
SAMISH


Secchi depth (ft)
0
5
10
15
20
Apr 97
May 97
May 97
Jun 97
Jul 97
Aug 97
Sep 97
Oct 97
Nov 97


SEASON
Summer
Spring
Depth (m)
Temperature (C)


Dissolved Oxygen (mg/L)

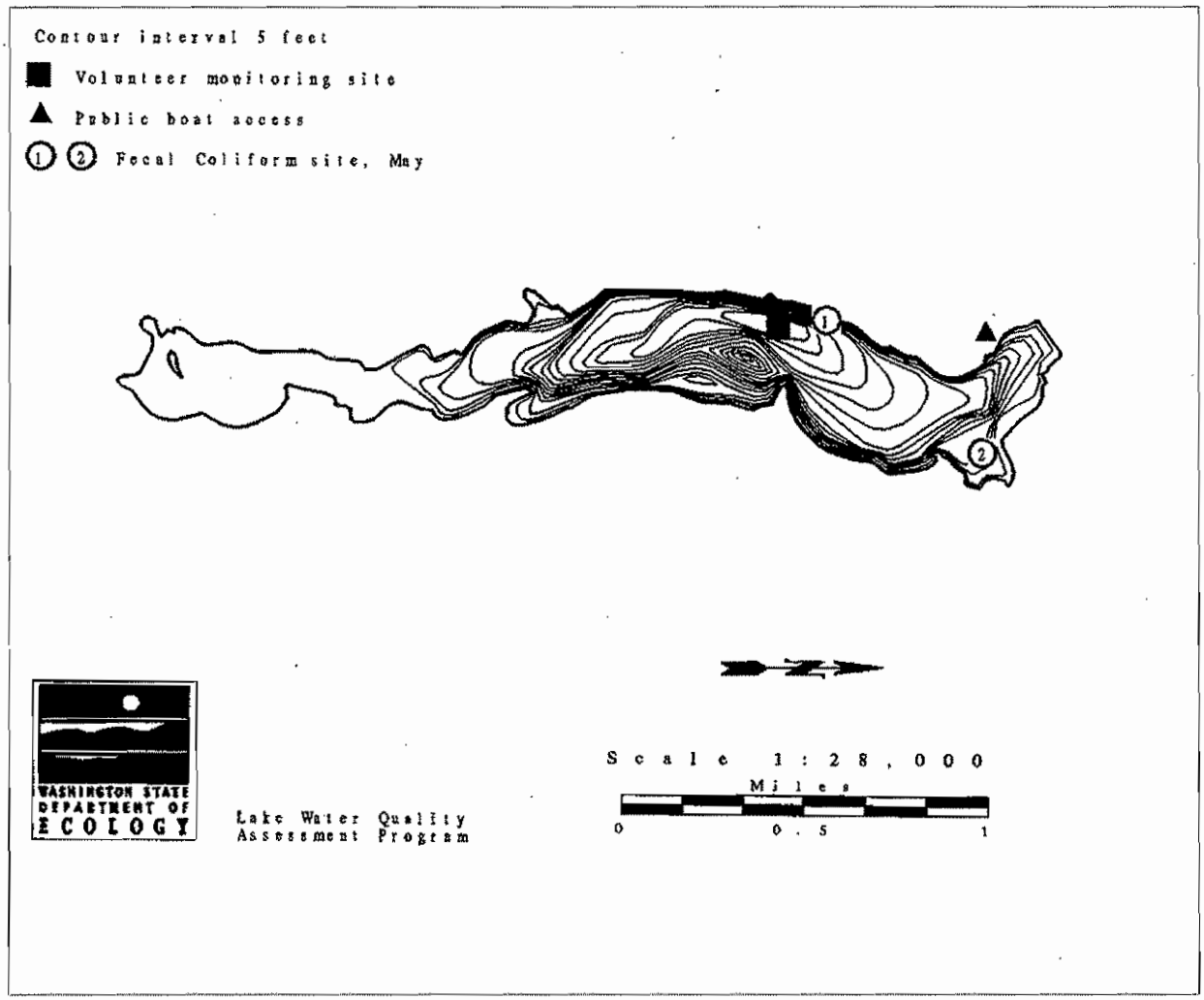

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY SILVER (SPOKANE)

DESCRIPTION Silver Lake is located 1.1 miles due east of the Town of Medical Lake. It is within the Crab Creek watershed.

AREA (acres)	486
MAX DEPTH (feet)	80
MEAN DEPTH (feet)	30
DRAINAGE (square miles)	19.
VOLUME (acre-feet)	14401
SHORE LENGTH (miles)	8.67
ALTITUDE (feet)	2341



SILVER LAKE -- SPOKANE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/06	18.0	64.4		Grn-brown	75	Light	Light	14.0	0.0	HOW DO WE DO PH
97/06/27	19.0	66.2		Pea-green	10	Trace	Light	12.8	3.0	
97/07/16	22.0	71.6		Mod Green	25	None	Light	12.1	6.0	WATER HAS LOTS OF VISIBLE STUFF.
97/07/23	-4.7	23.5		Mod Green	0	None	Light	12.1	2.0	BECAUSE WATER IS STILL SO HIGH THERE IS STILL NO CATTAILS BY OUR PLACE.
97/08/12	24.0	75.2		Grn-brown	5	None	Calm	12.3	0.0	
97/08/21				Undefined	10	None	Light	12.1	0.0	WATER WAS GREEN.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/22	E	25	1.44							
97/05/22	H	66	1.27							
97/08/21	E	24	0.82	5.4						
97/08/21	H	136	1.20							
STATION 2										
97/08/21	E	35	0.79	4.7						
97/08/21	H			4.9						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good.*** No specific problems were listed.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***NO***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***150 - 200***

Changes since last year? ***NO***

Lake Uses and Facilities at the lake include:

swimming fishing motor boating jet skiing camping hunting picnic facilities

The percent of the lakeshore that is sewered: ***5***

Motor boat restrictions include: ***no restrictions.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

Spring sampling: High water (25inches over volunteer's reference mark); lots of pollen

on surface; small zooplankton in all casts. Summer sampling: H2S in 15 and 20M casts, but Chaoborus at all depths; minor algae bloom (some Aphanizomenon (?) but mostly Oscillatoria (?). Typha are sparse this year, possibly due to high water. No profiles taken due to equipment problems.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	53 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	46 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Silver Lake summer phosphorus concentrations are more typical of an eutrophic lake but all other indicators suggest a mesotrophic assessment.

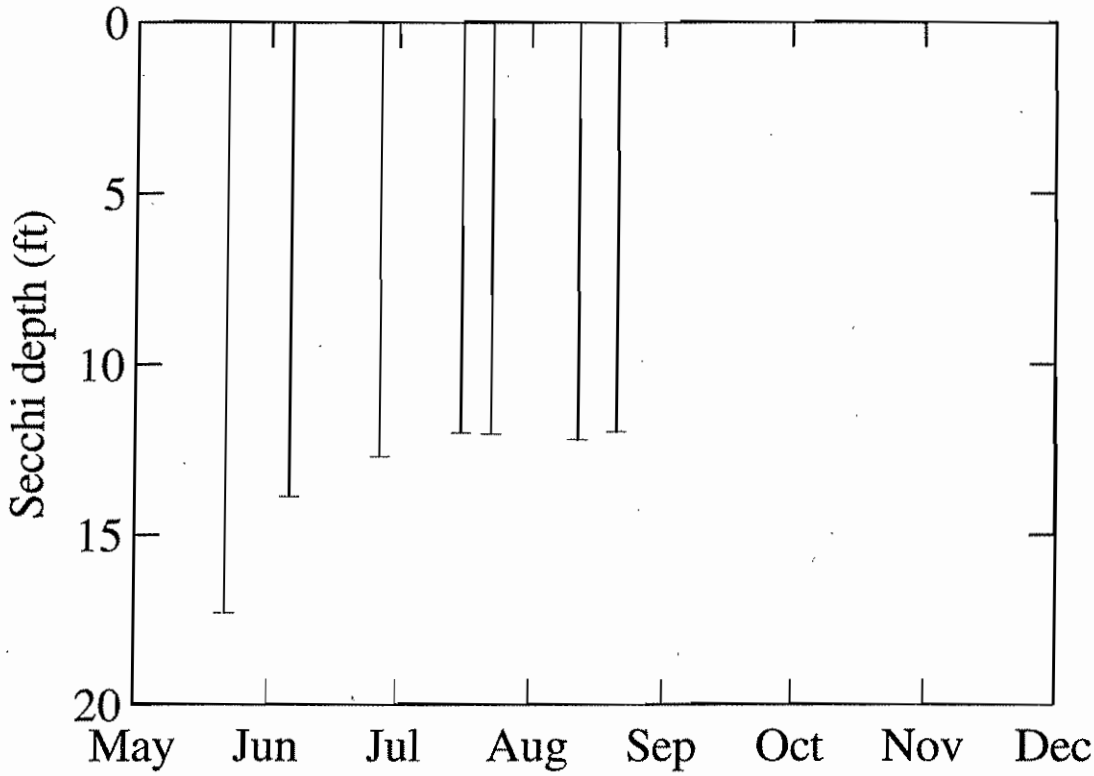
COMMENTS FROM 95/08/24 AQUATIC PLANT SURVEY

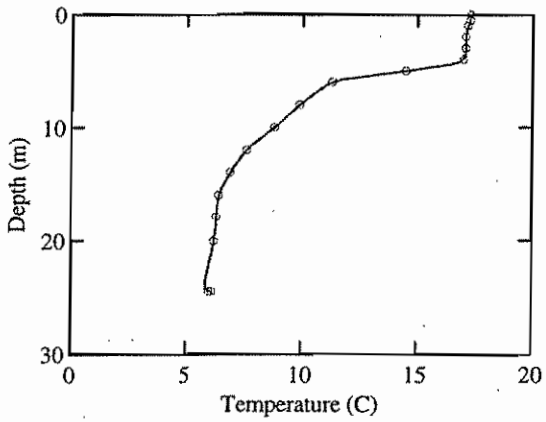
water level normal this year. out with WDFW biologists to do informal plant ID training. Heavy plant growth at south end. Made a composite list from plants observed in 2 spots - in cove on east shore and at far south end of lake

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

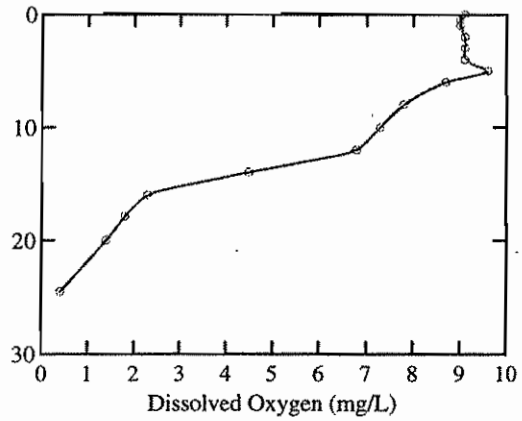
Alisma sp. (waterplantain) *Ceratophyllum demersum* (Coontail; hornwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Hippuris vulgaris* (common marestail) *Juncus sp.* (rush) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum sp.* (water-milfoil) *Polygonum sp.* (smartweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Ranunculus longirostris* (long beaked water-buttercup) *Ranunculus sp.* (buttercup) *Veronica sp.* (speedwell) *Zannichellia sp. unknown plant* (unknown)

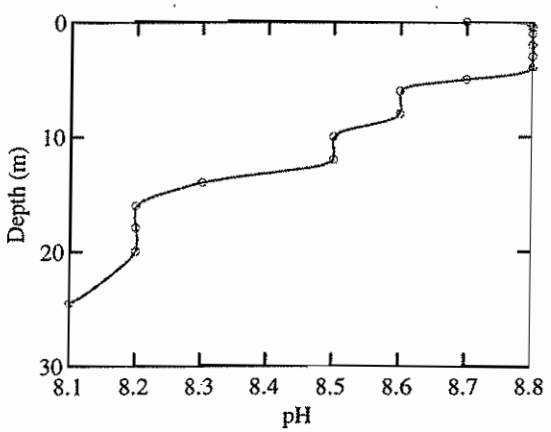
SILVER

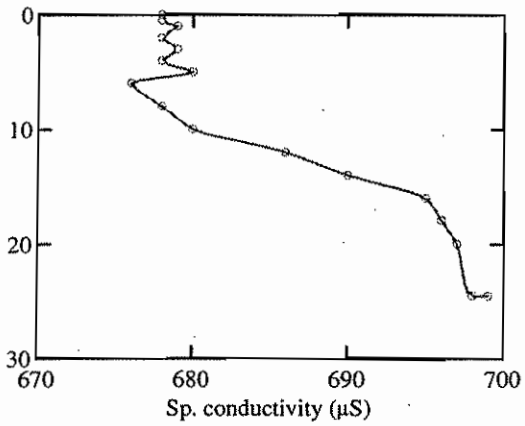




SEASON
× Summer
○ Spring



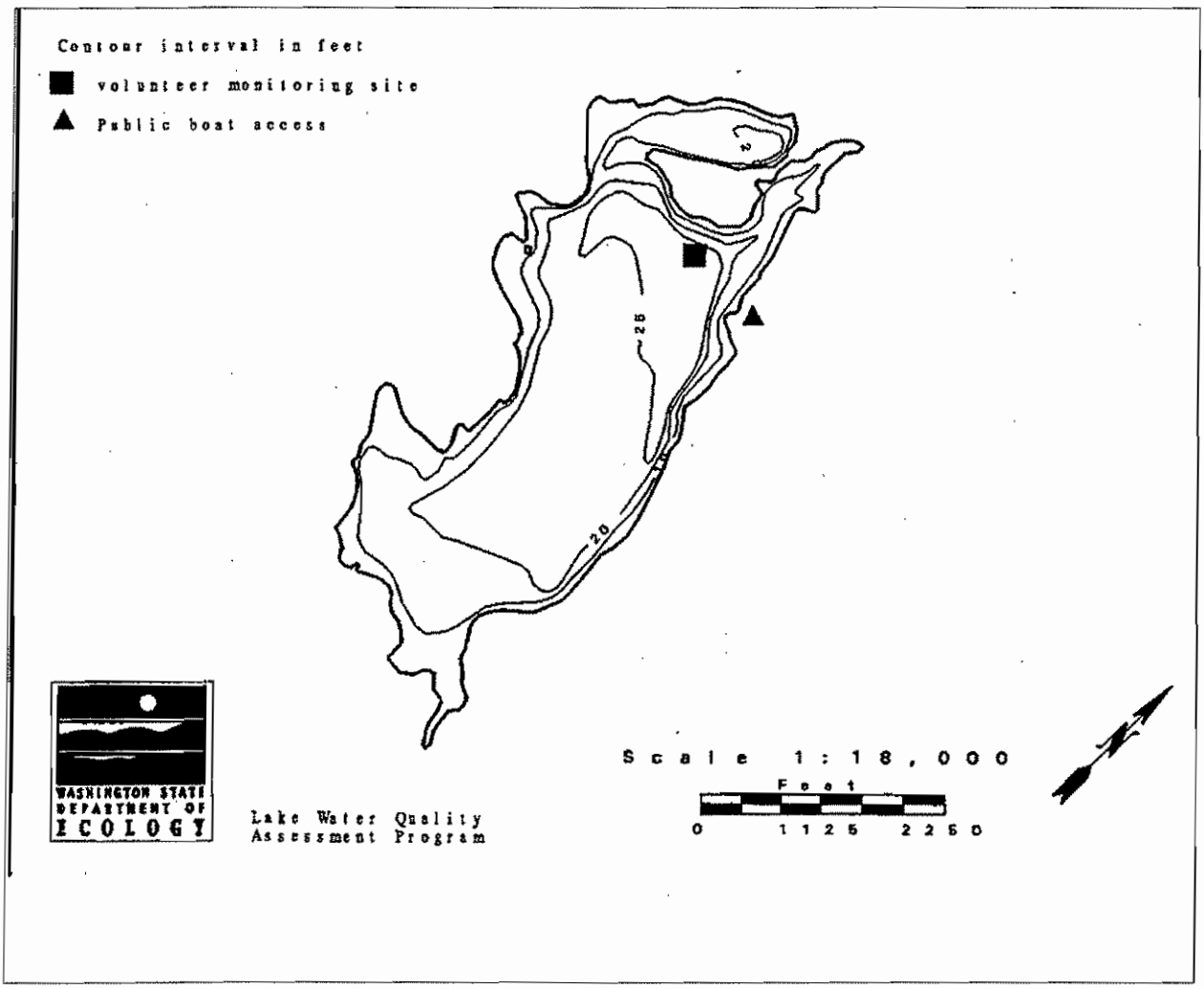




LAKECOUNTY SPANAWAY (PIERCE)

DESCRIPTION Lake Spanaway is located ten miles south of Tacoma, and 0.5 mile west of Spanaway. It is fed by drainage from a swampy area, and drains via Spanaway Creek to Clover Creek and Lake Steilacoom. Daron Island lies in the north portion of the lake

AREA (acres)	280
MAX DEPTH (feet)	28
MEAN DEPTH (feet)	16
DRAINAGE (square miles)	17.
VOLUME (acre-feet)	4600
SHORE LENGTH (miles)	4.36
ALTITUDE (feet)	320



SPANAWAY LAKE -- PIERCE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/18	18.9	66.0		Lt Green	0	None	Breezy	11.5	24.5	ALREADY A FAIR AMOUNT OF WEEDS REACHING THE SURFACE, ESPECIALLY ON THE SOUTH END.
97/05/31	18.3	64.9		Lt Green	50	None	Light	15.0	48.0	
97/06/15	21.1	70.0		Lt Green	75	None	Light	11.5	0.0	
97/06/29	18.9	66.0		Lt Green	75	Light	Light	10.5	12.3	BEEN WET AND RAINY. LAKE COOLED DOWN AGAIN.
97/07/13	20.0	68.0		Lt Green	75	None	Calm	9.5	0.5	
97/07/26	23.3	73.9		Undefined	0	None	Light	9.0	-0.5	WATER WAS A MODERATE GREEN COLOR.
97/08/10	23.3	73.9		Undefined	0	None	Breezy	12.5	2.0	WATER WAS A MODERATE GREEN COLOR.
97/08/23	22.8	73.0		Undefined	100	Mod	Calm	12.0	2.5	WATER WAS A MODERATE GREEN COLOR.
97/09/06	21.1	70.0		Undefined	10	None	Breezy	12.5	2.0	WATER WAS A MODERATE GREEN COLOR.
97/09/21	17.8	64.0	7.0	Undefined	0	None	Light	12.0	1.5	WATER WAS MODERATE GREEN. SEEONG MORE ALGAE EVERY WEEK.
97/10/04	15.6	60.1	6.5	Grn-brown	0	Heavy	Breezy	9.5	1.5	FT. LEWIS HAD A TEARGAS SPILL INTO THE AIR ON SEPT. 23. THE WATER HAS DEFINITELY BECOME BROWNER AS A RESULT. THIS IS THE FIRST TIME THAT I HAVE BEEN ABLE TO SEE DEEPER DUE TO WATER COLOR??
97/10/19	13.3	55.9	6.5	Grn-brown	0	Light	Light	10.5	1.8	MORE ALGAE THAN LAST WEEK.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/28	E	10J								
97/05/28	H	20								
97/09/05	E	14	0.28	6.4						
97/09/05	H	93	0.85							
STATION 2										
97/05/28	E	9								
97/09/05	E	14								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***fair***. The worst problems were reported as:

1. excessive aquatic plants 2. algae 3. decaying vegetation

Sources of actual or potential problems includes:

TOO MANY WATERFOWL. TOO MUCH ALGAE AND PLANT GROWTH FROM SEPTICS AND WATER FOWL.

Were there days (and how many) when poor water quality impaired

Fishing - ***YES(12)*** Swimming - ***YES(12)*** Aesthetics - ***YES(12)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

SUMMARY OF VOLUNTEER SURVEY (Continued)

Any lake groups present (such as a lake association)? ***YES***
Any lake management activities this year? ***NO***
OTHER----------
How many homes/new homes are there on the lake shore?~ ***179***
Changes since last year? ***NONE.***
Lake Uses and Facilities at the lake include:
swimming fishing motor boating jet skiing picnic facilities parks
The number of storm drains leading to the lake: ***4***
Motor boat restrictions include: ***40 mph speed restrictionno wake restriction.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-28-97 Had volunteer calibrate Secchi line. There were very few zooplankton in the water samples, the least I've seen in this lake. The lake association has dissolved.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	42 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	42 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	49 (Meso-eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Spanaway Lake is a high use lake located in an urban area. TSI values alone might suggest a mesotrophic assessment but low summertime hypolimnetic DO concentrations, the abundant blue-green algae and significant macrophyte biomass, all support a meso-eutrophic assessment.

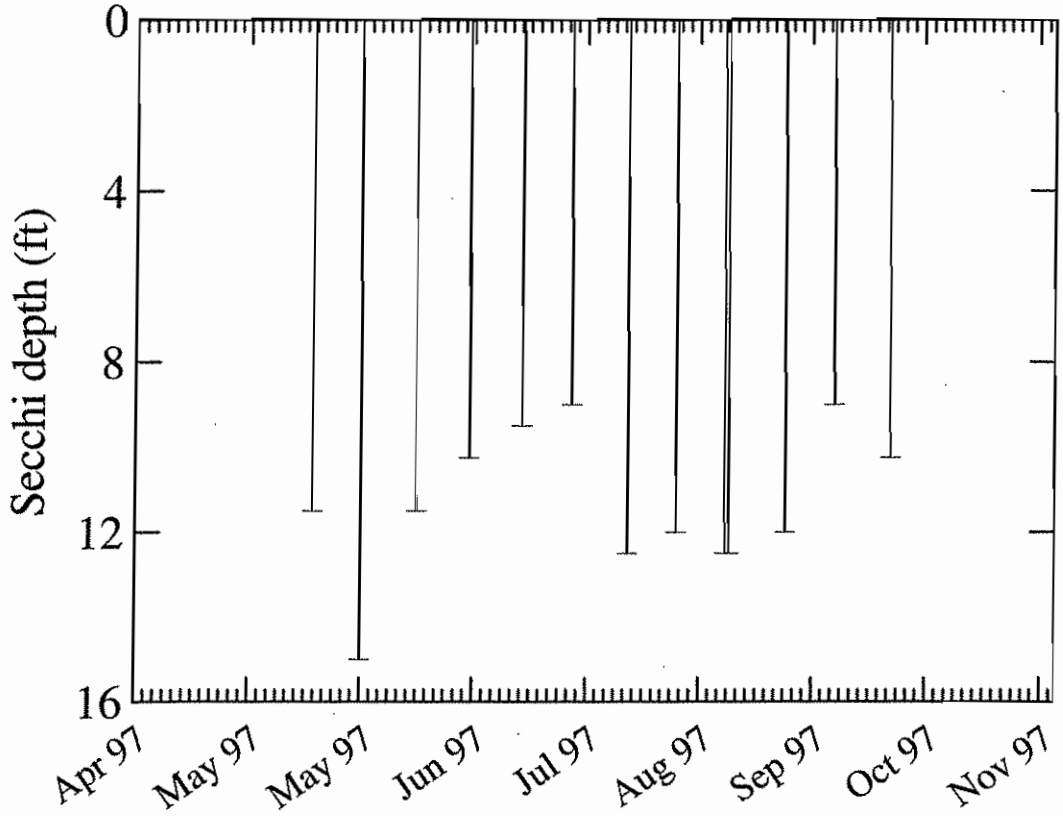
COMMENTS FROM 96/09/11 AQUATIC PLANT SURVEY

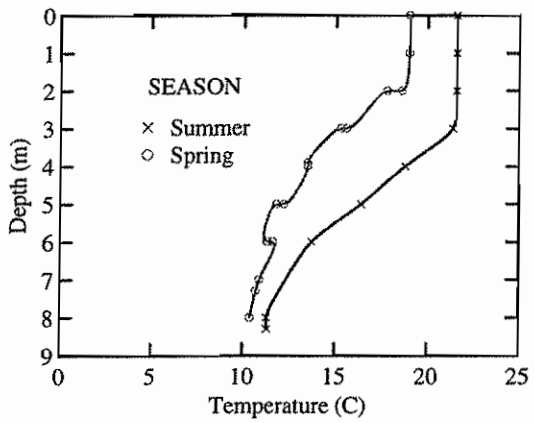
partly cloudy, calm. Heavy native plant growth, tho' nice diverse community, mostly not surfacing. Lots of purple loosestrife in south part of lake. Cove at south end with weird purple sediment (later identified by Mike Crayton of PLU as Thiopedia), no plants in this cove - fine loose sediment, with a history of plant control. Many shallow areas of the lake with cobble bottom, no plants. Most of shoreline developed, many bulkheads. Maximum depth of plant growth: 4.5M.

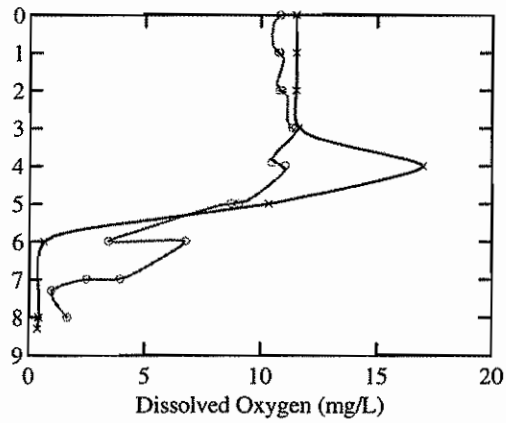
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

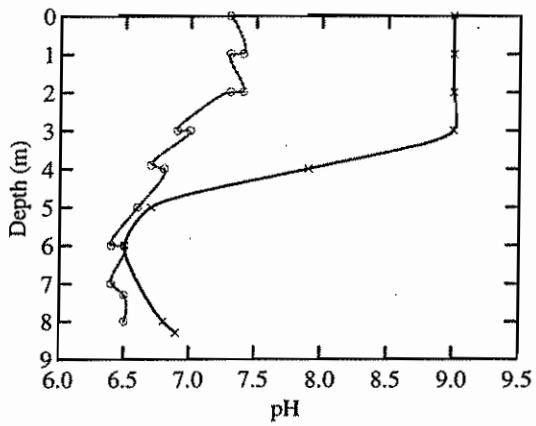
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Elodea sp.* (waterweed) *Fontinalis antipyretica* (water moss) *Iris pseudacorus* (yellow flag) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Lemna minor* (duckweed) *Lythrum salicaria* (purple loosestrife) *Myosotis sp.* (forget-me-not) *Najas flexilis* (common naiad) *Nitella or Chara Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton crispus* (curly leaf pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potamogeton zosteriformis* (eel-grass pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Scirpus sp.* (bulrush) *Tolypella intricata* (macro algae) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *unknown plant* (unknown)

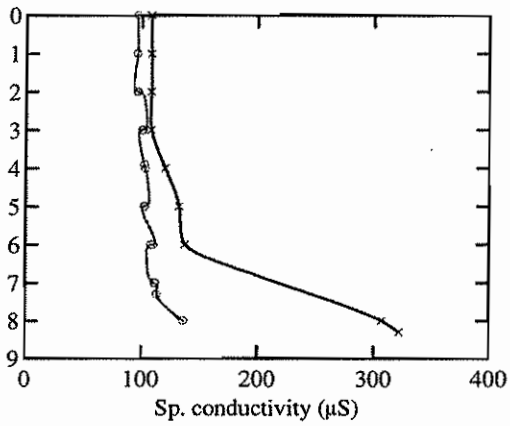
SPANAWAY


Secchi depth (ft)
0
4
8
12
16
Apr 97
May 97
May 97
Jun 97
Jul 97
Aug 97
Sep 97
Oct 97
Nov 97


SEASON
Summer
Spring
Depth (m)
Temperature (C)


Dissolved Oxygen (mg/L)


Depth (m)
pH


Sp. conductivity (µS)

SPORTSMAN

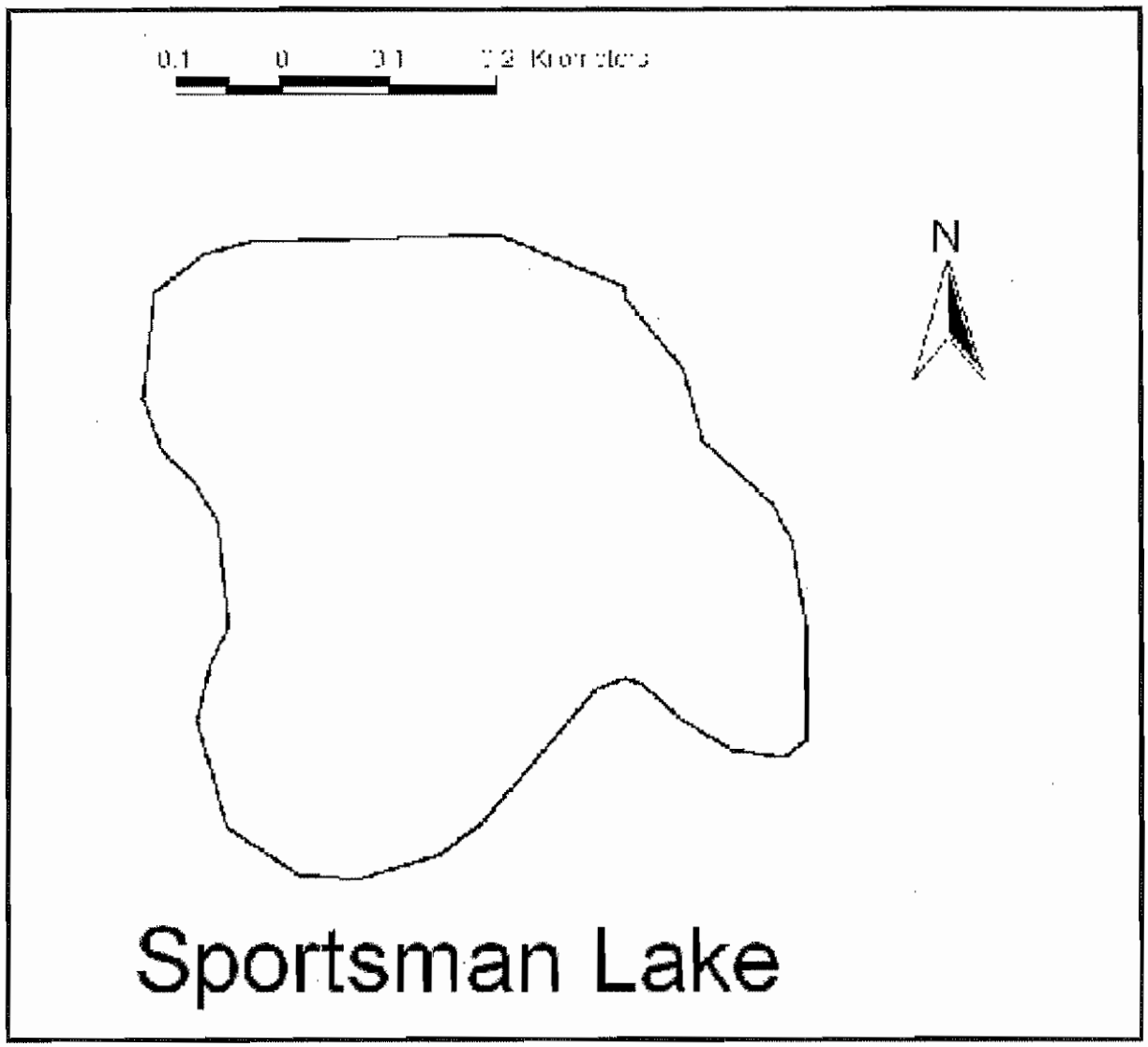
SAN JUAN County

Lake ID: SPOSA1

Ecoreigon: 2

Sportsman Lake is a very shallow lake on San Juan Island approximately 2 miles northwest of Friday Harbor. The lake is laden with macrophytes, mainly coontail.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
65	9	6	3	
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
397	1.34	153	48 33 59.	123 04 04.



SPORTSMAN LAKE -- SAN JUAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 1											
97/08/19				Lt Green	0			9.0	0.0		SECCHI HIT BOTTOM.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/17	E	26	0.21J				0.9			
97/08/19	E	20	0.58	5.6	770J		1.0			

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-17-97 The lake is very weedy.

8-19-97 The water is very clear. There are very few blue-green algal colonies. Oxygen is depleted--most likely from decaying coontail.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	45N* (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	47 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	47 (Mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although TSI values suggest mesotrophy, Sportsman Lake is rich with aquatic macrophytes, mainly coontail, which envelop the whole lake from shore to shore. Depleted summertime DO concentrations are most likely due to decaying coontail. An eutrophic assessment is appropriate.

