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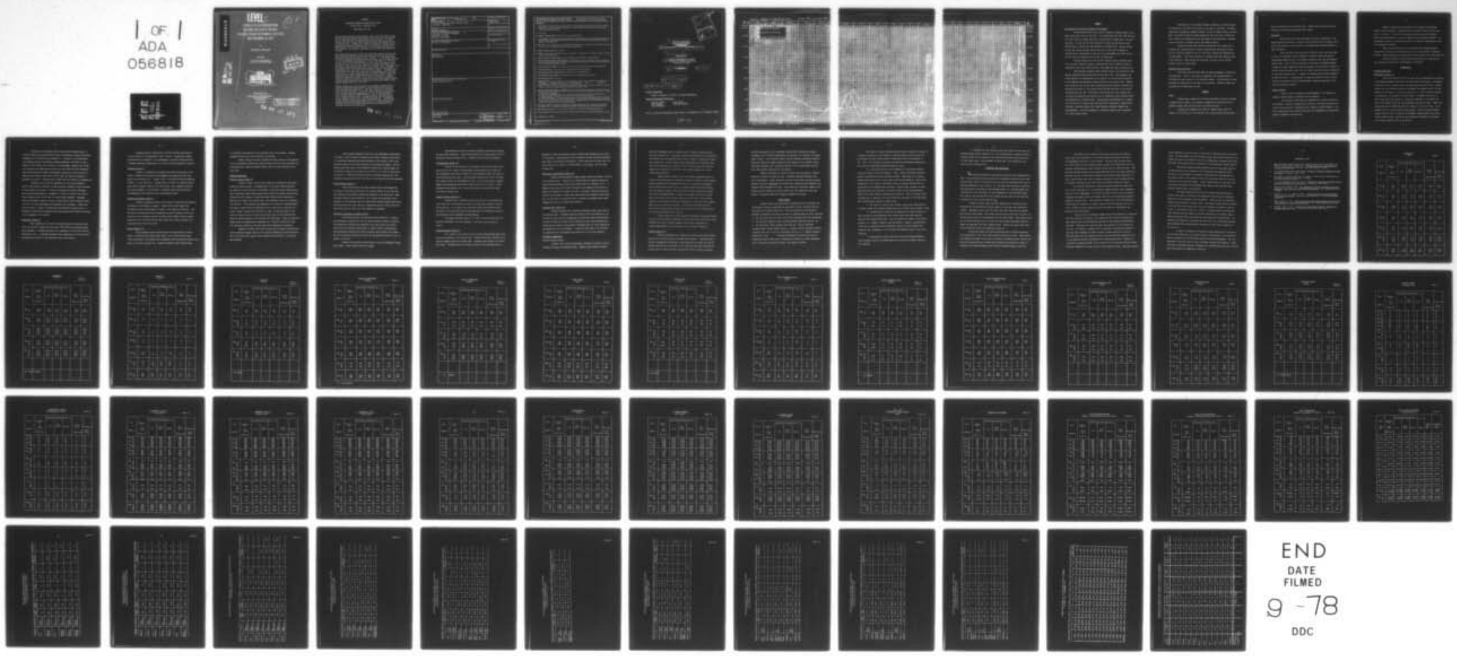

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CORALVILLE RESERVOIR WATER QUALITY STUDY WATER YEAR OCTOBER 1, 1976 TO SEPTEMBER 30, 1977

by

Donald B. McDonald

sponsored by

U.S. Army Corps of Engineers
Contract No. DACW25-77-C-0062

IIHR Report No. 213

Iowa Institute of Hydraulic Research
The University of Iowa
Iowa City, Iowa

March 1, 1978

ABSTRACT

CORALVILLE RESERVOIR WATER QUALITY STUDY

October 1976 - September 1977

IIHR Report No. 213

The Coralville Reservoir Water Quality Project was initiated in 1964 and has continued without interruption since that time. The purpose of the study has been the determination of the effects of a flood control reservoir on the chemical and biological characteristics of its parent river. Samples for a number of physical, chemical and biological water quality parameters were collected from the Iowa River upstream from the reservoir; from the top, mid-depth, and bottom of the reservoir; and from the Iowa River at two points downstream from the dam.

Data obtained during this study have consistently shown that the limnology and water quality of the Iowa River and Coralville Reservoir have been influenced primarily by four factors: 1) non-point source pollution resulting from agricultural activities in the drainage basin; 2) the hydrological characteristics of the Iowa River; 3) the morphometry of the Coralville Reservoir; and 4) the fluctuations in the storage and pool level of the reservoir resulting from flood control operation. During the present water year, October 1976 - September 1977, the significance of non-point source pollution and the hydrological characteristics of the river were especially evident. Throughout most of the 1977 water year river flow into the impoundment was far below normal and as a result concentrations of several parameters were substantially lower than levels observed during prior years. These effects were especially evident in the case of turbidity, suspended solids, nitrates and bacterial populations which reached their maximum concentrations during high flow periods and exhibited minimal levels during extended periods of low flow.

Special studies were also instituted to determine concentrations of several organochlorine pesticides in fish collected from the Iowa River and Coralville Reservoir. Fish were collected on a monthly basis at three locations: 1) the Iowa River near the county road a short distance above the impoundment, 2) the Coralville Reservoir near the Lake MacBride Fisheries Station, and 3) the Iowa River a short distance below the dam. Species collected included typical bottom feeding forms as well as carnivorous species. A comparison of data obtained during the present (1976-1977) study with that obtained during earlier studies indicates that a steady decrease in pesticide levels in fish taken from the Coralville Reservoir has occurred over the past eight years.

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CORALVILLE RESERVOIR
WATER QUALITY STUDY.

[redacted]

WATER YEAR OCTOBER 1, 1976 TO SEPTEMBER 30, 1977.

(9) Annual rept.

Submitted by

(10) Donald B. McDonald, Professor
Division of Energy Engineering
University of Iowa

(11) 1 Mar[redacted]78 (12) 66p.

(14) IIHR-213

(15) DACW25-77-C-0062

Project Supervisor:

Donald B. McDonald, Professor of Energy Engineering

Research Assistants (Part-time):

Suzanne Bangert
Judy Freitag
Tracy Middleton
Scott Prill
Mary Beth Watson

Data for plotting hydrological graph (Plate 1) furnished by U.S. Geological Survey

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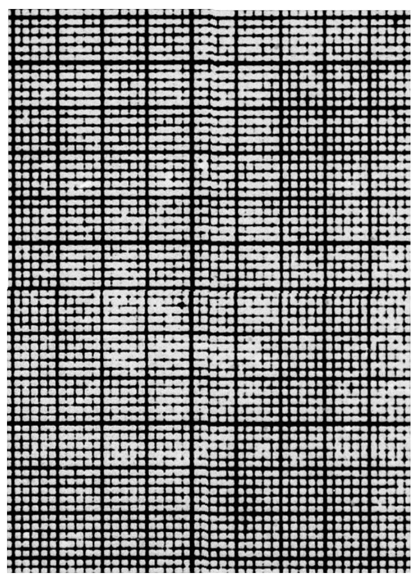

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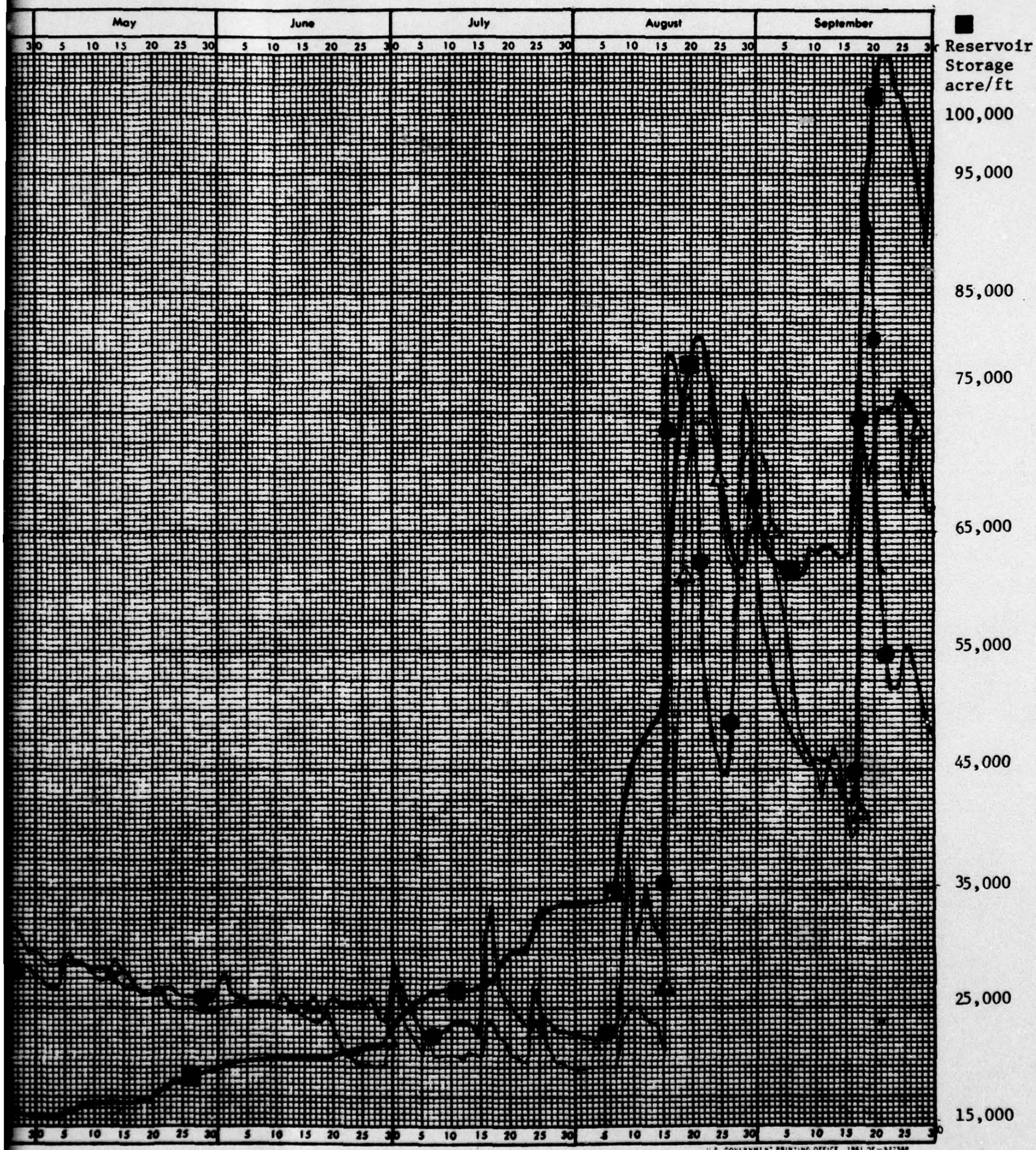
May
June
July
August
September
Reservoir Storage acre/ft
100,000
95,000
85,000
75,000
65,000
55,000
45,000
35,000
25,000
15,000

