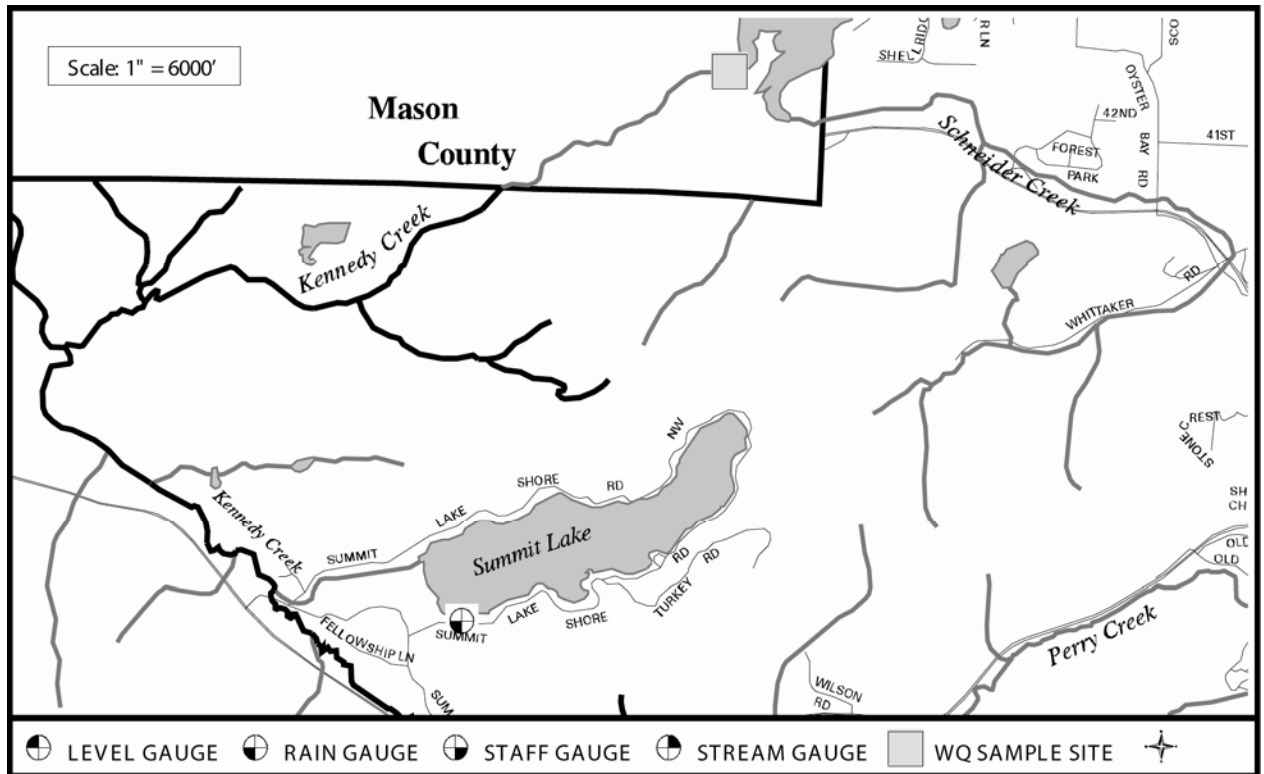


Totten / Little Skookum Inlet Watershed

WRIA 13

Chapter Includes:

**Kennedy Creek
Schneider Creek (Totten)
Summit Lake**



PART OF TOTTEN/LITTLE SKOOKUM WATERSHED

LENGTH OF CREEK: 10 miles

BASIN SIZE: 19 square miles

STREAM ORDER: 3

PRIMARY LAND USES:

Rural residential
Forestry and some farming

FISHERIES RESOURCES: (From A Catalog of Washington Streams and Salmon Utilization, WDOF)

Chinook (probable not proven)
Coho, Chum salmon

GENERAL TOPOGRAPHY:

The creek originates in Black Hills; falls gradually to lowlands except for a series of falls, cascades, and log jams 2.5 miles from the mouth. It discharges into the head of Totten Inlet.

GENERAL WATER QUALITY: (Excellent, Good, Fair, Poor)

Good – Passed both parts of the bacteria standard. Had one dissolved oxygen violation during summer low flow period in 2007. The turbidity standard was violated in November 2005 and 2006 and February 2007.

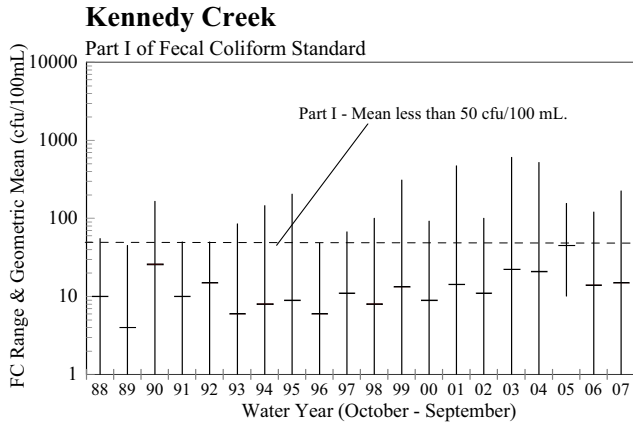
OTHER DATA:

Thurston County Environmental Health Division, (360) 754-4111 or www.co.thurston.wa.us/health/ehswat/swater.htm

Thurston County Department of Water and Waste Management, Storm Water Utility, Stream flow (360) 357-2491 or www.co.thurston.wa.us/monitoring

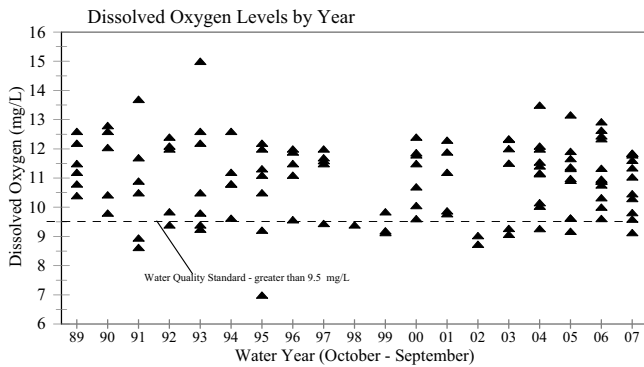
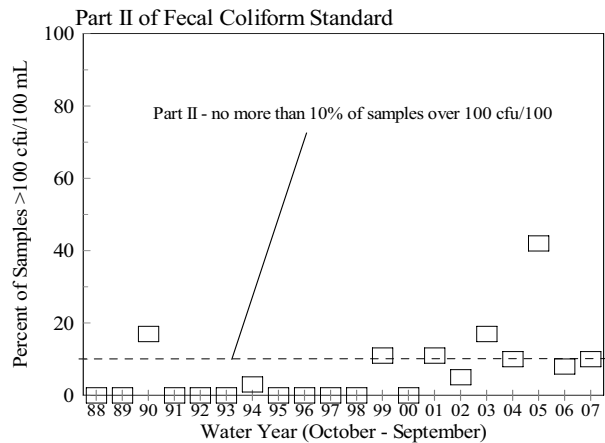
Washington Department of Ecology, Environmental Assessment Program, National Monitoring Program Project, Intensive wet season data between 1992 and 2002, (360) 407-6000.