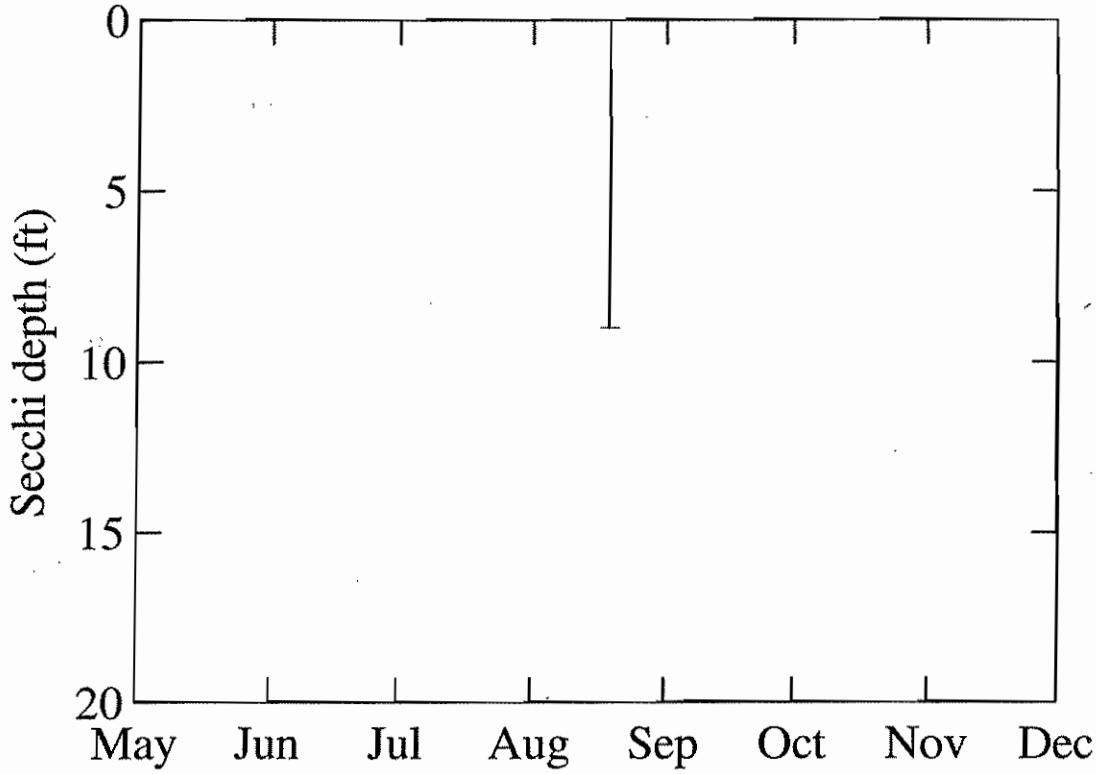
COMMENTS FROM 97/09/10 AQUATIC PLANT SURVEY

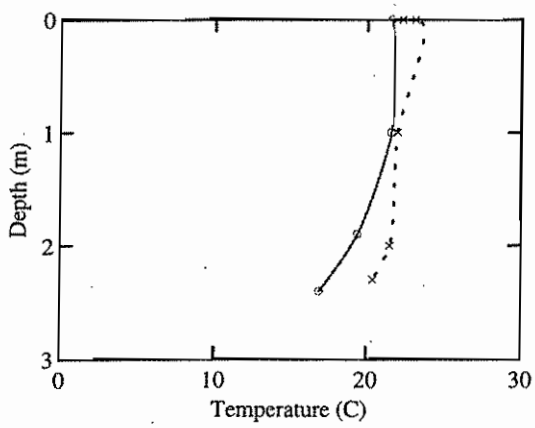
Partly cloudy, calm. Plants extended from shore to shore. Very strong 'stinky' smell in parts of lake when rake was brought on board. Surfacing coontail throughout much of lake. Lots of algae. Was difficult to survey due to heavy plant growth. Several duch species, and many fish of all sizes observed. Maximum depth of plant growth: 3.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

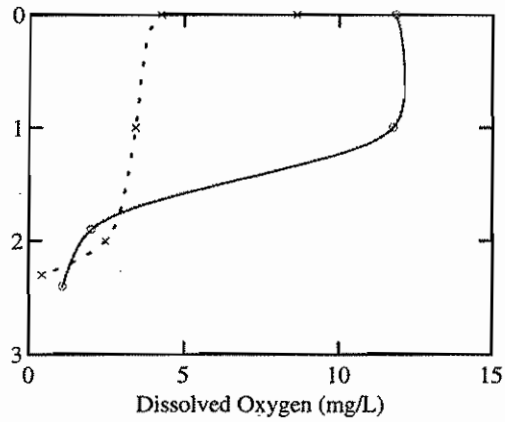
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum verticillatum* (whorled watermilfoil) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton friesii* (flat-stalked pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton pusillus* (slender pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Scirpus sp.* (bulrush) *Sparganium sp.* (bur-reed) *Spirodela polyrhiza* (great duckweed) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *Wolffia sp.* (water-meal)

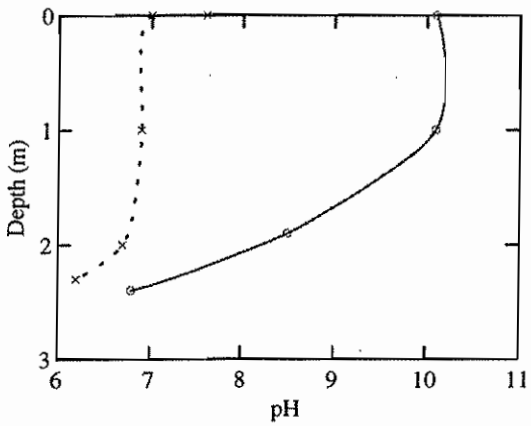
SPORTSMAN

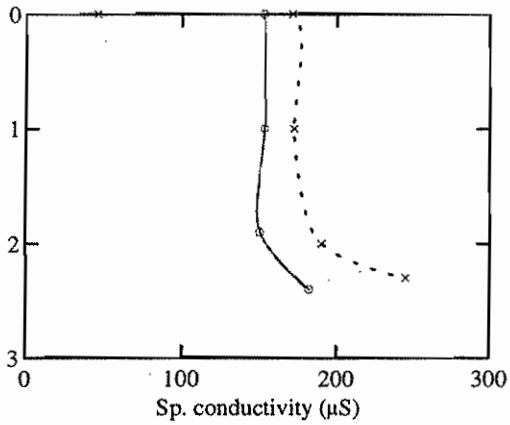




SEASON
× Summer
○ Spring



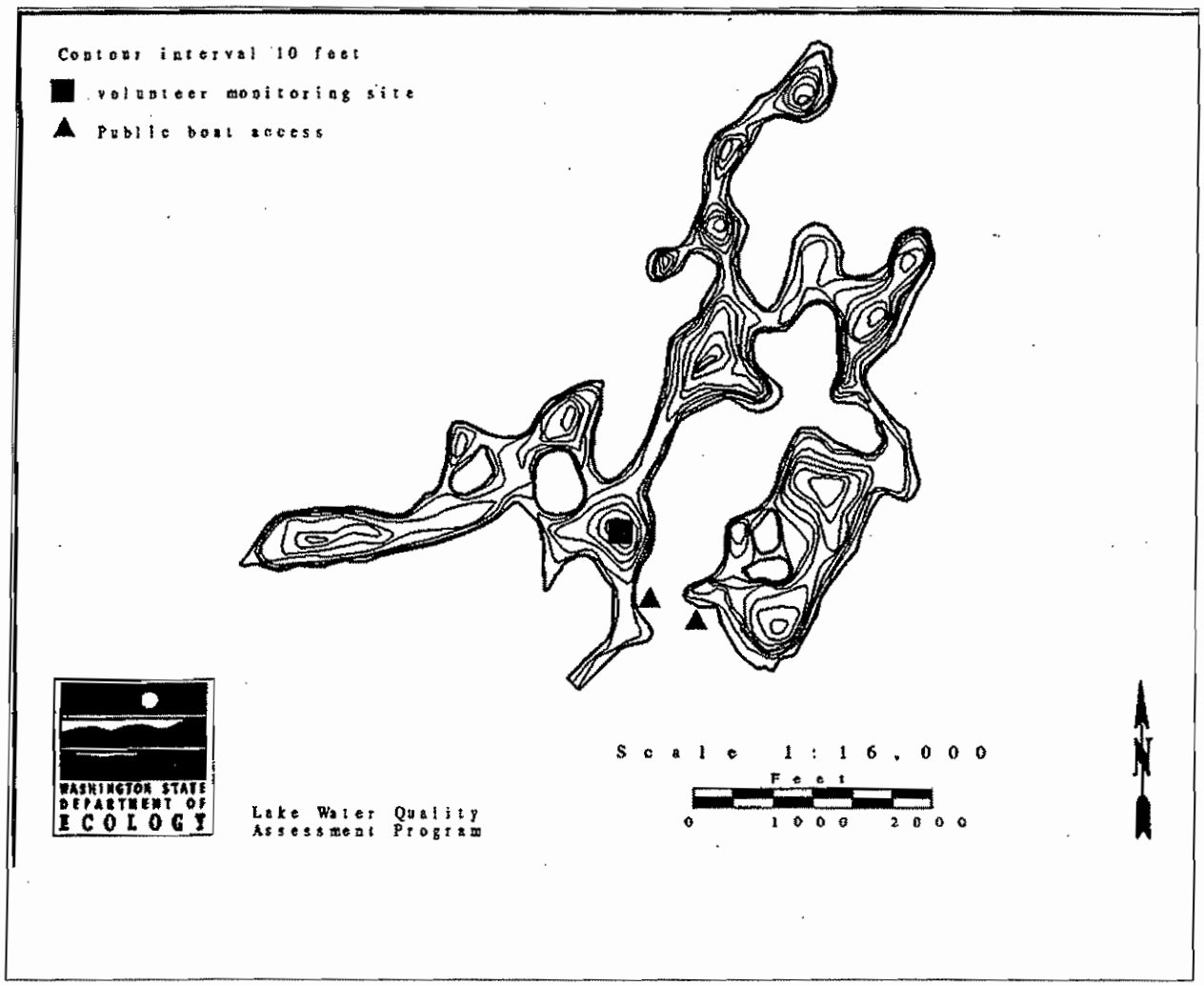




LAKECOUNTY ST. CLAIR (THURSTON)

DESCRIPTION Lake St. Clair is located 6.5 miles northwest of Yelm. It is an irregularly shaped lake with steep sides, numerous narrow arms and four small islands. The lake is fed by Eaton Creek, drains to the Nisqually River, and seeps to McAllister Springs. The south arm of Lake St. Clair is a deep conical-shaped depression.

AREA (acres)	268
MAX DEPTH (feet)	110
MEAN DEPTH (feet)	32
DRAINAGE (square miles)	20.
VOLUME (acre-feet)	8700
SHORE LENGTH (miles)	10.36
ALTITUDE (feet)	73



ST. CLAIR LAKE -- THURSTON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/08	17.5	63.5		Undefined	0	None	Calm	6.0	0.0	LAKE LEVEL RAISED DURING THE WINTER TO ABOUT THE LEVEL OF 3 OR 4 YEARS AGO (ABOUT NORMAL). VISABILITY POOR, A LOT OF FLOATING PARTICLES IN THE WATER (GREY GREEN COLOR).
97/05/18	21.0	69.8		Undefined	25	None	Breezy	6.5	-3.0	A LOT OF ALGAE/PARTICLES FLOATING, NOT EVIDENT ON SURFACE.
97/06/10	21.0	69.8		Undefined	0	None	Calm	8.5	3.0	WATER CLEARING UP. A LOT LESS FLOATING ALGAE. WATER VERY REDDISH COLORED.
97/06/23	20.0	68.0		Undefined	50	Light	Light	7.5	0.0	LAKE HEIGHT STABLE NO CHANGE, DUE TO RAIN STILL A LOT OF ALGAE PARTICLE IN WATER, NONE ON SURFACE. WATER COLOR- REDDISH BROWN
97/07/07	22.0	71.6		Undefined	90	Light		7.0	-6.0	WATER WAS REDDISH-BROWN.
97/07/18	23.0	73.4		Undefined	10	Light		8.5	-2.0	WATER WAS REDDISH-BROWN
97/07/31	24.0	75.2		Undefined	10	None	Light	8.5	-11.0	WATER WAS REDDISH-BROWN.
97/08/12	25.0	77.0		Undefined	1	None	Light	8.0	0.0	COLOR - REDDISH BROWN, LILLY PADS TURNING BROWN OR BLACK EARLY - MAYBE THE HOT WEATHER
97/08/27	22.0	71.6		Undefined	75	Heavy	Breezy	9.5	0.0	WATER WAS REDDISH-BROWN.
97/09/12	21.0	69.8			50	Trace	Breezy	10.0	-1.5	LAKE IS UP COMPARED TO THIS TIME LAST YEAR.
97/09/22	20.0	68.0		Grn-brown	0	None	Light	8.4	-2.0	INCREASE IN ALGAE. SOME FLOATING IN THE COVE. SEE A LOT ABOVE THE SECCHI.
97/10/11	15.0	59.0		Undefined	50	Mod	Light	7.0	-2.0	WATER WAS REDDISH. ALGAE REDUCED CLARITY. HEAVY RAIN BROUGHT LAKE ABOVE NORMAL FOR THIS DATE
97/10/24	14.0	57.2		Grn-brown	25		Light	7.5	0.0	GREENISH ALGAE PARTICLES IN THE WATER. LAKE HEIGHT IS STABLE BUT HIGHER THAN LAST YEAR THIS TIME.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. The worst problems were reported as:

1. fluctuating water levels 2. algae 3. declining long-term trend

Sources of actual or potential problems includes:

PASTURE & FIELD DRAINAGE. INCREASE IN WILD GEESE.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

SUMMARY OF VOLUNTEER SURVEY (Continued)

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***325-350***

Changes since last year? ***A FEW NEW HOMES. NO HUGE DEVELOPMENT.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

8-20-97 Bryozoan mass spotted--larger mass at the Christopherson's dock.

TROPHIC STATUS

Estimated Trophic State:	Meso-eutrophic
Mean Trophic State Index (Secchi):	47 (Mesotrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

TSI values and summertime hypolimnetic DO concentrations suggest a meso-eutrophic assessment. Dark water coloration inhibit substantial macrophyte and algal growth. It is suspected that most of the hypolimnetic oxygen demand is chemical in nature and not necessarily biological.

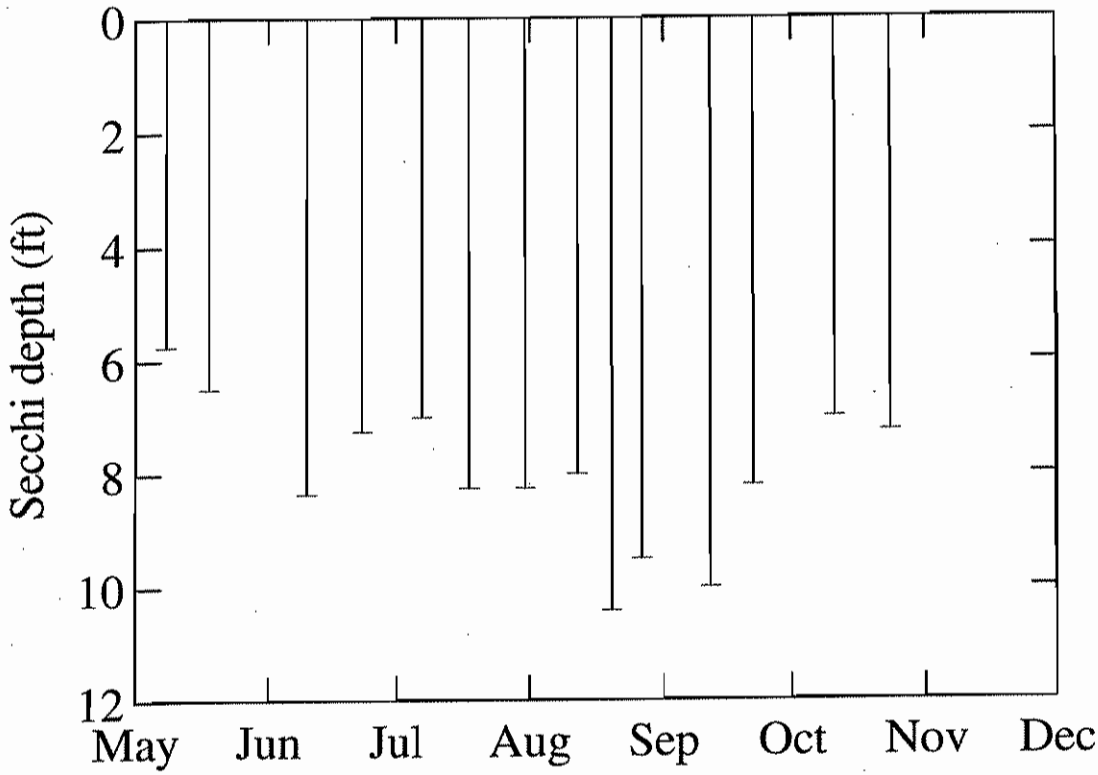
COMMENTS FROM 92/08/11 AQUATIC PLANT SURVEY

Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Brasenia schreberi (watershield) *Ceratophyllum demersum* (Coontail; hornwort) *Elodea canadensis* (common elodea) *Iris pseudacorus* (yellow flag) *Najas sp.* (water-nymph) *Nitella sp.* (stonewort) *Nymphaea odorata* (fragrant waterlily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Scirpus sp.* (bulrush) *Typha latifolia* (common cat-tail) *Vallisneria americana* (water celery)

ST. CLAIR



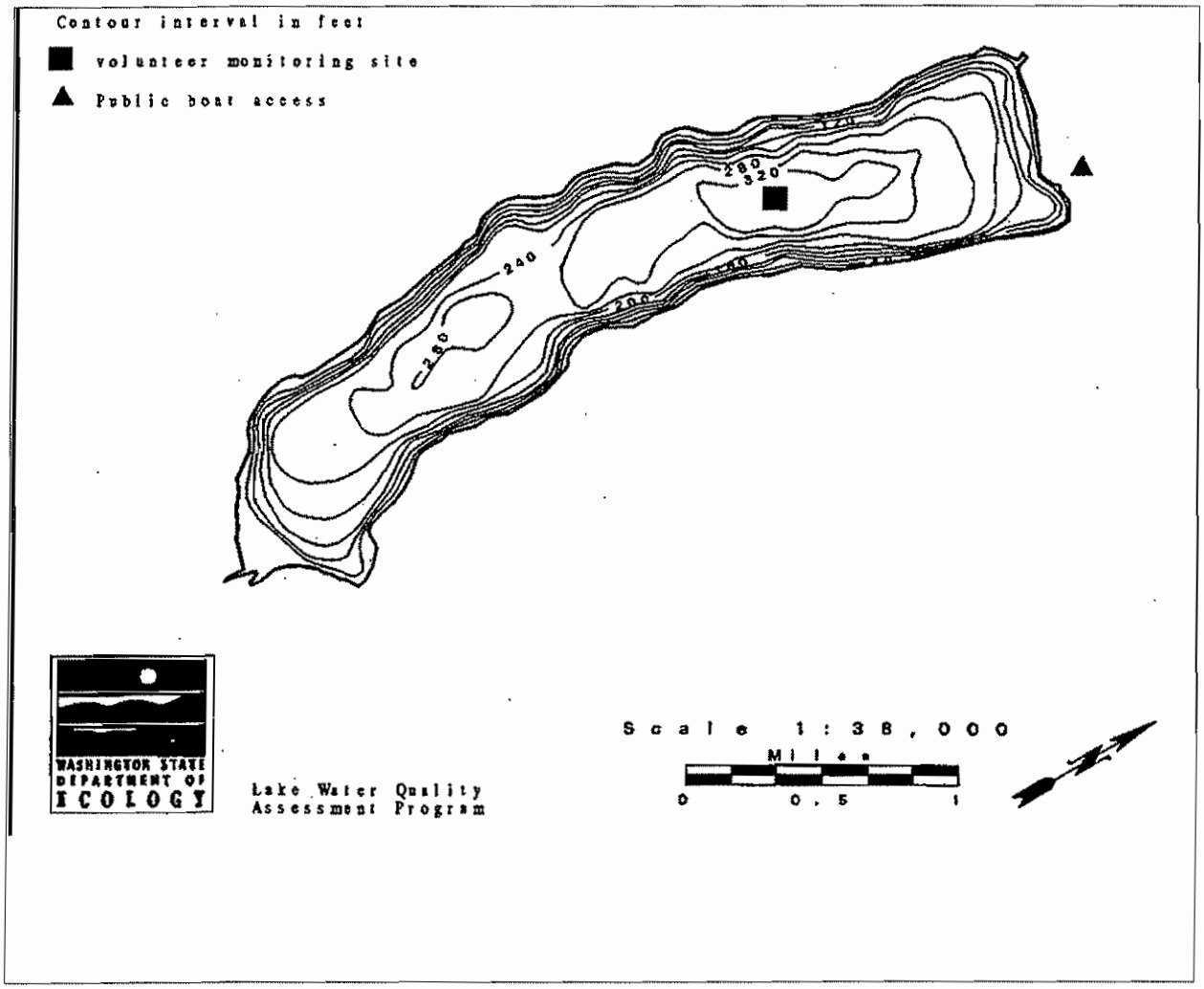
SEASON

× Summer
○ Spring

LAKECOUNTY SULLIVAN (PEND OREILLE)

DESCRIPTION Sullivan Lake is located 4.3 miles southeast of Metaline Falls. It is a natural lake that was enlarged by a dam built in Harvey Creek in 1931. The lake is 3.6 miles long and averages 0.6 miles in width. Sullivan Lake drains to Sullivan Creek and the Pend Oreille River. There are campgrounds at both the north and south ends of the lake.

AREA (acres)	1380
MAX DEPTH (feet)	332
MEAN DEPTH (feet)	193
DRAINAGE (square miles)	51.
VOLUME (acre-feet)	267000
SHORE LENGTH (miles)	8.89
ALTITUDE (feet)	2583



SULLIVAN LAKE -- PEND OREILLE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 0											
97/05/29					0			19.5	0.0		FIELD VISIT
97/05/29					100			17.9	0.0		LAKE LEVEL IS NORMAL BUT PUD HAS BEEN DISHCARGING LOTS MORE THAN NORMAL. LOTS OF DEBRIS IN WATER
STATION 1											
97/06/12	16.1	61.0		Lt Green	90	Mod	Light	16.5	0.0		lake water level at 2586.94. spotty pollen on/in surface water.
97/07/30	21.1	70.0		Undefined	90	Heavy	Gusty	28.0	0.0		WATER WAS FLOURESCENT GREEN. WATER LEVEL WAS 2588.29 FEET ABOVE SEA LEVEL.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/29	E	4	0.11							
97/05/29	H	4	0.03							
97/08/28	E	4	0.03	0.7						
97/08/28	H	4	0.02							
STATION 2										
97/08/28	E	3	0.03	0.6						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Lake level in spring was normal, but PUD had been discharging more than usual to keep it that way. Lots of debris on surface and water more turbid than usual this spring. Cool wet summer. Moderate number of small zooplankton in 1-10M summer samples.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	32N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	22 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	26 (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on

qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Sullivan Lake exhibits all the properties of an oligotrophic lake.

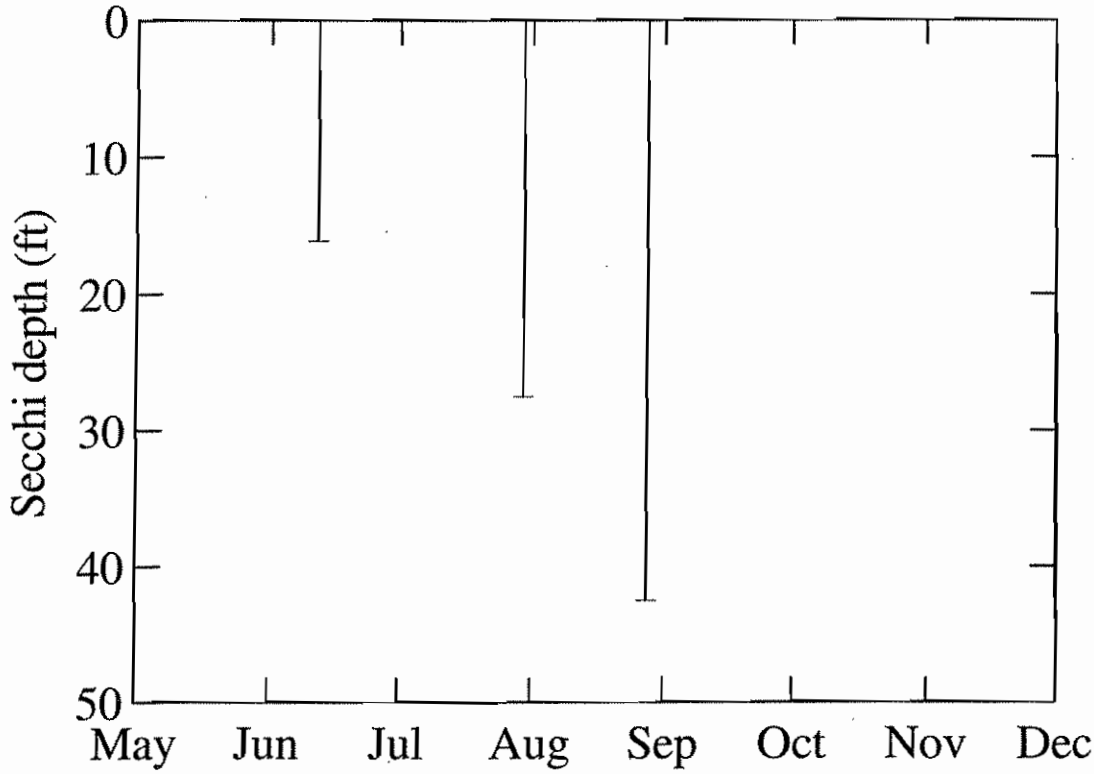
COMMENTS FROM 96/08/01 AQUATIC PLANT SURVEY

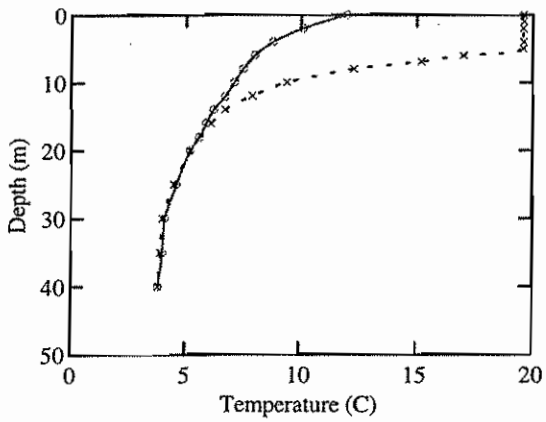
clear, calm. paddled boat along south shore, walked shore and swam at north end. Only 1 tiny patch of plants at north end, most growing at south end. Most of bottom rocky, plants mostly in water 2-4 m deep. Large bottom fish.

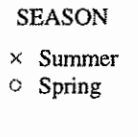
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

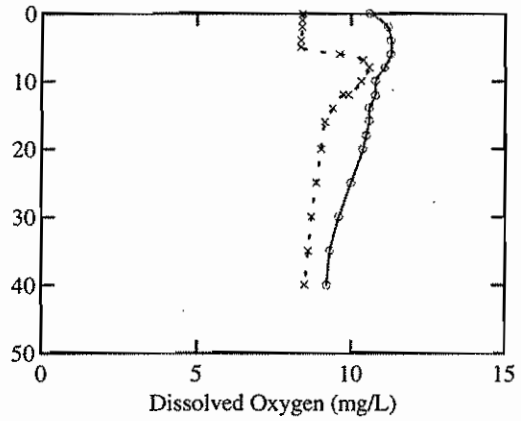
Callitriche verna (spring water-starwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Phalaris arundinacia* (reed canarygrass) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Ranunculus aquatilis* (water-buttercup) *Sagittaria sp.* (arrowhead) *aquatic Bryophyte* (moss or liverwort) *unknown plant* (unknown) *unknown plant 2* (unknown)

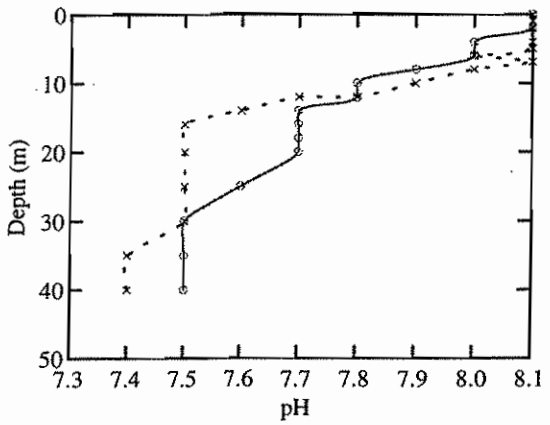
SULLIVAN

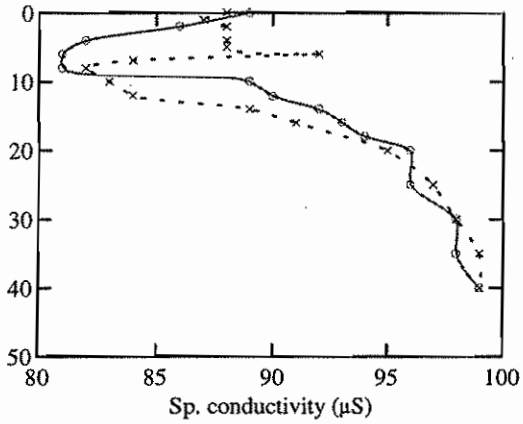

Secchi depth (ft)
0
10
20
30
40
50
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
40
50
0
5
10
15
20
Temperature (C)


SEASON
× Summer
○ Spring


0
10
20
30
40
50
0
5
10
15
Dissolved Oxygen (mg/L)

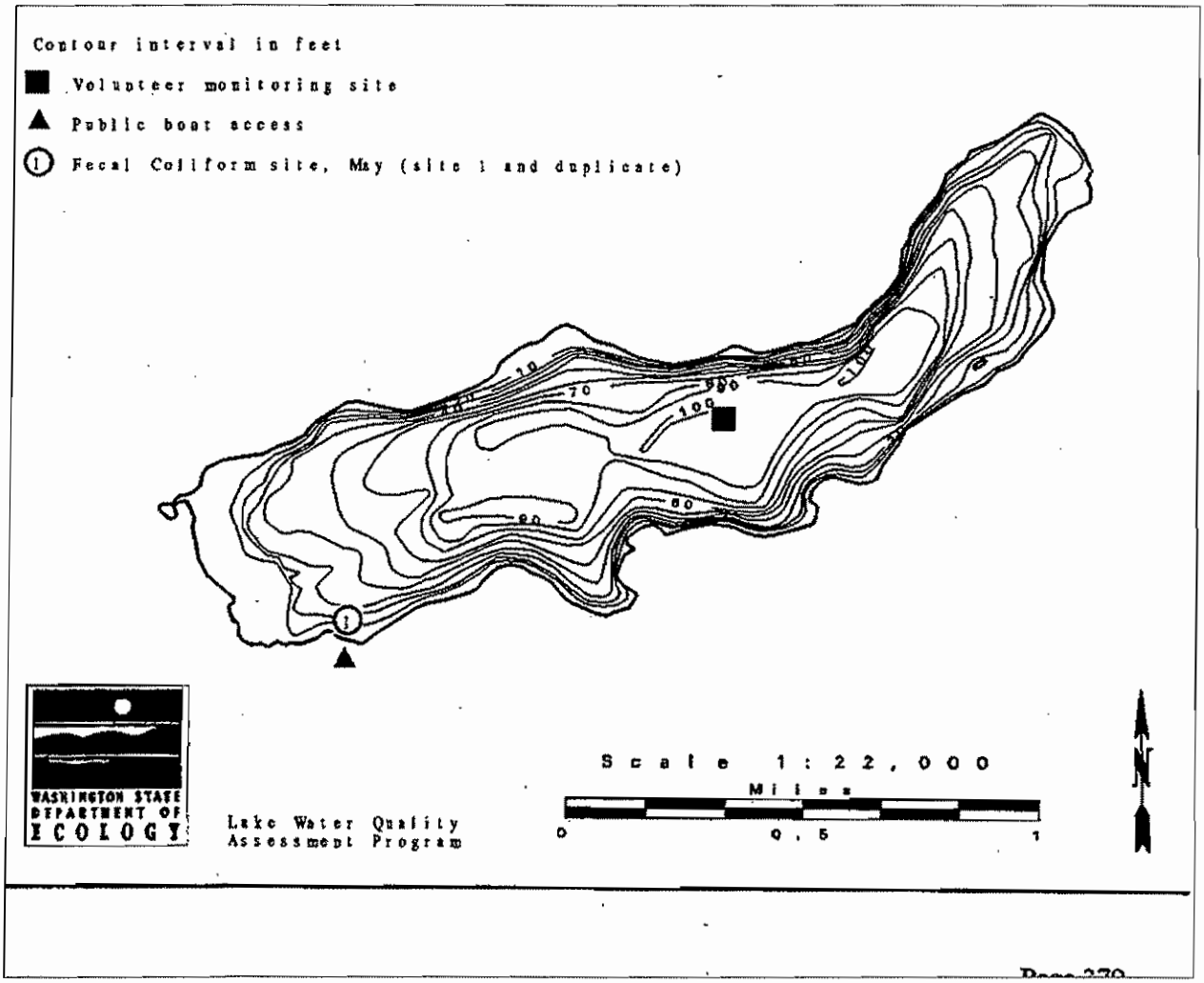

Depth (m)
0
10
20
30
40
50
7.3
7.4
7.5
7.6
7.7
7.8
7.9
8.0
8.1
pH


0
10
20
30
40
50
80
85
90
95
100
Sp. conductivity (µS)

LAKECOUNTY SUMMIT (THURSTON)

DESCRIPTION Summit Lake is located in a steep forested valley nine miles west of Olympia. It is two miles long. Summit Lake is fed by intermittent streams, seeps, and springs, and drains via Kennedy Creek to Oyster Bay in Totten Inlet.

