WATER-QUALITY DATA FOR ORWELL RESERVOIR AND THE OTTER TAIL RIVER NEAR FERGUS FALLS, MINNESOTA

By M. R. Have and L. H. Tornes

A Compilation of Data collected by the U. S. Geological Survey

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CONVERSION FACTORS AND ABBREVIATIONS

Readers who may prefer to use metric (International System) units rather than the inch-pound units can make conversions using the following factors:

Multiply inch-pound unit	By	To obtain metric unit
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
ton, short	0.9072	megagram (Mg)

Temperature in degrees Fahrenheit (^oF) can be converted to degrees Celsius (^oC) as follows:

$$^oC = 5/9 \times (^oF-32)$$

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ABSTRACT

Water-quality data were collected at five sites on Orwell Reservoir and two sites on the Otter Tail River, at the inflow and outflow points of the reservoir. The data, collected from April 1985 to July 1986, consist mainly of streamflow and nutrient concentrations at the river sites and nutrient concentrations, alkalinity, Secchi-disk transparency, phytoplankton counts, chlorophyll concentrations, and profiles of specific conductance, temperature, pH, and dissolved oxygen at the reservoir sites. Additional data collected at the outflow site include alkalinity and concentrations of major ions and organic carbon.

INTRODUCTION

Orwell Dam was constructed in 1953 to impound water during floods and to release water for water supply and pollution abatement during dry or low-flow periods.

In 1984-85, the U.S. Army Corps of Engineers did a study called ROPE (Reservoir Operating Plan Evaluation) for Orwell Reservoir (U.S. Army Corps of Engineers, 1985). The objectives of the ROPE study were to:

1. Determine how well the original operating plan for Orwell Reservior contributes to the presently authorized purposes.
2. Identify other resources or project purposes that operation of Orwell Reservoir might significantly affect.
3. Formulate and evaluate alternative reservoir operating plans to optimize benefits.
4. Consider minor structural modifications to enhance beneficial effects of reservior operation.
5. Report findings and make tentative recommendations.

As a result of the ROPE study, a new operating plan for Orwell Reservoir was proposed. An important aspect of the proposed plan is that changes in pool level would be relatively minor compared to changes under the original operating plan. Thus, the new plan would increase fisheries potential, recreational opportunities, and shoreline protection. The new plan was implemented for testing in the spring of 1986. Data for 1985 were collected while the original operating plan was in effect. Data for 1986 were collected while the new operating plan was in effect.

The U.S. Army Corps of Engineers has developed several computer models that can predict chemical loading to lakes and changes in quality of lake water following a change in reservoir operations, given the required water-quality data for input to the models. Because of the change in operations at Orwell Reservoir, the St. Paul District Corps of Engineers requested that the U.S. Geological Survey provide assistance by determining the quality of water in the reservoir.

PURPOSE AND SCOPE

This report presents data collected at five sites on Orwell Reservoir and two sites on the Otter Tail River.

The scope of the water-quality study included:

1. Inflow site -- monthly sampling from April to September 1985, a winter sample collected in February 1986, and samples collected in April and May 1986 during spring runoff. Samples were collected bi-weekly by the damtender for determination of total phosphorus to augment monthly data. Onsite determinations during monthly visits included streamflow, specific conductance, water temperature, pH, and dissolved oxygen. Monthly samples were analyzed for concentrations of nitrogen and phosphorus.

2. Outflow site -- sampled at the same frequency as at the inflow site, except no biweekly samples were collected. Onsite determinations were the same as those made at the inflow site, plus alkalinity. Samples were analyzed to determine concentrations of selected nitrogen and phosphorus species, organic carbon, major ions, and dissolved solids.

3. Five Lake sites -- sampled monthly from April to September 1985, and February, May, and July 1986. Onsite determinations included specific conductance, water temperature, pH, dissolved oxygen, and measurement of concentrations of nitrogen and phosphorus species, chlorophyll *a* and *b*, phytoplankton identification, and turbidity.

LOCATION AND ENVIRONMENTAL SETTING

Orwell Reservoir is in Otter Tail County in west-central Minnesota, about 180 miles northwest of the Minneapolis - St. Paul metropolitan area and about 6 miles southwest of Fergus Falls. The reservoir and the sampling sites are shown in figure 1. The reservoir is on the Otter Tail River, 38.6 river miles upstream of the point where the Otter Tail and Bois de Sioux Rivers combine to form the Red River of the North. It has a gross storage capacity of 14,100 acre-feet and a useful capacity of 13,100 acre-feet, which is approximately the volume of a 10-year flood (U.S. Army Corps of Engineers, 1963).

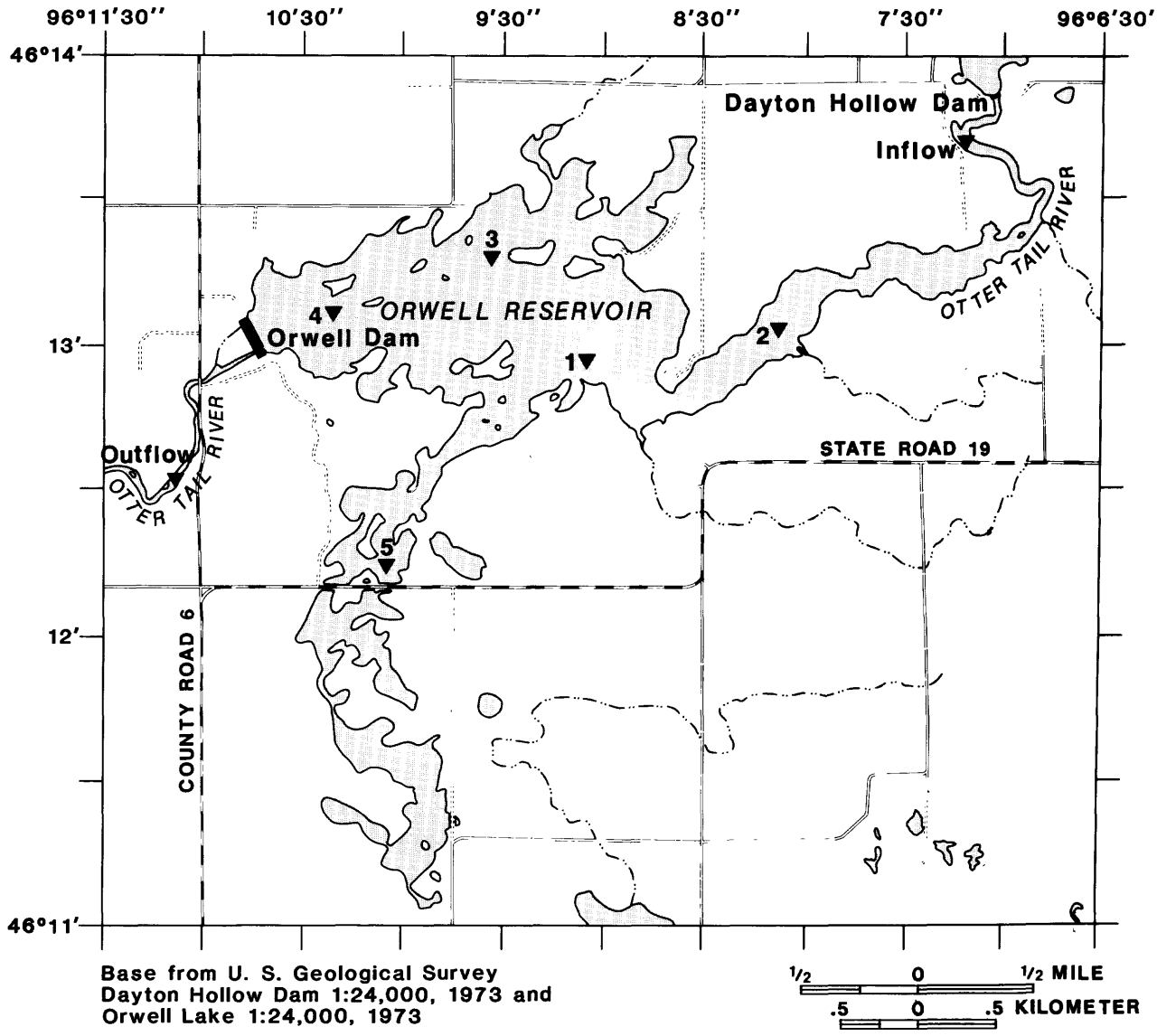

Figure 1.--Location of the sample sites on Orwell Reservoir and Otter Tail River

The drainage area above Orwell Dam is approximately 1,830 square miles. The headwaters are in the morainic hills of southwestern Clearwater County approximately 90 miles northeast of the reservoir. From the headwaters to Orwell Reservoir, the river flows through an extensive network of lakes and depressions. Above river mile 40, the river runs through rolling hills; whereas, below river mile 22, the topography is nearly flat. Between these two distinct areas lies a transition zone in which the dam and most of the reservoir is located. This transition zone is composed of a series of beach ridges that were formed by Glacial Lake Agassiz.

The basin is underlain by as much as 500 feet of glacial drift composed of a heterogeneous mixture of clay, sand, gravel, and boulders. Along the Otter Tail River and its tributaries, the channel slope and flow are sufficient to permit development of hydroelectric power.

The climate in the area consists of cold winters and warm summers. Average temperatures at the Fergus Falls weather station in January and July are 5.9 and 80.0°F, respectively. Average annual precipitation is 23.5 inches per year (National Oceanic and Atmospheric Administration, 1985).

Grain farming is the dominant agricultural activity, although diversified farming, including dairying, is becoming more prevalent. About 1,870 acres around and including Orwell Reservoir are leased to the Minnesota Department of Natural Resources for wildlife management. Numerous waterfowl species use the reservoir during migration. Non-game bird species of interest that may occur at the reservoir include the bald eagle, osprey, white pelican, sandhill crane, and common loon.

PREVIOUS INVESTIGATIONS

A limnological survey of Orwell Reservoir was done in 1978-79 by personnel from the University of Minnesota (Megard, 1980). The survey included several reservoirs, most of which were sampled eight times and analyzed for concentrations of major ions and nutrients. Secchi-disk transparency was measured during each sampling visit.

Water-quality data were collected from the outflow site by the U.S. Geological Survey in the 1960's. These data are included in this report for comparison.

METHODS OF COLLECTION AND ANALYSIS

Water at the inflow and outflow sites was well mixed; therefore, samples were collected at one vertical located near the center of the channel. Samples were depth integrated and bottles were filled in the stream directly or, if a suspended-sediment sampler was used, the water was transferred to a splitter and the bottles were filled from the splitter. Specific conductance, temperature, pH, and dissolved oxygen were measured with a Hydrolab[1] model 4041 portable four-parameter instrument. Streamflow during monthly sampling visits was determined with a current meter at the inflow site and determined from the

stage-discharge rating at the outflow site according to the methods of Carter and Davidian (1968). Mean-daily streamflow at the inflow site was calculated from the mean-daily outflow discharge and changes in reservoir storage.

At the reservoir sites, a white, 20-centimeter Secchi disk was used to determine transparency. Specific conductance, temperature, pH, and dissolved oxygen were measured with the portable four-parameter instrument. A peristaltic pump was used to collect depth-integrated water samples by moving the orifice of the tube through the euphotic zone, which was determined by doubling the Secchi-disk reading.

The portable four-parameter instrument was calibrated at the beginning of each sampling day and checked at the end of the day. Reservoir sites 2 and 5 were not sampled as often as the other reservoir sites because they were riverine or dry during periods of low water levels in the reservoir. All field and laboratory determinations were made using standard U.S. Geological Survey methods. References detailing the various methods include Greeson and others, 1979a and 1979b; Fishman and Friedman, 1985; Rantz and others, 1982; and Wershaw and others, 1983. Phytoplankton taxa were determined using the membrane filter method (McNabb, 1960) on samples preserved with Lugol's solution (Greeson and others, 1979a) by Aquatic Analysts of Portland, Oregon.

[1]The use of a trade name in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

REFERENCES

Carter, R. W., and Davidian, Jacob, 1968, General procedures for gaging streams: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3,Chapter A6, 13 p.

Fishman, M. J. and Friedman, L. C., 1985, Methods for determination of inorganic substances in water and fluvial sediments: U.S. Geological Survey Open-File Report 85-495, 709 p.

Greeson, P. E., Ehlke, T. A., Irwin, G. A., Lium, B. W., and Slack, K. V., 1979a, Methods for the collection and analysis of aquatic biological and microbiological samples: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A4, 332 p.

Greeson, P. E., Ehlke, T. A., Lium, B. W., Shoaf, W. T., Radtke, D. B., and Sohn, I. G., 1979b, A supplement to--methods for collection and analysis of aquatic biological and microbiological samples (U.S. Geological Survey Techniques of Water-Resources Investigations, Book 5, chap. A4): U.S. Geological Survey Open-File Report 79-1279, 92 p.

McNabb, C. D., 1960, Enumeration of fresh-water phytoplankton concentrated on the membrane filter: Limnology and Oceanography, v. 5, p. 57-61.

Megard, R. O., 1980, Limnological survey of reservoirs in Minnesota, North Dakota and Wisconsin operated by the St. Paul District U.S. Army Corps of Engineers - Part I: U.S. Army Corps of Engineers, 81 p.

National Oceanic and Atmospheric Administration, 1985, Climatological data, annual summary: Minnesota, 1984, v. 90, no. 13, 38 p.

Rantz, S. E. and others, 1982, Measurement and computation of streamflow: vol. 1--measurement of stage and discharge and vol. 2--computation of discharge: U.S. Geological Survey Water-Supply Paper 2175, 631 p.

U.S. Army Corps of Engineers, 1963, Flood control and water conservation Otter Tail River, Minnesota Red River of the North watershed Orwell Dam and Reservoir - Reservoir regulation manual: 91 p.

U.S. Army Corps of Engineers, 1985, Orwell Reservoir operation plan evaluation, draft, 154 p.

Wershaw, R. L., Fishman, M. J., Grabbe, R. R., and Lowe, L. E., 1983, Methods for the determination of organic substances in water and fluvial sediments: U.S. Geological Survey Open-File Report 82-1004, 173 p.