GENERAL

Description of the Area and Scope of the Project

The Coralville flood control dam is located in Johnson County, Iowa, about three miles north of Iowa City. At conservation pool level, 680 feet msl, it forms a lake 21.7 miles long with a surface area of 4,900 acres. At spillway level, 712 feel msl the lake extends 35.1 miles upstream from the dam. Surface area of the lake at this elevation is 24,800 acres. During a period in the late winter and early spring the level of the pool is reduced to 670 feet msl in anticipation of the use of the impoundment for flood control. At this level the reservoir has an area of 1,820 acres.

Surveys conducted in 1974 and 1975 indicate that at spillway level (712 feet msl) reservoir capacity is 469,400 acre feet; 40,300 acre feet at conservation pool level (680 feet msl); and 10,600 acre feet at 670 feet msl.

The Coralville Reservoir Water Quality Project was initiated in 1964 and has continued without interruption since that time. The purpose of the study has been the determination of the effects of a flood control reservoir on the chemical and biological characteristics of its parent river. Samples were collected from the Iowa River upstream from the reservoir; from the top, mid-depth and bottom of the reservoir and from the Iowa River at two points downstream from the dam. From October 1976 through July 1977 samples were collected and analyzed twice monthly for all parameters except plankton which was enumerated on a monthly basis. During August and September 1977 samples were collected on a weekly basis and analyzed for temperature, conductivity, turbidity, dissolved oxygen, pH, carbon dioxide, alkalinity ammonia and orthophosphate. All other parameters, including plankton, were determined on a twice monthly basis.

Determinations of pH, carbon dioxide, alkalinity, dissolved oxygen and temperature were made in the field at the time of collection. Turbidity, conductivity, phosphate, ammonia nitrogen, nitrate nitrogen, solids, threshold odor, 5-day 20^{o}C biochemical oxygen demand and total and fecal coliform and fecal streptococcus populations were determined in the laboratory. Plankton counts were made to determine genera and numbers present.

During the current year special studies were also carried out to determine the concentrations of several organochlorine pesticides in fish from the Coralville Reservoir and the Iowa River upstream and downstream of the impoundment. Fish were collected on a monthly basis when weather conditions permitted. These studies are described in detail in the "special studies" portion of this report.

Administrative and Fiscal

The project was continued under the same arrangement as during the preceding year. The U.S. Army Corps of Engineers, Rock Island District, furnished the major portion of the financial support. The University of Iowa furnished the remainder of the funds for the project. Laboratory space was furnished by the University of Iowa.

METHODS

Field

Routine water samples were collected throughout the year utilizing a Kemmerer water sampler. All reservoir samples were collected from the Mehaffey Bridge, about 6½ miles above the Coralville Dam.

Upstream river samples were taken at Johnson County Road "O". Samples of the outflow for the reservoir were collected from the Iowa River about one mile below the Coralville Dam. Samples were also taken from the Iowa River at the University Water Plant intake.

Laboratory

All laboratory work was performed in the water laboratory of the Energy Engineering Division, located in the University Water Treatment Plant. All of the chemical tests were made in accordance with Standard Methods[1] or EPA[2] procedures.

Total and fecal coliform and fecal streptococcus counts were made by use of the Millipore Filter procedure. Plankton counts were made on centrifuged samples by use of the Whipple micrometer disc and the Sedgwick-Rafter slide. Both of these procedures are described in Standard Methods. A sample of uncentrifuged water was also examined from each site in order to include those blue-green algae that are lighter than water and are eliminated by the centrifuging process. A summary of methods used in routine analysis is given in Table 1. Determination of pesticide residues in fish utilized extraction procedures and gas chromatographic techniques described in the Pesticide Analytical Manual.[3]

Quality Control

Quality control procedures were implemented for all laboratory analysis, field sampling techniques and data handling.

All biological procedures were performed in accordance with Standard Methods. Bacterial analyses were carried out utilizing sterilized collection bottles, sterile, disposable petri dishes and quality medias. Incubator temperatures were routinely monitored with thermometers with National Bureau of Standards certification.

Chemical procedures were performed in accordance with Standard Methods or EPA procedures. Standards were run within the matrix of the samples at all times. The bulk of the reagents used were American Chemical Society certified quality or top line reagents from reputable companies. All instruments involved in analyses were part of an annual or semi-annual preventive maintenance program.

Physical analyses were run in accordance with Standard Methods. Instruments utilized in the analysis were part of the preventive maintenance program. Residue weights were determined on balances which are calibrated yearly.

Sampling procedure included preservation and/or any required special handling as directed in the EPA Manual of Methods.[4]

OBSERVATIONS

PHYSICAL CONDITIONS

Hydrological (Plate 1):

During the 1976-1977 water year flow into the impoundment as measured at the Marengo gauging station was far below normal from October to mid-August resulting in lower reservoir stage and relatively stable pool level. During January and early February inflow was extremely low ranging from 24 cfs from January 29 to February 1 to 66 cfs on February 15. Runoff increased slightly in mid-February but remained far below normal. A maximum spring flow of 559 cfs was reported on March 13. During the remainder of the spring and most of the summer, flows into the impoundment were below normal. Mean flows during this period ranged from 329 cfs in March to 114 cfs in June. A low summer flow of 73 cfs occurred in early August. Inflow increased markedly during the latter half of August and throughout September when river stage was well above normal. During the period August 16-September 30 upstream river flows ranged from 875 to 11,400 cfs.

Reservoir level remained stable from October through November at ca 679 to 680' msl and then declined slowly from December through mid-February reaching a low of 673.88' msl on February 17. Elevation of the impoundment rose slightly during late February and March peaking at 679.69'msl on May 1. Because of low inflows, water levels in the impoundment remained low throughout the spring and summer period and did not reach 680' msl until mid-August. High inflow during late August and September resulted in rapid increases in reservoir level which varied from ca 681 to 689' msl during the August 15-September 30 period. A maximum level of 689.33'msl was attained on September 22.

Discharge from the dam was maintained at the normal minimum of 150 cfs from October to February 16 when rates were dropped to 100 cfs because of the extremely low inflow. In spite of continued low inflow, discharge was increased during March to a maximum of 1,100 cfs on March 29 in order to reduce reservoir pool to 670' msl for flood control purposes. Discharge rates were gradually reduced for April through June 17 when a minimum release rate of 75 cfs was established and maintained until mid-August. Heavy rainfall and runoff on August 19 necessitated increasing the release rate to a maximum of 4,000 cfs and discharge fluctuated between 700 and 4000 cfs throughout the remainder of the period.

Temperature (Table 2):

Water temperatures followed the seasonal pattern of previous years. River and reservoir temperatures were above 20°C (68°F) from mid-May through early September. A maximum upstream river temperature of 28.7°C (83.7°F) was observed on July 7. A maximum downstream river temperature of 29.0°C (84.2°F) was observed on July 12 at the University Water Plant Station.

Maximum reservoir temperatures of 28.6°C (83.5°F) were observed at the surface of the impoundment on July 7 and 12. Intermittent thermal stratification was observed in the impoundment in mid-May through mid-July. A maximum temperature differential of 4.5°C (8.1°F) was observed on June 28.

Turbidity (Table 3):

Because of abnormally low rainfall and runoff during much of the period, turbidity values above the impoundment were generally lower than those of the previous year ranging from 6 to 320 NTU and rarely exceeding 40 NTU's. In the reservoir, a maximum value of 81 NTU was observed during April while turbidity values of less than 10 NTU were frequently observed from early November to late February. Turbidity values within and below the impoundment were generally lower than upstream values.

Specific Conductance (Table 4):

Specific conductance values in the reservoir ranged from 942 µmho/cm in February to 216 µmho/cm in August. Values in the river ranged from 283 µmho/cm above the impoundment in August to 913 µmho/cm in December. Lowest specific conductance values accompanied the rapid increase in river and reservoir levels following rainfall in August while highest values occurred during cold low flow winter periods when ground water input accounted for a large proportion of the river flow.

Solids (Tables 5-7):

High suspended solids concentrations are characteristic of heavy runoff, particularly from agricultural lands. Due to below normal river flows during much of the present year, suspended solids values were usually below normal from October through July. Maximum suspended solids concentrations of 1,880 mg/l were observed in the upstream river in late August. Maximum suspended solids level in the reservoir was 188 mg/l.

Highest dissolved solids concentrations were present in the upstream river from December through early February when river flows were extremely low and ground water, high in dissolved solids, made up a major portion of the river flow.

CHEMICAL CONDITIONS

Dissolved Oxygen (Table 8):

Dissolved oxygen concentrations exhibited considerable fluctuation during the current period. A maximum value of 16.6 mg/l (126% saturation) was observed in the reservoir in late March. From late October through early April, dissolved oxygen values greater than 10 mg/l were common except during periods from late January to early March when reduced runoff resulted in a high ratio of oxygen, poor ground water in the upstream river and, ultimately, the reservoir. This condition was augmented by a reduction in photosynthesis and oxygen transfer from the atmostphere due to snow and ice cover and, as a result, oxygen concentrations declined to 2 mg/l (13.8% saturation) in the river on January 25 and to levels of less than 1 mg/l in the reservoir mid-depth and bottom samples in late February and early March. These low dissolved oxygen levels were apparently responsible for a fish kill within the reservoir which was reported by the Iowa Conservation Commission in February.

