DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared by the
U.S. GEOLOGICAL SURVEY
in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

WATER RESOURCES INVESTIGATION 77-126
OPEN-FILE REPORT

THE HYDROLOGY OF LAKE ROUSSEAU, WEST-CENTRAL FLORIDA

By
Edward R. German

Prepared by the
U.S. GEOLOGICAL SURVEY
in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Tallahassee, Florida

INTRODUCTION

Lake Rousseau, west of Dunnellon, is an impoundment of the Withlacoochee River formed by the Inglis Dam, and lies along the Levy-Citrus and Marion-Citrus County boundaries (fig. 1). The impoundment was completed in 1909 to provide water for hydroelectric power generation. Power generation was discontinued in 1965 when new facilities became operational. Lake Rousseau was to have been a part of the Cross-Florida Barge Canal. Inglis Lock, a canal to the Gulf of Mexico, and a bypass channel to the Withlacoochee River were constructed between January 1965 and December 1969, completing the western end of the proposed Barge Canal. Plans to dredge a channel through Lake Rousseau were never carried out; all work was halted in 1971 in response to increasing concern over possible environmental damage by the Barge Canal. The status of the Canal project is uncertain as of 1977. Inglis Lock is operational, however, and in 1976, was used for recreation by about 65 boats. The lock, operated by the U.S. Army Corps of Engineers, is presently (1977) manned only for specified hours during weekends, but is manned at other times on request.

Many kinds of hydrologic data have been collected for the Lake Rousseau drainage basin over the years. This report describes the hydrology of the lake. The report should be of interest to those concerned with management of water resources and to those using the lake for recreational purposes.

THE LAKE AND ITS ENVIRONMENT

Lake Rousseau is about 11 mi long, covers an area of about 4,000 acres or 6.3 mi^2, and contains about 34,000 acre-ft of water at normal lake elevation of 27.5 ft msl (mean sea level). The area now inundated by the lake was probably a cypress-hardwood swamp. Because the swamp was not cleared before closing Inglis Dam, stumps and snags abound outside the original river channel.

The lake appears to be in a state of advanced eutrophication approaching senescence. The area beyond the river channel in the eastern part of the lake is covered with a thick mat of vegetation (fig. 1) composed of cattails, smartweed, water hemlock, pickerelweed, elephant's ear, water lettuce, waterhyacinth, and many other floating or rooted plant species. In some places a layer of organic debris has accumulated on the lake bottom to a depth of many feet. The western part of the lake is more open than the eastern part, but is at times choked with waterhyacinth and hydrilla.

Limestone of the Floridan aquifer is at or near land surface in the vicinity of Lake Rousseau, and the river channel itself is incised into limestone which has been covered with a thin layer of mud deposited by the river (Vernon, 1951). Two different formations are exposed at land surface: the Avon Park Limestone and the Ocala Limestone of Eocene age.

The Avon Park Limestone, the older of the two, consists of chalky, highly fossiliferous, marine limestone and crystalline dolomite that are relatively poor in their ability to store and transmit water. This is the oldest unit to be found naturally exposed in the entire state of Florida, and occurs at or near the land surface in a belt which is crossed by the Withlacoochee River channel near Dunnellon. This belt is associated with a structural feature known as the Ocala Uplift, a broad, gentle fold in the rock strata from which the Ocala Limestone has been eroded.

The Ocala Limestone is an important water-bearing unit composed of an upper member and a lower member (Stringfield, 1966). The upper member is the equivalent of the Crystal River Formation of the Ocala Group and the lower member is the equivalent of the Williston and Inglis Formations of the Ocala Group, as defined by the Florida Geological Survey (now Florida Bureau of Geology). Near Lake Rousseau, the Inglis Formation of the Ocala Group is at or near land surface, and consists of cross-bedded fragmental and microfossiliferous marine limestone with finely crystalline dolomite.

In the vicinity of Lake Rousseau the potentiometric surface of the Floridan aquifer generally is highest north and east of the lake and lowest south and west of the lake. Near Dunnellon, the potentiometric surface of the Floridan aquifer may be greater than 27.5 ft msl, the operating surface elevation of the lake, but in the rest of the lake area the potentiometric surface of the Floridan aquifer is probably always less than that elevation. Thus, Lake Rousseau probably serves as a source of recharge to the Floridan aquifer over most of its length. Water levels in wells penetrating the Floridan aquifer near the lake are given on figure 1 for May 1977 (a low-water period) and for September 1976 (a high-water period). Continuous water-level records for the Floridan aquifer well CE-14, 3 mi east of Dunnellon, indicate annual fluctuations of as much as 9 ft in the potentiometric surface in response to rainfall (fig. 2). Construction of the Barge Canal complex—the lock, bypass, and canal to the gulf—caused a rise in the potentiometric surface of the Floridan aquifer in the immediate vicinity of the canal, as indicated by the water-level record for CE-05 (fig. 2). However, the net effect of constructing the canal was to lower the potentiometric surface in a 15-mi^2 area by as much as 15 ft (Faulkner, 1973a).

Climatic conditions are subtropical in the Lake Rousseau area, with humid, rainy summers and dry, mild winters. Continental weather patterns sometimes affect the area, causing heavy rainfall followed by subfreezing temperatures during passage of a cold front. More than half of the yearly rainfall generally occurs during the 4 warmest months, June–September, generally in the form of local thundershowers. However, tropical storms and hurricanes can deliver tremendous amounts of rainfall, as on September 5–6, 1950, when 38.7 in was recorded at Yankeetown, about 8 mi west of Lake Rousseau. Monthly rainfall totals for 1966–76 (fig. 2) represent the average of National Weather Service monthly totals for Inverness and Ocala.

INFLOW-OUTFLOW RELATIONS

Surface inflow to Lake Rousseau is supplied by the Withlacoochee River and is approximately equal to the sum of the discharges measured at a gaging station on the Withlacoochee River near Holder and at another on Blue Run near Dunnellon (fig. 1). Blue Run, a spring-fed tributary, originates at Rainbow Springs and discharges to the Withlacoochee River southeast of Dunnellon. Most of the water discharged by Blue Run is subsurface drainage from outside the Withlacoochee River basin, flowing to Rainbow Springs and to Blue Run by way of the Floridan aquifer. The approximate extent of the ground-water basin drained by Blue Run as estimated by Faulkner (1973) is shown in figure 1.

