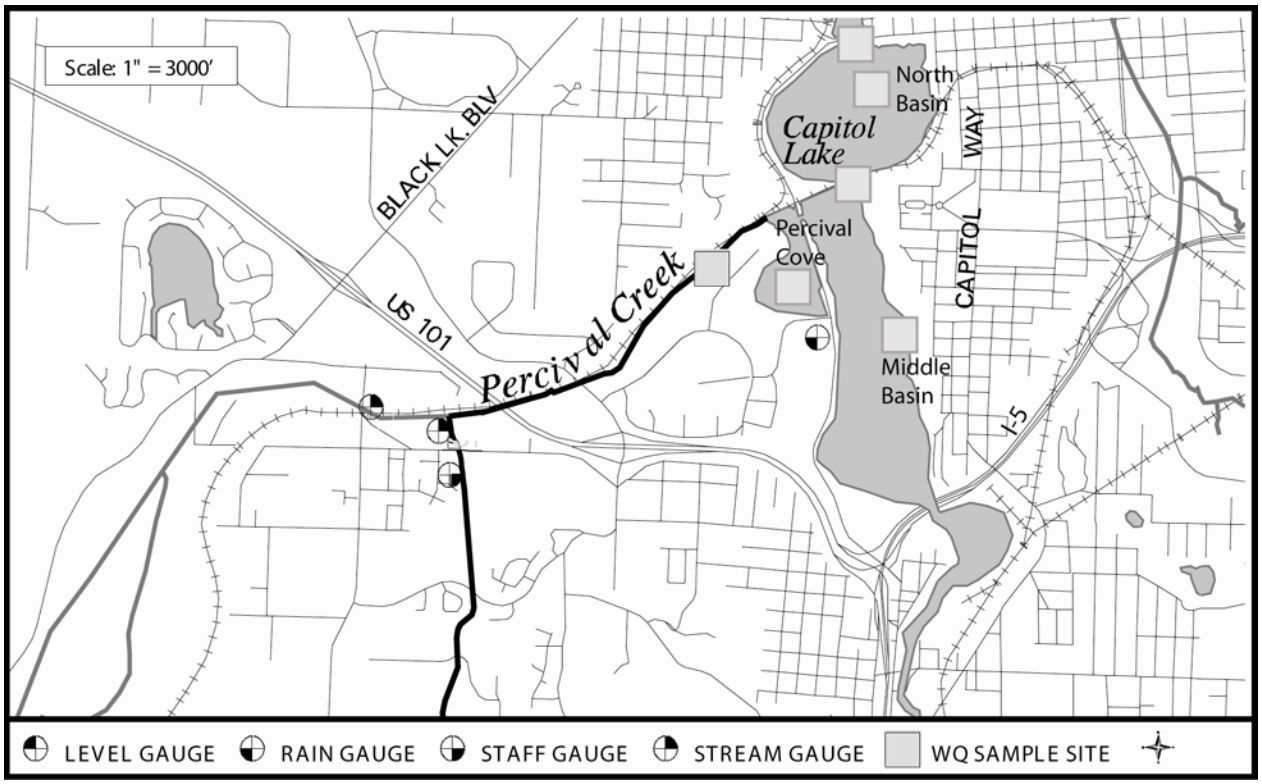
# Capitol Lake 2014




**PART OF** Budd Inlet **WATERSHED**

**LENGTH OF LAKE:** 1.6 miles

**SHORELINE LENGTH:** 5.3 miles

**LAKE SIZE:** 270 acres

**BASIN SIZE:** 185 square miles

**MEAN DEPTH:** 9 feet

**MAXIMUM DEPTH:** 20 feet

**VOLUME:** 2400 acre-feet

**PRIMARY LAND USES:**

The Deschutes River/Capitol Lake watershed includes commercial forestry in the upper basin and agriculture and rural residential in the middle of the watershed. Urban land uses in the lower watershed include portions of the Cities of Tumwater and Olympia and the state capitol campus.

**PRIMARY LAKE USES**:

Shoreline trails are used by walkers, joggers, and bird watchers. The lake is closed to boating and fishing to prevent the spread of an invasive species, the New Zealand Mudsnail.

**PUBLIC ACCESS:**

All of the north lake basin and much of the western sides of the middle and south basins are publicly owned. There are four parks along the lake, including Marathon Park, Tumwater Historical Park, Heritage Park, and the Capitol Lake Interpretive Center. There is a trail system along much of the western shoreline and around the north basin.

The public boat launch at Tumwater Historical Park on the south side of the Interstate 5 Bridge is currently closed to help prevent the spread of an invasive snail species, the New Zealand Mudsnail.

**GENERAL TOPOGRAPHY:**

The lake is essentially at sea level. Capitol Lake now covers much of the former saltwater estuary for the Deschutes River. In 1951 a tide gate was constructed at 5th Avenue, creating a freshwater lake and preventing saltwater from flowing into the lake under all but extreme high tide conditions. The lake is divided into three basins, constricted by fill at the Interstate 5 overpass and the railroad trestle near Marathon Park.

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

Poor: The lake is listed on the state's 303(d) list of water quality impaired water bodies for total phosphorus and fecal coliform. Sediment deposition from the Deschutes River, Percival Creek, shoreline erosion, and landslides has been progressively filling in the lake since it was created. Aquatic plant and algae growth is extensive in the summer. Control is on-going for invasive species, such as Eurasian water milfoil and purple loosestrife, and New Zealand Mudsnail, discovered in 2009.

**OTHER AVAILABLE DATA:**

Thurston County Environmental Health Division, (360) 867-2626, (historical water quality data) or www.co.thurston.wa.us/health/ehswat/swater.htm

**GENERAL DISCUSSION:**

***Background***

Capitol Lake was formerly an estuary of Budd Inlet. The lake was formed by the construction of a tide gate in 1951, which impounded the Deschutes River. The tide gate was constructed to create a reflection pond for the state capitol building. The resulting body of water looks like a lake; however the exchange of water into and out of the lake occurs fairly quickly compared to most lakes. During high winter flows in the Deschutes River, the water exchange in the lake can be as fast as a few hours. During the summer low-flow period, the exchange rate is much slower and it can take as long as 9 days for the river water to move through the lake.

Capitol Lake has several water quality problems. As an impoundment of the Deschutes River, Capitol Lake shares some of the river's characteristics, such as elevated nutrient levels and high turbidity during winter storms. The lake is gradually filling with sediments transported into it by the Deschutes River and Percival Creek, as well as other smaller sources. The wide shallow basins result in high surface water temperatures and allow light to reach the bottom of most of the lake. This provides excellent habitat for aquatic plants and algae, which impair recreational uses and further contribute to water quality problems. Until 1985, a swimming area was operated by the City of Olympia at the north end of the lake. However, poor water clarity and high fecal coliform bacteria levels forced closure of the swimming area. Water circulation into and out of the swim area was poor and likely contributed to its chronic water quality problems. There are numerous stormwater discharges into the lake along the shoreline in all three basins.

Likely sources of bacteria and nutrient pollution include: agricultural activities along the Deschutes River and its tributaries, septic systems, resident waterfowl, highway and urban stormwater runoff, accidental spills, illicit sewage discharges, and other nonpoint pollution sources.

To reduce water quality impacts on Percival Creek from stormwater discharges, City of Olympia constructed a regional stormwater detention/wetland system along Black Lake Ditch in the early 1990's. In 2003, City of Olympia initiated an illicit discharge detection and elimination program to identify and eliminate sewer connections to the city storm sewer systems. Since the program's inception numerous illicit connections have been found and eliminated.

City of Tumwater has been working to improve the stormwater system to help improve water quality. Currently under construction are the Cleveland Avenue bioswale retro-fit and Somerset Hill Rain Gardens projects, both of which will begin treating stormwater in early 2015. Two other storm water projects will also be constructed in 2015, and designs are underway to retro-fit a fifth major stormwater system that discharges to the Deschutes River. That project will incorporate low impact development features into the design. In addition, the City is doing habitat restoration activities along the river at Pioneer Park and in the DeSoto Canyon which drains Tumwater Hill and eastside neighborhoods.

