TEXAS DEPARTMENT OF WATER RESOURCES

REPORT 230

WATER QUALITY OF LIVINGSTON RESERVOIR ON THE TRINITY RIVER, SOUTHEASTERN TEXAS

By

Jack Rawson
United States Geological Survey

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April 1979

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Jack Rawson
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ABSTRACT

The concentrations of dissolved solids, chloride, and sulfate in Livingston Reservoir on the Trinity River in southeastern Texas usually average less than 250 mg/l (milligrams per liter), 40 mg/l, and 50 mg/l, respectively. The water is usually hard or moderately hard (61 to 180 mg/l as calcium carbonate). The concentrations of principal dissolved constituents in the reservoir are usually maximum during summer and fall when evaporation is high and inflow is low.

Thermal stratification of the reservoir usually begins in March and persists until September or October. Neither the seasonal variation of dissolved constituents in inflow to the reservoir nor thermal stratification has resulted in significant stratification of the principal dissolved constituents. However, thermal stratification has resulted in significant seasonal and areal variations of dissolved oxygen, which results in higher concentration of dissolved iron, dissolved manganese, total phosphorus, and total inorganic nitrogen.

Oxygen utilized in the stabilization of unoxidized material from upstream sources, decaying algae, and pre-existing organic material along the bottom of the reservoir is not replaced during periods of summer stagnation; and water below depths of 25 to 35 feet (8 to 11 meters) usually contains less than 1.0 mg/l dissolved oxygen.

During periods of summer stagnation, reducing conditions often result in the solution of iron and manganese from bottom sediments in the deep parts of the reservoir. At site A_C, a deep site near Livingston Dam, dissolved-iron concentrations in water near the bottom of the reservoir during summer have ranged from 80 to 2,300 µg/l (micrograms per liter) and have averaged about 750 µg/l. The concentrations of dissolved manganese in water near the bottom of the reservoir at this site during summer have ranged from 230 to 4,700 µg/l and have averaged about 2,600 µg/l. Water near the surface of the reservoir throughout the year and water near the bottom during periods of winter circulation usually contain less than 100 µg/l of dissolved iron and 100 µg/l of dissolved manganese.

The concentrations of total phosphorus and inorganic nitrogen in water near the bottom at deep sites near Livingston Dam are usually maximum during periods of summer stagnation when decay of aquatic organisms and chemical reduction of bottom sediments release phosphorus and nitrogen to the water. The concentrations of phosphorus in the bottom stratum of water at site A_C average about 2.0 mg/l. The concentrations of inorganic nitrogen in the bottom and surface strata at this site during summer average about 4.0 mg/l and 0.1 mg/l, respectively.

Seasonal temperature and dissolved oxygen cycles have resulted in significant quantities of dissolved iron, dissolved manganese, total phosphorus, and total inorganic nitrogen being trapped and recycled within the reservoir.

WATER QUALITY OF LIVINGSTON RESERVOIR ON THE TRINITY RIVER, SOUTHEASTERN TEXAS

INTRODUCTION

Purpose of Study

As part of a continuing cooperative program with State, federal, and local agencies to inventory the surface-water resources of Texas, the U.S. Geological Survey has made comprehensive water-quality surveys of selected reservoirs in Texas periodically since October 1961. During the 1970 water year, in cooperation with the Trinity River Authority and the Texas Water Development Board, the program was expanded to include periodic water-quality surveys of Livingston Reservoir.

The purpose of this report is to summarize the water-quality records and to explain the variations of selected chemical constituents and characteristics of the water in Livingston Reservoir during the 1970-74 water years. Other reports containing results of water-quality surveys for Livingston Reservoir are cited in the list of references.

Standard International Units and Conversion Factors

Most units of measurements in publications of the Geological Survey before 1973 were those of the English system. Reports published after July 1, 1973, have contained both English units and International System of Units (SI). Factors for converting English units to equivalents of the International System are given in the following table:

From		Multiply by	To obtain	
Unit	Abbreviation		Unit	Abbreviation
acres	–	4,047	square meters	m^2
acre-feet	–	1,233	cubic meters	m^3
cubic feet per second	ft^3/s	.02832	cubic meters per second	m^3/s
feet	–	.3048	meters	m
miles	–	1.609	kilometers	km

DESCRIPTION OF LIVINGSTON RESERVOIR AND ITS ENVIRONMENT

Livingston Dam is on the Trinity River about 6 miles (10 km) southwest of Livingston in southeastern Texas. The reservoir extends across parts of Polk, San Jacinto, Trinity, and Walker Counties (Figure 1). The area consists predominantly of densely forested rolling hills with wide flood plains along the Trinity River.

Livingston Reservoir, which is owned and operated by the city of Houston and Trinity River Authority, was designed to conserve water for municipal supply, industrial use, and irrigation. Construction of the project

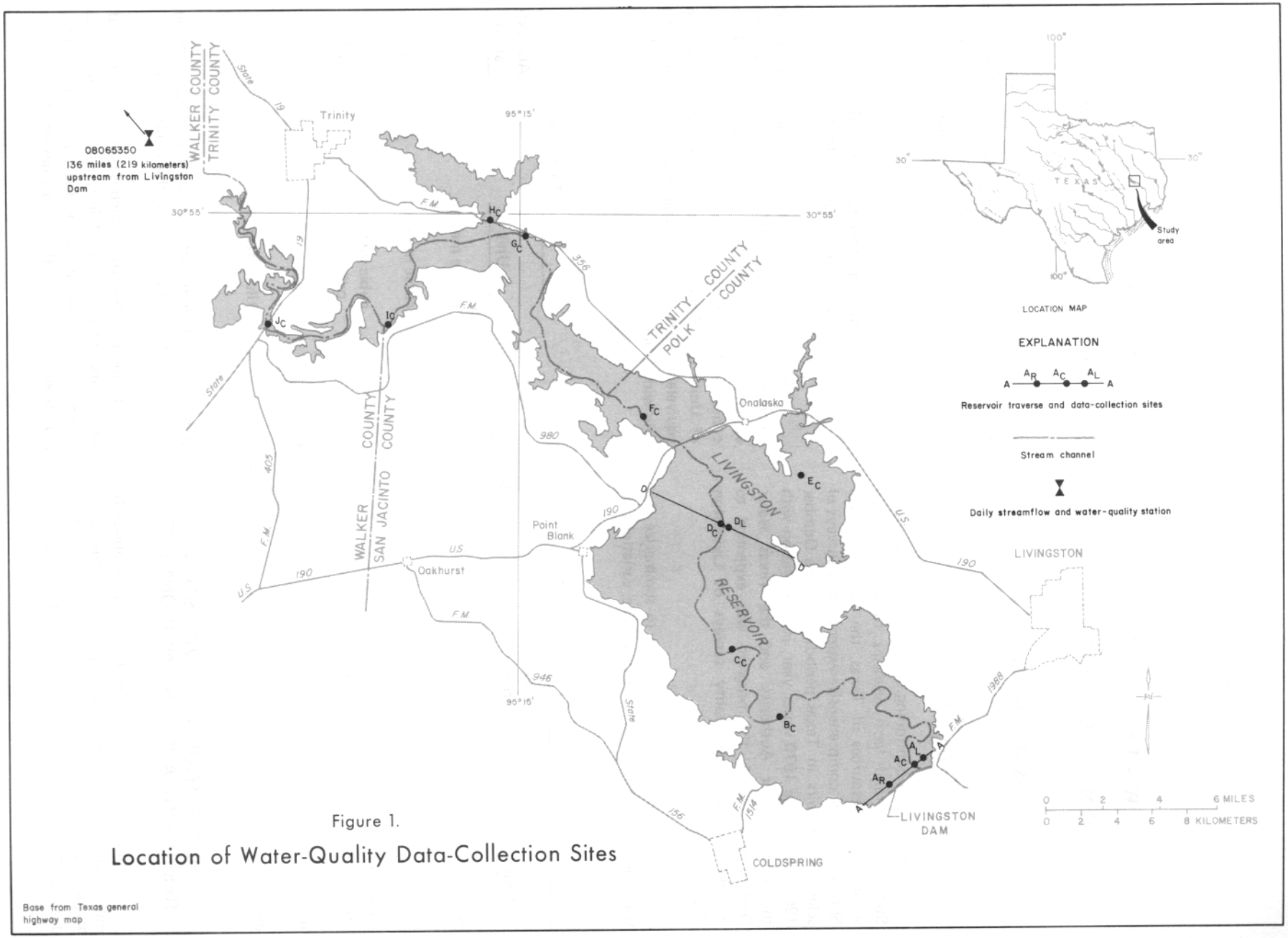

Figure 1.

Location of Water-Quality Data-Collection Sites

Base from Texas general highway map

was started in May 1966 and was completed in August 1969. Deliberate impoundment of water began in October 1968, and the first achievement of the normal capacity occurred in November 1971 (Trinity River Authority of Texas, 1974, sec. 8).

The reservoir has a total capacity of 1,750,000 acre-feet ($2.16 \times 10^9 m^3$) and a surface area of 82,600 acres ($3.34 \times 10^8 m^2$) at the top of the conservation pool at elevation of 131.0 feet (40.0 m). Other data regarding the dam and reservoir have been compiled by Dowell and Petty (1973, p. 08-25.0A) and are given in the following table:

Feature	Elevation (feet above mean sea level)	Capacity (acre-feet)	Area (acres)
Top of dam	145.0	–	–
Top of gates	134.0	2,045,000	88,900
Top of conservation storage	131.0	1,750,000	82,600
Spillway crest	99.0	161,000	17,700

ANALYSIS OF WATER-QUALITY DATA

Stream Records

A daily streamflow station has been operated on the Trinity River near Crockett (station 08065350) since 1964. Streamflow records for this station, which is about 136 miles (219 km) upstream from Livingston Dam, and records of reservoir contents and outflow from Livingston Reservoir indicate that more than 80 percent of inflow to the reservoir since deliberate impoundment began in October 1968 has originated in the drainage area upstream from the station near Crockett.

Samples for the determination of principle inorganic chemical constituents have been collected daily from this station since 1964. To supplement the information being obtained on the inorganic quality of the water, determinations of BOD (biochemical oxygen demand), dissolved oxygen, selected nutrients, and several other properties or constituents have been made at monthly or bimonthly intervals since 1968.

Streamflow and water-quality data are published annually in the U.S. Geological Survey series Water Resources Data for Texas: Part 1. Surface-Water Records and Part 2. Water-Quality Records. Selected streamflow and inorganic chemical water-quality records are summarized in Table 1 and on Figures 2 and 3.

Data on Figures 2 and 3 show that the concentrations of dissolved solids in the Trinity River near Crockett varies inversely with water discharge. At flows of greater than 1,000 ft^3/s (28 m^3/s), the water is usually of the calcium bicarbonate type. As the flow decreases, the percentages of sodium and chloride increase.

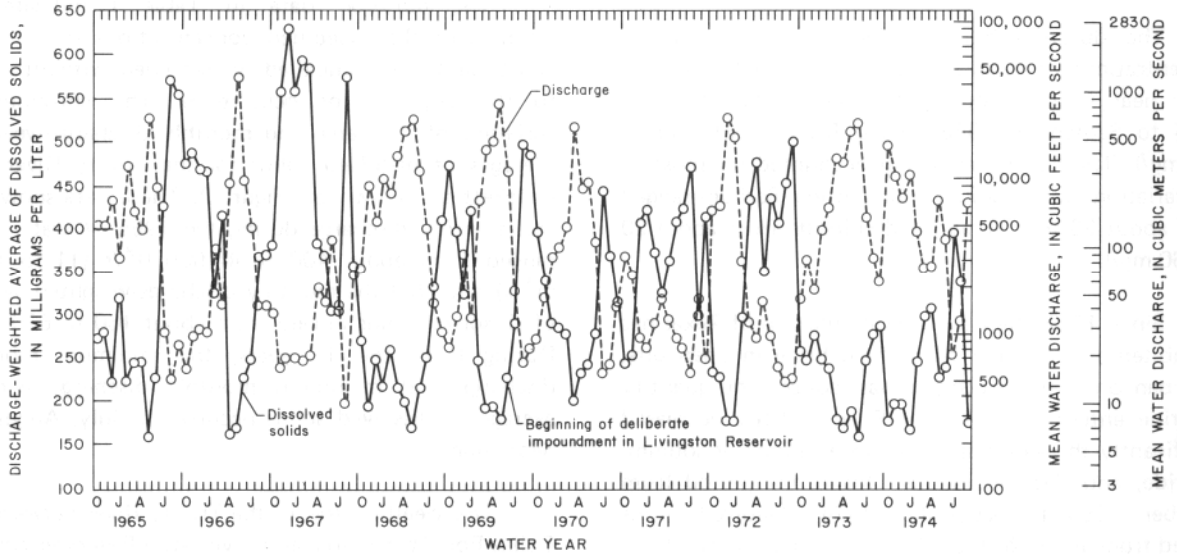

Figure 2.—Water Discharges and Concentrations of Dissolved Solids for Trinity River Near Crockett, Water Years 1965-74

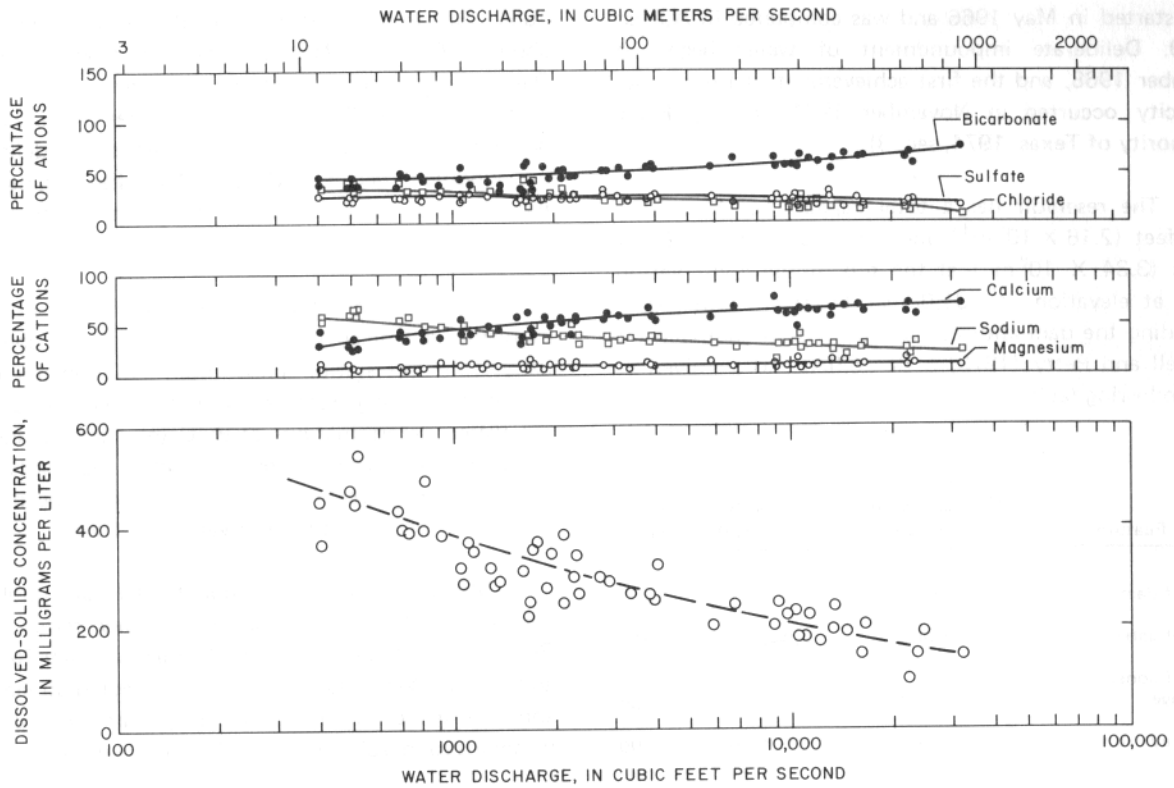

Figure 3.—Relations of Dissolved Solids and Percentages of Ions to Water Discharge, Trinity River Near Crockett

Oil is produced in many areas in the Trinity River basin upstream from Crockett, and the disposition of oil-field brines has contributed to the deterioration of water quality in the river (Leifeste and Hughes, 1967, p. 17-20).

The duration data in Table 1 show that the concentrations of dissolved constituents in the Trinity River near Crockett during the period from October 1964 to September 1968 ranged from about 200 to 580 mg/l. The constituents that accounted for most of the variations were sodium and chloride. Sodium ranged from about 20 to 150 mg/l and chloride from about 20 to 160 mg/l.

Since 1969, the Railroad Commission of Texas has prohibited the disposal of oil-field brine in open pits. This ban on open-pit disposal has reduced the quantity of brine entering the Trinity River and has decreased significantly the variations in concentrations of sodium, chloride, and dissolved solids. During the period from October 1969 to September 1974, dissolved solids ranged from about 200 to 460 mg/l; sodium ranged from about 20 to 100 mg/l; and chloride ranged from about 20 to 100 mg/l. Reductions in concentrations of other constituents were less significant. The concentration of sulfate usually ranged from about 35 to 95 mg/l from October 1964 to September 1968 and from about 35 to 80 mg/l from October 1969 to September 1974. The water usually was hard (121 to 180 mg/l as calcium carbonate) during both periods.

The duration data in Table 1 indicate the frequencies that specified concentrations of dissolved constituents were equalled or exceeded without regard to the sequence of occurrence. The chronological variation of discharge and monthly discharge-weighted averages of dissolved solids for the Trinity River near Crockett are shown on Figure 2. These data show that the monthly discharge during the 1965-74 water years ranged from about 400 to 44,000 ft^3/s (11 to 1,250 m^3/s) and that the monthly discharge-weighted average of dissolved solids ranged from about 160 to 630 mg/l. During 8 of the 10 years, the minimum monthly discharge and maximum monthly discharge-weighted average of dissolved solids occurred in July, August, or September.

