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ENVIRONMENT CANADA
CONSERVATION AND PROTECTION
ENVIRONMENTAL PROTECTION
PACIFIC AND YUKON REGION

QUINSAM COAL DEVELOPMENT

A DATA REPORT ON
RECEIVING WATER QUALITY
- 1985 -

Regional Data Report DR 87-01

By

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1 INTRODUCTION

Quinsam Coal Company a joint venture of Weldwood of Canada Ltd. and Luscar Ltd., in 1976 proposed to construct and operate an open pit coal mine in the vicinity of Middle Quinsam Lake, 20 km southwest of Campbell River, British Columbia, Figure 1. More recently, September 1981, Brinco Mining Ltd. replaced Luscar Ltd. and joined Weldwood in a similar joint venture, Quinsam Coal Ltd. The Quinsam Coal property contains surface and underground coal, 17 million tonnes would be extracted using surface mining methods over a period of 15 years. However, the potential exists for the life of the mine to continue beyond the 15 year life expectancy for surface mining methods.

Quinsam Coal Company began conducting environmental monitoring studies in 1978 to provide baseline data required to assess the potential impacts associated with coal mine development and operation phases. A federal intergovernmental Quinsam Coal Task Force, was established in 1978, and reviewed project developments parallel to the staged provincial review process. Stage I and II reviews by the Federal Quinsam Coal Task Force in 1979 and 1981 respectively, outlined the following areas of concern; acid generation, heavy metals, nutrient enrichment and sedimentation. The Quinsam Coal Task Force in 1981 recommended to the Provincial Government that Stage II approval-in-principle not be given "...pending satisfactory resolution of the many outstanding issues...". The concerns of the Federal Task Force were raised before a provincially appointed commission holding a Public Inquiry into the Quinsam Coal Project, in the fall of 1983. In the Commission's report to the British Columbia Minister of Environment they agreed with the issues raised by the Federal Task Force and that insufficient data was available to make a proper assessment of the potential impact.

To supplement the data collected by the company, Environment Canada in 1984 and 1985 conducted an investigation of four lakes and three stream reaches that could be affected by the development and operation of the mine (Figure 1). This report presents additional physical, chemical and biological data collected by the Environmental Protection Service (EPS) from April to September, 1985. Water quality data collected by EPS in 1983 and 1984 is reported by Sneddon and Kelso (1983) and Redenbach et al. (1985).

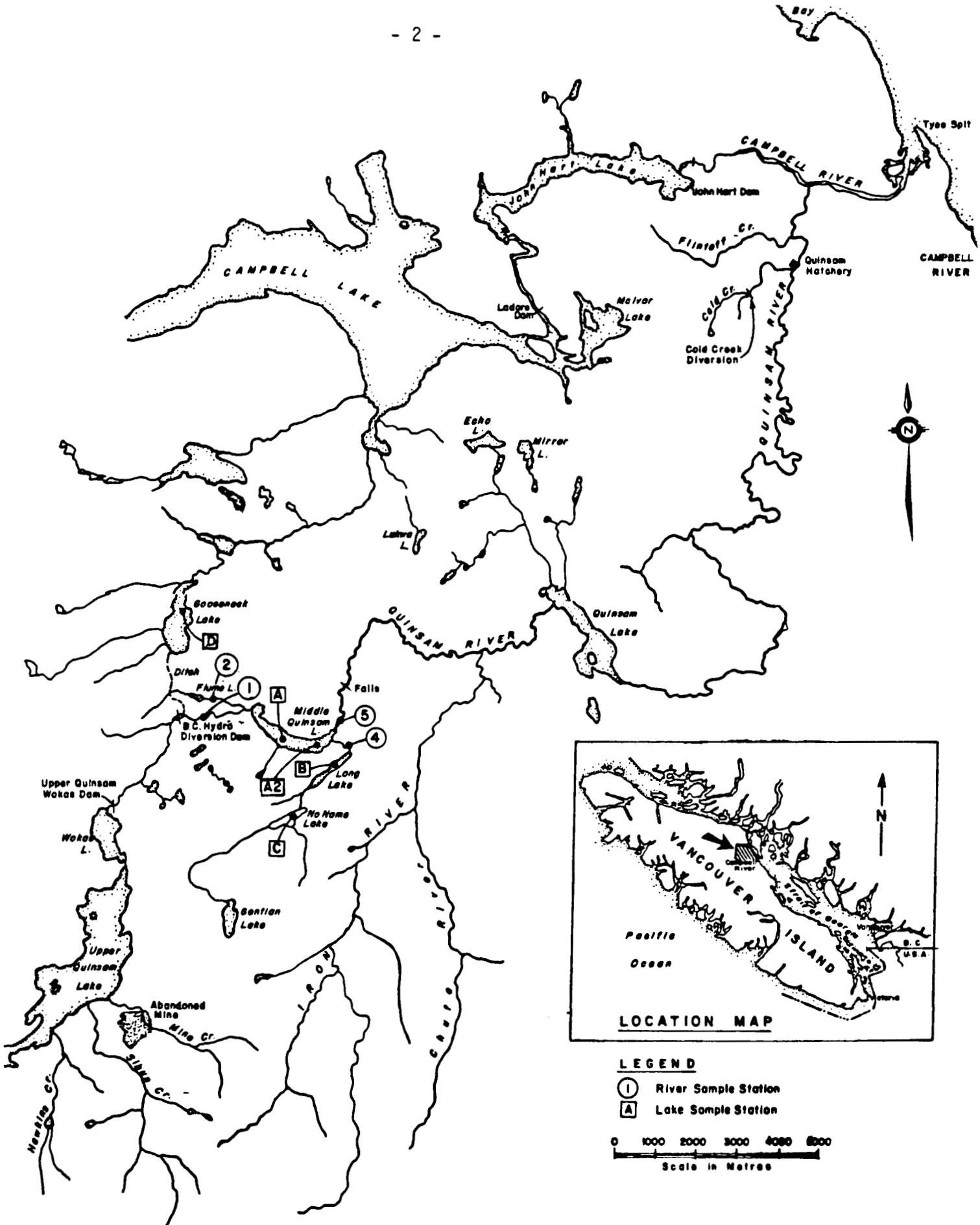


FIGURE 1 QUINSAM DRAINAGE BASIN - STREAM AND LAKE SAMPLING LOCATIONS, 1985

2 STUDY AREA

The Quinsam drainage is located in the coastal-Douglas fir biogeoclimatic zone on the eastern slopes of Vancouver Island and covers an area of 210 km². The Quinsam River flows northeast, joining the Campbell River three km upstream of its estuary (Figure 1). The study area is located in the upper half of the Quinsam drainage at an elevation of 300 m, approximately 20 km southwest of the Quinsam-Campbell confluence. The Quinsam drainage, having been logged in the 1950's, has a well established second growth. Annual precipitation is estimated at 100-150 cm and is concentrated in the fall and winter months (October to March).

Flows in the Quinsam River are regulated and diverted by British Columbia Hydro dams located at the outlet of Upper Quinsam and Wokas lakes and 1.9 km upstream of Middle Quinsam Lake. Minimum flows of 0.3 and 1.7 cms are maintained upstream of Middle Quinsam Lake and at the outlet of Lower Quinsam Lake. The remaining flow is diverted via Gooseneck Lake into the Campbell system where it is used for hydroelectric generation. All other flows are not regulated.

Station locations are shown in Figure 1. Lake stations were established at maximum depths in two basins of Middle Quinsam Lake (Station A1 and Station A2), Long Lake (B) and No Name Lake (C). A control station on Gooseneck Lake (D), was established at maximum depth, approximately 0.5 km to the north of the previously established control site. Three stream stations (1, 4 and 5) in the vicinity of the proposed mine developments were sampled in 1985.

3 METHODS AND MATERIALS

All stations were sampled during the growing season on four occasions in 1985 at approximately two month intervals. Table 1 summarizes the field methods, sample preparation and preservation, parameters and laboratory. All samples were kept cool and dark until further preparation or when delivered to the respective laboratories. Survey dates are listed below, but will be referred to throughout the report by the month in which the first day of the survey occurred.

April 14 - 19

June 9 - 14

July 14 - 19

September 22 - 27

3.1 Water Chemistry Sampling

TriPLICATE grab samples were collected at all stream and river stations. Temperature, pH, conductivity and D.O. were measured in situ with a Hydrolab Model 4041 and in the field laboratory (D.O) within 4 hours. All other samples were preserved and delivered to the respective labs.

Lake stations were located with a Furuno FM-21 Echo Sounder and geographic markers. Depth, temperature, pH, conductivity, dissolved oxygen and light transmission profiles were recorded to the bottom at 1 m intervals using a Hydrolab 4041. Sample depths were located 1 m below the surface, at the top of the thermocline, at the bottom of the thermocline and 1-2 m from the bottom. Discrete water samples were collected in a 6 l Van-Dorn water bottle, distributed to the various sample containers and preserved for shipment. All samples were kept cool and dark until delivered to the respective laboratories.

3.2 Biological Sampling

Profiles of chlorophyll in the water column were recorded at each lake station and date. Measurements were recorded at one meter intervals from the surface to a depth of constant fluorescence. Using

TABLE 1 SUMMARY OF PARAMETERS, LABORATORIES, INSTRUMENTS AND SAMPLE PRESERVATION

PARAMETER	INSTRUMENT/ LABORATORY	FIELD PREPARATION
Temperature	Hydrolab 4041	- in situ measurement
Conductivity	Hydrolab 4041	- in situ measurement
Dissolved Oxygen	Hydrolab 4041	- in situ measurement
pH	Hydrolab 4041	- manganese sulphate and alkaline-iodine azide solutions; Winkler titration
Turbidity	EPS/DOE Lab	- in situ measurement
Alkalinity	EPS/DOE Lab	- in situ measurement
Residues	EPS/DOE Lab	
Sulphate	EPS/DOE Lab	
Nitrate	IWD Lab	
Nitrite	EPS/DOE Lab	
Ammonia	EPS/DOE Lab	
Total Dissolved Nitrogen	IWD Lab	- filter through Whatman GF-F glass fibre filters
Particulate Carbon	EPS/DOE Lab) IWD Lab)	- filter onto Whatman GF-F glass fibre filters, freeze and desicate filters
Particulate Nitrogen	EPS/DOE Lab) IWD Lab)	
Total Phosphorus	EPS/DOE Lab	
Total Dissolved Phosphorus	EPS/DOE Lab	- filter through 0.45 u Sartorius cellulose acetate filters
Total Metals	EPS/DOE Lab	
Dissolved Metals	EPS/DOE Lab	- filter through 0.45 u Sartorius cellulose nitrate filters
Chlorophyll a	EPS/DOE Lab	- filter onto Whatman GF-C glass filters, freeze and desicate filters
Fluorescence	Turner Design Model 10-005R	- in situ measurment

a submersible pump, water was pumped to the surface, where a Turner Design Fluorometer (Model 10-005R) was used to measure fluorescence.

Chlorophyll a and phytoplankton sample depths were chosen after examining the fluorescence profile and included the depth of maximum fluorescence when a peak was present. Triplicate chlorophyll a samples were taken at four depths while a single phytoplankton grab sample was taken from each of three depths. Chlorophyll a samples were stored cool and in the dark for a maximum of four hours prior to being filtered onto Whatman glass fibre filters. Residues on the filters were filter dried, frozen and stored in the dark prior to being analysed. Phytoplankton samples were preserved with Lugol's solution and stored in the dark prior to being analysed.

Triplicate zooplankton samples were obtained from each lake station and date using a 25 cm diameter, 20 mesh Wisconsin net. Vertical hauls, 1.5 m from the bottom to the surface, were pulled at a rate of 1 m/sec. For each haul the net was washed a minimum of three times and the sample preserved with buffered formalin.

4 RESULTS

4.1 Profiles - temperature, pH, dissolved oxygen, specific conductivity
and light transmission

<u>TABLE 2(a)</u>	GOOSENECK LAKE
<u>TABLE 2(b)</u>	LONG LAKE
<u>TABLE 2(c)</u>	MIDDLE QUINSAM LAKE, STATION 1
<u>TABLE 2(d)</u>	MIDDLE QUINSAM LAKE, STATION 2
<u>TABLE 2(e)</u>	NO NAME LAKE
<u>TABLE 2(f)</u>	STREAMS

QUINSAM COAL DEVELOPMENT

TABLE 2(a) GOOSENECK LAKE.PROFILES - 1985 BASELINE - APRIL 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)
			(mg/l)	% sat'n.	
.0	8.2	6.7	10.6	97	49
1.0	8.2	7.0	10.6	97	49
2.0	8.2	6.9	10.6	97	50
3.0	8.2	6.9	10.6	97	50
4.0	8.1	7.0	10.6	97	50
5.0	8.2	7.1	10.6	97	50
6.0	8.2	7.2	10.6	97	50
7.0	6.5	7.1	10.6	93	47
8.0*	5.5	7.1	10.9	93	46
9.0	5.1	7.2	11.0	93	46
10.0+	5.0	7.1	10.9	92	46
11.0	4.8	6.9	10.9	91	46
12.0	4.6	7.1	10.7	89	47
13.0	4.5	7.1	10.6	88	47
14.0	4.4	7.0	10.6	88	47
15.0	4.4	6.9	10.6	88	47
16.0	4.4	6.8	10.5	87	47
17.0	4.3	6.9	10.4	86	47
18.0	4.3	6.9	10.5	87	47
19.0	4.3	6.8	10.4	86	47
20.0	4.3	6.8	10.4	86	47
21.0	4.3	6.8	10.4	86	47
22.0	4.2	6.8	10.4	86	47
24.0	4.2	6.8	10.4	86	47
26.0	4.2	6.8	10.4	86	46
28.0	4.3	6.8	10.3	85	46
30.0	4.3	6.8	10.3	85	46
32.0	4.2	6.8	10.3	85	46
33.0	4.3	6.8	10.4	86	46
34.0	4.3	6.7	10.4	86	46
35.0	4.2	6.7	10.3	85	46

* Secchi Depth

+ 1% Light Transmission

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(a) GOOSENECK LAKE. PROFILES - 1985 BASELINE - JUNE 9

