EXTENSION OF STREAMFLOW AND DISSOLVED-SOLIDS RECORDS AT SELECTED SITES IN THE COLORADO RIVER BASIN, ARIZONA, CALIFORNIA, COLORADO, NEVADA, NEW MEXICO, UTAH, AND WYOMING, 1940-83

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CONVERSION FACTORS

For the convenience of readers who may prefer to use metric (International System) units rather than the inch-pound units used in this report, values may be converted by using the following factors:

Multiply inch-pound unit	*By*	*To obtain metric unit*
acre-foot (acre-ft)	1,233	cubic meter
acre-foot per month (acre-ft/mo)	1,233	cubic meter per month
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
ton	0.9072	megagram
ton per month (ton/mo)	0.9072	megagram per month

Another term and abbreviation used in this report is:

milligram per liter (mg/L).

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ABSTRACT

Monthly streamflow and dissolved-solids concentration were estimated for periods prior to the initiation of data collection at selected sites in the Colorado River basin. Techniques used for this record extension included simple and weighted least-squares regression. Streamflow records were extended at 5 sites and dissolved-solids records were extended at 13 sites. Records were extended from October 1940 through the beginning of the period of record at each site to provide a completely concurrent data set for all sites. Standard errors were 5 to 74 percent for monthly streamflow and 3 to 27 percent for monthly, flow-weighted dissolved-solids concentration. The extended records at all sites were consistent with records from the historical period.

INTRODUCTION

Monthly streamflow and dissolved-solids data for 20 sites in the Colorado River basin (fig. 1) are compiled and published biennially by the U.S. Bureau of Reclamation as part of a report from the Secretary of the Interior to Congress on the quality of water in the basin. These reports are mandated by several Federal laws, including the Colorado River Storage Project Act (PL 84-485) and the Colorado River Salinity Control Act (PL 93-320). Data used to compute the monthly values are obtained from U.S. Geological Survey streamflow-gaging and water-quality sampling stations located at each of the 20 sites (table 1). The monthly values in the biennial reports are tabulated beginning with January 1941. For the 12th biennial report (U.S. Department of the Interior, 1985), monthly values were recomputed for the period of record at each site using a method developed by Liebermann and others (1987). Values could not be computed for all months for 13 of the sites because data collection began after 1941. Missing monthly values were replaced by undocumented estimates from previous biennial reports. For the 13th biennial report, the U.S. Bureau of Reclamation desired estimates that were derived using standard techniques and were more consistent with values computed for the historical period of record.

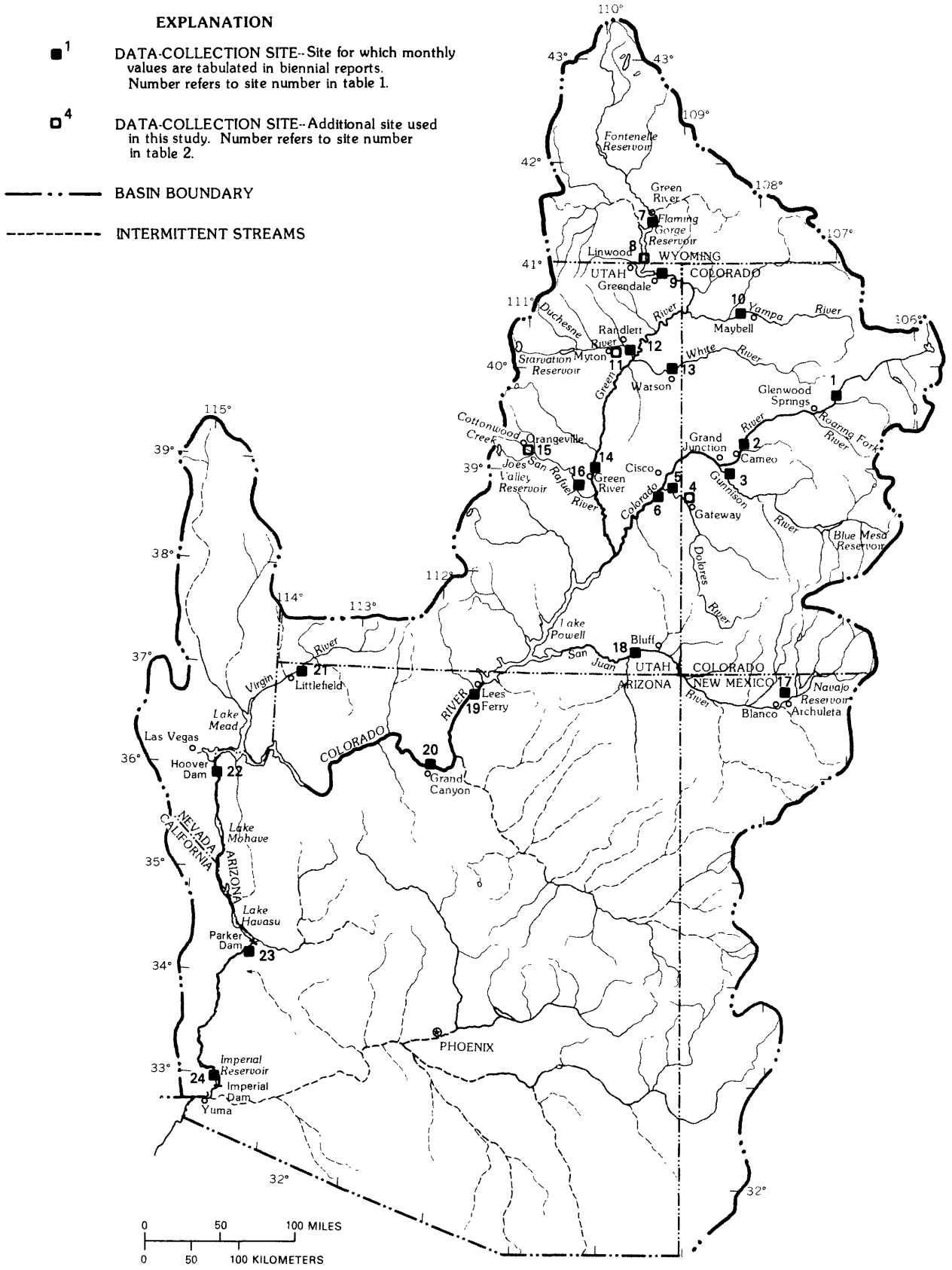

Figure 1.--Colorado River basin and data-collection sites.

Table 1.--*Sites for which monthly data are tabulated in biennial reports on quality of water in the Colorado River basin*

Site number in figure 1	U.S. Geological Survey station number	Station name	Historical period of record[1] (water years)
1	09071100	Colorado River near Glenwood Springs, Colo.	1942-83
2	09095500	Colorado River near Cameo, Colo.	1934-83
3	09152500	Gunnison River near Grand Junction, Colo.	1932-83
5	09180000	Dolores River near Cisco, Utah	1951-83
6	09180500	Colorado River near Cisco, Utah	1929-83
7	09217000	Green River near Green River, Wyo.	1952-83
9	09234500	Green River near Greendale, Utah	1957-83
10	09251000	Yampa River near Maybell, Colo.	1951-83
12	09302000	Duchesne River near Randlett, Utah	1957-83
13	09306500	White River near Watson, Utah	1951-83
14	09315000	Green River at Green River, Utah	1929-83
16	09328500	San Rafael River near Green River, Utah	1947-83
17	09355500	San Juan River near Archuleta, N. Mex.	1955-83
18	09379500	San Juan River near Bluff, Utah	1928-83
19	09380000	Colorado River at Lees Ferry, Ariz.	1926-31, 1942-83
20	09402500	Colorado River near Grand Canyon, Ariz.	1935-83
21	09415000	Virgin River at Littlefield, Ariz.	1949-83
22	09421500	Colorado River below Hoover Dam, Ariz.-Nev.	1935-83
23	09427520	Colorado River below Parker Dam, Ariz.-Calif.	1964-83
24	09429490	Colorado River above Imperial Dam, Ariz.-Calif.	1943-83

[1]Concurrent period of monthly streamflow and dissolved-solids concentration computed using the method developed by Liebermann and others (1987). Water year is defined as the period from October 1 through September 30 and is designated by the calendar year in which it ends.

Purpose and Scope

The purpose of this report is to provide documented estimates of streamflow and dissolved-solids concentration for 13 sites that have incomplete records. The first objective is to describe techniques for extending the records at individual sites. Techniques based on statistical relations between hydrological variables, such as streamflow and dissolved-solids concentration, either at a single site or between sites were acceptable. The second objective is to describe the techniques used to extend the monthly records of streamflow and dissolved solids from October 1940 through the

beginning of the period of record for the 13 sites listed in table 2. Eight of the sites were missing only dissolved-solids records; their streamflow records began earlier than 1941. The remaining five sites required extension of streamflow and dissolved-solids records.

Some techniques used for record extension require data from a base-station site having a record that overlaps the record at the extension site and includes the entire extension period. Descriptions of the base-station sites used in this study are listed in table 2 and their locations are shown in figure 1. Base-station sites included five biennial-report sites that had complete records and four additional sites.

Table 2.--*Record-extension and base-station sites used in this study*

[dashes indicate data not available]

Site number in figure 1	U.S. Geological Survey station number	Station name	Historical period of record (water years)[1]	
			Streamflow	Dissolved solids[2]
		RECORD-EXTENSION SITES		
Missing streamflow and dissolved solids data:				
5	09180000	Dolores River near Cisco, Utah	1951-83	1951-83
7	09217000	Green River near Green River, Wyo.	1952-83	1952-83
9	09234500	Green River near Greendale, Utah	1951-83	1957-83
12	09302000	Duchesne River near Randlett, Utah	1943-83	1957-83
16	09328500	San Rafael River near Green River, Utah	1946-83	1947-83
Missing dissolved-solids data:				
1	09071100	Colorado River near Glenwood Springs, Colo.	[3]1899-1983	1942-83
10	09251000	Yampa River near Maybell, Colo.	1916-83	1951-83
13	09306500	White River near Watson, Utah[4]	1923-83	1951-83
17	09355500	San Juan River near Archuleta, N. Mex.	[5]1928-83	1955-83
19	09380000	Colorado River at Lees Ferry, Ariz.	1895-1983	1942-83
21	09415000	Virgin River at Littlefield, Ariz.	1930-83	1949-83
23	09427520	Colorado River below Parker Dam, Ariz.-Calif.	1935-83	1964-83
24	09429490	Colorado River above Imperial Dam, Ariz.-Calif.	[6]1935-83	[7]1943-83
		BASE-STATION SITES		
2	09095500	Colorado River near Cameo, Colo.	1934-83	1934-83
4	09179500	Dolores River at Gateway, Colo.	1937-54	---
8	09225500	Green River near Linwood, Utah	1929-62	---
11	09295000	Duchesne River at Myton, Utah	1912-83	---
14	09315000	Green River at Green River, Utah	1905-83	1929-83
15	09324500	Cottonwood Creek near Orangeville, Utah	1933-83	1976-83
18	09379500	San Juan River near Bluff, Utah	1914-83	1928-83
20	09402500	Colorado River near Grand Canyon, Ariz.	1923-83	1926-83
22	09421500	Colorado River below Hoover Dam, Ariz.-Nev.	1934-83	1935-83

[1]Water year is defined as the period from October 1 through September 30 and is designated by the calendar year in which it ends.

[2]Computed monthly values.

[3]Streamflow from streamflow-gaging station 09072500, Colorado River at Glenwood Springs, Colo., prior to water year 1966, and from the difference between values at streamflow-gaging stations 09085000, Roaring Fork River at Glenwood Springs, Colo., and 09085100, Colorado River below Glenwood Springs, Colo., for water years 1966-83.

[4]After water year 1978, data are from streamflow-gaging station 09306395, White River near Colo.-Utah State line.

[5]Prior to December 1954, streamflow data are from streamflow-gaging station 09356500, San Juan River near Blanco, N. Mex.

[6]Computed monthly streamflow (method described in U.S. Geological Survey water-data reports for Arizona published annually).

[7]Dissolved-solids data for water years 1942-69 from water-quality station 09525500, Yuma Main Canal below Colorado River Siphon, at Yuma, Ariz.

Approach

Techniques that are used for record extension include correlation with data from the historical period of record, correlation with data from a similar site (base station), regional basin analysis, synthesis based on statistics for the historical record, and conceptual modeling. Correlation techniques were selected for this study because they are easy to apply and have proven effective in other studies (Hirsch, 1982; Alley and Burns, 1983). In addition, they are appropriate for the daily or monthly time scales of the streamflow and dissolved-solids data used in this study and for the type of record extension, which did not involve changes in drainage-basin characteristics.

Four different correlation techniques were used to extend streamflow and dissolved-solids records in this study. All of these techniques were based on least-squares, linear regression. Streamflow at record-extension sites was estimated by simple regression on data from a base-station site. Dissolved-solids concentration was estimated by weighted regression on streamflow, either at the record-extension site, if streamflow data were available, or at a base-station site. If a base-station site with water-quality data was available, dissolved-solids concentration was also estimated by simple regression on concentration at the base-station site.

EXTENSION OF STREAMFLOW RECORDS

Hirsch (1982) compared four techniques of extending streamflow records using correlation. Two of the techniques were based on least-squares regression using data from a base-station site. The other two techniques were developed by Hirsch to maintain the variance of historical data at the extension site. He called these techniques "Maintenance Of Variance Extension" types 1 and 2 (MOVE.1 and MOVE.2). In empirical trials, Hirsch found MOVE.1 and MOVE.2 effectively preserved certain time-series properties of the historical record, such as variance and extreme-order statistics. However, the goal of the present study was to produce the best estimate for each individual streamflow value. Regression is most suitable for this purpose, and therefore was the technique selected for extension of streamflow records in this study.

Alley and Burns (1983) developed a method for selecting the best base-station site if several possibilities are available. They achieved good results using regression, MOVE.1, and MOVE.2 analyses. However, in the present study selection of a base-station site was not considered a problem. There were few stations with long-term records during the period of interest at the record-extension sites, and there was always one base-station site that was clearly preferable.

Daily values of streamflow at the five sites requiring streamflow-record extension and at their associated base-station sites were retrieved from the U.S. Geological Survey's National Water Data Storage and Retrieval System (WATSTORE). These data were used to make regression estimates of daily streamflow, in cubic feet per second, which were combined to yield monthly streamflow, in acre-feet per month.

The accuracy of regression estimates from base-station data was tested for each of the five streamflow record-extension sites. The tests were made using split-sample analysis, in which the daily data for a site were divided into two approximately equal periods based on the number of water years in the overall period of analysis. The later years were used to calibrate a regression model for each site. The calibrated models were then used with data from the earlier years to verify the accuracy of the model predictions. Accuracy was measured by the standard error of predicted streamflow, defined as the square root of the mean squared deviation between the observed and predicted values. The period of analysis, mean streamflows, standard deviations, and standard errors are listed in table 3. The overall period of analysis used for a site generally was the concurrent period of record for the record-extension and base-station sites. However, for sites that were affected by completion of upstream reservoirs during the period of record, the period of analysis was restricted to the time prior to regulation of streamflow. This restriction was applied for record-extension site 12, Duchesne River near Randlett, Utah, which was affected by Starvation Reservoir beginning in water year 1970, and for record-extension site 16, San Rafael River near Green River, Utah, which was affected by Joes Valley Reservoir beginning in water year 1966.

Standard errors of prediction ranged from 9 to 116 percent of the observed mean daily streamflow. When the daily estimates were added to yield monthly values, the errors decreased to 5 to 74 percent. The site with the largest percentage error also had the smallest mean streamflow, and its absolute error was small in comparison with the error at the other sites.

EXTENSION OF DISSOLVED-SOLIDS RECORDS

The data used to extend records of dissolved-solids concentration primarily were the monthly values of streamflow and flow-weighted dissolved-solids concentration computed for the 12th biennial report (U.S. Department of the Interior, 1985). The procedure used to compute flow-weighted monthly dissolved-solids concentration is described by Liebermann and others (1987). Total monthly streamflow volume and dissolved-solids discharge (mass) were determined for each month of the period of record. Then the flow-weighted dissolved-solids concentration was computed as the ratio of dissolved-solids discharge to streamflow.

Three methods were used to estimate dissolved-solids concentration during the extension period. Weighted regression on streamflow at the record-extension site was used for sites that had a complete streamflow record during the extension period. If streamflow data were not available for the record-extension site, dissolved-solids concentrations were estimated by weighted regression on streamflow at a base-station site. Weighted-regression was used to decrease monthly differences in the variability of the residuals. (Weighted regression should not be confused with the flow-weighting procedure used to compute the historical dissolved-solids concentrations.) For several record-extension sites, water-quality data were available at a suitable base-station site. Dissolved-solids concentrations at these record-extension sites were estimated by linear regression on dissolved-solids concentration at the base-station site. In all three methods, flow-weighted concentration was the

Table 3.--*Statistical results of streamflow record extension*

[ft^3/s, cubic feet per second; acre-ft/mo, acre-feet per month; %, percent of observed mean]

Site number[1]		Period of analysis (water years)[2]		Daily streamflow during verification period						Monthly streamflow during verification period					
				Observed (ft^3/s)		Predicted (ft^3/s)		Standard error of prediction		Observed (acre-ft/mo)		Predicted (acre-ft/mo)		Standard error of prediction	
Record extension	Base station	Calibration	Verification	Mean	Standard deviation	Mean	Standard deviation	(ft^3/s)	(%)	Mean	Standard deviation	Mean	Standard deviation	(acre-ft/mo)	(%)
5	4	1953-54	1952	1,500	2,500	1,470	2,470	180	12	90,500	136,300	89,000	133,700	4,640	5
7	8	1957-62	1952-56	1,730	2,130	1,600	1,920	480	28	104,800	113,100	96,700	102,900	23,500	22
9	8	1957-62	1951-56	2,300	2,750	2,340	2,810	210	9	138,800	149,400	141,300	151,600	9,800	7
12	11	1956-69	1943-55	660	910	700	980	200	31	39,940	49,110	42,200	53,630	9,870	25
16	15	1956-65	1946-55	130	300	140	270	150	116	8,070	15,610	8,200	14,610	5,940	74

[1]Refer to figure 1 for site location and table 2 for site description.

[2]Water year is defined as the period from October 1 through September 30 and is designated by the calendar year in which it ends.

dependent variable for model calibration; therefore, the estimated concentrations correspond to flow-weighted values. Monthly dissolved-solids discharge was computed as the product of the estimated concentration and streamflow.

Weighted Regression

Extension of dissolved-solids records commonly is made by regression of dissolved solids on streamflow. Lane (1975) reviewed dissolved-solids-streamflow relations that had been proposed by many researchers and recommended using a power equation:

$$C = aQ^b, \tag{1}$$

where C = dissolved-solids concentration;
Q = streamflow; and
a and b = empirical parameters.

This equation subsequently was used by Steele (1976) and DeLong (1977) in analyzing Colorado River basin data.