AREA (acres)	530
MAX DEPTH (feet)	100
MEAN DEPTH (feet)	53
DRAINAGE (square miles)	2.8
VOLUME (acre-feet)	28000
SHORE LENGTH (miles)	5.61
ALTITUDE (feet)	500



SUMMIT LAKE -- THURSTON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/24	15.6	60.1		Lt Green	25	Light	Light	23.0	0.0	
97/08/05	20.6	69.1		Lt Green	0	None	Calm	25.0	0.0	
97/08/28	18.9	66.0	6.5	Lt Green	50		Calm	25.0	0.0	
97/09/09	18.9	66.0	6.5	Lt Green	0	None	Light	25.0	0.0	
97/09/21	15.6	60.1	6.5	Lt Green	0	None	Light	25.0	6.0	2 INCHES OF RAIN LAST WEEK.
97/10/06	13.3	55.9	6.0	Lt Green	50	Mod	Calm	25.0	0.0	THURSTON CO. SAYS THAT THERE IS A SMALL SPOT OF MILFOIL.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

8-28-97 pH paper = 6.5. The lake shore is almost entirely built out. Homes are now being built in the watershed away from the shore but the water supply is still coming from the lake. There is very little natural shoreline. Very few newts observed in the water. Lots of mussel shells observed. 2/3 rds of the residents drink lake water.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	31 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Summit Lake remains one of the clearest lakes in Thurston County. TSI values and hypolimnetic DO concentrations support the oligotrophic assessment. It's interesting to note that mid-summer hypolimnion DO concentrations remain favorable even near the deep site sediment.

TP and Chlorophyll TSI information along with DO profile information was provided by Thurston County Environmental Health.

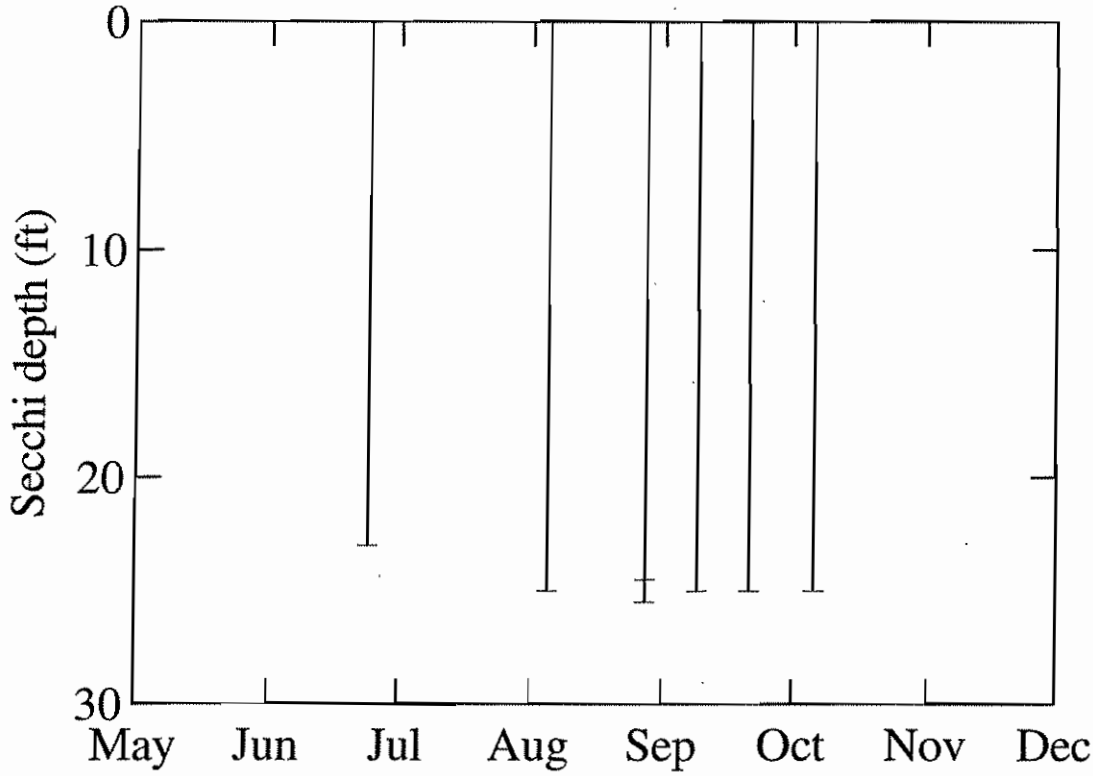
COMMENTS FROM 97/07/23 AQUATIC PLANT SURVEY

sunny, light breeze. freshwater mussels. Band of mostly bare sediment outside floating leaf community, deeper water mostly with P. amplifolius and P. robbinsii. Nice clear water, low growing plant community for the most part. Sediment mostly sand / gravel. John snorkled from boat launch around west end. Maximum depth of plant growth: 7.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Brasenia schreberi (watershield) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Isoetes sp.* (quillwort) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton foliosus* (leafy pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Utricularia sp.* (bladderwort)

SUMMIT

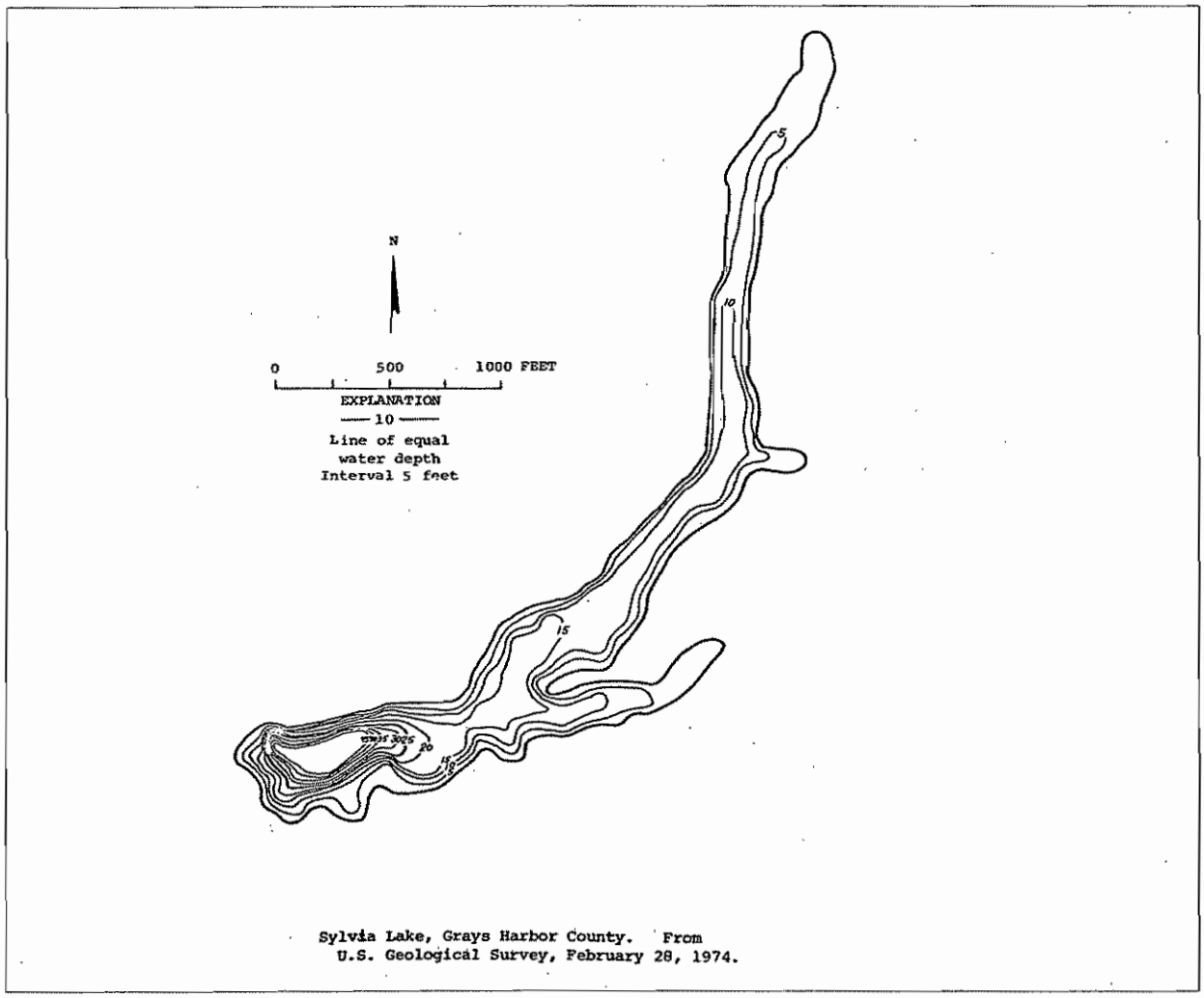


SEASON

× Summer
○ Spring

DESCRIPTION

AREA (acres)	32
MAX DEPTH (feet)	49
MEAN DEPTH (feet)	10
DRAINAGE (square miles)	5.0
VOLUME (acre-feet)	323
SHORE LENGTH (miles)	2.35
ALTITUDE (feet)	80



Sylvia Lake, Grays Harbor County. From U.S. Geological Survey, February 28, 1974.

SYLVIA LAKE -- GRAYS HARBOR COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 0											
97/05/17					0			9.2	0.0		SYLVIA IS MOSTLY SURROUNDED BY A STATE PARK.
97/05/17					0			9.2	0.0		LAKE IS MOSTLY SURROUNDED BY ST. PARK. NO COMBUSTION MOTORS. FORMERLY POWER GENERATING DAM
STATION 1											
97/08/15				Undefined	0	None	Light	13.1	0.0		WATER WAS BROWN. PROBABLY FROM LIGNINS.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/16	E	9	0.32							
97/05/16	H	11	0.40							
97/08/15	E	13	0.35	3.6			1.7J			
97/08/15	H	18	0.33							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

The lake is mostly (entirely?) surrounded by State Park lands, given them in 1936. Impounded by power dam used for power generation. No combustion motors allowed. Unable to retrieve anchor from sample site: possibly large trees on lake bottom. During summer sampling, a notice was seen posted at the swimming beach about leeches. Elodea mats present in places.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	40N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	41 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	43 (Mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Lake Sylvia is a relatively clean lake. As a small reservoir, the lake most likely will not stratify in much the same manner as natural lakes its size. The TSI values and the profile information support an oligo-mesotrophic assessment.

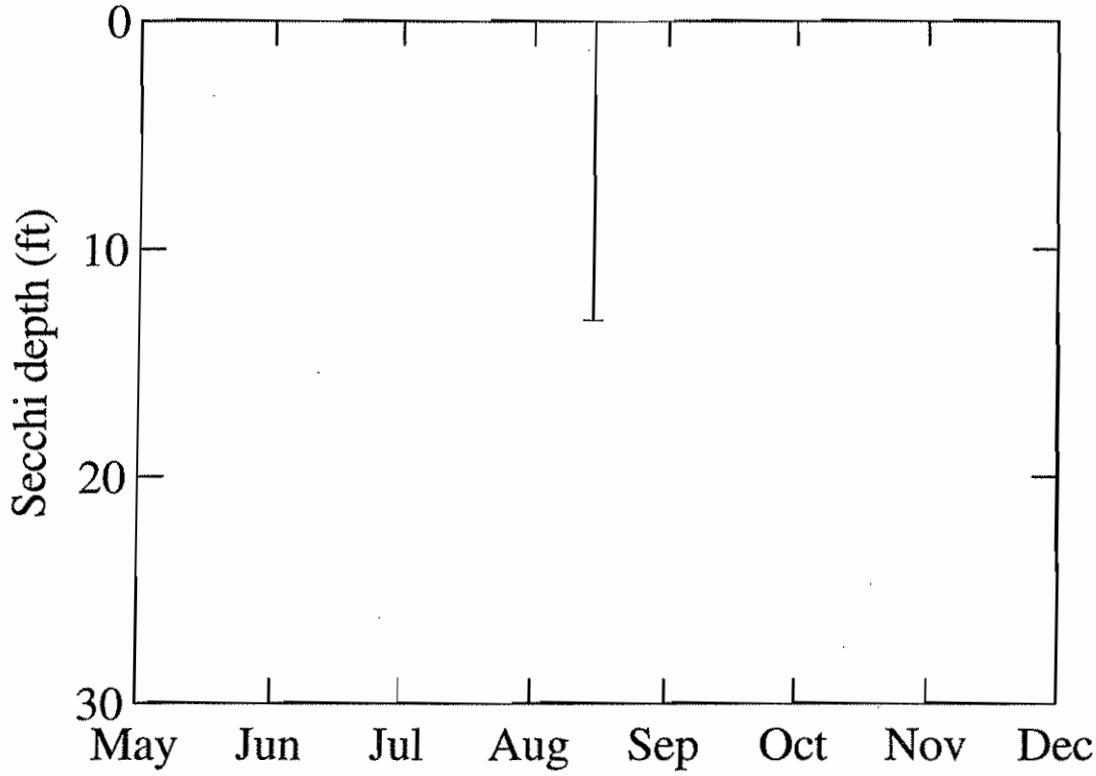
COMMENTS FROM 96/07/22 AQUATIC PLANT SURVEY

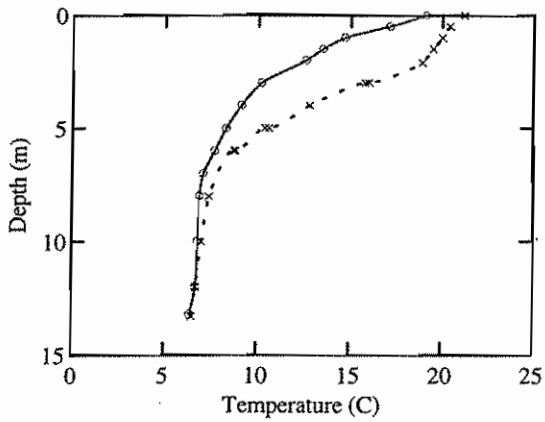
Not very diverse plant community. Water tea colored, lots of downed logs. Many newts, some ducks. Popular recreational area. Shallow sediment plume at mouth of creek Maximum depth of plant growth: 4.0M.

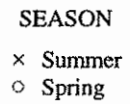
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

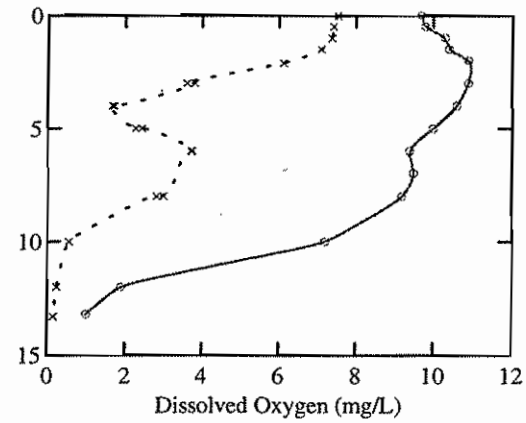
Alisma plantago-aquatica (American water-plantain) *Callitriche sp.* (water-starwort) *Carex obnupta* (slough sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Phalaris arundinacia* (reed canarygrass) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton pusillus* (slender pondweed) *Scirpus microcarpus* (small fruited bulrush) *Sparganium sp.* (bur-reed) *Typha sp.* (cat-tail)

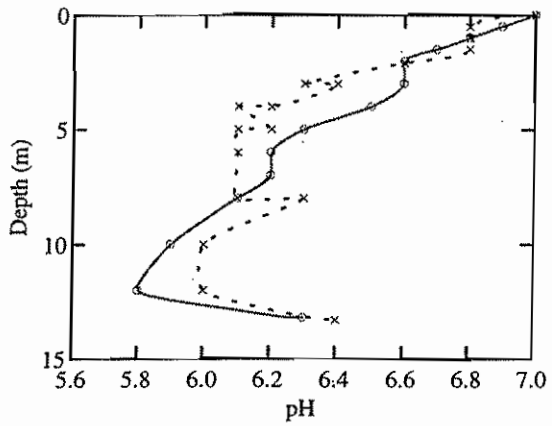
SYLVIA

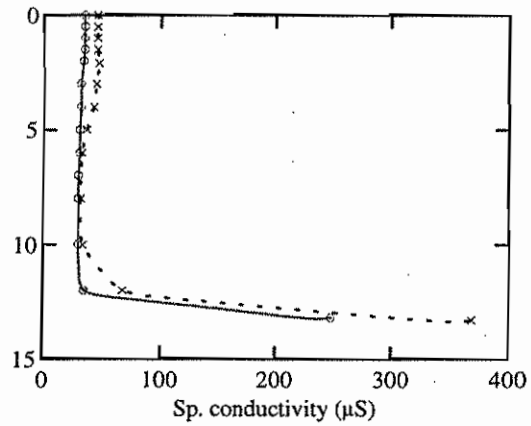

Secchi depth (ft)
0
10
20
30
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
5
10
15
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring

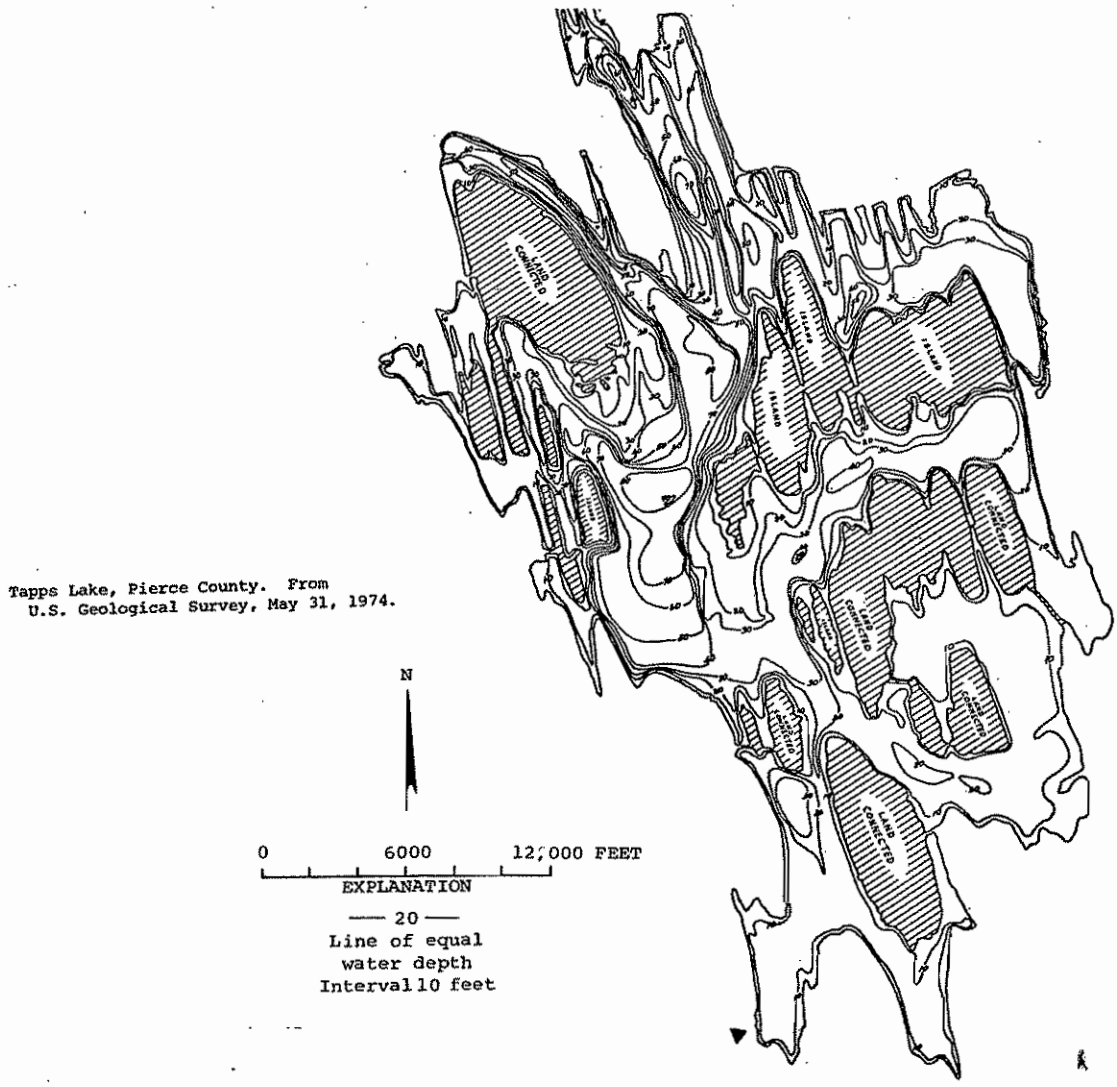

0
5
10
15
0
2
4
6
8
10
12
Dissolved Oxygen (mg/L)


Depth (m)
0
5
10
15
5.6
5.8
6.0
6.2
6.4
6.6
6.8
7.0
pH


0
5
10
15
0
100
200
300
400
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	2707
MAX DEPTH (feet)	90
MEAN DEPTH (feet)	25
DRAINAGE (square miles)	N/A
VOLUME (acre-feet)	67120
SHORE LENGTH (miles)	41.7
ALTITUDE (feet)	543



TAPPS LAKE -- PIERCE COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/19	13.3	55.9		Milky-grn	90	Trace	Light	3.0	0.0	HEAVY SEDIMENT FROM RUNOFF LEADING TO LAKE COLOR.
97/07/05	15.0	59.0		Clear	25	Heavy	Calm	4.0	0.0	WATER LEVEL AT 543 FT. ABOVE SEA LEVEL. AT PIERCE CO. PARK SECCHI DEPTHS WERE 4' AND 4'. AT INLET SECCHI DEPTHS WERE 10" AND 1'.
97/07/14	17.2	63.0		Undefined	25	None	Breezy	3.0	0.0	BRICK WAS CUT LOOSE BY VANDALS PLEASE SEND ANOTHER, WITH A WATERPROOF D.O.E. LABEL. WATER WAS 543 FEET ABOVE SEA LEVEL.
97/08/17	22.2	72.0		Milky-grn	50	Trace	Light	3.2	0.0	WATER WAS 543 FEET ABOVE SEA LEVEL
97/08/20				Undefined	100	None	Calm	2.5	0.0	WATER WAS A MILKY WHITISH GREEN.
97/08/31	23.9	75.0		Milky-grn	25	Trace	Light	3.0J	0.0	WATER WAS 542 FEET ABOVE SEA LEVEL
STATION 2										
97/08/17	15.0	59.0		Undefined	50	Trace	Light	0.3J	0.0	WATER WAS A CREAMED COFFEE COLOR WITH HIGH SEDIMENT LOADING
97/08/31	16.7	62.1		Undefined	25	Trace	Light	0.7	0.0	WATER WAS A CREAMED COFFEE COLOR WITH VERY HIGH SEDIMENT LOAD.

J - Estimate or QC requirements were not met

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/19	E	13	0.06		1U	7	3.4			
97/05/19	H									
97/08/20	E	25	0.11	5.7	1	1	20.0			
97/08/20	H	33	0.12							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. The worst problems were reported as:

1. suspended sediment

Sources of actual or potential problems includes:

HEAVY SEDIMENT LOADS FROM THE RIVER AND SNOWMELT

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***NO***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***YES***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***800***

Changes since last year? ***NEW HOMES CONSTRUCTED, MORE LANDS CLEARED FOR CONSTRUCTION***

Lake Uses and Facilities at the lake include:
swimming fishing motor boating jet skiing camping picnic facilities parks
The percent of the lakeshore that is sewered: ***0***
Motor boat restrictions include: ***no wake restriction.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-19-97 Very windy, no anchoring possible. Timber is on the bottom. The lake is dredged in the winter. Much glacial till in the summer. No hyplimnion samples collected--too windy.

8-20-97 The water is very turbid. Algae/macrophyte I.D. not possible.

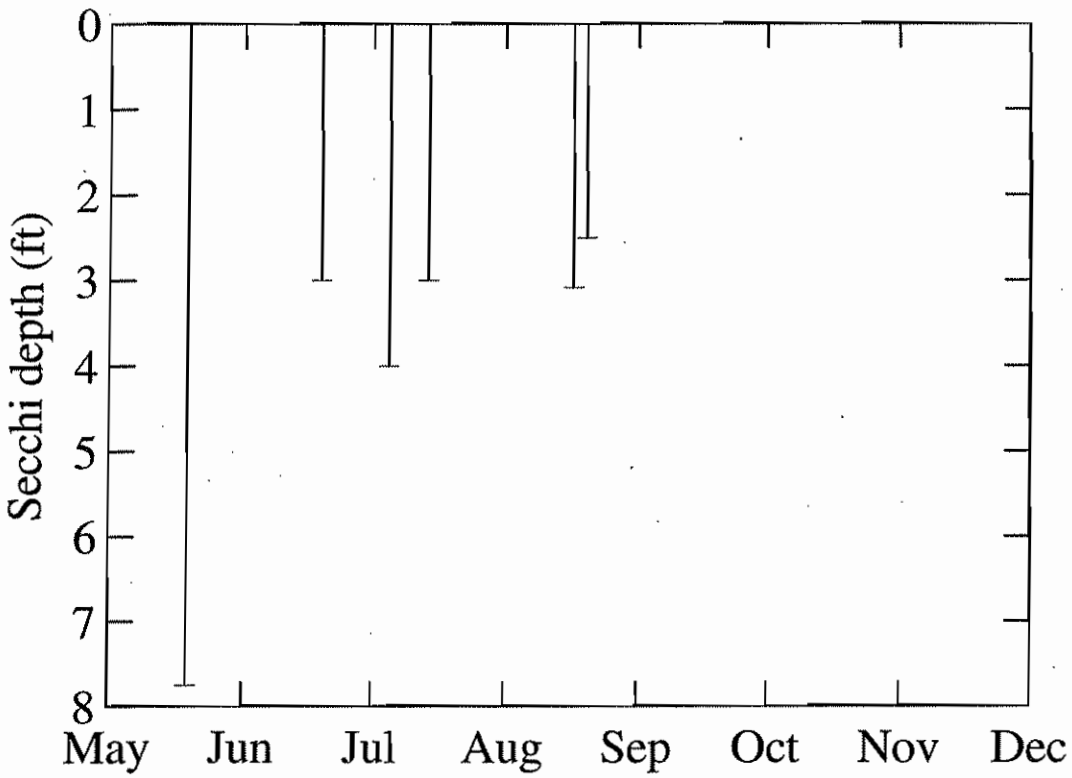
TROPHIC STATUS

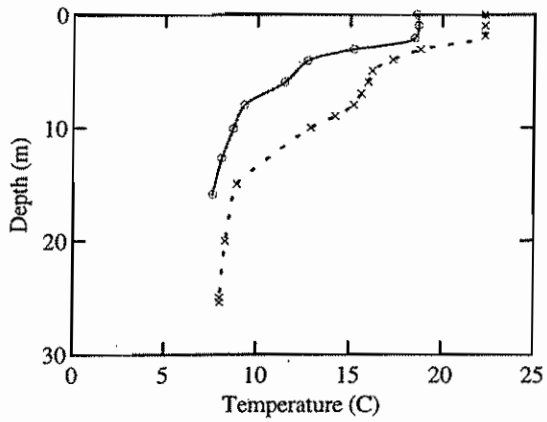
Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	61 (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	51 (Meso-eutrophic)
Mean Trophic State Index (Chlorophyll a):	48 (Meso-eutrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

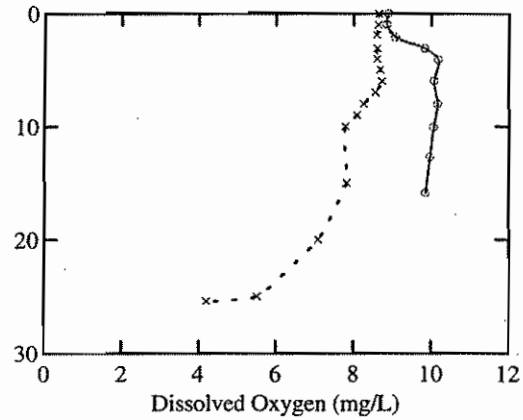
Lake Tapps is a very difficult lake to assess because it is a very turbid lake which prohibits abundant algae growth and restricts water clarity. Based on the chlorophyll TSI and the hypolimnetic DO concentrations, Lake Tapps is assessed as mesotrophic.

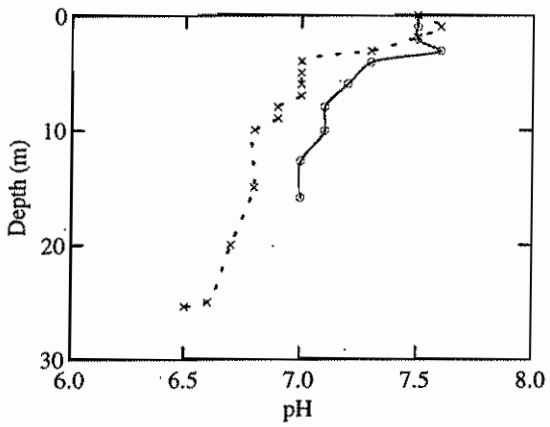
TAPPS

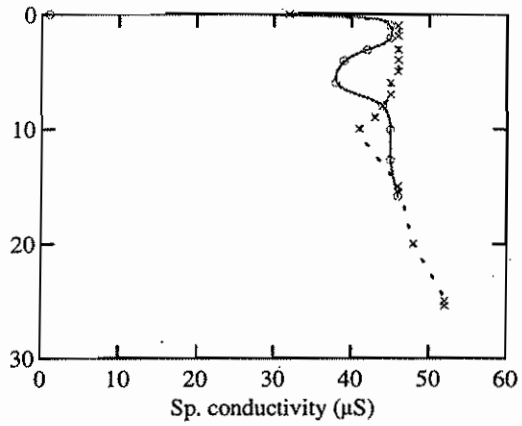




SEASON
× Summer
○ Spring







TERRELL

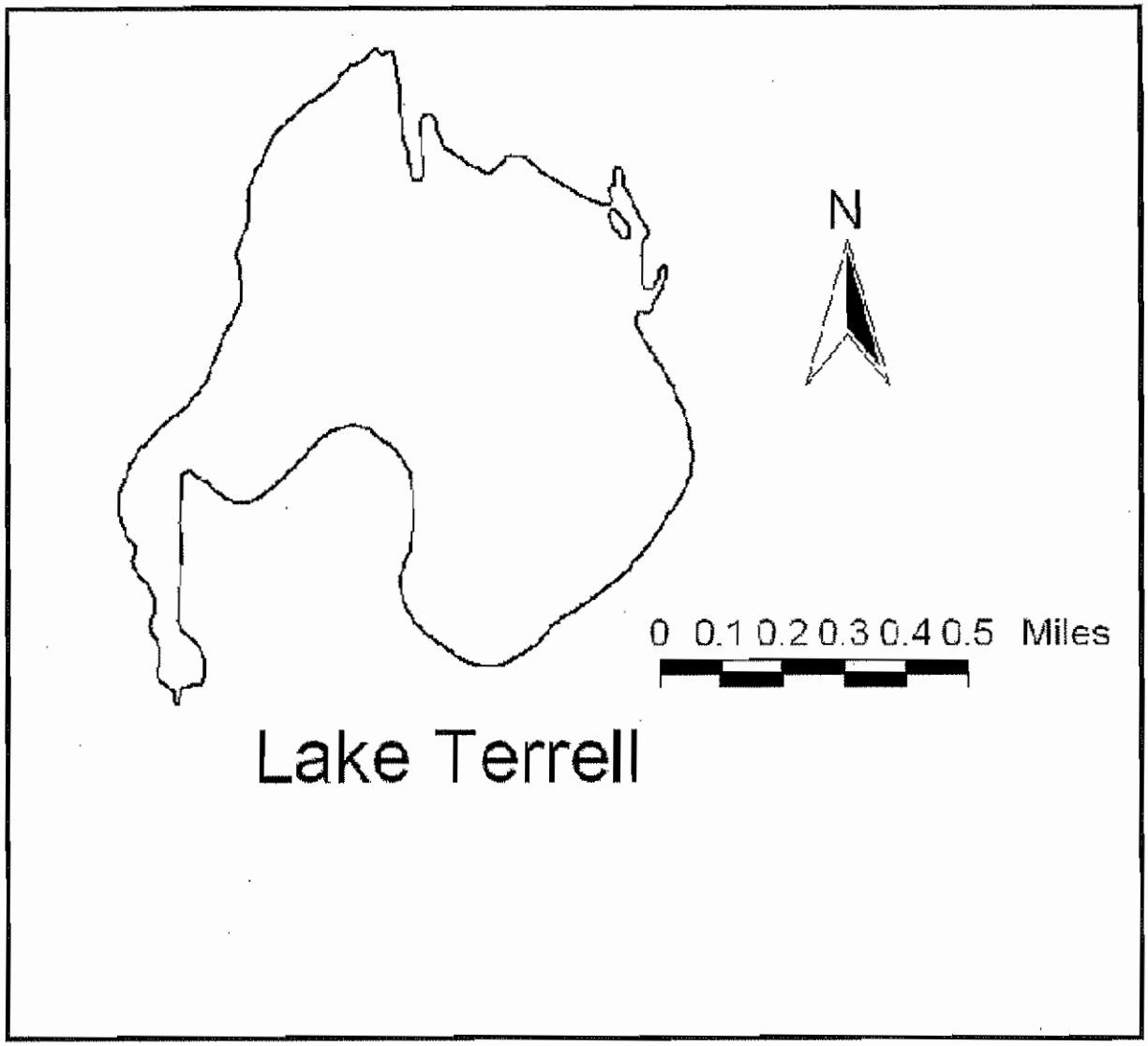
WHATCOM County

Lake ID: TERWH1

Ecoreigon: 2

Lake Terrell is a shallow lake with a wildlife refuge surrounding most of the lake. There is also access for livestock along the west shore. Some of the habitat has been altered to favor Canada goose reproduction and to attrack other waterfowl.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
435	10	7	3	
Volume (ac-ft)	*Shoreline (miles)*	*Altitude (ft abv msl)*	*Latitude*	*Longitude*
2950	3.84	212	48 52 10.	122 41 19.



TERRELL LAKE -- WHATCOM COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/09/08				Mod Green	0	None		2.9	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/11	E	54	0.72J				5.1			
97/09/08	E	93	1.00	33.7			6.8			

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-11-97 No development. The lake is entirely within a wildlife refuge. Lilies and rush are abundant along the shoreline. All data and observations support an eutrophic assessment.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	62N* (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	70 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	65 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Lake Terrel is a very productive lake full of macrophytes, nutrients and Canada geese. All indicators support an eutrophic assessment.