DEPTH (m)	TEMPER- TURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	16.0	7.3	9.3	101	50	2100	100
1.0	16.0	7.3	9.3	101	50	895	43
2.0	16.0	7.4	9.3	101	50	670	32
3.0	16.0	7.3	9.3	101	50	630	30
4.0	15.7	7.2	9.4	102	50	475	23
5.0	14.0	7.1	10.0	105	50	350	17
6.0	12.1	7.2	10.8	108	49	260	12
7.0	10.4	7.1	10.9	105	50	205	9.8
8.0	9.3	7.1	11.0	103	50	140	6.8
9.0	8.3	7.0	10.9	100	49	110	5.2
10.0	7.1	6.9	10.8	96	48	76	3.6
11.0*	6.4	6.8	10.6	93	48	56	2.7
12.0	6.0	6.7	10.4	90	48	45	2.1
13.0	5.9	6.6	10.2	88	48	32	1.5
14.0	5.7	6.6	10.1	87	48	24	1.1
15.0	5.5	6.6	10.1	86	48		
16.0	5.4	6.6	10.1	86	48		
17.0	5.3	6.6	10.0	85	47		
19.0	5.2	6.6	9.9	84	47		
21.0	5.1	6.6	9.9	84	47		
23.0	5.0	6.6	9.8	83	47		
25.0	4.9	6.6	9.8	82	47		
27.0	4.9	6.5	9.6	81	47		
29.0	4.9	6.6	9.6	81	46		
31.0	4.9	6.6	9.6	81	46		
33.0	4.9	6.6	9.6	81	46		
34.0	4.9	6.5	9.5	80	46		
35.0	4.9	6.5	9.5	80	46		
36.0	4.9	6.5	9.3	78	46		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(a) GOOSENECK LAKE. PROFILES - 1985 BASELINE - JULY 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	21.8	7.5	8.7	106	58	3850	100
1.0	21.8	7.6	8.7	106	58	2600	68
2.0	21.8	7.5	8.7	106	58	1950	51
3.0	21.6	7.5	8.6	104	58	1410	37
4.0	21.1	7.4	8.6	103	58	975	25
5.0	20.5	7.3	8.6	102	58	715	19
6.0	19.2	7.1	9.3	108	58	540	14
7.0	15.5	7.0	10.5	113	57	370	9.6
8.0	11.9	6.9	10.9	108	58	260	6.8
9.0	10.3	6.9	10.8	104	58	165	4.3
10.0*	8.6	6.7	10.4	96	57	140	3.6
11.0	7.4	6.6	10.3	92	58	80	2.1
12.0	6.9	6.6	10.0	88	57	63	1.6
13.0	6.5	6.6	9.8	86	57	40	1.0
15.0	6.2	6.6	9.5	83	57	37	1.0
17.0	5.9	6.6	9.3	80	57	26	0.7
19.0	5.6	6.5	9.2	79	56		
21.0	5.5	6.6	9.1	78	56		
23.0	5.4	6.5	9.0	77	57		
25.0	5.3	6.5	9.0	76	56		
27.0	5.3	6.5	9.0	76	56		
29.0	5.3	6.5	8.8	75	56		
31.0	5.3	6.5	8.9	76	56		
32.0	5.3	6.5	8.9	76	56		
33.0	5.3	6.5	8.7	74	56		
34.0	5.3	6.5	8.7	74	55		
35.0	5.3	6.5	8.7	74	55		
36.0	5.3	6.5	8.7	74	55		
36.5	5.3	6.5	8.7	74	55		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(a) GOOSENECK LAKE. PROFILES - 1985 BASELINE - SEPTEMBER 22

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	15.3	7.3	9.3	100	49	2650	100
1.0	15.3	7.3	9.0	97	49	1470	55
2.0	15.3	7.3	8.9	96	49	1120	42
3.0	15.3	7.3	8.9	96	49	635	24
4.0	15.3	7.3	8.9	96	49	575	22
5.0	15.3	7.2	8.8	95	49	410	16
6.0	15.1	7.2	8.7	93	49	280	10.5
7.0	15.0	7.1	8.7	93	49	200	7.5
8.0	14.9	7.1	8.6	92	50	120	4.6
9.0*	13.2	6.8	9.7	100	46	105	3.9
10.0	10.1	6.7	10.0	96	45	75	2.8
11.0	8.4	6.6	9.1	86	45	55	2.1
12.0	7.8	6.5	8.7	79	45	38	1.4
13.0	7.2	6.5	8.6	77	45	22	0.8
14.0	6.8	6.5	8.5	78	45	18	0.7
15.0	6.6	6.4	8.1	71	45	14	0.5
16.0	6.3	6.4	8.3	72	45		
18.0	5.9	6.4	8.2	71	45		
20.0	5.7	6.4	7.6	65	45		
22.0	5.5	6.3	7.4	63	45		
26.0	5.4	6.3	6.9	59	45		
28.0	5.3	6.3	6.6	56	45		
30.0	5.3	6.3	6.5	55	45		
32.0	5.3	6.3	6.5	55	45		
34.0	5.3	6.3	6.4	54	45		
35.0	5.3	6.3	6.3	54	45		
36.0	5.3	6.3	6.1	52	45		
36.5	5.3	6.3	6.1	52	45		

QUINSAM COAL DEVELOPMENT

TABLE 2(b) LONG LAKE. PROFILES - 1985 BASELINE - APRIL 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)
			(mg/l)	% sat'n.	
.0	9.5	6.5	10.7	101	28
1.0	9.5	6.9	10.3	97	28
2.0	9.4	6.6	10.2	96	29
3.0	7.8	6.5	10.4	94	29
4.0	6.6	6.6	10.5	92	30
5.0*	5.6	6.8	10.0	85	31
6.0	4.7	6.9	9.2	77	33
7.0+	4.6	7.0	9.0	75	34
8.0	4.4	6.8	8.7	72	34
9.0	4.3	6.8	8.6	71	35
10.0	4.3	6.7	8.5	70	35
11.0	4.2	6.6	8.4	69	35
12.0	4.1	6.5	8.4	69	36
13.0	4.1	6.9	8.3	68	36
14.0	4.0	6.7	8.3	68	35
15.0	4.0	6.6	8.3	68	35
16.0	3.9	6.4	8.1	66	36
17.0	3.9	6.4	8.0	65	36
18.0	4.0	6.8	7.9	65	36
19.0	3.9	6.5	7.6	62	36
20.0	3.9	6.4	7.5	61	36
21.0	3.9	6.8	7.4	61	36

* Secchi Depth; + 1% Light Transmission

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(b) LONG LAKE. PROFILES - 1985 BASELINE - JUNE 9

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	16.7	7.0	9.1	100	34	1250	100
1.0	16.8	7.1	8.9	98	34	440	35
2.0	16.7	7.1	9.0	99	34	295	24
3.0	15.4	6.9	9.5	102	34	190	15
4.0	12.3	7.0	10.9	110	22	88	7.0
5.0	10.0	6.8	10.6	101	32	64	5.2
6.0	8.1	6.5	9.7	88	33	44	3.5
7.0*	6.9	6.3	9.0	79	34	23	1.8
8.0	6.0	6.1	8.4	72	33	14	1.1
9.0	5.7	6.2	8.2	70	34	7.9	0.6
10.0	5.7	6.0	8.1	69	34		
11.0	5.7	6.1	7.9	68	34		
12.0	5.4	6.1	7.9	67	34		
14.0	5.3	6.1	7.8	66	34		
16.0	5.0	6.1	7.4	62	34		
18.0	5.0	6.0	7.1	60	33		
19.0	5.0	6.0	6.8	57	34		
20.0	4.9	6.0	6.4	54	34		
20.2	4.9	6.0	6.3	53	34		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(b) LONG LAKE PROFILES. 1985 BASELINE - JULY 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	21.6	7.3	8.6	104	35	3750	100
1.0	21.8	7.4	8.5	103	42	1900	51
2.0	21.8	7.3	8.4	102	42	1160	31
3.0	21.6	7.2	8.4	102	42	670	18
4.0	18.9	7.0	9.4	108	41	445	12
5.0	13.9	6.8	10.6	110	38	245	6.5
6.0	10.4	6.5	10.0	96	39	140	3.8
7.0	8.1	6.2	8.8	80	40	89	2.4
8.0	7.1	6.1	8.0	71	40	51	1.4
9.0*	6.6	6.0	7.8	68	40	28	0.8
10.0	6.3	6.0	7.3	63	40	16	0.4
11.0	5.9	6.0	6.9	59	41		
12.0	5.8	6.0	6.8	58	40		
13.0	5.6	6.0	6.7	57	41		
15.0	5.5	6.0	6.5	55	41		
16.0	5.4	6.0	6.2	53	41		
17.0	5.3	6.0	6.0	51	41		
19.0	5.2	6.0	5.7	48	41		
20.0	5.1	6.0	5.4	46	41		
21.0	5.2	6.0	5.5	47	41		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(b) LONG LAKE. PROFILES - 1985 BASELINE - SEPTEMBER 22

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	14.0	7.1	9.6	100	37	2100	100
1.0	14.0	7.2	9.4	98	37	935	45
2.0	14.0	7.1	9.2	96	36	575	27
3.0	14.0	7.0	9.1	95	36	325	16
4.0	14.0	7.1	9.1	95	36	210	10
5.0	14.0	7.1	9.0	94	36	140	6.6
6.0	13.9	7.0	9.0	94	36	58	2.8
7.0	10.9	6.3	7.6	74	32	48	2.3
8.0*	8.4	6.1	6.7	61	33	25	1.2
9.0	7.0	6.1	6.5	57	32	15	0.7
10.0	6.6	5.9	6.2	54	33	9.0	0.4
11.0	6.4	5.9	5.5	48	33		
12.0	5.9	5.9	5.1	44	33		
13.0	5.9	5.9	5.0	43	33		
14.0	5.5	5.9	4.3	37	33		
15.0	5.5	5.9	4.0	34	34		
16.0	5.4	5.9	3.3	28	34		
17.0	5.2	5.9	3.3	28	35		
18.0	5.4	5.9	3.3	28	35		
19.0	5.3	5.8	3.0	25	36		
20.0	5.2	5.9	2.8	24	36		
21.5	5.2	5.8	2.7	23	36		

QUINSAM COAL DEVELOPMENT

TABLE 2(c) MIDDLE QUINSAM LAKE, STATION 1. PROFILES - 1985 BASELINE - APRIL 14

DEPTH (m)	TEMPER- TURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)
			(mg/l)	% sat'n.	
.0	10.7	7.3	10.6	102	37
1.0	10.4	7.7	10.5	101	38
2.0	10.0	7.3	10.6	101	43
3.0	9.7	7.2	10.5	99	44
4.0	9.3	7.1	10.5	98	43
5.0	8.6	7.2	10.7	98	43
6.0	7.6	7.4	10.7	96	44
7.0	7.0	7.5	10.8	95	44
8.0	6.2	7.4	10.7	92	44
9.0	6.0	7.3	10.7	92	44
10.0	5.7	7.2	10.7	91	45
11.0	5.5	7.2	10.6	90	45
12.0	5.3	7.2	10.6	90	45
13.0	5.2	7.1	10.6	89	46
14.0	5.1	7.0	10.4	88	47
15.0	5.0	7.0	10.4	87	48
16.0	5.0	7.0	10.3	87	48

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(c) MIDDLE QUINSAM LAKE, STATION 1. PROFILES - 1985 BASELINE - JUNE 9

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	17.5	7.2	9.2	103	39	4800	100
1.0	17.3	7.3	9.3	104	44	3270	68
2.0	17.1	7.3	9.3	103	45	1220	25
3.0	16.8	7.2	9.3	103	45	1220	25
4.0	16.0	7.2	9.3	105	45	985	21
5.0	14.6	7.1	10.2	108	45	62	1.3
6.0	12.7	7.1	10.5	107	44	240	5.0
7.0	11.9	7.0	10.5	104	45	215	4.5
8.0	10.9	7.0	10.2	99	46	90	1.9
9.0	10.9	6.9	10.2	97	47	81	1.7
10.0	9.1	6.8	9.8	91	49	64	1.3
11.0*	8.3	6.6	9.1	83	51	57	1.2
12.0	8.1	6.6	9.0	82	52	35	0.7
13.0	7.9	6.5	8.7	78	52		
14.0	7.9	6.4	8.8	79	52		
15.0	7.8	6.4	8.6	77	54		
15.5	7.8	6.7	8.3	75	54		

* Secchi Depth

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(c) MIDDLE QUINSAM LAKE, STATION 1. PROFILES - 1985 BASELINE - JULY 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	21.3	7.7	8.8	106	48	5400	100
1.0	21.4	7.8	8.8	106	52	3460	64
2.0	21.4	7.8	8.8	106	49	2650	49
3.0	21.4	7.7	8.8	106	56	2080	38
4.0	21.2	7.6	8.7	104	56	1560	29
5.0	20.7	7.5	8.9	106	58	1250	23
6.0	18.2	7.5	10.6	121	54	830	15
7.0	15.7	7.4	11.0	119	53	665	12
8.0	13.8	7.3	10.7	111	55	460	8.5
9.0	12.0	7.1	10.1	100	57	310	5.8
10.0	10.5	6.7	9.2	88	61	210	3.8
11.0*	9.9	6.5	8.7	83	64	150	2.8
12.0	9.6	6.5	8.4	79	65	125	2.3
13.0	9.3	6.4	8.0	75	66	83	1.5
14.0	9.1	6.4	7.9	74	68	58	1.1
15.0	9.1	6.4	7.7	72	68	41	0.8
16.0	9.0	6.3	7.4	69	69		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(c) MIDDLE QUINSAM LAKE, STATION 1. PROFILES - 1985 BASELINE
- SEPTEMBER 22

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	14.8	7.4	9.2	97	45	3100	100
1.0	14.8	7.4	9.1	96	45	1780	58
2.0	14.7	7.3	9.1	96	47	1360	44
3.0	14.7	7.4	9.0	95	47	1150	37
4.0	14.7	7.3	9.0	95	49	680	22
5.0	14.7	7.3	9.0	95	50	610	20
6.0	14.5	7.2	8.8	93	51	575	19
7.0	14.3	7.2	8.8	92	51	345	11
8.0	14.2	7.1	8.7	91	52	245	7.8
9.0	14.0	7.2	9.6	90	52	185	6.0
10.0	13.8	7.0	8.4	87	52	175	5.6
11.0	12.4	6.6	6.7	67	54	120	3.9
12.0*	11.3	6.4	5.2	51	59	98	3.2
13.0	10.6	6.3	4.9	47	60	62	2.0
14.0	10.4	6.2	4.4	42	62	41	1.3
15.0	10.2	6.2	4.1	39	64	25	0.8
16.0	10.1	6.2	3.6	34	67	13	0.4
16.1	10.1	6.2	3.5	34	67		

QUINSAM COAL DEVELOPMENT

TABLE 2(d) MIDDLE QUINSAM LAKE, STATION 2. PROFILES - 1985 BASELINE - APRIL 14

DEPTH (m)	TEMPER- TURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)
			(mg/l)	% sat'n.	
.0	11.1	7.2	11.0	107	43
1.0	10.7	7.4	10.6	102	43
2.0	10.5	7.2	10.3	99	43
3.0	9.7	7.0	10.8	102	44
4.0	8.4	7.3	10.7	98	44
5.0	7.4	7.4	10.8	96	44
6.0	6.5	7.6	11.7	102	45
7.0	6.1	7.4	11.5	99	46
8.0	5.8	7.4	11.7	100	46
9.0	5.6	7.3	11.0	94	46
10.0	5.5	7.2	10.8	92	46
11.0	5.3	7.3	10.5	89	47
12.0	5.3	7.3	10.5	90	47
13.0	5.4	7.1	10.6	90	47
14.0	5.3	7.1	10.5	89	47
14.5	5.3	7.0	10.4	88	47

CONTINUED.....