Equation 1 can be transformed into a linear model so the empirical constants can be evaluated by least-squares regression:

$$ln(C) = a^* + b\ ln(Q) + \varepsilon, \tag{2}$$

where $a^* = ln(a)$; and
ε = random error, which is assumed to be normally distributed with a mean value of zero and a constant variance.

If the parameters in equation 2 are estimated using the method of least squares, the calibrated model is:

$$ln(\hat{C}) = \hat{a}^* + \hat{b}\ ln(Q), \tag{3}$$

where $ln(\hat{C})$ = the estimated value of $ln(C)$, and
$\hat{a}^*$ and $\hat{b}$ = regression coefficients.

For any particular observation, the residual is the difference between the observed value of $ln(C)$ and the corresponding estimate from the calibrated model (eq. 3). If the calibrated model is correct, the residuals should tend to exhibit the properties assumed for random errors (Draper and Smith, 1981).

Lane (1975) and DeLong (1977) suggested that the coefficients $\hat{a}^*$ and $\hat{b}$ be evaluated as harmonic functions of time, with a period of one year, to account for seasonal hysteresis in the relation. Mueller and Osen (1987) reported that allowing both coefficients to vary with time introduced significant collinearity into the model. This collinearity, which can cause poor estimation of regression coefficients, can be eliminated by evaluating only the intercept

term ($\hat{a}^*$) as a function of time. Mueller and Osen evaluated the intercept term using a single-harmonic function with a period of 1 year:

$$\hat{a}^* = \hat{a}_0 + \hat{a}_1 \sin\left(\frac{2\pi m}{12}\right) + \hat{a}_2 \cos\left(\frac{2\pi m}{12}\right) \quad , \tag{4}$$

where m = month of the year; and

$\hat{a}_0$, $\hat{a}_1$, and $\hat{a}_2$ = regression coefficients.

Combining equations 3 and 4 yields:

$$ln(\hat{C}) = \hat{a}_0 + \hat{a}_1 \sin\left(\frac{2\pi m}{12}\right) + \hat{a}_2 \cos\left(\frac{2\pi m}{12}\right) + \hat{b}\ ln(Q). \tag{5}$$

Mueller and Osen (1987) used a model of this type to estimate dissolved-solids discharge at sites in the Upper Colorado River basin. They found that the residual variance from a simple least-squares fit was not usually constant, which would imply a violation of the constant-variance assumption. To achieve constant variance, Mueller and Osen used weighted regression. Most of the inequality in residual variance was associated with variation in streamflow, which was correlated with month of the year. Therefore, weighting factors were computed based on the inverse of the monthly residual variance from the simple least-squares fit.

When the linearized model (eq. 5) is detransformed to give estimates of dissolved-solids concentration in original units, it becomes:

$$\hat{C} = \exp\left[\hat{a}_0 + \hat{a}_1 \sin\left(\frac{2\pi m}{12}\right) + \hat{a}_2 \cos\left(\frac{2\pi m}{12}\right)\right] Q^{\hat{b}} \ . \tag{6}$$

Miller (1984) showed that detransformation of a calibrated model can produce a biased estimator of the mean response. Therefore, a bias-correction factor must be included in the detransformed equation. For a model calibrated to natural logarithms and with normally distributed residuals, Miller recommended the bias-correction factor (BC) as:

$$BC = \exp(\tfrac{1}{2}\hat{\sigma}^2) \tag{7}$$

where $\hat{\sigma}^2$ is the mean square error, which is an estimator of the residual variance. Miller's formulation was based on ordinary least-squares regression, and must be modified for use with weighted least-squares regression. In a weighted least-squares solution, the residual variance is assumed to be

nonconstant and is estimated by $\hat{\sigma}^2/W_i$, where W_i is the weighting factor applied to the ith observation. In the present study, observations were classified by month; therefore, the residual variance within a particular month is $\hat{\sigma}^2/W_m$, where W_m is the weighting factor for the month. When this residual variance is used in the bias correction factor, equation 7 can be rewritten:

$$BC_m = \exp(\hat{\sigma}^2/2W_m), \tag{8}$$

where BC_m = the bias-correction factor for month m,
$\hat{\sigma}^2$ = the mean square error of the calibrated model, and
W_m = the weighting factor applied to observations within month m.

The detransformed model with bias correction is then:

$$\hat{C} = \exp\left[\hat{a}_0 + \hat{a}_1 \sin\left(\frac{2\pi m}{12}\right) + \hat{a}_2 \cos\left(\frac{2\pi m}{12}\right)\right] Q^{\hat{b}} \exp[\hat{\sigma}^2/2W_m]. \tag{9}$$

The procedure, in this study, for record extension using weighted regression was:

1. Calibrate the linearized model, including a time-variable intercept (eq. 5), using simple least-squares regression.
2. Compute monthly weighting factors based on the inverse of the monthly residual variance.
3. Recalibrate the model using weighted least-squares regression.
4. Compute dissolved-solids concentrations during the extension period using the detransformed model with the bias correction (eq. 9).

The dissolved-solids concentrations used for model calibration were flow-weighted monthly values. Streamflows in the models were monthly values at the record-extension site, if a complete record was available for the extension period. Otherwise, monthly streamflows at a base-station site were used.

Regression on Dissolved Solids at a Base-Station Site

An alternative technique used for extension of dissolved-solids records required the availability of water-quality data at a base-station site. This technique involved simple regression on dissolved-solids concentration at the base-station site. The model was:

$$\hat{C}_e = \hat{a} + \hat{b}\, C_b, \tag{10}$$

where $\hat{C}_e$ = estimated dissolved-solids concentration at the record-extension site,
C_b = dissolved-solids concentration at the base-station site, and
$\hat{a}$ and $\hat{b}$ = regression coefficients.

Flow-weighted monthly concentrations were used for all sites.

Results

The three techniques were tested using monthly dissolved-solids data from the 13 record-extension sites in this study. Weighted regression on streamflow was applied for seven sites that had streamflow data during the entire period of dissolved-solids record extension. Weighted regression on streamflow at a base-station site was applied for the five sites that did not have streamflow data during the record-extension period. Simple regression on dissolved-solids data at a base-station site was applied for six sites that had suitable base-station sites with water-quality data. Results are listed in table 4. Calibration periods used to fit the models were selected to decrease the effects of flow regulation upstream. The only sites affected by regulation during the calibration period were site 12, Duchesne River near Randlett, Utah; and site 23, Colorado River below Parker Dam, Ariz.-Calif. Streamflow at these sites was regulated during both the historical period of record and the entire record-extension period.

For sites at which two record-extension techniques could be applied, the appropriate model was selected based on a criterion of minimizing the standard error. Weighted regression on streamflow yielded better results for sites upstream from Lake Powell (sites 1, 9, and 17). Simple regression on dissolved-solids concentration at a base-station site was more accurate for main-stem sites downstream from Lake Powell (sites 19 and 24). Standard errors of the selected models ranged from 3 to 27 percent of the observed mean monthly dissolved-solids concentration.

COMPARISON OF EXTENDED AND HISTORICAL RECORDS

A summary of techniques used to extend streamflow and dissolved-solids records for the 13 record-extension sites is listed in table 5. This table also lists the periods, in water years, during which the record was extended. Graphs of the extended and historical records are shown in figures 2-19. The monthly values of streamflow and dissolved-solids concentration computed for the extension periods are presented in tables 6-19 in the "Supplemental Data" section at the back of this report.

Seasonal and annual variations in streamflow and dissolved-solids concentrations were comparable for the extension and historical periods at all sites. Most of the values estimated for the extension period were within the range of values observed during the historical period. Estimated streamflow values that were not within the historical range occurred at sites 5 (Dolores River near Cisco, Utah) and 9 (Green River near Greendale, Utah). Estimated

Table 4.--*Comparison of results for dissolved-solids record extension*

[mg/L, milligrams per liter; dashes indicate no analysis]

Record-extension site number[1]	Base-station site number[1]	Calibration period (water years)[2]	Observed mean monthly dissolved-solids concentration (mg/L)	Standard error of estimated dissolved-solids concentration, in percent		
				Weighted regression on streamflow	Weighted regression on streamflow at a base station	Regression on dissolved-solids concentration at a base station
1	2	1942-83	350	9	--	10
5	4	1951-54	1,650	--	21	--
7	8	1952-62	390	--	13	--
9	8	1957-62	440	--	8	--
9	14	1957-62	440	--	--	10
10	--	1951-83	270	19	--	--
12	11	1957-83	1,100	--	17	--
13	--	1951-83	510	15	--	--
16	15	1947-65	2,570	--	27	--
17	18	1955-62	220	16	--	17
19	20	1942-62	790	11	--	8
21	--	1949-83	1,960	9	--	--
23	22	1964-83	720	--	--	3
24	22	1943-57	720	7	--	6

[1]Refer to figure 1 for site location and table 2 for site description.
[2]Water year is defined as the period from October 1 through September 30 and is designated by the calendar year in which it ends.

Table 5.--*Summary of record extension for sites included in this study*

[dashes indicate extension not required; Wtd reg Q, weighted regression on streamflow at the record-extension site; Reg Q, simple regression on streamflow at a base-station site; Wtd reg B, weighted regression on streamflow at a base-station site; Reg DS, simple regression on dissolved-solids concentration at a base-station site]

Site number[1]	Station name	Streamflow		Dissolved solids	
		Extension period (water years)[2]	Method	Extension period (water years)	Method
1	Colorado River near Glenwood Springs, Colo.	---	---	1941	Wtd reg Q
5	Dolores River near Cisco, Utah	1941-50	Reg Q	1941-50	Wtd reg B
7	Green River near Green River, Wyo.	1941-51	Reg Q	1941-51	Wtd reg B
9	Green River near Greendale, Utah	1941-50	Reg Q	1941-56	Wtd reg B
10	Yampa River near Maybell, Colo.	---	---	1941-50	Wtd reg Q
12	Duchesne River near Randlett, Utah	1941-42	Reg Q	1941-56	Wtd reg B
13	White River near Watson, Utah	---	---	1941-50	Wtd reg Q
16	San Rafael River near Green River, Utah	1941-45	Reg Q	1941-46	Wtd reg B
17	San Juan River near Archuleta, N. Mex.	---	---	1941-54	Wtd reg Q
19	Colorado River at Lees Ferry, Ariz.	---	---	1941	Reg DS
21	Virgin River at Littlefield, Ariz.	---	---	1941-48	Wtd reg Q
23	Colorado River below Parker Dam, Ariz.-Calif.	---	---	1941-63	Reg DS
24	Colorado River above Imperial Dam, Ariz.-Calif.	---	---	1941-42	Reg DS

[1]Refer to figure 1 for site location.
[2]Water year is defined as the period from October 1 through September 30 and is designated by the calendar year in which it ends.

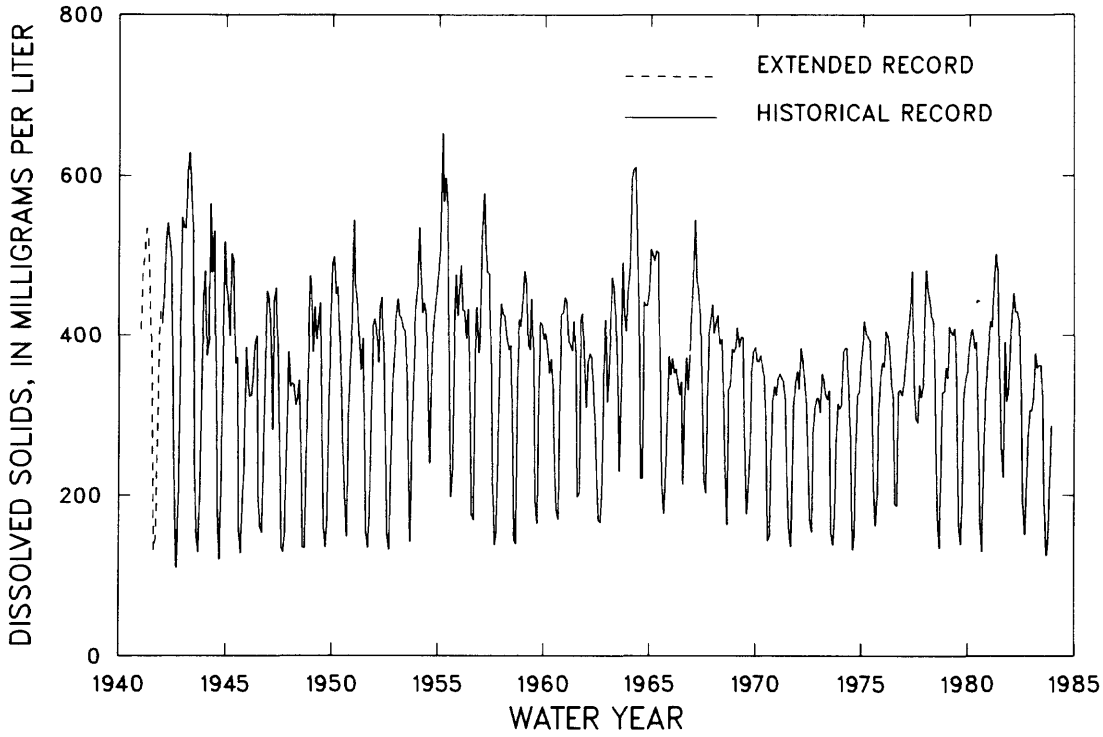

Figure 2.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 1, Colorado River near Glenwood Springs, Colo., water years 1941-83.

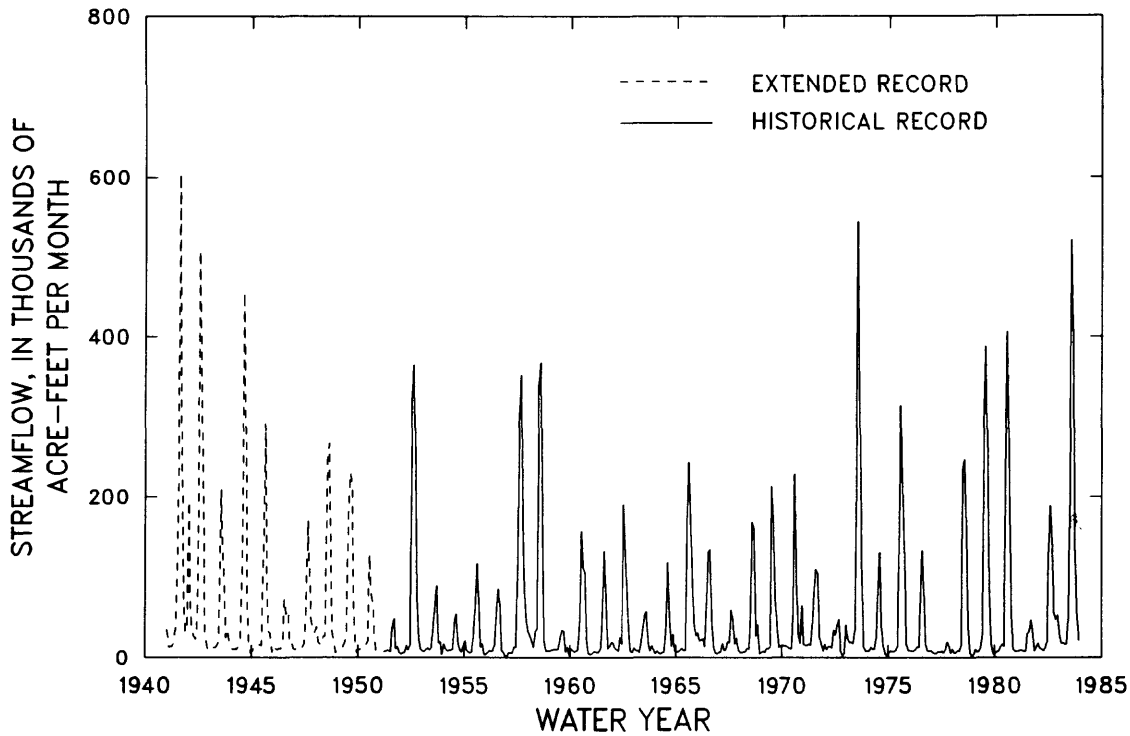

Figure 3.--Extended and historical record of monthly streamflow at site 5, Dolores River near Cisco, Utah, water years 1941-83.

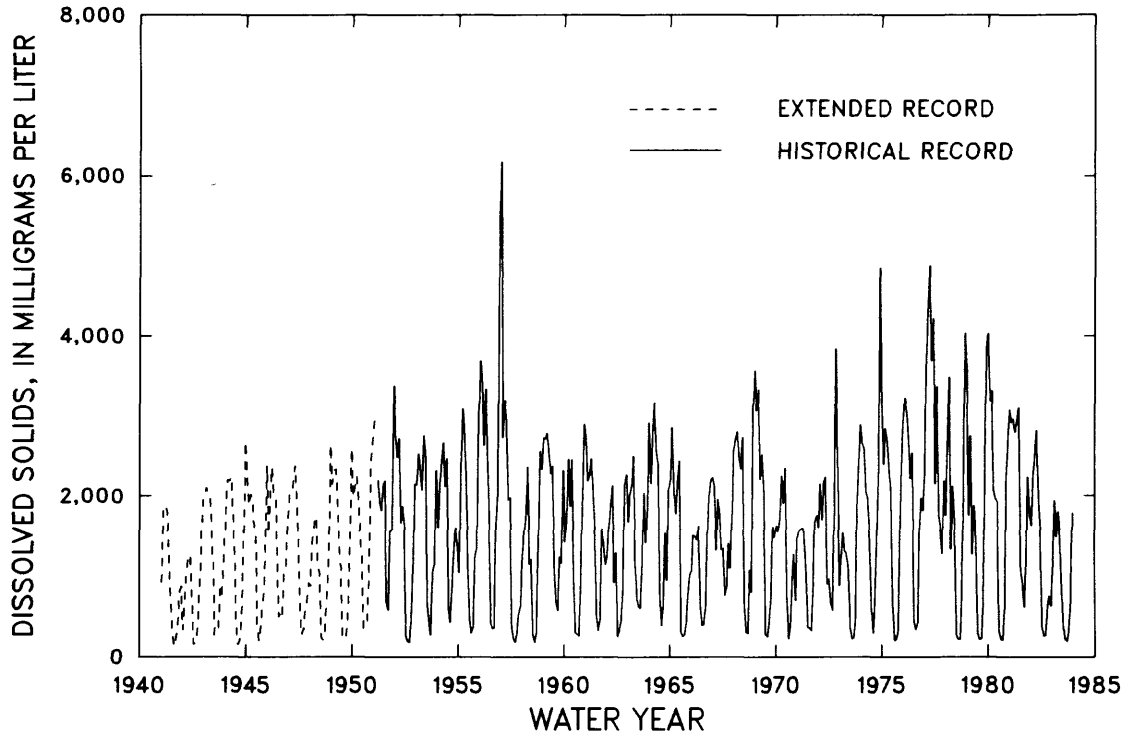

Figure 4.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 5, Dolores River near Cisco, Utah, water years 1941-83.