Kennedy Creek #0012



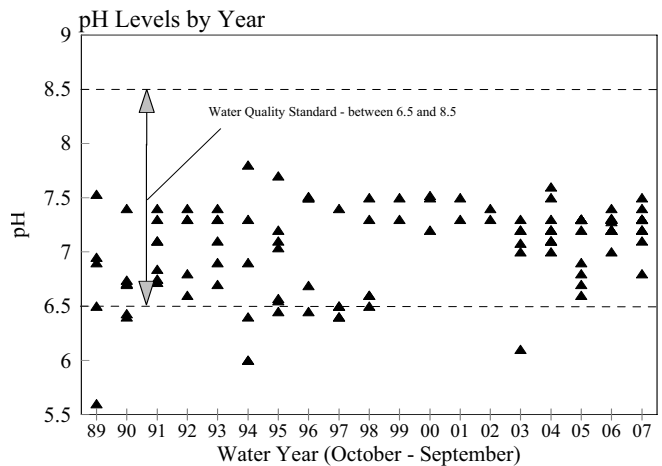
The water quality standard for fecal coliform has two parts: Part I - the geometric mean shall not exceed 50 colonies/100mL and Part II - no more than 10% of the samples shall exceed 100 colonies/100 mL.

In the past, the water quality of this stream has been excellent. However in 2004/05, the fecal coliform geometric mean was the highest on record at 45 colonies/100mL, with Part II of the standard violated because 42% of the samples were greater than 100. However, in 2005/06 & 2006/07 the geometric means were low and both parts of the standard were met.



The water quality standard for dissolved oxygen is a lowest one-day minimum of 9.5 mg/L. The DO frequently falls below the standard during the summer low-flow period. In July 2007 there was a violation.

The water quality standard for pH requires the pH to be within the range of 6.5 to 8.5. Throughout the period of record there are occasional measurements below the standard. There were no violations in 2005/2006 or 2006/2007.



Major Issues:

- Fecal coliform bacteria levels during the dry season appear to be increasing. Investigation for potential sources was conducted in 2006 and 2007.
- Kennedy Creek was part of a Washington Department of Ecology Total Maximum Daily Load Study. A water quality clean-up plan was prepared in November 2007, which included recommended actions for Kennedy Creek.
- The chum salmon run in Kennedy Creek continues to be a valued local resource. Various private and public entities worked together to build salmon spawning viewing areas for the public along a lower portion of the creek.

Funding Sources:

- Local stormwater utility rate

Water Quality Summary
Conventional Parameters
Kennedy Creek

Parameter	Units	WQ Standard WAC 173-201A	Water Year Data: 2005/06 & 2006/07				Cumulative Data: 1988-2005	
			Water Year	Mean	Range	# samples violating standard	Mean	Range
Temperature	° C	Highest 7-DAD Max of 16 ° C	05/06		6.19 – 14.56	0 of 12	1.09 - 17.53	
			06/07		5.62 – 14.72	0 of 12		
Dissolved Oxygen	mg/L	Lowest one-day minimum of 9.5	05/06		9.62 – 12.9	0 of 12	7 – 13.7	
			06/07		9.14 – 11.9	1 of 12		
Conductivity	µmhos/cm		05/06	76	53 - 99		37 – 202	
			06/07	75	45 - 101			
pH		6.5 - 8.5	05/06	7.3*	7.0 - 7.4	0 of 12	5.6 - 7.8	
			06/07	7.3*	6.8 - 7.5	0 of 12		
Turbidity	NTU	not to exceed 5 NTU over background	05/06	3.28	0.3 – 10.5	1 of 12	0 – 120	
			06/07	5.98	0 - 40	2 of 12		
Fecal Coliform	colonies/100 mL	GMV: ≤50 and ≤ 10% not to exceed 100	05/06	14**	0 – 120	% exceeding 100	0 – 605	
			06/07	15**	0 - 225			8% 10%
Total Phosphorus	mg/L		05/06	0.024	0.012 - 0.044		0.006 - 0.23	
			06/07	0.029	0.012 - 0.091			
Nitrate+Nitrite-nitrogen	mg/L		05/06	0.643	0.335 – 1.57		0.185 - 1.52	
			06/07	0.465	0.333 - 0.739			

* Median

** Geometric mean value (GMV)

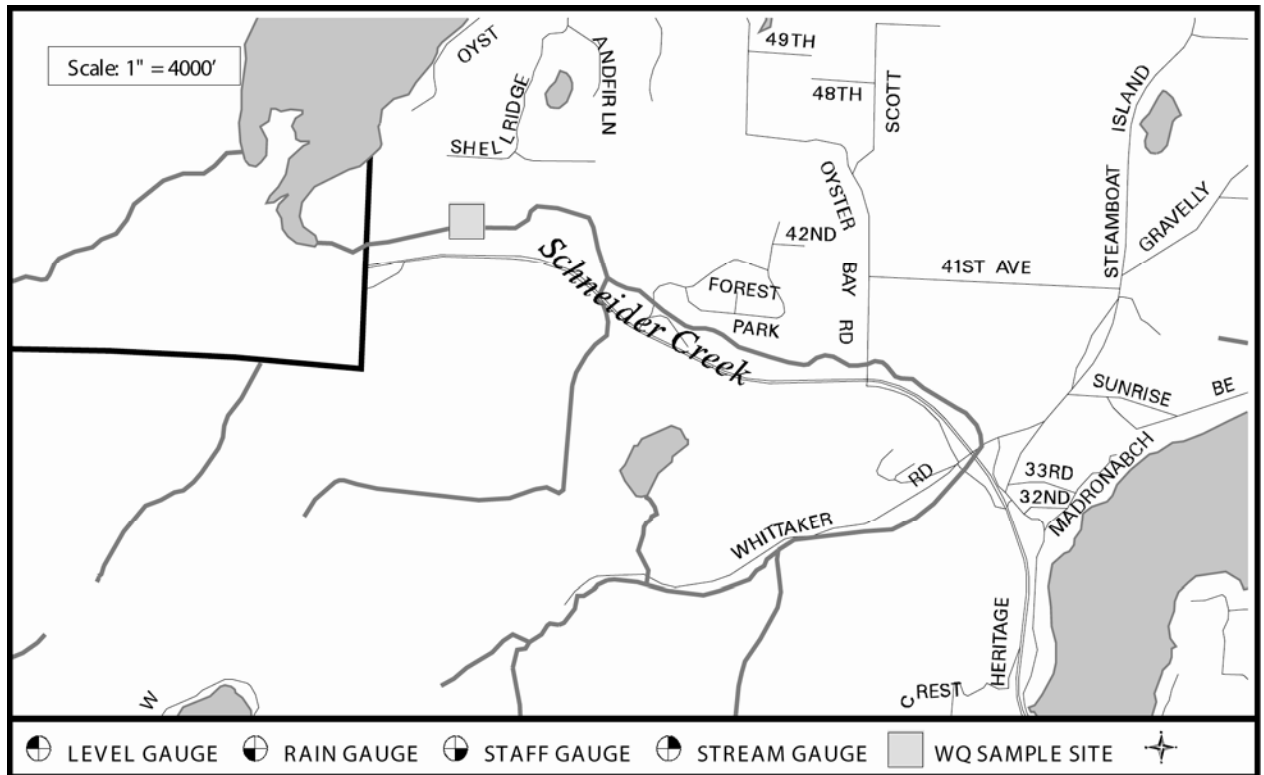
Thurston County Water Resources Monitoring Report 2005 - 2006 *Kennedy Creek Mouth*