Management of Capitol Lake is the responsibility of Washington Department of Enterprise Services (DES, formerly General Administration). Management of the lake has been guided by a 10-year Capitol Lake Adaptive Management Plan adopted in 2003. In September 2009, the Capitol Lake Steering Committee delivered a majority recommendation to the Director of Enterprise Services to remove the tidegate and restore the Deschutes River estuary in place of the existing lake. The community is divided regarding the estuary recommendation. Some residents support maintaining the lake. In 2010, the Capitol Lake adaptive management planning process was suspended. In the 2011-13 Capital Budget, the Legislature appropriated funds to begin looking at the permit process for dredging the lake. DES contracted for a Capitol Lake permitting analysis which was completed in June 2013. The William D. Ruckelshaus Center was then hired to do a situation assessment, which was finished in December 2014. The situation assessment explores key issues and prospects for collaboration among stakeholders around lake management.

### *2014 Ambient Monitoring Program*

In 2014, sampling locations for the ambient monitoring included two mid-lake sites, one each in the north and middle basins. Sampling included monthly sampling at those two locations, May through October. Sampling was done with the assistance of Department of Enterprise Services staff, using a boat that is dedicated to Capitol Lake. During and after sampling, special procedures are used to prevent the spread of the New Zealand Mudsnail.

Sample parameters include temperature, pH, dissolved oxygen, specific conductivity, water clarity, total phosphorus, total nitrogen, nitrate, ammonia, chlorophyll *a*, fecal coliform bacteria, and algae identification. Nutrient, chlorophyll, and algae samples were collected at a depth of one-meter. Nitrate and ammonia are included in the nutrient analyses to examine how nutrients from the Deschutes River are utilized as water moves through the lake basins. The water quality data is located at the end of the chapter.

### *Field Parameters*

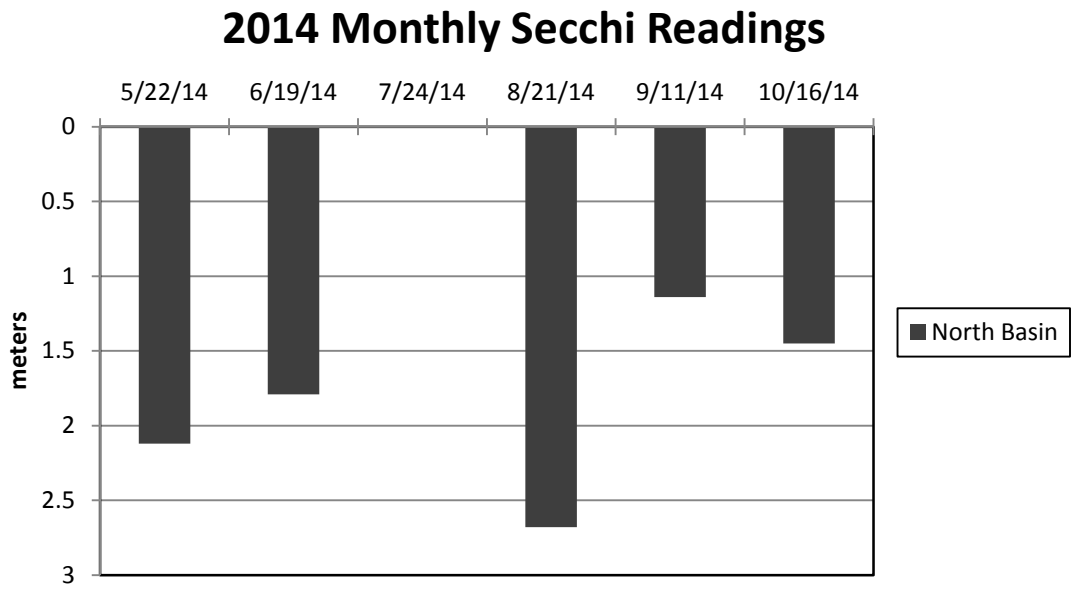
Unlike most Thurston County lakes, Capitol Lake does not thermally stratify due to its shallow depth and riverine influence. High conductivity (saline water) was measured near the bottom in the north basin from June through September, and to a less extent in the middle basin. This is the result of

marine water from Budd Inlet flowing over the fish ladder and into the lake during tides higher than 14 feet. Heavier saltwater settles in the deepest part of the lake and remains there until flushed out.

High dissolved oxygen concentrations sometimes occur as algae and aquatic plants photosynthesize during daylight hours. The highest dissolved oxygen level measured in 2014 was in the north basin in September at 1-meter depth, with a concentration of 14.07 mg/L at 10:30 AM. Profile graphs of the field measurements are located on pages 13 and 14.

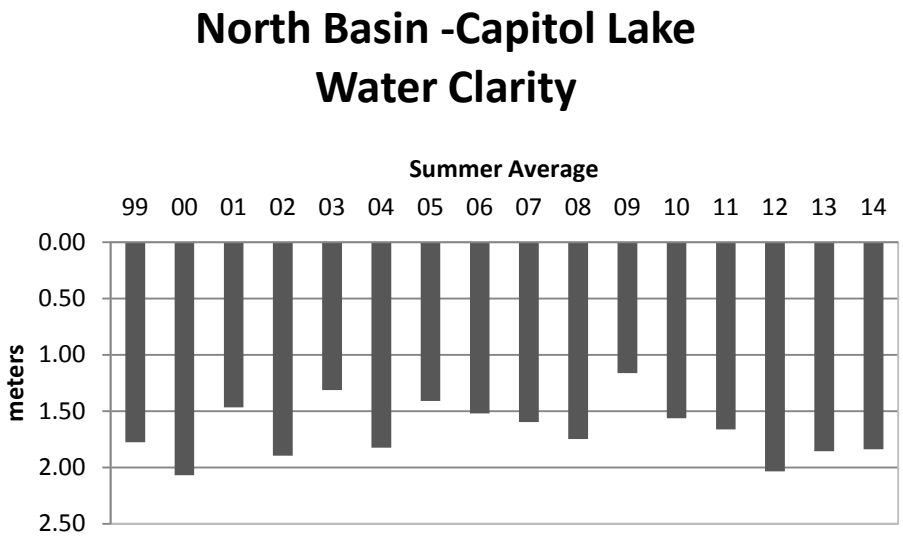
***Water Clarity***

The graph below shows 2014 monthly water clarity measurements in the north basin. Water clarity is measured with a device called a secchi disk. The water clarity standard that applies to bathing beaches is four (4) feet or greater. The north basin of Capitol Lake fell below that standard in September when the water clarity was only 1.14 meters (3.7 feet). The best water clarity in 2014 was measured in August at 2.68 meters (8.8 feet).




The season average clarity in the north basin in 2014 was 1.8 meters (6 feet). The next graph shows average summer water clarity for the past sixteen years. The averages are calculated using four to six monthly measurements collected between May and October. The exception is 1999, where only September and October data were available.

The graph shows that yearly water clarity averages vary by up to 0.9 meters, from 2.1 meters in 2000 to 1.2 meters in 2009. There does not appear to be an upward or downward trend in the water clarity over time.