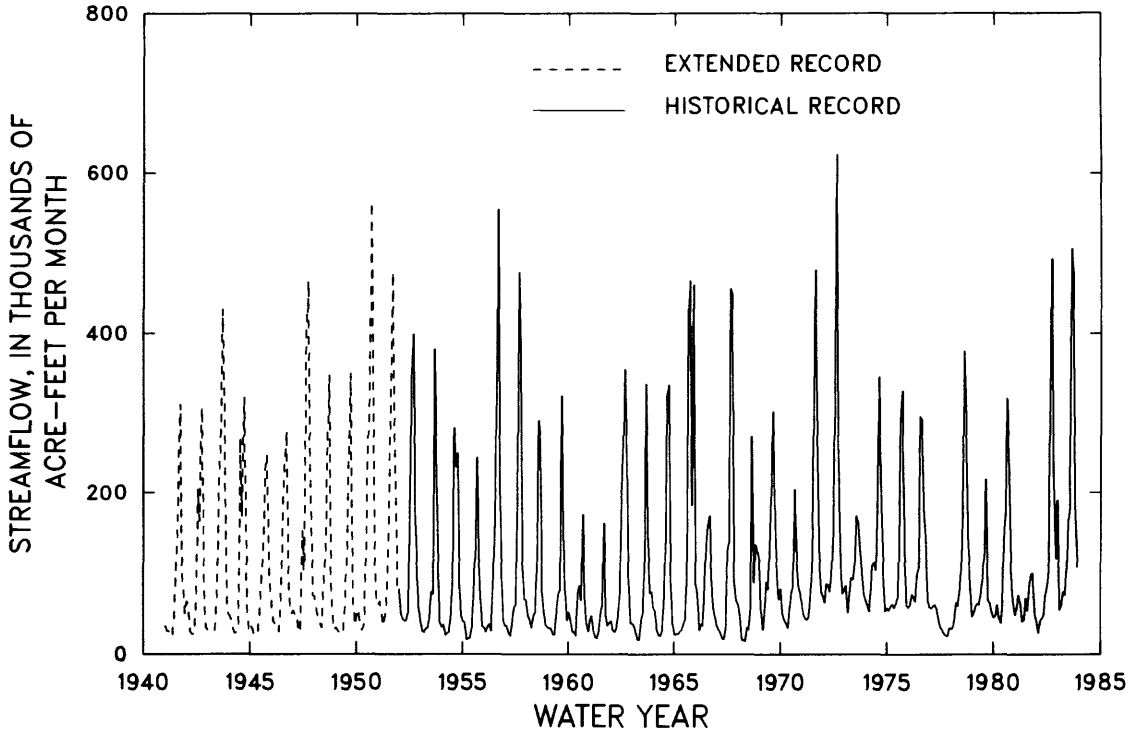

Figure 5.--Extended and historical record of monthly streamflow at site 7, Green River near Green River, Wyo., water years 1941-83.

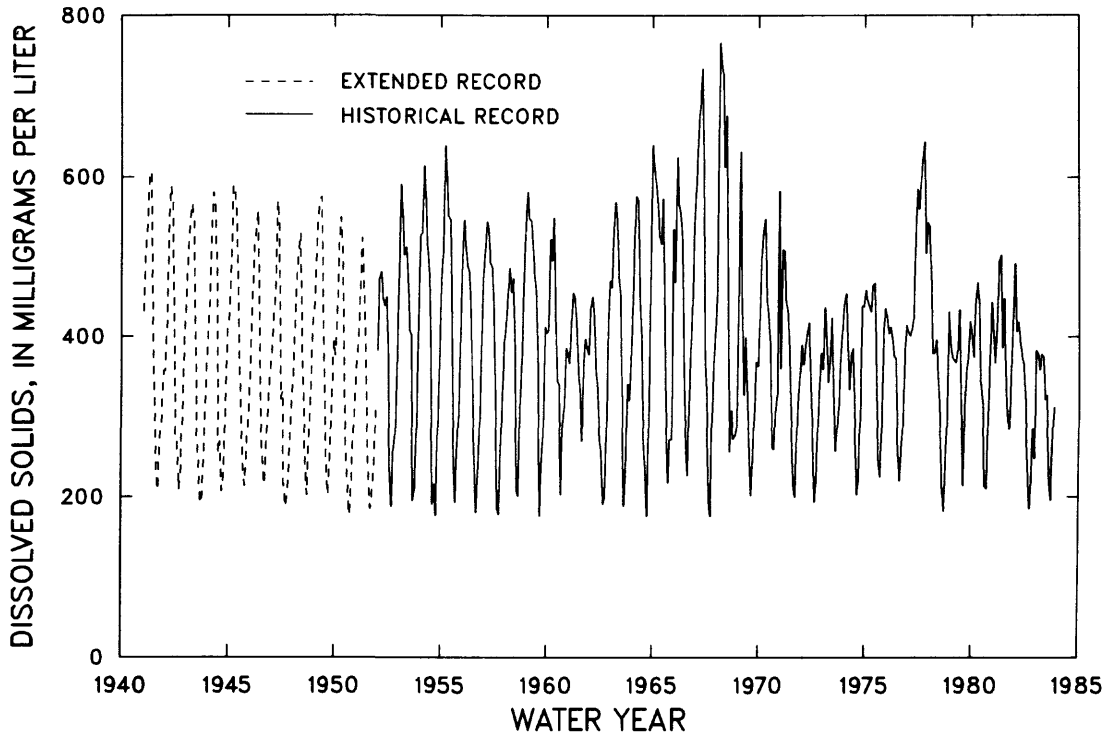

Figure 6.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 7, Green River near Green River, Wyo., water years 1941-83.

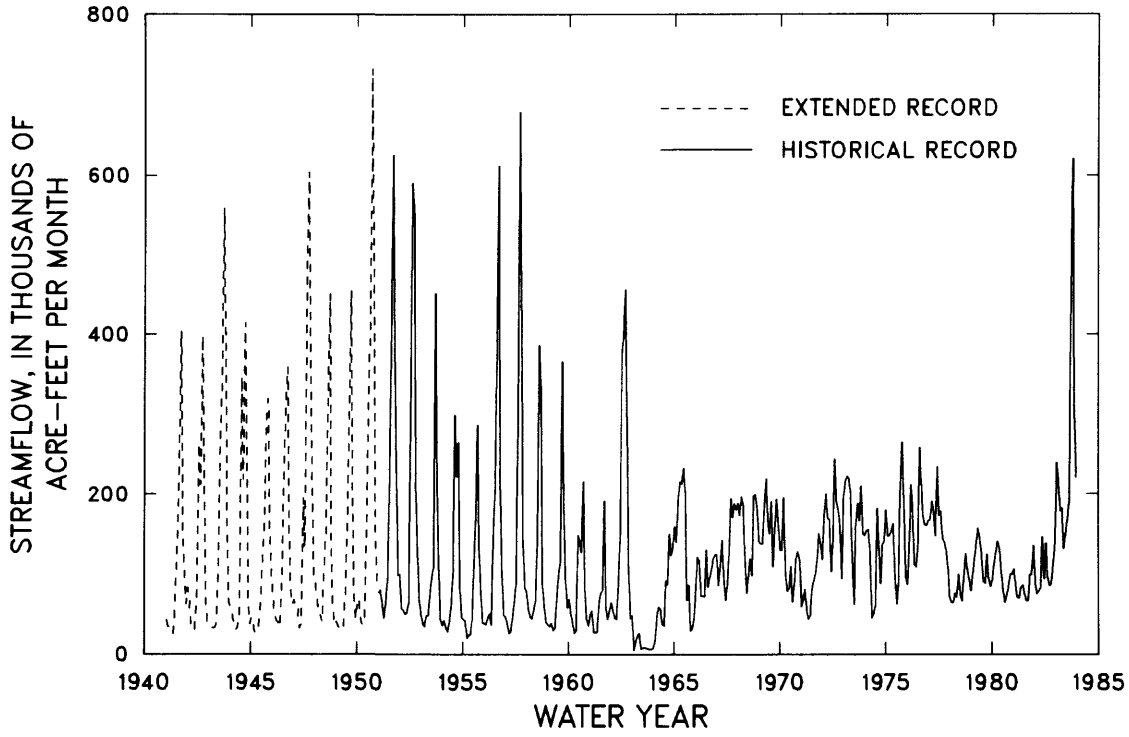

Figure 7.--Extended and historical record of monthly streamflow at site 9, Green River near Greendale, Utah, water years 1941-83.

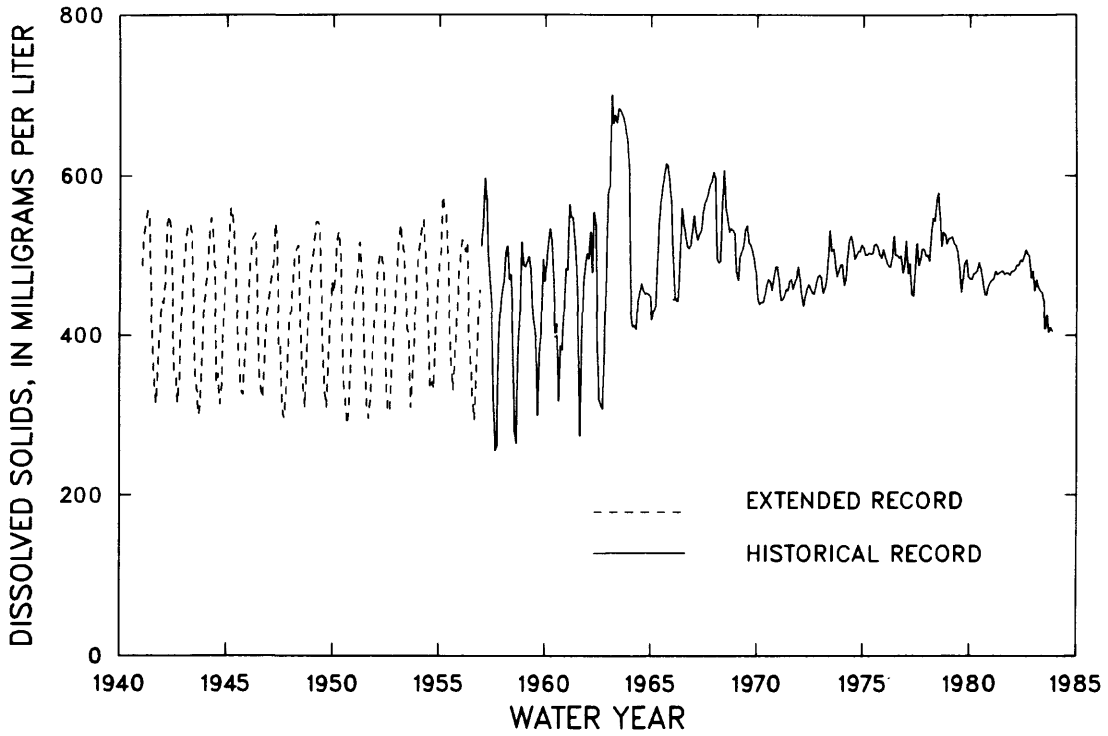

Figure 8.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 9, Green River near Greendale, Utah, water years 1941-83.

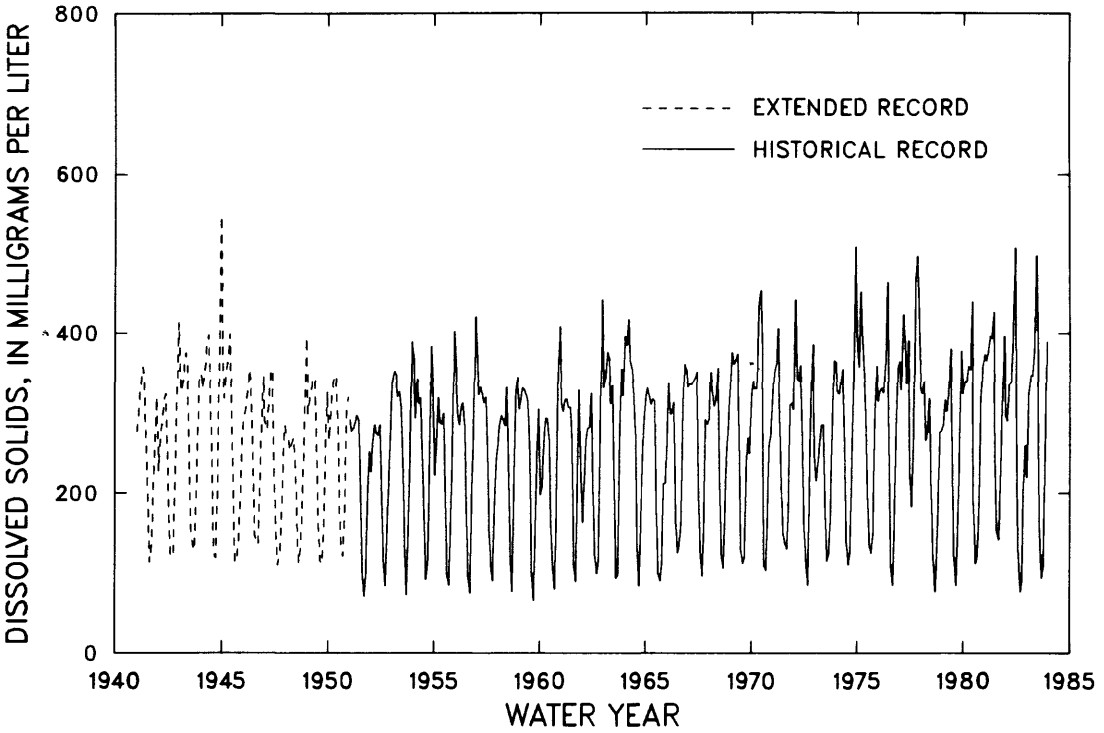

Figure 9.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 10, Yampa River near Maybell, Colo., water years 1941-83.

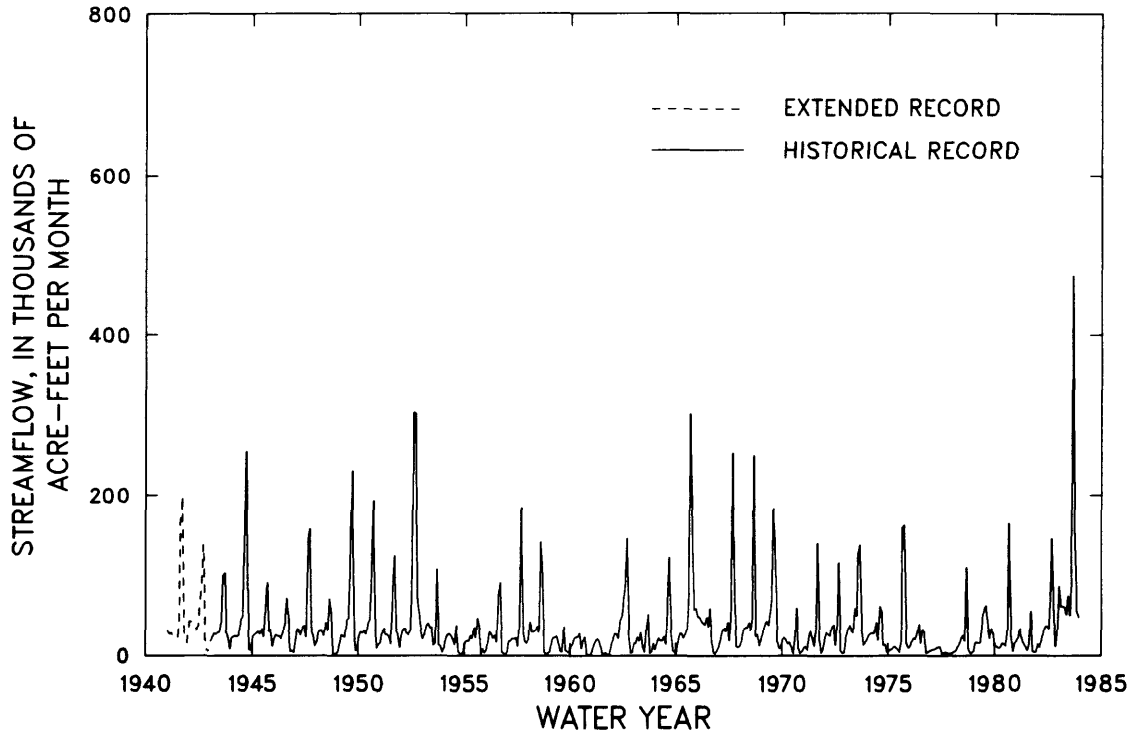

Figure 10.--Extended and historical record of monthly streamflow at site 12, Duchesne River near Randlett, Utah, water years 1941-83.

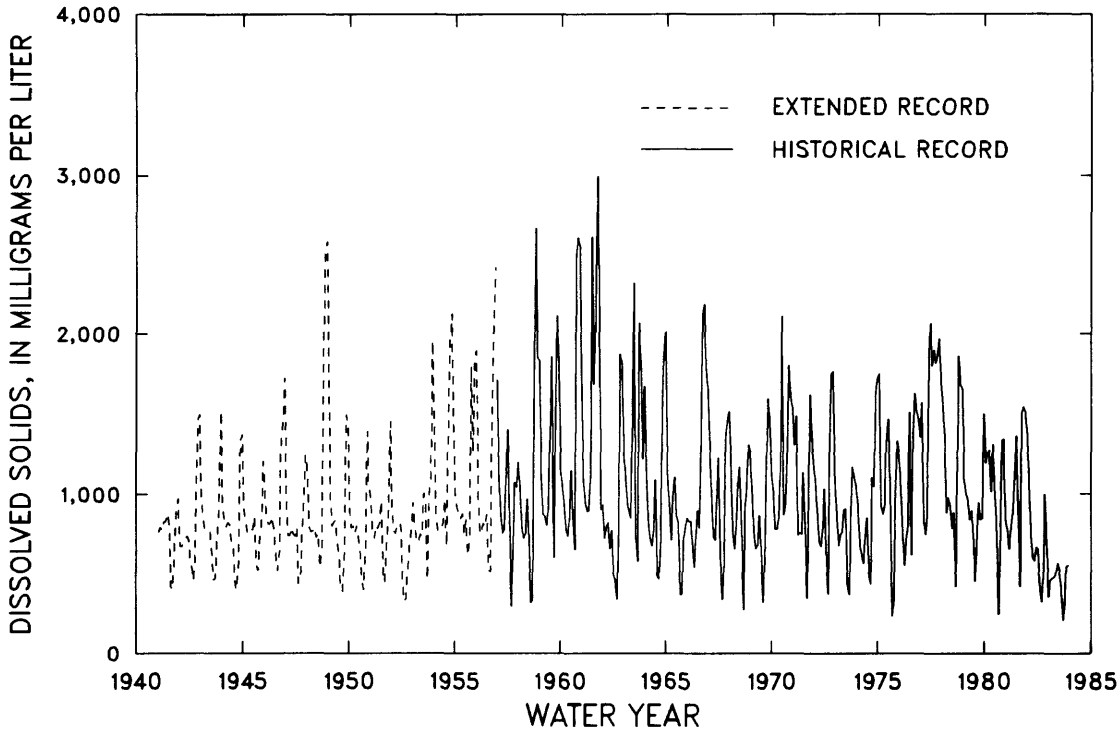

Figure 11.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 12, Duchesne River near Randlett, Utah, water years 1941-83.