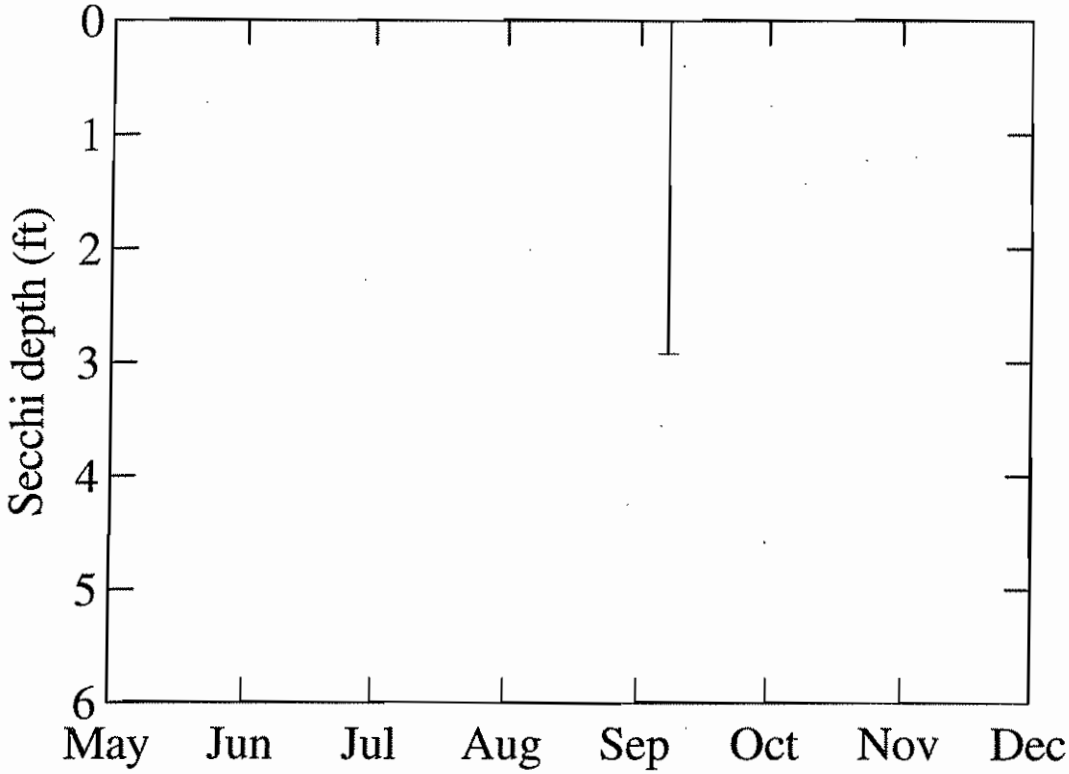
COMMENTS FROM 96/08/14 AQUATIC PLANT SURVEY

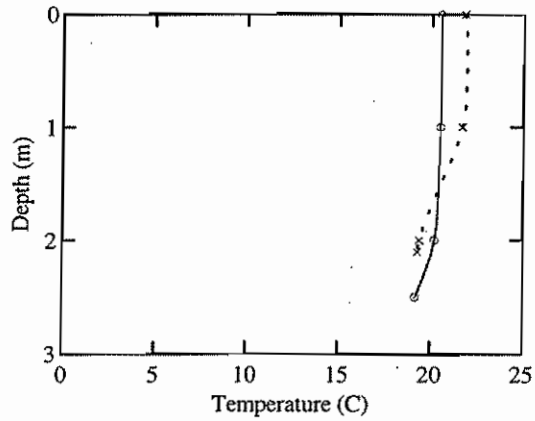
sunny, light breeze. Osprey, 3 otters. Surveyed rather quickly, thick submersed plants to about 2 m deep, also nice shoreline community. Water very turbid, looks like a good place for ducks. Much algae on plants in some areas. Maximum depth of plant growth: 2.0M.

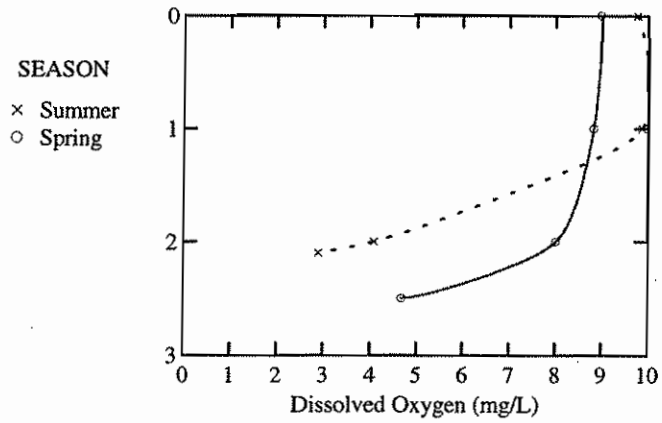
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Brasenia schreberi (watershield) *Ceratophyllum demersum* (Coontail; hornwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Lythrum salicaria* (purple loosestrife) *Myriophyllum hippuroides* (western watermilfoil) *Najas flexilis* (common naiad) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Polygonum sp.* (smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton natans* (floating leaf pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Scirpus tabernaemontani* (softstem bulrush) *Sparganium angustifolium* (narrowleaf bur-reed) *Typha sp.* (cat-tail) *Utricularia minor* (lesser bladderwort) *Vallisneria americana* (water celery)

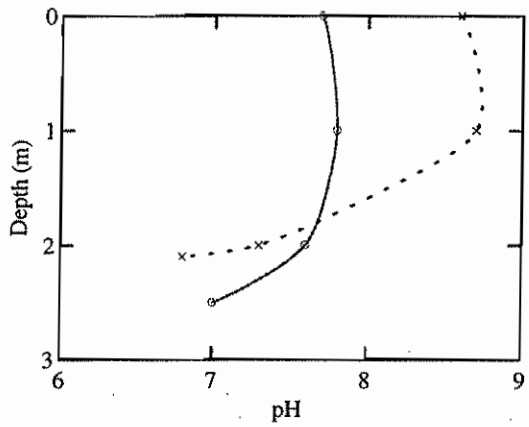
TERRELL

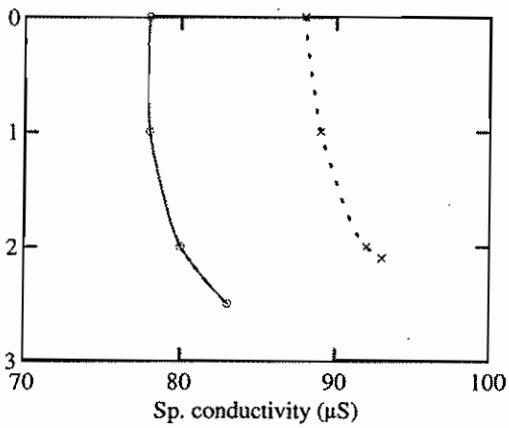

Secchi depth (ft)
0
1
2
3
4
5
6
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
1
2
3
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring

0
1
2
3
0
1
2
3
4
5
6
7
8
9
10
Dissolved Oxygen (mg/L)

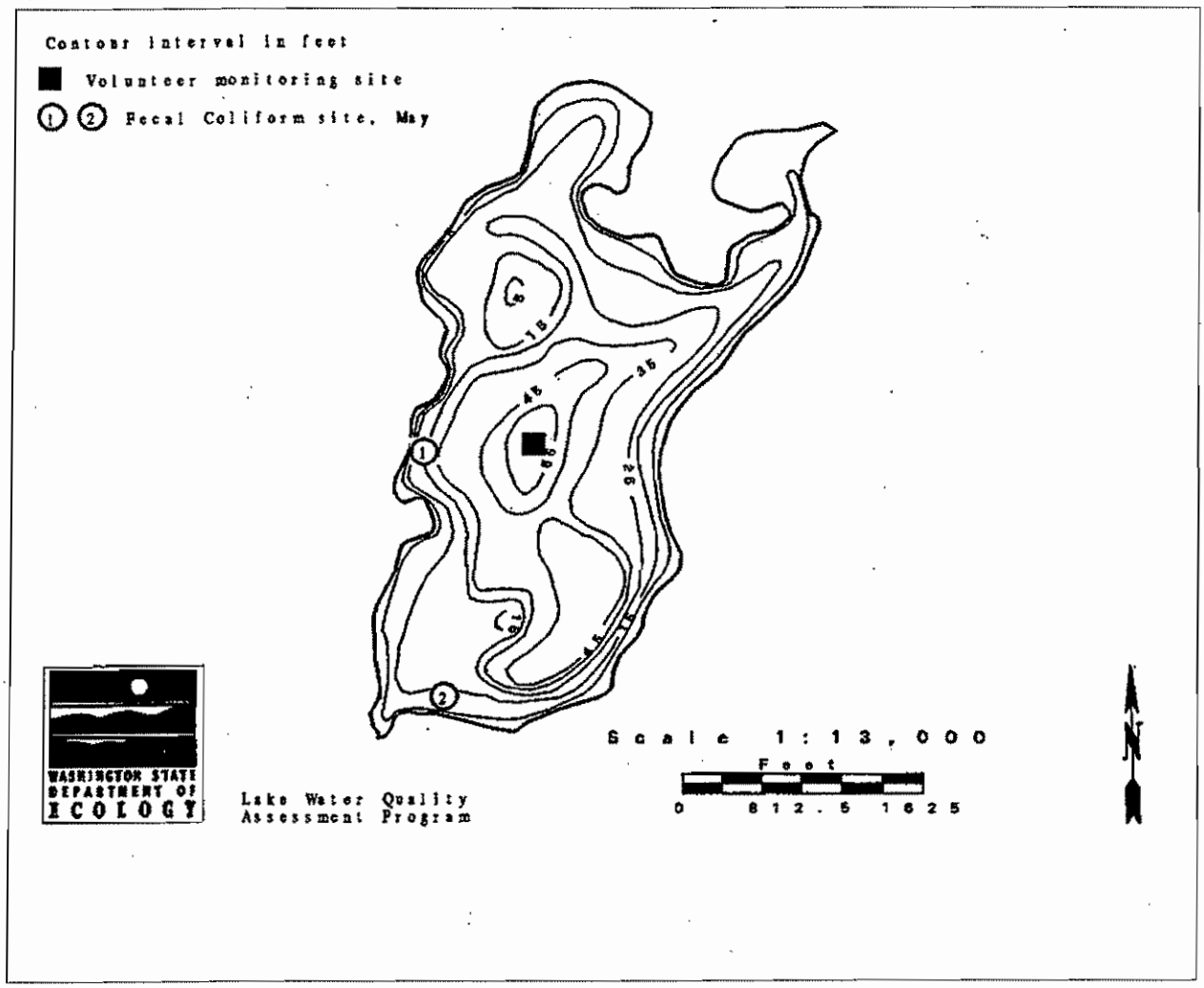

Depth (m)
0
1
2
3
6
7
8
9
pH


0
1
2
3
70
80
90
100
Sp. conductivity (µS)

LAKECOUNTY THOMAS (STEVENS)

DESCRIPTION Lake Thomas is located 17 miles northeast of Colville, and is in the Little Pend Oreille chain of lakes. It is fed by Heritage Lake via a narrow channel, and drains south to Gillette Lake and ultimately to the Little Pend Oreille River. There is no boat ramp on the lake, but it is accessible from the other lakes in the Little Pend Oreille chain.

AREA (acres)	170
MAX DEPTH (feet)	55
MEAN DEPTH (feet)	23
DRAINAGE (square miles)	12.
VOLUME (acre-feet)	4000
SHORE LENGTH (miles)	3.31
ALTITUDE (feet)	3147



THOMAS LAKE -- STEVENS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/12	18.9	66.0		Undefined	100			12.0	-1.0	WATER COLOR LIGHT SAND
97/06/25	18.9	66.0		Undefined	0	Heavy	Light	11.0	-2.2	WATER COLOR WAS YELLOW-GOLD. WEATHER HIGH OVERCAST.
97/07/17	22.2	72.0		Undefined	90	None	Light	13.8	0.0	WATER WAS YELLOW-GOLD
97/08/05	25.0	77.0		Mod Green	0	None	Light	13.0	-4.0	HEAVY BOAT & JET SKI TRAFFIC FOR THE LAST THREE DAYS.
97/08/19	22.2	72.0		Mod Green	50	None	Breezy	13.0	-4.0	LOTS OF WATER CRAFT.
97/08/26	21.1	70.0		Undefined	80			15.0	0.0	WATER WAS CLEAR AND BROWN.
97/09/02	21.1	70.0		Mod Green	100	Trace	Calm	14.8	0.0	
97/09/16	16.7	62.1		Mod Green	90	Mod	Strong	13.8	0.0	fISH AND WILDLIFE IS LOWERING THE LAKE LEVEL IN PREPARATION FOR ROTENONE TREATMENT.
97/10/08	12.2	54.0		Mod Green	90	Heavy	Breezy	13.0	0.0	LAKE BEING LOWERED FOR ROTENONE TREATMENT.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/29	E	11								
97/05/29	H	11								
97/08/27	E	9		2.6	5	13				
97/08/27	H	19								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available.*** No specific problems were listed.
Were there days (and how many) when poor water quality impaired
Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***
Were fish stocked this year? ***NO***
Any lake groups present (such as a lake association)? ***NO***
Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?
Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

Lake height was about normal during spring sampling. According to volunteer, DFW planned to rotenone the lake in October 1997 to kill introduced perch and bluegill; heavy winds and rain prior to summer sampling; no zooplankton or H2S smell apparent in

water samples. Lake has been Sonar treated on 5 alternate Thursdays to control Eurasian milfoil. Some waterlilies are present, but few healthy submersed plants.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	40 (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	36 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	40 (Oligo-mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Lake Thomas appears to be low in nutrients but high in macrophytes. Additionally, low hypolimnetic DO concentrations in the summer are quite severe, with nearly two-thirds of the water column anoxic. All factors considered, Lake Thomas is assessed as mesotrophic.

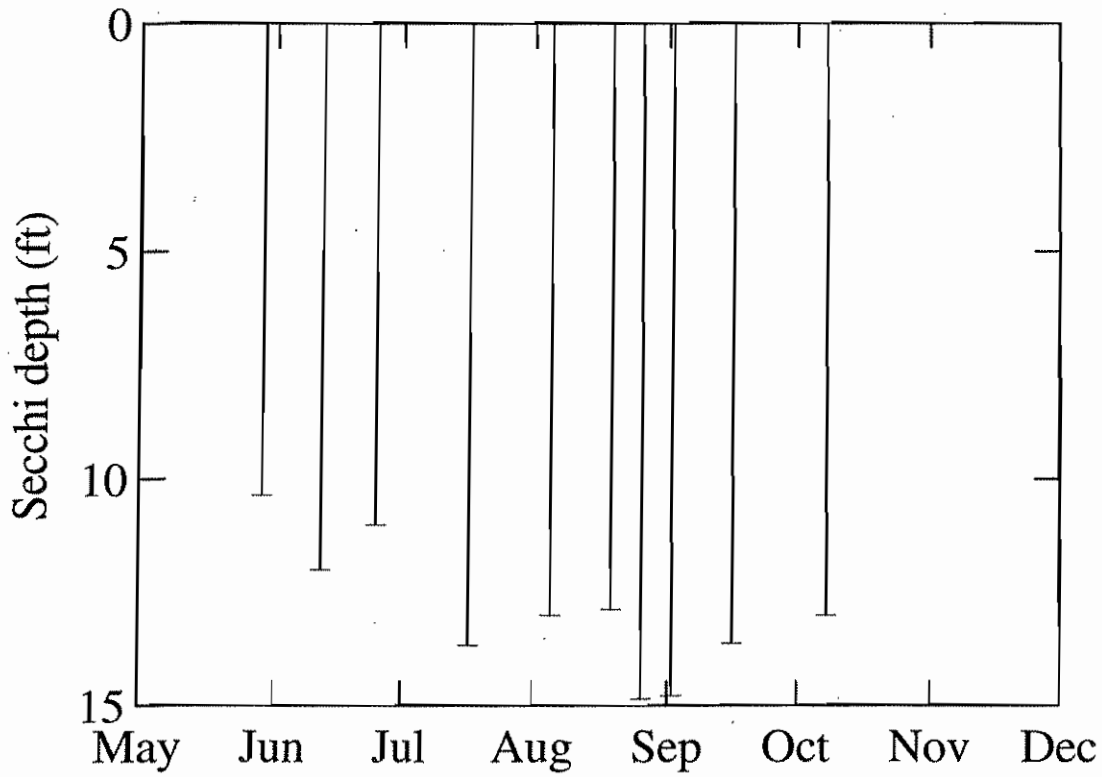
COMMENTS FROM 93/08/19 AQUATIC PLANT SURVEY

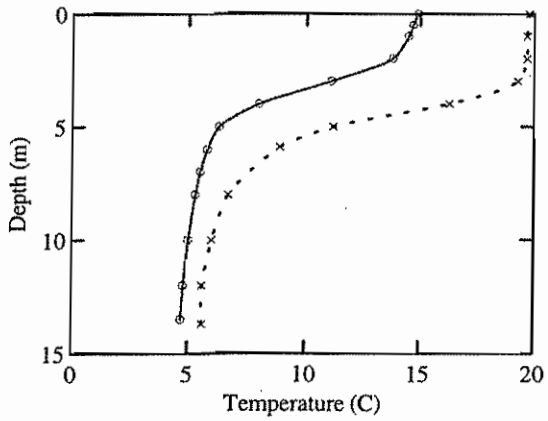
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

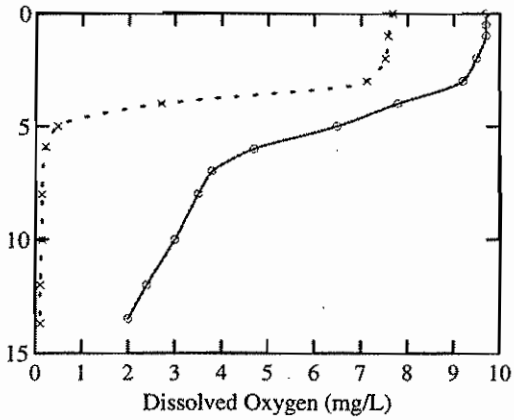
Brasenia schreberi (watershield) *Isoetes sp.* (quillwort) *Myriophyllum spicatum* (Eurasian water-milfoil) *Nitella sp.* (stonewort) *Nuphar lutea* (yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Nymphaea sp.* (water lily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved) or Heteranthera dubia* (thin leaved pondweed-like) *Potamogeton sp.* (pondweed)

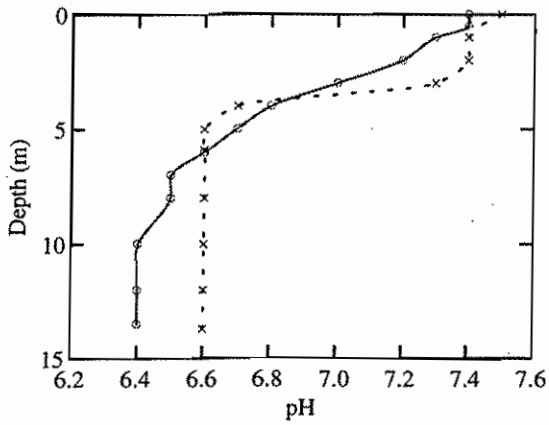
THOMAS

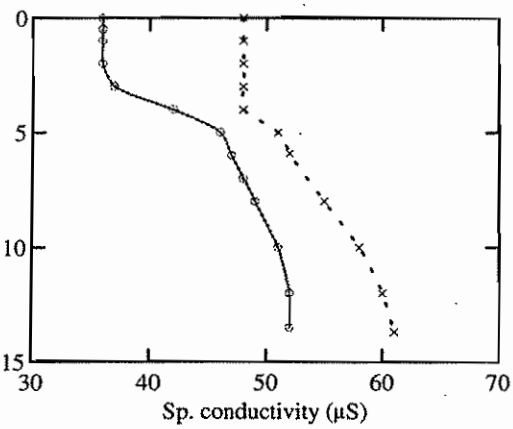




SEASON
× Summer
○ Spring



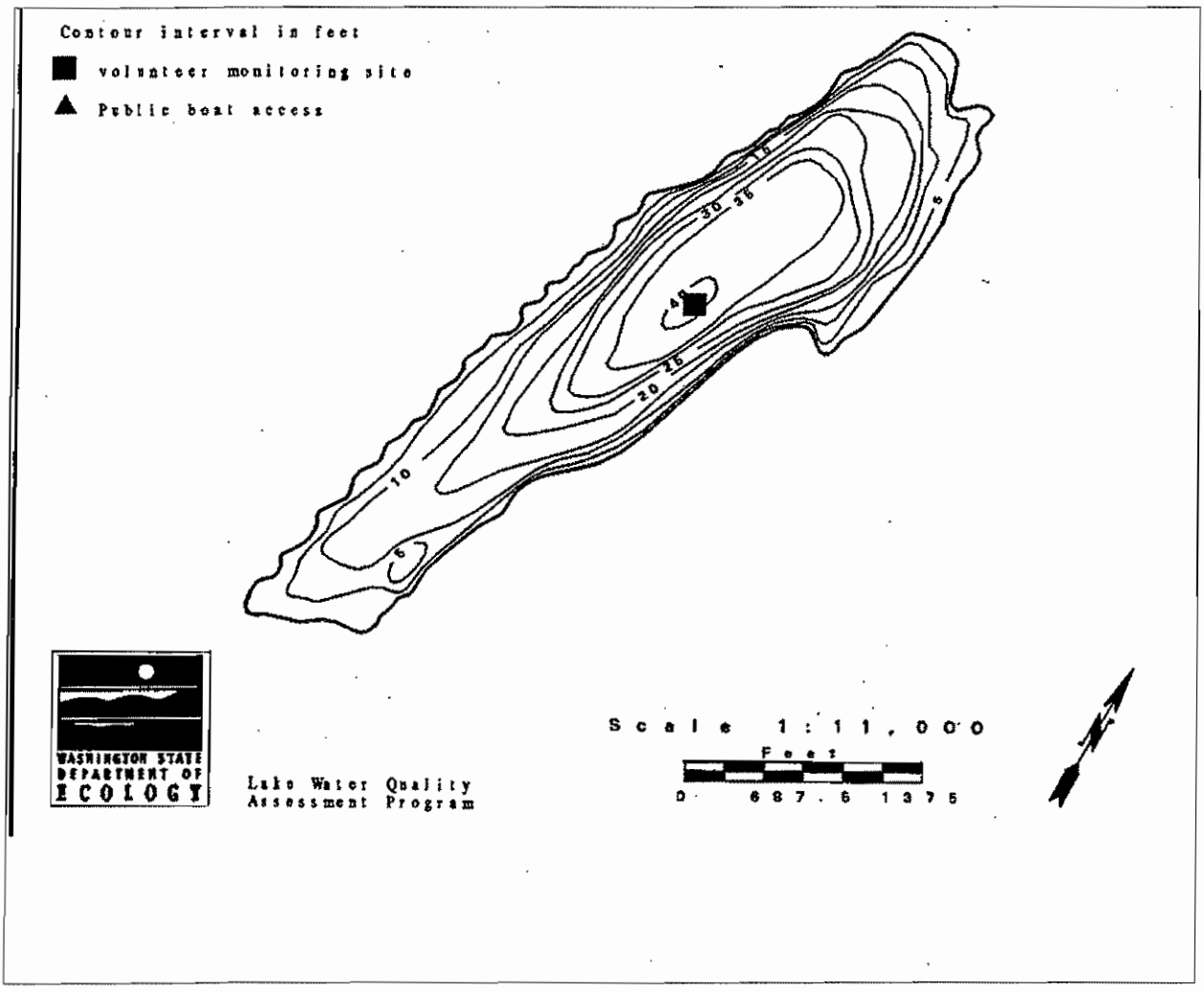




LAKECOUNTY TIGER (KITSAP/MASON)

DESCRIPTION Tiger Lake is located 9.5 miles southwest of Bremerton. Most of the lake (102.8 acres) is in Mason County, and the northern tip of the lake (6.3 acres) is in Kitsap County. Tiger Lake has no surface inlets, and drains via Mission Creek to Hood Canal.

AREA (acres)	110
MAX DEPTH (feet)	40
MEAN DEPTH (feet)	19
DRAINAGE (square miles)	0.7
VOLUME (acre-feet)	2100
SHORE LENGTH (miles)	2.46
ALTITUDE (feet)	496



TIGER LAKE -- KITSAP/MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 0											
97/09/16					0			0.0	0.0		
STATION 1											
97/06/02	20.0	68.0		Lt Green	0	Heavy	Light	21.5J	21.0		
97/06/10	20.6	69.1		Lt Green	75	Mod	Light	18.0	24.0		
97/07/03	21.7	71.1		Lt Green	0	Light		18.0	26.0		
97/07/16	23.3	73.9		Lt Green	25	Trace	Light	17.0	27.0		
97/08/15	25.6	78.1		Lt Green	100	Trace	Calm	16.5	38.5		
97/08/15	25.6	78.1		Lt Green	100	Trace	Calm	16.5	38.5		
97/08/28	23.3	73.9		Lt Green	10	Heavy	Breezy	17.0	37.0		
97/09/11	22.2	72.0		Lt Green	100	Light	Light	14.0	40.5		
97/09/23	24.4	75.9		Pea-green	0	None	Calm	14.0	39.8		

J - Estimate or QC requirements were not met

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/02	E	4								
97/06/02	H	8								
97/09/16	E	6	0.24	2.7						
STATION 2										
97/06/02	E	4								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. The worst problems were reported as:

1. shoreline erosion

Sources of actual or potential problems includes:

EXCESSIVE SHORELINE DEVELOPMENT AND CLEARCURRING HAS LED TO HIGH LEVELS OF RUNOFF.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***105***

Changes since last year? ***THERE IS A LARGE DEVELOPMENT IN A WET LAND AREA.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-2-97 No more jet skis allowed. Fishing has improved over the last year. The water is really clear, a very light green color.

9-16-97 Stirrer is not working on the hydrolab

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	37 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	31 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	40 (Oligo-mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

With the exception of hypolimnetic DO, all indicators suggest an oligotrophic assessment. The DO sag is interesting since the depletion is evident even in the spring. This oddity supports an oligo-mesotrophic assessment.

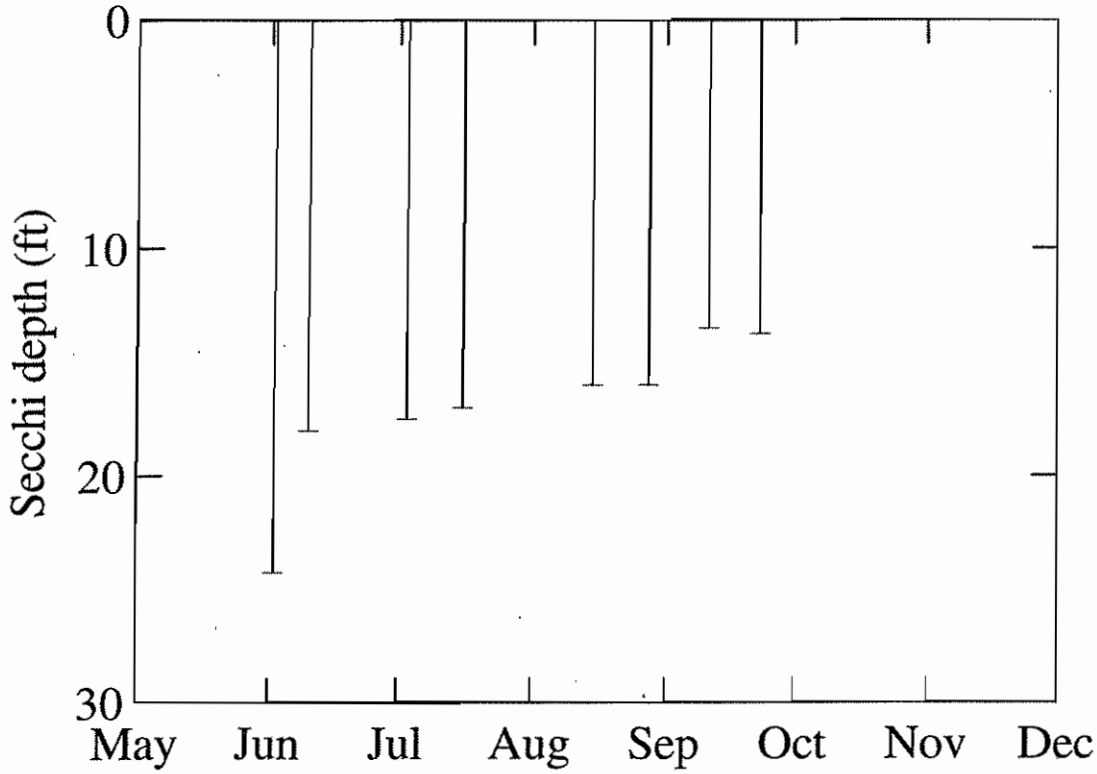
COMMENTS FROM 96/09/09 AQUATIC PLANT SURVEY

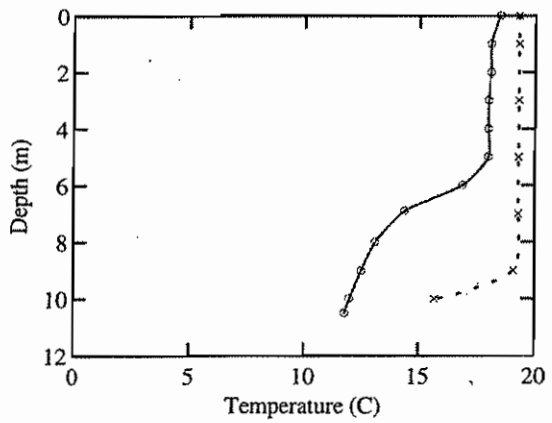
cloudy, light breeze. Lots of water intake lines. Not many plants, much of bottom is gravel with few low growing plants. P. epihydrous semi-thick between 1-2 m deep in north end. A resident says there are many more plants now that there used to be. Looked like good Lobelia habitat, but didn't see any. Maximum depth of plant growth: 4.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

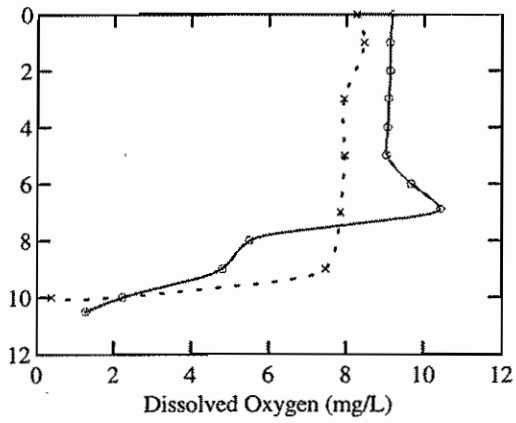
Isoetes sp. (quillwort) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Polygonum amphibium* (water smartweed) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort) *unknown plant* (unknown)

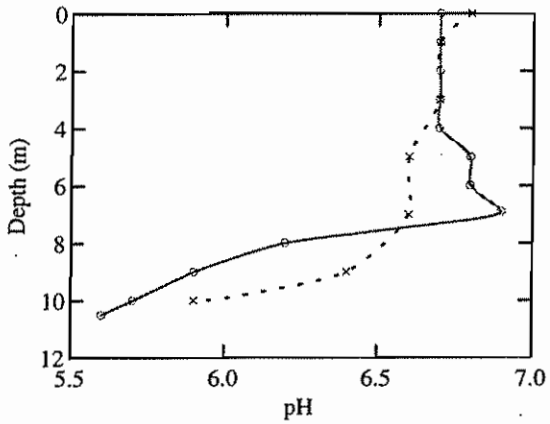
TIGER

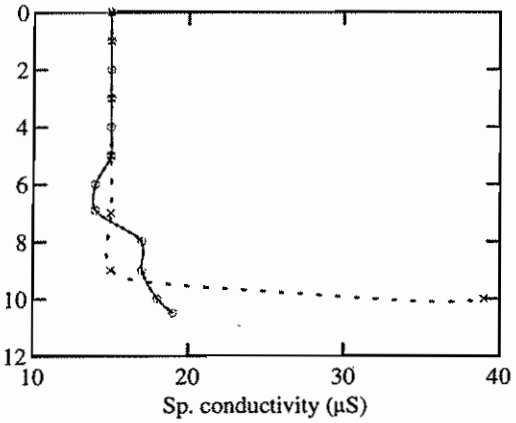




SEASON
× Summer
○ Spring



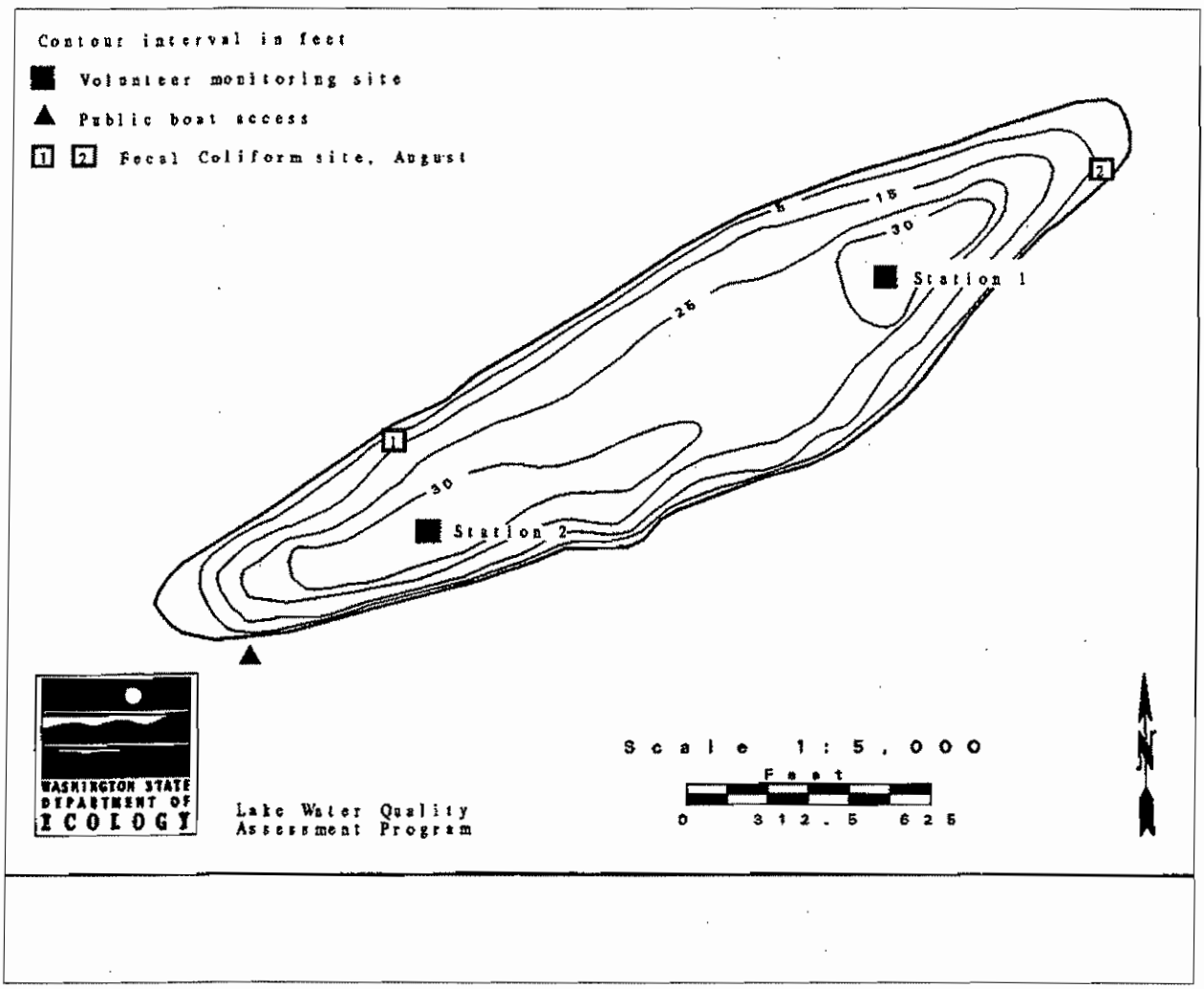




LAKECOUNTY TOAD (EMERALD) (WHATCOM)

DESCRIPTION

AREA (acres)	33
MAX DEPTH (feet)	31
MEAN DEPTH (feet)	20
DRAINAGE (square miles)	0.5
VOLUME (acre-feet)	655
SHORE LENGTH (miles)	1.16
ALTITUDE (feet)	714



TOAD (EMERALD) LAKE -- WHATCOM COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/09/08				Undefined	0	None	Calm	20.0	0.0		WATER WAS AQUA-MARINE

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/10	E	10	0.64J		3	1U				
97/06/10	H	17	0.66J							
97/09/08	E	9	0.26	3.2	3	2	0.8			
97/09/08	H	41	0.32							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-10-97 The lake truly is an emerald color. There were lots of fish fry observed. A bullfrog and garter snake were observed.