APPENDIX

Water-Quality Data

Table 1.--Vertical-profile water-quality data for Orwell Reservoir

[µS/cm, microsiemens per centimeter at 25° Celsius; mg/L, milligrams per liter]

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 1				
			1985				
April							
18...	15:20	2.0	386	8.3	12.5	9.6	92
18...	15:21	4.0	386	8.2	12.0	9.0	85
18...	15:23	5.0	386	8.2	12.0	9.0	85
May							
15...	15:41	1.0	390	8.1	16.0	8.0	83
15...	15:42	3.0	390	8.1	16.0	8.1	84
15...	15:43	6.5	390	8.1	16.0	8.0	83
June							
18...	17:01	1.0	378	8.2	19.5	9.1	100
18...	17:02	5.0	378	8.2	19.5	9.0	99
18...	17:03	10.0	378	8.2	19.5	8.8	97
18...	17:04	15.0	379	8.2	19.5	8.8	97
18...	17:05	20.0	379	8.2	19.0	8.3	90
July							
24...	16:11	1.0	356	8.2	23.0	8.2	98
24...	16:12	3.0	356	8.2	23.0	7.9	94
24...	16:13	9.0	356	8.2	23.0	7.8	93
24...	16:14	15.0	356	8.2	23.0	7.7	92
24...	16:15	17.0	356	8.2	23.0	7.7	92
August							
29...	15:20	1.0	360	7.9	20.0	8.8	98
29...	15:21	3.0	359	7.9	19.5	8.2	90
29...	15:22	6.0	359	7.9	19.5	8.0	88
29...	15:23	9.0	358	7.9	19.5	7.9	87
29...	15:24	12.0	358	7.9	19.5	7.8	86
29...	15:25	15.0	359	7.8	19.5	7.7	85
September							
24...	16:35	1.0	360	8.0	13.0	9.8	94
24...	16:36	5.0	358	8.0	13.0	9.8	94
24...	16:37	10.0	358	8.0	13.0	9.7	93
24...	16:38	16.0	360	8.0	13.0	9.5	91

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 1 --Continued				
			1986				
February							
26...	13:45	4.0	414	8.0	0.0	11.7	81
26...	13:48	6.0	414	8.0	0.0	11.7	81
26...	13:50	6.5	414	7.9	0.0	11.7	81
May							
01...	13:45	2.0	395	8.3	10.0	10.8	95
01...	13:46	10.0	395	8.3	10.0	10.6	93
01...	13:47	15.0	395	8.3	10.0	10.6	93
01...	13:48	19.5	396	8.3	10.0	10.6	93
July							
22...	13:00	1.0	380	8.7	27.0	10.9	138
22...	13:01	3.0	380	8.6	26.0	10.5	130
22...	13:02	6.0	383	8.4	26.0	9.1	113
22...	13:03	10.0	384	8.4	25.5	8.6	106
22...	13:04	15.0	384	8.2	25.0	7.5	91
22...	13:05	17.0	384	8.2	25.0	7.3	89
			Site 2				
			1985				
June							
18...	16:30	1.0	376	8.1	19.5	9.5	105
18...	16:31	3.0	376	8.1	19.5	9.1	100
18...	16:32	6.0	377	8.2	19.5	9.0	99
18...	16:33	9.0	377	8.2	19.5	9.0	99
18...	16:34	13.5	377	8.2	19.5	9.0	99
July							
24...	15:36	1.0	356	8.2	23.0	7.6	91
24...	15:37	3.0	357	8.2	23.0	7.6	91
24...	15:38	6.0	358	8.2	23.0	7.8	93
24...	15:39	9.0	358	8.2	23.0	7.5	89
24...	15:40	12.0	362	8.1	23.0	7.3	87

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 2 --Continued				
			1985				
August							
29...	14:50	1.0	360	7.9	20.0	8.4	93
29...	14:51	3.0	360	7.9	19.5	8.0	88
29...	14:52	6.0	361	7.9	19.5	7.7	85
29...	14:54	9.0	362	8.0	19.5	7.7	85
29...	14:55	11.0	363	7.9	19.5	7.3	80
September							
24...	16:10	1.0	348	8.0	13.0	10.2	98
24...	16:11	4.0	352	8.0	13.0	10.1	97
24...	16:12	7.0	355	8.0	13.0	10.1	97
			1986				
May							
01...	13:20	2.0	392	8.4	10.5	10.8	96
01...	13:25	5.0	393	8.4	10.5	10.7	95
01...	13:30	10.0	394	8.4	10.5	10.6	94
01...	13:31	15.0	394	8.4	10.5	10.6	94
01...	13:32	17.0	394	8.4	10.5	10.6	94
July							
22...	12:15	1.0	383	8.0	26.5	8.6	108
22...	12:16	3.0	384	8.0	26.0	8.3	103
22...	12:17	5.0	384	8.0	25.0	7.7	94
22...	12:18	8.0	383	7.9	25.0	7.2	88
22...	12:19	10.0	383	7.9	25.0	6.9	84

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 3				
			1985				
April							
18...	14:45	2.0	397	8.2	11.0	10.3	95
18...	14:46	4.0	397	8.2	11.0	10.3	95
18...	14:47	6.0	397	8.2	11.0	10.3	95
18...	14:48	8.0	397	8.2	11.0	9.3	86
18...	14:49	10.0	398	8.2	10.5	7.9	72
May							
15...	16:11	1.0	390	8.1	16.0	8.6	89
15...	16:12	3.0	390	8.1	16.0	7.7	80
15...	16:13	6.0	390	8.1	16.0	7.6	79
15...	16:14	9.0	390	8.1	16.0	7.3	76
15...	16:15	10.5	390	8.1	16.0	7.6	79
June							
18...	17:31	1.0	378	8.3	19.0	9.2	100
18...	17:32	5.0	381	8.3	19.0	9.0	98
18...	17:33	10.0	380	8.3	19.0	9.1	99
18...	17:34	15.0	381	8.3	19.0	9.0	98
18...	17:35	20.0	381	8.3	19.0	9.1	99
18...	17:36	25.0	380	8.3	19.0	9.0	98
July							
24...	17:29	1.0	360	8.3	23.5	8.2	99
24...	17:30	3.0	362	8.3	23.5	8.0	96
24...	17:31	6.0	362	8.3	23.5	7.8	94
24...	17:32	12.0	363	8.3	23.5	7.7	93
24...	17:33	18.0	363	8.2	23.5	7.5	90
24...	17:34	23.0	364	8.0	23.5	5.7	69

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 3 --Continued				
			1985				
August							
29...	16:26	1.0	362	8.0	20.0	8.9	99
29...	16:27	3.0	363	7.9	20.0	8.6	95
29...	16:28	6.0	364	7.9	20.0	8.1	90
29...	16:29	9.0	366	7.9	19.5	8.1	89
29...	16:30	12.0	366	7.9	19.5	8.1	89
29...	16:31	15.0	366	7.9	19.5	8.1	89
29...	16:32	18.0	369	7.9	19.5	7.7	85
September							
24...	17:30	1.0	360	8.1	13.5	10.1	98
24...	17:31	4.0	360	8.1	13.5	10.1	98
24...	17:32	10.0	360	8.1	13.5	9.9	96
24...	17:33	15.0	362	8.1	13.5	9.7	94
24...	17:34	16.0	362	8.1	13.5	9.7	94
			1986				
February							
26...	14:45	3.0	411	8.0	0.0	11.3	79
26...	14:46	6.0	412	8.0	0.0	11.3	79
26...	14:47	10.0	418	7.9	0.5	11.3	80
May							
01...	15:03	2.0	398	8.3	9.5	11.6	101
01...	15:04	10.0	396	8.3	9.5	11.3	98
01...	15:05	20.0	398	8.3	9.5	11.1	97
01...	15:06	26.0	398	8.3	9.5	10.9	95
July							
22...	14:30	1.0	376	8.7	28.0	12.2	157
22...	14:31	3.0	378	8.7	28.0	12.3	158
22...	14:32	6.0	379	8.7	26.0	11.8	146
22...	14:33	10.0	382	8.5	26.0	9.6	119
22...	14:34	14.0	384	8.5	25.5	8.8	108
22...	14:35	16.0	384	8.5	25.5	8.9	109

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 4				
			1985				
April							
18...	14:00	2.0	394	8.3	11.5	10.9	102
18...	14:02	4.0	395	8.4	11.5	10.9	102
18...	14:03	6.0	395	8.4	11.5	10.9	102
18...	14:04	7.0	397	8.4	11.5	10.9	102
May							
15...	16:36	1.0	387	8.1	16.0	7.6	79
15...	16:37	6.0	387	8.1	16.0	7.5	78
15...	16:38	15.0	388	8.1	16.0	7.6	79
15...	16:39	18.5	388	8.1	16.0	7.4	77
June							
18...	18:00	1.0	380	8.3	19.0	9.1	99
18...	18:01	5.0	380	8.3	19.0	9.1	99
18...	18:02	10.0	380	8.3	19.0	9.1	99
18...	18:03	15.0	381	8.3	19.0	9.0	98
18...	18:04	26.0	381	8.3	19.0	9.0	98
July							
24...	18:00	1.0	361	8.4	23.5	8.9	107
24...	18:01	3.0	362	8.4	23.5	8.7	105
24...	18:02	6.0	365	8.4	23.5	8.5	102
24...	18:03	12.0	364	8.4	23.5	8.5	102
24...	18:04	18.0	365	8.4	23.5	8.4	101
24...	18:05	24.0	365	8.4	23.5	8.3	100
24...	18:06	28.0	369	8.2	23.5	6.4	77
24...	18:07	32.0	378	8.0	23.0	2.3	27
August							
29...	16:57	1.0	368	8.0	20.0	9.6	106
29...	16:58	3.0	369	8.0	20.0	9.3	103
29...	16:59	6.0	369	8.0	19.5	8.3	91
29...	17:00	9.0	369	7.9	19.5	8.1	89
29...	17:01	15.0	369	7.9	19.5	8.1	89
29...	17:02	21.0	369	7.9	19.5	8.0	88
29...	17:03	27.0	368	7.9	19.5	7.4	81

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 4 Continued				
			1985				
September							
24...	17:50	1.0	354	8.1	14.0	9.4	92
24...	17:51	5.0	356	8.1	14.0	9.8	96
24...	17:52	10.0	360	8.1	14.0	9.6	94
24...	17:53	15.0	360	8.1	14.0	9.7	95
24...	17:54	20.0	360	8.1	14.0	9.6	94
24...	17:55	25.0	361	8.1	14.0	9.6	94
24...	17:56	27.0	361	8.1	14.0	9.5	93
			1986				
February							
26...	15:45	3.0	416	7.8	0.0	11.6	81
26...	15:46	6.0	418	7.8	0.0	11.2	78
26...	15:47	9.0	419	7.8	0.0	11.2	78
26...	15:48	12.0	419	7.8	0.0	11.2	78
26...	15:49	16.0	424	7.8	0.0	10.8	75
May							
01...	15:21	2.0	398	8.3	9.5	11.1	97
01...	15:23	5.0	398	8.3	9.5	11.0	96
01...	15:25	20.0	398	8.3	9.5	11.0	96
01...	15:26	25.0	399	8.3	9.5	11.0	96
July							
22...	14:50	1.0	379	8.6	27.5	10.6	135
22...	14:51	3.0	378	8.7	27.5	10.6	135
22...	14:52	6.0	379	8.7	26.0	11.4	141
22...	14:53	10.0	383	8.5	25.5	8.8	108
22...	14:54	15.0	383	8.5	25.5	8.6	106
22...	14:55	19.0	382	8.5	25.5	8.5	104
22...	14:56	21.7	384	8.5	25.5	8.4	103

Table 1.--Vertical-profile data for Orwell Reservoir--Continued

Date	Time	Sampling depth (feet)	Specific conductance (µS/cm)	pH (standard units)	Temperature (degree celsius)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
			Site 5				
			1985				
June							
19...	08:28	1.0	520	8.1	18.0	7.8	84
19...	08:29	3.0	521	8.0	17.5	7.8	83
July							
24...	16:45	1.0	496	8.0	23.0	4.5	54
24...	16:46	3.0	496	8.0	23.0	4.2	50
24...	16:47	6.0	496	8.0	23.0	4.0	48
24...	16:48	8.0	497	8.0	23.0	3.8	45
August							
29...	15:54	1.0	725	8.1	19.5	10.1	111
29...	15:55	3.0	732	8.1	19.0	7.9	86
29...	15:56	4.5	734	8.0	19.0	5.3	58
September							
24...	17:05	1.5	567	8.2	11.5	12.5	116
			1986				
May							
01...	14:15	2.0	502	8.3	9.0	12.4	107
01...	14:16	5.0	503	8.3	9.0	11.8	102
01...	14:17	9.0	503	8.4	9.0	11.6	100
July							
22...	13:45	1.0	610	9.3	28.5	22.1	287
22...	13:46	3.0	637	8.9	25.5	8.3	102
22...	13:47	5.6	650	8.7	25.0	4.5	55

Table 2.--Turbidity, transparency, alkalinity, nutrient, and chlorophyll data for Orwell Reservoir

[NTU, nephelometric turbidity units; m, meters; mg/L, milligrams per liter; µg/L, micrograms per liter; --, no data]

Date	Time	Reservoir depth (feet)	Turbidity (NTU)	Transparency (Secchi disk) (m)	Carbonate (mg/L as CO_3)	Bicarbonate (mg/L as HCO_3)	Alkalinity (mg/L as $CaCO_3$)	Dissolved Nitrogen: Nitrite plus nitrate (mg/L as N)	Dissolved Nitrogen: Ammonia (mg/L as N)	Dissolved Nitrogen: Ammonia plus organic (mg/L as N)	Phosphorus: Total (mg/L as P)	Phosphorus: Dissolved ortho (mg/L as P)	Chlorophyll a (µg/L)	Chlorophyll b (µg/L)
						Site 1								
Apr 1985														
18...	15:15	--	3.5	0.8	--	--	188	<0.10	0.05	0.6	0.08	0.03	3.20	<0.10
May														
15...	15:40	--	5.1	.7	--	--	187	.24	.25	1.0	.06	.05	3.10	< .10
Jun														
18...	17:00	--	2.5	.9	--	--	188	< .10	.04	.9	.07	.03	1.70	< .10
Jul														
24...	16:20	--	2.9	1.2	--	--	190	< .10	.03	.2	.04	.02	9.80	< .10
Aug														
29...	15:30	--	2.5	1.2	--	--	190	.13	< .01	.4	.06	< .01	2.30	< .10
Sep														
24...	16:30	--	1.7	1.2	--	--	181	< .10	.17	.6	.05	.05	84.0	< .10
Feb 1986														
26...	14:00	7.1	1.9	--	--	--	214	.13	.12	.7	.03	< .01	1.30	< .10
May														
01...	13:44	20.0	5.2	.8	--	--	187	.10	.06	.6	.03	< .01	6.40	.40
Jul														
22...	13:06	18.1	1.6	1.1	6.0	207	180	< .10	.04	.6	.06	.02	39.0	5.10

Table 2.--Turbidity, transparency, alkalinity, nutrient, and chlorophyll data for Orwell Reservoir--Continued