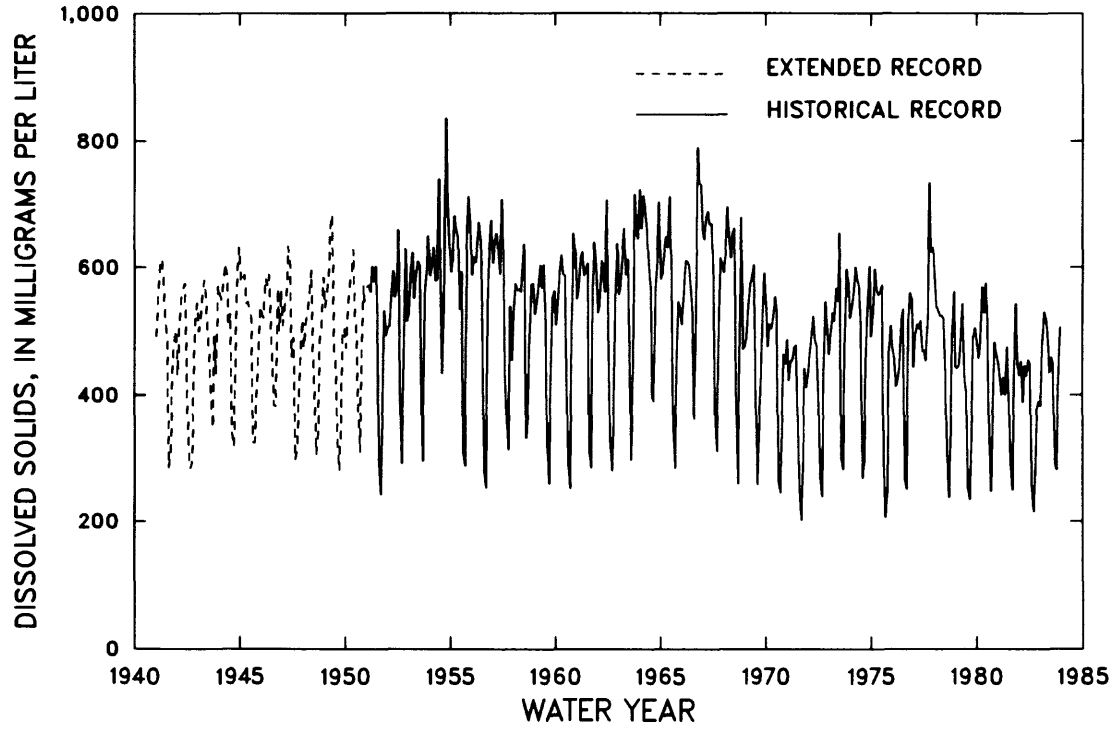

Figure 12.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 13, White River near Watson, Utah, water years 1941-83.

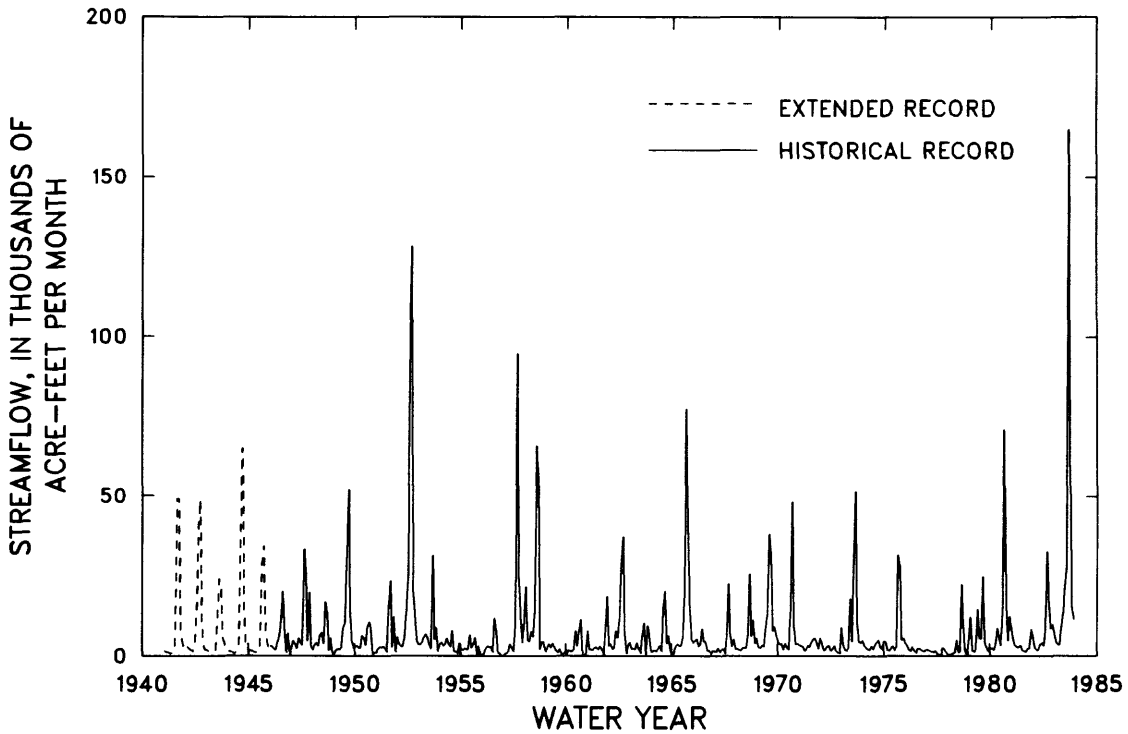

Figure 13.--Extended and historical record of monthly streamflow at site 16, San Rafael River near Green River, Utah, water years 1941-83.

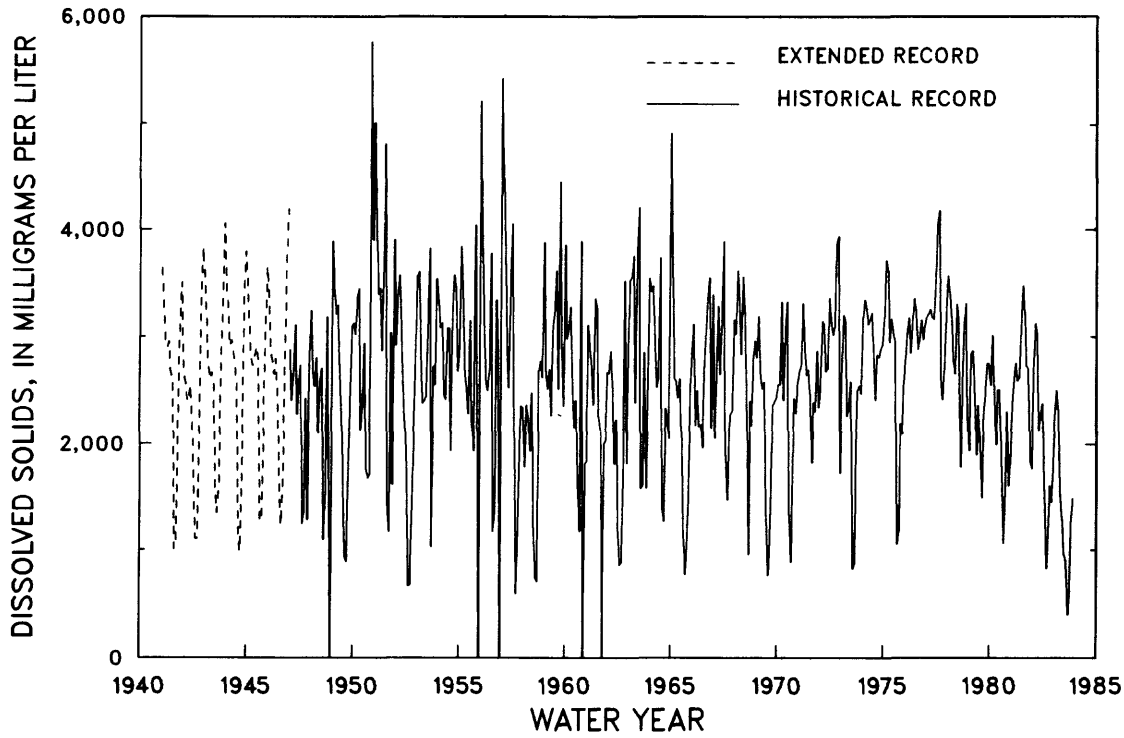

Figure 14.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 16, San Rafael River near Green River, Utah, water years 1941-83.

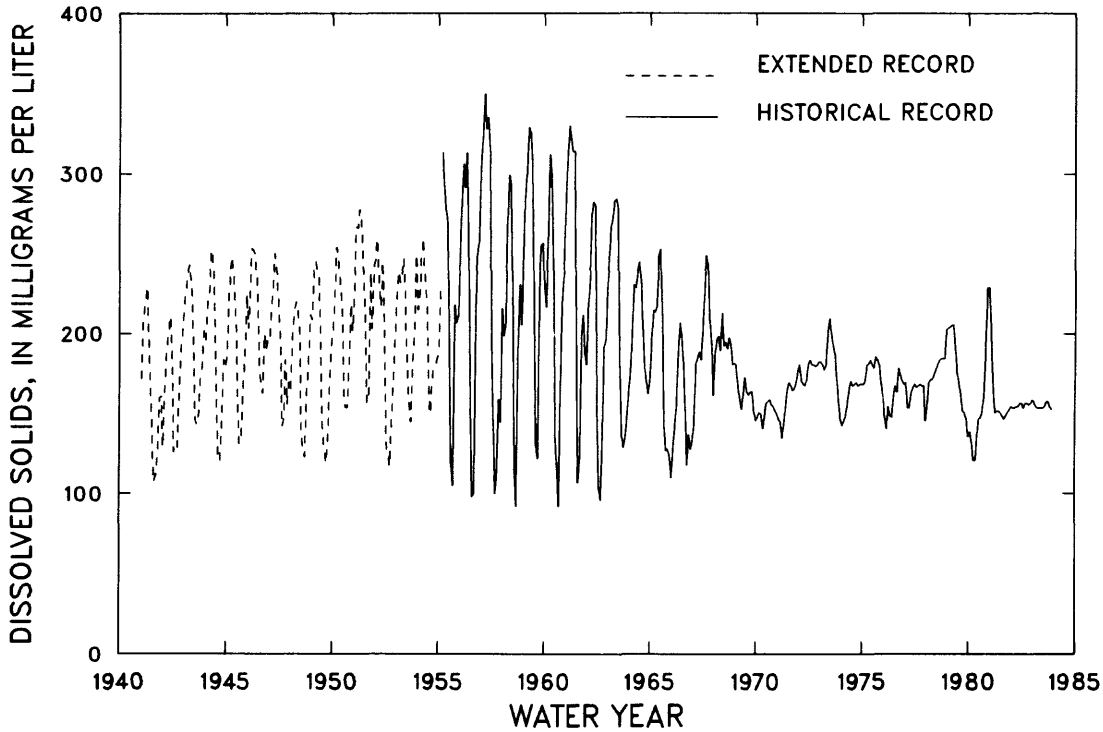

Figure 15.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 17, San Juan River near Archuleta, N. Mex., water years 1941-83.

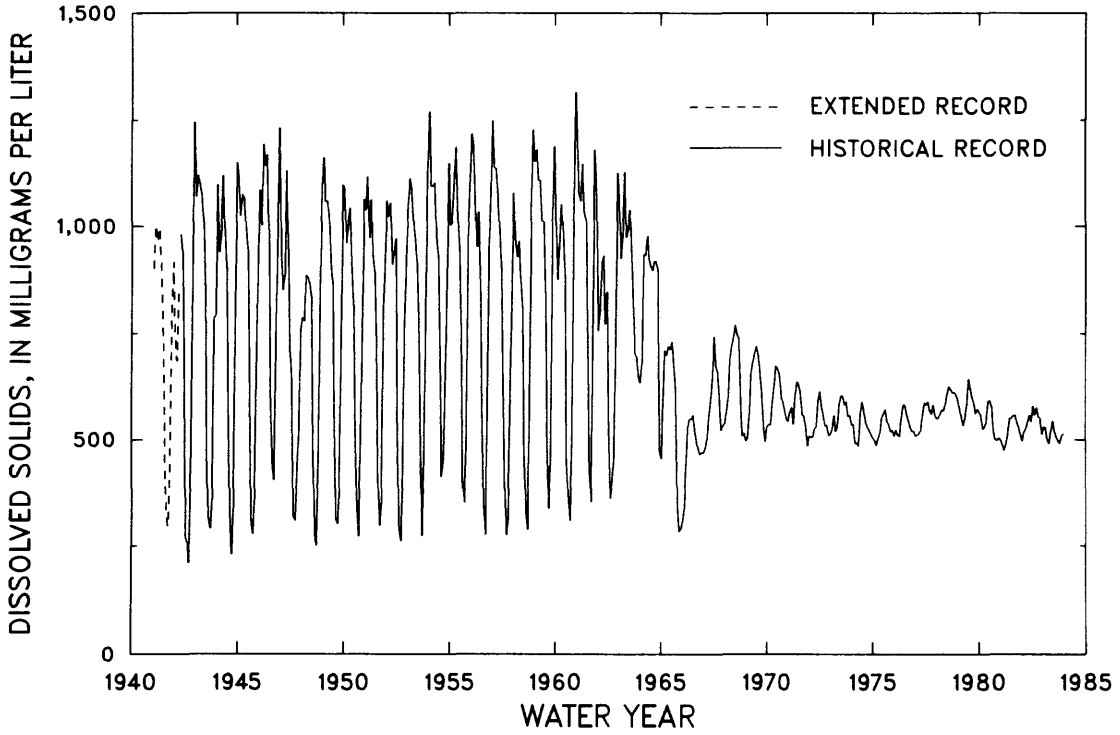

Figure 16.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 19, Colorado River at Lees Ferry, Ariz., water years 1941-83.

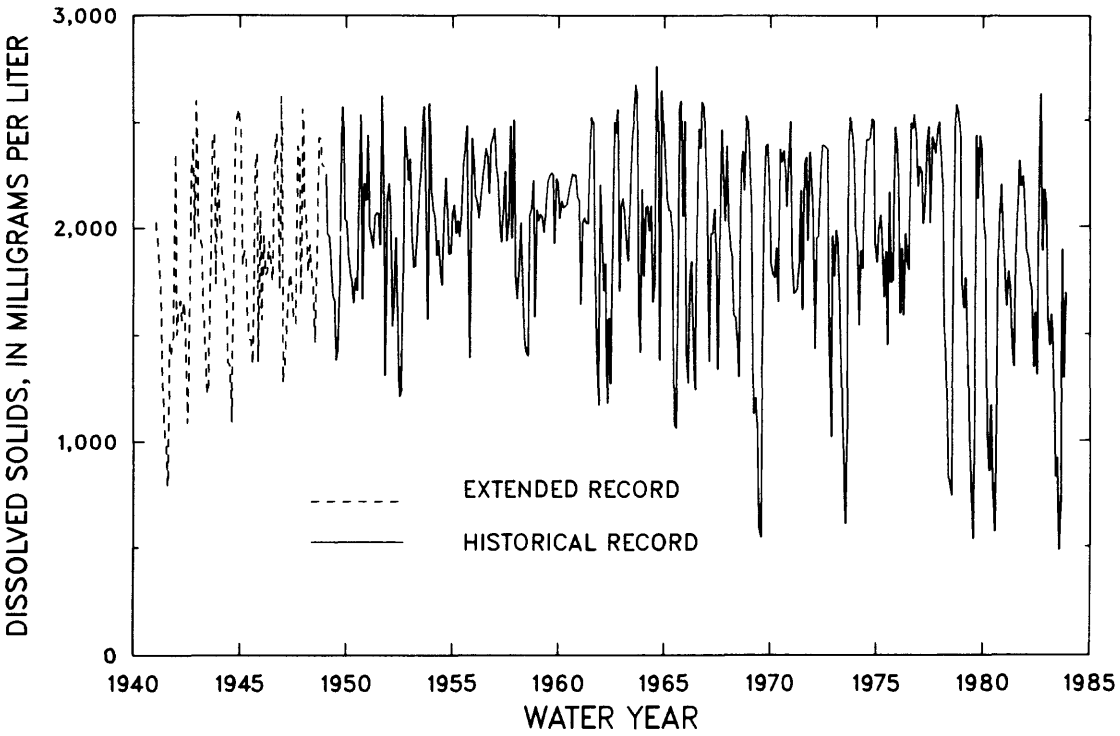

Figure 17.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 21, Virgin River at Littlefield, Ariz., water years 1941-83.

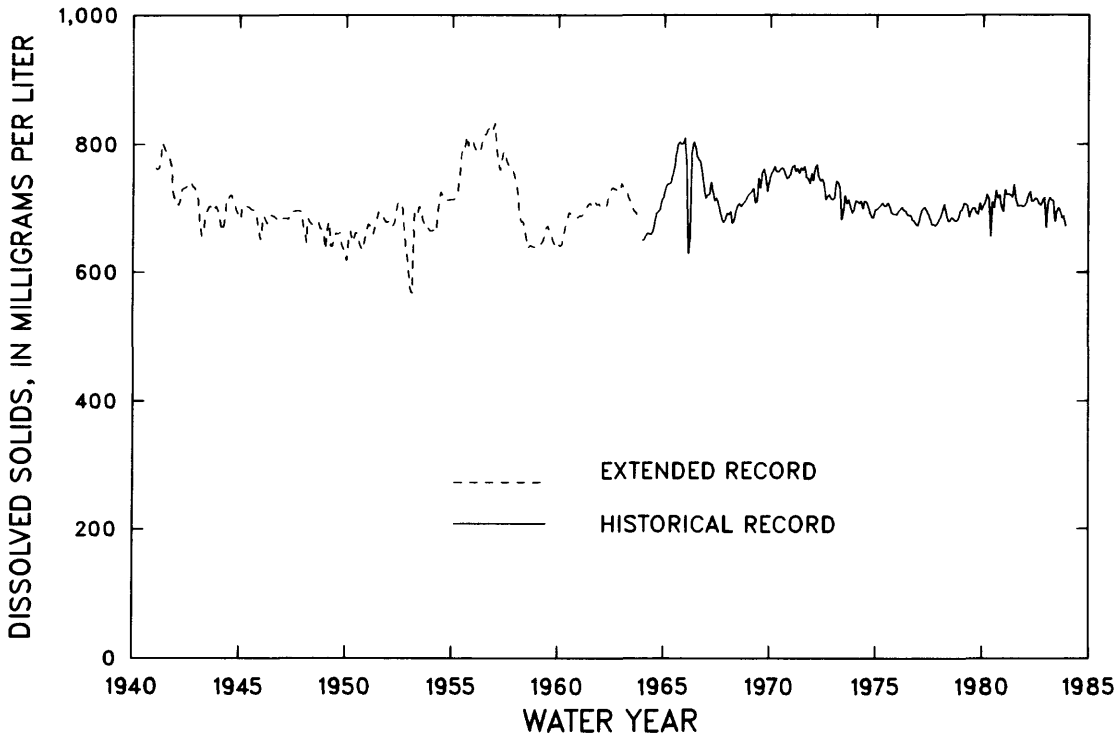

Figure 18.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 23, Colorado River below Parker Dam, Ariz.-Calif., water years 1941-83.