<i>Date</i>	<i>Time</i>	<i>Temp C</i>	<i>pH</i>	<i>DO mg/L</i>	<i>Cond @25c umhos/cm</i>	<i>FC cfu/100mL</i>	<i>Turb NTU</i>	<i>Flow cfs</i>	<i>TP mg/L</i>	<i>NOx mg/L</i>	<i>COMMENTS</i>
10/10/2005	10:15:00 AM	11.35	7.3	10.33	97	40	0.6	8.65	0.024	0.385	Turb standard recall of lot used to cal YSI on this date. Results could be up to 8% lower than the true turb value.
11/7/2005	11:30:00 AM	8.71	7.2	10.91	63	20	10.5		0.044	1.570	Fish spawning, did not measure flow.
12/5/2005	10:00:00 AM	6.19	7.2	12.64	67	15	1.7	69.43	0.038	0.824	
1/3/2006	11:00:00 AM	7.23	7.2	12.93	55	10	8.2		0.028	0.884	Too high for flow
2/6/2006	10:15:00 AM	6.50	7.3	12.45	53	5	7.4		0.020	0.625	Too fast to wade.
3/14/2006	11:15:00 AM	6.66	7.4	10.01	60	0	2.9	83.60	0.012	0.734	F.C. result was <5.
4/24/2006	10:00:00 AM	8.85	7.2	12.35	65	0	2.2	55.45	0.014	0.456	F.C. result was <5.
5/15/2006	11:50:00 AM	11.75	7.3	10.90	82	5	1.2	14.58	0.016	0.557	
6/13/2006	9:45:00 AM	13.09	7.2	10.97	84	40	0.7	13.22	0.017	0.475	
7/10/2006	11:10:00 AM	14.56	7.3	10.77	92	120	0.3	9.42	0.021	0.524	
8/8/2006	11:00:00 AM	14.52	7.3	11.34	98	40	1.1	4.56	0.022	0.335	Samples not stored at proper temperature for 3-5 days, NO2+NO3 may be high
9/12/2006	10:15:00 AM	13.02	7.0	9.62	99	50	2.5	4.61	0.028	0.349	

Thurston County Water Resources Monitoring Report 2006 - 2007 *Kennedy Creek Mouth*

<i>Date</i>	<i>Time</i>	<i>Temp C</i>	<i>pH</i>	<i>DO mg/L</i>	<i>Cond @25c umhos/cm</i>	<i>FC cfu/100mL</i>	<i>Turb NTU</i>	<i>Flow cfs</i>	<i>TP mg/L</i>	<i>NOx mg/L</i>	<i>COMMENTS</i>
10/10/2006	11:20:00 AM	9.57	7.2	10.30	101	65	1.3	4.01	0.021	0.343	
11/14/2006	10:00:00 AM	8.61	6.8	11.04	53	10	17.6		0.054	0.724	fish spawning, no flow measurement, too deep & fast
12/11/2006	10:30:00 AM	7.98	7.2	11.61	59	35	6.2		0.053	0.488	fish still spawning, no flow measurement.
1/24/2007	9:45:00 AM	5.62	7.3	11.35	62	5	1.7	73.60	0.014	0.568	
2/20/2007	11:00:00 AM	7.09	7.1	9.82	45	20	40.4		0.091	0.739	Too high and fast to wade
3/20/2007	11:15:00 AM	7.88	7.3		56	10	1.7	139.28	0.018	0.432	DO not working
4/26/2007	2:30:00 PM	10.33	7.5	11.85	65	10	0.7	52.29	0.012	0.366	
5/17/2007	9:40:00 AM	10.42	7.3	11.80	79	0	0.5	19.07	0.014	0.430	F.C. result was <5.
6/12/2007	2:15:00 PM	13.53	7.4	11.85	86	20	0.0	12.20	0.012	0.405	
7/18/2007	11:00:00 AM	14.72	7.3	9.14	94	0	0.7	9.02	0.020	0.404	F.C. result is <5.
8/21/2007	10:20:00 AM	14.32	7.3	9.60	97	100	0.0	6.05	0.017	0.343	
9/17/2007	10:00:00 AM	13.29	7.2	10.47	100	225	0.9	5.60	0.018	0.333	

Schneider Creek #0009 (In Totten/Little Skookum Inlet Watershed)



PART OF TOTTEN/LITTLE SKOOKUM WATERSHED

LENGTH OF CREEK: 5.3 miles

BASIN SIZE: 4,738 Acres

STREAM ORDER: 3

PRIMARY LAND USES:

- Rural residential
- Agriculture
- Forestry

FISHERIES RESOURCES: (From [A Catalog of Washington Streams and Salmon Utilization](#), WDOF)

Coho, Chum salmon

GENERAL TOPOGRAPHY:

Stream originates on Schneider Prairie and flows through generally flat and level pastures

and forest land. The stream gradient is gentle throughout its length.

WASHINGTON D.O.E. WATER QUALITY CLASSIFICATION: Class AA

GENERAL WATER QUALITY: (Excellent, Good, Fair, Poor)

Fair - Failed Part II of the fecal coliform standard in both water years 2005/06 & 2006/07. Dissolved oxygen and occasional temperature violations in summer months.

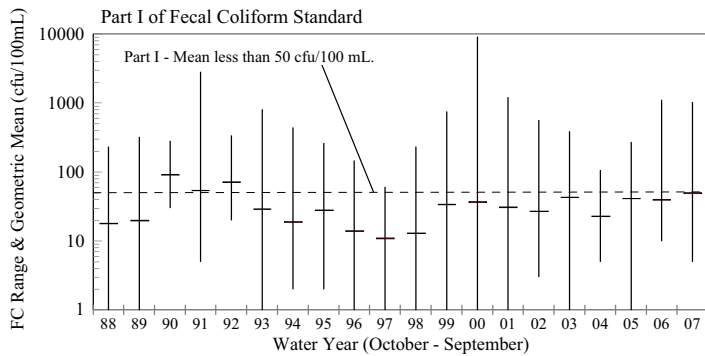
OTHER DATA:

Thurston County Environmental Health Division, (360)754-4111 or www.co.thurston.wa.us/health/ehswat/swater.htm

Washington Department of Ecology, Environmental Assessment Program, National Monitoring Program Project, Intensive wet season data between 1992 and 2002, (360) 407-6000.

Schneider Creek #0009
(In Totten/Little Skookum Inlet Watershed)

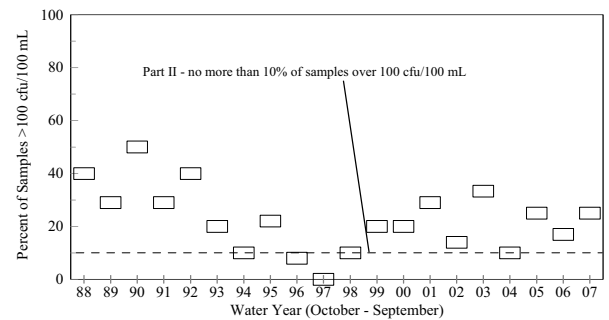
Schneider Creek



The water quality standard for fecal coliform has two parts: Part I - the geometric mean shall not exceed 50 colonies/100mL and Part II, no more than 10% of the samples shall exceed 100 colonies/100 mL.

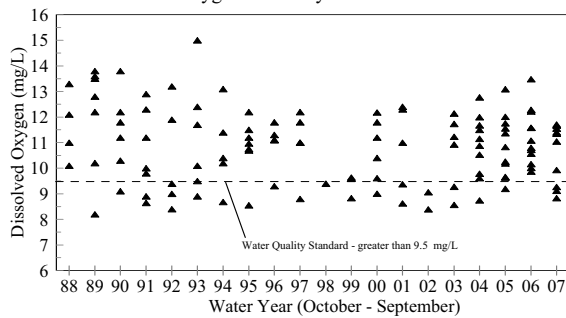
Part I of the standard has been met since 1993 but Part II of the standard is violated in most years on record.

