UNIVERSITY OF MINNESOTA
ST. ANTHONY FALLS HYDRAULIC LABORATORY

Project Report No. 271

DISSOLVED OXYGEN INVESTIGATION COON RAPIDS HYDROELECTRIC REDEVELOPMENT PROJECT

by

Cecilio Olivier,

Ekaterini I. Daniil,

and John S. Gulliver

Prepared for

THE CITY OF ANOKA
Anoka, Minneosta

May 1988

Minneapolis, Minnesota

University of Minnesota
St. Anthony Falls Hydraulic Laboratory

Project Report No. 271

DISSOLVED OXYGEN INVESTIGATION
COON RAPIDS HYDROELECTRIC REDEVELOPMENT PROJECT

by

Cecilio Olivier,

Ekaterini I. Daniil,

and John S. Gulliver

Prepared for

THE CITY OF ANOKA
Anoka, Minneosta

May 1988

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

John Thene and Theodor Strat assisted in the data collection. Patricia Swanson edited and word processed the manuscript.

List of Figures

List of Tables

I. Introduction

The Coon Rapids Dam is located in Hennepin County, Minnesota, on the Mississippi River approximately four miles downstream from the City of Anoka and approximately twelve miles upstream from the downtown section of Minneapolis. The structure was transferred to the Hennepin County Park Board by Northern States Power Company in 1969. Since 1969 the structure has undergone considerable modifications to make the facility meet its new recreational role, with the installation of walkways and observation platforms. The hydropower redevelopment at Coon Rapids will send between 1,000 and 8,000 cfs (the range of discharge for the turbines), which previously passed over the spillway, through the turbine units. This will have an impact on downstream D.O. concentrations because the spillway is an excellent aerator, increasing D.O. concentrations, while the turbines do not add any air to the water.

An additional impact could be caused by the different withdrawal level of the spillway and turbine unit. In summer the upstream reservoir can be stratified, with low D.O.concentrations developing at the bottom where the turbine intake will be located. Thus, in addition to losing the aeration of the spillway, the units would withdraw more low D.O. water from the bottom of the reservoir and send it downstream. In the case of Coon Rapids Dam, no summer stratification was observed, so this negative effect of turbine withdrawal does not exist.

Finally any discharge through the units would decrease the residence time of the low D.O. water in the upper reservoir. A decrease in residence time means that there is less time for D.O. depletion, and hence higher D.O. concentrations upstream. This results in higher D.O. concentrations downstream, and is one possible positive impact of hydroplant operation in D.O. concentration.

The purpose of this project is to assess the impact of hydropower redevelopment on dissolved oxygen concentrations, as related to the survival and growth of fish. In order to satisfy this general goal, the following studies have been performed, and form the core of this report:

1. Measure D.O. and temperature upstream of the Coon Rapids Dam on August 25, 1987.

2. Measure D.O. and temperature at 12–20 locations over depth from the dam and river banks on ten dates in August and September 1987.

3. Measure the dissolved oxygen concentrations at three stations downstream of the abandoned powerhouse one day in January, February, and March.

4. Compare the D.O. measurements with those already obtained from the U. S. Geological Survey eight–year record period.

5. Evaluate the effectiveness of the various spillway sections as aerators.

6. Analyze the impact of the Coon Rapids Hydroelectric Redevelopment Project on the dissolved oxygen concentrations downstream in the main river channel and in the tailrace of the old hydroplant.

II. Physical Description

The Coon Rapids Dam consists of several hydraulic structures separated by an earth berm as shown in Figure 5. The main spillway shown in Figure 1 consists of 28 bays, each containing a tainter gate and a gate hoist. This section of the dam is used for controlling the discharge by adjustment of the number and size of the openings between the bottom of the tainter gates and the crest of the spillway.

The powerhouse structure (Figure 2) is located near the north abutment of the dam and contains seven turbine pits. It is approximately 265 feet long. Since the decommissioning of the dam as a power producing facility and the removal of the turbines, all but one of the turbine pit intakes have been sealed with concrete walls. No flow passes through the powerhouse except through one remaining turbine pit that contains an intake structure through which water is passed, during the open water seasons. During winter, the spillway gates are opened and the headwater pool is drawn down such that no water passes through the old powerhouse and into the tailrace downstream.

III. Summary and Conclusions

1. The U. S. Environmental Protection Agency (USEPA) has recently [USEPA, 1986] revised guidelines for ambient dissolved oxygen concentrations. These guidelines are based on the most extensive and detailed literature review to date, and will be used as a guide to assess a potential negative impact in this report. For the early life stages of warm water species, a seven–day mean of 6.0 mg/ℓ is recommended. The State of Minnesota criteria that D.O. concentrations below 5.0 mg/ℓ are in violation will also be used.

2. Synoptic surveys of temperature and D.O. concentration were taken in August and September 1987.

3. Existing data on dissolved oxygen (D.O.) concentration from the U. S. Geological Survey were collected and compared with the synoptic surveys taken by St. Anthony Falls Hydraulic Laboratory.

4. The synoptic surveys taken upstream of Coon Rapids Dam (August 25, 1981), and those taken from the dam and river banks in late summer, compare fairly well to the U. S. Geological Survey data eight–year period of record for the same months. Therefore, it can be concluded that the D.O. synoptic surveys taken in late summer 1987 are fairly representative of D.O. behavior for this location and for this time of the year.

5. Five days of the D.O. concentration data from the U. S. Geological Survey dropped significantly below 5 mg/ℓ (from June 26 to June 30, 1980, Table 9). This period is not representative and probably involves some kind of measurement error. An unusual D.O. drop is recorded (3 mg/ℓ) between June 25 and June 26. Also another unusual rise (5 mg/ℓ) is recorded from June 30 to July 1.

6. The D.O. concentrations dipped below 5 mg/ℓ but remained above 4.0 mg/ℓ on 11 days of the approximately 2100 days of record. Thus, 99.5 percent of the time the river is within the D.O. guidelines specified by the USEPA. The eleven days amount to about 0.5 percent of the days. Considering that none of these D.O. concentrations approach a value that will affect fish survival, the negative impacts of hydropower facility operation appear to be very low to non–existent.

7. The high maximum D.O. concentrations during these "low D.O." periods indicate that the overall D.O.concentrations in the Mississippi River at Coon Rapids are at values that will support a healthy growth of juvenile fish.

8. The synoptic surveys indicate neither temperature nor D.O. concentration stratification for the period recorded, so a selective withdrawal analysis is not required.

9. Due to the high D.O. Concentrations measured upstream of the dam, there does not appear to be any adverse impact of hydropower operation on fish survival or growth. In addition, the State of Minnesota criteria of 5.0 mg/ℓ are met, an average 99.5 percent of the days of record.

10. Synoptic surveys of D.O. concentration were taken downstream of the old powerhouse on January 14, 1988 and February 14, 1988. The purpose of these measurements was to determine if low D.O. is a concern at this location in mid–winter.

11. The surveys taken downstream of the old powerhouse indicate that there is a zone .7–.8 m wide between the ice and the bottom in which the D.O. concentration never falls below 6.0 mg/ℓ, enough to assure fish survival during the winter period.

12. The D.O. profiles downstream of the abandoned powerhouse also indicate that there is some water and oxygen recirculation between the channel downstream of the powerhouse and the main river. Although river biochemical activity is not high during winter, this interchange is necessary to justify the D.O. profile on 14 February 1988 that was almost identical to the 14 January D.O. profile, with no flow over the overflow spillway in the intervening period.

13. Data taken in mid–winter 1985 and 1986 were used to estimate the effectiveness of the various spillway sections as aerators. The average dimensionless deficit ratio evaluated for the main spillway is 1.8, for a transfer efficiency of 0.44. This means that water passing over the spillway will gain 44 percent of the difference between saturation and upstream D.O. concentration.

14. The downstream impact of hydroplant operation was assessed for each synoptic survey. The result is given in Table 28.

15. No negative impact of hydroplant operation resulted from these computations. For most of the sampling dates, a downstream D.O. concentration rise was obtained.

IV. Water Quality Criteria for Dissolved Oxygen Concentration

The U. S. Environmental Protection Agency has recently [USEPA, 1986] revised their water quality guidelines for ambient dissolved oxygen concentration. The guidelines for warm water fishes are given in two age classifications: early life stages which include all embryonic and larval stages and all juvenile forms to 30 days following hatching, and all other life stages. For early life stages a seven–day mean of 6.0 mg/ℓ and a one day minimum of 5.0 mg/ℓ are recommended. Spawning for bass in Minnesota can continue until July, and for walleye occurs shortly after ice breakup. Hence, these guidelines for early life stages can be expected to apply from ice–out through August. For all other life stages, recommendations are for a 30–day mean of 5.5 mg/ℓ, a one–day minimum of 3.0 mg/ℓ, and a seven–day mean/minimum (the mean of the lowest D.O. concentration which occurs in seven consecutive days) of 4.0 mg/ℓ.

Background for developing the guidelines is given in the EPA report on p. 33.

> "The criteria are derived from the production impairment estimates... which are in turn based primarily upon growth data and information on temperature, disease, and pollutant stresses. The average dissolved oxygen concentrations selected are values 0.5 mg/ℓ above the slight production impairment values and represent values between no production impairment and slight production impairment. Each criterion may thus be viewed as an estimate of the threshold concentration below which detrimental effects are expected."

"Slight production impairment" as used in the EPA report is usually interpreted as any statistically significant indication of production impairment. An example would be Fig. 3 which gives data used to set the early life stage recommendation for a seven day mean, i.e. 6.0 mg/ℓ. The data indicate no impact at D.O. levels above 5.5 mg/ℓ. The EPA added 0.5 mg/ℓ to that as a safety factor, and set the guidelines at 6.0 mg/ℓ. Additional background is given on p. 28:

> "Naturally–occurring dissolved oxygen concentrations may occasionally fall below target criteria levels due to a combination of low flow, high temperature, and natural oxygen demand. These naturally–occurring conditions represent a normal situation in which the productivity of fish or other aquatic organisms may not be the maximum possible under ideal circumstances, but which represent the maximum productivity under the particular set of natural conditions. Under these circumstances the numerical criteria should be considered unattainable, but naturally–occurring conditions which fail to meet criteria should not be interpreted as violations of criteria. Although further

reductions in dissolved oxygen may be inadvisable, effects of any reductions should be compared to natural ambient conditions and not to ideal conditions."

"Situations during which attainment of appropriate criteria is most critical include periods when attainment of high fish growth rates is a priority, when temperatures approach upper–lethal levels, when pollutants are present in near–toxic quantities, or when other significant stresses are suspected."

Although the State of Minnesota is not required to follow the USEPA criteria, these recommendations are based upon the most extensive and detailed literature review to date, and serve as a good basis for making an informed impact assessment. Currently, the State of Minnesota has a minimum criteria of 5 mg/ℓ, which is applicable to the Coon Rapids Dam site. The criteria may become nondegradation, however. Under these circumstances the authors believe the USEPA guidelines should apply.

V. Dissolved Oxygen Data

All relevant existing field data have been obtained from the U. S. Geological Survey (USGS) and St. Anthony Falls Hydraulic Laboratory field surveys.

The USGS maintained a water quality sampling station approximately 4.5 miles upstream from Blanchard Dam (No. 05283500) until 1981. The USGS data, collected approximately once monthly from 1976 to 1982, were given in Tables 1 to 5. The dissolved oxygen data collected at this location may not be ideally representative of the site, since the station is 4.5 miles upstream and a water parcel would take approximately 1.5–9 hours to arrive at the Coon Rapids Dam. The data, however, should give an indication of the D.O. concentration regimes that occur at the Coon Rapids Dam. A certain amount of aeration or biochemical oxygen demand may have occurred upstream of the dam, but it is believed that the data are accurate to within ± 1.0 mg/ℓ. For this analysis, with the disclaimer in mind, it will be assumed that the dissolved oxygen values recorded at Station No. 05283500 can be compared with those taken upstream from Coon Rapids Dam.

The same thing can be said for the U.S. Geological Survey water quality Station No. 05288550 which is located 3.4 miles downstream of the Coon Rapids Dam. The data were collected daily from 1976 to 1984 and are given in Tables 6 to 13.

None of the data indicate a severe problem with downstream D.O. concentration. Only once does the D.O. drop below 5 mg/ℓ, that is June 26–30, 1980 as shown in Table 9, and listed below. These values are not representative and probably involve some kind of measurement error.

Date	Daily Mean D.O. Concentration
25 June 1980	6.3 mg/ℓ
26 June 1980	3.2 mg/ℓ
27 June 1980	2.6 mg/ℓ
28 June 1980	2.3 mg/ℓ
29 June 1980	2.4 mg/ℓ
30 June 1980	3.1 mg/ℓ
1 July 1980	7.2 mg/ℓ

The sharp drop on June 26 and sharp rise on July 1 makes one suspicious of this data, especially since it occurred only once on the entire period of record.

An additional, suspicious low D.O. concentration of 3.6 mg/ℓ was read on 27 August 1980. This value is also probably a measurement or typographical error, being 3 mg/ℓ below any of the neighboring figures.

The period 11 July through 18 July 1981 experienced low D.O. values that are not attributed to measurement calibration, or typographical errors. The data are as follows:

Date	7/11	7/12	7/13	7/14	7/15	7/16	7/17	7/18
Maximum (mg/ℓ)	6.9	5.7	5.8	9.0	7.0	7.7	—	8.0
Minimum (mg/ℓ)	5.2	4.3	4.0	5.8	4.7	4.1	—	5.5
Mean (mg/ℓ)	6.1	4.9	4.9	7.4	5.8	5.2	—	6.9
Discharge (cfs)	7310	7360	7790	7270	7130	7300	7130	7150

D.O. concentrations dipped below 5.0 mg/ℓ on four of the seven days. In addition, the 7–day mean (excluding 7/17 when no data were taken) was 5.88 mg/ℓ, which is just below meeting the USEPA recommended criteria of 6.0 mg/ℓ. On the 26th and 27th of July in the same year the daily minimum D.O. reading once again was below 5.0 mg/ℓ. The discharge was not usually low. The figures above compare with an average annual discharge of 7579 cfs.

The summer of 1982 once again experienced some relatively low D.O. values as follows:

Date	7/6	7/7	7/8	8/4	8/2
Maximum (mg/ℓ)	6.1	5.9	8.0	6.9	10.3
Minimum (mg/ℓ)	4.9	4.8	4.3	4.9	4.8
Mean (mg/ℓ)	5.4	5.2	6.1	6.1	7.7
Discharge (cfs)	7930	8250	7630	6280	6650

The high maximum D.O. concentrations indicate that even during these "low D.O." periods, the D.O.concentrations in the Mississippi River at Coon Rapids are at values that will support a healthy growth of juvenile fish.

The 11 dates with minimum D.O. concentrations below 5.0 are spread over approximately 2100 days of record. Thus on any given day, the possibility of having a D.O. value below 5.0 is 0.5 percent. Considering that none of these D.O. concentrations approach a value that will affect fish survival, the impact is very low indeed.

The data collected at the USGS stations upstream and downstream were averaged and compared with the survey data taken as part of this investigation. The average compared fairly well with the measurements. Indicating that the survey data taken by St. Anthony Falls Hydraulic Laboratory can be considered sufficiently appropriate.

3. Since there was no flow into the side channel from upstream all winter, there will be some kind of water interchange between the channel downstream of the powerhouse and the main river, enough to eliminate the winter biochemical oxygen depletion downstream of the old powerhouse.

Finally some mid–winter D.O. data upstream and downstream of the primary spillway was collected as part of research project for the Legislative Commission on Minnesota Resources. This data is summarized in Table 25.

VI. Spillway Reaeration

Waterside controlled mass transfer across the air–water interface can be described by the equation

$$\frac{dC}{dt} = K_L \frac{A_c}{V} (C - C_s) \tag{1}$$

where K_L = liquid film coefficient (LT^{-1}),
A_s = surface area (L^2),
C_s = saturation concentration (ML^{-3}),
C = instantaneous gas concentration (ML^{-3}) in water, and
V = control volume in which C is measured (L^3)

By following a control volume across a hydraulic structure and assuming $K_L A_s/V$ is a constant, this differential equation can be solved to yield:

$$\frac{1}{r} = \frac{C_s - C_d}{C_s - C_u} = \exp\left(-\frac{K_L A_s}{V} t\right) \tag{2}$$

where r = dimensionless deficit ratio,
C_u = upstream dissolved gas concentration,
C_d = downstream dissolved oxygen concentration, and
t = time of passage

Rindels and Gulliver [1986] determined the deficit ratio for seven spillways and hydraulic jump structures in the vicinity of Minneapolis, Minnesota, including the Coon Rapids Dam.

A simplified model to compute the deficit ratio was proposed by Tsviglou and Wallace [1972] and is given by Eq. 3.

$$r = \exp(KH) \tag{3}$$

where H is the water surface elevation difference and K was empirically determined to be .054. This equation is a logical extension to Eq. 2 since the time of passage can be related to water surface elevation.

The results for the spillway reaeration analysis from the data taken in mid–winter are presented in Table 27. Rindels and Gulliver [1988] also predicted also the effect of water temperature on oxygen transfer.

$$\frac{\ell n\ r}{\ell n\ r_i} = \sqrt{\frac{D}{D_i}} \left[\frac{\nu_i}{\nu}\right]^{1/4} \qquad (4)$$

where r_i = dimensionless deficit ratio at temperature i

D_i = diffusivity of oxygen in water of temperature i

ν_i = kinematic viscosity of water at temperature i

The values of r obtained in mid–winter were corrected using Eq. (4) for a standard temperature of 20° C. The results are presented in Table 26 in which the last column shows the theoretical K coefficient needed to verify Eq. (3) at 20° C.

With hydroplant operation, the relatively high D.O. concentrations upstream would be transferred to downstream of the hydroplant without spillway aeration.

VII. Impact Assessment

The downstream impact assessment of hydroplant operation is shown in Table 28. This table was developed in the following manner:

1. A mean overall D.O. concentration value was obtained from the upstream and downstream measurements for each sampling day.

2. A daily averaged water temperature was used to compute the percent of upstream and downstream saturation.

3. Since the powerhouse will be located on the south end of the island (Figure 5), a mean upstream D.O. concentration between gates 1 and 9 was employed to approximate the D.O. concentration at the intake of the hydroplant at normal operation

4. The total nominal operating flow for the two turbines proposed in the Coon Rapids Dam hydroelectric project is 8000 cfs. On the other hand the all–time record average flows at Coon Rapids for late summer is 4250 cfs. Therefore, the last column in Table 29 has been developed assuming no flow over the spillway.

Looking at Table 28, the following conclusions can be made:

1. No negative impact is observed, and in most of the sampling dates a downstream D.O. concentration rise is obtained due to the upstream supersaturation.

2. The upstream supersaturated flow generates a negative reaeration (deaeration) through the spillway that reduces the downstream D.O. concentrations.

Finally, it should be pointed out that flow through the turbine will actually decrease the residence time in the vicinity of the intake, and therefore the actual values for the D.O. concentration at the intake will be greater than those previously measured.

VIII. References

1. U.S. Environmental Protection Agency, *Ambient Water Quality Criteria for Dissolved Oxygen*, EPA 440/5–86–003, April 1986.

2. Rindels, A. J. and Gulliver, J. S., "Air–Water Oxygen Transfer at Spillways and Hydraulic Jumps," ASCE, *Proceedings Water Forum '86*, August 1986.

3. Rindels, A.J. and Gulliver, J. S., "Indexing Measurements of Gas Transfer at Hydraulic Structures," in preparation for ASCE, *Jour. Hydraulic Engineering*, 1988.