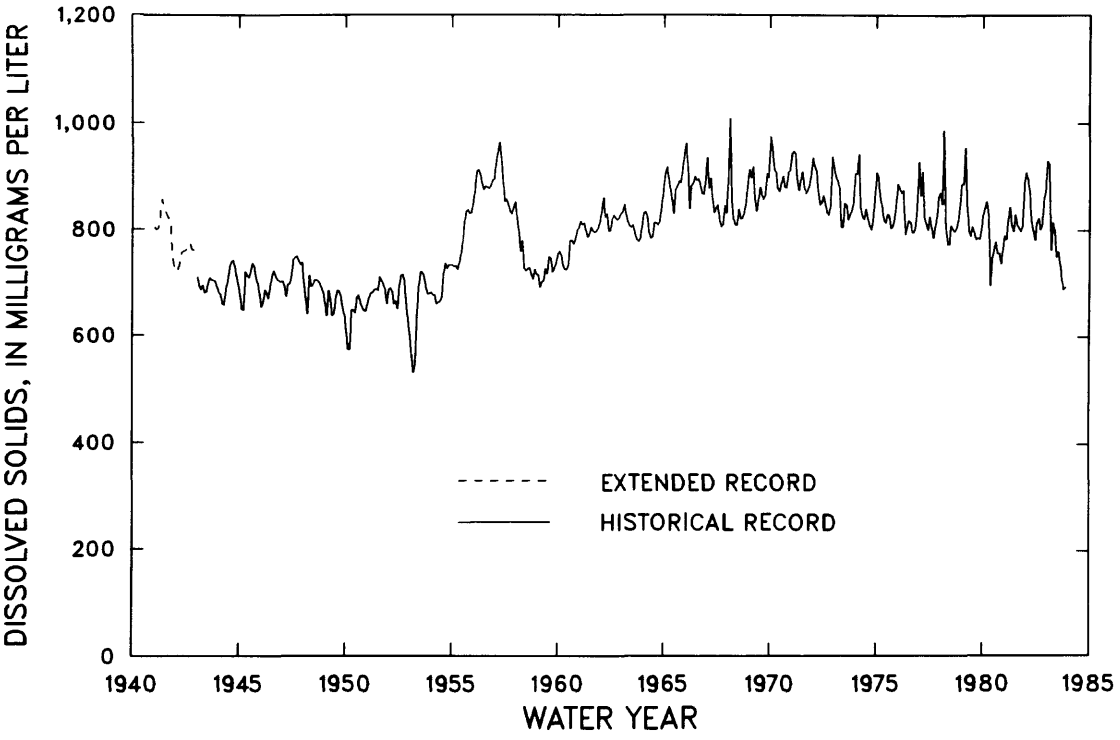

Figure 19.--Extended and historical record of flow-weighted monthly dissolved-solids concentration at site 24, Colorado River above Imperial Dam, Ariz.-Calif., water years 1941-83.

dissolved-solids concentrations that were not within the historical range occurred at sites 10 (Yampa River near Maybell, Colo.) and 23 (Colorado River below Parker Dam, Ariz.-Calif.). Streamflow record extension for sites 5 and 9 and dissolved-solids record extension for site 23 were made using techniques which required data from a base-station site. If the extreme values were larger at the base-station site during the extension period than during the concurrent historical period, estimates outside the historical range at the record-extension site are to be expected. Dissolved-solids estimates for site 10 were made by regression on streamflow; therefore, estimates that are not within the range of historical values involve extrapolation and may be inaccurate. However, such an estimate occurred only once. This estimate was 8 percent larger than the historical maximum monthly concentration, and was associated with an extremely low monthly streamflow; therefore, the potential error in this estimate has a negligible effect on the computed dissolved-solids discharge at the site.

At four sites (5, 12, 16, and 17) the difference between the last monthly value of dissolved-solids concentration during the record-extension period and the first monthly value during the historical period was greater than 20 percent of the historical value. However, the absolute magnitudes of the differences at each site were within the range of the historical differences between consecutive months.

SUMMARY

Monthly streamflow and dissolved-solids concentrations were estimated for the period from October 1940 through the initiation of data collection at selected sites in the Colorado River basin. The technique used for streamflow-record extension was simple linear regression on streamflow at a base-station site having a period of record that included the entire record-extension period and at least part of the historical period at the record-extension site. Standard errors ranged from 5 to 74 percent of the observed mean monthly streamflow.

The primary technique used to extend dissolved-solids records was weighted regression on streamflow. If a complete record of streamflow was not available at the record-extension site, streamflow at a base-station site was used. Weighted regression was used for all sites upstream from Lake Powell and for a site on the Virgin River in Arizona. Simple regression on dissolved-solids concentration at a base-station site was used for sites on the main stem of the Colorado River downstream from Lake Powell. Standard errors ranged from 3 to 27 percent of observed mean dissolved-solids concentration.

The extended records at all sites were consistent with records from the historical periods. The resultant monthly values provide estimates of streamflow and dissolved-solids concentration to complete the record back through water year 1941 at 13 sites in the basin.

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SUPPLEMENTAL DATA

Table 6.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 1, Colorado River near Glenwood Springs, Colo.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	71,000	407	39,000
1940	Nov.	49,000	479	32,000
1940	Dec.	42,000	504	29,000
1941	Jan.	36,000	534	26,000
1941	Feb.	37,000	522	27,000
1941	Mar.	50,000	448	31,000
1941	Apr.	85,000	347	40,000
1941	May	535,000	131	95,000
1941	June	470,000	146	93,000
1941	July	163,000	266	59,000
1941	Aug.	84,000	387	44,000
1941	Sept.	67,000	430	39,000

[1]Monthly streamflow is summation of historical daily values.

Table 7.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 5, Dolores River near Cisco, Utah*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	34,000	920	43,000
1940	Nov.	13,000	1,880	32,000
1940	Dec.	14,000	1,870	35,000
1941	Jan.	14,000	1,800	35,000
1941	Feb.	20,000	1,340	37,000
1941	Mar.	41,000	780	44,000
1941	Apr.	172,000	295	69,000
1941	May	604,000	127	104,000
1941	June	244,000	208	69,000
1941	July	97,000	363	48,000
1941	Aug.	31,000	782	33,000
1941	Sept.	32,000	873	38,000
1941	Oct.	194,000	329	87,000
1941	Nov.	61,000	723	60,000
1941	Dec.	34,000	1,070	49,000
1942	Jan.	26,000	1,240	44,000
1942	Feb.	22,000	1,260	38,000
1942	Mar.	50,000	696	47,000
1942	Apr.	508,000	156	107,000
1942	May	381,000	167	86,000
1942	June	210,000	227	65,000
1942	July	46,000	568	35,000
1942	Aug.	17,000	1,130	26,000
1942	Sept.	8,900	1,940	23,000
1942	Oct.	9,800	1,990	27,000
1942	Nov.	10,000	2,100	30,000
1942	Dec.	12,000	2,010	33,000
1943	Jan.	12,000	1,990	33,000
1943	Feb.	14,000	1,660	32,000
1943	Mar.	21,000	1,170	33,000
1943	Apr.	209,000	262	75,000
1943	May	132,000	312	56,000
1943	June	96,000	359	47,000
1943	July	24,000	833	27,000
1943	Aug.	34,000	741	34,000
1943	Sept.	19,000	1,200	31,000

Table 7.--*Monthly streamflow, flow-weighted dissolved-solids concentration and dissolved-solids discharge for the record-extension period at site 5, Dolores River near Cisco, Utah*--Continued

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Oct.	11,000	1,820	28,000
1943	Nov.	9,700	2,200	29,000
1943	Dec.	11,000	2,180	31,000
1944	Jan.	10,000	2,240	30,000
1944	Feb.	13,000	1,790	31,000
1944	Mar.	17,000	1,320	31,000
1944	Apr.	96,000	416	54,000
1944	May	455,000	150	93,000
1944	June	263,000	199	71,000
1944	July	72,000	433	43,000
1944	Aug.	15,000	1,230	25,000
1944	Sept.	5,400	2,680	20,000
1944	Oct.	8,100	2,250	25,000
1944	Nov.	12,000	1,890	32,000
1944	Dec.	12,000	2,020	33,000
1945	Jan.	12,000	1,970	33,000
1945	Feb.	16,000	1,540	34,000
1945	Mar.	15,000	1,460	29,000
1945	Apr.	132,000	344	62,000
1945	May	292,000	195	77,000
1945	June	87,000	382	45,000
1945	July	32,000	700	31,000
1945	Aug.	29,000	815	32,000
1945	Sept.	6,500	2,380	21,000
1945	Oct.	15,000	1,520	31,000
1945	Nov.	11,000	2,050	30,000
1945	Dec.	9,400	2,360	30,000
1946	Jan.	12,000	2,030	32,000
1946	Feb.	10,000	2,010	29,000
1946	Mar.	16,000	1,360	30,000
1946	Apr.	72,000	494	48,000
1946	May	53,000	534	39,000
1946	June	58,000	484	38,000
1946	July	17,000	1,040	24,000
1946	Aug.	18,000	1,080	27,000
1946	Sept.	11,000	1,720	25,000

Table 7.--*Monthly streamflow, flow-weighted dissolved-solids concentration and dissolved-solids discharge for the record-extension period at site 5, Dolores River near Cisco, Utah*--Continued

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Oct.	9,600	2,020	26,000
1946	Nov.	11,000	2,020	31,000
1946	Dec.	11,000	2,190	31,000
1947	Jan.	9,100	2,380	29,000
1947	Feb.	11,000	1,920	29,000
1947	Mar.	15,000	1,410	30,000
1947	Apr.	49,000	623	41,000
1947	May	170,000	268	62,000
1947	June	109,000	334	50,000
1947	July	48,000	555	36,000
1947	Aug.	37,000	709	35,000
1947	Sept.	30,000	911	37,000
1947	Oct.	38,000	873	45,000
1947	Nov.	19,000	1,430	38,000
1947	Dec.	16,000	1,680	37,000
1948	Jan.	15,000	1,740	35,000
1948	Feb.	26,000	1,160	41,000
1948	Mar.	26,000	1,030	36,000
1948	Apr.	247,000	238	80,000
1948	May	267,000	206	75,000
1948	June	131,000	300	53,000
1948	July	33,000	695	31,000
1948	Aug.	19,000	1,060	27,000
1948	Sept.	5,500	2,640	20,000
1948	Oct.	8,700	2,150	25,000
1948	Nov.	9,000	2,320	28,000
1948	Dec.	9,500	2,330	30,000
1949	Jan.	13,000	1,900	33,000
1949	Feb.	18,000	1,450	35,000
1949	Mar.	24,000	1,080	35,000
1949	Apr.	186,000	281	71,000
1949	May	230,000	225	70,000
1949	June	218,000	222	66,000
1949	July	70,000	440	42,000
1949	Aug.	20,000	1,020	28,000
1949	Sept.	5,700	2,590	20,000

Table 7.--*Monthly streamflow, flow-weighted dissolved-solids concentration and dissolved-solids discharge for the record-extension period at site 5, Dolores River near Cisco, Utah*--Continued

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Oct.	9,800	1,980	27,000
1949	Nov.	10,000	2,110	30,000
1949	Dec.	10,000	2,240	31,000
1950	Jan.	12,000	1,960	33,000
1950	Feb.	16,000	1,530	34,000
1950	Mar.	19,000	1,260	32,000
1950	Apr.	127,000	353	61,000
1950	May	77,000	429	45,000
1950	June	66,000	448	40,000
1950	July	22,000	886	26,000
1950	Aug.	5,100	2,470	17,000
1950	Sept.	5,400	2,680	20,000
1950	Oct.	5,400	2,930	22,000
1950	Nov.	6,000	3,020	25,000

Table 8.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 7, Green River near Green River, Wyo.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	35,000	431	21,000
1940	Nov.	28,000	505	20,000
1940	Dec.	28,000	550	21,000
1941	Jan.	23,000	600	19,000
1941	Feb.	21,000	607	18,000
1941	Mar.	58,000	424	33,000
1941	Apr.	105,000	332	47,000
1941	May	189,000	261	67,000
1941	June	312,000	208	88,000
1941	July	124,000	260	44,000
1941	Aug.	82,000	294	33,000
1941	Sept.	50,000	357	24,000
1941	Oct.	66,000	357	32,000
1941	Nov.	53,000	417	30,000
1941	Dec.	28,000	549	21,000
1942	Jan.	25,000	589	20,000
1942	Feb.	25,000	574	20,000
1942	Mar.	55,000	430	32,000
1942	Apr.	204,000	275	76,000
1942	May	165,000	271	61,000
1942	June	307,000	209	87,000
1942	July	181,000	234	57,000
1942	Aug.	57,000	327	25,000
1942	Sept.	33,000	406	18,000
1942	Oct.	29,000	458	18,000
1942	Nov.	27,000	511	19,000
1942	Dec.	27,000	551	21,000
1943	Jan.	27,000	567	21,000
1943	Feb.	30,000	543	22,000
1943	Mar.	76,000	391	41,000
1943	Apr.	205,000	275	77,000
1943	May	256,000	240	83,000
1943	June	430,000	191	112,000
1943	July	310,000	202	85,000
1943	Aug.	127,000	259	45,000
1943	Sept.	52,000	352	25,000

Table 8.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 7, Green River near Green River, Wyo.*--Continued

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Oct.	48,000	393	25,000
1943	Nov.	43,000	442	26,000
1943	Dec.	31,000	530	22,000
1944	Jan.	25,000	581	20,000
1944	Feb.	27,000	563	21,000
1944	Mar.	39,000	477	25,000
1944	Apr.	268,000	255	93,000
1944	May	170,000	269	62,000
1944	June	320,000	207	90,000
1944	July	202,000	227	62,000
1944	Aug.	58,000	324	26,000
1944	Sept.	31,000	414	17,000
1944	Oct.	38,000	422	22,000
1944	Nov.	32,000	486	21,000
1944	Dec.	22,000	590	18,000
1945	Jan.	25,000	587	20,000
1945	Feb.	28,000	554	21,000
1945	Mar.	52,000	439	31,000
1945	Apr.	88,000	348	42,000
1945	May	123,000	294	49,000
1945	June	227,000	227	70,000
1945	July	247,000	215	72,000
1945	Aug.	131,000	257	46,000
1945	Sept.	81,000	310	34,000
1945	Oct.	58,000	371	29,000
1945	Nov.	42,000	448	25,000
1945	Dec.	34,000	515	24,000
1946	Jan.	32,000	538	24,000
1946	Feb.	28,000	558	21,000
1946	Mar.	70,000	401	38,000
1946	Apr.	178,000	286	69,000
1946	May	229,000	247	77,000
1946	June	277,000	215	81,000
1946	July	128,000	257	45,000
1946	Aug.	65,000	314	28,000
1946	Sept.	50,000	357	24,000

Table 8.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 7, Green River near Green River, Wyo.*--Continued

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Oct.	54,000	379	28,000
1946	Nov.	49,000	427	28,000
1946	Dec.	50,000	458	31,000
1947	Jan.	27,000	571	21,000
1947	Feb.	30,000	542	22,000
1947	Mar.	152,000	322	67,000
1947	Apr.	104,000	332	47,000
1947	May	380,000	215	111,000
1947	June	465,000	187	118,000
1947	July	281,000	207	79,000
1947	Aug.	170,000	239	55,000
1947	Sept.	73,000	320	32,000
1947	Oct.	71,000	349	34,000
1947	Nov.	56,000	411	31,000
1947	Dec.	44,000	474	29,000
1948	Jan.	38,000	510	27,000
1948	Feb.	33,000	530	24,000
1948	Mar.	81,000	385	42,000
1948	Apr.	118,000	320	51,000
1948	May	238,000	245	79,000
1948	June	348,000	202	96,000
1948	July	101,000	275	38,000
1948	Aug.	50,000	340	23,000
1948	Sept.	30,000	418	17,000
1948	Oct.	33,000	438	20,000
1948	Nov.	29,000	503	20,000
1948	Dec.	26,000	557	20,000
1949	Jan.	26,000	574	21,000
1949	Feb.	25,000	576	20,000
1949	Mar.	58,000	424	33,000
1949	Apr.	117,000	321	51,000
1949	May	224,000	249	76,000
1949	June	350,000	202	96,000
1949	July	154,000	244	51,000
1949	Aug.	58,000	324	26,000
1949	Sept.	36,000	395	19,000

Table 8.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 7, Green River near Green River, Wyo.*--Continued

Year	Month	Streamflow (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Oct.	55,000	377	28,000
1949	Nov.	52,000	419	30,000
1949	Dec.	33,000	518	23,000
1950	Jan.	30,000	551	22,000
1950	Feb.	37,000	510	26,000
1950	Mar.	120,000	344	56,000
1950	Apr.	253,000	259	89,000
1950	May	316,000	226	97,000
1950	June	564,000	177	136,000
1950	July	359,000	194	95,000
1950	Aug.	123,000	262	44,000
1950	Sept.	70,000	323	31,000
1950	Oct.	60,000	366	30,000
1950	Nov.	65,000	392	35,000
1950	Dec.	49,000	459	31,000
1951	Jan.	35,000	525	25,000
1951	Feb.	47,000	475	30,000
1951	Mar.	77,000	391	41,000
1951	Apr.	170,000	289	67,000
1951	May	320,000	226	98,000
1951	June	477,000	186	120,000
1951	July	289,000	205	81,000
1951	Aug.	184,000	234	58,000
1951	Sept.	82,000	309	34,000

Table 9.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 9, Green River near Greendale, Utah*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	43,000	487	28,000
1940	Nov.	34,000	524	24,000
1940	Dec.	33,000	539	24,000
1941	Jan.	27,000	556	20,000
1941	Feb.	25,000	553	19,000
1941	Mar.	72,000	452	45,000
1941	Apr.	133,000	392	71,000
1941	May	244,000	346	115,000
1941	June	404,000	315	173,000
1941	July	159,000	362	78,000
1941	Aug.	104,000	394	56,000
1941	Sept.	61,000	443	37,000
1941	Oct.	82,000	440	49,000
1941	Nov.	66,000	472	42,000
1941	Dec.	33,000	539	24,000
1942	Jan.	29,000	551	21,000
1942	Feb.	30,000	536	22,000
1942	Mar.	69,000	456	43,000
1942	Apr.	263,000	354	127,000
1942	May	212,000	353	102,000
1942	June	398,000	316	171,000
1942	July	233,000	341	108,000
1942	Aug.	71,000	418	40,000
1942	Sept.	39,000	475	25,000
1942	Oct.	35,000	503	24,000
1942	Nov.	32,000	528	23,000
1942	Dec.	32,000	540	24,000
1943	Jan.	32,000	540	24,000
1943	Feb.	36,000	520	26,000
1943	Mar.	96,000	433	57,000
1943	Apr.	264,000	354	127,000
1943	May	331,000	331	149,000
1943	June	559,000	300	228,000
1943	July	402,000	315	172,000
1943	Aug.	163,000	368	81,000
1943	Sept.	65,000	439	39,000