Part II of Fecal Coliform Standard



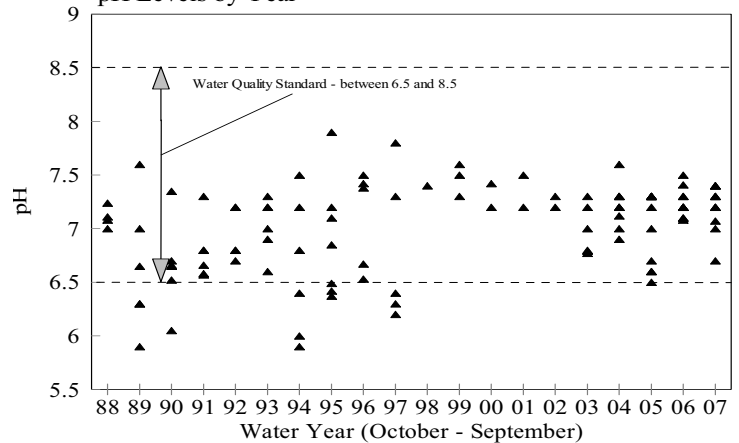
The water quality standard for dissolved oxygen is a lowest one-day minimum of 9.5 mg/L. Over the period of record, the dissolved oxygen standard is often below the water quality standard during the summer low flow period.

Dissolved Oxygen Levels by Year



The standard for pH requires the pH to be within the range of 6.5 to 8.5. There have been no violations since 1997.

pH Levels by Year



Schneider Creek has been monitored by the County since 1985 when the first water quality study was conducted in the watershed. A ten-year national monitoring project designed to document water quality change as a result of implementing best management practices was completed by the Washington Department of Ecology in 2002. There is currently a total maximum daily load study which recommends actions to improve water quality. In December 2006, monitoring began at a second site on Schneider Creek. This site is located where the creek flows into a culvert on the south side of the Steamboat Island Rd. Hwy 101 interchange. The data is summarized on the table entitled *Schneider Creek Head*. This site failed Part I of the fecal coliform standard and had dissolved oxygen concentrations below the standard for three of the nine site visits. Nutrients, especially nitrates, are lower at this site. Thurston County intends to continue long-term ambient monitoring of this creek.

Major Issues:

- The creek has the potential to be impacted by animal keeping practices.
- Logging practices and stream-side development also have the potential to affect water quality.

Funding Sources:

- Local Storm and Surface Water Utility

Water Quality Summary
 Conventional Parameters
Schneider Creek (in Totten/Little Skookum Inlet Watershed)

Parameter	Units	WQ Standard WAC 173-201A	Water Year Data: 2005/06 & 2006/07				Cumulative Data: 1987-2005	
			Water Year	Mean	Range	# samples violating standard	Mean	Range
Temperature	°C	Highest 7-DAD Max of 16.9C	05/06		4.44 – 14.79	0 of 12		1.5 – 18.15
			06/07		5.48 – 14.97	0 of 12		
Dissolved Oxygen	mg/L	Lowest one-day minimum of 9.5	05/06		9.87 – 13.5	0 of 12		8.2 – 15
			06/07		8.83 – 11.71	3 of 10		
Conductivity	: mhos/cm		05/06	85	55 - 115		75	37 – 169
			06/07	81	51 - 109			
pH		6.5 - 8.5	05/06	7.2*	7.1 – 7.5	0 of 12	7.1*	5.9 – 7.9
			06/07	7.3*	6.7 – 7.4	0 of 12		
Turbidity	NTU	not to exceed 5 NTU over background	05/06	3.38	0.8 – 11.5	1 of 12	6.18	0.4 - 100
			06/07	5.73	0.3 – 28.4	2 of 12		
Fecal Coliform	colonies/100 mL	GMV: ≤50 and ≤10% not to exceed 100	05/06	40**	10 - 1100	% exceeding 100	27**	0 – 9100
			06/07	50**	5 - 1025			
Total Phosphorus	mg/L		05/06	0.034	0.022 – 0.044		0.032	<0.005 - 0.134
			06/07	0.036	0.019 – 0.091			
Nitrate+Nitrite-nitrogen	mg/L		05/06	0.246	0.037 – 0.781		0.210	0.015 - 0.67
			06/07	0.169	0.027 – 0.277			

* Median

** Geometric mean value (GMV)

Water Quality Summary
 Conventional Parameters
Schneider Creek Head (in Totten/Little Skookum Inlet Watershed)

Parameter	Units	WQ Standard WAC 173-201A	Water Year Data: 2006/2007				Cumulative Data: none	
			Water Year	Mean	Range	# samples violating standard	Mean	Range
Temperature	° C	Highest 7-DAD Max of 16 ° C	06/07		4.5 – 15.82	0 of 10		
Dissolved Oxygen	mg/L	Lowest one-day minimum of 9.5	06/07		8.25 – 10.9	4 of 9		
Conductivity	µmhos/cm		06/07	99	54 - 163			
pH		6.5 - 8.5	06/07	7.2*	6.8 – 7.2	0 of 10		
Turbidity	NTU	not to exceed 5 NTU over background	06/07	4.94	0.2 - 13			
Fecal Coliform	colonies / 100 ml	GMV: ≤50 and ≤ 10% not to exceed 100	06/07	32**	0 - 605	% exceeding 100 30%		
Total Phosphorus	mg/L		06/07	0.022	0.013 – 0.036			
Nitrate+Nitrite-nitrogen	mg/L		06/07	0.051	0.02 – 0.142			

* Median

** Geometric mean value (GMV)

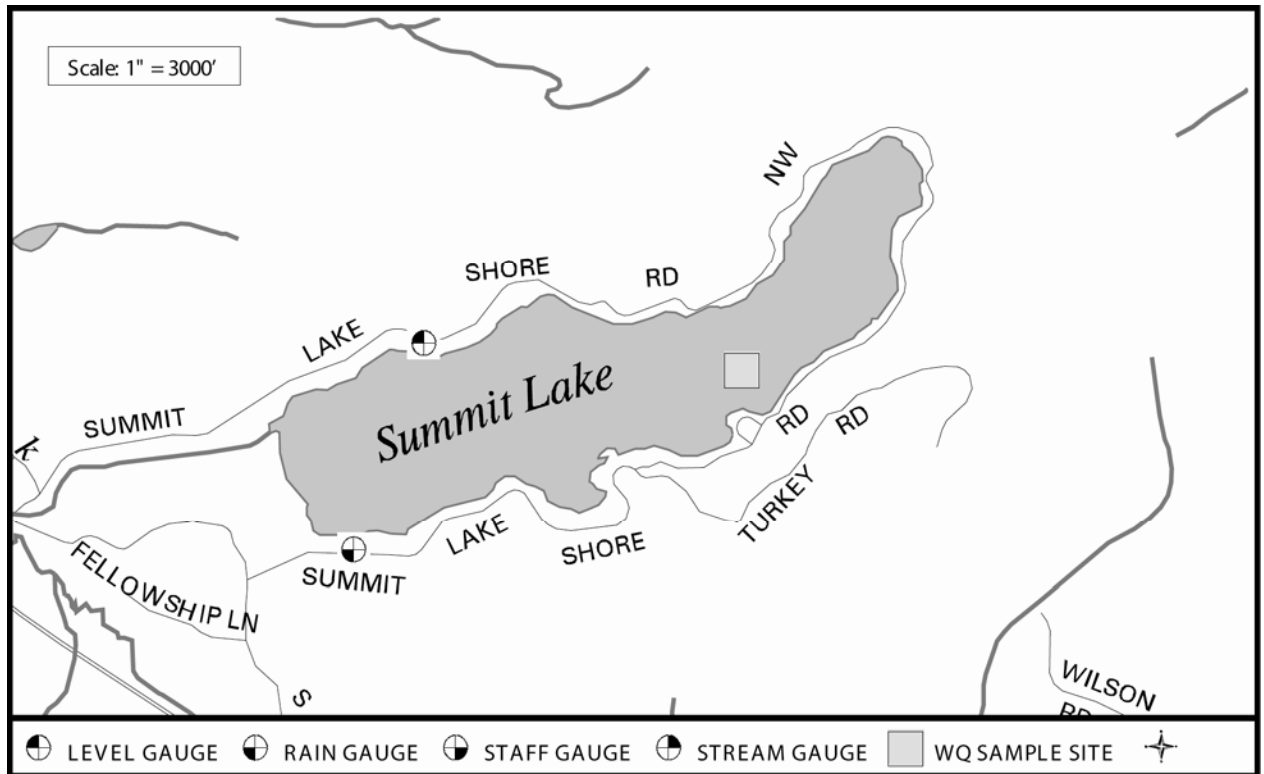
Thurston County Water Resources Monitoring Report 2005 - 2006 *Schneider Creek Mouth*