Date	Time	Reservoir depth (feet)	Turbidity (NTU)	Transparency (Secchi disk) (m)	Carbonate (mg/L as CO_3)	Bicarbonate (mg/L as HCO_3)	Alkalinity (mg/L as $CaCO_3$)	Dissolved Nitrogen: Nitrite plus nitrate (mg/L as N)	Dissolved Nitrogen: Ammonia (mg/L as N)	Dissolved Nitrogen: Ammonia plus organic (mg/L as N)	Phosphorus: Total (mg/L as P)	Phosphorus: Dissolved ortho (mg/L as P)	Chlorophyll a (µg/L)	Chlorophyll b (µg/L)
						Site 2								
Jun 1985														
18...	16:25	--	1.5	1.1	--	--	191	<0.10	0.02	1.1	0.07	0.03	1.80	<0.10
Jul														
24...	15:45	--	4.5	1.2	--	--	190	< .10	.05	.3	.04	.03	4.30	< .10
Aug														
29...	15:00	--	2.0	1.0	--	--	190	.11	< .01	.5	.06	< .01	.90	< .10
Sep														
24...	16:00	--	1.5	1.5	--	--	185	< .10	.20	.5	.08	.04	2.90	< .10
May 1986														
01...	13:19	17.5	4.7	.8	--	--	193	.11	.06	.6	.04	< .01	5.90	.40
Jul														
22...	12:20	11.0	2.2	.8	0	226	185	.15	.05	.9	.07	.03	16.0	2.60

Table 2.--Turbidity, transparency, alkalinity, nutrient, and chlorophyll data for Orwell Reservoir--Continued

Date	Time	Reservoir depth (feet)	Turbidity (NTU)	Transparency (Secchi disk) (m)	Carbonate (mg/L as CO_3)	Bicarbonate (mg/L as HCO_3)	Alkalinity (mg/L as $CaCO_3$)	Dissolved Nitrogen: Nitrite plus nitrate (mg/L as N)	Dissolved Nitrogen: Ammonia (mg/L as N)	Dissolved Nitrogen: Ammonia plus organic (mg/L as N)	Phosphorus: Total (mg/L as P)	Phosphorus: Dissolved ortho (mg/L as P)	Chlorophyll a (µg/L)	Chlorophyll b (µg/L)
						Site 3								
Apr 1985														
18...	14:40	--	1.6	0.5	--	--	192	<0.10	0.07	0.6	0.07	0.02	5.20	<0.10
May														
15...	16:10	--	1.1	.6	--	--	184	.17	.13	3.0	.07	.04	4.80	< .10
Jun														
18...	17:30	--	4.3	.9	--	--	194	< .10	.02	.6	.06	.02	1.10	< .10
Jul														
24...	17:40	--	2.5	1.0	--	--	190	< .10	.05	.4	.05	.04	8.50	< .10
Aug														
29...	16:40	--	1.5	1.2	--	--	190	< .10	< .01	.4	.07	.04	8.00	< .10
Sep														
24...	17:25	--	1.5	1.0	--	--	190	< .10	.20	.6	.07	.04	7.90	< .10
Feb 1986														
26...	15:00	10.9	1.4	--	0	271	222	.13	.12	.6	.02	< .01	.60	< .10
May														
01...	15:02	27.0	7.4	.8	--	--	190	< .10	.04	.5	.05	< .01	19.0	.60
Jul														
22...	14:36	17.2	1.5	1.0	12	204	187	< .10	.06	.9	.06	.02	15.0	1.30

Table 2.--Turbidity, transparency, alkalinity, nutrient, and chlorophyll data for Orwell Reservoir--Continued

Date	Time	Reservoir depth (feet)	Turbidity (NTU)	Transparency (Secchi disk) (m)	Carbonate (mg/L as CO_3)	Bicarbonate (mg/L as HCO_3)	Alkalinity (mg/L as $CaCO_3$)	Dissolved Nitrogen: Nitrite plus nitrate (mg/L as N)	Dissolved Nitrogen: Ammonia (mg/L as N)	Dissolved Nitrogen: Ammonia plus organic (mg/L as N)	Phosphorus: Total (mg/L as P)	Phosphorus: Dissolved ortho (mg/L as P)	Chlorophyll a (µg/L)	Chlorophyll b (µg/L)
						Site 4								
Apr 1985														
18...	13:55	--	7.3	0.5	--	--	190	<0.10	0.04	1.1	0.05	0.02	6.50	<0.10
May														
15...	16:35	--	7.1	.6	--	--	185	.13	.15	.7	.07	.05	6.00	< .10
Jun														
18...	17:55	--	2.7	1.0	--	--	192	< .10	< .01	.6	.06	.01	6.20	< .10
Jul														
24...	18:15	--	2.0	1.0	--	--	200	.17	.05	.3	.04	.04	21.0	< .10
Aug														
29...	17:10	--	2.0	1.2	--	--	180	.11	< .01	.7	.07	< .01	8.90	< .10
Sep														
24...	17:45	--	2.0	1.1	--	--	188	--	--	--	.07	--	11.0	< .10
Feb 1986														
26...	16:00	17.0	1.5	--	0	276	226	.13	.13	.7	.02	< .01	.80	< .10
May														
01...	15:20	26.0	6.9	.8	--	--	189	< .10	.04	.5	.05	< .01	25.0	1.00
Jul														
22...	14:57	22.7	2.0	1.5	1.0	223	185	< .10	.05	.7	.06	.02	35.0	3.10

Table 2.—Turbidity, transparency, alkalinity, nutrient, and chlorophyll data for Orwell Reservoir--Continued

Date	Time	Reservoir depth (feet)	Turbidity (NTU)	Transparency (Secchi disk) (m)	Carbonate (mg/L as CO_3)	Bicarbonate (mg/L as HCO_3)	Alkalinity (mg/L as $CaCO_3$)	Dissolved Nitrogen: Nitrite plus nitrate (mg/L as N)	Dissolved Nitrogen: Ammonia (mg/L as N)	Dissolved Nitrogen: Ammonia plus organic (mg/L as N)	Phosphorus: Total (mg/L as P)	Phosphorus: Dissolved ortho (mg/L as P)	Chlorophyll a (µg/L)	Chlorophyll b (µg/L)
						Site 5								
Jun 1985														
19...	08:27	--	3.5	0.9	--	--	210	<0.10	<0.01	1.1	0.18	0.11	8.20	<0.10
Jul														
24...	16:50	--	3.0	.8	--	--	220	< .10	.07	.7	.13	.03	35.0	< .10
Aug														
29...	16:00	--	3.7	.5	--	--	270	< .10	< .01	.9	.27	.15	83.0	< .10
Sep														
24...	17:00	--	2.0	1.5	--	--	240	< .10	.15	1.9	.21	.10	5.70	< .10
May 1986														
01...	14:14	9.8	6.3	.7	--	--	174	< .10	.04	.6	.06	< .01	74.0	1.50
Jul														
22...	13:48	6.6	3.0	.4	26	206	213	< .10	.04	1.0	.37	.06	690	6.40

Table 3.--Quality of runoff from fields to Orwell Reservoir at site 5

[Sample taken April 18, 1985 at 12:45 p.m.]

Specific conductance (microsiemens per centimeter at 25° Celsius)	1,100
pH (standard units)	8.4
Temperature (degrees celsius)	15.0
Oxygen, dissolved (milligrams per liter)	11.2
Oxygen, dissolved (percent saturation)	114
Turbidity (nephelometric turbidity units)	6.0
Alkalinity (milligrams per liter as $CaCO_3$)	200
Nitrite plus nitrate nitrogen, dissolved (milligrams per liter as N)	< .01
Ammonia nitrogen, dissolved (milligrams per liter as N)	<.01
Ammonia plus organic nitrogen, dissolved (milligrams per liter as N)	.9
Phosphorus, dissolved (milligrams per liter as P)	.09
Phosphorus, ortho, dissolved (milligrams per liter as P)	.01

Table 4.--Phytoplankton data for Orwell Reservoir

[&, dominant organism; mL, milliliter; --, not found; <, less than]

Date:	April 18, 1985		May 15, 1985		June 18, 1985		July 24, 1985		August 29, 1985	
Time:	1515		1540		1700		1620		1530	
Total Cells per mL:	2800		2600		1300		1400		1400	
Organism	Cells per mL	Percent	Cells per mL	Percent	Cells per mL	Percent	Cells per mL	Percent	Cells per mL	Percent
				Site 1						
BACILLARIOPHYTA (DIATOMS)										
.BACILLARIOPHYCEAE										
..ACHNANTHALES										
...ACHNANTHACEAE										
....ACHNANTHES										
.....A. CLEVEI	--		--		12	<1	--		--	
.....A. EXIGUA	--		--		--		11	<1	--	
.....A. LANCEOLATA	--		26	1	23	2	45	3	--	
.....A. MINUTISSIMA	--		--		--		--		28	2
....COCCONEIS										
.....C. PEDICULUS	27	1	26	1	--		--		14	1
.....C. PLACENTULA	53	2	150	6	12	<1	11	<1	56	4
..BACILLARIALES										
...NITZSCHIACEAE										
....NITZSCHIA										
.....N. ACICULARIS	--		51	2	12	<1	--		--	
.....N. AMPHIBIA	--		26	1	--		--		14	1
.....N. DISSIPATA	27	1	150	6	--		11	<1	56	4
.....N. FONTICOLA	--		26	1	--		--		--	
.....N. FRUSTULUM	27	1	26	1	--		--		14	1
.....N. PALEA	--		77	3	12	<1	23	2	--	
..EPITHEMIALES										
...EPITHEMIACEAE										
....EPITHEMIA										
.....E. SOREX	--		51	2	--		--		--	
..EUPODISCALES										
...COSCINODISCACEAE										
....CYCLOTELLA										
.....C. KUTZINGIANA	--		51	2	70	5	120	9	42	3
.....C. MENEGHINIANA	80	3	26	1	35	3	--		56	4
.....C. OCELLATA	27	1	--		--		--		--	
.....C. PSEUDOSTELLIGERA	--		--		--		120	9	84	6
....MELOSIRA										
.....M. AMBIGUA	27	1	51	2	12	<1	--		--	
.....M. GRANULATA	27	1	51	2	23	2	34	2	56	4
.....M. VARIANS	--		51	2	--		--		28	2
....STEPHANODISCUS										
.....S. ASTREA V. MINUTULA	--		26	1	--		--		84	6
.....S. HANTZSCHII	110	4	& 210	8	82	6	--		14	1
..FRAGILARIALES										
...FRAGILARIACEAE										
....ASTERIONELLA										
.....A. FORMOSA	27	1	--		--		--		--	
....DIATOMA										
.....D. TENUE V. ELONGATUM	--		26	1	--		--		--	
.....D. VULGARE	27	1	--		23	2	--		14	1
....FRAGILARIA										
.....F. CAPUCINA	--		--		--		--		28	2
.....F. CAPUCINA V. MESOLEPTA.	--		--		--		--		14	1
.....F. CONSTRUENS	--		51	2	--		--		--	
.....F. CONSTRUENS V. VENTER	--		150	6	--		--		42	3
.....F. CROTONENSIS	--		--		23	2	--		--	
.....F. PINNATA	--		26	1	--		--		--	
.....F. VAUCHERIAE	27	1	--		--		--		--	
....SYNEDRA										
.....S. PARASITICA	--		--		12	<1	--		14	1
.....S. RADIANS	& 770	29	51	2	--		--		--	
.....S. RUMPENS	--		--		35	3	--		14	1
.....S. ULNA	53	2	26	1	--		11	<1	--	
..NAVICULALES										
...CYMBELLACEAE										
....AMPHORA										
.....A. OVALIS	27	1	--		--		--		--	
.....A. PERPUSILLA	27	1	51	2	23	2	23	2	42	3
....CYMBELLA										
.....C. MINUTA	--		--		23	2	--		14	1
.....C. TUMIDA	--		26	1	--		23	2	--	
...GOMPHONEMACEAE										
....GOMPHONEMA										
.....G. ANGUSTATUM	--		26	1	12	<1	23	2	--	
.....G. OLIVACEUM	130	5	130	5	23	2	11	<1	56	4
.....G. SUBCLAVATUM	--		26	1	--		--		14	1

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	April 18, 1985		May 15, 1985		June 18, 1985		July 24, 1985		August 29, 1985	
Time:	1515		1540		1700		1620		1530	
Total Cells per mL:	2800		2600		1300		1400		1400	
Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
	Site 1 -- Continued									
BACILLARIOPHYTA (DIATOMS)										
.BACILLARIOPHYCEAE										
..NAVICULALES										
...NAVICULACEAE										
....NAVICULA										
.....N.ANGILICA (5) RALFS	--		--		12	<1	--		14	1
.....N.CAPITATA (5) EHR.-1	27	1	--		23	2	11	<1	--	
.....N.CRYPTOCEPHALA	--		& 210	8	23	2	34	2	42	3
.....N.CRYPTOCEPHALA V.VENETA	27	1	150	6	47	4	--		42	3
.....N.DECUSSIS (5) OSTR	--		26	1	--		23	2	28	2
.....N.GREGARIA	--		--		12	<1	--		--	
.....N.LANCEOLATA	27	1	26	1	--		--		--	
.....N.MENISCULUS V.UPSALIEN.	--		51	2	--		--		--	
.....N.MINIMA	--		--		23	2	--		70	5
.....N.MINUSCULA	--		--		12	<1	--		--	
.....N.TRIPUNCTATA (5) (D.	--		51	2	--		--		--	
CHLOROPHYTA (GREEN ALGAE)										
.CHLOROPHYCEAE										
..CHLOROCOCCALES										
...HYDRODICTYACEAE										
....PEDIASTRUM	--		--		--		--		14	1
...OOCYSTACEAE										
....ANKISTRODESMUS	--		--		12	<1	79	6	28	2
....OOCYSTIS	--		--		--		11	<1	--	
....SELENASTRUM	--		--		--		--		14	1
....TETRAEDRON	--		26	1	12	<1	11	<1	--	
...SCENEDESMACEAE										
....CRUCIGENIA	--		--		23	2	11	<1	--	
....SCENEDESMUS	--		--		35	3	45	3	--	
..TETRASPORALES										
...PALMELLACEAE										
....SPHAEROCYSTIS	--		--		12	<1	11	<1	--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)										
.BACILLARIOPHYCEAE										
..CENTRALES										
...COSCINODISCACEAE										
....CYCLOTELLA	--		51	2	--		--		--	
..PENNALES										
...ACHNANTHACEAE										
....RHOICOSPHENIA										
.....R.CURVATA	--		100	4	35	3	11	<1	28	2
...FRAGILARIACEAE										
....SYNEDRA	--		--		--		11	<1	--	
...GOMPHONEMATACEAE										
....GOMPHONEMA	--		--		12	<1	--		14	1
...NAVICULACEAE										
....CALONEIS	--		--		--		11	<1	--	
....NAVICULA	27	1	--		47	4	11	<1	14	1
...NITZSCHIACEAE										
....NITZSCHIA	--		52	2	35	3	--		28	2
.CHRYSOPHYCEAE										
..CHROMULINALES										
...CHROMULINACEAE										
....CHRYSOCOCCUS	160	6	--		--		--		28	2
....KEPHYRION	720	27	--		23	2	--		--	
...OCHROMONADACEAE										
....OCHROMONAS	--		--		12	<1	--		--	
CYANOPHYTA (BLUE-GREEN ALGAE)										
.CYANOPHYCEAE										
..OSCILLATORIALES										
...NOSTOCACEAE										
....ANABAENA	--		--		--		79	6	--	
EUGLENOPHYTA (EUGLENOIDS)										
.CRYPTOPHYCEAE										
..CRYPTOMONIDALES										
...CRYPTOCHRYSIDACEAE										
....CHROOMONAS	53	2	--		--		79	6	98	7
....RHODOMONAS	130	5	77	3	& 390	30	190	14	& 110	8
...CRYPTOMONODACEAE										
....CRYPTOMONAS	--		150	6	23	2	& 240	17	56	4
.EUGLENOPHYCEAE										
..EUGLENALES										
...EUGLENACEAE										
....TRACHELOMONAS	53	2	--		--		--		--	
PYRRHOPHYTA (FIRE ALGAE)										