Water is released from the lake at three places: the dam, the lock, and the bypass channel (fig. 3). The bypass channel can handle as much as 1,540 ft^3/s at a lake-surface elevation of 27.5 ft msl, and all outflow is normally directed through this channel except for about 70 ft^3/s of seepage past Inglis Dam, and water used to operate the lock. Water from the bypass channel is received by the Withlacoochee River and discharges to the gulf. When inflow is greater than the capacity of the bypass channel to maintain the lake stage at 27.5 ft msl, gates on the Inglis Dam spillway are opened and the excess water discharges to the gulf by way of the canal. Water may also be periodically released at Inglis Dam to correct any water-quality problems which may arise due to the restricted flow through the lower end of Lake Rousseau. The bypass-channel spillway may be closed in accordance with the hurricane emergency plan of the U.S. Army Corps of Engineers when storm tides threaten to flood the lower Withlacoochee River area.

Average surface inflow and outflow for the period 1971–76 was:

Surface inflow (ft^3/s)		Surface outflow (ft^3/s)	
Withlacoochee River (near Holder)	723	Dam	241
Blue Run (near Dunnellon)	674	Bypass channel	1,110
Estimated ungaged inflow	72	Lock	9
Total	1,469	Total	1,360

The ungaged inflow, estimated to be about 10 percent of the flow of the Withlacoochee River near Holder, is from the drainage area downstream from the gage on the Withlacoochee River near Holder.

Rainfall on and evaporation from the lake surface are relatively unimportant items in the water budget for Lake Rousseau, due to the relatively small surface area of the lake. For example, the estimated difference between rainfall and evaporation is about 6 in near Dunnellon (Visher and Hughes, 1969). This rainfall excess over the lake surface would amount to a mean discharge of only about 2.8 ft^3/s.

Measured outflow from Lake Rousseau for 1971–76 was 109 ft^3/s, or about 7.4 percent less than the estimated inflow. The net loss of water from the lake probably can be attributed to seepage from the lake to the Floridan aquifer through fractures, faults, and solution cavities. Fractures and faults which have been detected near the Lake (Faulkner, 1973; Vernon, 1951) are shown on figure 1.

Mean monthly inflow to Lake Rousseau (sum of the discharge for Blue Run and Withlacoochee River near Holder) is given in figure 4. The monthly figures are computed from daily discharge records for the Withlacoochee River for the period 1932–76, and for Blue Run for 1966–76. Monthly discharges for Blue Run before 1966 are estimated from one discharge measurement each month. Estimation of monthly discharge from a single measurement is feasible due to the low day-to-day variability in flow from the spring-fed Blue Run. An estimate of ungaged inflow for the drainage area downstream from the gage at Holder is not included because seasonal variation of this ungaged inflow is not known. Figure 4 shows that most of the variation in inflow to Lake Rousseau is due to variation in flow of the Withlacoochee River. Mean monthly discharge of the Withlacoochee River (1932–76) ranged from 622 ft^3/s for June to 1,920 ft^3/s for September, while for the same period, mean monthly discharge of Blue Run ranged from 685 ft^3/s in June to 802 ft^3/s in October.

The seasonal variation of inflow to Lake Rousseau is typical of streams draining central Florida (Kenner, 1969), where the tropical weather pattern of the Caribbean Sea is predominant over the continental weather pattern. Continental weather can advance into peninsular Florida, with significant hydrologic results, as on February 3, 1970, when 7.5 in of rain, associated with passage of a cold front in the northwest part of the Withlacoochee River basin, fell at Inglis Lock. As a result, the monthly discharge for February 1970 was unusually high (fig. 2). Lesser quantities of rain fell in other parts of the basin during this storm—at Inverness and Ocala only 3.9 in and 2.4 in were recorded.

The flow-duration curves (fig. 5) show the percentage of time that a specified daily discharge was equaled or exceeded during the period 1966–76. For example, daily discharges of 2,500 ft^3/s and 290 ft^3/s were equaled or exceeded 5 and 95 percent of the days, respectively, at the Withlacoochee River gage near Holder. This means that daily discharge at this gage was in the 290 to 2,500 ft^3/s range 90 percent of the days. In contrast, the daily discharge for Blue Run near Dunnellon during the same 11-year period was within 580 to 920 ft^3/s 90 percent of the days. These statistics indicate the small variability in daily discharge of Blue Run compared with the Withlacoochee River. The flow-duration curve for inflow to Lake Rousseau was computed using the sum of daily discharges for Blue Run near Dunnellon and the Withlacoochee River near Holder for the period 1966–76, and does not include ungaged inflow from the drainage basin downstream from the gage near Holder. Figure 5 shows that most of the inflow to Lake Rousseau is from Blue Run during low-flow periods, and is from the Withlacoochee River basin downstream from Blue Run during high-flow periods.

Maximum discharges of the Withlacoochee River have been relatively low during the period 1966–76. Therefore, the flow duration curves for the Withlacoochee River near Holder and for inflow to Lake Rousseau are not representative of long-term conditions at the high discharge end of the scale. For example, the highest daily discharge at the gage near Holder for the period 1966–76 was only 3,420 ft^3/s; this discharge was exceeded in 15 of the 34 years of record prior to 1966 and is considerably lower than the maximum daily discharge of 8,660 ft^3/s which occurred in April 1960.

Frequency curves for maximum and minimum monthly inflow to Lake Rousseau, not including runoff from the ungaged area east of Holder, are given in figure 6. These curves relate magnitudes of maximum and minimum monthly inflow to frequency of occurrence and were computed from annual maximum and minimum monthly inflow, where monthly inflow for each month was taken as the sum of the monthly discharge of the Withlacoochee River near Holder and Blue Run for the period 1932–76. Frequency curves cannot be used to predict when a selected high or low flow will occur, but they show the probability of occurrence of a selected high or low flow. Similarly, the probable number of years intervening between the recurrence of a selected extreme (high or low) flow may be determined. For example, from figure 6, the probability in any given year for a monthly inflow less than or equal to 860 ft^3/s is 20 percent. Also, the monthly inflow will be less than or equal to 860 ft^3/s at intervals averaging 5 years in length. Similarly, there is a 20 percent probability that a monthly inflow of 4,600 ft^3/s will be equaled or exceeded in any given year, and the recurrence interval for inflows equal to or exceeding 4,600 ft^3/s will average 5 years.