Table 9.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 9, Green River near Greendale, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Oct.	59,000	463	37,000
1943	Nov.	54,000	488	35,000
1943	Dec.	37,000	529	27,000
1944	Jan.	30,000	547	22,000
1944	Feb.	32,000	531	23,000
1944	Mar.	48,000	482	31,000
1944	Apr.	347,000	340	160,000
1944	May	218,000	352	104,000
1944	June	415,000	314	177,000
1944	July	260,000	336	119,000
1944	Aug.	73,000	415	41,000
1944	Sept.	37,000	480	24,000
1944	Oct.	46,000	482	30,000
1944	Nov.	39,000	513	27,000
1944	Dec.	26,000	560	20,000
1945	Jan.	29,000	550	22,000
1945	Feb.	34,000	526	24,000
1945	Mar.	64,000	461	40,000
1945	Apr.	111,000	403	61,000
1945	May	158,000	369	79,000
1945	June	293,000	331	132,000
1945	July	320,000	326	142,000
1945	Aug.	168,000	366	84,000
1945	Sept.	102,000	409	57,000
1945	Oct.	72,000	449	44,000
1945	Nov.	51,000	491	34,000
1945	Dec.	41,000	520	29,000
1946	Jan.	39,000	524	28,000
1946	Feb.	33,000	528	24,000
1946	Mar.	88,000	439	53,000
1946	Apr.	229,000	362	113,000
1946	May	296,000	336	135,000
1946	June	359,000	321	157,000
1946	July	164,000	360	80,000
1946	Aug.	81,000	408	45,000
1946	Sept.	61,000	443	37,000

Table 9.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 9, Green River near Greendale, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Oct.	67,000	454	41,000
1946	Nov.	60,000	479	39,000
1946	Dec.	61,000	488	41,000
1947	Jan.	32,000	541	23,000
1947	Feb.	36,000	520	26,000
1947	Mar.	196,000	389	103,000
1947	Apr.	133,000	393	71,000
1947	May	493,000	312	209,000
1947	June	604,000	297	244,000
1947	July	363,000	319	158,000
1947	Aug.	219,000	352	105,000
1947	Sept.	92,000	416	52,000
1947	Oct.	89,000	434	53,000
1947	Nov.	70,000	468	44,000
1947	Dec.	54,000	497	37,000
1948	Jan.	47,000	509	32,000
1948	Feb.	40,000	513	28,000
1948	Mar.	102,000	429	60,000
1948	Apr.	151,000	385	79,000
1948	May	308,000	334	140,000
1948	June	451,000	310	190,000
1948	July	129,000	373	65,000
1948	Aug.	62,000	426	36,000
1948	Sept.	36,000	482	23,000
1948	Oct.	40,000	492	27,000
1948	Nov.	34,000	523	24,000
1948	Dec.	31,000	543	23,000
1949	Jan.	31,000	543	23,000
1949	Feb.	30,000	538	22,000
1949	Mar.	73,000	452	45,000
1949	Apr.	150,000	386	78,000
1949	May	289,000	337	132,000
1949	June	454,000	310	191,000
1949	July	198,000	350	94,000
1949	Aug.	73,000	416	41,000
1949	Sept.	43,000	468	27,000

Table 9.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 9, Green River near Greendale, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Oct.	68,000	453	42,000
1949	Nov.	65,000	474	42,000
1949	Dec.	40,000	522	28,000
1950	Jan.	36,000	531	26,000
1950	Feb.	45,000	503	31,000
1950	Mar.	154,000	403	84,000
1950	Apr.	328,000	343	153,000
1950	May	409,000	320	178,000
1950	June	733,000	289	288,000
1950	July	466,000	308	195,000
1950	Aug.	157,000	370	79,000
1950	Sept.	88,000	419	50,000
1950	Oct.	76,000	446	46,000
1950	Nov.	80,000	457	49,000
1950	Dec.	61,000	489	40,000
1951	Jan.	45,000	517	31,000
1951	Feb.	61,000	484	40,000
1951	Mar.	93,000	432	55,000
1951	Apr.	212,000	364	105,000
1951	May	392,000	320	170,000
1951	June	625,000	296	251,000
1951	July	365,000	318	158,000
1951	Aug.	228,000	348	108,000
1951	Sept.	98,000	409	54,000
1951	Oct.	99,000	426	57,000
1951	Nov.	57,000	479	37,000
1951	Dec.	54,000	498	37,000
1952	Jan.	49,000	504	34,000
1952	Feb.	50,000	492	34,000
1952	Mar.	63,000	463	40,000
1952	Apr.	317,000	346	149,000
1952	May	591,000	305	245,000
1952	June	553,000	305	229,000
1952	July	204,000	351	97,000
1952	Aug.	121,000	389	64,000
1952	Sept.	67,000	441	40,000

Table 9.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 9, Green River near Greendale, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1952	Oct.	50,000	482	32,000
1952	Nov.	37,000	518	26,000
1952	Dec.	34,000	540	25,000
1953	Jan.	48,000	519	34,000
1953	Feb.	48,000	501	33,000
1953	Mar.	73,000	451	45,000
1953	Apr.	96,000	411	54,000
1953	May	107,000	392	57,000
1953	June	451,000	310	190,000
1953	July	197,000	347	93,000
1953	Aug.	105,000	393	56,000
1953	Sept.	43,000	464	27,000
1953	Oct.	35,000	500	24,000
1953	Nov.	42,000	512	29,000
1953	Dec.	32,000	538	23,000
1954	Jan.	28,000	546	21,000
1954	Feb.	39,000	513	27,000
1954	Mar.	62,000	462	39,000
1954	Apr.	101,000	406	56,000
1954	May	299,000	333	135,000
1954	June	222,000	342	103,000
1954	July	265,000	333	120,000
1954	Aug.	81,000	405	45,000
1954	Sept.	45,000	457	28,000
1954	Oct.	43,000	485	28,000
1954	Nov.	41,000	505	28,000
1954	Dec.	20,000	576	16,000
1955	Jan.	24,000	560	18,000
1955	Feb.	25,000	551	18,000
1955	Mar.	44,000	494	29,000
1955	Apr.	106,000	411	59,000
1955	May	166,000	367	83,000
1955	June	287,000	332	129,000
1955	July	130,000	371	65,000
1955	Aug.	80,000	409	44,000
1955	Sept.	38,000	475	25,000

Table 9.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 9, Green River near Greendale, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1955	Oct.	38,000	499	26,000
1955	Nov.	36,000	520	26,000
1955	Dec.	45,000	519	32,000
1956	Jan.	50,000	505	34,000
1956	Feb.	36,000	517	25,000
1956	Mar.	150,000	404	82,000
1956	Apr.	203,000	367	101,000
1956	May	366,000	323	161,000
1956	June	612,000	294	245,000
1956	July	205,000	347	97,000
1956	Aug.	104,000	392	56,000
1956	Sept.	48,000	457	30,000

[1]Beginning in October 1950, monthly streamflow is summation of historical daily values.

Table 10.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 10, Yampa River near Maybell, Colo.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	21,000	277	8,000
1940	Nov.	19,000	305	7,700
1940	Dec.	15,000	335	7,000
1941	Jan.	14,000	358	6,600
1941	Feb.	16,000	341	7,600
1941	Mar.	39,000	261	14,000
1941	Apr.	92,000	193	24,000
1941	May	451,000	112	68,000
1941	June	240,000	132	43,000
1941	July	50,000	203	14,000
1941	Aug.	21,000	261	7,400
1941	Sept.	11,000	321	5,000
1941	Oct.	40,000	228	12,000
1941	Nov.	28,000	268	10,000
1941	Dec.	24,000	292	9,600
1942	Jan.	21,000	313	9,000
1942	Feb.	19,000	325	8,500
1942	Mar.	50,000	243	17,000
1942	Apr.	239,000	145	47,000
1942	May	361,000	119	59,000
1942	June	329,000	120	54,000
1942	July	59,000	194	15,000
1942	Aug.	14,000	295	5,600
1942	Sept.	5,000	413	2,800
1942	Oct.	11,000	343	4,900
1942	Nov.	15,000	327	6,500
1942	Dec.	13,000	354	6,200
1943	Jan.	12,000	376	5,900
1943	Feb.	14,000	362	6,700
1943	Mar.	46,000	249	16,000

Table 10.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 10, Yampa River near Maybell, Colo.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	190,000	155	40,000
1943	May	237,000	136	44,000
1943	June	270,000	128	47,000
1943	July	70,000	183	18,000
1943	Aug.	20,000	264	7,200
1943	Sept.	8,600	350	4,100
1943	Oct.	10,000	346	4,800
1943	Nov.	14,000	331	6,400
1943	Dec.	12,000	359	6,000
1944	Jan.	10,000	389	5,500
1944	Feb.	9,900	398	5,300
1944	Mar.	18,000	332	8,100
1944	Apr.	44,000	242	14,000
1944	May	311,000	125	53,000
1944	June	347,000	118	56,000
1944	July	64,000	189	16,000
1944	Aug.	8,000	348	3,800
1944	Sept.	1,900	549	1,500
1944	Oct.	8,700	363	4,300
1944	Nov.	16,000	319	6,900
1944	Dec.	13,000	354	6,200
1945	Jan.	12,000	371	6,100
1945	Feb.	9,800	399	5,300
1945	Mar.	23,000	306	9,700
1945	Apr.	89,000	195	24,000
1945	May	439,000	113	67,000
1945	June	393,000	114	61,000
1945	July	163,000	142	31,000
1945	Aug.	56,000	193	15,000
1945	Sept.	20,000	271	7,300
1945	Oct.	17,000	297	6,800
1945	Nov.	19,000	303	7,800
1945	Dec.	16,000	330	7,200
1946	Jan.	14,000	355	6,800
1946	Feb.	18,000	330	8,200
1946	Mar.	40,000	261	14,000

Table 10.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 10, Yampa River near Maybell, Colo.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	215,000	150	44,000
1946	May	220,000	139	42,000
1946	June	228,000	134	42,000
1946	July	43,000	212	12,000
1946	Aug.	16,000	282	6,200
1946	Sept.	8,900	346	4,200
1946	Oct.	20,000	280	7,800
1946	Nov.	25,000	280	9,400
1946	Dec.	20,000	311	8,300
1947	Jan.	14,000	356	6,700
1947	Feb.	15,000	351	7,100
1947	Mar.	76,000	214	22,000
1947	Apr.	164,000	162	36,000
1947	May	492,000	109	73,000
1947	June	317,000	122	52,000
1947	July	119,000	156	25,000
1947	Aug.	32,000	228	10,000
1947	Sept.	17,000	286	6,500
1947	Oct.	22,000	275	8,100
1947	Nov.	27,000	274	9,900
1947	Dec.	38,000	254	13,000
1948	Jan.	37,000	263	13,000
1948	Feb.	36,000	270	13,000
1948	Mar.	57,000	234	18,000
1948	Apr.	195,000	154	41,000
1948	May	453,000	112	69,000
1948	June	240,000	132	43,000
1948	July	51,000	201	14,000
1948	Aug.	20,000	266	7,100
1948	Sept.	5,800	395	3,100
1948	Oct.	16,000	301	6,600
1948	Nov.	17,000	316	7,100
1948	Dec.	16,000	332	7,200
1949	Jan.	15,000	345	7,200
1949	Feb.	16,000	344	7,500
1949	Mar.	44,000	253	15,000

Table 10.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 10, Yampa River near Maybell, Colo.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Apr.	192,000	155	40,000
1949	May	422,000	114	65,000
1949	June	433,000	111	65,000
1949	July	120,000	156	25,000
1949	Aug.	21,000	262	7,300
1949	Sept.	11,000	328	4,700
1949	Oct.	24,000	267	8,700
1949	Nov.	20,000	298	8,100
1949	Dec.	16,000	334	7,000
1950	Jan.	15,000	347	7,100
1950	Feb.	15,000	348	7,300
1950	Mar.	28,000	291	11,000
1950	Apr.	133,000	173	31,000
1950	May	271,000	130	48,000
1950	June	327,000	120	54,000
1950	July	78,000	177	19,000
1950	Aug.	13,000	298	5,400
1950	Sept.	11,000	321	5,000

[1]Monthly streamflow is summation of historical daily values.

Table 11.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 12, Duchesne River near Randlett, Utah*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	31,000	759	32,000
1940	Nov.	27,000	792	29,000
1940	Dec.	28,000	772	30,000
1941	Jan.	23,000	829	26,000
1941	Feb.	23,000	829	26,000
1941	Mar.	21,000	879	25,000
1941	Apr.	26,000	813	28,000
1941	May	162,000	420	93,000
1941	June	200,000	402	109,000
1941	July	37,000	710	36,000
1941	Aug.	20,000	897	25,000
1941	Sept.	16,000	971	21,000
1941	Oct.	42,000	675	39,000
1941	Nov.	42,000	672	38,000
1941	Dec.	38,000	690	36,000
1942	Jan.	36,000	703	35,000
1942	Feb.	32,000	736	32,000
1942	Mar.	36,000	714	35,000
1942	Apr.	67,000	570	52,000
1942	May	86,000	527	62,000
1942	June	138,000	458	86,000
1942	July	20,000	904	24,000
1942	Aug.	6,700	1,460	13,000
1942	Sept.	6,200	1,500	13,000
1942	Oct.	18,000	1,010	24,000
1942	Nov.	22,000	858	25,000
1942	Dec.	28,000	775	29,000
1943	Jan.	26,000	784	28,000
1943	Feb.	29,000	773	30,000
1943	Mar.	29,000	762	30,000

Table 11.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 12, Duchesne River near Randlett, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	43,000	613	36,000
1943	May	100,000	463	63,000
1943	June	103,000	471	66,000
1943	July	28,000	721	28,000
1943	Aug.	23,000	882	28,000
1943	Sept.	8,100	1,520	17,000
1943	Oct.	22,000	955	29,000
1943	Nov.	24,000	839	27,000
1943	Dec.	25,000	796	27,000
1944	Jan.	23,000	822	26,000
1944	Feb.	25,000	811	28,000
1944	Mar.	43,000	700	41,000
1944	Apr.	48,000	687	45,000
1944	May	128,000	461	80,000
1944	June	255,000	399	138,000
1944	July	82,000	559	62,000
1944	Aug.	7,500	1,340	14,000
1944	Sept.	6,900	1,370	13,000
1944	Oct.	24,000	902	29,000
1944	Nov.	26,000	844	30,000
1944	Dec.	28,000	757	29,000
1945	Jan.	30,000	751	31,000
1945	Feb.	27,000	778	29,000
1945	Mar.	32,000	778	34,000
1945	Apr.	24,000	859	28,000
1945	May	59,000	553	45,000
1945	June	91,000	521	64,000
1945	July	31,000	725	30,000
1945	Aug.	31,000	774	32,000
1945	Sept.	12,000	1,210	19,000
1945	Oct.	21,000	1,020	29,000
1945	Nov.	26,000	835	29,000
1945	Dec.	24,000	812	26,000
1946	Jan.	23,000	817	26,000
1946	Feb.	21,000	858	25,000
1946	Mar.	29,000	777	31,000

Table 11.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 12, Duchesne River near Randlett, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	40,000	628	34,000
1946	May	70,000	517	49,000
1946	June	47,000	616	39,000
1946	July	5,200	1,400	10,000
1946	Aug.	6,100	1,410	12,000
1946	Sept.	4,100	1,730	9,500
1946	Oct.	16,000	977	22,000
1946	Nov.	32,000	741	32,000
1946	Dec.	30,000	740	31,000
1947	Jan.	26,000	789	27,000
1947	Feb.	36,000	747	36,000
1947	Mar.	35,000	734	35,000
1947	Apr.	23,000	790	25,000
1947	May	143,000	440	86,000
1947	June	158,000	473	102,000
1947	July	33,000	754	33,000
1947	Aug.	25,000	966	32,000
1947	Sept.	12,000	1,250	20,000
1947	Oct.	17,000	1,130	27,000
1947	Nov.	29,000	790	31,000
1947	Dec.	31,000	763	32,000
1948	Jan.	29,000	771	31,000
1948	Feb.	25,000	789	27,000
1948	Mar.	40,000	726	39,000
1948	Apr.	31,000	754	32,000
1948	May	70,000	539	51,000
1948	June	51,000	646	44,000
1948	July	3,100	1,930	8,100
1948	Aug.	2,100	2,530	7,100
1948	Sept.	1,300	2,590	4,700
1948	Oct.	4,800	1,720	11,000
1948	Nov.	14,000	981	19,000
1948	Dec.	26,000	802	28,000
1949	Jan.	24,000	824	27,000
1949	Feb.	23,000	836	26,000
1949	Mar.	44,000	701	42,000

Table 11.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 12, Duchesne River near Randlett, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Apr.	46,000	604	38,000
1949	May	127,000	439	76,000
1949	June	230,000	388	122,000
1949	July	50,000	615	42,000
1949	Aug.	6,700	1,500	14,000
1949	Sept.	7,900	1,440	15,000
1949	Oct.	24,000	903	30,000
1949	Nov.	29,000	789	31,000
1949	Dec.	28,000	800	30,000
1950	Jan.	31,000	752	31,000
1950	Feb.	26,000	800	29,000
1950	Mar.	40,000	722	39,000
1950	Apr.	44,000	630	38,000
1950	May	97,000	489	65,000
1950	June	193,000	401	105,000
1950	July	45,000	664	41,000
1950	Aug.	9,000	1,390	17,000
1950	Sept.	13,000	1,040	19,000
1950	Nov.	27,000	782	29,000
1950	Dec.	33,000	725	32,000
1951	Jan.	26,000	803	29,000
1951	Feb.	26,000	785	28,000
1951	Mar.	23,000	820	25,000
1951	Apr.	14,000	957	19,000
1951	May	79,000	518	56,000
1951	June	124,000	444	75,000
1951	July	31,000	701	30,000
1951	Aug.	26,000	845	30,000
1951	Sept.	9,600	1,460	19,000
1951	Oct.	25,000	917	31,000
1951	Nov.	32,000	766	34,000
1951	Dec.	33,000	754	33,000
1952	Jan.	28,000	813	31,000
1952	Feb.	26,000	821	29,000
1952	Mar.	31,000	804	34,000

Table 11.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 12, Duchesne River near Randlett, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1952	Apr.	111,000	491	74,000
1952	May	304,000	325	134,000
1952	June	302,000	339	139,000
1952	July	70,000	540	51,000
1952	Aug.	49,000	681	45,000
1952	Sept.	30,000	787	32,000
1952	Oct.	21,000	950	27,000
1952	Nov.	26,000	795	28,000
1952	Dec.	37,000	700	35,000
1953	Jan.	39,000	695	37,000
1953	Feb.	33,000	749	34,000
1953	Mar.	34,000	735	34,000
1953	Apr.	13,000	1,000	17,000
1953	May	15,000	971	20,000
1953	June	107,000	463	67,000
1953	July	13,000	974	18,000
1953	Aug.	12,000	1,090	17,000
1953	Sept.	4,600	1,960	12,000
1953	Oct.	9,000	1,330	16,000
1953	Nov.	20,000	855	24,000
1953	Dec.	26,000	765	27,000
1954	Jan.	27,000	776	29,000
1954	Feb.	25,000	786	26,000
1954	Mar.	20,000	821	23,000
1954	Apr.	13,000	967	18,000
1954	May	36,000	676	33,000
1954	June	5,100	1,540	11,000
1954	July	1,900	1,970	5,000
1954	Aug.	1,200	2,130	3,400
1954	Sept.	6,200	1,390	12,000
1954	Oct.	17,000	993	23,000
1954	Nov.	18,000	917	23,000
1954	Dec.	18,000	872	21,000
1955	Jan.	25,000	843	28,000
1955	Feb.	21,000	875	25,000
1955	Mar.	34,000	749	34,000

Table 11.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 12, Duchesne River near Randlett, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1955	Apr.	22,000	839	26,000
1955	May	45,000	616	38,000
1955	June	34,000	707	32,000
1955	July	1,800	1,800	4,300
1955	Aug.	8,200	1,260	14,000
1955	Sept.	3,800	1,860	9,500
1955	Oct.	6,100	1,890	16,000
1955	Nov.	15,000	1,020	21,000
1955	Dec.	29,000	749	30,000
1956	Jan.	27,000	764	28,000
1956	Feb.	22,000	816	24,000
1956	Mar.	25,000	792	27,000
1956	Apr.	17,000	872	20,000
1956	May	74,000	520	52,000
1956	June	90,000	513	63,000
1956	July	4,300	1,510	8,800
1956	Aug.	2,400	2,050	6,800
1956	Sept.	1,300	2,420	4,100

[1]Beginning in October 1942, monthly streamflow is summation of historical daily values.