***Fecal Coliform Bacteria***

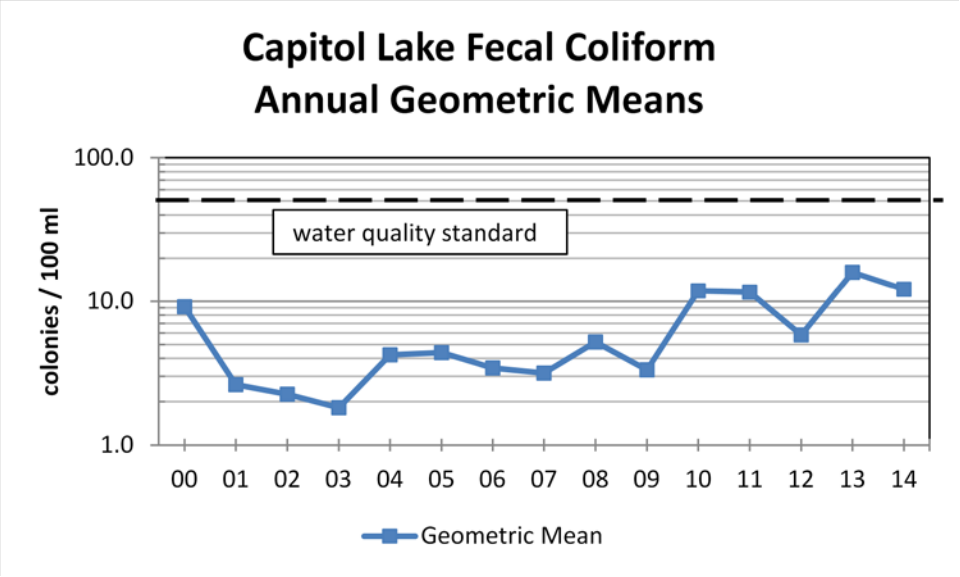
Fecal coliform bacteria samples are collected as part of the monitoring program because of the historic use of the lake for water contact recreation. Fecal coliform bacteria is also an indicator of pollution from human and animal waste, and the lake is on the Washington Department of Ecology 303(d) list of impaired water bodies for violations of the state fecal coliform standard. Results from 2014 sampling are shown in the table below.

**2014 Fecal Coliform Results**

| Date | North Basin | Middle Basin |
|---|---|---|
| 5/22/14 | 15 | <5 |
| 6/19/14 | 5 | 15 |
| 7/24/14 | 36 | 44 |
| 8/21/14 | 10 | 15 |
| 9/11/14 | <5 | 15 |
| 10/16/14 | 25 | 55 |

The state water quality standard for primary contact recreation is a geometric mean of 50 fecal coliform colonies per 100 ml with not more than ten (10) percent of the samples exceeding 100. County policy regarding closure of a bathing beach sets the fecal coliform standard at a geometric mean of 200 colonies per 100 ml. All sample results in 2014 in both basins met both parts of the water quality standard and were below the county beach closure threshold. Geometric means for 2014 in the north and middle basins were 10 and 15, respectively, and all samples results were below 100 colonies per 100 ml. Sample results from the past fifteen years are included in a table on pages 11 and 12.

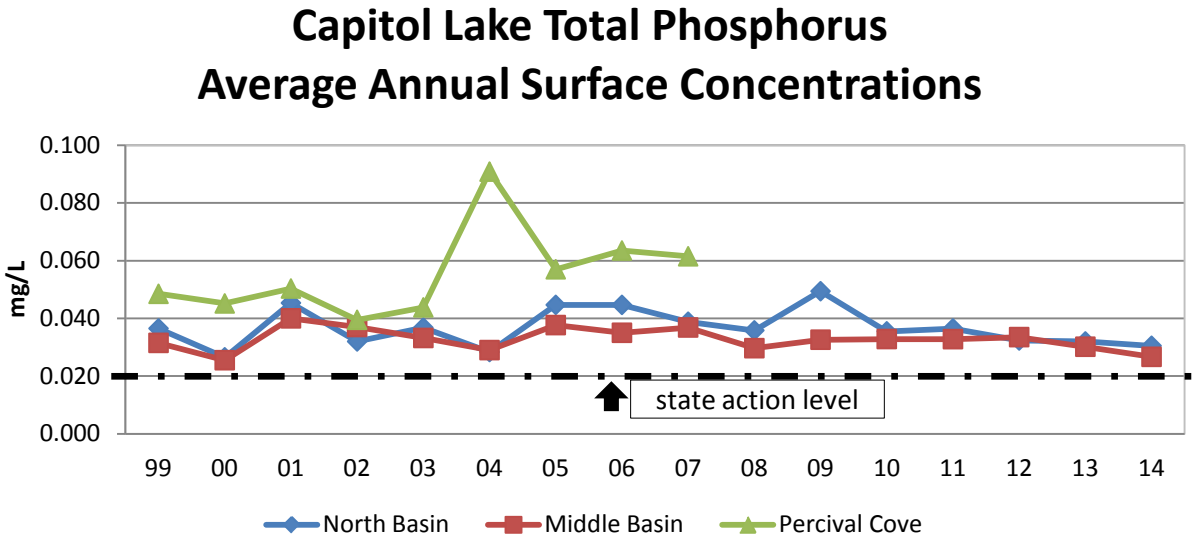
The graph below shows geometric means of each year's fecal coliform results since 2000. Geometric means since 2010 have been higher than in previous years, however, they still met the water quality standard.



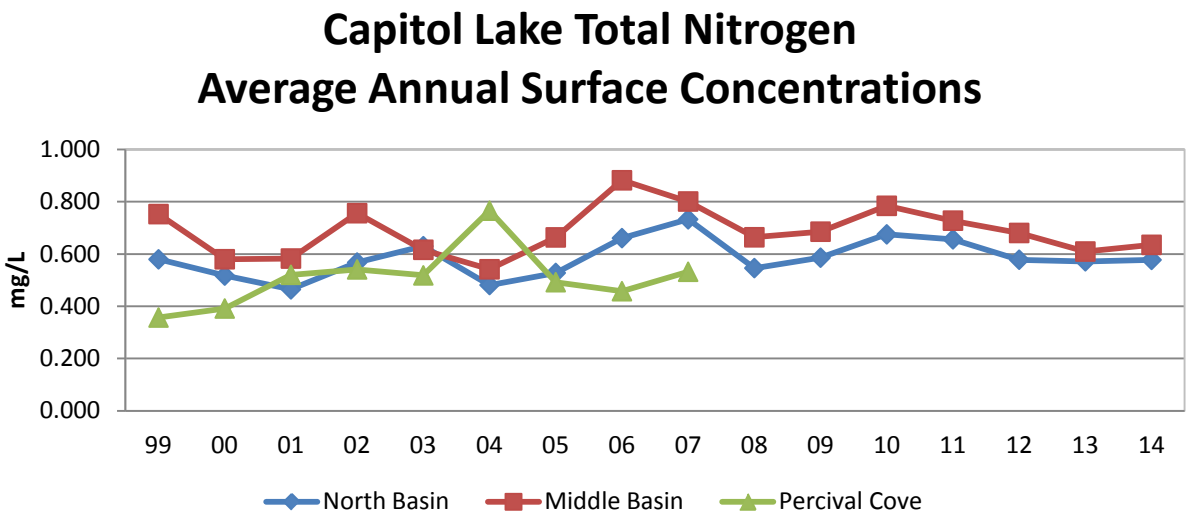

***Nutrients***

Generally, lakes in the Puget Sound region with summer average total phosphorus concentrations greater than 0.030 mg/l experience undesirable algae growth which interferes with recreational uses (USGS Water Supply Paper 2240). The state action level established in WAC 173-201A, "Water Quality Standards for Surface Water of the State of Washington" is 0.020 mg/l.

