

## Blue Lake

Jefferson County

Deschutes Basin

### Location

|                    |   |                  |                      |
|--------------------|---|------------------|----------------------|
| <b>Area</b>        | 54 acres (21.9 hect)  | <b>Elevation</b> | 3,453 ft (1,052.5 m) |
| <b>Type</b>        | natural lake  | <b>Use</b>       | recreation           |
| <b>Location</b>    | 23 miles north west of Sisters in Deschutes National Forest |                  |                      |
| <b>Access</b>      | road 1 mile south from US Hwy 20/126 at Suttle Lake         |                  |                      |
| <b>USGS Quad</b>   | Three Fingered Jack (24K), Bend (100K)                      |                  |                      |
| <b>Coordinates</b> | 44° 24' 55" N, 121° 45' 48" W                               |                  |                      |
| <b>USPLSS</b>      | township 13S, range 08E, section 27                         |                  |                      |

Blue Lake is a small, but very deep Cascade Mountain lake, and is often called "the Crater Lake of the Central Oregon Cascades." Because of its great depth (maximum depth greater than 300 feet), it is certainly the bluest of the many Blue Lakes in Oregon. The lake basin is an explosion crater formed from a violent steam explosion, a result of hot volcanic rock coming in contact with underground water. Radiocarbon dating of charcoal revealed that the formative blast occurred about 3500 years ago. Blue Lake and nearby Suttle Lake lie in the same broad valley and it was originally assumed that both lie in basins scoured by glaciers. Subsequent study by geologists revealed that only Suttle Lake is glacial in origin; Blue Lake is clearly volcanic.

The Blue Lake drainage basin is composed of forested slopes that are extremely steep; much of it is actually part of the explosion crater that holds the lake. The lake thus has very little shallow water; only about three percent of the water surface area is less than 10 feet deep. The water in the lake comes from several sources; some is supplied by snowmelt runoff from the surrounding slopes, and one intermittent stream enters from the northwest. However, the source of most of the water that fills Blue Lake is from large springs at about 240 feet below the water surface near the east shore. Link Creek, the outlet stream, has cut through the crater wall on the east and flows about half a mile to Suttle Lake.

The Blue Lake — Suttle Lake area has long been a favorite with outdoor enthusiasts, and several Forest Service campgrounds are in the area, including one at Blue Lake. Several hiking and horse trails follow the shoreline. Rainbow trout are stocked in the lake each year, and some kokanee are taken. Fishing is best in the warmer months because of the depth of the lake. Elliott R. Corbett Memorial State Park includes part of the south and west shores of Blue Lake. The park is preserved as a wilderness area, with only water and toilet installations provided. Use of the park is light, as it is accessible only by trail. About half of the rocky, forested shoreline is in private ownership, and a private resort is located at the outlet. The area of the Cascades from Blue Lake and Suttle Lake to Sisters and south of U.S. Highway 20 has a checkerboard pattern of privately-owned parcels of land alternating with land under management of the Forest Service. Land use and land management plans must be adjusted to the discontinuous nature of the land ownership pattern.

The water chemistry data for this lake are peculiar. In the water samples collected on 7/21/82 the concentrations of major ions were slightly above average for lakes in the region. Similar concentrations (with less complete data) were observed in samples collected in 1971 by the U.S. Environmental Protection Agency. However, a water sample collected by the Oregon Department of Environmental Quality in October, 1972, contained much higher concentrations of sodium and chloride, with a corresponding increase in conductivity. The explanation for this variability in the data is unknown, but it is possible that the lake receives sporadic inflow from concentrated hydrothermal springs. The concentration of phosphorus is exceptionally high in all samples and, by itself, this high phosphorus concentration would classify the lake as distinctly eutrophic. However, water transparency is high, dissolved oxygen is not depleted in the hypolimnion and except for an occasional bloom the populations of phytoplankton are low and the species are indicators of oligotrophy. All of these factors give the lake a distinct oligotrophic character.



Source: Oregon National Guard, 1981-82. View looking southwest.