9-8-97 Two hawks were observed flying overhead.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	34N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	36 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	42 (Mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Toad Lake is assessed as oligo-mesotrophic due to its moderate chlorophyll concentration and the low hypolimnetic DO concentration in the spring and summer.

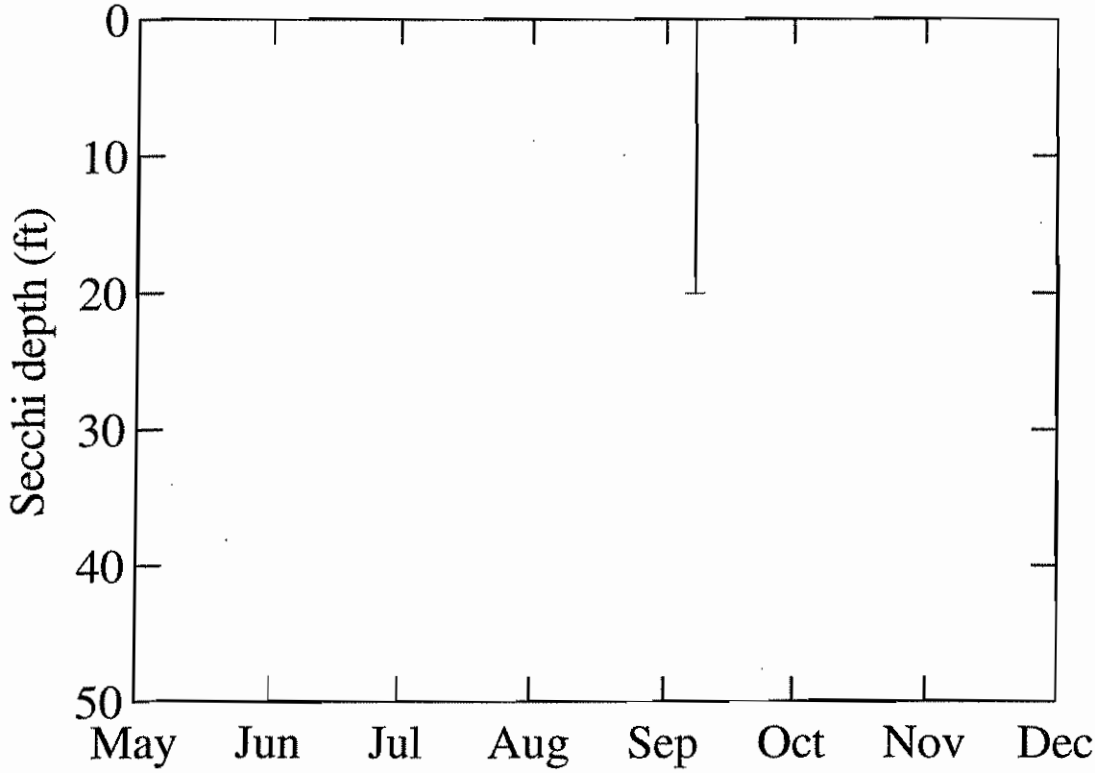
COMMENTS FROM 97/07/03 AQUATIC PLANT SURVEY

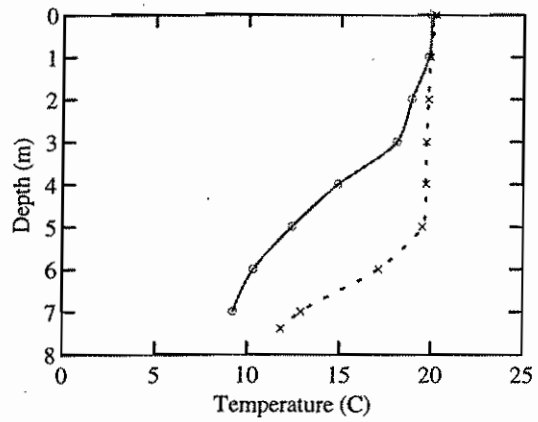
sunny, light breeze. Floculant algae in lake. Ducks and geese hanging out, strange frog noises. Not many plants in most of lake, steep sided, bare organic sediments. Patches of P. amplifolius and E. canadensis Maximum depth of plant growth: 3.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

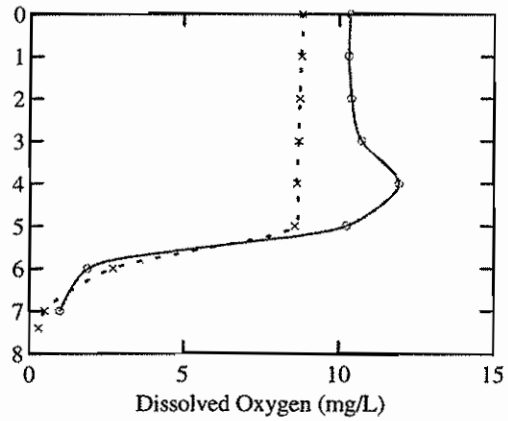
Carex sp. (sedge) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Juncus sp.* (rush) *Lysimachia thyrsiflora* (tufted loosestrife) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton amplifolius* (large-leaf pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Typha sp.* (cat-tail)

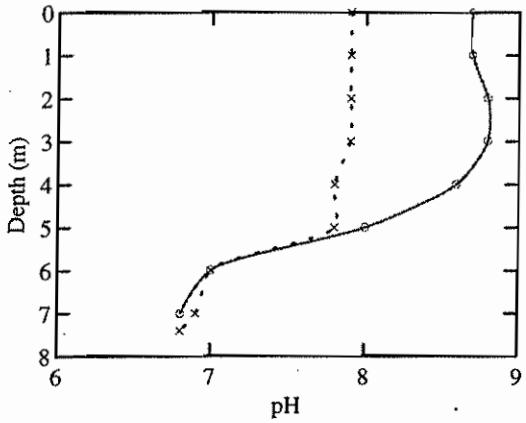
TOAD

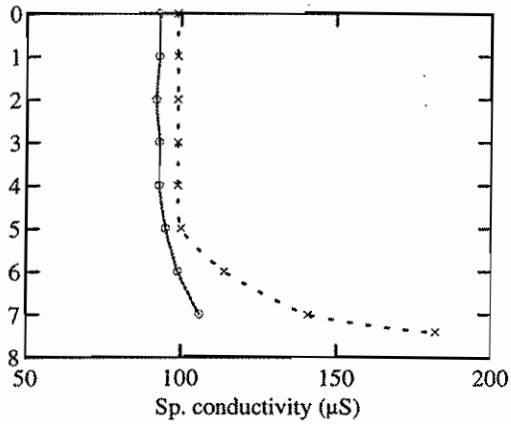




SEASON
× Summer
○ Spring



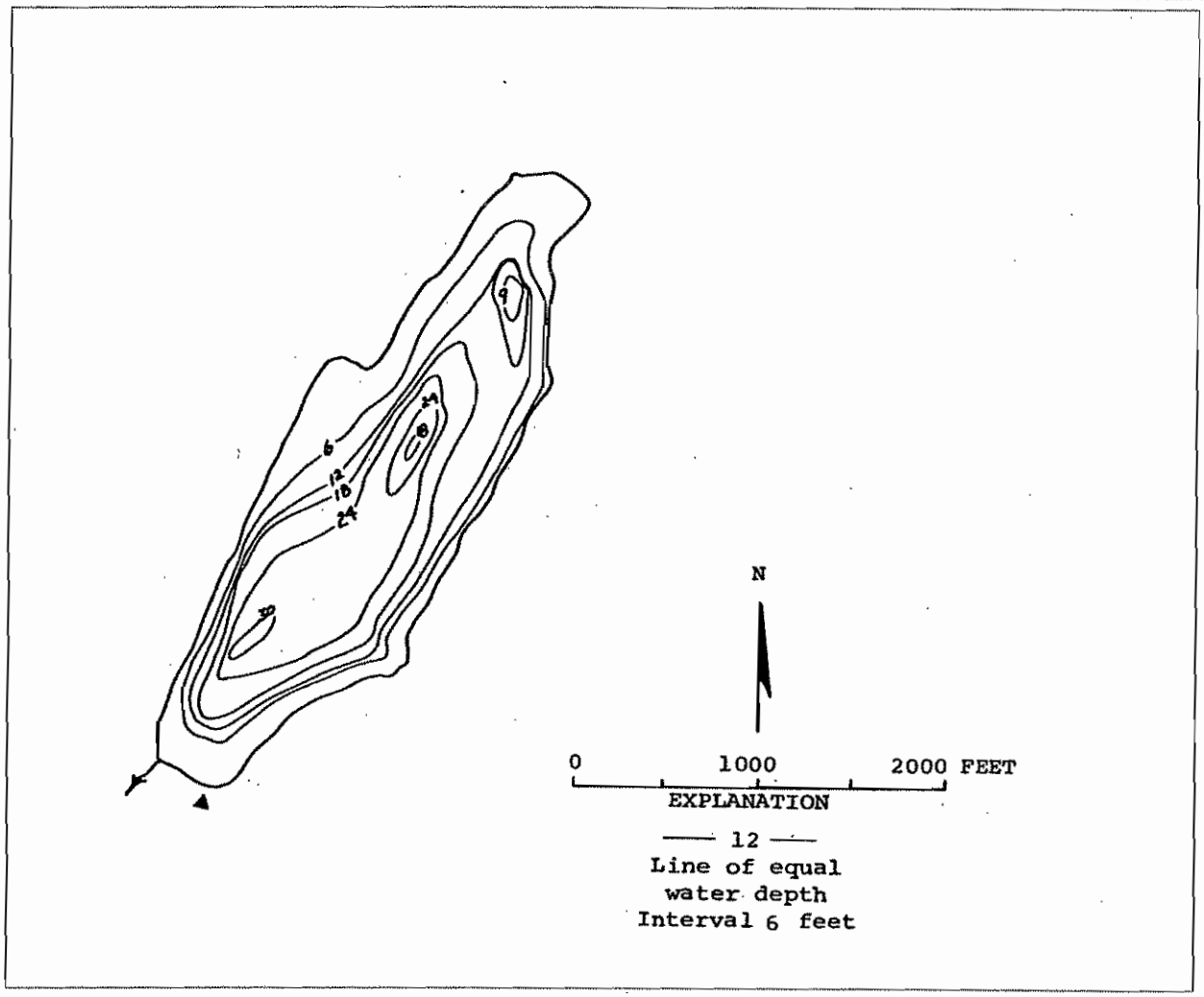




LAKECOUNTY TRAILS END (MASON)

DESCRIPTION Trails End Lake is located 5.5 miles southwest of Belfair. It has no surface inlets, and drains via Sherwood Creek to North Bay. Trails End Lake is also referred to as Prickett Lake.

AREA (acres)	74
MAX DEPTH (feet)	30
MEAN DEPTH (feet)	13
DRAINAGE (square miles)	0.3
VOLUME (acre-feet)	993
SHORE LENGTH (miles)	1.68
ALTITUDE (feet)	301



TRAILS END LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/09/01				Lt Green	50	None		17.5	0.0		
97/09/19	18.9	66.0		Lt Green	75	Heavy	Light	14.0	0.0		LAKE 13 INCHES HIGHER THAN LAST YEAR.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Fecal Col. Bacteria (colonies/100 mL) Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Suspended Solids Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/28	E	7								
97/05/28	H	16								
97/09/01	E	6	0.26	1.0						
97/09/01	H	6	0.23							
STATION 2										
97/09/01	E	4	0.22	1.4						
STATION 2										
97/09/01	E			1.4						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***fair***. The worst problems were reported as:

1. excessive aquatic plants 2. high water levels 3. fluctuating water levels

Sources of actual or potential problems includes:

UNCONTROLLED LILYPAD GROWTHS, BEAVER DAMS KEEPING THE LAKE TOO HIGH. EXCESSIVE PEAT ON THE BOTTOM OF SOUTH END OF THE LAKE. UP TO 8 FEET DEEP.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***70***

Changes since last year? ***A FEW LOTS ARE CLEARD FOR NEW HOMES. MOST ARE CLEAR CUT.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-28-97 The weir is still in but the beaver dam has been removed. The water level finally dropped.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	37N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	26 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	33 (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Trails End is a very clear and clean lake. All data and observations support an oligotrophic assessment.

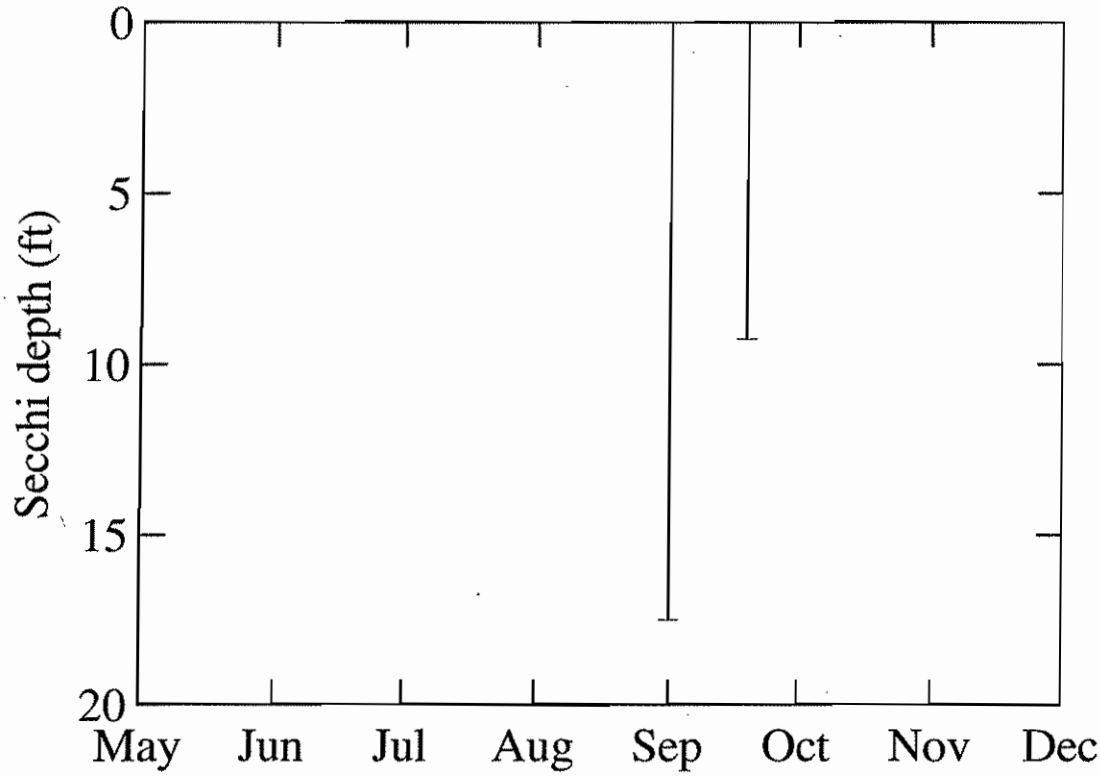
COMMENTS FROM 98/06/16 AQUATIC PLANT SURVEY

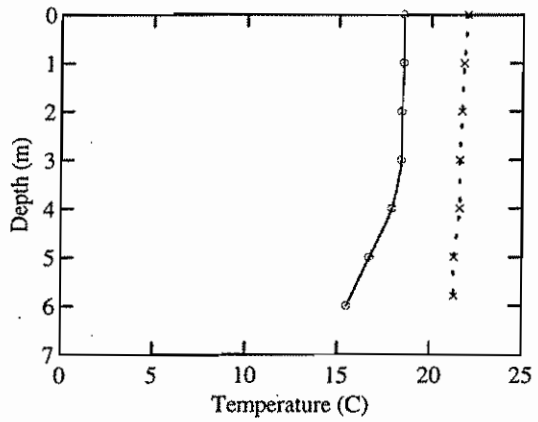
Partly cloudy, breeze. Mostly bare sediment, organic matter over rocky sand. Shoreline and emergent plants prevalent, but few submersed species.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

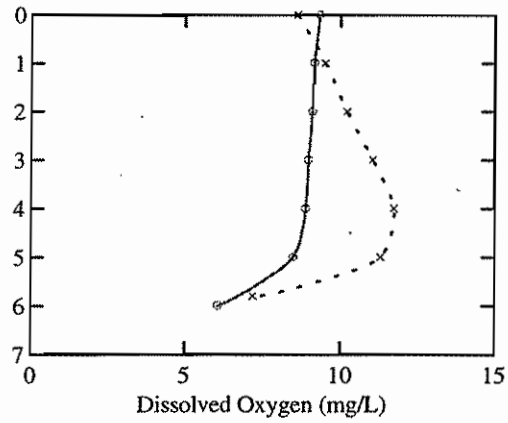
Brasenia schreberi (watershield) *Dulichium arundinaceum* (Dulichium) *Isoetes sp.* (quillwort) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Lobelia dortmanna* (water gladiole; water lobelia) *Ludwigia palustris* (water-purslane) *Lythrum salicaria* (purple loosestrife) *Nymphaea odorata* (fragrant waterlily) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Utricularia inflata* (big floating bladderwort)

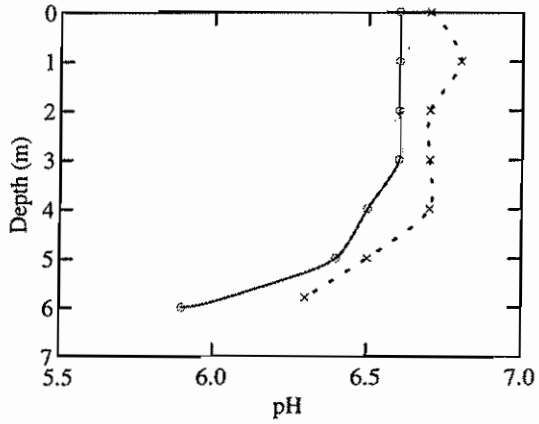
TRAILS END

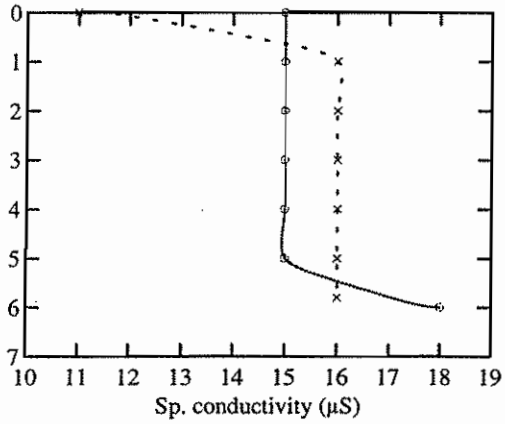




SEASON
× Summer
○ Spring

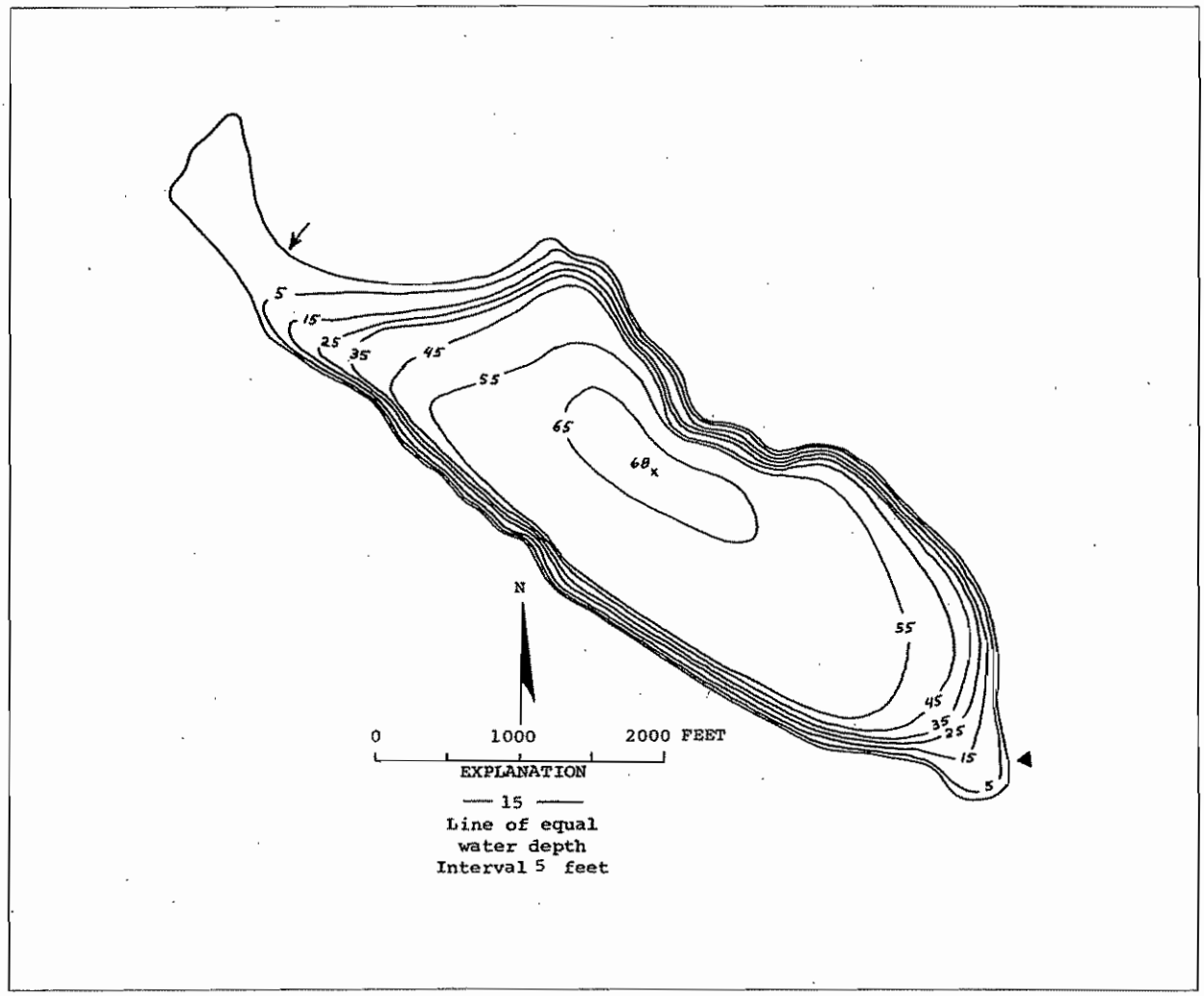






DESCRIPTION

AREA (acres)	216
MAX DEPTH (feet)	68
MEAN DEPTH (feet)	44
DRAINAGE (square miles)	N/A
VOLUME (acre-feet)	9464
SHORE LENGTH (miles)	3.22
ALTITUDE (feet)	1229



WAPATO LAKE -- CHELAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 0										
97/05/20					0			15.8	-0.0	
97/05/20					0			15.8	0.0	APPEARS TO BE A POPULAR FISHING LAKE. LOTS OF LARGE DAPHNIA IN ALL CASTS.
STATION 1										
97/08/19				Lt Green	0	None	Light	14.8	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/20	E	28	0.77			1U				
97/05/20	H	75	1.13							
97/08/19	E	11	0.48	2.0	6	11				
97/08/19	H	43	0.67							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

Spring sampling: Lots of fishermen; lots of large Daphnia in all casts. Summer sampling: Moderate number of large Daphnia at 2,4, and 6M, Chaoborus at 13M, H2S smell at 16M; Coontail and native milfoil on surface in places. There are two campgrounds and 1 house on lake.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	38N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	38 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	37 (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

TSI values suggest an oligotrophic lake, however, summertime hypolimnetic DO concentrations are considerably depleted and there is the production of H2S in the hypolimnion. Wapato Lake is assessed as oligo-mesotrophic.

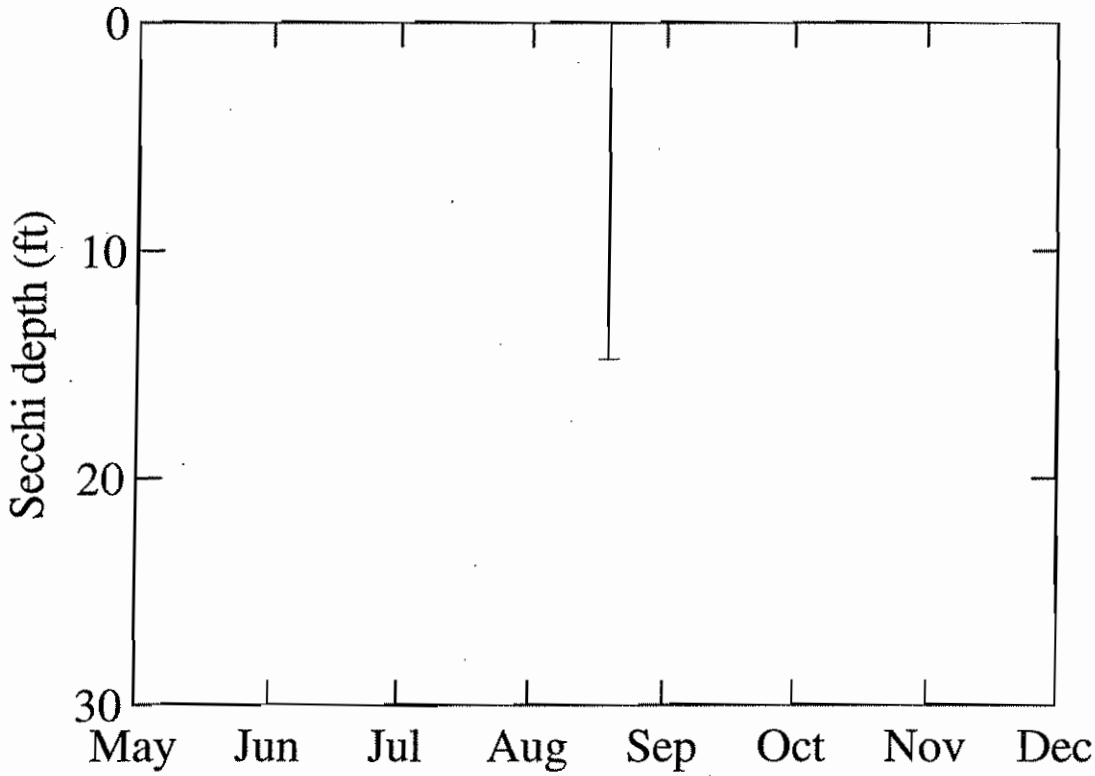
COMMENTS FROM 97/06/17 AQUATIC PLANT SURVEY

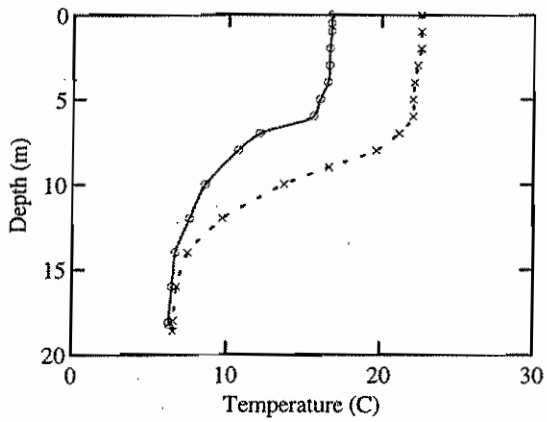
Cloudy, calm, light rain, water level higher than usual. Much filamentous algae covering plants at east end. More M. spicatum than last year, appears to be spreading - too much to hand pull in a reasonable amount of time. visibility not the best due to cloud cover.