Absence of rainfall and runoff contributed to chemical stratification and low dissolved oxygen values at the reservoir middepth and bottom from mid-April to mid-July when oxygen values ranging from less than 0.1 to 6.0 mg/l were observed.

Severe oxygen depletion occurred in the impoundment during August following a rapid increase in reservoir level which inundated large stands of terrestrial vegetation that had developed in the reservoir flood plain during the period of low pool elevation in the spring and summer. The subsequent death and decay of this vegetation resulted in reduced oxygen concentrations ranging from 0.9 mg/l at the surface to 0.2 mg/l at the bottom on August 23. Numerous dead and dying fish, primarily gizzard shad, were observed during this period but the extent of the fish kill was not determined.

Carbon Dioxide (Table 9):

Free carbon dioxide was absent during October and November but, in spite of large algal populations, was usually present in the river and the reservoir from December through the remainder of the water year. Maximum carbon dioxide concentrations of 20 to 28 mg/l were observed in the reservoir in late February and early March when dissolved oxygen values were low and ground water input made up a significant portion of the river flow. High carbon dioxide values were also observed in September.

Alkalinity, Hardness, pH (Tables 10-14):

These three factors are interrelated and influenced by climatic and hydrological conditions as well as the activities of aquatic organisms. Phenolphthalein alkalinity was generally lower than during the previous three years and inversely proportional to carbon dioxide concentrations. Phenolphthalein alkalinity was usually present during October and November and from late March through early April but was generally absent for the remainder of the year.

Highest total hardness concentrations occurred in December through early March. Lowest values occurred in August.

Determinations of pH were conducted bimonthly from October through May and weekly thereafter. Values were generally low ranging from 6.9 to 8.6. Maximum pH values occurred in July. Minimum values occurred in February.

Orthophosphate (Table 15):

Because of low rainfall and a subsequent reduction in runoff from agricultural land, average orthophosphate concentrations in the river and the impoundment from October through July were generally lower than those observed during previous years. Concentrations ranging from 0.02 to 0.32 mg/l were observed above the impoundment and were, as in previous years, slightly higher than downstream values which ranged from 0.01 to 0.25 mg/l. Orthophosphate concentrations in all areas were generally less than 0.10 mg/l from October through July.

Ammonia Nitrogen (Table 16):

Maximum levels of ammonia nitrogen occurred in late February and early March when concentrations as high as 6.4 mg/l were present on the reservoir bottom. It is likely that these high levels were associated with the decay of fish and other aquatic organisms that had succumbed to the oxygen depletion in the impoundment during February.

Low ammonia nitrogen values (< 0.1 mg/l) occurred during low flow periods in November, July and September. Low values also occurred in August.

Nitrate Nitrogen (Table 17):

As a result of low runoff, nitrate nitrogen concentrations were lower than those observed in the previous year. Maximum values were observed in the upstream samples during late August thru September when rainfall and runoff were high. A maximum value of 5.40 mg/l occurred in the upstream river on

September 13 when all sampling stations reached their maximum nitrate levels for the period. Concentrations rarely exceeded 0.50 mg/l except during March, early April, late August and September. Values less than 0.10 mg/l were commonly found in the reservoir during November and December, and late June through July.

Biochemical Oxygen Demand (Table 18):

Average 5-day biochemical oxygen demand values were similar to those of the previous year. Because of low spring flows the high BOD values frequently observed during spring runoff periods were not observed in 1977. A maximum river value of 12.6 mg/l occurred at the upstream river station on August 29, probably as a result of runoff. Increases in BOD values due apparently to the death of large algal populations were observed in the reservoir in June and in the upstream river in October and November when values ranging from 10.8 to 14.8 mg/l were observed.

Threshold Odor (Table 19):

Average threshold odor values were generally higher than those of the previous year. Extremely high odor values (>250) were observed at the reservoir bottom in March accompanying low dissolved oxygen concentrations. In spite of high odor values in the reservoir at this time downstream odor values did not exceed 24 during March. A maximum value of 42 was observed in the downstream river in September. Levels were also high in the reservoir and upstream river in September when values of 24 to 56 were measured.

BIOLOGICAL CONDITIONS

Bacteria (Tables 20-22):

Largest total coliform populations frequently occurred at the beginning of periods of increased runoff. Highest counts usually occurred above the impoundment where a maximum count of 300,000 organisms/100 ml occurred on August 29. A maximum of 130,000 organisms/100 ml occurred below the reservoir at the University Water Plant on August 8 immediately following a heavy rain. Total coliform counts downstream were constantly lower than at the upstream river location. Total coliform counts in reservoir samples were consistently lower than river values ranging from < 10 to 5,200 organisms/100 ml.

Highest fecal coliform levels (ca 105,000 organisms/100 ml) occurred in the upstream river following a period of rainfall in early August. Increased numbers also accompanied runoff in late August and September. Fecal coliform levels were low in all samples taken from October through July and reservoir samples taken during this period frequently contained less than 10 organisms/100 ml. Because of extremely low flows in Clear Creek which enters the Iowa River upstream of Iowa City, fecal coliform counts at the University Water Plant sampling site were only rarely higher than at the site directly upstream. In previous years input from the Clear Creek drainage basin has resulted in elevated fecal coliform counts at the University Water Plant location.

Fecal streptococcus levels generally exhibited fluctuations similar to those of fecal coliform organisms. Values ranged from less than 10 organisms/100 ml in many reservoir samples from October through May to 73,000 organisms/100 ml at the upstream river location on August 8.

Plankton (Table 23):

Plankton populations were sampled on a monthly basis from October through July and twice monthly in August and September. A maximum count of 558,626 organisms/ml was observed in the upstream river sample on June 28. Plankton populations were greater in the reservoir than those observed during the past two years and mean concentration levels frequently exceeded

110,000 organisms/ml in the impoundment during April through early August. A maximum count of 294,993 organisms/ml was observed in a reservoir top sample taken on May 3. The relatively large reservoir plankton populations observed during the spring and summer months were due largely to low turbidity values and stable reservoir level resulting from the lack of precipitation and low river flow present during most of the period.

Plankton diversity was relatively high during the period. Greatest diversity occurred from April to June. Diversity declined following rainfall in mid August. Lowest diversity occurred in the winter and early spring. Diatoms, especially Cyclotella and unidentified flagellates were generally the dominant forms throughout the year. Green algae were relatively common in the spring and early summer but declined during the late summer and early fall months. Blue-green algae were uncommon throughout the period.

OTHER STUDIES

Special studies were instituted in September 1976 to determine concentrations of several organochlorine pesticides in fish collected from the Iowa River and Coralville Reservoir. With the exception of the months of November and December fish were collected on a monthly basis at three locations: 1) the Iowa River near the county road a short distance above the impoundment, 2) the Coralville Reservoir near the Lake MacBride Fisheries Station, and 3) the Iowa River a short distance below the dam. Species collected included typical bottom feeding forms, i.e. channel catfish, bullhead, buffalo, carpsucker and carp, as well as carnivorous species, i.e., crappie, bluegill, walleye and bass. Pesticides determined included aldrin and its metabolite dieldrin, DDT and its metabolites p,p'DDD and p,p'DDE, heptachlor and its metabolite heptachlor epoxide, and lindane and B-BHC.

The results of these determinations are given in Tables 24 through 33. A complete analysis of these results is currently being carried out and will be presented in Judy Freitag's Master's Thesis which will be available in May 1978. The following conclusions are based on preliminary evaluation of the pesticide residue data obtained during the study:

1) A definite pattern in the accumulation of pesticide residues in various species of fish is apparent. Carp, catfish and buffalo exhibited highest concentrations of both dieldrin and DDT. These fish are all bottom feeders which tend to be in close contact with bottom sediments. Since these sediments act as a sink for pesticides, there is a greater availability of pesticides at the sediment water interface. Another basic property of these pesticides that may contribute to increased levels in the above-mentioned forms is the trend towards concentration in body fat. Thus, the higher lipid concentration in tissues of carp and catfish may contribute to the high pesticide concentrations observed in these forms.

2) The size of a fish is also related to pesticide concentrations. In general larger fish exhibited higher pesticide residues than do smaller forms.

3) Concentrations of DDT and its metabolites in several species of fish collected at the downstream river location were lower than those observed at the upstream river site. This was especially evident in carnivorous species, i.e., crappie, bluegill, bass and walleye. However, concentrations of DDT and its metabolites were relatively uniform in bottom feeding fish (buffalo, carp, carpsucker, channel catfish and bullhead) taken at both river locations.

4) Both groups of fish (carnivores and bottom feeders exhibited lower dieldrin levels at the downstream river location and highest levels in the reservoir.

5) Comparison of data obtained during the 1976-1977 study with that obtained during earlier studies 5, 6, 7, 8, indicates that a steady decrease in dieldrin levels in fish taken from the Coralville Reservoir has occurred over the past eight years. This decrease is likely due to the cessation in the use of aldrin following 1975.

DISCUSSION AND CONCLUSIONS

The Coralville Reservoir Water Quality Study was first implemented in 1964. Data obtained during this period have consistently shown that the limnology and water quality of the Iowa River and Coralville Reservoir have been influenced primarily by four factors: (1) non-point source pollution resulting from agricultural activities in the drainage basin; (2) the hydrological characteristics of the Iowa River; (3) the morphometry of the Coralville Reservoir; and (4) the fluctuations in the storage and pool level of the reservoir resulting from flood control operation.

During the present water year the significance of non-point source pollution and the hydrological characteristics of the river were especially evident. Throughout most of the 1977 water year river flow into the impoundment was far below normal. Mean annual flow during the 1977 water year was the lowest observed since the implementation of the study (1964). Mean monthly flows for the period October--July, 1977 were far below normal while mean flows for August and September were above seasonal norms. Monthly and annual mean flows for the 1964-1977 period are summaried in Table 34.