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	September 24, 1985		February 26, 1986		May 01, 1986		July 22, 1986	
Time:	1635		1400		1344		1306	
Total Cells per mL:	2800		400		2500		6700	
Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
			Site 1 --Continued					
BACILLARIOPHYTA (DIATOMS)								
.BACILLARIOPHYCEAE								
..ACHNANTHALES								
...ACHNANTHACEAE								
....ACHNANTHES								
.....A.CLEVEI	--		10	3	--		--	
.....A.EXIGUA	--		5	1	--		--	
.....A.LANCEOLATA	25	<1	5	1	--		--	
.....A.MINUTISSIMA	--		10	3	27	1	--	
....COCCONEIS								
.....C.PEDICULUS	--		5	1	--		--	
.....C.PLACENTULA	51	2	29	7	55	2	--	
..BACILLARIALES								
...NITZSCHIACEAE								
....NITZSCHIA								
.....N.ACICULARIS	51	2	5	1	& 330	13	190	3
.....N.AMPHIBIA	--		15	4	--		--	
.....N.CAPITELLATA	--		5	1	--		--	
.....N.DISSIPATA	--		10	3	--		--	
.....N.MICROCEPHALA	--		5	1	--		--	
.....N.PALEA	--		--		55	2	140	2
.....N.SIGMOIDEA	--		--		27	1	--	
..EUPODISCALES								
...COSCINODISCACEAE								
....CYCLOTELLA								
.....C.KUTZINGIANA	--		--		--		48	<1
.....C.MENEGHINIANA	100	4	5	1	27	1	48	<1
.....C.PSEUDOSTELLIGERA	510	19	--		--		& 1,900	29
.....C.STELLIGERA	--		--		27	1	--	
....MELOSIRA								
.....M.GRANULATA	25	<1	5	1	--		48	<1
.....M.VARIANS	51	2	10	3	--		--	
....STEPHANODISCUS								
.....S.ASTREA V.MINUTULA	150	6	--		110	4	1,100	17
.....S.HANTZSCHII	51	2	--		270	11	--	
..FRAGILARIALES								
...FRAGILARIACEAE								
....DIATOMA								
.....D.TENUE V. ELONGATUM	--		5	1	55	2	--	
.....D.VULGARE	--		24	6	27	1	--	
....FRAGILARIA								
.....F.BREUISTRIATA	--		5	1	--		--	
.....F.CONSTRUENS	25	<1	5	1	--		--	
.....F.CONSTRUENS V.VENTER	25	<1	5	1	27	1	--	
.....F.PINNATA	--		5	1	55	2	--	
.....F.VAUCHERIAE	25	<1	15	4	27	1	--	
....SYNEDRA								
.....S.RADIANS	76	3	--		220	9	48	<1
.....S.ULNA	--		5	1	27	1	--	
..NAVICULALES								
...CYMBELLACEAE								
....AMPHORA								
.....A.OVALIS	--		--		27	1	--	
.....A.PERPUSILLA	25	<1	10	3	27	1	95	1
....CYMBELLA								
.....C.AFFINIS	25	<1	--		--		--	
.....C.MINUTA	--		15	4	--		--	
...GOMPHONEMACEAE								
....GOMPHONEMA								
.....G.ANGUSTATUM	--		10	3	--		--	
.....G.OLIVACEUM	--		& 44	11	110	4	48	<1
...NAVICULACEAE								
....NAVICULA								
.....N.CAPITATA	--		--		27	1	--	
.....N.CRYPTOCEPHALA	25	<1	29	7	--		--	
.....N.CRYPTOCEPHALA V.VENETA	25	<1	5	1	160	6	--	
.....N.GRACILOIDES	25	<1	--		--		--	
.....N.GREGARIA	--		--		27	1	--	
.....N.MENISCULUS V.UPSALIEN.	--		--		27	1	--	
.....N.MINIMA	25	<1	10	3	--		--	
.....N.RADIOSA	--		5	1	--		--	
.....N.RHYNCHOCEPHALA	--		--		27	1	--	
.....N.SEMINULUM	--		5	1	--		--	
.....N.TRIPUNCTATA	25	<1	5	1	--		--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	September 24, 1985	February 26, 1986	May 01, 1986	July 22, 1986
Time:	1635	1400	1344	1306
Total Cells per mL:	2800	400	2500	6700

Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
			Site 1 --Continued					
CHLOROPHYTA (GREEN ALGAE)								
.CHLOROPHYCEAE								
..CHLOROCOCCALES								
...OOCYSTACEAE								
....ANKISTRODESMUS	25	<1	--		82	3	140	2
....CLOSTERIOPSIS	--		--		--		48	<1
....SELENASTRUM	--		--		27	1	48	<1
...SCENEDESMACEAE								
....CRUCIGENIA	--		--		27	1	95	1
....SCENEDESMUS	--		--		27	1	190	3
....TETRASTRUM	--		--		--		48	<1
..VOLVOCALES								
...CHLAMYDOMONADACEAE								
....CHLAMYDOMONAS	--		--		--		240	4
CHRYSOPHYTA (YELLOW-GREEN ALGAE)								
.BACILLARIOPHYCEAE								
..CENTRALES								
...COSCINODISCACEAE								
....CYCLOTELLA	--		--		27	1	--	
....MELOSIRA	--		5	1	--		--	
..PENNALES	--		10	3	--		--	
...ACHNANTHACEAE								
....RHOICOSPHENIA								
.....R. CURVATA	--		5	1	55	2	--	
...FRAGILARIACEAE								
....SYNEDRA	--		--		55	2	--	
...NAVICULACEAE								
....NAVICULA	25	<1	15	4	--		48	<1
....PINNULARIA	--		--		27	1	--	
...NITZSCHIACEAE								
....NITZSCHIA	25	<1	20	5	54	2	140	2
.CHRYSOPHYCEAE								
..CHROMULINALES								
...CHROMULINACEAE								
....CHRYSOCOCCUS	--		5	1	55	2	--	
....KEPHYRION	100	4	--		27	1	--	
CYANOPHYTA (BLUE-GREEN ALGAE)								
.CYANOPHYCEAE								
..OSCILLATORIALES								
...NOSTOCACEAE								
....ANABAENA	--		--		--		95	1
...OSCILLATORIACEAE								
....OSCILLATORIA	--		--		27	1	--	
EUGLENOPHYTA (EUGLENOIDS)								
.CRYPTOPHYCEAE								
..CRYPTOMONIDALES								
...CRYPTOCHRYSIDACEAE								
....CHROOMONAS	25	<1	--		--		48	<1
....RHODOMONAS	1,100	41	--		82	3	1,000	15
...CRYPTOMONODACEAE								
....CRYPTOMONAS	76	3	--		27	1	620	9
.EUGLENOPHYCEAE								
..EUGLENALES								
...EUGLENACEAE								
....PHACUS	--		--		--		95	1
....TRACHELOMONAS	--		--		55	2	48	<1
PYRRHOPHYTA (FIRE ALGAE)								
.DINOPHYCEAE								
..DINOKONTAE								
...CERATIACEAE								
....CERATIUM	25	<1	--		--		--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Organism	Cells per mL	Percent	Cells per mL	Percent	Cells per mL	Percent
Date:	June 18, 1985		July 24, 1985		August 29, 1985	
Time:	1630		1545		1500	
Total Cells per mL:	1400		1400		2000	
Site 2						
BACILLARIOPHYTA (DIATOMS)						
.BACILLARIOPHYCEAE						
..ACHNANTHALES						
...ACHNANTHACEAE						
....ACHNANTHES						
.....A. CLEVEI	24	2	12	<1	--	
.....A. EXIGUA	12	<1	--		--	
.....A. HUNGARICA	12	<1	--		--	
.....A. LANCEOLATA	--		12	<1	19	<1
.....A. LINEARIS	--		--		19	<1
.....A. MINUTISSIMA	12	<1	--		--	
....COCCONEIS						
.....C. PEDICULUS	--		--		19	<1
.....C. PLACENTULA	86	6	37	3	130	7
..BACILLARIALES						
...NITZSCHIACEAE						
....NITZSCHIA						
.....N. ACICULARIS	12	<1	12	<1	--	
.....N. AMPHIBIA	--		12	<1	--	
.....N. COMMUNIS	12	<1	12	<1	--	
.....N. DISSIPATA	24	2	12	<1	56	3
.....N. FRUSTULUM	24	2	--		--	
.....N. LINEARIS	12	<1	--		--	
.....N. PALEA	--		--		56	3
.....N. TRYBLIONELLA	--		12	<1	--	
..EPITHEMIALES						
...EPITHEMIACEAE						
....EPITHEMIA						
.....E. SOREX	--		--		19	<1
..EUPODISCALES						
...COSCINODISCACEAE						
....CYCLOTELLA						
.....C. KUTZINGIANA	49	3	160	11	19	<1
.....C. MENEGHINIANA	--		--		130	7
.....C. PSEUDOSTELLIGERA	--		150	11	150	8
....MELOSIRA						
.....M. AMBIGUA	37	3	--		37	2
.....M. GRANULATA	49	3	62	4	37	2
....STEPHANODISCUS						
.....S. ASTREA V. MINUTULA	12	<1	--		19	<1
.....S. HANTZSCHII	37	3	37	3	--	
..FRAGILARIALES						
...FRAGILARIACEAE						
....ASTERIONELLA						
.....A. FORMOSA	--		--		19	<1
....FRAGILARIA						
.....F. CAPUCINA	--		37	3	--	
.....F. CONSTRUENS	37	3	49	3	56	3
.....F. CROTONENSIS	12	<1	--		--	
.....F. PINNATA	37	3	--		19	<1
.....F. VAUCHERIAE	12	<1	--		37	2
....SYNEDRA						
.....S. PARASITICA	--		12	<1	--	
.....S. RADIANS	--		--		19	<1
.....S. RUMPENS	24	2	--		--	
.....S. ULNA	--		--		37	2
..NAVICULALES						
...CYMBELLACEAE						
....AMPHORA						
.....A. OVALIS	12	<1	--		--	
.....A. PERPUSILLA	73	5	37	3	& 170	9
....CYMBELLA						
.....C. AFFINIS	49	3	--		--	
.....C. MINUTA	--		25	2	--	
...GOMPHONEMACEAE						
....GOMPHONEMA						
.....G. ANGUSTATUM	12	<1	--		--	
.....G. OLIVACEUM	61	4	--		19	<1
.....G. PARVULUM	--		12	<1	--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

	Date:	June 18, 1985		July 24, 1985		August 29, 1985	
	Time:	1630		1545		1500	
	Total Cells per mL:	1400		1400		2000	
Organism		Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
Site 2 -- Continued							
BACILLARIOPHYTA (DIATOMS)							
.BACILLARIOPHYCEAE							
..NAVICULALES							
...NAVICULACEAE							
....NAVICULA							
.....N. ANGILICA (5) RALFS		12	<1	--		--	
.....N. CAPITATA (5) EHR.-1		24	2	12	<1	--	
.....N. CRYPTOCEPHALA		73	5	--		56	3
.....N. CRYPTOCEPHALA V. VENETA		37	3	--		--	
.....N. DECUSSIS (5) OSTR		12	<1	12	<1	--	
.....N. GREGARIA		--		12	<1	--	
.....N. MINIMA		37	3	25	2	37	2
.....N. MOURNEI		--		--		19	<1
.....N. PUPULA		--		--		19	<1
.....N. TRIPUNCTATA (5) (D.		37	3	--		--	
....NEIDIUM							
.....N. AFFINE		12	<1	--		--	
CHLOROPHYTA (GREEN ALGAE)							
.CHLOROPHYCEAE							
..CHLOROCOCCALES							
...OOCYSTACEAE							
....ANKISTRODESMUS		--		74	5	37	2
....OOCYSTIS		12	<1	25	2	--	
...SCENEDESMACEAE							
....CRUCIGENIA		--		12	<1	74	4
....SCENEDESMUS		24	2	12	<1	37	2
..TETRASPORALES							
...PALMELLACEAE							
....SPHAEROCYSTIS		--		12	<1	--	
..VOLVOCALES							
...CHLAMYDOMONADACEAE							
....CHLAMYDOMONAS		12	<1	--		19	<1
..ZYGNEMATALES							
...DESMIDIACEAE							
....STAURASTRUM		--		12	<1	--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)							
.BACILLARIOPHYCEAE							
..CENTRALES							
...COSCINODISCACEAE							
....CYCLOTELLA		--		12	<1	--	
..PENNALES							
...ACHNANTHACEAE							
....RHOICOSPHENIA							
.....R. CURVATA		24	2	12	<1	37	2
...CYMBELLACEAE							
....CYMBELLA		12	<1	--		--	
...FRAGILARIACEAE							
....SYNEDRA		--		--		38	2
...GOMPHONEMATACEAE							
....GOMPHONEMA		12	<1	--		37	2
...NAVICULACEAE							
....NAVICULA		12	<1	--		37	2
...NITZSCHIACEAE							
....NITZSCHIA		12	<1	12	<1	37	2
.CHRYSOPHYCEAE							
..CHROMULINALES							
...CHROMULINACEAE							
....CHRYSOCOCCUS		--		--		19	<1
....KEPHYRION		--		37	3	--	
...OCHROMONADACEAE							
....OCHROMONAS		12	<1	--		--	
CYANOPHYTA (BLUE-GREEN ALGAE)							
.CYANOPHYCEAE							
..OSCILLATORIALES							
...NOSTOCACEAE							
....ANABAENA		--		--		19	<1
EUGLENOPHYTA (EUGLENOIDS)							
.CRYPTOPHYCEAE							
..CRYPTOMONIDALES							
...CRYPTOCHRYSIDACEAE							
....CHROOMONAS		--		86	6	130	7
....RHODOMONAS		& 230	16	160	11	130	7
...CRYPTOMONODACEAE							
....CRYPTOMONAS		--		& 200	14	110	6