Table 12.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 13, White River near Watson, Utah*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	30,000	492	20,000
1940	Nov.	22,000	558	17,000
1940	Dec.	18,000	608	15,000
1941	Jan.	18,000	613	15,000
1941	Feb.	22,000	574	17,000
1941	Mar.	31,000	513	22,000
1941	Apr.	34,000	498	23,000
1941	May	156,000	285	61,000
1941	June	118,000	312	50,000
1941	July	40,000	449	25,000
1941	Aug.	33,000	481	21,000
1941	Sept.	29,000	502	20,000
1941	Oct.	44,000	431	26,000
1941	Nov.	29,000	508	20,000
1941	Dec.	24,000	552	18,000
1942	Jan.	23,000	567	17,000
1942	Feb.	22,000	576	17,000
1942	Mar.	43,000	457	27,000
1942	Apr.	107,000	329	48,000
1942	May	158,000	284	61,000
1942	June	144,000	291	57,000
1942	July	44,000	434	26,000
1942	Aug.	27,000	519	19,000
1942	Sept.	23,000	544	17,000
1942	Oct.	29,000	501	20,000
1942	Nov.	27,000	516	19,000
1942	Dec.	23,000	562	17,000
1943	Jan.	21,000	580	17,000
1943	Feb.	24,000	558	18,000
1943	Mar.	33,000	503	23,000

Table 12.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 13, White River near Watson, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	40,000	467	26,000
1943	May	56,000	412	31,000
1943	June	87,000	348	41,000
1943	July	31,000	494	21,000
1943	Aug.	44,000	432	26,000
1943	Sept.	20,000	572	15,000
1943	Oct.	21,000	559	16,000
1943	Nov.	23,000	549	17,000
1943	Dec.	21,000	574	17,000
1944	Jan.	19,000	606	15,000
1944	Feb.	21,000	591	17,000
1944	Mar.	32,000	508	22,000
1944	Apr.	29,000	528	20,000
1944	May	94,000	342	44,000
1944	June	112,000	318	48,000
1944	July	40,000	451	24,000
1944	Aug.	18,000	592	15,000
1944	Sept.	15,000	631	13,000
1944	Oct.	19,000	579	15,000
1944	Nov.	20,000	576	16,000
1944	Dec.	20,000	588	16,000
1945	Jan.	25,000	543	19,000
1945	Feb.	26,000	546	19,000
1945	Mar.	28,000	534	20,000
1945	Apr.	30,000	521	21,000
1945	May	108,000	325	48,000
1945	June	105,000	325	46,000
1945	July	57,000	397	31,000
1945	Aug.	38,000	458	23,000
1945	Sept.	23,000	539	17,000
1945	Oct.	25,000	529	18,000
1945	Nov.	27,000	521	19,000
1945	Dec.	21,000	583	16,000
1946	Jan.	22,000	572	17,000
1946	Feb.	21,000	589	17,000
1946	Mar.	30,000	519	21,000

Table 12.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 13, White River near Watson, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	43,000	454	27,000
1946	May	68,000	384	36,000
1946	June	67,000	383	35,000
1946	July	21,000	568	16,000
1946	Aug.	29,000	501	20,000
1946	Sept.	21,000	563	16,000
1946	Oct.	28,000	509	19,000
1946	Nov.	24,000	538	18,000
1946	Dec.	23,000	559	17,000
1947	Jan.	17,000	633	14,000
1947	Feb.	19,000	602	16,000
1947	Mar.	43,000	460	27,000
1947	Apr.	35,000	490	23,000
1947	May	140,000	297	56,000
1947	June	116,000	314	50,000
1947	July	61,000	388	32,000
1947	Aug.	37,000	459	23,000
1947	Sept.	26,000	518	18,000
1947	Oct.	34,000	474	22,000
1947	Nov.	28,000	513	19,000
1947	Dec.	27,000	528	19,000
1948	Jan.	23,000	560	18,000
1948	Feb.	20,000	595	16,000
1948	Mar.	38,000	478	25,000
1948	Apr.	59,000	407	33,000
1948	May	128,000	306	53,000
1948	June	91,000	342	42,000
1948	July	31,000	491	21,000
1948	Aug.	28,000	511	19,000
1948	Sept.	19,000	584	15,000

Table 12.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 13, White River near Watson, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1948	Oct.	24,000	537	17,000
1948	Nov.	22,000	554	17,000
1948	Dec.	19,000	595	16,000
1949	Jan.	15,000	657	13,000
1949	Feb.	14,000	683	13,000
1949	Mar.	39,000	475	25,000
1949	Apr.	44,000	451	27,000
1949	May	106,000	328	47,000
1949	June	159,000	281	60,000
1949	July	73,000	363	36,000
1949	Aug.	31,000	494	20,000
1949	Sept.	28,000	505	19,000
1949	Oct.	34,000	474	22,000
1949	Nov.	26,000	525	19,000
1949	Dec.	21,000	579	16,000
1950	Jan.	20,000	588	16,000
1950	Feb.	17,000	627	15,000
1950	Mar.	30,000	522	21,000
1950	Apr.	33,000	500	23,000
1950	May	63,000	395	34,000
1950	June	120,000	310	51,000
1950	July	38,000	459	24,000
1950	Aug.	20,000	572	16,000
1950	Sept.	24,000	535	17,000

[1]Monthly streamflow is summation of historical daily values.

Table 13.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 16, San Rafael River near Green River, Utah*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	1,500	3,640	7,400
1940	Nov.	1,200	3,320	5,400
1940	Dec.	1,100	2,940	4,500
1941	Jan.	830	2,900	3,300
1941	Feb.	790	2,960	3,200
1941	Mar.	1,500	2,660	5,500
1941	Apr.	2,700	2,610	9,600
1941	May	49,000	1,000	67,000
1941	June	49,000	1,100	73,000
1941	July	11,000	2,160	33,000
1941	Aug.	4,700	3,110	20,000
1941	Sept.	2,600	3,510	13,000
1941	Oct.	3,700	2,760	14,000
1941	Nov.	2,900	2,580	10,000
1941	Dec.	2,300	2,440	7,500
1942	Jan.	1,800	2,390	5,900
1942	Feb.	1,500	2,550	5,100
1942	Mar.	2,900	2,200	8,700
1942	Apr.	12,000	1,530	25,000
1942	May	39,000	1,100	58,000
1942	June	49,000	1,100	73,000
1942	July	9,900	2,250	30,000
1942	Aug.	3,500	3,440	16,000
1942	Sept.	2,000	3,830	10,000
1942	Oct.	1,700	3,490	8,300
1942	Nov.	1,500	3,130	6,400
1942	Dec.	1,500	2,720	5,700
1943	Jan.	1,300	2,600	4,700
1943	Feb.	1,200	2,670	4,500
1943	Mar.	1,800	2,540	6,300

Table 13.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 16, San Rafael River near Green River, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	11,000	1,580	23,000
1943	May	24,000	1,350	43,000
1943	June	20,000	1,580	43,000
1943	July	5,900	2,740	22,000
1943	Aug.	4,100	3,250	18,000
1943	Sept.	1,600	4,060	8,900
1943	Oct.	1,600	3,570	7,800
1943	Nov.	1,300	3,260	5,700
1943	Dec.	1,200	2,910	4,700
1944	Jan.	730	2,970	3,000
1944	Feb.	870	2,880	3,400
1944	Mar.	1,400	2,730	5,200
1944	Apr.	2,900	2,550	10,000
1944	May	40,000	1,080	60,000
1944	June	65,000	981	87,000
1944	July	16,000	1,860	41,000
1944	Aug.	3,800	3,350	17,000
1944	Sept.	2,000	3,790	11,000
1944	Oct.	1,800	3,460	8,500
1944	Nov.	1,500	3,120	6,500
1944	Dec.	1,400	2,800	5,300
1945	Jan.	1,100	2,730	4,100
1945	Feb.	1,000	2,810	3,800
1945	Mar.	1,100	2,910	4,200
1945	Apr.	2,200	2,790	8,200
1945	May	28,000	1,270	47,000
1945	June	34,000	1,280	59,000
1945	July	11,000	2,140	33,000
1945	Aug.	5,300	2,970	22,000
1945	Sept.	2,300	3,650	12,000
1945	Oct.	3,000	3,380	14,000
1945	Nov.	2,900	2,910	11,000
1945	Dec.	2,100	2,750	7,700
1946	Jan.	1,800	2,650	6,500
1946	Feb.	3,900	2,790	15,000
1946	Mar.	6,000	2,420	20,000

Table 13.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 16, San Rafael River near Green River, Utah*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	11,000	1,530	23,000
1946	May	20,000	1,230	33,000
1946	June	7,900	1,670	18,000
1946	July	1,100	2,830	4,100
1946	Aug.	6,900	3,750	35,000
1946	Sept.	380	4,200	2,200

[1]Beginning in October 1945, monthly streamflow is summation of historical daily values.

Table 14.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 17, San Juan River near Archuleta, N. Mex.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	57,000	196	15,000
1940	Nov.	23,000	263	8,200
1940	Dec.	23,000	278	8,500
1941	Jan.	21,000	284	8,100
1941	Feb.	48,000	228	15,000
1941	Mar.	120,000	171	28,000
1941	Apr.	265,000	134	48,000
1941	May	784,000	93	99,000
1941	June	565,000	95	73,000
1941	July	305,000	111	46,000
1941	Aug.	70,000	163	16,000
1941	Sept.	69,000	174	16,000
1941	Oct.	257,000	135	47,000
1941	Nov.	83,000	190	21,000
1941	Dec.	48,000	229	15,000
1942	Jan.	42,000	239	14,000
1942	Feb.	35,000	246	12,000
1942	Mar.	62,000	201	17,000
1942	Apr.	411,000	120	67,000
1942	May	303,000	118	48,000
1942	June	290,000	112	44,000
1942	July	68,000	162	15,000
1942	Aug.	31,000	200	8,500
1942	Sept.	22,000	232	6,900
1942	Oct.	17,000	266	6,200
1942	Nov.	16,000	287	6,300
1942	Dec.	15,000	310	6,200
1943	Jan.	15,000	307	6,500
1943	Feb.	24,000	272	8,800
1943	Mar.	55,000	208	16,000

Table 14.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 17, San Juan River near Archuleta, N. Mex.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	186,000	146	37,000
1943	May	179,000	135	33,000
1943	June	123,000	139	23,000
1943	July	49,000	176	12,000
1943	Aug.	36,000	193	9,500
1943	Sept.	22,000	233	6,800
1943	Oct.	29,000	232	9,200
1943	Nov.	20,000	272	7,400
1943	Dec.	19,000	290	7,500
1944	Jan.	13,000	319	5,700
1944	Feb.	14,000	311	5,900
1944	Mar.	39,000	227	12,000
1944	Apr.	133,000	159	29,000
1944	May	383,000	111	58,000
1944	June	380,000	105	54,000
1944	July	129,000	138	24,000
1944	Aug.	34,000	196	9,100
1944	Sept.	40,000	199	11,000
1944	Oct.	37,000	219	11,000
1944	Nov.	17,000	283	6,600
1944	Dec.	14,000	314	5,900
1945	Jan.	14,000	315	6,000
1945	Feb.	25,000	270	9,000
1945	Mar.	41,000	224	12,000
1945	Apr.	142,000	157	30,000
1945	May	277,000	120	45,000
1945	June	197,000	124	33,000
1945	July	61,000	166	14,000
1945	Aug.	32,000	200	8,600
1945	Sept.	12,000	268	4,500
1945	Oct.	25,000	242	8,200
1945	Nov.	16,000	290	6,100
1945	Dec.	11,000	334	4,900
1946	Jan.	13,000	321	5,600
1946	Feb.	15,000	306	6,200
1946	Mar.	24,000	257	8,200

Table 14.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 17, San Juan River near Archuleta, N. Mex.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	63,000	192	16,000
1946	May	72,000	169	17,000
1946	June	79,000	156	17,000
1946	July	24,000	211	6,900
1946	Aug.	29,000	204	8,000
1946	Sept.	24,000	227	7,400
1946	Oct.	29,000	233	9,200
1946	Nov.	21,000	269	7,700
1946	Dec.	17,000	301	6,700
1947	Jan.	13,000	319	5,700
1947	Feb.	19,000	288	7,400
1947	Mar.	31,000	240	10,000
1947	Apr.	44,000	211	12,000
1947	May	187,000	133	34,000
1947	June	137,000	136	25,000
1947	July	37,000	189	9,500
1947	Aug.	81,000	158	17,000
1947	Sept.	53,000	186	13,000
1947	Oct.	71,000	186	18,000
1947	Nov.	33,000	240	11,000
1947	Dec.	25,000	270	9,200
1948	Jan.	26,000	270	9,400
1948	Feb.	31,000	255	11,000
1948	Mar.	44,000	220	13,000
1948	Apr.	260,000	134	47,000
1948	May	315,000	117	50,000
1948	June	337,000	108	50,000
1948	July	67,000	163	15,000
1948	Aug.	40,000	188	10,000
1948	Sept.	17,000	248	5,700
1948	Oct.	21,000	252	7,300
1948	Nov.	13,000	301	5,500
1948	Dec.	13,000	321	5,600
1949	Jan.	16,000	304	6,600
1949	Feb.	22,000	277	8,400
1949	Mar.	84,000	187	21,000

Table 14.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 17, San Juan River near Archuleta, N. Mex.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Apr.	231,000	138	43,000
1949	May	317,000	116	50,000
1949	June	403,000	103	57,000
1949	July	194,000	125	33,000
1949	Aug.	50,000	178	12,000
1949	Sept.	26,000	223	7,800
1949	Oct.	25,000	241	8,300
1949	Nov.	15,000	292	6,000
1949	Dec.	11,000	335	4,900
1950	Jan.	14,000	312	6,100
1950	Feb.	22,000	277	8,300
1950	Mar.	31,000	239	10,000
1950	Apr.	110,000	167	25,000
1950	May	124,000	148	25,000
1950	June	106,000	145	21,000
1950	July	40,000	185	10,000
1950	Aug.	14,000	245	4,700
1950	Sept.	22,000	232	6,900
1950	Oct.	14,000	280	5,300
1950	Nov.	7,100	354	3,400
1950	Dec.	8,400	357	4,100
1951	Jan.	7,700	365	3,800
1951	Feb.	9,700	341	4,500
1951	Mar.	18,000	275	6,800
1951	Apr.	28,000	236	8,900
1951	May	111,000	152	23,000
1951	June	88,000	152	18,000
1951	July	9,800	264	3,500
1951	Aug.	21,000	222	6,300
1951	Sept.	9,400	288	3,700
1951	Oct.	8,900	314	3,800
1951	Nov.	8,300	340	3,800
1951	Dec.	19,000	292	7,400
1952	Jan.	27,000	265	9,900
1952	Feb.	16,000	299	6,700
1952	Mar.	58,000	205	16,000

Table 14.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 17, San Juan River near Archuleta, N. Mex.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1952	Apr.	327,000	127	56,000
1952	May	390,000	111	59,000
1952	June	431,000	102	60,000
1952	July	123,000	140	23,000
1952	Aug.	55,000	174	13,000
1952	Sept.	26,000	223	7,800
1952	Oct.	15,000	273	5,700
1952	Nov.	13,000	306	5,200
1952	Dec.	17,000	299	6,900
1953	Jan.	17,000	298	7,000
1953	Feb.	16,000	303	6,400
1953	Mar.	37,000	229	12,000
1953	Apr.	72,000	186	18,000
1953	May	113,000	151	23,000
1953	June	142,000	135	26,000
1953	July	37,000	189	9,400
1953	Aug.	23,000	215	6,900
1953	Sept.	7,200	307	3,000
1953	Oct.	18,000	262	6,500
1953	Nov.	18,000	281	6,700
1953	Dec.	12,000	325	5,300
1954	Jan.	11,000	335	4,900
1954	Feb.	20,000	285	7,700
1954	Mar.	29,000	244	9,700
1954	Apr.	87,000	177	21,000
1954	May	141,000	143	27,000
1954	June	61,000	166	14,000
1954	July	44,000	181	11,000
1954	Aug.	40,000	189	10,000
1954	Sept.	34,000	208	9,600
1954	Oct.	35,000	222	11,000
1954	Nov.	15,000	293	6,000

[1]Monthly streamflow is summation of historical values.

Table 15.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 19, Colorado River at Lees Ferry, Ariz.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	685,000	901	839,000
1940	Nov.	401,000	1,000	547,000
1940	Dec.	358,000	962	468,000
1941	Jan.	348,000	998	473,000
1941	Feb.	423,000	921	529,000
1941	Mar.	668,000	789	717,000
1941	Apr.	1,091,000	565	839,000
1941	May	4,974,000	321	2,174,000
1941	June	4,004,000	295	1,608,000
1941	July	1,666,000	387	877,000
1941	Aug.	798,000	776	842,000
1941	Sept.	608,000	917	758,000
1941	Oct.	1,797,000	737	1,801,000
1941	Nov.	903,000	686	842,000
1941	Dec.	576,000	856	670,000

[1]Monthly streamflow is summation of historical daily values.