QUINSAM COAL DEVELOPMENT

TABLE 2(d) MIDDLE QUINSAM LAKE, STATION 2. PROFILES - 1985 BASELINE - JUNE 9

DEPTH (m)	TEMPER- TURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY ($\mu\text{S}/\text{cm}$)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		($\mu\text{E}/\text{m}^2/\text{sec.}$)	(%)
.0	17.9	7.3	9.6	108	44	4800	100
1.0	17.9	7.5	9.2	104	44	3230	67
2.0	17.7	7.5	9.2	103	44	2520	53
3.0	17.2	7.5	9.2	102	45	1840	38
4.0	16.6	7.4	9.5	104	45	1340	28
5.0	14.8	7.4	10.6	113	44	840	18
6.0	13.4	7.4	10.7	110	44	620	13
7.0	12.0	7.3	10.6	105	45	295	6.1
8.0	11.1	7.2	10.5	102	46	230	4.8
9.0*	9.8	7.1	10.1	96	46	155	2.3
10.0	9.4	6.9	9.6	90	47	115	2.3
11.0	9.0	6.9	9.5	88	47	82	1.7
12.0	8.8	6.8	9.2	85	48	29	0.6
13.0	8.7	6.7	9.0	83	48		
14.0	8.6	6.6	8.9	82	48		

* Secchi Depth

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(d) MIDDLE QUINSAM LAKE, STATION 2. PROFILES - 1985 BASELINE - JULY 14

DEPTH (m)	TEMPER- TURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
0	22.3	7.6	8.6	105	54	1525	100
1.0	22.2	7.8	8.6	105	54	1000	66
2.0	22.2	7.7	8.7	106	55	755	49
3.0	22.0	7.7	8.6	105	55	535	35
4.0	21.9	7.7	8.7	106	55	405	27
5.0	21.6	7.6	8.7	105	55	315	21
6.0	19.7	7.6	8.7	113	54	245	16
7.0	16.8	7.6	11.1	123	52	195	13
8.0	14.1	7.4	10.7	112	55	110	7.3
9.0	12.3	7.0	10.0	100	56	80	5.3
10.0*	11.5	6.8	9.5	93	57	60	4.0
11.0	11.0	6.7	9.2	89	58	43	2.8
12.0	10.7	6.6	8.8	85	59	27	1.8
13.0	10.5	6.5	8.5	82	59	20	1.3
14.0	10.4	6.5	8.5	82	59	15	1.0
14.5	10.4	6.5	8.4	81	59		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(d) MIDDLE QUINSAM LAKE, STATION 2. PROFILES - 1985 BASELINE
- SEPTEMBER 22

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (μ S/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(μ E./ m^2 /sec.)	(%)
.0	14.9	7.3	9.4	100	51	4000	100
1.0	14.9	7.3	9.1	96	51	2350	59
2.0	14.9	7.3	9.1	96	51	1980	50
3.0	14.9	7.3	9.0	95	51	1380	35
4.0	14.9	7.3	9.0	95	51	1130	28
5.0	14.9	7.2	9.0	95	51	835	21
6.0	14.8	7.2	8.9	94	52	610	15
7.0	14.8	7.2	8.9	94	52	490	12
8.0	14.8	7.2	8.8	93	52	350	8.8
9.0	14.8	7.2	8.9	94	52	230	5.7
10.0	14.7	7.1	8.7	92	52	190	4.7
11.0	14.4	7.0	8.3	87	52	140	3.5
12.0*	12.5	6.3	5.7	57	54	105	2.6
13.0	11.6	6.2	3.7	36	59	75	1.9
14.0	11.3	6.1	1.2	12	72	40	1.0
14.5	11.2	6.1	0.3	3	77		

TABLE 2(e)

QUINSAM COAL DEVELOPMENT

NO NAME LAKE. PROFILES - 1985 BASELINE - APRIL 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)
			(mg/l)	% sat'n.	
.0	9.5	6.9	10.9	103	27
1.0	8.8	6.9	10.4	96	28
2.0	8.0	6.7	10.2	93	27
3.0	6.5	6.7	10.2	89	28
4.0	6.0	6.9	9.9	86	28
5.0	5.1	7.1	9.6	81	29
6.0	4.7	7.1	9.3	78	30
7.0	4.5	6.9	8.7	72	32
8.0	4.4	7.0	8.2	68	33
9.0	4.4	6.7	7.9	66	33
10.0	4.3	6.7	7.6	63	33
11.0	4.2	6.6	7.2	59	35
12.0	4.2	6.5	7.1	59	35
13.0	4.2	6.6	7.1	59	35
14.0	4.1	6.6	6.7	55	36
15.0	4.1	6.4	6.5	53	36
16.0	4.1	6.4	6.4	53	37
17.0	4.1	6.4	6.1	50	37
18.0	4.1	6.4	6.1	50	37
18.5	4.1	6.3	5.8	47	38

+ 1% Light Transmission

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(e) NO NAME LAKE. PROFILES - 1985 BASELINE - JUNE 9

DEPTH (m)	TEMPER- TURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY ($\mu\text{S}/\text{cm}$)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		($\mu\text{E.}/\text{m}^2/\text{sec.}$)	(%)
.0	17.0	7.0	9.1	101	32	550	100
1.0	17.0	7.2	9.0	100	33	280	51
2.0	17.0	7.0	8.9	99	33	140	25
3.0	15.3	6.9	9.4	101	33	91	17
4.0	11.7	6.9	10.8	107	30	55	9.9
5.0	9.6	6.7	10.2	97	31	31	5.7
6.0*	8.2	6.5	9.4	86	31	7.6	1.4
7.0	7.1	6.3	8.5	75	32	1.5	0.3
8.0	6.5	6.2	7.9	69	32		
9.0	6.3	6.2	7.6	66	32		
10.0	6.2	6.3	7.4	64	32		
11.0	6.1	6.1	7.3	63	32		
12.0	6.0	6.1	7.4	64	32		
13.0	6.0	6.1	7.4	64	32		
14.0	5.9	6.1	7.2	62	32		
15.0	5.8	6.1	7.3	63	31		
16.0	5.7	6.1	7.1	61	31		
17.0	5.7	6.1	6.8	58	32		
18.0	5.6	6.1	6.1	52	32		

* Secchi Depth

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(e) NO NAME LAKE PROFILES - 1985 BASELINE - JULY 14

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	21.6	7.3	8.6	104	40	3650	100
1.0	21.7	7.4	8.6	104	40	2030	56
2.0	21.6	7.3	8.6	104	40	1230	34
3.0	21.4	7.2	8.5	103	40	755	21
4.0	19.5	7.0	9.4	110	40	495	14
5.0	14.2	6.8	11.0	117	36	320	8.7
6.0	10.4	6.4	9.7	93	37	180	5.0
7.0	8.5	6.2	8.1	75	38	105	2.9
8.0	7.5	6.1	7.2	65	38	59	1.6
9.0*	7.0	6.0	6.7	59	38	35	1.0
10.0	6.8	6.0	6.5	57	39	18	0.5
11.0	6.7	5.9	6.4	56	39	7.4	0.2
12.0	6.5	6.0	6.4	56	38		
14.0	6.3	6.0	6.2	54	39		
16.0	5.9	6.0	5.4	47	39		
17.0	5.9	5.9	4.4	38	40		
18.0	5.7	5.8	4.2	36	40		
18.5	5.7	5.8	4.1	35	41		

CONTINUED...

QUINSAM COAL DEVELOPMENT

TABLE 2(e) NO NAME LAKE. PROFILES - 1985 BASELINE - SEPTEMBER 22

DEPTH (m)	TEMPER- ATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCT- IVITY (uS/cm)	LIGHT TRANSMISSION	
			(mg/l)	% sat'n.		(uE./m ² /sec.)	(%)
.0	14.5	7.2	9.3	98	32	2500	100
1.0	14.5	7.3	9.2	97	34	1920	77
2.0	14.5	7.3	9.1	96	34	940	38
3.0	14.5	7.1	9.0	95	34	550	22
4.0	14.5	7.1	9.0	95	34	355	14
5.0	14.4	7.1	8.9	94	34	220	8.8
6.0	14.3	7.0	8.8	93	34	135	5.4
7.0	13.1	6.4	8.0	82	31	83	3.3
8.0	9.2	6.2	5.8	54	31	45	1.8
9.0*	8.0	6.0	4.9	44	31	29	1.2
10.0	7.5	6.0	4.6	41	31	15	0.6
11.0	7.3	5.9	4.2	37	31	8.5	0.3
12.0	6.9	5.9	4.2	37	32		
13.0	6.6	5.9	4.2	37	32		
14.0	6.3	5.9	3.7	32	32		
15.0	6.2	5.9	3.3	29	33		
16.0	6.0	5.9	2.0	17	32		
17.0	5.9	5.8	1.1	9	35		
18.0	5.9	5.8	0.1	1	39		

QUINSAM COAL DEVELOPMENT

TABLE 2(f) STREAMS. PROFILES - 1985 BASELINE

STATION	DATE	TEMPERATURE (°C)	pH (rel. unit)	DISS. OXYGEN		SPECIFIC CONDUCTIVITY (uS/cm)
				(mg/l)	(% Sat'n.)	
1	Apr.	9.4	6.8	10.6	99	47
	June	14.7	7.3	9.4	99	47
	July	20.9	7.3	8.0	95	55
	Sept.	13.9	7.3	9.3	97	52
4	Apr.	9.6	6.8	10.9	103	23
	June	17.2	7.0	9.1	101	29
	July	22.8	6.5	6.2	76	38
	Sept.	10.8	6.5	8.0	77	38
5	Apr.	11.0	6.4	10.5	102	32
	June	17.5	7.2	9.2	103	39
	July	23.1	7.5	8.5	105	51
	Sept.	15.7	7.2	9.1	98	51

4.2 Physical and Chemical

<u>TABLE 3(a)</u>	GOOSENECK LAKE
<u>TABLE 3(b)</u>	LONG LAKE
<u>TABLE 3(c)</u>	MIDDLE QUINSAM LAKE, STATION 1
<u>TABLE 3(d)</u>	MIDDLE QUINSAM LAKE, STATION 2
<u>TABLE 3(e)</u>	NO NAME LAKE
<u>TABLE 3(f)</u>	STREAMS

QUINSAM COAL DEVELOPMENT

TABLE 3(a) GOOSENECK LAKE. PHYSICAL AND CHEMICAL (units in mg/l unless otherwise stated)
- 1985 BASELINE

DATE	DEPTH (m)	TOTAL ALKALINITY	HARDNESS		SULFATE	TURBIDITY (FTU)	RESIDUE		
			Ca,Mg	Total			Non-Filterable	Filterable	Total
Apr.	1.0	18.0	19.6	19.7	2	0.53	< 5	43	47
	5.0	18.0	19.7	19.6	2	0.53	< 5	42	45
	16.0	17.0	18.1	18.1	2	0.38	< 5	38	40
	33.0	17.5	18.5	18.6	2	0.40	< 5	41	45
June	1.0	19.0	21.8	22.2	2	0.38	< 5	32	32
	5.0	17.7	21.4	22.0	2	0.39	< 5	31	31
	10.0	17.0	19.4	19.6	2	0.44	< 5	30	30
	34.0	16.0	18.7	19.1	2	0.48	< 5	36	36
July	1.0	20.4	19.4	19.4	4	0.10	< 5	31	31
	5.0	19.6	18.9	18.9	4	0.23	< 5	31	31
	15.0	16.9	15.9	15.9	4	0.13	< 5	29	29
	35.0	16.9	15.9	15.9	4	0.13	< 5	29	29
Sept.	1.0	20.4	21.4	21.5	2	0.28	< 5	21	21
	8.0	20.4	21.3	21.3	2	0.28	< 5	21	21
	20.0	17.2	18.3	18.3	2	0.28	< 5	18	18
	36.0	17.6	18.4	18.5	2	0.30	< 5	21	21

QUINSAM COAL DEVELOPMENT

TABLE 3(b) LONG LAKE. PHYSICAL AND CHEMICAL (units in mg/l unless otherwise stated)
- 1985 BASELINE

DATE	DEPTH (m)	TOTAL ALKALINITY	HARDNESS		SULFATE	TURBIDITY (FTU)	RESIDUE		
			Ca,Mg	Total			Non-Filterable	Filterable	Total
Apr.	1.0	11.0	10.9	11.1	1	0.65	7	35	42
	3.0	11.0	11.1	11.5	1	0.65	5	34	39
	9.0	12.0	12.3	12.8	2	0.75	5	38	43
	20.0	12.0	12.7	13.2	2	0.75	5	42	47
June	1.0	13.0	13.8	14.0	2	0.50	< 5	29	29
	3.0	12.5	14.1	14.5	2	0.53	< 5	31	31
	7.0	11.0	12.3	12.6	2	0.60	< 5	29	29
	19.0	11.0	12.3	13.0	2	0.70	< 5	32	32
July	1.0	15.0	12.5	12.6	3	0.28	< 5	23	23
	3.0	15.0	12.7	12.9	3	0.23	< 5	28	28
	10.0	12.1	10.7	10.9	3	0.25	< 5	29	29
	20.0	11.7	10.6	10.9	4	0.40	< 5	54	54
Sept.	1.0	14.5	13.6	13.6	2	0.25	< 5	22	22
	6.0	29.0	13.7	13.7	2	0.23	< 5	23	23
	14.0	11.8	12.1	12.4	2	0.23	< 5	27	27
	19.0	12.5	12.3	12.9	2	0.38	< 5	22	22

QUINSAM COAL DEVELOPMENT

TABLE 3(c) MIDDLE QUINSAM LAKE, STATION 1. PHYSICAL AND CHEMICAL (units in mg/l unless otherwise stated)
- 1985 BASELINE

DATE	DEPTH (m)	TOTAL ALKALINITY	HARDNESS		SULFATE	TURBIDITY (FTU)	RESIDUE		
			Ca, Mg	Total			Non-Filterable	Filterable	Total
Apr.	1.0	14.5	17.1	16.9	2	0.53	< 5	33	37
	4.0	14.5	17.2	17.0	2	0.50	5	34	39
	10.0	15.0	18.9	18.8	2	0.61	6	32	38
	15.0	15.0	17.7	18.2	2	0.65	< 5	33	37
June	1.0	17.0	19.5	19.3	2	0.51	< 5	29	29
	4.0	18.3	19.1	18.9	2	0.43	< 5	26	26
	9.0	16.0	17.6	17.8	3	0.53	< 5	29	29
	14.0	16.0	17.1	17.5	2	0.76	< 5	32	32
July	1.0	21.2	21.5	21.7	3	0.25	< 5	32	32
	5.0	21.2	21.7	21.7	3	0.20	< 5	33	33
	11.0	16.9	17.9	18.0	3	0.23	< 5	34	34
	15.0	16.9	18.3	18.4	3	0.30	< 5	63	63
Sept.	1.0	19.6	22.2	22.5	2	0.20	< 5	30	30
	8.0	19.2	22.1	22.3	2	0.20	< 5	25	25
	12.0	15.7	18.3	18.4	2	0.28	< 5	30	31
	15.0	16.1	18.6	19.0	2	0.83	< 5	35	35

QUINSAM COAL DEVELOPMENT

TABLE 3(d) MIDDLE QUINSAM LAKE, STATION 2. PHYSICAL AND CHEMICAL (units in mg/l unless otherwise stated)
- 1985 BASELINE

DATE	DEPTH (m)	TOTAL ALKALINITY	HARDNESS		SULFATE	TURBIDITY (FTU)	RESIDUE		
			Ca,Mg	Total			Non-Filterable	Filterable	Total
Apr.	1.0	15.0	17.7	18.0	2	0.46	5	29	34
	4.0	15.0	17.6	17.6	2	0.48	< 5	37	42
	10.0	15.0	17.3	17.2	2	0.59	< 5	32	37
	15.0	16.0	17.8	17.7	2	2.40	< 5	33	37
June	1.0	17.3	18.6	18.8	2	0.39	< 5	35	35
	4.0	18.0	18.7	18.7	2	0.40	< 5	25	25
	9.0	16.5	17.3	17.4	2	0.35	< 5	31	31
	14.0	16.0	17.2	17.2	2	0.39	< 5	28	28
July	1.0	20.8	21.4	21.3	3	0.18	< 5	33	33
	5.0	20.8	21.2	21.2	3	0.18	< 5	32	32
	11.0	17.4	17.7	17.6	3	0.20	< 5	34	34
	15.0	17.4	17.6	17.6	3	0.23	< 5	30	30
Sept.	1.0	20.8	21.9	22.1	3	0.23	< 5	29	29
	8.0	21.2	22.2	22.3	2	0.18	< 5	33	33
	12.0	17.2	18.3	18.5	2	0.33	< 5	33	33
	15.0	16.5	18.5	18.7	2	0.35	< 5	34	34

QUINSAM COAL DEVELOPMENT

TABLE 3(e)

NO NAME LAKE. PHYSICAL AND CHEMICAL (units in mg/l unless otherwise stated)
- 1985 BASELINE