During the October-July period concentrations of several parameters were substantially lower than levels observed during prior years. These effects were especially evident in the case of turbidity, suspended solids, nitrates and bacterial populations which reached their maximum concentrations in August or September and exhibited minimal levels during extended periods of low flow.

Low inflow and the resultant stable pool level and low turbidity values were also responsible for the large plankton populations observed in the impoundment from April to early August. Extremely high plankton counts were also present in river samples during the April-July period when low flows resulted in substantially lower turbidity values than are usually present. The fact that maximum plankton counts accompanied periods of lower than normal phosphate and nitrate concentrations indicates that decreased light penetration or other factors rather than lack of inorganic nutrients are the limiting factors in plankton production in the Iowa River and Coralville Reservoir system.

The unusual hydrological conditions present during the period were also in part responsible for two episodes of oxygen depletion and a subsequent fish kill in the impoundment. The first fish kill occurred in early February following an extended period of extremely low river flow consisting largely of oxygen poor ground water. This condition, augmented by reduced photosynthetic activity and the limitation of oxygen transfer from the atmosphere due to ice cover, resulted in severe oxygen depletion throughout the impoundment that persisted until early March.

The fact that low dissolved oxygen levels were resulting in a fish kill was first observed on February 5 when some dead fish, primarily gizzard shad, were observed near the Lake MacBride spillway by Iowa Conservation Commission personnel. Many game and rough fish were also observed to be in distress in the area. By February 7 numerous fish in distressed condition were present in that area and a significant number of dead or dying catfish were observed. Some dead fish were also observed directly below the dam which apparently died in the reservoir and were discharged into the downstream river. Ammonia concentrations increased markedly in the reservoir in late February and early March, reaching a maximum of 6.4 mg/l (as N) at the reservoir bottom. These high ammonia values appeared to be due in part to the decay of fish which died the previous month. The high ammonia and low dissolved oxygen concentrations present in the deeper portions of the reservoir were also accompanied by extremely high threshold odor values which further contributed to the degredation in water quality.

The second oxygen depletion episode occured in late August when increased reservoir level resulted in the innundation and subsequent death and decay of large stands of terrestrial vegetation which had developed in the upper portion of the reservoir flood plain during the period of low pool elevation in the spring and summer. Oxygen concentrations of less than lmg/l were present throughout the impoundment and numerous dead and dying fish, primarily gizzard shad, were observed.

The oxygen depletion and fish kill episodes observed during the current study serve to illustrate the magnitude of the effects of reservoir operation on the limnology of the impoundment. These effects are especially evident during periods of low pool level. The small storage capacity available at the 670' msl flood control pool routinely subjects the fishery of the reservoir to considerable stress as a result of crowding during the normal February drawdown and this problem is further agrevated by the frequent oxygen depletion episodes that occur during the late winter and spring periods. Increasing the minimum pool elevation from 670 to 673' msl. would help alleviate these problems without significantly reducing the flood control capacity of the reservoir.

In spite of relatively low reservoir stage during much of the period the Coralville Reservoir, as in previous years, contributed to the reduction of certain parameters in the Iowa River directly below the impoundment. This was expecially true in the case of total coliforms, turbidity and plankton. Lesser reductions in phosphate ammonia, threshold odor and BOD values were also observed. These comparisons are summarized in Table 35.

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TEMPERATURE
(^{o}C)

Table 2

Date 1976-77	Highway "O" Iowa River Upstream	Ccralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	13.2	14.6	14.6	14.4	14.6	15.0
26	6.0	8.5	7.7	7.5	9.3	12.4
Nov 9	2.4	4.7	4.2	4.4	5.8	9.0
22	0.0	1.6	1.7	1.8	2.6	7.7
Dec 14	0.9	1.7	2.9	3.4	2.2	8.0
28	0.0	0.5	0.5	0.7	1.6	4.5
Jan 10	0.0	0.0	0.3	0.4	0.0	6.6
25	0.1	0.5	0.8	1.4	1.8	6.3
Feb 8	0.1	0.1	1.0	1.3	1.0	6.1
22	0.4	3.8	3.7	3.2	2.9	8.1
Mar 8	1.3	5.2	4.7	4.6	5.4	11.0
14	FA	11.2	7.6	7.6	FA	FA
21	3.9	5.1	4.9	4.6	5.2	12.0
Apr 5	6.2	6.6	6.5	6.4	8.4	11.9
19	20.4	21.0	20.4	19.4	18.7	20.6

TEMPERATURE
(°C)

Table 2
(cont'd)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
May 3	15.8	16.5	15.7	15.6	16.0	18.6
17	23.0	24.0	22.8	19.8	21.8	23.7
Jun 14	21.3	22.7	21.9	21.4	22.9	24.2
21	22.4	27.2	25.0	24.2	25.0	28.0
28	27.9	28.4	26.1	23.9	27.1	28.4
Jul 7	28.7	28.6	27.6	25.6	27.9	28.9
12	28.1	28.6	28.0	26.2	28.7	29.0
18	24.2	26.1	26.6	26.5	26.5	FA
25	27.0	27.6	27.3	26.4	27.8	28.4
Aug 8	21.6	25.2	25.3	24.5	25.5	25.0
23	22.2	21.9	21.6	21.6	21.7	26.7
29	22.1	23.6	22.9	22.6	23.0	25.2
Sep 6	22.9	26.8	24.2	24.0	23.8	25.8
13	19.1	21.3	21.0	21.0	22.1	24.6
22	18.8	18.7	18.4	18.4	19.2	22.2
27	17.8	17.9	17.5	17.9	18.6	20.8

FA - Field accident

TURBIDITY
N.T.U.

Table 3

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	15	10	15	25	15	20
26	15	10	10	10	10	10
Nov 9	10	5	5	5	5	5
22	--	--	--	--	--	--
Dec 14	10	5	6	10	5	3
28	8	5	5	6	3	3
Jan 10	6	3	3	4	2	2
25	8	3	4	5	3	2
Feb 8	10	3	5	20	2	5
22	28	9	9	6	5	4
Mar 8	20	8	11	35	5	6
14	--	15	15	55	--	--
21	15	8.5	10	11	8	8
Apr 5	23	23	27	27	15	18
19	49	22	33	81	19	25

TURBIDITY
N.T.U.

Table 3
(cont'd)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
May 3	27	28	18	28	15	32
17	32	18	23	55	13	27
Jun 14	22	20	32	52	13	23
21	--	--	--	--	--	--
28	38	12	30	66	8	20
Jul 7	--	--	--	--	--	--
12	40	9	12	30	8	13
18	--	--	--	--	--	--
Aug 8	42	10	15	34	12	45
23	70	40	40	60	30	60
39	320	19	22	45	20	28
Sep 6	--	--	--	--	--	--
13	44	26	50	20	24	20
22	54	25	31	31	12	21
27	70	40	40	68	39	45

-- No sample

SPECIFIC CONDUCTANCE
μmho/cm

Table 4

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11 26	599 530	495 514	495 514	495 506	507 484	550 491
Nov 9 22	519 609	498 552	498 552	505 552	491 535	498 535
Dec 14 28	913 589	684 477	706 477	730 530	674 527	706 524
Jan 10 25	896 707	720 654	735 654	735 654	680 552	680 552
Feb 8 22	707 606	788 672	788 848	848 942	678 858	678 807
Mar 8 14 21	491 -- 574	514 -- 448	848 -- 391	942 -- 437	722 -- 612	754 -- 540
Apr 5 19	608 593	608 510	593 540	608 612	510 574	496 593

LA - Lab accident

SPCIFIC CONDUCTANCE
μmho/cm

Table 4
(cont'd)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Coralville Reservoir No. 2 Mid-Depth	Coralville Reservoir No. 2 Bottom	Iowa River Downstream	University Water Plant
May 3	593	612	612	612	612	612
17	595	575	585	585	585	595
Jun 14	628	652	640	640	606	585
21						
28	536	565	587	622	545	501
Jul 7	--	--	--	--	--	--
12	606	538	530	575	565	538
18	--	--	--	--	--	--
25	574	525	540	532	548	574
Aug 8	283	522	507	479	522	345
23	374	216	219	219	283	296
29	372	393	404	404	314	314
Sep 6	--	--	--	--	--	--
13	673	543	543	565	442	428
22	427	486	470	470	564	564
27	672	353	336	344	362	382

-- No sample

Table 5

TOTAL SOLIDS
(mg/ℓ)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	382	336	352	414	315	325
26	404	372	448	403	358	401
Nov 9	398	351	348	363	330	324
22	418	351	356	367	334	327
Dec 14	537	390	396	402	372	368
28	557	362	399	428	367	369
Jan 10	552	401	419	496	376	376
25	508	478	485	498	411	399
Feb 8	483	549	565	629	453	428
22	434	449	558	596	548	497
Mar 8	363	306	571	627	454	521
14	--	--	--	--	--	--
21	351	260	280	271	361	389
Apr 5	396	379	388	407	297	308
19	581	402	431	597	366	394

Table 5
(cont'd)

TOTAL SOLIDS
(mg/ℓ)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
May 3	443	407	380	404	368	421
17	463	346	378	478	342	392
Jun 14	427	404	436	502	364	383
21	--	--	--	--	--	--
28	446	354	416	543	354	350
Jul 7	--	--	--	--	--	--
12	476	322	318	370	341	341
18	--	--	--	--	--	--
25	332	252	234	178	144	230
Aug 8	1,322	390	374	444	416	752
23	--	--	--	--	--	--
29	2,003	219	235	277	188	201
Sep 6	--	--	--	--	--	--
13	590	276	299	368	251	253
22	--	--	--	--	--	--
27	484	340	218	212	220	222

--No sample

TOTAL SUSPENDED SOLIDS
(mg/ℓ)