Dry-weather flow of the Trinity River between the Dallas-Fort Worth area and Livingston Reservoir consists predominantly of effluent from wastewater treatment plants (Trinity River Authority of Texas, 1974, sec. 26). A gradual decrease of oxygen-demanding wastes and nutrients and an increase of dissolved oxygen occurs as

the water moves downstream from the Dallas-Fort Worth area. However, during some periods, the concentrations of oxygen-demanding wastes and nutrients are high, and the dissolved oxygen is low in the Trinity River near Crockett, which is more than 200 miles (320 km) downstream from the Dallas-Fort Worth area.

The BOD of 55 samples collected at monthly or bimonthly intervals ranged from 0.6 to 33 mg/l and averaged 6.6 mg/l. The BOD of 28 samples was greater than 3.0 mg/l.

The dissolved oxygen in 56 samples ranged from 1.1 to 11.6 mg/l and averaged 7.0 mg/l. Six of the samples contained less than 5.0 mg/l dissolved oxygen.

The concentration of total inorganic nitrogen (ammonia, nitrite, and nitrate nitrogen) in 55 samples ranged from 0.00 to 10 mg/l and averaged 2.8 mg/l.

Total phosphorus in 55 samples ranged from 0.11 to 7.1 mg/l and averaged 1.4 mg/l.

Many of these samples were collected during low flow, and the averages for BOD, nitrogen, and phosphorus probably are considerably higher than discharge-weighted averages. However, available data indicate that the discharge-weighted averages of BOD, nitrogen, and phosphorus exceed 3.0 mg/l, 1.5 mg/l, and 0.7 mg/l, respectively.

Reservoir Water Quality

Thermal Stratification

Impoundment of water in a reservoir may result in significant changes in the quality of the water. Some of the changes are beneficial; others are detrimental. Many of the detriments are related to thermal stratification—layering of the water due to temperature-induced density differences.

The following table (Weast, 1975, p. F-5) shows that pure water reaches its maximum density at a temperature of about 4°C and that the difference in density per 1°C is must greater at high temperatures than at low temperatures.

Temperature (°C)	Density (g/ml)
0.0	0.999868
4.0	1.000000
5.0	0.999992
10.0	.999728
15.0	.999129
20.0	.998234
25.0	.997075
30.0	.995678
35.0	.994063

A change in temperature from 29° to 30°C results in a change in density of about 0.0003 g/ml (grams per milliliter), whereas, a change in temperature from 10° to 11°C results in a density change of about 0.0001 g/ml. Stable stratification is common in lakes and reservoirs where the density of the upper and lower strata of water differs by about 0.001 to 0.002 g/ml. Thus, temperature differences of 3° to 4°C during the summer may result in stable stratification.

Thermal stratification may assume many patterns, depending upon the geographical location, climatological conditions, depth, surface area, and configuration of the lake or reservoir. During the winter, many deep reservoirs in the temperate zone are characteristically isothermal—that is, the water has a uniform temperature and density and circulates freely. With the onset of spring, solar heating warms the incoming water and the water at the reservoir surface and causes a decrease in density. This warm surface water overlies the colder and denser water. As the surface becomes progressively warmer, the density gradient steepens and the depth to which wind can mix the water is diminished. Thus, water in the reservoir often is separated into three fairly distinct strata:

(1) The epilimnion—a warm freely circulating surface stratum,

(2) The hypolimnion—a cold stagnant lower stratum, and

(3) The metalimnion—a middle stratum characterized by a rapid decrease in temperature with increase in depth.

Thermal stratification in deep reservoirs usually persists until fall, when a decrease in atmospheric temperature cools both the surface water in the reservoir and inflow from streams. When the temperatures and densities of the epilimnion and metalimnion approach those of the hypolimnion, the resistance to mixing is

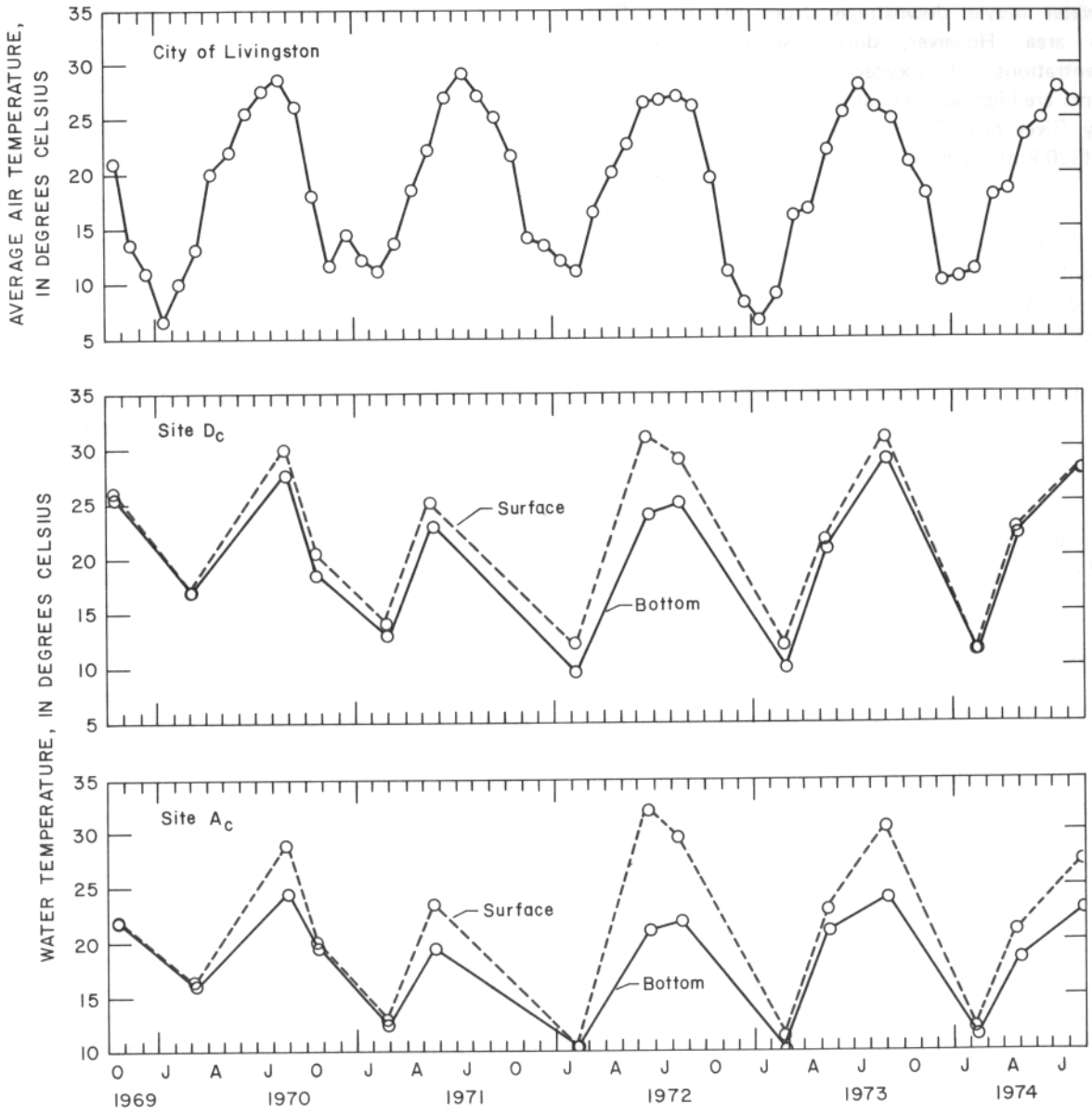

Figure 4.—Variations of Air and Water Temperatures at Selected Sites, October 1969-August 1974

reduced, and wind action produces a complete mixing or overturn of the water in the lake or reservoir.

The depth throughout most of Livingston Reservoir, outside the drowned channel of the Trinity River, usually is less than 50 feet (15 m). The pattern of thermal stratification in the reservoir often varies from the classical three-layered pattern because of shallow depths.

Water-temperature data for the reservoir during water-quality surveys are shown in Tables 2 to 16 and on Figure 4. These data, supplemented by air-temperature data for the city of Livingston (Figure 4), indicate that the fall overturn usually occurs in September or October, and that the water in the reservoir is nearly isothermal from October through February. During March, April, and May, warming of the surface water results in a gradual vertical temperature gradient. The temperature gradient usually steepens during June, July, and August and results in three fairly distinct layers in deep areas of the reservoir. However, the temperature and density of water near the bottom in shallow areas during the warm weather months may approach those at the surface and prevent significant stratification.

Dissolved Oxygen

Fish and other aquatic organisms require oxygen to maintain the metabolic processes that produce energy for growth and reproduction. Moreover, dissolved oxygen is related to the cycles of some of the chemical constituents dissolved in water and thus is one of the most important factors that influence the quality of water in a reservoir.

Water entering a reservoir contains organic material both from natural sources and from man's waste. Bacterial stabilization of this organic material requires oxygen. Decaying trees, brush, and other pre-existing oxidizable material within the area inundated by the reservoir and decaying algae and other organic material produced within the reservoir also exert an oxygen demand.

The distribution of dissolved oxygen in a reservoir is related to thermal stratification. Oxygen enters the surface stratum of a reservoir by plant photosynthesis and by absorption from the atmosphere. During the period of winter circulation, the water is exposed to the atmosphere repeatedly, and dissolved oxygen utilized in the decomposition of organic matter is replenished. However, during spring and summer, thermal stratification results in a reduction of vertical circulation of the water. Oxygen utilized in the decomposition of organic material is not replaced in the deep stratum of the reservoir, and a vertical dissolved-oxygen gradient develops.

Dissolved-oxygen data for Livingston Reservoir are given in Tables 2 to 16 and on Figures 5 and 6. These data show that the dissolved-oxygen gradient usually is large at deep sites during periods of summer stagnation when algal growth in the near-surface stratum is prolific. The gradients at all sites decrease greatly during periods of winter circulation.

The concentration of dissolved oxygen in the reservoir varies seasonally and areally. Although the concentration usually increases and the vertical gradient decreases at most sites during the winter, seldom is the water saturated with respect to dissolved oxygen. The depth-integrated concentration of dissolved oxygen at most sites in the downstream half of the reservoir averages about 4.0 mg/l during periods of summer stagnation and about 9.0 mg/l during periods of winter circulation. The concentration at most sites in the headwaters of the reservoir averages less than

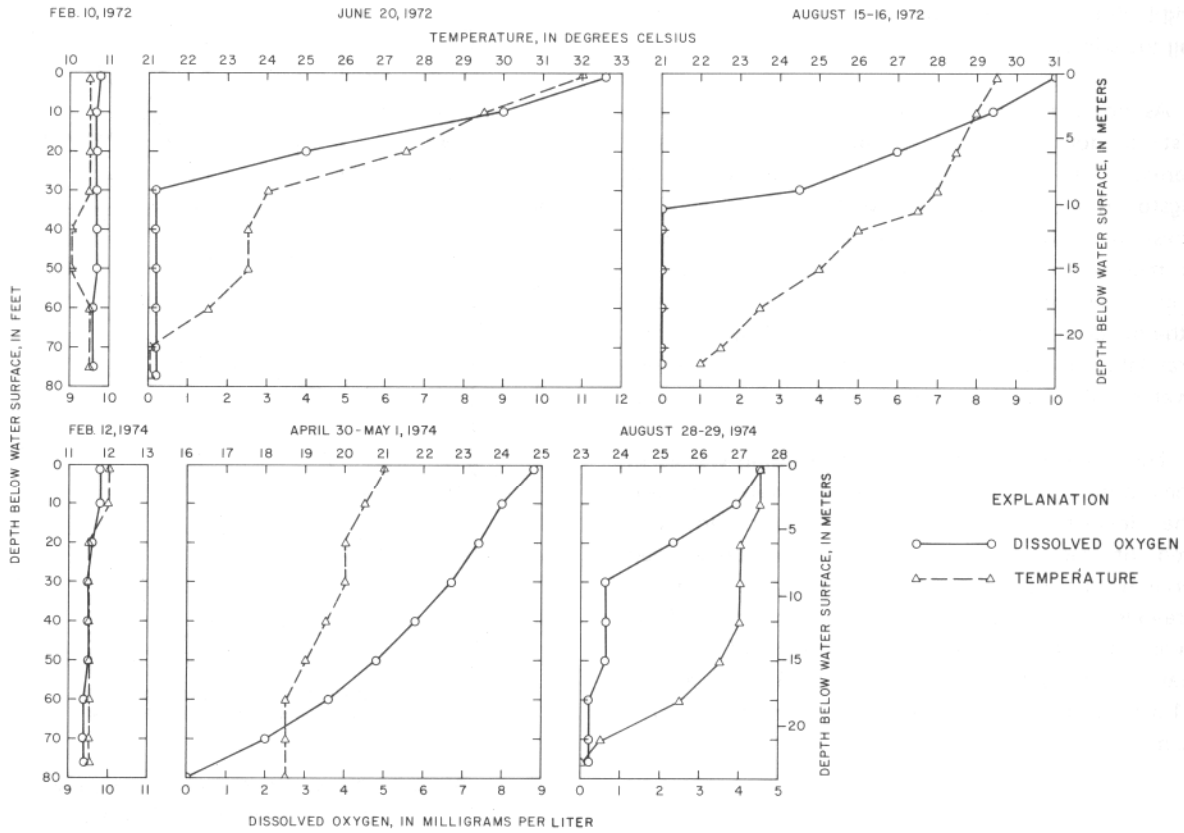

Figure 5.—Seasonal Profiles of Water Temperature and Dissolved Oxygen for Site A_C

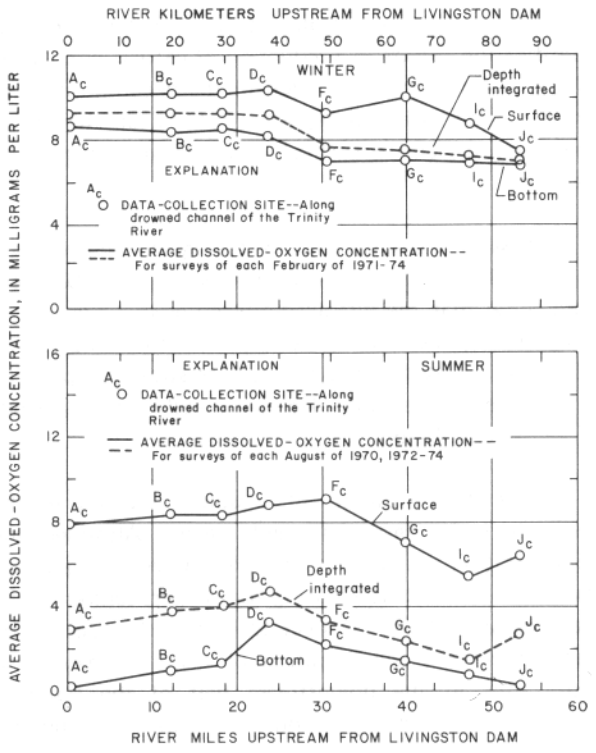

Figure 6.—Variations of Concentrations of Dissolved Oxygen During Summer and Winter Surveys

3.0 mg/l during the summer and less than 8.0 mg/l during the winter.

As noted earlier, low flows of the Trinity River consist predominantly of oxygen-demanding waste effluents. Thus, a large part of the headwaters of Livingston Reservoir during dry-weather periods consists of these partially stabilized effluents. As the Trinity River merges into Lake Livingston, the cross-sectional area increases, velocity decreases, travel-time increases, and the oxygen-demanding material in low flows and the natural debris in high flows are partially stabilized before the water enters the downstream reach of the reservoir.

The stabilization of oxygen-demanding wastes in the headwaters permits an increase of dissolved oxygen in the downstream half of the reservoir. However, oxygen utilized in the stabilization of unoxidized material from upstream sources by decaying algae and by pre-existing organic material along the bottom of the reservoir is not replaced during periods of summer stagnation; and water below depths of 25 to 35 feet (8 to 11 m) usually contains less than 1.0 mg/l dissolved oxygen.

Dissolved Iron and Dissolved Manganese

The occurrence and distribution of dissolved iron and manganese in waters of Livingston Reservoir are closely related to the dissolved-oxygen content (Figure 7). During summer stratification, the hypolimnion is unable to replenish dissolved oxygen utilized in the decomposition of organic matter. In the period of anaerobic decomposition that follows, reducing conditions often result in the solution of iron and manganese from sediments at the bottom of the reservoir. The concentrations of iron and manganese in the bottom waters at deep sites continue to increase throughout the duration of summer stagnation and eventually may reach high values before the fall overturn. After circulation begins in the fall and oxygen is replenished throughout the depth of the reservoir, most of the iron and manganese is oxidized to less soluble forms and settles to the bottom of the reservoir.