4. Gameson, A., VanDyke, K. and Ogden, C., "The Effect of Temperature on Aeration at Weirs," *Water and Water Engineering*, 62, 489–492, 1958.

5. Tsivoglov, E. C. and Wallace, J. R., "Characterization of Stream Reaeration Capacity," U. S. Environmental Protection Agency, Report No. EPA–R3–73–012, Washington, D. C., 1972.

Figure 1. Views looking upstream at the Coon Rapids main spillway.

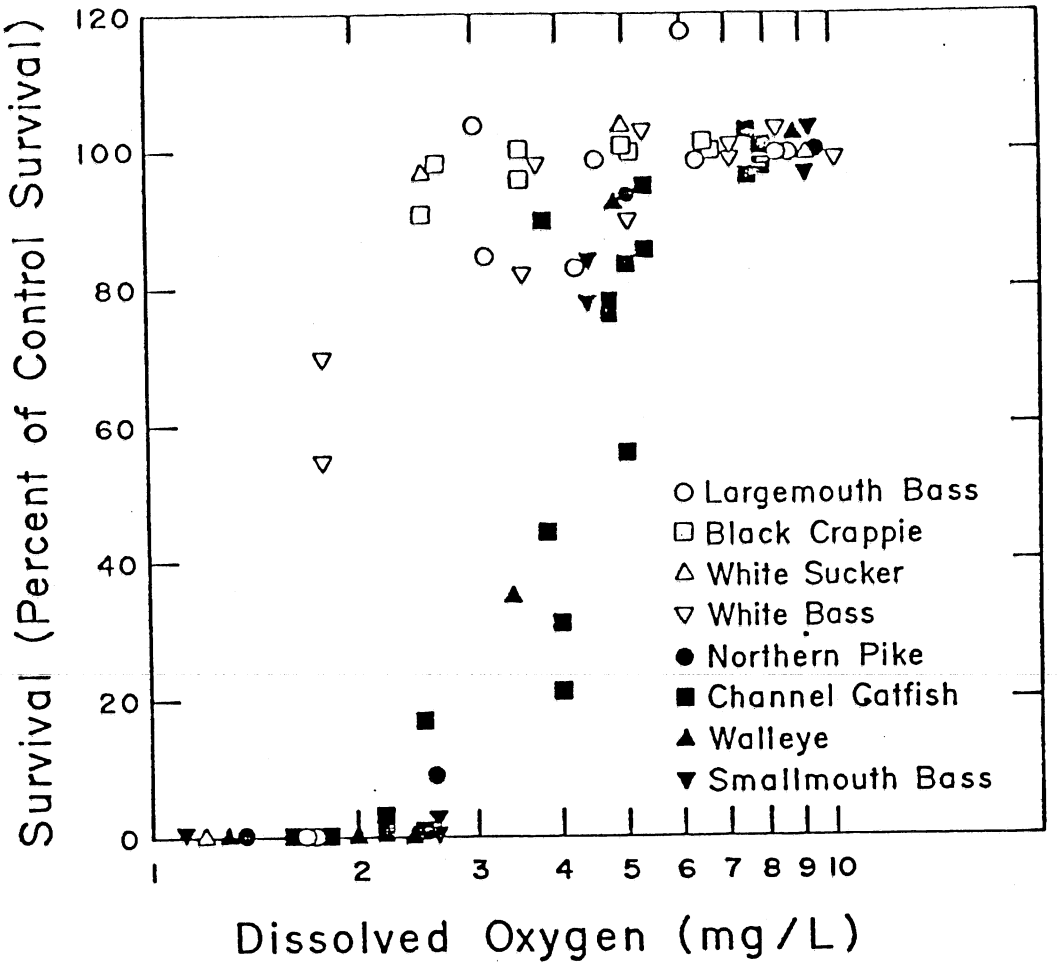

Figure 3. Effect of continuous exposure to various mean dissolved oxygen concentrations on survival of embryonic and larval stages of eight species of nonsalmonid fish. (Taken from EPA, 1986).

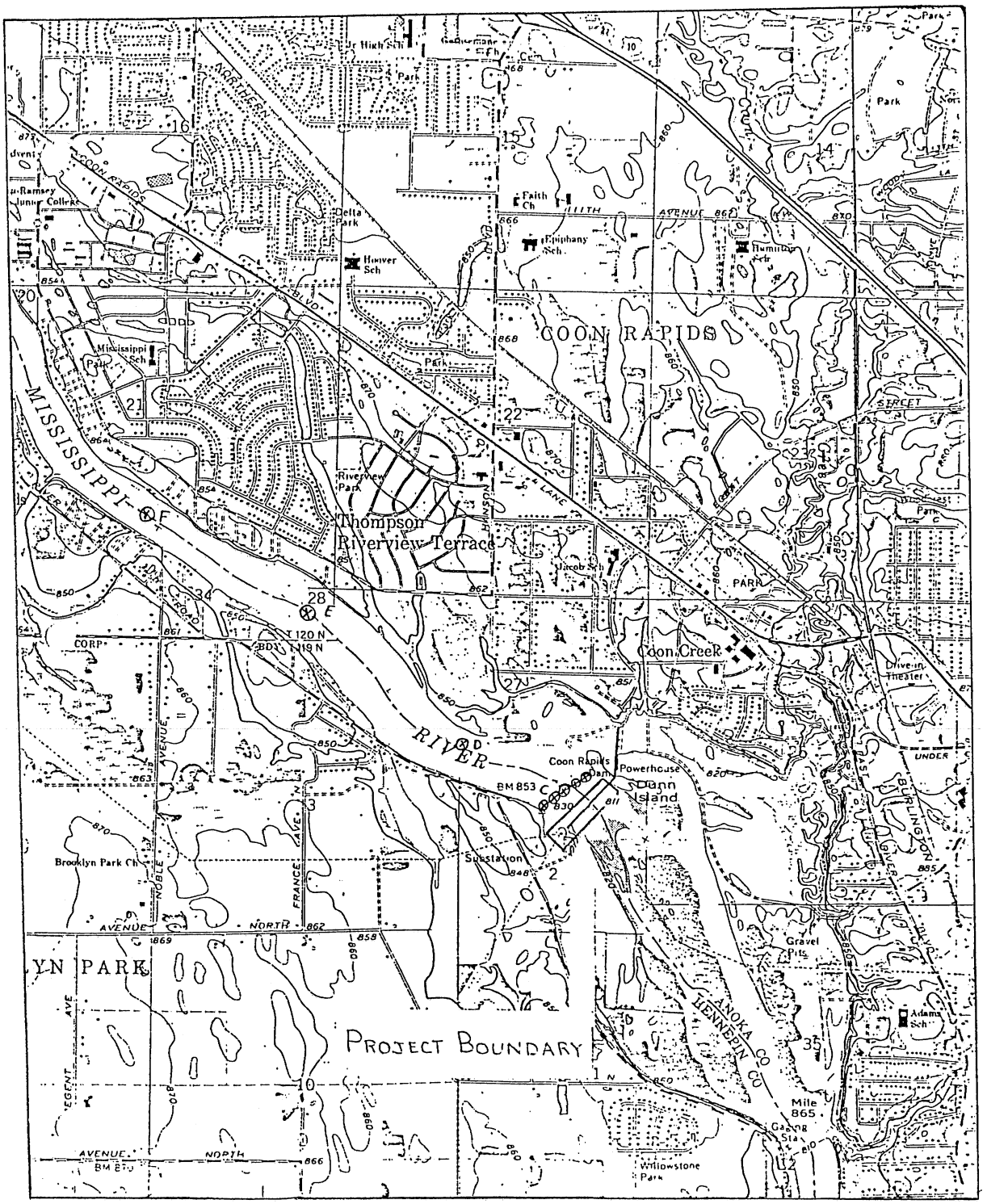

Figure 4. Water quality sampling stations for August 25, 1981.

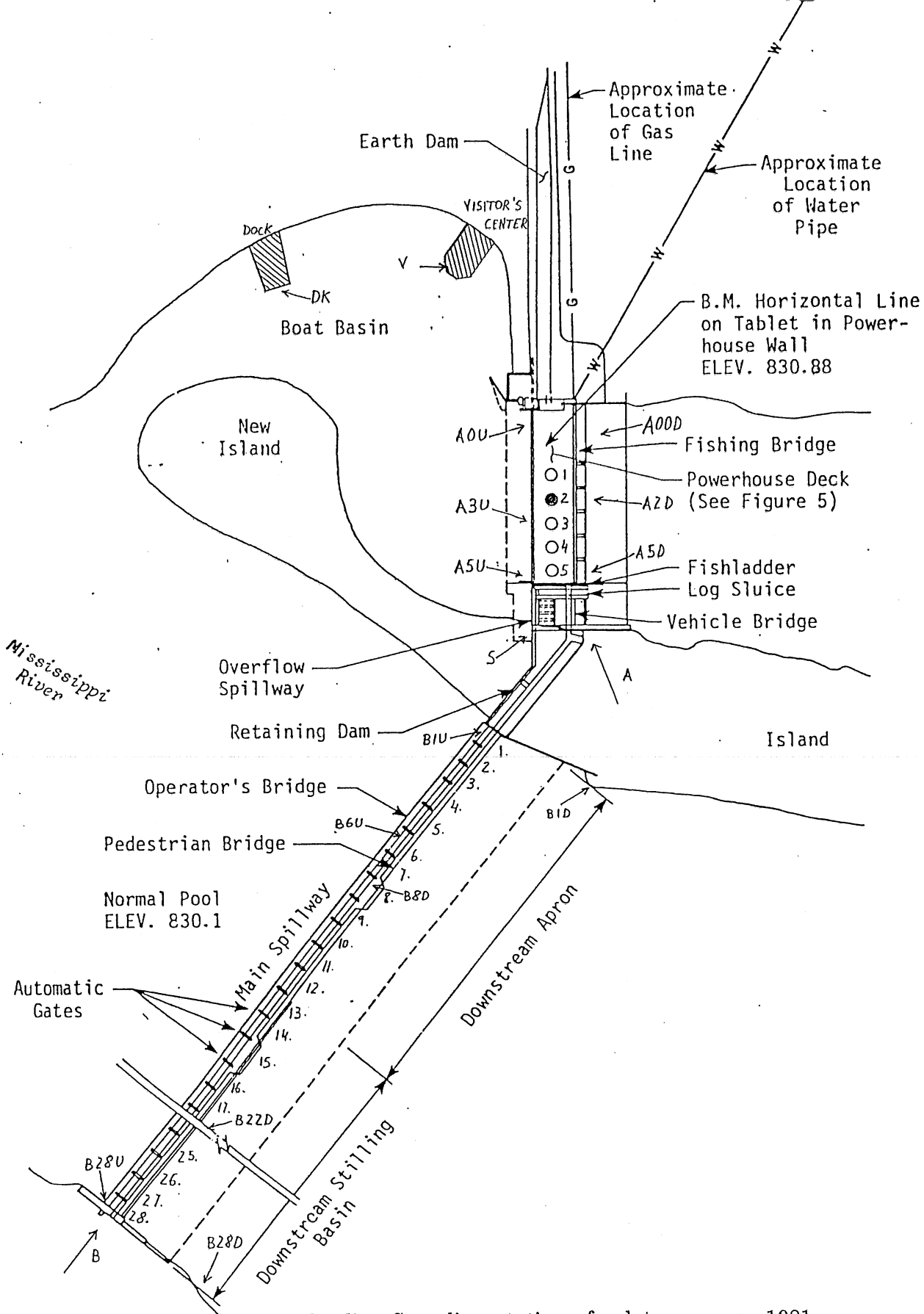

Figure 5. Water Quality Sampling stations for late summer 1981.

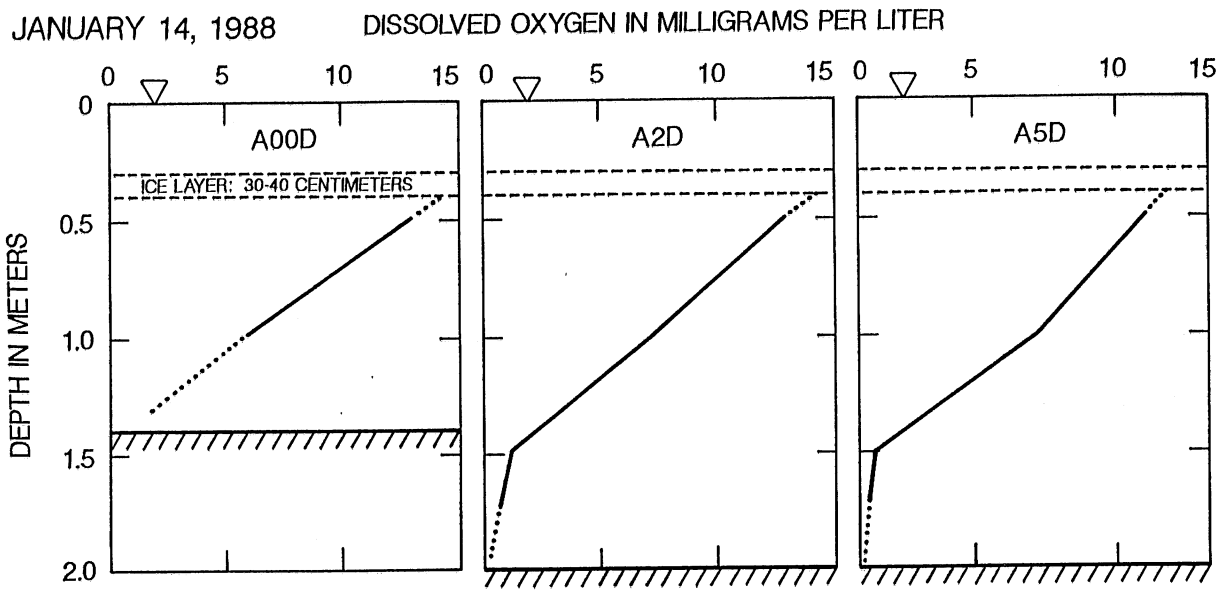

Figure 6. Dissolved oxygen profiles downstream of the old powerhouse on 14 January 1988.

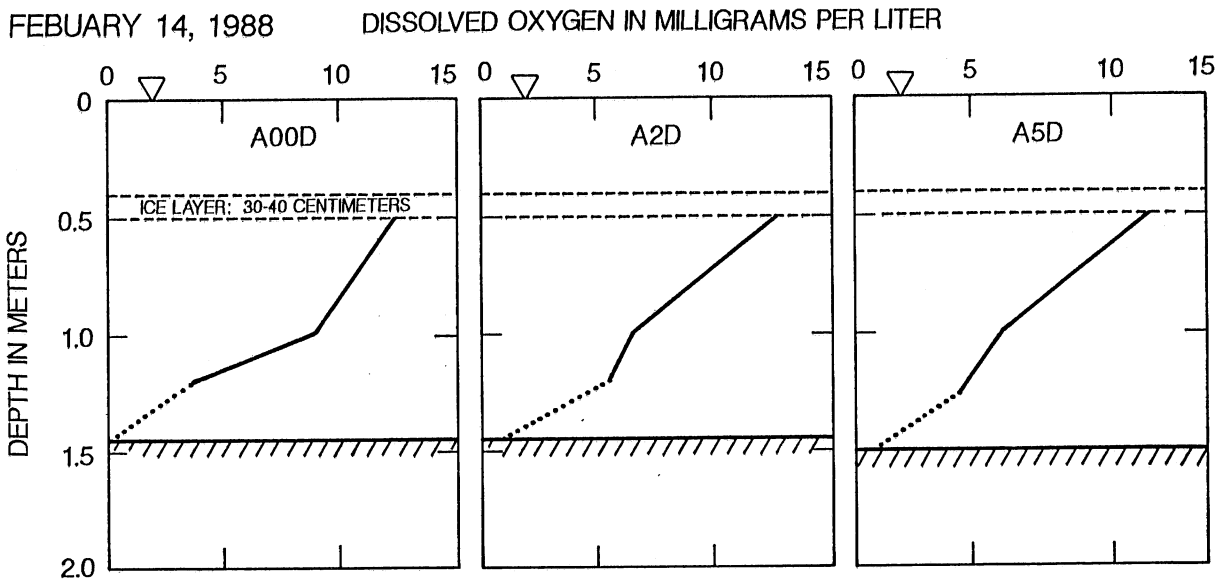

Figure 7. Dissolved oxygen profiles downstream of the old powerhouse on 14 February 1988.

05283500 MISSISSIPPI RIVER AT ANOKA, MN

LOCATION.--Lat 45°11'30", long 93°23'40", in SE 1/4 NW 1/4 sec.19, T.120 N., R.22 W., Anoka County, Hydrologic Unit 07010206, at bridge on U.S. Highways 52 and 169 at Anoka, 0.3 mi (0.5 km) upstream from Rum River, and at mile 871.3 (1,402 km) upstream from Ohio River.

DRAINAGE AREA.--17,100 mi^2 (44,300 km^2), approximately.

PERIOD OF RECORD.--Water years 1972 to current year.

REMARKS.--Discharge computed by subtracting ten percent from discharge computed from gage height at time of sampling for Mississippi River near Anoka.