### Drainage Basin Characteristics

|                   |                                 |                  |                  |                |                       |                |                  |
|-------------------|---------------------------------|------------------|------------------|----------------|-----------------------|----------------|------------------|
| <b>Area</b>       | 17.3 sq mi (44.8 sq km)         | <b>Relief</b>    | very steep       | <b>Precip</b>  | 57-80 in (145-203 cm) |                |                  |
| <b>Land Use %</b> | <b>Forest</b> 95.0              | <b>Range</b> 1.0 | <b>Water</b> 1.0 | <b>Irrig</b> - | <b>Non Irrig</b> -    | <b>Urban</b> - | <b>Other</b> 3.0 |
| <b>Notes</b>      | Other - Rock outcrops and lava. |                  |                  |                |                       |                |                  |

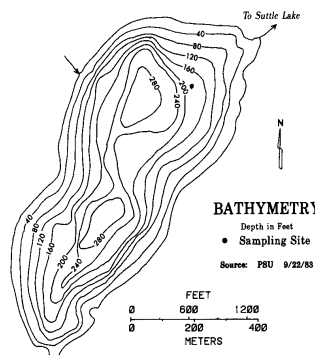
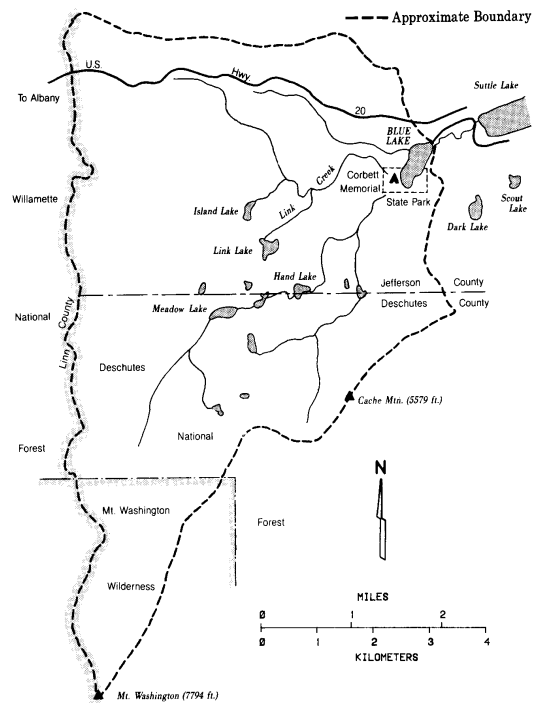
### Lake Morphometry

|                            |                        |                       |                                |                               |
|----------------------------|------------------------|-----------------------|--------------------------------|-------------------------------|
| <b>Area</b>                | 54.0 acres (21.9 hect) | <b>Depth</b>          | <b>Maximum</b> 314 ft (95.7 m) | <b>Average</b> 140ft (42.7 M) |
| <b>Ave/Max Depth Ratio</b> | 0.450                  | <b>Volume</b>         | 7,552 acre ft (9.33 cu hm)     |                               |
| <b>Shoal area</b>          | 4%                     | <b>Volume factor</b>  | 1.34                           | <b>Shape factor</b> 1.24      |
| <b>Length of Shoreline</b> | 1.3 mi (2.1 km)        | <b>Retention time</b> | indet.                         |                               |
| <b>Notes</b>               | -                      |                       |                                |                               |

### Water Quality

|                       |  |                                |               |                             |               |                 |  |
|-----------------------|--|--------------------------------|---------------|-----------------------------|---------------|-----------------|--|
| <b>Trophic status</b> | oligotrophic, high concentration of major ions |                                |               |                             |               |                 |  |
| <b>Sample date</b>    | 07/21/82                                       | <b>Temp</b>                    | 58.8F (14.9C) | <b>Diss. Oxygen (mg/l)</b>  | 8.2           |                 |  |
| <b>Transparency</b>   | 52.5 ft (16.0 m)                               | <b>Phosp (mg/l)</b>            | 0.029         | <b>Chlorophyll a (mg/l)</b> | 0.2           |                 |  |
| <b>Alkalinity</b>     | 16   | <b>Conductivity (umhos/cm)</b> | 50            | <b>pH</b>                   | 6.9           |                 |  |
| <b>Major Ions</b>     | <b>Na</b> 2.6                                  | <b>K</b> 0.9                   | <b>Ca</b> 4.3 | <b>Mg</b> 2.0               | <b>Cl</b> 0.6 | <b>SO4</b> <0.1 |  |
| <b>Notes</b>          | -  |                                |               |                             |               |                 |  |

### DRAINAGE BASIN



### TEMPERATURE AND OXYGEN