<i>Date</i>	<i>Time</i>	<i>Temp C</i>	<i>pH</i>	<i>DO mg/L</i>	<i>Cond @25c umhos/cm</i>	<i>FC cfu/100mL</i>	<i>Turb NTU</i>	<i>Flow cfs</i>	<i>TP mg/L</i>	<i>NOx mg/L</i>	<i>COMMENTS</i>	
10/10/2005	10:00:00 AM	11.19	7.3	10.01	115	35	0.8	0.88	0.038	0.037	Turb standard recall of lot used to cal YSI on this date. Results could be up to 8% lower than the true turb value.	
11/7/2005	11:00:00 AM	8.27	7.1	11.08	63	30	11.5	40.17	0.044	0.781		
12/5/2005	9:30:00 AM	4.44	7.1	13.48	71	15	1.9	15.53	0.026	0.299		
1/3/2006	10:00:00 AM	6.66	7.2	12.28	55	60	6.2	74.80	0.030	0.370		
2/6/2006	9:40:00 AM	5.97	7.2	12.22	55	20	7.5	62.00	0.022	0.248		
3/14/2006	11:15:00 AM	6.74	7.2	10.16	65	10	5.8	20.80	0.025	0.237		
4/24/2006	9:45:00 AM	9.08	7.2	11.58	78	10	1.9	9.26	0.028	0.169		
5/15/2006	11:30:00 AM	11.32	7.5	10.72	94	25	0.9	2.91	0.023	0.214		
6/13/2006	10:20:00 AM	13.34	7.2	10.80	102	1100	1.2	2.38	0.026	0.197		
7/10/2006	10:30:00 AM	14.79	7.3	10.57	105	25	0.8	1.01	0.033	0.177		
8/8/2006	10:40:00 AM	14.75	7.4	11.58	106	165	0.9	0.69	0.033	0.133		Samples not stored at proper temperature for 3-5 days, NO2+NO3 may be high
9/12/2006	9:50:00 AM	12.48	7.1	9.87	109	45	1.1	0.56	0.037	0.093		

Thurston County Water Resources Monitoring Report 2006 - 2007 *Schneider Creek Mouth*

<i>Date</i>	<i>Time</i>	<i>Temp C</i>	<i>pH</i>	<i>DO mg/L</i>	<i>Cond @25c umhos/cm</i>	<i>FC cfu/100mL</i>	<i>Turb NTU</i>	<i>Flow cfs</i>	<i>TP mg/L</i>	<i>NOx mg/L</i>	<i>COMMENTS</i>
10/10/2006	11:00:00 AM	8.90	7.3		75	45	1.0	0.58	0.028	0.027	No D.O. reading.
11/14/2006	9:30:00 AM	7.93	6.7	11.05	51	35	20.0	75.00	0.044	0.273	
12/11/2006	9:30:00 AM	7.56	7.0	11.40	65	30	9.4		0.052	0.205	fish still spawning, did not do flow
1/24/2007	9:15:00 AM	5.48	7.3	11.35	70	33	2.0	14.49	0.019	0.277	
2/20/2007	10:30:00 AM	7.08	7.1	9.12	54	25	28.4	107.01	0.091	0.263	
3/20/2007	10:15:00 AM	8.53	7.2		66	10	2.6		0.028	0.141	DO not working. Swiffer meter not working
4/26/2007	2:00:00 AM	10.57	7.4	11.55	80	5	1.3	8.32	0.025	0.115	
5/17/2007	9:15:00 AM	9.95	7.3	11.71	90	155	0.8	3.59	0.025	0.170	
6/12/2007	1:40:00 PM	12.48	7.4	11.67	101	40	0.3	1.71	0.026	0.164	
7/18/2007	10:30:00 AM	14.97	7.4	8.83	106	60	1.5	1.36	0.036	0.152	
8/21/2007	10:00:00 AM	14.54	7.2	9.27	109	180	0.5	1.18	0.031	0.121	
9/17/2007	9:30:00 AM	13.43	7.2	9.93	105	1025	1.0	0.78	0.029	0.121	

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PART OF TOTTEN INLET WATERSHED

LENGTH OF LAKE: 2.2 miles

SHORELINE LENGTH: 5.6 miles

LAKE SIZE: 530 acres

BASIN SIZE: 2.8 square miles

MEAN DEPTH: 53 feet

MAXIMUM DEPTH: 100 feet

VOLUME: 28,000 acre-feet

PRIMARY LAND USES:

The majority of the basin is commercial forest with dense development concentrated along the shoreline. There are approximately 400 homes along the shoreline.

PRIMARY LAKE USE:

Domestic water supply, fishing, boating, swimming, and other water sports.

PUBLIC ACCESS:

Washington Department of Fish and Wildlife public boat launch; three small private community accesses; 126-acre boy scout camp at the west end of the lake.

GENERAL TOPOGRAPHY:

The approximate altitude of the lake is 500 feet. The drainage is steep and rugged with slopes up to 80 percent. There are numerous springs and intermittent streams that flow into the lake. The outlet, at the west end of the lake, is controlled by flash boards and flows into Kennedy Creek.

GENERAL WATER QUALITY: (Excellent, Good, Fair, Poor)

Excellent - The lake has low nutrient and chlorophyll *a* levels and high visibility. The high water quality is important because the lake is the drinking water source for most of the lake residents. Uses are not impeded by aquatic weeds or algal growth.

Summit Lake

OTHER DATA:

Thurston County Dept. of Water and Waste Management, Storm and Surface Water Utility, (360) 357-2491, (Precipitation, lake level, and stream flow data).

Washington Department of Ecology, Environmental Assessment Program, (360) 407-6700 (water quality data).