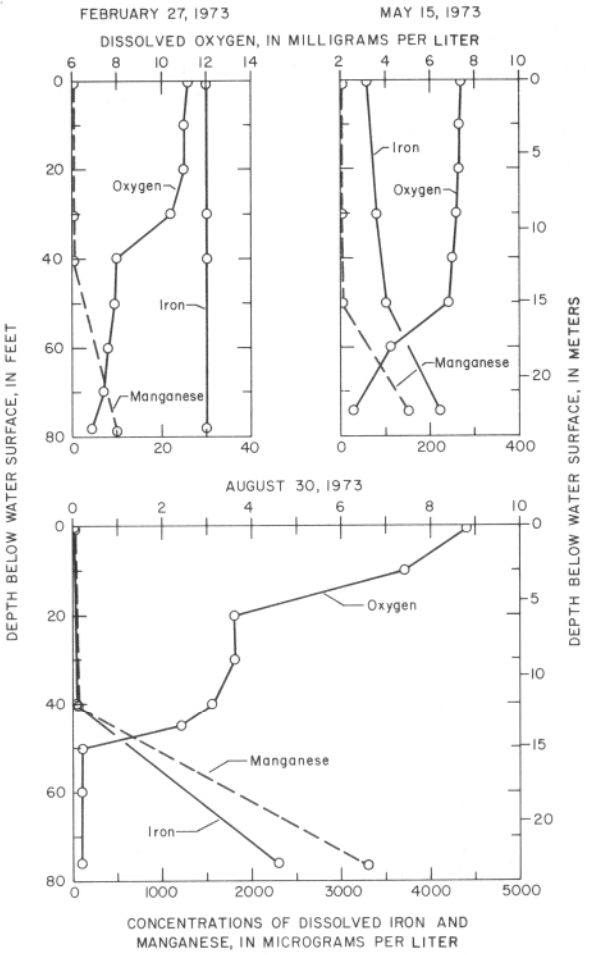

Figure 7.—Seasonal Profiles of Dissolved Iron, Manganese, and Oxygen for Site A_C

Throughout the year, water near the surface of the reservoir and water near the bottom during periods of winter circulation usually contain less than 100 µg/l of dissolved iron and 100 µg/l of dissolved manganese (Figures 8 and 9). However, during periods of summer stagnation, the concentrations of both constituents near the bottom of the reservoir increase in the downstream direction in response to increases in depth and decreases in the concentration of dissolved oxygen.

The iron concentrations near the bottom at site J_C, a shallow site in the headwaters of the reservoir, during the summer have ranged from 0 to 130 µg/l and have averaged about 60 µg/l. Manganese concentrations near the bottom at this site during summer have ranged from 0 to 220 µg/l and have averaged about 150 µg/l.

At site A_C, a deep site near Livingston Dam, the concentrations of iron in water near the bottom during summer have ranged from 80 to 2,300 µg/l and have averaged about 750 µg/l. The concentrations of manganese have ranged from 230 to 4,700 µg/l and have averaged about 2,600 µg/l.

The concentrations of both constituents at deep sites during summer stagnation have increased

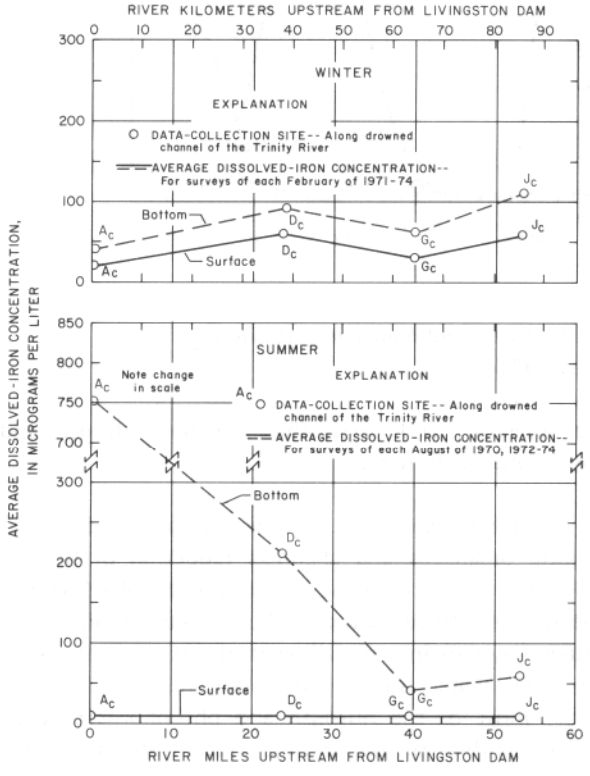

Figure 8.—Variations of Concentrations of Dissolved Iron During Summer and Winter Surveys

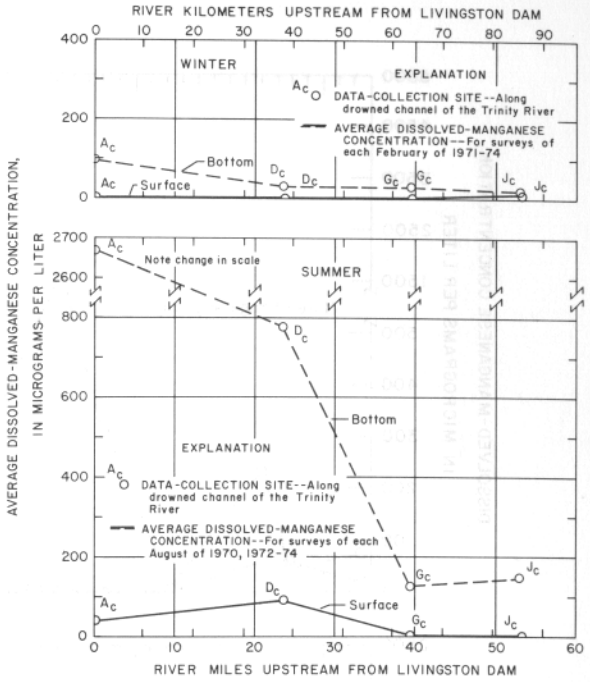

Figure 9.—Variations of Concentrations of Dissolved Manganese During Summer and Winter Surveys

significantly since the first achievement of normal capacity in 1971 (Figure 10).

Samples collected at about quarterly intervals since 1970 from the Trinity River near Crockett have contained from 0 to 4,700 µg/l of dissolved iron and from 0 to 350 µg/l of dissolved manganese, but seldom have contained more than 50 µg/l of either constituent. However, data collected since November 1974 show that the concentrations of iron and manganese associated with suspended sediment during high flows are much higher than dissolved fractions. The solution of iron and manganese associated with sediment deposited after high flows, supplemented by solution from pre-existing bottom material and from deposits precipitated during winter circulation, probably account for the increase of dissolved iron and manganese in water at deep sites near the bottom of the reservoir during periods of summer stagnation since 1971.

Nitrogen and Phosphorus

A literature review by Greeson (1971, p. 75) has revealed that at least 21 elements in some chemical combination are essential nutrients in the biological productivity in waters of a lake or reservoir. Among these nutrients, dominant roles in controlling productivity in most lakes and reservoirs are assigned to nitrogen and phosphorus because their concentrations in water are most likely to be in limited supply.

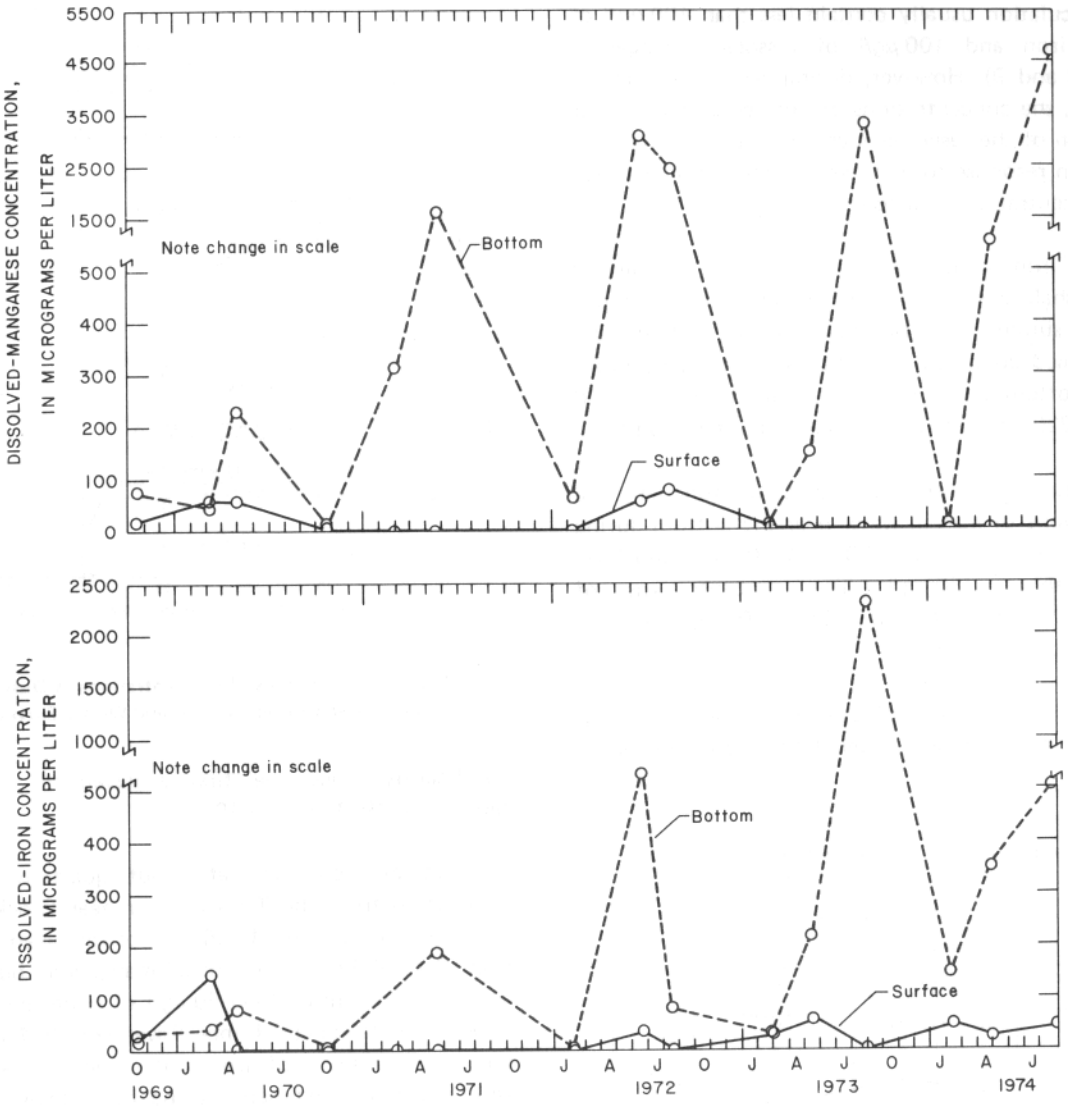

Figure 10.—Variations of Concentrations of Dissolved Iron and Manganese at Site A_C, October 1969-August 1974

Sources that may contribute nitrogen and phosphorus to a reservoir include land drainage, sewage effluent, industrial wastes, precipitation, decomposing plant and animal debris, and bottom sediments. Both total nitrogen and total phosphorus in the inflow to a reservoir may consist of four major components, dissolved and particulate inorganic forms and dissolved and particulate organic forms. As the water enters the reservoir, most of the particulate nitrogen and phosphorus eventually settles to the bottom; whereas, part of the dissolved fractions is utilized by algae and other aquatic organisms as primary sources of energy. Eventually, these organisms die, settle to the bottom of the reservoir, and carry their cellular nitrogen and phosphorus with them.

During periods of summer stagnation, decay of aquatic organisms and chemical reduction of bottom sediments reduce the concentration of dissolved oxygen and release nitrogen and phosphorus to the hypolimnion where they remain until fall overturn. As nutrients in the inflowing water are incorporated into this seasonal cycle, most of the nitrogen and phosphorus may be trapped in the reservoir, and the concentrations available for release from bottom materials during summer stagnation may increase greatly as the reservoir ages.

The concentrations of total phosphorus and total inorganic nitrogen (summation of total ammonia, nitrite, and nitrate nitrogen) in Livingston Reservoir vary seasonally and areally (Figures 11, 12, and 13). During periods of winter circulation, total phosphorus and total inorganic nitrogen concentrations are usually maximum in the headwaters and decrease progressively toward Livingston Dam. The concentrations of total phosphorus and total inorganic nitrogen at site J_C near the head of the reservoir average about 1.0 mg/l and 2.0 mg/l respectively, during winter. At site A_C near Livingston Dam, the phosphorus and nitrogen concentrations during the winter average about 0.2 mg/l and 0.7 mg/l, respectively.

The phosphorus and nitrogen concentrations in water near the bottom at deep sites near Livingston Dam are usually maximum during summer when the water is thermally stratified. The seasonal variation of phosphorus in water near the surface at these sites is insignificant; but assimilation by aquatic plants during the summer months reduces the inorganic nitrogen concentration. The concentrations of these nutrients at shallow sites near the head of the reservoir do not vary significantly with depth.

The concentrations of total phosphorus and total inorganic nitrogen in both the surface and bottom strata at site J_C average about 1.6 and 1.4 mg/l respectively, during the summer. The concentrations of phosphorus in the surface stratum at site A_C average about 0.2 mg/l during summer; those of the bottom stratum average about 2.0 mg/l. The concentrations of inorganic nitrogen in the surface stratum at this site average about 0.1 mg/l during summer; those of the bottom stratum average about 4.0 mg/l.

The chronological increase of both nutrients in the hypolimnion at deep sites during periods of summer stagnation (Figure 14) indicate that significant quantities of the nutrients are being trapped and recycled within the reservoir.

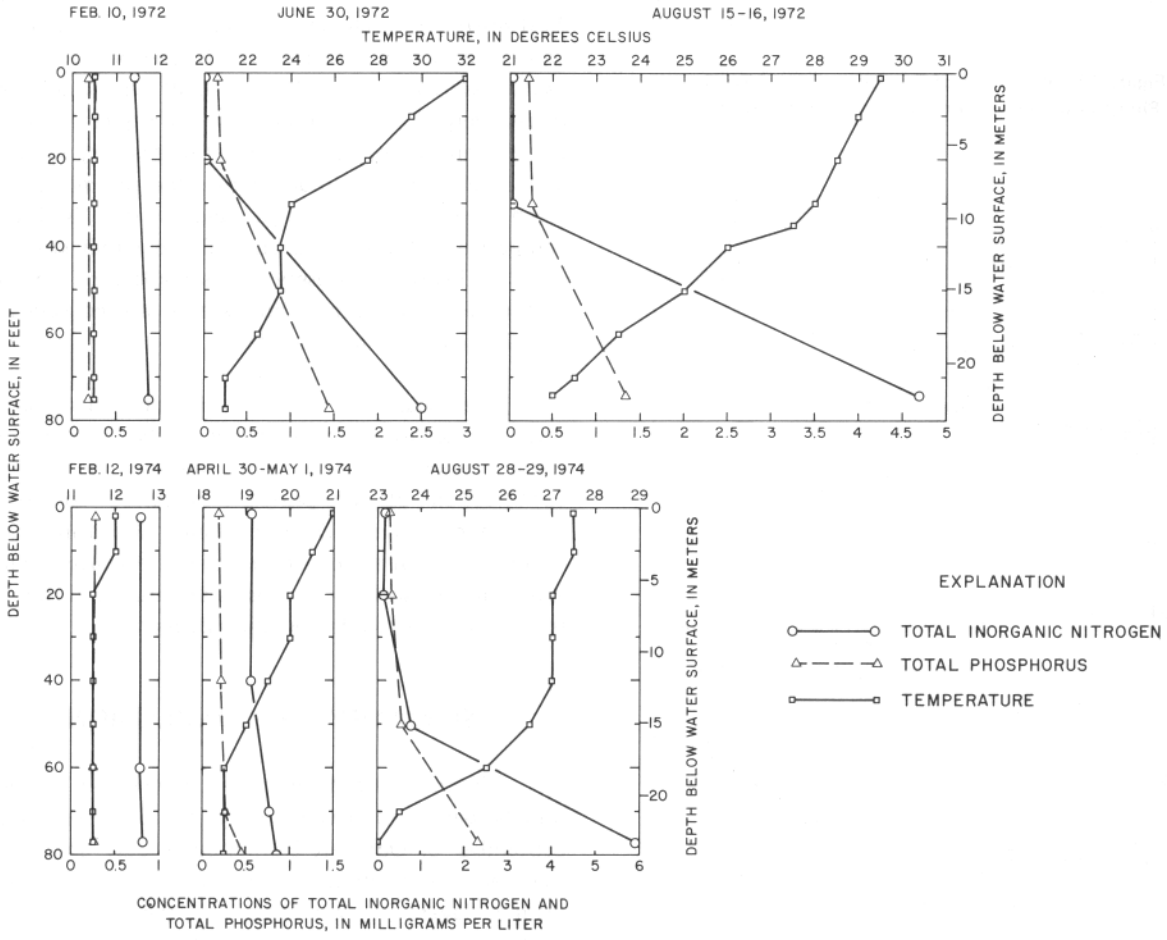

Figure 11.—Seasonal Profiles of Total Inorganic Nitrogen, Total Phosphorus, and Water Temperature for Site A_C

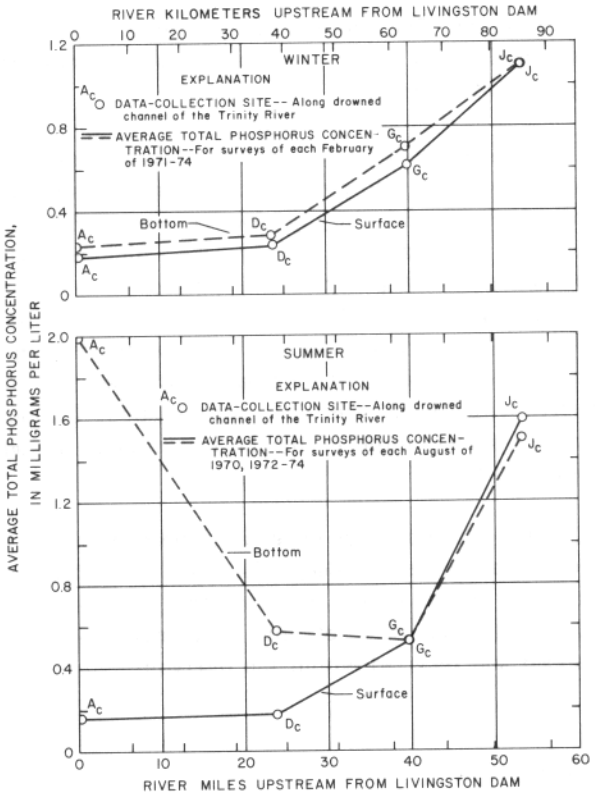

Figure 12.—Variations of Concentrations of Total Phosphorus During Summer and Winter Surveys

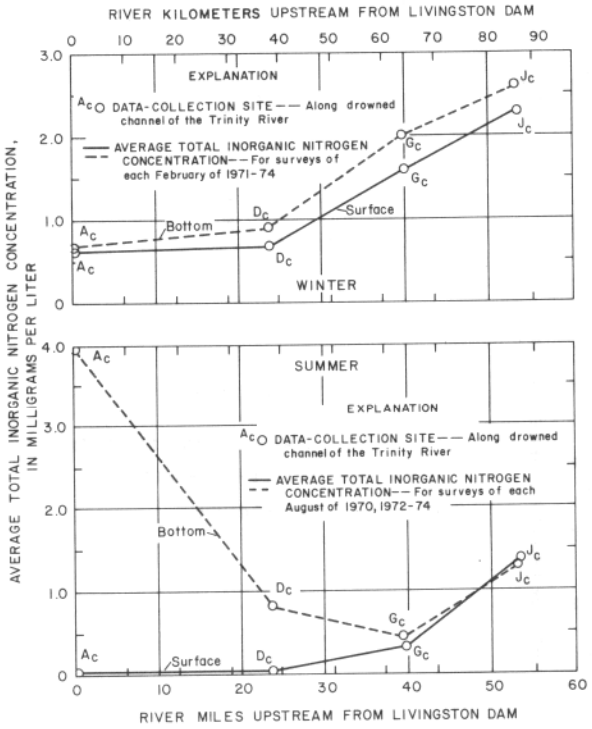

Figure 13.—Variations of Concentrations of Total Inorganic Nitrogen During Summer and Winter Surveys

Dissolved Solids, Chloride, Sulfate, and Hardness

Some of the more important properties or constituents that affect the utility of a reservoir as a water supply include dissolved solids, chloride, sulfate, and hardness.

