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Water Supply Wells at Lake Crescent, Olympic National Park

Hydrogeology

In general, the bedrock formations surrounding Lake Crescent are poor targets for water-supply wells (Em_{2a}, Em_{2ls}, Ev_{cp}, EP_{Am}). Private, domestic wells, requiring only 1-2 gpm, may be achievable. However, larger yields are unlikely. In particular, the bedrock (Em_{2a}) underlying the Log Cabin Resort area is mapped as siltstone and is unlikely to provide even 1 gpm on a sustainable basis.

Most of the wells at Lake Crescent have been constructed in unconsolidated deposits which have greater permeability than the bedrock; landslide deposits, alluvium, or glacial outwash.

Description of individual wells

Log Cabin – Several test wells were constructed at the Log Cabin Resort in 1979 and 1981. The drillers' logs all show the predominant rock type as shale; which could be an appropriate description for the dark-colored marine siltstone shown on the geologic map for this area. Three of the wells were drilled to about 200 feet, the fourth well was drilled to 125 feet. Three of the four test holes were reported to be dry, the fourth well reportedly yielded 5 gpm of salty water. All wells were abandoned. NPS operates a surface water system for the lodge and associated facilities. There are no good targets for constructing a productive well in the vicinity of the Log Cabin Resort.

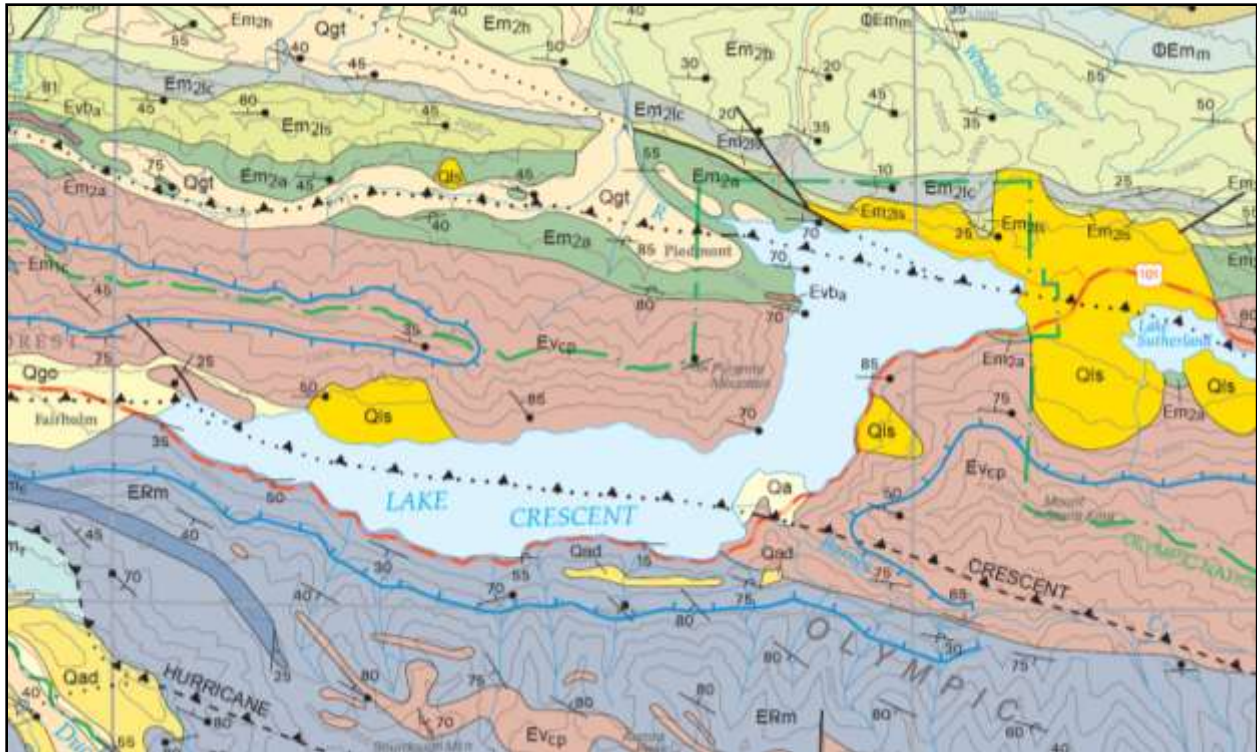
East Beach – The location of the East Beach well shown on the attached topo map is as shown on various documents in WRD files. The location description on the well completion report would place this well about a mile further west, along the north shore of the lake. The driller's log for the well shows that it encountered fractured basalt from 8-25 feet. Bedrock underlying the north shore is marine siltstone (identified as "shale" in the driller's logs for wells at Log Cabin Resort). Bedrock underlying the landslide deposits at the east end of the lake is more likely to be basalt (map unit Ev_{cp}). The well reportedly yielded 89 gpm with 3½ inches of drawdown. These data cause me to suspect that the well may be so close to the lake that it draws surface water directly through the fractures in the basalt.