DATE	DEPTH (m)	TOTAL ALKALINITY	HARDNESS		SULFATE	TURBIDITY (FTU)	RESIDUE		
			Ca,Mg	Total			Non-Filterable	Filterable	Total
Apr.	1.0	11.0	11.0	11.0	2	1.00	6	31	37
	4.0	11.0	10.7	10.9	2	0.18	< 5	32	36
	10.0	10.5	11.0	11.3	2	0.53	< 5	32	36
	15.0	13.3	13.3	14.1	2	1.50	< 5	40	45
June	1.0	12.6	13.7	14.5	1	0.56	< 5	25	25
	4.0	12.5	13.5	14.2	2	0.73	< 5	27	27
	9.0	11.0	12.3	12.9	2	0.74	< 5	29	29
	14.0	11.0	12.9	15.0	2	2.30	< 5	32	32
July	1.0	34.0	12.4	12.5	3	0.28	< 5	33	33
	5.0	34.5	12.3	12.4	4	0.43	< 5	31	31
	11.0	29.0	10.4	10.9	3	0.40	< 5	23	23
	15.0	31.0	10.4	11.1	4	0.93	< 5	26	26
Sept.	1.0	14.8	14.0	14.1	2	0.23	< 5	20	20
	8.0	14.1	13.7	13.8	2	0.23	< 5	17	17
	12.0	12.2	11.7	12.3	2	0.43	< 5	23	23
	15.0	12.5	12.0	13.4	3	1.00	< 5	26	26

TABLE 3(f) STREAMS. PHYSICAL AND CHEMICAL (units in mg/l unless otherwise stated) - 1985 BASELINE

STATION	DATE	TOTAL ALKALINITY	HARDNESS		SULFATE	TURBIDITY (FTU)	RESIDUE	
			Ca, mg	Total			Non-Filt.	Filt.
			\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)
1	Apr.	19.8 (0.3)	21.6 (0.1)	21.7 (0.2)	2.0 (0)	0.36 (0.02)	5 (4)	39 (1)
	June	19.7 (0.6)	21.8 (0.4)	21.5 (0.1)	2.0 (0)	0.31 (0.02)	< 5 (0)	33 (2)
	July	21.6 (0)	22.8 (0.1)	22.9 (0.1)	3.0 (0)	0.18 (0.11)	< 5 (0)	32 (3)
	Sept.	21.1 (0.2)	21.8 (0.3)	21.6 (0.2)	2.0 (0)	0.22 (0.05)	< 5 (0)	28 (5)
4	Apr.	11.0 (0)	10.8 (0.2)	11.1 (0.2)	2.0 (0)	0.59 (0)	5 (4)	34 (2)
	June	12.8 (0.3)	13.4 (0.1)	13.5 (0.2)	2.9 (0)	0.45 (0.03)	< 5 (0)	29 (2)
	July	15.5 (0.2)	12.9 (0.1)	13.1 (0.1)	3.0 (0)	0.40 (0)	< 5 (0)	27 (1)
	Sept.	15.4 (0.5)	14.2 (0.2)	14.3 (0.3)	1.7 (0.6)	0.24 (0.04)	< 5 (0)	28 (0)
5	Apr.	14.0 (0)	14.5 (0.1)	14.4 (0.3)	1.7 (0.6)	0.42 (0.10)	5 (4)	39 (1)
	June	16.3 (0.6)	18.2 (0.1)	18.3 (0.5)	2.0 (0)	0.50 (0.01)	< 5 (0)	30 (1)
	July	21.1 (0.2)	20.6 (0.8)	20.7 (0.8)	3.0 (0)	0.21 (0.02)	< 5 (1)	31 (2)
	Sept.	21.1 (0.3)	22.1 (0.1)	22.3 (0.2)	2.0 (0)	0.19 (0.01)	< 5 (0)	25 (4)

4.3

Nutrients

<u>TABLE 4(a)</u>	GOOSENECK LAKE
<u>TABLE 4(b)</u>	LONG LAKE
<u>TABLE 4(c)</u>	MIDDLE QUINSAM LAKE, STATION 1
<u>TABLE 4(d)</u>	MIDDLE QUINSAM LAKE, STATION 2
<u>TABLE 4(e)</u>	NO NAME LAKE
<u>TABLE 4(f)</u>	STREAMS

QUINSAM COAL DEVELOPMENT

TABLE 4(a) GOOSENECK LAKE. NUTRIENTS (mg/l) - 1985 BASELINE

DATE	DEPTH	TDP	TP	NO ₃	NO ₂	NH ₃	TDN	PN	PC
Apr.	1.0	<.002	<.002	<.005	<.005	.005	.06	<.01	.177
	5.0	<.002	.003	<.005	<.005	<.005	.06	<.01	.164
	16.0	<.002	<.002	.008	<.005	<.005	.06	<.01	.125
	33.0	<.002	<.002	.009	<.005	<.005	.06	<.01	.147
June	1.0	<.002	<.002	<.005	<.005	.006	.06	<.01	.126
	5.0	<.002	<.002	<.005	<.005	<.005	.06	<.01	.137
	10.0	<.002	<.002	<.005	<.005	<.005	.05	<.01	.144
	34.0	<.002	<.002	.008	<.005	<.005	.06	<.01	.176
July	1.0	<.002	<.002	<.005	<.005	.007	.08	<.01	.121
	5.0	<.002	<.002	<.005	<.005	.006	.07	<.01	.152
	15.0	<.002	<.002	<.005	<.005	.006	.06	<.01	.140
	35.0	<.002	<.002	<.005	.006	.009	.08	<.01	.141
Sept.	1.0	<.002	<.002	<.005	<.005	.006	.09	<.01	.167
	8.0	<.002	<.002	<.005	<.005	<.005	.08	<.01	.244
	20.0	<.002	<.002	.005	<.005	.006	.07	<.01	.257
	36.0	<.002	.002	.019	<.005	.011	.07	<.01	.154

QUINSAM COAL DEVELOPMENT

TABLE 4(b) LONG LAKE. NUTRIENTS (mg/l) - 1985 BASELINE.

DATE	DEPTH	TDP	TP	NO ₃	NO ₂	NH ₃	TDN	PN	PC
Apr.	1.0	<.002	.002	.007	<.005	.007	.10	<.020	.291
	3.0	.002	.003	.007	<.005	.005	.09	<.020	.199
	9.0	.002	<.002	.025	<.005	.007	.10	<.020	.229
	20.0	.002	<.002	.030	<.005	.009	.11	<.020	.227
June	1.0	<.002	<.002	<.005	<.005	<.005	.11	.010	.189
	3.0	<.002	<.002	<.005	<.005	<.005	.10	.010	.210
	7.0	<.002	<.002	<.005	<.005	<.005	.07	.013	.216
	19.0	<.002	<.002	.015	<.005	<.005	.09	<.010	.182
July	1.0	<.002	<.002				.12	<.010	.181
	3.0	<.002	.003				.12	<.010	.181
	10.0	<.002	<.002				.09	.010	.153
	20.0	<.002	.003				.12	<.010	.139
Sept.	1.0	.003	<.002	<.005	<.005	<.005	.12	.019	.218
	6.0	.003	.002	<.005	<.005	<.005	.13	.018	.393
	14.0	.003	<.002	.015	<.005	<.005	.10	<.020	.085
	19.0	.005	.004	.042	<.005	<.005	.14	<.010	.171

QUINSAM COAL DEVELOPMENT

TABLE 4(c) MIDDLE QUINSAM LAKE, STATION 1. NUTRIENTS (mg/l)
- 1985 BASELINE

DATE	DEPTH	TDP	TP	NO ₃	NO ₂	NH ₃	TDN	PN	PC
Apr.	1.0	<.002	.003	.007	<.005	.005	.11	.035	.341
	4.0	<.002	.005	.007	<.005	<.005	.10	.019	.254
	10.0	<.002	.003	.013	<.005	.005	.10	.012	.195
	15.0	<.002	.003	.016	<.005	.008	.11	.016	.233
June	1.0	.003	<.002	<.005	<.005	.007	.16	.021	.392
	4.0	<.002	<.002	<.005	<.005	<.005	.08	.011	.303
	9.0	<.002	.002	<.005	<.005	<.005	.06	<.010	.253
	14.0	<.002	<.002	.008	<.005	.013	.08	<.010	.205
July	1.0	<.002	.005	<.005	.006	.006	.14	.036	.443
	5.0	<.002	.004	<.005	.006	.005	.09	.011	.579
	11.0	<.002		<.005	.006	.006	.07	<.010	.171
	15.0	<.002	.005	<.005	.006	.011	.09	<.010	.222
Sept.	1.0	.002	.009	<.005	<.005	.008	.13	.043	.552
	8.0	<.002	.003	<.005	<.005	<.005	.07	.010	.258
	12.0	.002	<.002	<.005	<.005	.012	.09	.010	.189
	15.0	.002	.002	<.005	<.005	.055	.14	.015	.241

QUINSAM COAL DEVELOPMENT

TABLE 4(d) MIDDLE QUINSAM LAKE, STATION 2. NUTRIENTS (mg/l)
- 1985 BASELINE

DATE	DEPTH	TDP	TP	NO ₃	NO ₂	NH ₃	TDN	PN	PC
Apr.	1.0	<.002	.002	.008	<.005	<.005	.08	.019	.255
	3.0	<.002	.003	.007	<.005	<.005	.09	.010	.190
	8.0	<.002	.004	.010	<.005	<.005	.08	.010	.193
	13.0	<.002	.003	.012	<.005	.007	.08	.012	.195
June	1.0	<.002	<.002	<.005	<.005	<.005	.09	.014	.248
	4.0	<.002	<.002	<.005	<.005	<.005	.07	.012	.193
	9.0	<.002	<.002	<.005	<.005	.005	.09	.007	.174
	13.0	<.002	<.002	<.005	<.005	.008	.08	.012	.204
July	1.0	<.002	.002	<.005	.006	<.005	.09	<.010	.167
	5.0	<.002	.002	<.005	.006	<.005	.11	<.010	.225
	10.0	<.002	.003	<.005	.006	.005	.08	.011	.180
	14.0	<.002	.006	<.005	.006	.009	.08	<.010	.185
Sept.	1.0	<.002	<.002	<.005	<.005	.006	.08	<.010	.339
	10.0	<.002	<.002	<.005	<.005	.014	.07	<.010	.147
	13.0	<.002	.004	<.005	<.005	<.005	.07	.024	.305
	14.0	<.002	.004	<.005	<.005	<.005	.07	.033	.334

QUINSAM COAL DEVELOPMENT

TABLE 4(e) NO NAME LAKE. NUTRIENTS (mg/l) - 1985 BASELINE

DATE	DEPTH	TDP	TP	NO ₃	NO ₂	NH ₃	TDN	PN	PC
Apr.	1.0	<.002	.004	.009	<.005	<.005	.09	.025	.332
	3.0	.002	.004	.010	<.005	.005	.08	.027	.308
	6.0	<.002	.006	.022	<.005	.005	.12	<.020	.229
	16.0	.002	.004	.048	<.005	.012	.20	<.020	.246
June	1.0	<.002	<.002	<.005	<.005	.006	.21	.025	.373
	4.0	<.002	<.002	<.005	<.005	<.005	.10	.023	.310
	6.0	<.002	<.002	<.005	<.005	<.005	.07	.033	.365
	17.0	<.002	<.002	<.005	<.005	<.005	.08	.017	.323
July	1.0	<.002	.002	<.005	.005	.007	.13	<.010	.275
	3.0	<.002	.002	<.005	.005	<.005	.12	.012	.215
	11.0	<.002	.003	<.005	.005	.011	.09	<.010	.176
	17.0	<.002	.006	.018	.006	.006	.12	<.010	.230
Sept.	1.0	.003	.003	<.005	<.005	<.005	.15	.011	.221
	6.0	.002	.003	<.005	<.005	<.005	.13	.010	.179
	12.0	.005	.006	<.005	<.005	.008	.10	<.010	.167
	17.0	.006	.009	.079	<.005	.009	.17	<.020	.441

TABLE 4(f) STREAMS. NUTRIENTS (mg/l) - 1985 BASELINE

STATION	DATE	TOTAL DISSOLVED PHOSPHATE	TOTAL PHOSPHATE	NITRATE	NITRITE	AMMONIA	TOTAL DISSOLVED NITROGEN	PARTICULATE NITROGEN	PARTICULATE CARBON
		\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)
1	Apr.	< 0.002 (0)	< 0.002 (0)	0.015 (0)	< 0.005 (0)	< 0.005 (0)	0.073 (0.006)	< 0.010 (0)	0.114 (0.003)
	June	< 0.002 (0)	< 0.002 (0)	0.009 (0.001)	< 0.005 (0)	< 0.005 (0)	0.050 (0)	< 0.010 (0)	0.128 (0.016)
	July	< 0.002 (0)	< 0.002 (0)	0.017 (0.001)	0.006 (0.001)	< 0.005 (0)	0.070 (0)	< 0.010 (0)	0.109 (0.039)
	Sept.	< 0.002 (0)	< 0.002 (0)	< 0.005 (0)	< 0.005 (0)	< 0.005 (0)	0.067 (0.006)	< 0.010 (0)	0.133 (0.023)
4	Apr.	0.002 (0)	< 0.002 (0)	0.006 (0.001)	< 0.005 (0)	< 0.005 (0)	0.083 (0.006)	< 0.010 (0)	0.185 (0.002)
	June	< 0.002 (0)	< 0.002 (0)	< 0.005 (0)	< 0.005 (0)	< 0.005 (0)	0.093 (0.006)	< 0.010 (0)	0.166 (0.012)
	July	< 0.002 (0)	< 0.002 (0)	< 0.005 (0)	< 0.005 (0)	0.006 (0)	0.163 (0.006)	0.012 (0.01)	0.203 (0.031)
	Sept.	0.002 (0)	0.003 (0.001)	0.007 (0.001)	< 0.005 (0)	< 0.005 (0)	0.153 (0.006)	0.022 (0.005)	0.310 (0.009)
5	Apr.	< 0.002 (0)	< 0.002 (0)	0.008 (0)	< 0.005 (0)	< 0.005 (0)	0.100 (0)	< 0.010 (0)	0.165 (0.012)
	June	< 0.002 (0)	< 0.002 (0)	< 0.005 (0)	< 0.005 (0)	< 0.005 (0)	0.073 (0.006)	< 0.010 (0)	0.167 (0.016)
	July	< 0.002 (0)	< 0.002 (0)	< 0.005 (0)	0.006 (0.001)	< 0.005 (0)	0.100 (0)	< 0.010 (0)	0.181 (0.012)
	Sept.	< 0.002 (0)	< 0.002 (0.001)	< 0.005 (0)	< 0.005 (0)	< 0.005 (0)	0.090 (0.010)	< 0.010 (0)	0.177 (0.030)

4.4 Heavy Metals in Water

4.4.1 Detection Limits.

TABLE 5 HEAVY METALS IN WATER AT OR BELOW DETECTION LIMITS

4.4.2 Dissolved Heavy Metals.

TABLE 6(a) GOOSENECK LAKE. DISSOLVED HEAVY METALS IN WATER COLUMN
TABLE 6(b) LONG LAKE. DISSOLVED HEAVY METALS IN WATER COLUMN,
TABLE 6(c) MIDDLE QUINSAM LAKE, STATION 1. DISSOLVED HEAVY METALS IN WATER COLUMN
TABLE 6(d) MIDDLE QUINSAM LAKE, STATION 2. DISSOLVED HEAVY METALS IN WATER COLUMN
TABLE 6(e) NO NAME LAKE. DISSOLVED HEAVY METALS IN WATER COLUMN
TABLE 6(f) STREAMS. DISSOLVED HEAVY METALS IN WATER COLUMN

4.4.3 Total Heavy Metals.

TABLE 7(a) GOOSENECK LAKE. TOTAL HEAVY METALS IN WATER COLUMN
TABLE 7(b) LONG LAKE. TOTAL HEAVY METALS IN WATER COLUMN
TABLE 7(c) MIDDLE QUINSAM LAKE, STATION 1. TOTAL METALS IN WATER COLUMN
TABLE 7(d) MIDDLE QUINSAM LAKE, STATION 2. TOTAL METALS IN WATER COLUMN
TABLE 7(e) NO NAME LAKE. TOTAL HEAVY METALS IN WATER COLUMN
TABLE 7(f) STREAMS. TOTAL HEAVY METALS IN WATER COLUMN

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TABLE 5 HEAVY METALS IN WATER AT OR BELOW THE DETECTION LIMITS (mg/l)
- 1985 BASELINE

METAL	DETECTION LIMITS		
	ICAP	ATOMIC ABSROPTION*	
	Dissolved / Extractable / Total	Dissolved	Total
Antimony (Sb)	0.05		
Arsenic (As)	0.05		
Beryllium (Be)	0.001		
Cadmium (Cd)	0.002	0.0005	0.0006
Chromium (Cr)	0.005		
Cobalt (Co)	0.005		
Copper (Cu)	0.005	0.001	0.001
Lead (Pb)	0.02	0.001	0.001
Nickel (Ni)	0.02		
Selenium (Se)	0.05		
Tin	0.05		
Vanadium (V)	0.005		

* Atomic absorption analyzed during the July survey period.

