Fern Ridge Lake

Lane County

Willamette/Sandy Basin

Location			
Area	9,360 acres (3,788.0 hect)	**Elevation**	374 ft (114.0 m)
Type	reservoir	**Use**	multi-purpose
Location	12 miles west of downtown Eugene		
Access	adjacent to Ore Hwy 126		
USGS Quad	Veneta (24K), Eugene (100K)		
Coordinates	44° 07' 15" N, 123° 17' 58" W		
USPLSS	township 17S, range SW, section 04		

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

Drainage Basin Characteristics							
Area	275.0 sq mi (712.3 sq km)	**Relief**	moderate	**Precip**	40-55 in (102-140 cm)		
				Agriculture			
Land	**Forest**	**Range**	**Water**	**Irrig**	**Non Irrig**	**Urban**	**Other**
Use %	57.7	8.0	5.3	-	23.7	5.3	-
Notes	-						

Lake Morphometry					
			Maximum		**Average**
Area	9,360.0 acres (3,788. hect)	**Depth**	33 ft (10.1 m)		11ft (3.2 M)
Ave/Max Depth Ratio	0.330	**Volume**	101,200 acre ft (125.01 cu hm)		
Shoal area	52%	**Volume factor**	1.00	**Shape factor**	2.64
Length of Shoreline	30.1 mi (48.4 km)			**Retention time**	3 mo
Notes	Area, volume, and depth from U.S. Army Corps of Engineers				

Water Quality							
Trophic status	mesotrophic, high turbidity, occasional bacterial and algal problems						
Sample date	08/11/81	**Temp**	84.6F (29.2C)	**Diss. Oxygen (mg/l)**	8.0		
Transparency	3.3 ft (1.0 m)	**Phosp (mg/l)**	0.016	**Cholorophyl a (mg/l)**	2.5		
Alkalinity	18	**Conductivity (umhos/cm)**	67	**pH**	7.8		
Major Ions	**Na**	**K**	**Ca**	**Mg**	**Cl**	**SO4**	
	5.2	0.9	5.2	1.8	8.1	2.6	
Notes	-						

Fern Ridge Lake is a large reservoir near Eugene, built by the Corps of Engineers in 1941 by the damming of the Long Tom River. It is operated primarily for recreation in the summer and flood control in the winter, and is also part of a major wildlife management area. Fern Ridge is physically much different than other Corps of Engineers reservoirs in the Willamette Valley. Originally, it was a flat swampy portion of the valley floor, and one long, low dam and supplementary dikes were required to contain the water. At full pool during summer months it covers about 15 square miles, but averages only 11 feet deep; the maximum depth is 33 feet. Major shoreline features include two peninsulas, Perkins and Jeans Peninsulas, and one large island, Gibson Island, which has several small islands around it.

Fern Ridge Dam crosses the Long Tom River 23.6 miles above its confluence with the Willamette River. The dam also cuts off the channel of Coyote Creek, although the spillway was only built into the Long Tom River. The reservoir is filled primarily by inflow from the Long Tom River and Coyote Creek, with about 10 percent of the inflow coming from the Amazon Channel Basin and other small drainage basins feeding directly into the lake. A total land area of 275 square miles drains into Fern Ridge Lake. Generally, all streams except the Long Tom River stop flowing by late summer, although some may retain standing water. Water level in the reservoir drops by 1.5 to 3.0 feet over the summer because evaporation, irrigation, and downstream minimum flow releases exceed the inflow. The minimum winter pool elevation (353 feet)
maintained for flood control is 20 feet lower than the conservation/recreation pool (373 feet) maintained in summer and only contains six percent of the maximum volume of water. Winter drawdown leaves extensive mud flats exposed. Stream flows generally pass through the reservoir in less than a week during winter; much of the inflow passes through in the deeply etched historical channels until it reaches the reservoir level. The flats are periodically exposed to waves as the reservoir level raises and lowers.