Because the concentrations of these properties or constituents and specific conductance of a water are directly related, field measurements of specific conductance can be used to detect and document variations of the constituents in the water of a reservoir. Therefore, during each reservoir survey, the specific conductance of water at each data-collection site was determined at depth intervals of 5 to 10 feet (1.5 to 3 m). These data and results of analyses for dissolved solids, chloride, sulfate, and hardness for samples collected near the surface and bottom at selected sites (Tables 2 to 16) were used to estimate average concentrations of the dissolved constituents during each of the reservoir surveys (Figure 15).

Data on Figure 15 show that water in Livingston Reservoir usually is moderately hard or hard (61 to 180 mg/l as calcium carbonate) and that the concentrations of dissolved solids, chloride, and sulfate usually average less than 250 mg/l, 40 mg/l, and 50 mg/l, respectively. These data and data on Figure 2 show that the concentrations of these constituents vary seasonally and usually are maximum during the summer and fall when evaporation is high and inflow is low. A comparison of Figures 2 and 15 show that storage of water in Livingston Reservoir has resulted in a decrease in the range of concentrations of dissolved solids and principal chemical constituents.

The seasonal variation in concentrations of dissolved constituents in inflow to the reservoir or of water temperature has not resulted in significant stratification of the principal dissolved constituents within the reservoir. Data on Figure 16 and in Tables 2 to 16 show that the concentrations of dissolved solids in water at the surface of most sites usually differ from those at the bottom by less than 20 mg/l.

SUMMARY OF CONCLUSIONS

Thermal stratification in Livingston Reservoir usually begins to develop in March and persists until September or October. During June, July and August, thermal stratification usually results in three fairly distinct layers in deep areas: (1) the hypolimnion, a cold stagnant lower stratum, (2) the epilimnion, a warm freely circulating surface stratum, and (3) the

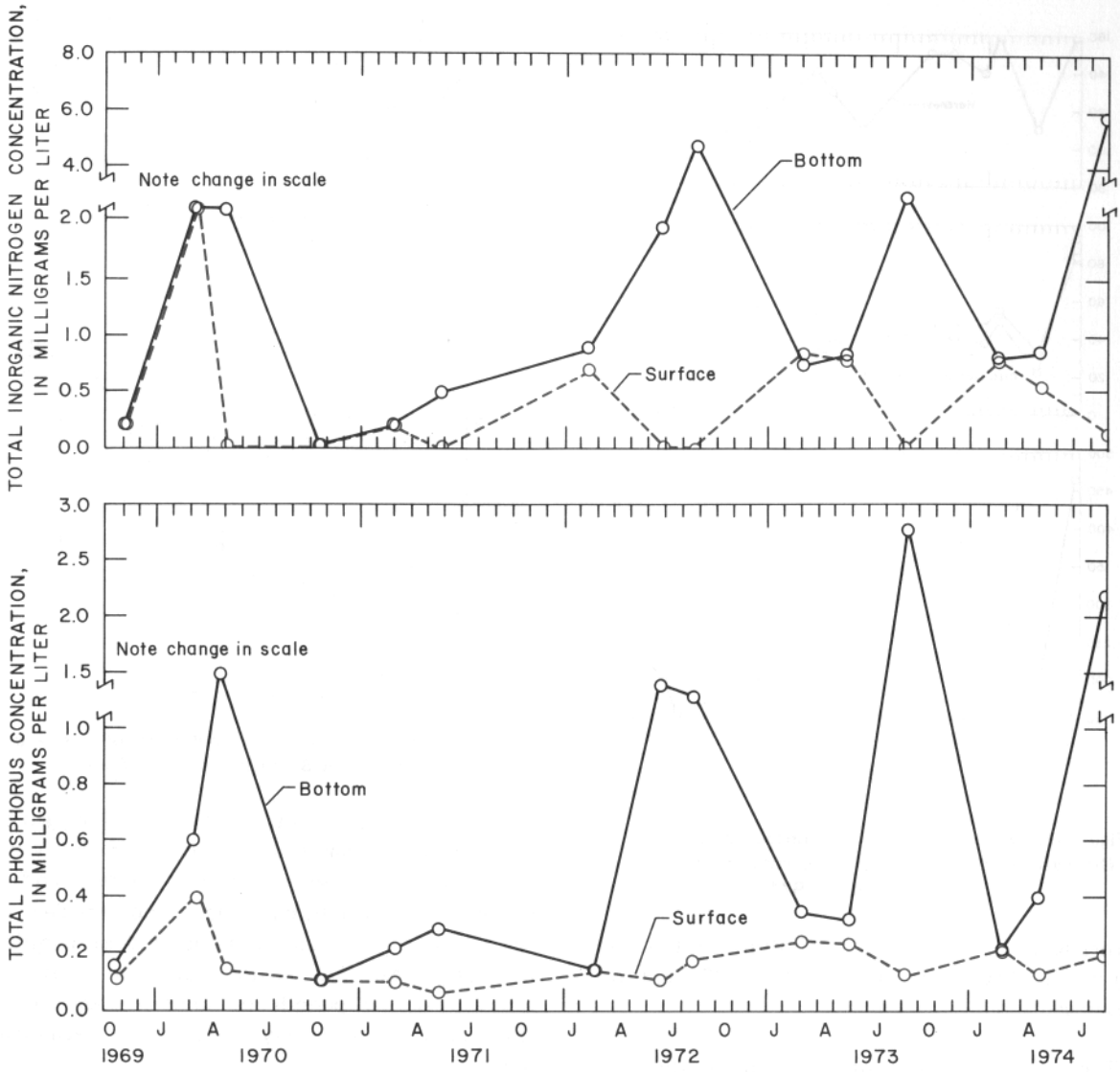

Figure 14.—Variations of Concentrations of Total Inorganic Nitrogen and Total Phosphorus at Site A_C, October 1969-August 1974

metalimnion, a middle stratum characterized by a rapid decrease in temperature with increase in depth.

The concentrations and distribution of dissolved oxygen, iron, and manganese and total phosphorus and inorganic nitrogen in Livingston Reservoir are related to the pattern of thermal stratification.

The depth-integrated concentration of dissolved oxygen at most sites in the downstream half of the reservoir averages about 4.0 mg/l during periods of summer stagnation and about 9.0 mg/l during periods of winter circulation. The concentration at most sites in the headwaters of the reservoir averages less than 3.0 mg/l during the summer and less than 8.0 mg/l during the winter. Water below depths of 25 to 35 feet (8 to 11 m) usually contain less than 1.0 mg/l dissolved oxygen during the summer.

The occurrence and distribution of dissolved iron and manganese in Livingston Reservoir are closely related to the dissolved-oxygen content of the water. Water throughout the reservoir during periods of winter circulation and water near the surface during periods of summer stagnation usually contain less than 100 μg/l of dissolved iron and 100 μg/l of dissolved manganese. The concentrations of both constituents in water near the bottom at deep sites increase greatly during periods of summer stagnation. At site A_C, a deep site near Livingston Dam, the concentrations of iron in water near the bottom have ranged from 80 to 2,300 μg/l and have averaged about 750 μg/l during the summer. Manganese

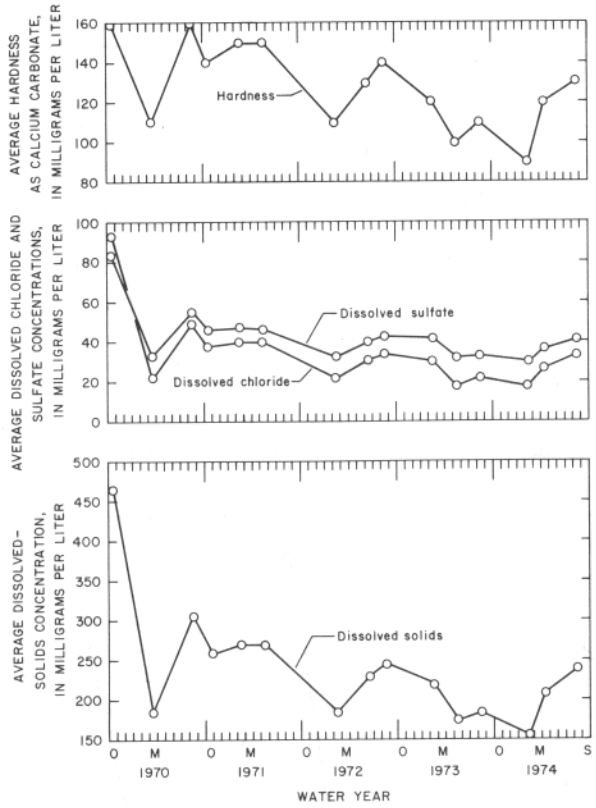

Figure 15.—Variations of Average Concentrations of Dissolved Solids, Chloride, Sulfate, and Hardness, October 1969-August 1974

concentrations in water near the bottom at this site during summer have ranged from 230 to 4,700 µg/l and have averaged about 2,600 µg/l.

The phosphorus and nitrogen concentrations in water near the bottom at deep sites near Livingston Dam are usually maximum during periods of summer stagnation when the decay of aquatic organisms and chemical reduction of bottom sediments reduce the concentration of dissolved oxygen and release nutrients to the water. The concentrations of total phosphorus and total inorganic nitrogen in the bottom stratum of water at site A_C during the summer average about 2.0 mg/l and 4.0 mg/l, respectively. Total phosphorus and total inorganic nitrogen concentrations in the surface stratum during the summer average about 0.2 mg/l and 0.1 mg/l, respectively.

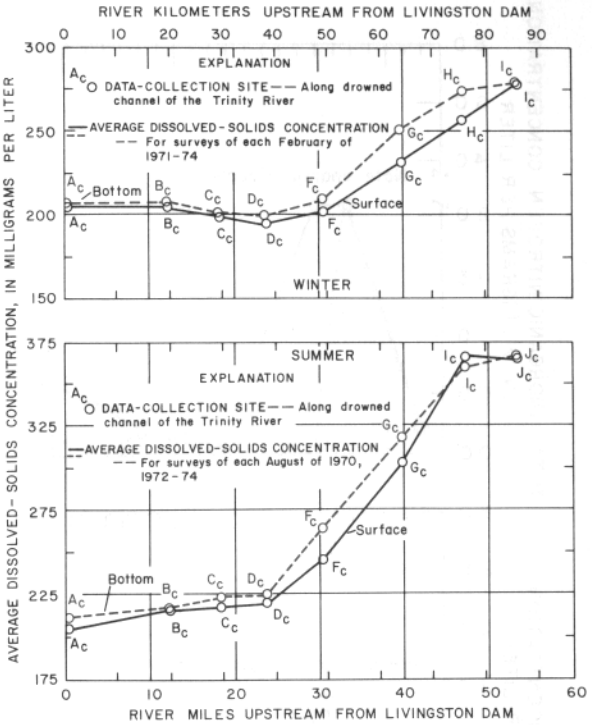

Figure 16.—Variations of Concentrations of Dissolved Solids During Summer and Winter Surveys

Seasonal temperature and dissolved-oxygen cycles have resulted in significant quantities of dissolved iron, dissolved manganese, total phosphorus, and total inorganic nitrogen being trapped and recycled within the reservoir. The concentrations of these constituents in water near the bottom at deep sites in the reservoir during periods of summer stagnation have increased progressively since the beginning of impoundment.

The concentrations of dissolved solids, chloride, and sulfate in Livingston Reservoir vary seasonally and are usually maximum during the summer and fall when evaporation is high and inflow is low. Neither the seasonal variation of dissolved constituents in inflow nor that of water temperature has resulted in significant stratification of dissolved solids within the reservoir. The concentrations of dissolved solids, chloride, and sulfate usually average less than 250 mg/l, 40 mg/l, and 50 mg/l, respectively. The water is usually moderately hard or hard (61 to 180 mg/l as calcium carbonate).

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Table 1.--Concentrations of Selected Dissolved Constituents and Hardness for the Trinity River Near Crockett, Texas

(Station 08065350)

Date	Constituent	Concentration of constituents, in milligrams per liter, that was equalled or exceeded for indicated percentage of days				
		10	25	50	75	90
Oct. 1964 - Sept. 1968 (1461 days)	Sodium (Na)	150	110	55	30	20
	Chloride (Cl)	160	115	50	25	20
	Sulfate (SO_4)	95	85	55	40	35
	Dissolved Solids	580	480	320	240	200
	Hardness (Ca, Mg)	170	160	150	140	120
Oct. 1969 - Sept. 1974 (1826 days)	Sodium (Na)	100	80	55	30	20
	Chloride (Cl)	100	80	50	25	20
	Sulfate (SO_4)	80	70	55	40	35
	Dissolved Solids	460	400	310	240	200
	Hardness (Ca, Mg)	170	160	150	140	120

TABLE 2.--Chemical-quality survey of Livingston Reservoir, October 15, 1969

Elevation 99.85 ft. Contents 173,700 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	Oct. 15, 1969	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	645	7.5	9.6	109	22.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	645	7.4	8.6	98	22.0
		17	--	--	--	--	--	--	--	199	--	62	--	--	--	--	--	170	3	650	7.2	8.6	98	22.0
A_C	Oct. 15	1	2.8	20	20	60	5.2	64	--	200	51	65	0.5	0.22	0.00	0.16	348	170	7	648	7.7	9.1	103	22.0
		10	--	30	20	--	--	--	--	--	--	64	--	--	--	--	--	--	--	645	7.6	8.6	98	22.0
		20	4.1	30	50	60	5.0	66	--	200	51	66	.6	.32	.00	.18	352	170	6	648	7.6	8.4	95	22.0
		30	--	20	50	--	--	--	--	--	--	64	--	--	--	--	--	--	--	640	7.5	8.5	97	22.0
		41	3.9	30	70	60	5.0	62	--	199	49	62	.5	.22	.00	.20	342	170	7	640	7.5	8.6	98	22.0
B_C	Oct. 15	1	11	--	--	58	5.3	100	--	194	72	100	.7	2.4	--	--	454	170	8	790	8.6	8.3	99	24.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	790	8.5	6.7	79	24.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	790	8.5	7.0	80	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	770	8.5	7.0	80	23.0
		36	--	--	--	--	--	--	--	200	--	92	--	--	--	--	--	170	4	760	7.4	6.6	76	23.0
C_C	Oct. 15	1	--	--	--	--	--	--	--	--	--	100	--	--	--	--	--	--	--	800	8.5	7.2	86	25.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800	8.4	6.4	76	25.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	790	8.4	5.9	70	25.0
		34	11	--	--	61	5.3	86	--	202	62	86	.6	2.1	--	--	420	170	8	725	8.3	5.2	61	24.0
D_C	Oct. 15	1	14	30	0	56	5.6	120	--	165	84	120	.9	5.3	.00	3.4	518	160	28	890	8.2	6.4	78	26.0
		10	--	20	10	--	--	--	--	--	--	120	--	--	--	--	--	--	--	900	8.2	5.2	63	25.5
		20	--	10	20	--	--	--	--	--	--	120	--	--	--	--	--	--	--	900	8.2	5.2	63	25.5
		32	14	20	50	55	5.4	120	--	166	82	120	.9	5.1	.00	3.3	511	160	23	875	8.1	5.0	60	25.5
E_C	Oct. 15	1	14	10	20	55	5.8	130	--	176	90	120	.9	7.7	--	--	542	160	17	925	8.4	6.9	83	25.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	900	8.3	6.6	78	24.0
		19	--	10	20	--	--	--	--	190	--	110	--	--	--	--	--	160	8	845	8.4	7.0	82	24.0
F_C	Oct. 15	1	13	20	10	52	5.3	130	--	166	100	100	1.1	11	--	--	532	150	16	890	8.2	3.9	48	26.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	890	8.1	2.0	24	26.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	890	8.1	2.3	28	25.5
		34	13	10	50	54	5.4	130	--	166	100	100	1.0	10	--	--	528	160	20	890	8.1	2.3	28	25.5

TABLE 3.--Chemical-quality survey of Livingston Reservoir, March 6, 1970

Elevation 104.22 ft. Contents 279,800 ac-ft.