TABLE 1

WATER QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS) (00061)	AIR TEMPERATURE (DEG C) (00020)	TEMPERATURE (DEG C) (00010)	DISSOLVED OXYGEN (MG/L) (00300)	PERCENT SATURATION (00301)
OCT 28...	0805	1230	2.0	3.5	13.8	106
NOV 24...	0805	1100	3.5	.0	13.0	92
DEC 22...	0830	1440	-2.5	.0	14.3	101
FEB 09...	0820	1300	-2.0	.0	12.0	84
MAR 09...	0805	1480	5.0	6.0	13.0	107
APR 06...	0810	4680	-1.0	3.0	13.4	102
MAY 23...	0750	2360	16.5	19.0	7.5	82
JUN 20...	0810	3540	20.0	20.0	7.2	81
JUL 27...	0810	2560	21.0	22.0	7.7	108
AUG 22...	1030	1240	19.0	--	9.0	--
SEP 15...	0730	5660	14.0	17.0	9.2	98

TABLE 2

WATER QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	TIME	STREAMFLOW, INSTANTANEOUS (CFS) (00061)	TEMPERATURE, AIR (DEG C) (00020)	TEMPERATURE (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)
OCT 03...	1115	8070	14.5	13.0	10.2	99
NOV 04...	0800	7260	15.0	6.0	10.7	88
DEC 22...	0945	9620	-3.0	.0	13.8	97
JAN 05...	0855	7120	-8.0	.0	--	--
FEB 01...	0900	4820	-14.0	.0	12.7	89
MAR 23...	0850	7520	-.5	2.0	12.0	89
APR 06...	0910	20800	9.0	4.0	12.0	94
MAY 08...	0915	11200	11.0	13.5	9.4	92
JUN 20...	0910	12200	17.0	20.0	7.0	77
JUL 03...	--	16800	18.0	22.0	6.3	73
AUG 22...	0910	9080	18.0	24.0	7.2	87
SEP 07...	0915	11800	24.0	24.0	6.6	80

TABLE 3

WATER QUALITY DATA, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095)	PH (UNITS) (00400)	TEMPER-ATURE, AIR (DEG C) (00020)	TEMPER-ATURE (DEG C) (00010)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
OCT									
10...	0900	7870	352	7.9	12.0	12.0	55	10.4	99
31...	0850	6230	346	8.5	7.0	6.5	30	12.0	99
DEC									
04...	1000	3460	380	7.7	6.0	.0	40	15.3	108
JAN									
31...	1030	9720	375	7.5	-13.5	.0	5	13.3	94
MAR									
19...	0945	4900	360	7.8	4.0	2.0	10	12.7	94
APR									
26...	1015	42000	270	7.6	6.0	10.0	70	11.3	103
MAY									
07...	1025	33100	270	8.0	14.0	11.0	55	--	--
JUN									
28...	1000	18400	460	7.6	21.5	22.0	30	7.2	84
JUL									
23...	0955	9270	400	8.2	24.5	26.0	30	7.0	88
AUG									
20...	1030	6100	402	8.4	20.5	21.0	20	7.6	87
SEP									
28...	1000	3490	350	8.4	16.0	19.0	25	8.5	93

TABLE 4

WATER QUALITY DATA, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095)	PH FIELD (UNITS) (00400)	TEMPER-ATURE, WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	FLUO-RIDE, TOTAL (MG/L AS F) (00951)
OCT								
24...	1050	5070	383	8.5	8.0	11.3	98	.1
DEC								
19...	1035	5260	360	7.4	.0	14.5	102	.0
FEB								
04...	1055	4060	400	7.9	.0	12.0	85	.0
APR								
01...	1115	10700	355	7.7	2.0	13.1	97	.0
JUN								
04...	1045	4320	402	8.1	20.5	8.6	98	.5
AUG								
08...	1105	2840	385	8.3	25.5	8.0	99	.1

TABLE 5

WATER QUALITY DATA, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUCT-ANCE (UMHOS) (00095)	PH (UNITS) (00400)	TEMPER-ATURE (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	FLUO-RIDE, TOTAL (MG/L AS F) (00951)
OCT									
14...	1000	--	3860	325	8.2	9.0	10.1	89	.3
DEC									
10...	1020	2800	--	375	7.9	.0	14.1	99	.1
FEB									
13...	1115	2050	--	386	7.9	.0	14.3	101	.2
APR									
06...	1030	--	5920	375	8.3	9.0	12.0	106	.1
JUN									
11...	1430	--	5330	300	8.1	21.0	9.1	105	.2
SEP									
08...	1220	--	7340	440	8.5	18.5	9.5	103	.2

05288550 MISSISSIPPI RIVER AT FRIDLEY, MN

LOCATION.--Lat 45°06'12", long 93°16'37", in SW¼NE¼ sec.10, T.30 N., R.24 W., Anoka County, Hydrologic Unit 07010206, on left bank at St. Paul Pumping Station in Fridley, 0.9 mi (1.5 km) upstream from Rice Creek, and 3.4 mi (5.5 km) downstream from Coon Rapids Dam, and at mile 862.8 (1,388 km) upstream from Ohio River.

TABLE 6

DISSOLVED OXYGEN (DO), MG/L, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DAY	OCTOBER MAX	OCTOBER MIN	OCTOBER MEAN	NOVEMBER MAX	NOVEMBER MIN	NOVEMBER MEAN	DECEMBER MAX	DECEMBER MIN	DECEMBER MEAN	JANUARY MAX	JANUARY MIN	JANUARY MEAN
1										---	---	---
2										---	---	---
3										---	---	---
4										---	---	---
5										---	---	---
6										---	---	---
7										---	---	---
8										---	---	---
9										---	---	---
10										---	---	---
11										---	---	---
12										---	---	---
13										---	---	---
14										---	---	---
15										---	---	---
16										---	---	---
17										14.0	13.4	13.7
18										13.7	13.3	13.5
19										13.6	13.0	13.3
20										13.1	12.7	13.0
21										13.2	12.9	13.0
22										13.1	12.6	12.9
23										13.0	12.3	12.6
24										12.6	11.8	12.1
25										13.9	11.7	13.0
26										13.6	12.8	13.2
27										13.2	12.4	12.9
28										13.1	12.3	12.6
29										---	---	---
30										---	---	---
31												

DAY	FEBRUARY MAX	FEBRUARY MIN	FEBRUARY MEAN	MARCH MAX	MARCH MIN	MARCH MEAN	APRIL MAX	APRIL MIN	APRIL MEAN	MAY MAX	MAY MIN	MAY MEAN
1	---	---	---	---	---	---	11.1	10.5	10.8	9.0	7.6	8.3
2	---	---	---	---	---	---	11.0	10.4	10.6	10.5	8.0	8.8
3	---	---	---	---	---	---	11.3	10.5	10.8	9.1	8.1	8.6
4	---	---	---	---	---	---	11.0	10.5	10.7	9.1	8.0	8.4
5	---	---	---	---	---	---	---	---	---	9.1	7.7	8.2
6	---	---	---	---	---	---	---	---	---	9.3	7.7	8.4
7	---	---	---	---	---	---	---	---	---	10.0	8.1	9.0
8	---	---	---	---	---	---	---	---	---	10.5	9.2	9.9
9	14.1	13.0	13.7	---	---	---	---	---	---	10.6	9.3	9.9
10	13.7	12.4	13.2	---	---	---	---	---	---	---	---	---
11	13.9	12.4	13.2	14.2	12.1	13.2	---	---	---	---	---	---
12	13.5	12.3	12.9	12.6	11.6	12.1	---	---	---	---	---	---
13	13.6	12.3	12.9	11.9	10.9	11.6	---	---	---	---	---	---
14	14.7	12.6	13.6	12.1	11.1	11.4	---	---	---	---	---	---
15	---	---	---	11.5	10.9	11.2	---	---	---	---	---	---
16	---	---	---	11.9	11.1	11.4	---	---	---	---	---	---
17	---	---	---	12.9	11.4	12.1	---	---	---	---	---	---
18	14.9	13.5	14.1	13.2	12.8	13.0	---	---	---	---	---	---
19	---	---	---	13.3	12.6	13.0	---	---	---	---	---	---
20	---	---	---	13.6	13.0	13.4	---	---	---	---	---	---
21	14.0	13.6	13.8	14.0	13.0	13.5	---	---	---	---	---	---
22	---	---	---	13.7	11.7	12.7	11.8	9.7	10.6	---	---	---
23	13.5	12.5	13.2	12.7	11.6	12.1	11.0	9.0	10.1	---	---	---
24	13.4	12.4	12.7	12.3	11.2	11.9	11.1	9.1	10.1	---	---	---
25	14.8	12.6	13.8	12.1	11.1	11.7	11.1	9.4	10.2	---	---	---
26	---	---	---	11.9	10.3	11.1	11.0	9.4	9.8	---	---	---
27	---	---	---	12.9	10.3	11.2	10.5	9.4	9.8	---	---	---
28	---	---	---	11.7	10.6	11.5	9.9	8.7	9.4	---	---	---
29	---	---	---	11.6	10.8	11.3	9.3	7.8	8.7	---	---	---
30	---	---	---	11.9	11.3	11.5	8.6	7.6	8.1	---	---	---
31	---	---	---	11.8	10.7	11.1	---	---	---	---	---	---

TABLE 6 (Cont'd)

DISSOLVED OXYGEN (DO), MG/L, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	9.2	8.0	8.5	---	---	---			
2	---	---	---	9.1	8.3	8.8	11.0	9.4	9.8			
3	---	---	---	8.9	7.9	8.6	10.2	7.4	8.8			
4	---	---	---	8.1	7.2	7.7	9.5	8.4	9.0			
5	---	---	---	7.8	7.1	7.4	8.9	7.7	8.5			
6	---	---	---	7.4	6.5	7.0	8.6	7.3	8.0			
7	---	---	---	7.0	6.4	6.7	---	---	---			
8	---	---	---	7.1	6.4	6.8	---	---	---			
9	---	---	---	7.6	7.1	7.4	---	---	---			
10	---	---	---	7.6	7.4	7.5	---	---	---			
11	---	---	---	7.9	7.4	7.6	---	---	---			
12	---	---	---	9.9	7.7	9.0	---	---	---			
13	---	---	---	9.7	8.6	9.1	---	---	---			
14	---	---	---	8.7	7.5	8.2	---	---	---			
15	---	---	---	8.0	7.3	7.8	---	---	---			
16	---	---	---	7.8	6.9	7.4	---	---	---			
17	---	---	---	7.4	6.8	7.1	8.4	7.0	7.6			
18	---	---	---	7.4	6.7	7.0	8.1	7.5	7.8			
19	---	---	---	---	---	---	8.0	6.9	7.7			
20	---	---	---	---	---	---	7.6	6.5	7.0			
21	---	---	---	---	---	---	7.6	6.7	7.1			
22	11.8	10.9	11.3	---	---	---	7.2	6.2	6.8			
23	11.5	10.0	10.5	---	---	---	8.5	6.8	7.7			
24	10.2	9.3	9.8	---	---	---	---	---	---			
25	9.7	8.6	9.1	---	---	---	---	---	---			
26	8.7	8.3	8.6	---	---	---	---	---	---			
27	9.0	7.9	8.4	---	---	---	---	---	---			
28	8.5	7.5	7.9	---	---	---	---	---	---			
29	8.7	7.6	8.1	---	---	---	---	---	---			
30	8.4	7.7	8.0	---	---	---	---	---	---			
31	---	---	---	---	---	---	---	---	---			

TABLE 7

DISSOLVED OXYGEN (DO), MG/L, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	---	---	---	12.8	12.4	12.6	12.1	11.7	11.9
2	---	---	---	---	---	---	13.2	12.5	12.8	12.0	11.4	11.7
3	---	---	---	---	---	---	14.1	12.9	13.7	12.0	11.5	11.8
4	---	---	---	---	14.8	---	14.1	12.8	13.4	12.3	11.4	11.7
5	---	---	---	---	---	---	13.4	12.9	13.1	12.2	10.3	11.5
6	---	---	---	---	15.0	---	13.2	12.5	12.9	12.3	12.2	12.3
7	---	---	---	---	14.3	---	13.7	12.7	13.2	12.2	12.1	12.1
8	---	---	---	14.5	13.7	14.2	13.7	12.6	13.2	12.3	12.1	12.2
9	---	---	---	13.9	13.5	13.7	12.9	12.3	12.7	12.4	12.2	12.3
10	---	---	---	---	13.8	---	13.0	12.4	12.9	12.4	12.0	12.2
11	---	---	---	---	---	---	12.6	11.7	12.2	12.1	11.4	11.7
12	---	---	---	---	---	---	12.6	12.0	12.3	11.5	10.6	11.1
13	---	---	---	---	---	---	12.4	11.8	12.0	11.4	10.6	11.1
14	---	---	---	---	14.0	---	12.0	11.4	11.7	11.5	11.3	11.4
15	---	---	---	14.5	13.0	13.6	12.0	11.6	11.9	11.6	11.3	11.4
16	---	---	---	14.4	13.7	14.1	11.9	11.4	11.7	11.6	11.4	11.5
17	---	---	---	14.7	13.5	14.3	12.2	11.5	11.8	13.1	11.4	12.4
18	---	---	---	14.3	13.4	14.0	12.3	11.7	12.0	12.7	12.6	12.6
19	---	---	---	14.8	13.6	14.4	12.2	11.7	12.0	12.7	12.4	12.6
20	---	---	---	14.9	13.6	14.5	12.4	11.9	12.1	12.6	12.4	12.5
21	---	---	---	14.3	13.4	13.9	12.0	11.5	11.8	12.6	12.3	12.5
22	---	---	---	---	13.5	---	11.9	11.4	11.6	12.5	12.3	12.4
23	---	---	---	---	14.6	---	12.2	11.6	11.9	12.7	12.3	12.5
24	---	---	---	14.9	14.6	14.7	12.1	11.3	11.6	12.5	12.0	12.3
25	13.9	12.1	13.3	14.8	13.9	14.4	12.3	11.4	11.9	12.1	11.9	12.0
26	14.0	13.2	13.7	14.1	12.8	13.6	12.3	11.6	11.9	12.3	11.9	12.1
27	13.4	12.5	13.0	13.6	12.3	12.9	12.2	11.6	11.9	12.4	12.0	12.2
28	12.6	11.7	12.2	12.7	11.4	12.1	12.3	11.6	11.9	12.4	12.1	12.2
29	12.9	11.9	12.3	13.5	12.4	12.8	11.9	11.4	11.6	12.4	12.1	12.3
30	12.6	11.5	12.0	12.9	12.4	12.6	12.1	11.5	11.8	12.4	12.0	12.2
31	11.9	10.2	11.2	---	---	---	12.1	11.7	11.9	12.5	11.9	12.3
MONTH	14.0	10.2	12.5	14.9	11.4	13.7	14.1	11.3	12.3	13.1	10.3	12.0
		FEBRUARY			MARCH			APRIL			MAY	
1	12.4	12.0	12.2	14.1	13.4	13.7	13.0	12.5	12.7	---	---	---
2	12.3	12.0	12.2	13.9	13.3	13.6	13.0	12.6	12.9	10.5	9.1	---
3	12.5	12.1	12.3	14.0	13.5	13.8	12.9	10.7	11.4	11.3	9.8	10.5
4	12.5	12.0	12.2	14.5	13.8	14.2	10.8	10.4	10.6	11.0	9.7	10.3
5	12.5	12.1	12.3	14.2	13.6	13.9	10.4	10.1	10.3	11.2	9.9	10.5
6	12.5	12.2	12.3	14.2	12.8	13.7	10.2	10.2	10.2	11.1	9.5	10.2
7	12.5	11.8	12.1	14.2	12.9	13.6	10.3	10.0	10.2	10.8	9.0	9.4
8	12.0	11.7	11.8	14.6	13.9	14.2	10.1	9.9	10.0	10.2	8.9	9.3
9	12.0	11.5	11.8	14.6	13.9	14.3	12.6	9.8	11.4	10.0	9.2	9.6
10	12.1	11.5	11.9	14.6	13.9	14.3	12.4	12.1	12.3	9.8	9.0	9.4
11	12.1	11.5	11.8	14.7	13.9	14.3	12.5	12.2	12.3	9.3	8.7	9.0
12	12.1	11.4	11.8	14.8	13.9	14.3	12.7	10.7	11.6	9.8	8.6	9.1
13	12.2	11.7	11.9	14.6	13.7	14.2	11.0	10.2	10.8	9.8	8.7	9.2
14	12.2	9.7	11.7	---	13.9	---	10.6	9.9	10.2	9.5	8.5	9.0
15	12.9	12.3	12.6	---	14.6	---	12.5	9.8	10.6	8.9	8.0	8.5
16	13.1	12.4	12.7	---	14.6	---	12.6	12.2	12.4	8.1	7.2	7.7
17	13.0	12.2	12.6	---	14.5	---	12.8	12.5	12.7	8.0	6.1	7.3
18	12.9	11.9	12.5	---	14.5	---	12.8	12.2	12.6	7.0	5.8	6.4
19	12.6	11.8	12.2	---	14.4	---	12.4	12.0	12.2	6.2	5.4	5.8
20	12.7	11.9	12.3	---	14.4	---	11.9	11.7	11.8	6.7	5.3	5.9
21	14.1	12.2	13.2	14.5	14.4	14.5	12.0	11.5	11.8	7.2	5.2	6.3
22	13.8	13.0	13.4	---	---	---	12.6	11.8	12.1	9.4	6.8	8.1
23	13.5	12.7	13.2	---	---	---	12.3	11.3	11.7	8.4	7.2	7.8
24	13.4	12.8	13.1	---	---	---	11.8	10.8	11.1	8.3	7.0	7.6
25	13.4	13.1	13.2	---	---	---	11.0	10.2	10.5	8.2	6.4	7.2
26	14.0	13.2	13.6	---	---	---	11.1	10.4	10.7	7.2	6.0	6.4
27	13.8	13.1	13.5	---	---	---	11.2	10.3	10.7	7.0	5.6	6.4
28	14.1	13.2	13.5	13.8	13.5	13.6	10.3	10.2	10.3	5.9	5.5	5.7
29	---	---	---	13.7	13.4	13.5	---	---	---	6.3	5.4	5.9
30	---	---	---	13.4	13.0	13.1	---	---	---	7.5	6.3	7.0
31	---	---	---	13.0	12.5	12.7	---	---	---	8.1	7.5	7.8
MONTH	14.1	9.7	12.5	14.8	12.5	13.9	13.0	9.8	11.4	11.3	5.2	8.0

TABLE 7 (continued)

DISSOLVED OXYGEN (DO), MG/L, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.5	8.0	8.3									
2	8.6	8.2	8.4									
3	8.5	8.1	8.3									
4	8.5	7.8	8.1									
5	8.2	7.8	8.1									
6	---	---	---									
7	---	---	---									
8	---	---	---									
9	---	---	---									
10	---	---	---									
11	---	---	---									
12	---	---	---									
13	---	---	---									
14	---	---	---									
15	---	---	---									
16	---	---	---									
17	---	---	---									
18	---	---	---									
19	---	---	---									
20	---	---	---									
21	---	---	---									
22	---	---	---									
23	---	---	---									
24	---	---	---									
25	---	---	---									
26	---	---	---									
27	---	---	---									
28	---	---	---									
29	---	---	---									
30	---	---	---									
31	---	---	---									
MONTH	8.6	7.8	8.2									