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

	Date:	September 24, 1985		May 01, 1986		July 22, 1986	
	Time:	1630		1545		1500	
	Total Cells per mL:	1400		1400		2000	
Organism		Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
Site 2 --Continued							
BACILLARIOPHYTA (DIATOMS)							
.BACILLARIOPHYCEAE							
..ACHNANTHALES							
...ACHNANTHACEAE							
....ACHNANTHES							
.....A. CLEVEI		--		16	1	22	<1
.....A. LANCEOLATA		57	4	16	1	22	<1
.....A. MINUTISSIMA		--		64	4	--	
....COCCONEIS							
.....C. PEDICULUS		--		16	1	--	
.....C. PLACENTULA		57	4	32	2	66	3
..BACILLARIALES							
...NITZSCHIACEAE							
....NITZSCHIA							
.....N. ACICULARIS		14	<1	180	11	66	3
.....N. AMPHIBIA		--		--		22	<1
.....N. DISSIPATA		--		32	2	22	<1
.....N. FONTICOLA		--		16	1	--	
.....N. FRUSTULUM		14	<1	16	1	22	<1
.....N. LINEARIS		--		16	1	22	<1
.....N. PALEA		--		--		22	<1
..EUNOTIALES							
...EUNOTIACEAE							
....EUNOTIA							
.....E. ELEGANS		--		--		22	<1
..EUPODISCALES							
...COSCINODISCACEAE							
....CYCLOTELLA							
.....C. KUTZINGIANA		--		16	1	--	
.....C. MENEGHINIANA		--		32	2	22	<1
.....C. PSEUDOSTELLIGERA		260	17	--		200	9
....MELOSIRA							
.....M. AMBIGUA		43	3	--		--	
.....M. GRANULATA		14	<1	--		44	2
.....M. GRANULATA V. AUGUSTISS.		--		16	1	--	
....STEPHANODISCUS							
.....S. ASTREA V. MINUTULA		--		80	5	22	<1
.....S. HANTZSCHII		--		80	5	--	
..FRAGILARIALES							
...FRAGILARIACEAE							
....ASTERIONELLA							
.....A. FORMOSA		--		32	2	--	
....DIATOMA							
.....D. VULGARE		--		32	2	--	
....FRAGILARIA							
.....F. CONSTRUENS		14	<1	--		--	
.....F. CONSTRUENS V. VENTER		29	2	--		22	<1
.....F. PINNATA		14	<1	--		22	<1
....SYNEDRA							
.....S. RADIANS		--		& 210	13	--	
.....S. ULNA		14	<1	80	5	--	
..NAVICULALES							
...CYMBELLACEAE							
....AMPHORA							
.....A. COEFFEIFORMIS		14	<1	--		--	
.....A. OVALIS		--		--		22	<1
.....A. PERPUSILLA		14	<1	64	4	--	
....CYMBELLA							
.....C. TUMIDA		14	<1	--		--	
...GOMPHONEMACEAE							
....GOMPHONEMA							
.....G. ANGUSTATUM		--		16	1	44	2
.....G. OLIVACEUM		14	<1	64	4	--	
.....G. TENELLUM		--		--		22	<1

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Organism	Date: September 24, 1985 Cells per mL	Per-cent	Date: May 01, 1986 Cells per mL	Per-cent	Date: July 22, 1986 Cells per mL	Per-cent
	Time: 1630		Time: 1545		Time: 1500	
	Total Cells per mL: 1400		Total Cells per mL: 1400		Total Cells per mL: 2000	
Site 2 -- Continued						
BACILLARIOPHYTA (DIATOMS)						
.BACILLARIOPHYCEAE						
..NAVICULALES						
...NAVICULACEAE						
....NAVICULA						
.....N. CRYPTOCEPHALA	29	2	--		22	<1
.....N. CRYPTOCEPHALA V. VENETA	14	<1	96	6	22	<1
.....N. DECUSSIS (5) OSTR	29	2	--		--	
.....N. GREGARIA	14	<1	--		--	
.....N. MINIMA	--		16	1	--	
.....N. RHYNCHOCEPHALA	--		16	1	--	
.....N. TRIPUNCTATA (5) (D.	14	<1	16	1	22	<1
CHLOROPHYTA (GREEN ALGAE)						
.CHLOROPHYCEAE						
..CHLOROCOCCALES						
...HYDRODICTYACEAE						
....PEDIASTRUM	--		--		22	<1
...OOCYSTACEAE						
....ANKISTRODESMUS	71	5	16	1	88	4
....OOCYSTIS	14	<1	--		--	
....SELENASTRUM	29	2	--		66	3
....TETRAEDRON	--		--		22	<1
...SCENEDESMACEAE						
....CRUCIGENIA	43	3	--		22	<1
....SCENEDESMUS	14	<1	32	2	66	3
..VOLVOCALES						
...CHLAMYDOMONADACEAE						
....CHLAMYDOMONAS	--		--		66	3
..ZYGNEMATALES						
...DESMIDIACEAE						
....COSMARIUM	14	<1	--		--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)						
.BACILLARIOPHYCEAE						
..CENTRALES						
...COSCINODISCACEAE						
....CYCLOTELLA	--		16	1	--	
..PENNALES						
...ACHNANTHACEAE						
....RHOICOSPHENIA						
.....R. CURVATA	29	2	16	1	--	
...FRAGILARIACEAE						
....SYNEDRA	--		16	1	--	
...GOMPHONEMATACEAE						
....GOMPHONEMA	--		16	1	--	
...NAVICULACEAE						
....NAVICULA	28	2	--		--	
...NITZSCHIACEAE						
....NITZSCHIA	43	3	32	2	22	<1
.CHRYSOPHYCEAE						
..CHROMULINALES						
...CHROMULINACEAE						
....CHRYSOCOCCUS	--		32	2	--	
....KEPHYRION	42	3	48	3	--	
CYANOPHYTA (BLUE-GREEN ALGAE)						
.CYANOPHYCEAE						
..CHROOCOCCALES						
...CHROOCOCCACEAE	14	<1	--		--	
CYANOPHYTA (BLUE-GREEN ALGAE)						
.CYANOPHYCEAE						
..OSCILLATORIALES						
...NOSTOCACEAE						
....ANABAENA	--		--		22	<1
EUGLENOPHYTA (EUGLENOIDS)						
.CRYPTOPHYCEAE						
..CRYPTOMONIDALES						
...CRYPTOCHRYSIDACEAE						
....CHROOMONAS	--		--		160	7
....RHODOMONAS	& 330	22	96	6	420	18
...CRYPTOMONODACEAE						
....CRYPTOMONAS	100	7	32	2	& 490	21
.EUGLENOPHYCEAE						
..EUGLENALES						
...EUGLENACEAE						
....TRACHELOMONAS	--		--		22	<1

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	April 18, 1985		May 15, 1985		June 18, 1985		July 24, 1985		August 29, 1985	
Time:	1445		1610		1730		1740		1640	
Total Cells per mL:	3600		2900		2700		2000		2600	
Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
				Site 3						
BACILLARIOPHYTA (DIATOMS)										
.BACILLARIOPHYCEAE										
..ACHNANTHALES										
...ACHNANTHACEAE										
....ACHNANTHES										
.....A. CLEVEI	--		--		--		16	<1	--	
.....A. EXIGUA	29	<1	--		--		--		--	
.....A. LANCEOLATA	--		29	<1	--		--		21	<1
.....A. MINUTISSIMA	--		29	<1	--		--		--	
....COCCONEIS										
.....C. PEDICULUS	29	<1	29	<1	--		--		--	
.....C. PLACENTULA	29	<1	87	3	23	<1	--		21	<1
..BACILLARIALES										
...NITZSCHIACEAE										
....NITZSCHIA										
.....N. ACICULARIS	--		29	<1	140	5	16	<1	21	<1
.....N. AMPHIBIA	--		--		23	<1	--		--	
.....N. DISSIPATA	29	<1	120	4	23	<1	--		--	
.....N. FRUSTULUM	29	<1	29	<1	--		--		--	
.....N. PALEA	--		58	2	--		--		21	<1
..EUPODISCALES										
...COSCINODISCACEAE										
....CYCLOTELLA										
.....C. KUTZINGIANA	--		29	<1	370	14	130	7	--	
.....C. MENEGHINIANA	29	<1	180	6	69	3	33	2	86	3
.....C. PSEUDOSTELLIGERA	--		29	<1	92	3	280	14	130	5
....MELOSIRA										
.....M. AMBIGUA	290	8	200	7	140	5	49	2	--	
.....M. GRANULATA	230	6	180	6	120	4	99	5	--	
....STEPHANODISCUS										
.....S. ASTREA V. MINUTULA	86	2	29	<1	23	<1	--		--	
.....S. HANTZSCHII	430	12	& 350	12	& 410	15	33	2	43	2
.....S. SUBSALSUS	--		--		--		16	<1	--	
..FRAGILARIALES										
...FRAGILARIACEAE										
....DIATOMA										
.....D. VULGARE	57	2	29	<1	--		--		--	
....FRAGILARIA										
.....F. BREUISTRIATA	--		--		--		--		21	<1
.....F. CAPUCINA	--		29	<1	--		16	<1	--	
.....F. CONSTRUENS	29	<1	--		--		33	2	--	
.....F. CONSTRUENS V. VENTER	--		58	2	--		--		--	
.....F. PINNATA	--		58	2	--		--		--	
.....F. VAUCHERIAE	29	<1	--		--		16	<1	--	
....SYNEDRA										
.....S. DELICATISSIMA	--		--		23	<1	--		--	
.....S. PARASITICA	--		--		--		--		21	<1
.....S. RADIANS	& 770	21	58	2	69	3	--		--	
.....S. ULNA	29	<1	29	<1	23	<1	--		--	
..NAVICULALES										
...CYMBELLACEAE										
....AMPHORA										
.....A. OVALIS	29	<1	--		--		--		--	
.....A. PERPUSILLA	140	4	58	2	23	<1	--		21	<1
....CYMBELLA										
.....C. AFFINIS	--		--		23	<1	--		--	
.....C. SINUATA	--		29	<1	--		--		--	
...GOMPHONEMACEAE										
....GOMPHONEMA										
.....G. ANGUSTATUM	--		29	<1	23	<1	--		--	
.....G. OLIVACEUM	110	3	87	3	46	2	16	<1	43	2
...NAVICULACEAE										
....NAVICULA										
.....N. CAPITATA	--		--		--		16	<1	--	
.....N. CRYPTOCEPHALA	--		120	4	23	<1	16	<1	43	2
.....N. CRYPTOCEPHALA V. VENETA	29	<1	120	4	23	<1	--		--	
.....N. DECUSSIS	29	<1	--		23	<1	16	<1	43	2
.....N. GREGARIA	--		--		--		--		21	<1
.....N. LANCEOLATA	29	<1	--		--		--		--	
.....N. MENISCULUS V. UPSALIEN.	--		--		23	<1	--		--	

Table 4.—Phytoplankton data for Orwell Reservoir--Continued

Date:	April 18, 1985	May 15, 1985	June 18, 1985	July 24, 1985	August 29, 1985
Time:	1445	1610	1730	1740	1640
Total Cells per mL:	3600	2900	2700	2000	2600

Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
			Site 3 -- Continued							
BACILLARIOPHYTA (DIATOMS)										
.BACILLARIOPHYCEAE										
..NAVICULALES										
...NAVICULACEAE										
....NAVICULA										
.....N. MINIMA	--		29	<1	--		--		--	
.....N. PUPULA	--		--		--		16	<1	--	
.....N. RHYNCHOCEPHALA	--		58	2	--		--		--	
.....N. SEMINULUM	--		29	<1	--		--		--	
.....N. TRIPUNCTATA (5) (D.	--		29	<1	46	2	--		--	
CHLOROPHYTA (GREEN ALGAE)										
.CHLOROPHYCEAE										
..CHLOROCOCCALES										
...HYDRODICTYACEAE										
....PEDIASTRUM	--		--		23	<1	--		--	
...OOCYSTACEAE										
....ANKISTRODESMUS	--		29	<1	120	4	130	7	43	2
....CHODATELLA	--		--		23	<1	--		--	
....SELENASTRUM	--		--		--		16	<1	--	
...SCENEDESMACEAE										
....ACTINASTRUM	--		--		23	<1	--		--	
....CRUCIGENIA	--		--		--		--		21	<1
....SCENEDESMUS	--		29	<1	92	3	81	4	63	3
..TETRASPORALES										
...PALMELLACEAE										
....GLOEOCYSTIS	--		29	<1	--		--		--	
..VOLVOCALES										
...CHLAMYDOMONADACEAE										
....CHLAMYDOMONAS	--		29	<1	--		16	<1	--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)										
.BACILLARIOPHYCEAE										
..CENTRALES										
...COSCINODISCACEAE										
....CYCLOTELLA	57	2	120	4	--		--		--	
..PENNALES	29	<1	--		--		--		--	
...ACHNANTHACEAE										
....RHOICOSPHENIA										
.....R. CURVATA	29	<1	58	2	46	2	16	<1	43	2
...NAVICULACEAE										
....NAVICULA	29	<1	29	<1	23	<1	16	<1	--	
...NITZSCHIACEAE										
....NITZSCHIA	--		58	2	69	3	--		21	<1
.CHRYSOPHYCEAE										
..CHROMULINALES										
...CHROMULINACEAE										
....CHRYSOCOCCUS	170	5	29	<1	--		--		--	
....KEPHYRION	710	19	29	<1	23	<1	33	2	21	<1
...OCHROMONADACEAE										
....OCHROMONAS	--		--		--		16	<1	--	
CYANOPHYTA (BLUE-GREEN ALGAE)										
.CYANOPHYCEAE										
..OSCILLATORIALES										
...NOSTOCACEAE										
....ANABAENA	--		--		--		& 380	19	--	
...OSCILLATORIACEAE										
....OSCILLATORIA	--		--		--		--		21	<1
EUGLENOPHYTA (EUGLENOIDS)										
.CRYPTOPHYCEAE										
..CRYPTOMONIDALES										
...CRYPTOCHRYSIDACEAE										
....CHROOMONAS	--		87	3	--		130	7	220	9
....RHODOMONAS	110	3	150	5	370	14	130	7	& 1,100	44
...CRYPTOMONODACEAE										
....CRYPTOMONAS	--		29	<1	69	3	66	3	260	10
.EUGLENOPHYCEAE										
..EUGLENALES										
...EUGLENACEAE										
....EUGLENA	--		--		--		16	<1	21	<1
....TRACHELOMONAS	29	<1	--		--		49	2	43	2
PYRRHOPHYTA (FIRE ALGAE)										
.DINOPHYCEAE										
..DINOKONTAE										
...CERATIACEAE										
....CERATIUM	--		--		--		33	2	110	4
...PERIDINIACEAE										
....PERIDINIUM	--		--		--		16	<1	--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	September 24, 1985		February 26, 1986		May 01, 1986		July 22, 1986	
Time:	1730		1500		1602		1436	
Total Cells per mL:	4100		230		1700		9300	
Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
			Site 3 -- Continued					
BACILLARIOPHYTA (DIATOMS)								
.BACILLARIOPHYCEAE								
..ACHNANTHALES								
...ACHNANTHACEAE								
....ACHNANTHES								
.....A. CLEVEI	--		3	1	14	<1	--	
.....A. HUNGARICA	38	<1	--		--		--	
.....A. LANCEOLATA	--		5	2	14	<1	71	<1
.....A. MINUTISSIMA	--		16	6	--		--	
....COCCONEIS								
.....C. DISCULUS	--		3	1	--		--	
.....C. PEDICULUS	--		3	1	14	<1	--	
.....C. PLACENTULA	--		13	5	14	<1	--	
..BACILLARIALES								
...NITZSCHIACEAE								
....NITZSCHIA								
.....N. ACICULARIS	--		3	1	120	7	71	<1
.....N. DISSIPATA	38	<1	16	6	--		--	
.....N. FRUSTULUM	--		3	1	--		--	
.....N. LINEARIS	38	<1	3	1	--		--	
.....N. PALEA	77	2	5	2	--		--	
..EPITHEMIALES								
...EPITHEMIACEAE								
....EPITHEMIA								
.....E. HYNDMANII	--		--		14	<1	--	
.....E. SOREX	--		5	2	--		--	
..EUPODISCALES								
...COSCINODISCACEAE								
....CYCLOTELLA								
.....C. KUTZINGIANA	--		--		--		140	2
.....C. MENEGHINIANA	77	2	3	1	14	<1	--	
.....C. PSEUDOSTELLIGERA	1,200	29	--		--		2,400	26
....MELOSIRA								
.....M. AMBIGUA	120	3	3	1	120	7	--	
.....M. GRANULATA	38	<1	--		27	2	--	
.....M. VARIANS	--		--		14	<1	--	
....STEPHANODISCUS								
.....S. ASTREA V. MINUTULA	310	8	--		300	18	1,100	12
.....S. HANTZSCHII	270	7	--		& 570	34	--	
..FRAGILARIALES								
...FRAGILARIACEAE								
....DIATOMA								
.....D. TENUE V. ELONGATUM	--		3	1	--		--	
.....D. VULGARE	--		8	3	14	<1	--	
....FRAGILARIA								
.....F. CONSTRUENS	--		5	2	--		--	
.....F. CONSTRUENS V. VENTER	--		3	1	14	<1	--	
.....F. PINNATA	--		3	1	--		--	
.....F. VAUCHERIAE	--		3	1	14	<1	--	
....SYNEDRA								
.....S. PARASITICA	38	<1	3	1	--		--	
.....S. RADIANS	--		3	1	--		--	
.....S. RUMPENS	--		5	2	--		--	
.....S. ULNA	--		8	3	41	2	--	
..NAVICULALES								
...CYMBELLACEAE								
....AMPHORA								
.....A. PERPUSILLA	--		13	5	27	2	71	<1
....CYMBELLA								
.....C. MINUTA	--		3	1	27	2	--	
...GOMPHONEMACEAE								
....GOMPHONEMA								
.....G. OLIVACEUM	--		& 27	11	27	2	71	<1
.....G. TENELLUM	--		3	1	--		--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	September 24, 1985		February 26, 1986		May 01, 1986		July 22, 1986	
Time:	1730		1500		1602		1436	
Total Cells per mL:	4100		230		1700		9300	
Organism	Cells per mL	Percent	Cells per mL	Percent	Cells per mL	Percent	Cells per mL	Percent
			Site 3 -- Continued					
BACILLARIOPHYTA (DIATOMS)								
.BACILLARIOPHYCEAE								
..NAVICULALES								
...NAVICULACEAE								
....NAVICULA								
.....N. COCCONEIFORMIS	--		3	1	--		--	
.....N. CRYPTOCEPHALA	77	2	5	2	--		--	
.....N. CRYPTOCEPHALA V. VENETA	--		19	8	14	<1	71	<1
.....N. DECUSSIS (5) OSTR	--		--		14	<1	--	
.....N. RHYNCHOCEPHALA	--		3	1	--		--	
.....N. TRIPUNCTATA	--		3	1	--		--	
CHLOROPHYTA (GREEN ALGAE)								
.CHLOROPHYCEAE								
..CHLOROCOCCALES								
...OOCYSTACEAE								
....ANKISTRODESMUS	150	4	--		41	2	140	2
....SELENASTRUM	--		--		--		71	<1
...SCENEDESMACEAE								
....SCENEDESMUS	38	<1	--		27	2	71	<1
..TETRASPORALES								
...PALMELLACEAE								
....SPHAEROCYSTIS	--		--		--		71	<1
..VOLVOCALES								
...CHLAMYDOMONADACEAE								
....CHLAMYDOMONAS	--		--		--		430	5
CHRYSOPHYTA (YELLOW-GREEN ALGAE)								
.BACILLARIOPHYCEAE								
..CENTRALES								
...COSCINODISCACEAE								
....CYCLOTELLA	--		--		27	2	--	
..PENNALES	--		3	1	--		--	
...ACHNANTHACEAE								
....RHOICOSPHENIA								
.....R. CURVATA	--		3	1	55	3	--	
...NAVICULACEAE								
....NAVICULA	76	2	6	3	--		--	
...NITZSCHIACEAE								
....NITZSCHIA	--		8	3	--		--	
.CHRYSOPHYCEAE								
..CHROMULINALES								
...CHROMULINACEAE								
....CHRYSOCOCCUS	--		--		68	4	--	
....KEPHYRION	--		5	2	--		--	
CYANOPHYTA (BLUE-GREEN ALGAE)								
.CYANOPHYCEAE								
..OSCILLATORIALES								
...NOSTOCACEAE								
....ANABAENA	--		--		--		140	2
....APHANIZOMENON	--		3	1	--		--	
EUGLENOPHYTA (EUGLENOIDS)								
.CRYPTOPHYCEAE								
..CRYPTOMONIDALES								
...CRYPTOCHRYSIDACEAE								
....RHODOMONAS	& 1,300	32	--		14	<1	& 3,000	32
...CRYPTOMONODACEAE								
....CRYPTOMONAS	190	5	--		--		1,400	15
.EUGLENOPHYCEAE								
..EUGLENALES								
...EUGLENACEAE								
....TRACHELOMONAS	--		--		55	3	--	
PYRRHOPHYTA (FIRE ALGAE)								
.DINOPHYCEAE								
..DINOKONTAE								
...PERIDINIACEAE								
....PERIDINIUM	38	<1	--		--		--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	P c
Date:	April 18, 1985		May 15, 1985		June 18, 1985		July 24, 1985		A	
Time:	1400		1635		1800		1815			
Total Cells/mL:	3400		3400		3000		3200			
	Site 4									
BACILLARIOPHYTA (DIATOMS)										
.BACILLARIOPHYCEAE										
..ACHNANTHALES										
...ACHNANTHACEAE										
....ACHNANTHES										
.....A. LANCEOLATA	--		32	<1	--		--		--	
.....A. LINEARIS	--		--		--		19	<1	--	
.....A. MINUTISSIMA	--		32	<1	--		--		--	
....COCCONEIS										
.....C. PEDICULUS	--		--		26	<1	--		--	
.....C. PLACENTULA	29	<1	96	3	26	<1	--		19	
..BACILLARIALES										
...NITZSCHIACEAE										
....NITZSCHIA										
.....N. ACICULARIS	--		--		--		--		39	
.....N. AMPHIBIA	--		--		26	<1	38	2	--	
.....N. COMMUNIS	--		32	<1	--		--		--	
.....N. DISSIPATA	29	<1	64	2	--		--		--	
.....N. FRUSTULUM	--		32	<1	--		--		--	
.....N. LINEARIS	29	<1	--		--		--		19	
.....N. PALEA	--		130	4	--		--		39	
..EUPODISCALES										
...COSCINODISCACEAE										
....CYCLOTELLA										
.....C. GLOMERATA	--		96	3	--		--		--	
.....C. KUTZINGIANA	--		130	4	280	9	77	3	--	
.....C. MENEGHINIANA	--		& 390	11	--		19	<1	77	
.....C. OCELLATA	29	<1	--		--		--		--	
.....C. PSEUDOSTELLIGERA	--		--		51	2	150	7	230	
....MELOSIRA										
.....M. AMBIGUA	200	6	190	6	180	6	19	<1	39	
.....M. GRANULATA	200	6	130	4	210	7	--		39	
.....M. VARIANS	29	<1	--		--		--		--	
....STEPHANODISCUS										
.....S. ASTREA V. MINUTULA	--		96	3	--		--		58	
.....S. HANTZSCHII	290	9	350	10	& 670	22	19	<1	120	
..FRAGILARIALES										
...FRAGILARIACEAE										
....ASTERIONELLA										
.....A. FORMOSA	29	<1	32	<1	--		--		--	
....DIATOMA										
.....D. VULGARE	29	<1	64	2	--		--		--	
....FRAGILARIA										
.....F. CONSTRUENS V. VENTER	--		32	<1	--		--		--	
.....F. VAUCHERIAE	--		32	<1	--		--		--	
....SYNEDRA										
.....S. DELICATISSIMA	--		32	<1	--		--		--	
.....S. RADIANS	& 800	24	64	2	26	<1	--		--	
.....S. ULNA	57	2	--		--		--		--	
..NAVICULALES										
...CYMBELLACEAE										
....AMPHORA										
.....A. OVALIS	29	<1	--		--		--		--	
.....A. PERPUSILLA	--		96	3	26	<1	--		19	
....CYMBELLA										
.....C. MINUTA	--		32	<1	--		--		--	
...GOMPHONEMACEAE										
....GOMPHONEMA										
.....G. ANGUSTATUM	--		64	2	--		--		--	
.....G. OLIVACEUM	57	2	--		--		19	<1	--	
...NAVICULACEAE										
....DIPLONEIS										
.....D. OCULATA	--		32	<1	--		--		--	
....NAVICULA										
.....N. CAPITATA (5) EHR.-1	--		32	<1	--		--		--	
.....N. CRYPTOCEPHALA	--		96	3	--		--		19	
.....N. CRYPTOCEPHALA V. VENETA	29	<1	64	2	--		--		--	
.....N. DECUSSIS (5) OSTR	--		--		--		--		19	
.....N. GREGARIA	--		32	<1	--		--		--	
.....N. MINIMA	--		32	<1	--		--		19	
.....N. MUTICA	29	<1	--		--		--		--	
.....N. PUPULA	--		32	<1	26	<1	--		--	
.....N. RHYNCHOCEPHALA	29	<1	--		--		--		--	
.....N. TRIPUNCTATA (5) (D.	29	<1	32	<1	26	<1	--		--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	April 18, 1985		May 15, 1985		June 18, 1985		July 24, 1985		Aug 1	
Time:	1515		1540		1700		1620		1	
Total Cells/mL:	2800		2600		1300		1400		1	
Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	P
				Site 4 -- Continued						
BACILLARIOPHYTA (DIATOMS)										
.BACILLARIOPHYCEAE										
..NAVICULALES										
...NAVICULACEAE										
....NEIDIUM										
.....N.AFFINE	--		--		--		--		19	
CHLOROPHYTA (GREEN ALGAE)										
.CHLOROPHYCEAE										
..CHLOROCOCCALES										
...OOCYSTACEAE										
....ANKISTRODESMUS	--		--		100	3	120	5	58	
....OOCYSTIS	--		32	<1	--		--		--	
....SELENASTRUM	--		--		26	<1	--		--	
....TETRAEDRON	--		--		26	<1	--		--	
...SCENEDESMACEAE										
....CRUCIGENIA	--		--		--		19	<1	19	
....SCENEDESMUS	--		130	4	150	5	38	2	--	
..TETRASPORALES										
...COCCOMYXACEAE										
....ELAKATOTHRIX	29	<1	--		--		--		--	
...PALMELLACEAE										
....GLOEOCYSTIS	--		32	<1	--		--		--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)										
.BACILLARIOPHYCEAE										
..CENTRALES										
...COSCINODISCACEAE										
....CYCLOTELLA	--		96	3	--		--		--	
..PENNALES										
...ACHNANTHACEAE										
....RHOICOSPHENIA										
.....R.CURVATA	--		32	<1	--		--		19	
...FRAGILARIACEAE										
....SYNEDRA	--		--		--		--		19	
...NAVICULACEAE										
....NAVICULA	29	<1	32	<1	26	<1	--		38	
...NITZSCHIACEAE										
....NITZSCHIA	--		32	<1	--		19	<1	--	
.CHRYSOPHYCEAE										
..CHROMULINALES										
...CHROMULINACEAE										
....CHRYSOCOCCUS	290	9	--		--		--		--	
....KEPHYRION	710	21	64	2	26	<1	19	<1	38	
...OCHROMONADACEAE										
....DINOBRYON	--		--		--		--		19	
....OCHROMONAS	--		--		26	<1	--		--	
CYANOPHYTA (BLUE-GREEN ALGAE)										
.CYANOPHYCEAE										
..OSCILLATORIALES										
...NOSTOCACEAE										
....ANABAENA	--		--		--		& 1,200	55	--	
EUGLENOPHYTA (EUGLENOIDS)										
.CRYPTOPHYCEAE										
..CRYPTOMONIDALES										
...CRYPTOCHRYSIDACEAE										
....CHROOMONAS	--		64	2	130	4	38	2	130	
....RHODOMONAS	290	9	160	5	620	21	210	10	& 680	
...CRYPTOMONODACEAE										
....CRYPTOMONAS	86	3	96	3	330	11	19	<1	250	
.EUGLENOPHYCEAE										
..EUGLENALES										
...EUGLENACEAE										
....TRACHELOMONAS	57	2	--		--		38	2	--	
PYRRHOPHYTA (FIRE ALGAE)										
.DINOPHYCEAE	--		--		--		--		19	
..DINOKONTAE										
...CERATIACEAE										
....CERATIUM	--		--		--		77	3	77	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL
Date:	September 24, 1985		February 26, 1986		May 01, 1986		Jul 1
Time:	1750		1600		1520		1
Total Cells/mL:	5000		140		2300		4
			Site 4 -- Continued				
BACILLARIOPHYTA (DIATOMS)							
.BACILLARIOPHYCEAE							
..ACHNANTHALES							
...ACHNANTHACEAE							
....ACHNANTHES							
.....A.CLEVEI	--		2	2	21	<1	--
.....A.HAUCKIANA	--		2	2	--		--
.....A.LANCEOLATA	87	2	7	5	--		--
.....A.LINEARIS	44	<1	2	2	--		--
.....A.MINUTISSIMA	--		--		21	<1	--
....COCCONEIS							
.....C.PLACENTULA	--		& 22	14	--		--
..BACILLARIALES							
...NITZSCHIACEAE							
....NITZSCHIA							
.....N.ACICULARIS	130	3	--		230	10	--
.....N.AMPHIBIA	--		2	2	41	2	--
.....N.DISSIPATA	--		5	3	--		--
.....N.FRUSTULUM	44	<1	2	2	--		--
.....N.LINEARIS	44	<1	2	2	--		66
.....N.PALEA	--		--		--		200
..EUPODISCALES							
...COSCINODISCACEAE							
....CYCLOTELLA							
.....C.COMTA	--		--		--		66
.....C.KUTZINGIANA	--		--		--		66
.....C.MENEGHINIANA	310	6	5	3	21	<1	330
.....C.PSEUDOSTELLIGERA	& 1,500	30	--		--		& 2,900
....MELOSIRA							
.....M.AMBIGUA	--		--		83	4	--
.....M.GRANULATA	44	<1	--		21	<1	--
.....M.GRANULATA V.AUGUSTISS.	--		--		21	<1	--
.....M.VARIANS	--		2	2	--		--
....STEPHANODISCUS							
.....S.ASTREA V.MINUTULA	440	9	--		150	7	1,900
.....S.HANTZSCHII	220	4	--		& 1,100	48	270
..FRAGILARIALES							
...FRAGILARIACEAE							
....DIATOMA							
.....D.TENUE V. ELONGATUM	--		--		21	<1	--
.....D.VULGARE	--		5	3	83	4	--
....FRAGILARIA							
.....F.CONSTRUENS V.VENTER	--		2	2	--		--
.....F.PINNATA	44	<1	--		--		--
.....F.VAUCHERIAE	87	2	--		--		--
....SYNEDRA							
.....S.PARASITICA	--		3	2	--		--
.....S.RUMPENS	44	<1	--		--		--
.....S.ULNA	--		10	6	--		--
..NAVICULALES							
...CYMBELLACEAE							
....AMPHORA							
.....A.PERPUSILLA	44	<1	5	3	21	<1	--
...GOMPHONEMACEAE							
....GOMPHONEMA							
.....G.OLIVACEUM	--		13	8	21	<1	--
...NAVICULACEAE							
....NAVICULA							
.....N.CRYPTOCEPHALA	--		5	3	--		--
.....N.CRYPTOCEPHALA V.VENETA	--		8	5	21	<1	--
.....N.DECUSSIS (5) OSTR	--		2	2	--		--
.....N.GREGARIA	--		3	2	--		--
.....N.MENISCULUS V.UPSALIEN.	--		2	2	--		--
.....N.MINIMA	--		2	2	--		--
.....N.PUPULA	--		3		--		--
.....N.REINHARDTII (5) (GRU	--		--		21	<1	--
.....N.TRIPUNCTATA (5) (D.	--		3	2	--		--
.....N.VIRIDULA	--		2	2	--		--