SITE	DATE	DEPTH (FT)	DISSOLVED SILICA (SiO_2) (MG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO_3) (MG/L)	DISSOLVED SULFATE (SO_4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMONIA-NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	TEMPERATURE (°C)
A_R	Mar. 6, 1970	1	--	--	--	41	4.0	--	--	105	--	37	--	--	--	--	--	120	33	410	7.3	6.8	70	17.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	410	7.3	6.6	67	16.5
		20	--	--	--	41	4.0	--	--	104	--	38	--	--	--	--	--	120	34	410	7.2	6.2	62	16.0
A_C	Mar. 6	1	7.6	150	60	40	4.0	34	--	104	45	36	0.3	2.3	0.21	0.48	228	120	31	410	7.3	6.8	69	16.5
		10	--	100	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	410	7.2	6.4	65	16.5
		20	--	90	40	--	--	--	--	--	--	--	--	2.8	.19	.50	--	--	--	410	7.1	5.4	54	16.0
		30	--	100	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.0	4.7	47	16.0
		45	8.4	40	40	42	4.2	36	--	104	47	42	.3	2.2	.29	.60	241	120	37	450	7.0	4.6	46	16.0
B_C	Mar. 6	1	--	--	--	36	3.3	--	--	96	--	18	--	--	--	--	--	100	25	310	7.3	6.4	66	17.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.3	6.2	64	17.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.3	6.2	64	17.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.3	6.2	64	17.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.3	6.2	64	17.0
C_C	Mar. 6	1	7.3	210	40	36	3.1	18	--	96	34	17	.2	.90	.10	.42	167	100	24	290	7.3	6.2	64	17.0
		10	--	210	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	7.3	6.2	64	17.0
		20	--	100	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	7.2	6.2	64	17.0
		34	--	180	40	--	--	--	--	--	--	16	--	.93	.05	.49	--	--	--	290	7.2	6.1	63	17.0
D_C	Mar. 6	1	--	--	--	36	3.1	--	--	97	--	16	--	--	--	--	--	--	--	295	7.3	6.5	67	17.0
		17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.3	6.5	67	17.0
		32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.2	6.5	67	17.0
E_C	Mar. 6	1	8.1	--	--	35	3.3	--	--	92	36	21	.2	--	--	--	--	100	25	320	7.2	6.6	68	17.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.2	6.2	64	17.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	340	7.1	5.8	57	15.5
F_C	Mar. 6	1	7.1	110	40	37	3.0	16	--	98	33	16	.3	.80	.10	.54	164	100	24	295	7.2	6.5	67	17.0
		17	--	90	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.2	6.5	67	17.0
		35	--	90	60	--	--	--	--	--	--	--	--	.80	.11	.68	--	--	--	295	7.2	6.5	67	17.0

TABLE 4.--Chemical-quality survey of Livingston Reservoir, August 26-27, 1970

Elevation 118.48 ft. Contents 908,100 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	Aug. 26, 1970	1	2.2	0	60	54	4.6	31	--	166	40	30	0.3	0.00	0.00	0.14	244	150	18	445	8.3	8.4	108	29.0
		10	--	0	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	8.2	7.8	100	29.0
		20	--	0	80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	7.7	5.7	73	29.0
		30	--	0	120	--	--	--	--	--	--	--	--	.00	.00	.14	--	--	--	450	7.7	5.6	72	29.0
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.7	5.6	72	28.5
		40	--	80	240	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	7.2	.2	2	27.5
		55	7.6	80	230	51	4.5	21	--	160	28	28	.3	.10	.24	1.5	223	150	15	445	7.0	.2	2	24.5
A_L	Aug. 26	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	8.4	8.8	114	29.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	8.2	7.8	100	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	7.8	5.2	67	29.0
		29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	7.7	5.2	67	29.0
B_C	Aug. 26	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	462	8.4	8.8	113	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	7.8	6.0	77	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	7.8	6.0	77	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	7.7	5.8	73	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	7.7	5.4	68	28.0
		55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	7.5	3.4	43	28.0
C_C	Aug. 26	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	455	8.5	12.9	172	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.6	5.0	64	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.6	4.5	57	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.6	4.8	61	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.6	4.6	58	28.0
D_C	Aug. 26	1	2.1	0	320	57	5.0	38	--	181	42	37	.4	.11	.00	.15	271	160	14	460	8.4	11.6	153	30.0
		5	--	0	80	--	--	--	--	--	--	--	--	.01	.00	.13	--	--	--	460	8.1	8.6	110	29.0
		10	--	20	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.6	4.4	56	28.5
		20	--	20	70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.6	4.4	56	28.5
		30	--	160	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.6	4.3	54	28.0
		40	--	--	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	7.6	4.3	54	28.0
		48	2.6	480	60	58	5.1	38	--	186	44	36	.3	.01	.28	.16	276	170	13	465	7.6	4.4	55	27.5
E_C	Aug. 26	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	465	8.4	10.6	139	30.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.2	10.0	132	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.6	4.0	51	28.5
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.6	4.0	51	28.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.6	3.6	46	28.0

TABLE 4.--Chemical-quality survey of Livingston Reservoir, August 26-27, 1970--Continued

Elevation 118.48 ft. Contents 908,100 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
F_C	Aug. 26, 1970	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	525	8.4	11.3	151	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	530	7.5	2.9	37	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	570	7.4	.2	3	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	7.4	.2	3	29.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	605	7.4	.2	3	29.0
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	605	7.4	.2	3	29.0
G_C	Aug. 27	1	6.8	0	0	60	5.9	100	--	224	79	86	0.7	1.1	0.19	1.2	453	170	0	775	7.9	3.6	47	30.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	775	7.8	2.0	26	29.5
		10	--	60	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	775	7.8	1.7	22	29.5
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	770	7.8	1.6	21	29.0
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	760	7.7	1.6	21	29.0
		40	5.2	0	40	61	5.9	84	--	220	70	75	.6	.27	.52	.55	412	180	0	720	7.4	1.2	15	28.5
H_C	Aug. 27	1	--	--	--	--	--	--	--	224	71	80	--	--	--	--	--	170	0	720	8.3	7.2	92	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	715	8.0	4.7	60	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	680	7.8	5.1	65	28.5
		28	--	--	--	--	--	--	--	216	66	72	--	--	--	--	--	170	0	690	8.0	4.9	63	28.5
I_C	Aug. 27	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	765	7.7	2.2	29	29.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	765	7.6	.8	10	29.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	765	7.6	.8	10	29.5
		32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	7.5	1.0	13	29.0
J_C	Aug. 27	1	13	0	0	56	5.6	99	--	201	80	82	.7	1.9	.29	2.7	447	160	0	760	7.8	3.6	47	30.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	760	7.7	2.2	29	30.0
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	760	7.6	1.8	24	30.0
		15	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	760	7.6	1.9	25	30.0
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	765	7.6	1.5	19	29.5
		26	12	0	0	57	5.9	100	--	224	74	88	.7	1.1	.53	1.8	455	170	0	790	7.6	.2	3	29.0

TABLE 5.--Chemical-quality survey of Livingston Reservoir, October 20, 1970

Elevation 120.88 ft. Contents 1,054,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	Oct. 20, 1970	1	2.0	0	0	50	4.8	34	--	156	40	34	0.4	0.00	0.00	0.10	242	140	17	450	8.4	10.6	115	20.0
		5	--	0	0	--	--	--	--	--	--	--	--	.00	.00	.09	--	--	--	460	8.0	8.5	91	19.5
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.2	8.5	91	19.5
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.0	8.5	91	19.5
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	8.5	91	19.5
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	8.5	91	19.5
		50	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	8.5	91	19.5
		60	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	8.5	91	19.5
		67	2.5	0	0	55	4.8	34	--	171	40	34	.4	.00	.00	.11	255	160	17	460	8.0	8.4	90	19.5
A_L	Oct. 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.3	9.7	105	20.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.2	8.6	92	19.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.2	8.7	94	19.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.2	8.6	91	19.0
		37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	8.4	90	19.5
B_C	Oct. 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.3	10.1	110	20.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.2	9.5	102	19.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.0	8.3	88	19.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.0	7.7	82	19.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.0	7.8	83	19.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.0	7.7	82	18.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.0	7.6	81	18.5
		58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.9	7.5	80	18.5
C_C	Oct. 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.3	10.3	113	20.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.2	9.4	101	19.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.1	8.5	90	19.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.1	8.6	91	19.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.0	8.2	87	19.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.9	7.8	83	18.5
		46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.9	7.4	79	19.0
D_C	Oct. 20	1	7.2	0	0	50	4.4	45	--	145	55	40	.4	1.8	.00	.51	281	140	24	500	8.0	9.5	104	20.5
		5	--	0	0	--	--	--	--	--	--	--	--	1.8	.00	.51	--	--	--	500	7.9	8.3	88	18.5
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.8	8.0	84	18.0
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	7.8	82	18.0
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	7.8	82	18.0
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	7.5	80	18.5
		48	4.2	10	0	52	4.7	43	--	162	47	40	.4	.92	.00	.34	275	150	16	490	7.8	7.5	80	18.5

TABLE 5.--Chemical-quality survey of Livingston Reservoir, October 20, 1970--Continued

Elevation 120.88 ft. Contents 1,054,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	Oct. 20, 1970	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.2	11.1	122	20.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.1	10.5	114	20.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.5	6.3	66	18.0
		16	--	--	--	--	--	--	--	156	47	41	--	--	--	--	--	140	16	480	7.4	5.9	63	18.5
F_C	Oct. 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.5	5.5	60	20.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.4	5.1	55	19.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.5	5.5	59	19.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.7	7.6	81	18.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.8	7.2	77	18.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	7.6	80	18.0
		51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.8	7.6	80	18.0
G_C	Oct. 20	1	8.0	0	0	44	4.2	39	--	125	45	40	0.4	1.7	0.00	0.54	249	130	25	430	7.7	7.9	88	21.0
		5	--	10	0	--	--	--	--	--	--	--	--	1.8	.00	.55	--	--	--	410	7.5	6.0	64	18.5
		10	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400	7.4	5.2	55	18.5
		20	--	20	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.4	4.9	52	18.5
		30	--	30	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.4	4.8	51	18.5
		43	8.1	70	30	41	3.5	32	--	114	33	38	.4	.90	.00	.60	216	120	23	380	7.4	4.7	50	18.5
H_C	Oct. 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.6	13.4	149	21.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.7	7.0	74	19.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	7.5	6.2	66	18.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.5	6.0	64	18.5
		32	--	--	--	--	--	--	--	126	45	42	--	--	--	--	--	120	15	450	7.5	5.7	61	18.5
I_C	Oct. 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.6	7.4	80	20.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	430	7.3	2.9	30	17.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	430	7.3	2.9	30	17.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.3	3.0	31	17.5
		32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.2	3.0	31	17.5
J_C	Oct. 20	1	8.3	10	0	40	3.1	32	--	120	36	27	.4	1.9	.00	.62	214	110	14	360	7.5	5.7	61	19.5
		5	--	0	0	--	--	--	--	--	--	--	--	1.8	.00	.57	--	--	--	320	7.5	5.1	53	17.0
		10	--	20	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.5	5.2	54	17.0
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.5	5.2	54	17.0
		34	7.3	0	0	40	2.8	16	--	117	28	10	.4	1.6	.00	.58	170	110	15	310	7.5	5.3	55	17.0

TABLE 6.--Chemical-quality survey of Livingston Reservoir, February 25-26, 1971

Elevation 125.87 ft. Contents 1,391,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	Feb. 25, 1971	1	2.2	0	0	52	4.6	37	--	162	46	33	0.4	0.20	0.00	0.10	256	150	16	420	8.3	9.6	91	13.0
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	8.0	9.6	91	13.0
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.8	9.1	86	13.0
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.0	84	12.5
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.0	84	12.5
		50	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.0	84	12.5
		60	--	0	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.0	84	12.5
		70	4.5	0	310	52	4.6	36	--	160	46	33	.4	.20	.00	.22	257	150	18	420	7.8	8.8	82	12.5
A_L	Feb. 25	1	--	--	--	--	--	--	--	--	--	--	--	.20	.00	.08	--	--	--	420	8.0	9.7	92	13.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	8.0	9.7	92	13.0
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.3	88	13.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.2	86	12.5
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.9	9.0	84	12.5
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	8.0	8.9	83	12.5
		56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	8.0	8.4	79	12.5
B_C	Feb. 25	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	8.0	10.8	102	13.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	10.8	102	13.0
		15	--	--	--	--	--	--	--	--	--	--	--	.20	.00	.12	--	--	--	450	8.1	10.4	98	13.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.0	10.2	96	13.0
		25	--	--	--	--	--	--	--	--	--	--	--	.20	.00	.13	--	--	--	450	7.9	9.5	90	13.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.9	9.0	85	13.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.8	8.8	83	13.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.8	8.6	81	13.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.6	7.8	73	12.5
C_C	Feb. 25	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	10.6	100	13.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	10.6	100	13.0
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.1	10.4	98	13.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	8.0	10.0	94	13.0
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.9	9.3	88	13.0
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.8	8.8	83	13.0
		57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.4	7.8	73	12.5
D_C	Feb. 25	1	.6	0	0	51	4.6	38	--	160	46	35	.4	.00	.00	.21	255	150	15	480	8.5	12.0	115	14.0
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.4	11.8	113	14.0
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.4	11.6	112	14.0
		25	--	0	0	--	--	--	--	--	--	--	--	.12	.00	.22	--	--	--	480	8.4	11.3	108	13.5
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.2	10.2	96	13.0
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.2	9.8	92	13.0
		50	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.1	9.0	85	13.0
		61	7.1	20	0	54	4.7	45	--	168	52	41	.4	.46	.00	.17	289	150	16	500	7.8	8.0	75	13.0

TABLE 6.--Chemical-quality survey of Livingston Reservoir, February 25-26, 1971--Continued

Elevation 125.87 ft. Contents 1,391,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
F_C	Feb. 25, 1971	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.5	11.2	108	14.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.4	8.8	85	14.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	8.0	7.8	74	13.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	590	7.7	5.5	52	13.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	7.7	5.0	47	13.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	7.6	5.0	47	13.0
		58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	7.6	5.0	47	13.0
G_C	Feb. 25	1	3.5	0	0	52	5.7	74	--	162	71	68	0.5	2.4	0.00	1.6	365	150	20	650	8.6	13.5	132	15.0
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	690	8.1	9.6	92	14.0
		15	--	0	0	--	--	--	--	--	--	--	--	3.4	.48	2.0	--	--	--	700	7.7	7.1	68	13.5
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	7.6	5.6	53	13.5
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	7.6	5.2	49	13.0
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	7.6	5.0	47	13.0
		49	5.2	10	0	53	6.2	85	--	166	79	78	.6	4.1	.46	1.8	407	160	22	750	7.6	5.0	47	13.0
H_C	Feb. 25	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	580	8.3	10.8	105	14.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	580	8.3	10.8	105	14.5
		15	4.0	--	--	48	5.4	64	--	150	63	60	.5	2.0	.05	1.1	327	140	19	620	7.7	7.8	74	13.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	620	7.7	5.8	55	13.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	650	7.7	5.6	52	12.5
		37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	650	7.7	5.6	52	12.5
I_C	Feb. 26	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	6.6	8.4	82	15.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	6.5	6.8	65	14.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	6.4	6.6	63	14.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	6.5	6.4	62	14.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	6.4	6.1	58	13.5
J_C	Feb. 25	1	9.0	10	0	50	6.6	92	--	158	82	89	.7	3.5	.62	3.2	424	150	22	760	6.4	6.7	66	15.0
		5	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	760	6.5	6.6	65	15.0
		15	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	760	6.4	5.7	55	14.0
		25	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	750	6.3	5.2	50	14.0
		35	8.6	60	0	49	6.2	91	--	160	79	87	.7	3.5	1.1	3.1	418	150	17	750	6.3	5.3	51	14.0

TABLE 7.--Chemical-quality survey of Livingston Reservoir, May 19, 1971

Elevation 126.85 ft. Contents 1,463,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	May 19, 1971	1	1.0	0	0	52	4.8	42	--	168	44	40	0.4	0.00	0.00	0.06	267	150	12	460	8.6	9.5	110	23.5
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.3	7.5	86	23.0
		20	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.2	6.7	76	22.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.8	4.4	50	22.0
		30	--	10	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.7	4.1	46	21.5
		40	--	20	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.7	4.0	45	21.5
		50	--	20	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.6	3.9	44	21.5
		60	--	190	470	--	--	--	--	--	--	--	--	.20	.00	.12	--	--	--	470	7.5	3.1	35	21.5
		65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.4	.6	7	20.5
		72	3.9	200	1600	56	4.8	37	--	175	41	37	.4	.21	.27	.30	269	160	16	490	7.3	.4	4	19.5
A_L	May 19	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.5	9.3	108	23.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.4	8.0	92	23.0
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.4	7.9	91	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.0	6.1	69	22.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.7	4.1	46	21.5
		39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.6	3.3	37	21.5
B_C	May 19	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.7	10.4	124	25.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	8.5	9.4	108	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.2	7.3	83	22.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.1	6.7	76	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.1	6.6	75	22.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.0	6.5	74	22.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.9	5.4	61	22.0
		55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.7	3.8	43	22.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.6	2.5	28	21.5
		66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.5	1.5	17	21.0
C_C	May 19	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.6	11.2	133	24.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.1	7.5	86	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.9	6.4	74	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	5.8	66	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	6.1	69	22.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.8	6.1	69	22.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.7	4.2	48	22.0
		58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.6	4.0	45	22.0
D_C	May 19	1	1.7	10	0	52	4.9	42	--	163	46	41	0.4	0.10	0.00	0.20	268	150	16	480	8.8	12.5	149	25.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.5	9.0	105	23.5
		10	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.2	6.7	77	23.0
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.1	6.5	75	23.0
		20	--	10	0	--	--	--	--	--	--	--	--	.10	.00	.16	--	--	--	490	8.1	6.5	75	23.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.1	6.5	75	23.0
		30	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.1	6.3	72	23.0
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.8	5.3	61	23.0
		40	--	40	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.6	4.1	47	23.0
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.5	3.6	41	23.0
		50	--	20	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.4	2.5	29	23.0
		57	5.8	10	120	48	5.0	51	--	153	52	49	.4	.60	.19	.82	289	140	15	500	7.4	2.5	29	23.0