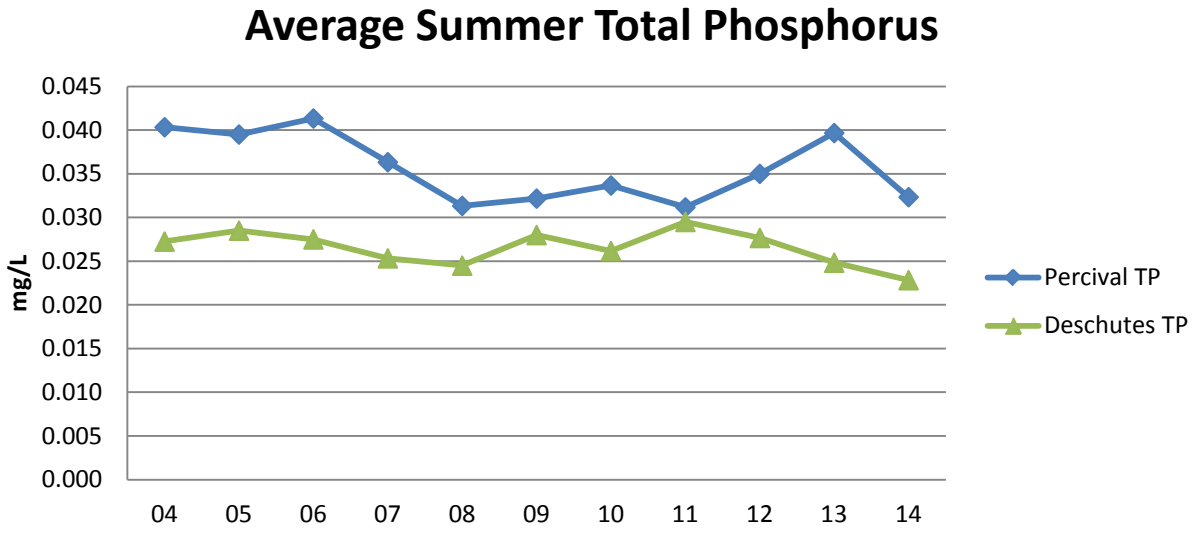
Average 2014 total phosphorus (TP) concentrations in the north and middle basins were above the state action level at 0.031 mg/l and 0.027 mg/l, respectively. Individual monthly phosphorus results in both basins in 2014 were all at or above the 0.020 mg/l state action level. The graph below shows the annual average total phosphorus concentrations since 1999 for the north and middle basins and Percival Cove (up to year 2007). Phosphorus concentrations in the north and middle basins are fairly similar, while Percival Cove had notably higher levels than in the main lake.



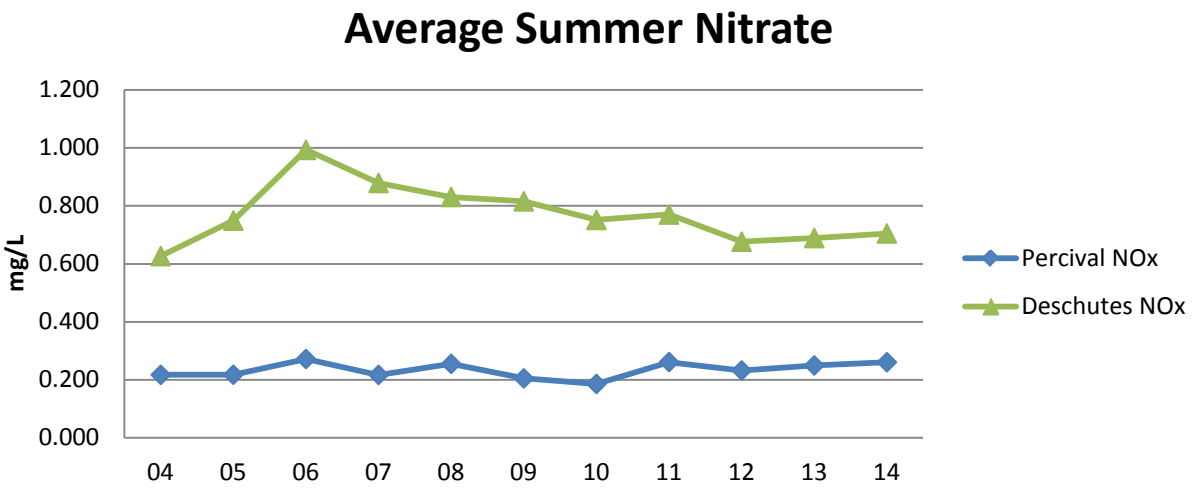
Annual average total nitrogen concentrations are graphed below. In 2014, average total nitrogen concentrations for north and middle basins respectively were 0.577 mg/l and 0.635 mg/l. The graph shows that the north basin consistently has lower nitrogen concentrations than the middle basin, likely due to uptake by aquatic plants. Total nitrogen to phosphorus ratios in both basins indicate that aquatic plant growth in summer is limited by the amount of available phosphorus.




Deschutes River and Percival Creek are the two main tributaries to the lake. Average summer total phosphorus and nitrate concentrations from 2004 to 2014 for these tributaries are graphed below. Percival Creek phosphorus concentrations are higher than the Deschutes River levels.



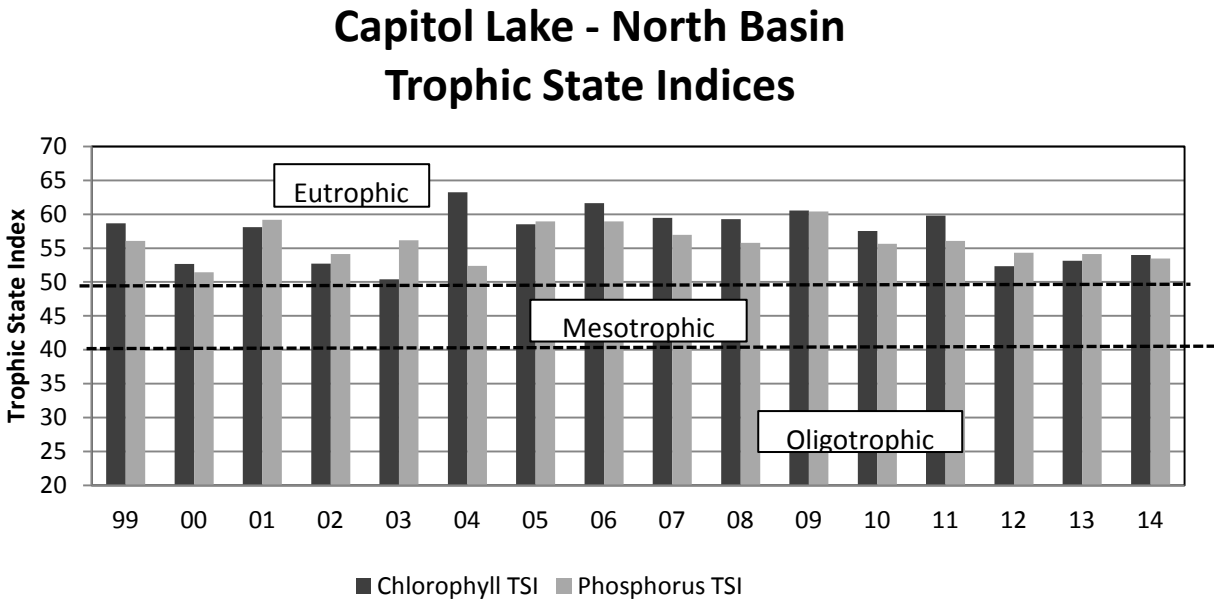

However the graph below shows that nitrate concentrations in the river are three times higher than in Percival Creek. The river nitrates range from 0.63 mg/l in 2004 to 0.99 mg/l in 2006, while in Percival the range is 0.186 in 2010 to 0.261 in 2011 and 2014. The average **total** nitrogen concentrations in the middle basin of the lake follow a pattern similar to nitrate in the river, although at slightly lower levels. The range of the average **total** nitrogen in the middle basin ranged from 0.54 mg/l in 2004 to 0.88 mg/l in 2006.