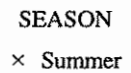
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

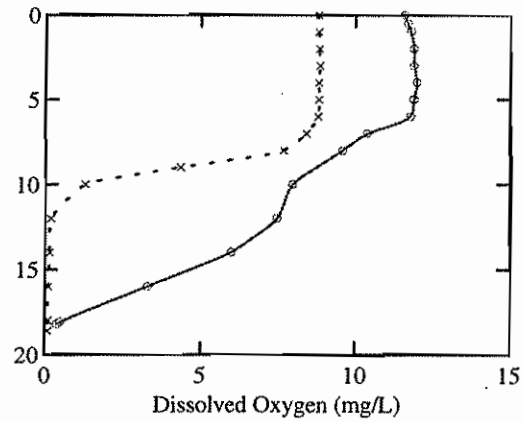
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Elodea canadensis* (common elodea) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Myriophyllum sibiricum* (northern watermilfoil) *Myriophyllum spicatum* (Eurasian water-milfoil) *Polygonum amphibium* (water smartweed) *Potamogeton friesii* (flat-stalked pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton pusillus* (slender pondweed) *Potamogeton richardsonii* (Richardson's pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Ranunculus aquatilis* (water-buttercup) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail) *unknown plant* (unknown)

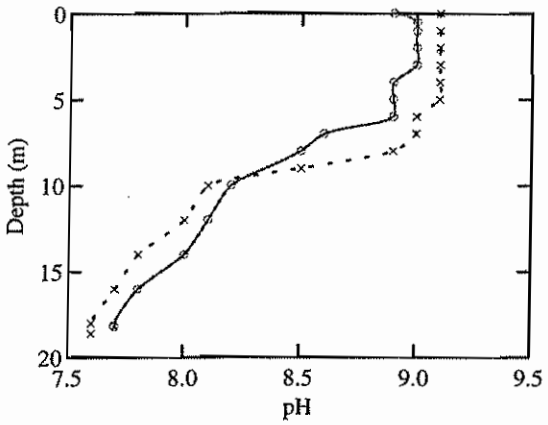
WAPATO

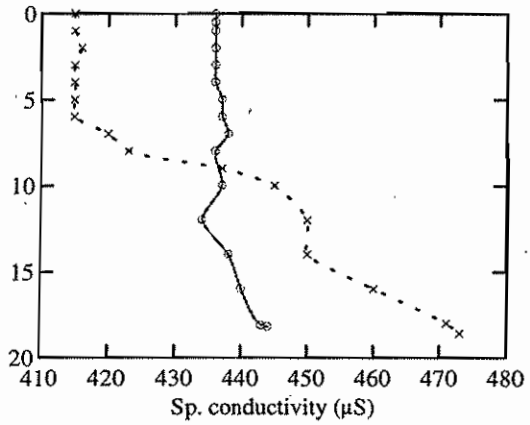

Secchi depth (ft)
0
10
20
30
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
5
10
15
20
0
10
20
30
Temperature (C)


SEASON
Summer
Spring


0
5
10
15
20
0
5
10
15
Dissolved Oxygen (mg/L)

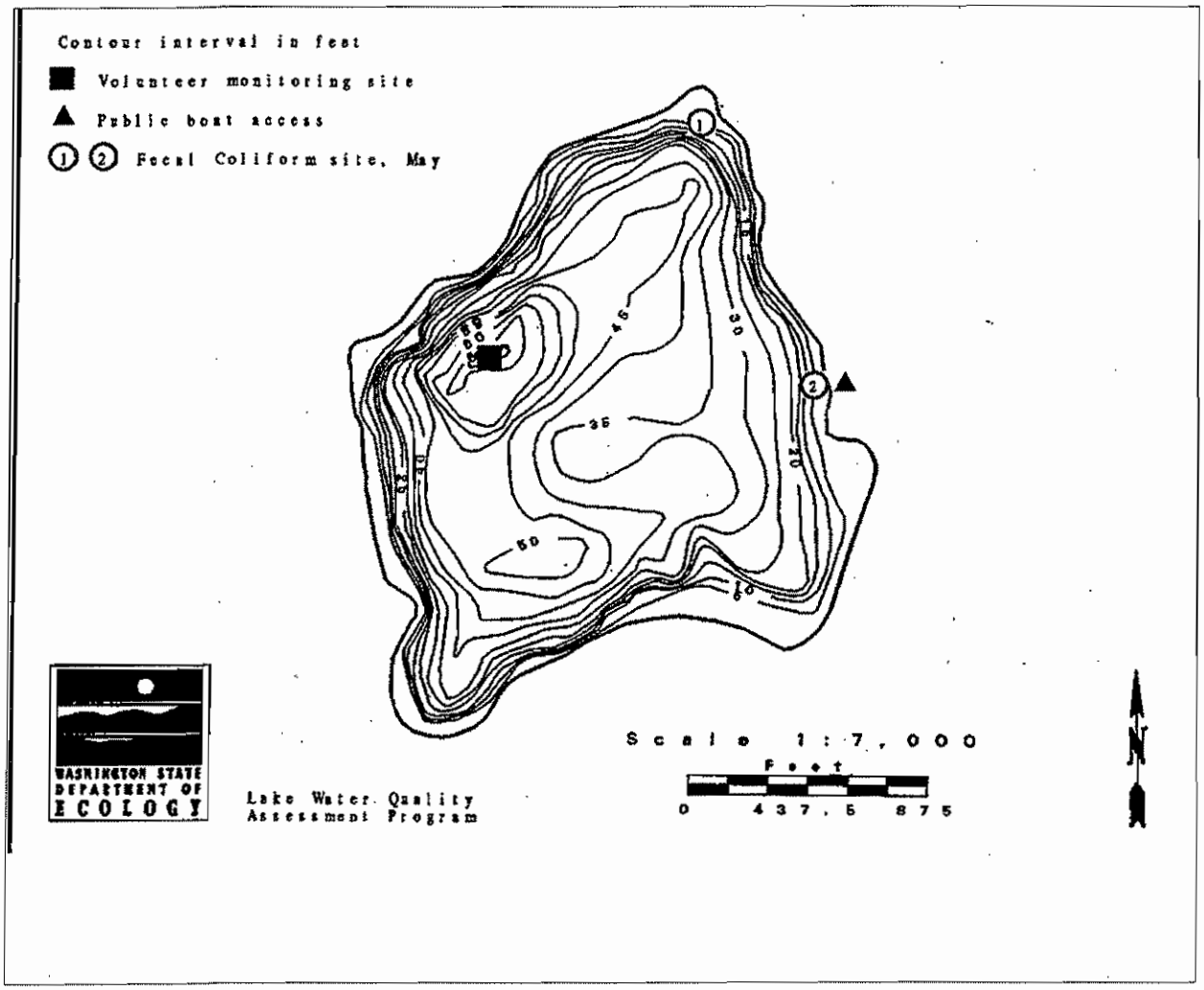

Depth (m)
0
5
10
15
20
7.5
8.0
8.5
9.0
9.5
pH


0
5
10
15
20
410
420
430
440
450
460
470
480
Sp. conductivity (µS)

LAKECOUNTY WARD (THURSTON)

DESCRIPTION Ward Lake is located 2.5 miles south of Olympia, in a kettle depression. It is spring-fed, and has no surface outlets. It is within the Deschutes River watershed.

AREA (acres)	65
MAX DEPTH (feet)	67
MEAN DEPTH (feet)	33
DRAINAGE (square miles)	0.9
VOLUME (acre-feet)	2100
SHORE LENGTH (miles)	1.36
ALTITUDE (feet)	123



WARD LAKE -- THURSTON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev. Comments
STATION 1										
97/04/15	12.2	54.0		Grn-brown	100	Mod	Calm	16.0	96.0	VERY DIRTY GREEN. WATER SECOND HIGHEST SINCE 1946.
97/05/01	13.3	55.9		Undefined	0	Heavy	Breezy	17.5	98.0	WATER COLOR IS DIRTY GREEN. TREE POLLEN SUSPENDED IN THE WATER COLUMN.
97/05/13	18.9	66.0		Milky-grn	0	None	Calm	21.5	98.0	FIRST GOOD DEPTH READING THIS YEAR. 104 INCHES DIFFERENT FROM LOWEST READING TO NOW.
97/06/16	21.1	70.0		Pea-green	100	None	Breezy	13.0	99.0	TOO ROUGH FOR GOOD DEPTH MEASUREMENT, OR SECCHI READINGS
97/07/01	20.0	68.0		Undefined	100	Light	Breezy	13.0	98.0	WATER WAS A DIRTY CLOUDY GREEN, BUT TOO ROUGH TO MEASURE ACCURATELY.
97/07/15	22.2	72.0		Undefined	7	None	Breezy	16.5	0.0	DIRTY GREEN, LITE FISHING AND SWIMMING -- 18 GEESE LAST CARD TILL 9/1
97/09/01	23.3	73.9		Undefined	10	Light	Light	0.0	0.0	WATER WAS A DIRTY GREEN. NO DIPS FOR 8/1 - 8/15.
97/09/15	20.0	68.0		Undefined	100	Heavy	Strong	16.5	77.0	WATER WAS DIRTY GREEN COLOR. TOO WINDY FOR GOOD DEPTH MEASURMENT.
97/10/01	16.7	62.1		Undefined	100	Heavy	Breezy	13.0	82.0	WATER WAS A DIRTY GREEN COLOR. ALL READINGS TAKEN FROM THE DOCK BECAUSE THE WATER WAS TOO ROUGH TO TAKE THE BOAT OUT.
97/10/15	15.6	60.1		Undefined	0	Trace	Light	17.3	82.0	WATER WAS A DIRTY GREEN COLOR.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)

There are no LWQA Program chemistry data for this lake in 1997.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***Not Available***. No specific problems were listed.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***NO***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?

Changes since last year?

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-2-97 Highest water level since 1946, so high that macrophytes aren't observed.

There has been a lack of mallards and widgeons and also fewer geese this winter. There was a pair of loons spotted this winter.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	37 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	0 (Not assessed)
Mean Trophic State Index (Chlorophyll a):	0 (Not assessed)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Ward Lake is an oligotrophic lake with depleted DO concentrations in the hypolimnion. Because the water is tannin in coloration, it is assumed that some or most of the oxygen demand in the hypolimnion is chemical in nature and not necessarily biological. All TSI values support an oligotrophic assessment.

TSI values for chlorophyll and total phosphorus were supplied by Thurston County Environmental Health as were the DO profiles.

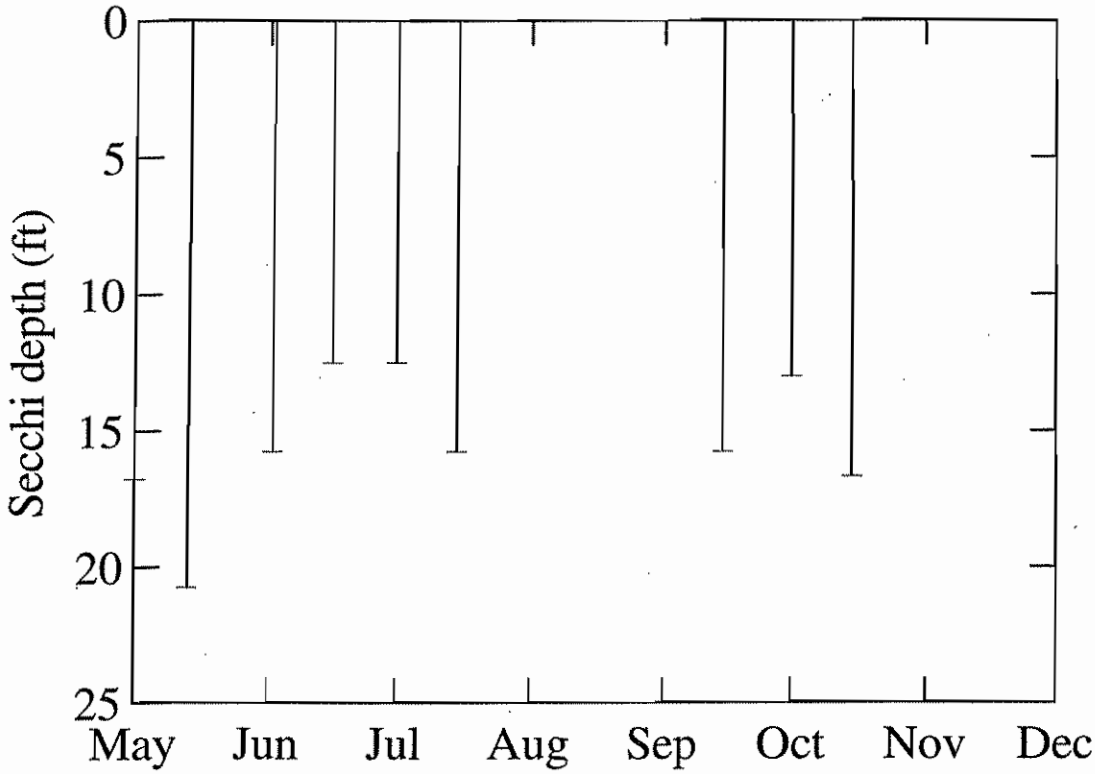
COMMENTS FROM 98/07/06 AQUATIC PLANT SURVEY

partly cloudy, light breeze, bullfrogs, sparse plant cover - mostly Nymphaea. Shoreline drops steeply in most areas, plant community pretty homogeneous. Conducted habitat survey for Kirk Smith. Maximum depth of plant growth: 6.0M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Callitriche sp. (water-starwort) *Callitriche stagnalis* (pond water-starwort) *Iris pseudacorus* (yellow flag) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Scirpus sp.* (bulrush) *Typha sp.* (cat-tail) *Utricularia sp.* (bladderwort)

WARD



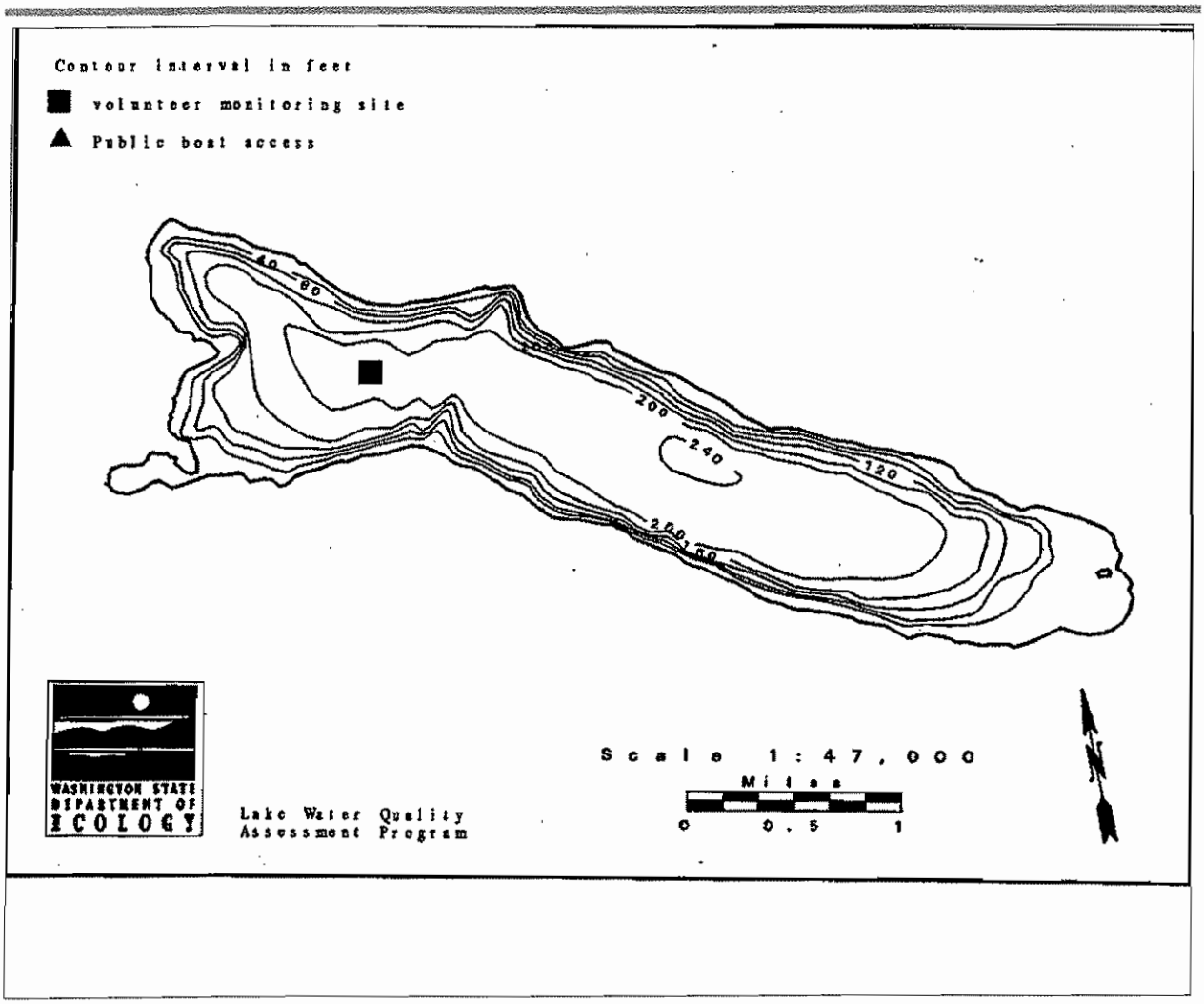
SEASON

× Summer
○ Spring

LAKECOUNTY WENATCHEE (CHELAN)

DESCRIPTION Lake Wenatchee is a large, steep-sided lake located 15 miles north of Leavenworth in the Wenatchee National Forest. It is fed principally by the Little Wenatchee River and the White River, and drains to the Wenatchee River. There is a large wetland at the northeast end of the lake.

AREA (acres)	2480
MAX DEPTH (feet)	244
MEAN DEPTH (feet)	147
DRAINAGE (square miles)	273.
VOLUME (acre-feet)	360000
SHORE LENGTH (miles)	13.3
ALTITUDE (feet)	1875



WENATCHEE LAKE -- CHELAN COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/06/18	13.3	55.9		Lt Brown	0	None	Strong	20.0	0.0	WIND WAS CALM IN THE MORNING AND STRONG IN THE AFTERNOON.
97/07/03	14.7	58.5		Undefined	0	None	Light	19.0	0.0	WATER IS COLORED LIGHT GREENISH BROWN.
97/07/16	15.0	59.0		Undefined	50	Light	Light	16.0	0.0	LOTS OF DUST ON THE WATER. STIRRED UP BY THE WIND. LATE SPRING CONDITIONS 25-30 DAYS BEHIND SCHEDULE.
97/07/28	15.6	60.1		Lt Green	0	None	Calm	18.0	0.0	WATER GETS DUST ON SURFACE WHEN WINDY. DUST ON BOTTM FROM STORM IN '95
97/08/15	16.7	62.1		Lt Green	0	None	Calm	22.6	0.0	
97/08/29	15.0	59.0		Undefined	90		Calm	26.0	0.0	WATER WAS LIME GREEN.
97/09/01	16.7	62.1		Lt Green	0	None	Calm	26.0	0.0	
97/09/17	16.1	61.0		Lt Green	10	Light	Calm	27.5	0.0	
97/09/29	15.6	60.1		Lt Green	0	Light	Calm	26.5	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/27	E	4			1U	2				
97/05/27	H	6								
97/08/29	E	5		1.7J						
97/08/29	H	4								

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. The worst problems were reported as:

1. high water levels

Sources of actual or potential problems includes:

NONE

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore?~ ***170***

Changes since last year? ***NONE***

Lake Uses and Facilities at the lake include:
swimming fishing motor boating jet skiing camping hunting picnic facilities parks

The percent of the lakeshore that is sewered: ***100***
The number of storm drains leading to the lake: ***0***
Motor boat restrictions include: ***no wake restriction 4 MPH UP RIVERS - WHITE AND LITTLE WENATCHEE.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

According to volunteer: Peak water levels occured 29May97 at 3ft higher than normal high water; Lake was sewered in ~1989; in 1995, flooding overflowed and flooded septic tanks which have since been sealed to prevent a reoccurance. High winds and rain prior to summer sampling; water level higher than normal and lake cooler than normal this year.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	32 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	27 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	36J* (Oligotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

All data and observations support an oligotrophic assessment.

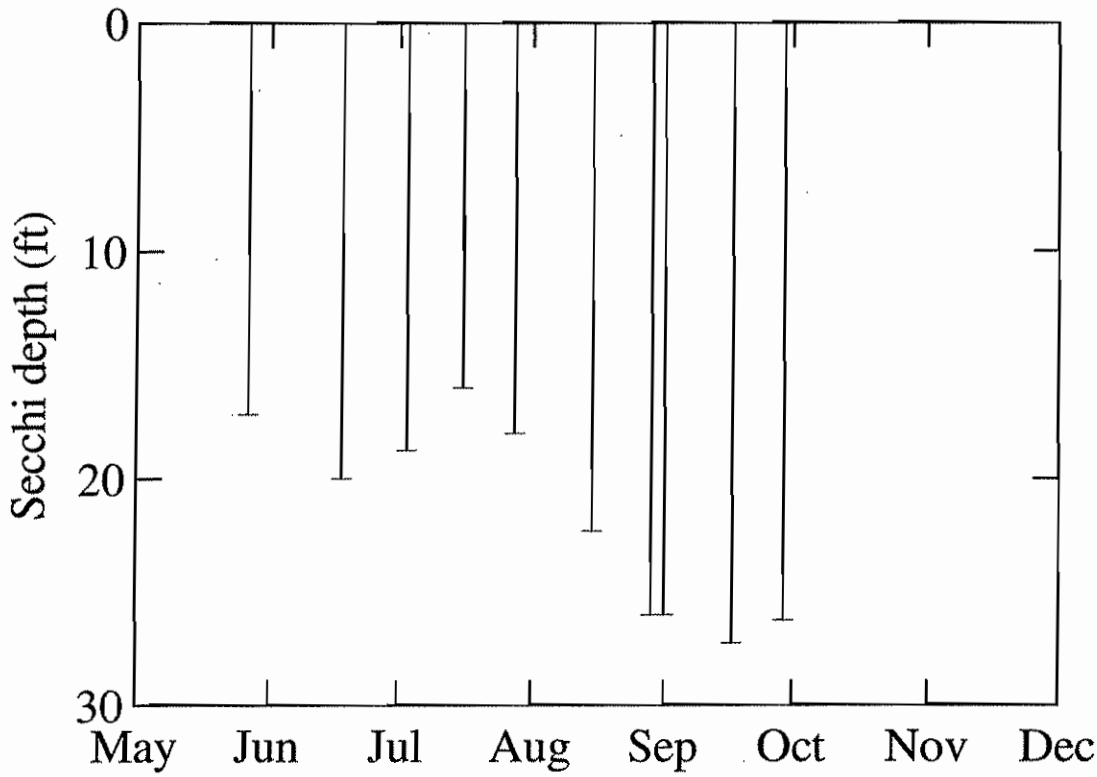
COMMENTS FROM 94/09/01 AQUATIC PLANT SURVEY

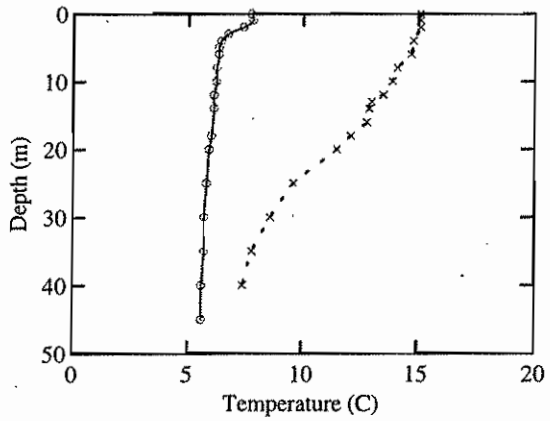
sunny, windy by afternoon. boated along entire western shore, and walked along part of the eastern shore. Maximum depth of plant growth: 5.0M.

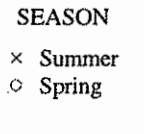
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

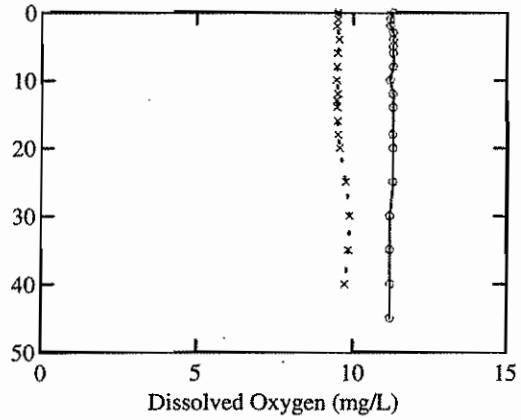
Eleocharis sp. (spike-rush) *Elodea canadensis* (common elodea) *Elodea nuttallii* (Nuttall's waterweed) *Elodea sp.* (waterweed) *Equisetum sp.* (horse tail) *Isoetes sp.* (quillwort) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Myriophyllum sp.* (water-milfoil) *Nitella sp.* (stonewort) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Potamogeton epihydrus* (ribbonleaf pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Ranunculus aquatilis* (water-buttercup) *Sparganium angustifolium* (narrowleaf bur-reed) *Subularia aquatica* (awlwort) *unknown plant* (unknown)

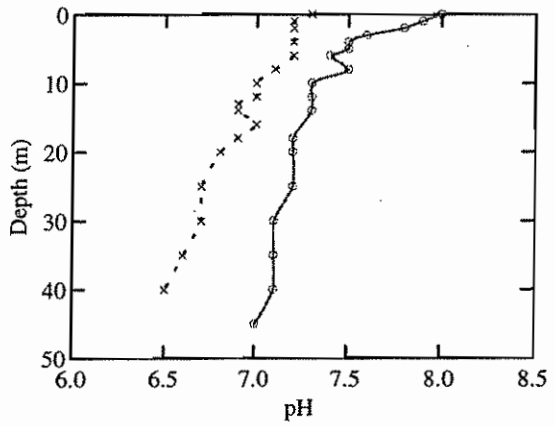
WENATCHEE

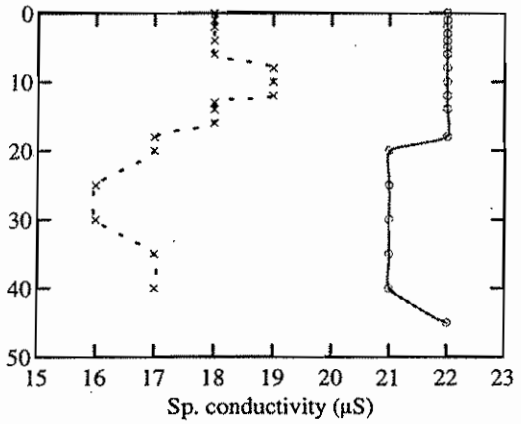

Secchi depth (ft)
0
10
20
30
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
40
50
0
5
10
15
20
Temperature (C)


SEASON
Summer
Spring

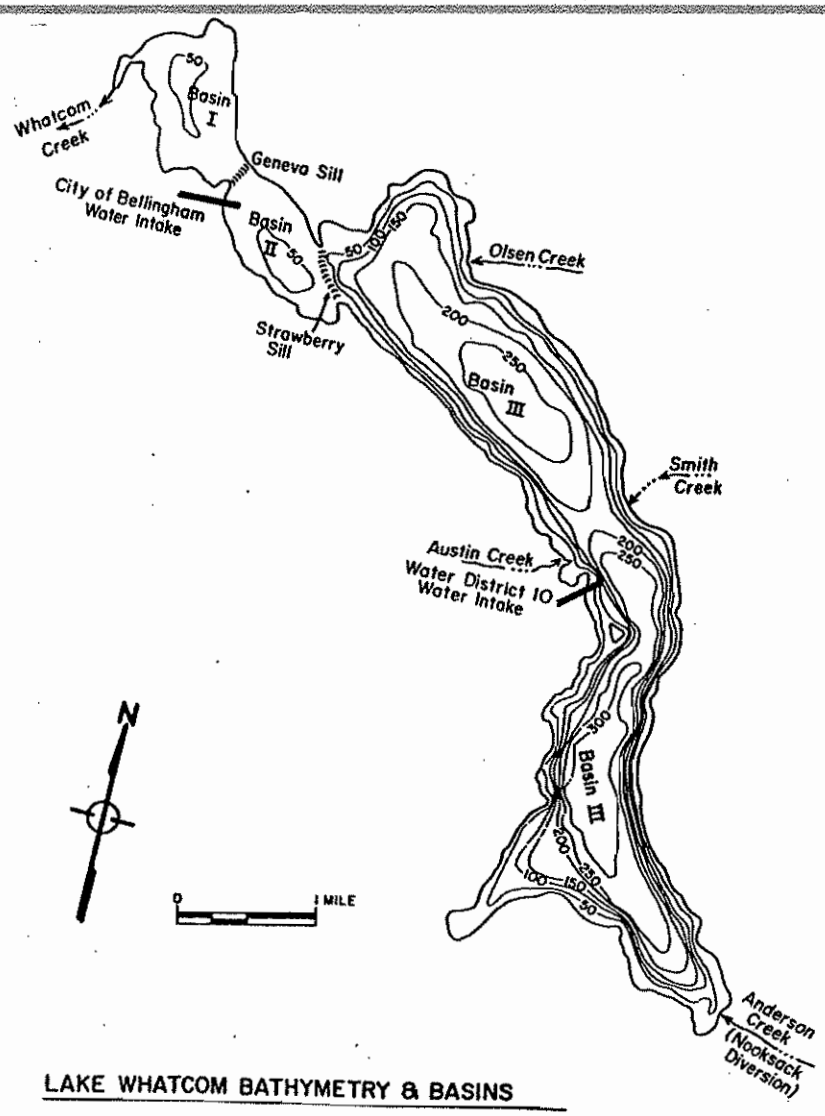

0
10
20
30
40
50
0
5
10
15
Dissolved Oxygen (mg/L)


Depth (m)
0
10
20
30
40
50
6.0
6.5
7.0
7.5
8.0
8.5
pH


0
10
20
30
40
50
15
16
17
18
19
20
21
22
23
Sp. conductivity (µS)

DESCRIPTION

AREA (acres)	5000
MAX DEPTH (feet)	330
MEAN DEPTH (feet)	154
DRAINAGE (square miles)	55.
VOLUME (acre-feet)	767700
SHORE LENGTH (miles)	26.52
ALTITUDE (feet)	315



LAKE WHATCOM BATHYMETRY & BASINS

WHATCOM LAKE -- WHATCOM COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/09/10					90	Trace	Light	14.8	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 3										
97/06/11	E	7	0.32J		26	2	0.9			
97/06/11	H	4	0.40J							
97/09/10	E	6	0.15	3.8	18	6	0.9			
97/09/10	H	20	0.20							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-11-97 Collection site at the orange buoy in the northern basin. Fec#1 collected at the east end of the swimming area; Fec#2 collected at the boat launch.

9-10-97 No H2S odor detected in the hypolimnion eventhough it was near anoxic.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	38N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	30 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	44 (Mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although low in phosphorus, Lake Whatcom apparently is productive. High chlorophyll concentrations and a severely DO depleted hypolimnion support the mesotrophic assessment for the northern basin of the lake. This survey does not assess the

remaining two basins in the lake.

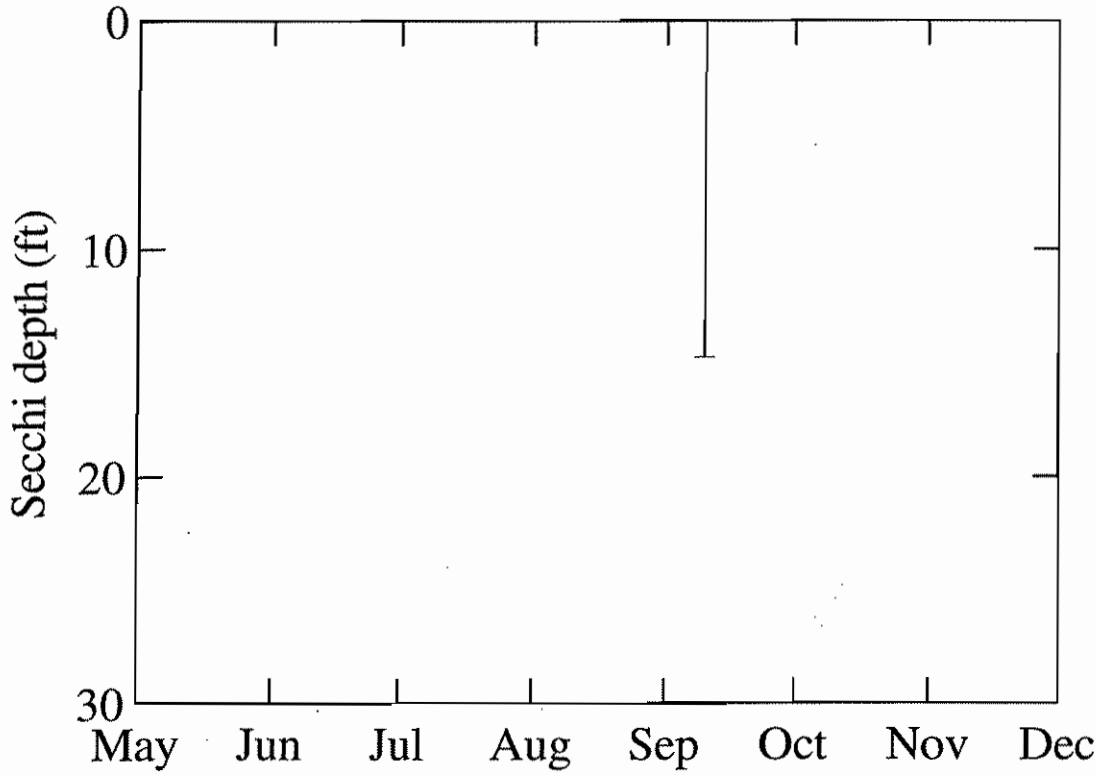
COMMENTS FROM 95/06/21 AQUATIC PLANT SURVEY

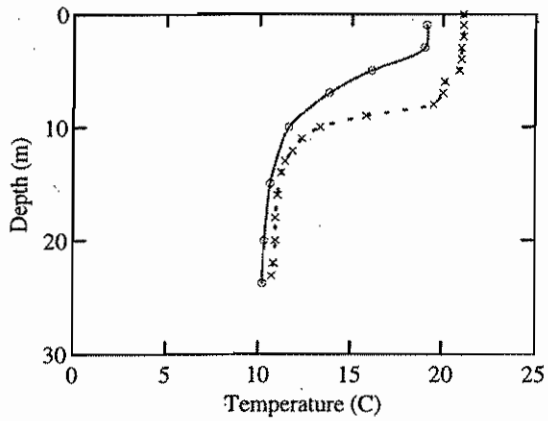
cloudy, canm. Hard to see into the water, early season. Plants not surfacing. Only circumnavigated the shallow basin, west end. Thick patches of milfoil in moderately deep water Maximum depth of plant growth: 4.5M.