TABLE 7.--Chemical-quality survey of Livingston Reservoir, May 19, 1971--Continued

Elevation 126.85 ft. Contents 1,463,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	May 19, 1971	1	2.6	50	30	50	5.0	44	--	160	45	44	0.4	0.10	0.00	0.20	270	140	14	470	8.9	12.9	157	26.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.6	9.0	107	25.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	8.0	6.5	76	23.5
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	8.0	5.8	67	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.9	5.6	64	23.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	7.3	.5	6	22.0
		34	14	60	1100	41	3.9	35	--	129	38	34	.3	.20	.37	1.5	232	120	13	420	7.2	.3	3	21.5
F_C	May 19	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.9	13.4	163	26.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	8.0	6.6	78	24.0
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.7	4.6	53	23.5
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.4	3.4	39	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.2	1.5	17	22.5
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.1	.1	1	22.0
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.1	.1	1	22.0
		55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.1	.2	2	22.0
		63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.1	.4	5	22.0
G_C	May 19	1	5.5	110	30	45	5.0	55	--	134	64	50	.5	.97	.06	1.2	295	130	23	510	9.0	16.0	193	25.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	7.7	6.0	71	24.0
		10	--	130	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.6	4.8	56	23.5
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.2	1.9	22	23.0
		20	--	180	40	--	--	--	--	--	--	--	--	1.8	.13	.72	--	--	--	480	7.1	.4	5	22.5
		30	--	270	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.1	.1	1	22.0
		40	--	150	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.1	.1	1	21.5
		48	7.4	560	290	37	5.0	47	--	108	55	47	.4	.60	.29	.75	256	110	24	460	7.0	.2	2	21.5
H_C	May 19	1	5.5	40	40	38	4.8	47	--	114	54	47	.4	.30	.08	.80	254	120	21	460	9.4	19.5	238	26.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	9.1	16.0	195	26.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	480	7.5	5.0	57	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.2	3.1	35	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	6.9	.1	1	21.5
		37	11	60	1100	36	5.0	45	--	100	58	46	.3	.24	.30	.90	253	110	28	440	6.9	.2	2	21.5
I_C	May 19	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.6	7.2	86	25.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.0	.8	9	22.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.0	.1	1	21.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.0	.1	1	21.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.0	.2	2	21.5
		52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.0	.2	2	21.5
J_C	May 19	1	8.3	20	10	38	4.3	43	--	98	59	39	.4	2.3	.05	.88	250	110	32	450	8.1	10.0	120	25.5
		5	--	40	10	--	--	--	--	--	--	--	--	2.3	.09	.88	--	--	--	450	7.2	3.9	45	23.5
		10	--	50	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.0	.4	5	22.5
		20	--	60	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.0	.1	1	21.5
		30	--	130	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.0	.1	1	21.0
		38	11	40	40	37	4.0	48	--	117	50	45	.4	.88	.59	1.4	258	110	13	470	7.0	.4	4	21.0

TABLE 8.--Chemical-quality survey of Livingston Reservoir, February 10, 1972

Elevation 131.07 ft. Contents 1,794,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	Feb. 10, 1972	a1	7.4	0	0	42	3.3	18	--	124	28	17	0.2	0.70	0.00	0.14	180	120	17	317	7.4	9.8	88	10.5
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	7.4	9.7	87	10.5
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.3	9.7	87	10.5
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.3	9.7	87	10.5
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	7.3	9.7	86	10.0
		50	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.3	9.7	86	10.0
		60	--	50	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	317	7.4	9.6	86	10.5
		75	7.4	0	60	42	3.4	18	--	.24	28	17	.2	.70	.18	.14	180	120	17	317	7.4	9.6	86	10.5
A_L	Feb. 10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.5	9.8	88	10.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.4	9.7	87	10.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.4	9.7	87	10.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.4	9.6	86	10.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.5	9.6	86	10.5
B_C	Feb. 10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.5	10.1	91	11.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.5	9.8	88	10.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.5	9.6	86	10.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.4	9.6	86	10.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.4	9.7	86	10.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.4	9.7	86	10.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322	7.4	9.7	86	10.0
		68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324	7.4	9.7	86	10.0
C_C	Feb. 10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.7	10.4	94	11.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.6	10.1	89	10.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.5	9.8	87	10.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.5	9.8	87	10.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.5	9.8	87	10.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.5	9.8	87	10.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.5	9.7	86	10.0
D_C	Feb. 10	b1	6.9	0	0	45	3.5	16	--	126	29	19	.2	.71	.22	.16	185	130	23	333	7.6	10.5	97	12.0
		10	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	334	7.5	10.1	90	10.5
		20	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.4	9.5	84	10.0
		30	--	0	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	347	7.4	9.2	81	10.0
		40	--	10	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	349	7.3	9.1	80	9.5
		50	--	20	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	349	7.3	9.0	79	9.5
		62	6.6	0	70	45	3.8	21	--	130	33	22	.2	.82	.25	.23	200	130	21	351	7.3	9.0	79	9.5
D_L	Feb. 10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	332	7.7	11.0	103	12.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	341	7.5	10.3	93	11.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	341	7.4	9.5	85	10.5
		26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	341	7.4	9.5	86	11.0

a SECCHI DISK TRANSPARENCY (FEET) 2.0
b SECCHI DISK TRANSPARENCY (FEET) 2.0

TABLE 8.--Chemical-quality survey of Livingston Reservoir, February 10, 1972--Continued

Elevation 131.07 ft. Contents 1,794,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	Feb. 10	c1	--	0	0	--	--	--	--	--	--	--	--	0.61	0.20	0.14	--	--	--	334	7.6	10.6	96	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	342	7.5	10.2	91	10.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	342	7.4	9.6	86	10.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	342	7.4	9.1	81	10.0
		34	--	0	0	--	--	--	--	--	--	--	--	.71	.21	.03	--	--	--	342	7.4	9.3	83	10.5
F_C	Feb. 10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.2	9.2	82	10.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.2	8.8	77	9.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.2	8.7	76	9.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.2	8.6	75	9.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.1	8.5	75	9.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.1	8.3	72	9.0
		65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.1	8.2	71	9.0
G_C	Feb. 10	d1	7.3	0	0	40	3.8	19	--	102	33	26	0.2	0.82	.27	.29	183	120	32	333	7.2	9.3	82	9.5
		10	--	10	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	314	7.2	8.7	74	8.5
		20	--	90	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	315	7.2	8.8	75	8.5
		30	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	312	7.1	8.8	75	8.5
		40	--	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	313	7.0	8.8	75	8.5
		50	7.9	0	70	36	3.6	21	--	98	32	24	.2	1.0	.31	.31	178	100	24	313	7.1	8.8	75	8.5
H_C	Feb. 10	e1	--	40	0	--	--	--	--	--	--	--	--	.21	.25	.19	--	--	--	360	7.4	10.3	92	10.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.3	9.4	82	9.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.2	9.1	78	9.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.1	8.6	73	8.5
		41	--	50	0	--	--	--	--	--	--	--	--	1.0	.30	.32	--	--	--	339	7.1	8.6	73	8.5
I_C	Feb. 10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	306	7.2	9.1	77	8.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	303	7.2	9.0	76	8.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	303	7.2	9.0	76	8.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	303	7.2	9.0	76	8.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	303	7.2	9.0	76	8.0
		46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	303	7.2	9.0	76	8.5
J_C	Feb. 10	f1	6.1	80	0	37	3.9	21	--	98	34	25	.2	.93	.31	.33	180	110	28	319	7.1	9.2	79	9.0
		10	--	50	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	326	7.1	9.0	76	8.5
		20	--	70	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	325	7.1	8.9	75	8.0
		30	--	90	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	326	7.1	8.9	75	8.0
		40	--	40	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	326	7.1	8.9	75	8.0
		46	6.4	40	0	37	4.0	22	--	100	35	26	.2	.93	.52	.34	184	110	27	325	7.1	8.9	75	8.5

c SECCHI DISK TRANSPARENCY (FEET) 2.2
d SECCHI DISK TRANSPARENCY (FEET) 0.8
e SECCHI DISK TRANSPARENCY (FEET) 1.2
f SECCHI DISK TRANSPARENCY (FEET) 0.6

TABLE 9.--Chemical-quality survey of Livingston Reservoir, June 20, 1972

Elevation 130.68 ft. Contents 1,762,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	June 20, 1972	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	342	9.2	11.1	148	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	342	8.9	8.9	114	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	8.2	4.8	59	27.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.3	.2	2	24.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	350	7.2	.2	2	24.0
		47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	351	7.4	.2	2	24.0
A_C	June 20	a1	4.7	40	60	38	3.8	24	--	117	32	23	0.3	0.01	0.00	0.11	184	110	15	344	9.2	11.6	157	32.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344	8.8	9.0	117	29.5
		20	5.1	60	250	41	3.8	25	--	130	33	22	.3	.01	.00	.14	195	120	11	354	8.1,	4.0	50	27.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	354	7.2	.2	2	24.0
		40	--	440	960	--	--	--	--	--	--	--	--	--	--	--	--	--	--	354	7.2	.2	2	23.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	354	7.2	.2	2	23.5
		60	--	300	1500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	354	7.2	.2	2	22.5
		70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	354	7.2	.2	2	21.0
		77	15	660	3000	50	3.9	15	--	161	20	18	.3	.06	1.9	1.4	208	140	9	374	7.2	.2	2	21.0
B_C	June 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	364	9.0	9.8	132	31.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	364	8.8	9.2	118	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	364	8.2	5.4	68	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	364	7.2	.2	2	24.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	364	7.2	.2	2	24.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.2	.2	2	23.0
		61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.2	.2	2	23.0
C_C	June 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370	9.0	10.6	141	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370	8.5	5.2	67	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370	7.7	2.8	35	27.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.2	.2	2	24.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.3	.2	2	24.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.3	.2	2	24.0
		56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.2	.2	2	24.0
D_C	June 20	b1	4.9	50	60	43	3.9	26	--	136	33	23	.3	.00	.00	.16	201	120	12	367	9.0	10.6	141	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	.02	.00	.25	--	--	--	367	8.4	5.4	69	29.0
		20	--	50	630	--	--	--	--	--	--	--	--	--	--	--	--	--	--	378	7.2	.2	2	27.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	414	6.8	.2	2	25.0
		40	--	560	1600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	405	6.8	.2	2	24.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	6.8	.2	2	24.0
		58	6.1	150	1300	45	4.0	25	--	144	31	25	.3	.03	.69	1.0	210	130	11	387	6.8	.2	2	24.0
D_L	June 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	367	9.1	11.0	149	31.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	367	8.5	5.6	73	29.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	376	7.4	.2	3	28.0

a SECCHI DISK TRANSPARENCY (FEET) 3.2
b SECCHI DISK TRANSPARENCY (FEET) 3.6

TABLE 9.--Chemical-quality survey of Livingston Reservoir, June 20, 1972--Continued

Elevation 130.68 ft. Contents 1,762,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	June 20, 1972	c1	6.0	20	170	42	3.8	27	--	136	32	24	0.3	0.03	0.00	0.15	202	120	9	366	9.1	10.5	142	31.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	366	8.5	6.0	77	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	368	7.4	.2	2	27.5
		34	9.0	290	1600	42	3.8	25	--	141	26	24	.3	.02	.81	1.0	202	120	5	368	7.0	.2	2	26.0
F_C	June 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	409	8.7	8.0	107	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	409	8.0	4.2	54	29.0
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.5	.8	10	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	7.2	.2	2	27.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	530	7.2	.2	2	26.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	470	7.2	.2	2	24.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	444	7.2	.2	2	24.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	444	7.2	.2	2	24.5
		68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	444	7.2	.2	2	24.5
G_C	June 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	496	8.5	8.0	108	31.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	496	7.4	1.0	13	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	524	7.2	.8	10	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	524	7.2	.8	10	27.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	524	7.0	.8	10	26.0
		47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	524	7.0	.8	10	26.0
H_C	June 20	d1	6.5	30	20	47	5.0	46	--	156	45	44	.4	.02	.00	.41	271	140	10	495	8.2	6.4	85	31.0
		10	--	70	300	--	--	--	--	--	--	--	--	.02	.00	.43	--	--	--	495	7.4	3.4	44	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	495	7.3	.8	10	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	519	7.1	.8	10	26.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	441	6.8	.8	10	25.5
		46	9.2	440	1600	40	4.9	37	--	137	36	39	.3	.04	1.5	1.4	238	120	8	441	6.8	.8	10	25.5
I_C	June 20	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	577	8.5	7.3	96	30.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	577	8.5	7.3	96	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	7.3	1.0	13	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	610	7.3	1.0	12	27.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	570	7.1	1.0	12	26.5
		43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	547	6.8	1.0	12	24.5
J_C	June 20	e1	5.7	70	20	59	5.6	62	--	166	90	50	.6	.53	.00	.52	358	170	34	623	8.8	8.2	108	30.0
		5	--	--	--	--	--	--	--	--	--	--	--	.83	.00	.50	--	--	--	634	8.8	7.4	96	29.5
		10	--	40	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	641	7.7	2.4	31	28.5
		20	--	20	150	--	--	--	--	--	--	--	--	1.8	.31	.74	--	--	--	642	7.5	2.2	28	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	588	7.2	.8	10	26.5
		42	12	60	430	52	5.3	54	--	160	71	49	.5	.12	1.7	1.2	326	150	20	579	7.0	.8	10	24.5

c SECCHI DISK TRANSPARENCY (FEET) 2.2
d SECCHI DISK TRANSPARENCY (FEET) 3.0
e SECCHI DISK TRANSPARENCY (FEET) 2.0

TABLE 10.--Chemical-quality survey of Livingston Reservoir, August 15-16, 1972

Elevation 130.20 ft. Contents 1,723,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	Aug. 16, 1972	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	374	8.5	10.0	132	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	8.1	6.6	85	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.9	6.0	77	29.0
		33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	379	7.4	1.2	15	28.5
A_C	Aug. 16	a1	4.6	0	80	44	3.8	28	--	144	30	26	0.4	0.03	0.00	0.18	208	120	7	371	9.1	10.0	130	29.5
		10	--	0	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	371	8.8	8.4	108	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	374	8.5	6.0	77	28.5
		30	--	0	320	--	--	--	--	--	--	--	--	.03	.00	.22	--	--	--	375	8.1	3.5	44	28.0
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.7	.0	0	27.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.5	.0	0	26.0
		50	--	170	2400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.4	.0	0	25.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	6.9	.0	0	23.5
		70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	391	7.0	.0	0	22.5
		74	21	80	2400	48	4.0	19	--	168	15	29	.4	.00	4.7	1.3	228	140	0	397	7.1	.0	0	22.0
B_C	Aug. 16	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	8.7	9.4	121	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	8.4	6.7	86	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	8.0	6.0	77	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	7.7	5.5	70	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.3	.0	0	27.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	7.0	.0	0	24.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	7.0	.0	0	23.5
		67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	385	7.0	.0	0	23.5
C_C	Aug. 16	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	386	8.1	8.2	105	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.8	6.4	82	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.7	5.7	73	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.7	5.6	71	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	430	7.2	.0	0	27.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	398	6.8	.0	0	24.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	398	6.8	.0	0	24.0
D_C	Aug. 16	b1	4.4	0	30	46	4.0	30	--	149	32	28	.4	.00	.00	.21	218	130	9	395	8.5	7.3	94	29.0
		10	--	0	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	395	8.2	5.4	69	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	395	8.1	5.2	67	28.5
		30	--	0	300	--	--	--	--	--	--	--	--	.02	.01	.24	--	--	--	396	7.6	4.3	55	28.5
		35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	410	7.0	.0	0	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	472	7.0	.0	0	27.5
		50	--	160	3700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	415	7.0	.0	0	25.0
		64	14	140	2800	48	4.0	23	--	168	20	24	.4	.10	2.1	1.6	222	140	0	403	7.0	.0	0	25.0
D_L	Aug. 16	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	396	8.2	7.4	95	28.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	396	8.1	6.8	87	28.5
		22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	396	7.8	6.8	87	28.5

a SECCHI DISK TRANSPARENCY (FEET) 3.4
b SECCHI DISK TRANSPARENCY (FEET) 3.2

TABLE 10.--Chemical-quality survey of Livingston Reservoir, August 15-18, 1972--Continued