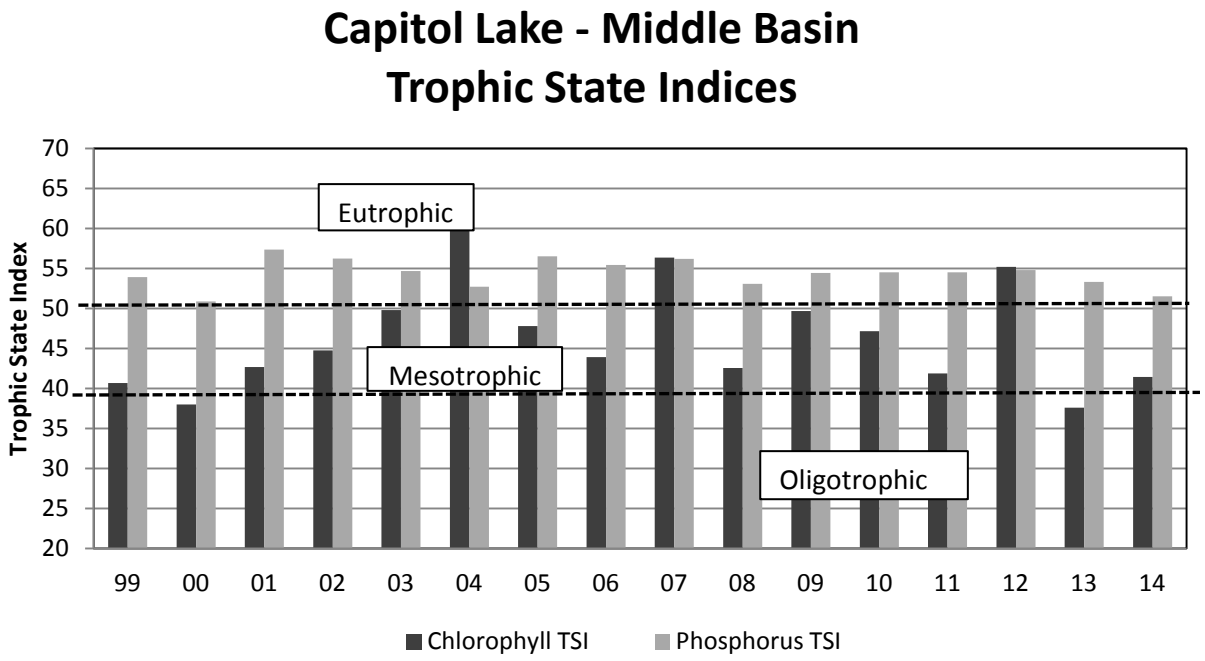

***Trophic State Indices***

The Carlson trophic state indices (TSI) are used to express the degree of productivity of a lake. Average summer total phosphorus and chlorophyll *a* concentrations and secchi disk transparency are each used to calculate TSIs for a lake. TSIs of 0 to 40 indicate an oligotrophic, or low productivity, lake. TSIs of 41 to 50 indicate a mesotrophic, or moderately productive lake. TSIs greater than 50 indicate a eutrophic, or highly productive lake. Due to the shallow nature of Capitol Lake and the dense rooted aquatic plant growth that occurs, secchi disk visibility is often either to the bottom or is obscured by plants, especially in the middle basin. Therefore, secchi TSIs are not a good indicator of trophic status in Capitol Lake and were not calculated for either basin.

The north basin's 2014 TSIs for chlorophyll *a* and total phosphorus were 54 and 53, respectively. The middle basin had TSI values of 41 for chlorophyll *a* and 52 for total phosphorus. TSIs from 1999 to 2014 are shown on the graphs below.




Note: '99 indices calculated from Sept and Oct data only




Note: '99 indices calculated from Sept and Oct data only

The phosphorus TSIs show that both basins are nutrient-rich and fall within the eutrophic range. The chlorophyll TSI for the north basin is also consistently in the eutrophic range indicating a highly productive system. Typically the chlorophyll TSI in the middle basin is lower than in the north basin due to the middle basin's proximity to the in-coming river, where the algae community has not had time to get established as it has farther downstream in the north basin. However, in 2013 and 2014 chlorophyll TSI in the middle basin were even lower than usual. The cause is uncertain.

One note regarding 2004, TSIs were high as a result of the effects of an herbicide treatment in the lake for the control of the invasive aquatic plant, Eurasian water milfoil.

***Algae***

In most nutrient-rich Thurston County lakes, blue-green algae tend to be the dominant algae group and the ones associated with "algae blooms". The algae composition in Capitol Lake is different, in that it tends to have more diatom species present than most other eutrophic lakes in this county. This is likely due to the lake's location at the downstream end of the Deschutes River system. In G.W. Prescott's, "The Algae: A Review", it states that water current is a major factor in the algae composition of flowing water environments. The organisms must be able to physically survive the rigors of current, be able to assimilate nutrients readily from flowing water, and be able to reproduce under those conditions. The diatom group is a diverse group, and many of the diatom species have characteristics that allow them to inhabitat flowing water environments.

2014 algae data is included at the end of this report. It is a list of those genera present in the sample, in alphabetical order by category. The order listed does not reflect dominance.

## Major Issues:

- A 10-year plan (for 2003 to 2013) for adaptively managing Capitol Lake was developed by Washington Department of Enterprise Services and a multi-agency steering committee. The goal of the plan is to achieve improvements in flood control, water quality, sediment management and infrastructure improvements. The plan identifies fourteen management objectives.

- In 2009 the Capitol Lake steering committee made a recommendation to the Washington Department of Enterprise Services to return the lake to a naturally functioning estuary after reviewing the results of several scientific studies conducted to determine the feasibility of estuary restoration. However, in May 2010, Enterprise Services, at the directive of the Legislature, suspended the Capitol Lake adaptive management planning process, due to budget limitations. In the 2011-13 capital budget, the Legislature appropriated funds to identify the permit process for dredging the lake, and a permitting analysis was completed in June 2013. In December 2014, William D. Ruckelshaus Center completed a situation assessment, which explored key issues and prospects for collaboration among stakeholders around lake management.

- Washington State Department of Ecology is conducting a total maximum daily load process in the watershed. This includes modeling the effects of the lake on Budd Inlet, and establishing discharge limits for pollution. A final technical report was released in June 2012. A draft water quality cleanup plan for the freshwater portion of the watershed (Deschutes River, Percival Creek, and Budd Inlet tributaries) is scheduled to be released for public comment in early 2015. The marine water cleanup plan (for Capitol Lake and Budd Inlet) will be developed, as phase II, after additional modeling is completed.

- Past and present Capitol Lake management issues include:
  - Sediment deposition and dredging
  - Poor water quality
  - Controlling the population of resident Canada geese
  - Accidental sewage and chemical spills
  - Excessive aquatic plant and algae growth
  - Invasive species such as purple loosestrife, Eurasian water milfoil**,** New Zealand mudsnail
  - Flooding and lake shoreline erosion
  - Chinook salmon hatching and rearing operation
  - Stormwater discharges

- In 2001 Eurasian water milfoil, an invasive aquatic plant, was discovered in the lake. In 2004, the herbicide triclopyr was applied to the lake to control the milfoil. In 2005, some surviving milfoil plants were discovered in the south basin and in the wetland near the Interpretive Center. Hand pulling and other alternative means are being used to control the plant's spread.

- In 2009 the invasive species, New Zealand mudsnail was discovered in the lake. Department of Enterprise Services has restricted lake access to prevent the spread of the snail, and is using water drawdown during freezing weather conditions to help control the population.

## Funding Sources:

2014 water quality monitoring was funded by Washington Department of Enterprise Services.