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TABLE 6(a) GOOSENECK LAKE. DISSOLVED HEAVY METALS IN WATER COLUMN (mg/l)
- 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.004	.001	6.8	.015	.6	.003	< .005	.7	1.8	.010	< .002	.003
	5.0	< .05	.016	.001	6.8	.015	.6	.003	< .005	.7	1.8	.010	< .002	.002
	16.0	< .05	.004	.001	6.2	.022	.6	.005	< .005	.8	1.9	.010	< .002	.002
	33.0	< .05	.011	.001	6.4	.026	.6	.006	< .005	.8	1.9	.010	< .002	.003
July	1.0	< .05	.015	< .001	6.7	.013	.6	.001	< .005	.6	.9	.011	< .002	.003
	5.0	< .05	.011	< .001	6.6	.012	.6	.001	< .005	.6	.9	.010	< .002	< .002
	15.0	< .05	.004	.002	5.5	.007	.5	.001	< .005	.6	1.0	.009	< .002	< .002
	35.0	< .05	.009	.002	5.5	.011	.5	.001	< .005	.6	1.2	.009	< .002	< .002
Sept.	1.0	< .05	.038	.002	7.2	.006	.9	.003	< .005	.7	.9	.014	< .002	< .002
	8.0	< .05	.027	.001	7.2	.007	.8	< .001	< .005	.7	.9	.013	< .002	< .002
	20.0	< .05	.027	.002	6.1	.006	.7	< .001	< .005	.8	1.8	.012	< .002	< .002
	36.0	< .05	.013	.002	6.1	.019	.8	.008	< .005	.8	2.1	.012	< .002	.004

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TABLE 6(b) LONG LAKE. DISSOLVED HEAVY METALS IN WATER COLUMN (mg/l) - 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.005	.001	3.3	.043	.7	.004	< .005	1.2	2.7	.009	< .002	.003
	3.0	.06	.011	.001	3.3	.048	.7	.005	< .005	1.3	2.7	.010	< .002	< .002
	9.0	< .05	.009	.001	3.8	.131	.7	.048	< .005	1.4	3.1	.010	< .002	.003
	20.0	< .05	.014	.002	3.9	.137	.7	.058	< .005	1.4	3.2	.011	< .002	< .002
July	1.0	< .05	.004	.002	3.9	.032	.7	< .001	< .005	1.2	1.4	.013	< .002	.004
	3.0	< .05	.011	.002	4.0	.032	.7	< .001	< .005	1.2	1.4	.012	< .002	< .002
	10.0	< .05	.024	.002	3.3	.050	.6	.015	< .005	1.0	1.9	.010	< .002	< .002
	20.0	< .05	.024	.002	3.3	.106	.6	.021	< .005	1.0	2.1	.010	< .002	< .002
Sept.	1.0	< .05	.016	.002	4.1	.015	.8	.002	.006	1.5	1.6	.016	< .002	.006
	6.0	< .05	.030	.002	4.1	.013	.8	< .001	< .005	1.5	1.6	.016	< .002	.002
	14.0	< .05	.038	.002	3.6	.053	.7	.026	< .005	1.3	2.4	.012	< .002	< .002
	19.0	< .05	.005	.002	3.7	.154	.7	.169	< .005	1.3	3.1	.015	< .002	< .002

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TABLE 6(c) MIDDLE QUINSAM LAKE, STATION 1. DISSOLVED HEAVY METALS IN WATER COLUMN
(mg/l) - 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.020	.002	5.8	.045	.7	.016	< .005	1.4	2.2	.012	< .002	.003
	4.0	< .05	.011	.002	5.8	.047	.7	.017	< .005	1.4	2.2	.012	< .002	< .002
	10.0	< .05	.011	.002	6.4	.059	.7	.023	< .005	1.4	2.5	.012	< .002	.002
	15.0	.06	< .001	.001	5.9	.075	.7	.022	< .005	1.5	2.2	.010	< .002	< .002
June	1.0	< .05	< .001	.001	6.3	.055	.8	.005	< .005	1.2	1.4	.013	< .002	.048
	4.0	< .05	< .001	.001	6.4	.058	.8	.005	< .005	1.2	1.3	.013	< .002	.016
	9.0	< .05	< .001	.001	5.9	.034	.8	.003	< .005	1.6	1.5	.012	< .002	.013
	14.0	< .05	< .001	.002	5.9	.111	.7	.014	< .005	2.1	1.6	.013	< .002	.011
July	1.0	< .05	.018	.001	7.2	.017	.9	.002	< .005	1.1	1.2	.014	< .002	.048
	5.0	< .05	.015	.001	7.3	.023	.9	.003	< .005	1.0	1.5	.014	< .002	.003
	11.0	< .05	.027	.001	6.0	.034	.7	.005	< .005	1.9	1.6	.013	< .002	< .002
	15.0	< .05	.030	.002	6.1	.058	.7	.013	< .005	2.3	1.6	.014	< .002	< .002
Sept.	1.0	< .05	.025	.001	7.5	.015	.9	.011	.005	.9	.9	.015	< .002	.051
	8.0	< .05	.018	< .001	7.4	.014	.9	.006	< .005	.9	.9	.014	< .002	.005
	12.0	< .05	.007	.002	6.1	.019	.8	.012	< .005	2.3	.9	.016	< .002	.002
	15.0	< .05	.029	.003	6.1	.060	.8	.142	< .005	3.2	1.6	.018	< .002	.003

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TABLE 6(d) MIDDLE QUINSAM LAKE, STATION 2. DISSOLVED HEAVY METALS IN WATER COLUMN
(mg/l) - 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	< .001	.001	5.9	.048	.7	.015	< .005	1.2	2.1	.011	< .002	< .002
	3.0	< .05	< .001	.001	5.9	.046	.7	.016	< .005	1.3	2.2	.012	< .002	< .002
	8.0	< .05	< .001	.002	5.9	.053	.7	.025	< .005	1.5	2.2	.012	< .002	< .002
	13.0	< .05	.016	.002	6.0	.056	.7	.027	< .005	1.5	2.2	.012	< .002	< .002
June	1.0	< .05	.003	.001	6.5	.051	.8	.005	< .005	1.2	1.3	.013	< .002	.005
	4.0	< .05	.006	.001	6.5	.051	.8	.005	< .005	1.2	1.2	.013	< .002	.012
	9.0	< .05	< .001	.001	6.1	.029	.7	.003	< .005	1.3	1.5	.012	< .002	.011
	13.0	< .05	.008	.001	5.9	.029	.7	.005	< .005	1.6	1.3	.012	< .002	.006
July	1.0	< .05	.024	< .001	7.2	.016	.9	.002	< .005	1.1	1.6	.014	< .002	.004
	5.0	< .05	.018	.001	7.1	.015	.9	.001	< .005	1.0	1.1	.014	< .002	< .002
	10.0	< .05	.030	.001	5.9	.012	.7	.002	< .005	1.5	1.2	.013	< .002	< .002
	14.0	< .05	.006	.001	5.8	.015	.7	.003	< .005	1.7	1.1	.013	< .002	< .002
Sept.	1.0	< .05	.018	.001	7.4	.012	.8	.002	< .005	.9	.9	.015	< .002	.008
	10.0	< .05	.018	.001	7.4	.011	.9	.002	< .005	.9	.9	.015	< .002	.002
	13.0	< .05	.018	.002	6.0	.014	.8	.007	< .005	2.4	.6	.016	< .002	< .002
	14.0	< .05	.018	.002	6.1	.011	.8	.016	< .005	2.4	<.1	.017	< .002	< .002

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TABLE 6(e) NO NAME LAKE. DISSOLVED HEAVY METALS IN WATER COLUMN (mg/l)
- 1985 BASELINE

DATE	DEPTH (m)	Al	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.011	.001	3.3	.053	.7	.005	< .005	1.1	2.9	.009	< .002	.003
	3.0	< .05	.005	< .001	3.2	.061	.6	.009	< .005	1.0	2.8	.008	< .002	< .002
	6.0	< .05	.004	< .001	3.3	.097	.6	.021	< .005	1.0	2.9	.008	< .002	< .002
	16.0	< .05	.007	.001	4.1	.374	.7	.117	< .005	1.2	3.4	.010	< .002	.002
June	1.0	< .05	.015	< .001	4.1	.022	.8	< .001	< .005	1.1	2.3	.012	< .002	.005
	3.0	< .05	.015	< .001	4.0	.029	.8	< .001	< .005	1.0	2.2	.011	< .002	.017
	6.0	< .05	.02	< .001	3.5	.016	.7	.002	< .005	1.0	2.4	.01	< .002	.006
	17.0	< .05	.013	< .001	3.6	.407	.7	.006	< .005	1.0	2.7	.011	< .002	< .002
July	1.0	< .05	.021	< .001	3.8	.038	.7	.002	.005	1.0	1.5	.010	< .002	.006
	3.0	< .05	.017	< .001	3.7	.038	.7	.003	< .005	1.0	1.4	.010	< .002	< .002
	11.0	< .05	.024	< .001	3.2	.164	.6	.016	< .005	0.9	1.9	.008	< .002	< .002
	17.0	< .05	.011	< .001	3.2	.250	.6	.043	< .005	0.9	2.0	.008	< .002	< .002
Sept.	1.0	< .05	<.001	< .001	4.0	.022	.9	.001	< .005	1.2	2.1	.013	< .002	.006
	6.0	< .05	.016	< .001	4.0	.022	.9	.001	< .005	1.2	2.4	.013	< .002	< .002
	12.0	< .05	.038	.001	3.4	.244	.8	.062	< .005	1.1	2.4	.011	< .002	< .002
	17.0	< .05	.038	.002	3.5	.346	.8	.392	< .005	1.1	3.2	.012	< .002	.002

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TABLE 6(f) STREAMS. DISSOLVED HEAVY METALS IN WATER COLUMN (mg/l) - 1985 BASELINE

STATION	DATE	Al		B		Ba		Ca		Fe		Mg	
		\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)
1	April	< 0.05 (0)		0.002 (0.004)	< 0.001 (0)		7.40 (0)		0.010 (0)		0.77 (0.06)		
	July	< 0.05 (0)		0.004 (0.007)	< 0.001 (0)		7.83 (0.06)		0.006 (0.001)		0.80 (0)		
	Sept.	< 0.05 (0)		0.031 (0.006)	< 0.001 (0)		7.43 (0.06)	< 0.005 (0)			0.80 (0)		
4	April	< 0.05 (0)		0.007 (0.003)	0.001 (0)		3.30 (0)		0.042 (0.001)		0.60 (0)		
	July	< 0.05 (0)		< 0.001 (0.001)	0.002 (0)		4.00 (0)		0.103 (0)		0.70 (0)		
	Sept.	< 0.05 (0)		0.025 (0.004)	0.002 (0)		4.23 (0.06)		0.032 (0.002)		0.90 (0)		
5	April	< 0.05 (0)		0.008 (0.008)	0.001 (0.001)		4.80 (0)		0.042 (0.001)		0.60 (0)		
	July	< 0.05 (0)		0.003 (0.005)	0.001 (0.001)		6.90 (0.26)		0.025 (0.001)		0.87 (0.06)		
	Sept.	< 0.05 (0)		0.018 (0.008)	0.001 (0.001)		7.40 (0)		0.013 (0.002)		0.90 (0)		

STATION	DATE	Mn		Mo		Na		Si		Sr		Ti		Zn	
		\bar{x} (SD)													
1	April	< 0.001 (0)		< 0.005 (0)	0.80 (0)		1.80 (0)		0.010 (0)		< 0.002 (0)		< 0.002 (0)		
	July	< 0.001 (0)		< 0.005 (0)	0.70 (0)		1.60 (0)		0.013 (0.001)		< 0.002 (0)		< 0.002 (0)		
	Sept.	< 0.001 (0)		< 0.005 (0)	0.60 (0)		0.90 (0)		0.013 (0)		< 0.002 (0)		0.002 (0.001)		
4	April	0.004 (0.001)		< 0.005 (0)	1.10 (0.1)		2.67 (0.06)		0.009 (0.001)		< 0.002 (0)		< 0.002 (0)		
	July	0.017 (0)		< 0.005 (0)	1.20 (0)		1.33 (0.06)		0.013 (0)		< 0.002 (0)		< 0.002 (0)		
	Sept.	0.005 (0)		< 0.005 (0)	1.50 (0)		1.57 (0.12)		0.016 (0.001)		< 0.002 (0)		0.020 (0.003)		
5	April	0.010 (0)		< 0.005 (0)	1.17 (0.06)		2.30 (0)		0.010 (0)		< 0.002 (0)		< 0.002 (0)		
	July	0.006 (0)		< 0.005 (0)	1.03 (0.06)		1.50 (0.1)		0.014 (0)		< 0.002 (0)		< 0.002 (0)		
	Sept.	0.003 (0.002)		< 0.005 (0)	0.90 (0)		0.90 (0)		0.015 (0)		< 0.002 (0)		0.016 (0.005)		

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TABLE 7(a) GOOSENECK LAKE. TOTAL HEAVY METALS IN WATER COLUMN (mg/l)
- 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	.06	.001	.001	7.4	.023	.7	.003	< .005	0.6	1.9	.011	< .002	.003
	5.0	< .05	.007	< .001	7.5	.019	.7	.002	< .005	0.7	2.0	.011	< .002	.002
	16.0	< .05	.003	.002	6.9	.031	.6	.006	< .005	0.8	2.1	.010	.003	< .002
	33.0	< .05	.003	.002	7.0	.018	.6	.006	< .005	0.8	2.2	.010	< .002	.003
June	1.0	< .05	< .001	.001	7.5	.025	.7	.002	< .005	0.7	1.3	.012	< .002	.154
	5.0	< .05	< .001	.001	7.4	.027	.7	.002	< .005	0.8	1.3	.012	< .002	.333
	10.0	< .05	.002	.001	6.7	.015	.7	.001	< .005	0.8	1.4	.011	< .002	.112
	34.0	< .05	.002	.002	6.4	.051	.7	.006	< .005	0.8	1.7	.011	< .002	.035
July	1.0	.05	.017	< .001	6.9	.034	.7	.003	< .005	0.6	1.3	.010	< .002	.005
	5.0	.05	.007	< .001	6.9	.050	.7	.003	< .005	0.6	0.8	.010	< .002	< .002
	15.0	< .05	.012	.001	5.8	.036	.6	.003	< .005	0.6	1.3	.009	< .002	.003
	35.0	.08	.020	.002	5.9	.082	.7	.006	< .005	0.7	1.3	.009	< .002	.004
Sept.	1.0	< .05	< .001	.001	8.0	.027	.9	.004	< .005	0.8	0.9	.014	< .002	< .002
	8.0	< .05	.026	.002	8.0	.028	.9	.005	< .005	0.8	0.9	.014	< .002	< .002
	20.0	< .05	< .001	.002	6.7	.017	.8	.006	< .005	0.8	1.8	.013	< .002	< .002
	36.0	< .05	.026	.003	6.8	.063	.8	.023	.010	0.9	1.7	.013	< .002	.007