Elevation 130.20 ft. Contents 1,723,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	Aug. 16, 1972	1	--	0	10	--	--	--	--	--	--	--	--	0.00	0.00	0.20	--	--	--	396	8.2	6.9	88	28.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	396	7.9	6.3	81	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400	7.8	6.1	78	28.5
		34	--	0	80	--	--	--	--	--	--	--	--	.00	.10	.28	--	--	--	405	7.1	.0	0	28.5
F_C	Aug. 16	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	427	8.2	7.8	100	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	427	7.4	7.1	91	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	430	7.2	5.6	72	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	6.9	.0	0	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	519	6.7	.0	0	27.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	442	6.6	.0	0	25.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	442	6.6	.0	0	25.5
		70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	442	6.5	.0	0	25.5
G_C	Aug. 15	c1	3.9	0	0	48	4.5	44	--	166	39	40	0.4	.00	.00	.29	262	140	2	473	8.0	6.0	78	29.5
		10	--	0	0	--	--	--	--	--	--	--	--	.02	.29	.29	--	--	--	473	7.4	5.3	68	28.5
		15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.4	2.6	33	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	505	7.4	.0	0	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	565	7.4	.0	0	28.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	567	7.4	.0	0	28.5
		49	8.1	10	200	52	5.2	58	--	180	50	55	.5	.00	.34	.74	318	150	4	572	7.4	.0	0	28.5
H_C	Aug. 15	1	--	0	70	--	--	--	--	--	--	--	--	.00	.00	.26	--	--	--	493	8.0	7.2	95	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.6	4.5	58	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.6	4.2	54	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	7.5	.0	0	28.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	555	7.4	.0	0	28.5
		45	--	10	470	--	--	--	--	--	--	--	--	.02	.45	.80	--	--	--	555	7.4	.0	0	28.5
I_C	Aug. 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	681	7.7	5.5	72	30.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	694	7.5	4.2	54	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	694	7.5	.0	0	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	694	7.4	.0	0	29.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	694	7.1	.0	0	29.0
J_C	Aug. 15	d1	18	0	0	50	5.2	80	--	166	67	77	.7	1.1	.12	1.4	384	150	10	667	7.8	6.6	87	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	667	7.7	6.5	84	29.5
		20	--	20	130	--	--	--	--	--	--	--	--	--	--	--	--	--	--	673	7.5	6.4	82	29.0
		30	--	50	140	--	--	--	--	--	--	--	--	.00	.74	1.7	--	--	--	673	7.5	3.1	40	29.0
		38	20	60	170	50	5.2	81	--	186	62	77	.7	.00	1.2	2.1	389	150	0	680	7.5	.0	0	29.0

c SECCHI DISK TRANSPARENCY (FEET) 3.8
d SECCHI DISK TRANSPARENCY (FEET) 3.2

TABLE 11.--Chemical-quality survey of Livingston Reservoir, February 27, 1973

Elevation 131.10 ft. Contents 1,797,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	Feb. 27, 1973	a1	6.5	30	0	43	4.2	33	--	129	42	32	0.3	0.61	0.23	0.25	227	120	19	404	8.6	11.2	102	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	406	8.5	11.0	100	11.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	407	8.5	11.0	100	11.5
		30	--	30	0	--	--	--	--	--	--	--	--	.51	.27	.26	--	--	--	409	8.5	10.4	95	11.5
		40	--	30	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	413	7.8	8.0	71	10.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	414	7.8	7.9	71	10.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	414	7.7	7.6	68	10.5
		70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	415	7.7	7.4	65	10.0
		78	8.1	30	10	44	4.2	34	--	133	43	32	.3	.60	.14	.35	234	130	18	418	7.6	6.9	61	10.0
B_C	Feb. 27	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	388	8.1	10.1	94	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	388	8.0	9.6	87	11.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	392	7.9	9.4	85	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	392	7.9	9.3	84	11.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	392	7.8	8.9	80	11.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400	7.6	7.8	70	10.5
		62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	403	7.5	6.7	60	10.5
C_C	Feb. 27	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	8.0	9.8	91	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.8	9.2	83	11.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.8	9.0	81	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	381	7.7	8.6	77	11.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.7	7.9	71	10.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	397	7.6	7.4	66	10.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400	7.6	7.3	65	10.5
D_C	Feb. 27	b1	8.3	100	0	37	4.2	30	--	102	46	28	.3	1.0	.23	.40	209	110	26	368	7.8	9.1	84	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	368	7.8	8.9	82	12.0
		20	--	100	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	369	7.7	8.2	74	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	369	7.6	7.8	70	11.0
		40	--	110	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	369	7.5	7.1	63	10.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	369	7.5	6.4	57	10.5
		63	8.8	130	20	38	4.1	29	--	104	46	27	.3	1.1	.30	.55	210	110	26	369	7.4	6.2	55	10.0
D_L	Feb. 27	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	366	7.8	9.1	85	12.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	366	7.7	8.4	76	11.5
		24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	371	7.5	8.0	85	11.0
E_C	Feb. 27	c1	--	90	0	--	--	--	--	--	--	--	--	.81	.15	.34	--	--	--	356	8.2	10.4	97	12.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	364	8.0	9.4	87	12.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	367	7.5	7.6	68	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	367	7.5	7.2	65	11.0
		45	--	100	0	--	--	--	--	--	--	--	--	1.1	.23	.49	--	--	--	371	7.4	6.4	57	10.5

a SECCHI DISK TRANSPARENCY (FEET) 3.9
b SECCHI DISK TRANSPARENCY (FEET) 1.8
c SECCHI DISK TRANSPARENCY (FEET) 2.6

TABLE 11.--Chemical-quality survey of Livingston Reservoir, February 27, 1973--Continued

Elevation 131.10 ft. Contents 1,797,000 ac-ft.

SITE	DATE	DEPTH (FT)	DISSOLVED SILICA (SiO_2) (MG/L)	DISSOLVED IRON (FE) (UG/L)	DISSOLVED MANGANESE (MN) (UG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO_3) (MG/L)	DISSOLVED SULFATE (SO_4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMONIA-NITROGEN (N) (MG/L)	TOTAL PHOSPHORUS (P) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	TEMPERATURE (°C)
F_C	Feb. 27, 1973	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.4	7.2	65	11.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.4	7.2	65	11.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.3	7.0	63	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.3	6.2	55	10.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.2	6.0	53	10.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.1	5.8	51	10.0
		58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.1	5.8	51	10.0
G_C	Feb. 27	d1	8.3	110	0	39	4.4	24	--	96	52	22	0.3	1.4	0.32	0.31	204	120	37	358	7.5	7.6	70	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	387	7.3	5.9	53	10.5
		20	--	90	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.3	5.9	53	10.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.3	5.9	53	10.5
		40	--	110	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.3	5.9	53	10.5
		54	7.4	80	10	45	4.5	26	--	114	51	25	.3	1.8	.42	.36	224	130	37	390	7.3	5.9	52	10.0
H_C	Feb. 27	e1	10	310	0	19	4.1	21	--	41	40	23	.2	.50	.23	.21	140	64	31	244	7.0	8.2	75	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	246	7.0	8.0	73	11.5
		20	--	160	0	--	--	--	--	--	--	--	--	1.1	.32	.27	--	--	--	328	7.3	6.3	56	10.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	369	7.3	5.9	53	10.5
		45	--	110	10	--	--	--	--	--	--	--	--	1.6	.42	.35	--	--	--	374	7.3	5.6	50	10.0
I_C	Feb. 27	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	374	7.5	7.4	69	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	454	7.4	5.3	48	11.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	473	7.3	5.1	46	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	473	7.3	5.1	46	11.0
		44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	473	7.3	5.1	46	11.0
J_C	Feb. 27	f1	8.8	70	20	50	4.9	32	--	130	58	31	.4	1.6	.74	.60	257	140	38	453	7.4	5.6	51	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.4	5.4	49	11.0
		20	--	70	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.3	5.3	48	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	461	7.3	5.2	47	11.0
		40	8.6	290	20	50	4.8	34	--	130	59	32	.4	1.9	.65	.62	262	140	38	461	7.3	5.2	47	11.0

d SECCHI DISK TRANSPARENCY (FEET) 1.0
e SECCHI DISK TRANSPARENCY (FEET) 1.4
f SECCHI DISK TRANSPARENCY (FEET) 1.0

TABLE 12.--Chemical-quality survey of Livingston Reservoir, May 15, 1973

Elevation 131.17 ft. Contents 1,802,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_C	May 15, 1973	a1	9.0	60	0	36	3.2	16	--	103	27	15	0.2	0.80	0.00	0.24	161	100	19	280	7.8	7.4	85	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	7.3	82	22.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	7.3	83	22.5
		30	--	80	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	7.1	81	22.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.7	7.0	80	22.5
		50	--	100	0	--	--	--	--	--	--	--	--	.80	.00	.25	--	--	--	280	7.7	6.8	77	22.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	7.4	4.2	47	21.0
		74	12	220	150	36	3.3	20	--	101	32	19	.2	.80	.02	.32	176	100	21	294	7.3	2.6	29	21.0
A_L	May 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	7.6	88	23.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	7.4	85	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	7.4	85	23.0
		36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.4	7.4	85	23.0
B_C	May 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.9	78	22.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.9	78	22.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.9	78	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.8	77	22.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.4	73	22.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	7.5	4.2	47	21.5
		64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	7.4	3.0	33	21.0
C_C	May 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.7	76	22.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.7	76	22.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.6	75	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.6	75	22.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.8	6.6	75	22.0
		55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	7.7	6.2	70	22.0
D_C	May 15	b1	9.5	80	10	44	3.6	18	--	127	33	16	.2	.70	.00	.27	189	120	20	331	7.6	6.0	68	22.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.6	5.9	67	22.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.6	5.8	66	22.5
		30	--	130	10	--	--	--	--	--	--	--	--	.60	.00	.28	--	--	--	331	7.6	5.6	64	22.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.6	5.6	64	22.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	7.5	5.5	62	22.0
		65	10	200	40	40	3.3	16	--	118	29	13	.2	.80	.00	.36	173	110	17	296	7.5	4.9	56	22.0
D_L	May 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.6	6.3	72	22.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.6	6.2	70	22.0
		23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	318	7.5	6.0	68	22.0

a SECCHI DISK TRANSPARENCY (FEET) 1.4
b SECCHI DISK TRANSPARENCY (FEET) 1.1

TABLE 12.--Chemical-quality survey of Livingston Reservoir, May 15, 1973--Continued

Elevation 131.17 ft. Contents 1,802,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	May 15, 1973	c1	9.1	80	0	32	2.8	15	--	92	26	14	0.2	0.60	0.00	0.22	147	91	16	255	7.5	6.3	71	21.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	255	7.4	6.2	70	21.5
		20	--	170	10	--	--	--	--	--	--	--	--	.60	.00	.21	--	--	--	255	7.3	6.0	67	21.5
		32	--	110	150	--	--	--	--	--	--	--	--	.60	.07	.29	--	--	--	255	7.0	3.6	40	21.0
F_C	May 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.6	5.6	65	23.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.5	5.4	62	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.5	5.4	62	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.5	5.3	61	23.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.5	5.3	61	23.0
		57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	339	7.5	5.0	57	23.0
G_C	May 15	d1	--	--	--	--	--	--	--	--	--	--	--	.82	.00	.32	--	--	--	340	7.6	5.6	66	24.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	340	7.5	4.9	57	23.5
		20	--	--	--	--	--	--	--	--	--	--	--	.81	--	.37	--	--	--	340	7.5	4.9	57	23.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	340	7.5	4.8	55	23.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	340	7.5	4.8	55	23.0
		54	--	--	--	--	--	--	--	--	--	--	--	.72	.04	.40	--	--	--	340	7.5	4.6	53	23.0
H_C	May 15	e1	10	80	0	22	3.4	16	--	54	34	16	.1	.20	.05	.21	130	69	25	224	8.0	9.0	107	24.5
		10	--	--	--	--	--	--	--	--	--	--	--	.30	.05	.21	--	--	--	233	7.8	6.7	77	23.0
		20	--	80	20	--	--	--	--	--	--	--	--	.72	.00	.31	--	--	--	335	7.5	5.1	58	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	335	7.5	5.1	58	22.5
		40	8.1	70	30	45	3.8	18	--	127	34	18	.2	.72	.00	.36	192	130	24	338	7.5	4.9	56	22.5
I_C	May 15	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344	7.5	4.6	53	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344	7.5	4.6	53	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344	7.5	4.6	53	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344	7.5	4.6	53	23.0
		41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	344	7.5	4.6	53	23.0
J_C	May 15	f1	7.5	80	10	46	3.8	19	--	130	35	18	.2	.90	.00	.39	198	130	24	347	7.5	4.6	53	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	347	7.5	4.6	53	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	347	7.5	4.6	53	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	347	7.5	4.6	53	23.0
		42	7.2	110	10	46	3.8	19	--	130	35	18	.2	.90	.00	.45	197	130	24	347	7.5	4.6	53	23.0

c SECCHI DISK TRANSPARENCY (FEET) 1.5
d SECCHI DISK TRANSPARENCY (FEET) 1.0
e SECCHI DISK TRANSPARENCY (FEET) 1.2
f SECCHI DISK TRANSPARENCY (FEET) 0.9

TABLE 13.--Chemical-quality survey of Livingston Reservoir, August 30, 1973

Elevation 131.16 ft. Contents 1,802,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	Aug. 30, 1973	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	296	8.6	8.6	113	30.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	296	7.9	5.4	69	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	302	7.5	3.4	43	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	302	7.4	3.4	43	28.0
		42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	302	7.4	3.1	39	28.0
A_C	Aug. 30	a1	4.1	0	0	38	2.4	18	--	120	24	14	0.2	0.01	0.00	0.13	160	100	6	296	8.6	8.8	116	30.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	296	8.3	7.4	95	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	296	7.5	3.6	46	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	296	7.5	3.6	46	28.0
		40	--	30	30	--	--	--	--	--	--	--	--	.01	.00	.17	--	--	--	299	7.4	3.1	39	28.0
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	299	7.2	2.4	30	28.0
		50	--	--	--	--	--	--	--	--	--	--	--	.00	.71	.51	--	--	--	306	7.0	.2	2	26.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	306	6.9	.2	2	25.0
		76	16	2300	3300	40	2.8	11	--	138	10	15	.2	.10	2.9	2.8	173	110	0	312	6.8	.2	2	24.0
B_C	Aug. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	8.6	10.4	137	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.8	4.9	63	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.8	4.9	63	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.7	4.4	56	28.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.1	.2	3	28.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.0	.2	3	27.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	6.9	.2	2	26.5
C_C	Aug. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	8.6	7.6	101	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.8	4.4	56	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.7	4.4	56	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.8	4.4	56	28.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.7	4.4	56	28.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	7.0	.2	3	27.0
		63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	308	6.9	.2	2	26.5
D_C	Aug. 30	b1	4.0	0	0	40	2.6	20	--	126	26	16	.2	.00	.00	.15	171	110	7	310	8.6	9.4	125	31.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.4	7.2	92	29.0
		10	--	0	0	--	--	--	--	--	--	--	--	.01	.00	.16	--	--	--	310	8.2	6.0	77	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.1	5.4	69	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.1	5.4	69	29.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.1	5.4	69	29.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.1	5.4	69	29.0
		63	4.6	120	140	40	2.6	20	--	126	26	16	.2	.01	.00	.16	172	110	7	312	8.0	5.2	67	29.0
D_L	Aug. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.6	9.6	125	29.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.2	6.0	77	29.0
		24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	8.0	5.4	69	29.0

a SECCHI DISK TRANSPARENCY (FEET) 3.8
b SECCHI DISK TRANSPARENCY (FEET) 3.0

TABLE 13.--Chemical-quality survey of Livingston Reservoir, August 30, 1973--Continued

Elevation 131.16 ft. Contents 1,802,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	Aug. 30, 1973	c1	3.8	0	0	41	2.6	23	--	128	30	18	0.3	0.01	0.00	0.21	182	110	8	333	8.7	10.2	134	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	333	8.2	6.0	78	29.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	333	8.2	6.0	77	29.0
		33	--	180	10	--	--	--	--	--	--	--	--	.02	.00	.18	--	--	--	333	7.9	5.8	74	29.0
F_C	Aug. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	365	8.8	12.2	163	31.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.6	3.8	49	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.6	3.8	49	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.6	3.8	49	29.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.6	3.8	49	29.0
		55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	389	7.5	3.8	49	29.0
G_C	Aug. 30	d1	--	--	--	--	--	--	--	--	--	--	--	.01	.00	.24	--	--	--	420	8.3	11.0	149	31.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.1	2.4	31	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	.20	.00	.29	--	--	--	420	7.1	2.4	31	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.1	2.4	31	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.1	2.2	28	28.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	420	7.0	2.0	26	28.5
		52	--	--	--	--	--	--	--	--	--	--	--	.20	.10	.29	--	--	--	420	7.0	1.8	23	28.5
H_C	Aug. 30	e1	4.8	0	0	48	3.6	34	--	152	43	27	.4	.02	.00	.23	236	140	10	424	8.0	9.5	127	31.0
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400	7.2	4.1	53	28.5
		10	--	20	0	--	--	--	--	--	--	--	--	.06	.00	.20	--	--	--	377	7.1	2.5	32	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	360	7.0	2.3	29	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	347	7.0	2.2	28	28.5
		45	5.6	20	220	38	3.4	27	--	118	36	23	.3	.05	.23	.21	192	110	12	347	6.9	1.8	23	28.5
I_C	Aug. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	415	7.9	7.2	95	30.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	415	7.0	1.2	15	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	415	7.0	1.1	14	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	413	7.0	1.1	14	28.5
		39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	415	7.0	1.1	14	28.5
J_C	Aug. 30	f1	5.8	0	0	47	3.8	32	--	145	39	29	.3	.20	.00	.27	229	130	14	410	8.4	11.0	145	30.5
		5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	410	7.5	5.2	68	29.5
		10	--	20	10	--	--	--	--	--	--	--	--	.60	.00	.29	--	--	--	410	7.1	2.8	36	29.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	410	7.1	2.8	36	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	.20	.20	.31	--	--	--	410	7.0	2.0	26	28.5
		42	7.5	40	220	48	3.7	30	--	151	35	28	.3	.05	.38	.36	227	140	11	410	6.6	.2	3	28.5

c SECCHI DISK TRANSPARENCY (FEET) 2.6
d SECCHI DISK TRANSPARENCY (FEET) 2.2
e SECCHI DISK TRANSPARENCY (FEET) 2.6
f SECCHI DISK TRANSPARENCY (FEET) 1.9