NOTE: NUMBER OF MISSING DAYS OF RECORD EXCEEDED 20% OF YEAR

TABLE 8

DISSOLVED OXYGEN (DO), MG/L, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	13.5	13.5	13.5	13.5	11.9	13.1	14.2	13.7	14.0
2	---	---	---	---	---	---	13.4	12.8	13.1	14.1	13.2	13.5
3	---	---	---	14.8	12.9	13.9	13.1	12.6	12.8	13.9	13.2	13.6
4	---	---	---	14.3	12.4	13.2	12.8	12.2	12.4	14.2	13.0	13.5
5	---	---	---	14.0	11.8	12.7	14.7	12.1	13.5	14.1	13.5	13.7
6	9.7	9.1	9.5	15.2	12.8	13.8	14.1	12.5	13.3	14.0	13.2	13.5
7	9.9	9.4	9.6	15.7	13.9	14.6	14.3	13.6	13.9	14.0	13.3	13.5
8	10.0	9.4	9.6	15.2	13.3	14.0	14.2	13.3	13.6	13.7	13.1	13.5
9	9.9	9.1	9.5	15.0	13.0	13.7	13.8	12.3	13.4	13.5	12.3	12.9
10	9.4	8.9	9.1	14.3	13.4	13.7	13.7	12.3	12.8	13.4	12.3	12.6
11	9.5	8.7	9.0	15.1	13.4	14.2	13.5	12.1	12.7	12.8	12.3	12.5
12	9.6	8.8	9.0	15.3	14.5	14.7	13.2	12.3	12.6	13.3	11.9	12.3
13	12.2	8.9	10.8	14.7	13.1	14.3	12.8	11.9	12.4	12.5	11.8	12.2
14	12.8	11.6	12.0	15.3	14.3	14.7	13.0	12.2	12.6	13.2	7.6	11.8
15	12.1	11.5	11.7	15.7	14.7	15.1	13.0	9.5	12.0	13.1	12.3	12.7
16	12.6	11.5	11.9	15.7	14.9	15.2	13.4	12.8	13.0	13.5	11.9	12.8
17	14.3	11.6	13.0	15.5	14.5	14.8	13.4	12.8	13.1	13.4	12.1	12.7
18	14.0	12.7	13.3	15.4	14.4	14.9	13.4	12.2	12.9	13.5	12.5	12.9
19	13.5	12.0	12.8	15.7	14.6	15.1	12.7	12.0	12.4	13.6	12.6	13.1
20	13.5	12.0	12.6	15.7	12.7	15.3	12.9	11.7	12.2	13.4	12.4	12.8
21	12.9	11.7	12.2	15.1	12.1	14.5	12.5	11.6	12.0	13.2	12.3	12.8
22	13.0	11.7	12.3	14.3	13.2	13.8	12.9	11.9	12.2	13.4	9.9	12.5
23	14.7	12.0	13.4	13.7	13.1	13.3	12.4	11.8	12.1	12.6	12.0	12.2
24	15.1	13.0	13.8	13.6	12.7	13.1	12.3	11.9	12.0	15.4	14.2	15.1
25	13.9	12.6	13.2	13.5	12.7	13.0	12.5	12.0	12.2	14.6	5.5	12.7
26	13.7	12.5	12.9	13.4	12.5	12.9	14.5	10.9	13.0	14.8	12.4	13.9
27	14.0	12.6	13.1	13.2	12.3	12.8	14.3	13.8	14.1	14.8	13.5	14.0
28	14.4	13.0	13.4	13.7	11.5	12.8	14.0	13.5	13.7	14.8	13.4	14.0
29	14.0	12.4	13.1	13.2	10.4	12.9	13.8	13.3	13.5	15.0	13.6	14.2
30	14.1	12.2	13.0	13.6	10.8	13.0	14.2	13.3	13.7	14.8	13.1	13.7
31	15.7	11.4	14.2	---	---	---	14.6	13.6	14.1	14.1	13.1	13.6
MONTH							14.7	9.5	12.9	15.4	5.5	13.2
		FEBRUARY			MARCH			APRIL			MAY	
1	15.2	10.0	13.4	12.2	11.0	11.4	14.2	13.4	13.8	12.1	11.7	11.9
2	14.2	13.2	13.7	11.9	11.2	11.5	14.1	13.5	13.8	11.7	11.5	11.6
3	14.1	13.2	13.6	11.4	11.0	11.3	14.2	12.8	13.4	12.0	11.5	11.8
4	14.4	13.3	13.9	12.2	11.2	11.9	13.5	12.5	13.1	11.8	11.3	11.7
5	14.5	13.5	14.0	12.6	11.6	12.1	13.6	12.5	12.9	11.5	11.1	11.3
6	14.0	12.0	12.9	12.0	10.8	11.4	14.0	13.3	13.7	11.5	10.9	11.2
7	12.8	11.9	12.3	11.7	10.8	11.3	14.0	13.2	13.5	11.0	10.9	10.9
8	12.7	11.7	12.2	12.3	10.8	11.6	13.6	12.9	13.3	11.3	10.8	11.1
9	12.9	11.9	12.3	12.3	11.4	11.9	13.8	13.2	13.5	11.4	11.1	11.2
10	13.0	11.8	12.3	12.9	11.9	12.4	13.5	12.4	12.9	12.0	11.3	11.6
11	12.8	11.8	12.3	13.3	11.6	12.3	12.9	12.5	12.8	12.1	11.9	12.0
12	13.1	11.9	12.5	12.2	11.3	11.6	12.8	12.0	12.5	12.1	11.6	11.9
13	12.5	11.8	12.1	13.4	11.5	12.3	12.7	12.3	12.5	11.9	11.3	11.6
14	12.6	11.7	12.1	14.4	13.6	14.1	---	---	---	11.3	10.7	11.1
15	12.6	11.7	12.1	14.9	13.3	14.1	---	---	---	11.5	10.2	10.9
16	13.2	12.1	12.7	14.1	12.9	13.6	---	---	---	11.1	9.6	10.7
17	13.3	12.3	12.8	13.5	12.8	13.1	---	---	---	10.3	9.3	9.9
18	13.1	12.1	12.6	13.6	12.8	13.1	13.1	12.4	12.8	10.1	9.2	9.6
19	12.8	12.1	12.5	13.5	13.0	13.2	12.8	12.3	12.5	10.0	9.1	9.6
20	12.6	11.5	12.1	14.0	13.3	13.6	12.6	12.2	12.4	9.7	8.7	9.2
21	12.0	11.4	11.6	14.2	13.7	13.9	12.5	12.2	12.4	10.1	9.5	9.8
22	12.4	11.4	11.9	14.2	13.1	13.6	12.9	12.3	12.6	10.6	9.2	9.9
23	12.0	11.4	11.7	13.8	13.4	13.6	12.8	12.0	12.4	10.4	9.8	10.1
24	12.5	11.5	12.0	14.5	13.8	14.1	12.0	11.4	11.7	10.3	9.3	9.9
25	13.0	11.9	12.4	14.8	13.8	14.2	12.1	11.4	11.6	10.1	9.5	9.8
26	12.8	11.9	12.4	14.3	13.8	14.0	12.1	12.0	12.0	10.0	9.2	9.7
27	12.8	11.4	12.0	14.3	13.5	14.0	12.3	12.0	12.1	9.7	8.9	9.2
28	12.0	10.8	11.5	13.9	13.3	13.5	12.6	12.1	12.2	9.2	4.3	5.9
29	---	---	---	14.0	13.2	13.4	12.6	12.4	12.5	9.8	4.4	7.7
30	---	---	---	13.8	13.4	13.6	12.6	12.5	12.6	9.4	8.4	8.8
31	---	---	---	14.0	13.7	13.8	---	---	---	9.6	8.5	9.1
MONTH	15.2	10.0	12.5	14.9	10.8	12.9				12.1	4.3	10.4

TABLE 8 (continued)

DISSOLVED OXYGEN (DO), MG/L, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.6	8.8	9.4	7.9	7.2	7.6	---	---	---	---	---	---
2	9.2	8.4	8.8	7.7	7.3	7.5	---	---	---	---	---	---
3	9.6	8.2	8.9	7.3	7.0	7.2	---	---	---	---	---	---
4	9.2	8.3	8.8	---	---	---	---	---	---	---	---	---
5	8.4	8.3	8.4	---	---	---	---	---	---	---	---	---
6	9.2	8.5	8.9	---	---	---	---	---	---	---	---	---
7	9.1	8.0	8.7	---	---	---	---	---	---	---	---	---
8	9.2	8.2	8.7	---	---	---	---	---	---	---	---	---
9	9.0	8.4	8.7	---	---	---	---	---	---	---	---	---
10	9.0	8.4	8.7	---	---	---	---	---	---	---	---	---
11	9.1	8.6	8.9	---	---	---	---	---	---	7.1	6.0	6.6
12	9.0	7.9	8.3	8.3	7.8	8.1	---	---	---	6.3	5.7	6.1
13	9.0	7.5	8.4	8.0	7.8	7.9	---	---	---	6.4	6.1	6.3
14	8.8	7.1	7.8	8.1	7.7	7.9	10.4	8.7	9.6	---	---	---
15	7.8	6.8	7.2	7.9	7.4	7.7	10.2	8.7	9.3	---	---	---
16	8.0	6.1	6.4	8.0	7.5	7.7	9.2	8.4	8.8	---	---	---
17	7.9	6.2	7.2	7.9	3.0	6.2	10.0	8.5	9.0	---	---	---
18	8.2	7.8	8.0	7.9	3.6	3.9	9.9	8.4	8.9	9.1	7.4	8.3
19	8.0	7.5	7.7	9.3	5.0	8.4	9.0	7.9	8.3	9.0	7.1	7.9
20	---	---	---	9.0	7.8	8.4	8.1	7.1	7.7	9.0	7.2	7.9
21	---	---	---	8.1	7.4	7.7	9.8	7.1	7.3	9.6	7.6	8.3
22	---	---	---	8.4	5.4	7.4	7.4	6.4	7.0	9.4	7.3	7.9
23	---	---	---	---	---	---	---	---	---	9.7	7.3	8.0
24	---	---	---	8.0	7.4	7.7	---	---	---	9.5	7.2	8.0
25	---	---	---	8.1	7.4	7.7	---	---	---	11.4	7.2	8.7
26	---	---	---	8.0	7.3	7.6	7.2	7.2	7.2	10.6	7.6	8.8
27	---	---	---	8.2	7.4	7.8	---	---	---	10.1	7.2	8.5
28	8.3	7.7	8.0	7.7	6.1	7.5	---	---	---	9.1	7.0	7.9
29	8.0	7.6	7.9	---	---	---	---	---	---	10.0	6.9	8.1
30	7.7	7.4	7.6	8.4	3.3	8.2	---	---	---	10.7	8.3	9.1
31	---	---	---	8.4	8.3	8.4	---	---	---	---	---	---

TABLE 9

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1										---	---	---
2										---	---	---
3										---	---	---
4										---	---	---
5										---	---	---
6										---	---	---
7										---	---	---
8										---	---	---
9										---	---	---
10										---	---	---
11										---	---	---
12										---	---	---
13										---	---	---
14										---	---	---
15										---	---	---
16										---	---	---
17										---	---	---
18										---	---	---
19										---	---	---
20										---	---	---
21										---	---	---
22										13.4	13.2	13.3
23										13.8	13.3	13.5
24										13.4	12.9	13.1
25										13.3	12.8	13.0
26										13.1	12.6	12.9
27										13.1	12.6	12.8
28										13.1	12.8	12.9
29										13.3	12.8	13.1
30										13.3	12.9	13.1
31										13.5	12.8	13.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	13.4	12.9	13.1	12.5	12.1	12.3	---	---	---	11.3	8.9	9.9
2	13.4	12.7	13.1	12.7	11.9	12.2	---	---	---	9.5	7.7	8.6
3	13.8	12.8	13.2	12.7	12.0	12.3	---	---	---	8.4	6.4	7.5
4	13.6	12.8	13.1	12.5	11.7	12.2	---	---	---	8.6	5.5	7.5
5	13.0	12.8	12.9	12.3	11.8	12.1	---	---	---	9.3	7.6	8.3
6	12.9	12.7	12.8	12.5	11.9	12.2	---	---	---	10.2	7.2	8.7
7	12.7	12.6	12.7	12.2	11.6	12.0	---	---	---	10.6	8.6	9.3
8	12.7	12.6	12.7	11.7	11.5	11.6	---	---	---	10.9	8.9	9.8
9	12.8	12.5	12.7	11.8	11.3	11.6	---	---	---	10.2	9.1	9.7
10	12.8	12.6	12.7	11.9	11.4	11.6	---	---	---	9.1	7.5	8.6
11	13.3	12.6	12.9	11.6	11.2	11.4	---	---	---	8.4	6.8	7.3
12	12.7	12.0	12.4	11.8	11.4	11.6	---	---	---	7.4	6.5	7.0
13	12.7	12.0	12.4	11.8	11.3	11.6	---	---	---	10.6	6.6	8.0
14	13.0	11.9	12.4	11.8	11.5	11.7	---	---	---	10.0	8.5	9.0
15	13.1	12.3	12.5	11.8	11.3	11.6	---	---	---	---	---	---
16	13.0	12.2	12.6	11.6	11.2	11.4	12.2	11.7	11.9	---	---	---
17	13.1	12.3	12.7	11.9	11.5	11.7	11.9	11.2	11.5	---	---	---
18	---	---	---	11.9	11.8	11.9	11.4	10.5	11.0	---	---	---
19	---	---	---	12.8	12.0	12.5	10.9	10.4	10.7	---	---	---
20	10.6	10.2	10.4	12.4	11.9	12.1	11.3	10.0	10.7	9.7	7.4	8.6
21	10.9	10.1	10.6	12.4	11.7	12.1	11.4	9.5	10.7	9.6	7.3	8.0
22	11.0	10.4	10.7	11.7	10.4	11.1	12.3	8.8	11.0	---	---	---
23	11.0	10.6	10.8	10.6	10.0	10.3	11.7	10.1	10.8	---	---	---
24	10.9	10.6	10.8	10.0	9.3	9.6	11.0	9.4	10.1	---	---	---
25	11.6	10.7	11.0	9.6	9.1	9.3	10.3	8.9	9.4	---	---	---
26	12.7	5.6	11.7	9.7	9.1	9.3	11.4	9.2	10.1	---	---	---
27	12.8	12.1	12.4	11.7	9.0	10.4	11.6	10.0	10.8	10.5	7.5	9.0
28	12.4	12.0	12.2	11.9	11.3	11.7	11.6	9.8	10.7	10.1	6.8	8.4
29	12.6	11.9	12.4	---	---	---	12.5	9.5	11.1	10.1	6.3	7.8
30	---	---	---	---	---	---	11.8	10.3	11.0	9.7	7.8	8.7
31	---	---	---	---	---	---	---	---	---	11.9	7.9	9.6

TABLE 9 (continued)

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1979 TO SEPTEMBER 1980

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.3	7.1	8.6	10.4	2.3	7.2	9.4	6.4	7.7	8.9	7.1	7.8
2	9.6	7.0	8.4	10.8	7.5	8.8	9.2	6.1	7.4	9.7	7.3	8.3
3	9.8	7.7	8.7	10.5	7.2	8.6	11.1	6.0	8.3	8.7	6.7	7.6
4	10.1	6.9	8.4	9.1	6.3	7.7	10.1	6.9	8.2	9.5	6.5	7.8
5	9.6	8.0	8.7	8.5	6.1	7.1	7.7	7.2	7.4	11.1	7.4	8.9
6	9.2	7.6	8.2	8.9	5.9	7.2	10.4	7.2	8.4	10.8	8.3	9.2
7	7.8	7.1	7.5	8.7	6.4	7.5	8.5	6.2	7.4	10.2	7.9	8.8
8	9.5	7.3	8.5	9.7	5.9	7.6	10.1	6.0	7.8	9.6	7.5	8.4
9	9.2	8.3	8.7	9.4	6.7	7.8	10.0	7.7	8.6	9.7	7.4	8.3
10	9.7	8.2	8.9	9.5	6.5	7.7	10.6	7.7	8.7	9.6	7.6	8.4
11	9.8	8.7	9.3	8.9	6.1	7.2	11.6	8.2	9.5	9.6	7.3	8.7
12	8.7	8.1	8.4	8.8	5.7	7.0	11.5	8.2	9.5	9.2	8.5	8.8
13	9.0	8.0	8.4	8.7	5.5	7.0	10.1	7.9	8.6	8.9	8.4	8.6
14	8.6	7.3	7.9	9.4	6.0	7.4	11.2	7.7	9.3	8.6	8.3	8.5
15	9.2	7.1	8.0	10.7	6.0	7.9	11.5	7.7	9.2	9.8	8.0	9.0
16	9.3	7.4	8.3	9.8	6.4	7.8	8.8	7.5	8.1	10.6	9.0	9.7
17	10.3	7.4	8.7	10.0	6.7	8.0	10.4	7.9	8.9	10.3	9.6	10.0
18	9.8	8.0	8.7	9.3	6.6	7.7	11.5	8.2	9.7	11.0	9.8	10.4
19	10.4	7.8	9.0	9.1	6.3	7.2	12.8	8.0	9.3	10.8	10.0	10.4
20	10.2	8.6	9.2	8.6	6.4	7.3	10.1	8.6	9.0	10.3	9.6	10.0
21	10.5	8.5	9.2	10.4	6.6	8.2	10.7	7.0	8.4	10.8	9.6	10.1
22	10.3	8.1	8.9	10.5	7.3	8.7	10.1	6.6	7.8	10.8	10.0	10.3
23	10.1	7.4	8.5	9.9	7.0	8.2	8.2	5.7	6.9	11.8	9.9	10.7
24	8.6	5.5	7.4	10.0	6.9	8.2	10.5	5.5	8.2	11.4	10.3	10.8
25	8.5	5.4	6.3	10.3	6.8	8.4	11.2	7.2	8.6	11.2	10.1	10.7
26	4.7	2.0	3.2	10.1	6.8	8.2	7.7	6.8	7.3	11.8	10.9	11.2
27	3.8	1.3	2.6	9.4	6.4	7.8	9.0	3.6	7.4	12.2	10.8	11.3
28	5.6	1.3	2.3	8.5	6.2	7.2	9.6	7.1	8.1	11.7	10.6	11.0
29	3.8	1.3	2.4	10.9	6.5	8.6	9.9	6.9	8.1	11.4	10.3	10.9
30	4.7	2.1	3.1	10.1	6.8	8.3	8.9	7.1	7.8	11.3	9.3	10.4
31	---	---	---	10.4	6.6	8.2	8.1	7.0	7.4	---	---	---
MONTH	10.5	1.3	7.5	10.9	2.3	7.8	12.8	3.6	8.3	12.2	6.5	9.5

TABLE 10

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.8	9.4	10.0	13.0	11.8	12.2	13.9	12.6	13.0	---	---	---
2	10.8	9.0	9.9	12.9	11.6	12.1	15.4	12.9	14.2	---	---	---
3	11.4	9.9	10.5	13.2	11.6	12.1	15.6	13.9	14.4	14.5	10.0	12.1
4	11.7	9.9	10.7	13.9	11.6	12.5	15.0	13.6	14.1	14.1	5.9	10.3
5	12.5	10.2	11.1	14.1	12.2	12.8	13.7	13.0	13.4	14.8	8.8	12.2
6	12.0	10.1	10.9	13.4	11.9	12.5	13.3	12.6	12.9	13.5	10.8	11.9
7	11.5	9.3	10.2	13.0	11.8	12.2	13.8	13.0	13.3	11.3	10.5	10.9
8	11.5	8.5	9.9	12.8	11.5	12.0	14.6	13.0	13.5	11.8	10.6	11.2
9	12.6	8.4	10.0	13.0	11.5	12.0	14.5	11.2	13.5	11.9	10.5	11.3
10	11.6	9.8	10.4	13.7	11.6	12.4	14.3	13.4	13.7	12.0	11.3	11.6
11	12.7	10.0	11.0	13.1	11.9	12.3	14.5	13.5	13.9	12.2	11.4	11.6
12	14.3	10.4	12.0	12.4	11.6	11.9	14.3	13.4	13.7	11.7	11.2	11.5
13	13.8	11.7	12.5	12.0	11.3	11.6	14.1	13.4	13.7	11.8	10.8	11.2
14	12.1	11.3	11.7	12.7	11.3	11.8	14.4	13.3	13.8	11.1	10.3	10.8
15	11.3	11.1	11.2	12.8	11.4	11.9	14.0	13.2	13.5	11.3	10.2	10.7
16	12.3	10.8	11.5	13.5	11.7	12.2	13.2	11.9	12.7	11.8	10.9	11.4
17	11.7	10.9	11.2	13.0	11.7	12.2	12.7	11.7	12.1	11.7	10.9	11.3
18	12.5	11.1	11.6	12.9	11.5	12.1	---	---	---	11.7	10.9	11.3
19	13.4	11.4	12.1	13.2	11.6	12.1	---	---	---	11.4	10.7	11.1
20	13.3	11.1	12.2	12.4	11.2	11.6	13.8	12.9	13.5	11.5	10.5	11.2
21	12.8	10.8	11.5	12.6	11.0	11.6	13.4	12.9	13.1	12.0	11.1	11.4
22	12.3	10.9	11.5	12.9	11.2	11.8	13.2	12.4	12.8	13.1	11.7	12.2
23	12.4	11.1	11.7	13.0	11.3	11.8	12.6	11.9	12.2	13.5	12.4	12.9
24	12.2	11.9	12.0	12.9	11.3	11.8	12.5	11.4	12.0	14.0	12.4	12.9
25	12.3	11.9	12.1	12.7	11.3	11.8	---	---	---	14.6	12.7	13.5
26	12.6	11.9	12.2	13.4	11.3	12.2	13.7	12.5	13.3	14.0	13.0	13.3
27	12.5	11.8	12.1	13.8	11.8	12.4	13.6	12.8	13.2	13.5	12.4	12.9
28	13.9	11.9	12.9	12.8	11.6	12.0	13.6	12.6	13.1	13.3	12.3	12.8
29	13.6	12.0	12.6	12.8	11.4	11.9	14.0	12.5	13.3	13.1	5.8	11.8
30	13.1	11.6	12.2	14.0	12.0	12.7	13.4	10.6	11.8	14.4	11.2	13.3
31	12.9	11.7	12.1	---	---	---	10.7	9.7	10.2	13.8	12.6	13.2
MONTH	14.3	8.4	11.4	14.1	11.0	12.1						