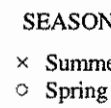
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

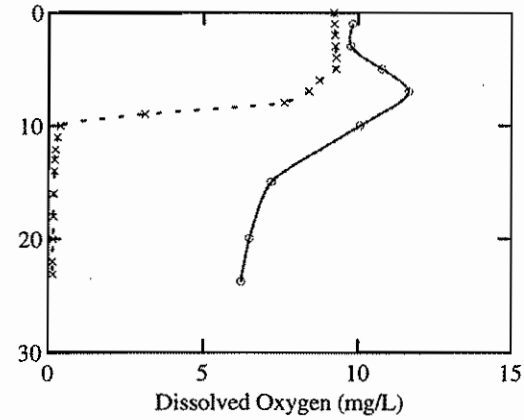
Elodea sp. (waterweed) *Myriophyllum spicatum* (Eurasian water-milfoil) *Najas flexilis* (common naiad) *Nitella sp.* (stonewort) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton sp.* (pondweed)

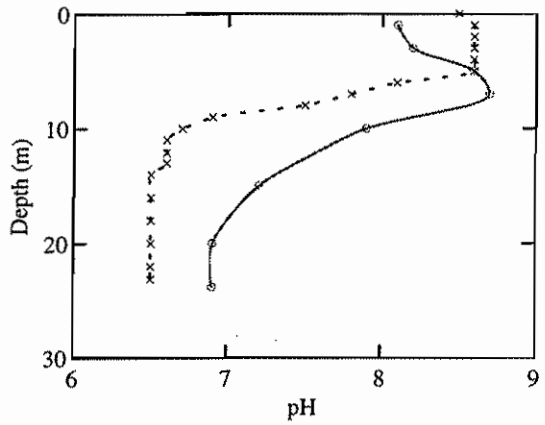
WHATCOM

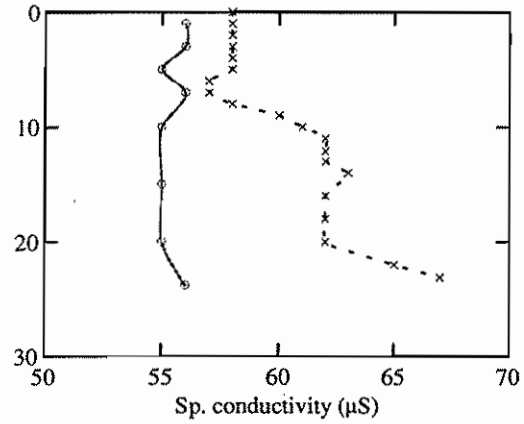

Secchi depth (ft)
0
10
20
30
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
10
20
30
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring


0
10
20
30
0
5
10
15
Dissolved Oxygen (mg/L)


Depth (m)
0
10
20
30
6
7
8
9
pH


0
10
20
30
50
55
60
65
70
Sp. conductivity (µS)

WILDCAT

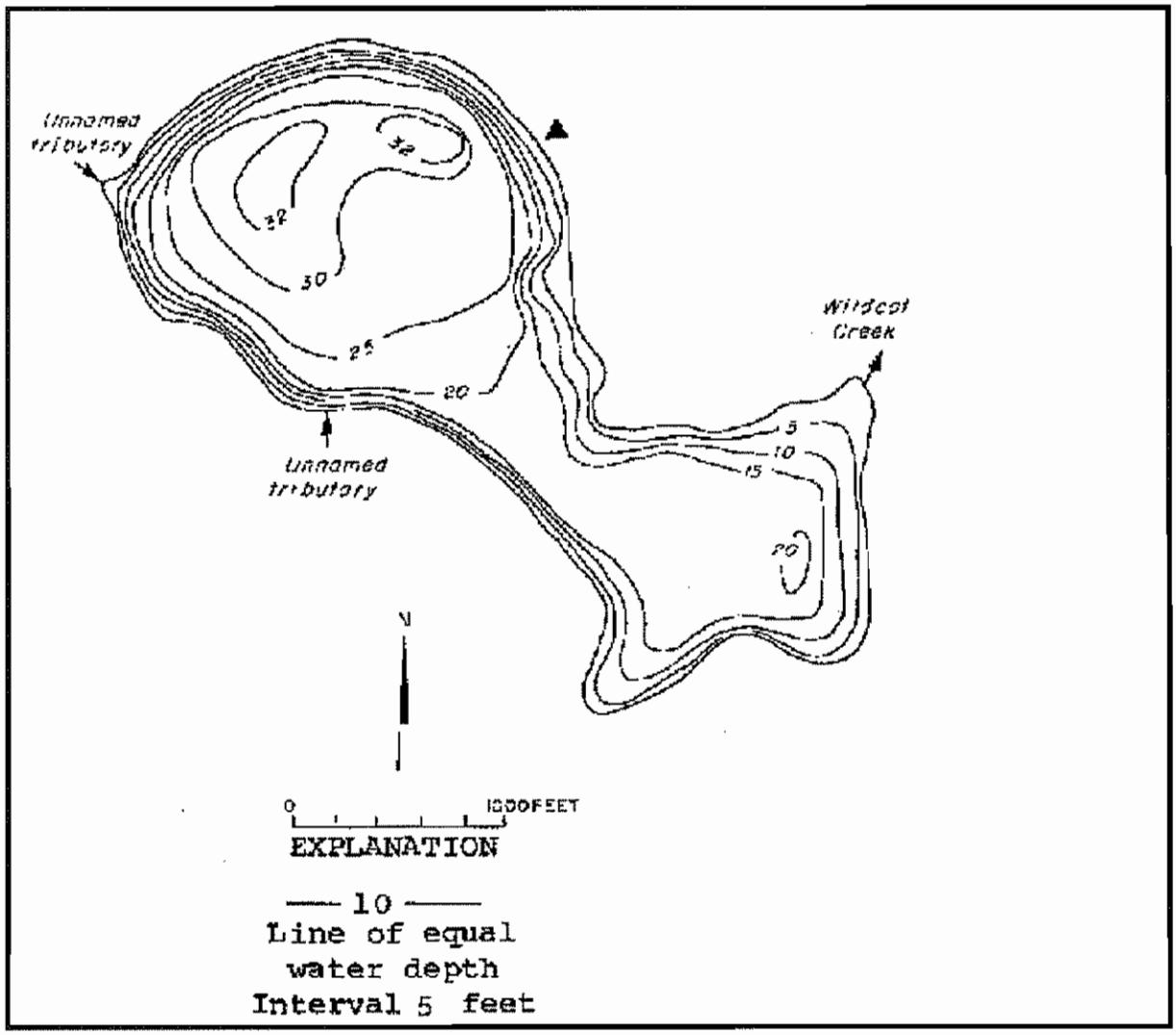
KITSAP County

Lake ID: WILK11

Ecoregion: 2

Wildcat Lake is located six miles northwest of Bremerton. It is fed by two inlets, and drains via Wildcat Creek to Dyes Inlet.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
120	33	18	3	
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
2200	2.24	377	47 35 59.	122 45 35.



WILDCAT LAKE -- KITSAP COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/07/04	24.4	75.9		Mod Green	0	None	Calm	15.0	-1.5	WEEDS OUT TO 12' DEPTH. BASS FRY 2". NEED pH KIT.
97/07/27	24.4	76.0		Mod Green	0	None	Breezy	15.0	-4.0	
97/08/26				Lt Green	100	Trace		19.3	0.0	

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/09	E	6	0.10J							
97/06/09	H	10	0.28J							
97/08/26	E	10	0.14	2.4						
97/08/26	H	16	0.15							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-9-97 Lots of freshwater clams. Many turtles observed. Lots of bass fry along the shoreline. Water was extremely high over the winter--highest in 15 years. Lots of zooplankton.

8-26-97 Very rainy and cloudy.

TROPHIC STATUS

Estimated Trophic State:	Oligo-mesotrophic
Mean Trophic State Index (Secchi):	37N* (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	38 (Oligo-mesotrophic)
Mean Trophic State Index (Chlorophyll a):	39 (Oligo-mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

TSI values for Wildcat Lake suggest a lake that is not very productive, however, low summertime hypolimnetic DO concentrations are indicative of a lake that is more eutrophic than the TSI values might imply. Wildcat Lake is assessed as oligo-mesotrophic.

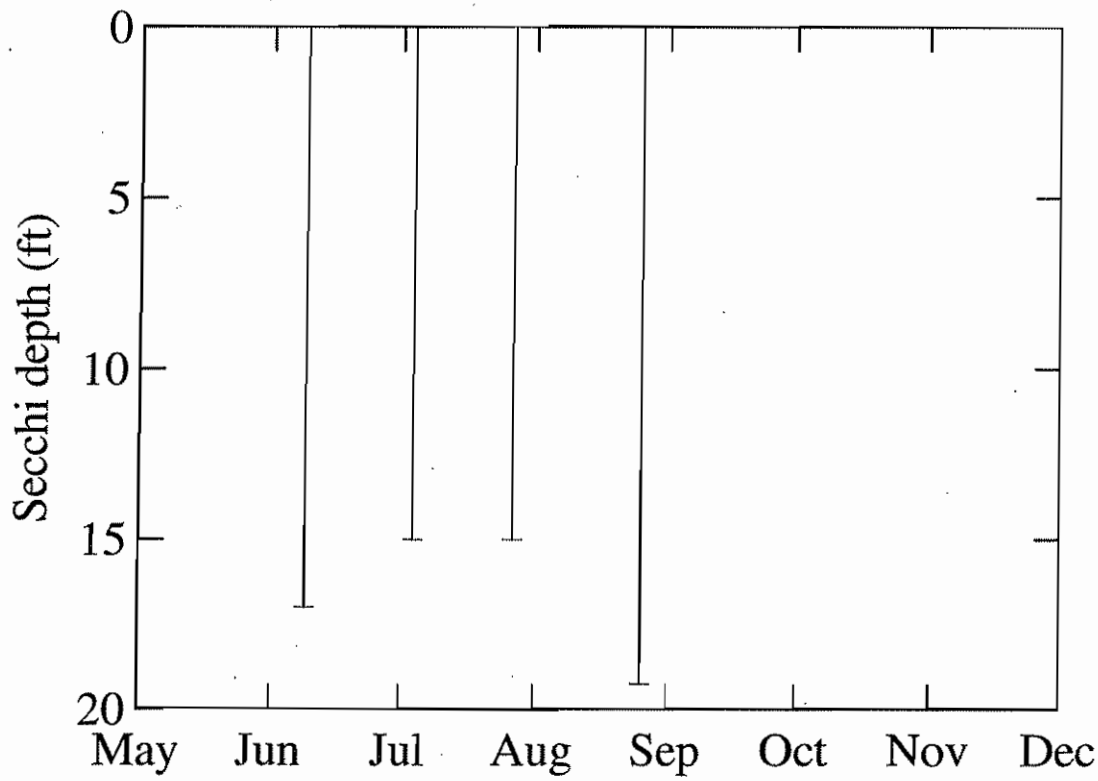
COMMENTS FROM 98/08/20 AQUATIC PLANT SURVEY

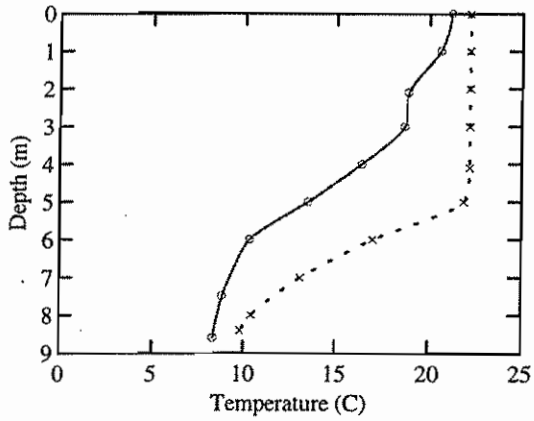
Sunny, calm. Popular fishing area, many people swimming at parks, and camps. Clear water. Sediments bare gravel/muck in sime areas, but most areas with macrophyte growth. Did habitat survey for Kirk Smith. Observed many bass in the shallows, kingfisher, bullfrog.

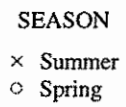
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

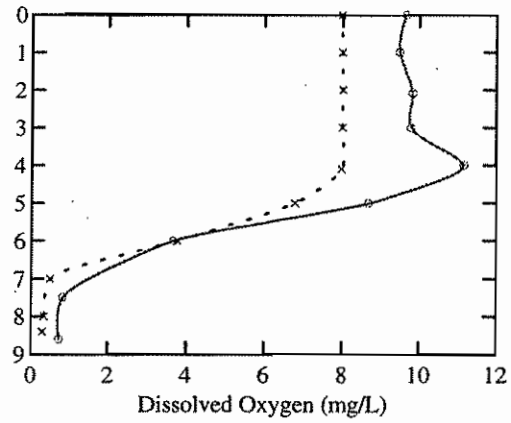
Brasenia schreberi (watershield) *Carex sp.* (sedge) *Ceratophyllum demersum* (Coontail; hornwort) *Chara sp.* (muskwort) *Dulichium arundinaceum* (Dulichium) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Iris pseudacorus* (yellow flag) *Isoetes lacustris* (lake quillwort) *Isoetes sp.* (quillwort) *Juncus sp.* (rush) *Juncus sp. or Eleocharis sp.* (small grass-like plants) *Mentha piperita* (peppermint) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton gramineus* (grass-leaved pondweed) *Potamogeton praelongus* (whitestem pondweed) *Potamogeton robbinsii* (fern leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potamogeton zosteriformis* (eel-grass pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Ranunculus flammula* (creeping buttercup) *Typha latifolia* (common cat-tail) *Typha sp.* (cat-tail) *Utricularia vulgaris* (common bladderwort) *Vallisneria americana* (water celery)

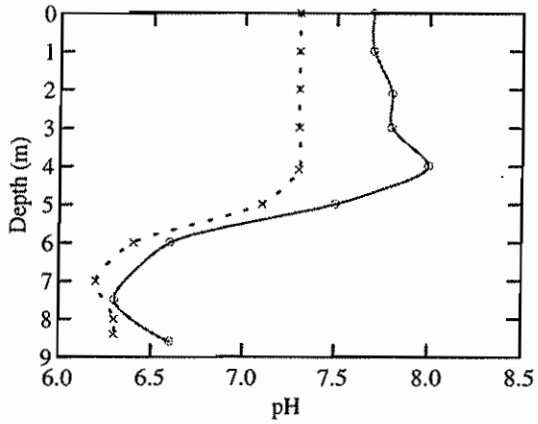
WILDCAT

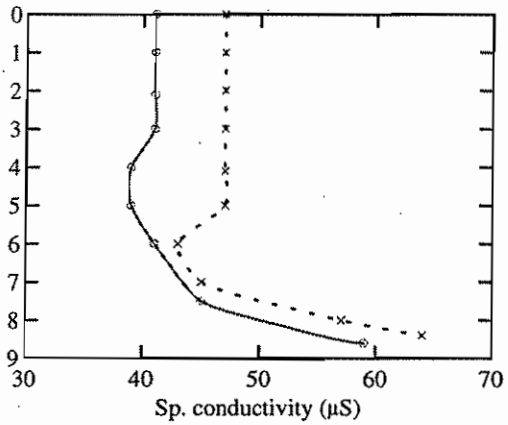

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring


Dissolved Oxygen (mg/L)

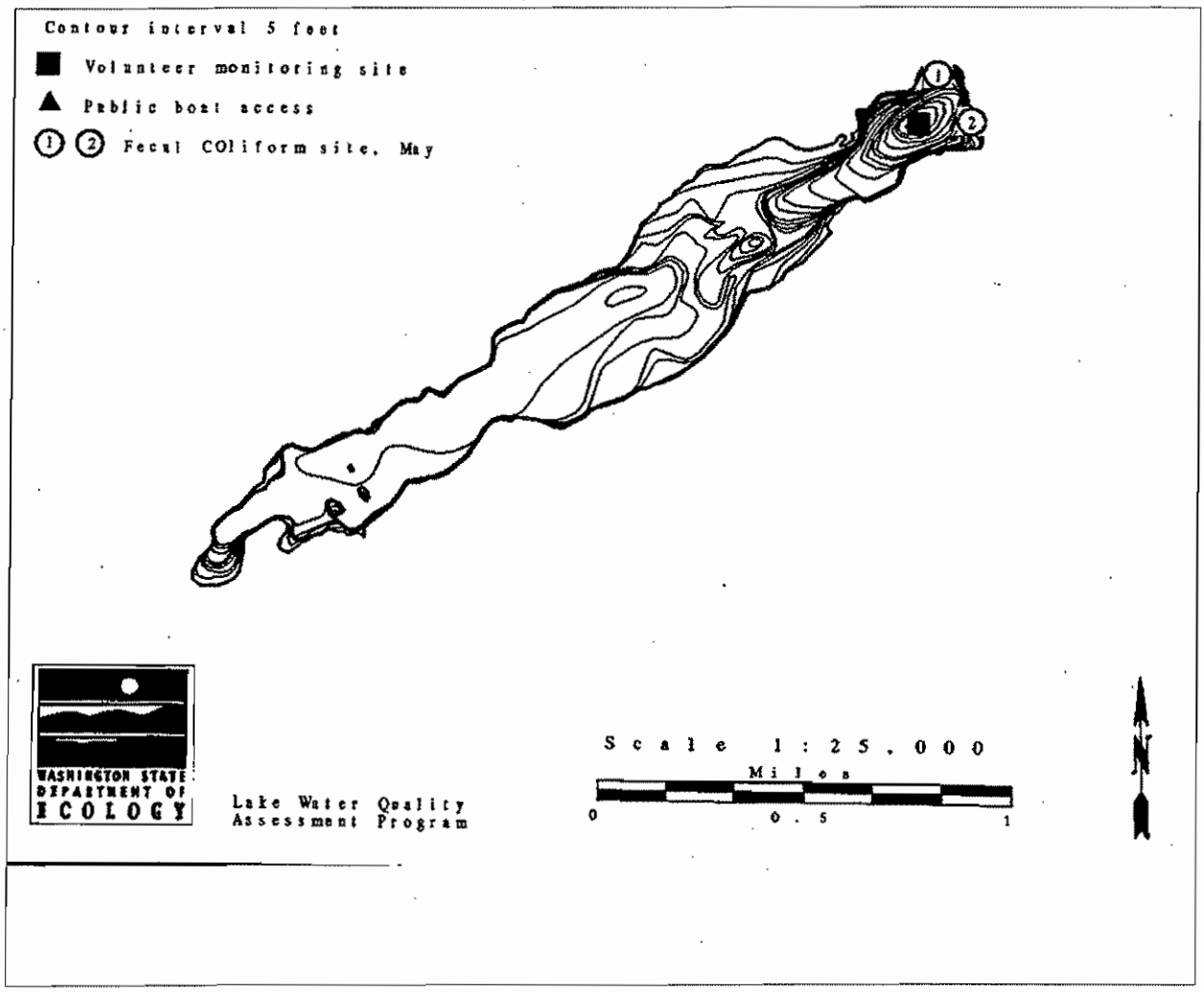

Depth (m)
pH


Sp. conductivity (µS)

LAKECOUNTY WILLIAMS (SPOKANE)

DESCRIPTION Williams Lake is located 11.5 miles southwest of Cheney and 12.5 miles east of Sprague. The inflow is intermittent. The outlet, which flows only during high water, drains to Downs Lake and the Palouse River.

AREA (acres)	320
MAX DEPTH (feet)	120
MEAN DEPTH (feet)	37
DRAINAGE (square miles)	21.
VOLUME (acre-feet)	12000
SHORE LENGTH (miles)	5.3
ALTITUDE (feet)	2052



WILLIAMS LAKE -- STEVENS COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev.	Comments
STATION 1											
97/05/30				Lt Green	100	Trace	Calm	15.5	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/30	E	13	0.54							
97/05/30	H	208J	1.48							
97/08/26	E	17	0.39	2.1J						
97/08/26	H	68	0.76							

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

According to volunteer: rotenone treatment Fall 96 with some harvest of dead fish, currently there are no fish in the lake; lake is spring fed; lake height doesn't vary much annually; more rain than normal in May and June, but little afterwards except Sunday prior to summer sampling. No immediate development on lake, 2 houses set back. Wetland at south end. Inlet stream is well-shaded, though runs through pastures, and may run underground at lower end. Lake bottom sediments are soft. Spring sampling: Pronounced oxygen peak between 4 and 5M, 6 and 9M samples black-tinted with strong H2S smell; no zooplankton apparent; aerator near access off. Fall sampling: 10M sample yellow, lots of Chaoborus, H2S smell; large Daphnia in 1-4M samples.

TROPHIC STATUS

Estimated Trophic State:	Mesotrophic
Mean Trophic State Index (Secchi):	38N* (Oligo-mesotrophic)
Mean Trophic State Index (Total Phosphorus):	45 (Mesotrophic)
Mean Trophic State Index (Chlorophyll a):	38J* (Oligo-mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Both Secchi and Chlorophyll TSIs are not adequate enough to accurately assess Williams Lake. Phosphorus and hypolimnetic DO concentrations suggest a moderately productive lake. Williams Lake is assessed as mesotrophic.

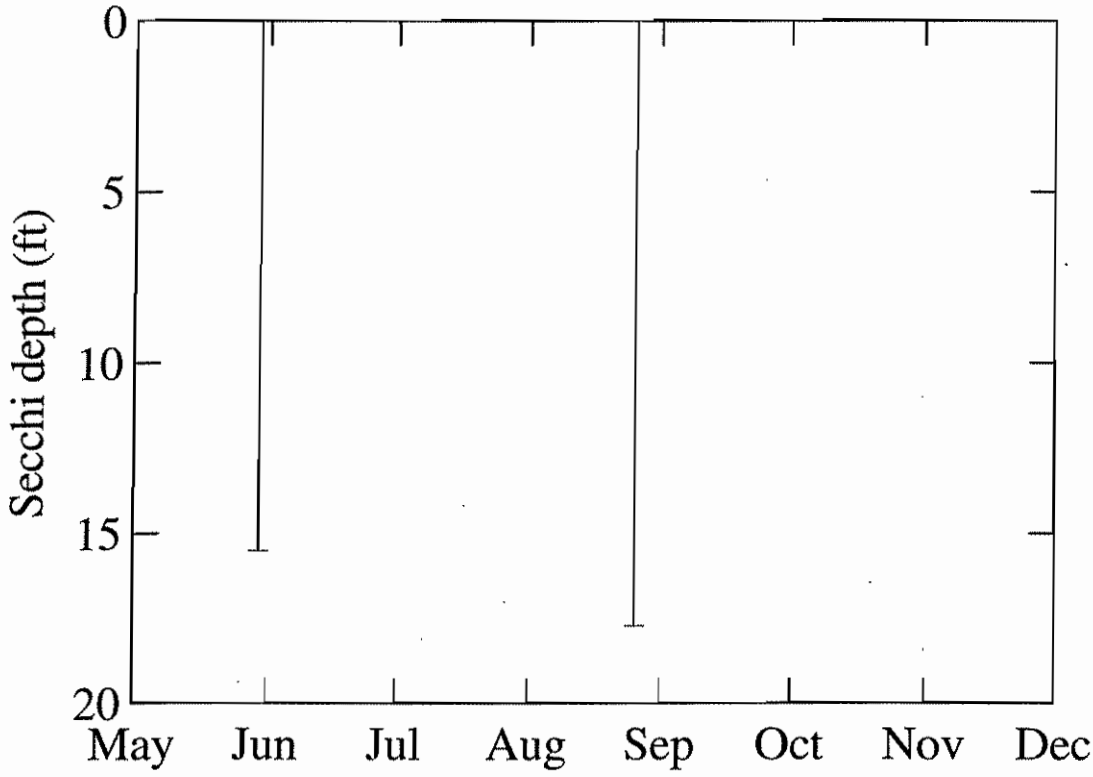
COMMENTS FROM 93/08/18 AQUATIC PLANT SURVEY

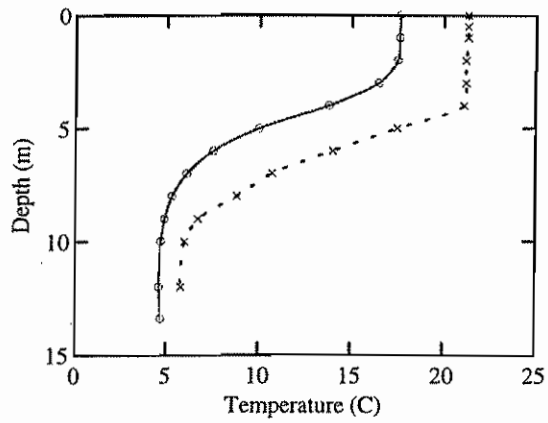
Aquatic plants were surveyed at the public access and at one to three transects around the lake. A thorough survey was not made and the list below may be incomplete.

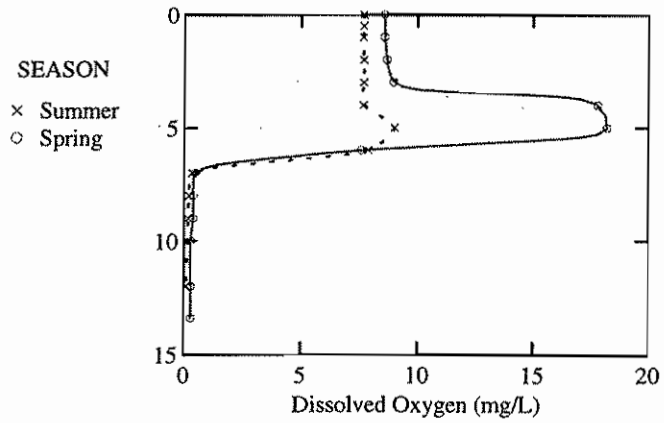
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

Chara sp. (muskwort) *Juncus sp.* (rush) *Myriophyllum sp.* (water-milfoil) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp.* (pondweed) *Typha sp.* (cat-tail)

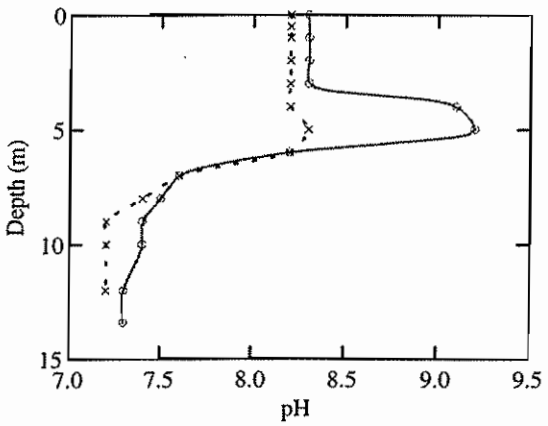
WILLIAMS

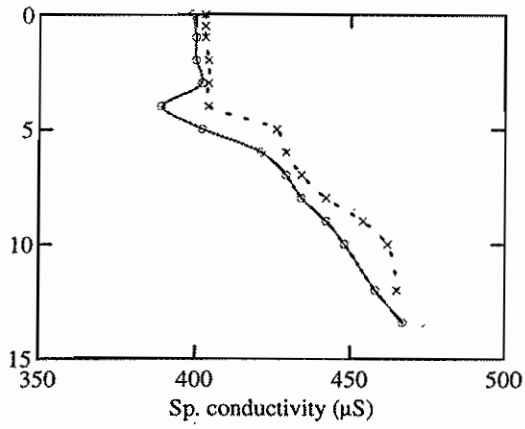

Secchi depth (ft)
0
5
10
15
20
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
0
5
10
15
0
5
10
15
20
25
Temperature (C)


SEASON
Summer
Spring

0
5
10
15
0
5
10
15
20
Dissolved Oxygen (mg/L)

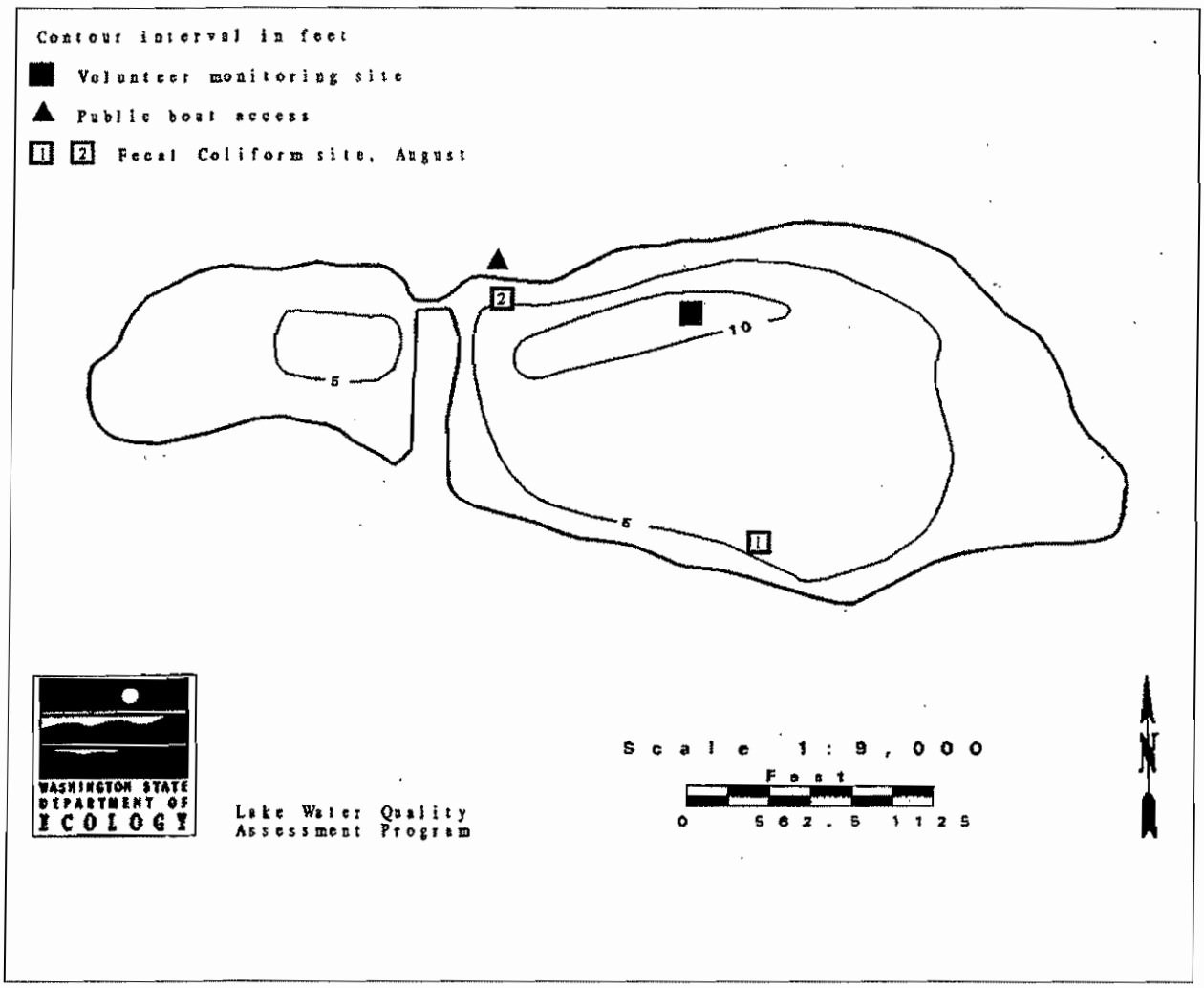

Depth (m)
0
5
10
15
7.0
7.5
8.0
8.5
9.0
9.5
pH


0
5
10
15
350
400
450
500
Sp. conductivity (µS)

LAKECOUNTY WISER (WHATCOM)

DESCRIPTION Wiser Lake is located three miles southwest of Lynden. It consists of two basin, connected by a narrow isthmus, which is crossed by Meridian Road. The lake has no surface inlets, and drains via Wiser Lake Creek to the Nooksack River. Wiser Lake was monitored by Ecology staff only.

AREA (acres)	103
MAX DEPTH (feet)	11
MEAN DEPTH (feet)	6
DRAINAGE (square miles)	3.7
VOLUME (acre-feet)	612
SHORE LENGTH (miles)	2.26
ALTITUDE (feet)	50



WISER LAKE -- WHATCOM COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	Temperature (°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht (in)	Abbrev.	Comments
STATION 1											
97/09/08				Pea-green	0	None	Light	1.7	0.0		

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turbidity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/06/11	E	58	1.02J		12	6	3.9			
97/06/11	H									
97/09/08	E	477	1.22	98.3	4	11	16.0			
97/09/08	H									

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

There was no survey response for 1997.

FIELD OBSERVATIONS OF ECOLOGY STAFF

6-11-97 Fec#1 is directly across the launch at the swimming dock; fec#2 is at the launch.

9-8-97 The blue-green bloom is horrific. No noticeable macrophyte growth in the lake--most likely due to high algal growth.

TROPHIC STATUS

Estimated Trophic State:	Eutrophic
Mean Trophic State Index (Secchi):	70N* (Eutrophic)
Mean Trophic State Index (Total Phosphorus):	93 (Eutrophic)
Mean Trophic State Index (Chlorophyll a):	76 (Eutrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Wiser Lake is a very productive lake. Blue-green blooms were quite noticeable. All TSI values and observations support an eutrophic assessment.