Table 6

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11 26	56 36	42 18	30 20	62 24	24 20	34 26
Nov 9 22	32 26	6 10	6 10	6 10	10 8	8 8
Dec 14 28	24 18	4 16	6 16	22 16	12 6	4 4
Jan 10 25	12 6	2 3	14 3	10 9	4 3	2 1
Feb 8 22	24 102	6 12	3 16	44 8	7 15	4 4
Mar 8 14 21	60 -- 40	21 -- 27	17 -- 28	26 -- 30	10 -- 14	9 -- 13
Apr 5 19	102 240	61 58	79 85	80 178	43 37	38 53

TOTAL SUSPENDED SOLIDS
(mg/ℓ)

Table 6
(cont'd)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
May 3	94	66	40	70	29	79
17	136	41	56	162	27	60
Jun 14	60	39	74	136	30	46
21						
28	138	30	74	188	18	45
Jul 7						
12	134	22	26	56	20	20
18						
25	104	8	16	2	12	32
Aug 8	1,112	52	64	130	84	532
23						
29	1,880	24	32	86	28	37
Sep 6						
13	220	41	50	148	42	37
22						
27	168	50	26	36	34	32

-- No sample

TOTAL DISSOLVED SOLIDS
(mg/ℓ)

Table 7

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	326	294	322	352	291	291
26	368	354	428	379	338	375
Nov 9	366	345	342	357	320	316
22	392	341	346	357	326	319
Dec 14	513	386	390	380	360	364
28	539	346	383	412	361	365
Jan 10	540	399	405	486	372	374
25	502	475	482	489	408	398
Feb 8	459	543	562	585	446	424
22	332	437	542	588	533	493
Mar 8	303	285	554	601	434	512
14						
21	311	233	252	241	347	376
Apr 5	294	318	309	327	254	270
19	341	344	346	419	329	341

TOTAL DISSOLVED SOLIDS
(mg/ℓ)

Table 7
(cont'd)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
May 3	349	341	340	334	329	342
17	327	305	322	316	315	332
Jun 14	367	365	362	366	304	337
21						
28	308	324	342	355	336	305
Jul 7						
12	342	300	292	314	321	312
18						
25	228	244	218	176	132	198
Aug 8	210	338	310	314	332	220
23						
29	123	195	203	191	161	164
Sep 6						
13	370	235	249	220	209	216
22						
27	316	290	192	176	186	190

Table 8

DISSOLVED OXYGEN
(mg/ℓ)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2			Iowa River Downstream	University Water Plant
		Top	Mid-Depth	Bottom		
Oct 11	9.7	8.8	7.6	6.9	11.0	11.2
26	12.0	11.0	11.0	10.5	11.0	11.3
Nov 9	14.7	12.0	11.9	11.9	12.0	12.1
22	14.6	13.0	12.8	12.5	12.9	13.0
Dec 14	15.7	9.4	9.2	8.7	11.9	13.3
28	12.7	9.4	9.2	9.2	11.6	13.3
Jan 10	7.9	11.8	11.7	11.0	10.3	12.0
25	2.0	9.1	10.2	11.9	9.8	11.6
Feb 8	2.3	4.2	3.6	0.8	9.2	12.0
22	11.3	1.4	0.4	0.3	7.9	11.8
Mar 8	13.7	15.0	0.7	< 0.1	11.0	15.3
14	--	14.4	14.1	0.1	00	00
21	13.6	16.6	16.3	16.5	12.3	11.6
Apr 5	14.2	13.1	12.7	12.7	11.7	10.9
19	8.1	5.5	4.4	0.4	6.5	6.9

DISSOLVED OXYGEN
(mg/ℓ)

Table 8
(cont'd)

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
May 3	7.5	5.9	0.6	0.3	7.6	7.1
17	7.0	4.2	1.4	0.2	6.0	7.9
Jun 14	9.3	5.5	4.4	4.0	7.6	6.6
21	9.1	6.5	6.0	5.4	9.0	11.6
28	6.0	8.4	0.4	< 0.1	13.5	--*
Jul 7	8.2	7.9	5.5	0.1	9.9	2.5
12	8.0	10.0	5.4	0.3	10.5	8.5
18	6.2	4.0	3.8	2.7	6.0	4.3
25	7.5	7.5	5.2	1.4	7.8	5.3
Aug 8	5.6	5.8	4.9	2.6	7.5	3.4
23	5.3	0.9	0.3	0.2	7.6	5.2
29	5.2	3.7	3.5	2.1	8.0	6.8
Sep 6	7.5	5.6	2.1	2.4	7.4	6.4
13	7.9	4.8	4.3	4.3	7.7	6.3
22	3.4	5.2	4.9	4.9	9.5	8.1
27	6.0	5.0	5.0	4.9	9.0	8.5

--* Lab accident

CARBON DIOXIDE
as $CaCO_3$ (mg/ℓ)

Table 9

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	0	0	0	0	0	0
26	0	0	0	0	0	0
Nov 9	0	0	0	0	0	0
22	0	0	0	0	0	0
Dec 14	10	4	4	4	2	2
28	8	4	4	4	4	4
Jan 10	20	6	6	6	4	4
25	10	4	4	6	4	4
Feb 8	10	8	8	10	6	4
22	12	20	22	24	18	12
Mar 8	6	8	24	28	10	8
14						
21	8	0	0	0	6	6
Apr 5	0	0	0	0	0	4
19	4	8	8	12	6	4
May 3	8	6	10	10	4	6
17	6	8	10	14	8	4
Jun 14	0	0	10	10	0	0
21						
28	4	4	14	18	0	4
Jul 7						
12	-	-	4	10	0	0
18						
25	0	0	4	8	2	4
Aug 8	5	4	4	10	3	4
23	6	6	6	6	6	6
29	6	4	6	6	4	4
Sep 6	12	14	16	18	16	16
13	8	8	12	12	10	10
22	8	10	8	8	8	12
27	12	8	10	10	8	10

ALKALINITY as $CaCO_3$
Phenolphtalein (mg/ℓ)

Table 10

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	16	4	2	2	2	1
26	8	6	6	6	4	6
Nov 9	10	10	10	10	4	6
22	6	10	10	10	8	4
Dec 14	0	0	0	0	0	0
28	0	0	0	0	0	0
Jan 10	0	0	0	0	0	0
25	0	0	0	0	0	0
Feb 8	0	0	0	0	0	0
22	0	0	0	0	0	0
Mar 8	0	0	0	0	0	0
14						
21	0	20	20	22	0	0
Apr 5	10	10	10	10	8	0
19	0	0	0	0	0	0
May 3	0	0	0	0	0	0
17	0	0	0	0	0	0
Jun 14	2	0	0	0	1	1
21						
28	0	0	0	0	10	0
Jul 7						
12	8	14	0	0	8	10
18						
25	4	8	0	0	0	0
Aug 8	0	0	0	0	0	0
23	0	0	0	0	0	0
29	0	0	0	0	0	0
Sep 6	0	0	0	0	0	0
13	0	0	0	0	0	0
22	0	0	0	0	0	0
27	0	0	0	0	0	0

ALKALINITY as $CaCO_3$
Total (mg/ℓ)

Table 11

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	216	190	214	200	184	200
26	232	224	228	224	206	216
Nov 9	250	240	236	236	210	210
22	212	226	224	228	230	204
Dec 14	318	228	230	234	224	224
28	314	264	246	256	232	234
Jan 10	356	274	270	264	242	242
25	304	272	292	302	240	230
Feb 8	280	326	330	384	270	260
22	212	290	382	416	348	320
Mar 8	200	206	378	460	308	204
14						
21	206	170	168	162	236	238
Apr 5	208	206	202	200	158	150
19	228	210	210	212	190	190
May 3	216	216	212	214	208	214
17	214	204	206	224	208	218
Jun 14	256	244	246	250	210	200
21						
28	208	216	244	272	198	172
Jul 7						
12	246	204	202	228	214	182
18						
25	210	188	194	196	190	198
Aug 8	88	180	180	182	190	96
23	102	100	94	100	114	112
29	128	138	146	152	126	112
Sep 6	228	150	156	150	142	152
13	250	200	200	194	162	164
22	124	164	160	158	184	178
27	206	112	114	114	124	134

HARDNESS as Ca CO_3
Calcium (mg/ℓ)

Table 12

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	192	156	160	160	164	160
26	156	164	164	164	136	136
Nov 9	192	176	176	180	148	156
22	196	172	176	176	160	160
Dec 14	236	208	208	208	144	164
28	320	208	208	212	204	216
Jan 10	356	268	272	272	208	212
25	280	232	232	236	220	220
Feb 8	236	244	260	288	200	180
22	176	240	236	276	240	236
Mar 8	144	140	224	232	188	160
14						
21	160	112	116	120	168	168
Apr 5	140	140	148	148	116	116
19	160	140	140	144	128	132
May 3	164	152	168	164	160	152
17	160	164	164	164	168	168
Jun 14	184	200	200	200	184	204
21						
28	196	180	200	208	188	152
Jul 7						
12	208	176	164	168	172	180
18						
25	160	136	136	144	136	160
Aug 8	112	160	104	156	136	112
23						
29	112	124	120	116	80	84
Sep 6						
13	208	160	160	168	108	120
22						
27	380	212	184	188	252	256

HARDNESS as $CaCO_3$
Total (mg/ℓ)