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TABLE 7(b) LONG LAKE. TOTAL HEAVY METALS IN WATER COLUMN (mg/l) - 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.002	.001	3.6	.051	.7	.004	< .005	1.2	2.8	.009	.016	< .002
	3.0	< .05	.006	.002	3.6	.048	.7	.005	< .005	1.3	2.8	.010	.017	< .002
	9.0	< .05	.006	.002	4.1	.152	.7	.050	< .005	1.4	3.3	.011	.016	.003
	20.0	< .05	< .001	.002	4.3	.156	.7	.061	< .005	1.4	3.4	.012	.016	< .002
June	1.0	.07	.005	.002	4.1	.053	.8	.005	< .005	1.4	2.1	.013	< .002	< .002
	3.0	< .05	< .001	.002	4.3	.074	.8	.006	< .005	1.4	2.1	.014	< .002	.072
	7.0	.06	< .001	.002	3.8	.095	.7	.027	< .005	1.5	2.3	.011	< .002	< .002
	19.0	< .05	< .001	.002	3.8	.187	.7	.042	< .005	1.3	2.6	.011	< .002	.096
July	1.0	.07	.029	.002	4.0	.052	.8	.004	< .005	1.2	1.3	.012	< .002	< .002
	3.0	.07	.029	.002	4.1	.052	.8	.004	< .005	1.2	1.5	.012	< .002	.003
	10.0	.08	.024	.001	3.4	.077	.7	.019	< .005	1.1	1.8	.009	< .002	.003
	20.0	.09	.024	.002	3.5	.251	.7	.037	< .005	1.1	2.0	.009	< .002	< .002
Sept.	1.0	< .05	< .001	.002	4.4	.026	.9	.004	< .005	1.5	1.9	.016	< .002	.007
	6.0	< .05	< .001	.002	4.5	.024	.9	.004	< .005	1.5	1.9	.016	< .002	< .002
	14.0	< .05	< .001	.002	4.0	.090	.8	.031	< .005	1.4	2.6	.013	< .002	< .002
	19.0	.05	< .001	.002	4.3	.316	.9	.194	< .005	1.4	3.5	.015	< .002	< .002

QUINSAM COAL DEVELOPMENT

TABLE 7(c)

MIDDLE QUINSAM LAKE, STATION 1. TOTAL HEAVY METALS IN WATER COLUMN (mg/l)
- 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.003	.002	6.2	.048	.7	.016	< .005	1.4	2.2	.012	.033	.004
	4.0	< .05	.003	.002	6.1	.052	.7	.017	< .005	1.4	2.2	.012	.032	.002
	10.0	< .05	.006	.002	6.3	.063	.7	.024	< .005	1.4	2.4	.012	.030	< .002
	15.0	< .05	.007	.001	6.2	.073	.7	.024	.006	1.5	2.2	.011	.033	< .002
June	1.0	< .05	.002	.002	6.6	.070	.7	.005	< .005	1.1	1.3	.012	< .002	< .002
	4.0	< .05	.012	.001	6.5	.055	.7	.005	< .005	1.0	1.3	.013	< .002	< .002
	9.0	< .05	.008	.001	6.0	.221	.6	.003	< .005	1.3	1.3	.012	< .002	< .002
	14.0	< .05	.012	.002	5.9	.110	.6	.015	< .005	1.9	1.6	.013	< .002	.214
July	1.0	< .05	.012	.001	7.1	.041	.9	.005	< .005	1.1	1.4	.014	< .002	.052
	5.0	< .05	< .001	.001	7.2	.048	.9	.005	< .005	1.1	1.5	.015	< .002	.007
	11.0	< .05	< .001	.001	5.9	.057	.8	.006	< .005	1.9	1.6	.012	< .002	.005
	15.0	< .05	.012	.002	6.0	.111	.7	.015	< .005	2.3	1.6	.014	< .002	.004
Sept.	1.0	< .05	.030	.001	8.1	.025	.9	.005	< .005	0.9	1.0	.015	< .002	.032
	8.0	< .05	.026	< .001	8.2	.033	.9	.007	< .005	0.8	1.0	.015	< .002	.008
	12.0	< .05	< .001	.002	6.8	.049	.8	.019	< .005	2.5	1.0	.017	< .002	.004
	15.0	< .05	< .001	.003	6.8	.282	.8	.171	< .005	3.2	1.8	.017	< .002	< .002

QUINSAM COAL DEVELOPMENT

TABLE 7(d)

MIDDLE QUINSAM LAKE, STATION 2. TOTAL HEAVY METALS IN WATER COLUMN (mg/l)
- 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	< .05	.007	.001	6.1	.058	.7	.015	< .005	1.2	2.1	.011	.033	< .002
	3.0	< .05	.007	.001	6.2	.052	.7	.016	< .005	1.1	2.2	.012	.034	< .002
	8.0	< .05	.011	.002	6.2	.057	.7	.025	< .005	1.5	2.2	.012	.035	< .002
	13.0	< .05	.011	.002	6.2	.057	.7	.027	< .005	1.5	2.2	.012	.034	< .002
June	1.0	.09	< .001	.003	6.3	.064	.7	.005	< .005	1.1	1.3	.013	< .002	< .002
	4.0	< .05	.009	.001	6.3	.048	.7	.005	< .005	1.1	1.3	.013	< .002	< .002
	9.0	< .05	.005	.002	5.8	.034	.7	.003	< .005	1.3	1.3	.012	< .002	< .002
	13.0	< .05	< .001	.002	5.8	.033	.7	.004	< .005	1.5	1.3	.012	< .002	< .002
July	1.0	< .05	.012	.001	7.1	.045	.9	.004	< .005	1.1	1.7	.014	< .002	.005
	5.0	.06	.009	< .001	7.0	.043	.8	.005	< .005	1.1	1.3	.015	< .002	.002
	10.0	< .05	.005	.001	5.8	.027	.7	.004	< .005	1.5	1.3	.014	< .002	.002
	14.0	< .05	.010	.002	5.8	.035	.8	.005	< .005	1.7	1.4	.013	< .002	< .002
Sept.	1.0	< .05	< .001	.001	8.3	.038	.9	.006	< .005	0.8	1.0	.016	< .002	.009
	10.0	< .05	.038	< .001	8.2	.030	.9	.006	< .005	0.9	1.0	.015	< .002	.003
	13.0	< .05	.019	.002	6.8	.039	.9	.019	< .005	2.3	0.7	.017	< .002	< .002
	14.0	< .05	.011	.002	6.8	.052	.9	.037	< .005	2.5	0.4	.017	< .002	< .002

QUINSAM COAL DEVELOPMENT

TABLE 7(e) NO NAME LAKE. TOTAL HEAVY METALS IN WATER COLUMN (mg/l) - 1985 BASELINE

DATE	DEPTH (m)	A1	B	Ba	Ca	Fe	Mg	Mn	Mo	Na	Si	Sr	Ti	Zn
Apr.	1.0	.08	.005	< .001	3.4	.005	.7	.005	< .005	1.1	3.0	.009	.034	.003
	3.0	.08	.002	< .001	3.4	.068	.7	.009	< .005	1.1	2.9	.009	.036	< .002
	6.0	.07	< .001	< .001	3.6	.102	.7	.022	< .005	1.0	3.1	.009	.035	< .002
	16.0	.07	< .001	.001	4.4	.429	.8	.118	< .005	1.3	3.6	.011	.035	< .002
June	1.0	< .05	< .001	.001	4.0	.040	.9	.001	< .005	1.3	2.1	.012	< .002	.327
	3.0	< .05	< .001	< .001	4.0	.080	.9	.005	< .005	1.3	2.2	.011	< .002	.188
	6.0	.06	< .001	.001	3.6	.059	.8	.008	< .005	1.2	2.3	.010	< .002	.080
	17.0	.09	< .001	.002	3.8	.512	.8	.029	< .005	1.3	2.9	.010	< .002	.413
July	1.0	< .05	.024	.001	3.8	.104	.8	.006	< .005	1.1	1.9	.011	< .002	.014
	3.0	.08	.029	< .001	3.9	.076	.9	.005	< .005	1.0	1.8	.009	< .002	.003
	11.0	.06	.024	< .001	3.3	.262	.7	.020	< .005	0.9	1.9	.008	< .002	< .002
	17.0	.11	.010	.002	3.4	.948	.8	.072	< .005	0.9	2.0	.009	< .002	.006
Sept.	1.0	< .05	< .001	< .001	4.5	.041	1.0	.004	< .005	1.3	1.7	.014	< .002	.006
	6.0	< .05	< .001	< .001	4.4	.053	1.0	.004	< .005	1.3	2.4	.013	< .002	< .002
	12.0	.06	< .001	.002	3.8	.432	.8	.071	< .005	1.1	2.5	.012	< .002	< .002
	17.0	.05	< .001	.003	4.0	2.1	.9	.442	< .005	1.1	3.3	.013	< .002	.004

QUINSAM COAL DEVELOPMENT

TABLE 7(f) STREAMS. TOTAL HEAVY METALS IN WATER COLUMN (mg/l) - 1985 BASELINE

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STATION	DATE	Al		B		Ba		Ca		Fe		Mg	
		\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)
1	April	< 0.05 (0.02)	0.002 (0.003)	< 0.001 (0)	8.17 (0.06)	0.021 (0.005)	0.80 (0.17)	0.023 (0.004)	0.023 (0.004)	0.023 (0.004)	0.67 (0.06)	0.67 (0.06)	0.67 (0.06)
	June	< 0.05 (0)	0.001 (0)	< 0.001 (0)	7.67 (0.12)	0.090 (0.122)	0.83 (0.06)	0.090 (0.122)	0.090 (0.122)	0.090 (0.122)	0.83 (0.06)	0.83 (0.06)	0.83 (0.06)
	July	< 0.05 (0)	0.003 (0)	< 0.001 (0)	8.03 (0.06)	0.090 (0.122)	0.83 (0.06)	0.090 (0.122)	0.090 (0.122)	0.090 (0.122)	0.83 (0.06)	0.83 (0.06)	0.83 (0.06)
	Sept.	< 0.05 (0)	< 0.001 (0)	< 0.001 (0)	8.53 (0.06)	< 0.005 (0.004)	< 0.005 (0.004)	< 0.005 (0.004)	< 0.005 (0.004)	< 0.005 (0.004)	1.00 (0)	1.00 (0)	1.00 (0)
4	April	< 0.05 (0.04)	0.002 (0.004)	0.001 (0.001)	3.63 (0.06)	0.046 (0.003)	0.63 (0.06)	0.052 (0.003)	0.052 (0.003)	0.052 (0.003)	0.70 (0)	0.70 (0)	0.70 (0)
	June	< 0.05 (0)	< 0.001 (0)	0.002 (0)	4.17 (0.06)	0.189 (0.012)	0.80 (0)	0.189 (0.012)	0.189 (0.012)	0.189 (0.012)	0.80 (0)	0.80 (0)	0.80 (0)
	July	< 0.06 (0)	0.008 (0.007)	0.002 (0)	4.30 (0)	0.089 (0.001)	0.97 (0.001)	0.089 (0.001)	0.089 (0.001)	0.089 (0.001)	0.97 (0.06)	0.97 (0.06)	0.97 (0.06)
	Sept.	< 0.05 (0.003)	< 0.001 (0)	0.003 (0.001)	4.73 (0.06)	0.089 (0.001)	0.97 (0.001)	0.089 (0.001)	0.089 (0.001)	0.089 (0.001)	0.97 (0.06)	0.97 (0.06)	0.97 (0.06)
5	April	< 0.05 (0.003)	0.002 (0.003)	0.001 (0)	5.20 (0)	0.043 (0.002)	0.70 (0)	0.061 (0.007)	0.061 (0.007)	0.061 (0.007)	0.70 (0)	0.70 (0)	0.70 (0)
	June	< 0.05 (0)	0.004 (0.003)	0.001 (0.001)	6.17 (0.06)	0.061 (0.006)	0.90 (0)	0.061 (0.006)	0.061 (0.006)	0.061 (0.006)	0.90 (0)	0.90 (0)	0.90 (0)
	July	< 0.05 (0)	< 0.001 (0)	< 0.001 (0.001)	7.13 (0.06)	0.061 (0.006)	0.90 (0)	0.061 (0.006)	0.061 (0.006)	0.061 (0.006)	0.90 (0)	0.90 (0)	0.90 (0)
	Sept.	< 0.05 (0)	< 0.001 (0)	< 0.001 (0.001)	8.07 (0.06)	0.022 (0.005)	0.90 (0)	0.022 (0.005)	0.022 (0.005)	0.022 (0.005)	0.90 (0)	0.90 (0)	0.90 (0)

STATION	DATE	Mn		Mo		Na		Si		Sr		Ti		Zn	
		\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)	\bar{x} (SD)
1	April	0.001 (0.001)	< 0.005 (0)	0.73 (0.12)	1.90 (0)	0.011 (0)	0.034 (0.001)	0.002 (0)	0.002 (0)	0.002 (0)	0.049 (0.085)	0.049 (0.085)	0.049 (0.085)	0.049 (0.085)	0.049 (0.085)
	June	0.002 (0.001)	< 0.005 (0)	0.57 (0.06)	1.30 (0)	0.012 (0.001)	0.034 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)
	July	0.003 (0.001)	< 0.005 (0)	0.70 (0)	1.63 (0.06)	0.012 (0)	0.034 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)
	Sept.	0.002 (0.001)	0.006 (0)	0.73 (0)	1.07 (0.06)	0.014 (0)	0.034 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)
4	April	0.004 (0.001)	< 0.005 (0)	1.10 (0.10)	2.87 (0.06)	0.009 (0.001)	0.012 (0.010)	0.002 (0)	0.002 (0)	0.002 (0)	0.055 (0.049)	0.055 (0.049)	0.055 (0.049)	0.055 (0.049)	0.055 (0.049)
	June	0.006 (0.001)	< 0.005 (0)	1.20 (0)	2.10 (0)	0.012 (0)	0.012 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
	July	0.026 (0.001)	< 0.005 (0)	1.20 (0)	1.40 (0.10)	0.013 (0)	0.013 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	0.008 (0.008)	0.008 (0.008)	0.008 (0.008)	0.008 (0.008)	0.008 (0.008)
	Sept.	0.032 (0.002)	< 0.005 (0.005)	1.67 (0.12)	1.57 (0.12)	0.017 (0)	0.017 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)
5	April	0.010 (0)	< 0.005 (0)	1.17 (0.06)	2.43 (0.06)	0.010 (0)	0.035 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	0.084 (0.145)	0.084 (0.145)	0.084 (0.145)	0.084 (0.145)	0.084 (0.145)
	June	0.007 (0.001)	< 0.005 (0)	1.00 (0)	1.30 (0)	0.013 (0)	0.035 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
	July	0.011 (0.001)	< 0.005 (0)	1.13 (0.06)	1.50 (0.10)	0.015 (0)	0.035 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)
	Sept.	0.005 (0.001)	0.005 (0.005)	0.83 (0.005)	0.90 (0)	0.015 (0)	0.035 (0.001)	< 0.002 (0)	< 0.002 (0)	< 0.002 (0)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)