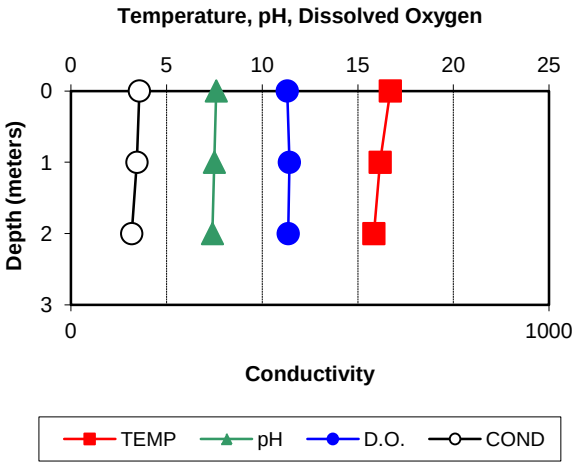
## Capitol Lake Fecal Coliform Bacteria Sample Results (colonies/100ml)

| Date | North Basin | Middle Basin | Percival Cove |
|---|---|---|---|
| 6/21/00 | 5 | 5 | 10 |
| 7/19/00 | 5 | 3 | 10 |
| 8/23/00 | <5 | 5 | <5 |
| 9/21/00 | 25 | 20 | 5 |
| 10/25/00 | 40 | 35 | 5 |
| 5/16/01 | 35 | 45 | 10 |
| 6/20/01 | <5 | <5 | 5 |
| 7/17/01 | 5 | <5 | <5 |
| 8/15/01 | <5 | <5 | <5 |
| 9/20/01 | 10 | <5 | 5 |
| 10/19/01 | <5 | <5 | 10 |
| 5/20/02 | <5 | 5 | <5 |
| 6/17/02 | <5 | 13 | 5 |
| 8/28/02 | <5 | <5 | – |
| 9/26/02 | <5 | 7 | – |
| 6/19/03 | – | -- | 5 |
| 7/17/03 | <5 | <5 | 5 |
| 8/19/03 | <5 | 5 | <5 |
| 9/24/03 | 5 | <5 | 5 |
| 5/25/04 | 8 | <5 | <5 |
| 6/14/04 | 6 | 11.5 | 5 |
| 7/13/04 | 2 | 3 | 5 |
| 8/18/04 | 1 | 1 | <5 |
| 9/29/04 | 4.5 | 9 | 10 |
| 10/13/04 | <5 | 15 | 5 |
| 5/18/05 | 50 | 45 | 60 |
| 6/22/05 | 5 | 38 | <5 |
| 7/20/05 | <5 | <5 | <5 |
| 8/17/05 | <5 | 5 | <5 |
| 9/14/05 | <5 | <5 | <5 |
| 10/18/05 | <5 | 15 | <5 |
| 5/24-25/06 | 10 | 105 | 40 |
| 6/21-22/06 | 5 | <5 | <5 |
| 7/26/06 | <5 | <5 | <5 |
| 8/16/06 | <5 | <5 | 5 |
| 9/20/06 | 5 | 10 | 10 |
| 10/11/06 | <5 | 5 | <5 |
| 5/23/07 | <5 | <5 | 15 |
| 6/18/07 | <5 | 20 | 10 |
| 9/12/07 | <5 | <5 | -- |
| 9/26/07 | 5 | <5 | -- |
| 10/17/07 | 15 | 50 | -- |

| Date | North Basin | Middle Basin | Percival Cove |
|---|---|---|---|
| 5/21/08 | 50 | 25 | -- |
| 6/16/08 | 5 | 5 | -- |
| 7/15/08 | <5 | 5 | -- |
| 8/12/08 | 20 | <5 | -- |
| 9/17/08 | <5 | <5 | -- |
| 10/15/08 | 5 | 10 | -- |
| 5/26/09 | 10 | 20 | -- |
| 6/24/09 | <5 | <5 | -- |
| 8/19/09 | <5 | 5 | -- |
| 9/14/09 | <5 | 10 | -- |
| 10/14/09 | <5 | 10 | -- |
| 5/27/10 | 45 | 60 | -- |
| 6/23/10 | 45 | 10 | -- |
| 7/22/10 | 10 | 45 | -- |
| 8/25/10 | <5 | 80 | -- |
| 9/22/10 | -- | 10 | -- |
| 10/21/10 | <5 | <5 | -- |
| 6/22/11 | 20 | 30 | -- |
| 7/20/11 | -- | 15 | -- |
| 8/30/11 | <5 | 5 | -- |
| 9/21/11 | <5 | 5 | -- |
| 10/12/11 | 60 | 163 | -- |
| 5/30/12 | 5 | 5 | -- |
| 6/21/12 | 15 | <5 | -- |
| 7/26/12 | 20 | <5 | -- |
| 8/23/12 | 10 | 30 | -- |
| 9/20/12 | <1 | <1 | -- |
| 10/25/12 | 40 | 10 | -- |
| 5/30/13 | 40 | 35 | -- |
| 6/20/13 | <5 | 15 | -- |
| 7/25/13 | 15 | 20 | -- |
| 8/22/13 | 30 | 10 | -- |
| 9/19/13 | 35 | 40 | -- |
| 10/17/13 | <5 | 67 | -- |
| 5/22/14 | 15 | <5 | -- |
| 6/19/14 | 5 | 15 | -- |
| 7/24/14 | 36 | 44 | -- |
| 8/21/14 | 10 | 15 | -- |
| 9/11/14 | <5 | 15 | -- |
| 10/16/14 | 25 | 55 | -- |
| Mean (GMV) | 4 | 7 | 4 |
| # of records | 79 | 81 | 37 |

# CAPITOL LAKE - NORTH BASIN

## May 22, 2014

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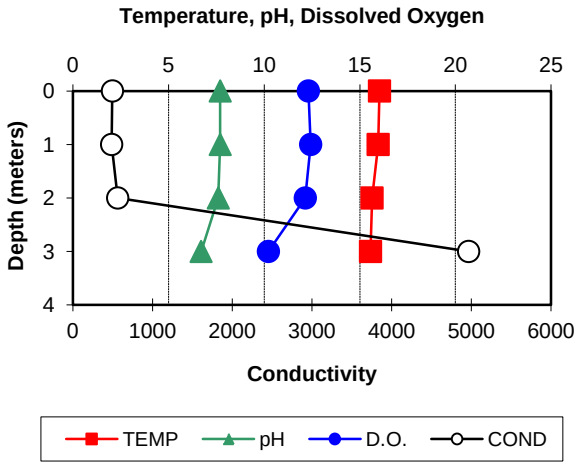


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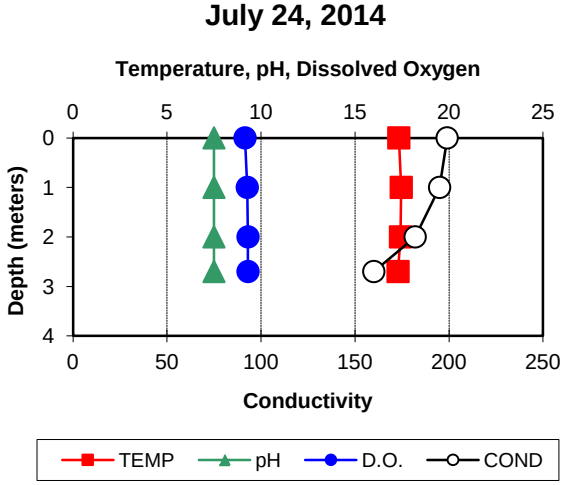


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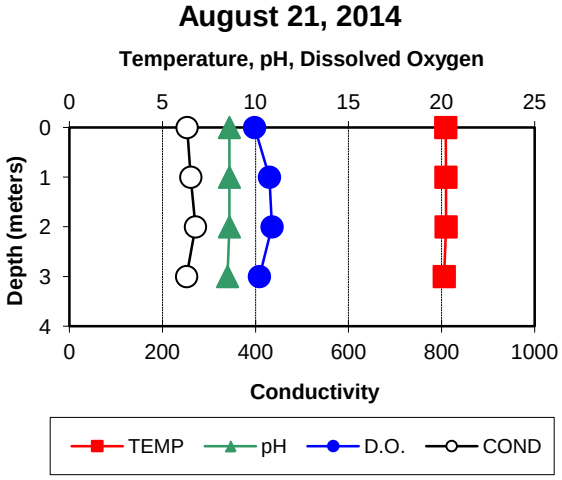


