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Quarterly Reports: April - September 1987

Limnological Studies at Crater Lake
CA-9000-3-0003
Subagreement 12

My objectives were to continue working on the lake data base, sample the lake in April and June through September, continue collecting rain and snow samples for chemical analyses, and complete the 1986 annual report. Work on the data base included water quality, lake color, optics, lake nutrients, climate and lake level fluctuations, and evaluations of pre-1982 data.

Trend monitoring of the lake was completed as scheduled. This work included water quality; optics; chlorophyll; primary production; algae species, abundance, and distribution; and zooplankton. A summary of some of the data is presented below:

Temperature (C)

Depth (m)	4/13	6/24	7/23	8/19	9/16
0	3.42	9.82	11.02	14.61	13.94
5	3.42	8.98	10.72	13.66	13.92
10	3.40	7.68	10.63	13.31	13.91
20	3.39	6.71	7.80	9.20	9.63
100	3.37	4.05	3.95	4.09	4.03
250	3.49	3.59	3.60	3.63	3.61

Water Quality

Depth (m)	4/13	6/24	7/23	8/19	9/16
pH					
0	7.8	7.7	7.7	7.8	7.8
100	7.8	7.7	7.7	7.8	7.7
300	7.7	7.6	7.6	7.7	7.6
550	7.6	7.4	7.5	7.5	7.4

Alkalinity (mg/l)					
0	26.6	26.5	28.0	27.8	27.2
100	26.5	26.5	27.4	28.2	28.5
300	26.7	26.8	27.8	28.2	28.3
550	27.1	27.8	27.7	28.8	29.1

Conductivity (μmhos/cm)					
0	113.3	112.0	111.8	113.6	-
100	112.1	114.6	112.4	116.0	-
300	113.3	113.2	111.4	114.8	-
550	115.7	115.7	115.7	116.0	-

Dissolved Oxygen (mg/l)					
0	10.1	8.8	8.1	7.8	8.0
100	10.2	9.8	9.4	9.9	10.2
300	9.7	9.6	9.0	9.3	10.3
550	9.5	9.1	9.0	9.1	9.4

Conductivity values for 9/16 will be available later.

Lake Phosphate and Nitrate

Depth	4/13	6/24	7/23	8/19	9/16
Nitrate (μg/l)					
0	0	0	0	1	-
100	0	0	0	0	-
300	8	8	2	10	-
550	11	13	14	15	-

Phosphate ($\mu\text{g/l}$)					
0	31	18	12	11	-
100	32	18	12	14	-
300	31	18	16	17	-
550	32	24	17	13	-

Data for 9/16 will be available at a later date.

Secchi Disk

Date	Depth of Reading (m)
4/13	29.1
6/24	36.2
7/23	32.1
8/19	32.3
9/16	28.0 (rough lake conditions)

Chlorophyll and Primary Production

Date	Depth (m) of Maximum Values	
	Chlorophyll	Primary Production
4/13	0 - 180	40 - 60
6/24	120	100
7/23	100	80 - 100
8/19	not processed	80
9/15	not processed	10 & 60

Initial work with the CTD/transmissometer began in July. Additional casts were made in August and September. The results are being analyzed and will be presented at a later date.

Caldera springs were sampled on each trend week. Only two springs could be sampled in April because of snow. Ten springs were sampled on most of the other trips. The water quality of the springs was similar to that found in previous years. These data will be presented in the annual report. Of particular interest, however, is the nitrate levels in the springs. Data for four springs are shown below:

Spring Number	Sampling Date				
	4/13	6/24	7/23	8/19	9/16
Nitrate ($\mu\text{g/l}$)					
19	91	40	19	37	-
39	-	91	30	28	-
42	356	162	126	290	-
48	32	15	12	17	-

Data for 9/16 will be available at a later date.

Phytoplankton and zooplankton samples were collected during each trend period. The samples will be processed this winter. Samples collected in 1985 and 1986 have been counted. The results will be reported in two MS theses early in 1988. In addition, nutrient algal bioassays were conducted on raw Crater Lake water. These results will be reported at a later date.

Fish samples were collected using gill nets, angling and the down rigger. Only kokanee and rainbow trout were captured. The samples from 1986 and 1987 will be processed by December, 1987. A final report (MS thesis) will be available in June, 1988.

Sedimentation traps were retrieved and redeployed in September. Chemical analyses on these samples and those from previous years have continued. The samples have been divided for faunal analysis this fall.

Work on the climatic and lake level relationships and the lake color evaluation projects continued on schedule. These results will be presented at a later date.

This fall I will continue working on the data sets and prepare for the proposed lake trips in January and April. I will be preparing the 1987 annual report and assembling information for the symposium on Crater Lake in June, 1988.