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	13.0	11.6	12.6	13.5	11.6	12.7	10.3	6.4	8.6	11.4	9.3	10.2
2	13.4	11.6	12.6	14.0	12.3	12.9	10.2	6.2	8.0	10.5	8.9	10.1
3	14.2	12.4	13.4	14.8	11.9	13.5	12.4	6.3	9.2	9.2	8.2	8.8
4	13.8	13.1	13.5	15.7	13.1	14.1	11.2	9.9	10.6	11.3	8.0	9.4
5	13.8	12.5	13.2	17.1	13.6	15.1	12.1	10.1	11.0	10.6	9.3	10.0
6	13.3	11.9	12.9	17.3	14.9	15.9	12.6	9.8	11.2	10.1	7.7	9.2
7	13.2	12.1	12.7	17.6	14.9	16.0	11.8	9.7	10.8	10.2	8.9	9.5
8	13.5	12.2	12.9	17.6	14.9	16.0	10.7	9.4	10.1	10.2	7.1	8.9
9	13.4	12.0	12.8	15.6	13.2	14.6	12.5	9.3	11.1	10.0	7.6	8.0
10	14.5	12.6	13.4	13.4	12.9	13.2	12.7	10.3	11.4	10.2	8.2	9.2
11	14.3	13.5	14.0	14.5	12.7	13.1	11.3	10.4	10.9	10.3	8.1	9.2
12	14.4	14.1	14.3	---	---	---	12.2	10.7	11.5	9.9	7.8	8.7
13	14.5	13.4	14.0	15.8	9.2	13.9	11.8	8.9	10.7	8.8	7.0	8.0
14	14.5	13.4	13.8	15.6	12.8	14.0	11.4	8.4	9.9	8.7	6.5	7.5
15	---	---	---	15.3	12.3	13.5	12.1	10.2	11.0	8.4	7.4	7.9
16	---	---	---	13.6	12.1	12.8	11.2	8.9	10.1	8.1	7.3	7.6
17	---	---	---	13.5	12.0	12.6	11.0	8.8	9.9	---	---	---
18	13.0	11.2	11.8	13.5	12.0	12.9	11.0	8.8	9.4	---	---	---
19	14.1	11.1	12.1	14.0	12.8	13.1	11.2	8.6	9.7	---	---	---
20	12.9	10.8	12.0	13.9	12.8	13.5	11.9	9.5	10.3	10.3	8.1	9.0
21	11.5	10.2	10.8	13.8	12.9	13.4	9.9	9.1	9.5	10.2	8.0	9.0
22	11.6	9.3	10.5	15.2	13.1	13.7	9.8	9.1	9.4	9.5	7.6	8.3
23	12.0	9.8	10.7	17.0	13.1	14.7	9.0	7.4	8.3	8.6	6.6	7.6
24	14.5	10.6	12.7	15.6	11.4	13.2	8.6	6.9	7.7	8.6	6.5	7.6
25	14.4	12.6	13.3	13.1	10.0	11.4	8.9	6.6	7.7	9.0	7.8	8.2
26	14.2	11.9	13.2	14.8	9.4	11.5	10.0	8.0	8.8	9.7	8.6	9.2
27	12.6	11.6	12.0	14.3	10.5	12.2	11.2	8.4	10.4	10.4	8.4	9.1
28	11.9	11.4	11.7	13.5	9.9	11.1	10.5	8.2	8.9	---	---	---
29	---	---	---	11.3	9.2	10.1	11.1	8.2	9.7	---	---	---
30	---	---	---	11.2	8.9	10.0	10.2	9.4	9.9	---	---	---
31	---	---	---	11.4	7.8	10.0	---	---	---	---	---	---
MONTH							12.7	6.2	9.9			

TABLE 10 (continued)

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	9.7	9.0	9.3	9.2	7.9	8.4	9.7	8.4	9.0
2	9.1	7.8	8.6	10.7	7.6	9.7	9.4	7.9	8.5	9.9	8.6	9.1
3	9.3	7.4	8.2	10.0	9.3	9.5	9.5	7.9	8.5	9.6	8.4	9.1
4	10.2	7.1	8.1	9.3	6.1	7.3	9.6	7.6	8.6	9.7	8.4	8.9
5	9.1	6.1	7.8	10.9	4.1	8.0	9.3	7.4	8.1	9.2	8.2	8.7
6	9.0	7.0	7.9	10.4	8.4	9.1	9.2	7.1	7.9	9.5	8.1	8.7
7	9.1	7.2	7.9	9.6	8.1	8.8	8.4	6.8	7.4	9.4	8.2	8.7
8	8.8	7.4	8.0	8.8	7.6	8.1	7.8	6.2	7.0	9.5	8.0	8.7
9	8.2	7.3	7.8	8.9	7.3	7.9	9.2	6.3	7.5	9.5	7.6	8.5
10	8.6	7.0	7.7	8.9	7.1	7.9	9.4	7.7	8.4	9.5	7.5	8.4
11	8.5	7.0	7.6	6.9	5.2	6.1	9.7	8.0	8.8	9.8	7.7	8.6
12	8.6	7.1	7.6	5.7	4.3	4.9	9.4	7.9	8.4	10.4	7.9	8.8
13	7.8	6.8	7.3	5.8	4.0	4.9	9.7	7.7	8.5	9.9	7.7	8.5
14	7.4	6.2	6.8	9.0	5.8	7.4	9.0	7.7	8.1	10.2	7.9	8.5
15	---	---	---	7.0	4.7	5.8	8.9	7.7	8.1	10.8	8.6	9.7
16	---	---	---	7.7	4.1	5.2	10.2	7.9	8.9	11.1	9.4	10.0
17	9.4	7.7	8.8	---	---	---	10.4	7.6	9.1	10.4	8.7	9.6
18	9.7	8.3	9.3	8.0	5.5	6.9	10.6	7.4	9.0	11.2	8.8	9.8
19	10.9	7.7	9.9	9.1	5.1	6.7	10.4	8.6	9.2	10.8	9.1	9.9
20	10.0	8.3	9.4	8.4	5.7	7.2	10.9	8.2	9.0	11.3	8.9	9.8
21	8.1	4.6	6.3	8.7	6.4	7.5	9.5	6.8	8.4	11.7	8.8	9.9
22	10.9	4.2	8.9	8.8	7.2	7.8	7.7	6.4	6.9	12.4	9.5	10.5
23	10.0	8.4	9.1	8.7	7.2	7.8	9.4	6.4	7.7	10.9	9.6	10.0
24	9.2	8.9	9.0	8.0	6.7	7.3	9.1	7.9	8.3	11.9	9.4	10.2
25	---	---	---	7.7	5.4	6.8	8.7	7.8	8.2	11.5	9.7	10.3
26	---	---	---	8.0	4.6	6.3	8.8	8.0	8.4	10.5	9.0	9.7
27	---	---	---	9.1	2.9	6.9	9.3	8.3	8.9	10.2	8.7	9.3
28	8.3	7.8	8.1	10.7	7.8	9.3	9.2	8.6	8.9	11.1	8.5	9.7
29	---	---	---	10.4	8.6	9.4	9.2	8.5	8.9	12.2	9.5	10.6
30	9.3	7.7	8.2	10.5	8.5	9.2	9.8	8.8	9.2	10.7	9.3	9.7
31	---	---	---	9.8	8.3	8.9	9.5	8.4	8.8	---	---	---
MONTH							10.9	6.2	8.4	12.4	7.5	9.4

TABLE 11

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.8	9.0	9.7	13.4	12.2	12.8	13.1	12.3	12.6	12.6	11.8	12.3
2	11.6	8.9	9.9	---	---	---	12.9	12.6	12.7	12.9	12.2	12.6
3	10.3	9.1	9.6	---	---	---	13.1	12.4	12.7	12.9	12.2	12.6
4	9.9	8.9	9.4	13.8	12.0	13.4	13.3	12.3	12.8	12.3	11.6	12.0
5	10.5	9.3	9.8	13.2	12.0	12.8	13.1	9.3	12.7	12.3	11.8	12.3
6	11.3	9.3	10.3	13.3	12.9	12.9	13.7	12.5	13.1	---	---	---
7	12.7	10.6	11.5	13.3	12.9	13.1	13.0	12.4	12.7	---	---	---
8	13.7	11.4	12.2	13.2	11.8	12.4	14.2	13.0	13.6	13.7	13.2	13.6
9	12.4	11.2	11.8	12.3	11.7	12.0	14.6	13.6	14.0	13.7	13.3	13.6
10	12.2	11.2	11.6	12.3	12.1	12.2	14.3	13.5	13.9	13.8	13.4	13.7
11	12.3	11.0	11.6	12.6	11.9	12.2	14.6	13.9	14.3	13.7	13.1	13.5
12	11.4	10.6	11.1	13.0	12.3	12.5	14.7	14.5	14.6	13.6	13.4	13.5
13	11.1	10.0	10.6	13.4	12.9	13.2	14.9	13.5	14.2	13.5	13.3	13.4
14	10.6	10.0	10.3	14.0	12.6	13.3	14.6	13.2	14.1	13.4	13.0	13.3
15	10.9	9.7	10.3	13.2	12.8	12.9	15.1	14.5	14.8	13.2	13.0	13.1
16	10.4	9.2	9.7	13.7	13.1	13.4	15.3	14.8	15.2	13.1	12.9	13.0
17	9.8	9.2	9.5	13.7	12.1	12.7	15.1	14.4	14.9	13.0	12.9	13.0
18	10.2	9.0	9.7	12.9	12.6	12.8	15.6	14.9	15.3	13.0	12.9	13.0
19	10.1	9.6	9.9	12.7	11.8	12.2	15.4	14.8	15.1	13.1	12.2	12.8
20	10.3	8.8	9.8	12.1	11.8	12.0	15.1	14.1	14.8	12.4	12.2	12.3
21	---	---	---	12.6	12.1	12.4	15.0	14.0	14.4	12.8	12.0	12.6
22	---	---	---	12.6	12.0	12.3	14.6	14.2	14.5	12.7	12.3	12.6
23	---	---	---	12.6	12.1	12.4	14.7	14.5	14.6	12.7	12.2	12.5
24	---	---	---	12.7	12.2	12.5	14.9	13.9	14.4	12.9	12.5	12.7
25	---	---	---	12.9	12.3	12.6	14.6	14.2	14.5	13.0	12.6	12.8
26	---	---	---	13.2	12.8	13.0	14.7	14.5	14.6	13.2	12.5	13.0
27	13.9	13.6	13.7	13.0	11.7	12.4	14.7	12.8	13.5	13.0	12.8	12.9
28	13.6	13.3	13.4	12.5	12.0	12.3	13.3	12.7	13.0	12.5	12.2	12.4
29	14.0	12.2	13.4	13.0	12.5	12.7	13.1	12.4	12.8	12.3	12.0	12.2
30	13.8	13.2	13.5	13.2	12.9	13.1	13.0	12.5	12.7	12.0	11.3	11.9
31	13.4	12.3	12.8	---	---	---	13.0	12.1	12.6	12.1	11.6	11.8
MONTH							15.6	9.3	13.9			

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.8	11.7	11.8	12.4	12.0	12.2	---	---	---	13.2	11.8	12.7
2	11.7	11.7	11.7	13.7	12.0	12.9	---	---	---	12.4	11.2	12.0
3	11.7	11.6	11.7	13.8	12.9	13.5	---	---	---	---	---	---
4	11.8	11.6	11.7	14.0	13.0	13.5	---	---	---	---	---	---
5	11.9	11.8	11.9	14.3	13.7	14.0	---	---	---	---	---	---
6	12.0	11.6	11.8	14.1	13.7	13.9	13.9	9.0	11.6	10.4	9.7	10.1
7	11.7	11.1	11.4	14.2	13.7	14.0	14.0	6.9	11.6	10.3	10.0	10.2
8	11.7	11.0	11.3	14.3	13.0	13.8	13.2	11.0	12.4	10.4	10.0	10.2
9	12.0	11.1	11.9	13.9	12.9	13.7	13.2	11.9	12.7	10.4	10.0	10.2
10	12.1	11.7	11.9	14.0	12.8	13.5	---	---	---	10.3	9.8	10.1
11	11.9	11.2	11.7	14.8	13.0	13.9	13.2	12.1	12.6	10.1	8.9	9.7
12	11.9	11.1	11.7	15.0	13.0	14.1	13.1	12.2	12.9	9.2	8.8	9.0
13	11.8	11.1	11.6	15.2	13.2	14.3	13.2	12.2	12.8	10.0	8.3	9.1
14	11.7	10.9	11.3	16.3	14.1	14.8	13.1	12.3	12.9	9.2	8.8	9.0
15	11.2	10.9	11.0	15.2	12.0	13.4	13.6	12.8	13.1	9.2	8.8	9.0
16	11.7	10.9	11.2	14.2	11.8	12.8	14.4	12.1	12.8	9.2	8.2	8.9
17	13.0	11.0	12.0	14.3	12.1	13.0	14.0	12.1	12.8	9.1	8.3	8.8
18	13.2	12.3	12.9	13.9	10.9	12.6	13.9	12.9	13.4	9.2	8.0	8.6
19	13.2	11.7	12.3	11.7	10.2	11.0	13.6	12.2	13.0	9.0	8.1	8.5
20	12.0	11.1	11.7	10.4	9.6	10.0	13.1	11.7	12.3	9.2	8.1	8.7
21	12.1	11.7	11.9	10.1	8.2	9.3	12.2	11.5	11.9	9.2	8.8	9.0
22	13.0	12.1	12.5	---	---	---	11.8	11.5	11.6	9.1	8.8	9.0
23	13.6	12.1	12.6	14.2	12.2	13.1	12.1	11.3	11.6	9.2	8.0	8.5
24	12.4	12.0	12.2	12.3	11.7	12.1	11.4	10.9	11.2	9.1	8.1	8.4
25	12.4	11.9	12.2	12.2	10.9	11.5	12.1	10.6	10.9	8.4	8.1	8.2
26	12.4	12.0	12.2	12.4	10.0	11.3	11.5	10.4	10.9	---	---	---
27	12.4	12.0	12.2	12.4	9.7	10.8	12.0	10.6	11.3	---	---	---
28	12.4	12.1	12.2	---	---	---	12.6	12.1	12.3	---	---	---
29	---	---	---	---	---	---	12.7	10.6	11.4	10.1	8.9	9.6
30	---	---	---	---	---	---	12.6	11.5	12.2	9.9	9.0	9.5
31	---	---	---	---	---	---	---	---	---	11.1	8.8	9.5
MONTH	13.6	10.9	11.9									

TABLE 11 (continued)

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1981 TO SEPTEMBER 1982

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	11.1	10.0	10.4	8.4	6.3	7.5	6.9	4.9	6.1	11.5	8.6	9.7
2	12.2	10.1	11.1	7.7	6.2	6.8	10.3	4.8	7.7	12.1	7.5	9.6
3	11.2	10.0	10.6	7.2	6.0	6.6	8.2	7.6	7.9	12.0	8.4	9.7
4	11.1	10.0	10.4	8.1	6.0	6.6	10.1	6.9	8.5	11.0	7.5	9.0
5	10.2	8.9	9.7	6.9	5.6	6.1	11.0	6.8	8.5	8.5	6.7	7.4
6	9.7	8.1	8.8	6.1	4.9	5.4	9.6	6.9	8.0	8.5	6.0	7.0
7	9.7	8.3	8.9	5.9	4.8	5.2	8.3	6.2	7.1	11.4	5.5	8.4
8	11.8	8.0	8.9	8.0	4.3	6.1	10.2	5.2	7.5	10.6	8.4	9.4
9	10.4	9.1	9.9	8.3	6.2	7.2	10.1	8.0	8.8	12.1	8.0	9.4
10	10.3	8.0	9.4	7.8	6.0	6.9	10.1	7.0	8.4	10.6	7.6	8.8
11	8.4	7.7	8.1	7.9	6.5	7.2	10.3	6.8	8.6	10.8	7.1	8.5
12	8.0	6.9	7.6	8.7	7.4	8.1	10.8	7.1	8.7	11.6	6.9	8.8
13	9.1	6.9	8.4	9.0	7.1	8.0	10.3	8.1	8.9	10.5	8.2	9.1
14	10.1	8.2	9.2	9.1	7.0	7.8	11.1	7.0	8.6	10.6	8.9	9.8
15	10.3	8.8	9.7	9.0	6.9	7.8	10.9	6.9	8.3	10.4	9.0	9.6
16	9.7	8.8	9.1	8.5	7.4	8.1	9.2	6.3	7.6	10.5	9.0	9.6
17	9.7	8.1	8.8	8.6	7.2	7.9	9.1	6.1	7.3	9.6	9.1	9.3
18	10.0	7.8	8.8	10.2	7.4	8.7	11.0	7.8	8.9	10.0	8.4	9.0
19	9.2	8.2	8.9	10.5	7.7	9.1	11.1	8.1	9.2	10.4	8.2	9.4
20	8.3	8.1	8.2	9.8	7.8	8.8	9.8	6.6	8.2	11.0	9.0	9.8
21	---	---	---	8.9	7.7	8.2	9.2	6.7	7.6	10.7	8.1	9.9
22	9.2	8.1	8.8	10.3	7.1	8.2	11.1	6.2	8.5	10.9	8.4	9.7
23	9.3	8.3	8.7	10.1	8.3	8.9	11.2	7.9	9.2	10.9	9.2	9.4
24	8.7	6.8	7.6	9.6	8.1	8.8	10.4	8.2	8.7	10.2	9.0	9.5
25	8.1	7.0	7.6	8.9	7.4	8.2	10.8	8.3	9.2	11.0	9.0	9.7
26	8.8	7.5	8.0	9.2	7.1	8.4	10.8	7.9	9.0	10.9	8.8	9.6
27	9.1	7.8	8.5	10.2	7.9	9.4	10.6	7.8	8.8	9.3	9.0	9.1
28	10.1	8.6	9.3	10.2	7.9	8.7	10.3	7.9	8.8	11.6	10.5	11.0
29	10.2	8.8	9.5	11.0	7.0	8.9	9.6	7.3	8.3	11.1	8.8	9.9
30	9.2	7.7	8.3	9.9	7.1	8.5	11.1	8.4	9.5	12.0	8.7	10.0
31	---	---	---	8.3	6.1	7.2	12.9	8.1	10.1	---	---	---
MONTH				11.0	4.3	7.7	12.9	4.8	8.4	12.1	5.5	9.3