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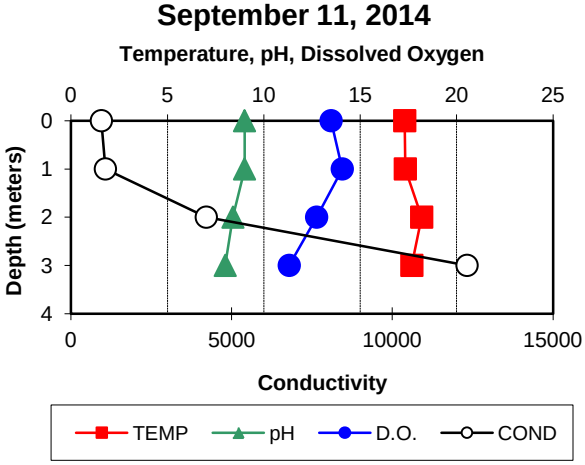


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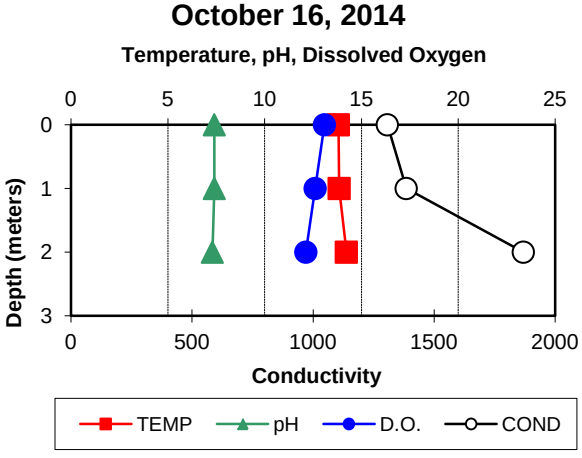

# CAPITOL LAKE - MIDDLE BASIN

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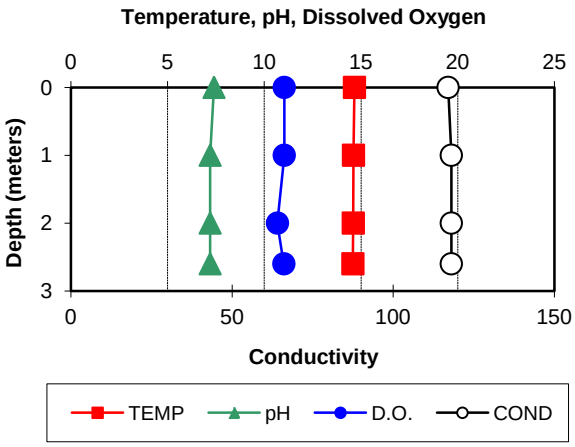
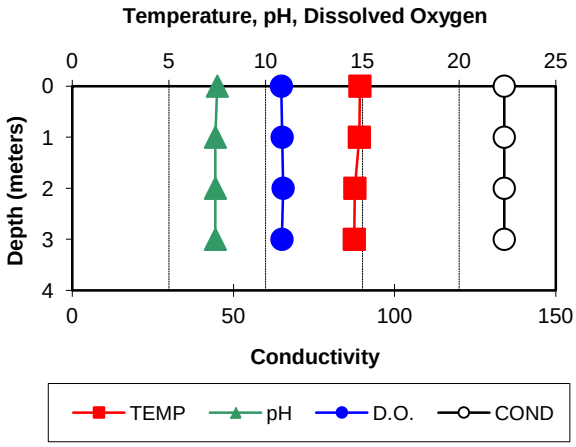
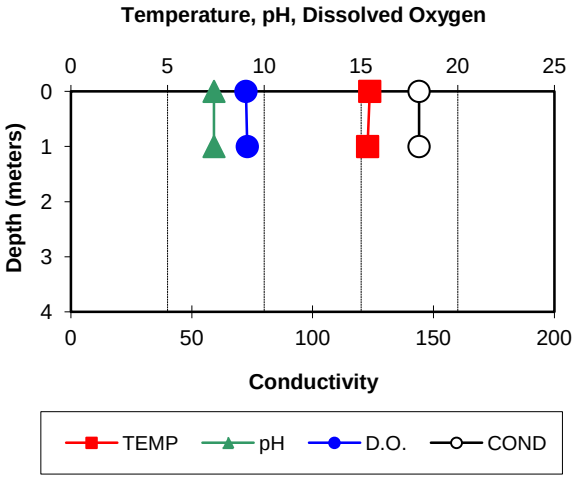


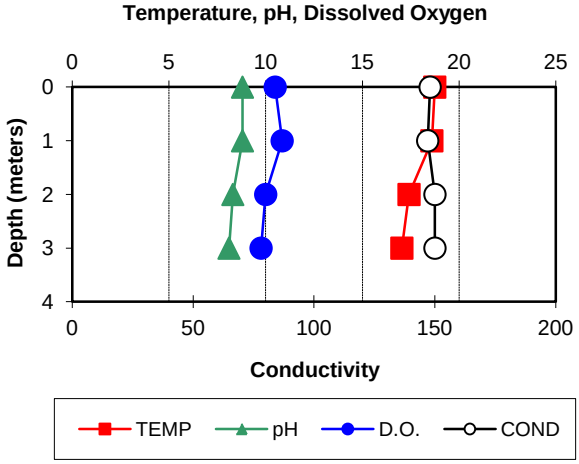

## June 19, 2014



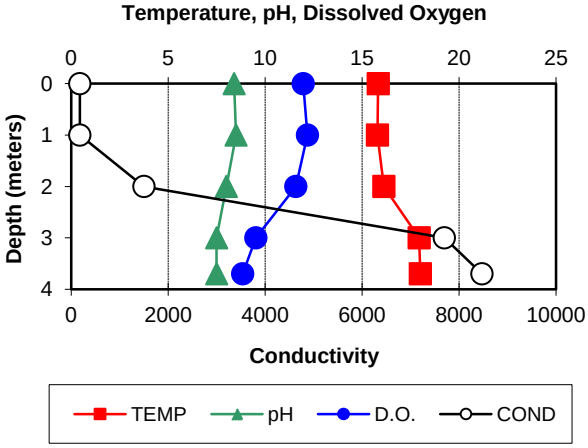

## July 24, 2014



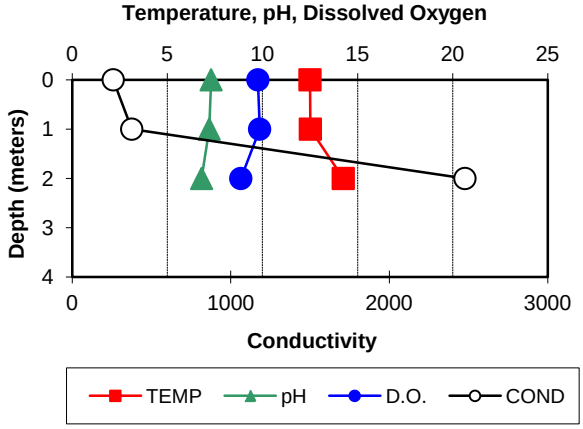

## August 21, 2014




## September 11, 2014




## October 16, 2014



# *Thurston County Water Resources Annual Report - 2014*

## Capitol Lake @ Mid- North Basin

***Site ID#*** *BUDCAL005*

| *Date* | *Time* | *Bottom Depth m* | *Sur TP mg/L* | *Sur TN mg/L* | *NO3+NO2 mg/L* | *NH4 mg/L* | *Secchi m* | *Chl a ug/L* | *Phae a ug/L* | *Water* | *Lake Notes* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 05/22/2014 | 10:00:00 AM | 2.4 | 0.027 | 0.433 | 0.326 | 0.019 | 2.12 | 5.3 | 1.8 | #6 yellow-green | Chl a & algae @ 1M. FC - 15 |
| 06/19/2014 | 10:00:00 AM | 3.2 | 0.027 | 0.585 | 0.391 | 0.005 | 1.79 | 7.5 | 7.8 | #6 yellow-green | Chl a & algae @ 1M. FC - 5 |
| 07/24/2014 | 9:45:00 AM | 2.7 | 0.026 | 0.598 | 0.499 | 0.038 | | 3.7 | 2.6 | | Chl a & algae @ 1M. FC - 36 |
| 08/21/2014 | 10:30:00 AM | 3.2 | 0.037 | 0.676 | 0.308 | 0.005 | 2.68 | 6.9 | 3.2 | #6 yellow-green | Chl a & algae @ 1M. Ammonia reported as <0.010. FC - 10 |
| 09/11/2014 | 10:30:00 AM | 3.2 | 0.035 | 0.411 | 0.116 | 0.005 | 1.14 | 22 | 0.9 | #6 yellow-green | Chl a & algae @ 1M. Ammonia reported as <0.010 mg/L. FC - <5 |
| 10/16/2014 | 10:00:00 AM | 2.2 | 0.031 | 0.761 | | | 1.45 | 20 | 4.2 | #6 yellow-green | Chl a & algae @ 1M. FC - 25 |