4.5 Phytoplankton

4.5.1 Species.

TABLE 8 PHYTOPLANKTON SPECIES LIST AND OCCURRENCE

4.5.2 Biovolume.

TABLE 9(a) GOOSENECK LAKE

TABLE 9(b) LONG LAKE

TABLE 9(c) MIDDLE QUINSAM LAKE

TABLE 9(d) NO NAME LAKE

4.5.3 Abundance.

TABLE 10(a) GOOSENECK LAKE

TABLE 10(b) LONG LAKE

TABLE 10(c) MIDDLE QUINSAM LAKE

TABLE 10(d) NO NAME LAKE

4.5.4 Dominance.

TABLE 11(a) DOMINANT PHYTOPLANKTON SPECIES, RANKED WITH
RESPECT TO BIOVOLUME

TABLE 11(b) DOMINANT PHYTOPLANKTON SPECIES, RANKED WITH
RESPECT TO ABUNDANCE

4.5.5 Chlorophyll a and Phaeophytin.

TABLE 12(a) GOOSENECK LAKE

TABLE 12(b) LONG LAKE

TABLE 12(c) MIDDLE QUINSAM LAKE

TABLE 12(d) NO NAME LAKE

QUINSAM COAL DEVELOPMENT

TABLE 8 PHYTOPLANKTON SPECIES LIST AND OCCURRENCE - 1985 BASELINE

PHYLUM	STATION / MONTH											
	GOSENECK LAKE			LONG LAKE			MIDDLE QUINSAM LAKE STATION 1			MIDDLE QUINSAM LAKE STATION 2		
	4	6	7	9	4	6	7	9	4	6	7	9
1) BACILLARIOPHYCEAE												
<i>Chmanthes minutissima</i>		X						X				
<i>Sterioneilla formosa</i>	X		X						X			X
<i>Cyclotella glomerata</i>				X					X			
<i>Cyclotella sp. B</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Yphella caespitosa</i>								X				
<i>Iatoma tenue</i> var. <i>elongatum</i>	X						X					
<i>Ragilaria capucina</i>	X								X	X		X
<i>Ragilaria crotorensis</i>	X	X			X	X	X		X	X		X
<i>Ragilaria vaucheriae</i>	X			X			X		X	X		X
<i>Ragilaria</i> sp. A							X		X		X	
<i>Elosira granulata</i>	X	X			X		X		X	X		X
<i>Elosira granulata</i> var. <i>augustissima</i>	X								X			X
<i>Avicula salinaria</i> var. <i>intermedia</i>								X				
<i>Avicula</i> sp.								X	X			
<i>Tephanodiscus astrea</i>	X								X			
<i>Ynedra ulna</i>								X	X			X
<i>Abellaria fenestrata</i>	X							X				X
<i>Abellaria flocculosa</i>									X			X

QUINSAM COAL DEVELOPMENT

TABLE 8 (Continued)

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PHYLUM	STATION / MONTH												NO NAME LAKE	
	GOOSENECK LAKE			LONG LAKE			MIDDLE QUINSAM LAKE STATION 1			MIDDLE QUINSAM LAKE STATION 2				
	4	6	7	9	4	6	7	9	4	6	7	9		
CHLOROPHYTA														
<i>Histiodesmus</i> sp			x	x	x	x	x	x	x	x	x	x	x	
<i>Hamydromas</i> sp			x									x	x	
<i>Isorium</i> sp	x				x							x	x	
<i>Urginea tetrapedia</i>	x					x						x	x	
<i>Urgenia</i> sp	x		x	x	x	x	x	x	x	x	x	x	x	
<i>Akatothrix</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	
<i>Cystis</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	
<i>Endesmus</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	
<i>Nurastum</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	
CYANOPHYTA														
<i>Labena spiroides</i>			x		x	x	x	x	x	x	x	x	x	
<i>Manocapsa</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	
<i>Oecapsa</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	
<i>Microsphaeria</i> sp					x		x	x	x	x	x	x	x	
<i>Oothecae</i> sp					x		x	x	x	x	x	x	x	
<i>Risopedia</i> sp A					x		x	x	x	x	x	x	x	
<i>Risopedia</i> sp B					x		x	x	x	x	x	x	x	

QUINSAM COAL DEVELOPMENT

TABLE 8 (Continued)

PHYLUM	STATION / MONTH									NO NAME LAKE					
	GOSENECK LAKE			LONG LAKE			MIDDLE QUINSAM LAKE STATION 1								
	4	6	7	9	4	6	7	9	4	6	7	9	4	6	7
) CHrysophyta															
<i>Chrysotrichomulina</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ceratium</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Unicorpon bavaricum</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Unicorpon sertularia</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Calmarionas</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Chromonas</i> sp	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
) PYRRHOPHYTA															
<i>Eratium hirundinella</i>							x	x	x	x	x	x	x	x	x
<i>Ymnodinium</i> sp A	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ymnodinium</i> sp B							x	x	x	x	x	x	x	x	x
<i>Endinum</i> sp A						x									
) CRYPTOPHYTA															
<i>Hraononas acuta</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ryptononas borealis</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ryptononas</i> sp A	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Ryptononas</i> sp B						x	x	x	x	x	x	x	x	x	x

QUINSAM COAL DEVELOPMENT

TABLE 9(a) GOSENECK LAKE. PHYTOPLANKTON BIOVOLUME ($\text{cm}^3/\text{m}^3 \times 10^{-3}$) - 1985 BASELINE

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	4	31.8	3.28	0	44.1	48.5	10.2	138
	7	19.2	0.96	0	114	0	127	261
	10	35.2	0.26	0	53.4	64.4	63.7	217
	\bar{x} (SD)	28.7 (8.4)	1.50 (1.6)	0 (0)	70.5 (38)	37.6 (33)	67.0 (59)	205
June	2	8.87	1.79	0.17	2.17	0	16.3	29.3
	5	8.40	1.10	0.07	1.56	0	15.7	26.8
	8	16.4	3.88	0.06	1.21	48.5	35.0	105
	\bar{x} (SD)	11.2 (4.5)	2.26 (1.5)	0.10 (0.06)	1.65 (0.49)	16.2 (28)	22.3 (11)	53.7
July	3	44.1	0.19	0.99	21.7	0	18.4	85.4
	8	14.3	0	2.34	11.3	0	29.5	57.4
	11	34.5	0.19	0.14	1.34	0	18.5	54.7
	\bar{x} (SD)	31.0 (15)	0.13 (0.11)	1.16 (1.1)	11.4 (10)	0 (0)	22.1 (6.4)	65.8
Sept.	2	90.5	1.74	11.9	129	2.18	12.4	248
	6	207	1.64	22.5	367	4.36	40.2	64.3
	10	113	0	37.1	31.8	0	32.3	214
	\bar{x} (SD)	137 (62)	1.13 (0.98)	23.8 (12.7)	176 (172)	2.18 (2.18)	28.3 (14)	368

QUINSAM COAL DEVELOPMENT

TABLE 9(b) LONG LAKE. PHYTOPLANTKON BIOVOLUME ($\text{cm}^3/\text{m}^3 \times 10^{-3}$) - 1985 BASELINE

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DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	2	32.8	0	0	190	109	1.12	333
	4	18.3	0	0	246	128	21.3	414
	6	14.5	0	0	93.4	0	14.6	123
	\bar{x} (SD)	21.9 (10)	0 (0)	0 (0)	176 (77)	79 (69)	12.3 (10)	290
June	1	2.58	0.60	0.12	1.23	0	38.7	43.2
	5	8.47	0.56	0	1.89	328	120	459
	9	30.2	0	0.08	1.24	256	118	406
	\bar{x} (SD)	13.8 (15)	0.39 (0.34)	0.07 (0.06)	1.45 (0.38)	195 (170)	92.2 (46)	303
July	1	173	0	3.43	0.70	0	6.34	184
	3	253	0.29	5.60	0.99	0	20.0	280
	6	66.0	0.33	1.03	19.0	289	58.1	433
	\bar{x} (SD)	164 (94)	0.21 (0.18)	3.35 (2.3)	6.90 (10)	96.3 (170)	28.1 (27)	299
Sept.	2	8.07	0	20.8	315	133	10.1	487
	5	49.1	1.53	43.1	572	0	10.0	676
	8	53.1	0.15	7.84	74.0	0	23.0	158
	\bar{x} (SD)	37.0 (25)	0.56 (0.84)	23.9 (18)	320 (250)	44 (77)	14.4 (7.5)	440

QUINSAM COAL DEVELOPMENT

MIDDLE QUINSAM LAKE, STATION 1. PHYTOPLANKTON BIOVOLUME ($\text{cm}^3/\text{m}^3 \times 10^{-3}$) - 1985 BASELINE

TABLE 9(c)

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	1	27.5	0.06	0	153	0	2.90	183
	5	33.2	0.09	0	220	0	19.0	272
	7	63.9	0.13	0.10	154	0	12.0	230
	\bar{x} (SD)	41.5 (20)	0.09 (0.04)	0.03 (0.06)	176 (38)	0 (0)	11.3 (8.1)	228
June	2	3.11	0	8.18	2.32	0	24.8	38.4
	6	8.86	0.16	0.83	1.36	0	75.3	86.5
	8	7.93	0.28	0	1.02	0	120	129
	\bar{x} (SD)	6.63 (3.1)	0.15 (0.14)	3.00 (4.5)	1.55 (0.68)	0 (0)	73.4 (47)	84.6
July	1	7.21	0.04	5.40	35.6	87.6	20.3	156
	4	16.8	0.88	1.46	62.8	0	24.5	106
	8	36.8	0.15	0	29.0	0	51.8	118
	\bar{x} (SD)	20.3 (15)	0.36 (0.46)	2.29 (2.8)	42.5 (18)	29.2 (51)	32.2 (17)	127
Sept.	2	5.31	0.31	1.12	68.4	1.24	33.4	110
	8	5.58	0.17	1.37	49.1	29.9	24.9	111
	12	10.7	3.60	0	7.47	52.2	165	239
	\bar{x} (SD)	7.20 (3.0)	1.36 (1.9)	0.83 (0.73)	41.7 (31)	27.8 (26)	74.4 (79)	153

QUINSAM COAL DEVELOPMENT

TABLE 9(d) MIDDLE QUINSAM LAKE, STATION 2. PHYTOPLANKTON BIOVOLUME ($\text{cm}^3/\text{m}^3 \times 10^{-3}$)
- 1985 BASELINE

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	1	45.0	0.35	0	148	0	5.80	199
	4	60.7	0.61	0	176	0	10.7	248
	7	86.0	0.09	0	200	0	48.6	335
	\bar{x} (SD)	63.9 (21)	0.35 (0.26)	0 (0)	175 (26)	0 (0)	21.7 (23)	261
June	1	7.76	0.07	2.26	3.91	0	63.1	27.1
	4	5.56	0.20	0	1.19	0	128	135
	7	4.29	0	0	1.29	0	57.5	63.1
	\bar{x} (SD)	5.87 (1.8)	0.09 (0.10)	0.75 (1.3)	2.13 (1.5)	0 (0)	82.9 (39)	91.7
July	2	19.8	3.02	8.07	38.2	219	26.2	314
	4	19.8	0.95	4.64	65.6	43.8	26.1	161
	6	51.8	0	4.60	11.1	43.8	52.4	164
	\bar{x} (SD)	30.5 (18)	1.32 (1.5)	5.77 (2.0)	38.3 (27)	102 (100)	34.9 (15)	213
Sept.	3	14.4	0.09	0	71.0	0	19.4	105
	6	21.3	0.15	0.44	45.5	0	29.4	96.8
	9	6.45	0.26	1.91	57.9	0.87	30.0	97.4
	\bar{x} (SD)	14.1 (7.4)	0.17 (0.09)	0.78 (1.0)	58.1 (13)	0.29 (0.5)	26.3 (6.0)	99.7

QUINSAM COAL DEVELOPMENT

TABLE 9(e) NO NAME LAKE. PHYTOPLANTKON BIOVOLUME ($\text{cm}^3/\text{m}^3 \times 10^{-3}$) - 1985 BASELINE

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DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	1	18.6	0	0	1680	0	2.35	1700
	3	3.44	0	0	921	21.8	35.5	982
	5	3.92	0	0	191	256	20.4	472
	\bar{x} (SD)	8.65 (8.6)	0 (0)	0 (0)	931 (740)	92.6 (140)	19.4 (17)	1050
June	2	7.41	1.71	0	8.84	768	64.9	851
	6	0.21	5.57	0	3.32	438	108	555
	8	13.8	0.22	0	3.38	0	182	199
	\bar{x} (SD)	7.14 (6.8)	2.50 (2.8)	0 (0)	5.18 (3.2)	402 (390)	118 (59)	535
July	3	33.3	0.29	10.6	1.57	0	17.9	63.6
	6	5.36	0	4.84	1.16	256	54.4	322
	9	1.03	0	1.22	1.39	128	51.4	183
	\bar{x} (SD)	13.2 (18)	0.10 (.18)	5.55 (4.7)	1.37 (0.2)	128 (130)	41.2 (20)	190
Sept.	2	86.3	0	65.9	3.75	2.18	13.3	171
	5	75.3	9.35	41.6	3.01	0	35.1	164
	8	37.1	0	14.9	2.73	0	29.4	84.1
	\bar{x} (SD)	66.2 (26)	3.12 (5.4)	40.8 (26)	3.16 (0.5)	0.73 (1.3)	25.9 (11)	140

QUINNSAM COAL DEVELOPMENT

TABLE 10(a) GOOSENECK LAKE. PHYTOPLANKTON ABUNDANCE (cells/ml) - 1985 BASELINE

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHrysophyta	PYRRHOPHYTA	Cryptophyta	TOTAL
April	4	40	5	0	94	1	25	165
	7	26	22	0	192	0	114	354
	10	37	5	0	117	1	85	245
	\bar{x} (SD)	34	(7)	11 (10)	0 (0)	134 (51)	0.7 (0.7)	75 (45)
June	2	13	10	34	59	0	49	165
	5	13	10	15	56	0	56	150
	8	26	14	11	56	1	69	177
	\bar{x} (SD)	17	(8)	11 (2)	20 (12)	57 (2)	0.3 (0.6)	58 (10)
July	3	42	2	10	89	0	43	187
	8	15	0	51	99	0	69	234
	11	32	4	29	67	0	61	193
	\bar{x} (SD)	30	(14)	2 (2)	30 (20)	85 (16)	0 (0)	58 (13)
Sept.	2	150	33	1180	216	2	50	1630
	6	342	2	1200	606	4	65	2220
	10	148	0	423	178	0	116	865
	\bar{x} (SD)	213	(110)	12 (19)	934 (440)	333 (240)	2 (2)	77 (35)

QUINSAM COAL DEVELOPMENT

TABLE 10(b) LONG LAKE. PHYTOPLANKTON ABUNDANCE (cells/ml) - 1985 BASELINE

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	2	27	0	0	156	1	12	197
	4	10	0	0	360	1	120	492
	6	13	0	0	190	0	58	261
	\bar{x} (SD)	17	(9)	0 (0)	235 (109)	0.7 (0.7)	63 (54)	317
June	1	5	11	7	62	0	51	136
	5	11	8	0	67	4	102	192
	9	34	0	16	62	6	99	217
	\bar{x} (SD)	17	(15)	6 (6)	8 (8)	64 (2)	3 (3)	84 (29)
July	1	155	0	92	35	0	18	300
	3	245	4	571	49	0	77	947
	6	63	7	135	43	3	78	329
	\bar{x} (SD)	154	(91)	4 (4)	266 (270)	42 (7)	3 (2)	58 (34)
Sept.	2	59	0	3300	316	4	61	3690
	5	50	22	2360	619	0	111	3160
	8	49	1	906	273	0	187	1420
	\bar{x} (SD)	36	(23)	8 (12)	2190 (1200)	403 (190)	1 (2)	120 (63)