The frequency distribution of peak inflow (maximum instantaneous discharge each year) into Lake Rousseau was estimated using annual peak inflows taken as the sum of observed peaks for the Withlacoochee River and annual maximum daily discharge for Blue Run. Records of annual maximum daily discharge for Blue Run are available since 1966 and annual peaks for the period 1932–65 were taken as the maximum of monthly discharge measurements. Peak inflows estimated by summing individual peaks will be greater than the actual peaks unless the peaks occur simultaneously, and peaks on Blue Run and the Withlacoochee River probably do not occur simultaneously. However, true peak discharges for Blue Run would be greater than the maximum monthly or daily discharge values which were used for these computations. Because these two factors tend to compensate each other, and because of the low variability of flow in Blue Run, the estimated peak flow frequencies listed below are probably valid, especially for high-magnitude peaks when most of the inflow is from the Withlacoochee River.

Exceedance probability (percent)	Recurrence interval (years)	Peak inflow (ft^3/s)
99	1.01	1,170
90	1.11	1,830
50	2	3,280
10	10	6,090
1	100	10,400

The combined capacity of the bypass channel and the Inglis Dam spillway is about 19,600 ft^3/s; these are, therefore, capable of handling discharges considerably greater than the estimated 100-year peak inflow to the lake at a lake surface elevation of 27.5 ft msl.

It is interesting to compare magnitudes of high monthly inflow with peak inflow to Lake Rousseau. The estimated 2-year peak inflow of 3,280 ft^3/s exceeds the 2-year high monthly inflow (fig. 6) by only 90 ft^3/s or 3 percent, and the 100-year peak inflow of 10,400 ft^3/s exceeds the 100-year high monthly inflow by only 1,680 ft^3/s or 19 percent. This relatively small difference between peak inflows and high monthly inflows is characteristic of river basins that have considerable surface storage such as swamps and lakes so that the flood peaks are extended or drawn out. The relatively flat topography of the basin and the high permeability of surficial material are also important factors in restricting runoff. Discharge of the Withlacoochee River generally peaks about 1 week after an intense rainfall and the flow remains near the peak for 1 to 6 weeks after the rainfall ceases (U.S. Army Corps of Engineers, 1976).

Owing to the increasing demand for municipal, industrial, and irrigation water supplies in this general area, the U.S. Geological Survey has been making a study that includes an evaluation of Lake Rousseau as a potential source of water. According to unpublished data of the U.S. Geological Survey, the lake could supply continuously about 200 ft^3/s during a 90-day low-flow period of a severity which would occur at intervals averaging 25 years. This diversion of water would still leave an outflow from Lake Rousseau sufficient to restrict saltwater encroachment in the lower Withlacoochee River to its present range (written commun., W. C. Sinclair, August 1977).

Lake stages at the dam since 1966 (fig. 2) were generally constant except for occasional drawdowns. The extreme stages for the period of record at the dam (1964–76) are 28.01 ft in June 1971 and 21.70 ft in October 1972. The U.S. Army Corps of Engineers (1976) has estimated lake stages which would occur during floods of selected recurrence interval. The increase in lake stage during floods would be smaller at the west end and greater in the upper reaches (east end) of the lake. Estimated stages at the U.S. Highway 41 bridge at Dunnellon with recurrence intervals averaging 10 and 100 years are 31.0 and 34.3 ft msl, respectively. A maximum stage of 33.0 ft msl occurred in April 1960 at this bridge, and was the highest stage known there since at least 1931.

WATER QUALITY

A large number of water samples have been collected from Lake Rousseau, Blue Run, and the Withlacoochee River in connection with studies related to the proposed Cross-Florida Barge Canal and other projects. Sampling sites are shown on figure 1. Although a wide variety of constituents and water-quality characteristics has been determined, all of the data available cannot be presented here. Instead, selected constituents for locations representative of the lake and of inflow to the lake are summarized. Additional data are presented and discussed by Lamonds and Merritt (1976).

The temperature of water in a lake or stream is important to many water users inasmuch as it affects suitability of the water for industrial and municipal uses and for recreation. For example, the types and numbers of aquatic organisms inhabiting a water body are related to water temperature. Weekly measurements of temperature of the water near the surface in Lake Rousseau above Inglis Dam for 1971–76 are plotted on figure 7, and range from 30°C in July and August to 12°C in January. The moderating effect of water from Blue Run on seasonal variation of water temperature is evident from figure 8 which shows generalized temperature curves computed from harmonic analysis of once-monthly measurements for 1975–76. Temperature of water discharged from the spring-fed Blue Run is relatively constant; seasonal variation in water temperature increases progressively west of Blue Run.

The concentration of major chemical constituents in water in Blue Run, the Withlacoochee River, and the lake is depicted by the water quality diagrams in figure 9. These diagrams show that water feeding the lake and in the lake is a calcium-bicarbonate type. Mean hardness of water at the stations listed in table 1 ranges from 120 to 140 mg/L as calcium carbonate, therefore, these waters would be classified as hard. The water type and hardness reflect the inflow of water from the Floridan aquifer.

There is a substantial increase in concentrations of calcium and bicarbonate in Blue Run between the source at Rainbow Springs and the mouth. This increase probably is caused by inflow of more highly mineralized water, possibly from deeper parts of the Floridan aquifer or from an area of relatively low recharge, with the result that water discharged from Blue Run is similar in chemical type and dissolved solids concentrations to water in the Withlacoochee River inasmuch as the Withlacoochee also receives highly mineralized water from sources within the Floridan aquifer, especially during low to medium flows. During high flows, surface runoff to the Withlacoochee River tends to dilute the water in the channel—largely ground-water inflow as in Blue Run—and results in lower concentrations of dissolved solids in the river than in Blue Run (Lamonds and Merritt, 1976).