*Summary for 'Site Description' = Capitol Lake @ Mid- North Basin (6 detail records)*

**Averages:** **Sur TP** *0.031*
**Secchi** *1.84*
**Chl a** *10.9*

# *Thurston County Water Resources Annual Report - 2014*

## Capitol Lake @ Mid- Middle Basin

***Site ID#*** *BUDCAL015*

| *Date* | *Time* | *Bottom Depth m* | *Sur TP mg/L* | *Sur TN mg/L* | *NO3+NO2 mg/L* | *NH4 mg/L* | *Secchi m* | *Chl a ug/L* | *Phae a ug/L* | *Water* | *Lake Notes* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 05/22/2014 | 9:15:00 AM | 2.6 | 0.020 | 0.591 | 0.379 | 0.023 | 2.24 | 4.3 | 3.6 | #6 yellow-green | Chl a & algae @ 1M. FC -<5 |
| 06/19/2014 | 9:30:00 AM | 3.2 | 0.026 | 0.612 | 0.555 | 0.035 | 1.79 | 2.7 | 2.9 | #6 yellow-green | Chl a & algae @ 1M. Ammonia reported as <0.010. FC - 15 |
| 07/24/2014 | 9:15:00 AM | 1.2 | 0.024 | 0.738 | 0.696 | 0.045 | 1.24 | 2.1 | 2 | #6 yellow-green | Chl a & algae @ 1M. FC - 44 |
| 08/21/2014 | 10:00:00 AM | 3 | 0.033 | 0.480 | 0.376 | 0.015 | 3.44 | 3.2 | 2 | #6 yellow-green | Chl a & algae @ 1M. FC - 15 |
| 09/11/2014 | 9:30:00 AM | 3.7 | 0.032 | 0.593 | 0.447 | 0.019 | 3.99 | 1.9 | 1.1 | #6 yellow-green | Chl a & algae @ 1M. FC - 15 |
| 10/16/2014 | 9:30:00 AM | 2.1 | 0.025 | 0.795 | | | 2.19 | 4 | 0.05 | #6 yellow-green | Chl a & algae @ 1M. PHAEO-a was reported as <0.1. FC - 55 |

*Summary for 'Site Description' = Capitol Lake @ Mid- Middle Basin (6 detail records)*

| | | |
|---|---|---|
| **Averages:** | **Sur TP** | *0.027* |
| | **Secchi** | *2.48* |
| | **Chl a** | *3.0* |

## *Algae data:* Capitol Lake @ Mid- North Basin

| *Type* | *Description* | *Dominant in Sample* |
|---|---|---|
| *05/22/2014* | | |
| CP | Cryptomonads | ☐ |
| DT | Asterionella species | ☐ |
| DT | Cyclotella species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Navicula species | ☐ |
| GR | Scenedesmus species | ☐ |
| YL | Dinobryon species | ☐ |
| *06/19/2014* | | |
| BG | Pseudanabaena species | ☐ |
| CP | Cryptomonads | ☐ |
| DT | Asterionella species | ☐ |
| DT | Aulacoseira species | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Cyclotella species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Synedra species | ☐ |
| DT | Tabellaria species | ☐ |
| DT | Urosolinia species | ☐ |
| EU | Trachelomonas species | ☐ |
| GR | Ankistrodesmus species | ☐ |
| GR | Pandorina species | ☐ |
| YL | Dinobryon species | ☐ |
| YL | Mallomonas species | ☐ |

| Type | Description | Dominant in Sample |
|---|---|---|
| *07/24/2014* | | |
| CP | Cryptomonads | ☐ |
| DF | Peridiniopsis species | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Cyclotella species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Meridion species | ☐ |
| DT | Synedra species | ☐ |
| *08/21/2014* | | |
| CP | Cryptomonads | ☐ |
| DT | Aulacoseira species | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Navicula species | ☐ |
| DT | Synedra species | ☐ |
| GR | Ankistrodesmus species | ☐ |
| GR | Closterium species | ☐ |
| GR | Golenkinia species | ☐ |
| GR | Nephrocytium species | ☐ |
| *09/11/2014* | | |
| DT | Cyclotella species | ☑ |
| DT | Synedra species | ☑ |
| GR | Actinastrum species | ☐ |
| GR | Golenkinia species | ☐ |

| *Type* | *Description* | *Dominant in Sample* |
|---|---|---|

*10/16/2014*

| | | |
|---|---|---|
| BG | Pseudanabaena species | ☐ |
| CP | Cryptomonads | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Cyclotella species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Synedra species | ☐ |
| GR | Actinastrum species | ☐ |
| GR | Pandorina species | ☐ |
| GR | Scenedesmus species | ☐ |

***Key:*** *BG = Blue green* *EU = Euglenophyte*
*CP = Cryptophyte* *GR = Green*
*DF = Dinoflagellate* *YL = Yellow*
*DT = Diatom*

## *Algae data:* Capitol Lake @ Mid- Middle Basin

| Type | Description | Dominant in Sample |
|---|---|---|
| *05/22/2014* | | |
| DT | Cocconeis species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Fragilaria species | ☐ |
| DT | Meridion species | ☐ |
| DT | Navicula species | ☐ |
| DT | Synedra species | ☐ |
| GR | Spondylosium species | ☐ |
| YL | Dinobryon species | ☐ |
| *06/19/2014* | | |
| CP | Cryptomonads | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Meridion species | ☐ |
| DT | Navicula species | ☐ |
| *07/24/2014* | | |
| CP | Cryptomonads | ☐ |
| DF | Peridiniopsis species | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Cyclotella species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Fragilaria species | ☐ |
| DT | Meridion species | ☐ |
| DT | Synedra species | ☐ |
| GR | Actinastrum species | ☐ |
| GR | Ankistrodesmus species | ☐ |
| GR | Scenedesmus species | ☐ |

| Type | Description | Dominant in Sample |
|---|---|---|
| *08/21/2014* | | |
| CP | Cryptomonads | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Navicula species | ☐ |
| DT | Synedra species | ☐ |
| EU | Euglena species | ☐ |
| GR | Ankistrodesmus species | ☐ |
| GR | Scenedesmus species | ☐ |
| YL | Dinobryon species | ☐ |
| *09/11/2014* | | |
| CP | Cryptomonads | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Synedra species | ☐ |
| GR | Closterium species | ☐ |
| GR | Pandorina species | ☐ |
| GR | Pediastrum species | ☐ |
| GR | Scenedesmus species | ☐ |
| *10/16/2014* | | |
| BG | Pseudanabaena species | ☐ |
| DT | Cocconeis species | ☐ |
| DT | Cyclotella species | ☐ |
| DT | Cymbella species | ☐ |
| DT | Diatoms species | ☐ |
| DT | Synedra species | ☐ |
| GR | Pandorina species | ☐ |
| GR | Scenedesmus species | ☐ |
| YL | Dinobryon species | ☐ |

***Key:*** *BG = Blue green* *EU = Euglenophyte* *CP = Cryptophyte* *GR = Green* *DF = Dinoflagellate* *YL = Yellow* *DT = Diatom*