Table 13

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	260	236	248	252	236	236
26	260	256	256	260	228	240
Nov 9	292	264	268	268	212	248
22	300	268	268	268	252	252
Dec 14	384	284	288	284	268	272
28	376	304	300	308	288	284
Jan 10	432	316	320	324	276	288
25	380	360	364	368	296	296
Feb 8	336	408	432	476	392	344
22	256	344	392	496	464	408
Mar 8	200	212	396	432	304	312
14						
21	224	168	176	180	260	264
Apr 5	224	224	228	228	164	164
19	260	232	232	236	208	212
May 3	228	232	228	232	232	244
17	236	228	232	228	228	263
Jun 14	284	276	268	264	240	224
21						
28	236	252	276	280	244	216
Jul 7						
12	260	224	216	236	232	244
18						
25	228	216	208	232	220	224
Aug 8	136	188	188	200	196	152
23						
29	160	136	148	140	104	112
Sep 6						
13	300	236	224	228	160	176
22						
27	532	252	220	244	260	260

pH

Table 14

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Coralville Reservoir No. 2 Mid-Depth	Coralville Reservoir No. 2 Bottom	Iowa River Downstream	University Water Plant
Oct 11	8.5	8.3	8.3	8.3	8.3	8.4
26	8.5	8.4	8.4	8.4	8.3	8.4
Nov 9	8.5	8.4	8.4	8.4	8.4	8.4
22	8.4	8.5	8.5	8.5	8.4	8.4
Dec 14	7.6	7.9	7.9	7.9	8.1	8.1
28	7.5	7.8	7.8	7.8	8.0	8.0
Jan 10	7.5	7.8	7.8	7.8	7.9	7.9
25	7.0	7.3	7.2	7.4		7.6
Feb 8	6.9	7.0	7.0	7.0	7.2	7.3
22	7.4	7.0	7.1	7.1	7.2	7.5
Mar 8	7.9	7.6	7.0	7.1	7.3	7.8
14		7.6	7.5	7.1		
21	7.5	8.3	8.4	8.4	7.7	7.7
Apr 5	8.3	8.3	8.3	8.3	8.2	8.0
19	7.8	7.6	7.5	7.3	7.7	u.9
May 3	7.9	8.0	7.8	7.8	8.1	8.0
17	8.0	7.8	7.6	7.4	7.8	8.1
Jun 14	8.2	8.0	7.8	7.8	8.1	8.1
21	8.5	8.1	7.9	7.8	8.2	8.5
28	8.1	8.2	7.6	7.4	8.5	8.1
Jul 7	8.2	8.3	8.0	7.5	8.4	7.6
12	8.4	8.6	8.1	7.6	8.4	8.5
18	7.5		7.7	7.4	7.7	7.7
25	8.2	8.4	7.9	7.6	8.1	7.9
Aug 8	7.5	7.6	7.6	7.4	8.0	7.6
23	7.5	7.0	7.0	7.0	7.3	7.0
29	7.5	7.5	7.4	7.4	7.5	7.4
Sep 6	8.0	7.7	7.3	7.3	7.4	7.4
13	8.0	7.6	7.6	7.6	7.4	7.5
22	7.3	7.6	7.5	7.4	7.8	7.6
27	7.6	7.4	7.4	7.4	7.5	7.4

ORTHOPHOSPHATE
(mg/ℓ)

Table 15

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2			Iowa River Downstream	University Water Plant
		Top	Mid-Depth	Bottom		
Oct 11	0.07	0.03	0.05	0.05	0.04	0.03
26	0.02	0.02	0.02	0.02	0.04	0.03
Nov 9	0.03	0.01	0.02	0.02	0.02	0.02
22	0.08	0.03	0.02	0.01	0.02	0.03
Dec 14	0.10	0.01	0.02	0.02	0.02	0.02
28	0.20	0.02	0.01	0.01	0.02	0.03
Jan 10	0.14	< 0.01	< 0.01	< 0.01	0.01	0.01
25	0.07	0.02	0.06	0.02	0.03	0.03
Feb 8	0.09	0.01	0.02	0.04	0.03	0.02
22	0.18	0.06	0.10	0.06	0.05	0.06
Mar 8	0.24	0.09	0.07	0.79	0.05	0.06
14						
21	0.11	0.04	0.05	0.04	0.03	0.02
Apr 5	0.05	0.03	0.03	0.03	0.03	0.03
19	0.07	0.04	0.04	0.09	0.03	0.03
May 3	0.12	0.09	0.11	0.11	0.07	0.09
17	0.10	0.07	0.06	0.10	0.06	0.06
Jun 14	0.06	0.08	0.08	0.10	0.03	0.06
21						
25	0.18	0.09	0.13	0.22	0.06	0.06
Jul 7						
12	0.09	0.03	0.07	0.11	0.03	0.03
18						
25	0.11	0.13	0.06	0.07	0.03	0.04
Aug 8	0.15	0.18	0.13	0.14	0.14	0.04
23	0.16	0.17	0.23	0.24	0.17	0.17
29	0.28	0.13	0.13	0.18	0.17	0.18
Sep 6						
13	0.05	0.12	0.4	0.16	0.03	0.13
22	0.32	0.24	0.27	0.24	0.18	0.21
27	0.30	0.28	0.27	0.27	0.25	0.24

NITROGEN AMMONIA
as N (mg/ℓ)

Table 16

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Coralville Reservoir No. 2 Mid-Depth	Coralville Reservoir No. 2 Bottom	Iowa River Downstream	University Water Plant
Oct 11	0.14	0.20	0.22	0.18	0.56	0.10
26	0.18	0.30	0.20	0.27	0.17	0.20
Nov 9	0.08	0.09	0.09	0.11	0.21	0.10
22	0.09	0.07	0.09	0.08	0.10	0.08
Dec 14	0.08	0.14	0.15	0.17	0.13	0.13
28	1.43	0.15	0.15	0.14	0.20	0.17
Jan 10	1.46	0.24	0.23	0.24	0.30	0.28
25	1.58	0.30	0.30	0.32	0.32	0.32
Feb 8	2.01	0.47	0.95	1.44	0.53	0.53
22	1.42	1.75	1.80	1.70	0.75	0.50
Mar 8	1.42	0.87	2.56	6.40	0.37	0.39
14		0.85	0.85	3.91		
21	0.80	0.40	0.37	0.48	0.92	0.62
Apr 5	0.20	0.33	0.28	0.19	0.19	0.19
19	0.16	0.57	0.72	1.18	0.49	0.21
May 3	0.08	0.21	0.35	0.40	0.34	0.25
17	0.16	0.76	0.96	1.15	0.30	0.09
Jun 14	0.17	0.84	1.40	1.46	0.38	0.25
21	0.10	0.43	0.41	0.58	0.22	0.12
28	0.13	0.14	0.42	1.00	0.22	0.22
Jul 7	0.16	0.04	0.11	0.37	0.09	0.11
12	0.12	0.19	0.33	0.89	0.27	0.22
18	0.60	0.68	0.43	1.06	0.64	0.34
25	0.06	0.09	0.23	0.40	0.06	0.18
Aug 8	0.43	0.34	0.36	0.42	0.21	0.35
23	0.15	0.22	0.31	0.30	0.37	0.14
29	0.20	0.35	0.31	0.33	0.39	0.19
Sep 6	0.73	0.74	0.81	0.80	0.81	0.73
13	0.49	0.50	0.50	0.49	0.49	0.49
22	0.22	0.23	0.23	0.24	0.21	0.21
27	0.06	0.23	0.21	0.17	0.20	0.02

NITROGEN NITRATE
as N (mg/ℓ)

Table 17

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 *Top*	*Mid-Depth*	*Bottom*	Iowa River Downstream	University Water Plant
Oct 11	0.08	0.06	0.06	0.12	0.13	0.07
26	0.13	0.10	< 0.10	< 0.10	0.11	0.11
Nov 9	0.13	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
22	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dec 14	1.16	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
28	1.58	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Jan 10	1.50	0.10	0.13	0.11	0.14	0.13
25	0.25	0.11	0.21	0.29	< 0.10	< 0.10
Feb 8	0.26	0.40	0.63	0.72	0.14	0.16
22	0.83	< 0.10	< 0.10	< 0.10	0.13	0.52
Mar 8	1.20	0.65	0.28	0.38	0.65	1.30
14						
21	1.00	0.68	0.68	0.68	0.28	0.46
Apr 5	0.28	1.06	1.04	1.00	0.92	1.04
19	0.24	0.16	0.19	0.42	0.13	0.27
May 3	0.33	0.27	0.13	0.29	0.23	0.75
17	0.38	0.54	0.46	0.54	0.10	0.26
Jun 14	0.26	0.28	0.43	0.52	0.31	0.14
21						
28	0.16	< 0.10	0.13	0.39	< 0.10	0.13
Jul 7						
12	0.21	< 0.10	0.10	0.17	0.11	0.21
18						
25	0.39	< 0.10	< 0.10	0.17	0.26	0.29
Aug 8	0.70	0.14	0.26	< 0.10	0.26	0.48
23	2.60	0.32	0.28	0.34	0.44	1.10
29	3.50	0.48	0.54	0.57	0.44	0.80
Sep 6						
13	5.40	3.30	3.40	3.30	2.20	2.80
22						
27	4.80	2.00	1.70	1.80	1.60	1.80

5-DAY, 20^{o}C
BIOCHEMICAL OXYGEN DEMAND
(mg/ℓ)

Table 18

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Coralville Reservoir No. 2 Mid-Depth	Coralville Reservoir No. 2 Bottom	Iowa River Downstream	University Water Plant
Oct 11	7.2	3.6	3.1	3.2	2.2	2.0
26	10.8	3.5	4.9	4.6	3.1	3.3
Nov 9	12.0	5.9	5.4	5.9	4.3	3.7
22	5.4	5.4	3.9	4.5	3.9	3.6
Dec 14	4.0	2.0	2.0	3.0	1.0	1.0
28	3.9	4.7	4.4	5.0	3.0	3.1
Jan 10	1.9	2.8	1.9	2.6	1.2	1.2
25	0.9	3.5	2.5	1.9	0.7	0.8
Feb 8	2.6	3.7	3.7	3.4	3.1	2.1
22						
Mar 8	4.9	9.1	5.3	6.7	7.0	5.2
14						
21	8.7	7.7	7.5	7.4	5.1	4.8
Apr 5	7.4	6.5	7.3	6.7	5.2	4.7
19	8.2	8.4	7.2	11.8	5.4	5.2
May 3	7.2	8.0	7.0	7.4	5.8	8.2
17	2.4	2.4	2.8	5.8	2.2	2.4
Jun 14	6.0	7.3	6.2	7.2	5.4	7.1
21						
28	7.5	8.2	6.5	14.8	7.9	4.5
Jul 7						
12	7.1	6.1	4.3	7.6	5.0	4.0
18						
25	5.0	4.4	4.1	6.5	4.1	4.2
Aug 8	9.6	5.2	2.8	6.6	5.4	7.2
23	7.6	3.3	3.6	3.9	4.6	5.8
29	12.6	4.5	4.1	4.5	3.7	5.0
Sep 6						
13	3.2	2.5	2.7	4.2	2.6	3.6
22						
27	2.6	2.0	2.5	2.2	2.7	1.2