The specific conductance of samples of water collected from Lake Rousseau weekly since 1971 indicates that the concentration of the major dissolved constituents in the lake water is relatively constant (table 1, figs. 2 and 10). As shown in figure 10, 90 percent of the water samples collected just upstream from the dam and the lock was within the specific conductance range 190 to 300 and 210 to 320 umho/cm at 25°C, respectively. Saltwater from the gulf is present in the canal below the lock, as evidenced by specific conductance of water there of as much as 32,900 umho/cm. Although the possibility of "locking up" seawater to Lake Rousseau during lock operation does exist and, in fact, has occurred, there has been little or no contamination of the main body of the lake. Specific conductances and chloride concentrations of lake water samples collected upstream from the lock have indicated the presence of seawater (table 1) rarely: since 1971 only 3 of 337 samples exceeded 400 umho/cm in specific conductance, and only 2 of 46 contained more than 30 mg/L of chloride. Seawater which enters the lock is diluted as the lock is filled during the 25-ft lift to lake level, and then is discharged through the bypass channel most of the time (Bush, 1973) so that it has little opportunity to migrate eastward in the main body of the lake. At Inglis Dam a sample of lake water collected May 1976 contained 48 mg/L of chloride, a concentration that may be indicative of saltwater contamination. In all other samples collected at the dam, however, chloride concentration has been less than 17 mg/L.

The mean concentrations of nitrogen and phosphorus species in water flowing into Lake Rousseau and in the lake at Inglis Lock are given in figure 11. The illustration shows that total nitrogen and phosphorus concentrations are similar in the lake, in the river, and in Blue Run. Organic nitrogen is the dominant form in both the Withlacoochee River and the lake, and the nitrate form predominates in Blue Run. Orthophosphate, the inorganic form of phosphorus, accounts for 50 to 75 percent of the total phosphorus concentrations. Nitrogen and phosphorus are important plant nutrients, but concentrations of organic nitrogen and total phosphorus, two indicators that have been used to classify the trophic state of north and central Florida lakes, are well below mean concentrations of these nutrients as reported for lakes which have been classified as eutrophic, or highly enriched (Shannon and Brezonik, 1972). However, the high productivity of Lake Rousseau, as evidenced by the abundance of aquatic vegetation, is characteristic of eutrophication, indicating that factors other than high nitrogen and phosphorus concentrations are important in maintaining productivity in the lake. Lamonds and Merritt (1976) computed the following nutrient budget for Lake Rousseau for 1975:

	Nitrogen (tons)	Phosphorus (tons)
Withlacoochee River	285	15
Blue Run	281	22
Rainfall	22	1.2
Total inflow	588	38.2
Total outflow	504	41.8
Excess inflow	84	−3.6

Their conclusion was that the net retention of nitrogen in the lake was probably due to uptake by the prolific aquatic plant community and that the gain in phosphorus in the lake may indicate the existence of an unmeasured source such as ground-water seepage into the east part of the lake, or, more likely, release of phosphorus from the thick layer of organic debris on the lake bottom.

Temperature profiles in Lake Rousseau for February, May, August, and November 1975 show little thermal stratification; surface and bottom temperatures differ by 4°C at most. Dissolved oxygen (DO), on the other hand, may at times decrease drastically with depth at some places in the lake, especially in the summer (fig. 12). Near the surface, also, dissolved-oxygen concentrations are highly variable. Figure 13, a graph of DO concentrations measured near the surface in Lake Rousseau at Inglis Dam for 1967–76 indicates that DO has been as high as 14.0 mg/L and that concentrations have been less than 3.0 mg/L occasionally late in the summer and early in the fall when water temperatures are high.

Concentrations of other constituents, such as toxic metals and pesticides, are low enough that no problems in Lake Rousseau related to these substances are indicated (Lamonds and Merritt, 1976). The primary problem in Lake Rousseau has been, and continues to be, an accelerated rate of aquatic plant production which interferes with recreational use of the lake, and which contributes to occasional low dissolved oxygen through the respiration of organisms and the decay of plant debris.

SELECTED REFERENCES

Bush, P. W.
1973 Saltwater movement in the lower Withlacoochee River–Cross-Florida Barge Canal Complex: U.S. Geol. Survey Water Resources Inv. 5-72, 32 p.

Faulkner, G. L.
1973 Geohydrology of the Cross-Florida Barge Canal area with special reference to the Ocala vicinity: U.S. Geol. Survey, Water Resources Inv. 1-73, 117 p.

____
1973a Ground-water conditions in the lower Withlacoochee River–Cross-Florida Barge Canal Complex area: U.S. Geol. Survey Water Resources Inv. 4-72, 31 p.

Kenner, W. E.
1969 Seasonal variation of streamflow in Florida: Florida Dept. Nat. Resources, Bur. Geology, Map Series 31.

Lamonds, A. G. and Merritt, M. L.
1976 Proposed Cross-Florida Barge Canal: Water quality aspects with a section on waste-assimilative capacity: U.S. Geol. Survey, Water Resources Inv. 76-23, 189 p.

Shannon, E. E. and Brezonik, P. L.
1972 Limnological characteristics of north and central Florida lakes: Limnology and Oceanography, vol. 17, no. 1, p. 77–110.

Stringfield, V. T.
1966 Artesian water in Tertiary limestone in the southeastern United States: U.S. Geol. Survey Prof. Paper 517, 226 p.

U.S. Army Corps of Engineers
1976 Flood Hazard Information, Withlacoochee River, Nobleton to Gulf of Mexico, Florida: Jacksonville, Fla., U.S. Army Corps of Engineers, 10 p., 12 plates.

Vernon, R. O.
1951 Geology of Citrus and Levy Counties, Florida: Florida Geol. Survey Bull. 33, 225 p.

Visher, F. N. and Hughes, G. H.
1969 The difference between rainfall and potential evaporation in Florida: Florida Dept. Nat. Resources, Bur. of Geology, Map series 32.