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

Date:	September 24, 1985		February 26, 1986		May 01, 1986		Jul 1
Time:	1750		1600		1520		1
Total Cells/mL:	5000		140		2300		8
Organism	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL
			Site 4 -- Continued				
CHLOROPHYTA (GREEN ALGAE)							
.CHLOROPHYCEAE							
..CHLOROCOCCALES							
...OOCYSTACEAE							
....ANKISTRODESMUS	130	3	--		21	<1	130
....CHODATELLA	44	<1	--		--		--
....OOCYSTIS	--		--		--		66
....TETRAEDRON	--		2	2	--		200
...SCENEDESMACEAE							
....CRUCIGENIA	44	<1	--		--		66
....SCENEDESMUS	87	2	2	2	42	2	200
..ULOTRICHALES							
...ULOTRICHACEAE							
....ULOTHRIX	--		--		--		66
..VOLVOCALES							
...CHLAMYDOMONADACEAE							
....CHLAMYDOMONAS	44	<1	--		--		130
CHRYSOPHYTA (YELLOW-GREEN ALGAE)							
.BACILLARIOPHYCEAE							
..CENTRALES							
...COSCINODISCACEAE							
....CYCLOTELLA	--		--		21	<1	--
..PENNALES	--		2	2	--		--
...ACHNANTHACEAE							
....RHOICOSPHENIA							
.....R. CURVATA	--		2	2	--		--
...GOMPHONEMATACEAE							
....GOMPHONEMA	--		--		21	<1	--
...NAVICULACEAE							
....NAVICULA	44	<1	5	3	--		66
...NITZSCHIACEAE							
....NITZSCHIA	88	2	2	2	--		66
.CHRYSOPHYCEAE							
..CHROMULINALES							
...CHROMULINACEAE							
....CHRYSOCOCCUS	--		--		210	9	--
....KEPHYRION	44	<1	--		21	<1	--
CYANOPHYTA (BLUE-GREEN ALGAE)							
.CYANOPHYCEAE							
..OSCILLATORIALES							
...NOSTOCACEAE							
....ANABAENA	--		--		--		270
....APHANIZOMENON	--		3	2	--		--
...OSCILLATORIACEAE							
....OSCILLATORIA	--		2	2	--		--
EUGLENOPHYTA (EUGLENOIDS)							
.CRYPTOPHYCEAE							
..CRYPTOMONIDALES							
...CRYPTOCHRYSIDACEAE							
....RHODOMONAS	960	19	--		62	3	1,400
...CRYPTOMONODACEAE							
....CRYPTOMONAS	440	9	2	2	21	<1	130
.EUGLENOPHYCEAE							
..EUGLENALES							
...EUGLENACEAE							
....TRACHELOMONAS	--		--		21	<1	66
PYRRHOPHYTA (FIRE ALGAE)							
.DINOPHYCEAE							
..PERIDINIALES							
...CERATIACEAE							
....CERATIUM	--		--		--		130

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

	Date:	June 19, 1985		July 24, 1985		August 29, 1985	
	Time:	0827		1650		1600	
	Total Cells/mL:	1500		5000		7000	
Organism		Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
	Site 5						
BACILLARIOPHYTA (DIATOMS)							
.BACILLARIOPHYCEAE							
..BACILLARIALES							
...NITZSCHIACEAE							
....NITZSCHIA							
.....N.AMPHIBIA		42	3	--		180	3
.....N.LINEARIS		14	<1	--		--	
.....N.PALEA		--		--		60	<1
..EUPODISCALES							
...COSCINODISCACEAE							
....CYCLOTELLA							
.....C.KUTZINGIANA		--		& 950	19	120	2
.....C.MENEGHINIANA		14	<1	370	7	840	12
.....C.PSEUDOSTELLIGERA		--		120	2	180	3
....MELOSIRA							
.....M.GRANULATA		190	13	--		--	
....STEPHANODISCUS							
.....S.ASTREA V.MINUTULA		--		120	2	1,300	19
.....S.HANTZSCHII		130	9	250	5	360	5
..FRAGILARIALES							
...FRAGILARIACEAE							
....DIATOMA							
.....D.TENUE V. ELONGATUM		14	<1	--		--	
....FRAGILARIA							
.....F.CAPUCINA		28	2	--		--	
..NAVICULALES							
...NAVICULACEAE							
....NAVICULA							
.....N.CRYPTOCEPHALA		--		--		60	<1
..SURIRELLALES							
...SURIRELLALCEAE							
....SURIRELLA							
.....S.ANGUSTA		--		--		60	<1
CHLOROPHYTA (GREEN ALGAE)							
.CHLOROPHYCEAE							
..CHLOROCOCCALES							
...OOCYSTACEAE							
....ANKISTRODESMUS		150	10	460	9	120	2
....CHODATELLA		--		170	3	--	
....SELENASTRUM		150	10	210	4	60	<1
...SCENEDESMACEAE							
....ACTINASTRUM		--		41	<1	--	
....CRUCIGENIA		69	5	--		--	
....SCENEDESMUS		& 290	19	540	11	360	5
....TETRASTRUM		--		--		60	<1
..TETRASPORALES							
...PALMELLACEAE							
....SPHAEROCYSTIS		69	5	--		--	
..VOLVOCALES							
...CHLAMYDOMONADACEAE							
....CHLAMYDOMONAS		--		250	5	--	
..ZYGNEMATALES							
...DESMIDIACEAE							
....STAURASTRUM		28	2	--		--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)							
.BACILLARIOPHYCEAE							
..PENNALES							
...NAVICULACEAE							
....NAVICULA		14	<1	--		60	<1
....PINNULARIA		14	<1	--		--	
...NITZSCHIACEAE							
....NITZSCHIA		--		41	<1	240	3
.CHRYSOPHYCEAE							
..CHROMULINALES							
...CHROMULINACEAE							
....KEPHYRION		42	3	--		--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

	Date:	June 19, 1985		July 24, 1985		August 29, 1985	
	Time:	0827		1650		1600	
	Total Cells/mL:	1500		5000		7000	
Organism		Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
Site 5 -- Continued							
CYANOPHYTA (BLUE-GREEN ALGAE)							
.CYANOPHYCEAE							
..OSCILLATORIALES							
...NOSTOCACEAE							
....ANABAENA		55	4	83	2	120	2
....APHANIZOMENON		--		41	<1	--	
EUGLENOPHYTA (EUGLENOIDS)							
.CRYPTOPHYCEAE							
..CRYPTOMONIDALES							
...CRYPTOCHRYSIDACEAE							
....CHROOMONAS		14	<1	370	7	120	2
....RHODOMONAS		97	6	--		120	2
...CRYPTOMONODACEAE							
....CRYPTOMONAS		42	3	170	3	--	
.EUGLENOPHYCEAE							
..EUGLENALES							
...EUGLENACEAE							
....EUGLENA						60	<1
....PHACUS						360	5
....TRACHELOMONAS		28	2	120	2	120	2
PYRRHOPHYTA (FIRE ALGAE)							
.DINOPHYCEAE							
..DINOKONTAE							
...CERATIACEAE							
....CERATIUM		--		620	12	& 2,000	29
...PERIDINIACEAE							
....PERIDINIUM		--		41	<1	--	

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

	Date:	September 24, 1985		May 01, 1986		July 22, 1986	
	Time:	1705		1414		1348	
	Total Cells/mL:	7300		3000		1700	
Organism		Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
	Site 5 -- Continued						
BACILLARIOPHYTA (DIATOMS)							
.BACILLARIOPHYCEAE							
..BACILLARIALES							
...NITZSCHIACEAE							
....NITZSCHIA							
.....N.ACICULARIS		--		49	2	--	
.....N.AMPHIBIA		67	<1	25	<1	15	<1
.....N.FRUSTULUM		--		25	<1	--	
.....N.PALEA		330	5	--		--	
..EUPODISCALES							
...COSCINODISCACEAE							
....CYCLOTELLA							
.....C.KUTZINGIANA		--		--		15	<1
.....C.MENEGHINIANA		670	9	49	2	250	15
.....C.PSEUDOSTELLIGERA		670	9	--		30	2
....MELOSIRA							
.....M.AMBIGUA		--		--		15	<1
.....M.GRANULATA		--		49	2	--	
....STEPHANODISCUS							
.....S.ASTREA V.MINUTULA		& 1,500	21	& 1,100	37	& 930	55
.....S.HANTZSCHII		270	4	890	30	130	8
..FRAGILARIALES							
...FRAGILARIACEAE							
....DIATOMA							
.....D.TENUE V. ELONGATUM		--		49	2	--	
....FRAGILARIA							
.....F.CAPUCINA V.MESOLEPTA.		--		--		30	2
.....F.VAUCHERIAE		67	<1	--		--	
....SYNEDRA							
.....S.ULNA		--		74	2	30	2
..NAVICULALES							
...CYMBELLACEAE							
....AMPHORA							
.....A.OVALIS		--		25	<1	--	
...NAVICULACEAE							
....NAVICULA							
.....N.CRYPTOCEPHALA		67	<1	--		--	
.....N.CRYPTOCEPHALA V.VENETA		--		--		15	<1
CHLOROPHYTA (GREEN ALGAE)							
.CHLOROPHYCEAE							
..CHLOROCOCCALES							
...MICRACTINIACEAE							
....MICRACTINIUM		--		--		15	<1
...OOCYSTACEAE							
....ANKISTRODESMUS		1,000	14	320	11	15	<1
....CHODATELLA		--		25	<1	15	<1
....OOCYSTIS		--		--		15	<1
....SELENASTRUM		67	<1	--		--	
...SCENEDESMACEAE							
....CRUCIGENIA		130	2	--		--	
....SCENEDESMUS		540	7	220	7	89	5
..VOLVOCALES							
...CHLAMYDOMONADACEAE							
....CHLAMYDOMONAS		67	<1	--		--	
CHRYSOPHYTA (YELLOW-GREEN ALGAE)							
.BACILLARIOPHYCEAE							
..CENTRALES							
...COSCINODISCACEAE							
....COSCINODISCUS		130	2	--		--	
..PENNALES							
...ACHNANTHACEAE							
....ACHNANTHES		--		--		15	<1
...NAVICULACEAE							
....NAVICULA		--		--		30	2

Table 4.--Phytoplankton data for Orwell Reservoir--Continued

	Date:	September 24, 1985		May 01, 1986		July 22, 1986	
	Time:	1705		1414		1348	
	Total Cells/mL:	7300		3000		1700	
Organism		Cells per mL	Per-cent	Cells per mL	Per-cent	Cells per mL	Per-cent
	Site 5--Continued						
CHRYSOPHYTA (YELLOW-GREEN ALGAE)							
.CHRYSOPHYCEAE							
..CHROMULINALES							
...CHROMULINACEAE							
....CHRYSOCOCCUS		--		25	<1	--	
....KEPHYRION		67	<1	--		--	
CYANOPHYTA (BLUE-GREEN ALGAE)							
.CYANOPHYCEAE							
..OSCILLATORIALES							
...OSCILLATORIACEAE							
....OSCILLATORIA		--		25	<1	--	
EUGLENOPHYTA (EUGLENOIDS)							
.CRYPTOPHYCEAE							
..CRYPTOMONIDALES							
...CRYPTOCHRYSIDACEAE							
....RHODOMONAS		130	2	--		--	
...CRYPTOMONODACEAE							
....CRYPTOMONAS		270	4	--		--	
.EUGLENOPHYCEAE							
..EUGLENALES							
...EUGLENACEAE							
....EUGLENA		67	<1	--		--	
....TRACHELOMONAS		67	<1	25	<1	15	<1
PYRRHOPHYTA (FIRE ALGAE)							
.DINOPHYCEAE							
..DINOKONTAE							
...CERATIACEAE							
....CERATIUM		1,100	15	--		--	

Table 5.--Water-quality data for the inflow site to Orwell Reservoir

[ft^3/s, cubic feet per second; µS/cm. microseimens per centimeter; mg/L, milligrams per liter; --, no data]