TABLE 12

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	11.8	10.0	11.0	---	---	---	12.7	12.3	12.5
2	---	---	---	11.8	10.9	11.2	---	---	---	12.8	12.4	12.6
3	---	---	---	11.4	11.0	10.8	---	---	---	12.9	12.5	12.7
4	---	---	---	11.5	10.5	11.1	---	---	---	13.2	12.8	13.1
5	11.2	9.9	10.4	10.8	10.4	10.6	---	---	---	13.2	12.8	13.1
6	10.3	8.9	9.7	11.0	10.6	10.8	---	---	---	13.1	12.2	12.9
7	9.3	8.4	8.9	11.3	10.8	11.1	12.3	12.1	12.2	12.8	12.1	12.5
8	8.6	7.9	8.3	11.6	11.4	11.5	13.2	12.1	13.0	12.4	12.0	12.2
9	8.2	7.4	8.0	12.4	11.5	11.8	13.9	13.0	13.5	13.2	12.2	12.7
10	9.4	7.3	8.5	11.9	11.7	11.8	13.8	13.0	13.5	13.0	12.3	12.8
11	8.7	8.4	8.5	11.9	11.2	11.5	13.2	12.8	13.0	13.2	12.2	12.7
12	8.7	7.3	7.8	11.5	11.1	11.3	15.8	12.8	13.1	13.2	12.9	13.1
13	8.2	6.7	7.4	12.3	11.6	11.9	16.1	12.4	13.1	13.4	12.5	13.1
14	9.0	8.4	8.8	12.4	12.1	12.1	15.9	12.2	12.9	14.0	13.0	13.4
15	10.4	9.2	10.0	13.4	13.3	13.3	13.0	12.1	12.5	13.5	13.1	13.4
16	10.4	7.9	11.4	14.0	13.0	13.6	12.4	12.0	12.2	13.6	12.8	13.1
17	---	---	---	13.7	12.1	13.1	14.9	12.0	12.4	13.7	12.9	13.4
18	---	---	---	13.9	13.0	13.3	12.3	12.1	12.2	13.7	13.1	13.5
19	---	---	---	14.1	13.7	13.9	12.2	12.0	12.1	13.7	13.1	13.4
20	12.0	10.4	11.4	14.2	12.0	12.8	12.4	12.0	12.1	14.8	13.1	14.1
21	11.8	11.0	11.3	13.6	12.1	12.9	13.2	12.0	12.7	14.4	14.0	14.2
22	11.4	10.6	11.1	14.4	12.1	13.4	13.2	12.8	13.0	14.2	13.9	14.1
23	12.0	10.4	11.2	14.4	14.0	14.2	14.1	12.8	13.4	14.3	13.8	14.1
24	12.1	11.2	11.5	14.4	14.0	14.2	---	---	---	14.1	13.7	13.9
25	12.1	10.8	11.4	14.4	13.9	14.1	---	---	---	14.0	13.7	13.9
26	11.8	10.7	11.2	14.1	13.8	14.0	---	---	---	14.2	14.0	14.1
27	11.2	10.0	10.4	---	---	---	13.1	12.0	12.7	14.2	13.8	14.1
28	10.3	10.0	10.1	---	---	---	13.1	12.2	12.5	13.8	13.1	13.5
29	10.4	10.0	10.2	---	---	---	12.4	12.0	12.2	13.1	12.9	13.1
30	11.1	9.9	10.7	---	---	---	12.5	12.1	12.3	13.2	12.8	12.9
31	11.1	10.1	10.7	---	---	---	12.6	12.2	12.4	13.1	12.8	13.1
MONTH	---	---	---	---	---	---	---	---	---	14.8	12.0	13.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	14.2	13.1	13.7	14.8	12.8	13.6	13.2	12.8	12.9	11.0	9.0	9.9
2	14.3	13.8	14.0	15.0	14.2	14.7	13.6	10.1	12.3	11.0	9.8	10.1
3	14.1	13.8	14.0	15.2	14.0	14.6	13.2	12.8	13.0	11.2	8.9	10.4
4	14.0	13.1	13.7	15.1	14.0	14.2	13.8	12.8	13.1	11.2	10.0	10.5
5	13.6	13.0	13.3	14.1	13.0	13.6	14.1	12.2	13.4	11.2	9.8	10.5
6	13.1	12.9	13.0	14.3	12.8	13.5	13.2	12.4	12.6	10.2	8.8	9.8
7	13.2	12.8	13.0	14.2	13.0	13.8	13.5	11.8	12.8	10.2	8.8	9.4
8	14.1	12.8	13.6	14.1	13.0	13.6	13.8	12.5	13.1	11.2	8.8	10.2
9	14.3	13.8	14.0	14.1	13.7	13.9	13.5	11.9	12.7	10.4	9.0	10.2
10	14.0	13.8	13.9	14.2	13.8	13.9	13.7	12.0	12.8	9.2	8.8	9.0
11	14.1	13.2	13.9	14.0	13.7	13.9	14.5	12.9	13.7	11.8	10.0	10.6
12	13.6	13.0	13.2	14.0	13.4	13.8	14.0	12.1	12.9	---	---	---
13	14.0	13.0	13.7	13.7	13.4	13.6	12.3	11.4	12.1	---	---	---
14	14.0	13.6	13.7	13.5	13.1	13.2	12.3	11.4	11.8	---	---	---
15	14.1	13.0	13.7	13.0	12.8	12.9	13.2	11.8	12.6	---	---	---
16	14.1	13.8	14.0	---	---	---	13.3	12.7	13.0	---	---	---
17	14.0	12.9	13.5	---	---	---	13.6	12.9	13.3	11.6	10.0	10.6
18	13.0	12.8	12.9	---	---	---	14.0	13.6	13.7	10.2	9.5	10.0
19	13.1	12.8	13.0	---	---	---	14.2	14.0	14.1	9.8	4.9	8.0
20	14.4	13.0	13.8	---	---	---	14.5	13.5	13.9	10.2	8.9	9.7
21	14.4	14.0	14.1	---	---	---	14.4	13.2	13.7	10.0	8.5	9.2
22	14.3	13.8	14.0	---	---	---	13.3	12.9	13.1	10.6	8.4	9.3
23	14.2	13.8	14.0	---	---	---	13.6	12.5	12.8	10.3	8.3	9.2
24	15.2	13.8	14.6	---	---	---	13.6	12.3	12.7	9.4	8.2	8.8
25	15.2	14.0	14.6	---	---	---	13.3	11.2	12.3	9.2	8.2	8.7
26	14.3	14.0	14.1	---	---	---	12.0	11.1	11.4	10.2	8.2	9.0
27	14.4	14.0	14.1	---	---	---	11.7	10.0	10.8	9.4	8.0	8.6
28	14.4	13.6	14.0	---	---	---	11.0	9.8	10.3	8.9	7.4	8.2
29	---	---	---	13.2	12.9	13.0	11.0	9.9	10.5	9.2	7.9	8.7
30	---	---	---	13.0	12.0	12.3	10.3	10.0	10.1	9.3	7.9	8.6
31	---	---	---	13.1	11.0	12.3	---	---	---	10.2	9.1	9.6

TABLE 12 (continued)

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	8.1	7.0	7.8	9.5	7.8	8.6	9.1	6.2	7.4
2	10.0	8.6	9.3	7.6	6.2	7.1	9.2	7.8	8.2	8.8	6.2	7.4
3	10.5	8.3	8.9	7.2	6.0	6.4	8.6	7.0	7.6	7.6	6.0	6.6
4	9.5	8.4	8.9	6.4	4.8	5.7	8.5	6.3	7.4	7.2	5.8	6.5
5	9.6	8.4	8.8	---	---	---	7.6	6.4	7.0	---	---	---
6	9.8	8.5	9.1	9.0	8.1	8.4	7.0	4.8	6.2	---	---	---
7	10.3	8.0	9.0	9.2	8.1	8.4	8.8	5.0	6.8	9.3	7.7	8.5
8	10.5	8.2	9.0	8.5	7.2	8.2	8.0	6.5	7.3	9.8	8.0	8.6
9	10.6	8.0	8.9	7.5	6.4	7.2	8.1	6.6	7.2	8.3	7.0	7.6
10	10.4	7.5	8.8	6.7	5.4	6.2	7.3	6.2	6.9	8.3	7.1	7.5
11	9.5	7.4	8.3	8.5	5.5	7.2	8.4	6.4	7.2	10.4	7.3	8.7
12	9.7	6.9	8.1	9.1	7.7	8.3	8.6	6.5	7.6	10.3	8.7	9.4
13	9.7	7.5	8.4	9.2	8.2	8.6	7.5	6.3	6.8	10.2	8.8	9.3
14	8.1	7.1	7.5	9.8	8.2	8.7	9.2	5.8	7.6	10.4	8.9	9.5
15	---	---	---	8.7	7.9	8.4	8.3	7.0	7.6	9.8	9.1	9.3
16	---	---	---	8.6	5.5	7.7	7.9	6.8	7.0	10.4	9.3	9.9
17	---	---	---	7.6	5.2	6.3	5.8	4.5	5.2	10.5	9.9	10.1
18	---	---	---	7.9	7.1	7.4	5.3	4.4	4.9	10.7	9.4	10.0
19	---	---	---	8.4	7.5	8.0	6.2	4.5	5.3	10.2	8.9	9.6
20	---	---	---	8.1	6.9	7.5	6.6	5.2	5.9	9.1	8.8	9.0
21	---	---	---	8.4	7.0	7.7	7.4	5.4	6.0	9.2	8.8	9.0
22	---	---	---	8.0	7.1	7.3	6.9	5.7	6.3	9.9	9.0	9.5
23	---	---	---	7.7	6.7	7.1	9.0	5.5	7.4	10.3	9.8	10.0
24	---	---	---	7.9	6.7	7.3	8.8	6.8	7.8	10.2	9.0	10.0
25	---	---	---	8.6	7.0	7.7	8.8	6.8	7.5	10.4	9.0	9.8
26	---	---	---	8.4	7.2	7.3	8.0	6.0	6.9	10.2	8.8	9.5
27	---	---	---	7.3	6.9	7.0	7.2	5.6	6.2	9.8	8.8	9.1
28	8.8	8.0	8.3	8.6	6.4	7.6	7.8	5.8	6.3	9.2	8.0	8.6
29	8.4	8.0	8.2	8.5	7.3	8.0	8.2	6.0	6.9	9.2	7.8	8.2
30	8.8	7.8	8.2	8.1	7.2	7.5	7.8	6.1	6.8	8.0	6.9	7.6
31	---	---	---	9.5	6.5	8.0	8.2	6.2	6.9	---	---	---
MONTH	---	---	---	---	---	---	9.5	4.4	6.9	---	---	---

TABLE 13

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.3	7.0	7.9	10.4	9.8	10.1	13.1	11.8	12.4	---	---	---
2	8.8	7.8	8.2	11.2	10.0	10.5	14.0	12.2	13.3	---	---	---
3	9.1	8.0	8.4	11.1	10.0	10.4	14.1	13.0	13.6	13.2	12.1	12.7
4	9.9	8.0	9.0	11.0	10.0	10.5	14.0	13.0	13.5	13.2	12.4	12.9
5	10.4	9.6	9.7	11.2	10.8	11.0	13.8	12.8	13.3	13.2	12.2	12.9
6	10.9	10.0	10.3	11.0	10.2	10.6	14.4	13.9	14.1	13.2	12.4	12.9
7	10.4	10.0	10.1	11.6	10.8	11.1	14.2	12.8	13.9	13.2	12.8	13.0
8	10.9	10.0	10.3	11.1	9.9	10.4	13.2	12.8	13.0	13.6	12.2	13.0
9	11.7	10.9	11.1	10.4	10.0	10.1	13.2	12.2	12.9	14.0	13.0	13.8
10	---	---	---	11.6	10.0	10.8	13.1	12.1	12.9	14.0	13.0	13.6
11	10.8	9.3	10.0	11.1	10.8	10.9	13.2	12.2	12.9	14.4	12.9	14.0
12	11.8	10.4	10.5	11.6	10.0	10.6	13.1	12.0	12.7	14.4	13.6	14.1
13	12.4	11.8	12.1	12.0	11.2	11.8	14.2	12.0	13.2	14.8	14.0	14.3
14	12.9	12.2	12.6	12.2	11.0	11.6	14.2	13.0	13.8	14.4	13.8	14.2
15	13.0	12.8	13.0	12.1	11.1	11.8	14.1	12.8	13.6	14.3	13.6	14.0
16	13.0	12.8	12.9	12.2	11.6	11.9	14.3	13.0	13.8	14.3	13.6	14.0
17	13.1	12.8	13.0	12.1	11.0	11.5	14.3	13.8	14.1	14.2	13.8	14.1
18	13.2	12.2	12.9	12.0	11.0	11.5	14.4	14.0	14.2	14.3	13.2	13.7
19	12.9	12.8	12.8	11.2	10.2	10.8	14.4	14.0	14.2	14.0	12.8	13.5
20	13.2	12.8	13.0	10.8	10.0	10.2	14.4	14.0	14.2	13.8	12.9	13.1
21	13.2	12.8	12.9	10.4	10.0	10.1	14.4	12.8	13.5	13.2	12.8	12.9
22	13.1	12.2	12.8	11.2	10.2	10.9	14.0	12.4	13.3	13.1	12.8	12.9
23	13.0	12.3	12.8	11.6	10.8	11.0	13.2	12.2	12.9	13.8	12.8	13.2
24	13.0	12.8	12.9	11.8	10.8	11.3	12.9	12.0	12.4	14.4	12.8	13.7
25	13.0	11.0	12.0	12.8	10.9	11.7	13.2	12.1	12.7	14.2	13.9	14.0
26	11.9	11.8	11.8	13.0	11.7	12.1	13.1	12.2	12.4	14.6	13.8	14.0
27	12.0	10.0	10.8	13.0	11.8	12.1	12.3	12.1	12.2	14.8	13.6	14.4
28	10.4	10.0	10.1	12.4	11.6	12.0	12.3	12.0	12.1	14.5	13.3	13.7
29	10.2	9.8	9.9	12.1	11.6	11.9	13.1	12.0	12.4	13.8	12.8	13.1
30	10.4	9.7	10.0	12.1	11.0	11.7	13.2	12.8	13.0	12.8	11.7	12.2
31	10.2	10.0	10.1	---	---	---	---	---	---	10.5	10.1	10.4
MONTH	---	---	---	13.0	9.8	11.1	14.4	11.8	13.2	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	10.4	10.0	10.1	---	---	---	---	---	---	12.5	11.7	12.1
2	11.3	10.1	10.6	---	---	---	14.0	13.4	13.7	12.3	9.5	10.7
3	11.2	10.2	10.6	---	---	---	13.9	12.3	12.8	10.0	8.5	9.2
4	10.7	10.3	10.4	---	---	---	12.5	12.0	12.3	8.6	7.1	7.7
5	11.5	10.6	10.9	---	---	---	12.4	12.0	12.2	7.3	7.1	7.2
6	12.2	11.8	12.0	15.5	14.4	14.8	12.3	11.8	12.0	7.6	6.2	6.9
7	12.9	12.7	12.8	14.7	14.4	14.5	12.0	11.5	11.8	---	---	---
8	12.4	12.0	12.1	15.2	14.3	14.6	12.3	11.6	12.0	11.1	10.8	11.0
9	12.3	11.8	12.0	15.4	14.7	15.1	12.2	11.7	12.0	11.0	9.9	10.4
10	12.9	12.0	12.3	14.8	14.4	14.6	12.1	11.5	11.8	10.8	9.7	10.2
11	13.0	12.0	12.8	15.0	14.5	14.7	11.6	11.2	11.4	9.9	9.2	9.7
12	12.3	12.0	12.1	15.2	14.5	14.9	11.8	11.1	11.5	10.2	9.1	9.7
13	12.4	11.6	12.2	14.8	14.4	14.6	11.8	11.3	11.5	10.0	9.5	9.7
14	11.2	11.0	11.0	14.5	14.2	14.4	11.7	11.5	11.6	10.1	9.2	9.8
15	13.1	12.4	12.8	15.1	14.2	14.6	12.2	11.5	11.8	11.7	9.7	10.7
16	14.8	12.5	13.9	15.2	13.6	14.4	11.9	11.1	11.5	10.6	10.1	10.3
17	14.8	14.3	14.6	15.0	13.6	14.3	11.2	10.9	11.1	10.7	9.6	10.2
18	14.7	14.2	14.5	15.4	14.6	15.1	11.5	10.8	11.1	10.1	9.3	9.7
19	14.8	14.2	14.5	15.5	14.2	15.1	11.7	10.8	11.2	9.5	8.6	9.1
20	---	---	---	15.0	14.7	14.9	11.4	11.0	11.2	10.2	8.4	9.3
21	---	---	---	14.9	14.5	14.7	11.3	10.5	10.9	9.3	8.7	8.9
22	---	---	---	14.8	14.5	14.6	11.4	10.6	11.0	10.5	8.4	9.6
23	---	---	---	15.0	14.6	14.8	11.4	10.7	11.0	10.7	9.7	10.1
24	---	---	---	14.9	14.3	14.6	12.1	10.3	11.1	10.1	9.3	9.7
25	---	---	---	14.5	14.2	14.4	11.7	10.7	11.2	10.1	9.2	9.6
26	---	---	---	14.5	13.7	14.2	11.6	10.7	11.0	10.3	8.9	9.7
27	---	---	---	14.7	13.6	14.1	10.6	10.0	10.3	11.7	9.1	10.0
28	---	---	---	14.8	14.1	14.4	11.6	10.1	10.9	12.1	10.7	11.3
29	---	---	---	14.6	14.1	14.4	12.0	11.2	11.6	11.6	10.2	10.8
30	---	---	---	14.8	14.3	14.6	12.3	11.7	12.0	10.8	9.3	10.1
31	---	---	---	14.8	14.0	14.4	---	---	---	11.6	9.2	10.3
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 13 (continued)

OXYGEN, DISSOLVED (DO), MG/L, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.6	9.3	9.8	8.2	6.6	7.6	9.8	6.9	8.3	8.7	6.3	6.9
2	10.8	8.8	9.6	8.2	7.6	7.9	9.7	6.6	7.9	10.4	6.2	8.0
3	11.7	8.7	10.1	8.6	7.3	8.0	10.0	7.0	8.2	---	---	---
4	10.3	8.3	9.4	8.5	7.8	8.1	8.4	6.3	7.3	9.8	7.3	8.6
5	9.5	8.5	9.0	9.0	7.7	8.4	9.7	6.0	7.9	9.0	6.8	7.8
6	8.5	7.3	8.1	8.8	8.1	8.5	9.0	6.7	7.9	8.8	6.5	7.6
7	---	---	---	8.8	8.1	8.3	8.1	6.4	7.0	10.2	7.5	8.3
8	---	---	---	8.2	7.5	7.9	8.6	6.6	7.4	10.4	7.3	8.5
9	---	---	---	7.7	4.4	6.3	10.1	6.3	7.9	11.6	7.4	9.0
10	---	---	---	5.7	4.5	5.1	9.2	7.3	8.1	10.8	8.0	9.2
11	---	---	---	6.4	4.3	5.0	8.9	6.9	7.8	13.1	7.9	10.1
12	8.9	8.2	8.5	7.7	5.5	6.3	8.5	6.4	7.3	11.1	9.1	9.8
13	8.4	6.1	7.5	7.4	6.0	6.4	10.6	6.1	8.2	11.5	8.8	9.9
14	9.0	5.6	8.0	6.8	5.0	5.9	10.7	7.1	8.6	10.8	8.5	9.6
15	8.7	4.8	7.1	9.1	5.3	6.9	10.4	6.6	8.0	11.3	8.5	9.6
16	5.1	4.3	4.6	8.8	7.9	8.4	10.7	6.5	7.9	11.4	9.2	10.3
17	9.0	4.7	7.4	8.8	8.0	8.4	9.5	6.7	7.8	11.3	9.4	10.2
18	8.0	6.3	6.8	8.9	7.9	8.4	8.6	5.9	7.1	14.3	8.7	10.9
19	8.2	7.9	8.0	8.3	7.4	7.7	10.9	5.1	7.3	13.2	9.1	10.9
20	8.0	7.5	7.8	8.2	6.9	7.6	11.3	7.3	8.8	14.7	8.7	10.8
21	8.2	7.1	7.7	7.6	6.0	6.8	10.7	7.2	8.2	13.9	8.2	10.2
22	7.9	6.0	7.2	8.2	5.7	6.9	8.9	6.7	7.7	10.6	7.7	8.7
23	5.9	4.9	5.3	7.1	6.4	6.9	11.3	6.5	8.9	13.8	7.7	10.0
24	8.2	5.2	7.3	8.1	7.0	7.3	11.3	7.2	9.0	12.7	6.3	9.8
25	8.1	6.5	6.7	8.4	8.3	8.4	8.8	6.1	7.5	13.7	6.2	10.6
26	8.1	7.0	7.6	7.8	6.5	7.1	9.6	5.8	7.4	13.8	10.9	12.2
27	7.9	7.3	7.6	7.2	5.9	6.5	9.8	6.7	8.1	14.9	10.5	12.0
28	7.9	7.1	7.6	7.2	5.9	6.5	10.3	6.5	7.9	14.1	11.2	12.2
29	8.0	7.2	7.6	10.0	5.7	7.7	9.7	6.3	7.7	13.1	11.3	11.9
30	7.5	6.8	7.2	9.4	7.0	8.1	10.8	5.9	7.6	14.4	10.9	12.2
31	---	---	---	11.1	6.9	9.9	9.5	6.6	7.6	---	---	---
MONTH	---	---	---	11.1	4.3	7.4	11.3	5.1	7.9	---	---	---