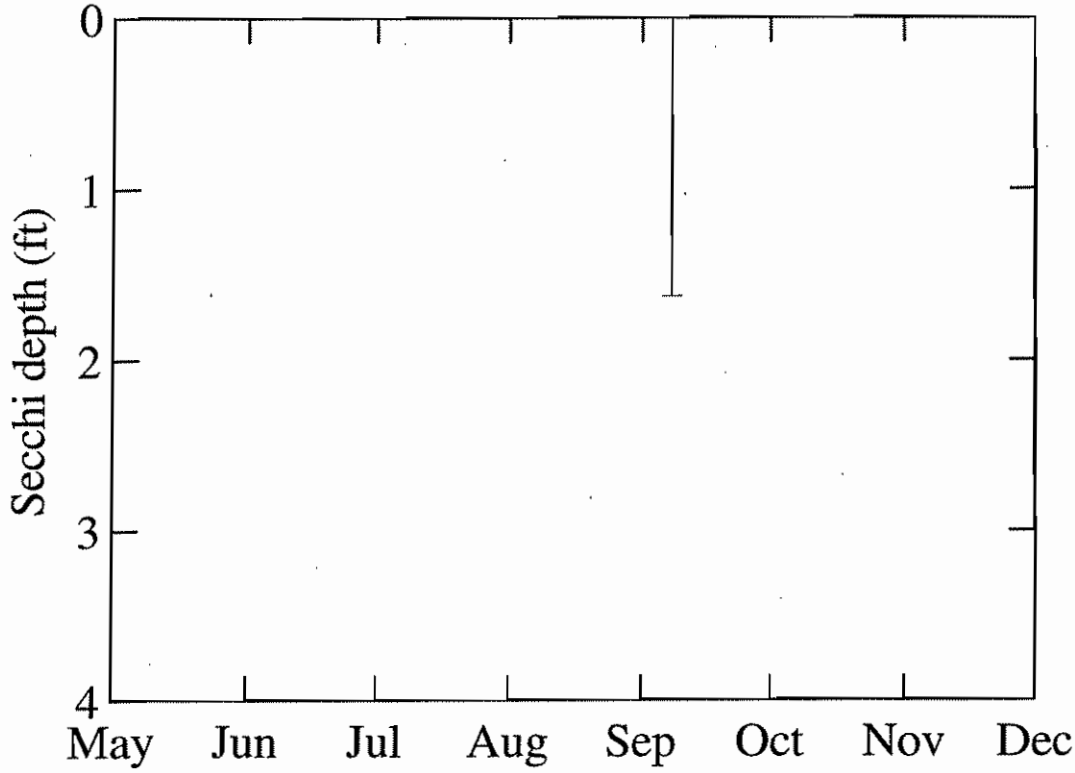
COMMENTS FROM 97/07/01 AQUATIC PLANT SURVEY

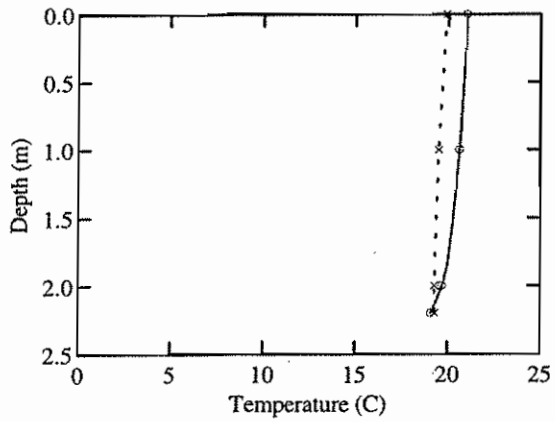
Brrr! Cloudy, breezy. Water brown / green with blue-green algae on surface and long-skinny suspended algae in water. Muddy / organic substrate. Many plants - P. crispus dominant. Bery nutrient rich. Nice riparian areas along some of shore. Water smells bad. Plants grow out far from shore, wetland area at west end. Maximum depth of plant growth: 1.5M.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

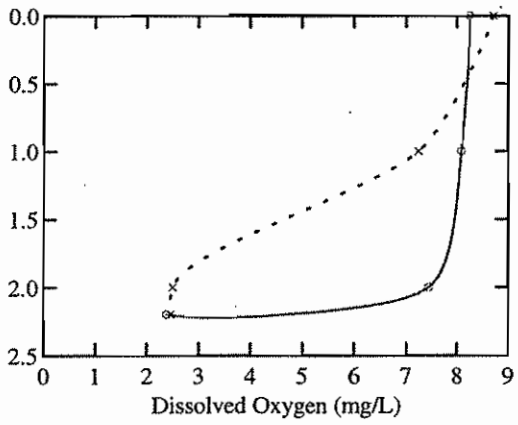
Ceratophyllum demersum (Coontail; hornwort) *Chara sp.* (muskwort) *Eleocharis sp.* (spike-rush) *Elodea canadensis* (common elodea) *Elodea sp.* (waterweed) *Epilobium hirsutum* (fiddle-grass) *Lemna minor* (duckweed) *Najas flexilis* (common naiad) *Nuphar polysepala* (spatter-dock, yellow water-lily) *Nymphaea odorata* (fragrant waterlily) *Phalaris arundinacia* (reed canarygrass) *Potamogeton crispus* (curly leaf pondweed) *Potamogeton pectinatus* (sago pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Potentilla palustris* (purple (marsh) cinquefoil) *Scirpus sp.* (bulrush) *Solanum sp.* (nightshade) *Spirodela polyrhiza* (great duckweed) *Typha sp.* (cat-tail) *unknown plant* (unknown)

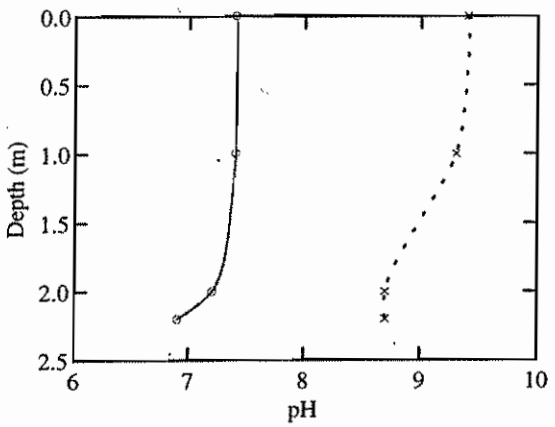
WISER

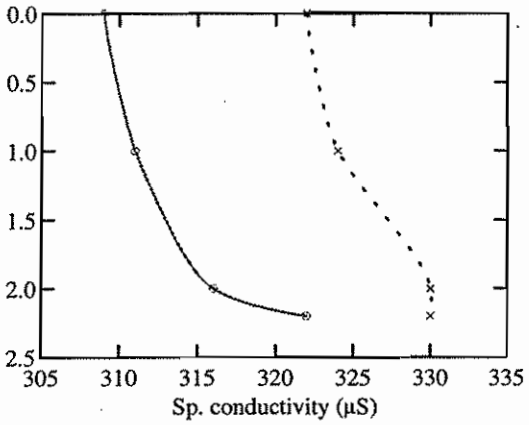




SEASON
× Summer
○ Spring



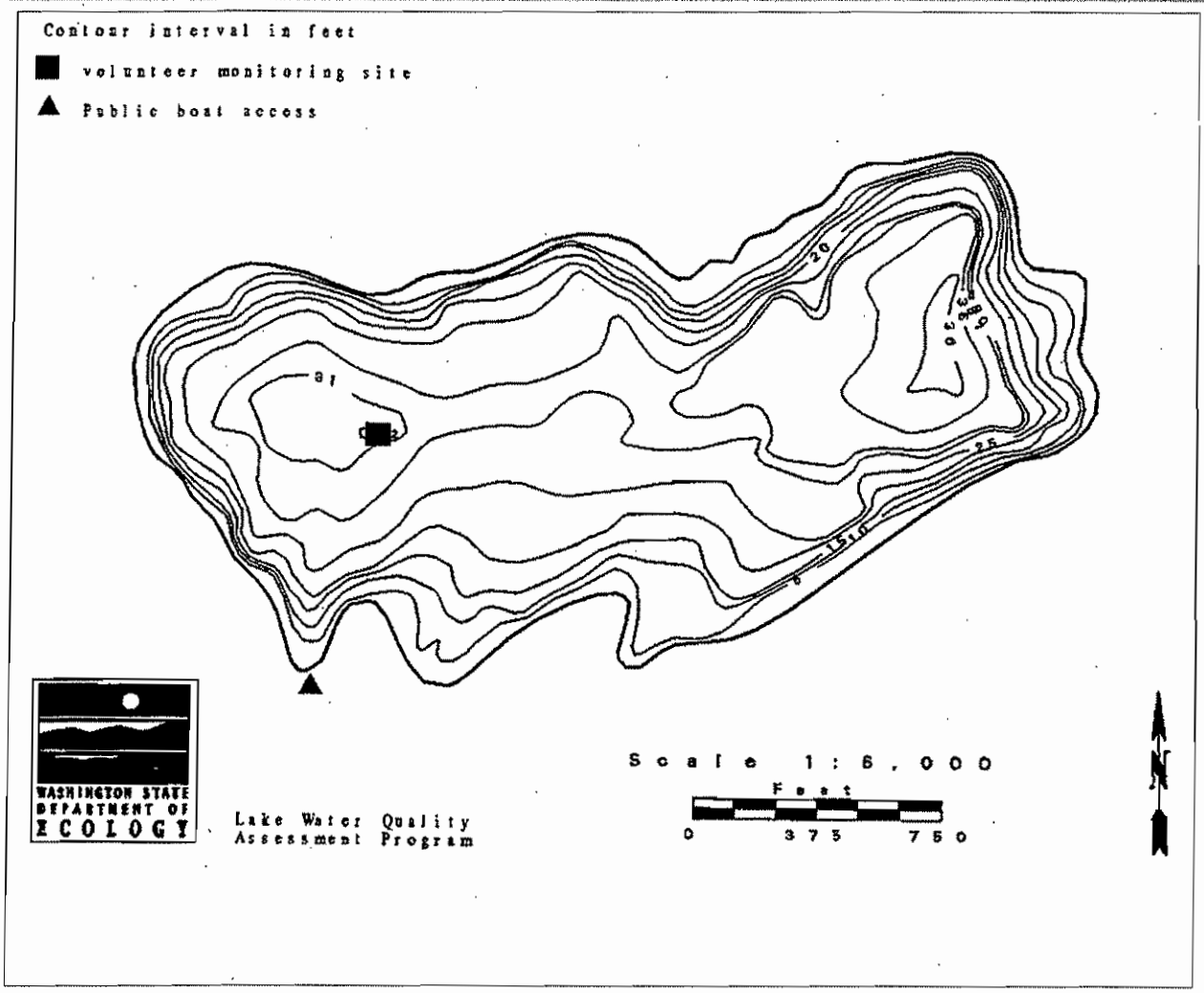




LAKECOUNTY WOOTEN (MASON)

DESCRIPTION Lake Wooten is located seven miles west of Belfair. The lake has no inlet and drains to Haven Lake and the Tahuya River.

AREA (acres)	68
MAX DEPTH (feet)	36
MEAN DEPTH (feet)	23
DRAINAGE (square miles)	0.3
VOLUME (acre-feet)	1530
SHORE LENGTH (miles)	1.55
ALTITUDE (feet)	407



WOOTEN LAKE -- MASON COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/13	18.0	64.4		Lt Green	0	None	Calm	28.0	0.0	
97/05/26	18.0	64.4		Undefined	90	Trace	Light	26.0	29.5	WATER COLOR LIGHT BLUE GREEN. FIRST TIME FOR THERMOCLINE. CHANGE IN WATER COLOR FROM LIGHT GREEN TO LIGHT BLUE-GREEN.
97/06/10	19.0	66.2		Undefined	0	None	Calm	27.5	30.5	
97/06/25	18.0	64.4		Undefined	10	Trace	Light	26.8	31.0	WATER COLOR WAS LIGHT BLUE. LAKE STILL HIGH. NO SIGN OF ALGAE. FISHING STILL GOOD.
97/07/09	20.0	68.0		Undefined	100	Heavy	Calm	25.3	29.5	BALD EAGLE PRESENT. WATER COLOR LIGHT ICE BLUE.
97/07/25	22.0	71.6		Undefined	0	None	Calm	26.5	27.0	WATER WAS LIGHT BLUE. KIDS HAVE SEEN SEVERAL TURTLES.
97/08/04	25.0	77.0		Lt Green	0	None	Calm	25.8	25.0	START OF ALGAE BLOOM.
97/08/27	22.0	71.6		Lt Green	100	Heavy	Breezy	22.5	24.0	
97/09/10	21.0	69.8		Lt Green	90	None	Light	22.0	23.0	WATER TURNING MORE GREEN THAN BLUE.
97/09/16					100	Heavy	Breezy	20.5	0.0	
97/09/23	19.0	66.2		Lt Green	0	None	Calm	17.3	27.0	LOTS OF DEAD ALGAE ON THE SURFACE AND SUSPENDED IN THE WATER.
97/10/07	16.0	60.8		Pea-green	90	Mod	Calm	13.0	30.0	LOTS OF SUSPENDED SILT (FROM LAND DEVELOPMENT) AND DEAD ALGAE.

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/26	E	4	0.08							
97/09/16	E	4	0.15	3.6						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***excellent***. No specific problems were listed.

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***NO(0)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***NO***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***68***

Changes since last year? ***TWO LOTS WERE STRIPPED CLEAR.***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-26-97 There was a fish with a white parasite in the mouth. It was a fluke-shaped flatworm. Fish was a trout about 10 to 12 inches long. The fish could have been a stocked fish from this year. About 300 brood stock planted this spring. This was the first time the volunteer can remember a thermocline. There were some daphnia in the water samples.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi):	31 (Oligotrophic)
Mean Trophic State Index (Total Phosphorus):	24 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	43 (Mesotrophic)

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Although chlorophyll concentrations suggest a moderately productive lake, all other indicators suggest a very unproductive lake, therefore, Lake Wooten is assessed as oligotrophic.

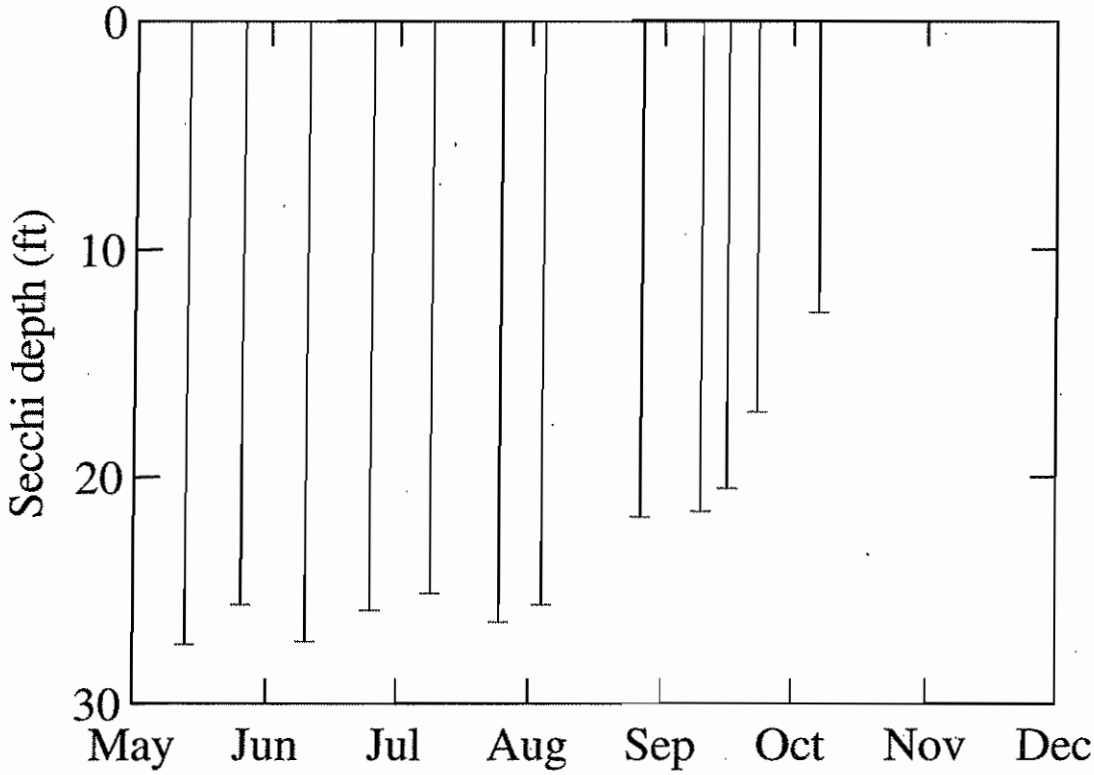
COMMENTS FROM 98/06/16 AQUATIC PLANT SURVEY

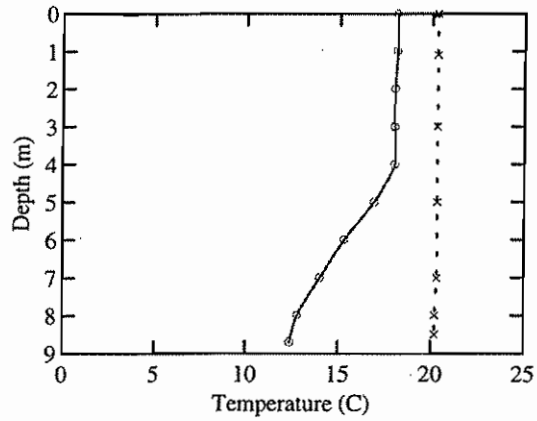
Sunny, light breeze. Shoreline mostly developed, large new homes under construction. Few submersed plants, only in more protected areas with sediment. Algae growing in a couple of spots that look suspicious - possibly spetic problems? More submersed plants observed this visit than in 1994.

AQUATIC PLANT LIST (This list may be from multiple years and sources.)

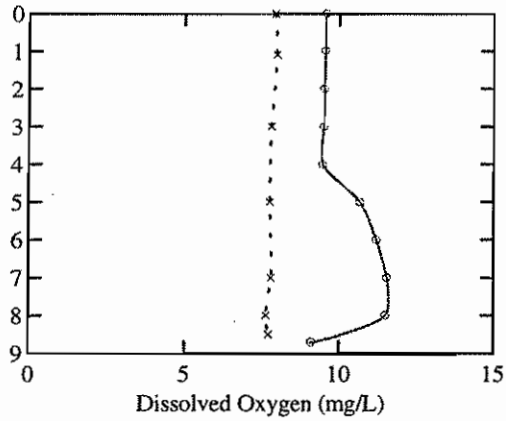
Callitriche stagnalis (pond water-starwort) *Carex obnupta* (slough sedge) *Carex sp.* (sedge) *Chara sp.* (muskwort) *Dulichium arundinaceum* (Dulichium) *Iris pseudacorus* (yellow flag) *Juncus balticus* (Baltic rush) *Juncus sp.* (rush) *Ludwigia palustris* (water-purslane) *Ludwigia sp. Nitella sp.* (stonewort) *Nymphaea odorata* (fragrant waterlily) *Potamogeton amplifolius* (large-leaf pondweed) *Potamogeton sp (thin leaved)* (thin leaved pondweed) *Typha sp.* (cat-tail)

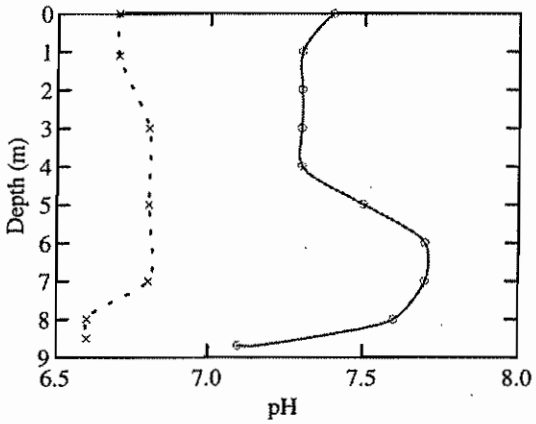
WOOTEN

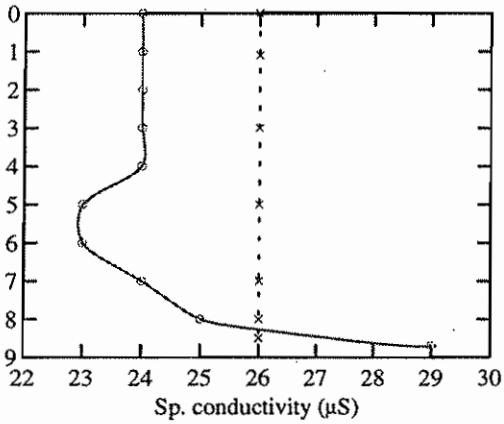




SEASON
× Summer
○ Spring



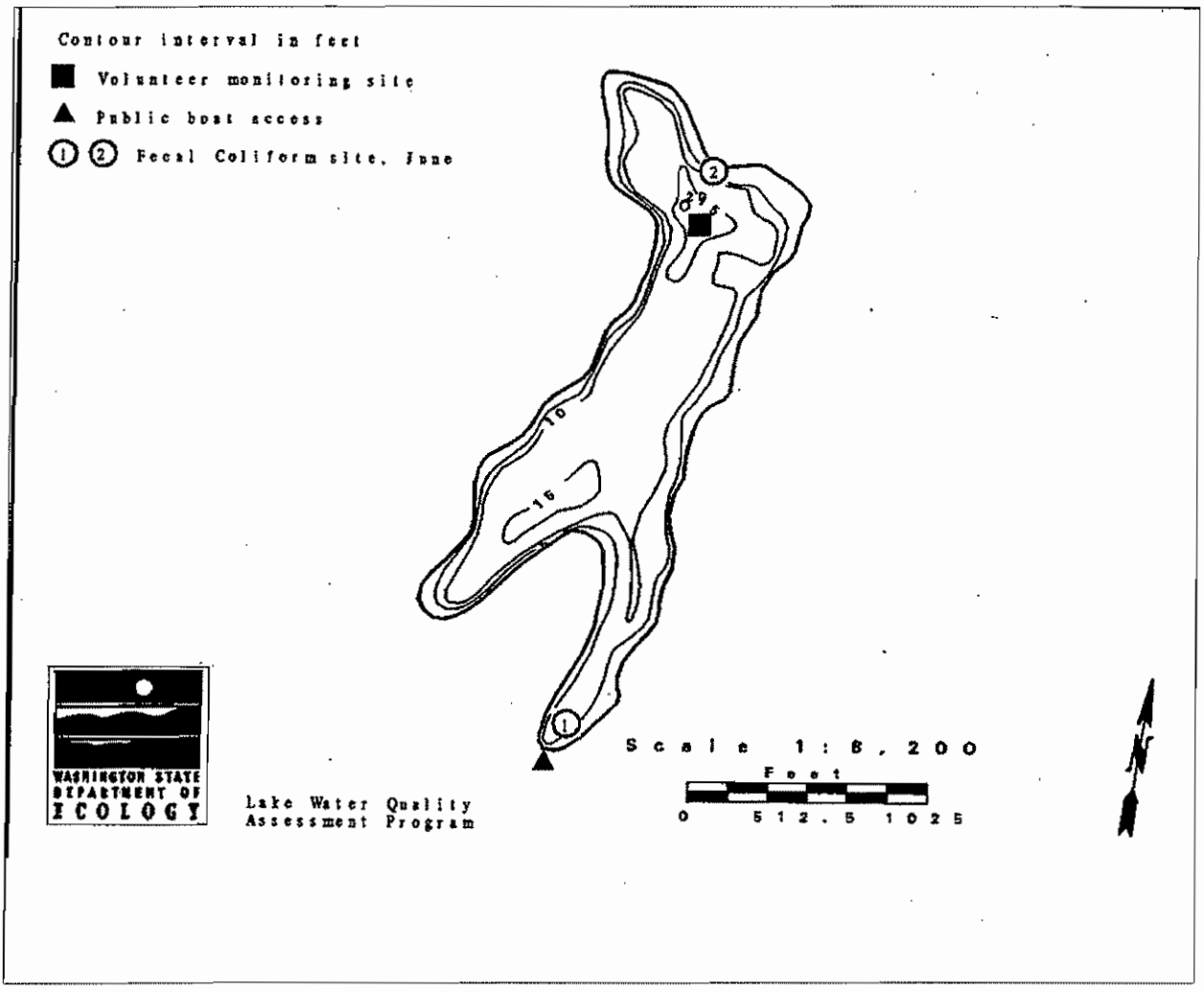




LAKECOUNTY WYE (KITSAP)

DESCRIPTION Wye Lake is located 3.5 miles southeast of Belfair. It is fed by about six intermittent inlets, and drains via an unnamed creek to Fern Lake, Rocky Creek and ultimately to Case Inlet.

AREA (acres)	39
MAX DEPTH (feet)	15
MEAN DEPTH (feet)	10
DRAINAGE (square miles)	1.0
VOLUME (acre-feet)	370
SHORE LENGTH (miles)	1.71
ALTITUDE (feet)	300



WYE LAKE -- KITSAP COUNTY: 1997

VOLUNTEER-COLLECTED SECCHI DATA

Date (Y/M/D)	Temperature (°C)	(°F)	pH	Water Color	%Cloud Cover	Recent Rain	Wind	Secchi (ft)	Lake Ht(in)	Abbrev. Comments
STATION 1										
97/05/29	21.5	70.7		Lt Green	50	Mod	Light	15.0	-0.5	HEAVY RAIN LAST NIGHT.
97/06/12	23.0	73.4		Lt Green	100	Trace	Light	14.8	-1.5	LAKE HEIGHT SHOWN FOR THIS YEAR IS NOT THE SAME MEASURE AS FOR PAST YEARS. OUR DOCK MOVED IN THE FLOODS THIS YEAR.
97/06/24	22.0	71.6		Lt Green	10	Trace	Light	14.8	-2.5	SAMPLER MARKED TEMPERATURE AS 22 F, BUT I PUT IT AS C BECAUSE OF COMMON SENSE.
97/07/13	24.5	76.1		Lt Green	0	None	Calm	14.6	-4.0	LAKE IS NOW WARM ENOUGH THAT WE HAVE CONSTANT USE.
97/07/27	26.5	79.7		Lt Green	0	None	Light	14.3	-7.0	MANY SUSPENDED PARTICLES. PROBABLY DUE TO SUMMER ACTIVITY ON THE LAKE.
97/08/10	-2.8	27.0		Lt Green	0	None	Light	13.8	-10.5	
97/09/07	24.0	75.2		Lt Green	0	None	Light	13.5B	-15.0	
97/09/12				Lt Green	0			13.5B	0.0	
97/09/22	-5.3	22.5		Lt Green	0	None	Calm	13.6B	-13.5	HEAVY RAIN EARLY IN WEEK. SOME SUSPENDED SOLIDS.
97/10/05	18.5	65.3		Lt Green	0	Heavy	Calm	14.0B	-9.5	REALLY CLEAR WATER.

B - Secchi disk hit bottom

LABORATORY RESULTS

Date	Strata	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Chlorophyll (µg/L)	Fecal Col. Bacteria (colonies/100 mL) Site 1	Site 2	Turb-idity (NTU)	Suspended Solids Total (mg/L)	Non-Volatile (mg/l)	Color (Pt-Co)
STATION 1										
97/05/26	E	5	0.15							
97/09/12	E	6	0.12	2.6						

E=epilimnion composite, H=hypolimnion composite. Remarks codes: U = Below detection limits; J = Estimate.

SUMMARY OF VOLUNTEER SURVEY

WATER QUALITY----------

Overall water quality was ***good***. The worst problems were reported as:

1. poor fishing 2. high water levels 3. swimmer's itch

Sources of actual or potential problems includes:

FAILING SEPTICS, INCREASED CLEARING OF LAND

Were there days (and how many) when poor water quality impaired

Fishing - ***NO(0)*** Swimming - ***NO(0)*** Aesthetics - ***YES(2)***

MANAGEMENT----------

Did the lake receive chemical treatments this year? ***NO***

Were fish stocked this year? ***YES***

Any lake groups present (such as a lake association)? ***YES***

Any lake management activities this year? ***NO***

OTHER----------

How many homes/new homes are there on the lake shore? ***108***

Changes since last year? ***NONE***

FIELD OBSERVATIONS OF ECOLOGY STAFF

5-26-97 The water is extremely clear, much like Wooten. The water color is an erie light blue-green hue, again, much like Wooten. No thermocline and extremely low conductivity. Nice red copepods; very few daphnia. Daphnia are more abundant near the sediments. The 4 meter Kemmerer tow appeared to have some sediments in it.

TROPHIC STATUS

Estimated Trophic State:	Oligotrophic
Mean Trophic State Index (Secchi): (Oligo-mesotrophic)	39YYYYYYBBBB*
Mean Trophic State Index (Total Phosphorus):	29 (Oligotrophic)
Mean Trophic State Index (Chlorophyll a):	40 (Oligo-mesotrophic)

*The calculated TSI is an estimate. The Secchi disk hit bottom (B), entered the weeds (W), or there were too few valid readings (N), or the calculation was based on qualified data (J), or TSIP was based on spring data (S).

SUMMARY AND EXPLANATION OF TROPHIC STATE ASSESSMENT

Wye Lake remains surprisingly clear and clean despite the heavy residential build-up along the shoreline. All indicators support the oligotrophic assessment.

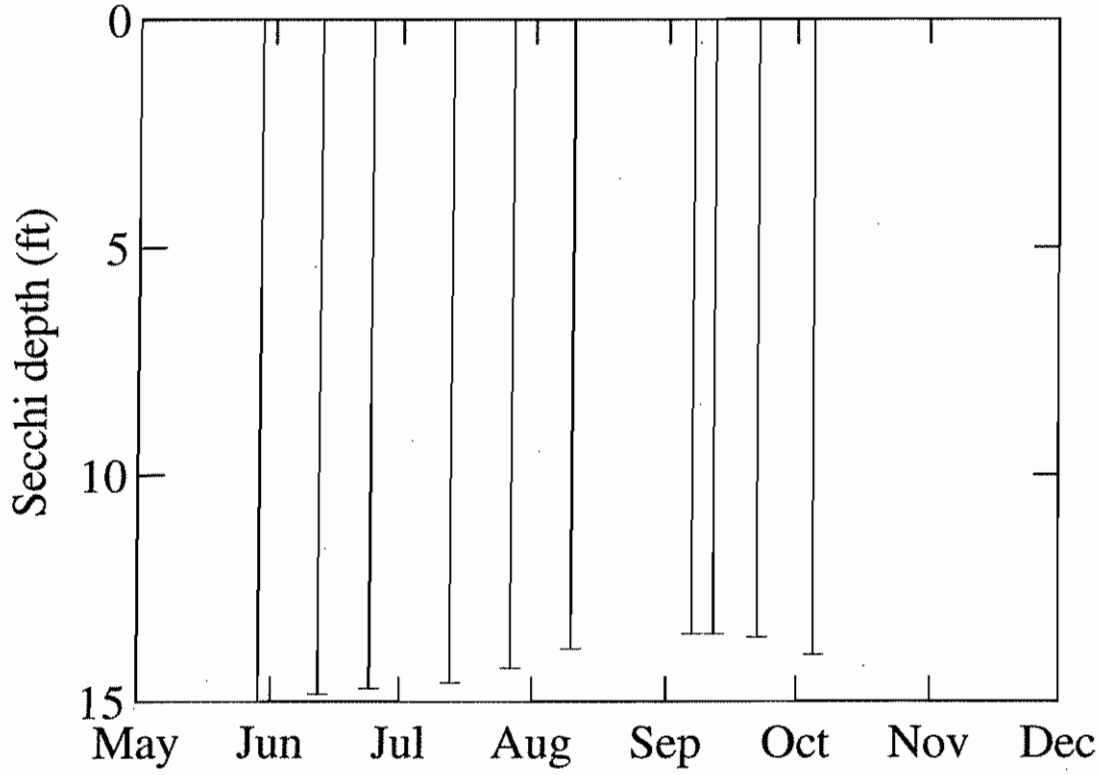
COMMENTS FROM 98/07/01 AQUATIC PLANT SURVEY

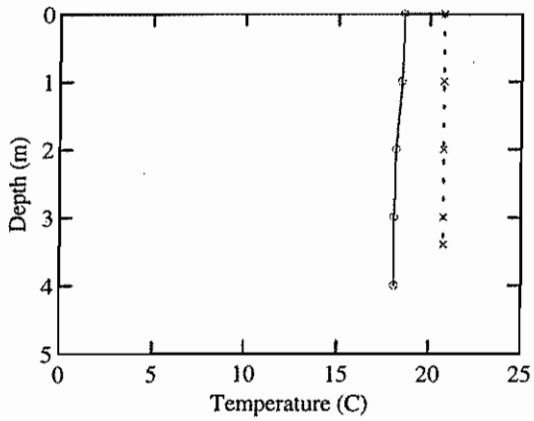
Cloudy. Did not launch boat, came to verify presence of Utricularia inflata. Walked shore at launch and tossed the rake.

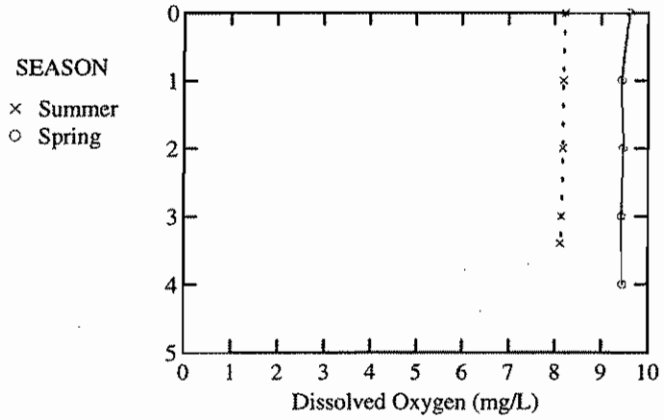
AQUATIC PLANT LIST (This list may be from multiple years and sources.)

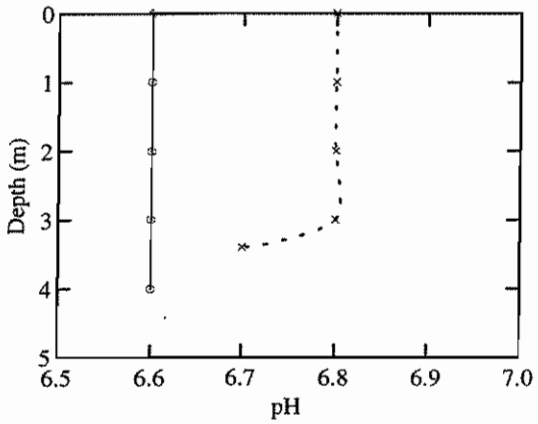
Elodea canadensis (common elodea) *Juncus sp.* (rush) *Ludwigia palustris* (water-purslane) *Nitella sp.* (stonewort) *Utricularia inflata* (big floating bladderwort)

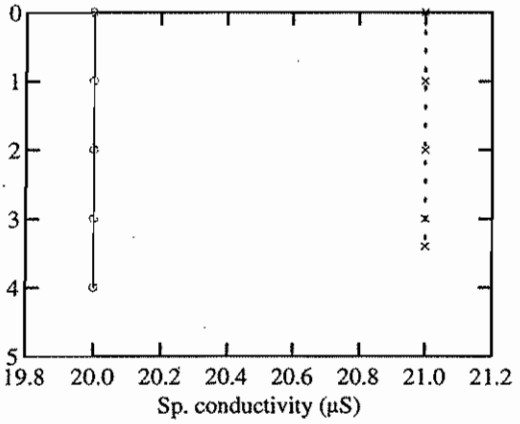
WYE


Secchi depth (ft)
0
5
10
15
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Depth (m)
Temperature (C)


SEASON
Summer
Spring
Dissolved Oxygen (mg/L)


Depth (m)
pH


Sp. conductivity (µS)