Fern Ridge Lake is among the most heavily used recreation sites in Oregon and provides for a variety of uses, including swimming, picnicking, all forms of boating, fishing, and assorted other activities. For most activities, users come from the local area in the southern end of the Willamette Valley, although the good, steady winds attract many sailors from farther away. Annual park usage is 1 to 1.5 million recreational user-days. Three public parks (two by the Corps, one by Lane County) have been developed for high density use, while two other public parks (one Corps, one county) are less developed. There is no overnight camping at any of these parks, although, a large private park nearby does include a campground. The fishery does not attract many anglers since non-game fish predominate. However, there are crappie, bluegill, largemouth bass and trout in small numbers. Fishing generally takes place in shallow areas, near shore, and at places where stream channels enter the reservoir. Reservoir elevation affects fishing success. At full pool, many fish hide in the densely vegetated areas that are unfishable; lower levels draw the fish into the open
water. Flood control and most recreational activities are often conflicting in Fern Ridge Lake because even a small drawdown from the recreation pool makes the water inaccessible, except at the dam. The present practice is to begin filling the reservoir in February and complete filling by mid-April. Water level is maintained as high as possible until September. It is then drained by mid-November to the minimum pool level and operated for flood control until February.

Emergent macrophytes in the lake include reed canary grass, (Phalaris arundinacea), bull rush (Scirpus validus), and cattail (Typha latifolia). Reed canary grass has been expanding its coverage and crowding out the other macrophytes in many areas. It is an inferior food and cover plant for waterfowl and efforts are planned to reduce its extent. In a few areas submergent macrophytes predominate; however, reservoir level fluctuations prevent plant establishment in most of the deeper locations. Many other areas of marshland are located adjacent to the shallow water on flat-lying, poorly drained soils where ponds form in response to winter rains. The marshland serves as a critical wave buffer which protects the shoreline from erosion and reduces the force of waves on the shallow bottom. The annual drawdown of the reservoir exposes the bottom to killing winter frosts which few deepwater macrophytes can survive. Thus, two-thirds of the reservoir is essentially devoid of macrophytes even though much of it is shallow enough to support rooted plants.

The wetlands at the south and west sides of the reservoir provide excellent habitat for many kinds of birds. Most of these areas are managed for wildlife use by the Oregon Department of Fish and Wildlife or as natural areas by the Corps. The water level fluctuation in the reservoir, however, makes a less than optimal habitat for nesting waterfowl and migrating shorebirds. A series of dikes and grain fields have been developed on higher Corps property to actively attract waterfowl. The Oregon Department of Fish and Wildlife has proposed activities such as providing nesting mounds within the reservoir to improve wildlife habitat. Several birds which are not common in the Willamette Valley reside in the Fern Ridge area, and the area near Royal Avenue is especially popular for bird watching.

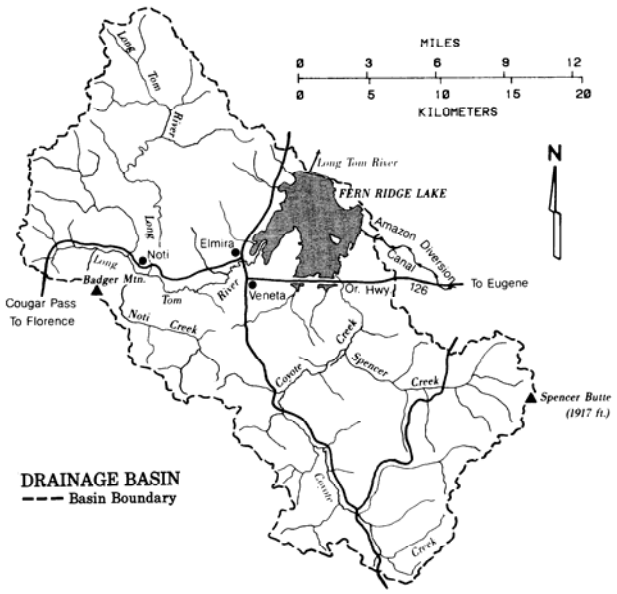
Lane Council of Governments investigated the water quality and pollution sources in Fern Ridge Lake from March 1981 to September 1982 under a study funded by the Clean Lakes Program (LCOG 1983). Until this EPA-funded study was done, there had been only limited testing of water quality in the lake, even though it had a history of turbidity problems. In addition, bacteria problems and problems from excessive plant and algal growth were suspected. The study was intended to identify water quality problems and identify measures to restore or improve water quality. Findings are summarized as follows:

1. Inflowing tributaries bring high concentrations of nitrogen (Long Tom River and Amazon Channel), phosphorus (Amazon Channel and Coyote Creek), bacteria and organic material (Coyote Creek and Amazon Channel), contaminants from chemical spills (Amazon Channel), and high levels of turbidity (Long Tom River and Coyote Creek), especially during winter storms. Bacteria counts in the reservoir were found to be low during the summer, giving no indication of a threat to human health. Similarly, most of the nutrients appear to be taken up by rooted wetland plants; thus algal growth is limited by nutrients and reduced transparency due to high turbidity. However, algal species present indicated an enriched lake system.

2. Water quality in the reservoir declines rapidly through the summer as the water level is drawn down. Water is typically clearest in May and June, but by August turbidity has reduced transparency to a very low level. A major component of the summer turbidity appeared to originate from the natural clay bottom and settled silts in the shallow southeast portion of the reservoir near Perkins Peninsula Park. Fine clay particles were found throughout the reservoir and heavier silts and clays were suspended by wind action and other factors such as foraging fish, motorboats, and beach use.

3. In winter, there is a significant increase in suspended sediment, bacteria, and nutrients, due mostly to contributions from Coyote Creek and Amazon Channel.

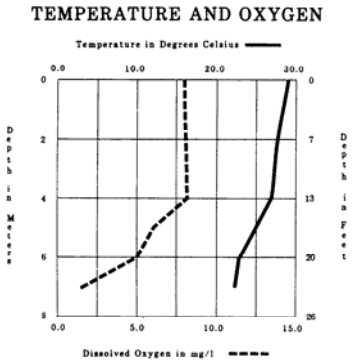
A final report of the LCOG study states that the lake quality should be improved to protect water contact recreation and warm water fisheries and to achieve water clarity for public safety and aesthetic acceptability during the June through September period. The report evaluates and recommends a series of restoration techniques including beach improvement, rocking banks, restricting water circulation, agriculture best management practices, and reentrainment through the construction of dikes and establishing vegetation on clay deposits. Restoration has been discussed with the U.S. Army Corps of Engineers since they are one of the entities responsible for the lake. The LCOG study should be consulted for details, and for recommended enhancement alternatives. In summary, water quality is the result of tributary and ground water contributions, biological activity, sediment content, human use, and physical circulation within the reservoir. The water itself tends to be neutral with low conductance, alkalinity, hardness, and chloride values. Total phosphorus and chlorophyl concentrations indicate that the lake is mesotrophic, the low transparency is due to suspended inorganic particles and is therefore unreliable as a trophic indicator.

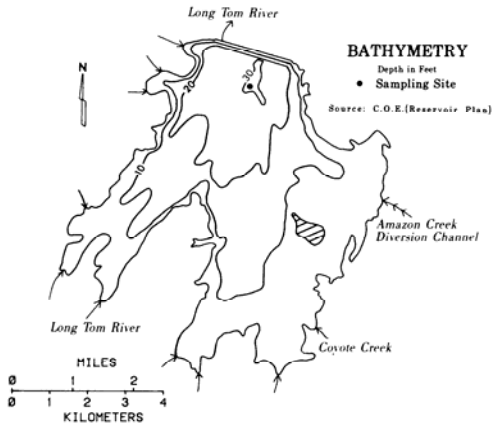


Phytoplankton Surveys:

8/11/81

Alga	#/ml	%
Melosira ambigua	71	26.3
Kephyrion spirale	33	12.2
Melosira italica	22	8.1
Nitzschia frustulum	16	5.9
Stephanodiscus hantzschii	16	5.9
others (20)	112	41.6
Total	270	100.0





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

Photo Captions

1. Fern Ridge Lake
2. Oregon Hwy. 126
3. Veneta (town)
4. Long Tom River