TABLE 14.--Chemical-quality survey of Livingston Reservoir, February 12, 1974

Elevation 130.94 ft. Contents 1,783,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	Feb. 12, 1974	a1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.4	10.0	93	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.4	9.8	91	12.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.4	9.8	89	11.5
		36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.3	9.6	87	11.5
A_C	Feb. 12	1	7.5	50	0	31	3.9	19	--	86	31	21	0.2	0.79	0.00	0.22	159	93	23	284	7.4	9.8	91	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.4	9.8	91	12.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.3	9.6	87	11.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.3	9.5	86	11.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.3	9.5	86	11.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.3	9.5	86	11.5
		60	--	60	0	--	--	--	--	--	--	--	--	.78	.00	.20	--	--	--	284	7.3	9.4	85	11.5
		70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	284	7.3	9.4	85	11.5
		77	7.8	150	0	30	4.0	21	--	86	32	21	.2	.82	.00	.21	162	91	21	284	7.3	9.4	85	11.5
B_C	Feb. 12	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.4	10.0	93	12.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.4	9.8	91	12.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.4	9.8	91	12.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.3	9.4	87	12.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	295	7.3	9.4	87	12.0
C_C	Feb. 12	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	253	7.3	10.0	93	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	253	7.3	10.0	91	11.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	253	7.3	10.0	91	11.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	253	7.2	9.8	89	11.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	253	7.2	9.8	89	11.5
		49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	253	7.2	9.8	89	11.5
D_C	Feb. 12	b1	7.0	130	0	24	3.3	15	--	69	24	16	.1	.60	.00	.19	126	73	17	225	7.2	9.9	90	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	225	7.1	9.8	89	11.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	225	7.1	9.8	89	11.5
		27	7.3	200	0	24	3.4	16	--	70	24	16	.1	.73	.00	.24	128	74	17	225	7.1	9.8	89	11.5
D_L	Feb. 12	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	225	7.2	9.7	88	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	225	7.1	9.7	88	11.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	225	7.1	9.7	88	11.5
		26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	225	7.1	9.7	88	11.5
E_C	Feb. 12	c1	7.7	120	0	28	3.6	18	--	79	27	19	.2	.71	.00	.19	146	85	20	259	7.3	10.0	93	12.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	259	7.2	9.8	89	11.5
		20	--	100	0	--	--	--	--	--	--	--	--	.63	.00	.18	--	--	--	259	7.2	9.8	89	11.5
		33	--	170	0	--	--	--	--	--	--	--	--	.73	.00	.19	--	--	--	259	7.1	9.2	84	11.5

a SECCHI DISK TRANSPARENCY (FEET) 1.2
b SECCHI DISK TRANSPARENCY (FEET) 0.8
c SECCHI DISK TRANSPARENCY (FEET) 0.9

TABLE 14.--Chemical-quality survey of Livingston Reservoir, February 12, 1974--Continued

Elevation 130.94 ft. Contents 1,783,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
F_C	Feb. 12, 1974	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	242	7.2	9.6	87	11.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	242	7.2	9.6	86	11.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	242	7.2	9.5	86	11.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	242	7.1	9.2	83	11.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	242	7.1	9.2	83	11.0
		52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	242	7.1	9.2	83	11.0
G_C	Feb. 12	d1	8.8	0	10	34	4.5	21	--	95	34	22	0.2	1.0	0.00	0.29	176	100	26	309	7.4	9.8	93	13.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	315	7.3	9.6	90	12.5
		20	--	130	10	--	--	--	--	--	--	--	--	1.0	.00	.30	--	--	--	324	7.3	9.3	86	12.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	351	7.2	8.7	79	11.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	351	7.2	8.7	79	11.5
		51	8.8	140	10	39	5.0	23	--	112	37	24	.2	1.1	.00	.34	197	120	26	351	7.2	8.7	79	11.5
H_C	Feb. 12	e1	8.6	70	10	25	3.9	16	--	70	28	17	.1	.64	.00	.23	135	78	21	242	7.2	9.6	90	12.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	259	7.2	9.4	87	12.0
		20	--	0	0	--	--	--	--	--	--	--	--	.94	.00	.26	--	--	--	274	7.2	9.0	82	11.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	305	7.2	8.9	80	11.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.2	8.8	79	11.0
		46	--	130	0	--	--	--	--	--	--	--	--	1.1	.00	.29	--	--	--	319	7.2	8.8	79	11.0
I_C	Feb. 12	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	378	7.3	9.1	86	13.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	417	7.2	8.3	78	12.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	417	7.2	8.1	76	12.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	417	7.2	8.1	76	12.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	417	7.2	8.1	76	12.5
J_C	Feb. 12	f1	9.4	60	20	49	6.0	32	--	136	50	33	.3	1.5	.00	.42	253	150	36	425	7.3	8.6	80	12.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	425	7.2	8.3	77	12.0
		20	--	70	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	425	7.2	8.2	76	12.0
		33	9.4	130	40	49	6.0	31	--	136	50	32	.3	1.5	.00	.44	251	150	36	425	7.2	8.2	76	12.0

d SECCHI DISK TRANSPARENCY (FEET) 0.8
e SECCHI DISK TRANSPARENCY (FEET) 0.7
f SECCHI DISK TRANSPARENCY (FEET) 0.8

TABLE 15.--Chemical-quality survey of Livingston Reservoir, April 30-May 1, 1974

Elevation 131.29 ft. Contents 1,812,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	May 1, 1974	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.8	8.6	96	21.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.5	7.9	87	20.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.3	7.2	78	20.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.0	6.4	70	20.0
		45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	6.7	4.9	53	19.5
A_C	May 1	a1	2.9	30	0	34	3.4	18	4.2	96	31	22	--	0.35	0.21	0.13	163	99	20	294	7.8	8.8	98	21.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.5	8.0	88	20.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.2	7.4	80	20.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	294	7.1	6.7	73	20.0
		40	--	30	20	--	--	--	--	--	--	--	--	.48	.06	.16	--	--	--	300	6.9	5.8	63	19.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	300	6.7	4.8	51	19.0
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	300	6.6	3.6	38	18.5
		70	--	50	260	--	--	--	--	--	--	--	--	.61	.15	.21	--	--	--	300	6.5	2.0	21	18.5
		80	8.1	350	1000	34	3.2	19	4.1	97	33	21	--	.56	.30	.41	172	98	19	300	6.4	.0	0	18.5
B_C	May 1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.9	8.5	96	21.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.8	8.4	93	21.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.7	7.9	88	21.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.3	6.6	73	20.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	7.2	6.4	70	20.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	6.8	3.2	35	20.0
		65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	6.6	1.0	11	19.0
C_C	May 1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	8.0	8.6	98	22.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	8.0	8.5	96	21.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.9	8.2	92	21.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.8	7.6	85	21.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.4	6.1	68	21.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.1	5.0	55	20.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	6.7	.9	10	20.0
D_C	Apr. 30	b1	.1	30	0	36	3.8	22	4.4	103	38	26	--	.09	.18	.15	181	110	21	319	8.4	9.8	111	22.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.3	8.6	98	22.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.3	8.6	98	22.0
		30	--	30	0	--	--	--	--	--	--	--	--	.11	.20	.15	--	--	--	319	8.3	8.4	95	22.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.2	8.4	95	22.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.2	8.2	93	22.0
		59	.3	60	0	35	3.5	20	4.1	102	35	25	--	.13	.11	.18	173	100	18	319	8.2	8.2	93	22.0
D_L	Apr. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.6	10.7	122	22.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.5	9.3	106	22.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.3	8.8	100	22.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	319	8.2	8.0	91	22.0

a SECCHI DISK TRANSPARENCY (FEET) 4.0
b SECCHI DISK TRANSPARENCY (FEET) 4.2

TABLE 15.--Chemical-quality survey of Livingston Reservoir, April 30-May 1, 1974--Continued

Elevation 131.29 ft. Contents 1,812,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	Apr. 30, 1974	c1	0.1	40	0	34	3.5	21	4.4	102	34	25	--	0.03	0.12	0.12	172	99	16	320	8.4	9.8	113	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	8.2	8.4	95	22.5
		20	--	40	50	--	--	--	--	--	--	--	--	.10	.17	.18	--	--	--	320	8.0	7.8	89	22.0
		25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	320	7.8	6.8	77	22.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.0	1.5	17	21.0
		37	3.0	80	680	41	4.6	30	4.7	122	43	36	--	.17	.55	.45	223	120	21	401	6.9	.0	0	21.0
F_C	Apr. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.9	8.1	93	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.5	6.4	74	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.5	6.2	70	22.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.5	5.9	67	22.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	7.5	5.6	64	22.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.3	4.6	52	22.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.2	4.5	51	22.5
G_C	Apr. 30	d1	6.5	20	0	52	7.0	54	5.6	140	73	66	--	.98	.42	.82	333	160	44	599	8.1	9.0	105	23.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	599	7.6	6.8	78	23.0
		20	--	60	0	--	--	--	--	--	--	--	--	1.6	.22	1.0	--	--	--	599	7.5	6.6	76	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	599	7.4	6.0	69	23.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	599	7.3	5.9	68	23.0
		52	9.0	30	60	47	7.3	60	6.0	132	77	66	--	1.8	.33	1.1	337	150	39	599	7.2	5.3	61	23.0
H_C	Apr. 30	e1	5.0	20	10	48	7.0	51	6.0	130	62	71	--	.67	.54	.66	314	150	42	562	7.8	8.8	101	23.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	490	7.1	6.8	77	22.5
		20	--	40	30	--	--	--	--	--	--	--	--	.16	.24	.20	--	--	--	470	7.0	6.4	73	22.5
		30	--	100	130	--	--	--	--	--	--	--	--	.11	.21	.18	--	--	--	470	6.9	6.2	70	22.5
		43	3.5	60	840	37	6.3	38	4.8	90	70	49	--	.05	.43	.21	254	120	45	465	6.4	1.5	17	21.5
I_C	Apr. 30	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	540	7.0	3.7	43	23.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	540	7.0	3.6	41	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	540	7.0	3.6	41	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	540	6.9	3.4	39	23.0
		41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	540	6.8	3.3	38	23.0
J_C	Apr. 30	f1	7.9	80	170	42	4.4	50	6.0	136	56	43	--	2.1	1.3	1.4	277	120	11	501	6.8	1.6	18	23.0
		10	--	160	140	--	--	--	--	--	--	--	--	2.2	1.3	1.4	--	--	--	501	6.8	1.2	14	23.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	501	6.8	1.2	14	23.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	501	6.7	1.2	14	23.0
		43	7.9	30	170	43	4.4	46	6.6	137	55	42	--	2.1	1.3	1.4	273	130	13	501	6.7	1.2	14	23.0

c SECCHI DISK TRANSPARENCY (FEET) 3.4
d SECCHI DISK TRANSPARENCY (FEET) 1.4
e SECCHI DISK TRANSPARENCY (FEET) 1.6
f SECCHI DISK TRANSPARENCY (FEET) 1.4

TABLE 16.--Chemical-quality survey of Livingston Reservoir, August 28-29, 1974

Elevation 129.88 ft. Contents 1,697,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
A_R	Aug. 29, 1974	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.9	3.7	46	27.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.9	3.6	45	27.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.8	3.4	42	27.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.5	.3	4	27.0
A_C	Aug. 29	a1	3.4	50	10	38	4.6	27	4.9	122	39	31	--	0.06	0.09	0.20	208	110	14	375	8.1	4.5	56	27.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	8.0	3.9	49	27.5
		20	--	30	30	--	--	--	--	--	--	--	--	.05	.09	.20	--	--	--	375	7.7	2.3	28	27.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.5	.6	7	27.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.4	.6	7	27.0
		50	--	180	1000	--	--	--	--	--	--	--	--	.05	.73	.43	--	--	--	380	7.4	.6	7	26.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.4	.2	2	25.5
		70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.1	.2	2	23.5
		76	12	530	4700	42	4.6	23	5.4	176	13	26	--	.01	5.9	2.2	218	120	0	399	6.9	.2	2	23.0
B_C	Aug. 29	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	8.0	5.2	65	27.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	8.0	5.1	64	27.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	8.0	5.0	62	27.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	8.0	5.0	62	27.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	7.7	3.9	49	27.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	7.1	.2	2	26.5
		60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	6.8	.2	2	25.5
		66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	6.8	.3	4	25.0
C_C	Aug. 29	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.7	4.5	56	27.5
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.7	4.4	55	27.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.6	4.4	55	27.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.6	4.4	55	27.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.6	4.2	52	27.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	395	7.2	1.1	14	27.5
		58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	400	7.0	.4	5	26.5
D_C	Aug. 28	b1	3.8	40	10	40	4.8	28	4.9	136	39	32	--	0.01	0.03	0.21	220	120	8	389	8.1	7.0	89	28.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	389	8.1	7.2	91	28.0
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	389	8.0	6.6	84	28.0
		30	--	50	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	7.8	5.7	72	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	395	7.6	4.5	57	28.0
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	405	7.6	4.3	54	28.0
		64	4.2	110	90	42	5.0	33	5.0	136	34	40	--	--	--	--	230	130	14	410	7.3	3.5	44	28.0
D_L	Aug. 28	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	389	8.1	7.2	91	28.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	389	8.1	7.2	91	28.0
		17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	389	8.1	7.2	91	28.0

a SECCHI DISK TRANSPARENCY (FEET) 5.0
b SECCHI DISK TRANSPARENCY (FEET) 2.4

TABLE 16.--Chemical-quality survey of Livingston Reservoir, August 28-29, 1974--Continued

Elevation 129.88 ft. Contents 1,697,000 ac-ft.

SITE	DATE	DEPTH (FT)	DIS-SOLVED SILICA (SiO_2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	DIS-SOLVED MANGA-NESE (MN) (UG/L)	DIS-SOLVED CAL-CIUM (CA) (MG/L)	DIS-SOLVED MAGNE-SIUM (MG) (MG/L)	DIS-SOLVED SODIUM (NA) (MG/L)	DIS-SOLVED POTAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO_3) (MG/L)	DIS-SOLVED SUL-FATE (SO_4) (MG/L)	DIS-SOLVED CHLO-RIDE (CL) (MG/L)	DIS-SOLVED FLUO-RIDE (F) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	AMMO-NIA-NITRO-GEN (N) (MG/L)	TOTAL PHOS-PHORUS (P) (MG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECIFIC CONDUCT-ANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED OXYGEN (MG/L)	PER-CENT SATUR-ATION	TEM-PERA-TURE (°C)
E_C	Aug. 28, 1974	1	4.0	80	10	40	4.9	29	4.9	135	42	33	--	0.02	0.10	0.23	224	120	9	399	8.2	7.7	99	28.5
		10	--	40	10	--	--	--	--	--	--	--	--	.00	.12	.23	--	--	--	399	8.0	6.9	88	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	405	7.4	3.7	47	28.0
		30	4.5	60	90	40	4.1	31	5.1	138	38	33	--	.03	.33	.29	224	120	4	405	7.3	3.0	38	28.0
F_C	Aug. 28	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	7.7	5.1	65	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	7.5	5.2	67	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	7.6	4.4	56	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	7.3	4.3	55	28.5
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.3	4.4	56	28.5
		50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.3	4.9	67	28.5
		56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	450	7.3	4.9	65	28.5
G_C	Aug. 28	1	4.0	50	0	46	5.2	40	5.5	160	42	40	--	.01	.05	.40	262	140	5	476	7.7	7.8	100	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	476	7.5	6.0	77	28.5
		20	--	50	10	--	--	--	--	--	--	--	--	.14	.21	.48	--	--	--	520	7.3	3.2	41	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	550	7.4	2.5	32	28.0
		40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	569	7.4	2.9	37	28.0
		52	5.7	130	20	50	5.6	53	6.1	182	48	54	--	.14	.24	.52	312	150	0	569	7.3	3.1	39	28.0
H_C	Aug. 28	c1	4.5	50	0	46	4.4	43	5.7	164	47	43	--	.00	.05	.41	275	130	0	496	7.9	7.7	99	29.0
		10	--	120	20	--	--	--	--	--	--	--	--	.01	.09	.33	--	--	--	480	7.6	6.2	79	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	471	7.3	4.0	51	28.5
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	471	7.2	3.4	43	28.0
		46	3.9	260	300	43	5.4	41	5.6	150	45	40	--	.01	.17	.22	258	130	7	471	7.2	3.8	48	28.0
I_C	Aug. 28	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	710	8.1	6.6	85	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	710	7.7	2.8	36	28.5
		20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	690	7.4	1.0	13	28.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	660	7.4	1.0	13	28.0
		42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	660	7.3	1.0	13	28.0
J_C	Aug. 28	d1	11	50	0	54	5.2	88	8.8	181	70	74	--	2.0	.19	1.9	400	160	8	710	7.6	4.6	59	29.0
		10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	710	7.3	1.8	23	29.0
		20	--	50	20	--	--	--	--	--	--	--	--	1.7	.36	1.8	--	--	--	710	7.2	1.0	13	29.0
		30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	701	7.2	.9	12	28.5
		39	10	130	160	54	5.5	82	8.3	188	67	73	--	1.4	.46	1.8	393	160	3	701	7.2	.9	12	28.5

c SECCHI DISK TRANSPARENCY (FEET) 1.9
d SECCHI DISK TRANSPARENCY (FEET) 1.8