Table 16.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 21, Virgin River at Littlefield, Ariz.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	9,100	2,030	25,000
1940	Nov.	10,000	1,970	27,000
1940	Dec.	13,000	1,830	32,000
1941	Jan.	15,000	1,720	35,000
1941	Feb.	31,000	1,330	56,000
1941	Mar.	62,000	1,030	87,000
1941	Apr.	62,000	1,010	86,000
1941	May	130,000	792	140,000
1941	June	19,000	1,460	38,000
1941	July	22,000	1,410	42,000
1941	Aug.	20,000	1,490	41,000
1941	Sept.	5,500	2,360	17,000
1941	Oct.	23,000	1,500	47,000
1941	Nov.	19,000	1,610	42,000
1941	Dec.	17,000	1,660	39,000
1942	Jan.	20,000	1,570	42,000
1942	Feb.	15,000	1,660	35,000
1942	Mar.	20,000	1,490	41,000
1942	Apr.	50,000	1,090	74,000
1942	May	28,000	1,310	50,000
1942	June	5,100	2,260	16,000
1942	July	4,200	2,420	14,000
1942	Aug.	8,900	1,950	24,000
1942	Sept.	4,000	2,600	14,000
1942	Oct.	9,100	2,030	25,000
1942	Nov.	10,000	1,970	28,000
1942	Dec.	11,000	1,920	29,000
1943	Jan.	18,000	1,620	40,000
1943	Feb.	21,000	1,510	43,000
1943	Mar.	36,000	1,230	60,000

Table 16.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 21, Virgin River at Littlefield, Ariz.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	34,000	1,230	57,000
1943	May	12,000	1,750	28,000
1943	June	4,000	2,450	13,000
1943	July	4,100	2,440	14,000
1943	Aug.	13,000	1,740	30,000
1943	Sept.	5,900	2,300	18,000
1943	Oct.	8,700	2,060	24,000
1943	Nov.	10,000	1,980	27,000
1943	Dec.	13,000	1,830	32,000
1944	Jan.	13,000	1,790	32,000
1944	Feb.	14,000	1,700	33,000
1944	Mar.	26,000	1,370	48,000
1944	Apr.	25,000	1,360	47,000
1944	May	49,000	1,090	73,000
1944	June	11,000	1,780	26,000
1944	July	3,900	2,480	13,000
1944	Aug.	4,100	2,520	14,000
1944	Sept.	4,200	2,570	15,000
1944	Oct.	5,000	2,470	17,000
1944	Nov.	13,000	1,830	32,000
1944	Dec.	12,000	1,900	30,000
1945	Jan.	11,000	1,880	29,000
1945	Feb.	18,000	1,590	38,000
1945	Mar.	20,000	1,480	41,000
1945	Apr.	20,000	1,480	39,000
1945	May	25,000	1,360	46,000
1945	June	4,700	2,320	15,000
1945	July	4,600	2,360	15,000
1945	Aug.	26,000	1,380	48,000
1945	Sept.	8,000	2,080	23,000
1945	Oct.	20,000	1,570	42,000
1945	Nov.	10,000	1,970	28,000
1945	Dec.	14,000	1,780	34,000
1946	Jan.	13,000	1,800	32,000
1946	Feb.	9,700	1,940	25,000
1946	Mar.	11,000	1,840	26,000

Table 16.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 21, Virgin River at Littlefield, Ariz.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	12,000	1,750	28,000
1946	May	4,600	2,370	15,000
1946	June	4,000	2,450	13,000
1946	July	6,200	2,140	18,000
1946	Aug.	13,000	1,710	31,000
1946	Sept.	3,900	2,620	14,000
1946	Oct.	37,000	1,280	64,000
1946	Nov.	33,000	1,350	60,000
1946	Dec.	22,000	1,540	46,000
1947	Jan.	15,000	1,710	35,000
1947	Feb.	12,000	1,790	30,000
1947	Mar.	13,000	1,700	31,000
1947	Apr.	16,000	1,590	34,000
1947	May	17,000	1,550	35,000
1947	June	4,300	2,390	14,000
1947	July	4,700	2,350	15,000
1947	Aug.	14,000	1,690	32,000
1947	Sept.	4,200	2,570	15,000
1947	Oct.	8,100	2,110	23,000
1947	Nov.	9,300	2,040	26,000
1947	Dec.	14,000	1,790	34,000
1948	Jan.	11,000	1,920	28,000
1948	Feb.	12,000	1,800	30,000
1948	Mar.	13,000	1,730	30,000
1948	Apr.	20,000	1,470	40,000
1948	May	10,000	1,830	25,000
1948	June	4,100	2,430	13,000
1948	July	4,200	2,420	14,000
1948	Aug.	5,400	2,300	17,000
1948	Sept.	5,900	2,290	19,000

[1]Monthly streamflow is summation of historical daily values.

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	798,000	764	830,000
1940	Nov.	736,000	761	762,000
1940	Dec.	848,000	764	881,000
1941	Jan.	627,000	777	662,000
1941	Feb.	561,000	803	612,000
1941	Mar.	750,000	795	811,000
1941	Apr.	608,000	789	652,000
1941	May	1,359,000	783	1,447,000
1941	June	1,628,000	777	1,721,000
1941	July	998,000	770	1,044,000
1941	Aug.	1,332,000	722	1,307,000
1941	Sept.	1,528,000	712	1,479,000
1941	Oct.	1,585,000	711	1,533,000
1941	Nov.	1,731,000	705	1,660,000
1941	Dec.	2,042,000	714	1,983,000
1942	Jan.	1,957,000	730	1,943,000
1942	Feb.	1,482,000	732	1,475,000
1942	Mar.	1,494,000	733	1,489,000
1942	Apr.	1,136,000	736	1,137,000
1942	May	1,588,000	743	1,603,000
1942	June	1,530,000	741	1,542,000
1942	July	1,226,000	734	1,223,000
1942	Aug.	880,000	733	877,000
1942	Sept.	797,000	723	784,000
1942	Oct.	845,000	716	822,000
1942	Nov.	1,041,000	679	961,000
1942	Dec.	1,214,000	657	1,084,000
1943	Jan.	1,015,000	668	921,000
1943	Feb.	746,000	688	698,000
1943	Mar.	886,000	696	839,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1943	Apr.	877,000	703	839,000
1943	May	957,000	704	916,000
1943	June	975,000	698	926,000
1943	July	1,086,000	697	1,028,000
1943	Aug.	991,000	704	948,000
1943	Sept.	1,006,000	698	955,000
1943	Oct.	1,160,000	688	1,085,000
1943	Nov.	1,149,000	673	1,051,000
1943	Dec.	1,231,000	665	1,113,000
1944	Jan.	1,241,000	684	1,155,000
1944	Feb.	1,181,000	717	1,151,000
1944	Mar.	1,297,000	716	1,263,000
1944	Apr.	1,164,000	721	1,141,000
1944	May	1,116,000	722	1,095,000
1944	June	983,000	713	952,000
1944	July	1,035,000	705	991,000
1944	Aug.	1,148,000	697	1,088,000
1944	Sept.	1,114,000	684	1,036,000
1944	Oct.	1,178,000	688	1,102,000
1944	Nov.	1,156,000	702	1,103,000
1944	Dec.	1,187,000	706	1,140,000
1945	Jan.	1,186,000	704	1,135,000
1945	Feb.	1,061,000	703	1,013,000
1945	Mar.	1,232,000	703	1,177,000
1945	Apr.	985,000	699	935,000
1945	May	970,000	698	920,000
1945	June	920,000	697	871,000
1945	July	913,000	688	854,000
1945	Aug.	770,000	671	702,000
1945	Sept.	824,000	652	731,000
1945	Oct.	1,038,000	671	947,000
1945	Nov.	1,036,000	689	970,000
1945	Dec.	1,099,000	683	1,021,000
1946	Jan.	1,041,000	677	959,000
1946	Feb.	1,028,000	688	961,000
1946	Mar.	944,000	690	886,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1946	Apr.	830,000	689	778,000
1946	May	873,000	688	817,000
1946	June	754,000	685	703,000
1946	July	801,000	680	741,000
1946	Aug.	722,000	682	670,000
1946	Sept.	730,000	683	678,000
1946	Oct.	759,000	685	707,000
1946	Nov.	789,000	685	734,000
1946	Dec.	870,000	685	810,000
1947	Jan.	953,000	684	886,000
1947	Feb.	899,000	692	845,000
1947	Mar.	940,000	696	889,000
1947	Apr.	797,000	696	755,000
1947	May	905,000	697	858,000
1947	June	860,000	697	814,000
1947	July	844,000	697	800,000
1947	Aug.	892,000	696	845,000
1947	Sept.	819,000	679	756,000
1947	Oct.	836,000	668	759,000
1947	Nov.	880,000	647	774,000
1947	Dec.	1,037,000	685	966,000
1948	Jan.	1,160,000	679	1,071,000
1948	Feb.	1,122,000	676	1,031,000
1948	Mar.	1,107,000	676	1,018,000
1948	Apr.	1,083,000	676	996,000
1948	May	1,115,000	680	1,031,000
1948	June	989,000	679	913,000
1948	July	1,108,000	670	1,009,000
1948	Aug.	986,000	668	896,000
1948	Sept.	941,000	658	841,000
1948	Oct.	918,000	636	793,000
1948	Nov.	978,000	669	889,000
1948	Dec.	1,106,000	681	1,023,000
1949	Jan.	1,229,000	641	1,071,000
1949	Feb.	1,192,000	642	1,041,000
1949	Mar.	1,236,000	657	1,104,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1949	Apr.	1,117,000	663	1,006,000
1949	May	983,000	660	882,000
1949	June	923,000	664	833,000
1949	July	952,000	647	838,000
1949	Aug.	1,013,000	639	879,000
1949	Sept.	1,099,000	629	940,000
1949	Oct.	1,148,000	619	966,000
1949	Nov.	1,011,000	648	891,000
1949	Dec.	1,158,000	665	1,048,000
1950	Jan.	1,080,000	648	952,000
1950	Feb.	1,036,000	653	919,000
1950	Mar.	1,209,000	663	1,090,000
1950	Apr.	998,000	660	895,000
1950	May	1,066,000	649	941,000
1950	June	900,000	640	784,000
1950	July	897,000	635	774,000
1950	Aug.	833,000	649	735,000
1950	Sept.	704,000	663	634,000
1950	Oct.	651,000	676	599,000
1950	Nov.	542,000	675	497,000
1950	Dec.	557,000	666	504,000
1951	Jan.	550,000	661	494,000
1951	Feb.	501,000	671	457,000
1951	Mar.	730,000	685	680,000
1951	Apr.	765,000	695	722,000
1951	May	675,000	687	631,000
1951	June	862,000	685	803,000
1951	July	945,000	686	881,000
1951	Aug.	945,000	681	874,000
1951	Sept.	723,000	679	667,000
1951	Oct.	709,000	683	658,000
1951	Nov.	561,000	674	514,000
1951	Dec.	707,000	674	648,000
1952	Jan.	1,104,000	678	1,019,000
1952	Feb.	1,092,000	695	1,031,000
1952	Mar.	1,424,000	710	1,374,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1952	Apr.	1,300,000	711	1,257,000
1952	May	1,443,000	709	1,391,000
1952	June	1,419,000	688	1,327,000
1952	July	1,263,000	650	1,116,000
1952	Aug.	1,296,000	628	1,106,000
1952	Sept.	1,321,000	599	1,076,000
1952	Oct.	1,234,000	573	961,000
1952	Nov.	1,172,000	568	905,000
1952	Dec.	1,303,000	689	1,221,000
1953	Jan.	1,198,000	698	1,136,000
1953	Feb.	1,020,000	692	960,000
1953	Mar.	947,000	704	907,000
1953	Apr.	808,000	701	770,000
1953	May	953,000	683	884,000
1953	June	956,000	676	878,000
1953	July	1,093,000	677	1,005,000
1953	Aug.	1,056,000	671	963,000
1953	Sept.	823,000	666	745,000
1953	Oct.	634,000	665	574,000
1953	Nov.	527,000	667	479,000
1953	Dec.	634,000	663	571,000
1954	Jan.	797,000	675	731,000
1954	Feb.	661,000	707	635,000
1954	Mar.	782,000	727	773,000
1954	Apr.	864,000	722	848,000
1954	May	1,015,000	715	986,000
1954	June	883,000	714	857,000
1954	July	1,000,000	714	971,000
1954	Aug.	982,000	715	955,000
1954	Sept.	755,000	715	733,000
1954	Oct.	636,000	715	619,000
1954	Nov.	638,000	717	621,000
1954	Dec.	659,000	722	647,000
1955	Jan.	734,000	733	731,000
1955	Feb.	598,000	755	614,000
1955	Mar.	733,000	788	785,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1955	Apr.	758,000	798	822,000
1955	May	791,000	796	856,000
1955	June	866,000	814	958,000
1955	July	963,000	799	1,047,000
1955	Aug.	849,000	809	933,000
1955	Sept.	693,000	808	762,000
1955	Oct.	499,000	801	543,000
1955	Nov.	369,000	794	399,000
1955	Dec.	286,000	788	306,000
1956	Jan.	317,000	791	341,000
1956	Feb.	349,000	794	377,000
1956	Mar.	628,000	807	689,000
1956	Apr.	684,000	817	760,000
1956	May	671,000	817	745,000
1956	June	787,000	825	883,000
1956	July	865,000	827	972,000
1956	Aug.	823,000	821	919,000
1956	Sept.	634,000	825	711,000
1956	Oct.	486,000	834	551,000
1956	Nov.	321,000	798	348,000
1956	Dec.	288,000	772	302,000
1957	Jan.	243,000	761	251,000
1957	Feb.	349,000	780	370,000
1957	Mar.	589,000	791	634,000
1957	Apr.	732,000	786	782,000
1957	May	645,000	775	680,000
1957	June	783,000	767	816,000
1957	July	891,000	766	928,000
1957	Aug.	817,000	763	847,000
1957	Sept.	661,000	754	678,000
1957	Oct.	503,000	744	508,000
1957	Nov.	781,000	726	771,000
1957	Dec.	1,005,000	692	946,000
1958	Jan.	1,285,000	681	1,190,000
1958	Feb.	565,000	680	522,000
1958	Mar.	1,345,000	666	1,218,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1958	Apr.	1,333,000	652	1,182,000
1958	May	1,013,000	639	880,000
1958	June	854,000	643	747,000
1958	July	930,000	642	812,000
1958	Aug.	867,000	640	755,000
1958	Sept.	714,000	641	622,000
1958	Oct.	610,000	643	533,000
1958	Nov.	623,000	642	544,000
1958	Dec.	753,000	645	660,000
1959	Jan.	677,000	649	598,000
1959	Feb.	593,000	656	529,000
1959	Mar.	690,000	671	630,000
1959	Apr.	832,000	674	762,000
1959	May	706,000	663	636,000
1959	June	797,000	659	714,000
1959	July	963,000	652	853,000
1959	Aug.	873,000	643	763,000
1959	Sept.	682,000	641	594,000
1959	Oct.	558,000	645	489,000
1959	Nov.	405,000	642	353,000
1959	Dec.	411,000	645	360,000
1960	Jan.	428,000	661	385,000
1960	Feb.	457,000	673	418,000
1960	Mar.	760,000	682	705,000
1960	Apr.	810,000	695	766,000
1960	May	740,000	693	697,000
1960	June	879,000	688	823,000
1960	July	986,000	688	922,000
1960	Aug.	868,000	688	812,000
1960	Sept.	639,000	687	597,000
1960	Oct.	490,000	690	459,000
1960	Nov.	397,000	689	372,000
1960	Dec.	322,000	692	303,000
1961	Jan.	379,000	699	361,000
1961	Feb.	453,000	702	433,000
1961	Mar.	742,000	709	714,000

Table 17.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 23, Colorado River below Parker Dam, Ariz.-Calif.*--Continued

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1961	Apr.	725,000	710	699,000
1961	May	705,000	704	674,000
1961	June	823,000	710	794,000
1961	July	900,000	711	870,000
1961	Aug.	710,000	707	682,000
1961	Sept.	606,000	710	585,000
1961	Oct.	412,000	705	395,000
1961	Nov.	319,000	704	306,000
1961	Dec.	202,000	703	193,000
1962	Jan.	334,000	705	320,000
1962	Feb.	374,000	713	362,000
1962	Mar.	692,000	723	680,000
1962	Apr.	757,000	731	752,000
1962	May	686,000	734	684,000
1962	June	778,000	732	775,000
1962	July	882,000	731	877,000
1962	Aug.	821,000	731	816,000
1962	Sept.	644,000	728	637,000
1962	Oct.	471,000	741	475,000
1962	Nov.	434,000	736	435,000
1962	Dec.	287,000	731	285,000
1963	Jan.	349,000	729	346,000
1963	Feb.	467,000	720	458,000
1963	Mar.	735,000	711	710,000
1963	Apr.	690,000	705	662,000
1963	May	708,000	699	673,000
1963	June	840,000	696	795,000
1963	July	933,000	689	874,000
1963	Aug.	819,000	684	761,000
1963	Sept.	630,000	680	583,000

[1]Monthly streamflow is summation of historical daily values.

Table 18.--*Monthly streamflow, flow-weighted dissolved-solids concentration, and dissolved-solids discharge for the record-extension period at site 24, Colorado River above Imperial Dam, Ariz.-Calif.*

[acre-ft/mo, acre-feet per month; mg/L, milligrams per liter; tons/mo, tons per month]

Year	Month	Streamflow[1] (acre-ft/mo)	Dissolved solids	
			Concentration (mg/L)	Discharge (tons/mo)
1940	Oct.	719,000	803	785,000
1940	Nov.	693,000	798	752,000
1940	Dec.	809,000	802	883,000
1941	Jan.	642,000	820	716,000
1941	Feb.	535,000	856	623,000
1941	Mar.	743,000	845	853,000
1941	Apr.	562,000	836	639,000
1941	May	1,150,000	828	1,295,000
1941	June	1,605,000	820	1,790,000
1941	July	965,000	810	1,062,000
1941	Aug.	1,192,000	745	1,207,000
1941	Sept.	1,444,000	730	1,434,000
1941	Oct.	1,505,000	730	1,494,000
1941	Nov.	1,671,000	722	1,639,000
1941	Dec.	2,010,000	734	2,005,000
1942	Jan.	1,876,000	756	1,929,000
1942	Feb.	1,590,000	759	1,640,000
1942	Mar.	1,476,000	760	1,525,000
1942	Apr.	1,080,000	764	1,122,000
1942	May	1,524,000	773	1,601,000
1942	June	1,465,000	771	1,535,000
1942	July	1,199,000	761	1,240,000
1942	Aug.	844,000	760	872,000
1942	Sept.	742,000	746	753,000

[1]Monthly streamflow is summation of historical daily values.

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