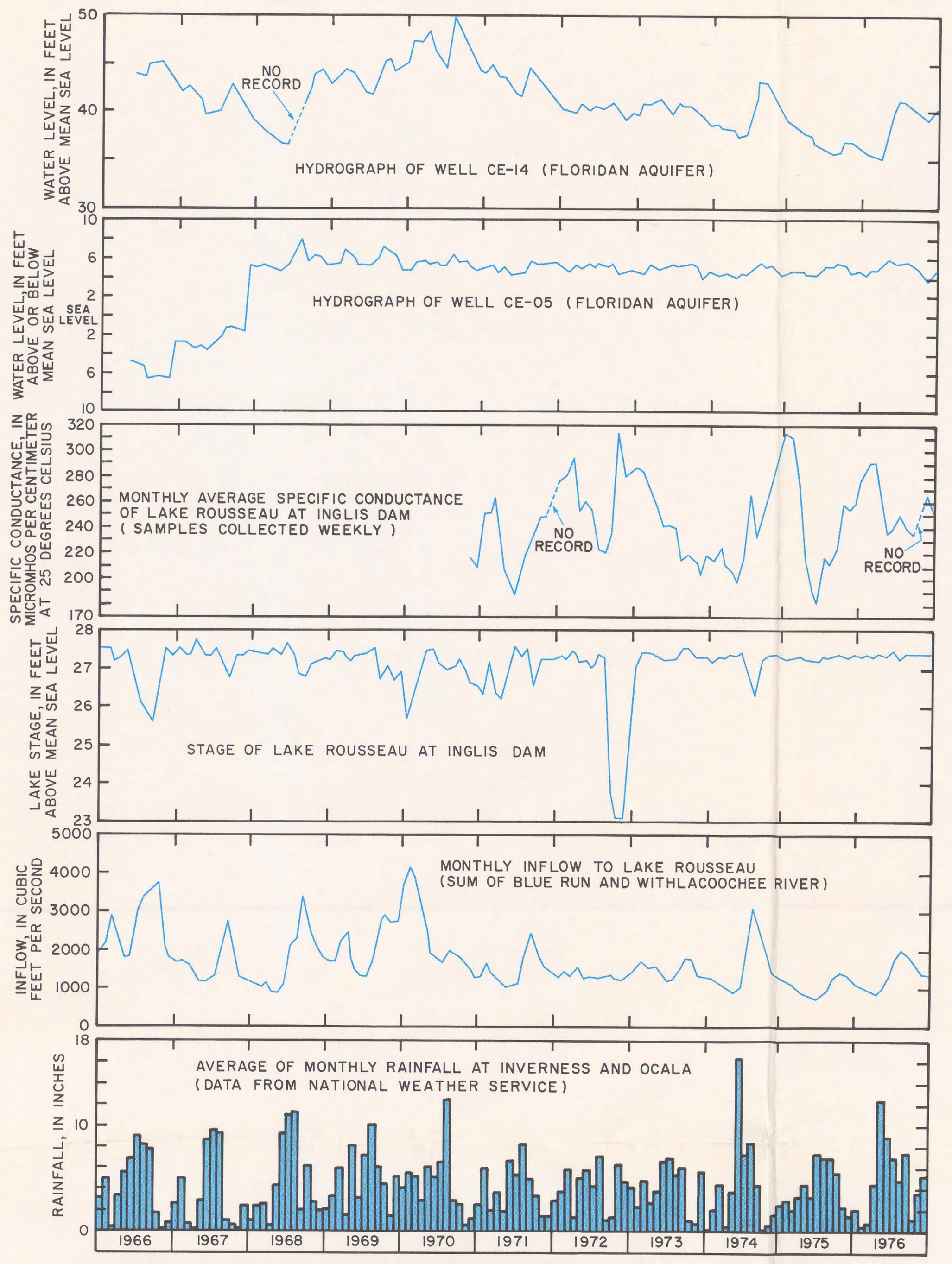

Figure 2.—Hydrographs of wells CE-05 and CE-14, specific conductance of water in Lake Rousseau, lake stage, lake inflow and rainfall.

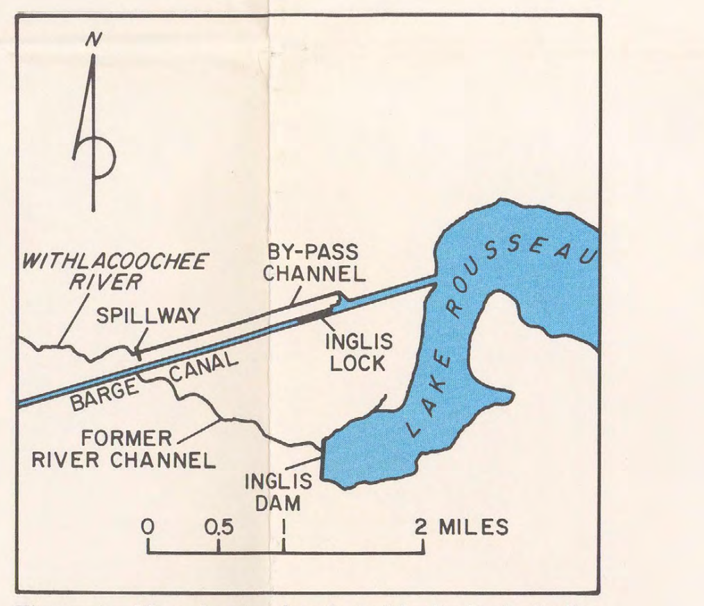

Figure 3.—Map showing location of Inglis Lock, Inglis Dam, and bypass channel complex.

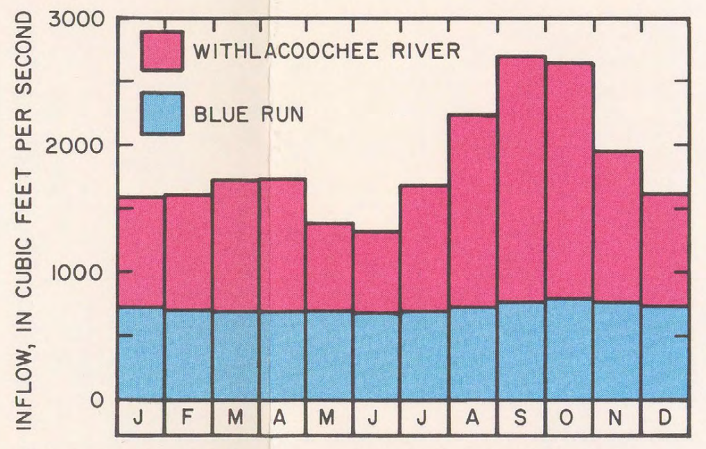

Figure 4.—Graph of mean monthly inflow to Lake Rousseau, 1932–76.

