

Auke Bay Job Prelim
Date ?

Auke Lake Limnological Characteristics Relative to Complications Resulting from Artificial Enrichment

Physical Characteristics:

The lake is small at 46 hectares, with a mean depth of 19 meters and maximum depth of 34 meters.

Discharges range from 20-35 cfs in summer (maximum 39.5 in June, 1964) to around 10 cfs in fall and winter (minimum 4.3 cfs in February, 1965). Such a small lake with low discharges, especially in the salmon egg incubation months in Auke Creek, could easily be affected by relatively small increases in nutrients. Thermally the lake is dimictic and strongly stratifies during the summer with the thermocline sharp and between 5 and 10 meters.

Transparency is as little as 2 meters and only as deep as 3.8 meters (secchi disk readings). SiO_2 contributes greatly to the limited transparency except during June through September. Then transparency is chiefly restricted by water color locked in from the drainage. Such limited transparency limits the euphotic zone to the top meter or two of the lake.

Chemical Characteristics:

Oxygen tension values (we only have data for 1963) show a depression in ppm to S-6 in June and is % saturated to below 60% throughout the water column in June to below 60% at 20 meter depth all summer long. Nutrient enrichment, higher primary production. We do not know anything about the seasonal depth distribution of fish to its effect on them is conjecture.

pH averages 6.6, and TDS on the basis of limited data seems to be about 12-18 ppm. The lake does not appear to be well buffered and could therefore be influenced relatively easily by nutrient enrichment.

Biological Characteristics:

Important fish species:

Sockeye salmon--5,000 to 7,000 spawners with a year's residence of young in lake.

Coho salmon--300 spawners with a year's residence of young in lake.

Pink salmon--300 spawners in Auke Creek, incubation and alevin stages in gravel, September to May.

Rate of I^0 productivity measured with C^{14} -- under ice, of course, all of the carbon assimilated in photosynthesis is assimilated in the top meter of the water column. Yet, in July (15, 1963) and August (29, 1963) assimilation still occurred in the top 1 or 1.5 meter. The euphotic zone is very shallow. It is evidently because of SiO_2 levels and water color. Nutrient enrichment could cause rather dramatic responses in this shallow euphotic zone. So, we must be concerned about increased algae blooms and their effects on oxygen tensions in the summers hypolimnions and during winter stagnation, and on water quality for our laboratory experiments, and on the aesthetic qualities of the lake.

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ADH-LAB-8

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Date received

Lab No. 0134
Date completed 1-23-50

CHEMICAL ANALYSIS OF WATER

DESCRIPTION OF SAMPLE:

GEOGRAPHIC FILE

A Lake Creek, Auke Bay

Total Solids	31 p.p.m.
pH 20° C.	7.05
pH 40° C.	7.72
Langelier Index 40° C.	-2.3
Silica	2 p.p.m. (SiO ₂)
Iron and Aluminum Oxides	_____ p.p.m (Fe ₂ O ₃ & Al ₂ O ₃)
Calcium	6 p.p.m. (Ca)
Magnesium	2 p.p.m. (Mg)
Sulfate	6.3 p.p.m. (SO ₄)
Sodium and Potassium	_____ p.p.m. as Na
Total Iron	0.5 p.p.m. (Fe)
Chlorides	0 p.p.m. (Cl)
Total Alkalinity	11 p.p.m. (as CaCO ₃)
Hydroxide (OH)	0 p.p.m. (as CaCO ₃)
Carbonate (CO ₃)	0 p.p.m. (as CaCO ₃)
Bicarbonate (HCO ₃)	11 p.p.m. (as CaCO ₃)
Total Hardness	26 p.p.m. (as CaCO ₃)
Carbonate Hardness	11 p.p.m.
Non-carbonate Hardness	15 p.p.m.
Hardness calculated from:	
ppm Ca x 2.496 / ppm Mg x 4.115 /	
ppm Fe ₂ O ₃ x 1.872 / Al ₂ O ₃ x 2.932	
Fluorides	0.1 p.p.m.
Nitrate N. less than 10 ppm	
Additional Tests:	