Water quality data - Thurston County Environmental Health Division, www.co.thurston.wa.us/health/ehswat/swater.htm (360) 754-4111

GENERAL DISCUSSION:

Summit Lake is one of the deepest lakes in Thurston County, with a maximum depth of 30 meters (100 feet). The lake clearly stratifies into two distinct layers of water in the summer, as can be seen in the profile graphs which follow. In 2007 the lake was already stratified in May and remained so through October. The warm upper layer extends from the surface to between 6 and 14 meters deep. The colder bottom water had developed anoxic conditions (lack of dissolved oxygen in the water) by August. When the lake is thermally stratified and there is no replenishment of the dissolved oxygen from the atmosphere to the bottom waters, bacterial decomposition of material such as aquatic plants, algae, and other organic matter depletes the available oxygen at the bottom. During the anoxic period, phosphorus is released from the sediments into the water near the bottom. This slight increase in bottom phosphorus concentrations can be seen in the data report at the end of this narrative.

The water clarity in 2007 averaged 6.9 meters (22.6 feet) and ranged from 5.5 meters (18 feet) in May to 10.1 meters (33 feet) in July. As can be seen from the secchi disk readings graph at the end of this narrative, Summit Lake consistently has average secchi disk readings between 5.75 and 8 meters. The graph entitled 'Summit Lake Water Clarity Trend' charts the difference between each year's average secchi reading and the overall average Summit Lake secchi reading from the period of record. Graphing the secchi disk visibility in this way helps to visually see true trends in water quality versus normal annual fluctuations. For Summit Lake, it appears there is no upward or downward trend in water clarity over the past 17 years of record, just plus or minus one meter variation around the mean.

The Carlson trophic state indices (TSI) are used to express the degree of productivity of a lake. Average summer total phosphorus concentrations, chlorophyll *a* concentrations, and secchi disk transparency are each used to calculate a TSI for the lake. A TSI of 0 to 40 indicates an oligotrophic, or low productivity, lake. A TSI of 41 to 50 indicates a mesotrophic, or moderately productive lake. A TSI of greater than 50 indicates a eutrophic, or highly productive lake.

Summit Lake is an oligotrophic, or low productivity, lake. The Summit Lake TSI's for total phosphorus, chlorophyll *a*, and secchi disk for 2007 are 29, 38, and 32, respectively. The trophic state indices graph which follows this narrative shows that all three parameters, total phosphorus, chlorophyll *a* concentrations, and water clarity, indicate that the lake is low in nutrients and algae growth with high water clarity.

Because this lake is clear and low in algae and aquatic plant growth, it is popular with recreational users. It is also used as a domestic water source for the majority of residences around the lakeshore due to the absence of an adequate ground water supply. Blue-green algae species, which are common in more nutrient rich environments, are often present in this lake but are rarely dominant. To date, only relatively minor and localized blue-green algae blooms occur. Algae species present

in the lake are included in a table at the end of this chapter. Rooted aquatic plants in this lake are minimal and do not interfere with recreational uses.

Major Issues:

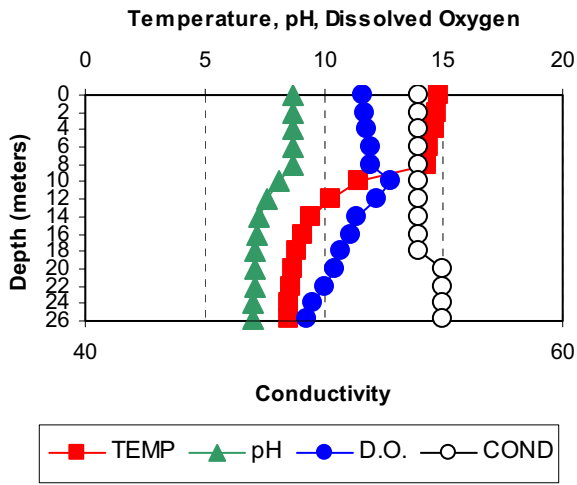
- Steep slopes, shallow soils, and generally small lots sizes make siting and functioning of on-site sewage systems around the lake difficult. A 1992-1997 sanitary survey of 330 on-site sewage systems around the lake perimeter found 58 systems were failing (18%). Nearly all of the 58 failing systems were repaired.
- The majority of lakeshore residents use lake water as their domestic water supply, and many do not disinfect it prior to use. Surface waters cannot be adequately protected from contamination to be safely used as a domestic water supply without treatment. A public health advisory issued in 1987 advises against consumption of untreated lake water at Summit Lake.
- The high density residential activities along the shoreline and forestry activities in the upper watershed are a concern for water quality.

Funding Sources:

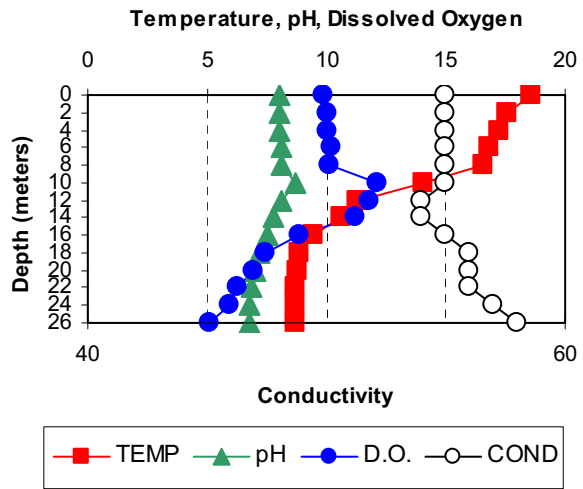
Thurston County funds will continue to support monitoring in 2008.