Q U I N S A M C O A L D E V E L O P M E N T

TABLE 10(c) MIDDLE QUINSAM LAKE, STATION 1. PHYTOPLANKTON ABUNDANCE (cells/m³)
- 1985 BASELINE

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DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	1	46	1	0	131	0	7	185
	5	41	2	0	198	0	20	261
	7	71	3	10	166	0	29	279
	\bar{x} (SD)	53 (16)	2 (1)	3 (6)	165 (34)	0 (0)	19 (11)	242
June	2	4	0	82	83	0	57	226
	6	14	2	8	66	0	78	168
	8	12	3	0	46	0	103	164
	\bar{x} (SD)	10 (5)	2 (2)	30 (45)	65 (19)	0 (0)	79 (23)	186
July	1	12	1	57	109	1	39	219
	4	22	18	15	126	0	40	221
	8	53	1	0	101	0	64	219
	\bar{x} (SD)	29 (21)	7 (10)	24 (30)	112 (13)	0.3 (0.6)	48 (14)	220
Sept.	2	8	6	11	140	1	49	215
	8	8	0	14	95	1	31	149
	12	11	1	0	123	1	131	267
	\bar{x} (SD)	9 (2)	2 (3)	8 (7)	119 (23)	1 (0)	71 (53)	210

QUINSAM COAL DEVELOPMENT

TABLE 10(d) MIDDLE QUINN'S LAKE, STATION 2. PHYTOPLANKTON ABUNDANCE (cells/ml) - 1985 BASELINE

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	1	57	5	0	179	0	0	271
	4	90	17	0	208	0	30	346
	7	105	4	0	278	0	31	447
	— x (SD)	84	(25)	9 (7)	0 (0)	222 (51)	0 (0)	40 (17) 355
June	1	11	1	23	81	0	103	219
	4	9	10	0	54	0	116	188
	7	7	0	0	59	0	66	132
	— x (SD)	9	(2)	4 (6)	8 (13)	65 (14)	0 (0)	95 (26) 180
July	2	23	19	103	83	4	43	275
	4	27	16	67	121	1	58	290
	6	73	0	75	50	1	77	276
	— x (SD)	41	(28)	12 (10)	82 (19)	85 (36)	2 (2)	59 (17) 280
Sept.	3	17	2	0	181	0	64	264
	6	30	1	46	115	0	53	245
	9	9	5	85	137	1	55	292
	— x (SD)	19	(11)	3 (2)	44 (43)	144 (34)	0.3 (0.6)	57 (6) 267

QUINSAM COAL DEVELOPMENT

TABLE 10(e) NO NAME LAKE. PHYTOPLANKTON ABUNDANCE (cells/ml) - 1985 BASELINE

DATE	DEPTH (m)	BACILLARIOPHYCEAE	CHLOROPHYTA	CYANOPHYTA	CHRYSOPHYTA	PYRRHOPHYTA	CRYPTOPHYTA	TOTAL
April	1	26	0	0	1230	0	26	1280
	3	7	0	0	798	2	89	896
	5	4	0	0	313	3	139	459
	̄x (SD)	12	(12)	0 (0)	780 (460)	2 (2)	85 (57)	879
June	2	10	10	0	166	9	77	272
	6	1	2	0	89	5	89	186
	8	12	2	0	169	0	145	328
	̄x (SD)	8	(6)	5 (5)	141 (45)	5 (5)	104 (36)	262
July	3	32	6	1660	78	0	45	1820
	6	6	0	600	58	3	199	866
	9	1	0	151	70	1	267	490
	̄x (SD)	13	(17)	2 (3)	804 (780)	69 (10)	1 (2)	170 (110)
Sept.	2	81	0	5060	100	2	113	5360
	5	72	7	3910	150	0	94	4230
	8	35	0	1280	78	0	65	1460
	̄x (SD)	63	(24)	2 (4)	3420 (1900)	109 (37)	0.7 (1)	91 (24)

QUINSAM COAL DEVELOPMENT

E 11(a) DOMINANT PHYTOPLANKTON SPECIES, RANKED WITH RESPECT TO BIOVOLUME
($\text{cm}^3/\text{m}^3 \times 10^3$) - 1985 BASELINE

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DATE	STATION						NO NAME LAKE	
	GOOSENECK LAKE		LONG LAKE		MIDDLE QUINSAM LAKE STATION 1			
Species	Biovolt	Species	Biovolt	Species	Biovolt	Species	Biovolt	
April	Dinobryon sertularia	68.0	Dinobryon sertularia	174	Dinobryon sertularia	171	Dinobryon sertularia	927
	Gymnodinium sp	37.7	Gymnodinium sp	79.1	Fragilaria crotonensis	18.6	Gymnodinium sp	85.3
	Cryptomonas borealis	31.9	Fragilaria crotonensis	10.5	Cyclotella sp B	13.7	Cryptomonas borealis	12.4
	Cyclotella sp B	17.4	Syndra ulna	9.27	Cryptomonas borealis	10.1	Peridinium sp	7.27
June	Cryptomonas borealis	17.9	Gymnodinium sp	182	Cryptomonas borealis	69.6	Cryptomonas borealis	402
	Gymnodinium sp	16.8	Cryptomonas borealis	88.9	Chroontonas acuta	3.84	Cryptomonas borealis	114
	Melosira granulata	5.41	Peridinium sp	12.4	Melosira granulata	3.84	Chroontonas acuta	3.88
	Cyclotella sp B	4.67	Fragilaria crotonensis	11.9	var augustissima	3.58	Cyclotella sp B	2.47
July	Melosira granulata	17.6	Melosira granulata	144	Ceratium hirundinella	40.1	Ceratium hirundinella	128
	Dinobryon sertularia	9.79	Gymnodinium sp	96.2	Dinobryon sertularia	29.2	Cryptomonas borealis	16.5
	Cryptomonas borealis	7.38	Cryptomonas borealis	24.1	Cyclotella sp B	18.7	Chroontonas acuta	14.1
	Cyclotella sp B	4.81	Cyclotella sp B	19.3	Chroontonas acuta	3.0	Melosira granulata	10.5
Sept.	Dinobryon sertularia	171	Dinobryon sertularia	316	Cryptomonas borealis	68.3	Dinobryon sertularia	55.3
	Asterionella formosa	114	Ceratium hirundinella	43.6	Dinobryon sertularia	38.8	Cryptomonas borealis	18.5
	Cryptomonas borealis	19.2	Melosira granulata	30.1	Ceratium hirundinella	27.2	Melosira granulata	4.97
	Melosira granulata	17.6	Chroontonas acuta	10.3	Cryptomonas sp A	3.23	Cyclotella sp B	12.1

QUINSAM COAL DEVELOPMENT

Table 11(b) DOMINANT PHYTOPLANKTON SPECIES, RANKED WITH RESPECT TO ABUNDANCE
 (cells/ml) - 1985 BASELINE

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DATE	GOOSENECK LAKE	STATION						NO NAME LAKE
		LONG LAKE		MIDDLE QUINSAM LAKE		MIDDLE QUINSAM LAKE		
	Species	No.	Species	No.	Species	No.	Species	No.
April	Ochromonas sp	82	Dinobryon sertularia	123	Dinobryon sertularia	123	Dinobryon sertularia	657
	Dinobryon sertularia	48	Ochromonas sp	99	Ochromonas sp	37	Ochromonas sp	115
	Chroontomas acuta	43	Chroontomas acuta	60	Fragilaria crotonensis	21	Chroontomas acuta	78
	Cyclotella sp B	25	Fragilaria crotonensis	12	Cyclotella sp B	19	Cryptomonas borealis	7
June	Ochromonas sp	55	Ochromonas sp	63	Ochromonas sp	64	Ochromonas sp	139
	Chroontomas acuta	49	Cryptomonas borealis	47	Chroontomas acuta	43	Chroontomas acuta	61
	Aphanocapsa sp	20	Chroontomas acuta	37	Cryptomonas borealis	37	Chroontomas acuta	43
	Cryptomonas borealis	9	Fragilaria crotonensis	13	Anabaena spiroides	30	Gymnodinium sp	5
July	Ochromonas sp	78	Meristopedia sp A	172	Ochromonas sp	81	Ochromonas sp	587
	Chroontomas acuta	49	Melosira granulata	127	Chroontomas acuta	33	Anabaena spiroides	213
	Melosira granulata	23	Aphanocapsa sp	82	Dinobryon sertularia	28	Chroontomas acuta	156
	Aphanocapsa sp	19	Chroontomas acuta	45	Cyclotella sp B	26	Cyclotella sp B	69
Sept.	Aphanocapsa sp	697	Meristopedia sp B	1840	Ochromonas sp	90	Ochromonas sp	2410
	Ochromonas sp	207	Aphanocapsa sp	234	Cryptomonas borealis	36	Chroontomas acuta	42
	Asterionella formosa	190	Dinobryon sertularia	224	Chroontomas acuta	30	Dinobryon sertularia	39
	Meristopedia sp B	128	Anabaena spiroides	80	Dinobryon sertularia	28	Aphanocapsa sp	38

QUINNSAM COAL DEVELOPMENT

TABLE 12(a) GOOSENECK LAKE. CHLOROPHYLL A, PHAEOPHYTIN AND FLUOROMETRY
(ug/l) - 1985 BASELINE

DATE	DEPTH (m)	CHLOROPHYLL A		PHAEOPHYTIN		FLUOROMETRIC VALUES ($\times 10^{-4}$)	
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
April	4	0.74	0.07	1.15	0.91	12	
	7	1.13	0.77	1.45	0.98	26	
	10	0.96	0.21	1.54	0.25	34	
	15	0.18	0.08	0.71	0.24	13	
June	2	0.33	0.0	0.41	0.17	32	
	5	0.53	0.07	0.32	0.08	53	
	8	0.53	0.07	0.70	0.07	95	
	12	0.58	0.04	0.75	0.08	140	
July	3	0.33	0.0	0.26	0.11	22	
	8	0.51	0.04	0.53	0.25	71	
	11	0.60	0.07	0.55	0.18	110	
	15	0.58	0.04	0.43	0.18	120	
September	2	0.27	0.0	0.33	0.07	34	
	6	0.35	0.17	0.45	0.18	50	
	10	0.67	0.12	0.30	0.16	93	
	14	1.31	0.28	1.29	0.37	150	

QUINNSAM COAL DEVELOPMENT

TABLE 12(b)
LONG LAKE. CHLOROPHYLL A, PHAEOPHYTIN AND FLUOROMETRY
(ug/l) - 1985 BASELINE

DATE	DEPTH (m)	CHLOROPHYLL A		PHAEOPHYTIN		FLUOROMETRIC VALUES ($\times 10^{-4}$)
		\bar{x}	SD	\bar{x}	SD	
April	2	0.54	0.18	1.46	1.27	32 67 36 27
	4	1.96	0.59	2.39	0.94	
	6	0.69	0.10	1.66	1.21	
	8	0.31	0.08	0.67	0.77	
June	1	0.55	0.04	0.25	0.06	67 170 350 220
	5	1.43	0.08	0.90	0.12	
	9	2.47	0.07	2.11	0.10	
	12	0.60	0.07	1.02	0.19	
July	1	0.51	0.04	0.31	0.12	55 77 180 180 170
	3	0.55	0.04	0.66	0.23	
	6	1.18	0.04	0.95	0.53	
	9	0.87	0.27	0.66	0.21	
September	12	0.55	0.04	0.45	0.10	110 120 160 160
	2	0.51	0.31	0.65	0.13	
	5	0.58	0.22	0.62	0.29	
	8	0.44	0.20	0.56	0.14	
	12	0.27	0.0	0.31	0.14	

QUINSAM COAL DEVELOPMENT

TABLE 12(c) MIDDLE QUINSAM LAKE, STATION 1. CHLOROPHYLL A, PHAEOPHYTIN AND FLUOROMETRY
(ug/l) - 1985 BASELINE

DATE	DEPTH (m)	CHLOROPHYLL A		PHAEOPHYTIN		FLUOROMETRIC VALUES ($\times 10^{-4}$)	
		\bar{x}	SD	\bar{x}	SD		
April	1	0.38	0.04	0.23	0.12	6	13
	3	0.29	0.27	0.66	0.65		
	5	0.89	0.10	0.65	0.12		
	7	1.21	0.23	1.26	0.73		
	12	0.25	0.04	0.31	0.25		
June	2	0.31	0.04	0.42	0.05	31	63
	6	0.47	0.07	0.59	0.20		
	8	0.33	0.07	0.88	0.13		
	12	0.47	0.0	0.48	0.02		
July	1	0.42	0.04	0.26	0.02	64	88
	4	0.56	0.08	0.22	0.05		
	8	0.87	0.24	0.47	0.07		
	12	0.76	0.10	0.43	0.05		
September	2	0.29	0.04	0.25	0.05	94	100
	5	0.33	0.0	0.30	0.12		
	8	0.29	0.04	0.46	0.12		
	12	0.34	0.12	0.32	0.25		

QUINSAM COAL DEVELOPMENT

TABLE 12(d) MIDDLE QUINSAM LAKE, STATION 2. CHLOROPHYLL A, PHAEOPHYTIN AND FLUOROMETRY
(ug/l) - 1985 BASELINE

DATE	DEPTH (m)	CHLOROPHYLL A		PHAEOPHYTIN \bar{x}	SD	FLUOROMETRIC VALUES $(\times 10^{-4})$	
		\bar{x}	SD			\bar{x}	SD
April	1	0.33	0.14	0.48	0.42	11	
	4	0.56	0.08	0.72	0.39	22	
	7	1.51	0.14	1.13	0.48	40	
	10	1.03	0.10	1.28	0.11	27	
June	1	0.49	0.04	0.79	0.13	39	
	4	0.47	0.07	0.75	0.03	45	
	7	0.46	0.12	0.73	0.15	91	
	10	0.49	0.14	0.88	0.29	120	
July	2	0.51	0.04	0.34	0.06	76	
	4	0.49	0.08	0.35	0.08	91	
	6	0.71	0.17	0.55	0.14	110	
	10	0.55	0.04	0.55	0.29	150	
September	3	0.20	0.0	0.11	0.03	120	
	6	0.27	0.0	0.14	0.10	130	
	9	0.27	0.07	0.42	0.15	120	
	12	0.89	0.24	0.70	0.10	190	

QUINNSAM COAL DEVELOPMENT

TABLE 12(e) NO NAME LAKE. CHLOROPHYLL A, PHAEOPHYTIN AND FLUOROMETRY
(ug/l) - 1985 BASELINE

DATE	DEPTH (m)	CHLOROPHYLL A		PHAEOPHYTIN		FLUOROMETRIC VALUES ($\times 10^{-4}$)	
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
April	1	0.71	0.14	0.55	0.13	26	
	3	1.14	0.24	0.34	0.34	57	
	5	1.47	0.46	0.87	0.84	66	
	7	*	-	*	-	32	
	12	*	-	*	-	23	
June	2	0.60	0.18	0.74	0.08	76	
	6	1.14	0.17	1.39	0.19	140	
	8	2.07	0.12	1.78	0.04	260	
	12	0.58	0.16	0.96	0.16	160	
July	3	0.53	0.0	0.81	0.10	88	
	6	1.71	0.10	0.95	0.22	190	
	9	0.76	0.20	0.73	0.15	180	
	12	0.55	0.04	0.33	0.11	160	
Sept.	2	0.67	0.0	0.86	0.03	130	
	5	0.69	0.04	0.82	0.09	140	
	8	0.67	0.0	0.88	0.14	170	
	12	0.25	0.04	0.16	0.11	160	

* Below Detection Limits.

4.6

Zooplankton Abundance

TABLE 13

APRIL

QUINSAM COAL DEVELOPMENT

TABLE 13 ZOOPLANKTON ABUNDANCE (individuals/m²) - APRIL 1985 BASELINE

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