TABLE 14. Summary of water temperature and dissolved oxygen measurements on 18 August 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
AUG 18,87	B 28 U		0.5	9.05	24.2	1.008	9.12
			1.0	9.10	24.2	1.008	9.17
			2.0	9.30	24.2	1.008	9.37
			3.0	9.20	24.2	1.008	9.27
			4.0	8.50	24.2	1.008	8.57
AUG 18,87	B 22 U		0.5	9.05	24.0	1.008	9.12
			1.0	8.80	24.2	1.008	8.87
			2.0	9.00	24.2	1.008	9.07
			3.0	8.90	24.3	1.008	8.97
			3.3	8.50	24.4	1.008	8.57
AUG 18,87	B 17 U		0.5	8.85	24.2	1.008	8.92
			1.0	7.45	24.1	1.008	7.51
			2.0	6.65	24.2	1.008	6.70
			3.0	6.15	24.3	1.008	6.20
			3.4	6.05	24.3	1.008	6.10
AUG 18,87	B10 U	10:48 AM	0.5	8.60	24.0	1.008	8.67
			1.0	8.40	24.1	1.008	8.47
			2.0	7.35	24.2	1.008	7.41
		10:51 AM	3.0	6.75	24.3	1.008	6.80
			3.5	6.60	24.3	1.008	6.65
AUG 18,87	B 5 U		0.5	8.90	24.1	1.008	8.97
			1.0	8.90	24.2	1.008	8.97
		10:57 AM	2.0	8.10	24.3	1.008	8.16
		10:59 AM	3.0	7.50	24.3	1.008	7.56
			3.3	7.10	24.4	1.008	7.16
AUG 18,87	B 1 U		0.5	9.20	24.2	1.008	9.27
			1.0	9.25	24.2	1.008	9.32
			2.0	9.45	24.5	1.008	9.53
		11:06 AM	3.0	8.30	24.5	1.008	8.37
			3.8	7.60	24.5	1.008	7.66
AUG 18,87	B 28 D		1.0	8.15	24.2	1.008	8.22
			2.0	8.20	24.3	1.008	8.27
		11:23 AM	3.0	8.05	24.5	1.008	8.11
AUG 18,87	B 22 D		0.5	8.70	24.5	1.008	8.77
			1.0	8.55	24.5	1.008	8.62
AUG 18,87	B 8 D		0.4	7.85	24.1	1.008	7.91
AUG 18,87	B 1D		0.3	8.50	24.5	1.008	8.57
AUG 18,87	A 4 U		0.5	9.30	24.2	1.008	9.37
			1.0	9.30	24.4	1.008	9.37
		11:48 AM	2.0	9.50	24.5	1.008	9.58
			3.0	9.45	24.5	1.008	9.53
			4.0	8.90	24.2	1.008	8.97
			5.0	8.05	24.2	1.008	8.11
			5.2	7.90	24.2	1.008	7.96
AUG 18,87	A 2 D		0.5	8.35	24.2	1.008	8.42
			0.9	8.35	24.2	1.008	8.42
			1.9	8.50	24.2	1.008	8.57
			2.8	8.35	24.3	1.008	8.42
			3.8	7.75	24.2	1.008	7.81
		12:04 PM	4.7	7.75	24.3	1.008	7.81

TABLE 15. Summary of water temperature and dissolved oxygen measurements on 20 August 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
AUG 20 ,87	B 1 U		0.5	10.25	23.8	0.958	9.82
			1.0	10.45	24.0	0.958	10.01
		10:56 AM	2.0	8.60	24.0	0.958	8.24
		10:59 AM	3.0	7.80	24.0	0.958	7.47
			4.0	7.35	24.1	0.958	7.04
AUG 20,87	B 6 U		0.5	10.15	23.8	0.966	9.80
			1.0	10.15	23.9	0.966	9.80
			2.0	10.20	24.0	0.966	9.85
		11:20 AM	3.0	9.65	24.0	0.966	9.32
		11:30 AM	3.4	8.45	24.0	0.966	8.16
AUG 20,87	B 9 U		0.5	10.20	23.9	0.971	9.90
			1.0	10.25	24.0	0.971	9.95
			2.0	10.25	24.0	0.971	9.95
			3.0	9.65	24.1	0.971	9.37
			3.5	9.25	24.1	0.971	8.98
AUG 20,87	B 17 U	11:45 AM	0.5	12.10	24.4	0.972	11.76
		11:46	1.0	11.10	24.2	0.972	10.79
		11:48	1.9	9.80	24.0	0.972	9.53
		11:49	2.9	9.60	24.0	0.972	9.33
AUG 20,87	B 22 U		0.5	10.55	24.0	0.975	10.29
		11:53	1.0	10.55	24.0	0.975	10.29
		11:53	2.0	10.45	24.0	0.975	10.19
			3.0	9.95	24.0	0.975	9.70
		11:57	5.0	9.50	24.0	0.975	9.26
AUG 20,87	B 28 U	12:00 N	0.5	11.00	24.0	0.976	10.74
		12:01	1.0	10.85	24.0	0.976	10.59
			2.0	10.40	24.0	0.976	10.15
			3.0	10.05	24.0	0.976	9.81
		12:03 PM	3.4	9.90	24.0	0.976	9.66
AUG 20,87	B 28D		0.5	8.45	24.0	0.981	8.29
			1.0	8.45	24.0	0.981	8.29
AUG 20,87	B 22 D	12:27 PM	0.3	9.15	24.0	0.983	8.99
AUG 20,87	B 8 D	12:31	0.3	8.25	24.3	0.985	8.13
AUG 20,87	B 1 D	12:42	0.3	7.90	24.3	0.987	7.80
AUG 20,87	A 4 U	12:48	0.5	11.20	24.2	0.990	11.09
			1.0	11.20	24.5	0.990	11.09
			2.0	10.75	24.1	0.990	10.64
			3.0	10.20	24.0	0.990	10.10
			4.0	9.90	24.0	0.990	9.80
		12:52	5.1	8.65	23.9	0.990	8.56
AUG 20,87	A 2 D	1:00 PM	0.4	8.50	24.0	0.993	8.44
			0.9	8.50	24.0	0.993	8.44
			1.7	8.60	24.0	0.993	8.54
			2.6	8.75	24.0	0.993	8.69
			3.5	8.60	24.0	0.993	8.54
			4.3	8.10	23.9	0.993	8.04

TABLE 16. Summary of water temperature and dissolved oxygen measurements on 25 August 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
AUG 25,87	C9		0.5	10.80	21.2	0.875	9.45
			1.0	10.80	21.2	0.875	9.45
			2.0	11.20	21.2	0.875	9.80
			2.3	10.60	21.2	0.875	9.28
AUG 25,87	C3		0.5	10.60	21.1	0.878	9.31
			1.0	10.60	21.1	0.878	9.31
			1.5	10.60	21.1	0.878	9.31
			2.0	10.65	21.1	0.878	9.35
AUG 25,87	C15		0.5	10.80	21.2	0.880	9.50
			1.0	10.60	21.2	0.880	9.33
			2.0	10.80	21.2	0.880	9.50
			3.0	10.80	21.2	0.880	9.50
AUG 25,87	C21		0.5	10.70	21.2	0.883	9.45
		10:45 AM	1.0	10.50	21.2	0.883	9.27
			2.0	10.55	21.2	0.883	9.32
			3.0	10.60	21.2	0.883	9.36
			3.5	10.00	21.2	0.883	8.83
			4.0	10.20	21.2	0.883	9.01
							0.00
AUG 25,87	C26		0.5	11.80	21.3	0.887	10.47
		10:52	1.0	11.45	21.3	0.887	10.16
			2.0	11.80	21.3	0.887	10.47
			3.0	12.00	21.3	0.887	10.64
		10:55	4.0	12.00	21.3	0.887	10.64
		10:58	5.4	11.00	21.3	0.887	9.76
AUG 25,87	D	11:21	0.5	11.30	21.1	0.900	10.17
			1.0	11.15	21.2	0.900	10.04
			2.0	11.15	21.2	0.900	10.04
		11:24	2.5	11.10	21.2	0.900	9.99
AUG 25,87	F		0.5	10.05	21.0	0.904	9.09
			1.0	9.50	21.1	0.904	8.59
			2.0	9.50	21.1	0.904	8.59
			3.0	9.30	21.1	0.904	8.41
			4.0	9.50	21.1	0.904	8.59
			4.1				
AUG 25,87	E		0.5	10.15	21.0	0.911	9.25
			1.0	10.15	21.0	0.911	9.25
			2.0	10.20	21.1	0.911	9.29
		11:43	3.0	10.15	21.1	0.911	9.25
AUG 25,87	B 1 U	12:35	0.5	11.15	21.2	0.938	10.46
		12:42	1.0	10.70	21.2	0.938	10.04
			2.0	10.45	21.2	0.938	9.80
			3.0	10.60	21.2	0.938	9.94
			3.5	10.55	21.2	0.938	9.90
AUG 25,87	B 5 U	12:46	0.5	10.80	21.1	0.943	10.18
			1.0	10.85	21.1	0.943	10.23
			2.0	10.35	21.2	0.943	9.76
		12:51	3.0	10.20	21.2	0.943	9.62
AUG 25,87	B 9 U	12:54	0.5	10.70	21.1	0.945	10.11
			1.0	10.65	21.2	0.945	10.06
			2.0	10.60	21.2	0.945	10.02
		12:56	3.0	10.30	21.2	0.945	9.73
			3.3	10.10	21.1	0.945	9.54
AUG 25,87	B 17 U	1:00	0.5	11.65	21.1	0.948	11.04
			1.0	11.15	21.2	0.948	10.57
			2.0	10.90	21.2	0.948	10.33
			3.0	10.80	21.2	0.948	10.24
		1:03	3.4	10.85	21.2	0.948	10.29
AUG 25,87	B 22 U	1:05	0.5	11.65	21.1	0.950	11.07
			1.0	11.50	21.2	0.950	10.93
			2.0	11.70	21.3	0.950	11.12
			3.0	11.60	21.3	0.950	11.02
			3.1				
AUG 25,87	B 28 U		0.5	11.95	21.2	0.955	11.41
		1:15	1.0	11.65	21.4	0.955	11.13
			2.0	11.55	21.3	0.955	11.03
			3.0	11.60	21.3	0.955	11.08
			3.2				
AUG 25,87	B 28 D	1:22	0.5	10.20	21.2	0.958	9.77
			1.0	10.10	21.2	0.958	9.68
AUG 25,87	B 22 D	1:25	0.5	9.80	21.1	0.960	9.41
	B 8 D	1:34	0.5	9.80	21.0	0.964	9.45
	B 1 D	1:38	0.5	9.40	21.0	0.966	9.08
AUG 25,87	A 4 U	1:45	0.5	11.05	20.8	0.969	10.71
			1.0	10.75	21.0	0.969	10.42
			2.0	10.75	21.1	0.969	10.42
			3.0	10.75	21.1	0.969	10.42
			4.0	10.60	21.1	0.969	10.27
			5.0	9.85	21.0	0.969	9.54
AUG 25,87	A 2 D		0.4	9.40	21.0	0.974	9.16
		1:55	0.9	9.35	21.0	0.974	9.11
			1.7	9.35	21.0	0.974	9.11
			2.6	9.50	21.0	0.974	9.25
			3.5	9.40	21.1	0.974	9.16
		1:59	4.3	9.50	21.1	0.974	9.25

TABLE 17. Summary of water temperature and dissolved oxygen measurements on 27 August 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
AUG 27,87	B1U	11:42A	0.5	9.10	19.2	0.902	8.21
			1.0	9.85	19.6	0.902	8.88
			2.0	9.00	19.7	0.902	8.12
			3.0	7.60	19.8	0.902	6.86
			3.5	6.10	19.8	0.902	5.50
	B6U	12:03	0.5	8.90	19.5	0.926	8.24
			1.0	8.80	19.8	0.926	8.15
			2.0	10.00	19.8	0.926	9.26
			3.0	10.60	19.8	0.926	9.82
			3.4	10.20	19.9	0.926	9.45
	B9U	12:10	0.5	9.15	19.5	0.934	8.55
			1.0	8.75	19.8	0.934	8.17
			2.0	9.60	19.8	0.934	8.97
			3.0	10.20	19.8	0.934	9.53
			3.5	9.65	19.8	0.934	9.01
	B13U		0.4	8.30	19.8	0.951	7.89
			0.9	8.95	19.8	0.951	8.51
	B17U	12:25	0.5	8.00	19.5	0.967	7.74
			1.0	9.45	19.8	0.967	9.14
			2.0	10.00	19.8	0.967	9.67
			3.0	8.80	19.8	0.967	8.51
			3.4	7.95	19.8	0.967	7.69
	B22U	12:35	0.5	8.80	19.5	0.983	8.65
			1.0	8.45	19.8	0.983	8.31
			1.5	9.15	19.8	0.983	8.99
			2.5	10.70	19.8	0.983	10.52
		12:41	3.3	10.70	19.8	0.983	10.52
AUG 27,87	B28U	12:45	0.5	8.75	19.5	1.000	8.75
			1.0	8.60	19.8	1.000	8.60
			1.5	9.45	19.8	1.000	9.45
			2.5	10.70	19.8	1.000	10.70
			3.4	11.00	19.8	1.000	11.00
	B28D		0.5	8.60	19.5	1.000	8.60
			1.0	9.20	19.7	1.000	9.20
	B22D	1:03	0.3	9.00	19.5	1.000	9.00
	B8D	1:08	0.3	8.45	19.5	1.000	8.45
	B1D		0.3	8.85	19.5	1.000	8.85
	S	1:20	0.5	9.10	19.8	1.000	9.10
			1.0	9.80	19.8	1.000	9.80
AUG27,87	A5U		0.5	8.55	19.3	1.000	8.55
		1:29	1.0	9.20	19.7	1.000	9.20
			2.0	10.65	19.8	1.000	10.65
			3.0	9.40	19.8	1.000	9.40
			4.0	8.90	19.8	1.000	8.90
			5.0	8.10	19.8	1.000	8.10
	A3U	1:41	0.5	9.10	19.5	1.000	9.10
			1.0	8.30	19.8	1.000	8.30
			2.0	9.35	19.8	1.000	9.35
		1:44	3.0	8.90	19.8	1.000	8.90
		1:47	4.0	8.60	19.8	1.000	8.60
			5.3	8.90	19.8	1.000	8.90
	A0U	1:52	0.5	8.55	19.8	1.000	8.55
			1.0	8.05	19.8	1.000	8.05
			2.0	9.25	19.8	1.000	9.25
			3.0	9.50	19.8	1.000	9.50
			4.0	8.35	19.8	1.000	8.35
			5.0	7.70	19.8	1.000	7.70
AUG27,87	A00D		0.5	8.95	19.8	1.000	8.95
			1.0	9.55	19.9	1.000	9.55
		2:16	2.0	10.05	19.9	1.000	10.05
			3.0	10.25	19.9	1.000	10.25
			4.0	10.20	19.9	1.000	10.20
			4.5	9.20	19.9	1.000	9.20
	A2D		0.4	9.10	19.9	1.000	9.10
			0.9	9.10	19.9	1.000	9.10
			1.7	10.10	19.9	1.000	10.10
			2.6	10.30	19.9	1.000	10.30
		2:33	3.5	9.10	19.9	1.000	9.10
	A5D	2:37	0.5	9.30	19.9	1.000	9.30
			1.0	9.50	19.9	1.000	9.50
			2.0	10.70	19.9	1.000	10.70
			3.0	10.20	19.9	1.000	10.20
			4.0	10.20	19.9	1.000	10.20
		2:48	4.9	8.90	19.9	1.000	8.90
	V	3:01	0.5	8.25	19.8	1.000	8.25
			1.0	8.60	19.8	1.000	8.60
AUG 27,87	DK	3:10	0.5	8.35	19.8	1.000	8.35
			0.8	8.40	19.8	1.000	8.40

TABLE 18. Summary of water temperature and dissolved oxygen measurements on 1 September 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
SEP 1,87	A0U		0.5	9.80	19.5	1.002	9.82
		8:40	1.0	9.60	19.5	1.002	9.62
		8:41	2.0	9.65	19.5	1.002	9.67
		8:44	3.0	8.70	19.5	1.002	8.72
			4.0	8.60	19.5	1.002	8.62
		8:46	5.0	8.20	19.5	1.002	8.22
	A3U	8:56	0.5	10.10	19.2	1.006	10.16
			1.0	10.70	19.5	1.006	10.76
			2.0	10.60	19.5	1.006	10.66
		8:58	3.0	10.30	19.5	1.006	10.36
			4.0	9.95	19.6	1.006	10.01
		9:01	5.3	9.60	19.7	1.006	9.66
	A5U		0.5	9.60	19.2	1.008	9.68
			1.0	9.70	19.5	1.008	9.78
		9:05	2.0	9.90	19.6	1.008	9.98
			3.0	9.90	19.5	1.008	9.98
			4.0	9.90	19.6	1.008	9.98
		9:08	5.1	9.60	19.6	1.008	9.68
SEP 1,87	A00D	9:18	0.5	9.05	19.3	1.012	9.16
			1.0	9.10	19.5	1.012	9.21
		9:20	2.0	9.10	19.5	1.012	9.21
			3.0	9.25	19.5	1.012	9.36
			4.0	9.15	19.5	1.012	9.26
	A2D	9:24	0.4	9.20	19.6	1.013	9.32
			0.9	9.10	19.6	1.013	9.22
			1.7	9.20	19.6	1.013	9.32
		9:27	2.6	9.30	19.7	1.013	9.42
	A5D	9:29	0.5	8.90	19.5	1.016	9.04
			1.0	8.95	19.6	1.016	9.09
			2.0	9.10	19.5	1.016	9.25
			3.0	9.20	19.6	1.016	9.35
			4.0	9.30	19.6	1.016	9.45
			4.6	9.20	19.7	1.016	9.35
SEP 1,87	B1D	9:41	0.2	8.25	19.6	1.017	8.39
	B9D	9:47	0.2	8.50	19.9	1.019	8.66
	B22D	9:56	0.2	9.15	20.0	1.021	9.34
	B28D	10:00	0.5	9.00	19.9	1.023	9.21
			1.0	9.30	19.9	1.023	9.51
SEP 1,87	B28U	10:04	0.5	10.70	19.8	1.024	10.96
			1.0	10.80	19.9	1.024	11.06
			2.0	10.85	19.9	1.024	11.11
			3.0	10.95	19.9	1.024	11.21
			3.4	10.85	19.9	1.024	11.11
	B22U	10:13	0.5	10.60	20.0	1.027	10.89
			1.0	10.75	20.0	1.027	11.04
			2.0	10.95	20.0	1.027	11.25
			3.0	11.00	20.0	1.027	11.30
			3.2	11.00	20.0	1.027	11.30
	B17U	10:18	0.5	10.55	19.9	1.028	10.85
			1.0	10.50	19.9	1.028	10.79
			2.0	10.50	19.9	1.028	10.79
			3.4	10.60	19.9	1.028	10.90
	B13U	10:22	0.5	10.60	19.9	1.029	10.91
			1.0	10.50	19.9	1.029	10.80
	B9U		0.5	10.05	19.9	1.030	10.35
		10:27	1.0	10.10	19.9	1.030	10.40
			2.0	10.25	19.9	1.030	10.56
			3.5	10.45	19.9	1.030	10.76
	B6U	10:31	0.5	10.00	19.9	1.032	10.32
			1.0	10.10	19.9	1.032	10.42
			2.0	10.25	19.9	1.032	10.58
			3.3	10.45	19.9	1.032	10.78
	B1U	10:39	0.5	10.15	19.9	1.033	10.48
			1.0	10.20	19.9	1.033	10.54
			2.0	10.30	19.9	1.033	10.64
			3.6	10.60	19.9	1.033	10.95
	S	10:49	0.5	10.05	19.9	1.036	10.41
			1.0	10.05	19.9	1.036	10.41
	V		0.5	10.40	19.9	1.039	10.81
			1.2	10.50	20.0	1.039	10.91
SEP 1,87	DK		0.5	10.70	20.1	1.039	11.12
			0.8	10.70	20.1	1.039	11.12