THRESHOLD ODOR NUMBER

Table 19

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Coralville Reservoir No. 2 Mid-Depth	Coralville Reservoir No. 2 Bottom	Iowa River Downstream	University Water Plant
Oct 11	24	18	18	18	18	18
26	18	18	13	13	18	18
Nov 9	18	18	24	18	18	18
22	18	18	24	24	18	18
Dec 14	13	13	5.6	18	18	7.5
28	32	32	18	13	18	18
Jan 10	24	7.5	10	5.6	1.8	1.8
25	13	13	13	10	7.5	7.5
Feb 8	18	18	13	24	5.6	4.2
22	24	24	32	32	10	10
Mar 8	24	32	130	>250	24	24
14		32	32	>250		
21	18	18	18	18	10	18
Apr 5	18	18	13	18	13	13
19	18	18	24	18	18	18
May 3	7.5	7.5	10.0	10.0	5.6	15.0
17	5.6	7.5	7.5	42.0	7.5	10.0
Jun 14	5.6	5.6	7.6	5.6	5.6	15.0
21						
28	5.6	4.2	4.2	32.0	5.6	4.2
Jul 7						
12	4.2	5.6	7.6	7.5	5.6	7.5
18						
25	5.6	10.0	5.6	24.0	10.0	56.0
Aug 8	13.0	18.0	3.2	4.2	4.2	13.0
23						
29	18.0	10.0	3.2	1.8	3.2	7.5
Sep 6						
13	42	42	42	75	42	24
22						
27	56	56	32	24	32	32

TOTAL COLIFORM BACTERIA
(Number of coliform bacteria per 100 ml) Table 20

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	600	< 100	100	100	1,900	1,300
26	< 100	< 100	< 100	< 100	< 100	300
Nov 9	1,700	< 100	< 100	< 100	300	200
22	< 100	< 100	< 100	< 100	< 100	< 100
Dec 14	1,700	150	230	100	60	10
28	440	10	20	10	10	10
Jan 10	3,900	< 100	< 100	< 100	100	< 100
25	580	30	30	40	20	< 10
Feb 8	1,160	< 10	10	30	640	80
22	150	70	40	210	30	<10
Mar 8	1,100	100	200	200	200	100
14						
21	1,800	100	< 100	200	1,000	< 100
Apr 5	1,500	500	300	1,300	200	1,500
19	100	< 100	200	600	< 100	< 100
May 3	400	100	100	200	200	2,200
17	2,100	2,200	1,300	1,700	800	900
Jun 14	3,000	700	900	2,100	500	200
21						
28	2,400	2,600	100	600	1,200	800
Jul 7						
12	2,400	400	800	700	200	1,800
18						
25	6,000	300	800	1,200	2,600	1,900
Aug 8	190,000	< 10	3,200	4,100	15,000	130,000
23						
29	300,000	2,100	2,000	5,200	5,900	4,600
Sept 6						
13	2,400	700	400	100	1,200	1,800
22						
27	7,100	600	1,300	800	1,400	1,400

FECAL COLIFORM BACTERIA
(Number of coliform bacteria per 100 ml) Table 21

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Coralville Reservoir No. 2 Mid-Depth	Coralville Reservoir No. 2 Bottom	Iowa River Downstream	University Water Plant
Oct 11	10	20	< 10	10	1,300	30
26	< 10	< 10	< 10	< 10	< 10	10
Nov 9	< 10	< 10	< 10	< 10	< 10	< 10
22	20	< 10	< 10	< 10	50	20
Dec 14	500	< 10	< 10	< 10	< 10	< 10
28	270	< 10	< 10	< 10	< 10	< 10
Jan 10	320	< 10	< 10	< 10	< 10	< 10
25	210	< 10	< 10	< 10	< 10	< 10
Feb 8	260	< 10	< 10	< 10	< 10	10
22	10	< 10	< 10	< 10	10	< 10
Mar 8	60	< 10	10	< 10	< 10	< 10
14						
21	190	< 10	< 10	< 10	< 10	< 10
Apr 5	40	< 10	< 10	20	< 10	240
19	70	< 10	10	< 10	< 10	30
May 3	80	< 10	10	< 10	10	490
17	210	< 10	10	< 10	< 10	50
Jun 14	280	40	10	20	30	20
21						
28	300	10	10	10	10	110
Jul 7						
12	500	40	80	240	110	100
18						
25	4,800	20	150	310	1,610	70
Aug 8	105,000	< 10	840	1,660	320	9,000
23						
29	31,000	10	10	40	50	560
Sep 6						
13	410	10	20	10	< 10	50
22						
27	4,300	100	40	100	280	390

FECAL STREPTOCOCCI
(Number of organisms per 100 ml)

Table 22

Date 1976-77	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2 Top	Mid-Depth	Bottom	Iowa River Downstream	University Water Plant
Oct 11	60	< 10	< 10	< 10	60	1,300
26	10	< 10	< 10	< 10	< 10	20
Nov 9	10	< 10	< 10	< 10	< 10	10
22	30	10	< 10	< 10	< 10	30
Dec 14	100	< 10	< 10	< 10	< 10	< 10
28	20	< 10	< 10	10	< 10	< 10
Jan 10	140	30	< 10	< 10	< 10	10
25	50	< 10	< 10	< 10	< 10	< 10
Feb 8	140	< 10	< 10	< 10	10	< 10
22	10	20	< 10	10	10	< 10
Mar 8	40	10	10	< 10	30	30
14						
21	400	< 10	< 10	< 10	< 10	10
Apr 5	200	< 10	60	10	< 10	150
19	30	10	< 10	50	10	50
May 3	50	< 10	< 10	30	< 10	50
17	260	10	< 10	190	20	90
Jun 14	180	20	< 10	10	10	10
21						
28	770	30	10	160	50	280
Jul 7						
12	190	100	240	190	110	80
18						
25	950	110	220	620	820	380
Aug 8	73,000	20	620	470	310	70,000
23						
29	9,400	40	50	170	40	540
Sep 6						
13	220	30	< 10	30	40	70
22						
27	2,300	170	210	220	280	250

TOTAL PLANKTON ORGANISMS
(Organisms per ml)

Table 23

Date 1976-1977	Highway "O" Iowa River Upstream	Coralville Reservoir No. 2				High-way 218	University Water Plant
		Top	Mid-Depth	Bottom	Mean		
Oct 26	157,172	77,869	42,055	45,795	55,240	41,518	54,705
Nov 22	80,545	15,057	14,969	11,761	13,929	48,827	20,048
Dec 14	43,302	7,573	5,880	4,810	6,088	2,316	2,049
Jan 10	13,633	12,384	12,385	11,849	12,206	6,503	6,509
Feb 8	15,145	6,256	20,939	78,406	34,867	14,967	15,234
Mar 8	38,847	100,682	29,135	9,623	46,480	28,869	15,502
Apr 19	328,354	104,069	134,374	138,651	125,698	78,047	59,517
May 3	214,731	294,993	173,781	240,630	236,468	197,805	86,427
June 28	558,626	267,300	133,674	187,170	196,048	214,743	178,200
Jul 12	397,422	146,124	137,214	200,478	161,272	206,751	143,451
Aug 8	31,185	169,398	40,986	142,692	117,692	97,119	16,929
29	Too dirty	47,283	46,344	48,138	47,255	49,956	33,894
Sep 13	162,640	15,195	40,998	16,953	24,382	23,190	27,633
27	50,015	20,493	19,626	18,711	19,610	34,749	16,038

Pesticide Residues in Fish Above, In and Below the Coralville Reservoir (Collected September 2, 1976)

Species	Location	Length (mm)	Weight (gms.)	P,P'DDE	Dieldrin (ppb)	P,P'DDD	P,P'DDT	Heptachlor Epoxide	Heptachlor
Carp	Below Reservoir	54	955	104.0	0	96.0	27	---	----
Channel Catfish	Below Reservoir	390	415	80.0	13.0	64.5	--	80.0	----
Carp	In Reservoir	550	1026	86.0	--	81.0	--	63.0	----
Channel Catfish	In Reservoir	410	452	----	--	----	--	----	21.5
Black Bullhead	Above Reservoir	95	34	17.5	7.5	----	--	8.0	----
Channel Catfish	Above Reservoir	370	412	34.5	52.0	----	--	48.0	----

Pesticide Residues in Fish Above, In and Below the Coralville Reservoir (Collected October 7 & October 23, 1976)

Species	Location	Length (mm)	Weight (gms.)	P,P'DDE	Dieldrin (ppb)	P,P'DDD	P,P'DDT	Heptachlor Epoxide	Heptachlor
Walleye	Below Reservoir	435	602.7	21.0	6.0	25.0	--	14.0	---
Buffalo	Below Reservoir	430	1356.7	54.8	76.0	52.5	--	52.0	---
Buffalo	In Reservoir	450	1473.4	----	--	45.5	--	17.5	---
Walleye	In Reservoir	355	513.9	30.0	114.0	21.5	--	32.5	1.0
Bluegill	In Reservoir	130	49.8	15.5	53.0	----	--	16.5	---
Carp	Above Reservoir	710	2247.7	96.5	78.0	50.0	--	57.0	---
Black Bullhead	Above Reservoir	210	109.4	60.5	2.5	----	--	---	---

Table 26

Pesticide Residue in Fish Above, In and Below the Coralville Reservoir
(Collected January 31, 1977)