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Spe-cific con-duct-ance (µS/cm)	pH (stand-ard units)	Temper-ature (degrees celsius)	Oxygen, dis-solved (mg/L)	Oxygen, dis-solved (percent satur-ation)	Dissolved Nitrogen			Phosphorus	
								Nitrite plus nitrate (mg/L as N)	Ammonia (mg/L as N)	Ammonia plus organic (mg/L as N)	Total (mg/L as P)	Dis-solved ortho (mg/L as P)
					1985							
April												
18...	16:00	--	388	8.4	11.0	10.0	93	<0.10	0.05	0.6	0.03	0.02
May												
01...	13:00	--	--	--	--	--	--	--	--	--	.02	--
16...	09:25	--	390	8.0	15.0	8.7	88	.14	.14	3.6	.03	.03
20...	13:00	--	--	--	--	--	--	--	--	--	.04	--
21...	13:00	--	--	--	--	--	--	--	--	--	.04	--
22...	14:30	--	--	--	--	--	--	--	--	--	.05	--
June												
05...	14:30	--	--	--	--	--	--	--	--	--	.04	--
18...	16:00	1,190	373	8.2	19.0	10.1	110	< .10	.03	.6	.06	.03
July												
05...	13:00	--	--	--	--	--	--	--	--	--	.05	--
19...	13:00	--	--	--	--	--	--	--	--	--	.05	--
24...	15:10	1,130	355	8.2	23.5	8.4	101	< .10	.05	.3	.04	.04
August												
08...	09:30	--	--	--	--	--	--	--	--	--	.08	--
29...	14:30	946	356	7.9	19.5	8.8	97	.11	< .01	.4	.07	< .01
September												
11...	10:00	--	--	--	--	--	--	--	--	--	.05	--
24...	15:45	874	354	8.2	13.5	10.3	100	< .10	.15	.5	.06	.03
					1986							
February												
26...	17:00	496	411	8.0	0.0	10.3	72	0.13	0.12	0.6	0.02	<0.01
April												
02...	13:15	959	414	7.9	4.5	11.8	92	.41	.12	.8	.05	.01
May												
02...	08:30	1280	382	8.2	9.5	10.5	91	< .10	.06	.5	.03	< .01

Table 6.--Water-quality data for the outflow site from Orwell Reservoir

[ft3/s, cubic feet per second; uS/cm, microseimens per centimeter; mg/L, milligrams per liter]

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Spe-cific con-duct-ance ($\mu S/cm$)	pH (stand-ard units)	Temper-ature (degree celsius)	Oxygen, dis-solved (mg/L)	Oxygen, dis-solved (per-cent satur-ation)	Calcium dis-solved (mg/L as Ca)	Magne-sium, dis-solved (mg/L as Mg)
Oct 1960									
12...	--	85	426	7.5	--	--	--	39	29
Mar 1961									
19...	--	233	466	7.5	--	--	--	43	31
May									
14...	--	307	455	7.7	--	--	--	43	30
Apr 1962									
10...	--	--	405	7.2	--	--	--	35	28
Mar 1963									
14...	--	--	505	8.1	--	--	--	47	35
Aug 1965									
21...	--	382	387	7.4	18.5	--	--	34	26
Oct									
29...	--	527	398	8.2	10.5	--	--	34	28
June 1966									
21...	--	1,040	389	7.6	--	--	--	35	27
Apr 1985									
18...	09:15	--	400	8.2	10.0	12.2	110	37	27
May									
16...	08:00	--	395	8.1	15.0	9.5	96	39	27
June									
19...	07:50	--	383	8.2	18.5	11.0	119	--	--
July									
25...	07:45	--	368	8.2	23.5	8.8	105	35	25
Aug									
30...	07:30	--	370	8.1	19.5	9.3	102	34	26
Sep									
25...	09:35	--	367	8.2	13.5	10.7	104	--	--
Feb 1986									
26...	16:35	--	424	7.9	0.0	12.2	85	45	31
Apr									
02...	14:15	--	418	7.9	4.0	13.8	106	42	27
May									
01...	16:00	--	399	8.3	9.5	11.5	--	39	26

Table 6.--Water-quality data for the outflow site from Orwell Reservoir--Continued

Date	Sodium, dissolved (mg/L as Na)	Potassium, dissolved (mg/L as K)	Alkalinity (mg/L as $CaCO_3$)	Sulfate dissolved (mg/L as SO_4)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)	Solids, residue at 180°C dissolved (mg/L)	Solids, dissolved (tons per day)	Nitrite plus nitrate dissolved (mg/L as N)
Oct 1960										
12...	8.2	4.2	--	20	3.7	0.2	9.8	248	57	--
Mar 1961										
19...	8.6	4.6	--	19	4.4	.2	16	275	173	--
May										
14...	7.9	4.1	--	32	2.7	.3	10	267	221	--
Apr 1962										
10...	7.2	4.5	--	27	3.3	.2	15	246	287	--
Mar 1963										
14...	9.6	4.2	--	23	4.3	.3	17	299	185	--
Aug 1965										
21...	6.9	3.3	191	13	3.7	.2	13	226	233	--
Oct										
29...	7.1	4.1	196	21	4.2	.2	13	239	340	--
June 1966										
21...	6.5	3.4	192	14	3.4	.2	9.5	250	702	--
Apr 1985										
18...	9.0	4.1	194	19	8.4	.1	10	225	--	<0.10
May										
16...	8.1	< .1	186	27	7.4	.1	11	281	--	.15
June										
19...	--	--	194	14	6.8	.2	--	--	--	< .10
July										
25...	7.8	3.4	192	9.4	6.9	.2	15	243	--	< .10
Aug										
30...	7.8	3.3	190	11	6.8	.2	15	229	--	< .10
Sep										
25...	--	--	195	9.3	7.5	.1	--	241	--	< .10
Feb 1986										
26...	9.2	3.4	--	15	8.8	.1	19	266	--	.13
Apr										
02...	7.9	4.6	201	26	8.0	.1	15	265	--	.58
May										
01...	7.4	4.1	--	17	7.2	.1	10	246	--	< .10

Table 6.--Water-quality data for the outflow site from Orwell Reservoir--Continued

Date	Nitrogen (mg/L as N)			Phosphorus (mg/L as P)		Organic Carbon (mg/L as C)		
	Ammonia total	Ammonia plus organic total	Ammonia plus organic dissolved	Total	Dissolved	Total	Dissolved	Suspended
Oct 1960 12...	--	--	--	--	--	--	--	--
Mar 1961 19...	--	--	--	--	--	--	--	--
May 14...	--	--	--	--	--	--	--	--
Apr 1962 10...	--	--	--	--	--	--	--	--
Mar 1963 14...	--	--	--	--	--	--	--	--
Aug 1965 21...	--	--	--	--	--	--	--	--
Oct 29...	--	--	--	--	--	--	--	--
June 1966 21...	--	--	--	--	--	--	--	--
Apr 1985 18...	0.09	1.0	0.8	0.06	0.07	7.2	--	--
May 16...	.11	1.7	1.6	.07	< .01	--	8.4	1.2
June 19...	< .01	0.9	.8	.06	.03	--	8.8	.6
July 25...	.05	1.0	.3	.06	.03	--	9.7	1.0
Aug 30...	< .01	.6	.5	.06	.05	--	7.9	.3
Sep 25...	< .01	.6	.5	.06	.04	--	7.8	.5
Feb 1986 26...	.14	.8	.8	.03	.02	--	6.7	.3
Apr 02...	.15	.8	.7	.05	.03	--	7.9	.5
May 01...	.03	.8	.5	.05	.01	--	8.5	.7

Table 7.--Mean-daily streamflow for the inflow site to Orwell Reservoir, April 2, 1985, to September 30, 1985

[Values in cubic feet per second]

Day	April	May	June	July	August	September
1	---	750	1,310	1,290	1,100	908
2	488	714	1,460	1,280	1,110	916
3	446	715	1,280	1,240	1,090	913
4	470	736	1,240	1,240	1,090	947
5	470	690	1,140	1,150	1,090	934
6	478	652	1,220	1,180	1,070	931
7	423	757	1,230	1,140	1,070	939
8	423	724	1,190	1,130	1,050	925
9	532	709	1,140	1,140	1,040	941
10	511	720	1,120	1,110	1,120	948
11	540	719	1,240	1,080	928	930
12	580	886	1,340	1,060	1,070	937
13	593	1,100	1,200	1,060	1,160	906
14	610	1,020	1,230	1,030	1,140	906
15	622	1,090	1,190	1,020	1,120	906
16	616	1,130	1,260	977	1,090	914
17	662	1,110	1,200	974	1,070	905
18	557	1,090	1,270	1.030	1,040	899
19	590	1,070	1,220	1.060	1,020	892
20	582	1,140	1,260	1.070	1,000	897
21	606	968	1,290	1,080	972	893
22	615	1,040	1,290	1,080	987	875
23	708	1,030	1,260	1,070	1,020	820
24	815	1,020	1,240	1,160	974	861
25	776	1,040	1,240	1,140	923	850
26	938	1,030	1,320	1,090	933	836
27	795	1,030	1,320	1,160	937	799
28	774	1,020	1,320	1,030	886	837
29	753	1,020	1,330	1,060	999	820
30	749	1,040	1,300	1,100	919	794
31	---	1,120	---	1,110	947	---

Table 8.--Mean-daily streamflow for the inflow site to Orwell Reservoir, October 1, 1985, to September 30, 1986

[Values in cubic feet per second]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep
1	823	901	666	582	554	592	943	1,320	1,470	1,040	651	570
2	792	916	746	557	564	607	912	1,360	1,450	939	681	583
3	808	895	627	602	566	595	957	1,320	1,420	889	632	785
4	782	895	662	570	580	541	912	1,300	1,470	983	632	766
5	787	901	655	583	585	590	959	1,280	1,400	1,060	603	640
6	792	906	682	578	577	605	965	1,280	1,410	1,000	626	660
7	780	908	661	521	594	601	939	1,270	1,440	1,020	547	645
8	772	909	691	539	582	643	909	1,300	1,430	1,020	584	610
9	786	852	684	599	577	635	867	1,460	1,420	980	597	610
10	791	868	695	585	569	602	941	1,690	1,420	950	651	615
11	829	747	691	599	605	581	866	1,460	1,530	959	628	625
12	929	833	656	597	584	629	891	1,560	1,450	977	603	600
13	881	863	646	567	584	615	857	1,550	1,400	927	712	597
14	915	855	625	585	539	646	929	1,500	1,360	930	628	564
15	878	772	681	579	549	639	1,090	1,520	1,400	919	621	595
16	952	723	644	579	559	656	870	1,500	1,390	956	601	630
17	861	789	630	582	567	679	1,190	1,510	1,250	915	604	659
18	882	761	625	570	537	614	1,400	1,500	1,240	883	567	722
19	880	878	633	591	562	616	851	1,490	1,170	868	543	699
20	869	874	628	603	558	682	1,220	1,510	1,410	908	621	743
21	889	807	611	588	545	657	1,160	1,470	1,380	869	587	755
22	896	722	549	581	643	661	1,170	1,460	1,430	790	665	803
23	926	792	579	631	639	748	1,200	1,450	1,370	752	707	837
24	904	629	604	632	613	805	1,190	1,510	1,340	775	626	814
25	902	592	612	600	590	741	1,180	1,520	1,220	740	633	1,060
26	895	678	651	559	602	785	1,190	1,520	1,240	720	736	821
27	879	641	614	553	591	880	1,190	1,580	1,160	744	441	790
28	875	677	569	587	598	1,160	1,220	1,540	1,150	753	584	806
29	880	684	599	566	---	1,090	1,230	1,550	1,120	737	553	808
30	931	673	588	554	---	1,330	1,240	1,550	1,060	705	555	781
31	904	---	611	554	---	1,350	---	1,520	-----	688	530	---

Table 9.--Mean-daily streamflow for the outflow site from Orwell Reservior, April 1, 1985 to September 30, 1985

[Values in cubic feet per second]

Day	April	May	June	July	August	September
1	527	806	874	1,250	1,140	893
2	591	794	709	1,250	1,140	896
3	510	781	779	1,240	1,130	898
4	502	772	891	1,250	1,140	899
5	496	760	944	1,190	1,130	899
6	486	726	962	1,080	1,130	904
7	482	708	1,020	1,090	1,130	905
8	441	711	1,080	1,130	1,120	910
9	418	712	1,100	1,160	1,120	911
10	432	712	1,060	1,150	1,120	913
11	446	720	1,040	1,150	1,110	915
12	474	751	1,100	1,140	1,120	917
13	503	877	1,120	1,140	1,110	917
14	520	985	1,130	1,130	1,110	917
15	532	1,000	1,130	1,110	1,110	917
16	535	1,020	1,120	1,090	1,110	920
17	594	1,040	1,120	1,090	1,110	921
18	640	1,040	1,120	1,080	1,100	920
19	633	1,050	1,120	1,080	1,100	921
20	630	998	1,120	1,070	1,090	923
21	624	968	1,170	1,070	1,080	920
22	622	981	1,190	1,060	1,080	916
23	632	992	1,190	1,060	1,080	916
24	675	993	1,190	1,100	1,070	912
25	717	1,000	1,190	1,170	1,060	911
26	791	1,010	1,220	1,180	1,060	909
27	853	1,020	1,250	1,180	1,050	880
28	843	1,020	1,260	1,180	952	855
29	829	1,020	1,260	1,160	892	855
30	817	1,020	1,260	1,140	892	833
31	---	961	----	1,140	892	---

Table 10.--Mean-daily streamflow for the outflow site from Orwell Reservoir, October 1, 1985, to September 30, 1986

[Values in cubic feet per second]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep
1	860	927	707	718	659	560	1,020	1,220	1,590	1,080	651	560
2	850	927	767	707	639	558	1,060	1,230	1,590	969	631	563
3	843	926	776	703	627	585	1,050	1,230	1,580	919	627	619
4	843	926	768	701	621	601	1,050	1,240	1,580	928	627	650
5	845	924	763	715	613	603	1,050	1,240	1,580	931	623	650
6	844	927	803	854	608	621	1,040	1,250	1,570	933	621	650
7	831	927	830	880	642	644	1,030	1,240	1,570	954	582	650
8	818	950	827	732	832	611	1,020	1,250	1,560	990	554	650
9	784	961	824	675	878	609	980	1,260	1,550	1,000	557	650
10	760	954	823	665	861	610	949	1,430	1,550	1,000	560	650
11	765	948	830	662	816	607	919	1,540	1,550	999	578	650
12	776	942	830	664	817	606	913	1,530	1,540	997	593	650
13	783	937	842	658	803	608	908	1,470	1,520	997	657	647
14	789	931	825	658	784	623	913	1,440	1,520	975	698	645
15	797	920	816	656	721	642	942	1,440	1,510	954	676	625
16	805	910	820	653	618	642	786	1,450	1,500	941	641	610
17	811	901	832	650	599	671	547	1,450	1,390	928	639	614
18	827	896	842	649	632	696	92	1,450	1,240	908	617	616
19	854	896	811	652	683	669	1,220	1,470	1,190	898	573	644
20	859	894	804	646	790	646	1,220	1,490	1,230	898	561	662
21	864	885	790	679	779	647	1,220	1,490	1,270	879	562	669
22	869	853	771	706	626	650	1,220	1,490	1,280	830	589	611
23	884	813	799	702	640	658	1,220	1,490	1,320	767	641	570
24	901	773	970	655	688	709	1,220	1,500	1,360	745	656	577
25	905	685	850	693	588	750	1,210	1,500	1,350	725	653	809
26	912	689	768	882	580	632	1,220	1,500	1,340	710	650	928
27	915	690	767	955	570	272	1,220	1,560	1,280	714	623	933
28	915	694	748	786	566	58	1,220	1,600	1,240	718	604	927
29	920	696	743	788	---	61	1,220	1,600	1,240	717	578	924
30	925	697	734	692	---	198	1,220	1,600	1,170	700	560	917
31	925	---	730	669	---	635	----	1,600	----	678	560	---

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