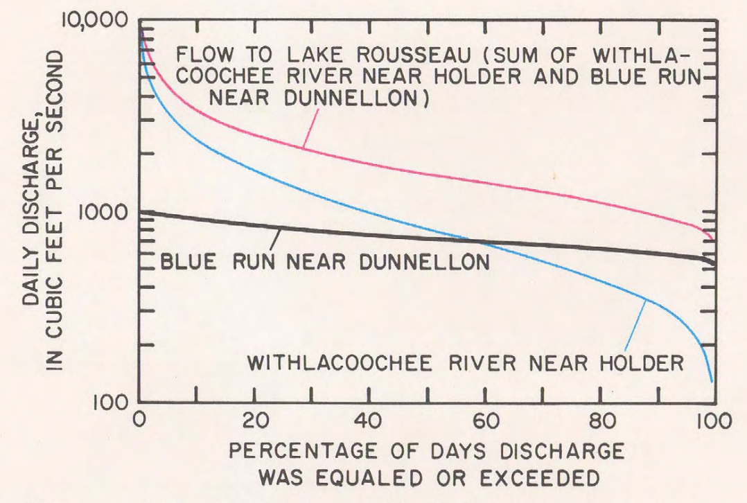

Figure 5.—Flow duration curves for Withlacoochee River near Holder, Blue Run near Dunnellon, and for total flow (calculated) to Lake Rousseau, 1966–76.

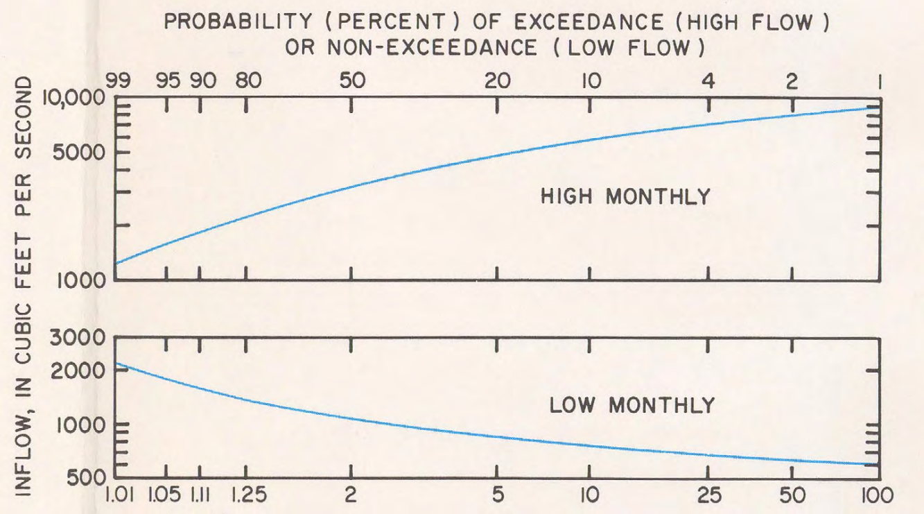

Figure 6.—Graphs of frequency of high and low monthly inflow to Lake Rousseau, computed from records for Withlacoochee River near Holder and Blue Run near Dunnellon, 1932–76.

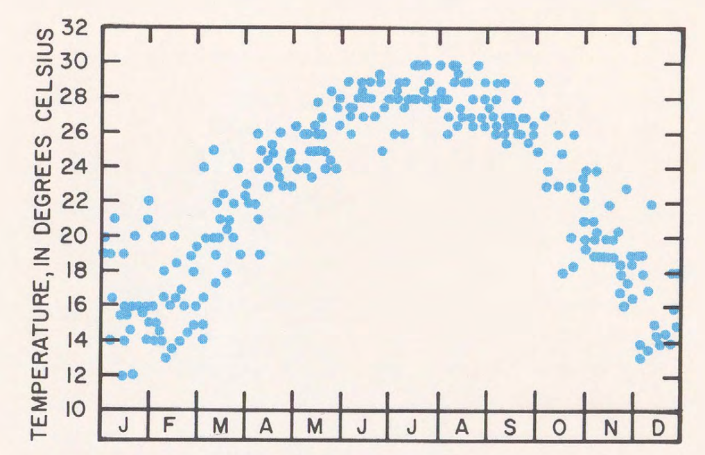

Figure 7.—Temperature of water in Lake Rousseau at Inglis Dam, 1971–76.

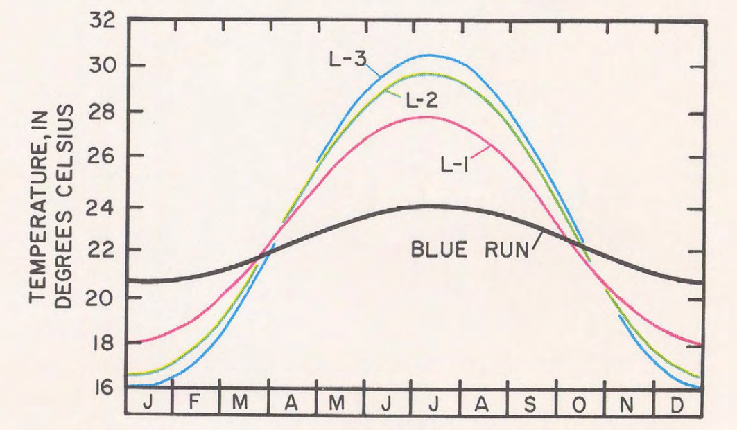

Figure 8.—Seasonal variation in water temperature at Blue Run near Dunnellon and three locations on Lake Rousseau, 1975–76.

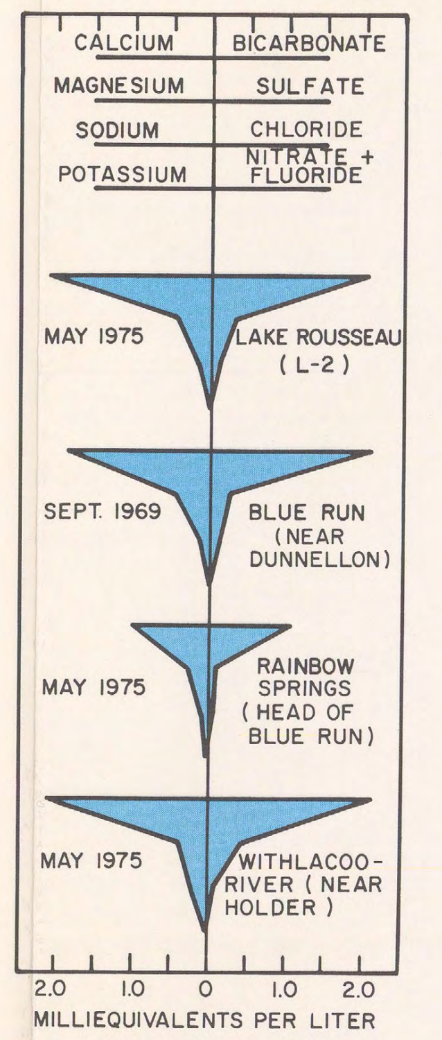

Figure 9.—Chemical analyses of water from four sampling sites in Withlacoochee River basin, September 1969 and May 1975.