Species	Location	Length (mm)	Weight (grams)	p,p'DDE	Dieldrin	p,p'DDD	o,pDDT	Heptachlor Epoxide	Heptachlor
Buffalo	Below Reservoir	525	2171.6	43.8	22.7			7.9	
Carp	Below Reservoir	570	2771.0	28.9	41.8	23.8			
Crappie	Below Reservoir	200	83.0	18.7	30.3				
Buffalo	In Reservoir	455	1026.4	98.6	223.9	53.3		77.0	
Carp	In Reservoir	465	1256.8	133.2	406.6	89.1		97.6	34.6
Crappie	In Reservoir	260	307.1	22.2	127.1			30.6	
Carp	Above Reservoir	395	886.0	140.4	137.8	78.7	77.4	120.9	60.5
Buffalo	Above Reservoir	435	1267.4	35.3	153.1	37.1		47.3	

Table 27

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected February 24, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	o,p'DDT	p,p'DDT	Heptachlor Epoxide	Heptachlor
Buffalo	Below Res.	540	2331.1	68.0	53.0	31.0	13.0	---	7.0	--
Buffalo	Below Res.	540	2282.4	60.0	80.0	42.0	15.0	7.0	---	--
Buffalo	In Res.	530	2417.4	169.0	77.0	69.0	19.5	---	12.0	--
Channel Catfish	In Res.	420	818.5	338.0	71.0	----	----	14.0	70.0	--
Carp	In Res.	500	1347.2	195.0	87.0	7.0	20.0	----	22.0	23.0
Channel Catfish	Above Res.	170	33.0	18.0	11.0	4.0	----	----	----	--

Table 28

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected March 25 and 29, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	o,p'DDT	p,p'DDT	Heptachlor Epoxide	Heptachlor
Carp	Below Res.	725	6167	213.0	106.0	56.0	----		33.0	--
Buffalo	Below Res.	580	2451.6	53.0	88.0	54.0	----	9.0	----	--
Channel Catfish	In Res.	420	648	260.0	---	23.0	----	---	----	--
Crappie	In Res.	290	351	204.5	25.0	17.0	13.0	---	17.5	--
White Bass	In Res.	270	369.5	204.0	50.0	33.0	----	---	42.0	--
Wall-eye	Above Res.	491	1291.5	417.0	59.0	42.0	37.0	18.0	81.0	--
Carp	Above Res.	410	671.2	47.5	114.0	68.0	26.0	3.0	18.0	--
Buffalo	Above Res.	505	1488.3	65.0	38.0	19.0	12.0	---	5.0	--

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected April 13, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	o,p'DDT	p,p'DDT	Heptachlor Epoxide	Heptachlor
White Bass	In Res.	185	90.5	146.0	31.5	17.5	----	----	17.5	--
Crappie	In Res.	255	340.1	255.0	36.0	----	----	8.0	75.0	--
Channel Catfish	In Res.	440	590.3	100.5	47.0	34.0	18.0	---	11.5	--

Table 30

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected May 3 and 5, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	o,p'DDT	p,p'DDT	Heptachlor Epoxide	Hepta-chlor	Aldrin
Buffalo	Below Res.	460	1325.4	52.7	22.0	16.0	--	--	--	--	--
Buffalo	Below Res.	480	1546.0	298	42.0	25.0	--	14	66	--	--
Carp	Below Res.	410	524.8	32.0	19.0	--	--	--	--	--	--
Buffalo	In Res.	440	1198.4	134	17.0	11.0	--	--	--	--	12.0
High Fin Carp-sucker	In Res.	350	483.7	225.6	32.0	22.0	--	--	--	--	--
Buffalo	Above Res.	503	1981.8	261.1	45.7	32.0	--	18.3	--	--	--

Table 31

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected June 13, 14, & 22, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	o,p'DDT	p,p'DDT	Heptachlor	Heptachlor Epoxide
White Bass	Below Res.	235	170.4	13.0	11.0	5.0	--	--	--	--
Buffalo	"	310	539.7	15.5	27.5	--	--	--	--	--
Channel Cat	"	220	77.0	19.0	26.5	8.0	--	--	--	--
Channel Cat	In Res.	267	138.2	259.0	97.5	50.0	--	--	--	--
Large Mouth Bass	"	262	227.9	90.0	17.5	8.0	--	--	--	1.0
Crappie	"	311	332.5	113.0	38.0	18.6	--	--	--	--
Carp	Above Res.	420	763	496.0	113	66.0	--	16.0	--	94.0
Buffalo	"	445	1270	156.0	33.0	--	--	--	4.5	9.0
Quillback	"	450	1044	176.0	47.9	--	--	--	11.0	--

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected July 15 & 29, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	p,p'DDT	Heptachlor	Heptachlor Epoxide	β-BHC
Buffalo	Below Res.	710	3344.7	434.0	221.5	105.0	--	--	93.0	--
Buffalo	"	515	2423.2	30.5	31.0	--	--	--	--	--
Flathead Catfish	"	655	2569.1	166.5	68.0	15.5	--	--	--	--
Channel Catfish	In Res.	355	371.7	238.0	--	--	--	--	--	--
White Bass	"	270	242.0	23.0	15.5	8.5	--	--	9.0	--
Crappie	"	240	233.6	108.0	14.5	--	--	--	--	--
Carp	Above Res.	530	1956.1	200.0	99.0	trace	--	13.0	--	--
Carp	"	600	1947.8	414.0	28.0	11.0	--	9.0	--	11.0
Crappie	"	205	154.5	127.5	52.5	19.0	--	--	--	--

Table 32

Table 33

PESTICIDE RESIDUES IN FISH ABOVE, IN AND BELOW
THE CORALVILLE RESERVOIR (ppb)
Collected August 10 & 30, 1977

Species	Location	Length (mm)	Weight (gm)	Dieldrin	p,p'DDE	p,p'DDD	o,p'DDT	p,p'DDT	Heptachlor	Heptachlor Epoxide
Buffalo	Below Res.	1020.3	410	89.0	107.0	70.5	--	--	--	6.0
Highfin Carp-sucker	"	336.1	305	5.0	10.5	--	--	--	--	--
Carp	"	824.5	319	42.0	84.0	49	--	--	--	--
Carp	In Res.	850.7	320	331.5	90.0	36.0	--	--	--	16.0
Quill-back Carp-sucker	"	533.2	309	91.0	19.5	11.0	--	--	--	--
White Bass	"	219.6	245	136.0	12.0	8.0	--	--	--	6.0
Buffalo	Above Res.	3312.8	610	118.5	13.0	26.0	--	17.0	--	--
Buffalo	"	2612.4	560	122	13.0	15.0	--	--	--	--
Carp	"	1614.0	590	137.0	53.5	27.5	--	--	--	--

MONTHLY MEAN FLOWS (in cfs) FOR IOWA RIVER AT MARENGO
OCTOBER 1964 - SEPTEMBER 1977

Water Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Mean for Water Year
1977	120	124	65	31	79	329	259	179	114	116	1776	2196	449
1976	245	308	400	184	632	2097	4572	2489	2193	632	278	133	1181
1975	734	1884	1538	1475	760	5403	4231	2662	4530	1684	583	447	2164
1974	1966	1177	1396	1913	3118	3523	2957	8220	7635	2153	3574	767	3201
1973	2468	3878	1868	4194	4363	6269	8197	5835	4968	1843	834	701	3773
1972	165	365	515	279	361	2183	1196	2225	4984	2160	3768	1439	1640
1971	2222	1648	1195	636	3214	5493	2314	1446	1389	1422	375	204	1792
1970	587	660	336	257	685	2438	1552	3508	1567	562	1135	1031	1201
1969	631	479	516	837	648	5217	4643	2725	4469	11340	2453	783	2917
1968	203	286	205	214	252	358	920	588	460	1286	859	295	495
1967	193	175	144	267	343	525	537	354	3137	1046	523	230	621
1966	4133	1738	1760	1577	1836	1987	2155	3298	4961	1479	589	255	2145
1965	338	230	186	745	1935	3681	10,850	2052	2579	1785	523	4098	2399
1964	208	206	128	116	195	256	829	1324	1434	967	456	729	570
Average	1010	936	727	892	1297	2826	3226	2624	1217	2034	1266	951	1753

Table 35

COMPARISON OF AVERAGE MONTHLY CHEMICAL & BIOLOGICAL PARAMETERS
in the Iowa River Above (A) & Below (B) the Coralville Reservoir

Dates	Orthophosphate mg/1		5-Day BOD mg/1		Coliforms per 100 ml		Total Plankton per ml		Threshold Odor		Turbidity NTU		Ammonia mg/1	
1976-1977	A	B	A	B	A	B	A	B	A	B	A	B	A	B
October	.05	.04	9.0	2.7	350	1000	157,172	55,240	21	18	15	12.5	.16	.37
November	.06	.02	8.7	4.1	900	200	80,545	13,929	18	18	10	5	.09	.16
December	.15	.02	4.0	2.0	1070	35	43,302	6,088	23	18	9	4	.76	.17
January	.11	.02	1.4	1.0	2240	60	13,633	12,206	19	4.7	7	3	1.52	.31
February	.14	.04	2.6	3.1	655	335	15,145	34,867	21	7.8	19	4	1.72	.64
March	.18	.04	6.8	6.1	1450	600	38,847	46,480	21	17	17.5	7	1.11	.65
April	.06	.03	7.8	5.3	800	150	328,243	125,698	18	15.5	36	17	.18	.34
May	.11	.07	4.8	4.0	1250	500	214,731	236,468	6.6	6.6	29.5	14	.12	.32
June	.12	.05	6.8	6.7	2700	850	558,626	196,048	5.6	5.6	30	11	.13	.27
July	.10	.03	6.1	4.6	4200	1400	397,422	161,272	4.9	7.8	39.5	17	.24	.27
August	.20	.16	9.9	4.6	245000	10450	31,185	82,474	15.5	3.7	144	21	.26	.32
September	.22	.15	2.9	2.7	4750	1300	106,328	22,001	49	37	56	25	.38	.43
Average of all samples	.12	.07	5.9	3.9	22114 1851 *	1407 585*	165,432	82,729	18.6	13.3	34	12	.56	.35

* August deleted