SUMMIT LAKE

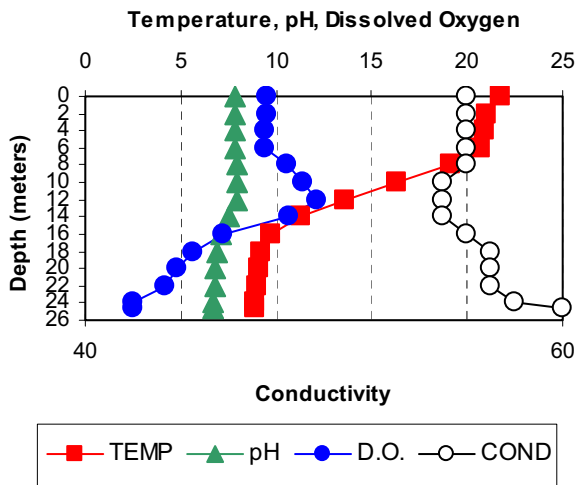
May 21, 2007



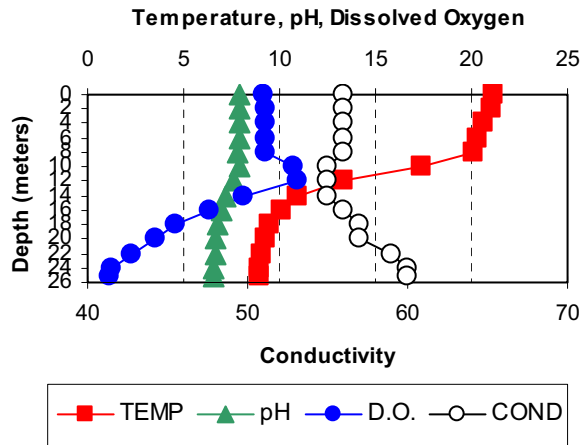
June 20, 2007



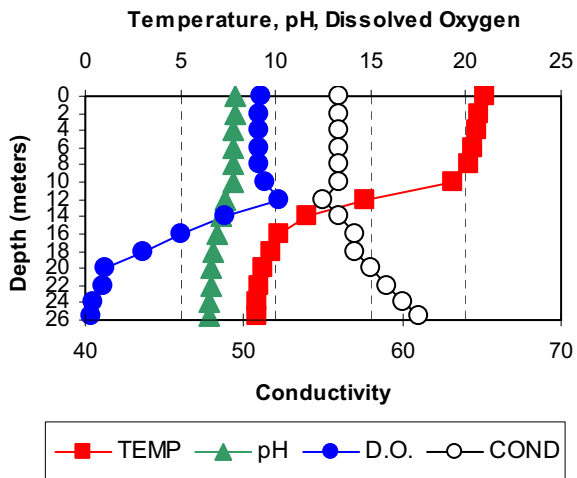
July 25, 2007



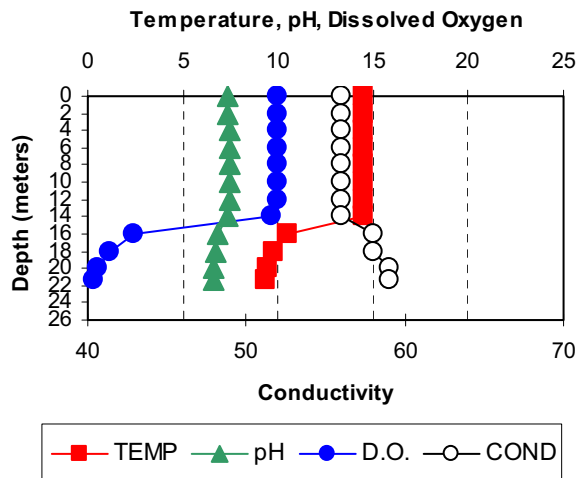
August 15, 2007



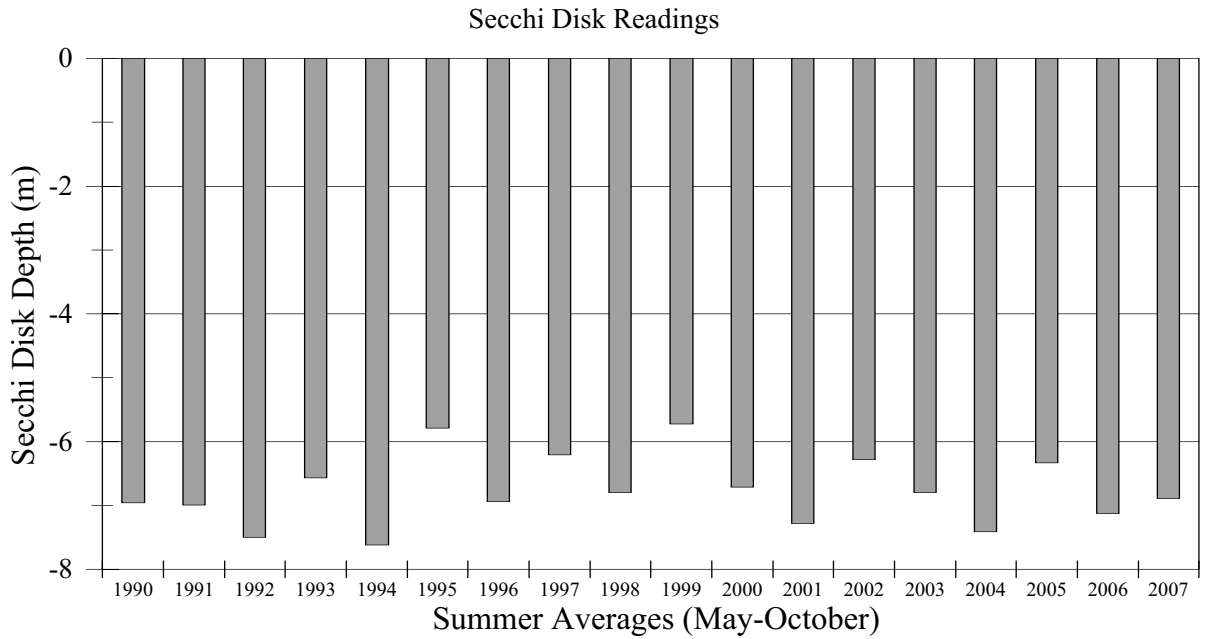
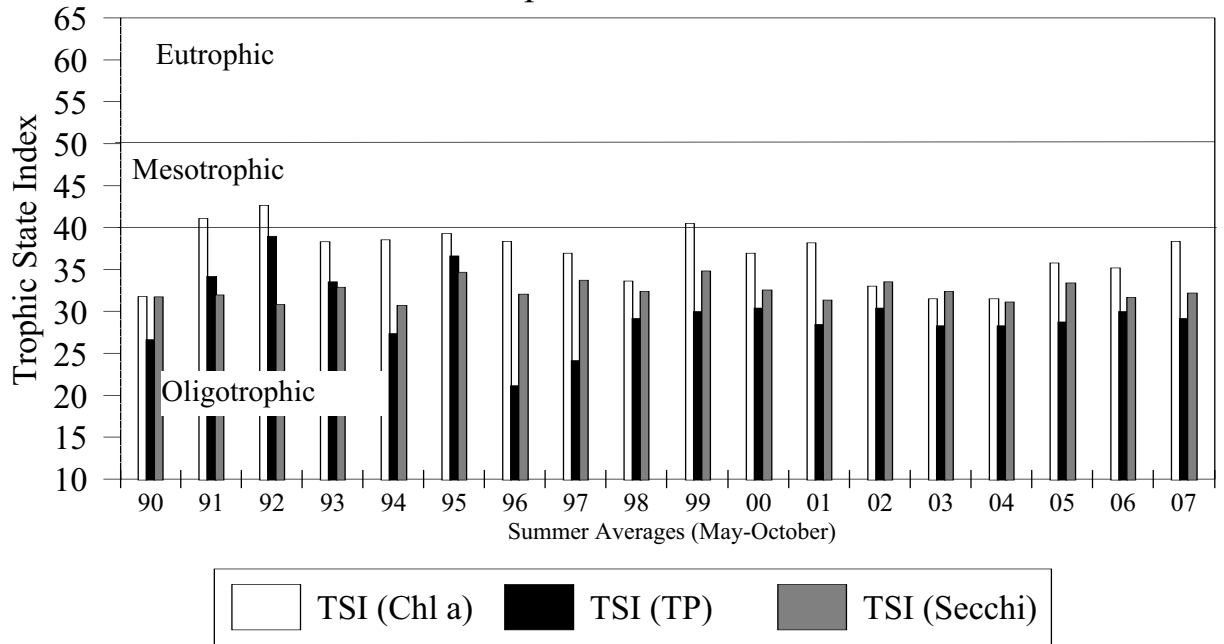
September 11, 2007