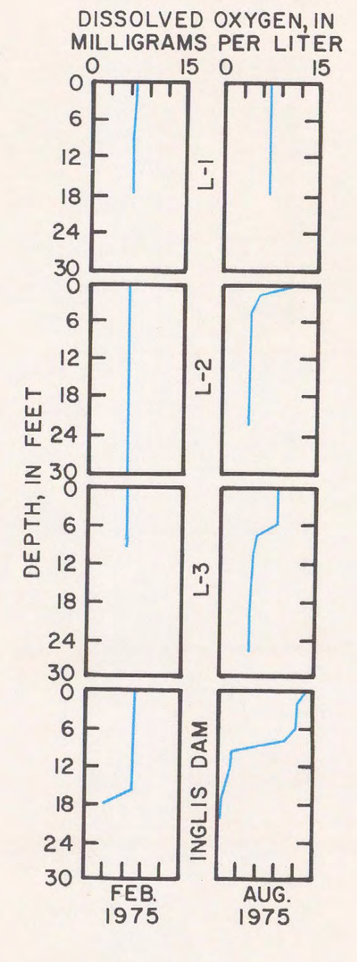

Figure 12.—Variation in dissolved-oxygen concentration with depth at four sites in Lake Rousseau.

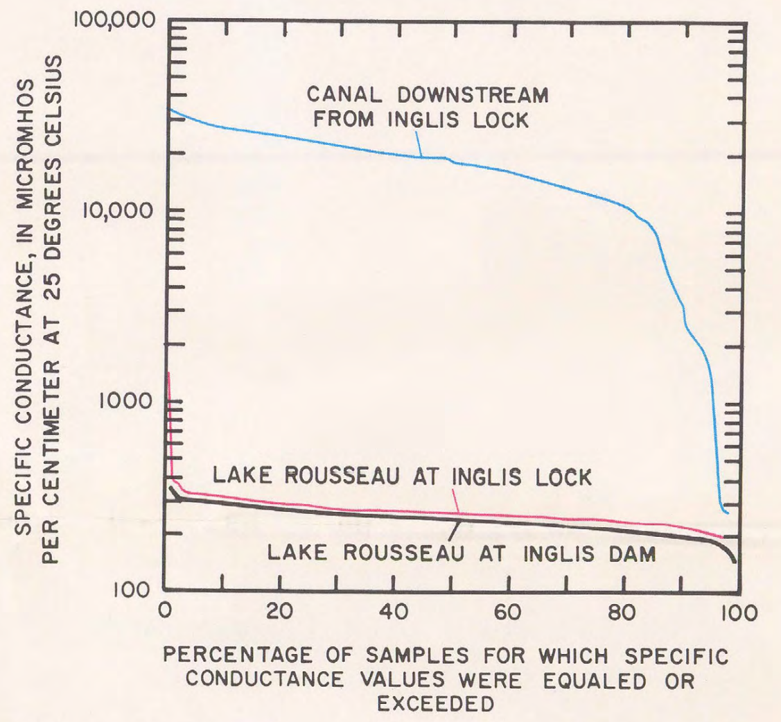

Figure 10.—Duration of specific conductance of water from Lake Rousseau and from canal downstream from Inglis Lock, 1971–76.

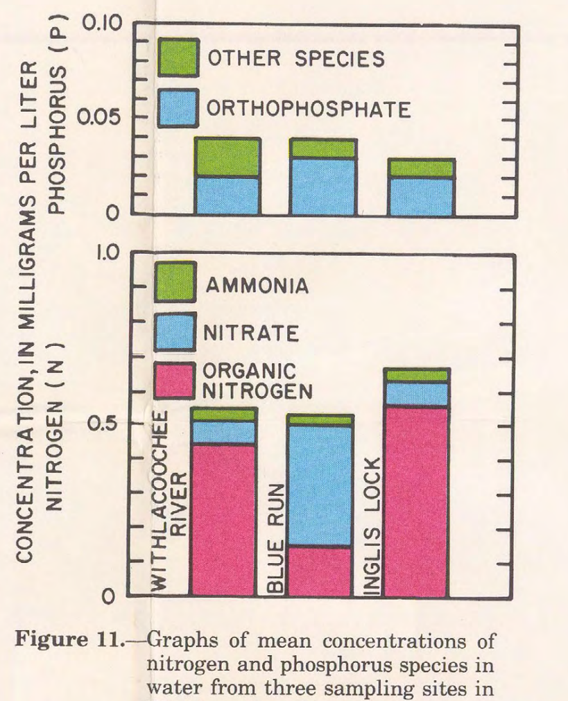

Figure 11.—Graphs of mean concentrations of nitrogen and phosphorus species in water from three sampling sites in Withlacoochee River basin.

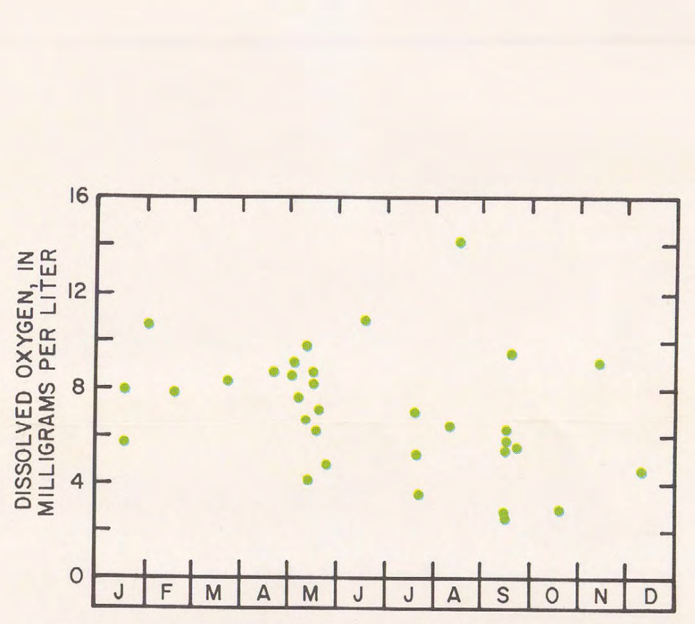

Figure 13.—Seasonal variation in dissolved-oxygen concentration near surface in Lake Rousseau at Inglis Dam, 1967–76.