TABLE 19. Summary of water temperature and dissolved oxygen measurements on 3 September 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
SEP 3,87	A0U	10:16	0.5	10.25	20.2	1.020	10.46
			1.0	10.60	20.4	1.020	10.81
			2.0	11.25	20.4	1.020	11.48
			3.0	10.20	20.2	1.020	10.40
		10:21	4.0	10.20	20.1	1.020	10.40
			5.1	9.80	20.1	1.020	10.00
	A3U	10:34	0.5	10.00	20.1	1.020	10.20
			1.0	10.15	20.2	1.020	10.35
			2.0	10.80	20.3	1.020	11.02
			3.0	10.50	20.2	1.020	10.71
			4.0	10.20	20.2	1.020	10.40
		10:39	5.4	9.50	20.2	1.020	9.69
	A5U	10:43	0.5	10.30	20.2	1.020	10.51
			1.0	10.20	20.5	1.020	10.40
			2.0	9.80	20.3	1.020	10.00
			3.0	9.95	20.2	1.020	10.15
			4.0	9.85	20.2	1.020	10.05
		10:45	5.2	9.35	20.1	1.020	9.54
SEP 3,87	A00D	10:58	0.5	8.80	20.1	1.020	8.98
			1.0	8.80	20.2	1.020	8.98
			2.0	9.30	20.2	1.020	9.49
			3.0	9.70	20.2	1.020	9.89
			3.8	9.30	20.3	1.020	9.49
	A2D		0.4	9.00	20.2	1.020	9.18
			0.9	8.85	20.2	1.020	9.03
			1.7	9.00	20.2	1.020	9.18
			2.6	9.30	20.2	1.020	9.49
	A5D	11:10	0.5	8.90	20.2	1.020	9.08
			1.0	8.80	20.2	1.020	8.98
			2.0	8.90	20.3	1.020	9.08
			3.0	9.20	20.2	1.020	9.38
			4.7	9.30	20.2	1.020	9.49
	B1D	11:21	0.1	8.50	20.8	1.020	8.67
SEP 3,87	B1U		0.5	10.20	20.9	1.020	10.40
			1.0	10.20	20.9	1.020	10.40
			2.0	10.40	20.9	1.020	10.61
			3.0	10.80	20.9	1.020	11.02
			3.7	11.00	20.9	1.020	11.22
	B8D	11:40	0.1	8.50	21.0	1.020	8.67
	B22D		0.1	8.70	20.9	1.020	8.87
	B28D	11:52	0.5	8.60	21.0	1.020	8.77
	B28U	11:54	0.5	10.25	20.9	1.020	10.46
			1.0	10.20	20.9	1.020	10.40
			2.0	10.20	20.9	1.020	10.40
			3.4	10.90	20.9	1.020	11.12
	B22U		0.5	10.15	21.0	1.020	10.35
			1.0	10.15	21.0	1.020	10.35
			2.0	10.40	21.0	1.020	10.61
		12:14	3.3	10.60	21.0	1.020	10.81
SEP 3,87	B17U	12:16	0.5	10.40	21.0	1.020	10.61
			1.0	10.35	21.1	1.020	10.56
			2.0	10.20	21.0	1.020	10.40
		12:19	3.4	10.20	20.9	1.020	10.40
	B13U		0.5	10.50	21.0	1.020	10.71
		12:21	1.0	10.55	21.0	1.020	10.76
	B9U	12:23	0.5	10.60	21.0	1.020	10.81
			1.0	10.55	21.0	1.020	10.76
			2.0	10.70	21.1	1.020	10.91
		12:25	3.5	10.80	21.0	1.020	11.02
	B6U	12:27	0.5	10.60	21.0	1.020	10.81
			1.0	10.60	21.1	1.020	10.81
			2.0	10.60	21.1	1.020	10.81
		12:30	3.3	10.70	21.0	1.020	10.91
SEP 3,87	S	12:36	0.5	10.55	20.9	1.020	10.76
			0.8	10.40	20.9	1.020	10.61
	V	12:55	0.5	10.60	20.9	1.020	10.81
				10.60	20.9	1.020	10.81
	DK	12:58	0.5	11.00	21.1	1.020	11.22
			0.9	10.90	21.4	1.020	11.12

TABLE 20. Summary of water temperature and dissolved oxygen measurements on 11 September 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
SEP 11,87	A0U	11:54	0.5		20.1		9.22
	A3U	12:32	0.5		20.0		9.52
	A5D	12:50	0.5		19.9		8.82
	B1U	1:00	0.5		20.2		9.97
		1:09	2.0				9.51
	B28U	1:26	1.3				10.15
	B1D		0.5				8.65

TABLE 21. Summary of water temperature and dissolved oxygen measurements on 21 September 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
SEP 21,87	A0U		0.5	10.15	17.5	0.914	9.28
		10:24	1.0	9.80	17.5	0.914	8.96
			2.0	9.10	17.5	0.914	8.32
			3.0	8.40	17.5	0.914	7.68
		10:27	4.0	8.20	17.5	0.914	7.49
			5.1	7.70	17.5	0.914	7.04
	A3U	10:43	0.5	9.20	17.5	0.992	9.13
			1.0	9.20	17.5	0.992	9.13
			2.0	9.10	17.5	0.992	9.03
		10:45	3.0	8.90	17.5	0.992	8.83
			4.0	8.50	17.5	0.992	8.43
			5.4	8.20	17.5	0.992	8.13
	A5U	10:54	0.5	9.25	17.5	0.992	9.18
			1.0	9.40	17.5	0.992	9.32
			2.0	9.30	17.5	0.992	9.23
			3.0	9.20	17.5	0.992	9.13
			4.0	9.00	17.5	0.992	8.93
			5.2	8.70	17.5	0.992	8.63
SEP 21,87	A00D	11:09	0.5	10.40	17.4	0.868	9.03
			1.0	10.60	17.5	0.868	9.20
			2.0	10.50	17.5	0.868	9.11
			3.0	10.40	17.5	0.868	9.03
			4.0	10.90	17.5	0.868	9.46
	A2D		0.4	11.00	17.5	0.868	9.55
		11:18	0.9	11.00	17.5	0.868	9.55
			1.7	11.00	17.5	0.868	9.55
			2.6	10.80	17.5	0.868	9.37
	A5D	11:22	0.5	11.20	17.5	0.868	9.72
			1.0	11.20	17.5	0.868	9.72
			2.0	11.00	17.5	0.868	9.55
			3.0	10.80	17.5	0.868	9.37
			4.5	10.75	17.5	0.868	9.33
SEP 21,87	B1U		0.5	10.90	17.5	0.865	9.43
			1.0	10.70	17.5	0.865	9.26
		11:45	2.0	10.60	17.5	0.865	9.17
			3.0	10.30	17.5	0.865	8.91
	B1D	11:51	0.2	11.00	17.5	0.865	9.52
	B8D	11:58	0.2	10.45	17.5	0.865	9.04
	B22D	12:04	0.2	11.20	17.5	0.865	9.69

TABLE 21 (continued)

	B28D	12:10	0.5	11.20	17.5	0.865	9.69
			1.0	11.20	17.5	0.865	9.69
	B28U	12:15	0.5	11.60	17.5	0.865	10.03
			1.0	11.50	17.5	0.865	9.95
			2.0	11.55	17.5	0.865	9.99
			3.4	11.50	17.5	0.865	9.95
SEP 21,87	B22U	12:22	0.5	11.40	17.5	0.865	9.86
			1.0	11.40	17.6	0.865	9.86
			2.0	11.40	17.5	0.865	9.86
			3.4	11.40	17.5	0.865	9.86
	B17U		0.5	11.30	17.5	0.865	9.77
			1.0	11.30	17.5	0.865	9.77
			2.0	11.30	17.6	0.865	9.77
	B13U		0.5	10.90	17.5	0.865	9.43
			1.0	10.80	17.5	0.865	9.34
	B9U	12:37	0.5	10.80	17.4	0.865	9.34
			1.0	10.80	17.5	0.865	9.34
			2.0	10.80	17.5	0.865	9.34
			3.3	10.85	17.5	0.865	9.39
	B 6U	12:44	0.5	11.25	17.5	0.865	9.73
			1.0	11.20	17.5	0.865	9.69
			2.0	11.00	17.5	0.865	9.52
			3.4	10.95	17.5	0.865	9.47
SEP 21,87	S		0.5	11.40	17.5	0.865	9.86
		12:53	1.2	11.20	17.5	0.865	9.69
	V		0.5	10.90	17.5	0.865	9.43
		1:07	1.0	10.85	17.5	0.865	9.39
	DK	1:10	0.5	11.05	17.5	0.865	9.56
			0.9	11.00	17.6	0.865	9.52

TABLE 22. Summary of water temperature and dissolved oxygen measurements on 23 September 1987.

COON RAPIDS D.O. STUDY DATA

DATE	Location	Time	Depth	D.O.Meter	Temp.	Factor	D.O.
SEP 23,87	A0U		0.5	11.60	18.2	0.881	10.22
		10:49	1.0	11.60	18.2	0.881	10.22
			2.0	11.60	18.2	0.881	10.22
			3.0	10.80	18.0	0.881	9.51
			4.0	10.70	18.0	0.881	9.43
			5.1	10.20	18.0	0.881	8.99
	A3U	11:04	0.5	11.70	18.2	0.881	10.31
			1.0	11.70	18.5	0.881	10.31
			2.0	11.65	18.3	0.881	10.26
			3.0	11.65	18.3	0.881	10.26
			4.0	11.65	18.3	0.881	10.26
		11:10	5.3	10.90	18.1	0.881	9.60
SEP 23,87	A5U	11:15	0.5	11.70	18.3	0.881	10.31
			1.0	11.65	18.3	0.881	10.26
			2.0	11.60	18.3	0.881	10.22
			3.0	11.55	18.2	0.881	10.18
		11:17	4.0	11.20	18.1	0.881	9.87
			5.1	10.90	18.1	0.881	9.60
	A00D	11:27	0.5	10.95	18.2	0.881	9.65
			1.0	11.00	18.2	0.881	9.69
			2.0	10.95	18.2	0.881	9.65
			3.0	10.95	18.2	0.881	9.65
			4.0	10.80	18.2	0.881	9.51
			4.7	10.05	18.1	0.881	8.85
	A2D	11:41	0.4	10.80	18.2	0.881	9.51
			0.9	10.80	18.2	0.881	9.51
			1.7	10.80	18.2	0.881	9.51
SEP 23,87	A5D	11:45	0.5	10.85	18.2	0.881	9.56
			1.0	10.85	18.2	0.881	9.56
			2.0	10.85	18.2	0.881	9.56
			3.0	10.85	18.2	0.881	9.56
			4.0	10.85	18.2	0.881	9.56
	B1U		0.5	11.95	18.9	0.881	10.53
			1.0	11.95	18.9	0.881	10.53
			2.0	11.80	18.8	0.881	10.40
			3.7	11.80	18.8	0.881	10.40
	B1D	12:10	0.1	10.80	18.9	0.881	9.51
	B8D	12:19	0.1	10.60	18.8	0.881	9.34
	B22D	12:25	0.1	11.20	18.8	0.881	9.87
SEP23,87	B28D	12:29	0.5	10.80	18.8	0.881	9.51
			1.0	10.80	18.8	0.881	9.51
	B28U	12:36	0.5	12.80	19.0	0.881	11.28
			1.0	12.60	18.8	0.881	11.10
			2.0	12.05	18.8	0.881	10.62
			3.4	11.90	18.7	0.881	10.48
	B22U		0.5	12.90	18.9	0.881	11.36
		12:44	1.0	12.90	18.9	0.881	11.36
			1.5	12.00		0.881	10.57
			2.0	11.90	18.6	0.881	10.48
			2.5	11.90		0.881	10.48
			3.3	11.90	18.5	0.881	10.48
	B17U	12:49	0.5	13.00	18.9	0.881	11.45
			1.0	12.40	18.8	0.881	10.92
			2.0	12.30	18.8	0.881	10.84
	B13U	12:57	0.5	12.30	19.0	0.881	10.84
			1.0	12.05	19.0	0.881	10.62
SEP 23,87	B9U		0.5	11.60	18.7	0.881	10.22
			1.0	11.80	18.7	0.881	10.40
		1:00	2.0	11.60	18.7	0.881	10.22
			3.5	11.60	18.6	0.881	10.22
	B6U	1:03	0.5	11.70	18.6	0.881	10.31
			1.0	11.70	18.7	0.881	10.31
			2.0	11.65	18.7	0.881	10.26
			3.4	11.65	18.7	0.881	10.26
	S	1:12	0.5	13.00	19.0	0.881	11.45
			0.8	12.70	19.1	0.881	11.19
	V		0.5	12.10	19.2	0.881	10.66
			1.0	12.20	19.0	0.881	10.75
	DK		0.5	12.20	19.1	0.881	10.75
			0.9	12.20	19.0	0.881	10.75

TABLE 23. Summary of Dissolved Oxygen Measurements Below the Old Powerhouse at Coon Rapids on 14 January 1988

COON RAPIDS D.O. STUDY DATA

Location	Time	Depth (m)	D.O. (mg/ℓ)
A5D	2:00 p.m.	.5	12.29
A5D		1.0	7.72
A5D		1.5	.68
A5D		2.0 bottom	.44
A2D	2:20 p.m.	.5	12.87
A2D		1.0	7.24
A2D		1.5	1.15
A2D		2.0 bottom	.71
A00D		1.0	5.79

–

The samples were taken in the following order: 1m, 2m, 1.5m and .5 m

Approximate ice layer thickness: 30–40 cm

Temperature: –15/–17° C

River bottom at point A00D: ≃ 1.4 m

TABLE 24. Summary of Dissolved Oxygen Measurements Below the Old Powerhouse of Coon Rapids on 14 February 1988

COON RAPIDS D.O. STUDY DATA

Location	Time	Depth (m)	D.O. (mg/ℓ)
A5D	11:30 a.m.	.5	12.5
A5D		1.0	6.23
A5D		1.25*	4.43
A2D	12:00 noon	.5	12.65
A2D		1.0	6.53
A2D		1.20**	5.55
A00D	12:30 p.m.	.5	12.41
A00D		1.0	9.00
A00D		1.20**	3.6

*Bottom at 1.5 m
**Bottom at 1.45 m
***bottom at 1.45 m

Approximate ice layer thickness 40–50 cm

Temperature: –10/–8° C

TABLE 25. Summary of mid–winter D.O. Data Upstream and Downstream of the Primary Spillway at Coon Rapids

Date	Upstream	Downstream	Location
	D.O. (mg/ℓ)	D.O. (mg/ℓ)	
Jan. 22, 1985	11.15	12.41	Left Bank
	11.15	12.68	Right Bank
Feb. 12, 1985	10.7	12.13	Left Bank
	10.7	12.36	Right Bank
Jan. 9, 1986	11.88	12.86	Left Bank

TABLE 26. Corrected Dimensionless Deficit Ratio for 20° C

Date	Temperature (° C)	Value of r	WLD (ft)[1]	K coeff.
Jan. 22, 1985	20	1.92	12.41	0.052
Feb. 17, 1985	20	1.91	11.68	0.055
Jan 9, 1986	20	1.73	7.3	0.072

[1]WLD: Water level difference

TABLE 27. Computed Values for the Coon Rapids Main Spillway Mid–Winter Deficit Ratio Coefficient

Date	Water Temp. (°C)	MVDO (mg/ℓ)[1]	MDDOC (mg/ℓ)[2]	SC (mg/ℓ)[3]	Value of R	Value of R (Model)[4]
Jan 22, 1985	0.5	11.15	12.54	14.39	1.7	1.94
Feb. 12, 1985	0.7	10.7	12.24	14.31	1.7	1.88
Jan. 9, 1986	0.3	11.88	12.86	14.49	1.6	1.48

[1]MVDO = mean upstream dissolved oxygen concentration

[2]MDDOC = mean downstream dissolved oxygen concentration

[3]SC = saturation concentration

[4]Computed value of r using Tsviglou model.

TABLE 28. Downstream Impact Assessment of Hydropower Operation

Date	Mean D.O. Concentration Upstream of Spillway	% of Saturation	Mean D.O. Concentrations Downstream of Spillway	% of Saturation	Mean Downstream Concentrations with Hydroplant Operations at Max. Avail. Discharge
Aug. 18, 87	8.30 mg/ℓ	99.3	8.33 mg/ℓ	99.7	8.19 mg/ℓ
Aug 20, 87	9.66 mg/ℓ	115	8.30 mg/ℓ	99	9.15 mg/ℓ
Aug. 25, 87	10.35 mg/ℓ	116.7	9.5 mg/ℓ	107.1	9.90 mg/ℓ
Aug. 27, 87	8.78 mg/ℓ	96.4	8.84 mg/ℓ	97.1	8.20 mg/ℓ
Sep. 1, 87	10.82 mg/ℓ	119	9.1 mg/ℓ	100	10.57 mg/ℓ
Sep. 3, 87	10.68 mg/ℓ	119.7	8.75 mg/ℓ	98.1	10.83 mg/ℓ
Sep. 11, 87	9.88 mg/ℓ	108.9	8.65 mg/ℓ	95.4	9.72 mg/ℓ
Sep. 21, 87	9.6 mg/ℓ	100.5	9.49 mg/ℓ	99.5	9.35 mg/ℓ
Sep. 23, 87	10.62 mg/ℓ	114.2	9.55 mg/ℓ	102.7	10.34 mg/ℓ