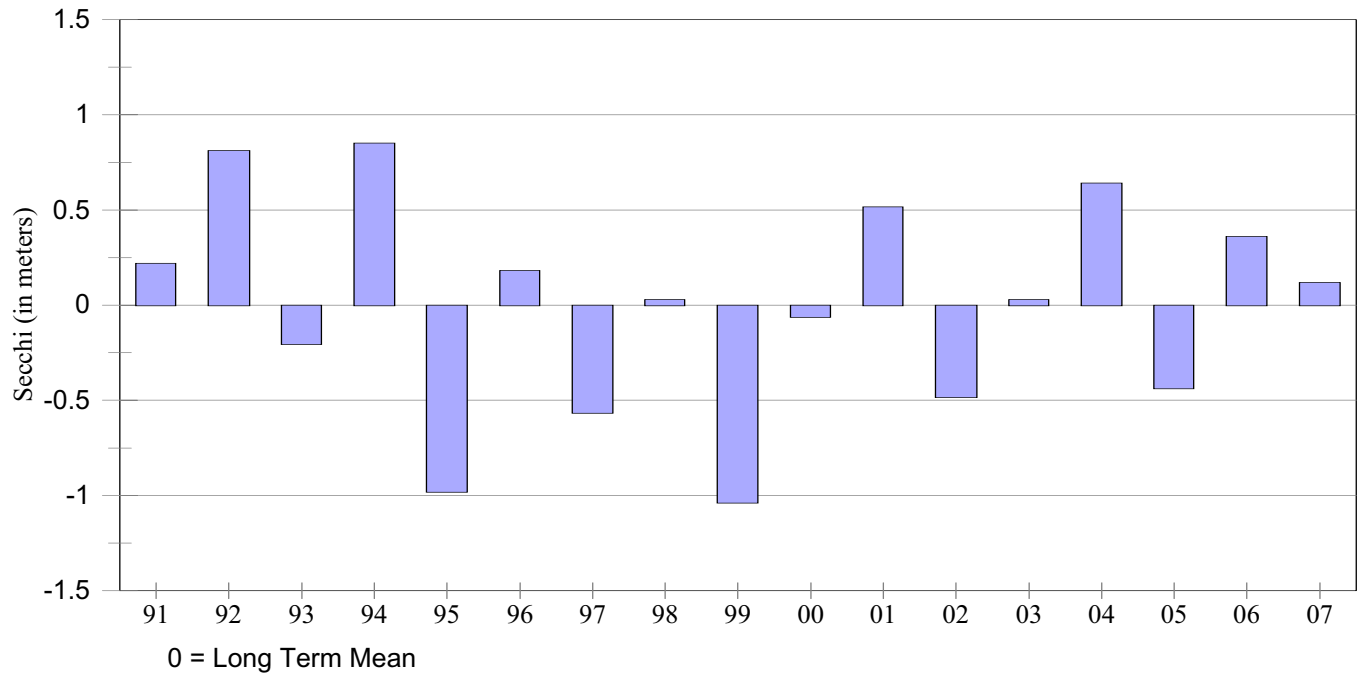
October 16, 2007



Summit Lake Trophic State Indices



Summit Lake Water Clarity Trend Annual Mean Secchi - Long-Term Mean



Thurston County Water Resources Annual Report - 2007

Summit Lake, Main (North) Basin

Site ID# TOTSUL010

Date	Time	Bottom Depth m	Bottom Sample Depth m	Sur TP mg/L	Bott TP mg/L	Sur TN mg/L	Bott TN mg/L	Secchi m	Chl a ug/L	Phae a ug/L	Water Color	Lake Notes
05/21/2007	2:00:00 PM	25.7	24.0	0.006	0.005	0.275	0.328	5.54	6.4	0.05	#2 lt green	Chl a & algae composite @ 2, 4, & 6M. Phaeo a was <0.1
06/20/2007	1:45:00 PM	26	25.0	0.004	0.006	0.109	0.250	6.51	1.6	0.3	#2 lt green	Chl a & algae composite @ 2, 6, & 10M.
07/25/2007	1:00:00 PM	24.7	24.0	0.007	0.017	0.134	0.309	10.08	0.8	0.9	#2 lt green	Chl a & algae composite @ 2, 6, & 10M.
08/15/2007	11:30:00 AM	25.3	24.0	0.005	0.027	0.140	0.254	5.90	0.5	1.7	#2 lt green	Chl a & algae composite @ 2, 5, & 8M.
09/11/2007	11:30:00 AM	25.6	24.0	0.006	0.023	0.149	0.234	7.30	1.9	0.7	#2 lt green	Chl a & algae composite @ 2, 6, & 10M.
10/16/2007	1:15:00 PM	21.3	20.0	0.006	0.017	0.205	0.218	5.93	2.1	2	#2 lt green	Chl a & algae composite @ 2, 4, & 6M.

Summary for 'Site Description' = Summit Lake, Main (North) Basin (6 detail records)

Averages: Sur TP 0.006
Secchi 6.88
Chl a 2.2

Algae data: Summit Lake, Main (North) Basin

	<i>Type</i>	<i>Description</i>	<i>Dominant in Sample</i>
<i>05/21/2007</i>			
	CP	Chroomonas species	<input type="checkbox"/>
	CP	Cryptomonas species	<input type="checkbox"/>
	DT	Asterionella species	<input type="checkbox"/>
	DT	Cyclotella species	<input type="checkbox"/>
	DT	Fragilaria species	<input type="checkbox"/>
	DT	Melosira species	<input type="checkbox"/>
	GR	Elakatothrix species	<input type="checkbox"/>
	GR	Oocystis species	<input type="checkbox"/>
	YL	Dinobryon species	<input type="checkbox"/>
<i>06/20/2007</i>			
	DT	Cyclotella species	<input checked="" type="checkbox"/>
	DT	Melosira species	<input type="checkbox"/>
	GR	Botryococcus species	<input type="checkbox"/>
<i>07/25/2007</i>			
	BG	Aphanocapsa species	<input type="checkbox"/>
	BG	Chroococcus species	<input type="checkbox"/>
	DT	Cocconeis pediculus	<input type="checkbox"/>
	DT	Stephanodiscus species	<input type="checkbox"/>
	GR	Ankistrodesmus species	<input type="checkbox"/>
	GR	Cosmarium species	<input type="checkbox"/>
	GR	Elakatothrix species	<input type="checkbox"/>
	GR	Sphaerocystis schroeteri	<input type="checkbox"/>
	GR	Spondylosium species	<input type="checkbox"/>
	YL	Dinobryon species	<input type="checkbox"/>

	<i>Type</i>	<i>Description</i>	<i>Dominant in Sample</i>
<i>08/15/2007</i>			
	DT	Cyclotella species	<input type="checkbox"/>
	GR	Ankistrodesmus species	<input type="checkbox"/>
	GR	Cosmarium species	<input type="checkbox"/>
	GR	Elakatothrix species	<input type="checkbox"/>
	GR	Eutetramorus globosus	<input type="checkbox"/>
	GR	Oocystis species	<input type="checkbox"/>
	GR	Tetraedron species	<input type="checkbox"/>
	YL	Dinobryon species	<input type="checkbox"/>
<i>09/11/2007</i>			
	BG	Anabaena species	<input type="checkbox"/>
	BG	Chroococcus species	<input type="checkbox"/>
	BG	Gomphosphaeria species	<input type="checkbox"/>
	DT	Melosira species	<input type="checkbox"/>
	GR	Botryococcus species	<input type="checkbox"/>
	GR	Cosmarium species	<input type="checkbox"/>
	GR	Elakatothrix species	<input type="checkbox"/>
	GR	Scenedesmus species	<input type="checkbox"/>
	GR	Tetradesmus smithii	<input type="checkbox"/>
	YL	Dinobryon species	<input type="checkbox"/>
<i>10/16/2007</i>			
	BG	Aphanothece species	<input type="checkbox"/>
	BG	Chroococcus species	<input type="checkbox"/>
	CP	Cryptomonas species	<input type="checkbox"/>
	DT	Asterionella species	<input type="checkbox"/>
	DT	Melosira species	<input type="checkbox"/>
	GR	Botryococcus species	<input type="checkbox"/>
	GR	Cosmarium species	<input type="checkbox"/>
	GR	Elakatothrix species	<input type="checkbox"/>
	GR	Oocystis species	<input type="checkbox"/>
	YL	Dinobryon species	<input checked="" type="checkbox"/>
Key: BG = Blue green EU = Euglenophyte CP = Cryptophyte GR = Green DF = Dinoflagellate YL = Yellow DT = Diatom			