Table 1.—*Summary of selected physical, chemical, and biological properties for selected locations at Lake Rousseau.*
[Reporting units are milligrams per liter (m/l) unless noted.]

Sampling location		Specific conductance (micromhos/cm at 25°C)	pH (units)	Color (platinum cobalt units)	Turbidity (Jackson turbidity units)	Dissolved oxygen	Biochemical oxygen demand (5-day at 20°C)	Coliform, M-ENDO medium (colonies/100 ml)	Coliform, fecal (colonies/100 ml)	Hardness, as calcium carbonate	Noncarbonate hardness	Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Bicarbonate	Carbonate	Sulfate, dissolved	Chloride, dissolved	Fluoride, dissolved	Silica, dissolved	Dissolved solids, residue at 180°C	Nitrogen, total as N	Phosphorus, total as P	Iron, total (micrograms per liter)	Carbon, total organic	Sediment, suspended
L-2	Maximum	295	8.1	60	3	14.4	1.9	390	100	140	42	46	5.3	3.5	0.2	140	0	21	7.8	0.3	7.3	169	0.71	0.06	100	30	3
	Minimum	237	7.1	5	1	2.4	0.0	0	0	120	13	40	3.7	3.4	.1	120	0	17	3.2	.2	5.4	154	.26	.02	20	0	0
	Mean	262	7.6[1]	28	1	6.8	0.7	110	22	130	24	43	4.6	3.5	.2	130	0	19	6.1	.3	6.4	162	.40	.04	60	7	1
	Number of Observations	20	18	17	21	18	21	20	15	17	12	7	7	2	2	12	18	2	17	2	2	2	20	21	2	22	15
Inglis Dam	Maximum	292	8.9	100	20	10.8	4.6	2600	120	140	31	41	4.7	—	—	140	6	—	48	—	7.7	—	1.6	0.10	100	17	6
	Minimum	175	6.6	0	1	2.5	.5	0	0	76	8	35	3.7	—	—	60	0	—	4	—	1.9	—	.31	.007	0	1	0
	Mean	227	7.8[1]	30	5	6.4	1.6	410	22	120	21	39	4.2	—	—	120	0	—	8.5	—	4.6	—	.64	.04	20	7	3
	Number of Observations	27	21	26	27	25	25	28	12	25	14	4	4	—	—	14	21	—	26	—	9	—	27	27	7	22	12
Inglis Lock	Maximum	3400	8.3	120	11	9.6	2.5	20000	200	440	140	43	5.7	—	—	150	0	—	910	—	7.4	—	5.0	.13	—	17	10
	Minimum	195	6.7	0	1	1.0	.1	0	0	86	14	33	4.0	—	—	81	0	—	4.5	—	2.8	—	.24	.01	—	0	1
	Mean	361	7.8[1]	29	3	5.8	.8	710	7	140	41	39	4.7	—	—	120	0	—	34	—	4.8	—	.56	.04	—	6	3
	Number of Observations	47	27	47	47	45	46	46	12	45	14	5	5	—	—	14	27	—	46	—	19	—	36	36	—	39	11

[1] Median value for pH.

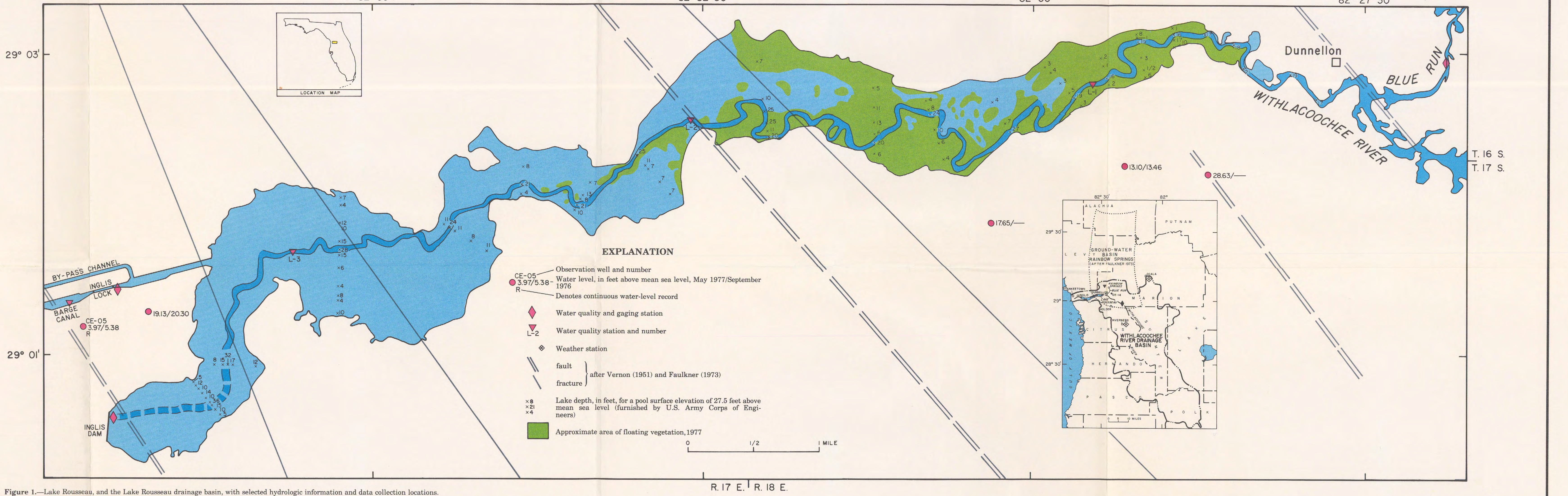

Figure 1.—Lake Rousseau, and the Lake Rousseau drainage basin, with selected hydrologic information and data collection locations.

THE HYDROLOGY OF LAKE ROUSSEAU,
WEST-CENTRAL FLORIDA
By
Edward R. German
1978