Lake Crescent Lodge – Four wells were constructed at Barnes Point in December 1977 and January 1978. Wells at Lake Crescent Lodge are shallow (LT 50 feet) and completed in alluvium deposited as a delta at the mouth of Barnes Creek, where it enters the lake. Primary and backup water supply wells were constructed in the parking lot area. Both wells are 78 feet deep and penetrated mostly gravel (outwash as shown on the geologic map). Both wells were test pumped at 200 gpm. A fire well was constructed about 1000 feet west of the potable water supply wells. The fire well is 72 feet deep and was test pumped at 300 gpm with 5" of drawdown. A fourth well was constructed on the south side of Hwy 101 to supply water for the water treatment plant. That well is 90 feet deep and was test pumped at 100 gpm.

La Poel – NPS drilled a well at the La Poel campground (now only a picnic area) in 1979. The well was drilled to 125 feet, penetrating shale from 13-125 feet. The shale listed on the driller's log corresponds to unit EP_{Am} on the geologic map; a sequence of interbedded siltstone, sandstone, and argillite.

Fairholm – NPS constructed a well at Fairholm lodge and campground in 1979. The area is underlain by glacial outwash which would be expected to produce abundant groundwater. The well was drilled to 75 feet, encountering mostly sand and gravel (outwash sediments). The well was completed with casing to 69 feet; no perforations and no well screen. The well reportedly produced 75 gpm with no drawdown.

Bonny Bray – NPS constructed a well at Bonny Bray in 1981. There was a lodge at Bonny Bray. Apparently it's no longer there. The park map & brochure identifies it as the North Shore picnic area now. The location shown on the attached topo map is approximate, from descriptions of distances from Hwy 101. A well at this location would have been drilled into the landslide deposits. The driller's log shows the well encountered compacted gravel from 7-65 feet and water-bearing gravel from 65-77 feet. The well was completed with 5 feet of Johnson well screen (0.020" slot) from 71-76 feet and reportedly produced 60 gpm.

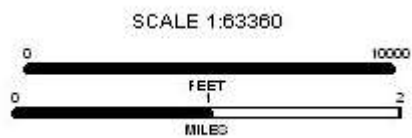


Park boundary shown as a dashed green line.

A portion of the Port Angeles 1:100,000 geologic map by Henry W. Schaase (2003).

Description of geologic map units

- Qa – Alluvium: well-sorted gravel, sand, silt, and clay deposited by running water in and along streams.
- Qls – Landslide deposits: Clay, silt, sand, gravel, and larger blocks deposited by mass wasting; may be unstratified, broken, chaotic, and poorly sorted or may retain primary bedding.
- Qgo – Glacial outwash: Poorly to moderately sorted outwash sand and gravel; locally contains silt and clay; also contains lacustrine deposits and ice-contact stratified drift; lies stratigraphically above till (unit Qgt).
- Qgt – Glacial till: Lodgement till consisting of unstratified, highly-compacted mixture of clay, silt, sand, gravel, and boulders deposited directly by glaciers.
- Em2lc/s – Lyre Formation: Conglomerate and sandstone (unit Em2lc) overlying and interbedded with sandstone and minor thin-bedded sandstone and siltstone (unit Em2ls).
- Em2a – Aldwell Formation: Thin- to medium-bedded, well-indurated marine siltstone and sandy siltstone with sparse interbeds of fine to very fine-grained sandstone.
- Ev_{cp} – Marine basalt rocks: pillow basalts, basalt breccias, and volcanoclastic sandstone and sedimentary rocks.
- EP_{Am} – Marine sedimentary rocks: gray-to-black sandstone, siltstone, and argillite, commonly laminated and rhythmically bedded



Locations of NPS wells in WA-DOE database for the Lake Crescent area